



MINISTERUL CERCETĂRII,
INOVĂRII ȘI DIGITALIZĂRII

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IN MEMORIAM
Mircea BERNIC

doctor of Science, university professor

1962 - 2021

Mircea Bernic started his activity at Technical University of Moldova in 1991, initially as assistant lecturer at the Department of Machinery and Apparats in the Food Industry, then at the Department of Technological Equipment in the Food Industry. In 1994 he became a senior lecturer, and in 2000 - associate professor at the Department of Industrial Technological Equipment. In 2005 he was elected as chief of the Department of Processes, Machines and Industrial Apparats, and in 2015, in the same position, he obtained the title of university professor. Since 2017, as vice-rector, he has kept the pulse on one of the most important university activities - research and doctoral activity.

Mircea Bernic was a Grand Laurate of EUROINVENT Invention Salon and he supported the exhibition as member of the International Jury.

Mircea Bernic remains a model of a man who dedicated himself to science and education of a new generation of engineers. He will remain in our hearts and souls as a kind colleague and dedicated researcher.

Coronavirus Disease 2019 (COVID-19)



How to protect yourself and others from infection

Follow these good practices



Always wash your hands with soap and running water when hands are visibly dirty. If your hands are not visibly dirty you can use an alcohol-based hand rub or soap and water.



Contact your nearest health care provider if you have fever and either cough or difficulty breathing, along with a history of travelling to one of the epidemic countries.



Cover your mouth and nose with disposable tissue when coughing or sneezing and dispose of tissue immediately after use.



Cough or sneeze into your upper sleeve or bended arm if a tissue is not available.

Things to avoid



Avoid close contact with people who have travelled from the areas experiencing an outbreak or those who show cold or flu-like symptoms.



Avoid direct unprotected contact with live farm or wild animals, as well as surfaces in contact with animals.



Avoid eating or drinking uncooked animal products, including raw meat, eggs and milk.



Avoid eating animals that have died of disease.





Gheorghe Asachi Technical University of Iasi

The *Gheorghe Asachi* Technical University of Iasi (TUIASI) has the oldest tradition in the engineering field of education in Romania. In 1813 the scholar Gheorghe Asachi established the first school for geodesists and civil engineers considered to be the nucleus of the technical higher education in Iasi. Currently, the *Gheorghe Asachi* Technical University of Iasi has 11 faculties and 4 departments that offer educational and doctoral programmes for more than 13400 students in 61 engineering specializations, 73 *Master of Science* programs and a doctoral school with 13 domains.

Besides its educational mission, the *Gheorghe Asachi* Technical University of Iasi has an important research dimension, having many centers and laboratories for scientific research. These centers activate in different fields, within national and international research grants, research contracts with industry or governmental organizations, their activities placing our university in the Romanian top of scientific research.

The constant focus on interdisciplinary research, on innovation and knowledge transfer, as well the quality of the research staff and their commitment for excellence provided a constant dynamics of research activities and the recognition and visibility of our university. The increased trend observed in the number of research contracts, published papers in peer reviewed international journals and conference proceedings, books, international co-operation grants, as well as joint Ph.D. supervision with well-known European universities contribute to the continuous appreciation of our university as a successful research and innovation institution able to provide proactive relationships with industry and public services and a contributor to local and regional development. Only in the last academic year, our university has participated in more than 350 national and international projects as well as research contracts.

Our research profile is directed towards high-tech engineering areas, which enable our research staff to have a very innovative approach towards research problems. Innovation in our university comes as sum of experience provided by our 194 of senior researchers, PhD supervisors and the enthusiasm brought by our more than 1000 PhD. students. This focus on scientific research in high-tech areas and cutting-edge technologies is proven by the outstanding innovation capabilities of our staff members.



Alexandru Ioan Cuza University of Iași

Alexandru Ioan Cuza University of Iași is the oldest higher education institution in Romania. Since 1860, the university has been carrying on a tradition of excellence and innovation in the fields of education and research. With over 25,000 students and 800 academic staff, the university enjoys high prestige at national and international level and cooperates with over 250 universities world-wide. Alexandru Ioan Cuza University is a member of some of the most important university networks and associations: the Coimbra Group, EUA - European University Association, Utrecht Network, International Association of Universities, University Agency of Francophony and the Network of Francophone Universities (RUFAC). These partnerships offer us the opportunity to experience changes, to have student and teacher mobilities and joint academic, research and strategy programmes.

Alexandru Ioan Cuza University became the first student-centered university in Romania, once the Bologna Process was implemented. We believe in the power of individual choice and customized education. Thus, we became the first Romanian university to offer students the opportunity to choose both a major and a minor field of study, in a combination at their choice, that best suits their career goals.

Research at our university is top level. For many years, UAIC is placed on top in the national research ranking, having also several fields of research in top 500 Shanghai. Our teachers are involved in over 400 national and international research projects, with the logistic support of 24 research centres. Striving for excellence, the university takes unique initiatives to stimulate research quality, to encourage dynamic and creative education and to involve its best students in academic life.

Today, with its fifteen faculties and an Institute of Multidisciplinary Research, Alexandru Ioan Cuza University offers to all inquisitive young minds a large diversity of academic programmes which are aimed to open the way towards their personal fulfilment and social recognition. In a world characterized by rapid and profound changes, where knowledge is the most valuable asset, Alexandru Ioan Cuza University aims to strengthen the flexibility of learning, to create opportunities for the intellectual and professional development of its students, to assist quality research and to contribute to the society's cultural and economic growth.

THE ORGANIZERS

ROMANIAN INVENTORS FORUM

Romanian Inventors Forum (FIR), as a professional association of dialog and representation, has the purpose to support, stimulate, develop and valorize the scientifically, technically and artistically creativity. Under the aegis of FIR, Romanian Inventors have participated at more than 80 World Invention Exhibitions, where their creations have been awarded with orders, prizes and medals. The performance of Romanian inventics is renowned in the whole world, which is the reason why FIR became member in different international clubs, associations and federations, with special contributions.

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FORUMUL INVENTATORILOR ROMÂNÎ

Forumul Inventatorilor Români (FIR), este o asociație profesională de dialog și reprezentare a inventicii românești în context internațional, care are drept scop sprijinirea, stimularea, dezvoltarea și valorificarea activităților de creație științifică, tehnică și artistică. Sub egida FIR, inventatorii români au participat la peste 80 de saloane mondiale de invenții, creațiile lor fiind apreciate cu numeroase ordine, premii și medalii. Performanța inventicii românești este recunoscută în întreaga lume, motiv pentru care FIR a devenit membru a diverselor cluburi, asociații și federații internaționale de profil, unde are contribuții deosebite.

THE ORGANIZERS

EUROPE DIRECT IAȘI

Association for Ecology and Sustainable Development is the host for Europe Direct Information Centre Iași. The EUROPE DIRECT Information Centre Iași assures the European information transfer to Romanian citizens and the feedback to the E.C., enhancing dialog between European institutions and the common citizen concerning to all European policies and the personal expectations.



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EUROPE DIRECT IAȘI

Asociația pentru Ecologie și Dezvoltare Durabilă este structura gazdă a Centrului EUROPE DIRECT Iași. Acesta asigură transferul informației către cetățenii români și feed-back-ul către Comisia Europeană, facilitând dialogul între instituțiile europene și cetățeanul de rând, referitoare la toate problemele privind politicile europene și așteptările individuale.

THE ORGANIZERS

„GHEORGHE ASACHI” TECHNICAL UNIVERSITY OF IASI Faculty of Materials Science and Engineering

“Gheorghe Asachi” University of Iasi is an excellent choice for the highschool graduates, who wish to embrace a carrier in the attractive field of engineering. The eleven faculties of the university are well equipped and have renowned specialists.

The Faculty of Materials Science and Engineering at the "Gheorghe Asachi" Technical University of Iasi has the mission to train specialists for the materials engineering, mechanical engineering and industrial engineering fields, through a 4-year programme (B.Sc.), Master Courses and Ph.D. Programmes. Also, our faculty is involved in the scientific research programmes, as well as in life-long education programmes for professionals that wish to extend their expertise. Besides the formative activity, research in various fields, focused to multi-disciplinary national and international co-operation is highly valued.

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UNIVERSITATEA TEHNICĂ “GHEORGHE ASACHI” IAȘI Facultatea de Știința și Ingineria Materialelor

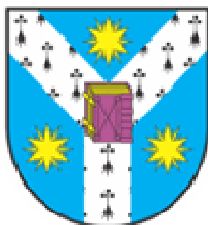
Universitatea Tehnică din Iasi este o alegere excelenta pentru absolventii de liceu care s-au hotarat sa imbratiseze o cariera in domeniul provocator al ingineriei. Cele unsprezece facultati ale universitatii sunt dotate cu laboratoare si echipamente de ultima ora, unde isi desfasoara activitatea specialisti recunoscuti pe plan european si international.

Facultatea de Știința și Ingineria Materialelor din cadrul Universității Tehnice "Gh. Asachi" din Iași, are ca misiune pregătirea specialiștilor pentru domeniul ingineriei materialelor, ingineriei mecanice și ingineriei industriale, prin programe de licență (4 ani), masterat și doctorat. De asemenea, facultatea este implicată în proiecte de cercetare și în programe de perfecționare pentru specialiștii. Valoarea personalul academic din cadrul facultății aduce o notă distinctivă predării ingineriei materialelor. Pe lângă activitatea de formare și de cercetare în diverse domenii de activitate, apreciable sunt și cooperările multi-disciplinare naționale și internaționale.

THE ORGANIZERS

ALEXANDRU IOAN CUZA
UNIVERSITY OF IASI

The Alexandru Ioan Cuza University of Iași (UAIC) is the oldest higher education institution in Romania. Since 1860, the university has been carrying on a tradition of excellence and innovation in the fields of education and research. With over 25.000 students and 800 academic staff, the university enjoys a high prestige at national and international level and cooperates with over 250 universities world-wide. The Alexandru Ioan Cuza University became the first student-centered university in Romania, once the Bologna Process was put into practice. Research at our university is top level. For many years, UAIC is placed on top in the national research ranking, having also several fields of research in top 500 Shanghai. Striving for excellence, the university takes unique initiatives to stimulate research quality, to encourage dynamic and creative education and to attract the best students to academic life.



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Universitatea "Alexandru Ioan Cuza" este cea mai veche instituție de învățământ superior din România continuând, din anul 1860, o tradiție a excelenței și inovației în educație și cercetare. Cu peste 25.000 de studenți și 800 de cadre didactice, universitatea se bucură de un important prestigiu la nivel național și internațional, având colaborări cu peste 250 de universități din străinătate. Universitatea "Alexandru Ioan Cuza" este membră a unora dintre cele mai importante asociații și rețele universitare: Grupul Coimbra, EUA - Asociația Europeană a Universităților, Rețeaua Utrecht, IAU - Asociația Internațională a Universităților, AUF - Agenția Universitară a Francofoniei și RUFAC - Rețeaua Universităților Francofone. Acestea permit schimbul de experiență, mobilități ale studenților și profesorilor și realizarea în comun a unor programe academice, de cercetare sau strategice.

THE ORGANIZERS

„GRIGORE T. POPA” UNIVERSITY OF MEDICINE AND PHARMACY OF IASI

Universitatea de Medicină și Farmacie „Grigore T. Popa” din Iași a fost fondată în 1879, fiind una dintre cele mai vechi și prestigioase instituții de învățământ superior din România. UMF Iași face parte din Grupul celor 12 Universități de Cercetare Avansată și Educație. Toate programele de studii universitare de licență și masterat aparținând celor patru facultăți – Facultatea de Medicină, Facultatea de Medicină Dentară, Facultatea de Farmacie și Facultatea de Bioinginerie Medicală – sunt acreditate de Asociația Română de Asigurare a Calității în Învățământul Superior (ARACIS) iar managementul educațional instituțional este certificat de forul european de evaluare European University Association (EUA) și de Consiliul Internațional al Decanilor Facultăților de Medicină de Expresie Franceză (CIDMEF). Universitatea este membră a Agenției Universitare Francofone (AUF) și clasată în Top Shanghai 500, Times Higher Education, Top 25 U-Multirank. Peste 9,000 de studenți din peste 70 de țări studiază în cele patru facultăți ale universității, ceea ce face ca Universitatea de Medicină și Farmacie „Grigore T. Popa” din Iași să fie cea mai cosmopolită instituție de învățământ superior din sud-estul Europei. Reputația internațională de care se bucură UMF Iași este întărită și de prezența absolvenților Universității în renumite spitalele ale lumii, precum și în cele mai importante centre de cercetare. Raportul de evaluare al European University Association (EUA) - Institutional Evaluation Programme (IEP) califică Universitatea de Medicină și Farmacie “Grigore T. Popa” din Iași drept lider regional și național în domeniului învățământului superior.



**GRIGORE T. POPA UNIVERSITY OF
MEDICINE AND PHARMACY IASI**

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The „Grigore T. Popa” University of Medicine and Pharmacy of Iasi was founded in 1879 and is one of the oldest and most prestigious institutions of higher education in Romania. The University is proud to be part of the 12 Universities of Advanced Research and Education in our country. The four faculties - Faculty of Medicine, Faculty of Dental Medicine, Faculty of Pharmacy and the Faculty of Medical Bioengineering - are accredited by the Romanian Association for Quality Assurance in Higher Education (ARACIS) and its institutional management is certified by the European forum for evaluation - European University Association (EUA) and by Conférence Internationale des Doyens et des Facultés de Médecine d'Expression Francaise (CIDMEF). The university is member of Agence Universitaire de la Francophonie (AUF) and high ranked in Top Shanghai 500, Times Higher Education, Top 25 U-Multirank. Over 9,000 students from over 70 countries around the world study in the four faculties of the University, which makes "Grigore T. Popa" University of Medicine and Pharmacy of Iasi the most cosmopolitan institution of higher education in south-eastern Europe. The University's international reputation is also sustained by the presence of the graduates in important hospitals in the world and even in the most important research centers. The evaluation report of the European University Association (EUA) - Institutional Evaluation Programme (IEP) describes the "Grigore T. Popa" University of Medicine and Pharmacy as a regional and national leader in higher education.

THE ORGANIZERS

The National Institute for Research and Development in Environmental Protection (INCDPM)

INCDPM is an institution with over 60 years of experience in the environmental protection field. INCDPM, through its activities, that involve the concept of sustainable development, ensures the development of win-win preventive solutions, adopted in an environmental friendly manner. The development of new monitoring and evaluation methods for various fields (environmental quality, habitats - avifauna and ichthyofauna) generates, develops and maintains the necessary knowledge for the elaboration of solutions that ensure the conservation status of nature and biodiversity. The institute also uses the most advanced techniques and research equipment, and develops partnerships with prestigious international institutions and with public and private national institutions. The research portfolio includes assessing and reducing the impact of natural and technological hazards, assessing climate change impact, numerical simulations and forecasts, renewable energies, etc.



INCDPM
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Institutul Național de Cercetare și Dezvoltare pentru Protecția Mediului (INCDPM), reprezintă o instituție cu peste 60 de ani de experiență în domeniul protecției mediului. INCDPM, prin intermediul activităților pe care le desfășoară, coroborate cu conceptul de dezvoltare durabilă, asigură elaborarea unor soluții preventive de tip câștig-câștig, prietenoase cu mediul. Astfel, prin dezvoltarea de metode de monitorizare și evaluare pentru diverse domenii (calitatea mediului, habitate-avifaună și ihtiofaună) se generează, dezvoltă și se mențin cunoștințele necesare elaborării de soluții care să asigure starea de conservare a naturii și biodiversității. De asemenea, institutul utilizează cele mai avansate tehnici și echipamente de monitorizare, având direcții și arii de cercetare conexe, dezvoltând parteneriate cu instituții de prestigiu din străinătate și instituții naționale, din sectorul public și privat. Portofoliul de cercetare cuprinde evaluarea și reducerea impactului hazardelor naturale și tehnologice, evaluarea impactului schimbărilor climatice, simulări și prognoze numerice în domeniu, energii regenerabile etc. Pe lângă acestea, monitorizarea traseelor de migrare a sturionilor, generează o bază de date unică la nivel mondial.

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- **Romanian Inventors Forum**
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- **ARHEOINVEST Platform, Alexandru Ioan Cuza University of Iasi**
- **Centre of Excellence Geopolymer and Green Technology (CEGeoGTech), Universiti Malaysia Perlis (UniMAP)**
- **Department of Physics, Czestochowa University of Technology, Czestochowa, Poland**

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- **International Federation of Inventors' Associations - IFIA**
- **World Invention Intellectual Property Associations – WIIPA**

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Romanian Inventors Forum &
The “Gheorghe Asachi” Technical University of Iasi, Romania

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EXHIBITS CLASSIFICATION

1	Environment - Pollution Control
2	Energy and sustainable development
3	Agriculture and Food Industry
4	Medicine – Health Care – Cosmetics
5	Industrial and laboratory equipments
6	Mechanical Engineering – Metallurgy
7	Buildings and Materials
8	Aviation, car industry and transportation
9	Chemical and Textile Industry
10	Information Technology and Communication
11	Printing and advertising
12	Safety, protection and rescue of people
13	Sports, Games and Leisure
14	Other
X	Innovative Research

P R E A M B L E

The Inventions' exhibitions and shows, national or international ones, represent one of the exogenous determining factors, with multiple effects on the creative process. The system is one of the most encouraging, an interactive manner to disseminate inventions, a competitive background generating innovative ideas, while as an evaluative scientometric system, allow attracting the potential applicants or inventions' owners. It is the best medium for negotiating, conveying or transferring inventions, the place where the complete new results are exhibited.

The past 30 years experience, a time in which many Romanian inventors took their new releases in international exhibitions and were rewarded with numerous medals, orders, distinctions and diplomas, situated each time Romania, in unofficial statistics, on the first places. The honours list of the Romanian inventions create a paradoxal result of the two very close fields, the technological or applied research and on the other hand the fundamental or scientifically research. If the scientific output, represented by papers published in ISI Thomson acknowledged journals, situate Romania dragging behind the second league, in compensation, the patented awarded inventions turn it in one of first countries. So much more we should focus especially on the organizing of this kind of shows which offer real opportunities to many inventors to see their dreams come true by putting their results into a competitive-interactive system of evaluation.

Interdisciplinarity of inventics as a science is approached today in a connected, integrated way (education-research-production), with both educative and research functions, carrying great attractivity for the young generation and increasing standards both for inventors and for their products. In this respect, it is necessary to pay a special attention to the inventics schools, as they have, beside the role to form characters, professions, as well as vocations and talents, the mission to stimulate the technical creativity. We should underline the fact that after 1990 we noticed a slight lowering of the Iași inventics school contribution in its aim to form young inventors. Meetings and workshops in the inventions exhibitions should put light on and find

solutions to turn the inventics schools in institutions and to improving and harmonizing the laws regarding the intellectual propriety and the industrial one.

Another serious, upsetting and alarming aspect which I want to put light on is the fact that about 60 to 70% of the Romanian specialists with international output accepted to work abroad, where they are appreciated and stimulated according to their value. We should as well attract them and offer the opportunity to reevaluate them selves at home and participate to such representative competitions.

A peculiar notice is the fact that many Romanian inventors of success, internationally acknowledged, are invited in organizing committees, in international juries and are active members or founders of associations or professional clubs. The Romanian delegations created a tradition in the international exhibitions, to organize a Romanian event, the so-called “The Romanian Inventors Day”, where they present in a festive atmosphere their inventions, their contributions and offer diplomas and small gifts to the hosts and the other participants.

This edition of EUROINVENT sent invitations to inventors associations from many countries. A big number of institutions and individual inventors are participating from Romania, a remarkable fact being to have here many young inventors (from schools or universities) as well as older inventors. This show is exhibiting more than 620 inventions and research projects from 32 countries.

With pleasure and gratitude, acknowledgements to all the persons, institutions and organizations who participate to EUROINVENT, to the partners, Romanian Inventors Forum, EUROPE-DIRECT Iasi, “Gheorghe Asachi” Technical University of Iași and “Alexandru Ioan Cuza” University of Iasi and all the partners for all their support and efforts to organize the events.

Prof. Ion SANDU – Honorary President of Romanian Inventors Forum

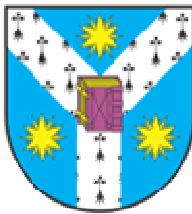
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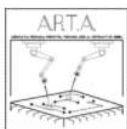
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Cine suntem?

Fundația Dan Voiculescu pentru Dezvoltarea României este o organizație non-guvernamentală, apolitică, înființată în anul 1990, care prin activitatea sa, urmărește valorificarea capitalului uman prin descoperirea, antrenarea și promovarea inteligenței și a excelenței

Ce facem?

Susținem Excelența – organizația noastră a susținut și susține tineri extraordinari din diverse domenii de activitate

Antrenăm Inteligența – peste 5000 de copii au participat, de-a lungul timpului, la cursurile gratuite organizate de noi

Promovăm inovația – oferim inventatorilor și cercetătorilor români sprijinul de care au nevoie pentru a-și continua cercetările





30

de ani de activitate

- * peste 6.000 de tineri cu performanțe remarcabile au beneficiat de programele FDVDR, numai în ultimii 7 ani
- * 2.000 de copii, cu vârsta între 4 și 18 ani, au participat la cursurile FDVDR, în ultimii 2 ani
- * mai mult de 200 de spectacole, concerte și evenimente cultural-educative, doar în ultimii 3 ani

Membru al European Council for the High Ability

- * peste 50 de programe și proiecte pe termen mediu și lung, în domeniul educațional, cultural și social, unele dintre acestea în curs de desfășurare

5.000.000 €

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- * premiera și susținerea actorilor tineri în cadrul evenimentului Gala Teatrului Tânăr

Membru al World Council for Gifted and Talented Childern

2000

de premii

- * cel mai mare premiu individual din istoria recentă a României, în valoare de 300.000 RON, decernat, în 2007, inventatorului Justin Capră
- * premii pentru inventatorii români care participă la Euroinvent și Salonul Auto București
- * recunoașterea adevăratelor valori naționale prin acordarea de premii de excelență pentru: Radu Beligan, Gabriella Ficz sau Tudor Gheorghe



Dezvoltarea și evoluția unei societăți moderne depind de accesul la tehnologie, informație și cercetare științifică. Din acest motiv, Senatul Științific al Fundației Dan Voiculescu pentru Dezvoltarea României susține cercetarea și inventica, sprijinind cercetătorii și inventatorii români și nu numai.

Prin activitatea noastră, încurajăm orice demers științific care contribuie la creșterea calității vieții, acordând o atenție deosebită cercetării științifice din domeniile alimentar și medical.

Având alături, în Senatul Științific al FDVDR, personalități remarcabile ale cercetării românești, ne dorim să oferim inventatorilor și cercetătorilor un mediu propice transformării ideilor și conceptelor de cercetare în proiecte aplicate în economia reală.

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INVENTION and INNOVATION
lie at the heart of our work



Our TECHNOLOGY TRANSFER
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Our **MEDIA** recites our past,
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INVENTION EXHIBITIONS
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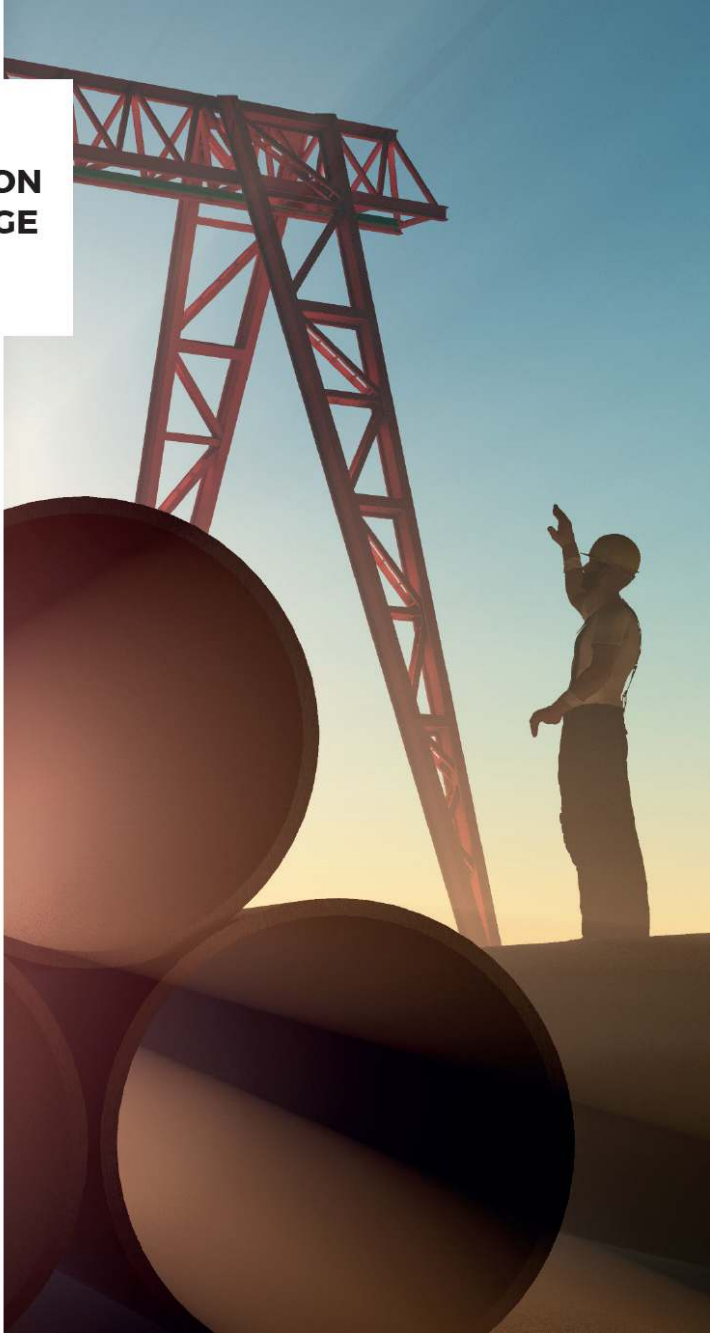
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HOFIGAL®

HOMEOPATIE - FITOTERAPIE - GALENICE

„Hofigal” este unul dintre cele mai faimoase nume de marca pentru produsele homeopate, gemoderivate și fitoterapice galenice din România, conditionate sub forma de medicamente, suplimente alimentare, produse cosmetice, ceaiuri.

„Hofigal” este o societate pe acțiuni cu capital social privat exclusiv românesc. Suprafața utilă a companiei este de 35 hectare.

În întreaga companie lucrează aproximativ 400 angajați, fiind permanent motivați spre o perfecționare profesională și personală continuă; aceștia își desfășoară activitatea acoperind domenii diverse: *Agricultura, Planificarea Producției, Producție, Aprovizionare, Logistica și Distribuție, Vânzări, Marketing, Terapii Noi, Managementul Calității Totale, Controlul Calității, Relații cu Autoritățile, Cercetare & Dezvoltare, Resurse Umane, Juridic, Administrativ, Întreținere, I.T.* - totuși alcătuind un sistem.

„Hofigal Export Import” S.A. este o companie specializată în fabricarea produselor exclusiv naturale, având ca caracteristic faptul că își produce majoritatea materiilor prime folosite în serele și pe terenurile agricole proprii.

Materiile prime active folosite se obțin în condiții controlate, în cadrul unei agriculturi strict ecologice.

Diversitatea portofoliului și calitatea produselor impun „Hofigal” ca unul dintre cei mai puternici concurenți al unor firme, deja cu tradiție, din Franța, Italia și Elveția.

Un punct forte privind portofoliul „Hofigal” îl reprezintă faptul că toate produsele sunt obținute pe baza unor rețete și tehnologii proprii, brevetate în țară și reprezintă premieri mondiale absolute.

Obiectivele majore ale companiei sunt de a aplica condițiile și măsurile privind asigurarea calității, eficacității și siguranței tuturor produselor, precum și obținerea de ingrediente farmaceutice active de natură vegetală garantată ce corespund în totalitate normelor ecologice internaționale în vigoare. Toate etapele procesului, de la cultivare (pre-procesare, procesare plantă), până la faza de produs finit sub formă de medicamente, suplimente alimentare, cosmetice, ceaiuri, respectă cerințele internaționale privind cultivarea și recoltarea plantelor, precum și Regulile GMP. Din punct de vedere al calității produselor, indiferent de etapă, acestea îndeplinesc cerințele Farmacopeei Europene, completate cu cele ale altor farmacopei de circulație internațională și ale condițiilor de calitate proprii filosofiei Hofigal.

Laboratoarele de control al calității produselor sunt dotate cu echipamente moderne, conforme cerințelor referențialelor de mai sus și operează cu un personal instruit și cu experiență, în care toate materiile prime procurate sau proprii, controalele interfațate pe parametri critici și produsele finite sunt analizate.

Toate liniile de fabricație respectă cerințele GMP internaționale în vigoare:

- fluxul de fabricatie „Forme Solide Dozate” (comprimate, capsule, capsule filmate);
- fluxul de fabricatie „Solutii de Uz Intern/Extern”;
- fluxul de fabricatie „Extracte Vegetale”;
- fluxul de fabricatie „Supozitoare si Ovule, Cosmetice monodoze”;
- fluxul de fabricatie „Ceaiuri”;
- fluxul de fabricatie „Cosmetice, Semisolide”

Echipamentele de fabricatie, de masura si control sunt de fabricație occidentala si de ultima generație.

Produsele portofoliului Hofigal reprezinta premiere pe plan mondial: *cea mai mare concentrație de β-caroten in ulei de cătina, de proteina in Spirulina, Coenzima Q10 in ulei de cătina.*

Aceste produse sunt rezultatul unei indelungate si sustinute activitati de cercetare sau dezvoltare desfășurate in laboratoarele noastre de către colectivul propriu de cercetători, doctori in științe (farmacisti, ingineri chimisti, medici, biologi, microbiologi, biochimisti, chimisti, agronomi). Acest colectiv colaboreaza cu cele mai importante instituții de învățământ superior si Institute Nationale de Cercetare si Dezvoltare din Romania.

Urmare a acestor activități nomenclatorul de produse realizate de „*Hofigal*” a crescut de la 3 produse in anul 1990, la peste 450 in 2008.

Preocupati de studiul si introducerea de Terapii Noi, recent am adaugat un element novator portofoliului Hofigal: gama **Gemoderivate**, sub forma de extracte hidroglicerolcoolice in dilutie 1:10, obtinute din tesuturi vegetale proaspete aflate in faza de crestere (muguri, boboci, amenti, mladite, scoarta ramurilor tinere, scoarta interna a radacinilor, seva, seminte). Acestea sunt formate din tesuturi embrionare care concentreaza intreaga energie si informatie genetica a plantei, fiind mai bogate in vitamine, oligoelemente, minerale, acizi nucleici sau factori de crestere decat planta insasi.

Exemplificam gemoderivatele 1 DH din: *afin negru, alun, arin negru, artar de campie, brad alb, castan salbatic, carpen alb, catina rosie, coacaz negru, dud negru, fag, frasin, ienupar, lemn cainesc, liliac, maces, mestecan alb si pufos, mur, nuc, paducel, pin, plop, porumb, porumbur, rozmarin, salcie, sanger, stejar, tei argintiu, ulm, vita de vie, zmeur.*

Valorificarea materialului vegetal obtinut de firma noastra are in vedere si domenii adiacente, deja aflate in studiu, cum ar fi: supernucleele pentru zootehnie (polivitamine), insectofungicide naturale vegetale netoxice.

Produsele noastre pot fi găsite in toate farmaciile din Romania.

Totodata Hofigal Export Import S.A. are si o rețea proprie de farmacii. In cadrul acestora produsele Hofigal se vând fără adaos comercial, adică cu costul de producție, in timp ce adaosul comercial pentru celelalte produse farmaceutice este mai mic decât in toate celelalte farmacii, cu excepția produselor cu preț fixat de Ministerul Sănătății.

In incinta fiecarei farmacii Hofigal exista amenajat un cabinet de consultanta, in cadrul căruia medici autorizati, angajati ai Hofigal, cu pregătire atât in domeniul alopatiei, fitoterapiei cat si al homeopatiei, acorda gratuit consiliere oricărei persoane interesate de portofoliul Hofigal.

O initiativa a firmei a fost infiintarea Complexul de terapie naturală “Alexandra”

Prin întreaga sa activitate „*Hofigal*” este promotorul celor mai înaintate si moderne concepte legate de fabricatia nepoluanta. De la materiile prime pana la produsele finite, totul este natural, curat si nepoluat.

Nici un produs Hofigal nu are contraindicații sau efecte adverse !

„Natura nu minte niciodata...”

Mihai Eminescu

București, Intrarea Serelor nr.2, sector 4;

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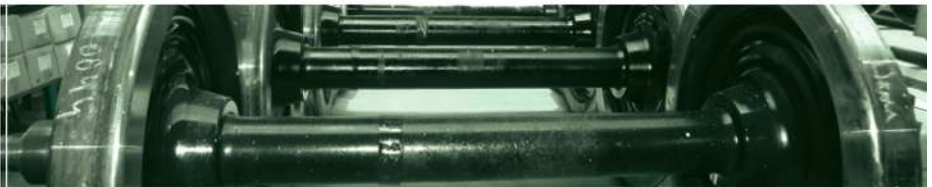
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Atribuții specifice ale O.S.I.M. conform obiectului său de activitate:

- înregistrează și examinează cererile din domeniul proprietății industriale, eliberând titluri de protecție care conferă titularilor drepturi exclusive pe teritoriul României;
- este depozitarul registrelor naționale ale cererilor depuse și ale registrelor naționale ale titlurilor de protecție acordate pentru invenții, mărci, indicații geografice, desene și modele, topografii de produse semiconductoare;
- editează și publică Buletinele Oficiale de Proprietate Industrială pe secțiunile: brevete de invenție, mărci și indicații geografice, desene și modele;
- editează și publică fasciculele brevetelor de invenție;
- administrează, conservă și dezvoltă, întreținând o bază de date informatizată;
- efectuează, la cerere, servicii de specialitate în domeniul proprietății industriale;
- desfășoară cursuri de pregătire a specialiștilor în domeniul proprietății industriale;
- atestă și autorizează consilierii în domeniul proprietății industriale, ținând evidența acestora în registrul național.



State Office for Inventions and Trademarks

Str. Ion Ghica Nr.5 Sector 3, Bucuresti
Tel.021.3060800-29; Fax:021.312.38.19; office@osim.ro; www.osim.ro

The State Office for Inventions and Trademarks (OSIM) operates as a specialized body of the central public administration, having sole authority in Romania to ensure the protection of industrial property, in accordance with national law and the provisions of international conventions and treaties.

Specific responsibilities of the O.S.I.M. according to its object of activity:

- registers and examines the applications in the field of industrial property, issuing protection titles that confer to the holders exclusive rights on the Romanian territory;

- is the depositary of the national registers of the submitted applications and of the national registers of the protection titles granted for inventions, trademarks, geographical indications, designs, topographies of semiconductor products;

- edits and publishes the Official Bulletins of Industrial Property on the sections: patents, trademarks and geographical indications, designs;

- edits and publishes the bundles of patents;

- manages, preserves and develops, maintaining a computerized database;

- performs, upon request, specialized services in the field of industrial property;

- conducts training courses for specialists in the field of industrial property;

- certifies and authorizes the advisers in the field of industrial property, keeping their records in the national register.



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E-mail: office@agepi.gov.md URL: www.agepi.gov.md www.facebook.com/AGEPI/

The State Agency on Intellectual Property of the Republic of Moldova (AGEPI) is an administrative central authority subordinated to the Government, responsible for promoting and implementing activities in the field of legal protection of intellectual property.

Through AGEPI you can effectively protect your intellectual property (IP) in the territory of the Republic of Moldova:

Inventions, plant varieties, topographies of integrated circuits, product and service trademarks, industrial designs, geographical indication, appellations of origin, traditional specialties guaranteed;

Literary, artistic, scientific works, computer programs and other objects of copyright and related rights.

AGEPI issues titles of protection for IP objects, provides information and legal advice about protection and enforcement of IP rights, publishes the Official Bulletin of Intellectual Property (BOPI), promotes and propagates intellectual property, organizes the attestation of patent attorneys, conducts trainings and professional development courses, provides IP pre-diagnosis and other related services.

Since 2015, it is possible to validate European patents in the Republic of Moldova through the European Patent Office (EPO). The single procedure for issuing European patents provides for simpler and more cost-effective protection of inventions in the EPO Member States but also in extension and validation states, including in the Republic of Moldova.

AGEPI services are provided according to the Quality Management System ISO 9001:2015, which ensures a quality according to international standards.



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Agenția de Stat pentru Proprietatea Intelectuală a Republicii Moldova (AGEPI) este o autoritate administrativă centrală din subordinea Guvernului, responsabilă de promovarea și realizarea activităților în domeniul protecției juridice a proprietății intelectuale.

Prin intermediul AGEPI vă puteți proteja eficient proprietatea intelectuală (PI) pe teritoriul Republicii Moldova:

Invenții, soiuri de plante, topografiile ale circuitelor integrate, mărci de produse și de servicii, desene și modele industriale, indicații geografice, denumiri de origine, specialități tradiționale garantate;

Opere literare, artistice, științifice, programe pentru calculator, alte obiecte ale dreptului de autor și drepturilor conexe.

AGEPI eliberează titluri de protecție a obiectelor de PI, informează și oferă consultații juridice ce țin de protecția și realizarea drepturilor de PI, editează Buletinul Oficial de Proprietate Intelectuală (BOPI), promovează și popularizează proprietatea intelectuală, organizează atestarea mandatarilor autorizați, cursuri de instruire și perfecționare a specialiștilor în domeniu, acordă servicii de prediagnoză a PI și alte servicii aferente.

Din 2015 este posibilă validarea brevetelor europene pe teritoriul Republicii Moldova prin intermediul Oficiului European de Brevete (OEB). Procedura unică de eliberare a brevetelor europene asigură obținerea printr-o modalitate mai simplă și cu mai puține costuri a protecției invențiilor în statele membre ale OEB, dar și în statele în extindere și validare, inclusiv în Republica Moldova.

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World Invention Intellectual Property Associations

Introduction

In 2010, it was founded by Mr. Hsieh Hsin-Ming. At the moment, 50 member countries and partners have joined the "WIIPA Family" with the goal of promoting invention, innovation and intellectual property rights around the globe.

Founder

Since 1993, Mr. Hsieh Hsin-Ming has formed "TIIPA" Successfully, opened up a way for Taiwan's products to be in line with international standards and also laid the foundation for the establishment of WIIPA.

History

In 2000, Mr. Hsieh Hsin-Ming felt that the main axis of TIIPA is limited to Taiwan. With a vision to gain access in the international stage, he dedicated his time and effort to gather transnational forces to put his vision at work.

Fueled with a vibrant ideology, he continued to open doors of opportunities for young and talented inventors to a global level and thrived on gaining international attention for the establishment of WIIPA as a multinational organization.

Our Goal

WIIPA upholds the spirit of globalization and extends its vision across the globe. With technology, using network interface allows a fluid communication pattern for a more innovative exchange of ideas and information among stakeholders.

Members

WIIPA member states span across continents. The member countries in the "WIIPA Family" currently has 50 member states and partners.

WIIPA put great emphasis on "common concept" and "substantial participation". WIIPA members have certain privileges other associations aspire for. One of them is taking part in WIIPA meetings, conferences as well as exchange activities from time to time to have a full understanding and mastery of the development and complexity of international inventions.



World Invention Intellectual Property Associations

WIIPA Family Create Your Minds Explore Your Life



www.wiipa.org.tw



Romanian Inventors Forum



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Romanian Inventors Forum (FIR) is a professional association which aims to support, stimulate the development and valorization of scientific and technical creative activities, and cultural - artistic, but also copyright problems of its members, diversification of research and technological development, design, scientific investigation, micro-production etc.

Research and development institution **certified** by the National Authority for Scientific Research (ANCS), according to HG. 551/2007, Decision ANCS no. 9708/29.07.2009.

FIR was established in 2003 by a group of university professors, elite inventors and researchers from the University Center in Iasi.

www.afir.org.ro



Universiti Malaysia Perlis (UniMAP) is Malaysia's 17th public institution of higher learning. It was approved by the Malaysian Cabinet on May 2001. Originally known as Kolej Universiti Kejuruteraan Utara Malaysia (KUKUM), or Northern Malaysia University College of Engineering, it was renamed as Universiti Malaysia Perlis (UniMAP) in February 2007. The first intake consisted of 116 engineering students who started classes on June 2002. Currently, UniMAP has approximately 15,000 students and a workforce of more than 1,900 academic and non-academic staff members. It offers 21 undergraduate programs that lead to Bachelor in Engineering, one undergraduate programs that leads to an Engineering Technology degree and two undergraduate programs that lead to a Bachelor in Business. We also offer six Diploma in Engineering programs and 13 postgraduate programs that lead to the Master of Science in Engineering and PhD degrees.



Center of Excellence Geopolymer & Green Technology (CEGeoGTech) lead by Vice Chancellor Universiti Malaysia Perlis (UniMAP), Professor. Dr. Kamarudin Hussin. CEGeoGTech located at the School of Materials Engineering, Kompleks Pusat Pengajian Jejawi 2, Taman Muhibbah, 02600 Arau, Perlis. CEGeoGTech has been established on July 2011 with the intention to induce innovation in green material technology among researchers in Universiti Malaysia Perlis. CEGeoGTech are able combining their expertise and skills in various fields to support the academic structure in the generation of human capital that contributes to the development of high quality research. This center also can become a pillar of academic activities, especially regarding research, development and innovation. CEGeoGTech have 8 fields of research includes:

- Geopolymer
- Polymer Recycling
- Electronic Materials
- Ceramic
- Electrochemistry Materials & Metallurgy
- Environmental
- Manufacturing and Design
- Green ICT



Malaysia Research & Innovation Society

No. 22 & 24, Taman Kechor Indah Fasa 2, Jalan Abi Tok Hashim,
01000 Kangar, Perlis, Malaysia

Phone: +604-9798885 & **Fax:** +604-9774026

Website: www.myris.org.my & **Email:** info@myris.org.my

The MyRIS acronym it came from “Malaysia Research & Innovation Society”.

We are solely a research & an innovation organization entity. Our goal is to create the research & an innovation environment among researchers & innovators to the high level standard thus international exposure. With various international mutual networks with several academic institutions & research & innovation entities, MyRIS able to bring up Malaysian innovation to high level standard recognition. The objectives of establishing of MyRIS are:-

1. Building research and innovation, networking between academic institutions and related societies.
2. Encouraging research and innovation activities, especially among young researchers.
3. Helping researchers in improving innovation in various aspects.

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The Patent offers numerous sections, with a competent and original approach to the issues dealt with:



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TARGET

The target audience of IDrevetto on the one hand is made up of **enthusiasts** of the sector, those who are always looking for the **new** who are not satisfied with general scientific journals, but seek the exact fulfillment of what **innovation** means.

On the other hand, it is aimed at those in search of **visibility** who intend to concretely enhance their **invention** through the **development** of the patent.



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Palatul Culturii

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- ▶ Muzeul de Istorie a Moldovei;
- ▶ Muzeul Științei și Tehnicii „Ștefan Procopiu”;
- ▶ Muzeul de Artă;
- ▶ Muzeul Etnografic al Moldovei.

Din cadrul Complexului face parte și

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Complexul are în subordine și obiective muzeistice de pe teritoriul orașului Iași și, respectiv, al județului. Acestea sunt:

- ▶ Muzeul Memorial „Mihail Kogălniceanu” Iași;
- ▶ Muzeul Unirii Iași;
- ▶ Muzeul „Poni-Cernătescu” Iași;
- ▶ Palatul Memorial „A.I. Cuza” Ruginoasa;
- ▶ Muzeul Arheologic de sit din Cucuteni;
- ▶ Muzeul Viei și Vinului din Hârlău.

Palatul Culturii a făcut subiectul unui amplu proces de restaurare, finalizat în ianuarie 2016, desfășurat în cadrul Programului Guvernamental de reabilitare a monumentelor istorice.

În data de 27 aprilie 2016, Palatul Culturii a fost redeschis publicului larg, cele patru muzee care își au sediul aici inaugurând fiecare expoziții temporare ce pun în valoare doar o parte din colecțiile muzeale.

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- Prof. Univ. Dr. Gheorghe SOLCAN
- Universitatea „Alexandru Ioan Cuza” din Iași - Prof. Univ. Dr. Ion SANDU
- Universitatea „Dunărea de Jos” din Galați - Prof. Univ. Dr. Kamel EARAR
- Universitatea de Medicină și Farmacie din Târgu Mureș - Conf. Univ. Dr. Kelemen HAJNAL
- Institutul Național de Cercetare Dezvoltare in Optoelectronica - Dr. Ing. Alina VLĂDESCU
- Institutul Național de Cercetare-Dezvoltare pentru Fizică Tehnică - IFT Iași - CSII Dr. Adriana SAVIN
- Institutul Național de Cercetare-Dezvoltare pentru Inginerie Electrică - Dr. Ing. Mirela CODESCU

OBȚINEREA ȘI EXPERTIZAREA UNOR NOI MATERIALE BIOCOMPATIBILE
PENTRU APLICAȚII MEDICALE

OBTAINING AND EXPERTISE OF NEW BIOCOMPATIBLE MATERIALS
FOR MEDICAL APPLICATIONS

Medical Met Mat

60 PCCDI / 2018

PN-III-P1-1.2-PCCDI-2017-0239

Valoare Proiect Complex: 5.273.400 RON

OBIECTIVE SPECIFICE:

- Proiectarea, realizarea și testarea diferitelor tipuri de materiale biocompatibile și îmbunătățirea acestora.
- Angajarea a 14 tineri cercetători pe posturi vacante cu normă întreagă conform contractului de finanțare, 10 aparținând partenerilor universitari (TUIASI, UP BUCUREȘTI, USAMV IAȘI) și 4 aparținând INCD-urilor (IFT IAȘI, INOE 2000 BUCUREȘTI).
- Utilizarea în mod echilibrat a cheltuielilor de întărire a capacității instituționale (cec-uri), atât pentru servicii de cercetare oferite între parteneri, cât și pentru mobilități și stagii de pregătire, în scopul perfecționării în înțelegerea de noi tehnici și tehnologii specifice proiectului.
- Asigurarea dezvoltării competențelor de ordin practic în realizarea și testarea de noi materiale biocompatibile cu utilizări în domeniul medical, prin identificarea unor compoziții optime ce vor fi brevetate și diseminate către mediul de afaceri interesat.
- Asigurarea transferului tehnologic a rezultatelor obținute în cadrul Proiectului Complex la nivel regional și național.

REZULTATE:

- Noi tipuri de biomateriale cu utilizări medicale diferite:
 - biomateriale biodegradabile cu utilizări în ortopedie;
 - biomateriale pe bază de titan pentru protetică medicală;
 - biomateriale cu aplicații stomatologice;
 - biomateriale cu entropie ridicată.
- Îmbunătățirea biocompatibilității acestor tipuri biomateriale prin acoperiri și sisteme de aerosoli.
- În realizarea activităților fiecărui proiect component sunt prevăzute livrabile obligatorii ce constau în lucrări științifice publicate în reviste ISI/BDI, cereri de brevete de invenții, participări la conferințe naționale și internaționale, respectiv workshop-uri de prezentare periodică a rezultatelor Proiectului Complex, cu participarea reprezentanților tuturor partenerilor, centrelor medicale locale și naționale, cât și a reprezentanților mediului de afaceri, producători și beneficiari de biomateriale, din țară și străinătate.

INTERNATIONAL EXHIBITORS

Australia, Bulgaria, Cambodia, Canada, China, Croatia,
Hong Kong, India, Indonesia, Iran, Japan, Jordan, Korea,
Lebanon, Macau, Macedonia, Malaysia, Morocco,
Moldova, Philippines, Poland, Qatar, Russia,
Singapore, Sudan, Taiwan, Thailand, Turkey, Ukraine,
United States of America, Vietnam

Australia

AU.1

Title
SYNERGISTIC TRAFFIC INTERSECTION
Authors

INV. VALIANT YUK YUEN LEUNG

Institution
SYNERGISTIC TRAFFIC CONSULTANCY PTY. LTD. – SYDNEY, AUSTRALIA

Patented: EP17798405 (3455407), SG11201810147T, RU2018144861

Patent

Patent-Pending: AU2016901871, AU2017266443, CN20178035540, IN201817045733, VN1-2018-05624, ID P00 2018 10707, US16/304654, JP2019516891, HK19128471.0

SYNERGISTIC TRAFFIC INTERSECTION was invented to target the worldwide urban traffic congestions. Flyovers, subways, and tunnels are not necessary. What we need to do are just rearrange the layout pattern of the functions, install extra traffic lights, and readjust the traffic light timing and phases per cycle. Existed road spaces are wisely rearranged to lower the red and green phase ratio from 3:1 to 1:1. Two red-light phases of the waiting time will be saved. By reducing the time-costly red traffic-light phase without losing any function, the congested volume will then be reduced to 1/3 as existed.

Description EN

Combinations of continuous green-wave flows are grouped comparatively easier and further. As a result, a constant high-speed smooth circulation will clean up all hotbeds of traffic congestion.

Unlike CONTINUOUS FLOW INTERSECTION (CFI) and DISPLACED LEFT/RIGHT TURN (DLT/DRT), SYNERGISTIC TRAFFIC INTERSECTION (STI), can also be applied to most of the narrow 3 or 4 lanes two ways urban slow traffic. It displaces the existed inefficient traffic within the original pavement. No extra land will be required.

Since the construction period is short and simple with a higher cost performance, this should become the priority choice for the world, no matter developed or developing countries.

Class no.

8

Bulgaria

BG.1

Title

Development and validation of SEM-EDS method for analysis of gunshot residues

Authors

Milazim Tahirukaj, Andriana Surleva

Patent

University of Chemical Technology and Metallurgy, Bulgaria

Institution

Kosovo Forensic Agency, R Kosovo

Description EN

This project is aimed at developing a Kosovo National database for elemental analysis of ammunition and identification of origin of gunshot residue (GSR) for forensic application. To achieve the aim, it is necessary to optimize and validate a method for identification of GSR characteristic particles commonly encountered in real cases in R Kosovo. The effect of operating parameters of SEM/EDS is thoroughly studied to obtain accurate and reliable GSR identification and elemental composition data. The optimized method is validated according to ASTM 1588-08 and is found to be fit-to-purpose. The advantages are: reproducibility for 0.5 μm particles 8% RSD; sensitivity - 95% and bias -5 %, any false positive detected, the number of false negatives is 3- 7 and true positives : 96 - 100. The validated method is applied for identification of GSR particles in 550 samples from 144 cases. The rate of positive results is 14 %.

Cambodia

Norton University

KH.1.

Title	NU Decision Support System for Restaurant
Authors	Khun Piti, Nai Phatiya, Seng Poem, Dul sopheak, Nou Buthang
Institution	Norton University
Patent	-
Description	Gotha, which is a decision support system for restaurant, aims to facilitate the decision-making for restaurant owners by making the most of existing resources in increasing sales during off-peak hours, monitoring promotion effectiveness, and viewing top-sale products. In order to do that, we will develop a Gotha mobile app for customers to download, whereas the point-of-sale system will be used in the restaurant to get those information on the mobile app.

KH.2.

Title	NU Smart Attendance
Authors	Chhoeung Rachana, Luy Mithona, Heng Sovanmonynuth, Sam Bandithviphou
Institution	Norton University
Patent	-
Description	Smart Attendance is an AI attendance system that allows users get attendance more convenient and save time by using the face recognition algorithms to recognize the detail information of the users and check the attendance for them automatically based on passing by the camera. In order to do that, we will create a Smart Attendance controller system integrate with Microsoft excel with the automatically get the attendant of the users. In particular, we want to have more research on AI technology in Industry 4.0, so that the quality of our students will never be lost compare to international students. (max 250 words)

Class 10

KH.3.

Title	NU Power Strip
Authors	Luy Mithona, Heng Sovanmonynuth
Institution	Norton University
Patent	-
Description	<p>NU Power Strip is an embedded system that allows users especially older and disabled people who can use their voice to control the fan to turn on or off in Khmer voice command based on Google Speech to Text API via Arduino UNO Microcontroller to automatically convert voice or text to control the fan. In order to do that, we will create a NU Power Strip app controller with the ability to translate voice and text that command by the users. In particular, we want to have more research on embedded system in Industry 4.0, so that the quality of our students will never be lost compare to international students.</p>
Class	10

KH.4.

Title	The Memorable of French Colonial in Cambodia
Authors	Mrs. SO Sokuntheary, Mr. Chuop Sopheak Mr. Lov ThaiLeng, Mr. Chiv VongHong, Mr. Kong SovanaRith
Institution	Norton University
Patent	-
Description	<p>Phnom Penh has plenty of colonial-era buildings. Old building will stay last longer longer. However, if we do not renew, it will suffer. We observe that About 40% of old French colonial architecture is being demolished, to make way for modern high-rises. This has seriously affected the architectural, historical and cultural values of capital. So we should renovated the old France colonial building to become a community place for cyclo that can attach the tourism to visit and feel back to the Cambodia historical</p>
Class	7

KH.5.

Title	Fascinating Khmer Dishes system
Authors	Dr. So Sokuntheary, Mr. Chuop Sopheak, Miss. Khat Sorina, Miss. Rey Sunday, Miss. Oum Sreypich
Institution	Norton University
Patent	-
Description	To begin with, every buildings in Phnom Penh city on present day has growth a remarkable rate. National parks, hotels, schools, hospitals, houses, phones, transportation, or even restaurants have included classic-modern concept to their buildings. Nevertheless, Some parts of blocks in the city still remain French architectural structures that have never been remove from its spot for years. Therefore, a concept pops up to create a “Tablet ordering system” which would be an innovative update idea to the old French building with a brand new modern system toward today’s technology.
Class	7

Canada

by

Toronto International Society of Innovation & Advanced Skills (TISIAS)

CA.1.

Title

FABRICATION OF ANODE MATERIALS FOR THE DESIGN OF LITHIUM ION BATTERIES

Authors

Hyun Ki Shim; Stephen Gopaul; Pouya Nourshoae

Institution

University of Waterloo – Canada

Patent no.

N/A

Description

This project's mission is the fabrication of anode materials using commercial graphite as active material, investigation of the effects of varying active material compositions on battery capacity and capacity fade, comparison of performance of commercial and experimental anode materials and the design of Li-ion battery with performance characteristics comparable to commercial batteries. Most Li-ion battery fabrication utilizes graphite anodes. Higher-capacity anode materials can be produced using complex synthesis methods. However, these materials have very high irreversible capacities and incur extra costs from the additional cathode material required to compensate. Graphite has a much lower irreversible capacity since its SEI layer deteriorates after initial discharge. Li-ion battery with 85% graphite anode composition has the capacity closest to the theoretical (i.e. maximum) capacity of 372 mAh/g. This composition shows good capacity fade results. 85% graphite composition has the lowest irreversible capacity. SEI layer is non-existent approaching the fifth charge-discharge cycle. Further research and data acquisition is required to compare capacity fade results.

Class

2

CA.2.

Title **Portable Safe-Parking Block for Vehicles**

Authors LEE, KEUMYEON

Institution -

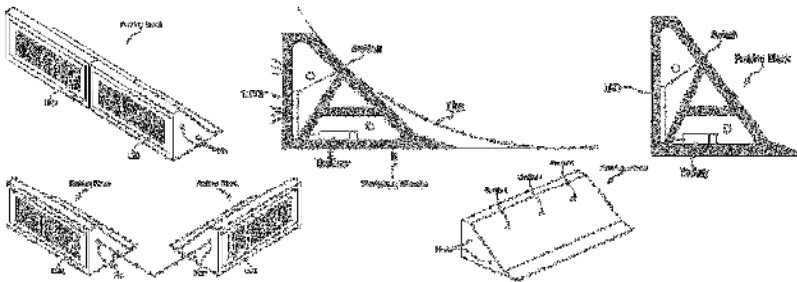
Patent no. Patent-Pending

The present invention is a portable safe-parking block for vehicles that prevents secondary accidents when parking a vehicle. Parking blocks are often used when parking a vehicle on slopes and hills. However, the existing parking blocks flaw in the function knowing if the block is installed correctly and tightly to the grip of wheels and also it is inconvenient because they are not easily portable before/after use. However, the present invention has a functional support which makes it easy to carry around and does not come off from vehicle wheels while also having a lamp that flashes to add more safety features.

Description

Class

8



China

CN.1.

Title Wall tiles

Authors Cheng chuan hsi

Institution YOUNG-AN Mineral Tech Co., Ltd

Patent D189352

Description

This invention is a kind of shaped lightweight cement. The function is use for sound insulation purposes, surface arc shape, sound reflection principle. Lightweight cement is also a durable material. The service life can be the same as that of cement sand. Recyclable and fireproof function.

Class

Buildings and Materials



Croatia

Represented by
CROATIAN INVENTORS NETWORK

HR.1.

Title

BOOKMEDIA

Authors

TOMISLAV BRONZIN; LEONARDO MARUSIC

Institution

CITUS d.o.o.; Felix liber d.o.o.

Patent no.

Patent application

BOOKMEDIA is the global multimedia platform for book publishers. It enables a completely new level of experience and interaction between book and men and extends the traditional experience of a book reading by implementation of various multimedia elements.

When a smartphone or a tablet is directed towards the object/image in the book the multimedia content, of that object/image is displayed on a screen of a device, as follows: sound and/or video and/or image and/or text and/or link on content etc..

Description

The main advantage of this innovation, which supports augmented reality, is its potential, ie the potential of the platform that is currently unique because it is not tied to just one book, it is applicable to different books/titles both existing and the new editions. Therefore, there is no need to change the design of the book or to print a special edition – it can be used on almost every book/title.

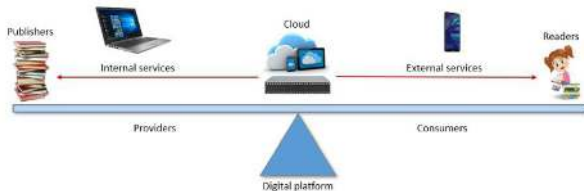
Applicable to wide range of industries: education, healthcare, tourism, entertaining, retail, marketing etc..

Supported on iOS and Android platforms.

Cloud based architecture.

Class

10



HR.2.**Title**

INSTRUMENT FOR MEASURING TEMPERATURE GRADIENTS IN COMPOSITE CLOTHING

Authors

DUBRAVKO ROGALE; SNJEZANA FIRST ROGALE; ZELJKO KNEZIC; SINISA FAJT

Institution

Tekstilno-tehnoloski fakultet Sveucilista u Zagrebu; Fakultet elektronike i racunarstva Sveucilista u Zagrebu

Patent no.

Patent application

Description

The instrument measures the temperature drop between the layers of clothing composites. It is designed to measure temperature gradients of conventional and intelligent clothing that has a composite structure of up to 5 layers, i.e. an outer shell, 3 layers of thermal protection and a lining. The instrument has a 4-channel amplifier for K-type thermocouples with temperature compensation of the cold end of the thermocouple and analogue temperature displays and outputs for connection to AD transducers. Thermocouples are placed between the composite layers on the so-called hot plate or differential conductometer. Based on measurements of temperature gradients, the individual thermal insulation properties of each composite layer and the overall structure are determined during the design phase of the thermal properties of clothing. It can also be used to test the thermal properties of ready-made garments, where thermocouples are incorporated into the structure of the garment to measure the thermal insulation efficiency of each layer of clothing and assess the feasibility of incorporation and the cost of materials incorporated into clothing composites. Measurements can be performed under laboratory conditions on thermal mannequins and on the human body while wearing clothing.

Class

9



INTERNATIONAL EXHIBITS

HR.3.

Title
Authors
Institution
Patent no.

OFFICE SHELL model WIN**DARKO SPILJARIC****DIZZ CONCEPT d.o.o.**

EUIPO No 007539341-0001, No 007539341-0002, No 007539341-0003

OFFICE SHELL is a circular capsule for more productive and safer work in multi-employee offices. The concept is based on scientific research that has proven the shortcomings of an open plan office.

OFFICE SHELL enables the right balance between working in an environment of privacy and working together, offers individual adjustment of the colour and intensity of light, temperature and humidity, worktop height for work in the sitting and standing positions, and provides enhanced protection against noise and infectious diseases by means of barriers and the passage of air through UV light.

Description

It is made of natural materials that are easy to recycle, applying the principle of biophilic design. Plants with positive effect on the health of employees are placed in the capsule to create a sense of security in an anti-stress environment. Contact with the rest of the team is made through a "smart glass" window that has the option of the opacity effect when voltage is fed to the liquid crystals.

Class

14



HR.4.**Title****„M“ sensor for monorail trains****Authors****ZVONIMIR VIDUKA****Institution****ALTPRO d.o.o.****Patent no.**

trade mark IR 1501978

Description

„M“ sensor for monorail trains is a special detection unit which provides safe and reliable detection of monorail train on track. Sensor is situated along the track and it senses the presence of the train by detecting its undercarriage. The current solution is a unique innovation in the world for the market of non standard modes of transportation which is gaining popularity.

The advantage of the innovation is its flawless ability to detect monorail trains in harsh atmospheric conditions. Detection is occurring in conditions of great EMI (electromagnetic interference), from -40 to +80 degrees Celsius, in snowy, windy, rainy conditions... Moreover, sensor will not detect anything but monorail train. Any interference or detection of other objects is filtrated by smart architecture of the sensor and by special algorithms implemented in software of the intelligent unit. The complexity of building such a product is showed in the fact that this kind of solution is the only one in the global market which suits ALTPRO innovation oriented market approach.

This innovative product is meant for operation inside vital safety systems for control and management of mass transit trains in urban areas. It is currently used in countries like China, Japan and USA. Taking into account the growing popularity of this mode of transport, it is expected that this product will be seen in operation worldwide.

Class

8



INTERNATIONAL EXHIBITS

HR.5.

Title NIKEL OLIVE line
Authors MIRJANA BRLECIC
Institution PRIRODA LIJECI d.o.o.
Patent no. trade mark: HR - Z20131494

OLIVE, a mythical tree revered since the ancient times. Olive oil, also called “liquid gold”, has been used to preserve beauty since the ancient times. Olive oil in combination with vitamin E has a protective effect on the body’s cells. Cold pressing green Mediterranean olives preserves all of their beneficial properties. It replenishes skin and protects it from moisture loss. It acts as a natural protection factor, reflecting around 25% of sunrays. NIKEL OLIVE line with virgin olive oil extracted from cold-pressed Mediterranean olives and 100% natural active ingredients for fresh and beautiful skin. Hydrating Cream, Nourishing Cream, Oil-Serum, Gentle Cleansing Foam, Gentle Exfoliant, Sun Oil SPF6.

Description**Hydrating Cream**

100% natural care for fresh, hydrated and glowing skin. Apply the cream to clean face, neck and décolletage. For best results, gently apply a few drops of the divine OLIVE Oil-Serum concentrate before the cream.

Nourishing Cream

100% natural care will nourish your skin and give it a natural glow. Apply the cream to clean face, neck and décolletage. For best results, gently apply a few drops of the divine OLIVE Oil-Serum concentrate before the cream.

Oil-Serum

100% natural blend of extra-virgin olive oil, natural vitamin E, natural shea butter and cold-pressed plant oils – jojoba, argan, passion flower, avocado, sweet almond and sunflower seed oil. Gently apply a few drops of this divine concentrate on your face before your moisturiser and massage in a circular motion. For best results, use regularly to nourish your skin in the morning and in the evening before your moisturiser.

EUROINVENT 2021

Gentle Cleansing Foam

USE This ECO Gentle Cleansing Foam thoroughly cleanses and soothes the skin. Apply to damp skin. Massage gently to eliminate impurities and wash off with lukewarm water.

Gentle Exfoliant

Gentle exfoliant with olive pit microparticles for even the most sensitive skin. Apply a small amount to damp face, neck and décolletage. Massage gently and wash off with lukewarm water.

Sun Oil SPF6

100% natural blend for natural skin nourishment. This divine oil's antioxidative effects neutralise the oxidative stress caused by UV rays and promote tanning. Apply to face and body before and during sun exposure. For both children and adults! NOTE Use in combination with Silky Sun Milk with UVA/UVB sun protection factor for direct sun exposure.

Class

4



INTERNATIONAL EXHIBITS

HR.6.**Title**

**GENERATION OF ELECTRICITY FOR
PROPULSION OF CAR AND SHIP WITH ENERGY
OBTAINED BY THE FORCE OF AIR OR SEA
JASMIN NOZINOVIC**

Authors**Institution****Patent no.**

Patent Application

We drive the car forward, air from the opposite direction enters the air turbine. It first passes through the filter then through the flap and comes to the turbine, turns it at high speed and the air escapes into the atmosphere.

The turbine rotates the generator over the shaft, the generator produces electricity which is stored in the battery via a cable. The rechargeable battery drives the electric motor, the electric motor drives the wheel axle.

In the system we have a gear pump with its oil tank that hydraulically opens or closes the flap when the battery signals via a sensor that it needs charging, then the pump starts, opens the flap, air enters and turns the turbine, the turbine turns the generator and we get electricity and charge the rechargeable battery until the sensor gives a signal that the battery is charged and then the pump closes the flap and shuts down.

We always have another spare battery in the system.

Description

Since we know that the generator must maintain a constant number of revolutions to obtain the required voltage to supply electricity to the battery, in the system we have a regulator that receives a signal from the sensor (That the battery needs to charge), the regulator gives a signal to the gear pump, the pump starts and hydraulically opens the flap, air enters and the regulator through the pump on the flap maintains a constant number of revolutions of the generator (by leaking more or less air by opening or closing the flap) so that the generator maintains the speed given to it, and we get the necessary voltage and electricity to charge the battery, when the battery is charged, the sensor gives a signal to the regulator and the flap is closed by the hydraulic pump then the turbine and generator fall out of use.

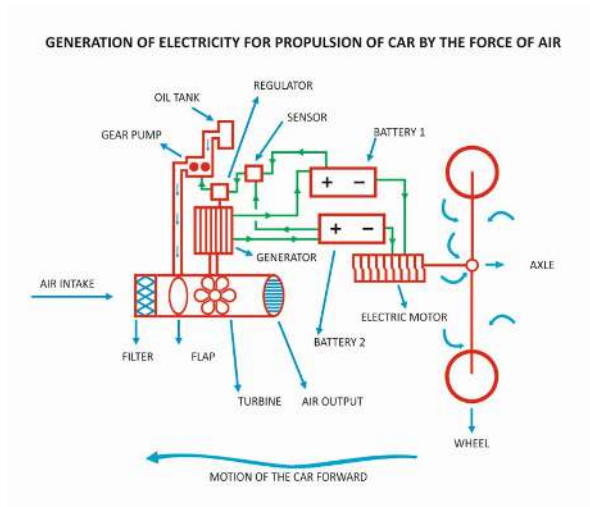
The system in the propulsion of the ship is the same as in the car, the principle of operation is the same, the only difference is that the fluid here is water, not air.

The generator rotation control is the same.

The only difference is that we have filth in the sea, so we have an anti-flush pump in the system, which we start automatically in the voyage to wash the filter (Because this pump has a separate suction and with a pressure higher than that in the system and occasionally washes the filter.). In the harbor filter needs to be cleaned, we have built-in valves in front of and behind the filter that we close and clean the filter.

Class

4



HR.7.**Title****AUTOMATIC MEDICINAL DOSING DEVICE****Authors****Author: VITO STIPANOVIC;
Menthor: GORAN ECIMOVIC****Institution****School: I. tehnicka skola Tesla, Zagreb****Patent no.**

Take therapy in pill form at a certain time, day by day, with all the effort we sometimes forget! With some medications, such situations can have serious consequences. The elderly population and especially those suffering from dementia, are unable to perform this task on their own.

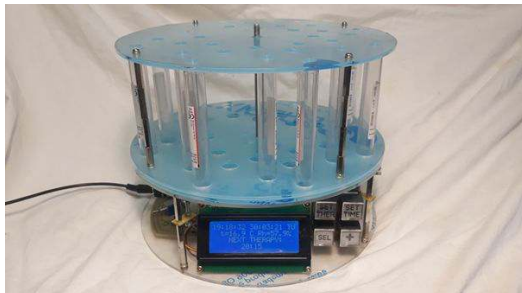
With this device, the person taking care of the therapy once a week prepares the correct doses and the necessary medications will be ready for consumption in the container at the right time. The device is intended for personal use, retirement homes, health care facilities...

Description

The device is based on the ATMEGA 16 microcontroller. The rotation of the drum is realized by using a STEP motor with an independent driver module, and four mini servo motors are used to open the test tubes with tablets. The exact position of the drum for the current day was solved with a four-bit optocoupler. The real time module is the DS2313 which contains the exact time and calendar of exceptional precision. A 3V lithium battery is used to buck up the power supply of the RTC module, which enables operation of the clock for one year, provided that there is no external power source (important information in case of storage of the device). The DF player is selected for the sound circuit, and the required messages are stored on the micro SD card. By changing the SD card, it is possible to select any speech area of the user.

Class

4



INTERNATIONAL EXHIBITS

HR.8.**Title****FASHION KIT****Authors****Author: TINA PETROV;
Menthor: MIRJANA PENDES****Institution****School: SKOLA ZA MODU I DIZAJN, Zagreb****Description**

Fashion Kit is an innovative folder with sewing accessories. It is intended for curious kids from the age of five to ten and small researchers and take's them to the first steps towards the world of fashion. It is made of non-woven textiles of cheerful colors and contains sewing accessories that are adapted to work in a safe way for the specified age.

The Fashion Kit folder is suitable for preschool children and lower elementary school students and serves as a teaching aid for teachers and educators to work with children. The goal is to promote the professions taught at the School of Fashion and Design Zagreb.

Touching the cover of the folder itself will stimulate the senses and encourage children to further explore the contents of the folder. By using accessories, children develop psychomotor skills, logical thinking, reasoning and problem solving, creativity, fine motor skills and a sense of fashion.

The folder contains hand needles (plastic) of different sizes, scissors, jute and cotton fabric measuring 10x15 and 10x12, wool threads of different colors, felt buttons and an educational pattern with a basic stitch.

Class

9



HR.9.**Title** Automatic train protection system RAS 90**Authors** ZVONIMIR VIDUKA**Institution** ALTPRO d.o.o.**Patent** trade mark IR 1501978

RAS90 is an advanced safety system for railway vehicles based on INDUSI technology which stops the train in emergency situations and continuously monitors train movement. Emergency situation can occur when the train passes through the stop signal, the train driver is distracted, the train overspeeds...

Advantages:

Innovation advantages are as follows:

- Continuous monitoring of train behaviour
- Advanced computer diagnostics
- Complete set of testing devices
- Event recording which enables more precise maintenance and evaluation of incident states in an accident
- Train driver registration
- Integrated dead man's system
- GPS positioning and communication which serves

Description the purpose of remote diagnostics

Purpose:

By implementing RAS90 system, the railway significantly increases its safety level. RAS90, based on INDUSI technology, is a microprocessor high tech product which warns the train driver and automatically stops the train depending on the information it gathered while passing by the signals on the railway and the information based on the train driver behaviour. RAS90 also monitors train behaviour throughout the journey and advises safety measures. The system is resistant to all sorts of vibrations, shocks and impacts which occur during exploitation on the railway vehicle and represents a turnkey safety solution for railway vehicles of a country. It is easily adaptable for communication to other safety systems and european standard for control/command and communication systems of ETCS level.

Class

8

Hong Kong

HK.1.

Title

Air-Conditioned Facemask (AC-Mask)

Authors

Dahua Shou; Wing Sze Suen; Jintu Fan

Patent

The Hong Kong Polytechnic University

Institution

US Provisional Patent Application No. 63/198,121.

Description EN

- AC Mask, a temperature-controllable facemask system, protecting you from unpleasant heat and high humidity inside the facepiece
- Automatic, efficient cooling based on the Peltier effect, reducing temperature by 12°C and humidity by 50% at a low voltage of 3 V
- Customized, ergonomic 3D printed mask frame and ventilation-guided design for wear comfort and smooth breathing
- Personal wearable air conditioner with rechargeable and detachable design
- Low cost and high compatibility with existing disposable facemasks in the COVID-19 era.

Class no.

12



HK.2.

Title

Endangered Butterflies Attracting Device

Authors

Yuk Yam CHUNG, Tsz Yin HUNG, Chin LAU, Wai Ka WANG, Zeming LI, Ka Yin CHAN, Yin Fong YEUNG, Jacky Tsz Chiu LIU

Patent

HKFEW Wong Cho Bau Secondary School

Institution

Patent-Pending

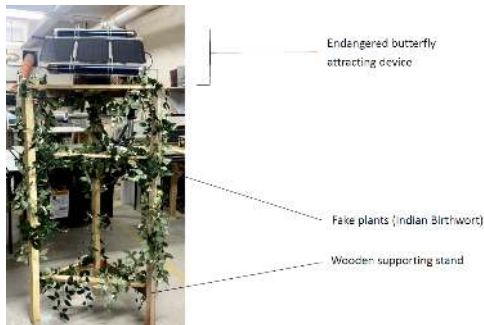
Description EN

Common Birdwing is a butterfly with attractive appearance. Profiteers catch them for specimens for sale, forcing the species into near extinction. India Birthwort is the only host plant in which Common Birdwing lays eggs and inhabits. The caterpillars of this species only feed on leaves and young shoots of India Birthwort. However, this climbing plant is rare and hard for the butterflies to find. This device is to spread the smell of fruits of India Birthwort to a further distance by heat and air movement so that Common Birdwing can find the plant more easily.

This device consists of a pair of evacuated solar collectors. In each of the collectors, there is a container to carry fruits of India Birthwort and light bulbs. A fan is installed at the opening of the collector. Light bulbs and fan are program controlled and operated by solar power. The heated collector and the fan facilitate the spread of the smell of fruits during sunny days. On cloudy days, the light bulbs are triggered to turn on so as to heat up the fruit to spread its smell. On rainy days or at night, the device is switched off.

Class no.

1



HK.3.**Title** Intravenous Drip Sensor**Authors** PAN, Wending**Patent** -**Institution** The University of Hong Kong**Description EN**

This is a sensor for intravenous drip. The main purpose of the invention is when the patient has a drip-feeding, attached a sensor which connects with a beeper at auxiliary drip bottle. The detector will detect the lower level of the auxiliary drip bottle automatically when it is about to use up, and immediately notify the buzzer on a beeper to give a warning sound to inform the medical personnel to make a replacement of the new bottle.

Class no.

4



India

IN.1.

Title

SMART - Sensing, Measuring & Analysing Remote Temperature & Humidity

Authors

RAMAN TEJA VENIGALLA

Institution

Ramsol Energy LLP

Patent no.

-

Description EN

SMART is a Raspberry PI based remote sensor data measurement and monitoring system with a cloud interface, The real-time data from the remote sensors is collected by the RPI through a communication network and is sent to the remote server for data analytics and visualization. SMART helps the users in taking quick and informed decisions regarding plant control by providing all the relevant data in an intuitive format.

Class no.

4

Indonesia

Represented by

Indonesian Invention And Innovation Promotion Association (INNOPA)

ID.1.

Title

Synthesis of Betacyanins Fiber Sandwich Material Based on *Hylocereus polyrhizus* for Anti Cancer Hijab: in Vivo Case Study

Authors

Muhammad Alief Dhafa Wahyudi, Akmalul Umam

Institution

Senior Islamic High School Unggulan Singa Putih (MA Unggulan Singa Putih)

Patent no.

000240287

Description EN

Cancer is a disease caused by the growth of new uncontrolled cells that results in genetic mutations. The interaction that occurs between the skin and UV rays is very influential on the formation of cancer on the skin. Sandwich material is able to protect from exposure to ultraviolet light. Cotton fabrics with natural coloring can increase protection against UV, but natural coloring in textiles is antibacterial that is not permanent, easily faded and oxidized. This research focuses on development of betacyanins fiber sandwich material based on *Hylocereus polyrhizus* for anti cancer hijab: in vivo case study. The best absorption power to protect toward UV-A and UV-B) by Hijab sandwich material *Hylocereus polyrhizus* reached by sample number four (25.93%). Morphology of Hijab sandwich material *Hylocereus polyrhizus* indicate that there are grains of *Hylocereus polyrhizus* concentrate perfectly layering the cotton. A group of molecule in which are Eter, Stretching, Carboxylic Acid, and Aldehyd in Hijab sandwich material *Hylocereus polyrhizus* perfectly collaborate. As a result, it creates chain reactions consist of isobetanin, phylloactin, and hylocerenin. They finally become betacyanins to absorb UV-A and UV-B perfectly, so the lower risk of cancer cause of radiation can be protected by them.

Class no.

9: Chemical and Textile Industry



ID.2.

Title

***Mimosa pudica* L. Immunomodulatory Minerals and Herbal Phytochemicals Supplement as Stress and Gastroesophageal Reflux Disease Management**

Authors

Prajna Wijaya

Institution

Indonesian Invention & Innovation Promotion Association

Patent no.

None

Description EN

Gastroesophageal reflux disease (GERD) is when stomach acid flows back to the esophagus and irritating its lining and causes symptoms like burning sensation in chest, difficulty swallowing, and many more. Long-term complications of GERD may cause the narrowing of esophagus, open sore in esophagus, and precancerous changes in esophagus, and in some cases, GERD may be deadly. During this COVID-19 pandemic, the number of GERD increased significantly. Studies show psychological stress is highly related to GERD. This shows the need of simple, affordable, and scientifically tested products to manage GERD and stress. To develop such products, the method used in this research is based on the General Guidelines for Methodologies on Research and Evaluation of Traditional Medicine by the World Health Organization. This method is started by reviewing theories & concept of the system of traditional medicine, review of safety & efficacy, and clinical trials. The results drawn in this research is that *Mimosa pudica* L. phytochemicals and mineral is safety and effective to manage stress, GERD, and also improve human immune system with terpenoids, flavonoids, anthraquinone, coumarin, and many more compounds as its active ingredients. To manage effectivity, the suggested dose each day is 1-2 capsules, each containing 500mg of *Mimosa pudica* L.

Class no.

4. Medicine – Health Care - Cosmetics



INTERNATIONAL EXHIBITS

ID.3.

Title

THE EFFECTIVENESS OF *Portulaca oleracea* ON INCREASING BRAIN INTELLIGENCE (LEARNING TIME & RETENTION TIME)

Authors

Siti Nurwaqidah, Inneke Maulina, Arvin Yoga Elyana, and Alva Sandgrahan Nindar Putra

Institution

State-Senior High School 3 of Ponorogo

Patent no.

-

Description EN

Portulaca oleracea is rich in omega-3, DHA, EPA and ARA that can boost brain intelligence. This study aims to determine the effect of Omega-3 *Portulaca oleracea* extract on the ability of Learning Time and Retention Time. This type of research is an experiment, which was conducted from November 2020-January 2021. The sample used was 50 *Rattus norvegicus*. The process of making Omega-3 *Portulaca oleracea* extract was carried out by a modified maceration extraction method. Tests were carried out on *Rattus norvegicus* by injection of Omega-3 *Portulaca oleracea* extract and was carried out on 5 groups of mice, with 2 controls and 3 treatments, each of which was 10 *Rattus norvegicus*. Positive control treatment was given Omega-3 on the market, negative control was not given Omega-3, and groups A, B, C were given Omega-3 *Portulaca oleracea* extract with various doses of 26 mg / KgBB, 52 mg / KgBB, 104 mg / KgBB . The average results of the learning time test on positive control 55 seconds, negative control 67.5 seconds, P1 55 seconds, P2 45 seconds, and P3 35 seconds. In the retention time test the average positive control was 600 seconds, negative control 54 seconds, P1 580 seconds, P2 590 seconds, P3 600 seconds. From these results, it can be concluded that the administration of Omega-3 *Portulaca oleracea* extract has an effect on cognitive and memory enhancement in mice. Product development is processed into ice cream and nori which have met the organoleptic test and content test.

Class no.

4

ID.4.**Title**

ASTIN AND PAFLOR BASED ON SOYBEAN STRAW AND EGGSHELLS COMPOSITE TO REDUCE ENVIRONMENTAL DAMAGE

Authors

Kania Siti Al-Fathi, Novita Dwi Fitriani, and Vina Afristalianti

Institution

State-Senior High School 3 of Ponorogo

Patent no.

-

Description EN

The increasing number of world population has resulted in the need for furniture to increase so that the availability of wood continues to decline accompanied by forest destruction. Soybean straw contains quite high fiber and carbon from the eggshells can be used to absorb sound. Meanwhile, eggshells contain high calcium which make the board strong, and have chitin substance which is disliked by termites, this making the board more durable. The purpose of this study was to process soybean straws and eggshells, into acoustic ceilings (Astin) and parquet floors (Paflor). This type of research was development research, which carried out from November 2020 to February 2021. The samples in this study were acoustic ceilings and parquet floors from the products of State-Senior High School 3 of Ponorogo. Based on the research by testing 3 different Astin compositions, the best composition was 60% soybean straw, 30% eggshells, and 10% adhesive. The Astin has a density value of $2,470\text{kg/m}^3 \times 10^{-3}$, porosity of 1,985%, water absorption of 0,802%, sound absorption coefficient of 0,344%, compressive strength of $20,56\text{kg/cm}^2$, the modulus of elasticity of 15.790kg/cm^2 , density $0,85\text{g/cm}^3$, and tensile strength of $8,21\text{kgf/cm}^2$. While testing on 3 compositions of Paflor produced the best composition, namely 30% soybean straw, 60% eggshells, and 10% adhesive. The Paflor has a coarse texture, could withstand a weight of 8kg, had a density value of $0,83\text{g/cm}^3$, a thickness expansion of 20%, and a water absorption capacity of 0,718%. To get better results, further research is needed.

Class no.

7

ID.5.**Title****ENCORE (Environmental Comprehensive Revolution)****Authors**

I Gede Kesha Aditya Kameswara, M Sulthan Arkana, Felicia Sintana, Pambayun Pulung Manekung Stri Sinandang, Gayatri Ari Indriani

Institution**Satya Wacana Christian University****Patent no.**

-

Description EN

Encore is a mobile apps platform aimed to engage, connect, and transform both public and political participation to end climate change and enforce good environmental governance. The Encore mobile apps will consist of 3 features. The first feature is “Gain useful data” which provide a data for environmentalist, government, and local people to take action (e.g plastic distribution database that shows the amount and origin of the plastic waste with a suggestion of what action is needed). The second feature is “Micro-volunteer work” that will enable the involvement of local communities and Increase public awareness by connecting local people to create micro-volunteerism work within their neighborhood (e.g cleaning up river from plastic waste). The third feature is “My network” that will enable environmentalist and local communities to connect with their fellow either inside the country or abroad to learn about different techniques and strategies of activism, and also to carried out project fundraising.

Class no.

10 Information Technology and Communication

ID.6.

Title

Cytotoxic Activity of Patindis Leaves (*Urophyllum arboreum* (Reinw. ex Blume) Korth.) Extract And Fraction Againts MCF-7 Cell Using Prestoblue Assay Method

Authors
Institution
Patent no.

Muhammad Hafizh Abiyuu Fathin Fawwazi, Andriyanto
Universitas Islam Indonesia

-

Description EN

High incidence of breast cancer and cancer treatment problems such as Multi-Drug Resistance are the reason for the importance of developing cytotoxic agents based on natural product. One of the natural product that can be developed as a cytotoxic agent is the leaves of *Urophyllum arboreum*, known locally as patindis by the Dayak villagers in Terantang. According to previous studies, it was reported that *U. arboreum* bark showed potential cytotoxic and antioxidant activities and was identified containing flavonoids, saponins, and tannins/ polyphenols. In addition, preliminary research showed that the 70% ethanol extract of *U. arboreum* leaves had a high antioxidant activity with the IC₅₀ value of 6.5310 ppm. Therefore, the objectives of this study were to examine the cytotoxic activity of extract and fractions of *U. arboreum* leaves on MCF-7 cells. The extraction process was carried out by Ultrasound-assisted extraction method using 70% ethanol as a solvent. Then the resulting extract was fractionated by liquid-liquid extraction method using n-hexane, ethyl acetate and ethanol 96%-water. Cytotoxic activity was evaluated by PrestoBlue assay method and the data were analyzed using Microsoft Excel 2016. The results of cytotoxic evaluation showed that the extract of ethanol 70%, n-hexane fraction, ethyl acetate fraction and ethanol 96%-water fraction of *U. arboreum* leaves had the IC₅₀ values of 136.370 µg/ml; 114.400 µg/ml; 87.340 µg/mL and 610.245 µg/mL, respectively. Based on these results, it can be concluded that the ethyl acetate fraction was the most active fraction with moderate cytotoxic activity. Furthermore, this shows that the ethyl acetate fraction of 70% ethanol extract of *U. arboreum* leaves has the potential to be developed as an alternative agent for cancer therapy based on natural product against MCF-7 cells.

Keyword: *Urophyllum arboreum*, breast cancer, MCF-7 cells, ethyl acetate fraction, PrestoBlue assay.

Class no.

4. Medicine - Health Care – Cosmetics

Iran

IR.1.

Title

The spider robot with the ability to fly and transforming to a four-wheel vehicle equipped with delta CNC system, 3D printer and solar energy panel.

Authors

Hamid morad, Erfan Mahmoudi, Aref Mahmoudi, Ehsan Marzban Shirkharkolaei, Niuosha Azadshahabi, Morteza Chamanara, Sima Chabi Vaisi Nezhad, Hamid Gharehbaghi, Alireza Barani, Rasool Marzban Shirkharkolaei

Institution

DtoP Innovation Group

Patent

Patent reg. no.: 139850140003006305

Description EN

The majority of 3D printer systems are located in a fixed location and cannot be used anywhere as a portable machine. Therefore, a robot consisting of mechanical and electronic parts with a spider platform was designed which, in addition to the ability to move with four legs, can be moved with the four Mecanum wheels mounted on the front and rear legs, and in addition to being equipped with four propeller engines, flight capability has also been added to it to have access to impassable areas. Beside that this robot equipped to GPS and other sensors to detect location and environment condition.

Moreover, this robot is equipped with a 3D FDM printer on its trail, which can print any component or mechanism in any place where the conditions are met. Also, in order to reduce the length of robot, the base of printer has been designed as foldable. On front-side of the robot, a camera has also installed on a two free degree stand that sends images to the operator's control system. The robot is also driven by remote control. On topside of robot, a solar energy panel has been embedded to absorb solar energy and charge batteries.

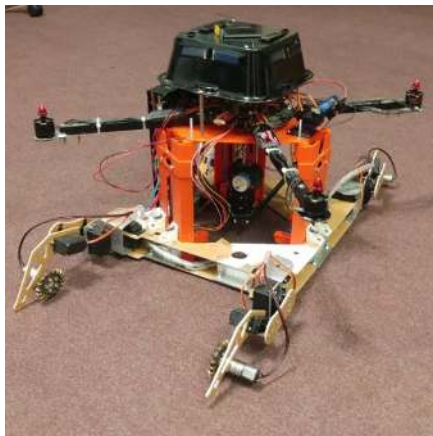
In front of this robot, there is a camera with a 2 free degree stand that makes possible the operating of this from long distance. Moreover, aerial photography and image processing can provide a great deal of information about natural resources, forests, and wildlife. And it can also be used to detect pests by photographing trees and

leaves.

Another application of this robot is relief on distant or impassable locations. And it can be used in post-disaster crises such as earthquakes.

Class no.

8



Japan

JP.1.

Title

SIMPLE SHOE-DRYING MACHINE

Authors

RYOKO KAWASAKI

Institution

OSAKA SANGYO UNIVERSITY

Patent no.

-

Description EN

First, to put a pair of shoe dryers into the wet shoes, utilize the thermal tubes to heat and dry out faster. Second, the charcoal which is to be placed at the bottom of the shoe dryer is the deodorant for the bad smell.

Class no.

6

Jordan

JO.1.

Title
ACTIVATED EYE STICKER
Authors

NUHA ABUYOUSEF

Institution

-

Patent no.

Patent Pending Jordan (PCT/EP2019/077128)

Description EN

Dry Eye Syndrome or Exposure Keratitis is a common ocular condition associated with Bell's palsy. Patients with Bell's palsy can easily open the affected eye—since the muscle that opens the eye is controlled by a separate cranial nerve—but they are unable to close the eyelid. Such a condition, if untreated, might lead to a total loss of the cornea, ulcers, eventually blindness in the affected eye. Accordingly, this application addresses the design, development, and validation of a rehabilitative instrumented spectacles that helps patients with Bell's palsy (or other neurological, neuro muscular conditions that will affect the normal closing or even opening the eyelids) – due to dysfunction of the Facial Nerve (a.k.a. Cranial Nerve VII)—gain control over the paralyzed upper and lower lids in the affected eye. The aim is to restore all three types of blinking (spontaneous, reflex, and voluntary) and facial symmetry in these patients. Significance to reduce the risks of possible loss of the cornea due to the dry eye syndrome associated with Bell's palsy.

Class no.

4



Korea

*coordinated by TISIAS for
Korea University Invention Association (KUIA)*

KR.1.

Title

A composite molded body of loess-coffee grounds showing air purification and antibacterial effect and its manufacturing method

Authors

Park Bo Hyun, Park Yoon Ki

Institution

St. Johnsbury Academy Jeju

Patent no.

10-2021-0035158

Description EN

This invention is about a complex plastic that shows air purification function and antibacterial effects that can remove fine dust, germs, odors, and VOCs that exist in the air. (max 250 words)



KR.2.

Title

Noise Filtering in Binary Space and Multispace using Principal Component Analysis

Authors

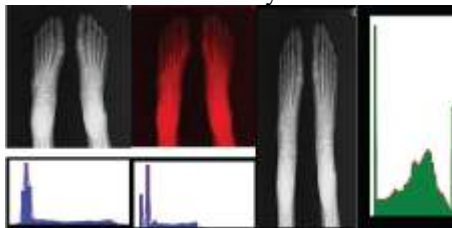
Jung Ju Yeon

Institution

Seoul Foreigner School

Description EN

Image processing x-ray photos for accurate identification of microfractures and stress would help solve many problems in the medical industry.

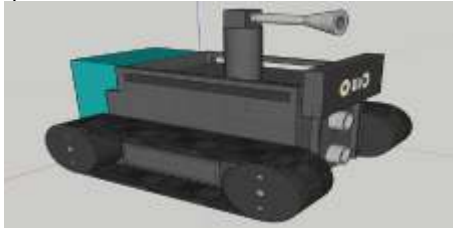


KR.3.

Title Fire Fighter Drone Robot
Authors Ian Park
Institution Cranbrook Schools

Description EN

Linux system supports Command Line Interface, allowing the robot to perform continuous movements. Makes Linux a favorable choice in making a prototype. Using RFID communication makes it possible for users to specify the location of the robot in cases of not being able to locate the drone in particular areas.

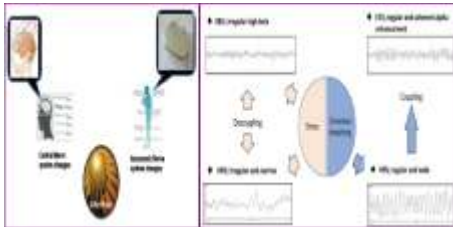


KR.4.

Title A Study on the Expression of Emotions and Minds Using the Correlation between Brain Wave and Heart
Authors So Un Park
Institution Korean Minjok Leadership Academy

Description EN

The human brain waves recognize changes in brain waves when the heart is strong, slow, or diseased, each wavelength is caused by mood or emotion, and these wavelengths correlate with heart rate or blood pressure, and compare them with 3 different types of data. Not just knowing the expression of this method, it was possible to predict the occurrence of the disease, which has been proven recently that heart disease and brain disease are interrelated.



KR.5.

Title

Artificial Intelligence Investment Propensity Determination and Recommendation App

Authors

Jang Kyung Choi

Institution

Singapore American School

Description EN

If AI investment app is a one-dimensional AI app that informs investment in stocks or stocks by making prediction models without analyzing customers' propensity or investment patterns such as stocks or bonds, this new investment app is an advanced AI app.



KR.6.

Title

A Study on Antimicrobial Properties Mixing Ginseng Fermentation Solution with Specific Actinobacteria

Authors

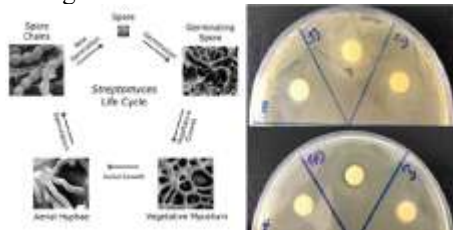
Hyung Jun Lee, Alexander Park

Institution

**North London Collegiate School Jeju
Korea International School**

Description EN

We had an experiment to test whether this compositional substance with actinobacteria and ginseng extracts could effectively suppress the spread of bacteria by exterminating the bacteria as well.



KR.7.**Title**

AI, change the low-definition image of two-dimensional X-Ray, CT, etc. to high-definition.

Authors

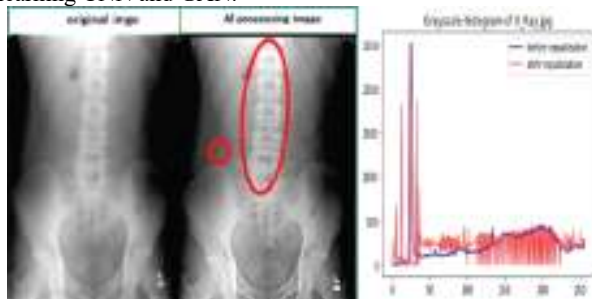
Won Yeol Choi

Institution

NLCS Jeju

Description EN

There are many people who have pain in their bones and cannot find details about X-rays. They are diagnosed with microfractures by taking mri. The problem with this diagnosis causes persistent pain for the patient and additional costs for the patient. Thinking about how to solve these problems, we learned how to use OpenCV, and we used openCV to reduce noise and reduce the image quality to high quality using deep learning CNN and GAN.



Lebanon

Represented by

National Association for Science and Research

LB.1.

Title

Dry Socket: New Etiology and Management

Authors

Wael Khalil

Institution

National Association for Science and Research -
Lebanon

Patent no.

-

Description EN

Dry socket (or alveolar osteitis) has been considered as the most common complication among those following dental extraction, many local or systemic factors are involved in the incidence of dry socket, such as local trauma, previous infection, use of contraceptives, smoking, comorbidities, etc., but according to present literature, there is no clear etiology of dry socket and the most current accepted hypothesis, that is centered on disorder in blood clot cannot explain alone all the clinical aspects of dry socket .

Based on bacterial culture and consequently on antibiotic prescriptions of serial cases we hypothesize an infection process to explain the pathophysiology of dry socket. According to our findings, *Pseudomonas aeruginosa* (found in culture), a biofilm forming bacteria is accused to be the principal cause of dry socket and hypothesis based on *Pseudomonas aeruginosa* and infectious process can better explain all clinical aspects seen and manifested in dry socket, including: onset of symptoms, exposed alveolus, severe pain, presence of lymphadenitis. Further investigations on larger number of cases are needed to confirm our findings.

Class

LB.2.

Title	New biocement from onion for dental application
Authors	Mohammad Medlej, Akram Hijazi, Mahmoud Kattan, Paul Nahas
Institution	National Association for Science and Research - Lebanon
Patent no.	-
Description EN	<p>The active compound was extracted from a wild species of onion. by using the combination of maceration and ultrasound. Extraction conditions were optimized by using response surface method (RSM) with a central composite design (CCD). The optimal extraction yield was 82.8 %. The antioxidant activities of the extract were evaluated from β-carotene bleaching and many others tests. Data show that the extract presents outstanding antioxidant activities. Biocompatibility of the extracts was evaluated using hemolysis and cytotoxicity assays. The adhesion force was determined by using DMA metravib machine.</p> <p>All results give an important power to use it in dental application</p> <ul style="list-style-type: none"> - Strong Adhesion Force (5 MPa) - High diffusion in dentine's (10 μm) - High antioxidant activity (Anti-lipophilic radicals with IC50 = 0.12mg/mL, inhibition of 98.3 % at 1mg/mL.) - Nontoxic with Safety factor > (155) - High thermal stability 200C

Class

Macao

MC.1.

Title

A method for indicating the braking distance based on motorcycle speed measuring

Authors

Hio Tong Ku, Ka Hou Mak

Institution

PUI CHING MIDDLE SCHOOL MACAU

Patent no.

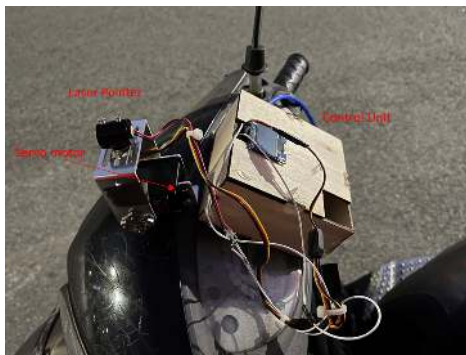
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Description EN

According to the statistics of the October in 2020 from the DSAT[1], Macau, there were 8116 cases for traffic accidents. 1375 cases for not give way to pedestrians crossing the road on the crossing line. Traffic accidents were up to 14715 cases in 2017, also there were up to 1677 cases for not give way to pedestrians crossing the road. The cases above show that traffic accidents cases increase these years. In May, 2019, there was a news talking about an old man was hit by a young guy who was driving motorcycle, it caused the old man got hurt. And there are countless news like this, that's why we make an item to solve these problems. A braking distance calculation is provided as the basis, a movable laser pointer is designed for the driver know where is the point after the motorcycle brake. For this device, we use GPS for speed detection, and the degree of the laser pointer is calculated for controlling where the laser will shot to. And the place that the laser shot to is the braking point.

Class

Safety, protection and rescue of people



MC.2.**Title**

A New Type Application Research of Rubens tube in Acoustics Teaching

Authors

Leong Chi Wang, Leng Ka Hei, Chong Ka Sin, Vu Weng Ian

Institution

The Affiliated School of the University of Macau

We designed this device to achieve the goal of the visualization of standing waves by reducing the risk of using flames in Rubens tubes, and find out the effects of different sound frequency and pressure on smoke.

We put the LED light into the tube body which has small holes. Then put a speaker and a fog machine on the sides of the tube, turn on the fog machine and speaker, observe the flowing of the smoke from the device under different music. If the sound wave of a fixed frequency is introduced into the tube, a standing wave will be formed. When the pressure of the standing wave is the highest, the speed of the smoke from the small hole will be the fastest. In con, when the standing wave pressure is small, the amount and rate of smoke sprayed from the small holes will be less and slow.

Description**EN**

1.Colour

The red light has the longest wavelength in visible light, therefore the use of red light can make the smoke spraying easier to observe and also enhance the visualization of standing waves.

2.Sound wave

When the speakers play high-pitched music, the effect is better than the low-pitched music.

3.Temperature

Experiments have found that the height of the spraying smoke increases regularly with the increase in pressure. The shape of the smoke corresponds to the shape of the standing wave, which is related to the increase in temperature in the tube caused by the accumulation of heat.

Class

Industrial and laboratory equipment

MC.3.**Title**

A study of the repairing effect of *Cabomba caroliniana* on eutrophic water

Authors

Vong Un Tong, Cheang Wai Lam, Liu Zhi Xi, Wong Weng Io, Sit Cho Lam

Institution

The Affiliated School of the University of Macau

Red tides which is known as a kind of algae bloom, belongs to a type of marine disaster. It alternately appears on the Hac-Sá Beaches and the Cheoc-Van Beaches in Macau. It has a significant impact on the local residents as well as causing a lot of serious pollution to the ocean. In the light of this, we hope to purify the water source by using some common aquatic plants.

Description**EN**

In this study, we carried out an experiment on the algae-inhibiting properties of *Cabomba caroliniana* on the basis of the high incidence of the Red Tide phenomenon in Macau. The extraction and performance study of *Cabomba caroliniana* tissue were designed. Our purpose is based on the excessive reproduction speed of red tide algae, hence this experiment was carried out.

Based on the algae-inhibiting properties of *Cabomba caroliniana*, the in-depth research on the inhibitory effect of *Cabomba caroliniana* can be the reference. It provides the basic gist for the biological control of *Cabomba caroliniana* and also the development of natural algae inhibitors. Meanwhile, *Cabomba caroliniana* can effectively solve the damage caused by the excessive propagation on the red tide control.

Consequently, the performance of the extraction of *Cabomba caroliniana* on the algae-inhibiting properties was successful and prospective. This means that it might have a huge development in the future that can reduce the pollution in the ocean.

Class

Environment - Pollution Control

MC.4.**Title**

A warning indicator against vehicle speed detecting near the crossing line

Authors

Chon Kio Lam

Institution

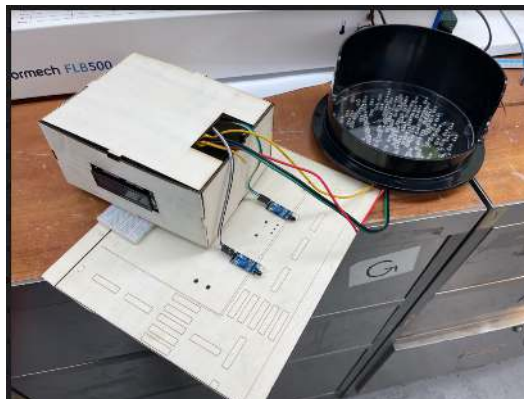
PUI CHING MIDDLE SCHOOL MACAU

Description EN

According to the statistics of the DSAT. Traffic accidents have increased in recent years. In December 2020, there was an alarming news report of an elderly gentleman standing on the side of the road and crossing directly. Several cars whizzed by. However, he was struck by a vehicle at high speed. The impact was severe. The 70-year-old man was hit and flew several feet across the road and died on the trip to the hospital. So, I found a way to solve those problems. Depending on the speed of the vehicle, approximately measure the distance of the vehicle and then warn people if it is appropriate to cross the road to reduce the recurrence of similar things. A speedometer , indicator, a red and green light is used for my invention.

Class

Safety, protection and rescue of people



MC.5.

Title	An Integrated Quality Inspection System for the Rotor of Commutator Motor based on EEMD Algorithm
Authors	Ka-Wai HUANG, Un-Man WONG, Yi-Xing LIANG, Chon-Hin WONG, Seng-Chi NGAN, Hio-Mei CHEOK
Institution	Lou Hau High School, Macau, China
Patent no.	ZL 2016 2 0312030.0
Description EN	Due to electric motors' omnipresence in the modern world, precise diagnoses of their faults are of great importance because they can cause a significant threat to the operators' safety and impact the financial investments due to equipment loss operation and downtime. The inter-turn short circuit fault (ITSCF) of rotor winding (RW), in particular, is the primary mode of electric motor failure. This invention address the need to prevent catastrophic motor failure and satisfy the market's needs by providing a novel, high-performance, low-cost, easy-to-operate fault detection device for ITSCF. The device consists of two parts: (1) EM generator that energizes RW; (2) EM probe precisely positioned a ferrous metals strip near the RW under test for detecting ITSCF through mechanical vibration.
Class	Industrial and laboratory equipment

MC.6.

Title	Design and application of a community epidemic prevention intelligent collecting robot
Authors	Leong Si Sam, Shi Zhuang Hao, Wang Ka Kuan, Lin Wai Chak
Institution	The Affiliated School of the University of Macau
Description EN	In the context of rapid development of industrialization and global pneumonia epidemic, and noticing personnel in front line were busy and chaotic especially during the peak of epidemic, we designed a smart robot to participate in this disease prevention and control war. Robots work for people during epidemic reduce risk of people cross-infection, save labor cost and improve work efficiency.
Class	Mechanical Engineering – Metallurgy

MC.7.**Title****Pizza Heat Preservation Device****Authors**

Cheng Cheuk Ho, Yeung Yat, Pun John Julian, Chan Weng Son, Yao Lok Fong

Institution

Premier School Affiliated to Hou Kong Middle School

Description EN

Because I remember that when I went to dinner with my mom, we ordered a lot of food. Because I like to eat pizza the most, I left the pizza at the end. But the pizza became very unpalatable when they got cold. I thought it was a waste. So I decided to design a device that can keep the pizza warm so that pizza lovers can enjoy delicious pizza throughout the meal. This device provides power to the heating module through a lithium battery, and transfers heat to the entire invention through a thermally conductive pizza pan. The invention outside the device heats up to keep the inside and outside of the pizza at a proper temperature, so that the pizza can be maintained at the best status of use. At the same time, the 3 wooden chassis structure provides a heat-proof effect, and the heat is used to maintain the temperature of the pizza, so that the pizza can be kept in the best eating state on the table.

Class

Chemical and Textile Industry

MC.8.**Title****Smart Parcel disinfection cabinet****Authors**

Cheng Ho Tung, Wong Chi Kei, Yao Lok Fong, Yeung Yat, Pun John Julian, Chan Weng Son

Institution

Premier School Affiliated to Hou Kong Middle School

Description EN

Aiming at the problem that the package has germs and virus attached to the surface and user can be infected, the design idea of using ultraviolet disinfection is proposed. Through the mirror reflection structure inside the disinfection cabinet, the internal light irradiation is adjusted, so that the package inside the disinfection cabinet can be disinfected at multiple angles. In addition, we have adopted an automatic sensor door method to allow users to avoid contact with the door of the disinfection cabinet, which will also reduce the risk of contact the spread of disease.

Class

Medicine - Health Care – Cosmetics

Macedonia

MK.1.

Title

Multipurpose organic anti-rash cream

Authors

Kristijan Nikolov

Institution

Yahya Kemal College - Skopje

Description EN

Organic cream produced with all-natural ingredients that help with skin problems. Essential oils used were tested in a microbiological laboratory and the inhibition of growth of different bacteria were measured. Natural ingredients used do not contain any preservatives, allergens or any other irritants.

For the purpose of using natural creams as remedies skin related problems first, we test how natural oils perform against the bacteria and then we are preparing all-natural organic cream that helps in skin related problems. That is why we first did microbiological laboratory testing of oils against bacteria/fungus. We test 5 oils against 5 bacteria and 1 fungus.

Second, and in addition to the oils, we also use other ingredients to prepare the mixture with which we prepare the multipurpose organic anti-rash cream. All these ingredients were carefully mixed in a controlled ambient temperature.

The multipurpose organic anti-rash cream that is a final outcome of this project is entirely natural. It does not contain preservatives, corrosive substances, corticosteroids and other irritants.

Class no.

4. Medicine-Health care-Cosmetics

MK.2.

Title

Multipurpose St John's wort / Black Cumin Oil Cream

Authors

Kristijan Nikolov

Institution

Yahya Kemal College - Skopje

Description EN

Organic cream produced with all-natural ingredients might help in some skin related problems, usually represented with itchiness, redness, inflammations, or acne. The nature of Republic of North Macedonia is rich with necessary herbs and tradition to prepare proper ingredients out of which we managed to prepare the organic cream.

But before organic creams are produced there is a very important step where the essential oils with which the creams are produced needs to be tested on how they react on different bacteria. This requires:

- Thorough preparation of the oils
- Experiments conducted on cultivating bacteria in controlled laboratory environment
- Testing on how oils perform against the bacteria from the experiments
- Organic cream samples produced

For the purpose of using natural creams as remedies skin related problems first, we test how natural oils perform against the bacteria and then we are preparing all-natural organic cream that helps in skin related problems. That is why we first did microbiological laboratory testing of oils against bacteria/fungus. We test 2 oils against 5 bacteria and 1 fungus.

Second, and in addition to the oils, we also use other ingredients to prepare the mixture with which we prepare the multipurpose organic cream. All these ingredients were carefully mixed in a controlled ambient temperature.

The multipurpose St John's wort / black cumin oil cream that is a final outcome of this project is entirely natural. It does not contain preservatives, corrosive substances, corticosteroids and other irritants.

Class no.

4

MK.3.

Title

Using Aloe vera plant to remove heavy metals from water

Authors

Enkela Karpuzi

Institution

Yahya Kemal College Skopje

Description EN

My project is to use aloe vera plant to remove heavy metals from contaminated water. Our goal with this project is to prove that water that has been contaminated can be cleaned and reused for different purposes. To make this possible we assembled materials which are easily found at the local store, pharmacy or even at your garden. First we mixed our metals (Copper, Lead, Manganese and Zinc) with distilled water, we treated water with a certain amount of aloe vera and we did

decantation for 15 min and filtered the water and performed a chemical analysis. And if the results are positive we can use this method for cleaning the water. In conclusion we can see that there are many ways to make water clean and now we can also see that there is aloe vera as another option, it's an affordable option, easy options and an ecological option, it's just a matter of initiative at this point. In the future we hope that people start reusing water by cleaning them with alternatives, so that our freshwater resources don't run out.

Class no.

1

MK.4.

Title

**Vinegars: Apple, Aronia, Plumb, Hawthorn
“Apple, Aronia, Plum, Hawthorn-wonder plants that
removes heavy metals from water”**

Authors

Meryem Alkin, Engin Alkin, Ahmet Tarik Dinc

Institution

Yahya Kemal College - Skopje

Description EN

Necessary substance to stay alive is water, especially clean and fresh water. Without water, there would be no vegetation on land, no oxygen for animals to breathe and the planet would look entirely different than it does today. This gift of nature makes up 70% of the surface of the Earth with only 1% of that as fresh water that is easily accessible and not trapped in glaciers and snow fields. This natural resource every day becomes less and less accessible, and its availability is big economic and social problem. And our mother uses homemade vinegars everywhere in the house. This summer our nephew Tarik's father sent Hawthorn vinegar from Turkey and because of Covid-19 situation my mother took different workshops for making creams and organic foods. And she started to make vinegars with our help and we want to clean water by using homemade vinegars. Our aim is to prove that with this natural resource **apple , aronia, plumb and hawthorn vinegar** can make the quality of water way better, especially the quality of polluted water, and with that We can make better conditions for living and We will make better environment and make the people's lives better. Heavy metals that we used were: **Zinc (ZnSO₄.7H₂O), Copper**

(CuSO₄), Lead (Pb(NO₃)₂), Manganese (MnO₂) from multi-component systems at different adsorbent/metal ion ratios. We used these heavy metals altogether since we tried achieving the same level of pollution like the ones in the most polluted waters flowing in Macedonia. The optimum absorption was found to occur at contact time 18h, adsorbent dose from highest range from 99.97% for Pb (with all types of 2.5% vinegars)

Class no.

1. Environment-Pollution control**MK.5.****Title****NATURAL AIR PURIFIERS ARE AROUND US
WE JUST NEED TO UTILIZE THEM****Authors****Erjona Azizi, Nadire Gul Yilmaz****Institution****Yahya Kemal College Skopje****Description EN**

The purpose of our project was not only to clean the air but also to make living easier as well. We live in North Macedonia where the air is so polluted and that approximately 1,350 deaths a year in the country are due to particulate air pollution. Particulate pollution cost the Macedonian economy about 253million euros, or 3.2 percent of GDP in 2011 (due to high premature deaths, healthcare costs, reduced population productivity and absenteeism). We wanted to at least try and find a solution to this crisis so we started brain storming .We came to the conclusion that we should try and experiment with a few plants that have cleansing abilities in order to filter the air from common harmful gases. We experimented with a lot of plants both dry and fresh such as: *Rosemary, Lavender, Chestnut with its components* and *Aloe Vera*

MQ - 135 is an air quality sensor with an operating voltage of +5V that is used to detect gasses of wide variety such as NH₃, NO_x, alcohol, Benzene, smoke, CO₂, etc. Resistance value of MQ-135 differentiates to various kinds and various concentration of gases. Therefore, sensitivity adjustment was calibrated for 100 ppm NH₃ or 50 ppm Alcohol concentration in air. We assembled the MQ- 135 air quality sensor to the Arduino single board microcontroller, in order to create a precise device for detecting the air quality changes in our experiments.

Class no.

1. Environment-Pollution control

MK.6.**Title****CLEANING WATER WITH SEEDS AND SHELLS****Authors**

Mihaela Nastova – Seniha Eslem Aydogdu

Institution**Yahya Kemal College - Skopje****Description EN**

With this project, we want to prove that contaminated water can be cleaned effectively and cheaply using food waste. When eating different food products from plants, there is a part which is not edible and it usually ends up in waste. These parts are the seeds, skin, and shells of the fruits, vegetables and nuts. There is a large number of types and species of nuts and fruits, however we chose to work and experiment with common snacks and appetizers such as dates, walnuts, sour cherries and pistachios. The non-consumable waste that comes from these products can serve a bigger purpose than just to be decomposed and bring back nutrients to the soil. Not only the soil but the water can use its benefits. We used sour cherry seeds, date seeds, walnut shells and pistachio shells which are easily accessible, and observed if they can absorb heavy metals.

We prepared contaminated water using solutions containing heavy metals, specifically Manganese, Lead, Chromium and Copper and poured them into 16 cups. We measured different amounts of each seed/shell and put them into the water solutions. Then we put the mixtures onto a magnetic stirrer and let them stir for 15 minutes. After the mixing finished, we filtered them with filter papers. When we received the chemical analysis of the solutions we saw that the results are positive and this method is approved to clean water.

Class no.

1**MK.7.****Title****Avocado and Chestnut peels for a better Environment****Authors**

Marija Shukulovska, Mihaela Zaneva

Institution**Yahya Kemal College****Description EN**

The health of our soil is of great importance due the impact it has on our daily diets. Eating unprocessed, fresh crops seems like more of a luxury than something we should have regularly in our everyday lives. Keeping

our soil unpolluted is vital to a healthy lifestyle and a green environment.

Constant distribution of agricultural chemicals and industrial activity retains the soil from staying in its natural nutritious state. Soil gets polluted when it gets in contact with toxic substances most frequently chemicals which are produced by human industry. These chemicals are distributed by contaminated water, underground storage tanks, applications of pesticides, herbicides or fertilizers etc. Because of this we chose to take our soil near one of the largest factories, which contributes excessively in polluting the soil in the surroundings of Veles, Macedonia.

Unfortunately, in our country there is a high percentage of both air and soil pollution. Even though the levels of pollution are particularly the same all the energy is devoted to the air pollution. This is why we set a goal to find a way to clean our soil in a cheap, eco-friendly and innovative way. Cleaning the soil from heavy metals, using chestnut and avocado peels which are easily available, inexpensive and biodegradable has proven to be a reliable way to easily clean soil in polluted areas. This method proves to be faster and easier than the methods used in soil cleaning factories. We hope to utilize it so it can fit global needs.

Class no.

1

MK.8.

Title

3D printed Bionic Arm – Venus Arm

Authors

Orhan Bagashov – Teo Kitanovski

Institution

Yahya Kemal College - Skopje

Description EN

Open-source bionic arm with revolutionary design and innovative features like the first universal forearm socket and pre-assembled 3D printed finger joints, in order for everyone to be able to buy the parts that are needed from third-party sellers and assemble it with our instruction within an hour, without any previous experience. It is 30 times cheaper than the other bionic arms.

Class no.

2, 10

MK.9.**Title**

USING SUPER HYDROPHOBIC SURFACES IN DAILY LIFE TO PREVENT BACTERIAL INFECTIONS

Authors

Nadire Gul Yilmaz

Institution

Yahya Kemal College, Skopje

Description EN

Super hydrophobic surfaces are surfaces that are very difficult to wet. The contact angle of a water droplets are greater than 150° , this makes the water slide away. The leaves of the lotus flower are good examples of super hydrophobic surfaces, even though they live in muddy water they have the ability to stay clean. When a droplet of water rolls off its leaves it also carries particles of dirt with them, this means it prevents bacterial attachment. This inspired us using it in a beneficial way for humans. It can be used in limitless ways such as prostheses, hospitals, schools, public restrooms, subways, stainless steel materials, textile fabrics etc.

Class no.

12

MK.10.**Title**

Water purification using Zea Mays cob (corn cob) : finding the easiest and most user friendly way to purify contaminated water

Authors

Alba Deari, Erblin Jakupi

Institution

Yahya Kemal College Skopje

Description EN

Going into this project we wanted to do something that would benefit our society environmentally. The idea of purifying water came up while doing research on what is more important nowadays for the better of our environment. We came across a couple of facts that lead us to believe that corn cobs can be a crucial asset to purifying water, so that's when our whole project idea and work started.

We tried lots of ways to purify water by using corn cobs, many of them failed until we came to the final method which is collecting contaminated water and letting it go through 5 layers which are: 1) whole pieces of corn cobs, 2) Small pieces of corn cobs, 3) Corn cob powder, 4) Corn cob active charcoal and 5) Fine sand. The contaminated water, by going through these 5 layers leaves all the impurities behind and turns to perfectly clean usable water. We ran 3 tests in the laboratory to test the water and the results came back positive. The 3 tests we ran are: the

INTERNATIONAL EXHIBITS

turbidity of the water, ATP detection, nitrogen and ammonium detection.

The importance of this project is that we all can create this eco filter at our homes without having to include toxic materials and also it is very easy to implement. By using this method we can save a lot of water which can be used in a lot of ways and we would benefit in saving what's left of our planet's water!

Class no.

1

MK.11.

Title

**Natural homemade topical pain relief ointment –
*Anti-dolore cream***

Authors

Ana Marija Dimoska, Martina Dzaleva

Institution

Yahya Kemal College Skopje

Description EN

After educating ourselves from various pharmacology books, we believe we have found the most effective, organic, low-cost ingredients that can ease pain, not only from long work hours but also from sport injuries. This is because in both cases the joints are overworked. By combining common comfrey (known for its external healing properties) with oils extracted from olives and rosemary as well as non-allergenic cream base ingredients, we can produce a highly effective pain relief product. With these oils we were able to make a complete extraction of the active substance Allantoin from the dried roots of the common comfrey which owns healing properties and helps with regeneration.

Class no.

4

MK.12.

Title

**The Potential in Biodegradable Bipolymer Obtained
from Whey Protein**

Authors

Elena Popovska, Ema Gajdova

Institution

Yahya Kemal College Skopje

Description EN

Since some of the plant-based materials (first generation feedstock) can take away food generally used for human or animal consumption, the preferred option is to utilize biomaterials which are by-products, wastes, or residues from other processes (second-generation feedstock).

We chose cheese whey, which is a by-product of cheese production, as a possible biomaterial for producing plastic. It contains whey protein, which is a group of globular (spherical, globe-like) proteins. During cheese making,

INTERNATIONAL EXHIBITS

curdled casein is strained into cheese, thereby separating yellowish clear solution that is liquid whey. Nine parts of whey are generated per one part of cheese manufactured, of which approximately 0.55% is whey protein. Liquid whey contains about 2.5–7.2 g/L minerals, 44–52 g/L lactose, and 6–8 g/L proteins.

Class no.

1

MK.13.**Title**

AM:PM SMART MUG – AN ECO-FRIENDLY 3D PRINTED MUG W/ SOLAR POWERED WIRELESS CHARGER

Authors

Matej Milosievski, Andreja Popovikj

Institution

Yahya Kemal College - Skopje

This project's purpose is lowering the CO₂ emissions and amount of plastic being produced by providing the public with a product for everyday use, which is Eco-friendly, recyclable/biodegradable and practical at the same time. We created the "AM:PM SMART MUG – ECO-FRIENDLY, 3D PRINTED MUG W/ SOLAR POWERED WIRELESS CHARGER".

Description EN

It can be used both in a casual manner, during physical activity and during professional occasions. We put in extra effort to supply the most Eco-friendly version of each component, while keeping the costs as low as possible. The AM:PM smart mug is a thermal mug with a solar powered charger/s integrated in its cap. The cap resembles a solar power bank with a 5000 mAh lithium battery, a 5V/1A USB output and a 5V/1A, 5W wireless charger output, while still serving as a cap for the thermal mug. One of the biggest benefits of this project is that every single component and material can be recycled/biodegraded in some way or another. The implementation of the AM:PM smart mug would bring many benefits to our society such as:

- Lowering annual greenhouse emissions by 1.694 kg per person, or 13 megatons globally.
- Lowering annual plastic production by up to 5.278 kg per person, or 40.5 megatons globally.
- Lowering annual paper production by 0.653 kg per person, or 5.01 megatons of paper on a global scale, which transitions into 7.3 million less trees being cut down each year by the paper industry.

Decreasing production of lead-ion batteries.

Class no.

2

MK.14.**Title****Safety Crossing System for Pedestrians****Authors**

Amin Osmani, Efe Kaja, Arlin Jonuzi

Institution**Yahya Kemal College / Tetovo****Patent**

MK/P/2020/000990

Description EN

Safety crossing system is an invention which refers to zebra crossing in traffic fields. This system is used to increase the safety for drivers and pedestrians while pedestrians cross roads. It's a hardware control project which includes electronic circuits with arduino and programming in arduino boards to control the hardware pieces (Ultrasonic Distance Sensor, Leds, Buzzers and 4 x matrix display).

Safety crossing system is set on the traffic roads. There is another iron skeleton which holds the ultrasonic sensor up that is a little bit higher than standard heightness of vehicles. This skeleton is placed before 150 - 200 meter so that the sensor detects the emergency and informs the people who are about to cross the road. This Ultrasonic distance sensor is also used to calculate the speed of the vehicles.

There are leds placed over the zebra crossing and around the Ultrasonic distance sensor. They blink in case of emergency to send a warning message to the walking people on the zebra crossing and to the drivers to warn them not to drive fast. There are also buzzers used to make a sound for warning the pedestrians on the traffic road side which are placed near to the zebra crossing and near to the driver before 150 - 200 meters to the zebra crossing. Additionally 4 matrix displays are also used to show a text of "SLOW" that keeps warning the drivers not to pass the speed limit (50km/h).

Class no.

10

MK.15.**Title****CleanBot****Authors**

Jasin Demiri, Edin Halili

Institution**Yahya Kemal College / Tetovo****Patent**

MK/P/2020/000990

Description EN

Our project is trying to help or in other words ease the fear of the pandemic. Well one project cannot really do that much to ease the fear, but it can help.

In our Auto Sanitizer Machine, we have used Lego EV3 Mindstorm to build, detail and programming of our project.

Mechanism of our project consist of some materials (2 Motor, 3 Ultrasonic sensor for measuring distance, Lego EV3 Hub and other bricks). It starts from the motors, the motors push down the Lego railed line and push the cap of the sanitizer, and the motors activate (they push the Lego line) when the pair of eyes that are linked close to the cap of the sanitizer see any object, so basically if you get close your hands to sensors it will automatically sanitize your hands.

Two other pair of eyes have their own programming. If the Pair of eyes one sees you and you pass it without using the sanitizer it will start alerting, if you go back to the vision of the two pair of eyes the alarm will stop by the pair of eyes two but to deactivate the alerting you must use the sanitizer. After usage of sanitizer, it will wait for 7 sec. for serving another person.

We can mostly use this at schools, hospitals and factories. I would recommend the placement being the Exit/Entrance

Class no.

10

Malaysia

Represented by University Malaysia Perlis

MY.1.

Title

SAOIL

Authors

Wan Suryani Wan Mohd Razali, Mastura Ismail, Nurrul Syairah A Shukor, Noor Azizah Mat Hassan, Suraya Shabingin, Khairun Hanisah Mujib, Abdul Zuhir Ahmad Ziyadi, Marsya Khairina Khairul Izwan, Muhammad Thaqif Ilias, Muhammad Ainul Salim Alsiddiq Abdul Halim, Muhammad Thaqif Adli Abdul Aziz, Muhammad Syafiq Aiman Shamsudin, Hariz Azfar Hasrul Nizam, Hanis Hana Nia Mohsin, Aisyah Ilmina Ismail, Aisyah Ilmuna Ismail

Institution

SBPI GOMBAK

Patent no.

-

Description EN

Sustainable development called for the invention of multipurpose products especially the one that can be easily attained. Filtered cooking oil was used as a base in the production of SAOIL, an organic soap which capable of removing grease effectively as well as having antimicrobial property in par with the commercially available soap at only a ration of production cost. This is attributed to the oil base in the soap which utilized domestically used cooking oil that is often being thrown untreated. The production of SAOIL was conducted by mixing the filtered cooking oil with the extract of *Cymbopogon nardus*, granulated sodium hydroxide and glycerin based before being cooled down to room temperature to generate a bar of soap that is capable to conduct its function similar with commercially available one. The effectiveness of SAOIL was conducted in several series of experiment and was compared to other types of soap available in the market. We believe SAOIL offer better function at a much lower price. We hope that this product will be an alternative to replace the chemically harsh soap that are readily available in the market.

Class no.

1

MY.2.

Title	PIPERIDE Wan Suryani Wan Mohd Razali, Mastura Ismail, Nurul Syairah A Shukor, Noor Azizah Mat Hassan, Suraya Shabingin, Khairun Hanisah Mujib, Abdul Zuhir Ahmad Ziyadi, Ahmad Atief Adham Mohd Nazri, Ummu Balqis Mohd Shahidan, Muhammad Alif Eiman Amran, Muhammad Adib Zakwan Zulkifli, Aneesa Humaira Fairul Hadi, Nurul Basyira Kamaruddin, Naurah Batrisya Mohd Azharuddin, Wan Mohamad Zarif Wan Mohamad Zakree, Wan Izzah Sakinah Wan Ahmad Dzaffran, Harith Idris, Muhammad Nazhan Mohamed Nadzri
Authors	
Institution	SBPI GOMBAK
Patent no.	-
Description EN	Antimicrobial compounds are needed now more than ever. With the increasing threat of pathogen during this pandemic, the demand for hand sanitizer is increasing. The drawbacks of commercially available sanitizer including limited activity of antimicrobial effect especially against non-enveloped viruses and bacterial spores called for a more effective antimicrobial compound. Eugenol and Hydroxychavicol, are two compounds in <i>Piper betle</i> and <i>Piper sarmentosum</i> leaves have been scientifically reported to induce bacterial cell death and pose antiviral activity. This information was used to create <i>Piperide</i> , an organic hand sanitizer made from locally grown <i>Piper betle</i> and <i>Piper sarmentosum</i> . Ethanolic extracts of this plant were mixed with ethanol, aloe vera gel, glycerol and water in specific composition to produce a solution with high antimicrobial activity as well as moisturising the skin barrier. The effectiveness of this product was conducted using Kirby-Bauer disc diffusion method against bacterial colony growth. We believed that this product will highlight the potential of <i>Piper betle</i> and <i>Piper sarmentosum</i> , a local Malaysia plant to reach the global market.
Class no.	4

MY.3.

Title Project AL
Authors ‘Ariff bin Amir Ali, Hifzhan Thaqif Mohd. Radzali, Muhammad Emin Mikael Muzamry, Ashraf Alimudin Zahin Akramshah Muammar Ubaidah, Muhammad Nuaim Hadif Mohamad Rosli, Mohd Khaidzir Yusof, Mohd Shahadan Abdul Rahman
Institution The Malay College Kuala Kangsar
Patent no. -

Project AL is an eco-system of microalgae air purifiers. Project AL boils down into 2 components AL hub an industrial size unit which as a microalgae air purifier system and a hydroponics system. And the second component is AL mini which is a 12-litre desktop size unit that is a microalgae air purifier.

Description EN



Class no.

Environment - Pollution Control

MY.4.

Title Safety Extension
Authors Muhammad Rafiz Jazman Rafizal, Muhammad Darwish Zaki, Haleefz Hashini, Ahmad Fahim Ahmad Faizal, Mohammad Mujahid Suhaimi, Mohd Razif Abdul Razak, Yanti Mat Amin
Institution The Malay College Kuala Kangsar
Patent no. -

Description EN Safety Extension is a better version of extension that warns the users once it has reached maximum current. Once it reaches maximum current limit, there will be high pitched buzzer and blinking lights to warn the users. After a certain

amount of time, the extension will automatically shut down so it doesn't create any danger

Class no. 12

MY.5.

Title

AROMATIC GERANIOBWAX CANDLE

Authors

Adlan Zakwan Arnizan, Naim Arfan Rosli, Syazreena Abdul Zawi, Nur Nasuha Erina Muhammad Iskandar, Nuramirah Maisarah Maizali, Alya Irdina Mohd Firdaus, Dania Nur Khadeeja Ghazali, Nur Diyanah Kamilah Noraidil Razman, Safia Nadeen Abdul Aziz, Lisneza Roseli

Institution

HULU SELANGOR SCIENCE SCHOOL

Patent no.

PENDING

**Description
EN**

Mosquito's bites lead to harmful diseases. To avoid it, we usually use aerosol spray. However, it contains chemical like CFC which are harmful. The mosquito also can be repelled using scented candles. However, the usual candles are made of paraffin wax, which is derived from petroleum. When it's burnt, it releases toxic compounds which affect the environment and our health too.

From the issues above, we created a product which we call Aromatic GeranioBwax Candle. Our product is made from beeswax and geranium which contains zero chemical traces and eco-friendly. Our objectives are reducing the usage of aerosol spray. Besides, we want to prevent illness caused by usage of chemical products such as breathing problems and dengue.

We prepared our product by putting the beeswax into a beaker and melt the wax. After the wax is totally melted, we put 20ml geranium oil and stir until it mixed. Then, we transfer the mixture into a jar and put a wick in the middle. When the wax has already froze, then our product is ready.

Our product is better than the usual one as our product has new features. For example, our candle last longer than the paraffin candle. Besides, our candle helps purifying the air and repelling the mosquito. Our candle also helps people to relax their mind and give positive vibe. In the future, we hope we can make our candle spread its scent to a wider surrounding.

Our product can be used especially by candle lovers. Besides, the hotel can use our candle to spice up their room with an aromatic aroma. Meanwhile, the spas can light up our candle as it helps relaxing the customers' mind. Lastly, the restaurant can light up our candle on the table especially for a candle light dinner.

Class no.

3. Medicine – Health Care - Cosmetics

MY.6.**Title****HYDROVASE****Authors**

Adlin Norman Norlymalis Jazzuir, Muhammad Afif Danial Rushdan, Muhammad Firdaus Badrol Nizam, Roshan A/L Arivananthan, Adam Khairrul Amin, Uzair Hani Shaha Baha, Rayyan Amsyar Mohd Nazri, Muhammad Firdaus Danial Mohd Shaidi, Tuan Hariez Daniel Tuan Hazli, Lisneza Roseli

Institution

HULU SELANGOR SCIENCE SCHOOL

Patent no.

PENDING\

**Description
EN**

People use pot to plant some flower, herbs or even a small size fruit tree. Almost every house around the world have at least 1 pot, but there are always some disadvantages by using these pots.

Usually, what happen to all the extra water that you pour inside pot? It just flows away, right? Plus, what happen to the plant soil that you didn't water for a long period of time? The soil is dried and dusty. When you check it there is an ant's nest. Plus, is there some stagnant water at your vase plate?

Hydro Vase (HYVE) is a modified pot with some special part, using different material, plus some brilliant idea, making it such a special pot and also as a solution to all the problems that is own by the normal pot. We use two different material which is sponge and clay. We glued the sponge upon the outer layer of the pot and we apply clay on the outer layer of the sponge. There are three layers of the pot, the second layer (sponge layer) will stores the water and the third layer (clay layer) will be the barrier and protect the water inside (to keep it clean). Thus, this benefits the targeted users as it comes with a light weight to move to other places.

In a hot day, plant loses water by transpiration process. As we all know, high heat, high pressure. So, the heat outside going to cause a high pressure inside the second layer, pushing the water inside it all back to the soil. Thus, making the soil always wet and in a moisture condition. As it will avoid tons of inconvenient caused by the pot. As for know, we use puttyfilla for the making of prototype as it shares the same characteristics clay except it takes much more time too dry compared too clay.

Class no.

3. Agriculture and food industry

MY.07.**Title****Mai'a Oat Biscuits****Authors**

Nuradlina Syafiqah Ahmad Kamal, Nurin Arisya Abdul Halim, Nor Dalilah Nor Zaili, Masyitah Noor Azizan, Sudeshna A/P Suria Rao, Locana Naidu A/P R.Sundharan, Adani Sufia Zairol Azlan, Nur Alya Irdina Ahmad Maszuki, Nur Lidiya Syazwani Mohd Shaharimi, Lisneza Roseli

Institution**HULU SELANGOR SCIENCE SCHOOL****Patent no.**

PENDING

Description EN

Nowadays, a lot of food waste is being disposed which still contain good nutrition. One of the wastes is the banana peel. We know that banana contains nutrients such as high fibre, as well as several antioxidants. Instead of throwing them away and make people waste all the nutrients from banana peels waste, we decided to use the waste as the main substance in our product. We named our product Mai'a Oat Biscuit.

Mai'a means banana in the Hawaiian language. Since we made the biscuits with the banana peel waste, we named it Mai'a Oat Biscuits.

Our product is used to overcome the problem when it comes to disposing of the extra banana peel waste. Besides, if we throw the waste at random places, it creates a bad smell and will clog the drain.

Banana peel is washed, cut into small pieces and dry in the oven so that it is easier to become flour. When the flour is produced, we put it into a container and make sure the container is being sealed tightly to prevent air from entering and spoil the flour. Then we mix the flour with other ingredients to produce Mai'a Biscuit. It is a baked snack, cheap, crunchy, long-lasting and daily snacks love by everyone.

Our product is eco-friendly because the materials that we use do not contain any chemical substances. Besides, we also clean the environment by reusing food waste and turn it into a useful product. This product brings us to a healthy lifestyle and also ensure our body will get enough number of nutrients.

Class no.

3 Agriculture and Food Industry

MY.08.**Title****MULTIPURPOSE TROLLEY****Authors**LUCAS NGANG JIM XUEN, DARENCE KIUNG
EEZER, NGAN KIN SENG, SIAO CHIN TZE,
CHIENG LEY FONG**Institution****SJK THAI KWANG SIBU, SARAWAK,
MALAYSIA****Patent no.**

-

Description EN

Multipurpose Trolley is designed to lighten the burden of heavy lifting as well as respond to environmental protection. It also speeds up the process of moving heavy objects from one place to another place. It is used to move hefty and bulky things regardless of their sizes. The materials used to make the Multipurpose Trolley are unused steel rods, car mechanical jack, spray paint, wheels, heavy duty bungee rope and a foldable plank. It is designed based on the concept of the third-class lever. The idea of the Multipurpose Trolley originates from the venue set up for various functions in schools which usually involves a lot of manpower. Based on an interview with a local orthopedic surgeon, the act of carrying heavy objects have great negative impact to our backbone and worse to the worst, it might cause health problems such as low-back pain, musculoskeletal disorders, muscle sprains or tears. Multipurpose Trolley is not only suitable to be used in schools but also workplace. According to a report issued by Department of Occupational Safety and Health, Malaysia (2018), manual handling activities such as lifting, lowering, pushing, carrying, restraining or holding contribute 40% of reported musculoskeletal disorders (MSDs) cases in Malaysia. Moreover, Malaysia Social Security Organization (SOCSO) states that the number of MSDs cases related to manual handling activities increase from 2009 to 2014. Heavy lifting is an unavoidable task in our daily life and Multipurpose Trolley is here to prevent or minimize health problems related to heavy lifting.

Class no.

6. Mechanical Engineering – Metallurgy

MY.09.

Title

NOBLE WALKING STICK

Authors

KAYREN KIUNG ZIXIN, CHLOE CHENG XIAO CI,
JADYN KONG QIAO YII, SIAO CHIN TZE, CHIENG
LEY FONG

Institution

**SJK THAI KWANG SIBU, SARAWAK,
MALAYSIA**

Patent no.

-

Description EN

Noble Walking Stick is a modification of an existing crutch stool which functions as a walking stick, a stool and a shopping trolley. It is attached with an alarm device which flashes warning light when triggered in an event of emergency. User can activate the alarm to spread loud sound to ask for attention and help. Moreover, it is attached with wheels to serve as a shopping trolley. For safety reason, the safety reflective sticker is used to help the user to be always seen easily. The targeted customers for the Noble Walking Stick are the elderly. A United Nations report (2020) states that by 2050, the number of older people in the world will exceed the number of young for the first time in history. Also, Malaysia's Healthcare National Key Economic Area (2019) estimated that Malaysia will reach ageing nation status in just 10 years, with more than 15% of the population being aged 60 and over. Furthermore, based on the 2000 census reports collected in 2010, about 1.4 million older people in Malaysia live alone. In addition, the Centers of Disease Control and Prevention (CDC) reports that between 2006 and 2014, falls were the leading cause of traumatic brain injury-related deaths in people aged 65 or older. The statistics indicate that the seniors need to be more autonomous in managing their life without depending on other people. Therefore, Noble Walking Stick is innovated to give more support to the elderly and allow them to move around confidently.

Class no.

12. Safety, protection and rescue of people

MY.10.**Title****PYROPROSTASIA****Authors**

NICHOLAS TOO KAH HEE, SUMMER TING IN HUI, LAETITIA LAW EU QI, SIAO CHIN TZE, CHIENG LEY FONG

Institution**SJK THAI KWANG SIBU, SARAWAK, MALAYSIA****Patent no.**

-

Description EN

Pyroprostasia is a fire prevention device which is designed to prevent electrical fires. It can ensure the safety of the users while using extension cords. It is totally different from the fire prevention device in the market as it functions before fires ignite. It is designed using Arduino and temperature sensor is used to detect the wires' temperature. When it reaches the dangerous range, the red light will light up and the piezo will ring to attract users' attention. It will cut off the power supply automatically within five seconds when it is overheated. The target is residential areas as it is reported that residential fires took about 61% of the overall fire deaths per year and 48% of the overall injuries per year in Malaysia (Tan et al, 2016). Besides, Pyroprostasia can raise awareness of overloading a circuit. According to Aliza (2017), among all the causes of fire hazard, faulty electrical sources is at the top of the list in Malaysia, with more than 5,300 cases recorded from 2015 to 2017. In other words, Pyroprostasia can help to reduce the number of electrical fires which is caused by overloading a circuit. Pyroprostasia is planned to be built in extension cords. According to Worldometer (2021), the world population has reached 7.9 million. Each family needs at least one Pyroprostasia. So, the sales volume will be unpredictably high. Also, Markets and Markets Research Private Ltd (2020) states that the fire prevention market will grow at a CAGR of 7.1% (2020-2025).

Class no.

12. Safety, protection and rescue of people

MY.11.**Title****NIKU FOOT MEASURING DEVICE****Authors**MUHAMMAD ARIEF BIN MOHD AMIR,
MUHAMMAD AFNAN BIN MUHAMMAD AMAR**Institution****SK DATO' WAN KEMARA****Patent no.**

-

Description EN

NIKU Foot Measuring Device is a tool specially designed to help customers or shoe enthusiasts to own their favorite shoes either from within the country or abroad without having to worry about the inaccuracy of their actual foot size. Presently consumers had problems on looking for their right sizes of shoes that cause time constraint and patience. Therefore , we created this NIKU Measuring Device a unique device to helps the people especially to solve problem the miss match between foot n shoes sizes and saves time to get the sizes of their shoes accurately. Using the Foot Measuring Device, the accuracy of a person's foot measurement can be taken precisely in JAPAN, UK and EURO measurements simultaneously less than 3 second. The program used on Niku is ARDUINO. The use of 6 Sonar sensors will detect the overall size of a person's footprint when placed on a Foot Measuring Device. The signal detected by the sonar sensor will be displayed on the LED display which is used to allow the customer to get a foot size measurement reading to determine the shoe size that fits their foot whether in JAPAN, UK and EURO measurements. In addition, the worries on inaccurate shoe size can be avoided as the NIKU Foot Measuring Device will give an accurate size measurement of 99.9%.

NIKU is developed based on the experience of many customers to overcome the problems often faced by someone who wants to buy shoes of various sizes whether the size of Japan, UK and also EURO more accurately, easily and save time without having to worry about size inaccuracies. The use of Foot Measuring Device is more efficient in terms of improving the accuracy of shoe size in various sizes whether in Japan, UK and EURO sizes simultaneously more accurately. It is also lighter and very easy to operate in a short period of time and can save costs. The costs to build Niku Foot Measuring Device around RM200. Currently, the shops are using manual foot measurement and the appliances are not portable. This device is totally can upgrade the current practice to be more practical and easier for all. The sale assistant and customers will be easy to get suitable shoes without taking and trying various sizes of the shoes. As a result, there is no time consuming. Furthermore, the readings from the device can be recorded to use in future

Class no.

14

MY.12.	
Title	MosIn Trap
Authors	Mohd Faizal Zainul, Muhd Qais Naufal Muhd Faizal, Ariq luqman Mazlan, Syed Nabil Irfan Syed Nordin, Syed Amirul Haziq Syed Mohd Abid, Aniq Naim Aziz, Muhammad Danial Shafiq Azami
Institution	Sekolah Menengah Dato' Sheikh Ahmad
Patent no.	-
Description EN	MosIn Trap is an Intelligent Mosquito Trap, a non-toxic mosquito killer is invented in order to kill the mosquitoes in practical way without chemicals, extremely quiet and safe with high capture rate of mosquitoes. MosIn Trap consists of a fan which speed can automatically change once the mosquito presence in the covered area.
Class no.	14

MY.13.	
Title	MINI FOLDABLE SAFETY LOCK
Authors	VALERIE VOON WEN XIN, BONG YU CHENG, BONG CHING SIANG, CELESTE TRINITY ANAK NATHAN, GRACE LIEW JIA XUAN, DOUGLAS CHAI JING CHENG, CHUNG SZE MEANG
Institution	SMK LAKE, SARAWAK, MALAYSIA
Patent no.	-
Description EN	<p>Mini Foldable Safety Lock is one of the device which can be used for deadbolt and lever door lock when the user especially women and ladies need second protection and avoid the problems of intrusion when they stay alone at home, hostel or hotel because the fitted door knob only able provide minimal amount of protection against unauthorized entry.</p> <p>The objective of this innovation is to build a device that can used for deadbolt and lever door when the user need second protection and avoid the problem of intrusion or theft.</p> <p>The Mini Foldable Safety Lock is made up of plastic material, recycling Styrofoam, acrylic and magnet.</p> <p>The design concept of this innovation are: (i) the Mini Foldable Safety Lock consists of two parts which are the slot for deadbolt and the other slot for lever door lock. (ii) The slots for deadbolt and lever door lock are able to adjust based on the distance between deadbolt lock and lever door</p>

EUROINVENT 2021

lock. (iii)The slots which attached to the deadbolt avoid the turning of turn button before the door be open. (iv) The safety lock is designed with the foldable function and can be folded and become smaller size and (iv) the slot for deadbolt can be exchange to other size that is able fit to the deadbolt.

The novelty for this safety lock are anti-theft and anti-intrusion function, can be folded to smaller size and portable, easy to use, adjustable and able bring to anywhere.

Class no. 12

MY.14.

Title

CITRUS-SCRAP PAPER

Authors

MUHAMMAD ADLI ARIF AZHARI, NURZARIFA AFZA AHMAD FAUZANSAH

Institution

SEKOLAH MENENGAH SAINS KUALA SELANGOR

Patent no.

-

Description EN

This paper is organically made from citrus + sinensis or in other word, orange's skin that is normally thrown by people all around the world. Records has stated that almost 85% of oranges scrap or skin being thrown and wasted by people everywhere. So, we take this opportunity to replace the use of woods with orange's scrap which unconditionally, reduce the effect of global warming as well as the domestic waste.

Class no. 1

MY.15.

Title

SLURP BIOPLASTIC

Authors

NUR IRINA SUFFIAH BINTI PAIRUS
PUTRI NUR HAIZANI ARIFIN

Institution

SEKOLAH MENENGAH SAINS KUALA SELANGOR

Patent no.

-

Description EN

Slurp bioplastic was made by a bunch of leftover foods such as coffee ground, banana peel, avocado seed and peel, egg shells. This product could help reduce plastic waste and can easily be made at home. This product can be degraded just by boiling it in hot water. Its child safe and most importantly are environmental friendly.

Class no. 1

INTERNATIONAL EXHIBITS

MY.16.

Title	ALTERNATIVE KAKF HYBRID COMPOSITES USAGE IN MANUFACTURING ECO DESIGN ARMY HELMET
Authors	MJ Suriani, CM Ruzaidi, AZ Asyraf, A Khalina, CY Zhariff, R Hannah Zalifah , S Nurdayana , MS Siti Nursufiyana, Z Nur Fatin Naziera and MR Izzuddin .
Institution	Faculty of Ocean Engineering Technology and Informatics, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, MALAYSIA.
Patent no.	-
Description EN	The scope for this innovation is to encourage widespread use of eco hybrid composite in various application specifically in defense or military operations. The demand for military operations defending the illegal immigrants during the Covid-19 outbreak in Malaysia has gone striking in number. General conditions in green composites are proposed, along with some preliminary data on the mechanical and thermal properties of hybrid composites. The new KAKF Eco Design Army helmet is manufactured using an alternative Kevlar / Fiberglass /Arenga Pinnata hybrid reinforced polyester for the outer layer while the epoxy reinforced by Kenaf Fibre is made as an inner layer to ensure military safety during operations at national state border.
Class no.	14

MY.17.

Title	A New Innovation of Fire-Retardant Fly Ash Geopolymer
Authors	Mohd Fathullah Ghazali, Mohd Mustafa Al Bakri Abdullah, Shazzuan Shahari, Shayfull Zamree Abd Rahim, Norshah Afizi Shuaib, Mohd Nasir Mat Saad, Farizuan Rosli, Amarul Talip, Mohd Khairul Fadzly Abu Bakar, Irfan Abd Rahim
Institution	Universiti Malaysia Perlis
Patent no.	COPYRIGHT MALAYSIA LY2021E00678
Description EN	Glass Fiber Reinforced Epoxy (GFRE) composite is widely used in applications such as aviation, transportations, civil-construction and machineries. This

material is popular as it has good mechanical properties. However, GFRE is susceptible to fire hazard, making its application still limited. Many works have been done to improve the fire retardancy of GFRE but the end-product are still not friendly to environment. Our Innovation is called 'Fly-Ash Geopolymer Fiber Reinforced Composite' which we introduced green material called geopolymer, that helps to increase fire retardancy of existing GFRE. This innovated idea is friendlier to environment as the geopolymer is made from waste/byproducts. It has more than 40% better FIRE RETARDANT as compared to ordinary GFRE. This new material also has 28% higher compressive strength as compared to ordinary GFRE. ONE (1) Journal (I.F 4.419, Q1) has been published from this project and ONE (1) COPYRIGHT has been registered. This project is under a collaboration with an industry.

Class no.

6

MY.18.

Title	Thermo Scoria – Multipurpose Green Slag Composites
Authors	Ikmal Hakem A Aziz, Mohd Mustafa Al Bakri Abdullah, Mohd. Arif Anuar Mohd Salleh, Heah Cheng Yong, Liew Yun Ming, Hamzah Fansuri, Subaer Junaedi, Januarti Jaya Ekaputri (UniMAP, ITS and UNM)
Institution	Geopolymer & Green Technology, Center of Excellence (CEGeoGTech), Universiti Malaysia Perlis (UniMAP)
Patent no.	Copyright CR-1: Notification of Literary Works (LY2020003778) / Patent Filing : Environmental friendly composite construction material (US8337612B2)
Description EN	As a result of developing world and non-stop pollution increase, high safety buildings are in high demand. However, such desire consumes extensive cost and severely broke out have been reported extensively. Even though ordinary commercial concrete blocks can withstand fire, deterioration still occurs when contact directly with fire.

Thermo Scoria is invented as a multipurpose green composite for heavy duty materials, ceramic tile and passive fire protection system.

Thermo Scoria is an ecologically friendly material invented to address the abundance of slag waste from iron-steel production. It is formulated by mixing aluminosilicate and alkaline solution and followed by curing at ambient temperature. It did not destroy in fire and possess better fire resistance due to ceramic-like properties. The usage of this steel waste makes **Thermo Scoria** even more sustainable and green –economical friendly.

Class no. 7

MY.19.

Title

Self-LoSC : Self Fluxing Technique For Low-Temperature Sintering Ceramic Product

Authors

Noorina Hidayu Jamil, Mohd Mustafa Al Bakri Abdullah, Wan Mohd Arif W. Ibrahim, Hasmaliza Mohamad, Faizul Che Pa

Institution

Universiti Malaysia Perlis

Patent no.

N/A

Description EN

Sintering of ceramic products required high temperature commonly above 1000deg C. Since few decades many researchers and manufacture looking to lower the sintering temperature in order to minimize the CO2 emmission and energy consumption. This project will highlight the Self-Fluxing technique as a novelty approach in fabrication of ceramic products at a significant lower sintering temperature. This can be obtained through initial critical geopolymerization process, where the elemental reaction will play as a main contribution.

Class no. 7

MY.20.

Title

i-MathFract®

Authors

Nurulwahida Azid, Abdul Hamid Busthami Nur, Ruzlan Md Ali.

Institution

Universiti Utara Malaysia

Patent no.

LY2020002709

Description EN

i-MathFract® is an interactive learning application

built using flash software with a combination of five multimedia elements namely text, graphics, animation, audio and video. This application is interactive and is designed specifically for young learners to grasp the fractions concepts. It is based on the primary schools mathematics curriculum with the main purpose of assisting young learners, by using their critical and creative thinking skills, in their construction and understanding of basic fraction concepts. Acquisition of these basic concepts is a prerequisite for their competence to engage meaningfully in their future learning of fractions that involved both conceptual and procedural knowledge and skills. The content structure of **i-MathFract®** is based on constructive alignment model and outcomes based education where each topic/ learning session contains: (i) Learning Outcomes, (ii) Learning Content, (iii) Learning Activities (interactive based-games learning) and (iv) Assessment (automatic scoring for correct answer). There are two learning sessions included in **i-MathFract®** namely (1) Introducing to the concept of fraction, (2) Identifying and Comparing various fractions. In learning activities and assessment part, pupils will have fun learning experiences through virtual games based learning approach. Such joyful and interactive learning experiences will promote student's engagement in more meaningful learning.

Class no.

14

MY.21.**Title****Smart Social Relation Detector (Smart-Soc)****Authors**

Nurulwahida Azid, Abdul Hamid Busthami Nur, Ruzlan Md Ali, Jaizah Nak Man, Tee Zhi Keong

Institution**Universiti Utara Malaysia****Patent no.**

LY2020002704

Description EN

Smart-Soc is designed to screen behaviours of bullies and bully victims among teenagers between the ages of 13 and 17. The objective of Smart-Soc is to serve as a basic effort to curb bullying and bully victims so as to develop teens who are physically and emotionally healthy. As such automatic screening using computers and mobile phones is needed to speed up the process of

screening these behaviours. Through Smart-Soc, it will help counsellors, teachers, school administrators, parents and the community to identify and build profiles of teenagers regarding their tendency to have either bullying behaviours or bully victims behaviours.

-There are two types of social behaviour namely dominant social behaviour type and recessive social behaviour type. The behaviour type measures four domains namely (i) dominant physical behaviour, (ii) dominant verbal behaviour, (iii) dominant anti-social behaviour, (iv) dominant cyber behaviour. Meanwhile, the recessive social behaviour type measures four domains namely (i) recessive physical behaviour, (ii) recessive verbal behaviour, (iii) recessive anti-social behaviour, (iv) recessive cyber behaviour. At the end of answering each type behaviour questions, users can get the Smart-Soc profiling based on four domains as stated above.

Class no.

14

MY.22.

Title

**REAL-TIME DRIVER DROWSINESS
DETECTION WITH IOT MONITORING SYSTEM**

Authors

Shia Teck Hooi, Mohd. Helmy Abd. Wahab, Radzi Ambar, Norhafizah Ismail

Institution

Universiti Tun Hussein Onn Malaysia

Patent no.

-

Description EN

Drowsy driving is a serious traffic problem that has been identified as a factor of crashes resulting in catastrophic injury and fatality. This prototype proposed a real-time driver drowsiness detection system that utilizes the facial expression to provide drowsiness detection with alert feature. Besides, the firebase cloud-based platform is used to receive and display the images of drowsiness detection that serve as the monitoring system for remotely review. (max 250 words)

Class no.

8: Aviation, car industry and transportation

Malaysia

by TISIAS

MY.23.

Title	Soil Conditioners for Soil and Crop Health
Authors	Prof. Dr. Ahmed Osumanu Haruna
Institution	Universiti Putra Malaysia Bintulu Sarawak Campus
	US 9,139,485B2 (USA) / Patented
Patent no.	EP 12822678.4 (Europe) / Patented
	140100682 (Thailand) / Patented
	Tropical humid soils impede cash crops productivity such as pepper, papaya, pineapple among others because of high aluminium (Al) and iron (Fe) hydrolysis. Chemical fertilization to improve soil health and crop productivity has not been successful for the aforementioned crops. Thus, we transformed vegetable, fruits, pineapple, and peat wastes into solid and liquid soil conditioner which are able to improve the productivity soil, black pepper, papaya, and pineapples growth, yield, fruit quality, and economic farmers income. A combination of fermented fruit juice and vegetable, pineapple ash, and peat ash also improves growth, yield, and fruit quality of papaya and pineapples grown on peat and mineral soils. Moreover, our soil conditioners using fermented juices and compost improve soil chemical, physical, and biological properties. The economic viability in adopting our intervention to produce fresh berry yield was comparable to the existing chemical NPK fertilization. Pineapple residue and peat ashes as solid conditioners maintain higher soil pH during pineapple growth in addition to decreasing CO ₂ , CH ₄ , and N ₂ O emissions relative to soils without ash because of adsorption of organic compounds, ammonium, and nitrate ions onto the charged surface of ash through hydrogen bonding. Also, co-application of peat and pineapple residue ashes and compound NPK fertilizer improves soil NPK and fruit quality of pineapples. The added advantage of our technology is that co-applying CZ and NPK fertilizers increases NPK contents in papaya and fruit quality because of the significant availability of soil ammonium, nitrate, P, and K.
Description	
EN	
Class no.	3

MY.24.

Title

**Connected and Interactive Advertising Campaign
(Connect-Interact)**

Authors

Dr. Leow Meng Chew; Dr. Ong Lee Yeng; Prof. Lau Siong Hoe; Prof. Koo Voon Chet; Mr. Leow Kang Ren; Mr. Lai Guo Yao, Mr. Loo Eng Keong

Institution

Multimedia University – Melaka, Malaysia

Patent no.

Patent (PI 2019005592) filed on 25 Sep 2019
Copyright filed on 30 April 2019

Description EN

This invention aims to showcase ONE new revolutionary way of Digital-Out-Of-Home advertising system that provides four powerful concepts (Augmented, Analytics, Interactive, Connected). Every signage is connected to the cloud for remote management on the advertising campaign. Content of every signage can be changed anytime, from anywhere, in any way for optimal advertising effectiveness. Advertising are humanly activities that warrant more humane interactions. By involving immersive interactive activities that are augmented through smart devices such as camera, microphone and audience’s mobile devices, audience is engaged effectively with visual, auditory, reading/writing and kinaesthetic (VARK) modalities. The interaction data in the aspect of behavioural and engagement level is collected for data analytics to better understand the potential customers. The advantages of this invention are four folds. Firstly, it provides the “word-of-mouth” personalized market infiltration by having customers recommending their friends into the campaign. Secondly, the smart hybrid demographic information compilation using built-in camera to access customer’s information provide more effective customer targeting capability. Thirdly, the time and space integrated marketing strategies allow experiential product/brand advertising. Lastly, the personalized customer behavioural profiling allows for better customer support by knowing the customers better.

Class no.

10

MY.25.

Title **Rig-S: All-in-one Portable Device for Endoscopes**
Authors PROFESSOR DR SALINA HUSAIN
Institution NATIONAL UNIVERSITY OF MALAYSIA
Patent no. PATENT NO: UKM.IKB.800-4/1/2085

The use of endoscopes in Otorhinolaryngology is synonymous with improved diagnosis and treatment. However, risk of micro-organisms transmission can be as high as 1-3:1000 patients if disinfection protocols are breached. The novel coronavirus 2 (SARS-CoV-2) is also capable of human-to-human transmission. Here we introduce a portable endoscope sterilizing device to reduce the risk of patient-to-patient virus transmission during the pandemic COVID19 era. This device comprises of storage and sterilizing compartments in sets of three. Each compartment is separate and functions independently. The first step is to place the used endoscope in one of the three wet compartments.

Description EN Next, the endoscope is transferred into one of the sterilization compartments filled with high-level disinfectant. Each sterilizing compartment is configured with an alarm set to the pre-determined soaking time for sterilization. An alert signal will notify the user on completion of the sterilization process. The final step is transferring the sterilized endoscope into one of the drying compartments integrated with built-in warmers. After each sterilization process, the acidity of the high-level disinfectant is tested with litmus paper to ensure efficacy. This innovative device provides the solution for proper sterilization of multiple rigid endoscopes in a busy clinic to avoid cross-infection and possible litigations.

Class no.

12

MY.26.

Title **4N-FREE HAIR SOLUTIONS PRODUCTS**
(4N-FREE HAIR OIL, 4N-FREE HAIR MASK, 4N-FREE HAIR SERUM AND 4N-FREE HAIR SOAP)
Authors GOMATHY D/O SANKARAN
Institution SJKT KANGKAR PULAI

Description EN 4N-FREE hair solutions products can be used in powder form, liquid and solid form as well. 4N-FREE hairs

INTERNATIONAL EXHIBITS

solutions products help prevent follicles duct from being congested, helps to accelerate scalp's cell metabolism and improve blood circulation, provides nutrients and boost hydration to the scalp and supports hair regeneration and helps accelerate healing. 4N-FREE hair solutions products all already tested in Lab and it has been approved in Malaysian government. But 4N-FREE hair solutions products still not in Malaysian market and global market due to finance problem. This product has been updated from 4N-FREE hair mask to 4N-FREE hair solutions products such as 4N-FREE hair oil, 4N-FREE hair mask, 4N-FREE hair serum and 4N-FREE hair soap as well by using same raw materials. 4N-FREE hair solutions products are most suitable for cancer patients before or after chemotherapy. Research is still going on to cancer patients by voluntary bases. Some cancer center is already started using the oil with free of charge for research purpose.

Class no.

4

MY.27.

Title

SMART MEDICAL WARD

Authors

SIVASHANKERY BALAN; SHIVA ROOBINI BALAN

Institution

SMK KOTA MASAI

Description EN

As National Health Policy 2018 aims to raise the public health care expenditure from 1.4 % to 2.5%, we came up with this idea of improving the systems in hospital which will eventually help to provide the benefits to patients and nurses. Our findings show that this creation is work-friendly, eco-friendly and quick in alerting notifications. Most importantly, helps to reduce the workload of the nurses and security guards. Smart Ward has the ability to sense the liquid level in the IV drip and send notification to the nurse station. Other than that, the noise level can be also monitored by using the app on our tablet. This would reduce the workload of the nurse and a security guard too. Nurses don't have to walk around checking for the liquids level. It works the same for the security guard.

Class no.

4

MY.28.**Title****Radon Remedy in Malaysian Buildings: Preliminary Endeavors of Flattening Radon Accumulation Graph**

Abdullah Mohd Noh, Nordin Ayoub, Siti Zurina Mat Noor, Norhafizah Zahari, Mardhiyati Mohd Yunus, Norhafizah Mohamad Nonudin,

Authors

Ayman Ismail Gholam, Ahmad Ismail A Gholam, Amgad Ismaeel Gholam, Abdul Mohye Mohamed Noh, Etaf Mohamed Noh, Abidah Mahmud

Institution**University of Selangor****SKS 13 Shah Alam****Ministry of Health Saudi Arabia****OM ABDO Enterprise****Description EN**

There are many Radon monitoring studies around the world including Malaysia report high radon concentration in many defined locations that require finding solutions of reducing its unhealthy level. The current ongoing study provide professional services to the Malaysian community in the form of monitoring indoor radon concentration and introducing the most effective solution with minimum or no cost to avoid its accumulation and inhalation inside the buildings. There are many suggested methods for radon mitigation recommended by United State Environmental Protection Agency (EPA) which include sealing walls and floors, applying pressurization to rooms, and installing a heat recovery ventilator. Some of them may not be applicable in Malaysia because of building design that requires finding alternative practical and innovative methods to replace the current established and recommended one by EPA. One of the innovative finding solutions of this study to avoid radon inhalation is to keep opening the door of the rooms that have high radon accumulation. This proposed solution for radon mitigation is successfully being implemented for the rooms that showed high radon accumulation graphs exceed healthy levels. Radon inhalation is reported by the world health organization (WHO) to cause unwanted health effects on human lungs and it should be given high attention during covid-19 pandemic because both affect respiratory system.

Morocco

Represented by OFEED

MA.1.

Title **Electric car without batteries**

Authors Majid EL BOUAZZAOUI

Institution **OFEED**

Patent no. Pending

Description EN

Electric car batteries are the most expensive part (costs between US \$5000 and US\$ 15000) in the electric cars. In addition, they need to be charged frequently. And the worst is that they cause pollution of the environment. Now, with the present invention, to generate electric power inside a car, we need two elements: 1/- a variable electromagnetic field outside the car, for example, a coil placed underground in the road (road coil), connected to a clean electric power (solar panels, etc.). 2/- a coil which should be placed inside the car (car coil).

By this way, electricity will be generated permanently, which imply that it can be used in all the electric equipment in the car. Advantages: 1- The pollution of the environment is avoided by using a clean energy to generate electromagnetic field (in road coils). 2- No need to use batteries. 3- Electric cars speed increases and their price becomes cheaper.

Class no.

8

MA.2.

Title **The Hexa-stroke engine**
Authors Mohamed Yalouh
Institution **The American Community School of Abu Dhabi**
Patent no. USPTO - PPA-63048310

Description EN

Problem to be solved

- Excessive use of materials in machine production.

Cars consume a lot of energy before they ever make it to the open road. Automotive production leaves a giant footprint because materials like steel, rubber, glass, plastics, paints, and many more must be created before a new ride is ready to roll. Similarly, the end of a car’s life doesn’t mark the end of its environmental impact.

- Unsustainable and expensive construction of engines for both military and civilian purposes.
- High emissions

An average vehicle produces almost 5 metric tons of carbon dioxide per year. This number can vary based on a vehicle’s fuel, fuel economy, and the number of miles driven per year. And when it comes to rotary engines, the combustion of lube oil is what makes emissions go up exponentially.

- Noise pollution

Proposed solution

- 1) Given that this design indicates less components, the H.S.E uses much fewer materials than an average engine. It is set to make an estimated improvement of 9% over small manufacturers and 20% towards large car manufacturers contributing to making smaller carbon footprints of a new car.
- 2) **High emissions problem** Considering the introduced design of the H.S.E, this won’t be an issue anymore. How? Here’s an explanation: the H.S.E demonstrates this by pre-heating chambers which means the fuel is injected by desired amounts and not being wasted by even a bit. When it comes to lube oil, graphene does the job.

Class no.

8

MA.3.

Title

PlatrASH as an innovative lightweight eco-plaster based on mining waste.

Authors

Mouatassim Charai, Ahmed Mezrhab, Mustapha Karkri, Ligia Moga.

Institution

Mohammed First University

Patent no.

Patent in pending

Description EN

PlatrASH is an innovative, ecological, and lightweight plaster made from local by-products. Besides its excellent thermal insulation properties, this 100 percent local product effectively solves the harmful issue of mining waste and presents the best means of valorization.

This next-generation building material adapts very well to contemporary constructions (false ceilings, etc.) and improves the thermal insulation quality of existing buildings, compared to the various plaster commercialized on the market.

Class no.

7



Moldova

Botanical Garden of Academy of Science Republic Moldova

MD.1.

Title THE CULTIVAR 'MELIFERA' OF LACY
PHACELIA *Phacelia tanacetifolia*
Authors Dr. Victor ȚÎȚEI
Institution "Alexandru Ciubotaru" National Botanical Garden
(Institute)
Patent no. MD 208 2016.05.31

The cultivar '*Melifera*' has been created by individual breeding of introduced plant taxa of Lacy phacelia, *Phacelia tanacetifolia* Benth., family Hydrophylaceae (Boraginaceae), which is native to the Americas, registered in the Catalogue of Plant Varieties (no.0713129) and patented by the State Agency on Intellectual Property (AGEPI) of the Republic of Moldova. The cultivar '*Melifera*' has potential application in various agricultural practices: as melliferous plants, green manure, forage for farm animals (natural fodder, hay, haylage, silage, vitaminized flour) and can be used as multi-purpose feedstock for renewable energy production.

This cultivar is a source of pollen and nectar for bees, available for 40-50 days, and makes it possible to obtain 400-780 kg/ha of honey. The green mass productivity varied from 31 t/ha (mowed in early May) to 51.4 t/ha (mowed in late June). The leaf content varied from 65 to 54 %. The incorporation of phacelia green mass into the soil contributed to the increase of the amount of organic matter from 3.1 t/ha to 8.1 t/ha, the amount of nutrients – from 458.6 kg/ha (in May) to 1028.1 kg/ha (in June), including nitrogen 126 to 182 kg/ha, phosphorous 34 to 37 kg/ha, magnesium 11.8 to 27.4 kg/ha, potassium 140.6 to 353.0 kg/ha and calcium 144.4 to 419.0 kg/ha, sodium 0.36 to 0.75 kg/ha, copper 0.03 to 0.05 kg/ha, zinc 0.10 to 0.18 kg/ha, manganese 0.29 to 0.33 kg/ha and iron 1.36 to 2.32 kg/ha.

The biochemical composition and the fodder value of the cv. '*Melifera*': 12-21 % CP, 1.6-2.7 % EE, 30-40 % ADF, 45-60 % NDF, 3-6 % ADL, 10-17 % ash, 0.9 % P, 3.6-3.8 % Ca, RFV=110-130. The obtained haylage was characterized by pH=5.05, lactic acid 38.8 g/kg, acetic acid 5.7 g/kg, butyric acid 0-0.2 g/kg.

The cv. '*Melifera*' substrates for anaerobic digestion were characterized by optimal C/N ratio and amount of hemicelluloses and moderate amount of lignin, the biomethane potential was 220-300 l/kg organic matter. The crop residues (stalks) had moderate gross calorific value of 18.4 MJ/kg, the produced briquettes, with

Description EN

specific density 916 kg/m³, were very solid and were not cracking.
Financially supported- project no. 20.80009.5107.02.

Class no. 3

MD.2.
Title

**THE INNOVATIVE TECHNOLOGY FOR
CULTIVATION AND USE OF NEW AND NON-
TRADITIONAL CROPS**

Authors

Dr. Victor ȚÎȚEI

Institution

“Alexandru Ciubotaru” National Botanical Garden
(Institute)

Patent no.

**MD 204 2016.05.31, MD 205 2016.05.31
MD 207 2016.05.31, MD 209 2016.05.31,
MD 344 2020.04.30.**

**Description
EN**

To face the global crisis, particular attention has been paid to the reassessment of the value of neglected and underutilized crops, mobilization and domestication of new species. New cultivars ‘*Vital*’ (MD204), ‘*Gigant*’ (MD205), ‘*Energo*’ (MD207), ‘*Solar*’ (MD209), ‘*Argentina*’ (MD344) created in NBGI, registered in the Catalogue of Plant Varieties and patented by the State Agency on Intellectual Property (AGEPI) of the Republic of Moldova, are used to found plantations of perennial crops. Harvested phytomass can be used as natural fodder and silage for livestock and as substrates for anaerobic digestion in biogas reactors and for renewable energy production.

For the foundation of plantations with cv. ‘*Vital*’ of cup plant, *Silphium perfoliatum* are necessary 5-10 kg/ha seeds or 28-40 thousand plants/ha; the plant spacing should be 70 cm x 50 cm or 70 cm x 35 cm, 45 cm x 45 cm. The fresh mass yield after cutting the plants 1-2 times is 124- 148 t/ha, the potential fodder production is 15-18 t/ha nutritive units and 1700-1800 kg/ha digestible protein. Silage quality: pH 4.00-4.30, 77-80 % lactic acid, 0-1.1 % butyric acid, 9.9-13.5 % CP, 3.26– 4.08 % EE, 8.9-12.7 % ash, 56.5.7-59.5 % NDF, 41.0-43.3 % ADF, 4.0-4.8 % ADL, 3.7-5.5 g/kg Ca and 1.8-2.7 g/kg P, 11.93–13.00 MJ/kg DE, 9.79-10.67 MJ/kg ME and 6.0-7.2 MJ/kg NEI. Renewable energy production, biomethane potential – 4500-5800 m³/ha/year. For the foundation of plantations with cv. ‘*Gigant*’ of *Polygonum sachalinense* are necessary 20-28 thousand plants/ha; the distance between plants should be 70 cm x70 cm or 70 cm x 50 cm. The fresh mass yield after cutting the plants 2-3 times is 124-148 t/ha, the potential fodder production – 14-18 t/ ha nutritive units and 1800-2000 kg/ha digestible protein. Silage quality: pH 3.80-4.10, 80-85 % lactic acid, butyric acid not identified, 13.5-18.0 % CP,

EUROINVENT 2021

2.3–2.6 % EE, 8.9-14 % ash, 54-8 % NDF, 34-45 ADF, 5.0-7.8 % ADL, 4.7-5.5 g/kg Ca and 2.3-2.5 g/kg P. Biomethane potential 4050-4300 m³/ha/year.

For the foundation of plantations with cv. '*Energo*' of *Sida hermaphrodita* are necessary 3-5 kg/ha seeds or 28-40 thousand plants/ha; the plant spacing should be 70 cm x 50 cm or 70 cm x 35 cm. The fresh mass yield obtained after cutting the plants twice: 104-112 t/ha; the potential fodder production is 15-18 t/ha nutritive units and 1750-2000 kg/ha digestible protein. Silage quality: pH 3.96-4.65, 75-80 % lactic acid, butyric acid not identified, 13.5-18.2 % CP, 2.20-3.00 % EE, 7.80-11.0 % ash, 53.6-73.4 % NDF, 35.0-51.5 % ADF, 5.7-6.3 % ADL, 3.2-5.7 g/kg Ca, 2.8.8-3.1 g/kg P, 11.33 MJ/kg DE, 8.91-9.30 MJ/kg ME and 5.06-5.32 MJ/kg NEL. From the substrates, about 4350– 5300 m³/ha/year biomethane can be obtained.

For the foundation of plantations with cv. '*Solar*' of *Helianthus tuberosus* are necessary 40-50 thousand tubers /ha; the plant spacing should be 70 cm x 25 cm. The fresh mass yield after cutting the plants 1-2 times is 74- 118 t/ha, and tubers – 34-43 t/ha, potential fodder production – 16-20 t/ha nutritive units and 1600-1750 kg/ha digestible protein. Silage quality: pH 3.90-4.30, 77-80 % lactic acid, 0-1.1 % butyric acid, 9.7-13.5 % CP, 1.90-3.07 % EE, 8.90-12.96 % ash, 55.9-62.3 % NDF, 31.0-45.8 % ADF, 4.8-6.3 % ADL, 4.7-6.5 g/kg Ca and 2.8-3.1 g/kg P, 11.25-12.43 MJ/kg DE, 9.23-10.21 MJ/kg ME and 5.96-7.02 MJ/kg NEL. Biomethane potential – 4000-6000 m³/ ha/ year.

For the foundation of plantations with cv. '*Argentina*' of *Sorghum almum* are necessary 5-10 kg/ha seeds; the plant spacing should be 70 cm x 10 cm or 45 cm x 15 cm. The fresh mass yield after cutting the plants 2-3 times is about 58-63 t/ha, the potential fodder production is 12-14 t/ha nutritive units and 1600-1650 kg/ha digestible protein. Silage quality: pH 3.80-4.20, 78-84 % lactic acid, 0-1.5 % butyric acid, 7.58-9.52 % CP, 3.20-3.68 % EE, 7.72-10.76 % ash, 65.7-66.2 % NDF, 41.0-43.3 % ADF, 4.0-4.8 % ADL, 3.7-5.5 g/kg Ca and 1.8-2.7 g/kg P, 10.85-11.33 MJ/kg DE, 8.91-9.30 MJ/kg ME and 5.06-5.32 MJ/kg NEL. Biomethane potential – 4500-5800 m³/ ha/ year.

Financially supported- project no. 20.80009.5107.02.

Class no.

3

The Institute of Physiology and Sanocreatology

MD.3.

Title **Biologically active additive**
Authors **Mantoptin Anatolii, Leorda Ana, Garaeva Svetlana, Furdul Vlad, Postolati Galina**
Institution **Institute of Physiology and Sanocreatology**
Patent no. **Patent MD 1421**

The invention relates to the food industry, in particular to additives based on beekeeping products and can be used for the production of biologically active additives with fortifying action. It can be recommended for use in case of physical and mental overload, for the purpose of prophylaxis during seasonal viral infections, during the period of convalescence after respiratory diseases. The biologically active additive comprise water-alcohol extracts of dead bees, wax moth larvae and propolis, in the following ratio of ingredients, ml per 100 ml of product: extract of dead bees 45-60, extract of wax moth larvae 20-35, propolis extract 15-30.

Description
EN

Class no. 3

MD.4.

Title **Method for maintaining the mobility of male reproductive cells**
Authors **Rosca Nicolae, Balan Ion, Boronciuc Gheorghe, Bucarciuc Melania, Cazacova Iulia, Buzan Vladimir, Mereuta Ion, Dubalari Alexandru, Fiodorov Nicolae, Blindu Irina**
Institution **Institute of Physiology and Sanocreatology**
Patent no. **Patent 1437 MD**

The invention relates to veterinary medicine, in particular to the reproduction of farm animals and can be used for maintaining morphophysiological parameters of male reproductive cells. The proposed method consists in that the collected ejaculate is diluted with a 6,2% isotonic glucose solution, in a ratio of 1:5, to which α -lipoic acid is added in an amount of 0,0018...0,003 g/ml.

Description
EN

Class no. 3

MD.5.**Title**

Biologically active food additive with antioxidant activity.

Authors

Mereuta Ion, Caraus Vladimir, Strutinschii Tudor, Dubcenco Valeriu

Institution

Institute of Physiology and Sanocreatology

Patent no.

Patent 1478 MD

Description**EN**

The invention relates to the food industry and sanocreatology, namely to a biologically active food additive with antioxidant activity. The food additive, according to the invention, comprises, in wt.%: dry extract of amaranth seeds 30, dry extract of wormwood leaves 40, dry extract of dihydroquercetin 15 and acti-vated carbon 15. Biologically active food supplement can be used for prophylactic purposes or included in the composition of predestined functional foods to increase the body's adaptive and antioxidant potential.

Class no.

3

MD.6.**Title**

Biologically active food additive with antioxidant activity.

Authors

Mereuta Ion, Caraus Vladimir, Strutinschii Tudor, Dubcenco Valeriu

Institution

Institute of Physiology and Sanocreatology

Patent no.

Patent 1479 MD

Description**EN**

The invention relates to the food industry and sanocreatology, namely to a biologically active food additive with antioxidant activity. The food additive, according to the invention, comprises, in wt.%: dry extract of amaranth seeds 25, dry extract of wormwood leaves 40, dry extract of dihydroquercetin 12, dry extract of walnut shell 8, activated carbon 15. Biologically active food supplement can be used for prophylactic purposes or included in the composition of predestined functional foods to increase the body's adaptive and antioxidant potential.

Class no.

3

MD.7.

Title	Biologically active food additive with antioxidant activity.
Authors	Mereuta Ion, Caraus Vladimir, Strutinschii Tudor, Dubcenco Valeriu
Institution	Institute of Physiology and Sanocreatology
Patent no.	Patent 1480 MD
Description	The invention relates to the food industry and sanocreatology, namely to a biologically active food additive with antioxidant activity. The food additive, according to the invention, comprises, in wt. %: dry extract of amaranth seeds 25, dry extract of wormwood leaves 35, dry extract of dihydroquercetin 10, dry extract of walnut shell 10, dry extract of dandelion roots 10 and activated carbon 10.
EN	Biologically active food supplement can be used for prophylactic purposes or included in the composition of predestined functional foods to increase the body's adaptive and antioxidant potential.
Class no.	3

MD.8.

Title	Phytotherapeutic composition for producing an aqueous infusion with body weight reducing effect.
Authors	Mereuta Ion, Fedas Vasile, Caraus Vladimir, Baciuc Anatol
Institution	Institute of Physiology and Sanocreatology
Patent no.	Patent 1498 MD
Description	The invention relates to preventive medicine, namely to a phytotherapeutic composition for producing an aqueous infusion with body weight reducing effect. The composition, according to the invention, comprises chicory root, burdock root, celery root, aloe leaves, aboveground part of lady's-mantle, aboveground part of common agrimony, aboveground part of sweet flag calamus, milfoil flowers, wormwood leaves, black cumin seeds, dry extract of astaxanthin and guava fruits.
EN	
Class no.	4

MD.9.

Title **Phytotherapeutic composition for producing an aqueous infusion with low density lipoprotein reducing effect.**

Authors Caraus Vladimir, Fedas Vasile, Mereuta Ion, Baciuc Anatol

Institution Institute of Physiology and Sanocreatology

Patent no. Patent 1499 MD

Description EN The invention relates to preventive medicine, namely to a phytotherapeutic composition for producing an aqueous infusion with low density lipoprotein (LDL) reducing effect. The composition, according to the invention, comprises dry laminaria extract, juniper fruits, dandelion root, restharrow root, buckthorn bark, linden flowers, dry cannabidiol extract, wormwood leaves and tansy flowers.

Class no. 4

MD.10.

Title **Phytotherapeutic composition for producing an aqueous infusion with antihypertensive effect**

Authors Fedas Vasile, Mereuta Ion, Caraus Vladimir, Baciuc Anatol

Institution Institute of Physiology and Sanocreatology

Patent no. Patent 1500 MD

Description EN The invention relates to preventive medicine, namely to a phytotherapeutic composition for producing an aqueous infusion with antihypertensive effect. The composition, according to the invention, comprises chicory root, aboveground part of winter cress, birch buds, black currant leaves, garden orach leaves, stinging nettle leaves, dandelion leaves, burdock root, hawthorn fruits, common horsetail leaves, dry cannabidiol extract, elder flowers and corn silk.

Class no. 4

MD.11.

Title **Method of treatment of the average form of SARS-CoV-2 viral infection**

Authors Mereuta Ion, Caraus Vladimir, Bodrug Nicolae, Strutinschi Tudor, Chiciuc Andrei

Institution Institute of Physiology and Sanocreatology

Patent no. Patent application MD no. deposit: s20200140, date of deposit: 2020.10.27

EUROINVENT 2021

The invention relates to medicine, in particular to infectious diseases and can be used for the treatment of viral infection with SARS-CoV-2.

Description
EN

The method of treatment of the average form of SARS-CoV-2 viral infection is that paracetamol 500 mg x 4 times / day, umifenovir 100 mg 4 times / day, and 15-20 minutes before meals, three times a day, 50 ml each, composition, containing dry extracts based on ethyl alcohol of 96.4% wormwood, cornet, maral root, walnut shell, horseradish, larch, taxifolin, astaxanthin and ginseng in a certain ratio of components.

Class no.

4

Technical University of Moldova

MD.12.

Title

System for plant growth study in extreme environments

Authors

ABABII Victor, SUDACEVSCHI Viorica, MUNTEANU Silvia, LEASHCENCO Victoria, GUSHTIUC Victor

Institution

Technical University of Moldova

Patent no.
Description
EN

The project concerns the field of ecology and plant protection, namely methods and techniques for the analysis of the plants growth in extreme environments. The analysis and study of plant resistance is important for agricultural crops growth in geographical regions not specific to them. At the same time, the system can be used to study the ability of plants to adapt to extreme growing conditions. The authors developed an experimental system, which creates an isolated environment with autonomous control on climatic parameters (Figure 1): air and soil temperature, air and soil humidity, gas concentration (CO, CO₂, etc.), brightness and IR radiation. The plant growth is also monitored using a video camera.

The climate control system is designed based on the Raspberry Pi 3B device (Figure 2) which provides data acquisition from the set of sensors, operations on the air, CO and CO₂ pumps, heating and light source, exhaust fan, water evaporation system and irrigation pump to create extreme climatic conditions. The system is connected to the global Internet network which allows remote process monitoring.

MD.13.

Title

Driving school simulator

Authors

ROȘCA Neonil, LUNGU Iulian, SUDACEVSCHI Viorica, ABABII Victor

Institution

Technical University of Moldova

Patent no.
Description
EN

This project refers to the field of driving schools or institutions that need to train drivers. This device allows the realistic simulation of different real drive conditions, which allows the improvement of the skills of the driver/pilot.

The project represent a car simulator equipped with all the subsystems of a real car: steering wheel, pedals, light

indicators, gearbox, parking brake (Figure 1).

The subsystems are created after the model of a real car, allowing the realistic simulation of the driving experience.

This system is intended for driving schools but can also be used to train drivers who need special skills (ambulance, police, rescuers, firefighters). This can be achieved due to the possibility of adapting the system and simulating different environments: vehicle type, season, traffic, visibility, road conditions.

The benefit of a car simulator is the possibility to study without the involvement of an instructor, it can autonomously detect and record the errors committed during the race, providing a report with the results and errors committed.

The following sensors are used to capture data from the simulator: resistive sensor - to read the position of the pedals (clutch, brake, and accelerator), optical encoder - is used to read the position of the steering wheel, buttons for peripheral control.

To simulate road bumps we use a DC motor connected to the steering wheel axle and three for the body. To transmit the data from the simulator to the PC, we used a microcontroller equipped with USB interface (STM32F411) - (Figure 2), using the HID protocol for data transmission. To display the speed, rpm, fuel consumption, we used the BMW e46 dashboard and specialized protocol for its control and data transfer.

MD.14.

Title

Precessional planetary transmission

Authors

Bostan Ion, Dulgheru Valeriu, Vaculenco Maxim, Malcoci Iulian, Ciobanu Radu, Ciobanu Oleg

Institution

Technical University of Moldova

Patent no.

Patent application, s 2020 0020. 06.03.2020

**Description
EN**

The precessional planetary transmission includes the housing (1), in which the satellite block (2) with the conical roller crowns (3) and (4), the fixed central gears (5), rigidly connected to the gearbox cover (6), and the furniture are located. (7) rigidly connected to the driven shaft (8). The satellite block (2) is installed on the bearings (9) on the inclined sector (10) of the crankshaft (11). The additional

mass (14) is provided at the design stage on the outside of the lighter half (13) of the satellite block (2).

The problem solved by the invention is the simplification of the construction and the increase of the reliability of the precessional planetary transmission by reducing the dynamic loads.

Class no.

6. Mechanical Engineering - Metallurgy

MD.15.

Title

Digital gear manufacturing technologies with non-standardized profiles from precessional planetary transmissions

Authors

Viorel Bostan, Ion Bostan, Valeriu Dulgheru, Maxim Vaculenco, Sergiu Mazuru, Ion Bodnariuc, Radu Ciobanu, Oleg Ciobanu, Nicolae Trifan, Iulian Malcoci, Ion Dicusarã, Dumitru Vengher, Alexandru Buga, Serghei Scaticailov, Vitalie Gladîş.

Institution

Technical University of Moldova

Patent no.

Research project

The success of the competition in which the producers of ts are engaged is based on the time consumed in the activities of designing, making prototypes, testing and putting them into manufacturing. The main performance factors in the development of a new product are the reduction of the time and the costs of carrying out all the steps prior to its launch on the market.

The research field refers to the technological development of precessional transmissions.

**Description
EN**

The time and costs of achieving the precessional transmissions mostly refer to the manufacture of central wheels with non-standard convex-concave profiles and to the satellites with circular arch profiles of the teeth.

These objectives were achieved by developing non-conventional technologies based on digital manufacturing.

In case of precessional kinematic transmissions for the manufacture of wheels and satellite of the precessional gear with non-standard profiles of the teeth, three non-conventional technologies have been used:

1. Plastic injection molding of the wheels of the precessional gear with small diameters up to 42mm and averages up to 105mm. The innovative elements consist in

the construction of wheels with metallic reinforcements which substantially reduce the inevitable deformations characteristic of the process. The inserts of the molds with negative profiles to the real ones are produced by digital manufacturing on numerically controlled machine tools based on the CAD /CAM system;

2. Pressing technology from metal powders. The innovative elements consist in the construction of pressing forms (double pressing) that provide airship porosity and lubrication regime with dry lubrication for operation in vacant spaces. The insertions of the pressing forms also have negative profiles to the real ones and are produced by CNC digital fabrication;

3. Direct digital manufacturing technology - 3D printing. Direct digital manufacturing is a process of obtaining the physical parts directly from a 3D CAD file. The main advantages of the process are: low energy consumption, small losses of material, high manufacturing speed, parts with complex geometries can be realized, reducing the time required to execute the industrial product. Implemented at laboratory level, prototype inside the Technical University of Moldova

Class no.

6

MD.16.

Title

Book edition for the development of creativity through drawing for 7-10 years old children

Authors

Calughin Alisa, Adascalita Lucia

Institution

Technical University of Moldova

Patent no.

Registration number **f 2020 0029**

**Description
EN**

The edition suppose the development of creativity of children aged 7-10, by involving logical and abstract thinking, and presents as a novelty the possibility of developing creativity directly in it, due to its structural concept, offering the possibility of personalization starting with the self-portrait title page, specify personal information, quotes about creativity. The edition includes drawings with elements that can be cut, joined in pairs, generating new drawing themes, involving the child in a creative game; pages with exercises: "Words inspire you to create", "In the

footsteps of Picasso"; additional pages that can be offered to friends. Each game has the rules of the game and an example, giving the child the opportunity to understand what he is going to do.

Class no. 11. Printing and advertising

MD.17.

Title

PROCESS FOR OBTAINING OF DIETARY FIBER FROM FLAXSEED POMACE

Authors

Baerle Alexei, Tatarov Pavel, Sandu Iuliana, Sturza Rodica, Macari Artur

Institution

Technical University of Moldova

Patent no.

Application **S 2020 0117**, Decision 9703 from 2021.01.22

Description

EN

Flaxseed pomace, resulting by cold pressing of oil, contains significant amounts of biologically active dietary fibers. The main macromolecular compounds from Flaxseed form two fractions: the water-soluble polysaccharides fraction, containing *arabinoxylan* and *arabinogalactan*, and the fraction of insoluble fibers, which contains cellulose, lignin, proteins. Soluble dietary fibers from Flaxseed are indigestible prebiotic ingredients, which stimulate the development of bacteria, responsible for hydrolysis and the formation of lactulose, sucrose, raffinose, etc. in the colon. At the same time, insoluble dietary fibers show excellent adsorption capacity of heavy metal cations, toxic metabolites resulting from bad gastrointestinal flora, and contribute to their elimination from the human body. Dietary fiber from Flaxseeds is of interest to the food industry and can be used as stabilizers, harmless agents for thickening the food texture, and are necessary for obtaining functional and dietary foods. They are a good alternative to food grade guar and xanthan gums, which are too many in modern nutrition.

According to the Process, the dietary fibers from Flaxseed pomace are extracted by degreasing of the flaxseed pomace, wetting the defatted pomace with a mixture of ethanol and water, extracting of water-soluble polysaccharides from the defatted pomace using hot demineralized water. Then follows separating the fiber fraction by pressing, dehydration and transformation of the dissolved pentosan fibers fraction into solid fibers, using

concentration or lyophilization. The results of the invention are insoluble dietary fibers in solid form and the composition of water-soluble polysaccharides (arabinoxylan and arabinogalactan) in solid form.

Class no. 3

MD.18.
Title

Process for producing dyes from Safflower petals (Carthamus tinctorius L.)

Authors

Alexandra Savcenko, Alexei Baerle, Pavel Tatarov, Raisa Ivanova

Institution

Technical University of Moldova

Patent no.

Patent No. 1453

**Description
EN**

Process for producing dyes from Safflower petals relates to the food industry, namely, to the extraction, purification and separation of natural chalconic colorants: carthamin and precarthamin. These biologically active colorants can be successfully used in order to substitute a toxic synthetic azo-colorants. This natural chalcones will be used to produce safe foods, cosmetics and pharmaceuticals. According to the method, the air-dried Safflower petals are treated with sodium carbonate solution (1-5%) and undergo high pressure. The liquid phase obtained by compression and clarification is treated with alimentary acid and undergo other simple operations. The result of the invention is obtaining a red-purple colorant, **carthamin**, in a solid state and a yellow colorant, **precarthamin** in the form of a concentrate dark-orange solution or yellow powder, if is necessary.

Applications:

Food Industry, Skin-friendly Cosmetics, Pharmaceuticals.

Advances:

1. Increasing the agricultural biodiversity and plant materials processing degree;
2. Compliance with the EU directive to replace synthetic dyes with natural ones
3. Solid state of obtained colorants, which offers them high stability

Class no. 3

MD.19.

Title	DRYING OF PLANT PRODUCTS INTO A CO₂ ENVIRONMENT
Authors	Bernic Mircea, Țislinscaia Natalia, Balan Mihail, Vișanu Vitali, Melenciuc Mihail
Institution	Technical University of Moldova
Patent no.	MD 1295 2018.03.06
Description EN	<p>The invention relates to the food industry, in particular to a drying plant for fruits and vegetables by applying three drying methods: convection drying, microwave application drying and CO₂ drying using microwave application, convection application or combining them . According to the invention, the drying plant for fruits and vegetables consists of: a housing on which the drying chamber to which a heat generator is mounted, and a centrifugal fan coupled to an electric motor, to which is connected an inverter ; a recycling channel is also connected to the drying chamber, which is adjusted to a condenser, which is connected with a centrifugal fan through an intermediate channel, which is provided with a nozzle; the microwave generator is mounted on the drying chamber and at the bottom there is the intermediate chamber in which a weighing machine is placed; a lid on which a CO₂ indicator and a CO₂ receiver are placed is also mounted in the lower part of the drying chamber; In the lower part of the installation, a processor for directing the microwave generator, a refrigeration plant, for directing the condenser via a pipe, is mounted in the housing; and a resistor for directing the heat generator; at the same time the plant is equipped with a CO₂ tank, which allows its supply via a hose.</p>
Class no.	3. Agriculture and Food Industry

MD.20.

Title	The process for obtaining vinegar from white wine fermented in walnut shell (<i>Juglans regia</i> L.)
Authors	Alina BOIȘTEAN, Aurica CHIRSANOVA, Rodica SIMINIUC, Vladislav REȘITCA, Boris GAINA
Institution	Technical University of Moldova
Patent no.	Decision AGEPI nr.9712 of 2021.02.05 Nr. deposit: s2020 0090
Description	The invention relates to the food industry, and in particular

EN to a method of acetic acid fermentation of white wine vinegar using a filler made from walnut shells. In the proposed method, according to the invention, the walnut shell is washed and dried at a temperature of $T=+32\pm 2$ ° C for 48 hours. The resulting filler is soaked in a starter culture in a ratio of 1: 3, which consists of raw wine vinegar, for 48 hours at a temperature of 20 ± 2 ° C, to implant the acetic bacteria on the filler surface. After aging, the sourdough is drained and replaced with white wine in a ratio of 1: 4 to carry out acetic acid fermentation.

Class no. 3

MD.21.
Title

Functional pastry sauce based on Carob pods with no added sugar

Authors

Tatiana Capcanari, Aurica Chirsanova, Rodica Siminiuc

Institution

Technical University of Moldova

Patent no.

-

Description

EN

The research is devoted to create new functional products using bioactive compounds extracted from local plant materials. The technology of a pastry sauce based on Carob pods with no added sugar has been developed. Carob pods of local origin were used in. Carob pods contains three major carbohydrates: sucrose, glucose and fructose. Are also rich in protein (5–8 g protein per 100g dry weight), vitamins A and B and several important minerals, such as K, P, Ca, and Mg, as major minerals and Fe, Mn, Zn, and Cu as trace minerals. It has been established that local Carob pods it is an important source of polyphenols, which show a high antioxidant activity. It was proved that pastry sauce based on Carob pods can be obtained without added sugar. The energy value of the elaborated functional carob-based sauce decreased by 60%, the fiber content increased 2,9 times, but Ca and Fe content increased in 2,9 and 5,08 times respectively. Increased antioxidant activity has been reported, the significant level of polyphenols, flavonoids and flavanols. The evaluation of the organoleptic indices of functional carob-based pastry sauce showed that it has a fine and homogeneous consistency, a pleasant taste and smell characteristic of the basic ingredient: pods with a specific dark chocolate smell and taste.

MD.22.**Title**

ELABORATION AND IMPLEMENTATION OF THE INNOVATIVE TECHNOLOGY OF DRY AGED BEEF

Authors

Bulgaru Viorica

Institution

Technical University of Moldova

Description**EN**

Beef is valued for its important macronutrient content in ensuring a healthy and balanced diet. It is a good source of protein, vitamin B12, niacin, zinc and iron. The nutritional quality of beef depends on the ratio of protein fractions, namely myofibrillar proteins (actin and myosin) and stromal proteins (collagen). The protein content, proteolytic enzymes together with the speed of muscle contraction (beef - slow contraction), the type of metabolism (oxidative for beef) determines the variation of the aging speed of muscle type. This indicator is the lowest for beef compared to other types of meat. Thus, beef for culinary treatment is subjected to longer heat treatments, which have a negative effect on the initial chemical composition. In this context, in order to obtain high characteristics of tenderness, juiciness, consistency, beef can be subjected to the dry aging process, with the controlled parameters in the aging room.

The project focuses mainly on specific parameters, including aging (duration, temperature, relative humidity and airflow), organoleptic quality (aroma, tenderness and juiciness), physico-chemical and microbiological. During the process, the processes of proteolysis and lipolysis intensify, the meat becomes juicy, the aroma becomes more intense due to the reduction of sugars, the release of free amino acids, peptides and the breakdown of ribonucleotides, natural meat enzymes break down proteins (solubilization of proteins) and connective tissue which leads to increased meat tenderness. The implementation of a aging technique by drying beef in aging room with predetermined parameters became the first such technology in the Republic of Moldova.

MD.23.

Title	APPLYING AUGMENTED REALITY IN THE CONCEPTUALIZATION AND VISUALIZATION OF INTERACTIVE EDITIONS PROMOTING THE URBAN ARCHITECTURE OF CHISINAU CITY
Authors	Cîrja Ana-Maria, Cazac Viorica, Cîrja Jana
Institution	Technical University of Moldova
Patent no.	MD 2020 041
Description	The elaboration presents an interactive book edition focused on the presentation and promotion of the urban architecture of Chisinau, integrated with Augmented Reality being intended for tourists, but also for all those interested in knowing and exploring the city through interactive 3D animated elements. The solution offers the possibility to access the graphics of the book edition into real interactive 3D architectural elements. They capture attention, maintain readers' interest in the book edition in the desire to explore new architectural values, ensure the possibility of detailed viewing of the constituent elements.
EN	The constituent elements are designed with specialized 3D software with all the details, presenting the functionality and the inside view of the presented subjects.
Class no.	11. Printing and advertising

MD.24.

Title	COGNITIVE-INTERACTIVE SCIENCE EDITION FOR 3-5 YEAR OLDS
Authors	Șonțu Lia-Liliana, Cazac Viorica
Institution	Technical University of Moldova
Patent no.	MD 2020 044
Description	The elaboration presents a set of cognitive-interactive elements about science, for 3-5 year old, consisting of 18 puzzle sheets, designed to help small explorers discover the animal world. The novelty of the elaboration is the complexity of the skills developed in young children aimed at: the skills of knowledge/recognition of animals, their environment and places of living, the necessary living conditions, exploration, the development of aesthetic taste, empathy and environmental protection. The product with its constituent elements is made of environmentally friendly, environmentally friendly, harmless materials. At the
EN	

constructive level, solutions were advocated that avoid the possibility of avoiding the occurrence of mechanical injuries: punctures, scratches, etc.

Class no. 11. Printing and advertising

MD.25.

Title

Mini-hydroelectric power plant

Authors

Bostan Ion, Bostan Viorel, Dulgheru Valeriu, Dumitrescu Cătălin, Dumitrescu Liliana, Ciobanu Radu, Ciobanu Oleg.

Institution

Technical University of Moldova

Patent no.

Patent application, A/00549,. 22.06.2020, OSIM, RO

The mini-hydroelectric power plant is intended for the production of electricity by transforming the flow (kinetic) energy of water into electricity with increasing conversion efficiency.

Description

EN

The micro-hydropower plant includes a platform, connected to the shore. A vertical axis rotor is installed on the platform with the blades installed asymmetrically on the axles and self-adjusting to the water currents by means of weather vanes. When the water currents flow on the surface of the blade, a hydraulic force is unevenly distributed on the two sides of the blade due to the offset installation of the axle. This technical solution allows to increase the efficiency of converting the kinetic energy of water into mechanical energy by reducing power losses when reorienting the blades.

Class no.

2. Energy and sustainable development

MD.26.

Title

Gear system, manufacturing process and production device

Authors

Dulgheru Valeriu, Bostan Ion, Ciobanu Radu, Ciobanu Oleg.

Institution

Technical University of Moldova

Patent no.

Patent application, s 2020 0061. 22.06.2020

The manufacturing processes by additive process are performed as follows. By the additive manufacturing process traditionally with one or more additive heads successively, a prefabricated gear made of polymeric material or metal powders is made. Subsequently, a surface layer of additive polymeric material or metal powders with the addition of solid lubricant is deposited on the formed

Description

EN

surfaces of the teeth. The material for forming the surface layer of the teeth is deposited through the nozzle of the additive head, which performs a sphero-spatial (precessional) movement with geometro-kinematic parameters ensured by a device and forward translational movement to the center of the gear or vertical, controlled by a computerized control module, finally forming the surface layer. Thus, the surface layer of the teeth will have a more resistant structure to the action of breaking forces in the gear, a more homogeneous structure with an optimal operating capacity in the conditions of cyclic deformations of diamond-type cellular units at the entrance and exit of the gear.

Class no. 6. Mechanical Engineering - Metallurgy

MD.27.

Title

Hybrid wind turbine with vertical axis

Authors

Bostan Viorel, Bostan Ion, Dulgheru Valeriu, Dumitrescu Cătălin, Ciobanu Oleg, Ciobanu Radu, Rabei Ivan, Guțu Marin, Ciocănea Adrian, Maican Edmond, Rădoi Radu, Șefu Ștefan

Institution

Technical University of Moldova

Patent no.

Patents, nr. 1261Y of 30.06.2018, nr. 934Y of 31.07.2015

**Description
EN**

The invention relates to energy, namely to hybrid wind turbines with vertical axis and can be used to transform wind energy into electricity.

The hybrid wind turbine with vertical axis contains a fixed vertical tower, on which is coaxially placed a basic rotating shaft with the Darreus helical rotor with blades with aerodynamic profile. An additional rotating Savonius rotor is coaxially placed on the tower, with at least two full helical blades. The rotor also contains an electric generator, with the stator to which the basic rotating shaft is rigidly connected, and with its rotor the additional rotating shaft is rigidly connected. The rotor is connected to the tower by a one-way coupling. The basic and the additional rotating shaft are kinematically connected to each other with the possibility of rotating in opposite directions.

Class no. 2. Energy and sustainable development

MD.28.

Title	n-BUTANOL SENSOR BASED ON ZnO-Al₂O₃ HETEROJUNCTION.
Authors	Magariu Nicolae, Trofim Viorel, Lupan Oleg
Institution	Technical University of Moldova
Patent no.	Deposit Nr. s 2020 0049 from 2020.05.13
Description EN	The invention relates to the technique and technology of oxide semiconductors, in particular to butanol sensors based on ZnO-Al ₂ O ₃ heteronjunctions. Butanol is widely used as a solvent for the manufacture of varnishes and paints. For butanol, the odor threshold is at 14-16 ppm, but the permissible limit of its concentration in air \approx 3.3 ppm. For these reasons it is necessary to make sensors sensitive to low concentrations of butanol. The problem solved by the proposed invention is the manufacture of an n-Butanol sensor with a higher sensitivity to low gas concentrations.
Class no.	12. Safety, protection and rescue of people

MD.29.

Title	Project title: NATO Science for Peace and Security Programme (SPS) under grant G5634 „Advanced Electro-Optical Chemical Sensors” AMOXES Research title: A single CuO/Cu₂O/Cu micro-wire covered by a nano-wire network as gas sensor for the detection of battery hazards
Authors	LUPAN Oleg, ABABII Nicolai.
Institution	Technical University of Moldova
Patent no.	-
Description EN	In this research, a strategy to prepare CuO/Cu ₂ O/Cu microwires which is fully covered by a nanowire network using a simple thermal oxidation process is developed. The CuO/Cu ₂ O/Cu-microwires are fixed on Au/Cr pads with Cu microparticles. After thermal annealing at 425 °C, these CuO/Cu ₂ O/Cu microwires are used as room-temperature 2-propanol sensors. These sensors show different dominating gas responses with operating temperatures, to ethanol at 175 °C, to 2-propanol at room temperature and 225 °C, and to hydrogen gas at \sim 300 °C, respectively. We propose the sensing mechanism of this 3-in-1 sensor based on CuO/Cu ₂ O/Cu. XRD studies reveal that the annealing time during oxidation affects the chemical appearance of the sensor, thus that for samples oxidized at 425 °C for 1 h the dominating phase is Cu ₂ O, whereas upon further rising the

annealing duration up to 5 h, the CuO phase becomes dominant. The crystal structure of the Cu₂O-shell/Cu-core and the CuO-NWs networks on the surface were confirmed with TEM, HRTEM, and SAED. DFT calculations brings valuable inputs to the interactions of the different gas molecules with the most stable top surface of CuO, revealing strong binding, electronic band gap changes and charge transfer due to the gas molecule interactions with the top surface. This research shows the importance of the non-planar CuO/Cu₂O layered hetero-structure as a bright nanomaterial for the detection of various gases, controlled by the working temperature, and the insight presented here will be of significant value in the fabrication of new p-type sensing devices through simple nanotechnology.

MD.30.**Title****Folk style bow tie collection****Authors**

Malcoci Marina, Doina-Bezutchi Angela, Malcoci Maria Eudochia

Institution**Technical University of Moldova****Patent no.**

MD nr. de intrare 2488, data depunerii 11.02.2021

Description**EN**

The collection of Folk-style bow ties was made in the spirit of poplar tradition. This collection carries the message of skill and thinking of the nation, it is a standard of dignity and beauty, a living testimony of a great phenomenon of mass creation. The bow tie is an alternative for those who do not wear a tie, but want to be interestingly dressed, at least in terms of formal outfits. With the evolution of fashion, the bow tie has evolved from classic black to a multitude of colors, from a simple knot to more interesting knots and loops, and the materials from which they are made have become increasingly diverse. After more than two centuries, the bow tie keeps its topicality and remains one of the main accessories, both in men's and women's wardrobe.

The elaborate collection is rich in decorative elements, which as a whole create a varied and interesting aesthetic aspect that corresponds to the source of inspiration. The following techniques were used in the decoration of the products: embroidery, perforation, lace. The authors propose such models to be introduced into school uniforms (gymnasiums, high schools and colleges) to promote national values and ancestral traditions.

Class no.

9

MD.31.**Title****MOLDS FOR PRODUCING PARTS FROM METAL POWDERS****Authors**

Alexandru Mazuru, Alexei Toca, Sergiu Mazuru, Nicolae Trifan

Institution**Technical University of Moldova****Patent no.**

MD 676 2013.09.30

Description
EN

The invention relates to mechanical engineering technology, namely to molds for producing parts from metal powders. The mold for metal powders comprises a clamping sleeve (3), in which are located a matrix (2) and upper (4) and lower (5) forming elements, made helical with internal protrusions in the lower part, which in assembly form a cylindrical surface, and placed with the possibility of mutual movement by a curved trajectory along the axis of molding. The mold further comprises a rod (7) and a punch (6), which together with the forming elements (4, 5) form the molding cavity. The powder form for metal powders works as follows. The mold 2, together with the forming elements 4 and 5, is placed in the bushing 3, by tightening, then from the bottom of the mold 2 is transmitted advance to the core 7, after which the space created by the upper and lower forming elements 5 and the core 7 is filled with the required amount of metal powders 1. After filling, the forming elements 4 are moved relative to the forming elements 5 by 2/3 of the height of the metal powder 1, then the punch 6 and the forming elements 4 and 5 are communicates a pressing force. After the required pressure level has been reached, and the forming elements 4 and 5, under the action of pressure, have moved with the execution of the rotational movement around their axis until they have aligned, the bushing 3 is removed, after which the phase is executed. extraction of the pressed part.

Class no.

6. Mechanical Engineering - Metallurgy

MD.32.**Title****PROCESS FOR HONING OF PRECESSION GEARWHEEL TEETH****Authors**

Sergiu Mazuru, Serghei Scaticailov, Ion Bostan, Alexandru Mazuru

Institution**Technical University of Moldova**

Patent no.	MD 807 2014.08.31
Description EN	The invention relates to the machining of precession gearwheel teeth, namely the tooth honing. The process for honing of precession gearwheel teeth includes honing of gearwheel teeth (5) with a satellite tool (1), which simulates a real transmission and includes two gear rings with drive (3) and machining (2) rollers, on the surface of the latter being applied strips (4) of metallic bond with diamond or abrasive grains, distributed uniformly, between which are formed chip removal channels. The rollers (2, 3) are made in the form of a truncated cone with the apex towards the gear rings of the satellite tool (1). Between the satellite tool (1) and the gearwheel (5) is fed lubrication-cooling fluid. The satellite tool (1) is communicated a precession motion with continuous axial advance or periodic axial advance with its rotation consecutively in both directions, then the satellite tool (1) performs a free running consecutively in both directions. The strips (4) of metallic bond with diamond or abrasive grains deposited on the surface of the machining rollers (2) are uniformly distributed in the form of a spiral, with winding directions opposite to the previous roller.
Class no.	6. Mechanical Engineering - Metallurgy

MD.33.

Title	IR photodetector based on the GaAs nanowire
Authors	Eduard Monaico, Veaceslav Ursaki, Elena Monaico, Ion Tiginyanu
Institution	Technical University of Moldova, National Center for Materials Study and Testing
Patent no.	Patent application No. 6674/2020
Description EN	Herein, we propose the manufacture of IR photodetector based on GaAs nanowire with good sensitivity and dynamic characteristics prepared by a cost-effective electrochemical etching of GaAs wafer, which does not require sophisticated and expensive equipment. The electrochemical etching being performed at room temperature in 1M HNO ₃ electrolyte. A special design of contacts was applied via laser beam lithography on selected nanowires. The deposition of Cr/Au ohmic contacts at the ends of the GaAs nanowire ensures the operation of the photodetector in photoconductor mode.

The analysis of the photocurrent build-up and relaxation for a photodetector produced on nanowires with different diameters shows that the measured photoresponse at the voltage of 5V increases from 50 mA/W to 100 mA/W with the increase of the nanowire diameter from 200 nm to 400 nm. It should be noted that, because the photodetector operates in the photoconductor mode, the photocurrent increases linearly with increasing polarization. Thus, at a polarization voltage of 15V the photoresponse is higher than 100 mA/W for all three manufactured photodetectors.

The task solved by the proposed invention consists in the elaboration of an infrared radiation photodetector with photoresponse of the order of 100 mA/W, which can be incorporated on a wide variety of substrates.

This work received partial funding from the PostDoc Grant #21.00208.5007.15/PD.

Class no.

14.

MD.34.

Title

Process for obtaining of semiconductor nanowires in one step via anodization

Authors

Elena Monaico, Eduard Monaico, Veaceslav Ursaki, Ion Tiginyanu

Institution

Technical University of Moldova, National Center for Materials Study and Testing

Patent no.

Patent application No. 6673/2020

Description

EN

Semiconductor nanowires, especially from III-V semiconductor compounds, demonstrate an obvious potential for applications as active components in solar cells, photodetectors, light emitters, transistors and other applications. The production of nanowire in masses with perpendicular orientation to the support surface it's a challenge and is very important for applications.

Herein, we propose the technological route via electrochemical etching of bulk GaAs, GaP, and InP substrates for obtaining of a network of semiconductor nanowires with a diameter in the range of 50 - 500 nm, the nanowires being oriented perpendicular to the surface of the substrate and with a homogeneous distribution on the surface of the semiconductor wafer.

The advantages of the proposed process over other already existing processes are: - the possibility of GaAs, GaP, and

InP nanowire networks obtaining with a diameter in the range of 50 - 500 nm oriented perpendicular to the crystal surface in a single technological step; - crystallographic orientation of nanowires can be tuned by using semiconductor wafers with different orientations; - this newly developed approach opens the possibility to avoid the contamination of obtained nanowires due to direct electrochemical dissolution of the crystalline material around the emerging nanostructures. As a result of anodization at optimal electrochemical parameters, the nanowires are not growth but the space around the nanowires is etched and the remaining nanowires have the same crystallinity and purity as used wafer.

This work received partial funding form the state program Grant #20.80009.5007.20.

Class no. 14

MD.35.
Title**PROCESS FOR PRODUCING ICE CREAM****Authors**

Popescu Liliana, Ghendov-Moșanu Aliona, Sturza Rodica, Cojocari Daniela, Balan Greta, Bulgaru Viorica

Institution

Technical University of Moldova

Patent no.

MD 1451 2020.08.31

**Description
EN**

The invention relates to the dairy industry, namely to a process for producing ice cream. The process, according to the invention, comprises preparing a mixture of normalized milk, cream, powdered skimmed milk, sugar, dextrose, a mixture of stabilizer and emulsifier, deionized water; filtering, homogenizing, pasteurizing, cooling the mixture, dosing the powder of chokeberry, or sea buckthorn, or rosehip, or hawthorn and the hydroalcoholic extract of chokeberry or hawthorn, or fat-soluble extract of sea buckthorn or rosehip, ripening, freezing the mixture, packaging, hardening and storing the ice cream.

Class no. 3. Agriculture and Food Industry

MD.36.
Title**PRINCIPLES OF DAIRY PROCESSING
CORRELATED TO BALANCED NUTRITION AND
FOOD SAFETY****Authors**

Popescu Liliana

Institution

Technical University of Moldova

Description
EN

Milk products is considered as a nearly complete foods since it is a good source of protein, fat and major minerals. To make them attractive, manufacturers are increasingly proposing dairy products with the addition of synthetic additives, to ensure texture, color and aroma. In recent years, there has been an increase in awareness of the adverse effects of synthetic additives in food composition. This paved the way for a variety of new products by replacing synthetic additives with natural ingredients, which at the same time have high sensory qualities and contain bioactive natural compounds. One of the most important sources for obtaining natural bioactive compounds are plants, rich in phenolic compounds, carotenoids, vitamins, which can inhibit or slow down the growth of bacteria, yeasts and molds.

The results of the research will lead to the production of dairy products with bioactive compounds and functional ingredients from plant raw materials (colorants, antioxidants, natural preservatives) that can contribute to the health and well-being of the population.

MD.37.

Title **PROCESS FOR VEGETABLE OILS STABILIZATION**

Authors Popovici Violina, Gendov-Moşanu Aliona, Sturza Rodica, Deseatnicova Olga

Institution Technical University of Moldova

Patent no. Decision no. 967 2020.12.02

The invention relates to the oil and fat industry and can be used in the food industry for the stabilization of vegetable oils with berry extracts. The problem solved by the proposed invention is to obtain oils with increased oxidative stability, without additives of synthetic origin using lipophilic extracts from local berries (sea buckthorn, hawthorn and rosehip).

Description
EN

The invention solves the problem by proposing a process for stabilizing vegetable oils of sunflower, or corn, or walnut, or grape seed by administering 0.5 ... 10% vol. of extract of sea buckthorn, or hawthorn or rosehip obtained on the basis of matrix oil. The result of the invention consists in obtaining stable vegetable oils, with antioxidant potential, with higher sensory characteristics and with a longer shelf life.

Class no. 3. Agriculture and Food Industry

MD.38.

Title SMART clothing system
Authors Victoria Danila, Stela Balan, Marcel Vîrlan
Institution Eliri S A., UTM, Davitex Neo SRL
Patent no. -

Description
EN

The elements of innovation proposed by the research team are necessary for any family in which a premature child was born. The product made in the form of specialized clothing with integrated electronic system, but mobile, can ensure monitoring of vital parameters and can be useful when a situation of respiration occurs, called apnea, a common situation for premature babies. In addition to monitoring data, the product performs the basic function, dressing the child and maintaining body temperature. At the same time, due to the fact that the clothing is simple to change, and the electronic system is not fixed on the child's body, but is integrated, the time to provide first aid to the child is reduced. The sensors are sensitive to the movements of the child's chest, simultaneously measuring the frequency of breathing, heartbeat and temperature. In view of the above, the continuation of such a project is argued to be appropriate for an impressive segment of premature babies born annually in the world.

MD.39.

Title Functionally sustainable clothing systems
Authors Victoria Danila, Antonela Curteza, Stela Balan
Institution Technical University of Moldova
Technical University „Gh. Asachi” Iasi
Davitex Neo SRL
Patent no.

Description
EN

The innovative elements of functional clothing systems consist of the inclusion of the original elements, comfort and safety.

The elaboration presents a solution to the problem of clothing insurance functionally sustainable for children, women, and men. The proposed solution is in strategies to intensify efforts on environmental protection. Taking into account the statistical data, which indicates the increase of the number of environmental pollutions, the idea comes to contribute to the environmental improvement through functionally sustainable clothing products adapted to the imposed requirements and conditions

"N.Testemiteanu"
State Medical and Pharmaceutical University

MD.40.**Title****New devices for dissection of tissue grafts****Authors**MACAGONOVA Olga, NACU Viorel, COCIUG Adrian,
IGNATOV Olga,**Institution***NICOLAE TESTEMITEANU* State University of Medicine
and Pharmacy of the Republic of Moldova**Patent no.**

1501 (13) Y, 1502 (13) Y

Description**EN**

The inventions relates to medical equipment, in particular to devices for circular and lamellar dissection of tissue grafts, and can be used in regenerative medicine. The first invention consists in that the device comprises a working surface, on which is placed a cylindrical support with a coaxial hole with internal thread; two arms, pivotally connected at one end with a screw. Each arm consists of two rods, also pivotally connected with a screw. At the joined ends of the arms is fixed a cylindrical handle with serrated surface. The opposite end of the first arm is provided with external thread for its fixation in the hole of the cylindrical support, and on the opposite end of the second arm is put on a hollow cylinder and is made a groove, in which is placed a removable sharp blade, with the possibility of its fixation with the hollow cylinder upon its displacement in the distal direction. All elements of the device are made of stainless steel. The second invention consists in that the device comprises a square working plate, on one edge of which is welded a ruler with divisions. On the working plate, with the possibility of sliding, is placed a dissection mechanism, which contains two rectangular plates with a U-shaped section, in each of which is made a longitudinal groove, in which is placed a rectangular blade. At a distance of 4 cm from each end face of the rectangular plates is perpendicularly made a through hole, in which are inserted two cylindrical rods, with the possibility of sliding thereon of rectangular plates. Perpendicular to each through hole is made a hole with internal thread, in which are placed screws for attaching rectangular plates to cylindrical rods, and in the middle of the cylindrical rods is fixed a handle, at the same time all elements of the device are made of stainless steel

Applications: regenerative medicine, tissue engineering, ophthalmology, surgery

Class no.

4

MD.41.

Title	Anti-VEGF in the treatment of non-infectious intraocular inflammation
Authors	CUȘNIR Valeriu, DUMBRĂVEANU Lilia, GROPPA Liliana, CUȘNIR Vitalie, CUȘNIR Valeriu, BOBESCU Nicolae
Institution	<i>NICOLAE TESTEMITEANU</i> State University of Medicine and Pharmacy of the Republic of Moldova
Patent no.	MD 1465
Description EN	The invention relates to medicine, in particular to ophthalmology and can be used for the medical treatment of non-infectious ocular inflammations. The essence of the invention is that an antibiotic of the class fluoroquinolones, a non-steroidal anti-inflammatory drug and a corticosteroid, which is administered for 7 days, is administered concomitantly in the form of ophthalmic drops, a third-generation cephalosporin antibiotic is administered systemically, for 7 days, a corticosteroid preparation for 5 days and a triazole-derived antifungal on the first day of treatment and also on the first day of treatment is administered in the anterior chamber soil. Bevacizumab 1.25 mg / 0.05 ml after local anesthesia with 0.5% tetracaine solution or 2% lidocaine solution.
Class no.	4

MD.42.

Title	Method for determining liver function in chronic viral hepatitis B and chronic HBV etiology infection with minimal activity.
Authors	Lupasco Iulianna, Dumbrava Vlada-Tatiana, Lupasco Daniella
Institution	<i>Nicolae Testemitanu</i> State University of Medicine and Pharmacy of the Republic of Moldova
Patent no.	1474 (13) Y
Description EN	The invention relates to medicine, in particular to gastroenterology, hepatology. Summary of the invention consists in that fasting venous blood is sampled and the concentration of transaminases, namely alanine aminotransferase and aspartate aminotransferase, is determined, after which a load test is performed by oral

administration of 50 g of glucose, dissolved in warm water and 0.5 g of aminophylline, followed by dynamic blood sampling in 60 and 120 min, and the concentration of transaminases is re-determined, in the event if in the sample taken in 60 min from the load test, the concentration of alanine aminotransferase increases by 1.3...1.8 times, and the concentration of aspartate aminotransferase increases by 1.4...2.0 times, and in the sample taken in 120 min from the load test, the concentration of alanine aminotransferase decreases by 1.3...1.4 times, and the concentration of aspartate aminotransferase decreases by 1.4...1.6 times from the concentration level in samples taken in 60 min from the load test, liver dysfunction is determined.

Benefits and the novelty of this method is that it sets early, accurate determining liver function in chronic viral hepatitis B and chronic HBV infection with minimal activity, allowing the timely prescription of adequate treatment in asymptomatic patients.

Fields of application: in medicine, especially in gastroenterology.

Class no. 4

MD.43.

Title

Method for predicting the course of neuropsychomotor disorders in children with ischemic cerebral stroke
SPRINCEAN Mariana, HADJIU Svetlana, CĂLCÎI

Authors

Cornelia, LUPUȘOR Nadejda, BOZADJI Veaceslav, REVENCO Ninel

Institution

NICOLAE TESTEMITEANU State University of Medicine and Pharmacy of the Republic of Moldova

Patent no.

MD 1487/2021

**Description
EN**

The invention relates to medicine, in particular to pediatric neurology, neonatology, pediatrics, and can be used for predicting the course of neuropsychomotor disorders in children with ischemic cerebral stroke. Summary of the invention consists in that the patient of pediatric age undergoes the clinical and paraclinical examination, the clinical picture of brain structure affection is established, at the same time 2...3 ml of venous blood is sampled, centrifuged, the blood serum is separated and stored at a constant temperature of -20°C, the serum concentration of

vascular endothelial growth factor, S100B protein and endoglin is determined, if the serum concentration of vascular endothelial growth factor is 1705.81...716.80 pg/ml, of S100B protein is 1.024...0.720 pg/ml and of endoglin is 1.90...2.11 pg/ml, a severe course of neuropsychomotor disorders is predicted; if the serum concentration of vascular endothelial growth factor is 716.80...450.41 pg/ml, of S100B protein is 0.720...0.399 pg/ml and of endoglin is 2.11...2.24 pg/ml, a course of moderate severity of neuropsychomotor disorders is predicted; if the serum concentration of vascular endothelial growth factor is 450.41...296.23 pg/ml, of S100B protein is 0.399...0.272 pg/ml and of endoglin is 2.24...2.29 pg/ml, a course of mild severity of neuropsychomotor disorders is predicted.

Benefits: The advantage of the invention consists in the early diagnosis of the degree and size of neuropsychomotor disorders to establish the prognosis of the severity of neuropsychomotor disorders in children with stroke for the administration of early treatment, assessment of the degree of child disability and remote prognosis.

Class no. Invention Classification: 4. Medicine-Health Care-Cosmetics

MD.44.

Title Method for diagnosing ischemic cerebral stroke in children
Authors SPRINCEAN Mariana, HADJIU Svetlana, CĂLCÎ Cornelia, LUPUȘOR Nadejda, BOZADJI Veaceslav, REVENCO Ninel
Institution *NICOLAE TESTEMITEANU* State University of Medicine and Pharmacy of the Republic of Moldova
Patent no. *nr. MD 1471/2020*
 The invention relates to medicine, in particular to pediatric neurology, neonatology, pediatrics, and can be used for early diagnosis of neuropsychomotor disorders in children who have undergone ischemic cerebral stroke. Summary of the invention consists in that the patient of pediatric age is clinically and paraclinically examined, it is established the clinical cerebral structure affection picture, at the same time it is sampled 2...3 ml of venous blood, it is centrifuged, it is separated the blood serum and stored at a constant temperature of -20°C, it is determined the serum
Description
EN

concentration of vascular endothelial growth factor, in the case when the serum concentration is more than 296.23 pg/ml, the presence of ischemic cerebral stroke is diagnosed.

Benefits: The advantage of the invention consists in the early diagnosis of the degree and size of neuropsychomotor disorders in children with stroke for the administration of early treatment, the assessment of the degree of disability of the child and the remote prognosis.

Class no. 4. Medicine-Health Care-Cosmetics

MD.45.
Title

Molecular genetic method for detecting Y chromosome microdeletions in male infertility

Authors

RACOVÎȚĂ Stela, MOȘIN Veaceslav, CAPCELEA Svetlana, BOICIUC Chiril, SPRINCEAN Mariana

Institution

NICOLAE TESTEMITEANU State University of Medicine and Pharmacy of the Republic of Moldova

Patent no.

MD 1489/2021

**Description
EN**

The invention relates to medicine, in particular to molecular genetics and can be used for detecting Y chromosome microdeletions in male infertility. Summary of the invention consists in that the analysis of isolated genomic DNA is performed using the chain polymerization reaction (PCR), with the analysis of sY84 and sY86 (AZFa), sY127 and sY134 (AZFb), sY254 and sY255 (AZFc) and SRY and ZFX/ZFY, sDBY1 and sY620 (AZFa), sY153 and sY158 (AZFc), sY117 and sY143 (AZFb) sequences, amplification of DNA fragments is performed, after which the DNA is separated by electrophoretic method under the action of constant electric current in an 8% polyacrylamide gel in a continuous buffer system, then the gel is stained with a solution of ethidium bromide with a concentration of 0.5 µg/ml, for 5 min, washed for 1 min, and the resulting fragments are photodocumented.

Benefits: The advantage of the invention consists in development of an effective method for detecting Y chromosome microdeletions, which allows to increase the sensitivity of the multiplex PCR test and a more complex approach, much more accurate in the diagnosis and treatment of patients with male infertility.

Class no.

4. Medicine-Health Care-Cosmetics

MD.46.

Title	Method of diagnosis of morphologically altered gastric precancerous conditions
Authors	Botezatu Adriana; Istrate Viorel; Barba Doina; Turcanu Gheorghe; Luca Ecaterina; Ursu Catalina; Zlatovcena Alla; Antonova Natalia; Bodrug Nicolae.
Institution	<i>NICOLAE TESTEMITEANU</i> State University of Medicine and Pharmacy of the Republic of Moldova
Patent no.	s 2020 0115, 2020.09.21
Description EN	<p>The invention relates to medicine, especially to gastroenterology and can be used for the diagnosis of morphologically altered gastric precancerous conditions. At the present stage, the most basic precancerous conditions are considered: chronic atrophic gastritis and <i>Helicobacter pylori</i> infection, and morphologically altered precancerous conditions are considered intestinal metaplasia and gastric mucosal epithelial dysplasia. The method of diagnosing gastric precancerous conditions by using the Gastro-Panel serological panel is known, where the determination of serum pepsinogen (PG) is the most useful non-invasive test in exploring the gastric mucosa (atrophy versus non-atrophy). The PG-I / PG-II (PGR) ratio can be associated as a biomarker of gastric neoplasms. A full list of serological tests (Gastro-Panel) that include serum pepsinogen levels (PG-I and PG-II), gastrin-17 (G-17) and anti-<i>H.pylori</i> antibodies have recently been proposed as tests.</p> <p>The essence of the invention consists in determining in the patient's blood serum the quantitative values of pepsinogen I (PG-I), pepsinogen II (PG-II) and the ratio between the quantitative value of pepsinogen I and pepsinogen II, if the quantitative value of PG- I is 64.10 ... 38.37 µg / L, and the ratio of PG-I / PG-II is 4.59 ... 2.55, the presence of morphologically altered gastric precancerous condition is diagnosed. The technical result of the invention consists in performing non-invasive investigations, which all patients support, which indicate the presence of morphologically altered gastric precancerous conditions with early diagnosis by prescribing an effective treatment and avoiding the transformation into gastric cancer.</p>
Class no.	4

MD.47.	
Title	Catena-(μ -nitrate-O,O'-O"-{methyl-N-(prop-2-en-1-yl)-2-[1-(pyridine-2-yl)ethylidene]hydrazine}hydrazinecarbimidothioate} copper (II) nitrate compound as superoxide radical inhibitors
Authors	GULEA Aurelian, GUDUMAC Valentin, ISTRATI Dorin, USATAIA Irina, GRAUR Vasiliu, ȚAPCOV Victor, ȘVEȚ Inna, PANTEA Valeriana
Institution	<i>NICOLAE TESTEMITEANU</i> State University of Medicine and Pharmacy of the Republic of Moldova
Patent no.	No. 4698
Description	The invention relates to chemistry and medicine, namely to a biologically active coordination compound of copper from the class of transition metal isothiosemicarbazidates. This complex exhibits antiradical activity, inhibiting superoxide radicals in the body. Due to these properties, it can be used in medicine as a drug that prevents the development of cellular and tissue lesions, atherosclerosis and carcinogenesis.
EN	According to the invention, claimed is catena-(μ -nitrate-O,O'-O"-{methyl-N-(prop-2-en-1-yl)-2-[1-(pyridine-2-yl)ethylidene]hydrazinecarbimidothioate} copper (II) nitrate compound, wherein n is limited by the size of the crystal. The said compound expands the arsenal of synthetic superoxide radical inhibitors with high biological activity. Applications: Medicine, Phthisiopneumology, Laboratory Medicine
Class no.	4

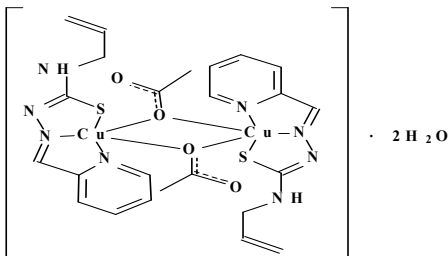
MD.48.	
Title	Use of bis(μ2-acetato-O)-bis{[N-prop-2-en-1-yl-N'-(pyridin-2-ylmethylidene) carbamohydrazonothioato]copper} dihydrate as an inhibitor of superoxide radicals
Authors	GUDUMAC Valentin, GULEA Aurelian, ȚAPCOV Victor, PANTEA Valeriana, GRAUR Vasiliu, ANDRONACHE Lilia

Institution *NICOLAE TESTEMITEANU* State University of Medicine and Pharmacy of the Republic of Moldova

Patent no. No. 4741

The invention relates to medicine, namely to the use of a biologically active copper coordination compound from the class of transition metal thiosemicarbazidates. Summary of the invention consists in the use as an inhibitor of superoxide radicals of bis(μ 2-acetato-O)-bis{[N-prop-2-en-1-yl-N'-(pyridin-2-ylmethylidene)carbamohydrazonothioato]copper} dihydrate of the formula:

Description
EN



This compound expands the arsenal of synthetic inhibitors of superoxide radicals with high biological activity.

Applications: Medicine, Phthisiopneumology, Laboratory Medicine

Class no.

4

MD.49.

Title

The method for restoration of cancellous bone defects using the induced membrane method in association with demineralized cancellous xenon plasty and stem cell cultures

Authors

Birca Radu, Sratan Vladimir, Nacu Viorel, Verega Grigore

Institution

NICOLAE TESTEMITEANU State University of Medicine and Pharmacy of the Republic of Moldova

Patent no.

Patent application No. 44/2135/CBSD/26.10.2020, S20200135

Description
EN

The invention relates to medicine, especially to traumatology and orthopedics, reconstructive surgery and can be used for the restoration of cancellous bone defects using the induced membrane method in association with demineralized xenon and osteoprogenitor cultures.

The essence of the invention lies in surgeries in several

stages - Stage I: "Formation of the induced membrane" - "Aseptic processing of the lower limb, covering of sterile fields. Incision at the level of the leg, the anterior medial part - from the large tibial tuberosity to 1/3 middle leg (metaphysis). Tibial bone periosteal stripping, circular bone defect formation of about 3.0 cm in length, 1/3 proximal to the tibia. Bone fragments aligned and fixed with plate and screws. Defect filled with antibiotic spacer cement (Aminofix). Antiseptic wash and wound suturing. " In 2 weeks:

Stage II "Incision at the same level, removal of the cement spacer, sleeving of the remaining induced membrane cavity with demineralized xenon, hermetic suturing of the wound; inoculation of the allochthonous mesenchymal stem cell culture 4.5 x 10⁶ (isolation and cultivation of mesenchymal stem cells in the Tissue Engineering Laboratory, 20 days period, bone marrow extracted from the iliac bone). At week 6: incision at the level of the anterior medial leg from the large tibial tuberosity to the middle 1/3 leg with removal of the plate and screws; skin suturing. Performing a control Rx at each stage, finishing with a CT of the limb at 8 weeks".

Class no.

4

MD.50.

Title

Patent cycle: methods of treatment of complications of liver cirrhosis - esophageal varices, refractory ascites, ascites-peritonitis

Authors

ANGHELICI Gheorghe; PISARENCO Sergiu; CRUDU Oleg; ZUGRAV Tatiana; LUPU Gheorghe.

Institution

NICOLAE TESTEMITEANU State University of Medicine and Pharmacy of the Republic of Moldova

Patent no.

Patent cycle : MD 1394 Z, MD 1404 Z, MD 1407 Z , MD 1425 Y , MD 1511 Y , Cerere de brevet Nr. depozitului: s 2021 0014

**Description
EN**

Were laborated new pathogenetically argued methods for complex laparo-endoscopic and endovascular minimally invasive treatment of patients with potentially lethal complications of liver cirrhosis.

Development of new methods and improvement of endoscopic and endovascular hemostasis of variceal

bleeding. New technologies in laparoscopic minimally invasive surgical treatment of spontaneous bacterial peritonitis; improvement of surgical correction methods of refractory ascites as an obscure form of spontaneous latent ascites-peritonitis through simultaneous interventions of cervical decompression of thoracic lymphatic duct and laparoscopic sanitation with postoperative peritoneal lavage. The expected results will present scientific novelty by specifying the pathogenetic mechanisms of the potentially lethal complications of liver cirrhosis, the improvement of technologies and the development of new pathogenetically argued methods of prophylaxis, early diagnosis and minimally invasive surgical treatment. The technologies and methods elaborated implemented in local clinics and abroad based on bilateral agreements.

Class no. 4

MD.51.

Title

Small-sized graft fixation and cellularization device

Authors

COBZAC Vitalie, NACU Viorel, GLAVAN Alina, JIAN Mariana, SEDAIA Ecaterina, ABABII Polina

Institution

NICOLAE TESTEMITANU State University of Medicine and Pharmacy of the Republic of Moldova

Patent no.

MD1332

Description

EN

The invention relates to regenerative medicine, tissue engineering, traumatology, surgery, and can be used for graft fixation, increase the efficiency of graft cellularization and ensures a easier transplantation of the grafts. The invention is one: efficient, safe, of good quality, easy in utilisation and production, but also economic. With the help of the device is possible a more abundant grafts cellularization, it ensures protection of cellularised material and an easier transplantation of the grafts. According to our studies, from complet/almost complete cell lost, the yield in transplantation of cells fixed to a graft increased to 92% (n=16).

Class no. 4

MD.52.

Title	STRENGTHENING THE CAPACITY OF INTERNATIONAL RESEARCH ON THE DETERMINANTS OF THE BEHAVIOR AND ACTIVITY OF HEALTHCARE WORKERS
Authors	Vlada Furdui, Elena Ciobanu, Ion Mereuță, Ana Leorda, Cătălina Croitoru, Vasile Dumitraș
Institution	<i>Nicolae Testemitanu</i> State University of Medicine and Pharmacy of the Republic of Moldova
Patent no.	-
Description EN	<p>Within the international bilateral project of the Francophone University Agency and the Ministry of Education, Culture and Research of the Republic of Moldova „Strengthening the capacity of international research on the determinants of the behavior and activity of healthcare workers” (2020-2021) the questionnaire was developed „Identification of occupational stress syndrome in healthcare workers (Questionnaire IOSSHW)”. This questionnaire holds a National Innovator Certificate nr. 5834/2021. In order to establish the level of emotional exhaustion, a multi-block questionnaire was developed. The questionnaire consists of two parts: the general part, which includes 10 items, and the special part, which includes 131 items. The scientific novelty of this tool lies in the fact that it includes several blocks: emotional sentimental, behavioral, cognitive, communicative, individual semantic, neurophysiological, which allow the characterization of individual psychophysiological status and the study of Burnout syndrome in medical workers. The application of the questionnaire, analysis and interpretation of data can help reduce morbidity by identifying indicators of emotional, behavioral, communicative components of mental health and neurophysiological indicators; can serve to identify markers for early diagnosis of occupational stress; can improve quality of life and professional performance. The questionnaire "Identification of occupational stress syndrome in healthcare workers" is a tool by which researchers, as well as stakeholders, could identify psychoemotional status, highlighting sanogenic, satisfying and dissanogenic states, emotional stability, emotional exhaustion, depersonalization, and reduced professionalism.</p>
Class no.	4

MD.53.**Title****Use of polymer mesh in guided bone regeneration****Authors**

Chele Nicolae, Zugrav Vasile

Institution*NICOLAE TESTEMITEANU* State Medical and Pharmaceutical University, Republic of Moldova**Patent no.**

-

The reconstruction techniques of the alveolar processes available at the moment involve some complications, traumas and additional interventions, which make difficult the duration of the treatment and the postoperative recovery of the patient.

The research present a prospective clinical study evaluating bone augmentation techniques and developing and implementing new bone reconstruction techniques. Conventional methods of diagnosis and treatment are used in the research.

- Augmentation with absorbable polymer surgical mesh
- Augmentation with perforated titanium mesh

To reduce the shortcomings of existing methods, we propose the study and development of a new alternative technique of guided bone regeneration using resorbable polymer nets, which are currently very often investigated and researched (Marco Annunziata The Use of Poly-D, L-lactic Acid (PDLA) Devices for Bone Augmentation Techniques: A Systematic Review - 13 December 2017). This method comes to facilitate the work of the specialist and to improve the patient's quality of life.

Description**EN**

The development of a new alternative technique for bone formation, as well as the completion of existing ones, will have a positive impact and a significant decline in the morbidity of patients with masticatory deficit.

Following the elaborated study, we propose a treatment algorithm that will help the practitioner in performing his practical maneuvers, but most importantly, in the easier recovery and rehabilitation of patients with severe atrophy of the alveolar processes.

The study and research in this paper is an application, based on evidence. From the clinical and paraclinical data of the patient, pre- and postoperative results will be collected, then formulated conclusions. Paraclinical diagnostic methods such as computed tomography (CT), panoramic radiography and laboratory histological data are used.

Within the doctoral research project, 2 patents were elaborated and implemented: Method for restoring the bone defects of the alveolar processes in the implant-prosthetic rehabilitation, Nr. 1288 and Method for restoring bone defects of the jaws, Nr. 1503.

Class no.

4

Moldova State University

MD.54.

Title

METHOD AND EQUIPMENT FOR TAKING AIR SAMPLES IN THE ATMOSPHERE

Authors

Petru LOZOVANU, Florentin PALADI, Tatiana BULIMAGA

Institution

Moldova State University

Patent no.

Patent application no. a 2020 0085/2020.12.07

Invention consists of a method for taking air samples during measurements, and an installation for drone automatic remote air sampling by absorption on carbon nanoclusters C_n ($n=40, \dots, 100$) and filters from different atmospheric altitudes up to 150 m.

Aim of invention is monitoring of harmful impurities in the form of gases and aerosols, including those in low concentrations; determining 3D distribution dynamics of air pollutants in hard-to-reach areas adjacent to the stationary and mobile sources.

Method for collection of atmospheric air samples consists in the forced filtration of air through a fibrous filter installed in a container, whereas the additional filtration is done by using a second filter made of carbon nanoclusters C_n , both components (including the container) having been subjected beforehand to heat treatment in vacuum. Inside part of the container is maintained in vacuum until the collection of air samples. Afterwards, the impurities retained are extracted separately from the two filters, a fibrous filter with solvents, and a nanocarbon cluster filter, via thermal desorption. Device transfer to the site of sample collection, recording coordinates and controlling sample collection process are done by drone. The method is implemented with the help of **air samples collection device in the atmosphere**, which includes an air distribution appliance, equipped with a ventilation valve, coupled to an adjustable air pump, an air duct, a mechanism for coupling the container, a programmed control unit, and one or more containers with two valves, inside of which a fibrous filter is placed for additional filtration. The filter is made in the shape of a cylindrical casing out of a composite porous material and an absorbent substance composed of nanocarbon clusters.

Advantage of the invention consists in an increased efficiency and reduction of costs in the process of taking air samples in the atmosphere, especially in hard-to-reach areas adjacent to both stationary and mobile sources.

Description

EN

Class no.

1. Environment - Pollution Control; 5. Industrial and laboratory equipments

MD.55.

Title	INHIBITOR OF THE PROLIFERATION OF FUNGI OF THE SPECIES <i>Cryptococcus neoformans</i>
Authors	Aurelian GULEA, Victor ȚAPCOV, Diana CEBOTARI, Greta BĂLAN, Olga BURDUNIUC, Valeriu RUDIC
Institution	Moldova State University
Patent no.	MD 4675/2020.02.29
Description EN	The invention relates to chemistry and medicine, namely to a biologically active coordination compound of copper from the class of transition metal thiosemicarbazonates. This complex inhibits the proliferation of <i>Cryptococcus neoformans</i> species fungi, which exceeds 1.3 times the activity of the prototype. Due to these properties, it can find application in medicine and veterinary medicine as an antifungal agent.
Class no.	4. Medicine - Health Care - Cosmetics

MD.56.

Title	NEW ANTIBACTERIAL AGENT AGAINST <i>Bacillus cereus</i> AND <i>Bacillus subtilis</i>
Authors	Aurelian GULEA, Greta BĂLAN, IANINA ULCHINA, VASILII GRAUR, VICTOR ȚAPCOV
Institution	Moldova State University
Patent no.	MD 4707/2020.08.31
Description EN	The invention relates to chemistry and medicine, in particular to a biologically active coordination compound with high antibacterial activity towards <i>Bacillus cereus</i> and <i>Bacillus subtilis</i> that exceeds by 623-153 times analogous characteristics of the Furacillin and 32-16 times the characteristics of the structural analog. The discovered properties of this substance are of interest for medical practice in terms of expanding the arsenal of antibacterial remedies.
Class no.	4. Medicine - Health Care - Cosmetics

MD.57.

Title	NEW SYNTHETIC INHIBITOR OF SUPEROXIDE ANION RADICALS
Authors	Aurelian GULEA, Valentin GUDUMAC, Dorin ISTRATI, Irina USATAIA, VASILII GRAUR, VICTOR ȚAPCOV, Inna ȘVETȚ, Valeriana PANTEA

Institution	Moldova State University
Patent no.	MD 4698/2021.02.28
Description	The invention relates to chemistry and medicine, in particular to the biologically active coordination compound with high inhibitory activity towards superoxide anion radicals that exceed 115 times the analogous characteristics of quercetin that is used in medicine. The discovered properties of this substance are of interest for medical practice for enhancement of the arsenal of superoxide anion radical inhibitors.
EN	
Class no.	4. Medicine - Health Care - Cosmetics

MD.58.

Title	DEVICES WITH INDIUM PHOSPHIDE p-n JUNCTIONS
Authors	Leonid GORCEAC, Vasile BOTNARIUC, Boris CINIC, Sergiu VATAVU, Andrei COVAL, Simion RAEVSCI, Petru Ion KETRUSH, Serghei MOLDOVANU
Institution	Moldova State University
Patent no.	MD 4686 B1/2020.03.31, MD 4554 B1/2018.02.28, MD 4510/2017.08.31
Description	Junctions of nCdS-pInP and of n-pInP type with an intermediary epitaxial layer were prepared by using HVPE (n, pInP), quazi-closed volume in H ₂ (CdS), thermal evaporation in vacuum (ohmic contacts), electron beam evaporation (SiO ₂).
EN	Using of SiO ₂ (80 nm) antireflective layer allowed realization of: <ul style="list-style-type: none"> - Photo-detectors having external quantum efficiency of 80% in the wavelength region of $\lambda = 650-900$ nm and the maximum photosensitivity (I/W) of 0,51 A/W, $\lambda = 850-900$ nm; - Photovoltaic cells (PVC) with photoactive surface area of $S_{ef} = 3$ cm² having maximum conversion efficiency of 12%, (AM1); - Photovoltaic modules (25 cells, $S_{ef} = 37$ cm²) having maximum generated power of 1,2 W. Advantages of the developed devices: <ul style="list-style-type: none"> • high resistance to the corpuscular radiation (electron/proton flow); • high resistance to the temperature influence and parameters slow degradation in time (about 5% in 10 years).
Class no.	2. Energy and sustainable development

MD.59.**Title****PHOTOSENSITIVE METALLOPHTHALOCYANINE COPOLYMER PREPARING PROCESS****Authors**

Stefan ROBU, Pavel TIULEANU, Tamara POTLOG, Galina DRAGALINA, Ana POPUSOI

Institution

Moldova State University

Patent no.

MD 4747/2021.02.28

**Description
EN**

A process of obtaining photosensitive materials with therapeutic effect made of copolymers of zinc acryloylphthalocyanine with N-vinylpyrrolidone well soluble in dimethylsulfoxide and partially in water is proposed. The concentration of zinc acryloylphthalocyanine varies from 10 to 30 mol%. The polymeric products obtained can be used successfully in medicine, especially in photodynamic therapy.

Class no.

4. Medicine - Health Care - Cosmetics

MD.60.**Title****THE SELF-ASSEMBLED ZINC PHTHALOCYANINE WITH (3R)-3-HYDROXY-4-(TRIMETHYLAMINO) BUTANOIC ACID FOR PHOTODYNAMIC THERAPY****Authors**

Tamara POTLOG, Vadim FURTUNA, Ion LUNGU

Institution

Moldova State University

Patent no.

a 2020 0045/2020.05.25

**Description
EN**

We propose a new promising photosensitizer based on self-assembled zinc phthalocyanine and (3R)-3-hydroxy-4-(trimethylamino)butanoic acid for photodynamic therapy. The present invention relates to a near infrared - absorbing photosensitizer, which includes: the cosolvation of ZnPc in dimethylsulfoxide solution (DMSO) and water (H₂O), the determination of the optimal composition of the solvent by study absorbance of solutions, the synthesis of photosensitizer based on ZnPc incorporated with (3R)-3-hydroxy-4-(trimethylamino)butanoic acid into the mixture with a composition determined by DMSO/H₂O and the estimation of generated singlet oxygen by the fluorescence study. The intense absorbance band in the (700-800 nm) region allows a deeper penetration of radiation into the tissue, that results in a higher efficiency of therapy, with higher values of singlet oxygen generation efficiency (¹O₂) $\Phi_{\Delta} \approx 0.8$ and the triplet state lifetime of $\tau_t = 1.1$ ms compared to the values $\Phi_{\Delta} \geq 0.7$ and $\tau_t = 750$ μ s for the commercial "Photosens".

Class no.

4. Medicine - Health Care - Cosmetics

MD.61.

Title e-Career EDUCATION PLATFORM

Authors Otilia DANDARA, Aida COTRUȚA, Boris VIȘNEVSCHI

Institution Moldova State University

Patent no. SERIA Operă 6686/2020.09.23

Description E-Career Educational Platform it is a distance Career Design Service. In the situation of COVID-19, where access to education is mainly based on ICT systems, the e-Career Education Platform becomes an inevitable service and an accessible way to organize the systemic and systematic career design process, including distance learning.

EN

Class no. 10. Information Technology and Communication

MD.62.

Title NATURAL BIOPREPARATION FOR THE TREATMENT OF ANEMIA IN DIABETES

Authors Alina TROFIM, Valentina BULIMAGA, Iurii BACALOV

Institution Moldova State University

Patent no. MD a 2019 0099/ 2019.12.26; Patent granted by decision 9716/2021.02.11

Description The invention relates to biotechnology and medicine, in particular to the production of biopreparations from the biomass of the cyanobacterium *Calothrix marchica* Lemm. CNMN - CB-18, for use in improving blood parameters, namely to increase hemoglobin levels in diabetes. The new biopreparation contains phycoerythrin and other bioactive substances.

EN

Class no. 4. Medicine - Health Care - Cosmetics

MD.63.

Title BIOSTIMULATORS DERIVED FROM CYANOBACTERIA FOR USE IN SUSTAINABLE AGRICULTURE

Authors Alina TROFIM, Valentina BULIMAGA, Maria-Bianca BULIMAGA

Institution Moldova State University

Patent no. MD 4694/2020.05.31

Description Elaborating a method for obtaining cyanobacterial biostimulators that contain larger quantities of gibberellins and can be employed in agriculture, namely, to enhance seed germination and stimulate plant growth. The stimulatory effect is due to the presence of gibberellins, amino acids, microelements in the biostimulators.

EN

Class no. 3

MD.64.

Title	ECOLOGICAL METHOD FOR STIMULATION SEED GERMINATION
Authors	Alina TROFIM, Valentina BULIMAGA
Institution	Moldova State University
Patent no.	MD 4693/2020.05.31
Description	Elaborating a method to stimulate seed germination with the use of biostimulants produced by cyanobacteria that can be used in the field of phytotechnics, namely in the cultivation of grasses, aromatic plants, legumes, etc.
EN	
Class no.	3. 3. Agriculture and Food Industry

MD.65.

Title	ECOLOGICAL METHOD OF TREATING TOMATO AND CUCUMBER SEEDS BEFORE SOWING
Authors	Sergiu DOBROJAN, Victor ȘALARU, Galina DOBROJAN
Institution	Moldova State University
Patent no.	MD 4606/2019.07.31
Description	The developed method is used for drying tomato and cucumber seeds before sowing and can be applied especially in organic farming. The method provides for the introduction and placement for a certain period of time of tomato and cucumber seeds in an aqueous solution obtained from the quantitative combination of the biomass of cyanophyte algae <i>Nostoc flagelliforme</i> and <i>Nostoc verrucosum</i> (in certain concentrations). After treating the seeds, they are planted in the soil according to traditional techniques. When applying the method we obtain a seed germination of 98.50% - 99.89% and a faster emergence of seedlings.
EN	
Class no.	3. Agriculture and Food Industry

MD.66.

Title	EFFICIENT METHOD OF ORGANIC SEWAGE SLUDGE DEODORIZATION
Authors	Victor COVALIOV, Veaceslav SACHEVICH, Olga COVALIOVA, Arcadie RUSNAC, Georgii POLESCHUK
Institution	Moldova State University
Patent no.	MD a 2020 0014/2020.02.18; Patent granted by decision MD 9705/2021.01.22
Description EN	A cost-efficient, simple to use deodorization agent and its application method was elaborated. Deodorizing agent proposed represents a water solution containing fermentation inhibitor, catalyst of oxidation process, oxidizing agent, as well as smaller amounts of other components. Deodorization efficiency of treated sewage sludge with strong unpleasant smell is provided due to the series of factors: 1) high oxidation capacity of the proposed agent, destroying the fetid-smelling thiolic compounds molecules due to the generated free active radicals; 2) inhibition of sludge biomass fermentation through application of natural vegetable compounds capable to suppress the vital activity of bacteria; 3) environmentally-friendly properties of the proposed agent, assuring the disinfection of organic wastes, destroying the helminths and pathoogen microflora; 4) in addition, essential oils as perfumery production wastes can be sprayed locally over the mass of treated sludge. As a result, efficient or complete removal of stinking unpleasant smells of fermented sludge, containing broad spectrum of organic wastes, is reached. The proposed deodorizing agent and its application method is simple, cheap and easy-to-use, ensures efficient and long-term deodorization effect. This approach can be used at the municipal wastewater treatment plants, in agriculture, farms and other entities where the fermented sludge / organic wastes are formed which produce strong stinking/fetid/putrid odours.
Class no.	1. Environment – Pollution Control

MD.67.

Title	SEWAGE SLUDGE DEWORMING METHOD
Authors	Victor COVALIOV, Olga COVALIOVA, Dumitru UNGUREANU, Natalia CIOBANU, Gheorghe DUCA
Institution	Moldova State University
Patent no.	a 2020 0077/2020.10.23
Description	A new environmentally-friendly sewage sludge deworming agent, including substances with pesticide, antiseptic, bactericide properties, obtained from the local vegetable wastes, has been elaborated. The aim was to enhance the efficiency and fiability, along with the costs reducing of wastewater sewage sludge deworming. The application of new deworming agent does not need any costly technical devices, it is easy-to-use and the deworming agent proposed can be used at wastewater treatment plants of any capacity. High rate and efficiency of deworming helps to resolve the problem of further using of treated sludge, which may be applied as an organo-mineral fertilizer for technical crops, flower beds, forest trees nurseries, decorative trees and bushes, etc.
EN	Application of the sludge deworming agent involves its mixing with treated sludge in doses of 0.1-0.5 g/dm ³ sludge. The exposure of helminths eggs for 6-8 hours, under the anaerobic stabilization conditions, has demonstrated the high sludge disinfection efficiency, reaching 97-100% of helminths eggs destroyed. The deworming agent proposed can be applied at wastewater treatment plants, in the fields of communal services and agriculture, especially for the disinfection of sewerage sludge containing the helminths eggs.
Class no.	1. Environment – Pollution Control

MD.68.

Title	ELECTROCHEMICAL GENERATOR OF HYDROGEN WATER
Authors	Victor COVALIOV, Olga COVALIOVA
Institution	Moldova State University
Patent no.	MD 4661/2020.06.30
Description	The apparatus was elaborated for electrochemical production of hydrogen from water as an effective antioxidant, to be used for healing of human body and
EN	

treatment of various diseases with hydrogen-enriched water. Application of the proposed apparatus makes it possible to reduce costs of hydrogen generator operation, reduce energy consumption and increase the efficiency of electrolysis to produce protonated hydrogen and hydrogen-saturated water. Electrochemical hydrogen water generator, according to the invention, comprises a cylindrical body made of two insulated working chambers. In the lower part of the upper working chamber two electrodes are fixed, and in the lower working chamber a power source is placed. Technical and economic advantages include increase in hydrogen production efficiency, by increasing the active cathode surface by 2 orders, and accordingly, reducing the overvoltage of water molecules decomposition, due to the using of 3D flow-through cathode made of foamy metal. Plating the cathode inner surface with nickel or cobalt alloys with rhenium, molybdenum or tungsten helps to reduce hydrogen discharge overvoltage from 0.6 V to 0.04-0.06 V (n.v.e), making it possible to avoid usage of Pt cathode. Apparatus proposed can be used in medical cabinets, health care organizations and other entities, which use the hydrogen-enriched water for the human diseases/disorders treatments.

Class no. 4. Medicine – Health Care - Cosmetics

MD.69.	
Title	UAV- BASED MONITORING AND MODELING OF ENVIRONMENTAL FACTORS
Authors	Veaceslav SPRINCEAN, Adrian PALADI, Vasili ANDRUH, Anton DANICI, Petru LOZOVANU and Florentin PALADI
Institution	Moldova State University
Patent no.	<i>NARD&MSU supported research project #20.80009.7007.05</i>
Description EN	We present UAV-based measuring station, air content analysis system “SOWA”, which is upgraded as a mobile air pollution control laboratory, that allows reading air content directly from the source and then 3D modeling of environmental factors: DYS D800 X-8 professional multi-rotor aerial photography and heavy lift platform; Air content analysis system “SOWA” (measuring station) equipped with

camera; Software for computational modeling of environmental factors, which represents an application developed in our ePhysMCS research lab for analysis of air pollution concentrations.

We present results of the measurements performed at the MSU laboratory “Environmental Metrology and Astronomy” near Lozova village in Straseni district: 3D mapping of the corresponding terrain of 3 ha ($3 \cdot 10^4 \text{ m}^2$) on September 17th, 2020 by Pix4Dmapper's photogrammetry, which algorithms transform ground and aerial drone images in a digital map and 3D model, and fitting of the averaged measurement data obtained from sensors in the real-time regime, which are accessed and displayed every 10 s, for concentrations of air pollution with solid microparticles $\text{PM}_{2.5}$ and PM_{10} at three different altitudes of 0 m (ground level), 5 m and 10 m from the ground level, which is nearly 375 m above the sea level. The site is one of the highest in this region of the forestry in the natural reservation Codru, where one can identified two air pollution sources: highway on southeast (main source) and a road on northeast (secondary source).

Data can be further used in computer modeling and forecasting of the impact of biotic and abiotic factors.

Class no.

MD.70.

Title

PHOTOSENSITIZERS FOR PHOTODYNAMIC THERAPY AND PHOTOVOLTAICS

Authors

T. POTLOG, S. ROBU, I. LUNGU, P. TIULEANU, V. FURTUNA, A. POPUSOI, G. DRAGALINA, P. BULMAGA, N. POPA, I. BULIMESTRU, I. GUTU, D. RUSNAC, G. COLIBABA

Institution

Moldova State University

Patent no.

20.80009.5007.16

**Description
EN**

Photodynamic therapy (PDT) is a noninvasive treatment in medicine that utilizes photosensitizers (PSs) to produce highly cytotoxic reactive oxygen species (ROS) (e.g., $\cdot\text{O}_2^-$, H_2O_2 , $-\text{OH}$) to kill cancer cells. Dye photosensitizer is also key to photovoltaics. It requires not only a wide range of absorption of sunlight, combined with good absorption properties of materials, but also suitable oxidation–reduction

potential, long lifetime of excited states, good photoluminescence, stability, ease of synthesis, and low cost. Tetrapyrrole structures such as porphyrins, chlorins, bacteriochlorins and phthalocyanines with appropriate functionalization have proved its properties as PSs for PDT and transporting materials in solar cells. Therefore, the development of a new photosensitizers based on self-assembly of functionalized metallphthalocyanines (MePc) with amino acids or conjugation to antibodies, peptides, proteins and other ligands with specific cellular receptors highly soluble in non-toxic water/organic solvents, absorption in the (700-800) nm spectral region and long lifetime of excited states is the aim of this project. Main NOVELTY of the project is development of PSs based on self-assembled of Zinc Phthalocyanine (ZnPc) and Bis-3-Pentyl - PTCDI derivative, ZnPc formulation with (3R)-3-hydroxy-4-(trimethylamino) butanoic acid and grafted ZnPc to binary copolymers N-vinylpyrrolidone (N-VP) with acryloyl chloride (Cl-AC). Another main NOVELTY of the project is the synthesis of ITO/PEDOT:PSS /ZnPc:I₂/Al Schottky diode devices with open circuit voltage 1.03 V and bulk ZnPc:Bis-3-Pentyl-PTCDI heterojunction solar cells with efficiency of about 2.4%.

ADVANTAGES:

- Absorbance band in the (700-800 nm).
- The higher values of the open circuit voltage (1.03 V) and the current density ($8.2 \mu\text{A}/\text{cm}^2$) than in the case of Schottky diode devices obtained by thermal vacuum evaporation were reached.
- The phosphorescence lifetime values of the ZnPc and ZnPc:Bis-3-Pentyl-PTCDI system were found to be 2.4 ms and 1.1 ms, respectively.
- The best bulk ZnPc: PCDTI heterojunction photovoltaic device reached an efficiency of about 2.4%
- The singlet oxygen generation abilities of PSs at 840 nm.

External quantum efficiency is situated between 300 nm and 800 nm wavelengths.

ACKNOWLEDGMENTS: *This research was supported by the project 20.80009.5007.16 of the Ministry of Education, Culture and Research, Republic of Moldova.*

Class no.

MD.71.

Title

TECHNOLOGY OF OBTAINING LIVE OILS, AND THEIR BENEFITS

Authors

Nicolai COJOCARU, Veaceslav SPRINCEAN, Florentin PALADI

Institution

Moldova State University

Patent no.

This research was supported by the *NARD&MSU research project #20.80009.7007.05*Description
EN**Aim of invention** is maximizing the benefits of oils, for consumption and maintaining human health**Solution:** We made a handmade press, which allows us to achieve the three proposed requirements:

- To avoid the oil contacting the metal, we tried using wooden and caprolon tubes. We chose the caprolon tube, as we find it to be the most practical and resistant material available in the food industry, which does not oxidize oils during pressing and does not raise the temperature above +42°C.

- To avoid exceeding the threshold of +42°C, the construction involves slow pressing, which is achieved by manual or pneumatic pressing, reaching a pressure of 25-50 tons per cm², which does not cause a raise in temperature.

- Individual offer for consumption, only in the first 15-30 days from the moment of pressing. The individual pressing is achieved by pressing minimal quantities of raw material, between 1-2 kg per cycle. This allows us to have an individual production of the optimal quantities of the prescribed terms, of 100-250 ml to be consumed in 15-30 days. Thus, ordering – pressing – delivery – consumption, are all possible within a maximum of 24 hours.

Production requirements: Here are the three requirements needed to keep the maximum beneficial properties of vegetable oils:

- The oil must not come into contact with the metal, so as not oxidize it;

- The process must not exceed the temperature threshold of +42 °C;

- The oil should be consumed only in the first 15-30 days from the moment of pressing

ADVANTAGE: the technology allows us to maximize the benefits of oils for consumption and maintaining human health

Class no.

3. Agriculture and Food Industry

National Agency for Public Health of Republic of Moldova

MD.72.
Title

Identification method of anti-COVID-19 marker in humans blood serum

Authors

Spînu Constantin, Cebotari Svetlana, Isac Maria, Sajin Octavian, Spînu Igor, Ceban Alexei, Donos Ala, Suveică Luminița, Ion Dopira.

Institution

National Agency for Public Health

Patent no.

-

**Description
EN**

The laboratory diagnosis of COVID-19 infection can follow two paths: 1. Virus detection, detection of SARS-CoV-2 viral RNA by RT-PCR method. 2. Detection of specific IgM and IgG antibodies - which represent the body's immune response to SARS-CoV-2 virus in immunoassay analysis with significance: early infection (IgM+; IgG-) person in transit (IgM+; IgG+) and person in recovery (IgM-; IgG+). Interpretation of results involves the following: negative; equivocal result and positive result. The disadvantages of the method are that some blood samples (serum) collected from patients, including primary blood donors with a clinical diagnosis of COVID-19 infection demonstrate the presence of equivocal results. This situation makes it difficult to interpret the results. The problem solved by the invention is to develop an original method for testing blood samples in ELISA by excluding equivocal results following the processing of samples with a special substance (removal of non-specific inhibitors). So the proposed technology significantly change the effectiveness of the test, shown by increasing sensitivity and specificity. The result of the invention consists in the exclusion of equivocal results, which require repeated investigation of patients after an interval of 2 weeks with additional costs: collection of samples, transportation, investigation, additional time for repeated investigation of the patient, etc.

MD.73.
Title

Identification method of AgHBs marker in humans blood serum

Authors

Spînu Constantin, Isac Maria, Sajin Octavian, Spînu Igor, Pînzaru Iurie, Donos Ala, Serbulenco Aliona, Tovba Lidia

INTERNATIONAL EXHIBITS

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Institution	National Agency for Public Health
Description EN	<p>The invention relates to human medicine, in particular to an original method for identifying viral hepatitis B virus marker (AgHBs) in blood serum and other body fluids.</p> <p>Following the presence of non-specific factors in these fluids, the final results frequently indicate invalid data.</p> <p>Primary processing of substances intended for investigation for the nominated marker with a mineral suspension leads to the removal of these nonspecific substances. Advantages of the patented method: the proposed algorithm for identifying the AgHBs marker totally excludes the occurrence of equivocal results and essentially enhances the effectiveness of the method manifested by increasing of specificity and sensitivity.</p>

MD.74.

Title	Identification method of CMV IgG marker in humans blood serum
Authors	Spînu Constantin, Isac Maria, Sajin Octavian, Miron Aliona, Spînu Igor, Placinta Gheorghe, Donos Ala
Institution	National Agency for Public Health
Description EN	<p>The essence of the invention is to increase the effectiveness of the method for identifying and confirming of blood-borne infection, etiologically caused by cytomegalovirus by ELISA method using an original algorithm. The proposed method of confirming CMV infection includes preparation of reagent control (RC) and neutralizing control (NC) with their use in the technological process of identifying the anti-CMV IgG marker in ELISA, conducted using a commercial kit. Advantages: high sensitivity and specificity compared to the classical immunoenzymatic method, used as a method prototype, the technology is accessible for the laboratories of different levels of medical service, accessible reagents price.</p>

MD.75.

Title	Identification method of HTLV IgG marker in humans blood serum
Authors	Spînu Constantin, Isac Maria, Sajin Octavian, Miron Aliona, Spînu Igor, Placinta Gheorghe, Donos Ala
Institution	National Agency for Public Health

Description
EN

The invention can be used for identification and confirmation of the marker of blood-borne infection etiologically associated with HTLV 1/2 virus in transplant, donors blood, medical contingent, general population and persons at high risk of infection (IDU, persons undergoing hemodialysis treatment, doctors, etc.) to reduce the risk of transmission of these infections. The method includes the preparation of two additional consumables: control reagent (CR) and neutralizing reagent (NR), obtained from positive anti-HTLV 1/2 serum further used as an additional step in carrying out the ELISA test using the commercial kit for anti-HTLV 1/2. Advantages: enhancing the effectiveness by excluding the influence of non-specific inhibitors.

MD.76.

Title **IMPLEMENTATION OF DETECTION METHOD OF METHEMOGLOBIN, SULFHEMOGLOBIN AND OXYHEMOGLOBIN LEVEL IN ACUTE CHEMICAL POISONINGS**

Authors Tatiana Tonu, Iurie Pinzaru, Valentin Gudumac, Kristina Stinca, Grigore Friptuleac

Institution **National Agency for Public Health of Republic of Moldova**

Patent no. Decision no.: 9544 from 2020.06.27 AGEPI

Description
EN

This is a original mechanism implementation method for detecting the quantitative and qualitative level of the methemoglobin (MetHb), sulfhemoglobin (SHb), oxyhemoglobin (HbO₂), and the content of inactive blood pigments for establishment the acute chemical poisonings. This method is implemented in the medical practice of toxicological departments in hospitals, including laboratories and other institutions of the health system. This is a practical tool to diagnose acute chemical poisoning and rapid intervention. Advantages: precision and reproducibility, short-time analysis, determination of MetHb, SHb, and HbO₂ level and the content of inactive pigments in the same blood sample, prelevated from the patient's finger, use of harmless health chemical agents, increases labor productivity with a positive economic effect.

MD.77.

Title	THE METHOD OF ORGANIZING ACTIVITIES OF THE POISON CONTROL CENTER IN THE REPUBLIC OF MOLDOVA
Authors	Iurie Pinzaru, Tatiana Tonu, Kristina Stinca, Grigore Friptuleac, Ana Oglinda
Institution	National Agency for Public Health of Republic of Moldova
Patent no.	Pending
Description EN	<p>The invention relates to human medicine in order to elaboration of the original method of organizing activities for creation and qualitatively operate of Poison Control Center, using modern technologies for diagnostics, treatment and toxicological advisory assistance.</p> <p>This method is extremely important in medical practice and can be used in toxicology departments of medical institutions, including the National Agency for Public Health, for promptly respond to acute chemical poisoning and the provision of medical advice. <i>Advantage:</i> efficiency and cost-effectiveness of timely telephone consultations in the field of toxicology, evidence of spectrum potentially hazardous new chemicals, providing therapeutic treatment and chemical poisoning monitoring.</p>

Institute of Microbiology and Biotechnology

MD.78.

Title

Procedures for obtaining *Spirulina* biomass – source of multifunctional remedies.

Authors

RUDI Ludmila, CHIRIAC Tatiana, CEPOI Liliana, ZINICOVSCAIA Inga, RUDIC Valeriu, DJUR Svetlana, ROTARI Ion, MISCU Vera, VALUȚA Ana, TAȘCA Ion, PLÂNGĂU Ecaterina, CODREANU Liviu, IUSHIN Nichita
Public Institution Institute of Microbiology and Biotechnology, Republic of Moldova

Institution

Joint Institute of Nuclear Research, Dubna, Russia
Horia Hulubei National Institute for Physics and Nuclear Engineering (IFIN-HH), Bucharest - Magurele, România

Patent no.

4714 MD, 2020.09.30; 4543 MD 2018.07.31

Proceedings for the cultivation of cyanobacterium *Spirulina platensis* are proposed in order to obtain raw material for new anticancer, immunomodulatory, antiviral, antibacterial remedies.

The new proceedings include the cultivation of *Spirulina platensis*, using:

- *Cu nanoparticles (5nm) in a concentration of 3,15 ... 3.18 μg/L;*
- *Au nanoparticles (5nm) in a concentration of 8,8 ... 9,1 μg/L*
for the stimulation of biomass production and lipid biosynthesis.

As result of the proceedings application, the spirulina biomass production increased by 35 - 44% and the lipid content in the spirulina biomass - by 28 - 68%.

**Description
EN**

The proceedings ensure the production of new raw materials and the arsenal of new products with multifunctional effects.

In addition, it could be opened new technological lines and created clusters between biotech and pharmaceutical companies that can produce and place on the local and external markets new ecologically pure natural products for human consumption.

Applications: Biotechnology, Bionanotechnology, Pharmaceutical and biotech producing companies, Human health, Cosmetics.

The inventions were created based on scientific results obtained within the project 20.80009.5007.05 „Biofunctionalized metal nanoparticles - obtaining using cyanobacteria and microalgae”, funded by National Agency for Research and Development (NARD), Republic of Moldova.

Class no.

Agriculture and Food Industry - Medicine - Health Care – Cosmetics.

MD.79.

Title	Process for extracting mannoproteins from brewer's yeast sediments.
Authors	BESLIU Alina, CHISELIȚA Natalia, CHISELIȚA Oleg, EFREMOVA Nadejda, TOFAN Elena, LOZAN Ana, ROTARI Doina.
Institution	Public Institution Institute of Microbiology and Biotechnology.
Patent no.	a 2021 0004, 2021.01.29
Description	<p>The invention relates to microbial biotechnologies, in particular to the process of extracting mannoproteins from yeast sediments from waste from the beer industry. The process can be used to obtain mannoproteins with high application potential in zootechnics, food, pharmaceuticals, medicine and agriculture.</p> <p>The process according to the invention includes the use of brewer's yeast biomass (30 g) which is mixed with 30 ml of sodium phosphate buffer (1:1 ratio) then subjected to autolysis at +37°C or +45° C for hours, with periodic stirring, then centrifuge and the process of remaining the sediments with 1N NaOH solution (1: 5 ratio) at +80±5° C for 2 hours, centrifugation at 3500 rpm. For 15 min, the alkaline supernatants obtained were sedimented with 96% ethyl alcohol in a volume of 1: 2.</p> <p>Elaboration of a process for extraction of mannoproteins from yeast sediments from beer production, which allows obtaining 7-16% more mannoproteins than the nearest solution, use of waste that pollutes the environment, reduction of autolysis time, temperature and amount of ethyl alcohol used.</p> <p>The inventions were created based on scientific results obtained within the project 20.80009.5107.16 „New biologically active microbial preparations for increasing the reproductive and productive potential of animals of zootechnical interest”, funded by National Agency for Research and Development, Republic of Moldova.</p>
EN	<ol style="list-style-type: none"> 1. Environment - Pollution Control. 3. Agriculture and Food Industry. 4. Medicine - Health Care – Cosmetics.
Class no.	

MD.80.

Title	Procedures for stimulating spermatogenesis in rams and boars.
Authors	DARIE Grigore, RUDIC Valeriu, ROTARI Doina, MAŞNER Oleg, BRADU Nina, CHISELIŢA Oleg, CHISELIŢA Natalia, DJUR Svetlana, CHIRIAC Tatiana, CIBOTARU Elena, OSIPCIUC Galina, DJENJERA Irina.
Institution	Public Institution Scientific and Practical Institute of Biotechnologies in Animal Husbandry and Veterinary Medicine”, Republic of Moldova (MD); Public Institution Institute of Microbiology and Biotechnology, Republic of Moldova (MD)
Patent no.	No1460MD, 2020.10.31; 1461MD 2020.10.31.
Description EN	<p>The invention <i>1460 MD</i> relates to animal husbandry, in particular to the stimulation of spermatogenesis in rams, and can be used to preserve, improve and effectively use the local gene pool. The method for stimulating spermatogenesis in rams in the inter-season involves feeding rams with feed containing a biopreparation additive based on extracts from <i>Spirulina platensis</i> biomass in an amount of 0.5-5 g per 0.5 kg of feed, which is administered to rams in an amount of 0.5 kg/head during the May-June period, daily for 45-50 days.</p> <p>The invention <i>1461 MD</i> relates to animal husbandry, in particular to the stimulation of spermatogenesis in pigs, and can be used during critical periods of the year. The method stimulating spermatogenesis in boars comprises feeding boars with combined feed comprising a biopreparation additive based on extracts from <i>Spirulina platensis</i> biomass in an amount of 3.3 g per 1 kg of feed, which is administered to boars in an amount of 4.0-4.5 kg/head during the spring and summer periods, daily for 45-50 days.</p> <p>The technical result of the inventions consists in the increasing of following data on rams and boars: ejaculate volume, the ejaculate sperm concentration, the sperm motility, the number of sperm with rectilinear movements. The inventions were created based on scientific results obtained within the project 20.80009.5107.16 „New biologically active microbial preparations for increasing the reproductive and productive potential of animals of zotechnical interest”, funded by National Agency for Research and Development, Republic of Moldova.</p>
Class no.	3. Agriculture and Food Industry.

MD.81.**Title**

Medium for lyophilization of fungal strains of the genus *Trichoderma*.

Authors

SÎRBU Tamara, TIMUȘ Ion, GORINCIOI Viorina, MOLDOVAN Cristina, ȚURCAN Olga, BÎRSA Maxim.

Institution

Public Institution Institute of Microbiology and Biotechnology.

Patent no.

MD 1475 Y 2020.10.21.

**Description
EN**

The invention relates to biotechnology, namely to a medium for lyophilization of fungal strains of the genus *Trichoderma* and can be used for conservation and long-term storage of fungal strains. The medium, according to the invention, comprises, %: glucose - 7, Fe₂ZnO₄ nanoparticles - 0.0005 and skim milk - the rest.

Advantage: The result of the invention consists in increasing the viability of fungal strains after lyophilization and after storage in lyophilized state.

Applications: Microbiology, Biotechnology.

The inventions were created based on scientific results obtained within the project 20.80009.7007.09 „Conservation and exploitation of microbial biodiversity as a support for the development of sustainable technologies and agriculture, integration of science and education”, funded by National Agency for Research and Development (NARD), Republic of Moldova.

Class no.

3. Agriculture and Food Industry.

MD.82.**Title**

Medium for lyophilization of fungal strains of the genus *Aspergillus*.

Authors

SÎRBU Tamara, TIMUȘ Ion, GORINCIOI Viorina, ȚURCAN Olga, MOLDOVAN Cristina.

Institution

Public Institution Institute of Microbiology and Biotechnology.

Patent no.

MD 1467 Y 2020.09.17.

**Description
EN**

The invention relates to biotechnology, namely to a medium for lyophilization of fungal strains of the genus *Aspergillus* and can be used for preservation and long-term storage of fungal strains. The medium, according to the invention, comprises, %: glucose - 7, Fe₂O₃ nanoparticles -

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0.0005 and skim milk - the rest.

Advantage: The result of the invention consists in increasing the viability of the fungal strains after lyophilization and after storage in lyophilized state (6 - 14.0%).

Applications: Microbiology, Biotechnology.

The inventions were created based on scientific results obtained within the project 20.80009.7007.09 „Conservation and exploitation of microbial biodiversity as a support for the development of sustainable technologies and agriculture, integration of science and education”, funded by National Agency for Research and Development (NARD), Republic of Moldova.

Class no.

3. Agriculture and Food Industry

Institute of Chemistry of Republic of Moldova

MD.83.
Title

Use of (Z)-4,4-dimethyl-1-(4-nitrophenyl)-2-(1*H*-1,2,4-triazol-1-yl)pent-1-en-3-one as a remedy against phytopathogenic bacteria

Authors

Macaev Fliur, Zveaghințeva Marina, Stîngaci Eugenia, Pogrebnoi Serghei, Lupascu Lucian

Institution

Institute of Chemistry, Republic of Moldova

Patent no.

Granted patent MD 4740 B1 2021.02.28

The essence of the invention is that as an active compound against phytopathogenic bacteria of the genus *Erwinia* and *Xanthomonas*, the *Z*-isomer of vinyltriazolketone is proposed, namely, (Z)-4,4-dimethyl-1-(4-nitrophenyl)-2-(1*H*-1,2,4-triazol-1-yl)pent-1-en-3-one.

The synthesis of this isomer is well elaborated, it is carried out stereospecifically in two stages, from easily accessible intermediates and with a high yield (70%), according to patent MD4515.

**Description
EN**

The result of the determining of the antibacterial activity, expressed in the minimum bactericidal concentration (100% inhibition), was 0.2... 0.4 $\mu\text{g} / \text{mL} \times 10^{-2}$ for the claimed *Z*-vinyltriazole ketone. At the same time for the reference compounds propiconazole and flutriafol this percentage of inhibition is respectively 3.0... 6.0 $\mu\text{g} / \text{ml} \times 10^{-2}$. These results show that (Z) -4,4-dimethyl-1-(4-nitrophenyl)-2-(1*H*-1,2,4-triazol-1-yl)pent-1-en-3-one exhibits an enhanced antibacterial action against phytopathogenic strains of the genus *Erwinia* and *Xanthomonas* and can be used as an active ingredient in the antibacterial compounds for the agriculture.

Class no.

3, 9

MD.84.
Title

Pectin oxidation process

Authors

Lupașcu Tudor, Mitina Tatiana, Goreacioc Tatiana, Culighin Elena, Cibotaru Silvia, Povar Igor, Pavlo Demchenko, Kostiantyn Kozlov, Oleksandr Voitko

Institution

Institute of Chemistry, Republic of Moldova

Patent no.

MD 4746 B1 2021.02.28

INTERNATIONAL EXHIBITS

EUROINVENT 2021

The invention relates to a process for increasing the ion exchange capacity of pectins, which can be used in medicine as enterosorbents for the removal of radioactive metal ions and heavy metals.

Description
EN The essence of the invention consist in that the pectins homogenized in hydrogen peroxide are oxidized with ozone.

The technical result of the invention consists in the fact that the process of immobilization of heavy metals on ozone oxidized pectin in hydrogen peroxide increases about 3.0 times compared to intact pectin and about 2.1 times compared to oxidized pectin with concentrated hydrogen peroxide.

Class no. 4,9

MD.85.

Title **Inhibitor of steel corrosion in water**

Authors LOZAN Vasile, PARȘUTIN Vladimir, COVALI Alexandr, JOVMIR Tudor

Institution Institute of Chemistry of Republic Moldova;
Institute of Applied Physics of Republic Moldova

Patent no. Patent application MD s 2020 00141 with decision of patent granting nr. 9746 from 17.03.2021

The invention relates to the field of metal protection against corrosion in water and can be used for inhibition of corrosion in closed steel pipeline systems.

Description
EN It was proposed a combination of malonic acid dihydrazide and carbazide as inhibitor of steel corrosion, effective concentrations being 0.025-0.75 g/L and 0.025-1.0 g/L respectively.

Due to unexpected synergetic effect of hydrazides action, the corrosion lost is reduced up to 38 times, compared with corrosion in absence of named inhibitors.

Class no. 9

MD.86.

Title Nitrate of 2,6-diacetylpyridine-bis(picolinoylhydrazone)-bis(aqua)iron(III)-hydrate(1/2,5) with stimulating properties on exocellular lipase synthesis for the *Rhizopus arrhizus* CNMN FD 03 fungal strain and nutrient medium for cultivation

Authors Danilescu Olga, Bulhac Ion, Cocu Maria, Bourosh Pavlina, Ciloci Alexandra, Clapco Steliana, Labliuc Svetlana, Matroi Alexandra

Institution Institute of Chemistry, Institute of Applied Physics, Institute of Microbiology and Biotechnology

Patent no. Patent application No. 6804, 29.03.2021

The invention relates to coordination chemistry and biotechnology, in particular to the synthesis of a new coordination compound of iron(III) and 2,6-diacetylpyridine bis(picolinoylhydrazone), with biostimulatory properties on exocellular lipase synthesis in mycelial fungal strain *Rhizopus arrhizus* CNMN FD 03 that may be used in the development of biotechnologies to obtain lipolytic enzymes.

According to the invention, a novel coordination compound

**Description
EN**

of 2,6-diacetylpyridine-bis(picolinoylhydrazone)-bis(aqua)iron(III)-hydrate(1/2,5) with the formula $[\text{Fe}(\text{H}_2\text{L})(\text{H}_2\text{O})_2](\text{NO}_3)_3 \cdot 2,5\text{H}_2\text{O}$, where H_2L represents 2,6-diacetylpyridine bis(picolinoylhydrazone), is claimed. The claimed compound is highly soluble in water, which ensures a practical use as a component of nutrient mediums.

A nutrient medium is claimed, as well, for submerged cultivation of *Rhizopus arrhizus* CNMN FD 03 fungal strain containing soy flour, $(\text{NH}_4)_2\text{SO}_4$, KH_2PO_4 , water and the above-mentioned stimulant in the following quantitative ratio of components (g): soy flour – 35,0; $(\text{NH}_4)_2\text{SO}_4$ – 1,0; KH_2PO_4 – 5,0; $[\text{Fe}(\text{H}_2\text{L})(\text{H}_2\text{O})_2](\text{NO}_3)_3 \cdot 2,5\text{H}_2\text{O}$ – 0,005...0,015; potable water – up to 1 L. The biostimulator ensures the increasing of lipases biosynthesis in the producer by 17,4...82,7% and reduction of duration of cultivation by 24 h.

Class no.

3. Agriculture and Food Industry

Institute of Genetics, Physiology and Plant Protection

MD.87.

Title	“ALEXANDRINA” RHIZOGENIC INTERSPECIFIC GENOTYPE <i>V. VINIFERA</i> (2n=38) X <i>M. ROTUNDIFOLIA</i> (2n=40)
Authors	Alexandrov Eugeniu, Botnari Vasile, Gaina Boris
Institution	Institute of Genetics, Physiology and Plant Protection
Patent no.	Plant variety certificate No. nr. 755/2019 Patent application No.342 / 2020.04.03
Description EN	“ <i>Alexandrina</i> ”, interspecific genotype <i>V. vinifera</i> L. (2n=38) x <i>M. rotundifolia</i> Michx. (2n=40), early ripening grapes, can be propagated by cutting, without grafting, thus obtaining own-rooted planting material that contributes to reducing the costs of setting up grapevine plantations. The own-rooted interspecific genotype have been officially approved in the Republic of Moldova and, in accordance with the classical uvological and technological principles, are classified a table grape variety.
Class no.	3. Agriculture and Food Industry

MD.88.

Title	Stefanel cultivar soybean (<i>Glycine max</i> L. Merrill)
Authors	BUDAC Alexandru, CELAC Valentin, CORETCHI Liuba, KHARCHUK Oleg
Institution	Institute of Genetics, Physiology and Plant Protection Republic of Moldova
Patent no.	Patent application MD No. 20200025/2020.09.14 The Stefanel variety was create by individual selection of the Irina x Hodgson hybrid. Plant average height is 70-90 cm with erect growth, compact bush, brown pubescence. Height insertion of pods basal – in average 15-16 cm. Inflorescence: brush, purple flowers. Leavers: yellowish color, Sharp-oval sheets. Grain yellow color, hilum – dark-brown, mass of 1000 seeds – 113-153 g. Production potential: 3.6 t/ha. Seeds quality: protein: 39%, fat: 20%. Good resistance to fall, common rust (<i>Uromyces appendiculatus</i>), bacteriosis. Good resistance to drought, septoria (<i>Septoria glycines</i> Hemmi), fusariosis of the cotyledons (<i>Fusarium</i> sp.), fomopsis (<i>Phomopsis sojae</i>).
Description EN	Is recommended for cultivation in north areas of the Republic of Moldova.
Class no.	3.Agriculture and Food Industry

MD.89.

Title	Method for increasing seed germination and resistance of beech (<i>Fagus sylvatica</i>) plants
Authors	ELISOVETCAIA Dina, IVANOVA Raisa, MASCENCO Natalia, BOROVSKAIA Alla
Institution	Institute of Genetics, Physiology and Plant Protection
Patent no.	Patent MD s2020 0103, application date 19.08.2020
Description EN	The invention relates to methods of stimulating seed germination and increasing seedlings resistance of beech (<i>Fagus sylvatica</i>). The method consists in treating beech seeds with a solution of 0.001% capsicoside for 22-24 hours and then stratifying the seeds at 30% humidity and a temperature of +4-6°C until germination. Method leads to stimulation of seed germination up by 18.5% in the variant of treatment with capsicoside compared to the control, as well as to significant reduction in the period of total seed germination by 20-22 days, which allows for an earlier sowing of germinated beech seeds. The beneficial effect of the treatment with capsicoside is also established during the adaptation of germinated seeds transferred to the soil. In the variant with capsicoside treatment the rate of seedling appearance and their surviving is 2.7 and 3 times higher, respectively. Thus, the result is the regulation of physiological processes, which is manifested by an increase in the rate of seed germination, as well as a significant increase in the survival rate of <i>Fagus sylvatica</i> seedlings during the adaptation after transferring to the soil.
Class no.	14. Other (forestry)

MD.90.

Title	Early Clary sage (<i>Salvia sclarea</i> L.) variety AMBRIELA
Authors	GONCEARIUC Maria, BALMUŞ Zinaida, COTELEA Ludmila, BUTNARAŞ Violeta, BOTNARENCO Pantelimon
Institution	Institute of Genetics, Physiology and Plant Protection
Patent no.	Patent application v2020 0019
Description EN	<u>AMBRIELA</u> variety are distinctive by: <u>Physiological properties</u> : Very good resistance to wintering; high resistance to drought; resistant to foliar diseases and root system diseases. <u>Quality properties</u> : Essential oil content: first year of

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vegetation: 0.353% (standard humidity, 70%); 1.175% (dry substance); second year of vegetation: 0.335% standard humidity; 1.185% dry substance. Major components in essential oil: linalyl acetate 61.06%, linalool, 8.59%, sclareol, 5.25%.

Production capacity: variety of 2-3 years of vegetation; flowering capacity in the first year of vegetation. Average harvest of raw material in 2 years of plantation operation – 16.1 t / ha, average production of essential oil - 55.6 kg/ha. Yield – 3.1-4.1 kg essential oil/ton of inflorescences.

Applications: Agriculture, perfumery, cosmetics, medicine
Advantages: Resistance to biotic and abiotic factors, high productivity, high quality.

Class no. 3

MD.91.

Title	SAVOARE, the new variety of Greek oregano <i>(Origanum vulgare L. ssp. hirtum Ietsw.)</i>
Authors	GONCEARIUC Maria, BUTNĂRAȘ Violeta, BOTNARENCO Pantelimon, BALMUȘ Zinaida, COTELEA Ludmila
Institution	Institute of Genetics, Physiology and Plant Protection
Patent no.	Patent application nr. v2020 0021
Description	<u>Physiological properties:</u> Variety SAVOARE has very good winter hardiness; high drought resistance; high resistance to diseases. <u>Quality features:</u> Raw material: essential oil content: 1.641% humidity 60%; 4.102% dry substance; essential oil (CG-SM) major components: Carvacrol - 82.87%; β-Caryophyllene - 15.79%; γ-terpinene - 2.89%; <u>Production capacity:</u> Raw material production (humidity, 60%): 9.3 t / ha; Pharmaceutical <i>herb</i> production (humidity 13%), 1.85 t / ha; Essential oil production – 152 kg/ha; Yield – 16.4 kg essential oil/t of raw material. <u>Applications:</u> Medicine, food industry, spice, agriculture.
Class no.	3. Agriculture and Food Industry

MD.92.

Title	Variety of Oregano (<i>Origanum vulgare</i> ssp. <i>vulgare</i> L.) PANACEA
Authors	GONCEARIUC Maria, BUTNARAŞ Violeta, BOTNARENCO Pantelimon, COTELEA Ludmila, BALMUŞ Zinaida
Institution	Institute of Genetics, Physiology and Plant Protection
Patent no.	Patent application No. v2020 0020 The PANACEA variety is distinctive by: <u>Physiological properties:</u> It has very good winter hardiness; high drought resistance; high diseases resistance. <u>Quality features:</u> Essential oil content in the raw material (humidity, 60%): 0.107% and 0.267% (dry substance); Major components in essential oil: Germacren D, 31.13%; β -Caryophyllene, 15.785%; α -Farnesene - 11.41%. <u>Pharmaceutical capacity:</u> Fresh material production. 7.8 t/ha; Pharmaceutical <i>herba</i> production, humidity 13%, 1.51 t/ha; Essential oil production - 8.35 kg/ha; Yield – 1.1 kg/t. Applications: Medicine, pharmacology, agriculture, ornamental plant. Advantages: High productivity, high quality. Resistance to biotic and abiotic factors,
Description EN	
Class no.	3

MD.93.

Title	A new variety of winter triticale (<i>Triticosecale Witt.</i>) - Costel
Authors	VEVERITSA Efimia, LYATAMBORG Svetlana, LUPASCU Galina, GORE Andrei, ROTARY Silvia
Institution	Institute of Genetics, Physiology and Plant Protection
Patent no.	Registered No. 490 2018.09.21 The Costel variety was obtained by hybridizing (Coerulescens 635 x Ciulpan) x Lasco (durum wheat, rye and hexaploid triticale) with individual selection from the F ₃ generation. The variety is part of the <i>Eritrospermum</i> variety. Spike yellow, cylindrical, without pubescence, length (10.0- 12.0 cm) with 28-30 spicules per spike. Long yellow kernels, the 1000 grains are 42-44 g, contains 23-25% gluten and 12.0-14.0% protein. The number of kernels in the spike varies from 42 to 75. The vegetation period is 275-280 days.
Description EN	

The plants have a height of 100-120 cm, the number of stems per plant is 2.8-3.0. It is resistant to drought, wintering, fall and disease (brown rust, septoriosi, fusariosi). It records a harvest of 5.5-7.5 t/ha, 2.0-2.5 t more than control cultivar Ingen 93. It is recommended sowing at the beginning of October with a seeding rate of 4.5-5.0 million grains per hectare. The cultivation technology is similar to that of common winter wheat. The variety is being tested for the third year in the State Commission for Testing Plant Varieties of the Republic of Moldova.

Class no. 3

MD.94.

Title	New Tomato Cultivar – <i>Matriona</i>
Authors	MAKOVEI Miania, BOTNARI Vasile, GANEA Anatol
Institution	Institute of Genetics, Physiology and Plant Protection Republic of Moldova
Patent no.	MD 309, 2019.08.31
Description	<i>Matriona</i> cultivar of determinant type of growth (<i>sp</i>). Early-ripening variety with a short vegetation period (100 to 107 days). The leaves are large, thick and intense green. The flowers are yellow. The first inflorescence appears after the 6 th to 7 th node, the next after 1-2. It has large fruits of the red-intense colour, with high palatability qualities. Fruit weight is 140 to 200 g. It is characterized by the long-lasting retention of fruits on the plant at the biological maturity stage (10 to 15 days), highly transportable. Total yielding capacity is 58.7...64.4 t/ha with while the standard fruit yield 91...96%.
EN	Recommendation. The cultivar <i>Matriona</i> are recommended for fresh use, producing juice and other tomato products. It is recommended to be grown in the conditions of open field and in greenhouses. Application domain - Agriculture (cultivation in private associations, farmers and individual households) Homologate in Republic of Moldova – 2019.

Class no. 3

MD.95.

Title	New tomato cultivare Cerasus
Authors	MIHNEA Nadejda, LUPAȘCU Galina, BOTNARI Vasile
Institution	Institute of Genetics, Physiology and Plant Protection
Patent no.	MD 301, 2019.08.31.
Description	The fruits of the variety Cerasus are of small size, 30.0-41.0 g. The fruits contain 5.2-5.8% dry substance, 5.8...6.8% of sugars, 25.7...26.8 mg/% of vitamin C, 0.40...0.50% of acidity. The variety is early ripening with a vegetation period 105-110 days. In the transplant culture, the variety ensures a yield of 60.0...76.0 t/ha, while the standard fruit yield is high (89.0-93.0%).
EN	The variety <i>Cerasus</i> harmoniously combines high productivity, good tasting qualities with the resistance to drought and <i>Candidatus Phytoplasma solani</i> . The productivity is high at cultivation through seeds or seedling.
Class no.	3.Agriculture and Food Industry

MD.96.

Title	Sofidurum a new variety of winter durum wheat (<i>Triticum durum</i> Desf.)
Authors	ROTARY Silvia, <u>VEVERITSA Efimia</u> , LUPASCU Galina, GORE Andrei, LYATAMBORG Svetlana, COINAC Irina
Institution	Institute of Genetics, Physiology and Plant Protection
Patent no.	Registered No. 489 2018.09.21
Description	The Sofidurum variety was created by the repeated individual selection of the elite plant from the hybrid population [Hordeiforme 333 x 1610-4 / 01-1162 / Parus / 1296 / 7-11]. The variety is part of the <i>Hordeiforme</i> variety. Spike and awns red, white-yellow grain. The spike has a length of 7.0 - 7.6 cm, cylindrical with 22-25 spicules per spike. The oval kernels, the 1000 grains are 45-46 g, contains 26-30% gluten and 13.5-14.2% protein. The number of kernels in the spike varies between 45-50. The vegetation period is 262 - 266 days. It is a semi-early variety, with high resistance to fall. The height of the plant is 80-82 cm, with 2.8-3.2 stems per plant. Manifest high resistance to drought, wintering and disease (brown and yellow rust, root rot). It is productive with a production capacity of 5.5-7.0 t/ha. The Sofidurum variety proved to have very good quality indices for the production of pasta. It is recommended to be sown in optimal terms with the seeding norm of 5 million grains per 1 ha.
EN	
Class no.	3. Agriculture and Food Industry

MD.97.

Title	NEW TOMATO VARIETIES <i>Solanum lycopersicum</i> L. FLACARA
Authors	SIROMEATNICOV Iulia, BOTNARI Vasile, COTENCO Eugenia, CHIRILOV Eleonora
Institution	Institute of Genetics, Physiology and Plant Protection
Patent no.	Patent of plants Nr.306 from 2019.08.31
Description EN	The vegetation period is 81-108 days, it is the medium early variety. The fruit is orange color, round-slightly elongated with weigh 48.0-65.0 g, 2-3 seminal lodges. Fruits with high taste qualities, the dry substance content of the fruits is 5.6- 6.5%, sugars 5.3-7.6%, ascorbic acid 31.5-41.3 mg/%, titratable acidity 0.34-0.39 mg/%. The total harvest of tomato fruit consists 49.9-52.4 t/ha and standard fruit yield 44.3-49.9 t/ha.
Class no.	3. Agriculture and Food Industry

Practical Scientific Institute of Horticulture and Food Technology

MD.98.

Title	<p>1. Strain of Saccharomyces cerevisiae yeast CNMN-Y-34 for the production of dry white wine in the wine center "Trifeshiti "</p> <p>2. Strain of Saccharomyces cerevisiae yeast CNMN-Y-35 for the production of dry white wine in the wine center "Trifeshiti "</p>
Authors	Taran Nicolae, Soldatenco Eugenia, Soldatenco Olga, Rudoï Alexandru, Sandu Vasile, Glavan Pavel
Institution	Public Institution Practical Scientific Institute of Horticulture and Food Technology
Patent no.	Patent No. 4727, No. 4728 / R. Moldova
Description EN	<p>1. The invention relates to biotechnology, in particular to a local strain of yeast, selected in the wine center "Trifeshiti" and is recommended for the production of white dry wines. To obtain white dry wines, a local yeast strain, deposited in the National Collection of Non-Pathogenic Microorganisms, with the assigned number CNMN-Y-34, is recommended.</p> <p>Physiological-biochemical peculiarities of the strain: the culture increases in the temperature range 8 °... 38 ° C, the optimal development is in the thermal range of 18 °... .28 ° C; colonies appear over 48 - 72 hours, optimal pH 2.8-3.4; It does not eliminate H₂S, it has technological competitiveness.</p> <p>2. The invention relates to biotechnology, in particular to a local strain of yeast, selected in the wine center "Trifeshiti" and is recommended for the production of white <u>aromatic</u> dry wines. To obtain white aromatic dry wines, a local yeast strain, deposited in the National Collection of Non-Pathogenic Microorganisms, with the assigned number CNMN-Y-35, is recommended.</p> <p>Physiological-biochemical peculiarities of the strain: the culture increases in the temperature range 8 °... 38 ° C, the optimal development is in the thermal range of 18 °... .28 ° C; colonies appear over 48 - 72 hours, optimal pH 2.8-3.4; It does not eliminate H₂S, it has technological competitiveness.</p>
Class no.	3. Agriculture and Food Industry

MD.99.

Title

- 1. Strain of *Saccharomyces cerevisiae* yeast CNMN-Y-36 for the production of dry red wine in the wine center "Trifeshiti "**
- 2. Strain of *Saccharomyces cerevisiae* yeast CNMN-Y-37 for the production of dry red wine in the wine center "Trifeshiti "**

Authors

Taran Nicolae, Soldatenco Eugenia, Soldatenco Olga

Institution**Public Institution Practical Scientific Institute of Horticulture and Food Technology****Patent no.**

Patent No. 4729, No. 4730 / R. Moldova

Description

EN

1. The invention relates to biotechnology, in particular to a local strain of yeast, selected in the wine center "Trifeshiti" and is recommended for the production of red dry wines. To obtain red dry wines, a local yeast strain, deposited in the National Collection of Non-Pathogenic Microorganisms, with the assigned number CNMN-Y-36, is recommended.

Physiological-biochemical peculiarities of the strain: the culture increases in the temperature range 10 °... 38 ° C, the optimal development is in the thermal range of 18 °... .28 ° C; colonies appear over 48-72 hours, optimal pH 3.0-3.4; It does not eliminate H₂S, it has technological competitiveness.

2. The invention relates to biotechnology, in particular to a local strain of yeast, selected in the wine center "Trifeshiti" and is recommended for the production of red dry wines. To obtain red dry wines, a local yeast strain, deposited in the National Collection of Non-Pathogenic Microorganisms, with the assigned number CNMN-Y-37, is recommended.

Physiological-biochemical peculiarities of the strain: the culture increases in the temperature range 10 °... 38 ° C, the optimal development is in the thermal range of 18 °... .28 ° C; colonies appear over 48-72 hours, optimal pH 3.0-3.4; It does not eliminate H₂S, it has technological competitiveness

Class no.

3. Agriculture and Food Industry

D. Ghitu Institute of Electronic Engineering and Nanotechnology

MD.100.

Title	Ultraviolet (UV) photodetector
Authors	V. MORARI, V. URSACHI, E. RUSU, I. TIGHINEANU
Institution	Ghitu Institute of Electronic Engineering and Nanotechnologies
Patent no.	Patent application : No.2139 / 2020

Description
EN

The UV domain of the optical spectrum is divided into the following subdomains: UV-A subdomain 400-320 nm, UV-B 320-280 nm, UV-C 280-200 nm, which correspond to the bactericidal domains, which is of major importance in the detection and optical radiation dosimetry in antibacterial treatment. The result of the invention consists in ensuring the selectivity of the photoreceptor to ultraviolet radiation for the subdomains of the optical spectrum A, B, C depending on the composition of the $MgxZn1-xO$ layer by creating a bandgap gradient of at least $3 \cdot 10^5$ eV/cm in the active region of the detector in the photoreceptor structure of the transparent-window film with a difference of the energy bands compared to the absorption film. This structure of the photoreceptor also maintains high photosensitivity to optical radiation. The low cost of the technology is ensured by using the sol-gel method of aerosol spraying or by centrifugation (spin-coating). The novelty of the invention consists in the deposition of sol-gel chemical solutions by aerosol spraying or by centrifugation (spin-coating) on an Si support of an absorption film with the composition $Zn1-xMgxO$ with value x from the range 0 - 0.8, at the same time, between the absorption film and the support being deposited a transparent film of $Zn1-x1Mgx1O$ with value x , which ensures an energy band at least 0.1 eV higher than that of the absorption film.

Class no.

5. Industrial and laboratory equipments

MD.101.

Title	Deformation vacuum gauge
Authors	BELOTSERKOVSKII Igor; SIDORENKO Anatolie; CONDREA Elena; SMYSLOV Vladimir
Institution	Ghitu Institute of Electronic Engineering and Nanotechnologies, Chisinau MD-2028, Moldova
Patent no.	DECISION on registration of industrial designs Vacuometru Nr. F 2019 0041 2019.05.23 Date of publication: 2019.09.30
Description	To improve the accuracy of low pressure measurements, a VD-10 tensoresistive vacuum gauge sample has been developed and constructed; the gauge includes a measuring unit and a transducer, the sensitive element of which is a silicon crystal in the middle part of which a thin membrane with tensoresistors placed on the outer surface is formed.
EN	To decrease the dependence on the ambient temperature, a circuit consisting of a transistor and resistors is formed on the crystal; the circuit provides power to the bridge circuit with a temperature-dependent voltage to compensate for the drift. In addition, temperature fluctuations are recorded by the measuring unit for additional software correction.
Class no.	5

**MD.102.**

Title	Technology of oriented growth of anisotropic single- crystal Bi films in a strong electric field.
Authors	Leonid Konopko, Albina Nikolaeva, Ana Kobyljanskaya, Gheorge Para
Institution	Ghitu Institute of Electronic Engineering and Nanotechnologies, Chisinau MD-2028, Moldova Republic of

Patent no.	The patent has been prepared for submission. The invention relates to the field of materials science and nanotechnology, and more precisely to the possibilities of obtaining single-crystal Bi films with predetermined parameters. The objective of the invention is to develop a technology for recrystallization of thin Bi films with the final aim to obtain the necessary orientation of the main crystallographic axis C_3 of the film. The proposed method is based on our patent on the recrystallization of a glass-coated bismuth microwire in a strong electric field (Patent No.MD 1409 Y 2019.12.31). The anisotropic heat flux sensor manufactured using this technology had a high sensitivity (10^{-2} V/W), but the glass coating greatly increased the time constant ($\tau = 0.5$ s). Another anisotropic heat flux sensor architecture based on the film technology will reduce the time constant by about 4 orders of magnitude. In the proposed technology, a Bi film deposited on a thin glass substrate is placed inside a capacitor consisting of a glass plate coated with a semitransparent conductive layer and a copper plate. A strong electric field is created inside the capacitor, $E = 8 \times 10^3$ V/cm. A moving focused laser beam melts the bismuth film pointwise; in the air flow, the melted regions crystallize with the direction of the main crystallographic axis C_3 of the film in the direction of the electric field. The proposed recrystallization technology in a strong electric field is the main and necessary component in the creation of anisotropic thermoelectric energy converters based on a single-crystal Bi films.
Description EN	
Class no.	14

MD.103.

Title	Technology to prepare the single-crystals layers for thermoelectric applications (microcoolers).
Authors	Albina Nikolaeva, Leonid Konopko, Pavel Bodiul, Igor Gherghisan, Tatiana Coromislichenco, Gheorge Para
Institution	Ghitu Institute of Electronic Engineering and Nanotechnologies, Chisinau MD-2028, Moldova Republic of
Patent no.	MD 1366 Z 2020.03.31 Procedeu de obținere a peliculelor monocristaline subțiri
Description	

EN

The primary purpose of the given presentation was to develop new reliable and reproducible engineering techniques to prepare low-dimensional structures (single-crystals layers) of bismuth telluride and semiconductor bismuth–antimony topological insulator (TI) *n*- and *p*-type for thermoelectric applications (microcoolers).

Single crystals of Bi₂Te₃ layers (1–20 μm) were prepared using the mechanical exfoliation method by cleaving a thin layer from bulk crystalline Bi₂Te₃ and Bi_{1-x}Sb_x samples. Using a mechanical cleavage process, thin layers were separated from the crystalline bulk. The process was repeated several times to obtain layers with different thickness. To peel Bi_{1-x}Sb_x layers off using an adhesive tape, the bulk sample was cooled to 70 K to increase the interatomic distance and thereby to provide a decrease in the interaction (Van der Waals) forces $P = m/d^2$ (patent). Using *p*- and *n*-type layers as *n*- and *p*-legs of a thermoelement, $\Delta T = 4^\circ\text{C}$ was obtained at 300 K on a cross section of 1×10^{-4} cm². The use of a segmentation method (increasing the cross section as high as to a value of 5×10^{-4} cm²) made it possible to obtain $\Delta T = 8^\circ\text{C}$.

It is known that an increase in the temperature of the micro-sensor by 10°C leads to a twofold decrease the sensor durability.

Our experimental samples the thermoelectric micro-coolers with efficient cooling capacity, small areas, short response time and with reproducible engineering techniques are in high demand on the telecommunication markets of the future.

Class no.

14

Institute of Applied Physics

MD.104.

Title **Process for corrosion protection of steel in water**

Authors Parshutin Vladimir, Covali Alexander

Institution **Institute of Applied Physics**

Patent no. MD 1494/2021

Description
EN

The invention relates to the field of protection of metals against corrosion in water and can be used for corrosion inhibition in closed systems of steel pipelines.

The process of corrosion protection of steel in water consists in introduction into the corrosive medium of 0.5-1.5 g/l of potassium permanganate $KMnO_4$ and 10-30 ml/l of aqueous extract of the walnut, obtained by extraction of dry leaves in water in a mass ratio of (2-4):10 at temperature of 70-100°C during 1-3 hours, with subsequent filtration.

Technical result of the invention is creation effective (reduction of corrosion losses up to 10.8 times), ecologically safe and inexpensive method of protection of steel against corrosion, thanks to extract of leaves of a walnut.

Class no. 9 : Chemical and Textile Industry

MD.105.

Title **Process for corrosion protection of steel in water**

Authors Parshutin Vladimir, Cernysheva Natalia, Covali Alexander

Institution **Institute of Applied Physics**

Patent no. MD 1371 /2020

Description
EN

The invention relates to the field of metal protection from corrosion in water and can be used for corrosion inhibition in closed steel pipeline systems. The process for corrosion protection of steel in water comprises the introduction into the corrosive medium of 0.35-1.05 g/L of calcium hydroxide and 10-150 ml/L of aqueous extract of birch leaves, obtained by extraction of dry leaves with water in a mass ratio of 1 : (10-30) at a temperature of 80-90°C for 1-3 hours, with subsequent filtration. Technical result of the invention is creation effective (reduction of corrosion losses up to 18.7 times), ecologically safe and easy method of protection of steel against corrosion, thanks to extract of leaves of a birch.

Class no. 9 : Chemical and Textile Industry

MD.106.

Title	Giant Heterometallic Compounds of Manganese Oxy-Hydroxy-Isobutyrate with Lanthanides [Mn ₂₆ Ln ₆ O ₁₆ (OH) ₁₂ (O ₂ CCH(CH ₃) ₂) ₄₂] (Ln = Tb, Dy, Ho) and Process for Their Preparation
Authors	Baca Svetlana, Darii Mariana, Kravtsov Victor
Institution	Institute of Applied Physics
Patent no.	MD 4660/2020
Description EN	The invention relates to coordination chemistry, in particular to the preparation of giant heterometallic dotriacontanuclear compounds of manganese oxy-hydroxy-isobutyrate with lanthanides with the formula [Mn ₂₆ Ln ₆ O ₁₆ (OH) ₁₂ (O ₂ CCH(CH ₃) ₂) ₄₂], where Ln = Tb, Dy, Ho. Up to date, these compounds represent the highest-nuclearity Mn–Ln clusters that shows a single-molecule magnetic (SMM) behavior. The process of obtaining these compounds is simple in execution and consists of the self-assembly reaction of the hexanuclear Mn(II)/Mn(III) isobutyrate cluster with Ln(NO ₃) ₃ ·6H ₂ O in the presence of 2,4,6-tris(2-pyridyl)-s-triazine as a template, the initial substances are accessible. The {Mn ₂₆ Ln ₆ } compounds are insoluble in acetonitrile, slightly soluble in dichloromethane, well soluble in alcohols, dimethylformamide, dimethylsulfoxide, chloroform. CAS Registry Numbers: 2396609-63-3; 2396609-68-8; 2396637-93-5; 236638-26-7; 2411422-06-3; 2411422-29-0. These compounds have been the focus of attention of researchers in recent years, due to the growing interest in potential applications in the storage and processing of information or in molecular spintronics.
Class no.	9 : Chemical and Textile Industry

MD.107.

Title	Slot electrolyzer
Authors	Bologa Mircea, Vrabie Elvira, Maximuk Evghenii, Paladii Irina, Policarpov Albert, Vrabie Valeria, Stepurina Tatiana, Gonciaruc Valeriu, Sprincean Cătălina
Institution	Institute of Applied Physics
Patent no.	MD 1325/2019
Description EN	The invention relates to slot electrolyzers and can be used in the dairy industry for protein extraction from whey.

The electrolyzer, according to the invention, comprises a dielectric body (1) with a hollow shaft (13), on which are fixed radial pipes (16), with cathode and anode chambers (2, 3), electrodes (5, 6), connected to a current source, with anodic liquid and whey inlet (8 and 10) and outlet (9 and 11) valves, and to a cooling jacket (19). On the sides of the body (1) are fixed collectors (12). The body (1) is made with slots (7), on the inner surface of which is installed the cathode (5). Inside the body (1), on the hollow shaft (13), is placed a semi-cylindrical carcass (14) with slots (15), on the outer surface of which is installed the anode (6). Between the cathode (5) and the anode (6) is placed a heterogeneous membrane (4) in the form of a semi-cylindrical band. The surface of the anode (6) and the membrane (4) form the anode chamber (3), and the surface of the cathode (5) and the membrane (4) form the cathode chamber (2).

Class no. 1: Environment - Pollution Control
3: Agriculture and Food Industry

MD.108.

Title

Method for the recovery of alpha-lactalbumin enriched protein concentrates from whey

Authors

Vrabie Elvira, Sajin Tudor, Bologa Mircea, Paladii Irina, Vrabie Valeria, Stepurina Tatiana, Policarpov Albert, Gonciaruc Valeriu, Sprincean Catalina

Institution

Institute of Applied Physics

Patent no.

Patent application No. s 2020 0055/2020

**Description
EN**

The invention relates to the dairy industry, namely to the obtaining from whey of the protein mineral concentrates (PMC), enriched with α -La, which includes cooling, electroactivation of the whey in periodic regime for **20-30 min** in the diaphragm electrolyzer, at current density of **10-20mA/cm²**, separation of PMC from deproteinized whey in the field of mass forces. The PMC, enriched with **50-70%** of α -La are recovered from two phases: the foamy phase - at intensely alkaline values of **pH 12.00-12.20** and the liquid phase at **pH 11.00-11.50**. The temperature of the whey during processing is maintained in the range of **20-40°C**.

In the image is shown the variation of α -La extraction in PMC depending on processing regimes and variation of pH and temperature values in examples:

E1 (at current density 10mA/cm²), E2 (at current density 20mA/cm²) in the foamy phase (F) and the liquid phase (L).

Class no.

3: Agriculture and Food Industry

INTERNATIONAL EXHIBITS

MD.109.

Title	Process for Producing the Coordination Compound of Copper(II): Bis(μ-2-1-(7-chloro-6-methyl-2,3-bis(pyridine-2-yl)-5H-cyclopenta[b]pyrazine-5-yl)ethanone)-dichloro-di-copper(II) Methanol Solvate
Authors	Melnic Elena, Kravtov Victor, Baca Svetlana
Institution	Institute of Applied Physics
Patent no.	MD 4653/2020
Description EN	The invention relates to the chemistry of coordination compounds of copper(II) with pyrazine and pyridine derivatives, in particular to the class of 2,3-bis(2-pyridyl)pyrazine. These compounds may be promising candidates for use in medicine due to their antimicrobial and antitumor activities. The invention consists in developing an optimal process for producing a new dinuclear coordination compound of copper(II) $[\text{Cu}_2(\text{acdpp})_2\text{Cl}_2] \cdot 2(\text{CH}_3\text{OH})$, which contains a unique ligand 1-(7-chloro-6-methyl-2,3-bis(pyridine-2-yl)-5H-cyclopenta[b]pyrazine-5-yl)ethanone (acdpp), obtained by the condensation of 2,3-bis(2-pyridyl)pyrazine and acetylacetonate ligands. The synthesis is simple and consists in dissolving copper(II) chloride dihydrate and 2,3-bis(2-pyridyl)pyrazine in methanol, with subsequent addition of acetylacetonate.
Class no.	9 : Chemical and Textile Industry

MD.110.

Title	The luminescent composite based on the binuclear coordination compound of Eu (III) and polymer
Authors	Verlan Victor, Bordian Olga, Iovu Mihail, Culeac Ion, Zubareva Vera, Bulhac Ion Moise Calin Constantin, Enachescu Marian
Institution	Institute of Applied Physics of Moldova Institute of Chemistry of Moldova NanoPro Start MC SRL, Romania
Patent no.	Research project ANCD 20.80009.5007.14 Patent MD 4677 2020.02.29
Description EN	The results of the present research project refer to the elaboration of the luminophor polymeric nanocomposite based on poly-N-epoxypropylcarbazole (PEPC) and the coordination compound of rare earth

ions $Eu(III)$ –
 $([Eu(\mu_2-OC_2H_5)(NO_3)(bfa)(Phen)]_2 \cdot Phen(bfa -$
 benzoyltrifluoroacetone monoanion).

The composite shows an abundant laser luminescence in the red field of the spectrum (612 nm), the intensity of which is higher than the luminescence of analogous nanocomposites with the known mononuclear compounds of $Eu(III)$. In the nanocomposite there is also an amplification of the luminescence intensity compared to the luminescence of the binuclear compound $([Eu(\mu_2-OC_2H_5)(NO_3)(bfa)(Phen)]_2 \cdot Phen$ without polymer.

The dissolution of the nanocomposite in different solvents and its subsequent deposition on different types of substrates, shapes and areas allows to propose the application of nanocomposite material in the optoelectronics industry, to obtain different luminescence systems, effective light sources, etc.

Institute of Emergency Medicine

MD.111.

Title **DEVICE FOR EXTERNAL FIXATION OF RIBS.**
Authors **GHIDIRIM Gh., KUSTUROV V, MIȘIN I., KUSTUROVA Anna**
Institution **The Institute of Emergency Medicine , The State University of Medicine&Pharmacology“N.Testemițanu”**
Patent no. **Brevet de invenție AGEPI MD nr.1357Z din 31.03.2020**

Description
EN

The invention relates to medicine, in particular to devices for external fixation of ribs, and can be used in traumatology and thoracic surgery for treating multiple, double rib, sternum fractures with impaired functioning of the chest, and in some cases, for eliminating congenital deformity of the chest. The device for external fixation of ribs comprises base support plates (1) with clamping holes (5), formed of long longitudinal parts (2), placed parallel to the lower ribs, and curved parts (3), in the zone of which the plates are interconnected by means of an adjustable connector assembly, comprising a sleeve and a fastener (4) for introduction into the rib.

Problema care rezolvă invenție dată constă într-o nouă proiectare a dispozitivului pentru a îmbunătăți rezultatele tratamentului la pacienții cu traumatism toracic prin prevenirea dezvoltării complicațiilor și crearea unor condiții adecvate de funcționare a fragmentului fixat al cutiei toracice. Avantajul dispozitivului propus destinat pentru fixarea externă a coastelor constă în faptul că dispozitivul toracal de fixare este format din segmente modelate după curbura naturală antero-laterală a cutiei toracale, nu apasă țesuturile moi ale peretelui toracic și nu provoacă tulburări trofice, schimbând configurația sa nu împiedică îngustarea și extinderea spațiilor intercostale în actul de respirație.

Class no. 4. Medicine - Health Care – Cosmetics

MD.112.

Title **DENTAL PERSONALIZED DEVICE CAD/CAM FOR DECOMPRESSION.**
Authors **STRÎȘCA S., SÎRBU D., CUCU G., TOPALO V.**

INTERNATIONAL EXHIBITS

Institution	The Institute of Emergency Medicine, The State University of Medicine&Pharmacology“N.Testemițanu”
Patent no.	Brevet de DMI AGEPI MD nr.1915 din 23.10.2020 Personalized CAD/CAM decompression device in the treatment of giant maxillary cysts, located in the upper jaw in the lateral region, refers to medicine, in particular, medical devices and can be used in stomatology as a special medical device for decompression in treatment of giant maxillary cysts, located in the upper jaw in the lateral region (provided the relative preservation of its own shape). The advantage of that technologic consist in the possibility of individualizing the treatment and making the devices that adapt to the operating site with a high precision, the intervention acquiring a mini-invasive aspect.
Description EN	
Class no.	4. Medicine - Health Care – Cosmetics

MD.113.

Title	MEDICAL INFORMATION SYSTEM AND WEB-SERVICES "PATIENT" FOR MANAGEMENT MEDICAL SERVICES PROVIDED FOR PATIENTS IN THE DEPARTMENT OF EMERGENCY MEDICINE.
Authors	GOLUBEV A., CUROV I., CIOCANU M., GOLUBEV Natalia
Institution	The Institute of Emergency Medicine
Patent no.	Certificate SAIP AGEPI MD seria OȘ 6632,6633 din 29.07.2020 The service of patients is carried out in 4 areas, according to the criteria of the medical triage procedure. Presented medical information system is focused on the activity criteria of medical professionals: 1.Registration and sorting of patients; 2.Research and evaluation of the patient's condition in the service areas; 3.Consultations of doctors-specialists and carrying out procedures and clinical analyzes; 4.Case finishing and data monitoring. Medical information system it allows monitoring and documentation during the service with the recording in time of all services provided in real time. A significant part of the presented medical information system is the facility of documenting the patient's condition, as well as medical professionals having access via mobile devices.
Description EN	
Class no.	4. Medicine - Health Care – Cosmetics

MD.114.

Title	OSTEOSYNTHESIS OF THE BONES OF THE LEG - TIBIOFIBULAR SYNDROME.
Authors	KUSTUROVA Anna, KUSTUROV V., CAPROȘ N.
Institution	The Institute of Emergency Medicine , The State University of Medicine&Pharmacology“N.Testemițanu”
Patent no.	Certificat SAIP AGEPI MD seria OȘ 6589 din 26.05.2020
Description EN	That scientific research relates to medicine, especially traumatology and orthopedics of osteosynthesis of the lower leg bones, at the level of interbital syndesmosis. The task that this scientific research solves is to develop a new fixator for osteosynthesis of the lower leg bones, specifically, interbital syndesmosis, which provides simplification of the design, stability of fixation, ease of operation, and reduction of injuries near the articular tissues. The advantage of the proposed fixator is a new technical solution that allows optimal adaptation of damaged surfaces, dosed compression in a stabilized interbital syndesmosis, with minimal tissue trauma, and early recovery of ankle joint function. Early and minimally invasive stabilization of the periarticular areas of long tubular bones, provides reliable retention of fragments for the entire period of treatment, creates optimal conditions for early development of joint function.
Class no.	4. Medicine - Health Care – Cosmetics

MD.115.

Title	MODELE PREDICTIVE PENTRU REZULTATELE TRATAMENTULUI (SUPRAVIEȚUIRE/DECES) ÎN TRAUMATIZM SEVER. METODE PREDICȚIEI MODIFICĂRILOR MORFOLOGICE LA NIVELUL FICATULUI, RENAL, SPLINEI.
Authors	ARNAUT O., ȘANDRU S., ROJNOVEANU Gh., CIOCANU M., GRABOVȘCHI I.
Institution	The Institute of Emergency Medicine , The State University of Medicine&Pharmacology“N.Testemițanu”
Patent no.	Certificate SAIP AGEPI MD , seria OȘ MD 6673, 6678 din 01.10.2020, seria OȘ MD 6668, 6669 din 06.10.2020, seria OȘ MD 6676 din 09.10.2020

Description
EN

Traumas, beside immediate local injuries, can cause pathological changes in other organs of the body, caused by the action of various substances secreted in the posttraumatic immune response, some of which are components of the protease/antiproteases system. As it was observed, the extent of these changes can be anticipated using certain mathematical models for modeling lesions. They can be useful in optimizing the therapeutic process, obviously, after completion, validation and testing in clinical trials. Even if the trauma itself does not directly affect the internal organs at the moment, it can affect them "remotely" after a certain period of time via substances secreted during the immune response. For example, the kidneys may undergo morphological changes whose size 24 hours after the traumatic impact can be predicted using a mathematical model. This research presents it in detail and brings arguments to sustain its practical usefulness after completion, validation and clinical testing. The immune response to trauma, characterized by complexity and polymorphism, is determined by a multitude of factors, of which, the protease / antiproteases system is only a small part. For simplicity and convenience, the components of this system have undergone the dimension reduction procedure. In total, using the data from the experimental study, by analyzing the components of the protease / antiproteases system at different time points, several models resulting from factor analysis were developed. In conclusion, some "latent" factors were extracted, containing different groups of components of the protease / antiproteases system.

Class no.

4. Medicine - Health Care – Cosmetics

MD.116.**Title**

MODELE PREDICTIVE PENTRU REZULTATELE TRATAMENTULUI (SUPRAVIEȚUIRE/DECES) ÎN TRAUMATIZM SEVER PREDICȚIA MODIFICĂRILOR MORFOLOGICE ȘI FUNCȚIONALE LA NIVELUL PULMONAR (SAMCRSPLĂMÂNI) LA 24 DE ORE DUPĂ IMPACTUL TRAUMATIC.

Authors

ARNAUT O., ȘANDRU S., ROJNOVEANU Gh.,

CIOCANU M., GRABOVSCI I.

Institution The Institute of Emergency Medicine , The State University of Medicine&Pharmacology“N.Testemițanu”
Patent no. Certificate SAIP AGEPI MD seria OȘ MD 6670, 6671, 6675, 6677 din 01.10.2020, seria OȘ MD 6672, 6674 din 09.10.2020

Description
EN Trauma is dangerous not only by local immediate injuries, but also by morphological and functional changes in other organs of the body, including the lungs due to exposure to various substances secreted in the immune system response, some of which are components of the proteases/antiproteases system. As it can be shown, the extent of these changes in the lungs can be estimated in advance using certain predictive tools for modeling lung damage. In the post-traumatic period, the patient's condition may worsen substantially in a short time due to numerous morphological and functional changes in some organs of the body other than those primarily affected, including the lungs, due to the avalanche of proteases / antiproteases as part of the immune system response. In this study, it was shown that the functional status of the lungs expressed by pO₂ arterial can be estimated in advance using predictive tools for modeling lung lesions. One of the manifestations of these imbalances may be pulmonary congestion that may occur at some time after trauma due to the increased concentration of proteases/antiproteases as part of the immune system response. In this research, it has been shown that the degree of pulmonary congestion can be predicted using some mathematical tools for modeling lung lesions. The degree of leukocyte infiltration may suggest processes that can quickly worsen the patient's condition, especially if the medical team is not prepared to deal with such a complication in the post-traumatic period. To predict in advance the evolution of this patient's category condition, a predictive model was designed to estimate the degree of pulmonary leukocyte infiltration at 24 hours after traumatic impact.

MD.117.

Title ENDOMETRIOSIS OF THE POSTOPERATIVE SCAR. PECULIARITIES OF SURGICAL TREATMENT, APPRECIATION OF THE QUALITY OF LIFE OF PATIENTS.

Authors MIȘINA Ana, ZAHARIA S., MIȘIN I.

Institution The Institute of Emergency Medicine, The State University of Medicine & Pharmacology “N.Testemițanu”, The Institute of Mother and Child

Patent no. Certificate SAIP AGEPI MD seria OȘ MD 6661 din 06.10.2020

Description
EN

Endometriosis was defined as a nosological entity, characterized by the presence of ectopic endometrial tissue outside the uterus. It is a benign condition that affects women of childbearing age. The two stages of surgical treatment in PSE consist of resection and reconstruction. The second stage consists of plastic reconstruction of the abdominal wall integrity for anterior abdominal wall aponeurosis, by using synthetic plastic material. Considering that the number of primiparous patients from the study group, aged - 30.1 ± 0.9 years, was significantly higher (95% CI:28.23–32.06) absolute indications for applying a plastic mesh in order to minimize further risks were required only in cases of deep invasion into the muscular layers, followed by a large aponeurotic defect formation, which cannot be removed by tension-free suturing. The following two options were suggested, depending on the size of the aponeurotic defect: synthetic suturing materials were used in minor aponeurotic defects (tension-free closure); reconstructive surgery was performed by using synthetic material in defects where this principle cannot be applied. *En block* excision was carried out by exceeding 5-10 mm within healthy tissue, while maintaining the formation intact, by removing the subcutaneous tissue. Depending on the endometrioma depth, excision was performed in 7(25%) cases, located subcutaneously, whereas 16(59%) cases required excision of the aponeurotic segment with tension-free sutures, using separate polypropylene threads. Anterior abdominal wall reconstruction by using a synthetic mesh was an absolute indication performed in 3(12%) cases, due to invasion into the peritoneal surface, thus causing a large aponeurotic defect, which couldn't be closed by tension-

free sutures. Three cases of PSE (3/28-10.7%), associated with pelvic endometriosis (adenomyosis and endometriosis of the pelvic peritoneum) required simultaneous surgeries, such as: hysterectomy with PSE excision, resection of retrocervical endometriosis and laparoscopic excision of endometriotic source by monopolar coagulation. The average length of hospital stay was 5.3 ± 0.5 days (95% CI:4.206–6.382), with no early postoperative complications. The average postoperative follow-up period of patients with PSE was 28.7 ± 1.8 months (95% CI:24.95–32.40). Further patient surveillance lasted from 6 to 49 months and no recurrent PSE cases were reported. The local examination of the postoperative scars did not reveal the presence of hernias. The Endometriosis Health Profile-5 (EHP-5) questionnaire was used to assess quality of life. According to the data presented in figure 8, the current study found a significant improvement in the quality of life of patients with PSE. The overall condition of patients showed an improvement in quality of life scores with a significant decrease in the mean scores from 13.7 ± 0.6 (95% CI:12.37–15.11) to 2.4 ± 0.7 (95% CI:1.205–3.742) postoperatively, which proved the benefits of surgical interventions. In order to quantify pain intensity that directly affects the patient quality of life, the Wong-Baker faces pain-rating scale was used, whereas the preoperative mean score was 7.1 ± 0.2 , and postoperative score - 1.2 ± 0.1 , showing a statistically significant difference ($p < 0.0001$).

Class no.

4. Medicine - Health Care – Cosmetics

MD.118.

Title	CLINICAL MANIFESTATIONS AND TOPOGROPHO-ANATOMICAL ASPECTS OF POSTOPERATIVE SCAR ENDOMETRIOSIS.
Authors	MIȘINA Ana, ZAHARIA S., MIȘIN I.
Institution	The Institute of Emergency Medicine, The State University of Medicine&Pharmacology“N.Testemițanu”, The Institute of Mother and Child
Patent no.	Certificate SAIP AGEPI MD seria OȘ MD 6665 din 09.10.2020
Description EN	For the reasons that ECP is an orphan pathology with a diverse symptomatology, the diagnosis in most cases is

established postoperatively at the histological examination. It is relevant that the rarity of CPE is one of the decisive factors in explaining the errors committed by specialists in establishing the preoperative diagnosis. Depending on its localization, PSE was more commonly reported in the anterior abdominal wall (n=28) compared to the perineal region (n=6). According to PSE occurrence regarding surgical interventions on the abdominal wall, the following data were revealed: cesarean sections (n=25), myomectomies (n=1), aparoscopic interventions - laparoscopic ablation of the source of endometriosis by monopolar coagulation (n=1), diagnostic laparoscopy (n=1). According to PSE localization, there were determined the characteristic features for endometrial ectopias, which mostly occurred on the anterior abdominal wall—in 28(82.4%) cases compared to the perineal region—6(17.6%) cases, the findings showing a statistically significant value ($p<0.0001$). This present study reported a number of endometriomas (n=38), the higher incidence being found in single ones (n=31, 91.2%) compared to multiple endometrial ectopias (n=3, 8.8%), which were detected only in two cases vs. one case in the abdominal wall region and one case in the vaginal region ($p<0.0001$). The PSE location within the anatomical structures of the anterior abdominal wall varies, being detected both in the superficial layers (type 1-3) and in the deep ones (type 4). There were reported 25 (89.3%) cases of superficial endometriosis vs. 3(10.7%) cases with deep localization, showing a statistically significant difference ($p<0.0001$). Depending on PSE location (n=28) within the anatomical layers of the abdominal wall, the following results were found: (type 1) which were located within the subcutaneous tissue; (type 2) involving the sheath of rectus abdominis muscle; (type 3) involving the muscles of the anterior abdominal wall; and (type 4) which were located in the rectus abdominis muscle – EMRA.

Class no.

4

Academy of Economic Studies of Moldova

MD.119.

Title	APPROACHES ON THE METHODOLOGY OF THE SIGNIFICANCE THRESHOLD IN AUDIT THROUGH QUICK TESTS.
Authors	Svetlana MIHAILA, Simona-Maria BRÎNZARU, Veronica GROSU, Marian SOCOLIUC, Cristina Gabriela COSMULESE, Marius-Sorin CIUBOTARIU.
Institution	UNIVERSITATEA „ȘTEFAN cel MARE” din Suceava, ACADEMIA DE STUDII ECONOMICE A MOLDOVEI, Chișinău
Patent no.	Certificat SAIP AGEPI MD seria OȘ MD 6698 din 27.10.2020
Description EN	<p>Faced with a financial crisis imposed by the global situation generated by the pandemic crisis, the economy tends to destabilize on the basic financial levers on economic flows due to disruptions in current activity, highlighted primarily in financial markets since 2020. The aim of the research is to develop a rapid test to reconsider the significance threshold through the analysis of financial performance performed for entities listed on the Bucharest Stock Exchange (European stock exchange), at the most liquid section BET Plus by reanalyzing the audit methodology on the primary function.</p> <p>The methods used are empirical and prospective and are defined by the study of literature, conceptualization of a model of analysis to readjust the level of significance and testing the proposed model through dynamic analysis of performance by all entities listed on the Bucharest Stock Exchange, BET Plus section.</p> <p>The results of the study are useful for professionals and stakeholders because they are an effective tool for interpreting the economic evolution of listed entities, giving them the opportunity to readjust their confidence in the information reported, as well as the forecast evolution of stock quotes in economic crisis.</p>
Class no.	14. Other Economical sciences, macro- microeconomics

MD.120.	
Title	ENSURING ECONOMIC SUSTAINABILITY IN AGRICULTURE. SMART DECISION MODEL.
Authors	Romeo Victor IONESCU, Monica Laura ZLATI, Valentin Marian ANTOHI, Silvius STANCIU, Svetlana MIHAILA, Florina-Oana VÎRLĂNUȚĂ, Constanța ȘERBAN.
Institution	UNIVERSITATEA „DUNĂREA de JOS” din Galați, ACADEMIA DE STUDII ECONOMICE A MOLDOVEI, Chișinău
Patent no.	Certificat SAIP AGEPI MD seria OȘ MD 6699 din 27.10.2020
Description EN	In a digital and sustainable economy, smart decision-making must focus on all aspects of demand for: product demand, quality demand and the elements of national and international bodies capable of ensuring the criteria of economic integrity in European markets. These aspects represent a set of challenges and represent the intelligent component of the management decision, assisted by reliable economic models. The present paper aims to develop such a model applied to the production of wheat seeds, starting from the study of the literature and using empirical methods. The analysis covers the period 2016-2020. The main objective of the study is to combine the information from the observational study, in order to obtain the intelligent decision model. The study results in the intelligent model of managerial decision (smart decision), which is a real need for managers, given the challenges they are subject to. The model proposed in the paper can be used for all types of seeds across the EU and beyond. The implementation of this study by the authors validates the proposed model.
Class no.	14. Other Economical sciences, macro- microeconomics

University of European Studies of Moldova

MD.121.

Title **METHODOLOGICAL APPROACHES - APPLICATIONS OF REVENUE AND EXPENDITURE ACCOUNTING IN PUBLIC MEDICAL AND HEALTH INSTITUTIONS**

Authors **FRUMUSACHI Ludmila.**

Institution **UNIVERSITATEA DE STUDII EUROPENE din MOLDOVA, Chişinău**

Patent no. **Certificat SAIP AGEPI MD seria OŞ MD 6701 din 27.10.2020**

Description
EN

One of the most important and difficult sectors of record of any entity, including the PMSI, is the accounting of income and expenses. Thus, the author deals with the accounting situation of the process of purchasing medicines and medical devices, the classification of costs in the PMSI according to various criteria, highlighting the costs by responsibility centers, the correlation of the centers of responsibility with the indirect costs. A special place is the method of determining the cost of a medical-sanitary service. In order to present full information on these costs, the use of accounts and sub-accounts is argued. Also, it explains the application of the scheme of the accounting records related to the operations of recognition of the revenues. The proposals made are substantiated by appropriate accounting calculations and records.

Based on the recommendations of the normative acts in force, the author proposed and argued for the PMSI, the application of the management accounts, considering that they have various objects of cost records (for example, activity, section, sector), which would facilitate information processing and decision-making.

Class no. **14. Other Economical sciences, macro- microeconomics**

MD.122.

Title	MODERNIZATION OF THE INFORMATION SYSTEM OF PUBLIC MEDICAL AND HEALTH INSTITUTIONS IN THE FRAMEWORK OF MANAGEMENT ACCOUNTING AND INTEGRATED REPORTING
Authors	FRUMUSACHI Ludmila.
Institution	UNIVERSITATEA DE STUDII EUROPENE din MOLDOVA, Chişinău
Patent no.	Certificat SAIP AGEPI MD seria OŞ MD 6700 din 27.10.2020
Description EN	<p>Currently, continuous metamorphoses of the accounting system are taking place within the public health-self-financing institutions, by changing the focus from the control function to the communication function, new requests for information of interested parties are created, new accounting objects and methods of evaluation appear. of them, which led to the orientation towards integrated reporting. Integrated Reporting highlights the relevant information for assessing value from the perspective of long-term investors in order to make decisions and encourage the allocation of financial resources to support the creation of long-term value within the meaning of corporate expectations.</p> <p>Thus, the rationalization directions regarding the management accounting organization within the PMSI are investigated. The problems regarding the structure, how to prepare and apply the financial and managerial situations in the decision-making process, as well as the calculations and decisions regarding the optimization of resources at the PMSI are examined and resolved. We propose the nomenclature of performance indicators for employee pay, implementation of the integrated reporting concept for PMSI. The research carried out is based on examples.</p>
Class no.	14. Other Economical sciences, macro- microeconomics

MD.123.**Title****THEORETICAL FUNDAMENTALS OF ACCOUNTING IN PUBLIC MEDICAL AND HEALTH INSTITUTIONS.****Authors****FRUMUSACHI Ludmila.****Institution****UNIVERSITATEA DE STUDII EUROPENE din MOLDOVA, Chişinău****Patent no.**

Certificat SAIP AGEPI MD seria OŞ MD 6702 din 27.10.2020

One of the key priorities of the state policy is to maintain and strengthen the health of the nation through a healthy way of life and consists in improving access and quality of medical services. Health protection is a system of state institutions, regulations and policies, which aim to ensure the health of the population in general and the individual in particular. The system of the provision of medical services is quite large, so that the problems of management and accounting, in these institutions, are proportional to the mentioned system.

**Description
EN**

Thus, the present research contains theoretical approaches regarding the concepts related to the medical services, their classification in the PMSI. It is analyzed the degree of investigation, by the researchers in the field, of the problems regarding the definition and the elements that characterize the organization of the accounting in the PMSI . The current state of accounting at PMSI, the particularities of PMSI activity and the factors that influence its organization are examined. Also, a study was made of the budgeting process at the branch level and within the PMSI in order to use the elaboration of budgets based on the concept of „result-oriented budgeting”.

Class no.

14. Other Economical sciences, macro- microeconomics

University of Political and Economical Studies

MD.124.
Title
RISK MANAGEMENT - A PERFORMING TOOL FOR ECONOMIC EXPERTISE.
Authors

Gheorghe AVORNIC, Cristina COPĂCEANU.

Institution
UNIVERSITATEA DE STUDII POLITICE ȘI ECONOMICE EUROPENE "CONSTANTIN STERE"
Patent no.

Certificat SAIP AGEPI MD seria OȘ MD 6593 din 04.06.2020

Description
EN

Currently, economic problems forensic financial audit and accounting is the subject of thorough research in the accountants and auditors academics and practitioners, the regulatory bodies of the field, who are obliged to promptly provide solutions for applications in society. The current needs for information and study in the field of economic expertise are gaining new dimensions, and this in turn implies a modern approach, in the context of the connection with risk management, both in the judicial and extrajudicial processes. In this context, the authors decided to approach the economic expertise from the risk perspective, in order to highlight the vulnerabilities, their size, the significance and the strictness of the risk control, in a global view of the risk factors.

The authors consider that, in the context of the economic-financial crisis, risk becomes an inevitable element in the process of conducting judicial economic expertise.

In the context of the above, the authors propose:

- ≈ implementation and development of the system of internal managerial control in the process of carrying out the judicial / extrajudicial economic expertise, with emphasis on performance and risk management, including process description;

- ≈ elaboration of a methodology on risk management, specific to the judicial / extrajudicial economic expertise;

- ≈ implementation of risk management in the activity carried out by experts, focusing on the elaboration of the risk register and the description of processes..

The authors concluded, that only when we become aware and accept that we live in a world of risk, we will have a priority / opportunity for development of the professionals who carry out the expertise as well as the authorizing officers, the beneficiaries of the expertise, as well as the whole society.

Class no.

14. Other Economical sciences, macro- microeconomics

The Transplant Agency

MD.125.

Title

**THE FIELD OF HUMAN TISSUE AND/OR CELL
TRANSPLANTATION IN PUBLIC HEALTH
INSURANCE**

Authors

TIMBALARI Tatiana, NACU Viorel, CODREANU Igor

Institution

**The Transplant Agency, The State University of
Medicine & Pharmacology „Nicolae Testemitanu”**

Patent no.

Certificates SAIP AGEPI MD, series OŞ MD 6785, 6786,
6787 from 14.01.2021

**Description
EN**

Transplantology as a medical science and transplantation have recorded a significant progress over the past decades. The human tissue and/or cell transplant service is incorporated in and is a component part of the national transplant system of the Republic of Moldova. In this study, for the first time, a complex assessment of the key elements of human tissue and/or cell transplant service at national level was performed, as well as an estimate of the degree of insurance of the health system in the Republic of Moldova with tissue grafts (cornea, bones, ligaments/tendons, skin, amniotic membrane) and cell grafts (stem cells). At the same time, organizational, financial and educational problems were identified, that have a direct impact on the efficiency of the transplant system. During the study, the criteria for evaluating the effectiveness of the activity of donation and transplant institutions were determined by establishing performance indicators for conducting an audit of donation and transplantation processes. The main factors that prevent effective donation and determine the potential of donation in the institution were pointed out. The study evaluated the doctors' opinions about providing the health system with human tissue and/or cell grafts, the public knowledge and attitude towards human tissue and/or cell donation and transplantation. Scientific support was elaborated for the continuous development of human tissue and/or cell transplantation, which would fortify an adequate and sustainable supply of tissues and cells, in the context of the significant increase in demand, as well as to ensure strategic stocks of tissues and cells in the Human Tissue Bank, which will be very useful in case of exceptional situations in the country (e.g. skin grafts, amniotic membrane in case of large fires, explosions).

Class no.

4. Medicine - Health Care – Cosmetics

Tiraspol State University

MD.126.

Title

Zinc coordination compound with antifungal and antibacterial activity

Authors

Vitiu A., Chișca D., Gorincioi E., Coropceanu E., Bouroș P.
Tiraspol State University, Chisinau, R. Moldova

Institution

Institute of Applied Physics, Chisinau, R. Moldova

Patent no.

Institute of Chemistry, Chisinau, R. Moldova

Patent no.

MD 4640

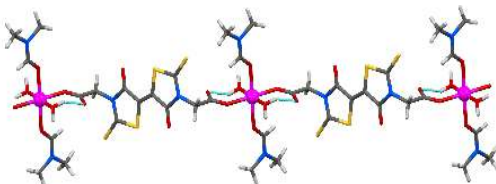
Description
EN

The coordination compound $[Zn(5,5'\text{-Rda-Rda})(dmf)_2(H_2O)_2]_n$ has been synthesised, its structure being characterized by single-crystal X-ray diffraction, IR-, and RMN-spectra. X-ray structural analysis of the metal assemblies reveal polymeric structure that could be obtained based on the used organic ligand.

Two bacterial strains and one yeast strain were obtained from the American Type Culture Collection (ATCC). Reference strains included the Gram positive bacteria *Staphylococcus aureus* (ATCC 6538), the Gram negative bacteria *Escherichia coli* (ATCC 25922), and one yeast strain, *Candida albicans* (ATCC 10231). The study of antibacterial and antifungal activity showed that compound $[Zn(5,5'\text{-Rda-Rda})(dmf)_2(H_2O)_2]_n$ presented antifungal activity in the range of all the studied concentrations, the MIC being 1.2 $\mu\text{g/mL}$ (dilution 1:1024) and antibacterial in the case of 1:8 dilutions towards *E. coli* and 1:16 dilutions towards *S. aureus*. The results of microbiological studies revealed significant activity of compound over *Candida albicans*, *E. coli* and *S. aureus* cultures, indicating its possible use as an antifungal and antimicrobial preparation.

Class no.

3. Agriculture and Food Industry

Fragment of the polymer chain $[Zn(5,5'\text{-Rda-Rda})(dmf)_2(H_2O)_2]_n$

Philippines

by *Manila Young Inventors Association / Farin Technologies*
powered by TISIAS

PH.1.

Title

BION

Authors

Student Inventors: Kimberly Jhenin H. Mangilog, Shieca Sophia D. Anagap, Angela C. Bolor
Teacher Inventor: Ma. Chat Donna V. Ofilas

Institution

Manila Young Inventors Association (MYIA) – Philippines

Description EN

This study aims to decrease air pollution in homes in order to help reduce the deaths caused by this particular problem. Specifically, this study is focused on determining if certain plants (Jade Plant, Golden Pothos, and African Violet were used) are able to remove harmful chemicals inside our homes with the help of ions. To further understand the components that are crucial to the study, ions are small particles with a net electrical charge which is usually considered negative due to convention. To verify the hypothesis that plants with negatively charged ions can help with the reduction of harmful chemicals, specifically particulate matter, an air filter which utilizes a generator that produces negative charged ions that attaches themselves to the leaves of a three certain plants to filter the air in a particular area was created. The results proved the hypothesis to be correct; although there were different plants that were most effective to use. For the reduction of Total Volatile Organic Compounds (TVOC), African Violet was most effective while the Golden Pothos was most effective for Formaldehyde (HCHO).

The results gathered indicates that three different indoor plants along with the air filter created, Bion, was successful in removing particulate matter, indoor ozone, and other harmful chemicals. With this information, it is suggested to consider using Bion with different types of indoor plants to further reduce indoor pollution and its damages to the population and the environment.

Class no.

1

PH.2.**Title****PARAHEAT****Authors**

Iman Hadi Vincheh; Ma. Chat Donna V. Ofilas

Institution**FARIN Technologies – Philippines****Description****EN**

Paraheat is the next level of the household solar heaters that has a lightweight parabolic reflector that uses innovations including a unique absorber that eliminates thermocline and heats the heat transfer fluid in a double time way and new piping which needs less pipes and more compact configuration. The system makes it possible to use less expensive materials for the reflector and makes heat loss less than before thanks to the different divergence of the heat flow. This way, using the sun tracking solar heaters become more reasonable for normal buildings and using less space for the heat bank and the combo function aligned with the backup heat source, makes a seamless solution for the urban areas.

This invention can be available as a single unit, all in one heating needs fulfiller for the house or can be at the shape of a combo system that combines the solar heating and the complimentary backup system and can save a lot. It can be used for farming, greenhouse, solar distillation, and many more and can be used in arrays.

Class no.

2



Poland

Represented by Eurobusiness-Haller

PL.1.**Title**

„Innovative research and training test rig "LNG training simulator" used to develop tactics of activities using the equipment used by the State Fire Service carried out during with LNG incident”

Authors

Robert Piec, Wiktor Gawroński, Przemysław Wysoczyński, Daniel Wierzbicki, Wojciech Kłapsa

Institution

Scientific and Research Centre for Fire Protection - National Research Institute

Patent no.**Description
EN**

A set of LNG trainer test stands made as part of the project „Innovative research and training test rig "LNG training simulator" used to develop tactics of activities using the equipment used by the State Fire Service carried out during with LNG incident” financed by the National Center for Research and Development as part of a competition in the field of scientific research and development works for the defense and security of the state No. DOB-BIO9/15/02/2018. Currently, the LNG trainer is in the final stage of construction. A complete and functional set of the LNG trainer consists of 6 parts: LNG bus, tanker carrying LNG, truck, stationary tank, certified test stands and virtual simulator.

Class no.

12



PL.2.**Title**

The mixture based on small rock fractions fertilizing the soil and supporting the cultivation of plants

Authors

Andrzej Pomorski, Dominika Kufka
„POLTEGOR-INSTYTUT”

Institution

Instytut Górnictwa Odkrywkowego
(Institute of Opencast Mining)

Patent no.

Patent application No. **PL 436543** (2020-12-30)

Description EN

The subject of the invention is a mixture based on fine rock fractions that fertilize the soil and support the cultivation of plants, intended for use in crops as a natural agent for improving soil properties. The problem to be solved by the present invention is to create a mixture on the basis of waste and by-product, metamorphic rock, previously unused for this purpose, which mixture improves soil properties, i.e. it is added to the soil to improve its properties or its chemical and physical parameters, physico-chemical or biological, and which supports the cultivation of plants, i.e. positively influences the development of plants or their other life processes.

A mixture based on fine rock fractions that fertilizes the soil and supports the cultivation of plants, according to the invention, is characterized by the fact that it consists of fine fractions of gneiss from the Doboszowice 1 deposit in a form of gneiss dust with a grain size of up to 0.05 mm in an amount from 10.00% to 40.00 wt.% and gneiss crushed sand with a grain size of 0.05 to 0.50 mm in an amount of 60.0 wt.% up to 90.0 wt.%

3. Agriculture and Food Industry

PL.3.**Title****Secret Chats Protocol****Authors**

Kamil KACZYŃSKI, Michał GLET

Institution**Military University of Technology****Patent no.**

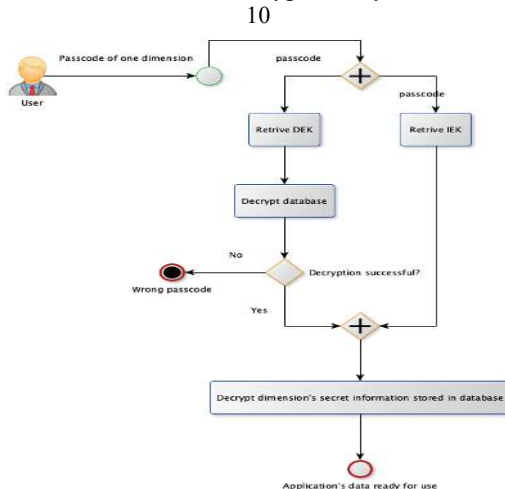
NA

The idea of secret chats is very simple – enable users, by entering different passcodes, to see different data in the application. It can be e.g. different conversations, different contacts and other data that the user wants to keep secret in some circumstances. What is also important, the proposed Secret Chats Protocol allows the hiding of information in many dimensions – one user passcode gives access to only one dimension. Moreover, the protocol proposed hides the actual total number of dimensions used by a user, revealing only the boundary configured by the application developer.

Description EN

Securing information in the Secret Chats Protocol is based on common idea of using SQLCipher to keep SQLite database in an encrypted form. Because of this, Secret Chats Protocol can be quite easily and with low cost integrated within existing application. Moreover, the Secret Chats Protocol can be effectively used also in environments which use other databases and database encryption methods – the Secret Chats Protocol proposed shows how to retrieve the database encryption key and chat information encryption key.

Class no.



PL.4.**Title**

Oxides-based biocompatible nanomarkers for early detection and treatment of tumors

Authors

Jarosław Kaszewski, Julita Rosowska, Bartłomiej S. Witkowski, Marek Godlewski, Paula Kielbik, Jarosław Olszewski, Michał M. Godlewski

Institution

Institute of Physics, Polish Academy of Sciences, PL-02668 Warsaw, Al. Lotnikow 32/46, Poland

Patent no.

P. 423187, P227243

Description EN

We developed a new generation of fluorescence and MRI markers for early detection of tumors. The markers are based on nanoparticles of biocompatible oxides, such as ZnO, ZrO₂ or Y₂O₃, which are activated (for a bright emission) with rare earth ions. Such markers can penetrate different barriers in living organisms, including blood-brain barrier. Importantly, after minor modifications the same markers act as contrast agents in MRI allowing to detect and localize early stage tumors.

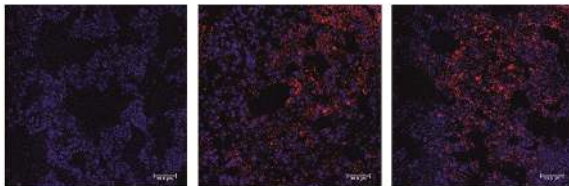
Present study shows that our markers not only for cancer detection but also for treatment. Markers can transport and then release a given medicine directly to tumor area, increasing efficiency of therapy. To improve safety of the method markers are optimized for uptake after oral application and direct transfer to tumors.

Thus, a new generation of biocompatible markers allows not only an early detection of cancers (via characteristic fluorescence or MRI), but also increases chances of effective therapy. In the case of lung cancers 100% selectivity of the method was demonstrated. Markers accumulate only in cancer-affected cells. Then, a directed therapy is possible minimizing by-effects observed in standardly used approach (chemotherapy)

Technology of markers is protected by several our patents and patent applications.

Class no.

4



Poland

Represented by

*Association of Polish Inventors and Rationalizers**Stowarzyszenie Polskich Wynalazców i Racjonalizatorów. SPWIR***PL.5.****Title****The modified drug substance molecule, method of its production, diagnostic or therapeutic receptor radiopharmaceutical based on this molecule, method of its production and its application****Authors**

Paweł Krzysztof Halik, Ewa Gniazdowska, Przemysław Koźmiński

Institution**Institute of Nuclear Chemistry and Technology****Patent no.**

Patent application No P.429991

**Description
EN**

The present invention relates to a method of chemical modification the aprepitant drug molecule and diagnostic or therapeutic receptor radiopharmaceutical based on this modified molecule. Aprepitant is a neurokinin1 receptor (NK 1R) antagonist and is currently approved for use as an anti-emetic during chemotherapy. For aprepitant modification, enabling the later attachment of a macrocyclic chelator for diagnostic or therapeutic radionuclide binding, secondary amine groups -NH located in the triazolone ring were used, while the main pharmacophore fragment of the drug (aromatic phenyl ring with substituents 3,5-trifluoromethyl), responsible for interaction with the receptor remained intact. Designed radiopharmaceuticals containing emitters of gamma and beta plus radiation are indicated to targeted diagnostics imaging by SPECT (Single Photon Emission Computed Tomography) or PET (Positron Emission Tomography) method, respectively, while radiopharmaceuticals containing emitters of Auger electrons, alpha or beta minus particles are indicated for glioblastoma targeted therapy. The radiopreparations designed in frame of invention are characterized with better physicochemical properties (molecular weight, lipophilicity, stability) than the Substance P peptide-based radiocompound currently tested for the treatment of brain glioma (at the Department of Nuclear Medicine of the Central Clinical Hospital in Warsaw).

PL.6.**Title**

Specialized drone for tropospheric ozone research with precise positioning and wireless data transmission

Authors

Marek Rauchfleisz

Institution

-

Patent no.

-

Description

EN

The drone for tropospheric ozone research with precise positioning and wireless data transmission allows for quick and efficient monitoring of ozone concentration, especially in hard-to-reach places. The concentration of tropospheric ozone depends to a large extent on local weather conditions and the chemical composition of the air. Measurement stations with a stationary location are not always located in places where the most ozone accumulates. The drone has an RTH system for automatic return to the place of take-off at a set altitude. It is possible to fly autonomously along a pre-programmed route. Programming the flight controller, setting the PID controller parameters, which are responsible for smooth flight, extinguishing the tilts of the multirotor and the speed of response to tilts of the control rods, were made using specialized software. A telemetry system has been used, which enables data reception during the flight and its presentation on the screen of a smartphone or tablet with Android or iOS. The innovative elements include equipping the project with the functions of visualization of parameters and normative, warning and alarm states. The ozone sensor allows you to work in the measuring range of 10-1000 ppb. The developed drone is a useful and functional mobile tool for monitoring ozone levels that fulfills information, control and warning tasks. It can be used for research on tropospheric ozone, contributing to a better understanding of the mechanisms of ozone formation in a specific area and under certain conditions.

PL.7.**Title**

Method for manufacturing semi-finished products, in particular hollow railway axles hollow forgings

Authors

Janusz Tomczak, Zbigniew Pater, Tomasz Bulzak

Institution

Lublin University of Technology

Patent no.

Patent application No. P.434407/2020

Description

This method relates to efficient manufacturing of semi-finished hollow railway axles. The method makes it possible

EN

to deform simultaneously internal and external surfaces of the workpiece, particularly in skew rolling processes for semi-finished tubular billets.

The proposed method for manufacturing semi-finished hollow railway axles requires the use of CNC skew rolling mills in order to correlate radial motion of the tools and axial displacement of the workpiece in such a way that the resulting trajectory of tool motion complies with the envelope profile of the part being rolled.

A preheated billet in the shape of a thick-walled tube section is mounted in a rear grip. The rear grip moves the billet to the working zone of three tapered tools, where an end step is formed on the workpiece. After that, a front grip grabs the workpiece by the formed step, and the workpiece is rolled along the rolling axis, which results in the formation of other steps on the workpiece. The rolling process is performed between three skew rollers with tapered working surfaces. The rollers are located symmetrically every 120° along the rolling axis. During the process they rotate in the same direction with the same speed and can perform radial motion toward the rolling axis at the same time. Throughout the rolling process, the workpiece is held by one of the two grips. The grips can rotate freely around their axis and simultaneously move along the rolling axis in a controlled manner. During the formation of steps on the workpiece ends, a stepped mandrel is put inside the hollow workpiece in order to form the internal surfaces of the hole and thus increase the manufacturing accuracy of parts produced thereby.

PL.8.

Title	Method and tools for the manufacture of axisymmetric hollow forgings
Authors	Janusz Tomczak, Zbigniew Pater, Tomasz Bulzak, Tomasz Kusiak
Institution	Lublin University of Technology
Patent no.	Patent application No. P.434539/2020
Description	In the presented rolling scheme it was assumed that forming axles is realised with three rolls. The rolls are located on the circumference of the billet by each 120° . The hollow rail axle is formed simultaneously on its entire length as a result of the working surfaces of the roll gradually growing
EN	

(eccentrically) on the arch of the roll at the angle 216° , which is the working zone. Tools in this zone were separated into 3 equal parts, differing in the intensity of growth of the radius of the working surfaces. Such a solution causes the load of rolls in the forming zone to be more even. The advantages of the invention are that it enables the production of hollow forgings of railway axles from a billet in the shape of a tube section. Another advantageous effect of the invention is its versatility, which is manifested in the fact that the method can be used for the production of any hollow, stepped axis and shaft forgings. The spiral shape of the working projections in the tool forming zone causes the rolling process to be carried out gradually, so that the tool pressure forces and torques are several times smaller in relation to the processes of forging or cross-wedge rolling.

PL.9.**Title**

Corrosion inhibitor for refinery plants, especially for a crude oil distillation unit

Authors

Barbara Gaździk, Stefan Ptak, Kamil Pomykała, Marcin Warnecki, Zbigniew Paćkowski, Roman Kempński, Mieczysław Socha, Michał Pajda

Institution

Oil And Gas Institute – National Research Institute

Patent no.

Patent application No. P. 427277

Description**EN**

The inhibitor is a clear, amber-coloured liquid with a density of approx. 0.9 g/cm^3 , pour point below -30°C , easily soluble in raw gasoline. The inhibitor protects distillation columns, condensation systems and pipelines against corrosion when continuously dosed to vapour and reflux pipes of distillation columns at an amount of 10-15 ppm/gasoline. The tops of the CDU distillation columns are the most vulnerable to corrosion. Acidic gases: H_2S and CO_2 , inorganic acids: HCl , H_2SO_3 , H_2SO_4 , H_2CO_3 and organic naphthenic acids are the main corrosion factors in the CDU plants, where crude oils is used as raw material . High process temperature favours corrosion. Hydrocarbons containing water vapour, hydrogen chloride and hydrogen sulphide, which leave the distillation column at a temperature of approx. 130°C , cause the most intensive corrosion. The inhibitor ensures high corrosion protection both in the hydrocarbon and water phase. It has high solubility in gasoline fractions and excellent protection

against the formation of emulsions of crude gasoline in the contact with water vapour. All these properties are significantly better in comparison to those of other refinery plant's corrosion inhibitors according to the state of the art overview.

PL.10.**Title****Innovative method for production of modified fat****Authors**

Stefan Ptak, Wojciech Krasodowski, Artur Antosz, Zygmunt Burnus, Wojciech Wilk, Agnieszka Wieczorek, Iwona Rycaj

Institution

Oil And Gas Institute – National Research Institute

Patent no.

Patent application No. P. 434448

Description**EN**

Vegetable oils and animal fats, in addition to its main application in food industry, are commonly used in the production of biofuels for diesel engines and in the production of lubricants. Vegetable oils used as base oils, in addition to numerous advantages, also have some disadvantages, such as their limited thermo-oxidative and hydrolytic stability and, in some cases, because of their too high cloud and pour points, the fluidity of lubricants is limited at low ambient temperatures. The essence of the present invention is to subject fats, which are vegetable oils, hydrogenated vegetable oils, animal fats, used cooking oils, to a solvent separation process into a filtrate - a modified fat and a residue based on the principles of the solvent dewaxing process, which is conventionally used for dewaxing oils and deoiling slack waxes, hydrocarbon compounds. The use of the solvent separation process into a filtrate and a residue for fats, which are vegetable oils, hydrogenated vegetable oils, animal fats, used cooking oils, maintains the selectivity of the process while obtaining short filtration times, which is desirable in industrial processes and allows for the reduction of the cloud point, pour point and solidification point, which results in the improvement the low-temperature properties of the obtained product, including rheological properties at low temperatures.

PL.11.

Title **Composition of low-permeability lightweight slurry**
Authors Marcin Kremieniewski, Marcin Rzepka, Miłosz Kędzierski, Ewa Kałna
Institution **Oil And Gas Institute – National Research Institute**
Patent no. Patent application No. P. 434964

Description
EN

The invention consists in the ‘composition of a low-permeability slurry with a reduced density’, which is used to seal boreholes, as well as during special-application works in the construction sector. The cement composite from such slurry is of low permeability and features a homogeneous microstructure, which is also difficult to achieve in a liquid with a large amount of a light filler, such as a micro-sphere. The invention is used in the cases, where the priority consists in obtaining an impermeable structure of the forming product, retaining at the same time a low density of the liquid product. The composition of low-permeability lightweight slurry may be used in the oil sector to seal boreholes in areas of an increased risk of gas migration occurrence. In such places, where it is required to obtain a protective barrier, impermeable to gas media, which originates after binding of a lightweight mixture of the cement slurry.

PL.12.

Title **Composition of ultra-tight slurry**
Authors Marcin Kremieniewski, Marcin Rzepka, Ewa Kałna, Miłosz Kędzierski
Institution **Oil And Gas Institute – National Research Institute**
Patent no. Patent application No. P. 435702

Description
EN

In the oil sector there was no ultra-tight slurry so far. There was only some information on compounds, which improve tightness, however, to be used only in the construction sector. It is not possible to use such products in the technology of drilling fluids designed to seal boreholes. The innovative composition of ultra-tight slurry features a very low permeability coefficient, which already after 7 days of hydration is 0.016 [mD]. Such a tight matrix was obtained as a result of proper selection of sealing materials and the use of a nano-filler in the form of hydrophilic nanosilica. The composition of ultra-tight slurry may be used in the oil sector to seal boreholes in areas, where gas migration or

exhalation occur, where it is required to form a barrier impermeable to gas media, once the slurry made of the above mixture is bound. The ultra-tight slurry may be successfully used for sealing casing columns in boreholes in a specified geological profile. A cement sheath, formed of the slurry, features a very low value of permeability for gas and porosimetric permeability, due to which it is a barrier impermeable to the reservoir media. Also in the construction or power sector the ultra-tight slurry may be used as an impermeable barrier of very high mechanical strength.

PL.13.**Title****Method of reading the indication of gas volume****Authors**

Jacek Matusik

Institution**Oil And Gas Institute – National Research Institute****Patent no.**

Patent application No. P. 435975

Description**EN**

The subject of the invention consists in a method of reading of the measuring data from diaphragm gas meters. It is based on the optical detection of a measuring scale marked on the last drum of the mechanical counter of a gas meter. The optical system, specifically designed, enables one to detect each measuring scale and to generate an electric impulse for each of them, which may be fed to the counter input of a metrological station. In addition, to ensure reliability of operation of the optical system, a digital magnetometer has been applied, which continuously measures the intensity of the magnetic field originating from a rotating magnet placed in the last drum of the counter. The magnetic system is intended for determination of the performance of full rotations by the drum. A microcontroller applied in the system systematically controls whether there are exactly fifty impulses (i.e. the number of measuring scales on the drum) generated by the optical system per each full rotation of the drum, which is determined by the magnetic system. The fulfilment of this condition ensures reliability of the operation of the optical system.

PL.14.**Title****Device protecting against gas theft****Authors**

Maciej Łach

Institution**Oil And Gas Institute – National Research Institute****Patent no.**

Patent application No. P.436004

A plate with an O-ring on the front plate is screwed into a valve installed on the gas pipeline end, ensuring tightness in the case of opening of the valve. A monostable button, installed in the ring, leans against the plate on one side. The ring is installed in the device casing. The button is connected with an electronic circuit, which is aimed at detection of button closing or opening, and is enabled with remote communication via GSM. The device is battery-supplied. The whole is placed in a casing, which has an outside thread on one side and, on the other, an assembling seat.

Description
EN Protection of the valve is carried out in two stages. In the first stage, it is necessary to screw in the sealing plate; in the second stage - the device with the button. Unauthorised removal of the device results in the button being released and a message with information on illegal collection being sent. The device is particularly recommended for liquidated measuring points which are situated inside an apartment. This is related to the fact that the subsequent control of the valve and connection is difficult, and an illegal, frequently leaking connection, may result in major losses, not only material.

PL.15.

Title **Multi-purpose package of additives for diesel fuel, containing alkenyl succinimide-amides with controlled content of imide and amide groups**

Authors Grażyna Żak, Michał Wojtasik, Leszek Ziemiański, Celina Bujas, Jarosław Markowski, Zbigniew Stępień, Aleksander Mazanek, Roman Kempniński, Zbigniew Paćkowski

Institution Oil and Gas Institute – National Research Institute, Pachemtech Sp. z o.o.

Patent no. PL231364

Description
EN The subject of the invention is a multi-purpose package of additives for diesel fuel, which contains an active substance with detergent-dispersant properties, a demulsifier, a foam inhibitor and an organic solvent. The package may also contain a cetane improver, oxidation inhibitor, metal deactivator, corrosion inhibitor, biocide and marker. The active substance with detergent-dispersant properties used in the package is an innovative, highly effective alkenyl

succinimide-amide, which is a product of the amidization of polyalkylene polyamine with alkenyl succinic anhydride with an average molecular weight from 750 to 2500 Daltons, while maintaining the ratio of reagents such that 1.0 mole of polyalkylene polyamine is 1.0 to 3.0 moles of alkenyl succinic anhydride, the resulting alkenyl succinimide amide subjected to a thermal conditioning process in the presence of an inorganic or organic compound containing at least one hydroxyl group. The process of thermal conditioning of the alkenyl succinimide amide is controlled by the methods of infrared spectroscopy and nuclear magnetic resonance spectroscopy

PL.16.**Title****C-IED and CBRN robot****Authors**

Tomasz Krakówka, Rafał Czupryniak, Mariusz Kozak, Stanisław Nycz, Kamil Jasiński, Jacek Mickiewicz

Institution

Łukasiewicz Research Network – Industrial Research Institute for Automation and Measurements PIAP

Patent no.

-

**Description
EN**

PIAP PATROL®C-IED and CBRN robotPIAP PATROL® is a medium tracked robot used for detection and neutralization of potentially lethal objects. The robot can replace or assist people in the most dangerous tasks with countering IEDs or CBRN threats. The robot design enables the assembly and use of several accessories at the same time. The lightweight control panel of a robot fully supports the operating software of Logos Imaging's portable X-ray systems, as well as CBRN sensors. Its dimensions and drive system allow to carry out activities both inside buildings and in difficult field conditions. The compact and modular design of the robot allows it to be transported even in a passenger car.Using a manipulator with 6 degrees of freedom and the gripping function of the gripper jaws, it is possible to pick up loads up to 22 kg. Additionally, the manipulator has the reach of 2 meters, with a wide range of motion in each plane.

PL.17.

Title **Protective cover for the robot arm**
Authors Falkowski Piotr, Marek Pachuta, Klimasara Wojciech, Pilat Zbigniew
Institution Łukasiewicz Research Network – Industrial Research Institute for Automation and Measurements PIAP
Patent no. -

Description
EN A new, convenient, simple and effective means of personal protection for programmers and servicemen of industrial robots. In programming and service work carried out in robotic installations, there is a frequent need for the presence of an industrial robot operator in his work area, in the immediate vicinity of the manipulator arm and the tool it operates. In these works there is a hazard of human collision with the robot arm and associated elements. Such situations, which are most often the result of a malfunction of a robot or human error, may lead to injury to the operator. The risk of such accidents can be reduced by using a protective cover according to the submitted proposal / idea. The protective cover is made of flexible, soft, multi-layer fabric in which high-sensitivity and fast-reacting pressure / touch sensors are attached. The fabric is cut and sewn in the shape of a shell, which is enough to put on the robot frame and fasten. The cover is made in several sizes, which allows it to be used for a wide range of manufactured industrial robots. Main advantages: • easy assembly and disassembly on the robot arm, • no physical wiring between the cover and the detector • adjustable activation threshold possible • versatility - it is possible to use one size of cover for many types of robots..

PL.18.

Title **A device for covering smoke detectors during the overhaul or disinfection of rooms**
Authors Piotr Szykarczyk
Institution Łukasiewicz Research Network – Industrial Research Institute for Automation and Measurements PIAP
Patent no. P.434923

Description
EN Efficient decontamination of rooms and equipment, especially in hospitals, can be a difficult challenge. The device developed by the Łukasiewicz – PIAP company for covering smoke detectors for the time of disinfection or the overhaul facilitates this task. The device to effectively

protect fire detectors was developed during the COVID-19 virus pandemic. It guarantees quick manufacturing, low manufacturing and operating costs, ease of operation and service, as well as increased safety. The design of the device is based on non-specialized and easily available materials – handle (wooden or metal), string (e.g. cotton), screws, cable ties, and 3D prints. The design of the device can be uploaded via Internet links as files to the 3D printer. The printable parts are designed to be printable even on low-quality equipment – they are strength redundant, and mountings and connections have been adjusted for dimensional deviations. In addition, they can be easily separated and replaced, and re-printed on a 3D printer, if necessary. The device allows you to carry out the operation of covering fire smoke detectors without large financial outlays, due to the low price of consumables. More than 20 installations per hour are possible to be executed. No ladders are required, so the task can be completed by workers who are not certified or equipped to work at heights. The device is covered by patent protection.

Poland

Represented by

Czestochowa University of Technology**PL.19.****Title****Structure, magnetocaloric properties and thermodynamic modeling of enthalpies of formation of (Mn,X)-Co-Ge (X = Zr, Pd) alloys****Authors**

Piotr Gębara, Zbigniew Śniadecki

Institution

Częstochowa University of Technology

Patent no.

PL

Description EN

Enthalpies of formation of (Mn,X)-Co-Ge (X = Zr, Pd) system in different structural states were analyzed utilizing the semi-empirical Miedema's model combined with the geometric one. Substitution of Mn by Zr significantly improves glass forming ability of Mn-Co-Ge, with parent equiatomic alloy among them. Chosen half-Heusler alloys, which are thermodynamically stable for the mentioned elemental compositions, were obtained by arc-melting. The x-ray diffraction studies confirmed coexistence of orthorhombic NiTiSi-type and hexagonal Ni₂In-type structures for parent MnCoGe alloy and (Zr, Pd)-substituted samples. Thermomagnetic curves and magnetic isotherms allowed to reveal the Curie temperature T_C and a magnetic entropy change ΔS_M and allowed to analyze the influence of both substitutive elements. The Curie temperatures are equal to 293 K for MnCoGe, 278 K for Mn_{0.9}Zr_{0.1}CoGe alloy and 318 K for Mn_{0.9}Pd_{0.1}CoGe. The maximum magnetic entropy change ΔS_M values, calculated for the change of external magnetic field of about 5 T, amount to 6.17, 2.94, and 11.11 J/(kg K) for MnCoGe, Mn_{0.9}Zr_{0.1}CoGe and Mn_{0.9}Pd_{0.1}CoGe, respectively. Differences in magnetic characteristics of the analyzed alloys are mainly caused by the changes of extent of undergoing first order magnetostructural transition with Pd and Zr atoms substitution. The presence of Pd d moments is also beneficial for the enhancement of total magnetic moment and maximum value of magnetic entropy changes in Mn_{0.9}Pd_{0.1}CoGe alloy.

PL.20.

Title **Magnetocaloric response of binary Gd-Pd and ternary Gd-(Mn,Pd) alloys**

Authors Piotr Gębara, Alvaro Diaz- Garcia, JiaYan Law, Victorino Franco

Institution Częstochowa University of Technology

Patent PL

This work investigates the MCE of alloying Pd or (Mn,Pd) to Gd, which yields the formation of an extra Gd_7Pd_3 or $Gd_7(Mn,Pd)_3$ phase in addition to the Gd phase, forming a composite. The phase coexistence is observed from XRD and SEM/EDX results, whereby the phase fraction of secondary phase increases with the dopant content.

Description EN

The magnetocaloric behavior of the binary samples present two characteristic ΔS_M peaks, attributed to the Curie transitions of the coexisting biphasers (separated by $\Delta T_C = 45$ K). Two minima are observed from the exponent n of field dependence of ΔS_M , reinforcing the presence of the Curie transitions of the two phases. The largest phase proportion of Gd_7Pd_3 observed in $Gd_{80}Pd_{20}$ sample gives rise to the largest RC value, which is also 10% increase compared to single phase Gd.

PL.21.

Title Modern, highly energy efficient materials for transformers cores

Authors Katarzyna Błoch, Marcin Nabiałek, Joanna Gondro, Bartłomiej Jeż, Kinga Jeż, Paweł Pietrusiewicz

Institution Częstochowa University of Technology

Patent no. PL

Description EN

The project presents a modern method of production, rapidly - quenched, functional amorphous materials. The iron-based alloys are soft ferromagnetic materials, which are characterized by fine magnetic properties: low values of coercitivity field and core losses, high saturation magnetization and Curie temperature. Samples were produced in the form of ribbons with a thickness of about 30mm, and after appropriate preparation (winding toroids) were the perfect material for construction of special applications transformer cores. In addition,

amorphous materials exhibit good mechanical properties, high microhardness and corrosion resistance. All described features of these amorphous alloys, in comparison with crystalline alloys with the same chemical compositions and commercially used FeSi sheets, make them much more attractive, for application in the electrical industry.

PL.22.**Title**

Acoustic energy harvesting – panel system

Authors

Garus Sebastian, Sochacki Wojciech

Institution

Częstochowa University of Technology

Patent no.

PL

Description EN

The subject of the invention is a method of constructing panels that allow obtaining acoustic energy and converting it into electricity. A single panel consists of four types of parts: incident wave horn type panel (1), sliding module with electrical contacts (2), a locating pin (3), energy harvesting module with converter (4). Incident wave horn type panel The incident wave horn type panel (1) is constructed in such a way as to intercept the incident mechanical wave and direct it to the energy harvesting module (3), which, depending on the version, converts it using piezoelectric or electromagnetic elements into electricity. A Graetz bridge that is built into the module converts an alternating-current (AC) input into a direct-current (DC) output. Depending on the setting, the sliding modules (2) allow for parallel or serial connection of the panels. The shape of the individual panels should be such that they cover the entire surface (in the example, a regular hexagon, but you can also use squares, triangles, etc.). The modular construction allows the use of the invention to cover the walls of buildings, allowing to leave free space for the windows or doors. The developed solution allows for collecting energy, silencing buildings and modern arrangement of the building facade.

PL.23.

Title Recovery of Ti chips with gradation below 2 mm
Authors Feliks Kusaiev, Siergii Arestenko, Marcin Nabiałek, Bartłomiej Jeż
Institution MPSTECHNOLOGY Sp. z o.o.
Patent no. Czestochowa University of Technology
 PL

Description EN

We are the only company in the world to fully recycle titanium chips. This means that our titanium recovery is almost 100%. Using the traditional and commonly used pyrolysis, it is not possible to recover titanium chips with a grain size less than 2 mm. The apparatus constructed and designed by us enables ecological recovery of titanium chips with a fraction of 2 mm - 0. As we know, such small pieces of titanium are easily flammable and even explosive. The technology used is safe and is part of the entire production line for the recovery of titanium, which can be reused in medicine. This product is sought after in the market specifically for the production of fireworks. An additional advantage is that it is a material unavailable because in traditional recycling, Ti is burned. Normally its production is very dangerous and expensive.

PL.24.

Title FeTi alloy produced with eco-friendly methods
Authors Feliks Kusaiev, Siergii Arestenko
Institution MPSTECHNOLOGY Sp. z o.o.
Patent no. PL

Description EN

Our company is successfully operating in the titanium chip recycling market and is a leader in terms of the ecology of the process. The use of modern solutions makes it possible to recycle titanium chips without losses, even when it comes to small fractions. In the case of titanium chips for medical use, the chips must not be less than 4 mm. In the traditional firing process, smaller chips are largely burnt. Our technology enables ecological (without the release of hazardous gases into the atmosphere and without the risk of explosion) recovery of titanium chips with a fraction of less than 4 mm for use in the production of FeTi alloy.

PL.25.

Title Ecological, no waste, recycling of titanium chips

Authors Feliks Kusaiev, Siergii Arestenko, Marcin Nabiałek, Jerzy Wysłocki

Institution MPSTECHNOLOGY Sp. z o.o.
Czestochowa University of Technology

Patent no. PL

Description EN As one of the few companies in the world, we recycle titanium chips with almost 100% titanium recovery. The titanium chip recycling line used is unique. As a company, we have ECHA registration, ISO and UDT certificates. Our shavings after the recycling process can be successfully used in medicine. Restrictive chip quality control is essential. Our company is pro-ecological and the entire cycle of cleaning titanium chips takes place in closed cycles, while adhering to the highest standards. We are proud of our activities for the protection of the environment by applying the best technology in our company.

PL.26.

Title Recycling of Ti chips for use in medical products

Authors Feliks Kusaiev, Siergii Arestenko, Marcin Nabiałek, Katarzyna Błoch

Institution MPSTECHNOLOGY Sp. z o.o.

Patent no. PL

Description EN Our company is one of the few in the world to recycle titanium chips for reuse in medical devices. Additionally, the recycling process is ecological and very efficient. The designed and used production line gives a capacity of 10 tons per day, of which nearly 8.5 tons are reused for the production of medical products. A complex technological process involving several stages of segregation, washing and drying ensures the appropriate quality of titanium chips. Before each recycling process, the chip distribution is tested and its composition is analyzed. Such an approach to recycling ensures obtaining the highest quality products. We are proud of our achievements in chip recycling and willing to cooperate with any company that has titanium waste.

PL.27.**Title**

BULK NANOCRYSTALLINE IRON ALLOYS

Authors

Marcin Nabiałek, Katarzyna Błoch, Bartłomiej Jeż

Institution

CZESTOCHOWA UNIVERSITY OF TECHNOLOGY

Patent no.

PL

Description EN

The subject of the invention is a massive nanocrystalline iron alloy classified as magnetically soft, which can be used in electronics, electrical engineering and energy and in particular as: high power transformers for switched mode power supply systems, high accuracy current transformers for energy meters or impulse transformers for communication.

The massive fast-cooled nanocrystalline alloy according to the invention, the main component of which is iron, is characterized in that Si (Si: 0.25 or 0.5 or 0.75 or 1%) was introduced as a structure stabilizer. Increasing the Si content blocks the growth of Fe phase and borides by limiting the diffusion of atoms over further distances.

The massive nanocrystalline alloy was produced in one production step, which means that it was not subjected to additional processing enabling its nanocrystallization. In the casting process it was cooled at a speed of about 102 K / s, which at this speed causes a significant relaxation of structure and gives the alloy the expected properties. The Fe₆₅Co_{11-x}B₂₀Si_xZr₂Hf₂ alloy material according to the invention contains (atomically) respectively: Fe - 65%; B - 20%; Zr - 2%; Si - from 0.25% - to 1%; Co - from 10% to 10.75%, Hf - 2% when meeting the Co_{11-x}Si_x relationship (where x = 0.25 or 0.5 or 0.75 or 1) with permissible contamination not more than 0.09%.

Class**PL.28.****Title**

COMPREHENSIVE DISINFECTION WITH AN ANTI-INFECTIVE COATING

Authors

Marcin Nabiałek, Maciej Pike-Bieguński, Agata Nowakowska, Jerzy J. Wysocki

InstitutionCZESTOCHOWA UNIVERSITY OF TECHNOLOGY
NANO KOLOID Sp. z o. o.

Patent no.

PL

Nowadays, protection against bacteria, fungi and viruses is very important. It is known that bacteria and fungi multiply on all kinds of surfaces and in hard to reach nooks and crannies. New viruses can survive under favorable conditions for up to several days, which means that they are easily infected. That is why comprehensive disinfection is so important. It is particularly important to subject such disinfection to all types of public transport, special vehicles (ambulances, police cars, fire trucks, military vehicles, etc.), hospital rooms, school rooms, flats, production halls and offices. Ozone treatment is the first stage of anti-infective purification. After ozonation, anti-infective nanocrystalline coatings are applied by fogging. The proposed preparations provide anti-infective coatings that last for several months. This means that the area subjected to the above procedure will combat any infectious threat for a longer time than traditional decontamination with alcohol-based agents. It is important that the preparation contains nanoparticles with dimensions ranging from fractions of nanometers to several nanometers and shaped like flakes. This dimension and shape ensures unprecedented performance. Commonly used nanosilver are ball, tube or rod-shaped particles whose contact surface is a point and a line. In addition, these particles are large and do not provide as effective action as proposed in this solution. Nanoparticles colloid should be non-ionic, which further improves its effectiveness.

Description EN

This procedure has been checked for effectiveness and safety for humans. I believe that during the epidemic it is necessary to use it especially in facilities exposed to direct contact with the virus as well as commonly used buildings or communication vehicles. The creation of a long-lasting anti-infective coating is most purposeful and increases human safety.

Class

4,12

PL.29.**Title**

A UNIT FOR ADJUSTING LOCATION OF THE
INDUCTION FURNACE HEATING ELEMENT

Authors

Marcin Nabiałek, Paweł Pietrusiewicz, Katarzyna Błoch,
Joanna Gondro, Kinga Jeż, Bartłomiej Jeż

Institution

CZESTOCHOWA UNIVERSITY OF TECHNOLOGY

Patent no.

PL

Description EN

The induction furnace heating element adjustment unit has a sealing member (4) mounted on the cylindrical holder (1) of the heating element and has an adjustment-locking nut (5) placed on the threaded end of the cylindrical handle (1) for blocking its position in the chamber opening an induction furnace, wherein the sealing member (4) forms a flanged outer sleeve (6) with an external thread (7), removably secured and sealed by a sealing element to the wall of the induction furnace, inside which the inner sleeve (8) and sealing elements (9) are arranged) on both sides of it, and from the side of the adjusting and locking nut (5) there is a pressure ring (10), threadedly connected with a flanged outer sleeve (6).

PL.30.**Title**

**The influence of minor platinum additions (0.5 – 2.0
%) on the properties of ultrafast-cooled FeCoBW-
based alloys in the shape of plates**

Authors

Paweł Pietrusiewicz, Marcin Nabiałek

Institution

Department of Physics,
Faculty of production engineering
and materials technology, CZESTOCHOWA
UNIVERSITY OF TECHNOLOGY

Patent no.

PL

Description EN

This paper presents the results of investigations carried out on bulk, ultrafast-cooled FeCoBW-based alloy samples, with and without the addition of small quantities of platinum. The samples were created in the form of plates of 0.5 mm thickness using injection-casting method with in a cooled copper die. The respective platinum contents within the samples were: 0, 0.5, 1.0, 1.5 and 2.0 at.%. The resulting samples were subjected to structural investigations using: XRD, SEM.

The magnetic properties were investigated using: VSM, and m0Ms(T300-1100K). Based on the performed studies, it was found that the addition of even small quantities of Pt to the described base alloy influenced the resulting structure and magnetic properties of the alloy. Changes in the values of the saturation magnetisation and coercive field were observed. These changes are due to crystalline phases, created in the alloys with the addition of platinum. As a consequence of the presence of these crystalline phases, the value of the saturation magnetisation increased and the value of the coercive field decreased. The saturation magnetic polarisation curves, as a function of temperature, were found to be similar for all of the investigated samples.

PL.31.

Title

Innovative composite aggregate made from recycling of ash and plastic waste

Authors

Przemysław POSTAWA, Piotr GÓRAK, Jarosław KRET

Institution

Czestochowa University of Technology,
Faculty of Mechanical Engineering & Computer Science,

Patent no.

Department of Technology and Automation
PL

Description EN

The subject of the invention is a new composite aggregate made from recycling of ash and plastic waste. The product of such a reaction, while maintaining the specific conditions of the process, may be a composite lightweight aggregate (CLA). As a matrix in the created composite the flakes from recycling of a post-consumer thermoplastic polymer PET (polyethylene terephthalate) were used (any thermoplastic polymer can be used in that technology). The filler's role was fulfilled by fine-grained anthropogenic raw materials.

Defined problems:

- millions of tons of mineral and plastic waste, and no idea what to do with them
- no possibility of multiple recycling of plastic waste (max 5 times)
- problems with mineral waste management

What problem the invention solves:

Fulfilling the criteria of Circular Economy that is all man-made materials should be reused:

- waste management of PET, PE, PP plastic,
- management of waste of combustion processes (fly ashes)
- the possibility of using waste heat from other processes for their production, reduction of energy compared to current methods of producing lightweight aggregate by 60-70%

Purpose and application areas:

- architecture (concrete, light mortars, insulation)
- road engineering,
- chemical industry (fillers mortars and resins, gardening (filtration layers)

PL.32.

Title

An instrument for placing processors in the LGA type socket

Authors

Paweł Palutkiewicz

Institution

Czestochowa University of Technology

Patent no.

PL

Description EN

The subject of the invention is a tool for installing processors (CPU) in an standardized Land Grid Array (LGA) socket on a motherboard of a desktop computer.

The main advantages (benefits) of this solution:

- prevention of incorrect processor seating in the socket,
- an injection molded product made of polypropylene (PP),
- monoblock construction,
- low manufacturing costs, due to the simple design,
- possibility of multiple use.

During the installation of modern processors in the computer motherboard there is a high risk of damaging conductive pins. The problem concerns, among other, Intel processors and motherboards with an LGA socket. All pins in the motherboard slot must be in contact with the processor land pads. If the pins are bent, there is no sufficient contact, and computer may not start up or work unstably or the components may be short-circuited and damaged (in some cases, even one bent pin may

cause system failure or hardware damage). A weak link in the manual assembling of computer components is therefore the human factor. During placing the processor in the socket, it can be easily damage the pins of the socket (placing the processor at the wrong angle, in the wrong direction, falling out of the processor from the fingers to the socket, shaking hands, etc.). The described tool eliminates this problem. The characteristic feature of the presented tool is to provide protection the LGA socket pins from damage during installing the processor. Thanks to the use of a monoblock construction made of plastic (e.g. PP), the production of the presented tool could be fast and cheap, moreover, the simple design of the tool (without movable mechanical elements) affects the reliable and precise operation. The design of the device according to the invention allows for repeated use.

PL.33.

Title Tire for vehicle wheels
Authors Paweł Palutkiewicz
Institution Czestochowa University of Technology
Patent no. PL

Description EN

The subject of the invention is a tire for vehicle wheels, intended in particular for use as a spare wheel tire or for special vehicles. The aim of the invention was to develop a puncture-proof structure for vehicle wheels that would retain shape stability when damaged without losing its load-bearing properties. The essence of the tire for vehicle wheels according to the invention consists in the fact that under the covering layer, which is a tread connected to two sides with bead ends, the tire has a tight, toroidal chamber with centrally arranged partitions on which a layer of material reducing friction is placed. Between the baffles there is a monolithic layer of filling material with separate chambers filled with gas at atmospheric pressure. The tread-side filler material layer has convex-shaped chambers, while the filler material layers above have at least one toroidal chamber around the axis of rotation of the wheel and have convex-shaped chambers

on the sidewall side of the tire.

The tire for vehicle wheels according to the invention is characterized by a simple structure ensuring maintenance-free operation without the need to control and adjust the pressure. In addition, the tire has a shock absorption similar to conventional tires. The use of separate toroidal chambers filled with air at atmospheric pressure ensures the operation of the tire even after damage by puncture.

PL.34.

Title

Completely biodegradable bio-based derived plastic mulch foils with a functional inner layer

Authors

Krystyna MALIŃSKA, Przemysław POSTAWA, Tomasz STACHOWIAK, Agnieszka PUDEŁKO, Danuta DRÓŻDŹ, Dorota NOWAK

Institution

Czestochowa University of Technology,
Faculty of Infrastructure and Environment

Patent no.

Faculty of Mechanical Engineering & Computer Science
PL

Description EN

The subject of the invention is an innovative structure of a biodegradable bio-based mulch foil used in conventional and organic agriculture for growing plants.. This is an alternative for conventional plastic mulches and is applied to suppress weeds, and thus reduce the use of pesticides.

The presented invention aims at solving the problem with on-farm waste generated from the use of conventional non biodegradable foils. The most pressing issue with the use of thermoplastic polymers is associated with the elevated costs of recycling.

The idea of the presented invention is to use the biodegradable mulch foil on the fields and after vegetation season let it decompose in soil or collect it and compost in on-site. This is possible due to the types and ratios of materials used for foil manufacturing and a unique structure of the foil itself. The foil consists of 3 layers with different functionalities. Outer layer demonstrates a sufficient mechanical resistance and longer degradation time and the inner layer is made with polymer with faster time of degradation. Additionally, the inner layer could be filled with different active

substances and/or nutrients to facilitate soil properties and plant growth. All polymer materials, fillers and additives used for manufacturing the presented foils are bio-based and biodegradable.

Identified problems:

- Significant costs of recycling conventional plastic mulch foils in agriculture (mostly due to the fact that foils are covered with dirt and soil, and thus need to be rinsed),
- difficulties with collecting conventional plastic mulch foils after completion of vegetation season,
- illegal practices for removal of conventional plastic mulch foils from farms and fields such as burning or burying them in soil.

The inventions solves the identified problems by :

- reducing of the use of non-renewable resources,
- increasing the use of bio-based materials,
- reducing the costs and field works related to foil disposal,
- using the selected materials as fillers in the inner functional layer which could be safely mixed with soil after vegetation process or mixed with organic waste in on-site windrow composting

applying to other products such as welded bags used for collecting biodegradable waste managed through biological methods such composting.

PL.35.

Title	Construction building element
Authors	Damian Jończyk, Marlena Rajczyk, Bartłomiej Stachecki, Malwina Tubielewicz-Michalczuk
Institution	Czestochowa University of Technology
Patent no.	Faculty of Civil Engineering
Description EN	PL In the bottom of the glued laminated timber beam (1), in the tension zone, there are longitudinal openings (2), in which the reinforcement of the beam in the form of aramid fiber cords (3) is stabilized with resorcinol glue. The ends of the ropes (3) on both sides of the beam (1) are placed in supporting them metal sleeves (4) filled with resorcinol glue. Metal sleeves (4) are embedded in

the box openings of the metal fittings (5), which embrace the ends of the wooden beam (1). The box fittings (5) have venting lugs (7) on the underside of the beam that enable micro-ventilation in the longitudinal direction. Additionally, the sheet of the box fitting (5) is fixed with screws to the corners of the beam's front wall (8). The structure of the building element allows to increase the length of the beam and reduce its cross-section. Additionally, thanks to the use of venting tabs on the inner side walls of the box-fitting or a specially contoured yoke the anchor, the risk of biological corrosion development is eliminated, which affects the durability of its operation. Besides, the use of fibers composite materials makes it difficult to penetrate the beam of flames, slowing down the rate of reduction of its cross-section during fire.

PL.36.

Title

Construction elements

Authors

Anna Derlatka, Piotr Lacki

Institution

Czestochowa University of Technology

Patent no.

PL

Description EN

The aluminum beam has an I-profile cross-section. It was made with aluminum alloy 6061-T6 sheets. The beam was made with two cold bent channels with a thickness of 0.8 mm. The channels were joined by along the webs. The flanges were reinforced by flat bars with 2.0 mm thick sheets. The metal sheets components were connected by Refill Friction Stir Spot Welding (RFSSW). All the RFSSW spots had a diameter of 9.0 mm.

PL.37.

Title

Openwork wall block

Authors

Adamczyk Izabela, Major Maciej

Institution

Częstochowa Univeristy of Technology
Faculty of Civil Engineering

Patent no.

PL

Description EN

The subject of the invention is an openwork wall block made mainly of ceramics or concrete, used in construction, in particular for the construction of walls exposed to external dynamic effects, e.g. machine

foundation walls or external load-bearing walls of buildings located near railway tracks, trams or communication routes with heavy traffic of wheeled vehicles. The aim of the invention was to develop such a block structure that would allow for the construction of walls that would dampen external dynamic effects (i.e. vibrations and waves) and limit their impact and propagation inside the wall structure itself - both load-bearing ground walls and foundation walls.

PL.38.

Title

Elastomer shock absorber

Authors

Maciej Major, Izabela Major, Judyta Niemiro – Mażniak

Institution

Czestochowa University of Technology, Faculty of Civil Engineering

Patent no.

PL

The subject of the invention is an elastomer shock absorber which is used in engineering steel structures and industrial machine structures where high dynamic loads occur.

The aim of the invention is to develop an elastomer shock absorber with increased vibration damping capacity and resistance to dynamic interactions acting on the shock-absorbed structure and harmful external factors during the shock absorber's operation.

Description EN

The analyzed elastomer shock absorber consists of two homogeneous rubber layers (1, 3) with a hardness of 80 to 900 Sh A divided by a porous rubber layer (2) with a hardness of 30 to 400 Sh A and containing uniformly distributed rubber, spherical elements in the middle part (7). Each rubber layer (1, 2, 3) in the central portion having a carbon fiber cloth layer (6), stabilized with an epoxy adhesive layer (4). The bottom rubber layer (3) is connected to a steel stabilizing plate (5).

With the new solution was increased durability elastomer shock absorber and reduced have harmful the dynamic interactions acting on structures in which the shock is applied. The developed structure of the shock absorber thanks to a porous rubber damping layer with spherical microporous rubber elements is characterized by high internal damping and the ability to absorb

sound, which improves the comfort of work of people staying nearby.

PL.39.**Title**

Ultrafast statistical reconstruction method for medical image tomography techniques

Authors

Robert Cierniak

Institution

Czestochowa University of Technology

Patent no.

PL

Description EN

Nowadays, the most significant problem in medical computer tomography (CT) is the development of image reconstruction algorithms from projections which would enable the reduction of the impact of measurement noise on the quality of tomography images. It is argued that x-ray radiation is harmful to the health of patients being examined because it can lead to many serious illnesses, and this therefore creates a barrier to the development of this x-ray medical imaging technique. In the case of positron emission tomography (PET) medical imaging technique a radiopharmaceutical – a radioisotope attached to a drug is injected into the body of patient as a tracer which are also very harmful to the health.

This invention is related to the high resolution and low dosage computed tomographic (CT) and positron emission tomography (PET) medical imaging techniques. More particularly, the fully analytical fast iterative statistical algorithms for image reconstruction from projections obtained in spiral cone-beam x-ray and PET scanners in this invention are described. The presented method allows to improve the resolution of the reconstructed images and/or decrease the x-ray intensity at maintenance of quality of the obtained CT images and use lower dose of radiopharmaceuticals in the case of PET, because the signals obtained are adapted to the specific statistics for these imaging techniques (Model-Based Iterative Reconstruction – MBIR). In both cases, the iterative reconstruction procedures were implemented for a computer with 10 cores, i.e. with an Intel i9-7900X BOX/3800MHz processor (the iterative reconstruction procedure was implemented at assembler level), and using a GPU type nVidia Titan V (in both

cases a cheap standard gaming computer system). According to an assessment of the quality of the obtained images by a radiologist, 8000 iterations are enough to provide an acceptable image. The same results were achieved for both hardware implementations after 7.44s and 7.73s, for the CPU and GPU implementations, respectively. It is worth emphasizing that reconstruction process can be performed for every cross-section image separately, and a specific image requested by a doctor is ready for diagnostics after the above mentioned time. In the case of the referential MBIR commercial approach this time is from 10 up to 90 minutes depending on the number of the simultaneously reconstructed cross-sections, using very expensive computer systems.

PL.40.**Title**

Stiffening insert, preferably of thin-walled C-type sections

Authors

Maciej Major, Jarosław Kalinowski, Mariusz Kosin

Institution

Faculty of Civil Engineering

Patent no.

Czestochowa University of Technology

PL

Description EN

The invention relates to a stiffening insert, especially thin-walled C-profiles used in the construction industry in light steel constructions, applicable in particular for fixing wall ties and wherever there is a need to stiffen profiles. The insert has a width and height to match the closed inner space of the thin-walled profile. The insert is characterized by the fact that it is composed of three elements. In practice, many methods are known for stiffening thin-walled profiles with lacings, diaphragms or lattices. These methods can be problematic when it comes to their implementation in existing facilities, as it is in the case assumed by the authors. Therefore, an alternative solution has been created for this type of stiffener enabling efficient installation in the field. The proposed method of stiffening allows for an increase to the bending – torsional stiffness of the profile in the place of ties mounting.

PL.41.**Title**

Atlas of changes in the microstructure of new-generation ferritic steels for high temperature operation

Authors

Zieliński, H. Purzyńska, M. Sroka, A. Śliwa

Institution

Sieć Badawcza Łukasiewicz- Instytut Metalurgii Żelaza im. St. Staszica

Patent no.

PL

The basic requirement for structural elements of power boilers is long-term operation, also referred to as service life, ensuring reliable and safe operation at the actual temperature and stress parameters of the system and the impact of a corrosive medium – water vapor and flue gases with varying degrees of aggressiveness. Therefore, steels intended for the construction of power, heating and petrochemical installations should be characterized, in the long term, by the required resistance to plastic deformation under the conditions of interaction of mechanical, corrosive and thermally activated factors. In practice, the safe operation time is the main quantitative indicator related to the durability of boiler components, the modernity of which is determined by high efficiency and low emission of harmful substances.

Description EN

The study of the microstructure of steel after long-term exposure to elevated and high temperatures, close to and higher than the temperature of long-term operation, enabled the analysis of the dynamics of microstructure changes. Scanning and transmission electron microscopy and X-ray analysis of the phase composition of the precipitates were used to thoroughly describe the changes in the microstructure during long-term exposure to elevated and high temperatures. The degradation of the basic phase components (bainite/martensite) and the ongoing precipitation processes of carbides and intermetallic phases result in a loss of service life through a decrease in the value of mechanical properties, including creep strength. The participation of individual processes and their intensity in the degradation of the microstructure under the influence of elevated temperature strongly depend on the initial state of the tested steels.

The developed atlas of changes in the microstructure of the new-generation ferritic matrix steel is an original scientific study, which is used by numerous scientific and industrial institutions for forecasting the safe operation time of power units.

PL.42.

Title	Armour panels with plates of nanostructured bainitic steel
Authors	Bogdan Garbarz, Jarosław Marcisz
Institution	Lukasiewicz Research Network – Institute for Ferrous Metallurgy
Patent no.	PL
Description EN	Nanostructured bainitic or nanobainitic steel is a new structural material with the strength in the range of 1.9–2.2 GPa and good plasticity. One of the main applications of ultra-strength nanobainitic steel plates are armour systems. ŁUKASIEWICZ-IMŻ develops a technology for producing ULTRA-PAN armour panels made of ultra-strength nanobainitic steel (tensile strength min. 2.0 GPa, plasticity A min. 12%). The optimised perforation system of the panel combined with the innovative material cause destabilisation of the projectile trajectory during impacting on the armour, diminishing the penetration efficiency, while reducing the surface mass of the armour shield by at least 25%. The achievable level of ballistic protection for ULTRA-PAN panels with a thickness of 4-8 mm is comparable or higher than the best currently offered solutions. Level 2 ballistic protection requirements according to the Stanag 4569A standardisation document were met by 7.5 mm thick ULTRA-PAN plates. Industrial technology production of the nanobainite steel plate was developed, including smelting and casting into ingot moulds, preparation of the rolling mill charge, hot rolling, post-rolling plate processing as well as intermediate and final heat treatment.

PL.43.

Title	FILTERS IMPROVING PROTECTION AGAINST MICROORGANISMS AND PREVENTING INFECTIONS
Authors	Marcin Nabiałek, Katarzyna Błoch, Jerzy J. Wysocki
Institution	CZESTOCHOWA UNIVERSITY OF TECHNOLOGY
Patent no.	PL
Description EN	Nowadays, protection against bacteria, fungi and viruses

is very important. It is known that bacteria and fungi multiply on all kinds of surfaces and in hard to reach nooks and crannies. New viruses can survive under favorable conditions for up to several days, which means that they are easily infected. That is why comprehensive disinfection is so important. It is particularly important to subject such disinfection to all types of public transport, special vehicles (ambulances, police cars, fire trucks, military vehicles, etc.), hospital rooms, school rooms, flats, production halls and offices. Ozone treatment is the first stage of anti-infective purification. After ozonation, anti-infective nanocrystalline coatings are applied by fogging. The proposed preparations provide anti-infective coatings that last for several months. This means that the area subjected to the above procedure will combat any infectious threat for a longer time than traditional decontamination with alcohol-based agents. It is important that the preparation contains nanoparticles with dimensions ranging from fractions of nanometers to several nanometers and shaped like flakes. This dimension and shape ensures unprecedented performance. Commonly used nanosilver are ball, tube or rod-shaped particles whose contact surface is a point and a line. In addition, these particles are large and do not provide as effective action as proposed in this solution. Nanoparticles colloid should be non-ionic, which further improves its effectiveness. This procedure has been checked for effectiveness and safety for humans. I believe that during the epidemic it is necessary to use it especially in facilities exposed to direct contact with the virus as well as commonly used buildings or communication vehicles. The creation of a long-lasting anti-infective coating is most purposeful and increases human safety.

PL.44.

Title

Mechanism of power transmission to the entomopter wings

Authors

Sochacki Wojciech, Garus Sebastian

Institution

Czestochowa University of Technology

Patent no.

PL

Description EN

The essence of the invention is the use of a simple yoke and

slide mechanism to impose specific movement of the wings of an entomopter. The movement of an insect wing consists (simplified) of the movement of the flapping and the movement of changing the angle of attack of the wing. These two movements take place in different planes and take place in a strictly defined position of the wing. The angle of attack of the wing changes in the extreme positions of the wing flapping. The proposed mechanism allows to obtain just such a movement in a mechanical object. A special feature of the invention is the use of a sliding mechanism with a two-way slider, which, in combination with the wing swing lever and a suitably shaped guide of the wing swing lever, ensures a sequential change of the mechanical wing in the respective phases of its movement.

PL.45.

Title

Abrasive disc

Authors

Marcin Knapieński, Paweł Rajczyk

Institution

Częstochowa University of Technology, Faculty of Production Engineering and Materials Technology, Poland.

Patent no.

PL

Description EN

The subject of the invention is a new constructional and material solution for an abrasive disc for mechanical treatment of the surface of mineral materials, particularly granite surface treatment. The new structural solution in terms of form and geometric proportions of abrasive segments, used for given kinematic parameters, for a given type of material determined by its hardness, allows to increase the machining efficiency, guaranteeing an even distribution of roughness of the machined surface at one blade transition on the workpiece. The new solution allows you to shorten the machining time at one blade transition on the workpiece for a given cycle of operations, which is determined by the grain size of the abrasive. The technical and economic efficiency of the 40/45 # diamond abrasive powder abrasive tests allowed to shorten the machining operation time by 27% in relation to the commonly known and practically applied disc solution for the above-mentioned group of granules.

PL.46.**Title**

An agitator, especially for homogenizing liquid composites

Authors

Marlena Rajczyk, Jarosław Rajczyk, Damian Jończyk, Paweł Rajczyk, Bartłomiej Stachecki, Karolina Bednarczyk, Kamil Ryndak

Institution

Częstochowa University of Technology, Poland.

Patent no.

PL

Description EN

The agitator, particularly for homogenizing the flowable composites of the invention, comprises a circular ring and a hub for connecting a rotating shaft. The stirrer is characterized in that it has a three-arm base element joined to the circular ring and situated inside it, with edges formed by arcs of circles with centers located at a distance from the center of the stirrer being from 0.65 to 0.75 of the outer diameter of the circular ring and the diameter of each being from 0.9 to 1.1 of the outer diameter of the circular ring. The axes of symmetry of the base element coincide with the heights of the equilateral triangle on which the outer circular ring is described. On each of the arms of the base element, the stirrer has joined thereto, preferably three, circular stirring elements, each with a thickness equal to the thickness of the circular ring and the diameter of which decreases radially from the center of the stirrer. Each of the mixing elements is positioned perpendicular to the base element and parallel to the axis of symmetry of the next counterclockwise arm of the base element. The agitator comprises a circular ring 1 and a three-arm base element 2 joined to it and disposed therein, with a centrally located hub 3 for the attachment of a rotating shaft, not shown in the drawing. The edges of the base element 2 are formed by arcs of circles with centers located at a distance from the center of the stirrer equal to 0.7 of the outer diameter of the circular ring 1 and each diameter equal to the outer diameter of the circular ring 1. The axes of symmetry of the base element 2 coincide with the heights of the equilateral triangle on which the described there is an outer circular ring 1, and moreover, on each of the arms of the base element 2, the stirrer has three mixing elements 4, 5 and 6 joined to it in the form of circular rings. Each of the elements 4, 5 and 6 has a thickness equal to the thickness of the ring 1 and the ribs connected to it and located diametrically perpendicular to the surface of the element 2. The ribs 7 are in the form of bars with a thickness equal to

the thickness of the elements 4, 5 and 6. The diameter of the elements 4, 5 and 6 decrease in the radial direction from the center of the agitator. Each of them is positioned perpendicular to element 2 and parallel to the axis of symmetry of the next counterclockwise leg of element 2. Each element 4 is located at a distance M1 equal to three times the thickness of ring 1 from the parallel axis of symmetry of element 2 and its diameter is half the outer diameter of the ring 1. The distance M2 between the mixing elements is each 1.5 times the thickness of the ring 1. The diameter of each element 5 is equal to the difference between half the outer diameter of the ring 1 and its thickness. The diameter of each element 6 is equal to the difference between half the outer diameter of the ring 1 and twice its thickness. The element 2 has projections 8 on the side opposite to the elements 4, 5 and 6 with sides in the shape of triangular curved legs with their apex directed in the direction of rotation of the stirrer. The distance W between the peaks of the projections 8 of each limb of the element 2 is greater than the distance P between the bases of these projections 8. The height H of the projections 8 is 0.7 times the thickness of the ring 1. The ring 1 and the elements 4, 5 and 6 are in the form of a rod of circular cross-section.

PL.47.

Title	New unconventional process and tool of plastic forming of the internal tothing of coupling spline sleeves
Authors	Jacek Michalczyk, Sylwia Wiewiórowska CZESTOCHOWA UNIVERSITY OF TECHNOLOGY
Institution	FACULTY OF PRODUCTION ENGINEERING AND MATERIALS TECHNOLOGY
Patent no.	PL
Description EN	The abstract proposes the implementation of a novel method of plastic forming of internal tothing in flange spline sleeves. A method being the subject of Polish patent PL232713 has been used for this purpose, which involves a combination of the scheme of the direct extrusion of a cone hollow with the die press forming of the wall to obtain a flange. The entire process takes place in a single technological sequence. The operations

come one after another, so that there is no need for reheating the stock or carrying out intermediate soft annealing. The proposed method is assumed to be an alternative to the operation of press forming of internal spline sleeve toothing in a conical die [] and to the operation of swaging on rotary swaging machines []. It is assumed that this method, too, is alternative to other technologies known from the literature and industrial practice.

The tool (Polish patent (PL235009) operates with a double-sided press, where the stock positioned in sleeve 11 is co-extruded with ejector 10 and pusher 6 through the clearance between die 12 and punch 5. A conical sleeve forms with a preliminarily profiled internal toothing. Next, after pusher 6 and ejector 10 retract, the conical sleeve is drawn through die 12. Then, the sleeve is gradually stretched, the internal toothing is finish formed, and the sleeve flange is preliminarily formed by turning up on plate 7. After punch 5 has gone into sleeve 11, plate 7 will press the spline sleeve flange on the surface of die 12. The simultaneous return motion of pusher 6 and punch 5 will remove the finished product from the tool.

PL.48.

Title

Self reducing mixtures of iron based recycling materials

Authors

Marek Warzecha, Artur Hutny

Institution

Czestochowa University of Technology, Poland.

Patent no.

PL

Description EN

The subject of the invention is the development of a technology for the production of a self-reducing material that can be used in steel production processes, especially in electric arc furnaces (EAF). The iron-bearing material is scale milled to a specific fraction, combined with a specific reducing material and other components. Initial laboratory tests were carried out on selected mixtures with very positive results. After smelting the samples, the yield of the resulting metal was determined, which turned out to be promisingly high. A positive scale effect is expected, the much greater heat capacity of the furnace on an industrial scale – compared with

laboratory furnace - should compensate for the energy effect of the process.

The process is part of ecological activities as it allows the management of industrial waste materials (both scale and reducer) and processing them into a feedstock for steel production. The prepared mixture can be used directly in the industrial process.

PL.49.

Title

A method of modifying the surface layer of metallic materials showing a strong affinity for oxygen

Authors

Józef Iwaszko, Krzysztof Kudła

Institution

Czestochowa University of Technology

Patent no.

PL

The surface remelting treatment of metallic materials can be done using the GTAW (Gas Tungsten Arc Welding) technology. However, when machining metals or alloys showing a high affinity for oxygen, effective remelting of the surface layer of these materials is difficult and often impossible. This is because the oxide layer that is forming obstructs the flow of current, causing the arc bending and hence disturbing the remelting process.

Description EN

The aim of the invention was to develop a method enabling modification of the surface layer of metallic materials showing a high affinity for oxygen without the need to use preliminary chemical or mechanical treatments for cleaning the surface of the material from the non-conductive layer.

The essence of the developed solution was the system with two independent burners operating in a **tandem configuration** (Fig. 1). In the course of the treatment, the electric arc of the alternating current burning between the infusible electrode 5 of the burner **A** and the material surface caused the breaking of the oxide layer on the surface of the material being modified and an initial heating up of the surface layer, whereas the heat of the arc burning between the infusible electrode 6 of the burner **B** enabled an intensive remelting of the surface layer of the material cleaned from a thin layer of the oxides by the burner **A** to the required depth. Therefore, the function of the leading burner **A** was to

remove the layer of the oxides by means of the cathodic cleaning, while the function of the burner following the burner *A* was to remelt the surface cleaned this way. In the developed system the cleaning burner *A* was powered by the alternating current, and the remelting burner *B* was connected with the power pack of the one-direction pulsating current. The use of the one-direction pulsating current, consisting in the pulsating introduction of the electric arc heat through the cyclically repeated welding current pulses, enabled to achieve the main experiment purpose, i.e. to obtain favorable structural changes in the surface layer of metallic materials showing a strong affinity for oxygen without triggering any disqualifying changes in the surface geometry. Moreover, the proposed two-burner solution eliminated the need of the mechanical and/or chemical removal of the layer of oxides from the surface of the magnesium alloy being remelted before the remelting process.

The greatest advantage of the two-burner variant is the possibility to limit and even eliminate the need of a previous cleaning the alloy surface out of the oxides layer.

PL.50.**Title**

Novel porous Ti-Ta material with a micro core-shell structure using the powder metallurgy method

Authors

Grzegorz Dercz, Izabela Matuła, Maciej Zubko

Institution

University of Silesia in Katowice, Institute of Materials Engineering

Patent no.

PL

Description EN

The projected and produced by powder metallurgy material built from the core-shell particles. Material have inhomogeneous microstructures and compositions in a strictly designed way. A core-shell structure, consisting of Ti-rich cores and Ta-rich shells formed due to diffusion between the Ti and Ta powders. The outer part of the particles contains an area enriched in tantalum. The mechanical studies indicated the presence of three main zones, different in terms of the mechanical properties inside each particle.

PL.51.

Title Functional Ti/Zr material with radial gradient materials for potential medical applications for long-term bone implants

Authors Izabela Matuła, Grzegorz Dercz

Institution University of Silesia in Katowice, Institute of Materials Engineering

Patent no. -

Description EN The material based on zirconium/titanium were prepared by powder metallurgy method. The whole sample is built of three zones with different porosity and composition internal and external zones with radial gradient of phase composition, microstructure and structure of pores. The samples were prepared by two stages powder metallurgy method. The microstructure and properties change gradually with the change of distance from the center of the sample.

PL.52.

Title Guillotine for cutting miniature profiles

Authors Krzysztof Sokół

Institution Czestochowa University of Technology

Patent no. PL

Description EN The subject of the invention is a guillotine for cutting miniature profiles, especially made of wood, various types of polymers and paper. This product is addressed to architects and scale modelers who require even and sharp edge during cut when creating dioramas

PL.53.

Title Hydraulic jack with adjustable base

Authors Krzysztof Sokół

Institution Czestochowa University of Technology

Patent no. PL

Description EN The subject of the invention is a hydraulic jack with adjustable base. The aim of this invention is to provide a jack that can be used in places with limited working space. The use of an adjustable base increases safety and equipment stability during workshop works.

PL.54.**Title**

Piezoelectric-magnetic resonators for the energy harvesting system

Authors

Garus Sebastian, Sochacki Wojciech, Garus Justyna

Institution

Czestochowa University of Technology

Patent no.

PL

Description EN

The subject of the invention is a multi-chamber structure with elements made of vibrating cantilever beams ended with magnets. The special construction of the chamber allows to increase the frequency of the element's operation.

The beam elements in the developed solution are placed radially with the magnets facing the center with the same pole. Such a solution causes that slender beams, when vibrating, cause a variable magnetic field affecting the vibrations of the remaining beams. The shift of the beam ring axis in relation to the cylinder axis causes the length of each beam to be different and thus has a different value of natural frequency of vibrations. Uneven distances between the rings additionally create resonance chambers for mechanical waves. The capped bottom of the resonance chamber creates and strengthens standing waves. The presented solutions increase the operating frequency range, and thus increase the possibility of recovering energy from mechanical waves.

PL.55.**Title**

Wheels made in additive manufacturing

Authors

Dawid Cekus, Radosław Krawczyk, Bogdan Posiadała

Institution

Czestochowa University of Technology

Patent no.

PL

Description EN

The subject of the invention is the use of additive manufacturing (3D printing) to make wheels, which adapt to each obstacle, have the proper weight and are reliably and esthetic. The wheels are characterized by high impact strength and resilience, the least susceptibility to temperature, and the tire tread is adapted to sandy and stony terrain.

The designed and made wheel is divided into rim and tire. Both elements can be made of different materials and then combined with each other. The tire module is a

multifaceted spatial body with open and closed zones reinforced with internal ribs that allows for greater rigidity and weight reduced as well as during collision with an obstacle reduces part of the vibration. The outer circumference of the tire has tabs that act as a tread. The rim module consists of two detachable parts, each of them has five holes, which allows you to keep all modules complete.

Additive manufacturing is ideal to do enclosed zones, it gives virtually unlimited selection of a mixture of materials from which the elements are printed. The range of filaments currently on the market allows to specify the density, hardness and many other parameters of the material.

A thermoplastic elastomer (pigmented) known as Pureflex/TPU was used to print the tires, and a carbonnylon mixture known as Nylon12CF was used to print the rims. These materials were selected after the complex stress analyses and testing filament samples.

The perfection of the printed wheels was confirmed in the operational test of the Modernity rover equipped with them, winning University Rover Challenge in the USA.

PL.56.

Title

Innovative flexible solid state solar cell with a hybrid layered architecture.

Authors

Paweł Jarka, Tomasz Tański, Weronika Smok, Aleksandra Drygała, Wiktor Matysiak

Institution

Department of Engineering Materials and Biomaterials, Silesian University of Technology, Konarskiego 18a Str.,

Patent no.

-

Description EN

The extraordinary value of the present invention includes both the production technology and the contribution to the development process of energy generation systems from renewable sources. The key issues taken into account in the design process of the presented photovoltaic structure were the intensification of the process of solar radiation absorption and the process of formation, separation, transport, and charge inside. Hence, the idea of the developed system is a

hybrid solid state cell with an active layer in the form of a volumetric p n junction consisting of polymer and inorganic 1D nanostructures. From the point of view of the electrical properties of photovoltaic cells, the combination of high electron extraction achieved by the use of 1D SnO₂ with a high radiation absorption coefficient of the polymer material PCPDTBT in a wide spectrum of visible and infrared light make possible to increase the efficiency compared to fully organic solar cells. Additionally, the use of ETL and HTL layers increasing charge transport, increases the efficiency of the photovoltaic devices. The architecture was manufactured using a combination of modern technologies such as spin coating as electrospinning

PL.57.**Title**

Improving properties of AZ31 magnesium alloy surface layer by HVOF sprayed WC - based coatings

Authors

Ewa Jonda

Institution

Silesian University of Technology

Patent no.

-

Description EN

The aim of the presented innovation is to develop a method of manufacturing hard coatings using High Velocity Oxy Fuel method (HVOF) on a soft substrate of magnesium alloy, which will allow the use of light components (Mg alloy) covered with coatings resistant to abrasion and corrosion and will enable the introduction of such a solution in the industry. In the present work three types of cermet coatings manufactured from commercially available WC-based powders (WC-Co-Cr, WC-Co and WC-Cr₃C₂-Ni) onto AZ31 substrate was to compare in terms of their microstructure features (using scanning electron microscope, SEM), topography (confocal microscope), hardness (Vickers indenter), instrumented indentation (NHT3 nanoindenter) and instrumental Young modulus (calculated from slope of unloading curves for indents with different maximum loads) respectively. Magnesium alloys are very interesting engineering materials due to their very high strength to density ratio. However, because

of low hardness as well as low resistance against erosion, abrasion and corrosion, their applications in the industry is very limited. In order to improve mechanical performances, deposition of hardening coating by thermal spraying was proposed. Review of the presented results of experimental works indicates that in the field of development of modern techniques for improving or restoring the properties of the surface of an element by supersonic spraying, there are few studies on research works on the production of the abovementioned coatings on magnesium alloys. The goal of the study was to compare three types of cermet coatings manufactured from commercially available WC-based powders in terms of their microstructure features, topography, hardness, instrumented indentation and instrumental Young modulus. All the coatings have been successfully deposited, the coating-substrate interface is clear, without discontinuities and the coatings revealed relatively smooth, dense and homogeneous structure. The hardness and instrumental hardness measurements showed the same tendency, moreover, they confirmed that coatings based on cobalt matrix exhibit higher hardness than ones based on nickel matrix. The most noticeable effect was influence of cobalt matrix on higher hardness and Young modulus of deposited coatings in compare to the nickel matrix ones.

PL.58.

Title **Innovative PVD + ALD hybrid coatings as a protection of ultra-light Mg-Li-Al-RE alloys against corrosion**

Authors Marcin Staszuk, Łukasz Reimann, Tomasz Taoski

Institution **Silesian University of Technology**

Patent no. -

Description EN Magnesium alloys are considered as potential candidates for numerous applications, especially in transportation vehicles or lightweight enclosures for 3C (computer, communication and consumer electronic) products owing to their excellent properties, such as low density, high specific strength, high damping capacity

and high recycling ability. A huge advantage of the magnesium alloys is casting possibility of thin-walled large surface elements manufactured with high accuracy and dimensional stability. Magnesium-lithium alloys have an unusually low density (1.35-1.65 g cm⁻³) and superior formability as a consequence of the addition of lithium to magnesium. The addition of Al in Mg-Li alloys leads to the improvement of strength and the slight increase in density, but it causes the reduction of elongation. Alloying magnesium with rare earth elements is used to develop light construction alloys for the applications at elevated and high temperatures and improve corrosion resistance and improve creep resistance. Generally, RE elements in Mg have relatively high solubility decreasing significantly with decreasing temperature. Rare earth components are typically useful metallic elements, which can improve the binding energy of magnesium atoms, and decrease the diffusion velocity of atoms.

PL.59.

Title

Optimization of the shape and mechanical properties of a piston in a passenger car internal combustion engine

Authors

Agata Śliwa, Marek Sroka, Amadeusz Dziwis, Rafał Dziwis

Institution

Silesian University of Technology

Patent no.

-

Description EN

The extraordinary value of the present invention includes both the production technology and the contribution to the development process of automotive. A large increase in interest in computer simulation has been seen in the recent decade. The scientific and technical community has realised that this tool can be used for solving many scientific and engineering issues emerging in modern technology. Computer simulation was created by way of cooperation between mathematical, natural, technical and computational sciences. Computer simulation is an alternative for experimental and observational techniques, where

phenomena cannot be observed and identified very often.

The aim of this was to perform computer simulation of stresses and displacements of different piston construction of a passenger car engine under the influence of a given pressure. As a part of work, three models of pistons with different pistons head were compared:

- Piston with deep bowl.
- Piston with deep bowl and cooling galleries.
- Piston with flat bowl.

Qatar

QA.1.

Title

Development of organic–inorganic halide perovskites (OHPs) microfiber based memristors.

Authors

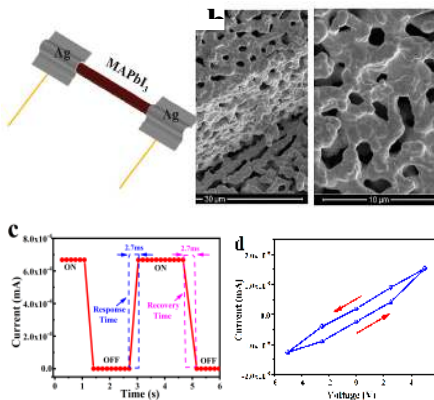
Dr. Zubair Ahmed, Mohammed Yousef Al-Hor

Institution

Qatar University

Description EN

Organic-inorganic halide perovskite (OHP) has drawn researcher's attention for the last ten years due to its remarkable optical properties such as adjustable bandgap, ambipolar charge transport, high optical absorption coefficients, and extended carrier diffusion lengths. In this work, we have fabricated a methylammonium lead iodide (MAPbI₃) crystals-based device (Figure 1a) from MAPbI₃ crystals, as shown in Figure 1b. The crystals have been developed by a simple solution process-based method. Developed crystals have shown highly porous geometry, and trap charges across these pores facilitate higher conductivity. The fabricated device exhibit ~2.7 ms response recovery time (Figure 1c) which enable elevated speed and shown hysteresis in the current-voltage characteristics (Figure 1d), thus demonstrated superior storage capacities. Hence, the developed device could be a potential candidate for next-generation non-volatile memories.



(a): Schematic of an individual MAPbI₃ microfiber-based two-terminal optoelectronic switching device. (b) FESEM of MAPbI₃ crystal. (c) Response and recovery switching cycles of the device. (d) Current-voltage hysteresis characteristics of the fabricated memristors

QA.2.

Title	Effect of UV/ozone treatment on surface hydrophilicity and humidity sensing properties of PVDF-BaTiO₃ composite films
Authors	Dr. Zubair Ahmed, Dr. Shoaib Mallic, Jibril Al-Metairi
Institution	Qatar University Humidity sensors are applied extensively in industrial manufacturing, packing, and quality control to monitor and detect moisture levels. The incorporation of nanoparticles within the polymeric film has been widely investigated for humidity sensing applications. However, the modification of the nanocomposite film surface without affecting surface roughness has not been reported yet. In this research work, we have studied the impact of UV/ozone treatment on the hydrophilicity of the PVDF-BaTiO ₃ nanocomposite film. We have prepared the nanocomposite solution by mixing PVDF (2.5 wt% kept constant) and BaTiO ₃ nanoparticles (0.25 wt%, 0.5 wt%, and 1 wt% varied concentration) in the volumetric ratio (1:2). The spin coating technique has been used to deposit the nanocomposite film on the Interdigitated ITO electrode. The surface topography and surface roughness of the sensing film before and after applying UV/ozone treatment studied by atomic force microscopy. The sensing film's hydrophilicity was investigated thoroughly by the optical contact angle measurement method using SCA software. The PVDF-BaTiO ₃ composite film exposed to UV/ozone light from 2.5 min to 10min. The UV/ozone treatment of the PVDF-BaTiO ₃ nanocomposite film improves the sensing film's hydrophilicity as shown in Table 1. The PVDF -BaTiO ₃ (0.5 wt%) impedance sensor with 5 min UV/ozone treatment shows higher sensitivity and small hysteresis (~1.65%) over the whole investigated RH range as compared to 0.25 wt% and 1 wt% BaTiO ₃ concentration as presented in figure 1.
Description EN	
Class no.	

Russia

RU.1.

Title

Production of Mineral–Organic Hybrid Adsorbent for Metal Removal from Industrial Wastewater

Authors

Inga Zinicovscaia^{1,2,3*}, Nikita Yushin¹, Dmitrii Grozdov¹, Konstantin Vergel¹,

¹Joint Institute for Nuclear Research, Joliot-Curie Str., 6, 1419890 Dubna, Russia

Institution

²Horia Hulubei National Institute for R&D in Physics and Nuclear Engineering, 30 Reactorului, Bucharest-Magurele, Romania

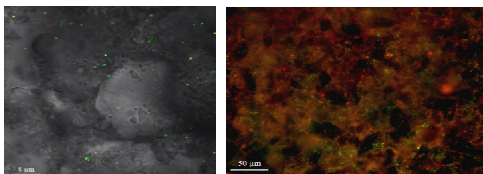
³Institute of Chemistry, Chisinau, Moldova

Description EN

Metals are one of the most dangerous environmental pollutants and its removal from wastewater is an important task. The capacity of a mineral-organic hybrid adsorbent, consisting of *Shewanella xiamenensis* biofilm and zeolite (clinoptilolite of the Chola deposit), to remove metal ions from nickel- and zinc-containing effluents was tested. The effects of several parameters (pH and biosorbent dosage) on Ni(II) and Zn(II) removal from real effluent, containing nickel with a concentration of 125 mg/L and zinc – 52.8 mg/L, was investigated. The optimal pH for Ni(II) removal was 5.0-6.0 and an increase of sorbent dosage from 0.5 to 2.0 lead to an increase of Ni(II) removal from 17% to 27%. At effluent 2 times dilution, maximum Ni(II) removal of 26 % was attained at pH 6.0 and sorbent dosage of 1.0 g. A 12-fold effluent dilution resulted in the removal of 72% of Ni(II) at the same pH and sorbent dosage values. Maximum Zn(II) (85%) removal was achieved at pH 6.0 applying two-stage treatment system (with the addition of a new dose of biosorbent). The obtained hybrid biosorbent can be used for metals removal from industrial effluents with low metal concentrations or for wastewater post-treatment.

Class no.

1



Zeolite surface before (left) and after (right) biofilm formation

RU.2.

Title	Unexpected Reproductive Effect of Prolonged Oral Administration of Silver Nanoparticles in Laboratory Mice
Authors	I. Zinicovscaia ¹ , A. L. Ivlieva ² , E. N. Petritskaya ² , D. A. Rogatkin ²
Institution	¹ Joint Institute for Nuclear Research, Dubna, Moscow Region, Russia ² Moscow Regional Research and Clinical Institute named after M. F. Vladimirovskiy, Moscow;
Description EN	Nanoparticles overcome biological barriers, therefore, their mother-to-offspring transmission through the placental barrier or during lactation may have deleterious effects on development and survival of the offspring. The aim of the study was to assess exposure to silver nanoparticles (AgNP) during pregnancy and lactation on cognitive impairments in the offspring in mice. Mice in the experimental group were received a solution of AgNP at concentration of 25 µg/ml in drinking water from one week before mating until the end of lactation. Mice in the control group drank clean water during the same period. The silver content in mice organs and tissues was assessed by the neutron activation analysis. The experiment to count the offspring was repeated twice. In both experiments an unexpected effect was observed: in the experimental group the birth rate was approximately twice as high as in the control group. In the first experiment, 117 pups were born in the experimental group vs. 62 in the control group. The average number of pups per mouse was 4.68 (95 % CI: 3.87- 5.61) in the experimental group and 2.48 (95 % CI: 1.9-3.18) in the control group, $p < 0.001$. In the second experiment there were 29 vs. 17 pups, or 5.8 (95 % CI: 3.8-8.33) and 3.4 (95 % CI: 1.98-5.44) pups per mouse, respectively, $p = 0.077$. In the samples of organs and tissues of the experimental mice and pups, the average silver content was 3.77 ± 2.03 and 4.13 ± 1.52 µg/g ($p = 0.369$), respectively. In the control group, the silver content in the samples of females and offspring did not exceed the background level of 0.05 ± 0.04 µg/g ($p < 0.001$). No difference in survival of the offspring was observed. Conclusions: We found a significant reproductive effect of silver nanoparticles in laboratory mice. These findings need replication in other studies. Further research on reproductive effects of silver nanoparticles is warranted.

RussiaRepresented by **SODINEXPO****RU.3.****Title**

Process of contactless detection of presence, location, and danger degree of stress concentrators of mechanical stress in metal of ferromagnetic constructions

Institution Patent

RD Center Transkor-K, LLC
RU 2724582, 25.06.2020

Description EN

The invention is concerned with the area of means and methods of instrumental control, preferably involving registration of magnetic anomalies, and it can be used in controlling assets of pipeline transportation system, oil and gas industry, railway transportation system, utility systems, inspection of metal constructions, environment protection programs, and other industries that involve use of pipelines (construction, energy, nuclear, etc.). For the purpose of the suggested process description, a stress concentrator is assumed to be a metal defect or an area of an increased mechanical load. It may be differentiated by its danger degree.

Realization of the suggested process involves mainly inspection of ferromagnetic constructions like pipelines, rails, beam and girder elements of bridges and towers.

An embodiment is possible where, depending on the structure and size of the inspected object, the distance between the sensor blocks may be adjustable. The technical problem that is being solved by implementing the suggested process is further development of testing methods of ferromagnetic constructions.

The technical result achieved by implementing the suggested process is increasing the probability of detection of metal defects and their identification by gathering more statistical data per unit of length of the inspected ferromagnetic construction.

To achieve the said technical result it is proposed to utilize the suggested process of contactless detection of location and danger degree of stress concentrators of mechanical stress in metal of ferromagnetic constructions.

Class no.

2. Energy and sustainable development

RU.4.**Title**

Integrated digital communicative and educational platform "KAMMERTON"

Authors

Poteryakhin Anton, Khusnutdinov Linar, Kamaeva Svetlana, Pirogov Mikhail

Institution

RD Center Transkor-K, LLC

Patent

RU 2020664132, 09.11.2020

Description EN

Integrated digital communicative and educational platform "KAMMERTON" is designed as a cross-platform server application, optimized for delivery to customers as a ready-to-use solution out of the box, including a running computer. This solution supports two modes of operation: LAN and Internet.

The main purpose of the program is to organize and conduct distance learning and self-study.

End users interact with the platform over the network using free traditional web browsers installed on their own devices. The list of suitable user devices is very extensive: the main thing is that the device supports the execution of web browser, can connect via the Internet or a local network, and optionally contains a camera and microphone.

Field of application is education on various levels from early childhood to tertiary, and:

- secondary, vocational, special education
- corporate training, internal certification of employees, business presentations
- maintaining user documentation for projects and technical support

It provides the necessary tools for distance learning and communication of all kinds. Tools implement features such as:

- exchange of educational materials in the form of images, audio, documents in common data formats
- audio / video / desktop streaming
- statistical analysis of training
- tests, polls, and votes
- flexible access rights management system
- creation of digital training programs, courses, and lessons

Kammerton is available in two versions: a global server as an Internet service; server in the local network with deployment at the customer's enterprise. Scalability is provided by the ability to configure data exchange between multiple platform instances.

Class no.

10. Information Technology and Communication

RU.5.

Title	Automated system of intelligent artificial vision for collecting and processing priority data in beef stock farming management
Authors	IVASHCHUK Olga, MASLAKOV Yuriy, GAYVORONSKIY Vitaliy, BEREZHNOY Vladislav, FEDOROV Vyacheslav
Institution	Belgorod State National Research University
Patent	Know-how registration certificate № 301, 13.04.2020
Description EN	<p>The project aims to develop technologies and an automated system with the intelligent technical vision for non-invasive monitoring of the behavioral characteristics and physiological state of farm animals used in dense, dynamic groups, to ensure automated collection and intelligent processing of priority data in the management of beef cattle breeding, which will improve the quality of animal husbandry and increase the safety of the livestock by at least 10% of the existing technological conditions. The main functions of the developed system of video cameras and robotic systems: automatic remote inventory of livestock; control of the feeding process; automatic recognition of aggressive / inappropriate animal behavior; early detection of deviations in health by a combination of various signs; non-invasive remote weighing; monitoring and analysis of the situation by the operator from a remote workplace; formation and continuous replenishment of the knowledge base.</p> <p>Technical result</p> <ul style="list-style-type: none"> - development of method for determining the livestock of animals with the help of artificial vision; - development of method for calculating the integral indicator of animal activity in a dense dynamic group with the help of artificial vision; - development of recognition method of aggressive behavior of animals based on integral indicator of activity; - development of an approach for the diseased animals identification in the process of non-invasive intelligent video monitoring. <p>Development of neurocomputer – a unique specialized device for processing video information based on working principles of biological neural networks.</p>
Class no.	10. Information Technology and Communication

RU.6.

Title**Red rose petal syrup with fragrances of various essential oils and vanilla****Authors****DEYNEKA Ludmila, MYACHIKOVA Nina,
BLINOVA Irina, SALASINA Yaroslava,
OLEINITS Elena****Institution**

Belgorod State National Research University

Patent

RU 2598082

Description EN

The invention can be used to obtaining sugar syrups made from red rose petals with the smell of various essential oils or vanillin. The proposed natural syrups can be used primarily as additives in baby food since they consist of exclusively natural raw materials and are good antioxidants. The anthocyanin content in dried rose petals can reach 3.5%. Anthocyanins are known as potential colorants for the food industry due to the high and varied biological activity of these compounds. The proposed method of syrup production makes it possible to improve the organoleptic properties of the final product and increase the stability of biologically active anthocyanins in syrups and increases the antioxidant activity of the syrup.

Technical result - anthocyanin-rich syrups with a prolonged aromatic fragrance produced from red rose petals with different aromatic fragrances and sustainable supramolecular complexes in the composition.

Advantages - the amount of sugar and citric acid in the syrup provides both good taste and preservation of syrup, and increasing concentration of anthocyanins in the syrup increases their antioxidant activity and health benefits

Application – food industry.

Class no.

3



RU.7.

Title	Integrated technology for reprocessing gypsum-containing waste of industrial enterprises in order to use the obtained raw materials in the production of organo-mineral fertilizers
Authors	NIKULIN Ivan, TITENKO Alexey, NIKULICHEVA Tatyana, ALFIMOVA Natalia, CHUB Alexandr, MISHUNIN Maxim
Institution	Belgorod State National Research University
Patent	Know-how registration certificate N 305, 22.09.2020, N 306, 22.09.2020, N 307, 22.09.2020
Description EN	<p>Development and testing of cost-effective, scalable and knowledge-intensive reprocessing technology of gypsum-containing waste for the use of obtained raw materials in agriculture and building. Research of biochemical processes when co-processing organic animal waste with calcium sulphate of various degrees of hydration; development and making of pilot unit for the production of granular organo-mineral fertilizers based on organic waste from livestock enterprises and raw materials obtained from reprocessing gypsum-containing waste. The project is being implemented within the framework of development programme of world-class scientific-educational center in Belgorod Oblast "Innovative solutions in agro-industrial complex".</p> <p>Technical result</p> <p>Possibility of obtaining mineral fertilizers for agriculture from gypsum waste. Field tests in the area of 80 ha showed that a new kind of fertilizer increased yield of main crops by 10-25%. Soybean, which yield has increased by 5 centners per hectare, is the most susceptible to this fertilizer. In the process of reprocessing technological waste the amount of detrimental impurities drops down to more than 2 times, which makes possible to use the obtained binder in building. In order to increase cost-effectiveness of technology a new method of enrichment was developed. This method allows obtaining rare earth elements concentrate in the process of reprocessing gypsum-containing waste.</p> <p>Application:building, agriculture, metallurgy</p>
Class no.	7

RU.8.**Title**

**Method of drilling deep holes in copper, Auger drill
ABRAMOVA Natalya, MUHORIN Evgeniy,
OBERTAS Dmitry**

Authors**Institution**

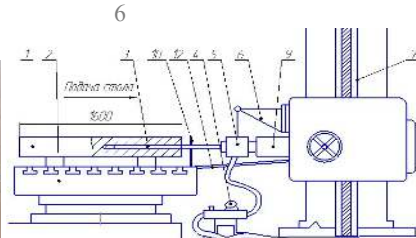
Kuban State Technological University

Patent

RU 676123, 183409

Description EN

A method for drilling deep holes in copper has been developed, including drilling the workpiece on the machine, using a deep drilling drill using a system for feeding and removing the coolant and leaving it together with the chips, drilling is carried out on a universal horizontal boring machine with a screw drill with a drill rotation speed of $n = 600-915$ rpm, while the workpiece is fixed on the machine table with bolts and slats, and the workpiece is fed by a table with a table feed speed of $S = 120-125$ mm/min. The cooling produced by sulfofrezol. The diameter of the screw drill is 20-25 mm. The drill is made of a solid construction made of 9XC steel with special geometric parameters, which increases the durability of the drill and improves chip crushing, reduces the number of drill leads from the part when drilling. Drills of such designs have fewer breakdowns and greater productivity, the processing time is reduced by up to 40 %. As a result of the proposed method, the productivity of drilling deep holes increases by 1.5 times. In this case, the withdrawal of the axis of the hole does not exceed 2 mm. The roughness of the holes after processing is $Ra = 25$ microns.

Class no.

1 - blank; 2 - machine table; 3 - drill; 4 - installation of coolant; 5 - water intake; 6 - bracket; 7 - machine column; 8 - spindle head; 9 - spindle; 10 - flap; 11 - tank; 12 - gutter; 13 - high pressure hoses.

RU.9.**Title****Method and technology for producing lactose-free functional beverages****Authors****TIKHOMIROVA Natalya, TARASOV Vasilij, KALMANOVICH Svetlana****Institution**

Kuban State Technological University

Patent

RU 2679834

Description EN

Field - food industry. Substance: invention relates to food industry, namely, to soy milk production, and can be used for production of food from soy milk. Method includes cleaning of soy seeds, their soaking, wet grinding, filtration and heat treatment. At the same time, soaking of soy seeds is carried out in electro-activated liquid (anolyte) with the pH of 3.2–3.5 with a redox potential of (-400) - (-700) mV, obtained by electrolysis of a 1-3 % aqueous solution of sodium chloride with a DC power of 0.5-0.6 A and a voltage of 36 V, in the ratio of soy seeds: electro-activated liquid 1:3, at the temperature of 40-45 °C for 60-65 minutes. After soaking, the soy seeds are rinsed with running water for 3-5 minutes. Effect - this ensures the destruction of urease and trypsin inhibitor in soy beans and in soy milk, increasing the degree of inactivation of lipoxidase, giving the product bifidogenic properties and discoloration of coloring matter

Class no.

3. Agriculture and Food Industry



Fig. 1 - Functional drink

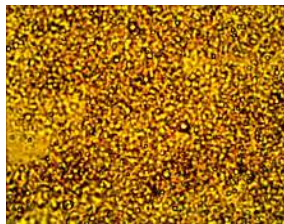


Fig.2 - View under the microscope of Micromed 3, magnification 40x

RU.10.**Title**

Technology of rice grain processing into cereal with obtaining products of increased nutritional value

Authors

SHAZZO Aslan, ZIIATDINOVA Veronika

Institution

Kuban State Technological University

Patent

RU 2628938, 2689724, 2683222, 2683223, 2681926

A technology has been developed for rice grain processing into cereal with obtaining products of increased nutritional value, the advantages of which are increased yield of rice cereal and production of new types of products with increased nutritional value.

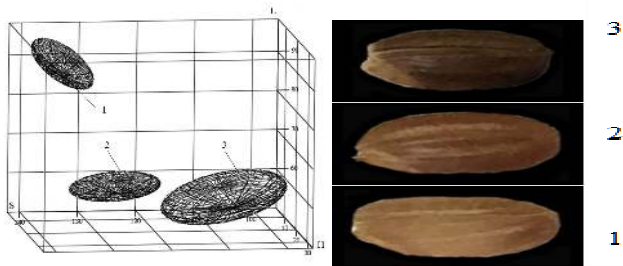
Description EN

The peculiarity of technology is presented by the fact that before the grinding stage hulled rice grains are sorted according to color parameters of hue, saturation and lightness into several fractions, which are sent for further apart processing: hulled rice with ordinary color is processed into high-quality rice cereal and red grain rice of various shades – from pink to dark-red – into products of increased nutritional value.

Due to the fractionation of the grain mass of hulled rice according to color parameters, it was possible to increase the yield of whole cereals and to process by-products of rice cereal technology effectively.

Class no.

3. Agriculture and Food Industry



Red rice fractionation according to color parameters of Hue, Lightness and Saturation for further
1-pink shade, 2-bright-red shade, 3-dark-red shade

RU.11.**Title****Rock drill bit****Authors****BALAEV Etibar, CHERKESOV Timur,
RUBAN Daria****Institution**

Kuban State Technological University

Patent

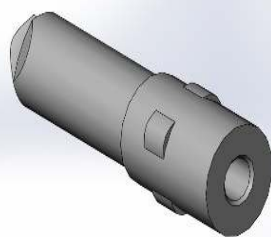
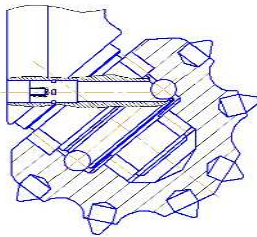
RU 201586

Description EN

A roller cone bit consists of a paw with a channel for a locking pin with a trunnion, on which a roller cutter is installed, mounted by means of a ball bearing lockable with a locking pin, made of a material with a shape memory effect, made in the form of a two-stage cylinder, on a stage with a large diameter of which there are protrusions from 2 to 6, located on a cylindrical surface with an equidistant step of $180-60^\circ$, and at the end there is a threaded hole, and the channel for the locking pin is made in the form of a two-stage cylindrical hole in accordance with the geometric parameters of the locking pin and has counterparts on the inner surface of a larger diameter grooves identical in shape and location to the protrusions on the step of the locking pin with a large diameter. In this case, the fixation of the locking pin in the channel occurs not through the use of a welded joint, with all its disadvantages both during installation and in operation, but due to the mating between the protrusions of the locking pin and the mating grooves of the channel, which became possible due to the use of the effect of restoring the shape of the material shape memory effect from which the locking finger is made. This technique provides rigid fixation of the locking pin in the channel, and also guarantees the fixation of the roller cutter and the accuracy of positioning of the parts of the roller cutter bit, balls, bearing, roller cutters on the journal, and self-locking as a result of mating the protrusions of the locking pin with the channel hollows under the locking pin.

Class no.

2. Energy and sustainable development



RU.12.

Title**Immunostimulating food additive with the use of CO₂-technologies****Authors****Kasyanov Gennady, Mishkevich Evelina,
Zaporozhsky Alexey****Institution**

Kuban State Technological University

Patent

RU 2548497

Description EN

The development of the territories of the Far North and especially the Arctic Zone of the Russian Federation (AZRF) is of great interest to our country. The implementation period of the state program "Socio-economic Development of the Arctic Zone of the Russian Federation" has been extended until 2025. In the plans for: socio-economic development, the food supplement is recommended for people living or working in climatic conditions in which the heat transfer to the environment exceeds the value of the heat production of the human body. The complex use of a universal food supplement against the background of basic diets will strengthen the immune system and increase the adaptive capabilities of the body. Application of CO₂ technology in the preparation of vegetable raw materials allows to obtain sterile raw material is practically unaffected oxidative processes with particle size less than 50 μm, as well as save in the native state hydrophilic fraction of BAS. The food supplement is recommended for direct consumption or for fortification of food products.

Class no.

3. Agriculture and Food Industry

CO₂- sea buckthorn mealCO₂- rosehip mealCO₂- black currant mealCO₂- carrot mealCO₂- carrot mealCO₂- beet meal

RU.13.

Title	Method for restoring the functional capabilities of human muscles in conditions of reduced motor activity in the elderly patients and patients with chronic heart failure
Authors	ORLOV OLEG, TOMILOVSKAYA ELENA and others
Institution	IBMP RAS
Patent	RU 2729932
Description EN	<p>The invention relates to medicine, namely rehabilitation, and is intended to restore muscle strength in elderly people, as well as patients with chronic heart failure using electrical stimulation. Patients with chronic heart failure (CHF) are forced to stay on bed rest for a long time or lead a lifestyle with minimal physical activity. Such restrictions result in a significant diminish of muscle strength, and as a result, a deterioration in the overall condition of the body and a decrease in the quality of life. Similar problems also occur in the elderly people, who tend to gradually reduce their motor activity due to chronic diseases or other circumstances.</p> <p>The method provides an increase in the effectiveness of the stimulating effect directed at the weakened muscles of the lower limbs, provided that overloads of the muscular apparatus are avoided, due to a two-stage effect on the muscles.</p>
Class no.	4. Medicine – Health Care – Cosmetics

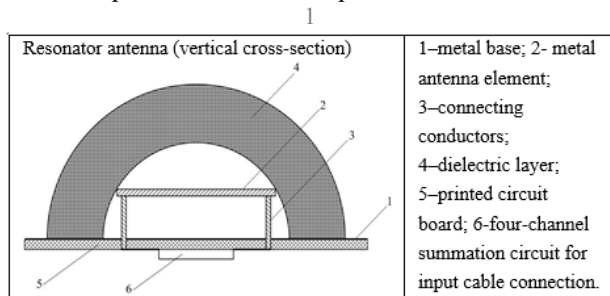
RU.14.

Title	Resonator antenna
Authors	YATSKEVICH Vladimir, TURIGIN Sergei
Institution	Vologda State University
Patent	RU 198462
Description EN	<p>The utility model relates to antenna technology and can be used as an all-wave receiving, transmitting or receiving antenna in the global navigation satellite system (GNSS). The resonator antenna consists of a metal base in the form of a round disk, and a metal antenna element of the same shape located above it</p>

which is connected by four conductors to a printed circuit board located on the lower side of the base. The resonator antenna is provided with a dielectric layer of a hemispherical shape installed on the base coaxially to it so that the antenna element is located in the cavity between the base and the dielectric layer.

The given device solves the problem of reducing the horizontal size of the antenna and simplifying the design. To achieve this technical result, a hemispherical dielectric layer is introduced into the antenna. The antenna element is installed inside the cavity of the dielectric layer, which distinguishes this antenna from others, where the antenna element is installed on top of the dielectric cone. The dielectric permittivity and the layer dimensions of the utility model are selected on the basis of resonance condition in the cavity at the average frequency of the operating frequency band, which makes it possible to reduce the horizontal size of the antenna to 96 mm with a vertical size of 86 mm. The dielectric layer, being part of the resonator antenna, also serves as a protective housing, which allows using the antenna without a protective radio transparent cover.

Class no.



RU.15.

Title

Method for the diagnosis of axial hiatal hernia

Authors

ISMAILOV Efendi

Institution

Dagestan State Medical University

Patent

RU 2745253

Description EN

The invention relates to medicine, namely to radiation diagnostics, as well as to abdominal surgery and gastroenterology.

The aim of the invention is to optimize the diagnostic

technique, as well as to provide a more accurate separation of patients in need of surgery. The proposed method will improve the efficiency of diagnosis of patients with this pathology and use the proposed classification in the diagnosis of hiatal hernia. X-ray diagnostics of axial hernia of the esophageal opening of the diaphragm is performed. Depending on the X-ray examination, the hernia is divided into 3 subgroups of prolapse: A - subgroup - prolapse into the posterior mediastinum of less than half of the folds of the gastric vault mucosa, B-subgroup - prolapse into the posterior mediastinum of half of the folds of the gastric vault mucosa, C - subgroup - prolapse into the posterior mediastinum more half of the folds of the mucous fornix or the entire fornix of the stomach. At the same time, with the A-subgroup, conservative treatment is indicated, with the B-subgroup, delayed surgical treatment is indicated, with the C-subgroup of prolapse, only surgical treatment is indicated. The method makes it possible to determine the degree of prolapse of axial hiatal hernias, to more accurately determine the degree of hiatal hernias during fluoroscopic examination with contrast, to screen patients in need of surgical treatment, and to predict the condition of patients by the X-ray picture.

Class no. 4. Medicine – Health Care – Cosmetics

RU.16.

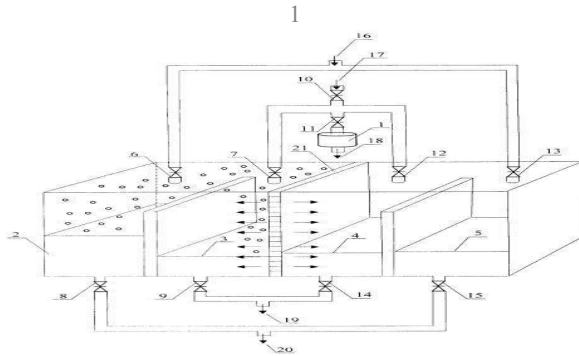
Title **Method of seawater desalination energy efficient way**
Authors **ISMAILOV Tagir, GADZHIEV Khadzhimurat, GADZHIEVA Soltanat, CHELUSHKINA Tatyana, SHIKHAKHMEDOVA Dinara**
Institution Dagestan State Technical University
Patent RU 2706066
Description EN FIELD: water treatment. SUBSTANCE: invention can be used in sea water desalination. Method is carried out in a desalination plant with a semiconductor thermoelectric cooling device, wherein the method includes bringing sea water to boiling followed by condensation of water vapour on the surface of the cooling device and removal of fresh water. Sea water is brought to boiling at ambient temperature by means of

artificial reduction of atmospheric pressure, using a desalination plant consisting of two sealed chambers (2, 3) with reservoirs for sea and fresh water, made with mirror walls, with creation of low pressure in chambers alternately due to air pumping (18) by pump (1) through air solenoid valves (7, 11). For cooling water vapour there is used semiconductor thermoelectric cooling device (21) with ultraviolet radiation.

EFFECT: method ensures reduction of power consumption and environmental safety of the desalination plant operation, reduction of boiling temperature of sea water to ambient temperature with simultaneous disinfection of water with ultraviolet radiation.

1 - Environment-Pollution Control

Class no.



RU.17.

Title

Medical equipment product "Phototherapeutic device "AVERS-LIGHT"

Authors

GRACHEV Vladimir, GRACHEV Alexander

Institution

Scientific & Industrial company «AVERS», LLC

Patent

RU 166852

Description EN

The phototherapeutic device "AVERS-LIGHT" is intended for the prevention and treatment of viral diseases, including COVID-19, as well as diseases of otorhinolaryngology, ophthalmology, urology, gynecology and proctology by acting on the oral cavity, nose, ears, as well as vaginally or rectally with monochromatic blue light.

Based on the results of clinical studies on the prevention

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and treatment of all types of human viral diseases, including COVID-19, which were carried out at the I.M. Sechenov, Research Institute of Pulmonology of the Russian Academy of Sciences, Novosibirsk State Medical University, it was concluded that today the phototherapy device "AVERS-Light" is the most effective means for the prevention and therapy of COVID-19 (2020).

This is a unique portable and multifunctional medical equipment product that has no analogues in the world, and today it is the only medical equipment product for the prevention and treatment of COVID - 19, it can replace a large number of drugs (up to 800), in the prevention and treatment of major diseases person.

The device has European certification as a medical device, obtained in Germany.

Class no.

4. Medicine – Health Care – Cosmetics



Singapore

SG.1.

Title **The massage hammer with sound function**

Authors -

Institution **Chevrotain Singapore Pte. Ltd**

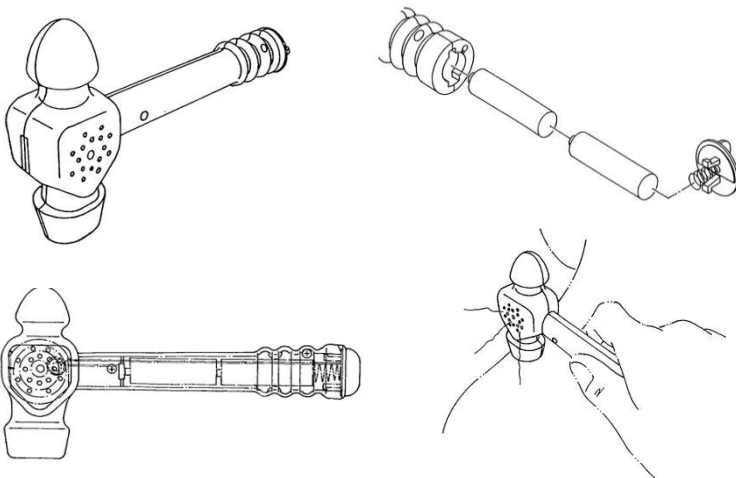
Patent -

Massage is one of the common and easy ways to relieve the pressure and weariness. Currently, there's no sound effect during massage, therefore, it cannot inspire the desire of using it to reduce the pain or the soreness.

Description EN The main purpose of this invention is to provide a sound function of the massage hammer. I install the battery into the grip of the massage hammer. When a user uses it to massage, the sound device will make the sound, so that the willingness of use will be raised.

Class no.

13



Sudan

SD.1.

Title

Hope Stick for blind persons

Authors

Osman Mohamed Osman Mohamad

Institution

Smart Care teck

Patent

4172

is a device that helps the blind person to photograph the environment around him and identify things with high accuracy that helps him to practice his life normally.

Functions :-

1-Determine the things and people surrounding the blind

Determine the weather for the blind-2

3-Determine the location of the blind for his family in case of his loss.

Description EN

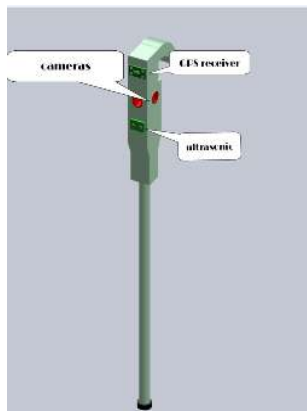
Stick components

Censor to measure the weather1-

Sensor locator2-

2- 4 cameras to photograph the patient's surroundings in all directions and tell him what is around him through the headphone

3-headphone



Taiwan Represented

by WIIPA

TW.1.

Title 360° roof air intake ventilation

Authors CHEN, YI-AN/HSU, WEI-CHEN, HUANG, TA-HUA, HSU, CHIH-YU, KUAN, HSIEN-HSIANG

Institution Kuai Ji Junior High School , Dong Xing Junior High School , Sin shih Elementary School

Patent no. M588775

Description EN Different from the existing exhaust function of the existing roof ventilation. The ventilator rotates 360° can Turns the vent to the windward side, and bring fresh cool air into the room to regulate the function of reducing indoor temperature. This device can prevent rain or insects from entering the room.

Class no. 7

TW.2.

Title A Lactobacillus rhamnosus GKLC1, a composition and its use for improving alcoholic injury in liver, stomach and intestine.

Authors Chen Chin-Chu, Chen Yen-Lien, Lin Shin-Wei, Chen Yen-Po, Wang Ci-Sian

Institution GRAPE KING BIO

Patent no. I715177

Description EN The present invention provides a Lactobacillus rhamnosus GKLC1, a composition and its use for improving alcoholic injury in liver, stomach and Intestine.

Class no. 4. Medicine - Health Care - Cosmetics

TW.3.

Title Anti-bolt pen

Authors PAO SHUN, HU CHIEH-CHI, LEE, JUN-YU, LIU, SHU-YOU, WANG, ALLEN YO-LUN

Institution Pu Tai Senior High School

Patent no. -

Description EN Buttons are added to the hand-pressing place. The nib will be stretched out only when the buttons are pressed; Also, soft material is added between the pen body and the nib.

Class no. 5. Industrial and laboratory equipment

TW.4.

Title Aquaculture Intelligent Auxiliary System
Authors Pang-Chieh Lin, Huang-Kuang Kung, Chun-Te Lee, Yu-Ting Wu, Jia-Xiang Lin
Institution Cheng Shiu University
Patent no. -
Description EN With the help of the Internet of Things and mobile APP technology, the Aquaculture Intelligent Auxiliary System aims to help aquaculture farmers reduce accidents and increase the success rate of aquaculture.
Class no. 3

TW.5.

Title Aquarium Water Cleaning Appliances
Authors KUAN , CHIA-YI, KUAN, HSIEN-HSIANG
Institution Feng Chia University
Patent no. M585040
Description EN This device use the principle of atmospheric pressure, surface tension, gravity and one-way valve mechanism, easily clean the dirt in the aquarium without using electricity, motor or pump. It's also easy to control the drainage time and water discharge to achieve energy saving and carbon reduction.
Class no. 1

TW.6.

Title Bible player
Authors YIN GUAN-XIN, HUANG JUN-YING, WANG HUI FEN, LI YI HSIU, CHANG WEN-YU
Institution Jen-Teh Junior College of Medicine, Nursing and Management
Patent no. M604006
Description EN The appearance of this creation is a kind of realistic robot, which looks like a real priest or priest, which can rotate 360 degrees, read the Bible to people and read the content aloud. Automatic voice recognition is used to automatically browse and search the Bible, or a built-in artificial intelligence software system. When believers confess or seek spiritual comfort, they can get answers or contact priests or pastors at any time. It is expected to be popular in churches at home and abroad in the future.
Class no. 12

TW.7.

Title Breathable raincoat
Authors KUAN, CHUN-KUAN, KUAN, HSIEN-HSIANG
Institution SCI-EXCELLENCE Co. Ltd
Patent no. M592663

Description EN Breathable raincoat improves the two disadvantages of traditional raincoat, which include dampness inside the raincoat causing sweating and not easily accessible belongings. In addition to the above-mentioned enhancements, breathable raincoat also incorporates the safety function with LED lights, which makes you more visible during the dim raining days.

Class no. 12

TW.8.

Title Deep-Learning based English Vocabulary Learning Platform
Authors Yi-Wen Liao, Ja-Hwung Su, You-Wei Zhao, Chia-Chen Hsu, Jin-Ming Chen, Hong-Yu Zeng
Institution Cheng Shiu University
Patent -

Description EN The English Vocabulary Learning Platform combine the method of learning with picture cards and E-book, and Image Recognition based on the technique of image recognition and artificial intelligence. The platform can read English words of the item based on the image recognition and provide quizzes to verify the learning results. We expect this platform could increase the learning interesting, motivation, and performance by the hands-on and practice-oriented learning methods.

Class no. 10

TW.9.

Title Disaster prevention robot with transformable crawler
Authors Fa-Shian Chang, I Chang Hsu, Chih-Chung Hsu, Cheng Fang Chen, Jia Hong Wu, Guan-Yu, Li
Institution Cheng Shiu University and and Chung-Shan Industrial & Commercial School
Patent I700209

Description EN The invention is a multifunctional robot used for climbing terrain such as stairs and has a multi-functional module combined design. Can be used for unknown

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environmental observations, gas detection, dangerous goods removal, rescue and firefighting. The main function is to reduce personnel to enter and secondary damage caused by the accident, and to improve the efficiency of the relevant investigation, exploration and shorten processing times dangerous conditions, so as to effectively deal with related issues quickly to ensure that people and property dough!

Class no. 12

TW.10.

Title Easy swing table tennis racket
Authors CHEN YI-AN, KUAN CHUN- I, KUAN HSIEN-HSIANG
Institution Kuai Ji Junior High School
Patent no. M580993
Description EN This racket has a bamboo stick inserted on its side, using bamboo fibers to replace other more expensive rayon fibers. For example: carbon fiber can make the ball faster and it is light. Glass fiber is soft and elastic. Bamboo's Fiber can achieve these two effects well, and the structure makes the wood board more elastic. Make the ball faster.

Class no. 13

TW.11.

Title Electronic component splicing module
Authors Kang Tsai-Hua, Zeng Zhi-Xiang, Chen Feng-Chin, Liao Shu-Han, Chien Wei
Institution HungKuo Delin University of Technology, TamKang University, Ningde Qianwei Industrial Technology Co., Ltd.
Patent no. M605362
Description EN This creative department provides a splicing module for electronic components. At the same time, it can also measure the measured object. The voltage and current are high, the measurement accuracy is high, and the assembly of multi-functional electronic components is truly realized

Class no. 5

TW.12.

Title

Group medication reminder system

Authors

Chun-Hsiung Lee, Hsiu-Ling Pang, Meng-Chang Tsai,
Ruei-Jan Hung, Yong-Ren Jheng

Institution

Cheng Shiu University

Patent

I686191

Description EN

This topic proposes the "Smart Reminder to Take Medicine Method" and actually develops a set of "AIOT Cloud Smart Pill Box", which will identify whether the user is a drug user through AI artificial intelligence images, in order to achieve the purpose of smart medical treatment and care.

Class no.

4

TW.13.

Title

Hazardous Range Alarm for High Voltage Electric Environment

Authors

Fa-Shian Chang, Cheng Fang Chen, I-Chang Hsu, Hung,
Jui-Chi,

Institution

JIA-HONG, WU, Ya-Jin, Lyu

Cheng Shiu University and and Chung-Shan Industrial &
Commercial School

Patent

I717011

Description EN

This invention relates to an active alarm for operating under high voltage environment, which includes at least an electromagnetic wave warning system mounted on engineering vehicles (excavators, cranes or ladder trucks, etc.) and an observation rod located near the engineering vehicles and continuously monitoring the engineering vehicles from the far end.

Class no.

12

TW.14.

Title

Energy-Saving Research on New Type of LED Sensor Lamp with Low Light Mode

Authors

Chun-Te Lee, Huang-Kuang Kung, Che Jen Hsieh,
Huan-Mei Chu, Yen-Yi Lee, Bonnie HM Chen

Institution

Cheng Shiu University

Patent no.

M541833

Description EN

The design of the Holtek HT66F70A developed by the semiconductor company as the overall control of the core, with a fully functional human-computer interface, and the collection of three three-axis acceleration sensor, in accordance with the sensor to obtain the value of automatic statistics, Machine interface instantly shows the sleeping posture.

Class no.

12

TW.15.

Title Light-Controlled Energy-Saving Device Of Half-Wave Rectification With Pulse Width Modulation Technology And Thermal Infrared Detection

Authors LU CHIA-LIANG, LU TAO-TING, LEE CHIU-PING, CHEN WEI-TENG, CHIANG MING-CHUAN

Institution St. John's University , Shan Yan Industrial Co.

Patent no. M601927

Description EN In the invention, a thermal infrared sensing switching circuit is combined with a light control circuit, and then a pulse width control (PWM) signal is generated by a programmable single chip, the AC power is synchronized for pulse width control, and the conduction voltage of the AC output can be controlled Area, and then achieve the power regulation of the control load.

Class no. 2

TW.16.

Title Magic Backpack

Authors CHENG CHIAO-YIN, HUANG TING-HSUAN

Institution Kang Chiao International School (Linkou Campus), Hsinchu County Liou Jia Senior High School

Patent no. M609214

Description EN Compartments with different sizes, shapes, and styles can be attached and detached to our specially designed strap to cater to the needs of users. Not only you can make changes with different compartments, but the length and width of our specially designed strap can also be adjusted easily. With our product, you can take several advantages such as sub-packing and classifying.

Class no. 12

TW.17.

Title Magical peeling gloves

Authors YU YUN-CHEN, CHANG WEN-HSUAN

Institution Zhong Li Commercial Senior High School Wu-Ling Senior High School

Patent no. M580880

Description EN Generally, the commercially available peeling gloves can only remove the soft peel of the fruits. It's helpless for apples with harder peels. Apple's peel contains precious nutrients. When apples are eaten together with peel, it is possible to eat the problem of wax. This work can remove wax and residual pesticide easily and preserving the nutrients of apples.

Class no. 12

TW.18.

Title Marine Garbage Cleaner
Authors MENG LING-YAO, CHAN CHEN-HAN, KAO CHENG-WEI, LAI YU-HUSN, LEE HSIN-YUAN
Institution Pu Tai Senior High School
Patent no. -
Description EN It utilized sensors such as infrared technology to detect the pollutions floating on any kind of water surface. The machine uses solar batteries as its power source and a solar panel is placed on the top of the machine. The unique point of this machine is the when the machine is at its full capacity, it will send message to the phone which it is connected to.
Class no. 1

TW.19.

Title Mini Potted Weeder
Authors CHOU HSIU-JUNG, HUANG JIA-HONG, LI YI-XUE
Institution Cheng Shiu University
Patent no. M568581
Description EN This mini weeder is designed for weeding in a plant pot. Place the weeder on the soil and against the edge of the pot, the steel tiller blade under the weeder can pulls weeds easily. The potted weeder is lightweight and easy to use.
Class no. 3

TW.20.

Title Multifunction mobile phone holder
Authors CHUNG ANDERSON, CHUNG KAI-HSIN, YANG HAO-CHENG, WANG XIN, WEI YOU-AN, CHENG CHIAO-YIN
Institution Hsinchu County American School Chun-I Senior High School
Patent no. Kang Chiao International School (Linkou Campus) M609509
Description EN When this device is placed on the shoulder along with a mobile phone it contains more than 10 functions, increasing the convenience and practicality of everyday life.
Class no. 13

TW.21.	
Title	Pillow structure
Authors	Chun-Te Lee, Huang-Kuang Kung, Huan-Mei Chu, Wei-Chieh Liang, Ping-hsin Tai, Chien-Heng Lin
Institution	Cheng Shiu University
Patent no.	M549034
Description EN	The bumps shaped of our creation is great for different types of sleepers to use. The height of one pillow is good for sleeping on back in the middle and the appropriate height for side sleeper.
Class no.	12
TW.22.	
Title	Projected Traffic Light
Authors	Wu Chung-Chuan, Lee Ting-Yi, Tseng Yo-Chia, Jeff Lee, Morris Yu-Yen Cheng
Institution	Pu Tai Senior High School
Patent	-
Description EN	In order to increase the safety of pedestrians passing through the intersection at night, we would like to install projectors right below the traffic lights to project zebra crossing lines and a vehicle stopping line on the surface of the paved roads. When the traffic light of the intersection is red, the vehicle stopping line is red and the vehicle is inaccessible. At this time, the zebra crossing is green for the pedestrians to pass; when the traffic lights of the intersection vehicles are green, the vehicle stopping line is green, for the vehicles to pass; when the zebra crossing is red at this time, the pedestrians are not allowed to pass. This largely improve and guarantee the safety of passersby.
Class no.	12
TW.23.	
Title	Gas pipeline inspection and cleaning robot
Authors	FA-SHIAN CHANG, CHUAN-TSE HSIANG, TAI-YUAN CHANG, WEN-BIN LAI, YA-JIN LYU
Institution	CTCI Corporation and Cheng Shiu University
Patent	-

Description EN The object of the present invention is to provide a pipeline interior cleaning robot with a quick-change module, which includes a carrier body and a detection cleaning module. The carrier body can be a general crawler-type carrier or a wheeled carrier. It can be moved inside a general horizontal pipeline; or it can be a screw-powered vehicle or a worm-moving vehicle, so that it can move inside a vertical pipeline

Class no. 12

TW.24.

Title Ship fire-fighting intelligent damage control and rescue system

Authors Fa-Shian Chang, Chia-Yao Chang, I-Chang Hsu, Hung, Jui-Chi, Jia-Hong Wu, Ya-Jin Lyu

Institution Cheng Shiu University and and Chung-Shan Industrial & Commercial School

Patent no. M602449

Description EN A smart motion sensing fire-extinguishing platform that can be combined with various types of wall-mounted fire extinguishers of the existing specifications, uses an array flame optical detection module to determine the flame position, and immediately responds to the sensor-connected fire extinguisher spray start switch, aiming at the fire source point for precise fire extinguishing, which has The battery can function when the power is off, and the power line communication and the wireless remote control coexist in communication.

Class no. 12

TW.25.

Title Smart Nano Ion Mask

Authors Lin Wen Chieh, Wu Ting Lien, Wu Cheng Chang, Chuang Shih Ching, Chen Cheng Chi

Institution Kao Yuan University

Patent no. M597669

Description EN A special mask, suitable for wearing on the head of the human body, cover your mouth and nose. There is a special filter between the mask body and the human body. Increase filter bacteria and viruses, the user can apply soothing elixir to the partition, it is an improved gas mask that can be used universally.

Class no. 4

TW.26.

Title Splash Proof Cup Lid
Authors KUAN CHUN-KUAN, KUAN HSIEN-HSIANG,
 CHUNG HSIU-CHIN
Institution SCI-EXCELLENCE Co. Ltd
Patent no. M590571
Description EN Normal cups splash out water easily while cars moving because of inertia. Through our special design, we improved and prevent the problem of water splashing out so while driving, drivers can feel assured to drink water without worrying about splashing water out.
 Class no. 12

TW.27.

Title The Multifunctional traffic cone
Authors KUAN CHUN-KUAN, KUAN HSIEN-HSIANG
Institution SCI-EXCELLENCE Co. Ltd
Patent no. M592452
Description EN The invention is kind of multifunctional traffic cone. The creation part is the seat body can be extended, moreover contracted for convenient storage. It is not only having a direction light indicator and a warning lamp set on, but also has multiple functions and a light storage function.
 Class no. 12

TW.28.

Title The Simple detection device for Sleep apnea
Authors Chun-Te, Lee Che Jen Hsieh, Yu-Ting Lin, Huan-Mei Chu, Wei-Chieh Liang, Bonnie HM Chen
Institution Cheng Shiu University
Patent no. M541832
Description EN Unit testing whether there are ups and downs in the chest, when the subjects chest with ups and downs, and the oxygen concentration decreased, the treatment unit will be judged as obstructive sleep apnea syndrome, while the subjects chest without ups and downs, and oxygen When the concentration is lowered.
 Class no. 4, 12

TW.29.**Title**

The use of Cordyceps Cicadae mycelium for preventing, postponing or treating steroid-induced ocular diseases

Authors

Chen Chin-Chu, Yeh Shu-Hsing, Lee Li-Ya, Hsu Jui-Hsia

Institution

GRAPE KING BIO

Patent no.

10835563

Description EN

Cordyceps cicadae mycelium are useful in preventing steroid-induced ocular diseases, and in particular relates to a method for preventing changes in the anterior, posterior chamber volume, vitreous humour, and, or retinal detachment.

Class no.

4

TW.30.**Title**

Toilet Cleaning Intelligent Device

Authors

Chang Chuo-Yean, Chen Hsieh-Ping, Zhang Hong-Wei

Institution

Cheng Shiu University

Patent no.

-

Description EN

Toilets in public places often have dirt and malfunctions. The dirt causes the next user to be nauseated. The malfunction causes the user to be very inconvenient. The device can detect the dirt on the toilet surface and flush it in time to make it more convenient clean. If you can't clean it or the toilet fails, notify the administrator by wireless communication. Combined with the precise control of water flow detection, water-saving effect is achieved.

Class no.

1

TW.31.**Title**

Transparent inflatable Rainbow rays Buddha statu

Authors

Cho Yufang, Li Meng Hsuan, Yin Chun-Hung, Chlutaneng

Institution

Jen-Teh Junior College of Medicine, Nursing and Management

Patent no.

M603721

Description EN

There are many different styles of large Buddha statues on the market. Whether it is engineering or manpower, the construction resources required require a huge cost to produce, and it will be very inconvenient when there are celebrations in other areas that need to be moved.

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This creation is to provide a huge Buddha statue that can be easily inflated to complete the installation. It uses super transparent inflatable bag material to form different Buddha statues, and is surrounded by LED copper wire light bars to form a transparent structure. The glare refracted in the object can greatly enhance the color light effect of the inflatable Buddha; because it can be quickly inflated into a very huge Buddha statue, it can better show the solemn feeling of the Buddha statue, and it can be greatly improved in local folk activities. Religious Buddha statues have soothing effects

Class no.

12

TW.32.

Title

Using deep learning to detect internal thread technology of fasteners

Authors

Huang-Kuang Kung, Pang-Chieh Lin, Shih-Chuan

Chang, Sheng-Jie Lin, Yi-Chen Huang, Ming-Yan Weng

Institution

Cheng Shiu University

Patent

-

Description EN

Most fasteners for the using of automotive industry require a 100% full quality control inspection. Conventional optical inspection machines are unable to provide 100% full quality control inspection as it is time consuming and have a difficulty to detect the defects and flaws of internal screw. This innovation provides an application of AI deep-learning technique to the internal thread measurement of misaligned fasteners. Integration of an optical hardware system and a software platform, the system is capable of capturing an image of an internal thread of the fastener and analyzing by AI deep-learning technique. We found out that the efficiency and accuracy of this development implementation is many times higher than human resources are used.

Class no.

5

Thailand

By ATIP

TH.1.

Title

Plant Pot from Coffee Grounds

Authors

Noppadon Sangwalpetch, Attawut Kumban

Institution

Suan Sunandha Rajabhat University

Patent no.

Patent application No. 2002005109

Description

EN

A plant pot from coffee grounds is a product designed to solve waste materials problems in cafe business, instant coffee powder production and consumption of coffee within the household. The problems were analyzed to seek for materials that can be used for producing this product with the BCG Economy (Bio-Circular-Green Economy) idea.

The idea aims at using biological resources to create added value linked to a circular economy and the use of various waste materials to make them more useful under the green economy, which is an economic development that develops along with the society and environmental protection by using a rubber molding process. The ingredients used as a mixture consists of 2 parts: chun or dammar (wood powder mixed with resin and mortar) is a binder of the coffee grounds that can hold shape and cast over it with stucco to make them stronger.

According to the test, the ingredients used had a pH of 6.2 which is equivalent to the soil pH (between 5.5-6.5) suitable for growing plants and naturally biodegradable. Thus, these ingredients are 100 percent environmentally friendly.

In addition, dammars can repel ants and insects and stuccos reacting in alkalinity prevent the product from being moldy. For these reasons, the plant pot from coffee grounds is not produced by reusing waste materials just to be only a pot but it can also be another way to help prevent soil from being moldy and avoid insects destroying plants.

Class no.

14

TH.2.**Title**

Peanut shell Paper

Authors

Akapong Inkuer

Institution

Suan Sunandha Rajabhat University

Patent no.

Patent application No. 2103000780

Description EN

Paper, a culturally rich product for a long time, is used in all cultures of the world and a large amount of consumption. In the manufacturing process, paper is made from enormous trees to support consumer demand. Paper made from peanut shells are developed based on sustainable design concept with the reuse of waste such as peanut shells and corn husks. These two raw materials are abundant in Thailand and can be reused as an alternative choice for sustainability with less complicated technology in making.

The peanut shell paper consists of 60 percent peanut shells mixed with 40 percent corn husks by weight ratio. The production process starts with digesting peanut shells and corn husks thoroughly until pulp. Then, the pulp is mixed with natural pigments, such as yellow color is made from turmeric, red color is made from Lac to create a colorful glide on the frame, and just dry.

The aim of this invention is to produce peanut shell paper which is consistence thin, and strong. It has passed the standard test for tensile strength 804 N, Tear strength 771 mN, Absorption of water drop 9.81 s , 0.05 cubic centimeters, and the pressure resistance exceeds 76.3 kPa. Thus, it can be further developed in the design and packaging of products that take into account the cost-effective and most beneficial use of resources.

(max 250 words)

Class no.

4

TH.3.**Title****Odor Eliminator By Corona Electric Field****Authors****Siseerot Ketkaew****Institution****Ramkhamhaeng University****Patent no.**

-

Description EN

This innovation research presented the odor eliminator by corona electric field on principle of plasma discharge and electric field intensity changing technique. The power supply based on flyback converter comprises of a pulse generator using NO. IC#SG3526 for the electric field intensity adjustment at 5 kV, cm, 10 kV, cm, and 15 kV, cm under switching frequency adjustment at 20 kHz, 30 kHz and 40 kHz, respectively, and high frequency pulse transformer was used as a ground isolator and signal expanding for Power MOSFET#IRFP460 driving to control high voltage switching transformer to generate 1 kV, 2 kV and 3 kV by using cell electrode (electric field net) for generate ozone gas. The experimental results are switching frequency increasing of high voltage at 1 kV equal to 20 kHz, 2 kV equal to 30 kHz, and 3 kV equal to 40 kHz which the testing of ozone gas quantity measuring will observation at electric field intensity equal 5 kV, cm enables generate ozone gas 3.96 ppm, 10 kV, cm enables generate ozone gas 4.43 ppm and 15 kV, cm enables generate ozone gas 5.83 ppm. By ozone gas 5.83 ppm can be used to get rid of VOCs, H₂S and NH₃ gas which fruticosa is a foul odor, as well. The odor eliminator by corona electric field was tested at the Elderly Social Welfare Development Center and the Center for the Protection and Development of the Disabled and evaluating its use. The result is that this machine can actually get rid of the bad smell based on the evaluation of the user. Therefore this research was funded activities to promote and support research of the National Research Council of Thailand (NRCT) 2020 and can be developed into commercial innovations in the future.

Class no.

14. Other

Turkey

TR.1.

Title **An Adobe Designed To Trap And Absorb The Moisture Resulting From Air And Soil Getting Warm And Cold**

Authors Mehdi Farzpourmachiani, Simin Naghibi Masouleh, Ali Farzpourmachiani, Amir Berenjkar, Saeed Najafi, Hamid Shatranji, Ashkan Maghsoudi Ghashghaeinejad, Akbar Shirzadi Motlagh, Ahmad Rahmanzad Masouleh, Behnam Heidari, Meysam Aminkhaki.

Institution **Turkish Inventors and Innovators Network**
Patent Patent Pending

Description EN This is method for performing a physical action based on which an adobe with certain features is designed and used. The proposed design is a method for trapping and absorbing soil moisture and air moisture which is produced as the result of air and soil getting warm and cold during the 24 hours of a day without use of any electricity and chemicals preserving environment as well as natural resources, to increase the quantity and quality of the life of animals and to make an attempt to prevent drought. This Dew-trap adobe (New Moisture absorbent adobe) can be used in different climates such as deserts and dry lands and under different weather condition and as a very simple adobe can even help eliminating deserts by planting it in the ground and making the soil more wet and also using it around the roots of the plants which enhances their growth and even could be an automatic irrigation system in despite of using any equipment, electricity and machinery which might not be environment friendly and cheap expenses to use them in large amounts.

Class no.

3



TR.2.

Title

A method to produce drinkable water in emergency situation.

Authors

Mehdi Farzpourmachiani, Simin Naghibi Masouleh, Ali Farzpourmachiani, Amir Berenjkar, Yaghoob Badrikoohi, Saeed Najafi, Hamid Shatranji, Ashkan Maghsoudi Ghashghaeinejad, Akbar Shirzadi Motlagh, Ahmad Rahmanzad Masouleh, Behnam Heidari, Meysam Aminkhaki.

Institution Patent

Turkish Inventors and Innovators Network
Patent Pending

Description EN

- Water purification in less than five minutes.
- Portable assistant to help emergency force (Red Cross) in disasters.
- This method could be used to produce drinkable water in emergency situation and disaster like flood and earth quake.
- Be using this invention, it could be possible to produce drinkable water in suitable PH range in less than five minutes.
- This is an environmental friendly invention.

Class no.

1



TR.3.

Title

A method special for adobe (Multi-Functional Adobe)

Authors

Mehdi Farzpourmachiani, Simin Naghibi Masouleh, Ali Farzpourmachiani, Amir Berenjkar, Saeed Najafi, Hamid Shatranji, Ashkan Maghsoudi Ghashghaeinejad, Behnam Heidari, Meysam Aminkhaki.

Institution Patent

Turkish Inventors and Innovators Network
US Patent App.No. US2011, 0203197A1

Description EN

Using this adobe, it is possible to build walls in any form and design without employing materials, cement and concrete.

Using this adobe, building walls can be done faster in

comparison with building walls by means of traditional and ordinary adobes available in the market.

It has been a tradition to use cement and concrete as mediator when the new adobe, because of its unique design and features, walls can be built without employing cement, concrete or any other materials, and adobes can be laid in an entirely different method.

Class no.

7



TR.4.

Title

A mechanism for preventing lateral torque in walking

Authors

Mehdi Farzpourmachiani, Simin Naghibi Masouleh, Ali Farzpourmachiani, Akbar Shirzadi Motlagh, Ahmad Rahmanzad Masouleh, Saman Vadiat, Ebrahim Morad Pour Dehka, Davoud Siabi, Peiman Jamali Safsari, Amir Khodadadi Parashkouh.

**Institution
Patent**

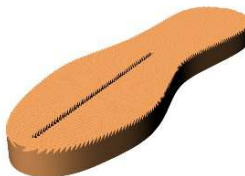
Turkish Inventors and Innovators Network
Provisional US Patent Application Number: 63160007

Description EN

- A mechanism which is placed on sole of a shoes.
- The sole of the shoes distribute total forces including weight of a user.
- The sole of the shoes distribute friction force on at least one element and some friction coefficients are defined for the sole of the shoes simultaneously.

Class no.

10



TR.5.

Title	Yogurt maker with concentration system for special uses
Authors	Mehdi Farzpourmachiani, Simin Naghibi Masouleh, Ali Farzpourmachiani, Akbar Shirzadi Motlagh, Ahmad Rahmanzad Masouleh, Sina Rajabi, Saman Vadiat, Ebrahim Morad Pour Dehka, Davoud Siabi, Peiman Jamali Safsari, Amir Khodadadi Parashkouh.
Institution Patent	Turkish Inventors and Innovators Network Provisional US Patent Application Number: 63160749
Description EN	<ul style="list-style-type: none"> - This invention is a type of home appliances for concentrated yogurt making. - By using this invention it's possible to produce concentrated yogurt in to short time in home kitchen by some milk. - Concentrated yogurt can be used in various ways. - Concentrated yogurt is produced from yogurt and has two parts. - Liquid substance, which is enriched by protein and calcium. - Cream dry substance, which can be used in various forms such as food and for skin mask and cream.
Class no.	5

TR.6.

Title	A method for combination of different type of salts for insoles of shoes, slippers and, or socks
Authors	Mehdi Farzpourmachiani, Simin Naghibi Masouleh, Ali Farzpourmachiani, Akbar Shirzadi Motlagh, Ahmad Rahmanzad Masouleh, Saman Vadiat, Ebrahim Morad Pour Dehka, Davoud Siabi, Peiman Jamali Safsari, Amir Khodadadi Parashkouh.
Institution Patent	Turkish Inventors and Innovators Network Provisional US Patent Application Number: 63160000
Description EN	<ul style="list-style-type: none"> - A method for insoles of shoes (pumps and, or loafers and, or scuffs and, or sandals and, or machine-made shoes and, or pantofles and, or slippers) that can be replaceable or permanent. - A method for soles of different type of socks that can be replaceable or permanent.

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- A method with combination of different type of salts for soles of shoes and socks.
- Direct and, or indirect contact of soles of foot may remove dark matter of user.

Class no.

4



Ukraine

UA.1.

Title	METHODS OF CONSERVATION THE RESIDENTIAL AND PUBLIC ARCHITECTURE OF THE 19TH – EARLY 20TH CENTURIES (ON THE EXAMPLES OF KYIV AND CRACOW)
Authors	Mykola ORLENKO ¹ , Yulia IVASHKO ² , Dominika KUSNIERZ-KRUPA ³ , Justyna KOBYLARCZYK ³ , Oleksandr IVASHKO ²
Institution	<p>¹Ukrrestavratsiia Corporation, 6 Boryspilska Street, Kyiv, 02099, Ukraine</p> <p>²Kyiv National University of Construction and Architecture, 31 Povitroflotskyi Avenue, Kyiv, 03037, Ukraine</p> <p>³Cracow University of Technology, 24 Warszawska Street, 31-155, Cracow, Poland</p>
Description EN	<p>The scientific novelty of the research consists in the systematization of the neo-Gothic heritage and in an innovative systematic approach to the restoration of such objects, when an architectural monument is considered as a system integrity and is presented in the form of a model with a set of constituent elements, for each of which the problems of an emergency state and ways of solving them are systematized.</p> <p>The issues of the monument preservation are divided into the legal problems (imperfect system of monument registration; failure to comply with the monument protection requirements; inefficient work of the monuments protection authorities; the disparity between the national legislation and international law) and the restoration issues directly associated with the work of the restoration industry, and methods of their solution, which is the subject of the submitted research. The main issues to be solved for the preservation of architectural heritage in Ukraine, including its restoration are: insufficient legislative and legal regulations for the preservation and restoration of monuments; consequences of their uncontrolled exploitation (accident rate, violations of statics of buildings, changes in the hydrogeological conditions under foundations, loss of parts of foundations, etc.), the lack of the methodological and organizational framework, information system of monitoring and expert assessment of the monuments condition.</p>

UA.2.

Title	FINISHING MATERIALS FOR FACADES AND INTERIORS OF ART NOUVEAU BUILDINGS (ON THE EXAMPLES OF UKRAINE AND POLAND)
Authors	Yulia IVASHKO ¹ , Ann KOROVKINA ² , Iryna YERMOLENKO ³ , Valerii TOVBYCH ¹ , Dominika KUSNIERZ-KRUPA ⁴ , Justyna KOBYLARCZYK ⁴ ¹ Kyiv National University of Construction and Architecture, 31 Povitroflotskyi Avenue, Kyiv, 03037, Ukraine. ² O.M. Beketov National University of Urban Economy in Kharkiv, 17 Marshal Bazhanov Street, Kharkiv, 61002, Ukraine. ³ National Technical University "Kharkiv Polytechnic Institute", 2 Kyrpychova Street, Kharkiv, 61002, Ukraine. ⁴ Cracow University of Technology, Warszawska 24, Cracow 31-155, Poland.
Institution	

**Description
EN**

The article is devoted to the study of building materials for Art Nouveau buildings in the cities of Ukraine and Poland and the experience of their restoration using modern materials and technologies. Considering the vastness of Art Nouveau (Secession style) heritage in Ukraine and Poland, the authors limited themselves to only one narrow aspect – finishing materials and four cities – Kyiv, Kharkiv, Cracow and Lodz. The example of Rodzianko's apartment in Kyiv shows what finishing materials were used at the beginning of the 20th century. The buildings of the northern national romanticism, in which natural raw stone was widely used, were distinguished by the specifics of the decoration. The Polish Art Nouveau version formed in the mainstream European trends and under the direct influence of the Vienna Secession. On the example of objects in Cracow and Lodz, different methods of finishing the facades of buildings with various functional purposes were shown. The scientific novelty of the article is the analysis of the chemical compositions of paints and plasters of the Secession period, and modern methods of restoration of such objects.

UA.3.

Title	WAYS OF PERFORMANCE AND PRESERVATION OF MONUMENTAL ART WORKS ON THE FACADES OF ARCHITECTURAL MONUMENTS OF THE 19TH – EARLY 20TH CENTURY
Authors	Yulia IVASHKO ¹ , Kazimierz KUŚNIERZ ² , Michał KRUPA ² , Piotr GRYGLEWSKI ³ , Andrii DMYTRENKO ⁴ ¹ Kyiv National University of Construction and Architecture, 31 Povitroflotskyi Avenue, Kyiv, 03037, Ukraine ² Cracow University of Technology, 24 Warszawska Street, 31-155, Cracow, Poland
Institution	³ Institute of Art History, University of Lodz, 65 Narutowicza Street, 90-131, Lodz, Poland ⁴ National University "Yuri Kondratyuk Poltava Polytechnic", 24 Pershotravnevyi Avenue, Poltava, 36011, Ukraine
Description EN	<p>One of the restoration important tasks is to preserve the original monumental art works on the historic buildings facades. The stylistics of buildings in the Central Ukraine cities in the second half of the 19th – early 20th centuries was analyzed and it was proved that ceramic decor was used to a rather limited extent, mainly in the form of decorative inserts and cornice strips of one colour. Polychrome majolica panels also did not become widespread. The exception is the direction of Ukrainian national romanticism, which can be called "ceramic Art Nouveau" and most vividly embodied in the Poltava Provincial Zemstvo building and the memorial chapel in Poltava.</p> <p>Original examples of Secession period monumental art have been preserved on the buildings' facades in Cracow and Lodz. A common technique is the combination of typical Art Nouveau forms with rich sculptural and ornamental decorations. In many cases there is Viennese Secession direct influence, especially when the facade decoration involved masters from Vienna.</p> <p>The research scientific novelty lies in determining the features of ceramic decor on the facades, in substantiating the uniqueness of Ukrainian national romanticism as a phenomenon, in covering the tried and tested technologies of restoration and conservation of ceramic decor.</p>

UA.4.

Title	THE SPECIFICITY OF THE RESTORATION AND MONUMENT PROTECTIVE MEASURES FOR THE PRESERVATION OF HISTORICAL CHINESE GARDENS
Authors	Mykola ORLENKO ¹ , Yulia IVASHKO ² , Peng CHANG ² , Yang DING ² , Michał KRUPA ³ , Kazimierz KUŚNIERZ ³ ¹ Ukrrestavratsiia Corporation, 6 Boryspilska Street, Kyiv, 02099, Ukraine.
Institution	² Kyiv National University of Construction and Architecture, 31 Povitroflotskyi Avenue, Kyiv, 03037, Ukraine. ³ Cracow University of Technology, 24 Warszawska Street, 31-155, Cracow, Poland.
Description EN	The relevance of research and preservation of Chinese historical gardens with small forms is due to several factors. The unique heritage of Chinese landscape design, represented by the gardens of Suzhou, is today listed as a UNESCO World Heritage Site and is an international tourist attraction. It is a source of research on traditional Chinese landscape design techniques based on the principles of Feng Shui, Taoism, Buddhism and Confucian doctrines. All Chinese gardens had been developed with the use of established rules and techniques, among which the authors have described eight main ones that are present in the gardens of Suzhou. The scientific novelty of the research consists in analyzing and concretizing a list of the main techniques of traditional Chinese landscape design and argumentation of the revealed techniques with specific examples of gazebos in the gardens of Suzhou. The methods of figurative expressiveness of pavilions in different regions of China are systematized. Comparison of historical and modern Chinese pavilions demonstrated the narrowing of figurative means, the use of a narrow range of historical prototypes (mainly in the east and southeast), in which the national features of the small-scale architecture are vividly pronounced.

United States of America

By *TISIAS*

US.1.

Title

EDIBLE HOLY COMMUNION GEL CAPSULE

Authors

THERESA MARYBETH LAY

Institution

God's Pill

Patent no.

Patent Granted (No.248087) – State of Israel

Description EN

An edible communion gel capsule including a gel capsule having at least one interior cavity & at least one of a liquid, alternately, a powder disposed within at least one interior cavity. The liquid is one of wine, alternatively, grape juice, and the powder is an edible grape juice powder. An edible solid material is disposed around one section of a medial section of the capsule, and entirely of an exterior surface area of the gel capsule & one half of an exterior surface area of the gel capsule.

The solid material is bread.

Holy Communion Gel Capsule is described where both juice (or wine & wafer) are provided in a compact and portable package facilitating the participation away from the church or distributed quicker and more conveniently. A gel cap or soft gel capsule filled with grape juice and, or wine surrounded by a wafer or bread ring. Compact juice, juice power + wafer in a supplement form, portable, sanitary, great for military, large or small groups.

Class no.

3



Vietnam

By Dr. Phan Quoc Nguyen, Vietnam National University, Hanoi

VN.1.

Title	Smoking prevention in public area using deep learning
Authors	NGUYEN KHANH LINH, NGUYEN HOANG YEN NGOC
Institution	DAO DUY TU HIGH SCHOOL, HANOI CITY
Patent	Patent application No. 1-2021-01725 Our invention implements smoking detection in public area using deep learning technology that can be used in smallest computers like Raspberry.
Description EN	By using a pre-trained model include smoker and nonsmoker, we were able to perform deep transfer learning to produce a voice advise that can predict with the accuracy up to 90%. We strongly believe that our system can assist people quitting tobacco easier.
Class	10. Information Technology and Communication

VN.2.

Title	Antibacterial fabric based on silver nanoparticles and nonwoven fabric for application in antibacterial products
Authors	NGUYEN THUY LINH, TANG DUC MINH
Institution	DAO DUY TU HIGH SCHOOL, THAINGUYEN PROVINCE
Patent	Patent application No. 1-2021-01726 Currently, there are many diseases caused by bacteria and viruses. These diseases spread very quickly in the community it cause damage to health, even leading to human death such as Covid 19... There are many solution help prevent the spread of COVID-19, as well as other bacteria and viruses: wear a face mask; maintain at least two meter of distance between yourself and others; avoid large gatherings; avoid close contact with people who are sick. In particular, it must be mentioned that the active use of antibacterial products. Researches on the uses of human friendly materials help fight the spread of disease, hence, have been considered to be one of the most important tasks in all countries.
Description EN	Recently, silver nanotechnology has been shown to be have

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great potential for applications. Silver nanoparticles is known to have outstanding antibacterial property, they have been used in medicine, cosmetics and consumer goods, so they are safe for humans. In this invention, we have successfully fabricated antibacterial silver nano fabric. Groundbreaking of invention is dispersion of silver nanoparticles onto the nonwoven fabric. The voids of the nonwovens fabric are not arranged in order, one layer may be obscured by the other. Therefore, dispersion and retained of silver nanoparticles on nonwoven fabric are better than other fabrics. Testing the bactericidal shown that silver nano fabric ability to kill over 80 % of E.coli bacteria and 97% of Bacillus subtilis bacteria. This results as a new choice to prevent the spread of diseases caused by bacteria and viruses, thereby, protecting human health.

Class 9. Chemical and Textile Industry

VN.3.

Title Energy saving and smart air conditioning system for classroom

Authors NGUYEN VIET ANH, HAU VIET DUC

Institution DAO DUY TU HIGH SCHOOL, THAINGUYEN PROVINCE

Patent Patent application No. 1-2021-01727

Description A system for providing a specific cool - air flow to a specific location in a classroom having a pupils is disclosed that include: a primary air conditioner for setting temperature and temporary storing cool air chamber in the ceiling, a plurality of air flow controllable outlets for creating an air current with specific temperature at each location, a central processing unit (CPU) with an AI algorithm for reading the information from a low cost thermal camera and control the cool-air flow of each outlet according to the selected working mode.

EN

Class 2. Energy and sustainable development

VN.4.

Title	A special watch for the elderly and disabled
Authors	Hua Gia Vu, Brian Lam Pak Lai, Luong Thiep Bang Lomonosov Secondary and High School
Institution	Marie Curie Secondary and High School Thang Long Secondary School
Patent	Patent application pending; Registered According to data from Department of Economic and Social Affair, United Nations (UN), currently, it is estimated that 15% of the population worldwide or some 1 billion individuals live with one or more disabling conditions. More than 46 per cent of older persons – those aged 60 years and over—have disabilities and more than 250 million older people experience moderate to severe disability. Around the world, persons with disabilities face a number of obstacles including attitudinal, environmental and institutional barriers preventing their full and equal participation in all aspects of life. Often older persons with disabilities are among the most adversely affected, facing further age barriers in society. The Sustainable Development Goals (SDGs) of the 2030 Agenda of UN pledges that no one will be left behind, promoting and protecting the rights and dignity of older and disabled persons and facilitating their full participation in society is an integral part of the pursuit of the 2030 Agenda:
Description	Leaving no one behind.

EN

There have been so many wearable technology devices and smartwatches invented to support the elderly and disabled over the world including those in Vietnam. However, the most challenging thing is the price of these watches. Not many people can afford to have one, especially Vietnamese people whose income is still low. That is the reason why my team decided to make a simple watch with a reasonable price.

This watch has round surface with 2 circles: one to count minutes and one to count hour. People just touch this watch and know what time it is. Its strap is interchangeable and made of recycled materials so it is environmentally friendly to the environment. My team plans to active voiceover in this watch so people can hear it too. Furthermore, we prefer using solar energy to recharge batteries so that it is safe.

New features:

- Easy to make and to use
- Voiceover activated to support users
- Use recycled material to make interchangeable straps.
- Environmentally friendly to the environment because of using solar energy to charge batteries.

Applicability and commercialization:

- Support and satisfy the elderly and disabled's need
- Be potential for mass production in Vietnam market in a near future
- Have reasonable price for all people to afford one in comparison with current smartwatches .

Teach children and raise people's awareness about humanism when using this special watch.

Class

VN.5.

Title

Method for the gradient isolation of anticancer agents ZERUMBONE and ZEDERONE from the rhizomes of *Curcuma aromatica* Salisb. and Extracted product from this method

Authors

HOÀNG HẢI, PHẠM MINH ĐỨC, HỒ THÁI ĐỨC

Institution

HUS High School for Gifted Students

Patent

Patent application pending; REGISTERED

Description

EN

A simple, optimized method is developed for the simultaneous isolation of the anticancer agents zerumbone and zederone from the rhizomes of *Curcuma aromatica* Salisb. *Curcuma aromatica* Salisb. is a medicinal plant of the family Zingiberaceae and widely cultivated in Vietnam. Zerumbone is a multitarget anticancer agent against a number of cancer cell lines such as HeLa and HCT116 while zederone is a cytotoxic agent against human cancer cell lines PC-3, KG1a, and HT-29. The method extracts zerumbone from the rhizomes into an *n*-hexane extract and a simple step-wise gradient column chromatography on silica gel with three solvent systems give crystal-pure zerumbone as the main product in high yield. Zederone is the minor products and is exhaustively isolated as a more polar end product of the isolation process of zerumbone. The two compounds are promising anticancer drugs of natural origin for clinical uses and the isolation method can be scaled up in an environment-friendly manner.

Class

4

VN.6.**Title****IoT based Health Monitoring System using Arduino****Authors**

Le Tran Quynh Anh; Nguyen Duc Huy; Ngo Nguyen Anh Hao; Nguyen Bao Duy; Tran Hoang Long

Institution**VNU University of Science****Patent**

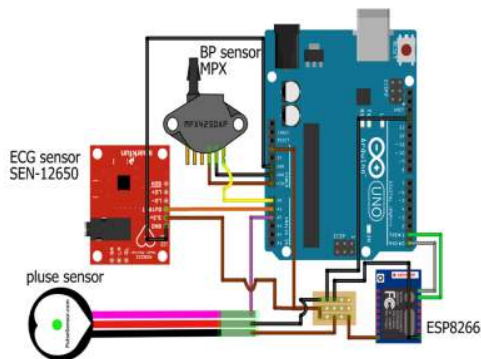
N, A

Description**EN**

This paper introduces a wireless health monitoring system that can monitor a human 24x7. This system consists of a number of the part. Controlling and data processing is done through the Arduino Uno board, all the sensors are connected to Arduino UNO. Through this system, we can measure ECG, heartbeat, BP, and spo2. Through sensors, it is possible to measure all these values. Here all the sensors are powered using a solar power system. All these analog sensors can be connected to Arduino through any of the six analog pins. These values are then used for detecting any critical situation. In the case of a critical situation, an alert can be given as a message. Also, it is possible to monitor the person's health from any location in the world through the Thingspeak cloud. Data from sensors is uploaded to the Thingspeak periodically without any interruption if the internet is available. Here ESP8266 wifi module is used for connecting Arduino to the internet

Class

4





NATIONAL EXHIBITORS

Universities

Research Institutes

Companies

Individuals

University POLITEHNICA of Bucharest

RO.1.

Title EN

SYSTEM AND METHOD FOR DETECTING ACTIVE AIRCRAFT (DRONE) VEHICLES BY DEEP LEARNING ANALYSIS OF SOUND AND CAPTURE IMAGES

Authors

Cătălin DUMITRESCU, Marius MINEA, Ilona-Mădălinea COSTEA, Ionut-Cosmin CHIVA, Viviana-Letiția MINEA, Augustin SEMENESCU

Institution

University POLITEHNICA Bucharest, ROMANIA, EU

Patent no.

Patent application RO 00331/2020

Description

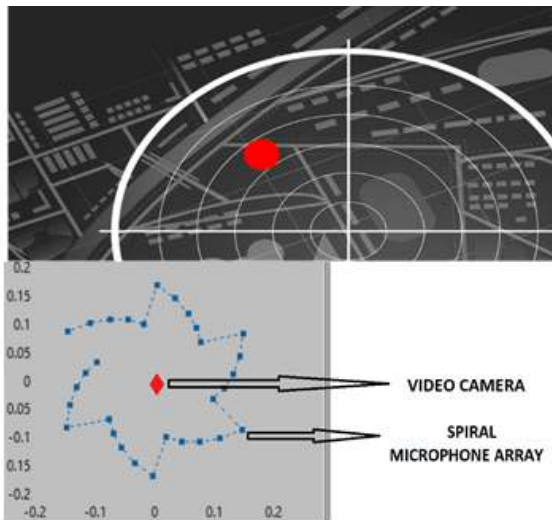
EN

The invention relates to a system and a method for detecting, identifying and classifying drones (UAV), based on the concept of competition at the level of a collection of artificial neural networks with performance in identifying acoustic signals, by means of a computing unit for processing, analysis and classification of drones based on associated acoustic fingerprints.

Application domain: Critical Infrastructure Protection

Class no.

10. Information Technology and Communication



RO.2.

Title EN

**SHORT FEMORAL STEM CERVICAL
ENDOPROSTHESIS**

Authors

Marius MOGA, Augustin SEMENESCU, Mihnea Cosmin COSTOIU, Ileana Mariana MATES, Cezar - Ionut CALIN, Catalin Gheorghe AMZA

Institution

University POLITEHNICA Bucharest, ROMANIA

Patent no.

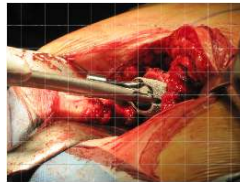
Patent RO130731-B1

**Description
EN**

The patent relates to a short femoral stem cervical endoprosthesis, coceived with a threaded fixation system, working through the process of screwing, improves the process of osteo-integration by increasing the application forces of the bone-prosthesis interface and by increasing the primary and final stability, through the injection via an axial or excentric opening of low viscosity orthopaedic cement.

Class no.

4. Medicine - Health Care - Cosmetics



RO.3.

Title EN

Dental alloy of cobalt-chromium-molybdenum type used for making metal-ceramic dental prostheses, comprises cobalt, chromium, molybdenum, silicon, niobium, ruthenium, zirconium and silver

Authors

ANTONIAC Vasile Iulian, RAU Dzhulietta, SEMENESCU Augustin, DAWOD Nazem, GEANTA Victoras, VOICULESCU Ionelia, MATES Ileana Mariana, SOLEA Marina Roxana

Institution

University POLITEHNICA Bucharest, ROMANIA

Patent no.

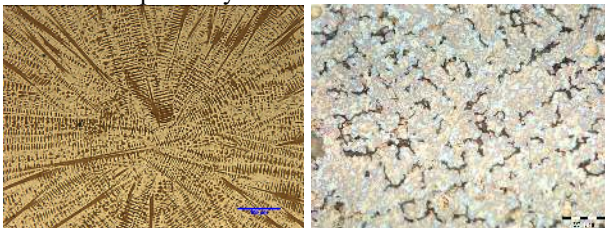
Patent RO134131

**Description
EN**

NOVELTY - Dental alloy of cobalt-chromium-molybdenum type comprises 47-53 wt.% cobalt, 22-26 wt.% chromium, 4-7 wt.% molybdenum, 0.9-1.2 wt.% silicon, 3-5 wt.% niobium, 0.8-1.1 wt.% ruthenium, 10-14 wt.% zirconium and 2-4 wt.% silver, where the alloy has biocompatible metals comprising molybdenum, zirconium, niobium, silver and ruthenium, and is prepared by elaboration in electric arc furnace in neutral atmosphere.

USE - The alloy is used for making metal-ceramic dental prostheses.

ADVANTAGE - The alloy exhibits excellent biocompatibility and corrosion resistance.



Microstructural aspects of the dental alloy (light microscopy)

RO.4.

Title EN	Cobalt, chromium and noble metal containing alloy used for manufacturing metal-ceramic dental prostheses, comprises cobalt, chromium, silicon, ruthenium, zirconium and silver
Authors	ANTONIAI Vasile Iulian, RAU Dzhulietta, SEMENESCU Augustin, DAWOD Nazem, GEANTA Victoras, VOICULESCU Ionelia, MATES Ileana Mariana, SOLEA Marina Roxana
Institution	University POLITEHNICA Bucharest, ROMANIA, EU
Patent no.	Patent RO134132 A0, Derwent Primary Accession Number: 2020-492783
Description EN	NOVELTY - Cobalt, chromium and noble metal containing alloy comprising 58-61 %mass cobalt, 28-30 %mass chromium, 3.4-4.4 %mass silicon, 2-4 %mass ruthenium, 0.7-1.4 % mass zirconium and 0.8-1.2 %mass silver and obtained by elaboration in an electric arc furnace in a neutral atmosphere, with or without magnetic levitation. USE - The alloy is useful for manufacturing metal-ceramic dental prostheses. ADVANTAGE - The alloy has high biocompatibility. DETAILED DESCRIPTION - Cobalt, chromium and noble metal containing alloy of formula: CoCrMn comprises 58-61 %mass cobalt, 28-30 %mass chromium, 3.4-4.4 %mass silicon, 2-4 %mass ruthenium, 0.7-1.4 %mass zirconium and 0.8-1.2 %mass silver and obtained by elaboration in an electric arc furnace in a neutral atmosphere, with or without magnetic levitation.

RO.5.

Title EN	Composition for restoring paper from documents affected by microorganisms
Authors	OPREA Ovidiu Cristian; FICAI Anton; FICAI Denisa; MOTELICA Ludmila; TRUȘCA Roxana Doina; ANDRONESCU Ecaterina
Institution	University POLITEHNICA Bucharest, ROMANIA, EU
Patent no.	Patent application RO A00818/09.12.2020
Description EN	NOVELTY - The present invention relates to the production of gel-type compositions based on cellulose derivatives, with silver nanoparticles protected with biocompatible polymers, such as PVP, PEG for the restoration of paper documents, which will provide long-lasting antimicrobial protection. USE - The gel with cellulose derivatives, with silver nanoparticles, by rapid drying, forms a cellulose film that will repair the damaged areas (ruptures, holes with missing material, etc.). The gel can also be inserted under the letters that came off the initial support following the degradation of the cellulosic material. By rapid drying it will act as a real glue, but having the same composition, based on cellulose. Because the composition contains silver nanoparticles, the cellulose film remaining after drying has antimicrobial activity and no longer allows the development of microorganisms on the treated area.
Class no.	14

RO.6.

Title EN	EXPLOITATION OF THE MAGNETIC NANOPARTICLES IN DEVELOPING MAGNETIC MICRO-DEVICES
Authors	Georgiana DOLETE, Denisa FICAI, Gheorghe MARIN, Anton FICAI, Paul SVASTA, Ecaterina ANDRONESCU
Institution	University POLITEHNICA Bucharest, ROMANIA, EU
Patent no.	Registration OSIM A/00075
Description EN	The aim of the present project is to develop magnetic inks/pastes used for a modern and cost-effective deposition technique, namely screen-printing. The project aims to integrate the two separate components in a demonstration model to prove the enhanced functionality of microelectromechanical systems devices (MEMS) used in biological applications by magnetic actuated micropumps. Starting from this, two major objectives are defined. First of

all, the development of the magnetic inks/pastes is essential to be further used in development of a demonstrator for magnetic actuated microdevices. By using the developed magnetic inks/pastes the consortium, especially by the involvement of the innovative SME, novel experimental models of magnetic actuated micropumps will be developed. So, two experimental models (one product and one device) will be developed by two (nano)technological approaches. According to the proposed work-plan, the consortium is assuring the validation at laboratory level. Moreover, the presence of an innovative SME creates the premises to further develop these researches and to produce magnetic inks and even magnetic actuated microdevices.

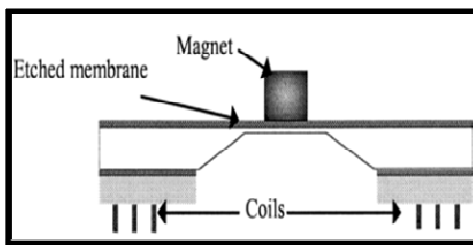


Figure 1. Structure of a microactuator[1]

Class no.

7

RO.7.

Title EN

Treatment Procedure For Various Natural Or Synthetic Surfaces With The Scope Of Inducing Antimicrobial, Antibiofilm, Antifungal, Antialgic Or Antiviral Activities Based On Nanotechnology

Authors

Liliana MARINESCU, Laura-Florentina BOANTA, Anton FICAI, Denisa FICAI, Ecaterina ANDRONESCU

Institution

University POLITEHNICA Bucharest, ROMANIA, EU

Patent no.

Pending

**Description
EN**

The invention consists of developing treatment solutions based on functionalization agents/coupling agents of silanes/siloxanes with functional groups with the role of performing a silanization action onto the treated surfaces. It also consists in functional groups that can ensure both the system's detergency, the anti-adhesive activity, antibiofilm, antibacterial and pore closure / "crack healing" as well as, possibly, induce their hydrophobic character. The system of agents of functionalization can develop through functional

groups and / or adsorbed nanoparticles as gold, copper, silver (AuNPs, CuNPs, AgNPs), complex surfaces with antimicrobial, antiviral, antifungal, analgesic protection for various substrates.

Application domain: natural stone, monuments, restoration claddings, brick, concrete, terrazzo, wood, plaster surfaces. based on mineral compounds, silicate plasters, plasters based on siloxane compounds, glass, wood, composite materials based on cement or resins combined with various fillers (natural stone, glass, ceramics, wood).

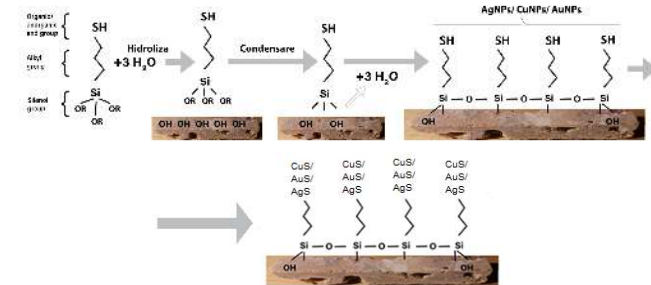


Fig 1 Natural stone system functionalized with siloxanes and nanoparticles

RO.8.

Title EN

Equipment for microhole finishing by ultrasonically aided electrical discharge machining

Authors

Niculae Ion Marinescu, Liviu Daniel Ghiculescu, Alexandru Sergiu Nanu

Institution

Polytechnic University of Bucharest

Patent no.

RO-126381/ 2015-07-30

Description

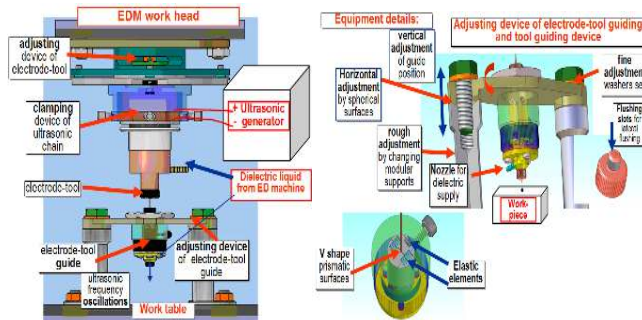
EN

The invention deals with a technology and equipment for microholes finishing by ultrasonically aided electrical discharge machining (EDM). The equipment is assembled on ED machine, and connected to an ultrasonic generator, the tool-electrode vibrating with ultrasonic frequency on longitudinal direction of microhole axis, previously machined by roughing through pulsed laser. The tool-electrode guiding is achieved by an adjustable system using prismatic surfaces from electrically isolating materials. The supplying with dielectric liquid at three levels, depending on tool-electrode type, is conceived.

The technology is used in various industries like: automotive, aeronautics, health care system, chemistry, food

etc., where micromachining very hard materials are needed, without any high costs.

Class no.



RO.9.

Title EN

Equipment for ultrasonically aided electrical discharge machining of microslots

Authors

Liviu Daniel Ghiculescu, Niculae Ion Marinescu,
Alexandru Sergiu Nanu

Institution

Polytechnic University of Bucharest

Patent no.

RO-126381/ 2012-05-30

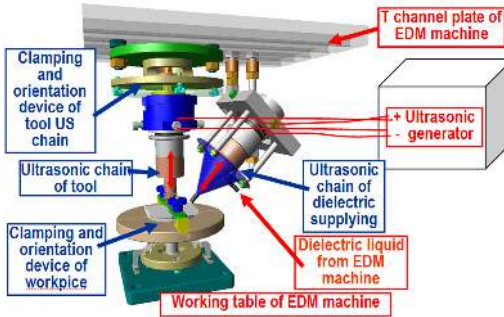
**Description
EN**

The invention deals with an equipment for ultrasonically aided electrical discharge machining (EDM) of microslots, which is assembled on an ED machine and connected to an ultrasonic generator. The equipment comprises: an ultrasonic chain that has at its end, the tool-electrode with blade shape that vibrates on longitudinal direction, and produces cavitation ultrasonically induced within the working gap, a device for clamping and orientation of ultrasonic chain, a hoper supplied with dielectric liquid, that contains another ultrasonic chain, which also vibrates longitudinally within the dielectric liquid, and creates high acoustic pressure, the dielectric liquid being injected with high pressure through the end of the hoper within the working gap.

The technology is used in various industries like: automotive, aeronautics, health care system, chemistry, food etc., where micromachining very hard materials are needed, without any high costs.

Class no.

5



RO.10.

Title EN Mobile equipment for ultrasonically aided electrochemical machining of workpieces of big dimensions

Authors Niculae Ion Marinescu, Liviu Daniel Ghiculescu, Alexandra Banu, Alexandru Sergiu Nanu

Institution Polytechnic University of Bucharest

Patent no. RO - 128982/30.04.2019

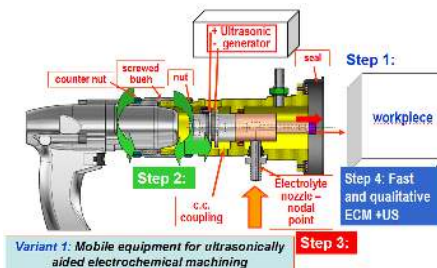
Description EN

The invention deals with a mobile equipment for ultrasonically aided electrochemical machining and polishing of surfaces belonging to workpieces of large dimensions. At electrochemical machining variant, the tool is assembled at the end of an ultrasonic chain, and at electrochemical polishing variant, the tool is rotated, and the electrolytic liquid is introduced in a hopper, on which is assembled an ultrasonic transducer.

The technology is used in many industries like: nuclear, medicine, chemistry, food, aeronautics, automotive etc., where high surface quality on hard materials, electrically conductive is needed, without high costs.

Class no.

5

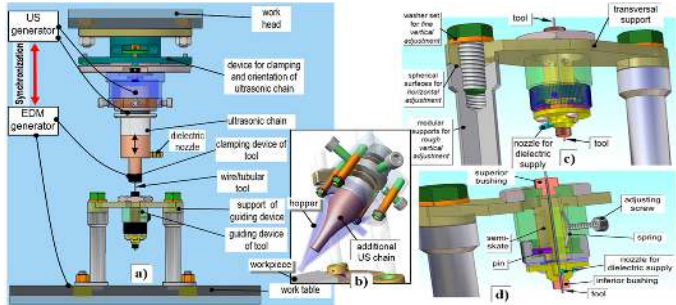


Variant 1: Mobile equipment for ultrasonically aided electrochemical machining

NATIONAL

RO.11.

Title EN	Machining of Advanced Materials Based on Ti and Co Alloys through Ultrasonically Aided Electrical Discharge Micro-drilling (AM_ED_US)
Authors	Daniel Ghiculescu, Gheorghe Jitianu, Alexandra Banu, Andrei Drumea, Nicolae Ionescu, Ovidiu Alupeii, Gabriela Pârveu (Ene)
Institution	Polytechnic University of Bucharest
Patent no.	-
Description EN	<p>The research project, “Machining of Advanced Materials Based on Ti and Co Alloys through Ultrasonically Aided Electrical Discharge Micro-drilling (AM_ED_US)” develops a technology of microdrilling through ultrasonically aided electrical discharge machining (EDM+US) tested at laboratory level applied on <i>advanced materials</i> like nanotubes of TiO₂ thin layers on Ti or Ti alloy support, Titanium aluminides with different proportions between Ti₂Al (α2) and TiAl (γ) phases, and CoCr alloys. These can be used at various parts for very diverse <i>applications in medicine, automotive, aerospace, military, nuclear, food industry</i> etc. The advanced materials mentioned above, due to their high wear resistance, and toughness characteristics cannot be microdrilled by cutting technologies, but by classic EDM with low technological performances yet. So, <i>EDM+US technology improves spectacularly the output technological parameters</i> supported also by lower costs relative to other nonconventional technologies, e.g. laser, electron and ion beam machining. <i>We are the only ones that reported in the state of the art the improvement of all main EDM+US technological parameters at finishing modes</i> - machining rate (V_w) increase up to 500%, volumetric relative wear (\mathcal{G}) (ratio between volumes eroded from tool-electrode and removed from workpiece), and surface roughness (Ra) decrease up to 50% - <i>based on some optimization conditions</i> of working parameters.</p>



Equipment for EDM+US microdrilling - components

Class no.

5

RO.12.

Title EN

MILL KNIFE FOR ASPHALT CUTTING/STRIPPING THAT HAS WEAR SELF PROTECTION AND AUTO BLOCK WHEN SPINNING

Authors

BINCHICIU Emilia, GEANTĂ Victor, VOICULESCU Ionelia, ȘTEFĂNOIU Radu, IOVĂNAȘ Răzvan Florin, BINCHICIU Horia, BINCHICIU Aurelia

Institution
Patent no.

University POLITEHNICA of Bucharest, SUDOTIM AS
RO 129863/2019

Comprises a support made of steel low alloyed with chromium, which is consolidated, at the conical surface level, with an system that avoid blocking during rotation around its axis, produced by welding process, WIG or flame welding, in the form of layers realized by a matrix of steel low alloyed with chromium, in which are embedded melted tungsten carbide particles. In the working area, a conical body made from tungsten carbide is brazed using soldering alloy.

Description
EN

THE MANUFACTURING PROCESS is performed in several stages: obtaining the knife holder, made by a low alloy steel, from a bars product; hardening the holder to around 55 HRC by heat treatment and quenching in oil; machining the knife holder to the final dimension; attainment by sintering of the reinforcing mill body, using tungsten carbide; brazing in the knife holder of the reinforcing mill body; obtaining of the reinforcing layers, that have the role of self-protection system; slow cooling of the assembly.

APPLICABILITY DOMAIN: earthmoving machines.

Class no.

7 & 8

**RO.13.**

Title EN **WEAR-RESISTANT REMOVABLE COMPOSITE REINFORCEMENT AND PROCESS FOR OBTAINING IT**

Authors ȘTEFĂNOIU Radu, BINCHICIU Emilia, BINCHICIU Horia, VOICULESCU Ionelia, GEANTĂ Victor, BINCHICIU Aurelia

Institution POLITEHNICA University of Bucharest, SC SUDOTIM AS SRL Timisoara

Patent no. RO 129865 / 30.05.2019

Description Relates to a removable reinforcement of solid rigid composite type, of equal wear resistance, used to reinforce the active elements of the crushing-grinding equipment of the stone quarry aggregates, in order to increase their reliability and ensure efficient operation conditions from economically point of view and a process for obtaining this reinforcement. The reinforcements consist of a matrix made of austenitic-manganese steel alloyed with max. 12% Cr and max. 3% Ni, reinforced in the area of maximum wear, in a ratio of up to 30%, with spheroidal particles having the granulation of 3...10 mm and reinforced, in the areas of medium wear, with layers of NiFe-CW-Ti, NiFe-Cr-CW, FeNi-Cr, Fe-Cr-Ti, Fe-Cr, Fe-CW alloys compatible, upon welding, with the matrix, and deposited as anti-wear intelligent systems of grid, embossed and/or grooved type.

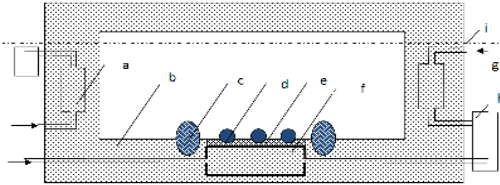
EN The electrode consists of a case of 55%Ni-45%Fe alloy, which contributes by 55% by mass to forming the deposition and a composite core consisting of 80% carburized Cr, 12% FeTi60, 5% FeSi70 and 3% FeMn45 with a contribution of 45% to the deposition mass. The process consists in carrying out the reinforcement matrix as a rectangular plate with the dimensions of 1000 x 250 x 100 mm, anti-gravitationally cast into a mold made of quartz sand, of steel of the Fe-14%Mn-3%Ni-2%Cr type, onto the reinforcements of 6 mm,

uniformly pre-positioned in the central area in a ceramic mass.

Applications: soil-working equipments, construction and metallurgical industry.

Class no.

6 & 7



RO.14.

Title EN

TUBULAR ROD WITH COMPOSITE CORE AND IT'S MANUFACTURING PROCESS

Authors

BINCHICIU Emilia, VOICULESCU Ionelia, BINCHICIU Horia, GEANTĂ Victor, ȘTEFĂNOIU Radu, BINCHICIU Aurelia

Institution

University POLITEHNICA of Bucharest, SUDOTIM AS

Patent no.

RO 129867/2019

Allows coating by welding process, WIG or flame welding, of rough composites layers. The rod consists in a soft steel sheath that has a composite core realized from two distinct layers, made of wolfram carbide and an alloying-compensation system.

**Description
EN**

THE MANUFACTURING PROCESS consists in: shaping of sheath in U-shape, using a band of steel low alloyed with chromium (1), uniform dosage of the first layer of reinforcing material, as wolfram carbide granules (2), dosage and homogenization of the alloying-compensation system (3), dosing and deposition of the second layer of alloying-compensation system over the first layer (4), shaping and closing of the sheath, compacting of the composite core and cutting of the tubular rods at the specified length.

APPLICABILITY DOMAIN: Deposition of homogeneous rough layers with high hardness.

Class no.

6&7

RO.15.

Title EN COMPOSITE STRIP USED TO REINFORCE THE ACTIVE SURFACES OF SOIL-WORKING EQUIPMENTS AND PROCESS FOR OBTAINING IT

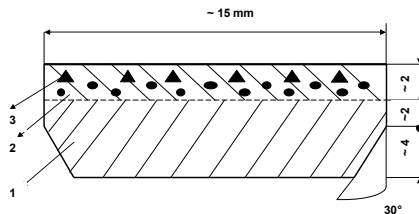
Authors BINCHICIU Emilia, BINCHICIU Aurelia, BINCHICIU Horia, VOICULESCU Ionelia, GEANTĂ Victor, ȘTEFĂNOIU Radu

Institution POLITEHNICA University of Bucharest, SC SUDOTIM AS SRL Timisoara

Patent no. RO 129877 / 30.08.2019

Description EN COMPOSITE STRIP USED TO REINFORCE THE ACTIVE SURFACES OF SOIL-WORKING EQUIPMENTS AND PROCESS FOR OBTAINING IT relates to a composite strip, used for reinforcing the active surfaces of soil working equipment, which has a saw teeth-like cutting edges with self-sharpening properties in operation, which favors easy soil-working, with low fuel consumption. The strip comprises a support made of steel low-alloyed with Mn, rolled at sizes of 15 x 6 mm, whereon there is deposited, by welding, an anti-wear layer with a thickness of 2 mm, consisting of a steel matrix of the Fe - 30%Cr; Fe - 12%Cr - 14%Mn; Fe - 25%Cr - 1%V type, wherein particles of melted W carbide with grinding texture, in the granulometry class of 1.5 mm are embedded, in ratios of 15%. The process is a sequential technological process comprising operations of cutting, chamfering, build-up welding with one of the above mentioned alloys, followed by heat treatment of the assembly.

Applications: soil-working equipments, construction and metallurgical industry

Class no.**6&7**

RO.16.

Title EN	AIR-ARC GOUGING ROD AND MANUFACTURING PROCESS
Authors	VOICULESCU Ionelia, BINCHICIU, Emilia GEANTĂ Victor, BINCHICIU Horia, ȘTEFĂNOIU Radu, BINCHICIU Aurelia
Institution Patent no.	University POLITEHNICA of Bucharest, SUDOTIM AS RO 129992/2019
Description EN	AIR-ARC GOUGING ELECTRODES are covered rods, made from carbon steel pipes with thin laminated walls, and then coated with special extruded layer. THE MANUFACTURING PROCESS of the gouging electrodes consists in the following steps: cutting of the pipes at the specified length; filling with stearin of the pipe ends; cleaning the stearin excess; preparing the covering mixture, the dosing and homogenization of the constituents; deposition by extruding of the covering on the rod; heat drying and packaging of the electrodes. APPLICABILITY DOMAIN: metallurgical processing, welding reparations.
Class no.	6&7

RO.17.

Title EN	METALLIC MATERIAL TYPE Ni-Cr-Fe-Mn-Al FOR WELDING LOADING AND PRODUCTION PROCESS
Authors	GEANTĂ Victor, VOICULESCU, Ionelia., ȘTEFĂNOIU Radu., BINCHICIU Horia, VASILE, Ion Mihai, BĂRLĂDEANU, Mihai, IONESCU, Maria, CÂRCIUMĂREASA, Daniel, IRIMIA, M.
Institution Patent no.	University POLITEHNICA of Bucharest, IMA-METAV RO 130677/30.10.2020
Description EN	METALLIC MATERIAL TYPE Ni-Cr-Fe-Mn-Al FOR WELDING LOADING AND PRODUCTION PROCESS relates to a metallic material type Ni-Cr-FeMn-Al for welding deposit, with good resistance to wear and corrosion containing 4.6-6.8% Al, 20-22.5% Cr, 23-24 , 5% Fe, 23-24.5% Mn, 24-26.5% Ni, with density 7.4-7.6kg / dm ³ and hardness values of 400-535HV0.1 and after heat treatments of 700-950HV0.1. The production process consists of charging and melting the metallic components in a vacuum induction furnace and controlled argon atmosphere. Applications: welding, mechanical engineering, metallurgy
Class no.	6&7

RO.18.**Title EN****EQUIPMENT FOR COMPLEX METALLURGICAL PROCESSING BY HEATING INDUCTION - BIOLEV****Authors**

GEANTĂ Victor, VOICULESCU Ionelia, KELEMEN, Gyorgy, MOLNAR, Gabor, KELEMEN, Hajnal, HORVATH, Laszlo, OPREA, Simion

Institution**University POLITEHNICA of Bucharest, AAGES S.A.****Patent no.****RO 133993/27.11.2020****Description****EN****EQUIPMENT FOR COMPLEX METALLURGICAL PROCESSING BY HEATING INDUCTION - BIOLEV**

relates to a multifunctional equipment for complex sequential metallurgical processing with a single compact converter and working atmosphere, equipped with two different inductors (flat inductor and helical inductor) Depending on the type of inductor used, it allows the sequential development of several complex metallurgical processing operations such as: surface melting, deposits of metallic and non-metallic powders, obtaining compact layers (with flat inductor), elaboration of ferrous alloys and non-ferrous, brazing of cylindrical or flat products, elaboration of metallic and non-metallic alloys in levitation (with the helical inductor). The two inductors placed vertically at different distances are fed sequentially by a single medium frequency converter that performs the conversion of 50 Hz alternating current energy into medium frequency energy, necessary for heating and induction melting of metals and alloys. **Applications:** metallurgy

Class no.**6 & 7**

Technical University of Cluj-Napoca, România

RO.19.

Title EN	Spherical robot for the rehabilitation of the proximal area of the upper limb
Authors	Vaida Călin, Plitea Nicolae, Pislă Doina, Carbone Giuseppe, Gherman Bogdan, Ulinici Ionuț, Pislă Adrian
Institution	Technical University of Cluj-Napoca
Patent no.	Patent OSIM: RO132233 -B1/30.03.2020
Description EN	The invention relates to a spherical robotic system for the rehabilitation of the proximal zone of the upper limb, containing three active couplers for the purpose of reproducing the abduction/adduction and flexion/extension of the shoulder in the horizontal and vertical plane and reproducing the forearm pronation/supination in the vertical plane. The invention is directed towards post-stroke patients suffering from paralysis at the level of the upper limb following stroke, but its use may be extended to other afflictions that result in the partial or total loss of upper limb mobilization capacity. The robot has three degrees of freedom, achieved through three active rotation joints that have the axis intersection in a single point, more specifically the center of a sphere, which relative to the patient will be transposed over the center of rotation of the shoulder joint, for the first two rotations, and the third being done around the midline of the upper limb.
Class no.	4

RO.20.

Title EN	Parallel robotic system for the medical rehabilitation of the upper limb
Authors	Gherman Bogdan, Pislă Doina, Plitea Nicolae, Vaida Călin, Carbone Giuseppe, Pislă Adrian, Baniță Alexandru
Institution	Technical University of Cluj-Napoca
Patent no.	Patent OSIM: RO132234 -B1/30.03.2020
Description EN	The invention relates to a robotic system for the rehabilitation of the upper limb, in this case the recovery of the following movements: flexion of the forearm (elbow), pronation / supination, flexion / extension and abduction / adduction of the hand (palm). The system is implemented using a modular architecture with two parallel robotic modules, one for the forearm rehabilitation: elbow flexion

NATIONAL

and pronation/supination; the other for the rehabilitation of the wrist: flexion/extension and adduction/abduction. The advantage of this family of robots consists in a large range of motion, high stiffness and modularity. The system has been tested in hospital with patients for a period of 5 months and the results have positive and encouraging.

Class no. 4

RO.21.

Title EN

Variable reluctance motor with outer rotor and modular construction for e-bike applications

Authors

Jurca Nicolae Florin, Ințe Răzvan

Institution

Technical University of Cluj-Napoca

Patent no.

Patent OSIM: RO131721 -B1/30.03.2020

**Description
EN**

The patent refers to a variable reluctance synchronous motor with outer rotor and modular construction. The rotor is made up of 6 modules, between modules is an element of non-magnetic separation. Each module is made up of three separate magnetic elements fixed to each other by a dovetail joint. The connecting elements are made of non-magnetic material. Each pole rotor is provided with holes that allow attachment of 3 different lengths of spokes on the same module. Each spoke is fixed by means of safety spring pin. Using this motor with outer rotor and modular construction, facilities maintenance operations for a such systems making them more reliable and simpler. Depending on the type of defect can be removed the entire motor or only components (rotor poles, spokes).

Class no. 8

RO.22.

Title EN

Wiping device of surface of the steel wire after galvanizing

Authors

Tintelecan Marius Constantin

Institution

Technical University of Cluj-Napoca

Patent no.

Patent OSIM: RO130512 -B1/30.01.2020

**Description
EN**

The patent relates to a device for wiping the surface of steel wire after galvanizing.

This device, which will finally create a thin but strong zinc layer shiny appearance.

It is known that by immersing a steel wire in a molten Zn bath,

on its surface are formed seven concentric layers of Fe-Zn alloy having a matte appearance; the phases formed differing by micro- hardness, by mode of crystallization and (of course) by their chemical composition. The basic, incipient ideas for achieving of this device refer to:

1. Proper wiping of the wire on which the zinc is deposited
2. Sudden cooling of the whole assembly: deposited steel-zinc wire

In these moments is used to wipe the surface of the steel wire after galvanizing, a different technique variant, in a horizontal version where some pills of asbestos are pressed on the outer surface of the wire, the wire following an ascending path (given by the its pulling system of accumulation) after its exit from the molten zinc bath.

Class no.

6

RO.23.

Title EN

Multilayered composite panel and the method used for obtaining it

Authors

Tămaș-Gavrea Daniela-Roxana, Iștoan Raluca, Tiuc Ancuța Elena

Institution

Technical University of Cluj-Napoca

Patent no.

Patent OSIM: RO133261 -B1/30.04.2020

The invention relates to a multilayered composite panel and the method of obtaining it. The panel has two rigid perlite-based boards, reinforced with natural flax fiber nets, with a compact layer of flax fiber between them, using white cement as a binder. The purpose of the panel is to improve the quality of life and human health in buildings' environment by providing optimum acoustic comfort based on users' requirements.

Description

EN

The acoustic absorption coefficient of the non-perforated composite panel is high at medium frequencies. The peak of sound absorption coefficient of 0.98 is reached at the frequency of 500 Hz.

In order to optimize the sound absorbing properties of the multilayered composite panel, perforations were made on one of the rigid boards of the panel. Thus, perforated panels have acoustic absorption coefficients above 0.70 for a wider frequency range, of 500-3000 Hz. The maximum absorption coefficient is 0.98 at the frequency of 900 Hz.

Class no.

7

RO.24.**Title EN****Programable method for current sensor fault detection of 3-phase electronic inverters****Authors**

Ruba Mircea

Institution**Technical University of Cluj-Napoca****Patent no.**

Patent OSIM: RO132781 -B1/30.12.2020

**Description
EN**

The invention refers to a method of detecting the current sensors faults of 3-phase inverters that is running at a rate of 250 time higher than the rate of the actual control loop. It permanently monitors readings from the sensors and computes the difference between the reference values and the actual measured ones. The difference then is compared with an adaptive threshold. The comparison yields if a fault occurred on a certain sensor and decides the replacement of the faulted measurement with an estimated one and also modifies the gains of the control loop's PI regulators, adapting them to the new operational regime. In the same time, it stops the fault detection procedure for a certain period of time till the eventual occurred transient due to the current replacement passes. By this, the detection, isolation and compensation of the fault occurred is handled by the strategy in-between two consecutive iterations of the actual inverter control loop. The fault detection procedure executes 250 calculations (detection) between two consecutive calculations of the control loop.

Class no.

2

RO.25.**Title EN****Stand for study of tribocorrosion****Authors**

Vermesan Horatiu, Chira Mihail

Institution**Technical University of Cluj-Napoca****Patent no.**

Patent RO130936 -B1/30.12.2020

**Description
EN**

The invention consists of an experimental stand for the determination of surfaces tribocorrosion. The experimental stand for the study of tribocorrosion offers technological and building simplicity. It allows precise measurement of frictional force and other tribocorrosion parameters. It allows adjustment of working parameters, positioning and fixing of electrodes for the corrosion study. The synergistic action of tribocorrosion factors leads to surface degradation and hence loss of material, the result being superior to that obtained by

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simply summing up the individual degradation processes. The patent will be useful in determinations of tribocorrosion resistance of various machine parts which are working in both corrosive and wear environment. The results are easy to understand and compare.

Class no. 5

RO.26.

Title EN **System for fixing plastic bottles in rotary tightness testing apparatuses**

Authors Ungureanu Miorița, Marina Marian Gabriel, Stoicovici Dinu Ioan, Ungureanu Nicolae Stelian

Institution **Technical University of Cluj-Napoca**

Patent no. Patent OSIM: RO133200 -B1/28.08.2020

**Description
EN**

The invention relates to a system for fixing plastic bottles in rotary tightness testing apparatuses while maintaining the bottles in vertical position in transport means and ensuring their transfer from one transport means to the other. According to the invention, the system comprises three devices: the rotary bottle fixing device consisting of a metal drum on which a profiled rubber bush and two identical bottle fixing linear devices consisting of two vertical drums on which a profiled rubber belt.

Class no. 5

RO.27.

Title EN **Adaptive system designed to ensure electric power quality in low voltage networks**

Authors Sacerdoțianu Dumitru, Nicola Marcel, Ivanov Sergiu, Ciontu Marian, Chindriș Mircea Dorin, Cziker Andrei Cristinel, Radu Alexandru, Dumitrescu Camil-Sorin

Institution **Technical University of Cluj-Napoca & Partners from Craiova**

Patent no. Patent OSIM: RO132402 -B1/28.08.2020

**Description
EN**

The invention relates to an adaptive system that compensates for most of the supply voltage disturbances (mainly harmonics, unbalance, dips and swells, slow and fast fluctuations of short or long duration), respectively of the electric current (mainly harmonics and unbalance), in low voltage electrical networks. The installation of this equipment ensures a satisfactory quality of the electricity supplied to the consumers.

The proposed system ensures increased response speed to compensate for disturbances by constantly monitoring the electrical quantities in the network and adapting the control in real-time to optimize operation. In addition, the equipment provides a power factor of the unit at the connection point.

Class no.

2

RO.28.

Title EN

Induction machine with rotor in modular construction

Authors

Jurca Nicolae Florin, Ințe Răzvan Alexandru, Popa Dan-Cristian

Institution

Technical University of Cluj-Napoca

Patent no.

Patent application OSIM: A/00341/18.06.2020

Description

EN

The conception of the induction machine with rotor in modular construction is based on building the short-circuit rotor of the most used electric machine at industrial level from modules in which aluminum bars are placed. Modules are fixed to the rotor yoke, common to all modules, by dovetail clamps. The shape of the modules is of such a nature as to allow their fixation on the yoke. The short circuit ring will be fixed to the bars using the two holes with which each bar is provided at the ends.

The proposed induction machine, with the rotor in modular construction, retains all the operating characteristics specific to this type of electric machine. The advantage of this rotor construction is the reduction of the time and maintenance cost of such a structure.

Class no.

5

RO.29.

Title EN

Rear located aerodynamic device for rigid transport semi-trailers

Authors

Mariașiu Florin, Scurtu Liviu Iacob, Varga Bogdan Ovidiu

Institution

Technical University of Cluj-Napoca

Patent no.

Patent application OSIM: A/00714/09.11.2020

Description

EN

The invention relates to a rear aerodynamic device for rigid semi-trailers (with rigid walls) in the composition of a road freight train, which reduces the value of its aerodynamic coefficient. The applicability of the device in the road transport industry derives from the need to carry out the transport process in the best conditions of economic efficiency (achieved by reducing fuel consumption) and

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indirectly by reducing the pollutant emissions caused by road transport. The rear aerodynamic device for rigid transport semi-trailers is characterized by the fact that the active operating principle is based on the use of variable geometric shapes (aerodynamic cushions) located at the rear of a rigid semi-trailer, made of a waterproof elastic material (rubber), which allows it to swell with compressed air until the desired shape is obtained.

Class no.

8

RO.30.

Title EN

Superior located aerodynamic device for rigid transport semi-trailers

Authors

Mariașiu Florin, Scurtu Liviu Iacob, Varga Bogdan Ovidiu

Institution

Technical University of Cluj-Napoca

Patent no.

Patent application OSIM: A/00716/09.11.2020

**Description
EN**

The invention relates to a superior aerodynamic device intended for rigid transport semi-trailers (with rigid walls) from the composition of a road freight transport train, which reduces the value of its aerodynamic coefficient. The applicability of the device in the road transport industry derives from the need to carry out the transport process in the best conditions of economic efficiency (achieved by reducing fuel consumption) and indirectly by reducing the pollutant emissions caused by road transport. The superior aerodynamic device for rigid transport semi-trailers is characterized by the fact that the active operating principle is based on the use of a variable geometric shape (aerodynamic cushion) located at the top of a rigid semi-trailer, made of an elastic elastic material, which allows it to swell with compressed air until the desired shape is obtained.

Class no.

8

RO.31.

Title EN

Electronic extremal regulator

Authors

Munteanu Radu Adrian, Dulf Eva-Henrietta, Feștilă Clement, Munteanu Radu

Institution

Technical University of Cluj-Napoca

Patent no.

Patent application OSIM: A/00287/26.05.2020

**Description
EN**

The extreme electronic regulator controls an electronic power converter that ensures the operation at the point of maximum power of a photovoltaic panel. The regulator

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contains a generator that produces a triangular disturbance signal that is applied to the control of the electronic power converter, simultaneously with two short pulses, synchronized with the triangular signal. The effects of the disturbance are sensed by a power transducer whose output signal is stored in two sample-and-hold circuits in successive alternating moments, controlled by the generator pulses. The signal resulting from the decrease of the stored signals is applied to a usual integrating regulator to produce the intermediate control signal which will be added to the triangular signal, obtaining the control signal for the electronic converter which will ensure the operation of the photovoltaic panel at maximum power.

Class no.

2

RO.32.

Title EN

Compliant mini-gripper with high flexibility

Authors

Noveanu Simona, Noveanu Dan Cristian

Institution

Technical University of Cluj-Napoca

Patent no.

Patent application OSIM: A/00103/26.02.2020

Description

EN

The technical problem that the present invention solves is the realization of a compliant mini-gripper, in single-block construction, with easy connection of piezoelectric actuators to both the compliant mechanism and the power system, command and control system, which ensures the capture of objects in a large range of dimensions with high precision. The innovative idea is highlighted to the maximum by the fact that, the determination of the position of flexible couplings within the structure of the compliant mini-gripper is made in such a way as to ensure the greatest amplitude at the end of the clamping elements, which have attachments piezoelectric tape actuators that allow simultaneous or separate control of the clamping elements.

Class no.

6

RO.33.

Title EN

Linear tubular motor with modular construction for direct driving vehicle electrical power steering

Authors

Popa Dan-Cristian, Szabó Loránd

Institution

Technical University of Cluj-Napoca

Patent no.

Patent application OSIM: A/00260/14.05.2020

Description

EN

The linear tubular motor with modular construction for direct driving vehicle electrical power steering has simple parts. The stator modules are built-up of ring-type iron core pieces

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alternated by non-magnetic space holders. Round their yokes concentrated coils are wound, which are connected in series and form a phase of the motor. The mover is passive, and it is constructed by alternating ferromagnetic and non-magnetic rings.

The motor works upon the variable reluctance principle. By sequentially supplying its phases a bidirectional linear movement can be achieved.

Class no. 8

RO.34.

Title EN

Desulfatization, optimization and application technique of the spent plates provided from car battery

Authors

Rada Simona, Opre Răzvan, Pinteă Andrei, Culea Eugen

Institution

Technical University of Cluj-Napoca

Patent no.

Patent application OSIM: A/00531/24.08.2020

Description EN

The invention relates to an efficient desulfatization technique of the spent plates from a lead acid battery by doping with a suitable content of nickel (II) oxide or double cobalt (II and III) oxide in order to obtain optimized materials which can be used to make new electrodes for batteries. The process according to the invention uses as raw materials: the anodic electrode as source of Pb, the cathodic electrode as source of PbO₂ from a spent car battery with high wear and powder of nickel (II) oxide or double cobalt (II and III) oxide. The mixture of substances in the $x\text{NiO} \cdot (100-x)[4\text{PbO}_2 \cdot \text{Pb}]$ or $x\text{Co}_3\text{O}_4 \cdot (100-x)[4\text{PbO}_2 \cdot \text{Pb}]$ with $x = 8 \text{ mol \% NiO}$ or $20 \text{ mol\% Co}_3\text{O}_4$ chemical formulas is introduced into alumina crucibles, melted in an electric oven and then overturned on a stainless steel plate directly at room temperature.

Class no. 8

RO.35.

Title EN

Method for the detection and evaluation of pleural and lung surface modifications based on computer analysis of ultrasound images

Authors

Rusu-Both Roxana, Chira Romeo Ioan

Institution

Technical University of Cluj-Napoca

Patent no.

Patent application OSIM: A/00826/14.12.2020

Description EN	The invention relates to a non-invasive method for the human body, without radiation exposure, with low costs for the detection and diagnosis of interstitial lung diseases based on advanced ultrasound processing, making it possible to diagnose and assess the severity of pleuro-pulmonary damage in patients with interstitial lung diseases after a transthoracic ultrasound evaluation. The solution has many advantages: accessibility, portability, non-invasive for the human body, reduction of side effects in the monitoring stage, reduction of costs in the screening stage and which makes it possible to improve the prediction rates of heart failure and increase patient life expectancy, ultrasonographic evaluation being a quick method of assessment possible even in the emergency unit in the moments of decompensation of patients with heart failure.
Class no.	4

RO.36.

Title EN	Beamforming compact radiant system
Authors	Palade Tudor-Petru, Pastrav Andra-Elena-Iulia, Pușchiță Emanuel-Dumitru, Dolea Paul, Cristea Octavian, Dascăl Paul Vlăduț, Rațiu Ovidiu
Institution	Technical University of Cluj-Napoca
Patent no.	Patent application OSIM: A/00082/18.02.2020
Description EN	The invention describes a compact radiant system with beamforming capabilities. The radiant system, according to the invention, comprises a 1:16 combiner / splitter, a switching / phase shifting block and a radiant element block. The radiant element block comprises eight identical panel antennas, whose reflecting panels form a regular octagonal prism structure, each panel antenna including two open dipoles. The radiation pattern of the radiant system can be modified horizontally to obtain a radiation pattern with a circular symmetry or one that favors a certain direction. The system is controlled digitally, without the need for mechanical modifications of the system.
Class no.	10

RO.37.	
Title EN	System and method for wifi terminal positioning using anchors equipped with retro-directive antennas
Authors	Palade Tudor-Petru, Pastrav Andra-Elena-Iulia, Pușchiță Emanuel-Dumitru, Rațiu Ovidiu, Dolea Paul, Cristea Octavian, Dascăl Paul Vlăduț
Institution	Technical University of Cluj-Napoca
Patent no.	Patent application OSIM: A/00081/18.02.2020
Description EN	The invention describes a system and a method of locating a WiFi terminal using the directions found by two or more WiFi anchors. The WiFi anchors are equipped with retro-directive antennas and are connected to a computing system to which they transmit the information regarding the determined WiFi terminal direction. The computing system, knowing in advance the positions and orientations of the anchors, determines the location of the WiFi terminal.
Class no.	10
RO.38.	
Title EN	Soil stabilization with plastic waste materials (PET)
Authors	Ana-Maria Trîmbițaș (Urian), Nicoleta Maria Ilieș, Andor Csongor Nagy, Ovidiu Nemeș
Institution	Technical University of Cluj-Napoca
Patent no.	Patent pending
Description EN	Nowadays, the researchers are trying to find innovative solutions for the reuse of different types of wastes generated by living or by different industries. Wastes like tire shreds, glass fibers, polypropylene, polyester, polyethylene are mixed with soil in order to obtain an increase on the shear parameters. The aim of this research is to observe the variation of the shear parameters for clay mixed with polyethylene terephthalate waste. To investigate the effects of polyethylene waste on the strength of the soil, a series of test have been performed on the mixture. The initial experimental results show that there is a significant improvement on the shear parameters. This increase is depending on the amount of waste plastic added to the clay.
Class no.	7

RO.39.**Title EN**

Innovative use of sheep wool for obtaining new materials with sound-absorbing properties

Authors

Simona Ioana Borlea (Mureșan), Ancuța-Elena Tiuc, Ovidiu Nemeș

Institution

Technical University of Cluj-Napoca

Patent no.

Patent pending

**Description
EN**

The aim of this study is to obtain new materials with sound absorbing properties using the sheep's wool as raw material. Seven new materials were obtained by hot pressing ($60 \div 80$ °C and $0.05 \div 6$ MPa) of wool fibers and one by cold pressing. Results shown that by the simply hot pressing of the wool, a new product is obtained which can be processed and easily manipulated. The obtained materials have very good sound absorption properties with acoustic absorption coefficient values over 0.7 for the frequency range $800 \div 3150$ Hz; the results prove that the sheep wool has a comparable sound absorption performance to that of mineral wool or recycled polyurethane foam. Hot pressed materials have a much higher density than cold pressed materials. The density of materials made from hot pressed sheep's wool increases with increasing pressure.

Class no.

7

„Alexandru Ioan Cuza” University of Iasi

RO.40.

Title EN

Smart table to accommodate management and consumer needs to low interaction economy in the hospitality sector.

Authors

Andrei Ungureanu, Florin Alexandru Luca

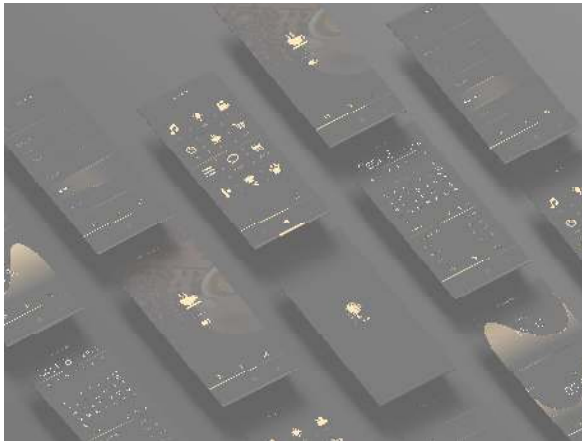
Institution

University Alexandru Ioan Cuza Iasi, Doctoral School of Economics and Business Administration
Technical University Gheorghe Asachi Iasi

Description

EN

The following research has the scope of developing a prototype of a mobile application in the hospitality sector. The mobile app will be the interface between a fully functional innovative table and a smartphone. Due to the implications of COVID-19, the low interaction economy has set different call to actions for most of the hospitality sector. Its potential has also been brought sharply into focus as society grapples with the impact of the COVID-19 pandemic. As the world adapts to a new social and economic normality, the need for an intelligent application creating fluent bridge interaction strategies in the hospitality sector is more relevant than ever. The intelligent table has an exact role in keeping consumer and management connected, with as little physical interaction as possible.



RO.41.**Title EN****Hydromassage device****Authors**

Chirazi Marin

Institution**University"Alexandru Ioan Cuza" from Iași****Patent no.**

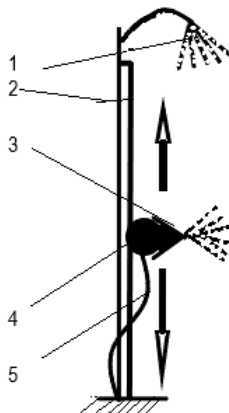
Patent application No. 2354/2020

**Description
EN**

The hydromassage device consists of a hydraulic motor (4), driven by the pressure of the mains water, which slides controlled on a support (2), on the whole height of the body or only on a certain area. The engaged hydraulic motor has a nozzle (3) of various shapes attached, which scatters water and can generate either a pressure effect or a pungent effect on the targeted skin. The mains water, which engages the engine, is directed towards the sliding nozzle, and the user has the possibility to adjust the temperature. The bar on which the hydraulic motor slides is fixed next to a regular shower (1), so that the user will benefit from two sources of water at the same time, one ordinary from above and one from the sliding nozzle (5). This will allow the user to use two therapeutic procedures simultaneously: hydromassage and thermotherapy. Hydromassage by changing the sliding nozzle and obtaining the desired effect and thermotherapy by differentiating the temperature from the two sources. The device can have both a home use, in SPA centers or recovery centers. The other existing equipment is based on electric drive sources of the hydraulic motor and represents potential sources of electric shock.

Class

4



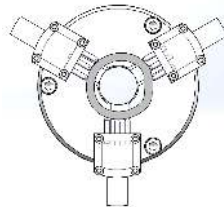
NATIONAL

386

“Gheorghe Asachi” Technical University of Iasi

RO.42.

Title EN	Universal chuck with jaws, plunjer and hydroplast
Authors	Seghedin Eugen Neculai, Chitariu Dragoş-Florin, Articuci M. Gabriel, Clipa D. Matei, Diaconu C. Alexandru Costel, Dron C. Simeon, Moldovanu D. Alexandru Florin, Pântea A. Florin, Rusu V.M. Alin, Scorțanu C. Claudiu Constantin, Sofia P. Ionuț
Institution	Gheorghe Asachi Technical University of Iași
Patent No.	Patent application No. 5315/09.04.2021
Description EN	<p>The invention relates to a self-centering chuck used for tightening and centering thin-walled parts and with an irregular profile when machining.</p> <p>The self-centering chuck according to the invention is composed of a body to which is attached a rotating disk with an archimedical channel, the disk rotating under the action of a pinion, which produces the radial displacement of three jaws engaging with the archimedical channel of the rotating disk, in each jaw being practiced an enclosure in which oil is introduced, and each jaw has some plungers that hold the piece, the connection between the plungers being ensured by a plastic material.</p> <p>The invention can be exploited industrially for gripping parts with thin walls and irregular profile when processing them on machine tools.</p> <p>Benefits:</p> <ul style="list-style-type: none"> - allows the application of clamping forces in several directions; - allows the attachment of thin-walled parts; - allows the attachment of parts with an irregular profile
Class no.	<p>5. Industrial and laboratory equipments</p> <p>6. Mechanical Engineering - Metallurgy</p>

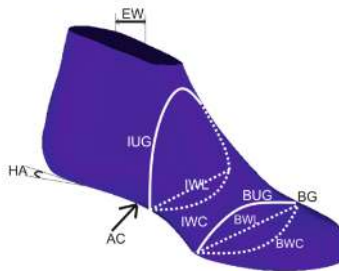


RO.43.**Title EN** Shoe lasts modelling method for customized footwear**Authors** Mariana Costea, Aura Mihai**Institution** Gheorghe Asachi Technical University of Iasi**Patent** RO20170000664 20170918**Description
EN**

The invention relates to a method of modelling shoe lasts for customized footwear by modifying the dimensional parameters in a validated order, corresponding to the anthropometric data of the feet, using a triangulation technique, as follows: 1. stick length, 2. toe girth, 3. width, 4. instep girth, 5. heel height, 6. heel curvature, 7. heel width, 8. toe spring, 9. toe thickness. The parameters' modification is of successive type, so that at each step a single main parameter is modified, which entails the modification of all the other parameters, both main and auxiliary.

Class no.

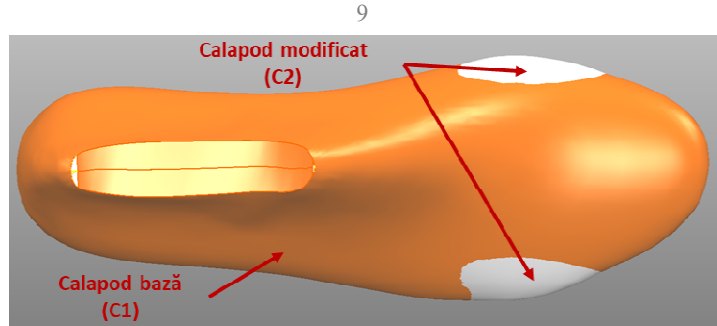
9

**RO.44.****Title EN** Method of modifying shoe lasts for therapeutic footwear by applying load-bearing elements**Authors** Ghebuța Florea, Costea Mariana, Sârghie Bogdan Theodor, Mihai Aura**Institution** Gheorghe Asachi Technical University of Iasi**Patent** RO20180000888 20181109**Description
EN**

The invention relates to a method of modifying the lasts for therapeutic footwear by applying loading elements. The method according to the invention consists in selecting a shoe last similar in shape and size with the subject's foot, modeling the selected last, comparing the initial last with the modified one and extracting the differences between the two. The loading elements can be obtained with the help of 3D printers, thus reducing the

number of used last, and keeping a single standard last to which the loading elements are added depending on the condition of the subject

Class no.



RO.45.

Title EN

Titanium alloys alloyed with molybdenum, zirconium and silicon, for medical applications

Authors

Vizureanu Petrica¹, Baltatu Madalina Simona¹, Sandu Andrei Victor¹, Loghin Maria Carmen¹, Burduhos-Nergiş Dumitru Doru¹, Bernic Mircea², Balan Mihail²

Institution

¹ "Gh. Asachi" Technical University of Iasi
² Technical University of Moldova

Description
EN

The invention relates to a titanium alloy alloyed with Mo, Zr, Si, for medical applications having as alloying elements, nontoxic elements, alloy intended for medical applications. The biocompatible alloy according to the invention has the following chemical composition, expressed in mass percentages: 78.50-75.50% Ti, 14.50-15.50% Mo, 6.50-7.50% Zr, 0,50-1.50%Si. Obtaining consists in cutting the raw material (Ti, Mo, Zr and Si) to appropriate dimensions (maximum 5 x 5 x 5 mm), degreasing with volatile organic solvents to remove impurities, both raw materials and the crucible used, gravimetric dosing of raw materials according to the load calculation, loading the raw materials in the furnace crucible, vacuuming the installation and creating the controlled atmosphere (Ar) in the melting chamber, melting the charge by adjusting the electric power and evacuating the semi-finished products from the crucible.

RO.46.

Title EN	Preliminary Processing of Floral Bio-Residues of Saffron (<i>Crocus sativus</i> L.) as a innovative source for development of high added-value cosmetic products
Authors	Ana Simona BARNA, Delia TURCOV, Oana Teodora CIUPERCĂ, Daniela ȘUTEU
Institution	“Gheorghe Asachi” Technical University of Iasi, Faculty of Chemical Engineering and Environmental Protection, Iași, România
Description EN	<p>Floral bio-residues of saffron (<i>Crocus sativus</i> L.) are generated in huge amounts after collecting the stigmas, being highly perishable. Therefore appears the necessity to be valorised as a innovative source of active biocompounds. The preliminary processing of floral bio-residues consisted in obtaining of enriched extracts in high-value added compounds using different extraction methods: heat reflux extraction (HRE), room temperature extraction (RTE), as conventional techniques and ultrasounds assisted extraction (UAE) as a „green” unconventional method. The extractions were performed taking into account the following parameters: solvent concentration (water, hydroethanolic solvents %v/v), solid to liquid ratio (m/v) and extraction time.</p> <p>The control of extraction process was performed by assessing of the total flavonoids content (TFC) expressed in mg quercetin equivalent (QE) per ml of extract and total polyphenols content (TPC) expressed in mg gallic acid equivalent (GAE) per ml of extract.</p> <p>This study aimed to investigate the influence of extraction parameters (solvent concentration and solid to liquid ratio) on TFC and TPC to compare the extraction methods in order to obtain high yields of interest bioactive compounds.</p> <p>This work demonstrated that TFC and TPC are influenced by the applied extraction techniques. The results assessed that saffron floral bio-residues can be processed to obtain high yields of phytochemicals opening new possibilities to become a valuable source of actives with applications in the pharmaceutical, cosmetic and food industries.</p>
Class no.	4

RO.47.

Title EN	Enhancing antioxidant ability of resveratrol used in dermatocosmetic products
Authors	Delia TURCOV ¹ , Daniela ŞUTEU ¹ , Ana Simona BARNA ¹ , Andreea Teodora Iacob ²
Institution	¹ “Gheorghe Asachi” Technical University of Iasi, Faculty of Chemical Engineering and Environmental Protection, Iaşi, România ² Faculty of Pharmacy, University of Medicine and Pharmacy “Grigore T. Popa” Iasi, 700115 Iasi, Romania
Description EN	The efficiency in antioxidant activity is higher when combining different natural compounds able to combat oxidative stress impact and prevent adverse reactions of synthetic ingredients. Based on bioactive properties of resveratrol (RV), enhancing antioxidant ability was attempted, in order to obtain a new dermatocosmetic formula with improved biological effects. For this purpose, different concentrations of resveratrol (1%, 3%, 5%) were associated with 0.5% concentration of ferulic acid (FA) and different mixtures have been studied. Results indicate that the optimum associations are 1% RV:0.5% FA, 1:1 and 1:2, or 3% RV:0.5% FA 1:2, in v/v ratio. Economical cost versus benefits criteria will stand for choosing the most advantageous solution for a new dermatocosmetic formula.
Class no.	4

RO.48.

Title EN	Valorization of residual biomass as biosorbent for removal chemical pollutants from aqueous media
Authors	Luiza Ioana Horciu, Alexandra Cristina Blaga, Carmen Zaharia, Daniela Suteu
Institution	Technical University “Gheorghe Asachi”, Iasi, Faculty of Chemical Engineering and Environmental Protection “Cristofor Simionescu”
Description EN	The paper aims is to present new bioproducts that capitalize on industrial by-products (microbial residual biomass-RMB). RMB by immobilization in sodium alginate has been tested as a potential biosorbent for retaining chemical pollutants (i.e. Brilliant Red HE-3B and Orange 16 reactive dyes) from aqueous media. In this context, biosorbents based on Bacillus sp. and Lactobacillus sp. immobilized in sodium alginate were obtained and characterized. The biosorption process has been studied in order to establish the optimum conditions of process. The effect of various experimental

parameters such as biosorbent dose, temperature, initial dye concentration, dyes type, particle size and solution pH were investigated.

This work was supported by a Grant of The Romanian Ministry of Research and Innovation, CCDI-UEFISCDI, project number PN-III-P2-2.1-PED-2019-1063, within PNCDI III.

RO.49.**Title EN**

Business sustainability assessment operated to identify an associated profile

Authors

Ionut Viorel HERGHILIGIU¹, Ioan-Bogdan ROBU², Adrian Vilcu¹, Marius Pislaru¹

Institution

¹„Gheorghe Asachi” Technical University of Iasi

²„Alexandru Ioan Cuza” University of Iasi

Description EN

Organizational sustainability is an approach that aims to create long-term value for stakeholders by implementing a business strategy that focuses on financial, environmental, ethical and social issues. Business sustainability in essence represents the synergy between three organizational dimensions: environmental, social and economic. Significant deviations associated to operational symmetry between these key components could generate a decrease in organization's market value. Business sustainability assessment represents a complex statistical approach, presented in some cases as unclear in the literature, but characterized by an ongoing need for flexible instruments with a wider spectrum of applicability. The project purpose is to improve business sustainability assessment process. Thus, the research results aim to identify firm's sustainability profile and to propose solutions to business sustainability improvement.

Class no.

6

RO.50.**Title EN**

Statistical model on technical system powered by artificial intelligence

Authors

Adrian Vilcu¹, Ionuț Herghiligi¹, Bodan Robu²

Institution

¹ „Gheorghe Asachi “ Technical University of Iași

² Alexandru Ioan Cuza University of Iasi

Description EN

The complexity of technical processes involves an increased level of quantitative and qualitative modeling characterized by combining different statistical techniques to highlight the connection and causal relationships between technical systems maintainability parameters, in conjunction with artificial intelligence techniques - genetic algorithms, neural networks. Thus, the use of statistical

methods is justified by the increasing need to illustrate in an adequate and as accurate as possible numerical form, the interdependence between technical systems parameters and techniques specific to artificial intelligence contribute to increasing the performance of classical modeling, both by improving the optimization model and by validating it.

This approach combines the procedures of data systematization and verification of the existence of the interdependence between maintenance parameters with procedures for checking and measuring the interdependence form. We hybridize this algorithm by applying artificial intelligence techniques to increase the performance of the optimization algorithm and to validate it. Thus, we design a practical application methodology, structured gradually, with objectives observed and conclusions justified at each stage of analysis.

Class no.

6

RO.51.

Title EN

Dome City

Authors

Neculai Oana, Barbu Marian Bogdan

Institution

Technical University “Gheorghe Asachi” of Iasi

Patent

in progress

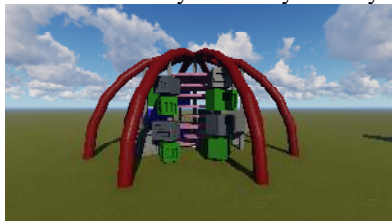
Description

EN

Dome City is made of several circular arches intersected in the center and having their ends joined using cables, like buttresses, thus presenting a flexible behavior, best fitted for seismic areas. The innovative concept here is given by the way of vertically arranging the buildings, namely lifting them on cables, therefore starting the construction on top. A cable will be lowered from the point given by the intersection of the arches and from other carefully calculated points, and will be attached at the base of the construction foundation.

This principle can be applied to build the highest building in the world, as well, as the cables on which the building is formed could be lowered from a satellite, orbiting the Earth, and fixed in a very solid foundation in the ground.

In this way we can build literally to the sky and beyond!



RO.52.**Title EN****Under the sea hotel – Hotel Halkida****Authors**

Neculai Oana, Cămară Alexandru

Institution**Technical University “Gheorghe Asachi” of Iasi****Patent**

in progress

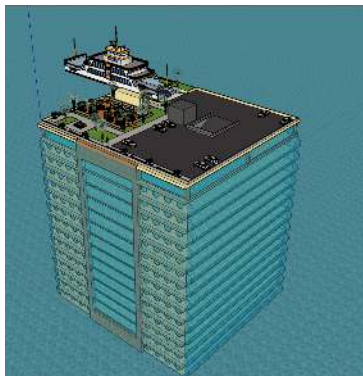
The concept of this hotel is based on the idea that people could not just explore the sea from a ship or by diving, but they could also spend holidays there. The idea involves a hotel situated under the sea, for people to have a unique experience, in the tranquility of the sea. Thus, the people can admire the beauty of the sea environment from the window of their hotel apartment. All sides of the hotel and the middle facades have semi-cylindrical shaped window - walls, which give a wider perspective angle.

The hotel has a structure type with a central core made of reinforced concrete, the floors are in console and the glass of the windows is well sealed.

Description**EN**

The hotel has a parking area on the first two levels, as the visitors will reach the hotel by a ferry. The project involves also the following facilities on the roof: a recreation area with green areas with palm trees. On the first floor there is a restaurant, a café, the reception and the parking. The access from the roof to the hotel is done by four elevators, in the central reinforced concrete core of the structure. Starting from the second floor there are rooms and apartments, placed around the central core of the structure.

The ventilation system is the mechanical ventilation heat recovery type (MVHR). The heat recovery unit is placed on the roof. Extra fresh air and recreation areas are provided by greenhouses placed at the submerged levels, with luxurious green plants that can ensure fresh air even under the sea.



NATIONAL

„Grigore T. Popa” University of
Medicine and Pharmacy Iași

RO.53.

Title EN

Simultaneous infrared photo-stimulation with physiotherapy exercises, in the rehabilitation of post-traumatic hand

Authors

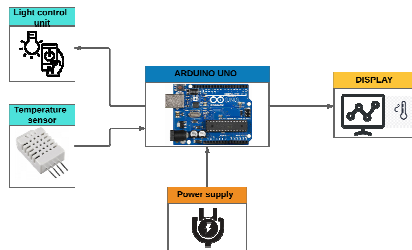
Ilie Onu, Doru Andrițoi, Călin Corciovă, Rober Fuior, Cătălina Luca, Anca-Irina Galaction

Institution

“Grigore T. Popa” University of Medicine and Pharmacy Iași, Medical Bioengineering Faculty

Description
EN

Infrared (IR) is electromagnetic radiation with wavelengths between 760 nm and 100.000 nm. IR can improve the healing of skin wounds, pain relieve, stiffness relieve, fatigue of rheumatoid arthritis, and post-traumatic recovery. Post-traumatic hand rehabilitation is a sensitive area of physiotherapy, due to the complexity of the anatomical structures of the forearm, fist and fingers. The most common injuries are those in the field of orthopedics, traumatology, closely followed by specific injuries from plastic and reconstructive surgery. From the perspective of rehabilitation with physiotherapy, the biggest challenge is to restore the function of the hand, the prehension, opposability of the fingers and pluridigital grips (bidigital and tridigital). In hand physiotherapy, pain and stiffness in active and passive mobilization is the biggest challenge. Classical physiotherapy protocols do not include forms of simultaneous therapy, which could facilitate the exercises performing's, losing important time in recovery. Simultaneous IR therapy - physiotherapy exercises, shorten working time, bringing benefits to the patient from the perspective of pain and stiffness.



Control diagram of the system

RO.54.

Title EN

A Combined sEMG and Sensors System for Monitoring Functional Activity in Medical Rehabilitation

Authors

Corciovă Călin, Andrițoi Doru, Luca Cătalina, Fuior Robert
“Grigore T. Popa” University of Medicine and Pharmacy Iasi, Faculty of Medical Bioengineering

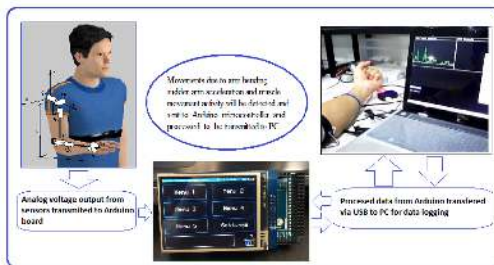
Institution

Rehabilitation process due to stroke or accident related injuries are based on clinical assessment tools which can be executed by self-report (home-based) and observer-rated (done at rehabilitation centre). Observer rated by caregivers can be time consuming and patients require to have repeated observations at rehabilitation centre which can be costly. The assistive device is an alternative for monitoring which incorporate many high-tech systems into rehabilitation. That system involves attaching devices to the affected human limbs in order to monitor patient’s physical activity.

Description

EN

Miniaturized sensors such as accelerometers, flex sensors and force sensitive resistors are widely used in developing this assistive device. Any movements due to arm bending, sudden arm acceleration and muscle movement activity will be detected and sent to a microcontroller and processed to be transmitted to PC via USB connection for real-time data logging or SD card data logging. The designed system is compact and does not restrict movement during usage. The proposed system is easy to be attached onto arm with minimal external assistance. It has data logging systems which can store data into PC for certain period of time that can be used by physical therapist for further analysis.



Block diagram of the system

RO.55.**Title EN****SMART DEVICE FOR INDOOR AIR QUALITY MONITORING IN HOSPITAL UNITS****Authors**

Robert Fuior, Doru Andrițoi, Cătălina Luca, Călin Corciovă

Institution**“Grigore T. Popa” University of Medicine and Pharmacy Iasi, Faculty of Medical Bioengineering****Description EN**

In the context of widespread transmission of the SARS Cov2 virus, isolation policies have become the norm. The hospitalization of critically affected patients, in isolation units, requires remote monitoring of patient and environmental parameters. Also, certain dangerous situations can be noticed by releasing a large amount of oxygen in the rooms, which can become catastrophic. As oxygen is a flammable gas, so it maintains combustion, it can become a real danger, when sources appear nearby to contribute to the triggering of an unpredictable event. Air quality could have an influence on the well-being of the patient. The purpose of this project was to develop an intelligent monitoring system of the oxygen levels, temperature and humidity in the isolations units of the Covid19 patients. The proposed system wants to bring an improvement of the O2 concentration monitoring in the salons, respectively in the ATI sections. It is composed of an Arduino Nano development platform that represents the central core of the system to which is attached a set of sensors for Oxygen, temperature and humidity. Since the monitoring data will be stored on an SD card where you can view the history of all recorded data, and the alarm part will be done in two steps, one in which an automatic message will be sent to the default phone number when the value the concentration in the room is exceeded and an acoustic one through a buzzer. For the display part, it was decided to choose a small OLED.

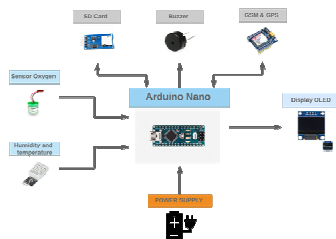


Diagram block of the system

RO.56.**Title EN****New method applied for the obtaining of fumaric acid****Authors**Lenuța Kloetzer¹, Mădălina Poștaru², Dan Cașcaval¹, Anca-Irina Galaction²**Institution**¹“Gheorghe Asachi” Technical University of Iasi, “Cristofor Simionescu” Faculty of Chemical Engineering and Environmental Protection²“Grigore T. Popa” University of Medicine and Pharmacy Iasi, Faculty of Medical Bioengineering**Description EN**

Fumaric acid is a naturally organic acid, first isolated from the *Fumaria officinalis* plant. Nowadays, fumaric acid is produced via chemical conversion of maleic anhydride, obtained from butane, but this process involves the use of petrochemical substrates which are non-renewable resources and there is an increasing concern over sustainability. Thus, biotechnological route for production of fumaric acid has been studied using different microorganisms, like yeast, bacteria and fungi. Carboxylic acids produced by fermentation, including fumaric acid, can be separated using conventional extraction methods, but they involve multiple steps and require high amount of materials and energy.

This study presents a non-conventional method of separating fumaric acid, namely reactive extraction, using Amberlite LA-2 dissolved in two solvents with different dielectric constants, without and with 1-octanol as phase modifier. The most important effect of the addition of 1-octanol was recorded for the solvent with the lowest polarity, the extraction degree being $\eta = 86\%$ compared to 58% without 1-octanol.

RO.57.**Title EN****Non-conventional method for selective separation of 2-ketogluconic acid****Authors**Alexandra Cristina Blaga¹, Mădălina Poștaru², Dan Cașcaval¹, Anca-Irina Galaction²**Institution**¹“Gheorghe Asachi” Technical University of Iasi, “Cristofor Simionescu” Faculty of Chemical Engineering and Environmental Protection²“Grigore T. Popa” University of Medicine and Pharmacy Iasi, Faculty of Medical Bioengineering**Description EN**

The 2-ketogluconic acid production through biosynthesis is an extremely important process because of its multiple applications in food, cosmetic and pharmaceutical industries.

Its biotechnological production has been improved significantly, but separation needs constant attention, mainly due to involvement of multiple downstream steps that generates high costs. Taking into account that limited research has been carried out on the reactive extraction of 2-ketogluconic acid, this study was focused on analyzing the pH dependent extraction performance and the molar ratios of acid and extractant (Amberlite LA-2) dissolved in three solvents (n-heptane, butyl acetate, and dichloromethane) with 1-octanol as phase modifier.

The highest extraction yield and distribution coefficient were achieved for a pH-value of 3 and 120 g/l extractant, for all the studied solvents.

RO.58.

Title EN

SARS-CoV2 infection detection device for high-risk workers

Authors

Petrescu Paul-Costin, Corciovă Călin, Stihă Andreea, Fuior Robert, Parfeni Cristian

Institution

“Grigore T. Popa” University of Medicine and Pharmacy Iasi, Faculty of Medical Bioengineering

Description EN

The SARS-CoV-2 pandemic is an ongoing global challenge for high-risk workers, including medical staff. Early detection is essential to prevent the spread of viral infection. Protective measures are needed to prevent the biological danger to which workers are exposed. The system designed and built is divided into two parts: the first part is based on monitoring the vital functions of users and the second part is the disinfection part to provide protection to users. By combining these two parts, the system can also become a quick screening tool. The complete system contains a hardware interface and a graphical user interface for displaying the measured parameters and to a central station. The electronic hardware interface contains a microcontroller, a humidity sensor to measure the disinfectant level from the container, a peristaltic pump, LCD and a health sensor module. The health sensor module is developed from Maxim Integrated, which captures biosignals and is configured to communicate with software applications on PC and Android systems. Finally, a system has been developed that can be classified in the category of medical devices and to provide general protection measures in addition to measuring vital parameters for workers working in areas with a high risk of infection.

RO.59.**Title EN****Intelligent orthosis in the correction of postural defects****Authors**LUCA Cătălina^{1*}, ANDRITOI Doru¹, FUIOR Robert^{1,2},
CORCIOVĂ Călin¹**Institution**1. "University of Medicine and Pharmacy Grigore T
Popa", Faculty of Medical Bioengineering, Iasi, Romania
2. "Tehnică University Gheorghe Asachi" Iasi, Romania,
Faculty of Electrical Engineering, Energetics and
Applied Informatics**Description
EN**

Introduction. Postural defects are a real challenge for the contemporary world. Scoliosis, kyphosis and lordosis are diseases of the spine, with various evolutions and multiple changes of the other components of the thorax (shoulders, shoulder blades, ribs), as well as of the intrathoracic and even abdominal organs. **Material and method.** This paper presents a study on the need to use a smart orthosis and the idea of a smart orthosis. The smart orthosis will use inertial sensors capable of calculating orientation angles in a portable monitoring system that will calculate and represent the curvature of the spine. It is hoped that finding a non-invasive solution to identify the shape of the human back can help reduce the time required for medical rehabilitation sessions or can prevent possible postural defects. **Results and discussions.** In this study, the existing orthoses on the market that could fall into the category of rehabilitation devices used in the prevention of postural defects were evaluated and an intelligent orthosis was designed. **Conclusions.** At this time, the existence of an intelligent orthosis in the prevention of postural defects would lead to an improvement in health among the population. Also, this prosthesis would crown the work of physiotherapists by maintaining the results obtained.

Class

4

RO.60.

Title EN **THE IMPORTANCE OF A MULTIDISCIPLINARY APPROACH TO IMPROVE THE LIFE QUALITY FOR PATIENTS WITH PARKINSON'S DISEASE**

Authors Iustina Condurache, Cătălin Ionițe, Paula Ancuța, Genoveva Filip, Mariana Rotariu

Institution **“Grigore T. Popa” University of Medicine and Pharmacy of Iasi, Faculty of Medical Bioengineering**

Parkinson's disease is defined as a complex degenerative neurological disease with progressive evolution, which is part of motor system of the brain disorders, being the second degenerative disease as a frequency after Alzheimer's disease. It is characterized by tremor when muscles are at rest (rest tremor), increased muscle tone (stiffness), slow voluntary movements and difficulty maintaining balance (postural instability).

Occupational therapy helps Parkinson's patients improve their ability to perform daily tasks. The intervention consists in assisting patients in developing a self-care routine, taking into account the limitations of functional mobility, encouraging patients to maintain maximum function of daily activities for as long as possible, learning adaptive techniques to reduce tremor.

Description EN

The devices used for this purpose are commercially available but they are quite expensive, which is why we wanted to make devices made of material as cheap and affordable as possible. Some of the devices can be successfully made of material that every person has in their home. We also took into account the variant of making them without the need to use complicated tools and devices that are not available to patients.

Starting from these premises, we thought and made in our occupational therapy laboratory various devices designed to offer patients a variety of techniques and exercises and also a flexible work environment. On a pallet plate we fixed a series of elements such as zippers, snap button, hook-and-eye closure, systems that patients use on a regular basis. We also manufactured a device designed to help patients with household chores such as dish washing. The device is provided at one end with a washing sponge, its handle being a detergent tank. The size and shape have been adapted to the needs of patients with Parkinson's disease.

NATIONAL

Using the devices made during the physiotherapy sessions, significant improvements of the life quality for patients with Parkinson's disease were observed.

Class

4 – Medicine – Health Care - Cosmetics



RO.61.

Title EN

The use of the sensory carpet as an integrated part in occupational therapy in children with hypersensitivity
Rucsandra Nedelcu, Catalin Ionite, Iustina Condurache, Rotariu Mariana

Authors

Institution

“Grigore T. Popa” University of Medicine and Pharmacy of Iasi, Faculty of Medical Bioengineering

the literature defines hypersensitivity, or sensory processing sensitivity (SPS) as an innate / congenital trait characterized by an increased sensitivity of the central nervous system, which leads to a more detailed processing of external and internal stimuli. The incidence of SPS worldwide is 15% -20%.

Description EN

Occupational therapy, the branch of medical recovery, which started from the idea of incorporating / combining different activities in the field of work, but also various recreational activities with the objectives of medical recovery lead to an increase in patient motivation.

In this direction we designed and realized in the

occupational therapy laboratory, from the Faculty of Medical Bioengineering - a sensory carpet - meant to help patients with SPS by increasing perception leading to a decrease in the processing time of all information received, so the child can make a decision in the shortest possible time.

The sensory carpet was built of nine pieces with a base made of Ethyle Vinyl Acetate (EVA). Each piece is different, not deviating from the principle from simple to complex, the principle of progressivity, so that the therapy starts from walking on a simple material, easily recognizable for the child, such as wool and will end with walking on a much more complex material. such as hard synthetic fiber. The pieces of the carpet come together like a puzzle, so that depending on the time of the child's recovery program, different pieces can be changed so that the child's sensitivity is permanently stimulated.

By integrating the sensory mat in the kinetic sessions, it is possible to reduce the time destined to the recovery of each objective, maintaining in all this time the motivation and the interest of the child in the recovery process.

Class

4



The sensory carpet.

RO.62.

Title EN	Facial reconstruction: anthropometric studies regarding the morphology of the nose for Romanian adult population
Authors	Madalina Maria Diac, Diana Bulgaru Iliescu
Institution	University of Medicine and Pharmacy “Grigore T Popa” Iasi, Institute of Legal Medicine Iasi, Romania
Description EN	<p>Craniofacial reconstruction represents a final step in medico-legal identification procedures and facilitate forensic identification. The study aim is to create a reliable and readily reproducible method of predicting the nasal morphology, the maximum width of the nose based on the maximum nasal aperture and the length, height and the depth of the nose based on the three distances between four craniometric landmarks of the nose. The purpose of craniofacial reconstruction is to achieve an image as close as possible to that of the individual before death, thus facilitating skeletal identification in the absence of other means of identification.</p> <p>The technique of craniofacial reconstruction is a completely new field in legal medicine in Romania. Thus, it goes without saying that there are currently no valid data on the correlation between soft tissues and hard tissue specific to the Romanian population. In this context, the research represents an important contribution in the field of the identification of legal medicine by introducing the process of craniofacial reconstruction as well as by the resulting data, data specific to the population of Romania.</p> <p>In the present research, new regression formulas specific to the adult population of Romania have been developed to predict the maximum width of the nose on one hand and the height, length and projection (depth) of the nose on the other, based on the distances measured between the craniometric landmarks.</p> <p>The data resulted from the doctoral study provide reliable results with a wide future applicability in the field of forensic anthropology and craniofacial reconstruction.</p> <p style="text-align: center;">(max 250 words)</p>

RO.63.**Title EN****LOW-COST DEVICE FOR EARLY DETECTION OF TOXIC GAS LEAKS IN THE PROTECTIVE MASK****Authors****Dimitrie-Cristian FODOR****Institution****“Grigore T. Popa” University of Medicine and Pharmacy Iasi, Romania, Faculty of Medical Bioengineering
“Dr. Iacob Czihaac” Military Emergency Clinical Hospital Iasi****Description
EN**

The research refers to a protection device against dangerous gas poisoning experimentally implemented in an M74 type gas mask with a role in protecting the person who uses it. One of the hazardous gases to which rescue personnel (especially firefighters) are exposed is carbon monoxide (CO). The physico-chemical properties of CO make it very difficult to detect through the human senses, being odorless, colorless and tasteless. Inhalation of this gas can cause tissue hypoxia which results in a number of symptoms such as headache, nausea, vomiting, chest pain, weakness, blurred vision, dizziness, muscle aches and slight confusion, dyspnea, hypotension, cardiac arrest, respiratory arrest. A system has been designed and implemented to monitor the presence of carbon monoxide in the air to be inhaled by the user using protective masks in a contaminated location. When dangerous gas enters the mask due to gas leaks or due to the filter no longer performing proper filtration, the system emits audible and visual alarms to the user. Warning signals are activated at the lowest CO concentration to ensure that the user takes the necessary safety measures for as long as possible, in order to avoid incidents and eliminate the risks of compromising health and mission.

**University of Medicine and Pharmacy
„Iuliu Hatieganu” Cluj-Napoca**

RO.64.

Title EN	A Fiber Glass Reinforced composite for CAD/CaM applications in dentistry
Authors	Bogdan Culic, Mihai Varvara, Diana Dudea, Alexandru Grecu, Alexandru Burde, Cristina Gasparik, Cristina Prejmerean, Marioara Moldovan, Prodan Doina, Sarosi Codruta, Laura Silaghi -Dumitrescu, Filip Miuta
Institution Patent	UMF “Iuliu Hatieganu” Cluj-Napoca, UBB Cluj-Napoca A201801062 / 2020
Description EN	The invention relates to a composition of fiber glass reinforced composite material based on thermo-baro-photopolymerizable composite resin and fiber glass fabric type E in the form of a veil and / or Stratimat, being indicated for obtaining a materiales to be used for obtaining for prosthetic restorations using CAD / CAM technology. The material has superior mechanical properties and corresponding radiopacity. The dental product is presented in the form of a composite disc reinforced with solid fiberglass, with a diameter of 98.5 mm and a height of 10 mm, dimensions specific to dental CAD/CAM technology.
Class	4, 7

RO.65.

Title EN	Natural antiplatelet agents based on <i>Allium cepa L.</i> extract used in primary cardiovascular prevention
Authors	Moldovan Marioara, Oprean Radu, Saplonțai–Pop Aniela Cristina, Prodan Doina, Saroși Liana Codruța, Silaghi-Dumitrescu Laura, Cuc Stanca, Agapescu Camelia
Institution	Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca
Patent	Babes Bolyai University, Cluj-Napoca Patent application No. 00677/18.09.2017
Description EN	The present invention relates to the composition of the solid, lyophilized formulation, presented in encapsulated form, obtained on the basis of <i>Allium cepa L.</i> extract. The presented formulation is intended for primary cardiovascular prevention, for the antiplatelet effect demonstrated. According to this patent, the encapsulated formulation

consists of a liquid extract obtained from the white variety of *Allium cepa L.* stabilized with excipients to decrease the degree of hygroscopicity and increase the stability in lyophilized form.

The advantages of using *Allium cepa L.* extract capsules are:

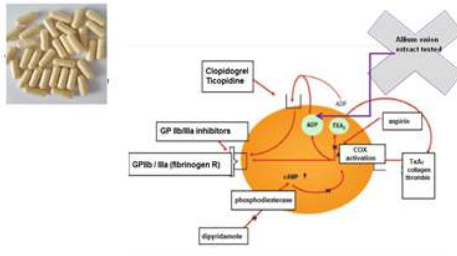
- demonstrated antiplatelet effect;
- reduced side effects, being a compound based on natural extract;
- high biocompatibility;
- low cost price.

Contraindications:

- secondary cardiovascular prevention (no studies);
- known allergy / intolerance to the excipients used.

Class

4. Medicine - Health Care - Cosmetics



Mode of action of *Allium cepa L.* extract, at the level of platelet aggregation process

RO.66.

Title EN

Solid plasmonic substrate based on silver nanoparticles for Surface Enhanced Raman Spectroscopy

Authors

Valentin Toma, Ioana Pavel, Nicolae Leopold, Mihai Constantin Lucaciu, Rareș Ionuț Stiuțiu

Institution

”Iuliu Hațieganu” University of Medicine and Pharmacy Cluj-Napoca

Patent

Patent application No. **A/00392/27.06.2019**

Description EN

We developed a simple procedure for the preparation of a new class of solid plasmonic substrates based on silver nanoparticles. The silver colloid employed for the synthesis of the plasmonic substrate has been purified by means of TFF (Tangential Flow Filtration). The substrates have been tested on different types of biofluids (saliva, urine, blood plasma and serum samples) and provided a very high degree of spectral reproducibility. The spectra recorded using these

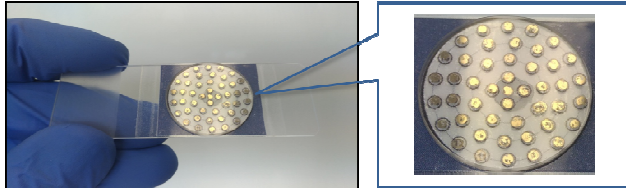
substrates have been employed for early breast cancer detection by means of Multivariate Analysis of the spectra collected on blood samples.

Applications

Early cancer detection

Class

4



RO.67.

Title EN

Method for Obtaining Biocapsules for Phothermal Applications in Hepatocarcinoma Therapy

Authors

Mocan Lucian, Mocan Teodora, Buzoianu Anca, Al Hajjar Nadim, Zdrehus Claudiu, Mosteanu Ofelia, Pop Teodora Atena

Institution

University of Medicine and Pharmacy Cluj-Napoca

Patent

Patent application No. 00663/2018 (A 2018 00663)

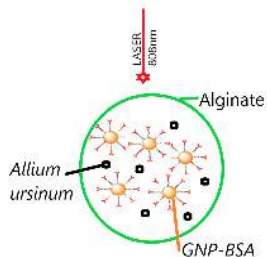
Description

EN

The invention relates to a process for obtaining alginate biocapsules for phothermal applications in the therapy of hepatocarcinoma. The process, according to the invention, consists in the synthesis of gold nanoparticles, followed by stabilization with citrate and functionalization with bovine serum albumin, after which they are encapsulated together with alcoholic extract of *Allium ursinum*, resulting in alginate biocapsules having improved synergic characteristics.

Class

4



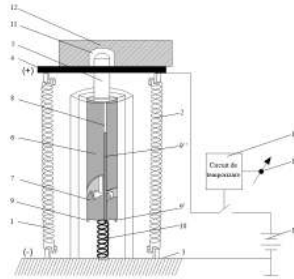
Ștefan cel Mare University of Suceava

RO.68.

Title EN	Method and system for power supply to isolated electrical consumers
Authors	Ciprian BEJENAR, Marian BEJENAR, Dan-Laurențiu MILICI, Daniela IRIMIA, Ciprian AFANASOV, Vasile-Eusebiu TOADER, Oana-Vasilica GROSU, Ovidiu-Magdin ȚANȚA
Institution	Ștefan cel Mare University of Suceava
Patent	Patent application No. A/00776/2020 The invention involves the conversion of an electrically powered motor vehicle with an electrical connection capability into a mobile electricity source and a mobile electricity generator, using a system that ensures the implementation of the method that allows the selectivity of the source of electricity and the distribution of electricity from the outside / inside of the vehicle to the inside / outside.
Description EN	
Class	2. Energy and sustainable development

RO.69.

Title EN	Interlocking system
Authors	NIȚAN Ilie, MILICI Laurențiu-Dan, POIENAR Mihaela, CERNUȘCĂ Dumitru, PAȚA Sergiu Dan, PIANÎH Alexei, PENTIUC Radu Dumitru, POPA Cezar, RAȚĂ Mihai, UNGUREANU Constantin
Institution	Ștefan cel Mare University of Suceava
Patent	European Patent No. EP3536880/2020 According to the invention, the interlocking system consists essentially of two Nitinol springs, attached to one end of the fixed plate, and at the other end of the movable plate with the locking element, whose bi-directional displacement obtained by heating the springs, controls the position of two cams by means of guiding grooves and leads to the locking or unlocking of the mobile element.
Description EN	
Class	2. Energy and sustainable development



RO.70.

Title EN

Pumping system

Authors

TOADER Eusebiu, NIȚAN Ilie, PAVĂL Mihaela, MILICI Dan Laurențiu, CERNUȘCĂ Dumitru, MILICI Mariana Rodica, GRAUR Adrian, DIMIAN Mihai, UNGUREANU Constantin

Institution Patent

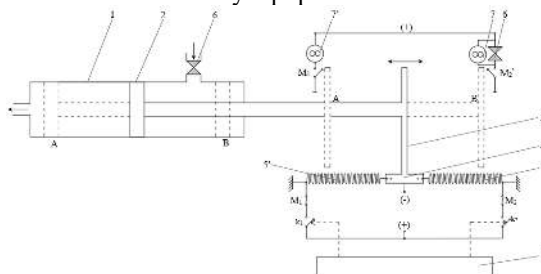
Ștefan cel Mare University of Suceava
Patent application No. A00503/2020.

Description EN

The pumping system according to the invention consists of a cylindrical container (1), provided with a piston (2) which is moved by means of a rod (3) terminated with a T-shaped profile, provided at the lower end with a support (4) fixing two nitinol springs (5) and (5'), and the upper part of the rod profile (3) acts at the ends of the stroke the double microcontacts (M₁), (M₁') and (M₂) respectively , (M₂₁) and (k₂) by means of a microcontroller (8).

5: Industrial and laboratory equipments

Class



RO.71.**Title EN****Energy recovery system****Authors**

MILICI Dan Laurențiu, PAVĂL Mihaela, NIȚAN Ilie, GROSU Oana Vasilica, TOADER Eusebiu, POPA Cezar Dumitru, ATĂNĂSOAE Pavel, BOBRIC Crenguța Elena, IRIMIA Daniela

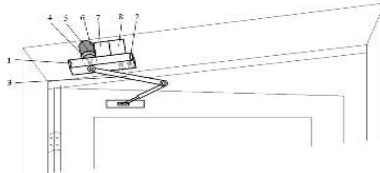
Institution Patent**Ștefan cel Mare University of Suceava**

Patent Application No: A/00519/2020

Description EN

The energy recovery system according to the invention consists mainly of a fixing body 1 with LED light sources 2 facing downwards for the illumination of the access path and an articulated arm 3 connecting to the hinged door / pivoting window, provided with an axis 4 whose movement is multiplied by means of a mechanical multiplier 5 and is taken over by the direct current generator 6, and by means of the battery charging system 7 the battery 8 is charged and supplies the LED light sources 2 placed on the fixing body 1, the system counting the number of openings by noticing the double change of the direction of the voltage generated by the direct current generator 6.

2: Energy and sustainable development

**RO.72.****Title EN****Automatic system for monitoring drivers' attention****Authors**

TOADER Eusebiu, PAVĂL Mihaela, MILICI Dan Laurențiu, BOBRIC Crenguța Elena, IRIMIA Daniela, VLAD Valentin, NIȚAN Ilie, GRAUR Adrian

Institution Patent**Ștefan cel Mare University of Suceava**

Patent Application No: A/00319/2020

Description EN

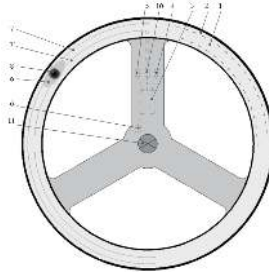
The automatic system for monitoring the attention of drivers according to the invention consists of a system of two sensors for evaluating the electrodermal resistance (7) and (7') at the driver's hand, pulse (9), hand contact force and the steering wheel (8), the acceleration of the vehicle (4), the angular displacement of the steering wheel (5) and its vibrations (6), placed on the steering wheel by means of a

NATIONAL

cover. The retrieved data is processed using a microcontroller procurement system that will determine if the position of the hands on the steering wheel is correct and if the driver's condition allows him to drive.

Class

8: Aviation, car industry and transportation



RO.73.

Title EN

Equipment for flip turn learning in swimming lessons

Authors

VIZITIU, E.; MILICI, D. L.; PAVĂL M.

Institution

Ștefan cel Mare University of Suceava

Patent

Patent Application No: A/00092/2020

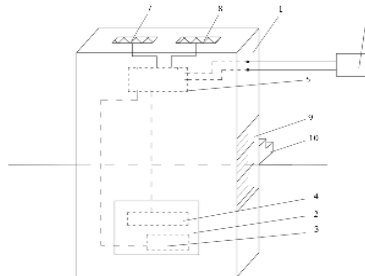
Equipment for flip turn learning in swimming lessons, according to the invention, consists mainly of a parallelepipedic panel (1), which is immersed in the pool at the end of the athlete's flip turn zone and which contains at the bottom the impact area (2), equipped internal with a force sensor (3), and a light source (4), connected to a command and control microsystem (5), together with the presence sensor (6) used to detect the presence of the swimmer and provide information at the time the return procedure must be started.

Description

EN

Class

13: Sports, Games and Leisure



Politehnica University Timișoara

RO.74.

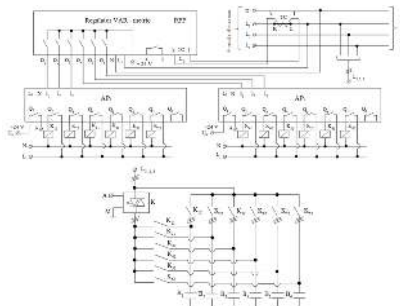
Title EN **Economical system for automatic adjustment of the power factor, with capacitor banks, in three-phase low-voltage installations**

Authors Popa Gabriel Nicolae, Diniș Corina Maria, Popa Iosif
Institution Politehnica University Timișoara, Faculty of Engineering Hunedoara

Patent no. Patent application A/00491/04.08.2020;
 The invention relates to an economical system for automatic regulation of the power factor with capacitor banks in three-phase low-voltage installations. The technical problem is the realization of an economical system of automatic regulation of the power factor, with capacitor banks, from three-phase low voltage installations, which uses a three-phase static electronic power relay common to all stages of capacitor banks to improve the power factor in three-phase low-voltage installations. It consists of a current transformer (which measures current in a phase), a VAR-metric controller with microprocessor, two small capacity PLCs, a three-phase static electronic power relay, twelve electromagnetic contactors and six capacitor banks.

Description
EN

Class no. 5. Industrial and laboratory equipments



RO.75.

Title EN

Automatic siphon installation

Authors

Popa Gabriel Nicolae, Popa Iosif

Institution

Politehnica University Timișoara, Faculty of Engineering Hunedoara

Patent no.

Patent No. A/00492/04.08.2020

Description

EN

The invention relates to a hydraulic installation which can be used to transfer a liquid between two basins, the first for storage and the second for feeding consumers, located at different levels at which the route of the supply pipe must pass, due to natural causes, over the water level in the accumulation basin. The hydraulic flow pump is used for a short time, and the principle of the siphon is used to transfer the liquid. The proposed installation has the role of transferring the liquid between two basins by achieving a significant saving of electricity. The hydraulic installation is connected between three basins: two main basins and one for filling and aeration of small capacity. The control of the siphon system can be done with microcontroller or PLC.

Class no.

5. Industrial and laboratory equipments



RO.76.

Title EN

Control method for an automatic capacitive compensator meant to improve the power factor and to load balancing in three-phase four-wire electrical networks

Authors

Pană Adrian

Institution

Politehnica University of Timisoara

Patent no.

RO 131297 B1 / 30.09.2020

Description

EN

The method is meant to be implemented through the medium of a specialized software in the control system of a three-phase capacitive compensator, consisting of single-phase power capacitor banks, included in two three-phase circuits, one in triangle connection, the other in star connection, to allow a variable unbalanced three-phase capacitive compensation, in order to fulfill, in addition to the “classic” function of power factor improvement, that of balancing the load of the three-phase network.

Class no.

5. Industrial and laboratory equipments



RO.77.**Title EN****Intelligent control system for continuous casting based on water flow control in the secondary cooling****Authors**

Gelu-Ovidiu TIRIAN

Institution**Politehnica University Timișoara, Faculty of Engineering Hunedoara****Patent no.**

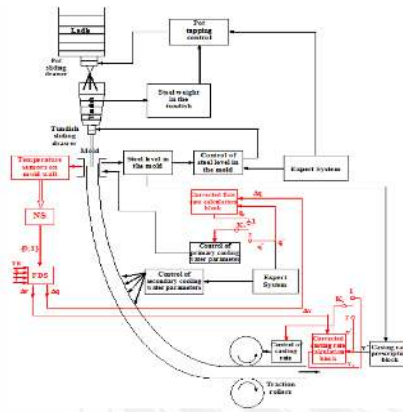
research project

**Description
EN**

was realised developed and implemented, meant to control the casting process by an intelligent fuzzy-type system, allowing the control of the water flow rate in the secondary cooling, by appropriate distribution along the cooling area. This necessity is imposed by the fact that actual control systems do not correlate in real time the variations of the multiple variables related to the continuous casting process and stick to a rigid distribution of the water flow rate on each cooling area. The intelligent system is capable of eliminating this shortcoming, by controlling in real time the distribution of the water flow rate according to the real situation in the installation, working as an adaptive system.

Class no.

5. Industrial and laboratory equipments



RO.78.**Title EN**

PROCESS FOR INTEGRATING THE DRY DEFLECTION BY-PRODUCT INTO THE DENSITY SLAM RECIPE FOR HYDRAULIC TRANSPORT THROUGH PIPE SYSTEMS

Authors

WÄCHTER Mihail Reinhold, IONEL Ioana, NEGREA Petru

Institution

Politehnica University of Timisoara

Patent no.

RO 131485 B1 / 27.11.2020

Description EN

The invention relates to a process for integrating the by-product resulting from dry desulfurization by applying the dense sludge technology for hydraulic transport through piping systems, as well the storage in the dump of the desulfurization by-product resulting from the technological process of flue gas treatment related to coal-fired power plants. The field of the invention is that of environmental protection.

The process does not influence the self-hardening properties of dense sludge, prevents the deposition phenomena on the walls of transport pipes, reduces the cost of transport and storage of desulfurization by-product, involves a low implementation cost, has a low energy consumption in operation compared to other methods and does not pollute the environment.

Applications: The dense sludge prepared according to the process described according to the invention solves the problem of preparing the dense sludge recipe, which also includes the desulphurization by-product, resulting in a slurry fluid, capable to be hydraulically transported through pipes to the slag and ash depot, specific to coal thermal power plants. According to the experimental results, it is found that the process of integrating the dry desulfurization by-product into the dense sludge preparation recipe according to the invention provides a technological solution for the hydraulic transport of the dense sludge containing dry desulfurization by-product.

Class no.

Environment - Pollution Control



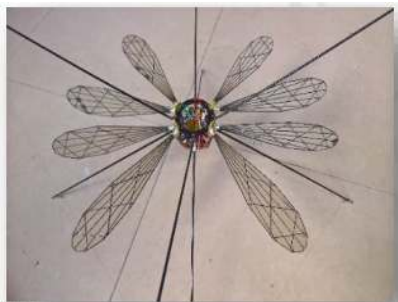
AD=additive; FA=electrofilter fly-ash; SD=dense sludge; FGD=by-product of dry desulphurisation, W=water.

RO.79.

Title EN **New Nature-Inspired Cycloidal Propeller for Low-Reynolds-Number Hovering Flight**
Authors Francisc Bereczky, Ioan Silea
Institution **Politehnica University Timișoara; Echitron S.R.L.**
Patent no. **Research project**

Description EN A new type of pivoting-blade cycloidal propeller having the appearance of damselfly wings, which can equip aircraft with vertical take-off and landing capability was designed and tested. This propeller is emerging as an alternative solution for electrically powered Planetary Aerial Vehicles capable of operating in the rarefied atmosphere of Mars.

Class no. 8. Aviation, car industry and transportation



RO.80.

Title EN **METHODS TO DETERMINE THE PREVENTIVE MAINTENANCE CYCLES OF ROLLING MILLS**
Authors Adina Budiul Berghian
Institution **Politehnica University Timișoara, Faculty of Engineering Hunedoara**
Patent no. PhD thesis

Description EN This survey presents two mathematical models of preventive maintenance that take into account stochastic factors which influence the failure rates and working life of an entity. The models are hybrid so that they combine the reduction of proper operation time with failure rate. The starty point consists in idea that preventive maintenance is done with imperfections: it is not reduced the proper operation only but it is increased the probability of entity failure as much as the number of maintenance is increased. The target of this survey is to determine the optimal graphic of planned maintenance activities either to reduce the related costs or to maintain the reliability above a prescribed minimum level.

Class no. 6. Mechanical Engineering – Metallurgy

RO.81.

Title EN **DYE-SENSITIZED SOLAR CELL MODULE FOR WAVELENGTH-SELECTIVE PHOTOVOLTAIC GREENHOUSE**
Authors Melinda Vajda, Miclau Marinela, Albulescu Daiana, Daniel Ursu
Institution **Politehnica University Timișoara, National Institute of Research and Development for Electrochemistry and Condensed Matter**
Patent no. PhD thesis / PN-III-P2-2.1-PED-2019-2091

Description EN A photovoltaic greenhouse must strike a balance between two contradicting requirements: maximize the flow of photosynthetic active radiation (PAR) which is essential for the growth and photosynthesis of the plants and enhance the production of energy which increases along with the increase in size of the opaque surface of the panels. The greatest

challenge of a PV greenhouse is the competition between PV roofs and plants. The main limitations of the integration in greenhouse concern the fact that these PV cells do not transmit sunlight and form a permanent shadow region which has negative effects on production, reducing the crop growth or the amount of biomass. Simple manufacturing process, the low fabrication cost, flexibility in scaling, low material usage and low light level sensitivity, but mainly the variation in color and transparency of the dye sensitized solar cell (DSSC) are essential characteristics that could make these cells the ideal candidate for greenhouse application. The selection of the color of DSSC given by the dye can act as a plant growth regulator or serve as a photo selective covering adsorbed with dye to manipulate the light spectrum entering the greenhouse. In this context, the invention proposed to design, build, and test the wavelength-selective solar cell module (DSSC module), as a technically and economically credible alternative concept of a PV roof for PV greenhouses. Diagram of n-type (a); our DSSC module (b) [original work]. This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, the project number PN-III-P2-2.1-PED-2019-2091, within PNCDI III.

Class no. 2. Energy and sustainable development

RO.82.

Title EN

AIR by CORNELIU intake manifold insulation layer

Authors

Corneliu Birtok Băneasă

Institution

Politehnica University Timișoara, Faculty of Engineering Hunedoara

Patent no.

PhD thesis

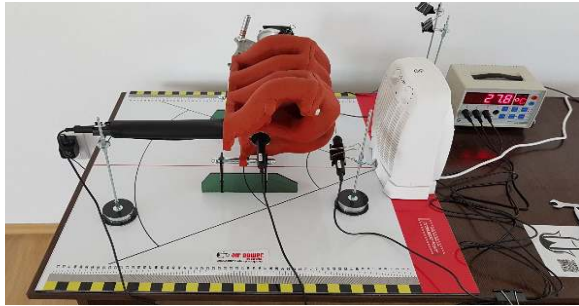
**Description
EN**

This product is dedicated to the reduction of heat transfer on the intake system, mainly in the case of the aluminum alloy intake manifold. To this end, a series of solutions for reducing heat loss have been adopted, implemented and tested. These consist in the design and insulation of the intake manifold with a new type of composite material with thermal insulation, whose composition contains natural, organic and recyclable elements. The thermal insulation layer called SPTI (Silicone Polyurethane Thermo-Insulating), offers protection to the thermally stressed

components (convection, conduction and radiation) of vehicles, such as intake manifolds, air conditioning systems, various components of the braking system, etc.

8. Aviation, car industry and transportation

Class no.



RO.83.

Title EN

Experimental installation for testing brake pads for successive braking

Authors

Camelia Pinca-Bretotean

Institution

Politehnica University Timișoara, Faculty of Engineering Hunedoara

Patent no.

PhD Thesis

The experimental installation aims to carry out experimental research in order to test ecological friction materials designed to make brake pads for small and medium vehicles. The experimental installation allows for sustained braking, in order to analyze the laboratory behaviour of the pad-disc brake assembly.

The installation consists of the following components: electric motor with power of 2.2 kW and speed of 2950 rpm, gearbox, belt drive, vacuum pump with membrane, planetary shaft, hub, pivot, brake disk. Vacuum pump training is carried out by a trapezoidal belt transmission. The drive belt was fixed to the planetary shaft by a non-demountable mounting and the driven belt is fixed to the vacuum pump mechanism by a removable mounting with screws. Two couplings have been made for the mechanical transmission, one connecting the electric motor to the reducer and other linking the output shaft between the gearbox and the planetary shaft. The speed variation allows the speed to be changed from 0 to 200 rpm. The principle of experimental determinations implies ten successive brakes and the results

**Description
EN**

obtained allow the evaluation of the behavior of ecologic friction material tested.

Class no. 8. Aviation, car industry and transportation



RO.84.

Title EN

Research on the influence of moulding-casting technology on the quality of castings

Authors

Josan Ana, Pinca Bretotean Camelia, Rațiu Sorin, Ardelean Erika, Ardelean Marius

Institution

Politehnica University Timișoara, Faculty of Engineering Hunedoara

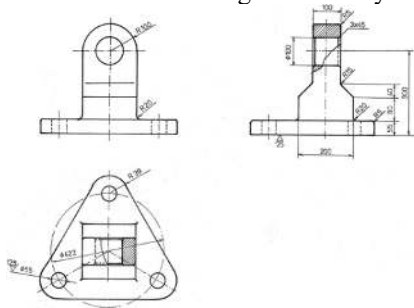
Patent no.

research project

**Description
EN**

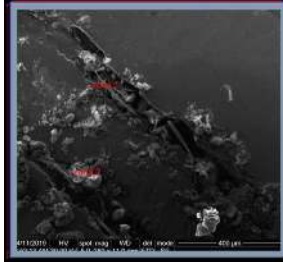
The quality of castings has a particularly role in the Romanian foundries. In this context, quality assurance is the overall objective of the foundries. The paper presents the critical analysis performed on moulding-casting technology of the type Lifting mechanism. This casting is a subset of the lifting and rotating mechanism of the furnace vault. The casting analysed is a medium size, with weight of 114 kg. The current moulding-casting technology involves moulding into three mould-parts leading to the occurrence of defects (decentering of the core, displacement of the lower mould and the middle mould and occurrence of burrs in area separated. Thus, to reduce the percentage of defects registered in industrial practice is necessary to change the moulding-casting technology. Thus, to reduce the percentage of defects registered in industrial practice is necessary to change the moulding-casting technology. This requires the use of two mould-parts, re-dimensioning of the core and the core box and dimensioning of the runner network. The

adoption of these changes in industrial practice has direct implications on the cost of casting and foundry costs default.



RO.85.	
Title EN	Development and implementation of an interdisciplinary virtual laboratory-classroom
Authors	ALIC Daniela Delia , RACKOV Milan
Institution	Politehnica University of Timisoara, Faculty of Engineering Hunedoara, Romania; University of Novi Sad, Faculty of Technical Sciences, Serbia
Patent no.	research project
Description EN	The project is concerned on the development of an interdisciplinary virtual laboratory-classroom, on the base of multimedia potential as learning and teaching tool. Currently operational in our faculty, the laboratory is dedicated our students, future mechanical engineers, who have the opportunity to use, via internet or face-to-face, innovative and advanced educational software solutions.
RO.86.	
Title EN	Non-metallic inclusions in steels intended for the automotive industry
Authors	Poenaru Iulia Olivia, Popa Alina-Maria, Ana Virginia Socalici, Adina Budiul-Berghian, Corneliu Birtok Baneasa
Institution	Politehnica University Timișoara, Faculty of Engineering Hunedoara
Patent no.	PhD thesis
Description EN	Outstanding performance in development of microalloyed steels with titanium, vanadium or niobium are determined by the chemical composition, advanced purity and small additions of alloying elements in order to finish the granulation and to improve the mechanical properties, but

also by modern laminations technologies and heat treatments. In this scientific study, are presented the results of the industrial researches regarding the titanium microalloying of steels that are destined to manufacturing of thick-walled pipes for the automotive industry .



RO.87.

Title EN

Experimental determination of filtration efficiency for porous ceramic cabin filter prototype

Authors

Robert Bucevschi, Ana Virginia Socalici, Adina Budiul-Berghian, Corneliu Birtok Baneasa

Institution

Politehnica University Timișoara, Faculty of Engineering Hunedoara

Patent no.

PhD thesis

Description EN

This project presents the results obtained from the experimental analysis of the filtration efficiency for two prototypes of full ceramic cabin filters. The innovation presented by these concepts is the exclusive use as a filtration medium of a combination of porous ceramic materials. The project also presents the influence of the granulation of the ceramic filtration medium on the pressure drop and the filtration efficiency. The analysis presented is part of the development process carried out within the doctoral research supported by the author.



RO.88.

Title EN

Puma AIR by CORNELIU

Authors

Corneliu Birtok Baneasa, Adina Budiul Berghian, Diana Stoica, Oana Gaianu, Alin Stoianov

Institution

Politehnica University Timișoara, Faculty of Engineering Hunedoara, Corneliu Group Association

Patent no.

Educational program

Description EN

Puma AIR by CORNELIU is a project realized by the FIH-UPT students through the educational program Dexter's Laboratory. The goal is to transform a street car into a sports car in order to participate at specific competitions. The materialization of the project involves the design within the student diploma works by approaching the various necessary modifications: reducing weight, increasing body strength, implementing a roll cage, improving braking efficiency, increasing engine power etc.

Class no.

8. Aviation, car industry and transportation



RO.89.

Title EN

Increase of weld strength by micro alloying for HSLA steel

Authors

Laurentiu Zgripcea, Teodor Heput

Institution

Politehnica University Timișoara, Faculty of Engineering Hunedoara

Patent no.

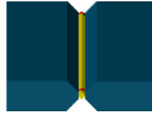
PhD Thesis

Description EN

For special repairs of steel armors, standard welding cannot assure the strength required in normal exploitation. This is a safety requirement and cannot be minimized. As example repairs of armored vehicles, digging shovels for excavator or heavy machineries wearing plates. The common elements of these steel grades are equivalent carbon which is much higher than ordinary steel grades. For this reason, special precaution must be taken during welding and special

techniques also. The new idea is to use a superalloyed cold wire, positioned in the welding center which will diffuse during the welding in the whole joint section. Special welding using superalloyed wire and effect of weld microalloying is tested at impact, using Charpy machine. The sample must absorb higher energy and aspect of the breakage must be resilient, without fragility.

Class no. 6. Mechanical Engineering – Metallurgy



RO.90.

Title EN **A new dimension in the understanding of human perceptions using View Point System and Captiv L7000 Premier technology**

Authors Popa Mihaela, Mutu Robert Marian

Institution **Politehnica University Timișoara, Faculty of Engineering Hunedoara**

Patent no. PhD Thesis

The heart of View point system is the VPS 16 glasses. These Eye Hyper-Tracking glasses with stereoscopic cameras in the nose bridge enable for the first time like spatial plane in which the user is looking to be precisely determined. Added to this is the outstanding light immunity, which allows for reliable results even outdoors and under suddenly changing lighting conditions. The corrective power of the glasses can also be adapted to the wearer, and the eye tracking glasses can be comfortably worn with contact lenses. With the very short calibration time compared with other options, the glasses can be quickly adapted to the wearer and made ready for use. Once calibrated, the Eye Hyper-Tracking glasses can be used again and again for hours at a time – comfortably and unobtrusively.

Description EN CAPTIV-L7000 Premier is a flexible research software for the synchronization of video and measurements from sensors and interfaced third-party hardware and measurement devices, including advanced analysis and processing features.

Class no. 10. Information Technology and Communication

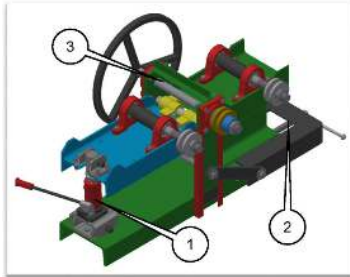
RO.91.

Title EN	Study on the recycling methods of used engine oil
Authors	Diana Miruna Armioni
Institution	Politehnica University Timișoara, Faculty of Engineering Hunedoara
Patent no.	student project
Description EN	The study presents an overview of the main technologies for recycling used engine oil, as well as a comparative analysis of the impact of these technologies on the properties of recycled oil. The aim of this research is to highlight the importance of proper management of this type of hazardous waste.
Class no.	1. Environment - Pollution Control

**RO.92.**

Title EN	Bar rolling device
Authors	CIOROAGĂ Bogdan-Dorel, CIOATĂ Vasile George, ALEXA Vasile
Institution	Politehnica University Timișoara, Faculty of Engineering Hunedoara
Patent no.	PhD thesis
Description EN	<p>The bar rolling device is used for the controlled bending of straight bars, regardless of their profile.</p> <p>Overall dimensions: 1365 x 824 x 948 mm.</p> <p>The operation is manual.</p> <p>Body with rigid construction, made of laminated profiles, joined by welding.</p> <p>Usable in metal workshops.</p> <p>The device has 3 main mechanisms:</p> <p>(1) The mechanism for adjusting the degree of deformation operated by the hydraulic jack;</p> <p>(2) The mechanism for adjusting the position on the vertical axis of the drive roller;</p>

- Class no.** (3) The drive mechanism of the drive roller.
5. Industrial and laboratory equipments



RO.93.

- Title EN** Antik “Energy Tree”
- Authors** Sapta Doru Ioan, Marinut Gabriel Paul, Obrenovici Lavinia Ioana, Golcea Julia Daiana, Strugaru Dragos; coordinator Corneliu Birtok Baneasa,
- Institution** Politehnica University Timișoara, Faculty of Engineering Hunedoara
- Patent no.** student project
- Description EN** The Antik “Energy Tree” charging station is a multi functional device. Based on renewable energy in order to fix the problem of the modern citizen who often when is in the public space ends up in the situation of having to charge his mobile device, but has no power source. It is made of durable materials regardless of weather conditions, with various modern technologies to offer its user a pleasant experience. Antik Energy Tree aims to increase the autonomy of mobile devices, and to provide ergonomics in an Eco-Friendly design.
- Class no.** 2. Energy and sustainable development



NATIONAL

RO.94.

Title EN

Adaptive exhaust cover Air by Corneliu

Authors

Marinut Gabriel Paul, Saptă Doru Ioan, Golcea Julia Daiana, Obrenovici Lavinia Ioana, Strugaru Dragos; coordinators Birtok Baneasa Corneliu, Budiul-Berghian Adina

Institution

Politehnica University Timișoara, Faculty of Engineering Hunedoara

Patent no.

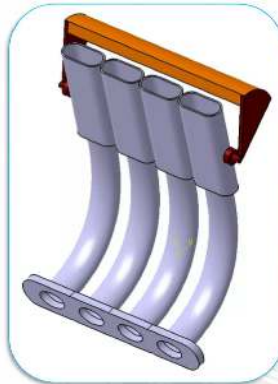
student project

Description EN

Adaptive exhaust cover (AEC) is a device for competition engines equipped with dynamic exhaust systems, especially the Air by Corneliu type. The implementation of AEC prevents the entry into the dynamic exhaust system of solid particles (dust, sand, leaves) or water when the engine is stopped. AEC has a smart control unit that allows it to operate according to the following parameters: temperature, humidity, wind speed, light intensity etc.

Class no.

8. Aviation, car industry and transportation



RO.95.

Title EN

Experiments on the wear of ball mill armor

Authors

Teodor VasIU

Institution

Politehnica University Timișoara, Faculty of Engineering Hunedoara

Patent no.

PhD thesis

Description EN

The study analyzes the wear behavior of armor execution materials in an experimental ball mill $\varnothing 700 \times 700$ depending on the parameters of the mechanical regime and also the wear of the metal lining of an industrial mill.

Class no.

6. Mechanical Engineering - Metallurgy

RO.96.**Title EN****CLOS DRESS****Authors**

Albescu Corina, Tîrnăvean Alexandru Adrian

Institution**Politehnica University Timișoara, Faculty of Engineering Hunedoara****Patent no.**

2020001R

**Description
EN**

The kirtle dress is a versatile fit with the club perfect for any form of silhouette and height, giving you freedom to move. The kirtle dress is made of ships, such as the veil, and the waist is exposed by a delicate strap. This three-quarter dress is closed behind with a pearl-type button, with a boat neck-neck. White and black never gets fashioned, you can always rely on the combination of these two colors.

Class no.

9. Chemical and Textile Industry

**RO.97.****Title EN****Mobile Pavilion for Rainwater Collection****Authors**

Pisleaga Mihaela, Gabriel Aranda, Cristina Capotescu

Institution

Polytechnic University of Timisoara, Glomad, Aquatim

Patent no.

research project

**Description
EN**

As a result of research on "how to reuse rainwater" a mobile pavilion will be designed. The objective is to explain the rainwater circuit. Offering the viewers a close look, at how a roof can become a green roof, and how it can work as a method to collect rainwater or using the rainwater for other various activities. The project has an educational component, aiming to inform and raise awareness among the population regarding the care for the resources we have at our disposal, respectively rainwater. The scientific component consists of proposing green solutions for residential buildings (walls/roof), to collect rainwater and reduce the impact on

the sewerage network. Rainwater harvesting is seen as a method of adapting to climate change. The mobile pavilion can be located in populated areas to increase the impact, having an environment and health-friendly design.

Class no. 7. Buildings and Materials

RO.98.

Title EN

ELECTRICAL LIGHT INSTALLATION FOR DENTAL ESTHETICS

Authors

Pavel Ștefan, Krems Cristina, Mocan Marian Liviu, Doboși Ioan Silviu

Institution

Politehnica University of Timisoara

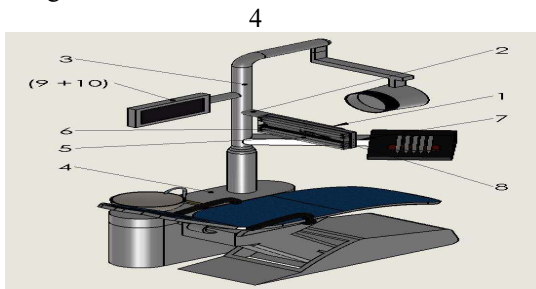
Patent no.

U/00018 28.04.2017

Description EN

The invention relates to a fixed electrical lighting installation used in the dental cabinets which provides illumination to the dental area of the patient, illumination which is very close to the daylight parameters. The installation is made up of a mobile metal body made from a mirror coated inoxidable steel, attached to the dental pillar unit, in which 5 lamps with the true color rendering index are mounted, 97 Ra8 and the color temperature of 53000Kelvin, a black light type of lamp, and between the lamps is mounted a camera connected to a computer with the monitor fixed (optionally) on the dental pillar unit. **ADVANTAGES:** Ensures transparency in the incisal zone of the teeth; Ensures an illumination very close to the daylight parameters on the dental work area ; It ensures that the teeth are photographed with an illumination very close to the daylight parameters before and after the medical procedure of dental aesthetics; It ensures a better color setting in dental aesthetics.

Class no.



RO.99.**Title EN****INSTALLATION FOR THE EVALUATION OF THE MAGNETIC FIELD EXPOSURE EFFECTS****Authors**

Pavel Ștefan, Lupa Lavinia Afrodita, Mocan Marian Liviu, Ungureanu Daniel-Viorel, Doboși Ioan Silviu, Moldovan Aurel, Simina Alina Georgiana, Bînzar Alexandru, Suciș Silviu Cristian

Institution**Politehnica University of Timisoara****Patent no.**

A/00336/15.05.2018

**Description
EN**

The invention relates to an installation which can be used to evaluate the effects of a oscillating, pulsed, low frequency magnetic, 20÷70 Hz, and adjustable intensity on the cells of a biological sample: extracted tissue, organic fluid, living organism, seeds. The installation according to the invention consists of a support plate on which at least two perpendicular supports are positioned, depending on the number of workstations required to perform the study. On each arm attached to the support it is fixed an inductance, which can be positioned and fixed both in perpendicular plane for approach or distancing of the work sample so as to obtain the desired intensity of the magnetic field, as well as horizontally plane by sliding or (and) by rotation on the mounting support in front of the studied sample. The adjustable power source is controlled by a scheduler and connected to a variable frequency rectangular pulse generator.

ADVANTAGES: Ensures the possibility of performing experiments under controlled exposure conditions; Allows evaluation of the effects of a low frequency magnetic field, 20 ÷ 70 Hz, on the sample cells under specific exposure conditions; It is a compact, unitary, portable investigation tool and it doesn't require any auxillary measuring and recording equipment; It provides flexibility in configuration, depending on the investigation needs, simplicity and safety in operation

Class no.

3&4



RO.100.**Title EN****EARTHING ELECTRODE WITH CORROSION RESISTANT CONNECTIONS****Authors**

Pavel Ștefan, Ungureanu Daniel-Viorel, Mocan Marian Liviu, Doboși Ioan Silviu, Topală Florin-Ionel

Institution**Politehnica University of Timisoara****Patent no.**

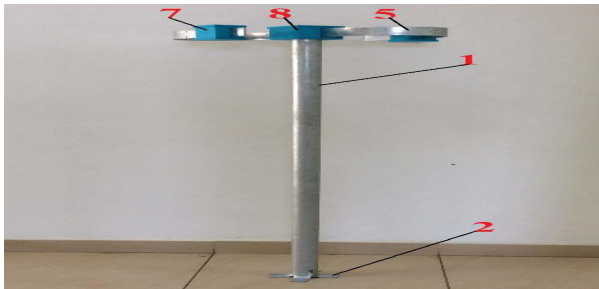
A/ 00757/28.09.2018

**Description
EN**

The electrode consists of some concentric tubes, an outer galvanized steel tube, and an inner galvanized steel tube joined to the bottom by welding with a plate, and at the top by a flattened metal plate in the shape of „S”, so that the connections are made through the heads of the flattened metal plate through welding with the flattened horizontal metal plate of the earthing installation. The connection are covered with bitumen inside a plastic corrosion protection box and the top of the electrode assembly, the connection area between the electrode’s flattened metal plate, and the horizontal earthing installation flattened metal plate has an access zone for periodic checks and measurements. The externally galvanized steel tube provides, at a limited length, at least 4 equidistant longitudinal grooves that allow the material of the tube so that on said tube some wings materialize, transversely on its axis, in the form of a rosette, which defines a larger contact surface of the galvanized steel tube with the soil. ADVANTAGES: Allows a better contact with the soil; Provides through a lower electrical resistance, a better passage and dissipation of the lightning surge through the soil ; Provides anticorrosive protection for the horizontal earthing flattened metal plate joining pieces Ensures a simpler assembly work so that the possibility of friction with the soil is removed, implicitly the removal of the zinc coating.

Class no.

7. Buildings and Materials



RO.101.

Title EN	ELECTRICAL INSTALLATION FOR AIR AND SURFACE DISINFECTION FROM THE PUBLIC TRANSPORT
Authors	Pavel Ștefan, Ungureanu Daniel-Viorel, Bînzar Alexandru, Tutelcă Ancuța Letiția, Suciuc Silviu Cristian, Popoiu Călin Marius
Institution	Politehnica University of Timisoara
Patent no.	U/ 00024 24.06.2020
Description EN	<p>The technical problem which is solved by the invention, consists in realization of a fixed electrical installation which is used for surface and air disinfection with UVC ultraviolet radiation from the public transport, mounted on the ceiling of the transportation vehicle, powered by the electrical source of the public transport vehicle. The command of the disinfection installation can be executed manually or via Wi-Fi, from a predetermined distance. ADVANTAGES Being a fixed technical solution, located on the ceiling of the vehicle and powered by the electrical source of the public transport vehicle, compared to other types of similar solutions, for the same disinfection effect, it offers a lower manufacturing and operation costs. It uses three UVC germicidal lamps (26), two at the wavelength of 253.7 nm, and one at the wavenelgth of 183 nm [3], UVC radiation generators and ozone. The disinfection lamps are incorporated in an assembly protected by a slotted stainless steel with rhomboidal slots (perforations), expanded (successive “zig-zag” L-bends), with multiple reflection surfaces for the dispersion of the radiation into the device, for air disinfection, and into the exterior, onto the surfaces which necesisit disinfection found inside the space of the public transport vehicle. The installation operates, disinfects the air and the surfaces, within 10 minutes, during the intended break of the tram driver or the bus driver, at the end of the public transportation vehicle route, place where the Wi-Fi transmitter is mounted and/or in the depot</p>
Class no.	8. Aviation, car industry and transportation

RO.102.

Title EN	INSTALLATION FOR REMOTE MONITORING OF CORROSION OF THE GROUND CONSTRUCTIONS COATED OR NOT WITH ZINC
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NATIONAL

Authors	Pavel Ștefan, Ungureanu Daniel-Viorel, Bînzar Alexandru, Moldovan Aurel
Institution	Politehnica University of Timisoara
Patent no.	U/ 00037 03.08.2020
Description EN	Installation for real-time remote monitoring of ground constructions coated or not with zinc. The technical issue solved by this invention, consists in making an installation for real – time remote monitoring of the coated or no coated ground metal constructions found at predetermined depths and data recording, transmission of the obtained data and archiving it. ADVANTAGES: Ensures remote monitoring of the installation; Provides recording, saving, archiving and real-time data transmission; Provides remote control.

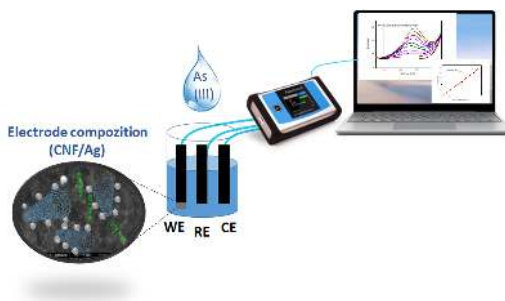
RO.103.

Title EN	Electrode and method for fast electrochemical detection of arsenic (III) from aqueous solutions
Authors	Manea Florica, Pop Aniela, Baciu Anamaria, Remes Adriana
Institution	Politehnica University of Timisoara
Patent no.	RO 129026 B1/30.10.2020
Description EN	The invention relates to the elaboration of an electrode and a process for the electrochemical detection of arsenic (III), a highly toxic pollutant from aqueous solutions. Also, the working electrode and the process of the invention can be used both for the detection of other pollutants from water (heavy metals and organic pollutants) and for other applications (the analysis of pharmaceutical products, food quality control and safety, clinical analysis). The issue to be solved by the invention is to develop a product and a method based on the electrochemical method of fast detection of arsenic (III) from aqueous solutions using a relatively inexpensive electrode material, with a long operating time, exhibiting high electroanalytical performance - limit of detection, sensitivity, reproducibility, accuracy. The electrode and the method of fast electrochemical determination of the arsenic (III) from aqueous solutions according to the invention consist on the use of an electrode called working electrode, a counter electrode in assembly with a reference electrode, which based on the anode stripping method and using the square wave voltammetry technique allow the contact with the arsenic (III) contaminated water in the presence of an electrolyte, leading

to the working electrode electrochemical response in the presence of the pollutant. The working electrode is a composite electrode obtained by dispersing carbon nanotubes in a epoxy matrix and then, electrochemically modified with silver nanoparticles.

The electrode and the method of fast electrochemical detection of arsenic (III) from aqueous solutions according to the invention has the following advantages: very high electroanalytical characteristics (limit of detection, sensitivity, reproducibility, accuracy), low cost of materials used for the working electrode elaboration, long operating time (at least 1 year).

Class no.



RO.104.

Title EN 3D Porous dimensionally stable anode-integrated particulate electrode-electrochemical filtering system for advanced treatment of cytostatics-containing water (3DSAPECYT)

Authors Manea Florica, Orha Corina, Tudoran Constantin Adrian

Institution Politehnica University of Timisoara/INCEMC Timisoara/ SC BeeSpeed SRL

Patent no. Project no. 441PED/2020

Description EN

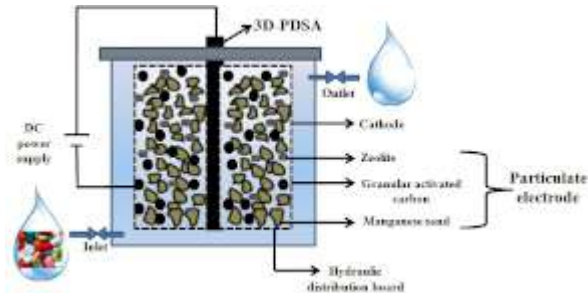
The goal of the present project is to develop an innovative three-dimensional (3D) porous dimensionally stable anode – integrated particulate electrode electrochemical filtering system for advanced water treatment, which will be validated at the lab-scale for advanced treatment of cytostatics-containing water. The system will be flexible and enable for an advanced treatment of water/wastewater characterized by a wide range of contaminants (organics and inorganics) by

combination of advanced electrooxidation with adsorption/catalysis processes within one reactor.

Porous dimensionally stable anodes (PDSA) acts as a 3D anode that should improve the mass transfer at the electrode surface and through DSA composition should exhibit strong oxidation ability. In 3D system, each electrode material (anode, cathode and particulate electrode) is one of the most important factors determining the process efficiency and cost. Integration of fluidized bed filtering system between anode and cathode, namely particulate electrode (PE) overcome some intrinsic drawbacks/limitation (mass transfer limitation, small space–time yield, low area–volume ratio and temperature increase) of 2D conventional electrochemical reactor generally used, especially when the water is of low conductivity. Also, by PE composition, the range of contaminants potentially removed should be extended and sorbent materials will be electrochemically regenerated.

Class no.

1



"Lucian Blaga" University of Sibiu**RO.105.****Title EN****Flexible modular system for fixing workpieces for the incremental forming process****Authors**

Racz Sever-Gabriel, Breaz Radu-Eugen, Oleksik Valentin Ștefan, Pascu Adrian Marius, Popp Ilie Octavian, Gîrjob Claudia Emilia, Tera Melania, Chicea Anca Lucia, Biriș Cristina Maria, Crengăniș Mihai

Institution**Lucian Blaga University of Sibiu, Faculty of Engineering****Patent no.**

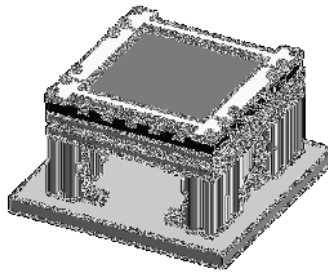
Patent application A 2019 00712 - 07.11.2019

**Description
EN**

The incremental forming process is a flexible alternative to conventional cold metal forming processes. One of the main disadvantages of the process is that it allows the processing of a single type of workpiece size, because the working area and implicitly the size of the workpiece sheet that can be processed is fixed. To eliminate this disadvantage, a flexible modular system for fixing the workpiece is proposed, which allows the user to adjust the size of the workspace and implicitly the size of the workpiece.

Class no.

5

**RO.106.****Title EN****Methods and devices for recovery of therapeutic properties of salted water from balneary area, in the case of stratified salinity concentration****Authors**

Nederita Victor, Oprean Constantin, Oprean Letitia, Ciudin Rodica, Titu Aurel Mihail

Institution**Lucian Blaga University of Sibiu, Faculty of Engineering****Patent no**

Patent 125497

**Description
EN**

The invention concern's new methods and devices for recovery of therapeutic properties of salted water from balnear area, in the case of stratified salinity concentration.

NATIONAL

The method is to induce surface water with low salinity concentration under lower layers of water, with a higher salinity concentration in a gravitational continue water flow; water mix, water transportation and diffusion of rehabilitated water on the surface, in the upper layer under the direct osmosis.

Class no.

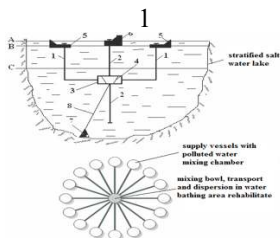


Figure 1. Satellite device bathing water rehabilitation.

1. polluted water pipeline, 2. rehabilitated water pipeline, 3. mixing chamber, 4. membrane osmotic, 5, 6. hoses, 7. anchor, 8. anchor cable, A, B. bathing layer, A, C. depth with variable salt concentration.

RO.107.

Title EN

Device and method for disposal and collection of pathological products

Authors

Sabău Dan, Sabău Alexandru Dan, Dumitra Anca Maria, Țițu Aurel Mihail

Institution

Lucian Blaga University of Sibiu, Faculty of Engineering

Patent no.

Patent application No. A 2013 00004

**Description
EN**

The invention refers to a method and a device for the abdominal collection of certain corpuscular/fluid structures with a diameter below 10 mm, destined for minimally invasive surgery, especially laparoscopic as well as for open surgery. Collection methods rely on the existence of a closed, hyperbaric chamber (abdominal cavity) and several fragments of gallstones, blood clots, dispersed or agglutinated, possibly fluid tissue, that need to be relatively quickly discharged without unnecessary moves, fragmentation tools and/or contamination. The preferably transparent device consists of a metallic or plastic tube with an interior diameter of approximately 9-9.5-10 mm capable of discharging the formations due to the difference of pressure inside and outside the abdomen, difference that may be enhanced by attaching an external vacuum.

Class no.

4

RO.108.**Title EN****Stable synergistic composition with antioxidant and anti-inflammatory properties based on bioactive phytoextracts****Authors**

Oancea Rodica Simona, Tecuceanu Andreea Cristina, Dulf Francisc Vasile

**Institution
Patent****Lucian Blaga University of Sibiu, Faculty of Engineering**
Patent request A 2020 00393 - 9.07.2020**Description
EN**

The invention relates to a new synergistic composition, 100% natural, in the form of an emulsion, containing extracts of β -carotene from pumpkin, anthocyanins from red cabbage and inulin from parsnips, as well as the method of preparation and the bioactive properties of the composition. The process according to the invention consists in combining 50% and 25%, respectively β -carotene oily extract from pumpkin, 25% and 15%, respectively, concentrated anthocyanin extract from red cabbage and 25% and 60%, respectively, aqueous fructan extract from parsnip, in the presence of 0.5% guar gum relative to the composition, resulting in a stable composition of phytoextracts with bioactive properties tested *in vitro*. The process of preparing the emulsion based on natural extracts rich in bioactive principles, in pumpkin oil, has the advantage of stability by using a guar seed flour product, which stabilizes the emulsion formed, and the final product obtained has anti-inflammatory and antioxidant properties, which contributes both to the beneficial effect on human health and to protection against oxidation. The composition presented is rich in bioactives such as β -carotene, fructans (inulin), anthocyanins and polyunsaturated fatty acids. The invention is situated at the intersection of food and health sciences, providing a safe, prophylactic alternative for the human body compared to similar products obtained by synthesis. The invention has practical importance both by valorization of plants rich in carotenoid compounds, polyphenols (anthocyanins), fructans and essential fatty acids, to obtain extracts with special biological properties, and by applying sustainable technologies for their preparation and the final product.

Class no.

3

RO.109.**Title EN****Intelligent window solar protection system****Authors**

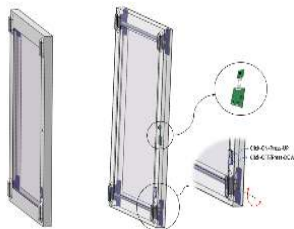
Draşovean Paula Nicoleta, Olaru Andreea Melania

Institution**“Lucian Blaga” University of Sibiu, Faculty of Engineering****Description
EN**

This project refers to a sun ray protection device for inside the home. A sun ray filtering mechanism is presented for when the penetrating rays become unbearable during the warm summer days when the temperatures are high. Depending on the set temperature for inside the room, this protection mechanism will control the quantity of sun rays that is allowed to enter the room through the window and the quantity which is going to be reflected. The solar filter can be maneuvered easily, it can be rolled up vertically, half way, one quarter of the window or any length that is desired, automatically using the sensors or manually by a push of the button placed on the exterior of the frame. This device is able to protect us very well from the blinding brightness of the sun throughout the day while we are at the desk and sensitive plants can benefit from protection against the strong rays especially by the ability of the device to roll up to the plants' height. The device in the shape of a frame can be mounted very easily on the window frame and consists of construction and assembly elements, action, control and filter positioning components, the filter with a double structure, both transparent and reflective, a variety of incorporated sensors which operate the device when the necessary information is received, thus when a certain temperature is set and the sensors detect strong brightness as well as a rise in temperature, the rays begin to be reflected. When it is cloudy outside and the temperature stays the same or drops, such actions are not necessary. Besides all benefits described above, what makes the device unique is the existence of visual and thermal sensors which detect the presence of an individual in its action range when working at a desk situated near a window and protects them from the harmful UV rays while facilitating a low temperature working space without powerful, bright light.

Class no.

3



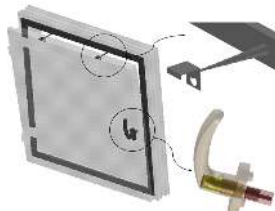
NATIONAL

RO.110.**Title EN****Intelligent system for window automatization****Authors**

Olaru Andreea Melania, Draşovean Paula Nicoleta

Institution**“Lucian Blaga” University of Sibiu, Faculty of Engineering****Description****EN**

This project proposes the designing of an intelligent system for window automatization having in its composition a number of oxygen sensors. These sensors signal an electrical motor which acts upon the device to open, and ultimately close the window. The opening of the window consists in the folding of the window towards the inside of the room and can function on folding PVC doors with slight dimensioning modifications. This device consists of a universal handle that can fit most, if not all, PVC windows and a slim frame (about 10 mm) which contains two telescopic rods. The main purpose of the frame is to maintain the sealing tightness of the window by being in contact with a plane surface, flat on both sides (the frame). The telescopic rods have the thickness of the frame when not in use and can go out to a length of about 100 mm. These function through the action of a reversible hydraulic system that has the capacity to extend and fold the rods through connection to the oxygen sensor. The components to the hydraulic system are placed inside of the frame. Attached to the end of each telescopic rod, two easily mountable and demountable parts can be found which connect the action device to the window frame at all times for an increased ease in function. The oxygen sensor functions on the wireless principle and is positioned inside of the handle which also has an end-to-end reaming for ventilating and proper functioning purposes. This oxygen sensor has the role of detecting an accentuated deficiency in the oxygen concentration of the room, under a safety limit and signals in these conditions the opening of the window. This can also be set to close the window after a certain limit of increase in oxygen concentration (optional). This system was thought-out to help the elderly and/or house pets as a safety and integrity measure in the cases when these categories are left alone in a room for a certain amount of time and in certain conditions.



RO.111.**Title EN****Protection for trees****Authors**

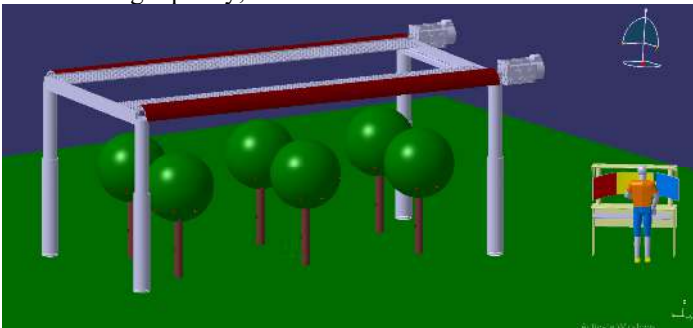
Sava Gabriela-Andreea, Bărbușiu Andreea-Mihaela

Institution**“Lucian Blaga” University of Sibiu, Faculty of Engineering****Description
EN**

The designed device actuates a safety net at the push of a button, and the net moves on rails positioned at the ends of telescopic poles. Once the net is spread over the trees, they can be considered protected. On the support poles will be found devices that emit sounds that have the role of scaring animals and birds. On the rails there will be a hose that is provided with side bores having the role of spraying the trees with different substances. At the end of the season, the farmer has the opportunity to tighten the net at the touch of a button, and the net will be kept in the carcass at the end of the row on the support poles. If the trees have grown the following year and the net is too low, the farmer can change the height of the telescopic poles using software.

Applications: This device is to be used both in human households and in agriculture with the role of protecting trees against hail, birds and animals.

Advantages: Protects trees from animals, birds through devices placed on poles that emit sounds, Protects hail trees with a thick net, Through this system we can also spray the trees with different substances, It is modeled according to the client's requirements (height, length), Resistance over time, High quality, Reduces the household's duties



RO.112.**Title EN****Coaxiality verifying device****Authors**

Vergu Constantin-Alexandru

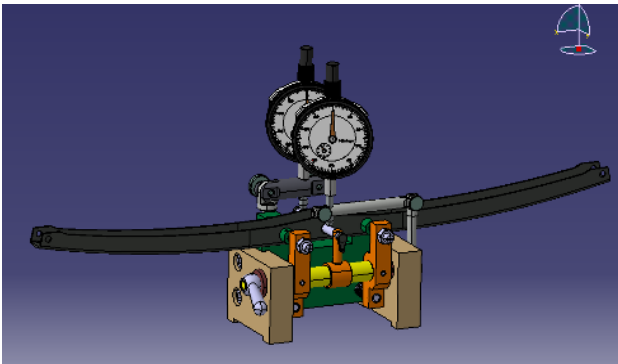
Institution

"Lucian Blaga" University of Sibiu, Faculty of Engineering

Description**EN**

The project proposes a special device projected for the control of the coaxiality of two reamings from a window wiper arm of a car. This is made of a support (1), two support rings (2), two fixing studs 1,5x10 (3), two threaded studs M6x35 (4), two nuts M6 (5), two support walls (6), the handle (7), the shaft (8), two hinges (9), two resorts (10), two bolts (11), two washers (12), two studs 4x18 (13), two nuts (14), four screws M8x20 (15), one stud 3x18 (16), the support of the verifier (17), two comparator watches (18), verifier (19) and the support of the comparator watch (20).

The wiper arm is gripped manually using the handle (7), which drives the shaft (8) where are located the hinges (9). These have the studs M6x35 threaded (4) in the upper part, where are gripped the support rings (2). The semi-manufacturing is orizontally elastic gripped by the rings (10) and the bolts (11). After the gripping of the semi-manufacturing, the coaxialty between the two shafts is checked, using the verifier (19) which makes a manual rotation move on the support (17). When the verifier rotates, the two comparator watches are fixed to check the coaxiality of the shafts. If the comparator watches don't move their needle, it means that the two shaft are coaxial.



Regele Mihai I al Romaniei
Banat University of Agricultural Science
and Veterinary Medicine, Timisoara

RO.113.

Title EN

Quality of flowers to daffodils based on vegetative and floral indices

Authors

Maria BALA, Florin SALA

Institution

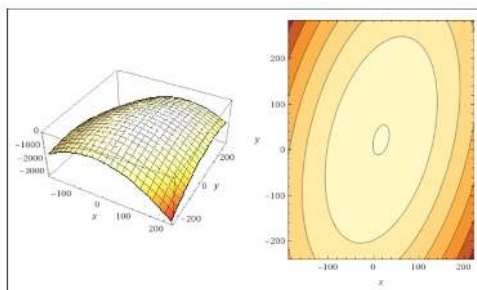
Banat University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara

Research project aimed to evaluate the quality of flowers in daffodils (*Narcissus pseudonarcissus* L.) in relation to physiological and floral indices. The biological material was represented by five varieties of daffodils: 'Carlton', 'Ice Follies', 'St. Patrick', 'Dick Wilden' and 'Salome'. A series of physiological and floral indices were evaluated that described the status of plants (plant height - PH, number of leaves - LN, length of leaves - LL), vegetation period (VP), flowering period (FP), and flowers size (FS). The flowering period (FP) expressed in days, recorded the values: FP = 13 days for 'Carlton', FP = 18 days for 'Ice Follies', FP = 9 days for 'St. Patrick', FP = 10 days for 'Dick Wilden', and respectively FP = 11 days for 'Salome'. The variation of FS according to LN was described by a polynomial equation of degree 2, under conditions of $R^2 = 0.938$, $p \ll 0.001$. A 3D model of FS variation with respect to LN and FP was obtained, and a graphical representation in the form of isoquant, expressed a possible combination of LN and FP for optimum of FS. PCA led to the distribution of the studied varieties in relation to the main quality parameters considered (VP, FP and FS). Cluster analysis led to the grouping of daffodils varieties based on affinity with respect to flower quality indices (FP and FS) under statistical safety conditions, $Coph.corr. = 0.924$.

Description EN

3

Class no.



Graphical distribution of FS values in relation to LN and FP

RO.114.

Title EN

Optimization of some parameters for ornamental plants production in off-season

Authors

Maria BALA, Florin SALA

Institution

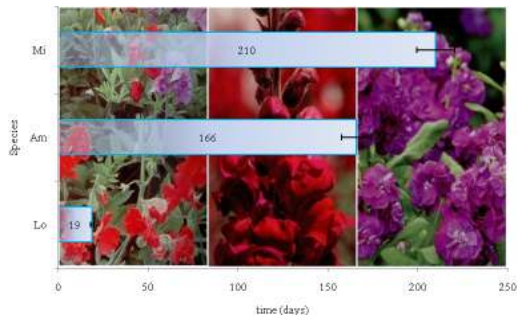
Banat University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara

Patent

Description
EN

The present research project evaluated the behaviour of three ornamental species through flowers, in off-season cultivation conditions, in order to optimize production parameters. The total time of flowering (Ttf) was described, for each species, by mathematical models, in relation to the temperature and plants height. The biological material was represented by the species: *Lathyrus odoratus* L.; *Antirrhinum majus* L., and *Matthiola incana* (L.) W.T. Aiton., respectively. The variation of the plant height, in the studied ornamental species, in relation to the temperature (T), was described by polynomial equations of degree 3, in safety statistical conditions ($R^2=0.975$ for *Lathyrus*; $R^2=0.987$ for *Antirrhinum*, and $R^2=0.971$ for *Matthiola*, respectively). In relation to the biological specificity and the behavior in the off-season, the three species had different values for the total time of flowering (Ttf); Ttf = 19 days for *Lathyrus*; Ttf=166 days for *Antirrhinum*, and Ttf=210 days for *Matthiola*. Multiple regression analysis led to the obtaining of Ttf estimation models, depending on the temperature (T, °C) and the height of the plants (H, cm), in statistical safety conditions. The Wolfram Alpha software facilitated the obtaining of 3D and isoquant graphic distribution models of Ttf, according to T (°C) and H (cm), for each species studied. The optimal values for H and T were determined, in order to obtain the best total flowering time, in off-season conditions, values that can be ensured by the cultivation technology of the studied species.

Class no.



Graphical representation of Ttf for the studied species; left - *Lathyrus odoratus* L.; middle - *Antirrhinum majus* L.; right - *Matthiola incana* (L.) W.T.Aito

RO.115.	
Title EN	Tentatii Culinare Marine
Authors	Raba Diana Nicoleta, Misca Corina-Dana, Bordean Despina Maria, Dumbrava Delia-Gabriela, Moldovan Camelia, Popa Viorica Mirela, Mariana-Atena Poiana, Pirvulescu Luminita, Radulov Isidora
Institution	Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara
Patent	TRADEMARK M2021/002405 Marine culinary temptations include products from the category of meatballs and rolls, innovative by the facts that are prepared from seafood meat in varying proportions depending on the manufacturing recipe. The seafood used is: squid, mussels, shrimp, which can be used individually or combined. The products are both tasty and valuable from a nutritional point of view by the fact that they benefit both from the proteins with high biological value of seafood and from the vitamins, minerals and fiber from the vegetables used in the recipe: onions and green garlic, parsley leaves, peppers, spices (pepper, chili). The products are suitable for all categories of consumers over 3 years of age except those allergic to seafood.
Description EN	
Class no.	3
RO.116.	
Title EN	AperGoFree
Authors	Moldovan Camelia, Borozan Aurica-Breica, Botău Dorica, Drugă Mărioara, Dumbravă Delia-Gabriela, Mișcă Corina Dana, Negrea Monica Viorica, Poiană Mariana-Atena, Popa Viorica-Mirela, Raba Diana-Nicoleta, Rădoi Bogdan-Petru, Riviș Adrian
Institution	Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara
Patent	TRADEMARK M 2021/002463 The AperGoFree product range has an innovative character through the recipe and the increased nutritional value conferred by the addition of ingredients much appreciated by consumers. These products are a perfect alternative, as an appetizer or snack, for most categories of consumers. (max 250 words)
Description EN	
Class no.	3

RO.117.

Title EN	LensSpread
Authors	Dumbravă Delia-Gabriela, Alexa Ersilia-Călina, Bordean Despina Maria, Botău Dorica, Cocan Ileana, Dogaru Diana-Veronica, Mișcă Corina Dana, Moldovan Camelia, Popa Viorica-Mirela, Raba Diana-Nicoleta, Radulov Isidora, Riviș Adrian, Ștef Ducu Sandu
Institution	Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara
Patent	TRADEMARK M2021/00222
Description EN	A range of innovative, spreadable, lentil-based vegan appetizer creams with the addition of different vegetables depending on the manufacturing recipe The products are both healthy and tasty, suitable for consumers of all ages, rich in polyphenols, chlorophylls, carotenoids, unsaturated fatty acids, with a remarkable antioxidant activity - which can include them in the category of protective foods (max 250 words)
Class no.	3

RO.118.

Title EN	ASSESSMENT OF THE ANTIBACTERIAL POTENTIAL OF A MIXTURE OF PROPOLIS AND PROPOLIS COMPOUNDS
Authors	Borozan Aurica Breica, Popescu Sorina, Dumbravă Delia, Botău Dorica, Moldovan Camelia, Mișcă Corina, Popa Mirela, Poșta Gheorghe, Bordean Despina
Institution	Banat University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara
Description EN	Propolis is considered a natural antibiotic, being used since ancient times against some diseases. The chemical composition and biological activity of propolis have been explored in many studies, but it seems that there are still requirements to investigate bioactive compounds and their applicability. In addition, it was observed that the geographical area and botanical sources influence the chemical composition of propolis, which in turn has an impact on biological activity. The main objective was the evaluation and selection of propolis extracts and propolis compounds with promising antibacterial activity and

NATIONAL

possibilities for use in food matrices or in the medical field. Ethanolic extracts from propolis and dilutions of catechin, quercetin and gallic acid were tested on three high-frequency bacterial species (*Escherichia coli*, *Staphylococcus aureus* and *Salmonella flexneri*) in the food and medical fields. Studies have shown that the degree of sensitivity is dependent on the concentration of propolis and test compounds. Of the three bacterial cultures tested, sensitivity to the propolis mixture shows *Escherichia coli*. Regarding the three main components of propolis, it can be noticed that the values of inhibition halos are lower compared to propolis.

Class no.

3

RO.119.

Title EN

Obtaining and nutritional characterization of some innovative shrimp products

Authors

Delia-Gabriela Dumbravă, Camelia Moldovan, Viorica-Mirela Popa, Diana-Nicoleta Raba, Bogdan-Petru Rădoi, Diana-Veronica Dogaru, Corina Dana Mișcă, Adalbert Okros, Aurica-Breica Borozan, Dorica Botău.

Institution

Banat`s University of Agricultural Sciences and Veterinary Medicine „King Michael I of Romania” from Timișoara

**Description
EN**

An innovative, ready-to-eat shrimp-based food product was obtained: "shrimp appetizer cream", in two variants: one with baked red peppers and the second with green olives, using raw and auxiliary materials from the Romanian market and a simple obtaining technology. The obtained products were characterized in terms of total polyphenols content, antioxidant activity but also the content of 12 mineral elements (Cu, Cd, Cr, Ni, Pb, Zn, Fe, Mn, Ca, Mg, K, P).

Class no.

The highest content of total polyphenols was recorded for the appetizer cream variant with shrimp and baked red peppers the highest content of total polyphenols was recorded for the appetizer cream variant with shrimp and baked red peppers. Among the heavy metals analyzed, Cd was not identified in either the raw materials or the finished products. Pb was present in shrimp in a higher concentration than the maximum limit provided by law. All other raw materials and finished products had concentrations of heavy metals below

the maximum limits provided by law. The two varieties of appetizer with shrimp cream were very similar both in terms of proximate composition and energy value. The appetizer cream version with shrimp and backed red peppers had a slightly lower energy value than the green olive variant.

RO.120.**Title EN**

Space and time analysis of grassland surfaces by remote sensing methods and means

Authors

Luminița Cojocariu, Loredana Copăcean, Mihai Simon

Institution

Banat's University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania" from Timisoara

Description**EN**

At the level of Romania, the lands occupied with grasslands have undergone profound changes of surfaces depending on the local agro-forestry-pastoral practices and the traditions specific to the living areas. The aim of this study is to evaluate the spatio-temporal dynamics of grassland areas (by increases or decreases in area), in an interval of over thirty years, by processing satellite images (Landsat 4-5 and Landsat 8) and GIS technology. Data processing involved two satellite scenes acquired at the beginning and the end of the considered time interval, being applied specific operations: extraction of the area of interest, spectral band combinations (to improve the quality of visual analysis), spectral classification (Maximum Likelihood Classification algorithm). The obtained raster images were compared in specialized software to locate the changes in land use between 1988 and 2020 – the spatial impact. The last stage of the study was the quantification of the changes produced in the analyzed time interval - the temporal impact. The overall radiography of land use over the three decades (1988-2020) shows the increasing trend of forested areas, while natural grasslands show a visible downward trend. Basically, these two categories of land are, for the most part, in a relationship of inverse proportionality. The approach of the grasslands, assisted by remote sensing and GIS, allows the analysis and quantification of discrete processes, difficult to quantify through the classical methodology.

Class no.

3

RO.121.**Title EN****Sentinel 2 satellite image processing techniques for geospatial analysis of grassland areas****Authors***Loredana Copăcean, Luminița Cojocariu, Mihai Simon, Cosmin Popescu***Institution**

Banat's University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania" from Timisoara

**Description
EN**

With the technical possibilities of investigating and representing the pastoral space through satellite images and GIS technology, the pratological research has passed into a new dimension, with perspectives of "extension" and with a strong multidisciplinary character. The spectral classification methods applied in the study of grasslands, the main objective of this technical analysis, "include more and more ground" in the approach of delimitation and multitasking analysis of pastoral space. In this context, through the present research, spectral classification techniques applied on Sentinel 2 satellite images were "experimented", in order to identify, territorial representation and complex analysis of grasslands in hilly and mountainous areas, in southwestern Romania. The materials and software used were accessed through the Copernicus program and the European Space Agency, and the specific working methodology was adapted to the conditions of the areas of interest. The spectral classification involved the preprocessing and processing of satellite images in order to extract the grassland surfaces, all stages being accompanied by statistical operations to validate and ensure the quality of results. The use of geomatic techniques in the analysis of grasslands has as major advantages: limiting field trips, the possibility of expanding large-scale research given the global "coverage" of satellite scenes, obtaining a large volume of information of different categories, the opportunity to "combine" results in multilayer analysis of great complexity, but also the possibility of generating forecasts, under different theoretical or practical aspects.

Class no.

3

RO.122.

Title EN	Evaluation of urban areas by remote sensing methods in relation to climatic conditions
Authors	Mihai Valentin HERBEI, Florin SALA
Institution	Banat University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara The study used methods based on remote sensing to evaluate the urban area of Timisoara City in relation to the climatic conditions. Satellite images were taken from the Landsat 8 system. The study interval was between August 9, 2013 and August 7, 2018. The images were taken in August, an expressive month in thermal aspect for the studied area. The spectral information from the satellite images was analyzed using specific indices, such as: Land Surface Temp - LST, Normalized Difference Built-Up Index - NDBI, and Normalized Difference Vegetation Index - NDVI, respectively. For the interpretation of the values of the indices, the climatic data were taken into account for the period January - July of each analyzed year (P1 - P7, precipitation in January-July; T1-T7, average monthly temperature in January-July). There was registered very strong, negative and positive correlations (NDVI with NDBI, $r = -0.998$; LST with P7, $r = -0.976$; LST with T4, $r = -0.984$; NDVI with P7, $r = 0.900$). Also, strong negative or positive correlations were recorded (LST with P6, $r = -0.891$; LST with T5, $r = -0.889$; NDVI with LST, $r = 0.824$; NDVI with T4, $r = 0.883$). Depending on the time factor (T), the variation of indices was described by smoothing spline model (LST vs. T), or by the models on type of polynomial equations of degree 2 (NDBI vs T, $R^2 = 0.965$, $p < 0.05$; NDVI vs. T, $R^2 = 0.986$, $p < 0.01$). Multiple regression analysis led to obtaining 3D and isoquant variation models of NDVI and LST indices depending on T7 and P6.
Description EN	
Class no.	3

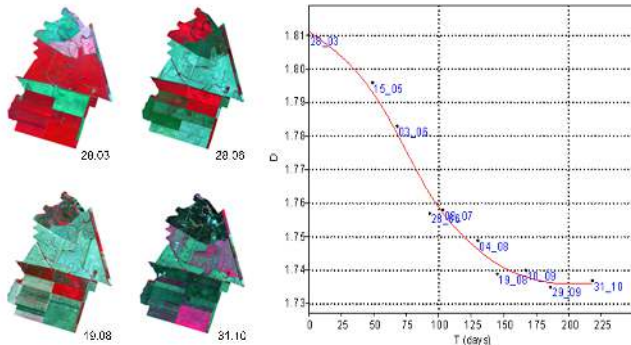
RO.123.

Title EN	Assessment of temporal variability for agricultural land by fractal analysis of satellite imagery
Authors	Florin SALA, Cosmin Alin POPESCU, Mihai Valentin HERBEI
Institution	Banat University of Agricultural Sciences and Veterinary

Medicine "King Michael I of Romania" from Timisoara
 The study used fractal analysis and remote sensing technique to analyze and describe the temporal variation of an agricultural area. The fractal analysis was performed on the binarized images, using the box-counting method. Fractal dimensions (D) were obtained in conditions of statistical accuracy (R^2 for $D=0.999$). Fractal dimensions had values ranging between $D=1.735$ (trial 9, data 29.09) and $D=1.810$ (trial 1, data 28.03). There were identified very high negative correlations between D and T ($r=-0.942$). The variation of the fractal dimension (D) with respect to T has been accurately described by a polynomial model of degree 2, under conditions of $R=0.951$, $p<<0.001$, and by a model of smoothing spline, under conditions of statistical certainty ($\bar{\epsilon}=0.001289$). In the framework of PCA analysis, PC1 has explained 87.845% of variance, and PC2 has explained 10.688% of variance. Cluster analysis, based on fractal dimensions (D), led to the grouping of the studied cases, associated with the ten moments of time, according to the Euclidean distances, under statistical accuracy conditions (Coph.corr=0.895). Variants were found to be grouped into two distinct clusters. Estimating a moment in time T depending on the values of the fractal dimensions (D) was possible on the basis of a model expressed by a polynomial equation of 3rd degree, under conditions of statistical accuracy $R^2=0.947$, $p=0.00031$.

Description
EN

Class no.



Graphic distribution of D values in relation to T, according to spline model

RO.124.

Title EN	Photogrammetric techniques and Lidar Systems (UAV and MMS) adapted for the detailed investigation of the rural area
Authors	<i>Mihai Simon, Cosmin Popescu, Loredana Copăcean, Luminița Cojocariu</i>
Institution	Banat's University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania" from Timisoara
Description EN	UAV technology - <i>Unmanned Aerial Vehicle</i> - as well as MMS - <i>Mobile Mapping System</i> - are techniques with remarkable results in the measurement and mapping activity. The main purpose of this paper is to combine the two technologies, UAV and MMS, in order to obtain a detailed situation plan of the investigated perimeter. The data sets generated with the two equipments were obtained in the same coordinate system and with the same precision, in this way, the overlap of the two data sets was done perfectly, without the need to apply additional corrections. By applying the specific methodology, a faithful copy of the reality was obtained in digital format, with topographic precision and degree of detail according to the situation in the field. By combining the two data sets obtained "remotely" by UAV and MMS technology, the detailed topographic survey (with GPS and total station) is replaced, and by 3D analysis, all the details are captured, both from the outside and from the inside of investigated objective. By creating the orthophotoplan, the way of land use, aspects related to vegetation or the way of territorial arrangement can be analyzed. The equipment used and the work methodology "experienced" in this study can be applied in any type of space or for any other purpose.
Class no.	3

RO.125.

Title EN	MIRUNA F1 – Authentic Taste of Romanian Tomatoes.
Authors	Șumălan Radu, Ciulca Sorin, Bodnărescu Florin, Ciulca Adriana
Institution	Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara
Description	Hybrid with vigorous plants and undetermined growth with

EN good adaptability to different cultivation conditions (field or greenhouses). In greenhouse conditions it has a very good pollination. The fruits are slightly patchy, with the mass between 100 and 180 g, the firmness and cracking resistance is limited, so they can not be stored long time after harvesting. In the cross section the fruit has pericarp with a thickness of 5.6-7.5 mm and a variable number of seminal lodges (4-6). The fruit has an attractive commercial aspect, with a very pleasant, balanced taste, at ripening have a content of 5-5.5% sugar (BRIX).

Class no. 3



RO.126.

Title EN

Tomato Hybrid BANATO – Romanian Tomato for Traditional Farmers.

Authors

Bodnărescu Florin, Șumălan Radu, Ciulca Sorin, Popescu Sorina, Gașpar Sorin

Institution

Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara

Description

EN

Tomato hybrid with vigorous plants, undetermined growth, with rich foliage that provides good protection of fruit, medium precocity at flowering and fruits maturation. good adaptability to different cultivation conditions. The plants show a good adaptability to different growing conditions. The fruits are large, with a flattened shape, large seminal cavity, and medium thickness of the pericarp, glossy red color, pleasant taste and aroma, and attractive commercial appearance. The fruits are appreciated considering the increasing interest of the consumers for traditional and healthy products.

Class no.

3



RO.127.

Title EN

The use of essential oils as antifungal agents in cereals protection

Authors

Bota Voichita, Sumalan Renata, Obistioiu Diana, Negrea Monica, Cocan Ileana, Botău Dorica, Alexa Ersilia*

Institution

Banat University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara

Cereals are subject of fungal attack both in vegetation and in warehouses when storage conditions are not appropriate. Fungal control of cereals involves the use of synthetic fungicides with a negative impact on health. The use of essential oils as antifungal agents is a healthy alternative to chemicals. Thyme (TEO), coriander (CEO) and oregano (OEO) essential oils have been tested to demonstrate the ability to inhibit the *Fusarium graminearum* fungal growth and mycotoxins (deoxynivalenol) developed on cereals using in vivo studies. Also, the phytotoxic effect of essential oils on the germination capacity of wheat seeds was studied.

Description
EN

The results shown that TEO and OEO have a strong antifungal effect against *Fusarium graminearum* development, while CEO stimulates the growth of fungal mycelium at low concentrations. The minimum concentration with fungistatic effect (CMFs) was 0.06% for OEO and TEO and the minimum fungicidal concentration (CMFg) 0.2% for TEO and 0.1% for OEO.

The antifungal effect on *Fusarium graminearum* in vivo is maximum and comparatively similar when applying OEO and TEO treatment at concentrations with fungicidal effect, but lower when applying CEO to wheat seed.

The antimycotoxigenic effect of EOs against DON is maximal in the case of TEO (inhibition rate of 85.2%), while OEO and CEO do not prove to have antifungal potential compared to the control.

NATIONAL

Seed germination is not affected by treatment with essential oils (Germination index 90-100%), recommended their use as antifungal agents.

In conclusion, due to high bioactivity and the absence of toxicity essential oils of *Thymus vulgaris* and *Oregano vulgaris* can be used as natural antifungal and antimycotoxigenic agent in protection of cereals.

Class no. 3

RO.128.

Title EN

**Reverse osmosis of whey –
A valuable biocomponent of feed and food**

Authors

**Mirela Ahmadi, Ioan Peț, Lavinia Ștef, Gabi Dumitrescu,
Mărioara Nicula, Laura-Iosefina Șmuleac, Raul
Pașcalău, Dorel Dronca**

Institution

Banat University of Agricultural Sciences and Veterinary
Medicine "King Michael I of Romania" from Timisoara

Whey is a high-quality dairy by-product from cheese industry, being an important source of valuable proteins. It is important in human and animal nutrition due to its content in enzymes, hormones, vitamins, minerals, and antioxidant compounds, it has low lactose content, very little or it is free of lipids, but the dehydration (drying) technique must be very well chosen to preserve the quantity and quality of components. The objective of our study was to analyze the possibility of concentrating whey by reverse osmosis and having in view the possibility to preserve most of the biochemical properties of whey. Thus, we made comparative

Description

EN

tests for quantitative determination of total protein, lipids, pH and acidity for – raw, skimmed and concentrated whey. The results showed that reverse osmosis is a good, cheap and easy-to-use method in cheese factories to obtain whey with well-preserved components. Most of the farmers from western Romania (especially in Timis county) use whey as ingredient of feed products. Studies from previous years present whey as an ingredient of nutritional supplements for animal feeding plan, as well as an ingredient in supplements for athletes and alternative medicine. There are many technological options for whey processing, but the final option must be very well correlated with the final nutritional purpose.

RO.129.**Title EN****THE AGRICULTURAL SYSTEM IN THE DOROBANȚI COMUNA, ARAD COUNTY****Authors****Okros Adalbert, Mihuț Casiana, Manca Dan, Ungureanu Alexandra, Bereci Miodrag,****Institution**

Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara

Description**EN**

The agriculture has been a vital area of human activity from nine thousand year. It is the only source of food even the most recent development of artificial substrates. It is also a major supplier of raw materials for different industries. Mankind evolution leads to the development of the agricultural sector. Agricultural development is the main result of the changes determined by demographic pressure, increasing agricultural production, for making the basic food needs for larger population than the one currently existing. The Dorobanți locality is in the Western Romanian Plain, namely in its central part. The perimeter presented in this paperwork, although located in a plain, has various differences, which has led into three geomorphological subunits. These subunits are represented by the Comlăuș Plain, the Macea Plain and the Turnul Iratoș Plain. The Dorobanți Plain is a small area located east from and at about 1.5 km from the territory of Curtici and south from the Curtici-Sântana county road, that mean is in west of Arad county. The Macea Plain: is about 2.5 km wide oriented towards NW – SE. The Turnul Iratoș Plain: over the sands existing at the end of the Quaternary, there were loessoid deposits of relatively small thicknesses of 2.0 m similar to those of Banat. From a geological point of view, nature is showing the physical and chemical properties of the parental materials in Comlăuș, Macea-Curtici, Zimand plains. The texture of soils formed in some interdunes is medium and fine sandy clay. To the west of the area occupied by the Macea-Curtici Plain, Zimand-Cicir, the loessoid materials were deposited. Their thickness does not exceed 1.5 to 3.0 m. The territory under investigation is characterized by a continental temperate climate with milder winters, or seasonal thermal action centres.

Class no.

3

NATIONAL

RO.130.	
Title EN	HPLC determination of amygdalin content in kernel oils cultivars from Romania
Authors	Popa Viorica-Mirela, Socaciu Carmen, Ranga Florica, Fetea Florinela, Raba Diana Nicoleta, Moldovan Camelia, Dumbravă Delia-Gabriela, Ștef Ducu-Sandu, Mișcă Corina Dana, Bordean Despina Maria
Institution	Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara
Patent	
Description EN	<p>In the present paper, the amygdalin content of oil samples extracted from the kernels of some fruits belonging to the <i>Rosaceae</i> family was studied and identified.</p> <p>The determinations were performed using the HPLC chromatographic method on a C18 Supelcosil 250 x 4.5 x 5µm column with methanol/water (15/85) as the mobile phase at (1 ml/min) flow rate and detection at the length wavelength of 215 nm. The experimental results showed the linearity range of 0 - 0.6 mg/ml amygdaline with a correlation coefficient of 0.9949. Retention time specific for amygdalin is tR = 12.45 min. The amygdalin content detected in the oil samples analyzed ranged from 51.61-398.45 µg / ml of oil.</p>
Class no.	3

RO.131.	
Title EN	Applications of gene sequencing method (barcoding) for plant pathogens identification
Authors	Popescu Sorina, Borozan Aurica Breica, Boldura Oana-Maria, Ihos Salvina, Madosa Emilian
Institution	Banat University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara
Description EN	One of the most important problems of <i>Geranium growers</i> is the infection of plants with bacteria considered <i>Xantomonas</i> which cause huge losses due to the lack of control possibilities. Thus, prevention methods are particularly important. The classic identification of bacteria consists in analyzing their morphological traits, followed by

microscopic ones. Since these methods do not allow the precise identification of bacterial species, it is necessary to supplement them with DNA sequencing analyzes.

The aim of this project was to identify the pathogen which produce the leaf spots and the necrosis on geranium plants cultivated in greenhouses. First the bacteria were isolated from attacked leaves and soil and the extracted DNA was amplified with F27: AGAGTT TGATCMTGGCT and F485: CAGCAGCCGGGGTAA primers. The sequences of the amplified products were compared with the international databases (<https://blast.ncbi.nlm.nih.gov/>). The results showed that none of the isolated strains from soil and leaves belonged to the genus *Xanthomonas*, as inferred from morphological observations. *Pseudomonas* species were identified in four of the six soil samples, which were not surprising, considering that *Pseudomonas* species are widespread in the soil and also represent a pathogen of geraniums. In other soil samples *Erwinia* and *Lelliottia* species were identified which are both genera present in the soil. For samples isolated from plants, only *Pseudomonas* strains were identified, which represent a pathogen of geraniums. The importance of molecular analyzes is obvious, considering that *Xanthomonas* has morphology similar to *Pseudomonas* and *Erwinia*, and their differentiation would not have been possible exclusively through microscopic observations.

Class no. 3

Babes-Bolyai University

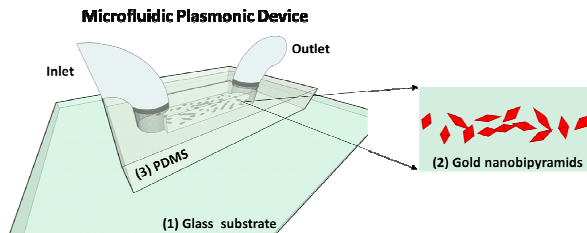
RO.132.
Title EN **Microfluidic Plasmonic Device based on Gold Bipyramidal Nanoparticles**
Authors Monica Focsan, Andreea Campu, Simion Astilean, Teodora Murariu, Ioan Turcu

Institution **Babes-Bolyai University and National Institute for Research and Development of Isotopic and Molecular Technologies INCDTIM Cluj-Napoca**
Patent **Patent application No. 00958/2018**
**Description
EN**

The invention entitled “Microfluidic Plasmonic Device based on Gold Bipyramidal Nanoparticles” proposes a microfluidic plasmonic device based on gold nanobipyramids (AuBPs) which allows the implementation of two detection methods in the microfluidic network, specifically the Localized surface Plasmon Resonance (LSPR) and Surface Enhanced Raman Spectroscopy (SERS). The fabrication method of the device implies the integration of a nanoparticulate film obtained by a self-assembling process of AuBPs available in solution onto a silanized glass substrate inside of a microfluidic channel. The AuBPs present themselves as promising due to their controllable optical properties and, implicitly, detection capabilities. The validation of the developed low-cost, miniaturized and portable microfluidic device was realized by the real-time detection of active molecules in laminal flow.

Class no.

4



RO.133.**Title EN**

Innovative circular process for the electrochemical recovery of the base metals from waste printed circuit boards

Authors

Marian-Iosif FRÎNCU, Sorin-Aurel DORNEANU, Petru ILEA

Institution

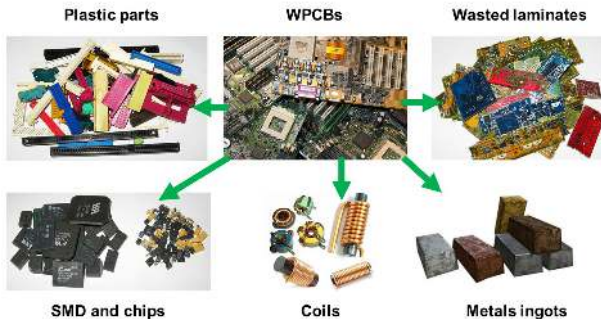
Babeş-Bolyai University, Cluj Napoca, Romania

Patent**Description****EN**

In this work, we describe an original and innovative process used for the complete recycling of waste printed circuit boards (WPCBs) resulting from depleted computers. Using the bromine/bromide leaching system, the proposed and tested technology allows, in a theoretical 100% closed circuit, the integral recovery of the exposed base metals (Cu, Sn, Pb, Ni, Fe, Zn and Al) from WPCBs. The process uses a combination of chemical and electrochemical steps, that allows the base metals dissolution in parallel with the electrochemical regeneration of the leaching solution and the electrodeposition of pure copper. In the next steps, the remaining dissolved metals can be also recovered from the leaching solution by electrodeposition. Moreover, the other recyclable materials included in the WPCBs (plastic parts, fiber glass/epoxy wasted laminates, SMD components and integrated circuits (chips), magnetic parts or coils) are recovered in unaltered form, allowing their easier and superior valorization.

Class no.

3



University of Transilvania of Brasov**RO.134.****Title EN****Lightweight disassemblable utility trailer made of 3D-printed parts****Authors**

Bogdan Marian Coltan, Marius Nicolae Baba

Institution**University of Transilvania of Brasov, Faculty of Mechanical Engineering****Description
EN**

The objective is to demonstrate proof of concept of a disassemblable utility trailer, figure 1. With main advantage of having the convenience of storing the trailer in the urban areas, e.g. in a building basement. This will be possible by analyzing different design concepts, that are based on the concept of function, form, process, and material. Function representing the possibility of disassembling and storage in small storage areas. Form sustaining dynamic cycles of work required in exploiting the utility trailer. Suitable material aimed at reducing mass and achievable manufacturing process, using SLM (selective laser melting), also known as direct metal laser melting.

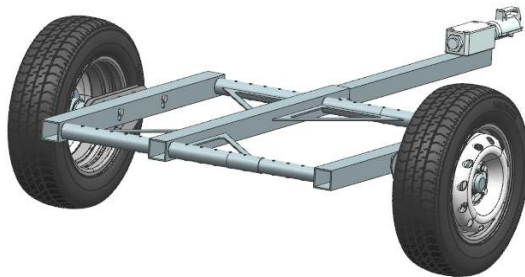


Figure 1: Disassemblable utility trailer

Class no.

3

„Nicolae Bălcescu” Land Forces Academy Sibiu, Romania

RO.135.

Title EN

TRACKED ROBOT FOR HUMANITARIAN DEMINING OPERATIONS

Authors

Silviu Mihai Petrișor, Ghiță Bârsan, Mihaela Simion, Ioan Virca, Dănuț Eugeniu Moșteanu

Institution

“Nicolae Bălcescu” Land Forces Academy from Sibiu, Romania

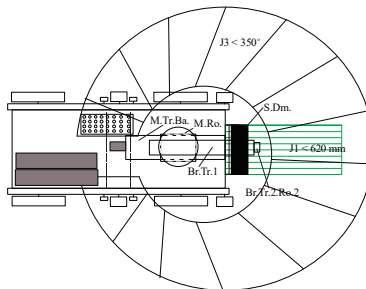
Patent no.

Patent application No. RO A 00562/2017

Description
EN

The tracked robot designed for humanitarian operations represents, according to the invention, a technological product belonging to the category of tracked mobile robots, capable of replacing the human element in high-risk areas for its health and life, either by avoiding accidental detonation, or by detecting and demining anti-personnel and armor-piercing minefields in countries where there were military conflicts. The robot is able to move autonomously using electric motors which take their energy by means of electric engines that take energy from solar photovoltaic cells encased in solar panels, which is provided with a storage compartment for the explosive necessary for humanitarian demining; it has a completely modularized structure, compact, easy to mount and maintain. It is made of two main organological structures: the tracked basis and the serial-modular robot of type *TRTR* to which the translation system of detecting unexploded mines is being added, the functional product having applicability both in the military-applicable field by enriching actional flexibility within humanitarian detecting and demining operations and in the educational field, by forming high educated and specialized resources in the field of advanced military technologies.

12

*Tracked robot and workspace*

Bucharest University of Economic Studies

RO.136.

Title EN

**MARKETING AGILITY – AN INNOVATIVE
MARKETING APPROACH**

Authors

Razvan ZAHARIA

Institution

Bucharest University of Economic Studies

**Description
EN**

Marketing Agility is an innovation in marketing because it proposes a symbiotic perspective of classical marketing concepts as adaptation to the environment, speed of reaction, valorization of market challenges.

The purpose of our approach is to develop an effective tool for evaluating and optimizing the marketing agility of a company. Based on an exhaustive literature review, a conceptual model is developed, which includes all the factors involved in defining the concept of Marketing Agility. This model is tested with the help of expert panels, both theorists and practitioners. Then, the model is validated through a quantitative research, conducted among marketing specialists in companies.

Finally, a software will be developed to assess the level of Marketing Agility of a company. The software will be an innovative management tool, but could also be used for teaching purposes.

Starting from a highly topical theoretical concept, a high-performance management tool is being developed. This can be an excellent example of successful technology transfer from academia to business.

**National Research&Development Institute for Chemistry
and Petrochemistry - ICECHIM Bucharest**

RO.137.

Title	TRANSDISCIPLINARY APPROACH FOR DEVELOPMENT OF TECHNOLOGICAL SOLUTIONS FOR TARGET COMPOUNDS RECOVERY FROM AGRO SIDE-STREAMS - E!13365/TARDIS
Authors	Radu Claudiu Fierascu ¹ , Irina Fierascu ¹ , Alina Ortan ² , Daniela Ionescu ³
Institution	¹ National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM Bucharest, ² University of Agronomic Sciences and Veterinary Medicine of Bucharest, ³ S.C HOFIGAL S.A.
Patent no.	Project E!13365/TARDIS, contract 220/2020
Description	<p>Biowaste valorization is an attractive approach in the framework of the EU Waste Management policies and the development of a circular economy. Wastes from bio streams and different bio-based sources are being under-utilized as potential resource of valuable compounds. The general objective of the project is to underline, optimize and apply an integrate technology of sustainable and enhanced production of natural extracts with high content of biological active compounds from side streams of phyto therapeutical industries applicable for obtaining smart formulations for disorders of the 21st century, for which continuous research is carried out. The project will provide thus the necessary support for creating and developing a complementary research chain in bio-economy (industry, pharmacy, agriculture) that aims to achieve a high level of internationally recognized expertise. The project demonstrates an integrated cascading concept including pre-treatment, optimized extraction and separation technologies.</p> <p>This work was supported by a grant of the Romanian Ministry of Education and Research, CCCDI-UEFISCDI, project number PN-III-P3-3.5-EUK-2019-0226, contract 220/2020 within PNCDI III.</p>
Class	3

RO.138.

Title	EVALUATION OF THE EXPLOATATION POTENTIAL OF POROUS MATERIALS IN THE TREATMENT OF MICROBIOTA-RELATED DISEASES
Authors	Irina Fierascu ¹ , Radu Claudiu Fierascu ¹ , Denisa Ficai ² , Anton Ficai ² , Coralia Bleotu ³ , Lilia Matei ³ , Mihaela Economesci ³ , Denisa Dragu ³
Institution	¹ National Research and Development Institute for Chemistry and Petrochemistry-ICECHIM; ² University Politehnica of Bucharest, ³ The Stefan S. Nicolau Institute of Virology (INV-SN)
Patent no.	Project 524 PED/2020
Description	<p>Drug delivery systems have gained interest in medicine, being suitable for cancer treatment, infections, neurodegenerative or inflammatory diseases treatment etc., because they can target and optimize the released concentration of the desired biological active agent and can reduce, or even avoid, systemic toxicity. The scope of the current project proposal is to develop novel micro- and mesoporous materials (MMMs) using recent synthesis methods and to further functionalize these materials for developing better performances in order to be used as drug delivery systems (DDS), especially for microbiota-related diseases. These drug delivery systems are developed for oral administration and are expected to be protected within the stomach and maintain their activity until reach the desired site.</p> <p>This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS/CCCDI – UEFISCDI, project number PN-III-P2-2.1-PED-2019-4018, contract 524 PED/2020, within PNCDI III.</p>
Class	4

RO.139.

Title	GREEN TECHNOLOGY FOR PHARMACEUTICALS REMOVAL FROM WATER USING ECO-FRIENDLY OXIDATION CATALYSTS
Authors	Irina Fierascu ¹ , Radu Claudiu Fierascu ¹ , Sorin Marius Avramescu ² , Sorin Claudiu Ulinici ³
Institution	¹ National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM Bucharest,

Patent	² University of Bucharest, ³ ICPE Bistrita S.A. Project 299 PED/2020
Description	<p>Water pollution remains nowadays a critical issue of our society since in the last decades the pace of industrialization, urbanization and agricultural activities increased rapidly. The main goal of this project is to develop a green technology for the removal of pharmaceutical compounds from water, using catalytic systems for oxidation, consisting of phytosynthesized metal oxides. The choice of the use of plant extract in the preparation of the considered catalytic systems has advantages over the classical approaches, as it does not require environmentally harmful precursors, which can generally significantly reduce the "green" impact of catalytic processes. Thin-film morphology with phytosynthesized nanosized mixed oxides particles is suitable for catalyst processes since this approach includes advantages from nanoparticles superior properties and avoidance of diffusivity problems (in fixed bed systems) or daunting separation step (in slurry approach).</p> <p>Another important innovative and eco-friendly aspect of the project consists in the preparation of novel thin-film ozonation catalysts using plant extracts as an environment for nanoparticle formation and stabilization from catalytic starter materials.</p> <p>This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS/CCCDI – UEFISCDI, project number PN-III-P2-2.1-PED2019-3166, contract 299 PED/2020, within PNCIDI III.</p>
Class	1
RO.140.	
Title	COMPREHENSIVE APPROACH TO SUPPORT PRECISION AGRICULTURE AND ENVIRONMENTAL MANAGEMENT THROUGH SATELLITE TECHNOLOGIES AND CLASSIC METHODS OF INVESTIGATION
Authors	Irina Fierascu ¹ , Radu Claudiu Fierascu ¹ , Anca Nemuc ² , Bogdan Antonescu ² , Livio Belegante ² , Alina Ortan ³ , Cristi Moise ³
Institution	¹ National Research and Development Institute for Chemistry and Petrochemistry-ICECHIM; ² National R&D Institute for Optoelectronics – INOE 2000,

³University of Agronomic Sciences and Veterinary Medicine of Bucharest**Patent**

Project 259 PED/2020

Accelerated advances in Earth Observation technologies determine their successful use in various fields, but especially for natural resources management, ecosystem management and agriculture, providing important information input for monitoring agrosystems and assessing risks to human health. The overall project objective is the development and implementation of an alert system for precision agriculture and environmental management related to identification of air pollution and extreme weather events. The specific objectives are focused on the evaluation of the evolution in time of the physical-chemical characteristics of plants in correlation with the air and of the climatic variables in the area of a pilot site, the estimation of the occurrence of extreme weather phenomena, but also estimation of pollution events during annual vegetative vegetation cycles of the crops with the identification of the influences of long-range transport air masses. The project will have as final product a near real-time alerting system for precision agriculture using a comprehensive integrated platform where near real time satellite-based products and ready to use information for farming will be available for decision-making.

Description

This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS/CCCDI – UEFISCDI, project number PN-III-P2-2.1-PED-2019-3495, contract 259 PED/2020, within PNCDI III.

Class**1,3****RO.141.****Title**

ANTIMICROBIAL PULVERISABLE SOLUTION FOR TREATMENT, CONSOLIDATION AND PROTECTION OF INORGANIC SURFACES OF BUILDINGS AND/OR HISTORICAL MONUMENTS

Authors

Radu Claudiu Fierăscu¹, Irina Fierăscu¹, Adriana Moanță², Ionela Petre²

Institution

¹National Research and Development Institute for Chemistry and Petrochemistry-ICECHIM;

Patent

²CEPROCIM S.A
RO133306/2021

Description

The invention relates to an antimicrobial composition based

on hydroxyapatite structure in which calcium is partly replaced by silver for the treatment, consolidation and protection of inorganic surfaces of buildings and / or historical monuments. Sprayable biocide solutions have an effect on both gram-positive strains (*Staphylococcus aureus*) and gram-negative strains (*Pseudomonas aeruginosa*). The solution uses compounds whose synthesis is fast, economical, and without negative action on the environment and human health under normal conditions of use, having an antimicrobial component easily to synthesize. In addition, the influence on the treated objects is insignificant from an aesthetic point of view.

Class

7

RO.142.

Title

PROCESS OF PRODUCING MICRO (NANO) CELLULOSE CRYSTALS FROM PLUM SEED SHELLS

Authors

Adriana Nicoleta FRONE, Ioana CHIULAN, Denis Mihaela PANAITESCU

Institution

National Research and Development Institute for Chemistry and Petrochemistry-ICECHIM

Patent

RO133172

The invention describes a process for the isolation of micro-(nano) cellulose crystals from agro-food waste. The micro- and nanocellulose crystals of the invention are obtained from plum seed shells through environmentally friendly operations consisting mainly of mechanical defibrillation routes. Plums production is widely spread in Romania and used especially for juice, brandy (“țuica”) or jam production. The plum seed shell waste is discarded in the environment, raising important issues.

Description

The novelty of this invention refers to the exploitation of low-cost and abundant waste consisting in plum seed shells for the obtaining of highly added value products as nanocellulose.

The micro- (nano) cellulose crystals can be used in a wide range of applications including food industry as a food additive or thickening agent as well as in the pharmaceutical industry as a support or filler and as a reinforcement agent in different synthetic and natural polymer matrices.

The invention has numerous advantages such as:

- ✓ The new and valuable micro- (nano) cellulose crystals are obtained starting from a cheap cellulosic source, a waste raising environmental issues;
 - ✓ The micro- (nano) cellulose crystals can be obtained in a wide variety of forms: powdered, gel, film or suspension, depending on the desired application;
 - ✓ The process of obtaining these micro- (nano) cellulose crystals is simple and environmentally friendly without the use of hazardous substances for humans or the environment;
- The obtained micro- (nano) cellulose crystals are characterized by high specific surface area, flexibility, low density, high mechanical properties, regenerability and durability.

Class

1,3



RO.143.

Title MEDICAL DEVICE FOR HSV-1 / SARS-COV-2 / COVID-19 ANTI-VIRAL PHOTODYNAMIC INACTIVATION ON SURFACES, METHOD OF MAKING AND USING IT

Authors Rodica-Mariana ION

Institution ICECHIM, Bucharest

Patent Patent application No. 00112/11.03.2021

Description The invention relates to the use of a sulfonated porphyrin for the production of a medical device of the hydrogel type used for the antiviral photodynamic inactivation of HSV-1 /

NATIONAL

EUROINVENT 2021

SARS-CoV-2 / COVID-19 on surfaces such as: furniture, medical instruments, laboratory vessels, access, etc., from the health system, hospitals, pharmacies as well as in other spaces for staff protection. The device is based on a hydrogel, a sulfonated porphyrin embedded in the hydrogel, used for the photodynamic inactivation of the HSV-1 virus as a model for SARS-CoV-2 (COVID-19), which exposed to low power laser radiation of 15 W and an irradiation distance is approx. 5 cm, leads to the destruction of viruses.

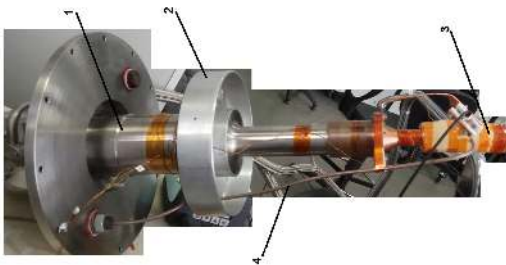
Class

4

National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest

RO.144.

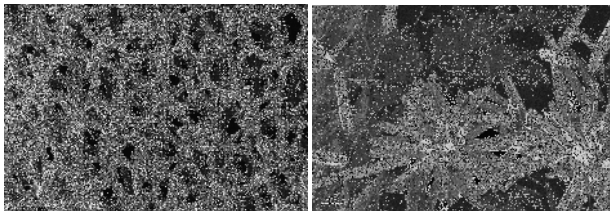
Title	Assembly for cryogenic cooling and gas condensation / solidification
Authors	Dobrin Ion, Dumitru George, Dobrin Andrei, Enache Dan, Pinteau Radu, Popovici Iuliu Romeo, Djourelou N., Leca V., Dinescu D.
Institution	- National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest (INC DIE ICPE-CA) - National Institute for Research and Development in Nuclear Physics and Engineering „Horia Hulubei” IFIN – HH
Patent no.	Patent application No. A/00972/2018
Description	<p>The invention relates to an assembly for cryogenic cooling and gas condensation / solidification with applications in the fields: cryogenic gas separation, gas liquefaction / solidification, or for gas thermal conditioning. The technical problem solved by the invention consists in the realization of an assembly for cryogenic cooling and gas condensation / solidification which, through the special construction, in the cascade realized by the additional insertion of several cooling modules, which are based on cryocoolers, allows obtaining temperatures in the range 4...10K for the gas/gases processed by the cooling assembly.</p> <p>Applications</p> <p>Cryogenic gas separation, gas liquefaction / solidification gas thermal conditioning in cryogenic range.</p> <p>Applied experimental physics for neon / other noble gas solidification on targets, acting as moderator for positron sources.</p>
Class	2



1 - Cryocooler; 2 - 1st stage cooling; 3 - 2nd stage cooling; 4 - Gas circulation pipe

RO.145.

Title	Zinc oxide - three-dimensional graphene network hybrid composite material and process for obtaining the same
Authors	Banciu Cristina Antonela, Băra Adela, Chițanu Elena, Ion Ioana, Teișanu Aristofan Alexandru, Marinescu Virgil Emanuel
Institution	National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest (INC DIE ICPE-CA)
Patent no.	Patent application No. a 2019 00122
Description	<p>The invention relates to a process for obtaining a zinc oxide - three-dimensional graphene network hybrid composite material, used for making electrodes for energy storage and conversion devices. The process comprises the steps of growing graphene on nickel foam, obtaining the three-dimensional network of graphene by removing the nickel foam, and growing zinc oxide nano/microparticles on the graphene surface by the hydrothermal method, resulting in a zinc oxide - three-dimensional graphene network hybrid composite material of macroporous monolith type, having an electrical resistivity of $0.8 \dots 1.2 \times 10^{-5} \text{ S x m}$ at 25°C, large specific surface area and maximum absorbance in the UV-Vis range of 0.96 a.u. at 327 nm.</p> <p>Applications: The zinc oxide - three-dimensional graphene network hybrid composite material could be used for making electrodes for energy storage and conversion devices.</p>
Class	2



Zinc oxide - three-dimensional graphene network hybrid composite material

RO.146.

Title	Graphene material for supercapacitors and process for obtaining the same
Authors	Băra Adela, Banciu Cristina Antonela, Iordoc Mihai Nicolae, Prioteasa Paula Ionela, Marinescu Virgil Emanuel
Institution	National Institute for Research and Development in

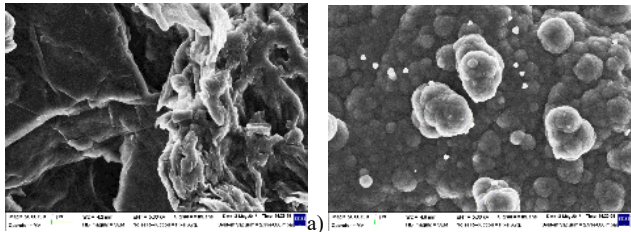
NATIONAL

Electrical Engineering ICPE-CA Bucharest (INC DIE ICPE-CA)

Patent no. Patent application No. a 2018 00814
 The invention relates to a process for obtaining a graphene material for supercapacitors. The process consists in the fact that a paste consisting of reduced graphene oxide and conductive carbon black, in a mass ratio of 1:1, mixed with tetrafluoroethylene copolymer binder, is scraped on a stainless steel support in the form of a disc and dried at room temperature, over which a conductive layer of polypyrrole obtained by electropolymerization by cyclic voltammetry is deposited, resulting in a graphene material having a specific capacity of 55-65 mF/cm².
 Applications: The graphene material could be used for making electrodes for energy storage and conversion devices.

Class

2



Morphology of graphene material: a) before polypyrrole deposition, b) after polypyrrole deposition

RO.147.

Title **Inertial device for energy storage and protection of local micro-grid power supply**
Authors Ilie Cristinel Ioan, Mihaiescu Gheorghe Mihai, Chiriță Ionel, Nicolaie Sergiu, Tănase Nicolae, Popa Marius, Popescu Mihail
Institution **National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest (INC DIE ICPE-CA)**
Patnet **RO 134279-A2**
Description The invention relates to a designed inertial device for energy storage and protection of local micro-grids power supply, with special safety conditions, such as lighting and utilities supply in surgery rooms, powering computer equipment and

devices in security laboratories, banks and other special applications. The device can protect both against voltage shocks and parasitic elements from the power supply network, as well as against espionage or sabotage actions, coming from the industrial network of distribution.

The inertial device consists of an inertial flywheel, dimensioned in size and speed for storing kinetic energy at the value required by the intended consumers for a specified duration, which is connected bilaterally with two electric machines. An electric machine acts as a motor, powered by a controller from the industrial network, to drive the flywheel and the second electric machine acts as a generator for converting kinetic energy from the flywheel to electricity to consumers, with an electronic converter and adapter of electrical parameters.

Applications

Energy storage; protection of local micro-grids power supply;

Class

2

RO.148.

Title

Realization Process of an Inductor for Permanent Magnets Synchronous Motor with Self-Starting

Authors

Popescu Mihail, Kappel Wilhelm, Nicolaie Sergiu, Mihăiescu Gheorghe Mihai

Institution

INC DIE ICPE-CA

Patnet

RO 128961 / 2021

Description

The invention relates to a method of manufacturing an inductor for a synchronous motor with permanent magnets and self-starting, intended for equipping synchronous motors with permanent magnets. The process uses a well-known rotor lamination, used in the manufacture of the general purpose asynchronous motors, in which some rectangular holes/slots are additionally cut, which are made next to each rotor tooth and distributed so as to achieve a geometric symmetry and a metal bridge, which results from cutting to the inner centering hole, that has to not exceed 1 mm. In order to be able to execute the pressure casting of the self-starting rotor cage, two prisms are inserted in the rectangular holes/slots, provided with threaded holes, through which some rods having the same length as the rotor package to be executed are inserted. Then the prisms are extracted with the

help of a screw extraction device, they are processed inside by turning so that the metal bridges are removed. In the rectangular holes some permanent magnets are inserted, taking into account the orientation of the magnetic field, so that the desired number of poles is obtained on the periphery of the inductor. The mounting position of the magnets is radially and axially ensured with some non-magnetic bushes, the whole assembly thus made being afterwards pressed on a non-magnetic material axis.

Class 2

RO.149.

Title γ -Fe₂O₃ – biocompatible polymer nanocomposite

Authors Georgescu Gabriela, Mălăeru Teodora, Enescu Elena, Pătroi Eros-Alexandru, Marinescu Virgil Emanuel, Sbârcea Beatrice-Gabriela

Institution National Institute for R&D in Electrical Engineering
ICPE CA Bucharest (INCDIE ICPE CA)

Patnet Patent application No. a 2019 00256

Description The process consists in the preparation stages of a solution of iron acetate Fe(C₂H₃O₂)₂ and polyethylene glycol, the addition of 1M KOH for a pH value of 10... 11, respectively H₂O₂, the reflux of the solution at a temperature of 100... 220 °C, resulting iron oxide nanoparticles γ -Fe₂O₃ which are refluxed for 4... 10h, together with biocompatible polyethyleneimine polymer, resulting in a hydrophilic nanocomposite with a particle size of less than 20 nm, used as a non-radioactive magnetic tracer in tumor diagnostic methods.

Applications as a non-radioactive magnetic tracer in the diagnosis of malignant tumors by magnetic (non-invasive) technique for *sentinel node biopsy (SNB)*

Class 4

RO.150.

Title Silver nanoparticles with narrow dimensional dispersion and their manufacturing method

Authors Lungulescu Eduard-Marius, Setnescu Radu, Lupu Ana-Maria, Nicula Nicoleta Oana, Mateescu Carmen, Ducu Robert, Ion Ioana

Institution	National Institute for R&D in Electrical Engineering ICPE-CA Bucharest
Patnet	Patent application no. A/00971/27.11.2018
Description	The invention relates to Ag nanoparticles with narrow dimensional dispersion obtained by radiochemical synthesis and to their manufacturing method. Ag nanoparticles with narrow dimensional dispersion according to the invention are obtained by exposure to gamma irradiation of systems consisting of salt-precursor of Ag ions and a pair of coating and stabilizing agents based on water-soluble polymer and a compound of the form R (OH) x soluble or partially soluble in water, with SPR maxima between 390-482 nm, with average dimensions between 2-90 nm, with high stability over time, and with high antimicrobial activity. These nanoparticles can be used in various applications, such as optoelectronics, sensors, renewable energy technologies and catalysts, biomedical devices, antimicrobial agents etc.
Class	9

RO.151.

Title	Process of algal biomass enzymatic pretreatment used for biogas production
Authors	Mateescu Carmen, Nicula Nicoleta Oana, Lungulescu Eduard-Marius, Török Liliana Paraschiva, Török Zsolt
Institution	National Institute for R&D in Electrical Engineering ICPE CA Bucharest (INC DIE ICPE CA)
Patnet	Patent application No. a 2018 00523
Description	This invention relates to an enzymatic pretreatment of algal biomass used as a digestion substrate in anaerobic reactors for producing biogas. The pretreatment process claimed by this invention aims at dissolving compact macromolecular structures of carbohydrates (cellulose and hemicelluloses) from algal biomass under the action of a mixture of hydrolytic enzymes secreted by the following fungal species: <i>Trichoderma reesei</i> , <i>Trichoderma versicolor</i> , <i>Penicillium chrysosporium</i> , <i>Fusarium solani</i> , <i>Chaetomium thermophile</i> and <i>Myrothecium verrucaria</i> , thus facilitating the access of anaerobic fermentation bacteria to heavily biodegradable cellulosic fibers, reducing fermentation time and increasing the production of biogas in anaerobic fermentation processes. The experimental results obtained for the <i>Ulva intestinalis</i> marine macroalgae, which was used as substrate

for mesophilic anaerobic digestion, revealed significant increase in methane production in biogas by 83% for the enzymatically pretreated sample, compared to the control sample. The increase is due to the stimulating effect of the selected fungal mixture on biodegradation of the compact macromolecules from macroalgae structures.

Applications:

Energy recovery of algal biomass in biogas plant projects;
Laboratory tests for research projects;
Demonstration tests for didactic purposes in the field of evaluating the biomethane potential of various types of residual algal biomass.

Class 1,2

RO.152.

Title Piezoelectrically actuated linear positioning system for standardized guideways

Authors Ovezza Dragoş, Tănase Nicolae, Chiriţă Ionel, Guţu Mihai, Ilie Cristinel Ioan, Popa Marius, Nedelcu Adrian

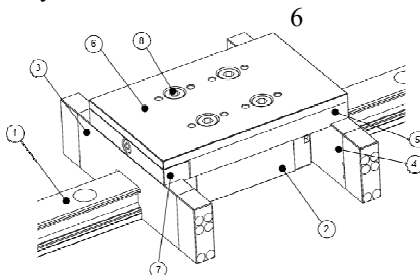
Institution National Institute for R&D in Electrical Engineering ICPE CA Bucharest (INC DIE ICPE-CA)

Patnet Patent Application No. A 2018 01064 / 06.12.2018

Description Description: The invention offers a solution for a piezoelectrically actuated linear positioning system for standardized guideways. The movement is achieved by successive clamping and releasing of two piezoelectrically operated brakes, situated at the opposite sides of a piezoelectrically driven advance/retraction system which is mounted on a standardized translation platform.

Applications: Compact, high precision, large displacement piezoelectric drives usable for positioning in special environments or for special applications such as aerospace, military or medicine.

Class



RO.153.

Title	Electroconductive composite with thermal self-regulating effect and its manufacturing method
Authors	Setnescu Radu, Caramitu Alina, Lungulescu Eduard Marius, Mitrea Sorina, Băra Adela, Stancu Nicolae
Institution	National Institute for R&D in Electrical Engineering ICPE-CA Bucharest (INCDIE ICPE-CA)
Patnet	Patent application No. A / 01053 / 05.12.2018
Description	The invention relates to an electroconductive composite material with a thermal self-regulating effect and and method of its manufacturing. The material shows electrical conductivity at ambient temperature and electrical insulating properties at high temperatures between 50 ... 130°C, having thermal self-regulation properties without controlling them through external devices. The positive temperature coefficient (PTC) effect is enabled by a high crystallinity polymer matrix with low oxygen permeability, crosslinked by ionizing radiations, and a synergistic pair of antioxidants with different action mechanisms, one being a free radical scavenger and the other hydroperoxide decomposer, in concentrations of 0 ... 2%, as well as by a bicomponent system of conductive charges, one consisting of spherical particles of nanometric size and the other of graphite planes particles of micron dimensions, in total concentration < 25% w/w. The manufacturing process uses gamma rays (or accelerated electron) at doses between 150 ... 250 kGy, to generate and stabilize the PTC effect.
Class	7

RO.154.

Title	Electromagnet for Digital Hydraulics
Authors	Tănase Nicolae, Mihăiescu Gheorghe Mihai, Nicolaie Sergiu, Chiriță Ionel, Ilie Cristinel Ioan, Lipeinski Daniel, Ovezza Dragoș, Nedelcu Adrian, Popa Marius
Institution	National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest (INCDIE ICPE-CA)
Patnet	Patent application No. A / 00936 / 2018
Description	The electromagnet for digital hydraulics has a construction of direct current electromagnet with plunger, in the version

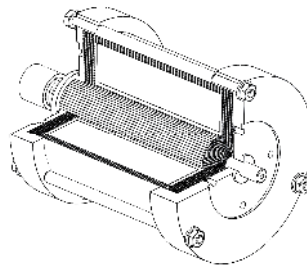
with closed magnetic circuit and straight or conical sliding armature, but in which the closing yokes of the magnetic circuit (the outer cylindrical shell and side shields) as well as the inner cylindrical plunger, are in rolled lamellar construction and shaped according to concentric involute curves (the vortex of the involute has the property of constancy of the distance between adjacent curves) made from ferromagnetic electrotechnical sheets with a slope of high increase of the magnetization curve characteristic (for example "supermendur" alloys). This design promotes a reduced startup time of the plunger (which is the longest running time) and ensures minimal power losses through eddy currents and magnetic hysteresis, respectively minimal heating of the closing parts of the magnetic circuit. Regarding the electrical circuit, the winding, as number of turns and section of conductors, is correlated so that the context of supply voltage-inductance and electrical resistance of the coil to ensure the minimum value of actuation time and armature release time.

Applications

Ultra-Fast switch ON/OFF valves for digital hydraulics.

Class

2



RO.155.

Title

Thermoelectric generator of high power and efficiency, pulsating operation

Authors

Nedelcu Marin, Teişanu Alexandru Aristofan, Iordoc Mihai Nicolae, Prioteasa Paula Ionela

Institution

National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest (INCDIE ICPE-CA)

Patnet

Patent application No. 00336 / 2019

Description

The invention relates to a new type of thermoelectric generator consisting of a heating source (1), the

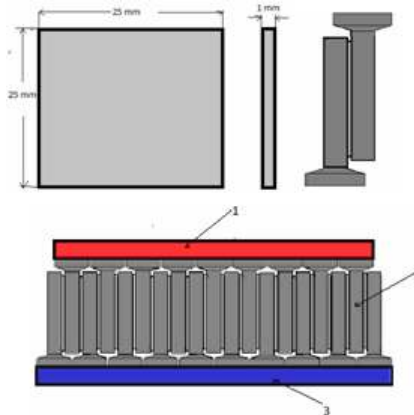
NATIONAL

thermoelectric unit itself (2), cooling unit (3), obtained by substantially increasing the dimensional factor, thermoelectric pleasant surface / thickness, (A / l) of at least 100 or compared to traditional thermoelectric modules and the non-stationary (pulsating) operation of such a unit at high frequencies of 100-500 kHz so as to obtain a high power per generator but also a substantial improvement in the conversion efficiency of thermal energy into electricity by avoiding the thermal dissipation of the electrical pulse energy.

Applications: Mobile and stationary energy conversion devices, Space exploration.

Class

2 Energy and sustainable development



1 – heating source, 2 – the thermoelectric unit, 3 – cooling unit.

National Institute for Research and Development in Environmental Protection - INCDPM

RO.156.

- Title** **Monitoring of hydrodynamic and hydromorphological conditions on the Danube-Izvoarele-Vadul Oii sector, in order to develop measures to ensure environmentally friendly navigability**
- Authors** Eng. DEÁK GYÖRGY Ph.D. Habil.*; Eng. BURLACU IASMINA Ph.D., Eng. RAISCHI MARIUS Ph.D.; Eng TUDOR GEORGETA; Eng. URLOIU IRINA
Corresponding author: dkrcontrol@yahoo.com
- Institution** **The National Institute for Research and Development in Environmental Protection**
- Description** The conducted researches aimed to evaluate the real-time variation of hydromorphological conditions and to assess the impact of existing and future hydrotechnical constructions, by implementing a DKL-B-C solution (hydrotechnical solution for redistributing the flows of a river between its main riverbed and its branch), to ensure the navigability in low water conditions on the Danube without endangering the migration routes of sturgeons. DKL-B-C is a hydrotechnical solution for redistributing the flows of a river between its main riverbed and its branch, which can ensure the navigability in low water flow conditions on the Danube without endangering the migration routes of sturgeons. Following field measurements, it was found that 58% of the flow is directed on the Bala Branch and the remaining 42% to the Old Danube (Figure 4). The *in situ* physical model is an innovative and replicable solution, which will definitely ensure the possibility to develop favorable navigability in low water flow conditions on the Danube, without endangering the migration routes of sturgeons



RO.157.

Title	Determining the methodology and coefficients specific to Romania in order to quantify GHG emissions and absorbions for the quantification of climate change
Authors	Ph.D. Eng. CS I DEÁK György, PhD Eng. CS II MATEI Monica, Geogr. ACS ROTARU Anda, Eng. ACS ENACHE Natalia, PhD Eng. CS III LASLO Lucian, Ec. CS BOBOC Mădălina, Ecol. ACS BARA Norbert
Institution	National Institute for Research and Development in Environmental Protection
Patent no.	
Description	In the context of the implementation of the Paris Agreement the aim was to update and develop methodologies for assessing GHG emissions and removals and to develop a compliant strategy at the national level. In this project is presented the CO ₂ methodology to upgrade from level 1 to the higher detail levels, according to the IPCC recommendations by improving the methods. The methodology developed contains procedures for observation of those local conditions (weather, terrain, vegetation, sun exposure, etc.) of the measurements in order to establish their correlation with CO ₂ flux for a better application of the analytical method or the one based on GIS technique. The results of CO ₂ flux measured in three different case studies, cropland, forest and wetland, contribute to the development of emission factors for their improvement at national level, as well as to the reduction of uncertainties in national GHG emission inventories.
Class	1, 3

RO.158.

Title	The ecosystem approach to identify and assess climate change adaptation and mitigation measures
Authors	Ph.D. Eng. CS I DEÁK György, PhD Eng. CS II MATEI Monica, Geogr. ACS ROTARU Anda, Eng. ACS ENACHE Natalia, PhD Eng. CS III LASLO Lucian, Ec. CS BOBOC Mădălina, Ecol. ACS BARA Norbert
Institution	National Institute for Research and Development in Environmental Protection (INCDPM Bucharest)

Description The aim of the present study was to develop a database with climate pressure indicators, state of ecosystems and services provided by them, in order to analyze the current state of ecosystems chosen as study areas. Another objective was to identify general adaptation and mitigation measures on the effects of climate change based on forest ecosystems and wetlands. Using the ecosystem approach, the proposed project deals in an integrated way with both mitigation and climate change adaptation measures by assessing how the implementation of such measures contributes to the dynamics of the services provided by the ecosystems concerned. The methods used to analyze the current state of ecosystems and the services provided by them in the study areas, as well as in the next stages of the project which will involve assessing the effects of the measures, have as starting point the DPSIR framework and the working steps of the instrument. for adaptation assistance presented on the Climate-ADAPT platform.

Class 1, 4

RO.159.

Title Synthetic microplastic materials preparation and their purification for spike studies on biological and other environmental matrices.

Authors Alexandru IVANOV, Ecaterina MARCU, Cristina MARIA*, Ioana SAVIN, Carmen TOCIU

Institution National Institute for Research and Development in Environmental Protection

Description **Abstract:** Currently, there is a need for valid and uniform methods for the qualitative and quantitative analysis of environmental contamination with microplastics. For this reason, appropriate methods for identifying and quantifying microplastics still need to be developed in order to collect reliable data on the quantity, size and composition of plastic particles from various environmental samples. Subsequently, these data may be used to assess the impact of the presence of micro-structured materials on the environment. Several synthetic microplastic manufacturing methods were developed, based on grinding. The obtained synthetic MPs

were evaluated through laser-granulometry and optical microscopy to reveal their quality and their micro-structure. Most microplastics had a fluffy appearance with complex irregular 3D shapes and rarely distributed fibers with sizes between 20 μm and 200 μm . To improve the MPs separation method and to obtain more useful reference materials for the method development stage, a granulometric separation through wet cascade sieving was introduced, with sieves ranging from 2 mm to 20 μm . The method developed for the MPs reference materials provides adequate micro-structured plastics from 0.5 mm to under 0.02 mm range. Greater experience was achieved in manipulating MPs suspensions and achieving quantitative transfers.

Class

7

RO.160.

Title Contamination with Ecologically Relevant Pharmaceuticals of the Argeş-Vedea, Buzău-Ialomița and Dobrogea-Litoral river basins and of the Danube River

Authors Mihaela ILIE PhD, Gina GHITA PhD, Florica MARINESCU PhD, Senior Researcher Alexandru IVANOV, Eng. DEÁK György PhD Habil, Carmen TOCIU PhD, Researcher Ioana SAVIN, Marius RAISCHI PhD

Institution National Institute for Research and Development in Environmental Protection (INCDPM)

Description Water pollution with emerging pollutants such as pharmaceuticals is a major global problem with multiple aspects, raising growing concerns about potential adverse effects on environment and human health. The presence of antibiotics in aquatic ecosystems is a major problem because they can disrupt the ecological balance of the water micro-biota, can increase the incidence of pathogenic bacteria, as well as conditioned antibiotic resistant pathogens in the normal human micro-biota, posing a threat to human health.

The results obtained in this project, materialized by the development and optimization of analytical methods for the detection and quantification of 36 pharmaceutical micropollutants, in the category of estrogen hormones, antibiotics, anti-inflammatory medicines, analgesics, beta-blockers, benzodiazepines respectively, as well as of

elemental/isotopic inorganic pollutants, from different complex environmental matrices, will contribute to the completion of the available information on the presence and levels of pharmaceutical micropollutants in aquatic ecosystems in our country, in the hydrographic basins of Argeş-Vedea, Buzău-Ialomița and Dobrogea-Litoral and of the Danube River. The results will also allow the assessment of risks associated with the presence of emerging pollutants in the aquatic environment.

The study also aimed to investigate the prevalence of antibiotic resistance of potentially pathogenic bacteria isolated from aquatic environments and to assess the impact of effluents from wastewater treatment plants on the antibiotic resistance of bacterial populations in the receiving river, in order to identify links between environmental antimicrobials and development and spread of antimicrobial resistance in aquatic environments.

RO.161.

Title	Rapid Extraction Method for the Determination of Biota Antibiotics (Fish) by Ultra-High Performance Liquid Chromatography Coupled with Tandem Mass Spectrometry (UHPLC-MS / MS)
Authors	Mihaela Ilie PhD, Eng. Deák György PhD Habil, Gina Ghiță PhD, Florica Marinescu PhD, Carmen Tociu PhD, Monica Silvia Matei PhD, Elena Holban PhD
Institution	National Institute for Research and Development in Environmental Protection (INCDPM)
Patent no.	A/00754/2020

Description The main concerns due to the presence of emerging pharmaceutical micropollutants in surface waters are their potential for bioaccumulation and bioconcentration in aquatic organisms that can cause various adverse effects such as changes in behavior, sexual differentiation, reproduction and bioenergetic parameters. In order to carry out these types of researches, highly sensitive analytical techniques are needed for the detection and quantification of pharmaceutical micropollutants, including rapid methods for their extraction from biota. Fish are representative indicators of the aquatic environment pollution, due to their ability to

take up and concentrate the micropollutants contained in water, in tissues. The invention relates to a rapid extraction method for the determination of antibiotic residues from biota samples (fish). The technical problem solved by the invention consists in the elaboration of a rapid extraction method for the determination of antibiotic residues from biota samples (fish) by extraction with organic solvents at temperature and pressure, followed by treatment of the extract by online solid phase extraction (Solid Phase Extraction- SPEonline) in acetonitrile flow and simultaneous detection of antibiotics by ultra-high performance liquid chromatography coupled with tandem mass spectrometry (UHPLC-MS/MS).

Detection and quantification of the antibiotics doxycycline and metronidazole from the extract obtained by the rapid extraction method for the determination of antibiotic residues from biota samples (fish) was performed with the equipment SPE-online-UHPLC-MS/MS.

Compared to other extraction methods reported in literature, the method has a low extraction time, a high selectivity and detection limits of antibiotic residues in the biota at ng/g.

Class

1

RO.162.

Title

Innovative environmental friendly materials such as nanostructured materials and inorganic binders, with applicability in environmental protection - Assessing the capacity of innovative functionalized environmental friendly nanomaterials to retain different classes of pollutants from wastewater

Authors

Dumitru Florina-Diana, Moncea Mihaela-Andreea, Marcu Ecaterina

Institution

National Institute for Research and Development in Environmental Protection

Patent no.

-

Description

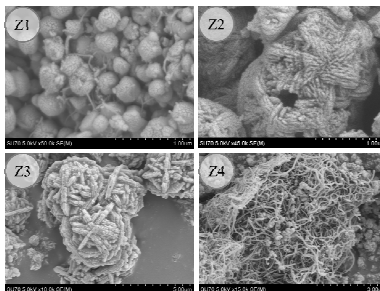
The project aims to develop innovative ecological materials such as nanopowders and inorganic binders with alkaline activation, applicable in the field of environmental protection (e.g. for wastewater treatment, encapsulation of hazardous pollutants, etc.). One of the project's objectives was to obtain

nanostructured materials with a zeolite structure from secondary materials that can represent valuable sources of alumina and silica. Thus, pure precursors (pure sodium silicate, Merck reagent) and obtained through various synthesis routes from agricultural waste (rice husks) and metal wastes (aluminum cans and foil) were used for the synthesis of zeolite materials. Additionally, in order to improve the zeolite's ability to retain certain pollutants from wastewater (e.g. different heavy metal ions) in its porous structure, they were further functionalized with multi-layer carbon nanotubes (MWCNT).

The developed zeolite materials were characterized by scanning electron microscopy, X-ray diffraction, and thermal analysis. The results of the XRD and SEM analysis highlight the formation of the Na-A type zeolite in the Z1 and Z2 samples, and type X in the Z3 and Z4 samples. Also, the addition of 0.05 g MWCNT in the Z1 sample results in a higher degree of crystallinity. The TG – ATD curves show a maximum mass loss of 16% for Z1 (a higher porosity and therefore a greater amount of water existing in the structure) and up to 5% in the case of Z3 and Z4 zeolites.

Class

1



RO.163.

Title

Consolidation and preservation of historical monuments using innovative materials based on doped or non-doped nanolime, freshly synthesized

Authors

Ion Sandu, Moncea Mihaela-Andreea, Dumitru Florina-Diana, Deák György

Institution

National Institute for Research and Development in Environmental Protection

Patent no.

-

Description

The project aims to develop innovative nanolime based

materials, with self-healing and cleaning properties, proper for consolidation and preservation works of stone monuments, plasters and architectural surfaces. To this purpose, nanostructured calcium hydroxide (nanolime), synthesized by recycling eggshells waste is doped with photocatalytic ions Zn(II) and Ti(IV). The consolidation, self-healing and cleaning properties of the developed nanolime based materials is assessed by applying them on physical models. The specimens will be firstly deteriorated through certain procedures (freeze – thaw cycles, UV radiation, controlled cracking) and subsequently will be treated with the nanolime based suspensions (spraying surface coating and inner injection). For assessment of the preservation state of the physical models the following analysis will be carried out: porosity, capillary water absorption capacity, compressive strength, sulphate attack resistance before and after treatment, macro and microstructural surface assessment and color changes. To assess the penetration depth of the nanolime dispersed in alcohol, the consolidator uptake value will be measured by using inorganic indicators. Additionally, the consolidation and preservation effect of nanolime based materials will be assessed on miniature statues specimens exposed in natural environment for 360 days.

Class

7

RO.164.

Title **Additive mortar composition for finishing works of old monuments and obtaining and application process**

Authors Ion SANDU, György DEÁK, Irina Crina Anca SANDU, Mihaela-Andreea MONCEA, Ioan Gabriel SANDU, Florina-Diana DUMITRU, Andrei Victor SANDU, Monica MATEI, Sorin PANAITTE, Mădălina Georgiana BOBOC

Institution **National Institute for Research and Development in Environmental Protection**

Patent no. Patent application No. A00862/2020

Description The invention relates to a composition of an additive mortar for finishing works of old monuments and its obtaining and application process with the following characteristics: a volumetric weight below 250 kg/m^3 , the thermal conductivity coefficient below $0,08 \text{ Kcal/m}\cdot\text{h}\cdot^\circ\text{C}$, mechanical

strengths more than 7 daN/cm² allowing a good compatibility with the operating support and by staining it in mass, before application, does not affect the patina. The invention could be applied at facades restoration of historical monuments (structural-superficial and chromatic reintegration), the self-cleaning effect on chromatic deviation under the influence of environmental factors and pollutants and microbiological, allows the realization of specific applications for hydro-, thermo- and sound-insulating plasters.

The problem solved by the invention consists in using a light mortar having as aggregate the expanded perlite and finely divided eggshells, both doped with very fine powders of ZnO, TiO₂ and three burnt clay ceramics differently colored in titian red, brown and black, as a mineral binder, along with Portland cement, fine powder of calcium oxide (dehydrated calcium lime), fly ash from the burning of sunflower husks and acrylic binder.

The mortar application process involves two cases: its application on surfaces without holes, but chromatically degraded and with thick deposits and aits application on damaged areas with deep lacunar zones.

Class

7

RO.165.

Title

Monitoring and assessment of air pollution in the central and peripheral areas of Bucharest city

Authors

Deák György, Natalia Raischi; Lucian Luminariou; Burlacu Iasmina; Biz Alina; Marius Raischi

Institution

National Institute for Research and Development in Environmental Protection

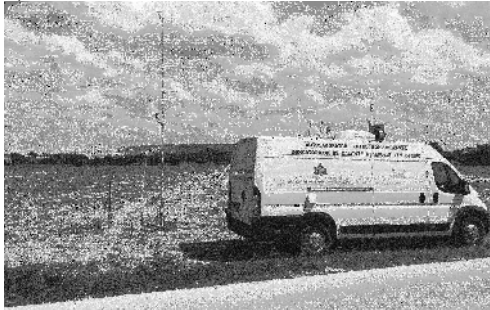
Patent no.

-

Description

This paper presents the results of the research studies carried out by INCDPM in the last period, regarding the monitoring and assessment of the air quality in the central and peripheral areas of Bucharest city. In big cities, air quality is influenced by the multitude of emission sources and varies greatly, depending on the type of pollutants. In addition, the dispersion of air pollutants is influenced by weather conditions and regional and local topography. The presented results are referring to the influence of meteorological

parameters on the dispersion of pollutants and to the *in-situ* monitoring of air quality in specific areas where the level of pollution is significant. In fig. 1 is presented the Air quality monitoring laboratory of INCDPM, equipment used in the research studies to monitor the level of pollution such as PM₁₀ concentration, and the meteorological parameters (wind direction and speed, air relative humidity, and other factors that influence the dispersion and accumulation of pollutant)



Air quality monitoring laboratory of INCDPM

RO.166.

Title

Device for laboratory testing of prototypes of renewable energy production from multiple source

Authors

Poteraş George, György Deák, Neacşu Ionel, Natalia Raischi

Institution

National Institute for Research and Development in Environmental Protection

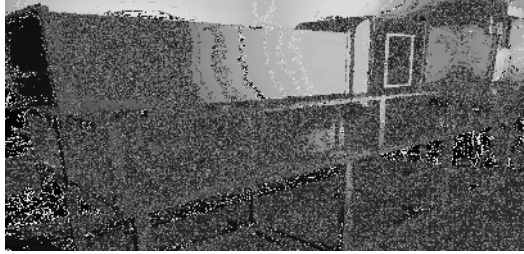
Patent no.

Patent application No. A/00126/2021

Description

In order to make laboratory tests of some prototypes and installations and to simulate the production of renewable energy from several sources (wind and hydrodynamic energy) a smart device was made, shown in figure below. If the renewable energy production prototypes under test are also equipped with photovoltaic cells, the mobile device can be adapted to this source, either by using reflectors in the laboratory or by testing prototypes outside.

Class



The device for laboratory testing of prototypes of renewable energy production from wind and water sources

RO.167.

Title *Innovative Paddles/Blades for hydraulic/wind turbines with geometry inspired by the bioengineering model of the black marlin caudal fin*

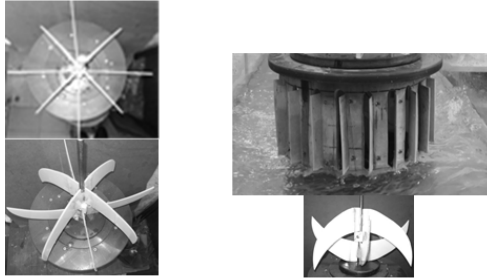
Authors Poteraş George, György Deák, Neacşu Ionel, Natalia Raischi

Institution **National Institute for Research and Development in Environmental Protection**

Patent no. Patent application **No. A/00796/2020**

Description The research relates to the innovative paddles for the submerged parts of the renewable energy production systems from watercourses and is based on a bioengineering model inspired by nature, namely the shape of the caudal fin of the black marlin fish species (*Istiompax indica*). Taking into account the constructive part of the energy production installation, the innovative paddles can be tubed into a vertical shaft turbine, fitted with slots and fixed deflectors, to direct the water flow. Geometry adapted from the bioengineering model of the caudal fin of the black marlin fish species can also be used to make blades, instead of paddles, which could be used for wind turbines for the same purpose, to produce renewable energy.

Class 2



*Paddle with geometry inspired by the caudal fin of *Istiompax indica* fish species, installed on a vertical axis*

RO.168.

Title

Advanced treatment process of wastewater from livestock farms – EpurAgroTech/EchO

Authors

Tociu Carmen, Deák György, Maria Cristina, Ciobotaru Irina, Ivanov Alexandru, Marcu Ecaterina, Vlăduț Valentin, Manea Dragoș

Institution

National Institute for Research and Development in Environmental Protection

Patent no.

A/00399/2019 (patent application)

Description

The invention addresses the **water management** issue related to wastewater treatment which should be considered from the perspective of current concern of authorities and specialists for identifying alternative water resources in areas affected by water shortage and preventing environment pollution.

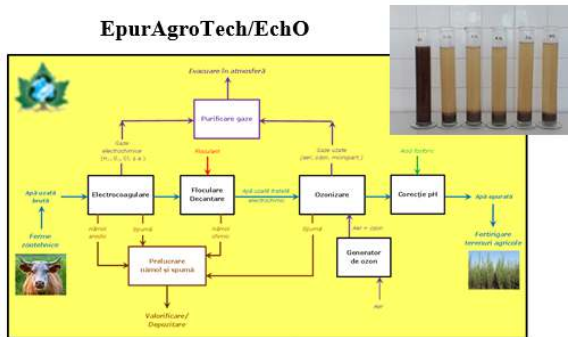
The invention describes an advanced (tertiary) wastewater treatment **process** which enables the removal or reduction of chemical and microbiological pollutants from livestock wastewater under certain regulated limits by chemical methods. The treatment takes place in two stages: (1) electrochemical treatment which facilitates the removal of organic and inorganic contaminants by means of electrocoagulation with aluminium electrodes followed by flocculation and sludge separation; (2) advanced oxidation of organic matter and disinfection using ozone, followed by pH adjustment with phosphoric acid. The treatment process enables the advanced removal of the contaminants from wastewater, including persistent compounds (pesticides, antibiotics, et.) which cannot be degraded through conventional methods, together with the inactivation of pathogens. The patented process provides superior removal

efficiency for the removal of organic substances (60-90% COD-Cr), biodegradable organic substances (60-80% BOD₅), suspended matter (over 80%), reduction of saline residue (40-60%) and up to 100% inactivation of faecal coliform bacteria.

The quality of treated wastewater is suitable for its use in crop irrigation and also provides public comfort towards the odour and colour of the effluent, ensuring a high degree of social acceptability towards the reuse of such type of water. The process employs a technology with relatively low requirements for space and wastewater feeding volume which allows the development of mobile setups with fast initiation of wastewater treatment.

Class

1



RO.169.

Research on morphological and hydrodynamic evolution tendencies in the Chilia - Bystroe transboundary area - Numerical modelling activities for hydrodynamic and morphologic analysis

Title

Authors

Tudor Georgeta, DEÁK György; Raischi Marius; Dănălache Tiberius Marcel; Petculescu Bianca; Țucă Dănuț Marian; Arsene Miruna, Edward Bratfanof

Institution

National Institute for Research and Development in Environmental Protection Bucharest

Description

This project's phase main objective was to develop a calibrated and validated hydrodynamic numerical model for the Chilia – Bystroe transboundary area, using in situ measurements campaigns' results and MIKE 3 by DHI modelling software. The focus area has a strategic

importance, being located in the Danube Delta, on the transboundary Chilia branch sector, shared by Romania and Ukraine, where bifurcates the Bystroe Channel on the Ukrainian territory. The hydrotechnical works, carried out since 2004 by Ukraine in order to make this channel operational for large ships navigation, lead to international controversy over the environmental impact of construction and maintenance of the canal that would significantly affect the whole delta region with transboundary effect, thus disregarding the provisions of international Conventions (Espoo, Bern, Ramsar). The 3D riverbed relief data was recorded by using high-resolution multibeam measurements and has been used for the geometric model by integrating the resulted elevation values into the numerical model computational grid.

For the model calibration/validation processes, in order to obtain highly reliable results, have been used water discharge/water level pairs for the upstream/downstream model domain limits (on the Chilia branch) and for the Bystroe Channel access area. Also, comparative analysis between modelled and measured water velocity distribution in vertical profiles was used for model validation.

The results obtained in the model calibration and validation steps confirmed that the developed numerical model for the Chilia – Bystroe Channel can provide data with a high degree of confidence.

Class

1

RO.170.

Title

Study regarding the inventory of danubian fish fauna from Baziaș till the Black Sea

Authors

Dănălache Tiberius-Marcel, Deak Gyorgy, Holban Elena, Raischi Marius Constantin, Matache Răzvan, Prangate Raluca, Gheorghe Ionut

Institution

National Institute for Research and Development in Environmental Protection - Bucharest

Description

The Lower Danube River is an important river both as a navigation pathway that connects Western and Eastern Europe and as a natural environment providing the carrying capacity for a variety of important fish species. In the Lower Danube, the most complex studies on fish fauna inventory

date back to Grigore Antipa and Petru Bănărescu. This current study aims to contribute to the updating of the knowledge base regarding the identification of the fish species from the Lower Danube River, using data from the monitoring campaigns undertaken by the expert teams of the INCDPM Bucharest as well as data collected from the literature.

The data collection methods for the fish inventory undertaken by the INCDPM Bucharest's experts consisted of two techniques depending on the ecological requirements of the investigated species: standardized method for electrofishing (SR EN 14011/2003) and drift netting.

A total of 66 species were identified on the entire Lower Danube River, representing 80.49 % of the baseline. The river stretch between Iron Gates II (rkm 853) and Danube Delta (rkm 0 – Black Sea) has the highest species richness with 53 species. These represent 80.30 % of the total identified fish species of the Lower Danube. Both the river sectors Călărași – Isaccea (rkm 375-100) and the Danube Delta- Black Sea (rkm 100-0) had the highest number of species of Community interest – 22 fish species.

Further research is recommended in the area between the Iron Dam I and II where the newly formed lentic ecosystem requires more monitoring campaigns in order to consolidate upcoming policies regarding the implementation of measures meant to improve the conservation state of species and habitats.

Class

1

RO.171.

Title **Electronic tag for alarming and remote location (cartesian coordinates) of valuable fish (sturgeon) used against poaching through Multical LORA/GSM/SAT radio communication network**

Authors DEÁK GYÖRGY, GEORGESCU TUDOR, BĂNICĂ COSMIN-KARL, BURLACU IASMINA,

Institution **The National Institute for Research and Development in Environmental Protection¹, Hypertech SRL²; WING COMPUTER GROUP SRL³**

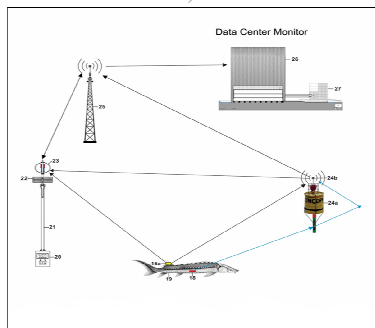
Patent no. A/00178/2021

Description The present invention relates to an electronic tag for alarming and remote locating of poaching for valuable fish

(sturgeons) using a radio communication network of type Multicable LORA/GSM/SAT and to an assembly of alarm and monitoring systems for valuables fish (sturgeons) tagged with ultrasonic transmitters in the abdomen (internal) and Electronic Anti-Poaching Alarm Tag (EAAT) in the dorsal fin (external). The assembly will be used to monitor the population of valuable fish (wild sturgeons) by using two types of tags (ultrasonic transmitters and autonomous ultrasonic tag detection stations), connected to the LORA NET communications network, which will allow both poaching and alarm by emitting a radio alarm signal when the protected fish is caught, in case of poaching. The electronic triggering system for intervention and location uses a chemical marking solution by the pyrotechnic release of a photo detectable marking substance. The electronic tag will be placed using an elastic fixing system of the device that allows the growth (thickening of the fin) during the life of the fish, ensuring its normal development and the position does not hurt the fish.

Class

1, 10



National Institute for Research-Development for Non-ferrous and Rare Metals – IMNR

RO.172.

Title	PROCEDURE FOR OBTAINING A SEMI-FINISHED BAR SINTERED FROM METALLIC POWDERS OF Al-Mg-Mn-Cr-Ti ALLOY
Authors	<i>Marian Burada, Vasile Soare, Dumitru Mitrica, Ionut Constantin, Adrian Caragea, Daniela Violeta Dumitrescu</i>
Institution	National R&D Institute for Non-ferrous and Rare Metals – IMNR,
Patent no.	RO130769 B1
Description	The invention discloses a process of obtaining a semi-finished bar sintered from metallic powders of oxide dispersoid strengthened 5083 alloy (Al-Mg-Mn-Cr-Ti). The alloy was obtained by mechanical alloying of metallic element component, with addition of 5...10 wt.% alumina, in a high energy attritor. The obtained alloy powder was pressed, sintered and hot extruded in 2...4 stages up to 8 mm diameter. A strength of 420...480 MPa and an elongation of 7...9 % was measured.

RO.173.

Title	ELECTROCHEMICAL SYNTHESIS OF HIGH ENTROPY ALLOYS WITH SUPERIOR TRIBOLOGICAL AND CORROSION RESISTANCE CHARACTERISTICS (HEASYNTCORR)
Authors	<i>Marian Burada¹, Mihai Tudor Olaru¹, Dumitru Mitrica¹, Ioana Anasiei¹, Ana Maria-Julieta Popescu², Virgil Constantin²</i>
Institution	¹ National R&D Institute for Non-ferrous and Rare Metals – IMNR; ² Romanian Academy, “Ilie Murgulescu” Institute of Physical Chemistry,
Description	The goal of the demonstration experimental project (PED) is the development of a new laboratory technology for the electrochemical synthesis of high-entropy alloys (HEAs) thin films with superior corrosion resistance and mechanical characteristics, for applications in marine environments. HEA thin films, with 4...7 elements (Al-Co-Cr-Cu-Fe-Ni-Mn), will be obtained by the electrochemical co-deposition in non-aqueous electrolytes (organic solvents). The obtained thin films will be chemical, structural, tribological and mechanical characterized. The corrosion tests will be done in the operational environment (sea water). The thin films properties will be improved by heat treatment processes. <i>This work was supported by a grant of the Romanian Ministry of Education and Research, CCCDI – UEFISCDI, project number PN-III-P2-2.1-PED-2019-0022, within PNCDI III.</i>

**National R&D Institute for Textiles and Leather
INCDTP Bucuresti****RO.174.****Title EN****Graphene-based composite material with conductive and antistatic properties obtained by plasma functionalization****Authors**

Aileni Raluca Maria, Chiriac Laura, Jipa Cristian, Toma Doina

Institution**National Research and Development Institute for Textiles and Leather****Patent**

Patent application No. A/00814/8.12.2020

**Description
EN**

The invention refers to a composite textile material with electroconductive properties obtained by RF plasma cleaning treatment and immersing in a polymeric dispersion based on graphene oxide.

The novelty consists in the functionalization of the textile support using oxygen RF plasma in order to improve the hydrophilic and absorption capacity of textile material, as well as in the process of developing the electroconductive composite material by immersing the fabric in a polymeric dispersion based on graphene oxide. This functionalization gives the composite material electroconductive properties presenting values of electrical surface resistance specific to conductive or antistatic materials.

The composite textile material obtained has applications in development of textile electrodes for actuators, sensors, and electromagnetic attenuation screens, technical applications in electronics or for intelligent textiles.

Class

9



Textile composite obtained by RF oxygen plasma and graphene oxide treatment

RO.175.

Title EN **Denim-type fabrics, developed to improve the mechanical potential at repeated stresses of traction, friction, tearing, by optimally combining the pattern of the fabric, the fibrous composition and the structure of the component yarns**

Authors Dorogan Angela

Institution **National Research and Development Institute for Textile and Leather, Bucharest, Romania**

Patent Patent application No. A/000610 / 2020

Description EN The invention relates to developed denim fabrics, as a fibrous structure and composition. Woven structures can be used to make independent products, but also as a component of textile systems with the role of protection, safety and comfort in wearing, suitable for organized and / or random activities (PPE, clothing for high-performance sports activities, active leisure time, for daily activities of people with some disabilities, including people of extreme age). Compared to the denim fabrics, known per se, the developed woven structures have an improved mechanical potential, at repeated stresses of traction, friction, tearing, by the optimal combination of bonding, fibrous composition, and yarn structure.

Class 9 : Invention Classification

RO.176.

Title EN **Biodegradable polymeric composite based on natural rubber and functionalized wood waste**

Authors Laurenția Alexandrescu, Maria Sonmez, Mihai Georgescu, Daniela Stelescu, Mihaela Nituica

Institution **INCDTP-Division ICPI**

Patent A/ 00539/27.08.2020

Description EN The invention refers to a biodegradable polymer composite based on natural rubber and wood waste, ground to nanometric dimensions and functionalized with potassium oleate, intended for product processing for the food, medical, consumer goods and footwear industries. The biodegradable polymer composite based on natural rubber and wood waste ground to nanometric dimensions and functionalized with potassium oleate is used to manufacture: caps, gaskets and O-

Rings, products for footwear, soles, soleplates, insoles etc. by means of mold pressing vulcanization methods. These products will have properties in compliance with specific product standards and will be biodegradable.

Class 1

RO.177.

Title EN The compositions for the treatment of medical furs

Authors Niculescu Olga, Gheorghe Coară

Institution INCDTP – Division ICPI

Patent A/ 00654 / 2017

The compositions for the treatment of medical furs consists of 55-65% Eucalyptus oil, or 55-65% Cajeput oil, or 55-65% Mint oil, or 55-65% Ginger oil, and 10-15% Ethanol, 8-10 % Lauryl alcohol ethoxylated with 7 moles of ethylene oxide, 8-10% Polyethylene Glycol 400 and water.

Description EN The products can be used to treat the surface of finished sheep furskins (free of metals) for medical purposes and improve the quality of natural fur and fur articles (lumbar belts, knee pads, knee elbow) used to prevent, relieve and treat rheumatic, muscular, circulatory disorders, complementing the medical treatment of patients suffering from these conditions.

Class 9

National Institute for Research and Development in Microtechnologies - IMT Bucharest

RO.178.
Title EN

Quaternary hydrophilic nanohybrid composition for resistive humidity sensors

Authors

Bogdan-Catalin Serban, Octavian Buiu, Cornel Cobianu, Viorel Avramescu, Nicolae Dumbravescu

Institution

Proprietor: National Institute for Research and Development in Microtechnologies (IMT-Bucharest),

Patent no.

EUROPEAN PATENT APPLICATION 20 465 580.7 /2020

**Description
EN**

The present invention relates the RH sensing response of a resistive sensor employing a sensing layer based on a quaternary nanohybrid comprising oxidized carbon nanohorns (CNHox)/graphene oxide (GO)/SnO₂/ polyvinylpyrrolidone (PVP) at 1/1/1/1 to 0.75/0.75/1/1 w/w ratio. The interdigitated sensing structure (IDT) was manufactured on a Si substrate covered by a SiO₂ layer. A dispersion formed in isopropyl alcohol of a nanohybrid was deposited on the IDT structure using the drop casting method. The relative humidity monitoring capability of the sensitive layers was investigated by applying a current between the two electrodes and measuring the voltage at different values of the relative humidity level at which the sensitive layer made of the quaternary nanohybrid composition of the invention was exposed. From the detection principle point of view, the resistance of the sensitive layer varies with the relative humidity level.

The quaternary hydrophilic nanohybrid compositions of the invention, used as sensing layers for resistive monitoring relative humidity have several significant advantages:

- both CNHox and GO provide a high specific surface area /volume ratio, affinity for water molecules as well as a rapid variation of the electrical resistance in contact with water molecules in the humidity range from 0%RH to 90%;
- nanometric tin (IV) oxide (SnO₂) powder exhibits good sensitivity towards the relative humidity;
- PVP is a hydrophilic polymer with excellent binder properties for the nanocomposition of the present invention;
- detection at room temperature;
- fast response time;
- low cost, small size, and simplicity in manufacturing.

RO.179.**Title EN****Quaternary oxidized carbon nanohorns - based nanohybrid for resistive humidity sensor****Authors**

Bogdan-Catalin Serban, Octavian Buiu, Cornel Cobianu, Viorel Avramescu, Niculae Dumbravescu

Institution

Proprietor: National Institute for Research and Development in Microtechnologies (IMT-Bucharest),

Patent no.EUROPEAN PATENT APPLICATION 20 465 581.5 /2020

The present invention relates the RH sensing response of a resistive sensor employing a sensing layer based on quaternary nanohybrid composition comprising or consisting of oxidized carbon nanohorn (CNHox)/SnO₂/ZnO/PVP at 1.5/1/1/1 w/w ratio to 3/1/1/1 w/w ratio.

These quaternary nanohybrid compositions, used as sensitive layers in resistive humidity sensors for monitoring relative humidity, have several significant advantages:

- The CNHox provide a high specific surface area/volume ratio, affinity for water molecules, as well as a rapid variation of the electrical resistance in contact with water molecules in the humidity range from 0%RH to 90%RH.
- SnO₂ nanopowder exhibits good sensitivity towards the relative humidity. The oxidized carbon nanohorns have p-type electrical conduction, while SnO₂ is a n-type metallic oxide semiconductor. By adding SnO₂ to the CNHox, it will result in the formation, in the quaternary nanocomposite, of islands of p-n semiconductor heterojunctions embedded in the PVP (a dielectric material) that increase the sensitivity of the sensitive layer.
- ZnO nanopowder exhibits good sensitivity towards the relative humidity. Both ZnO and SnO₂ are n-type electrical conductors. The ZnO – SnO₂ nanocomposite has sensing properties superior to each of the single oxides, because each of the oxides interacts differently with the oxidized carbon nanohorn material, leading to alterations in the pore distribution, which increase the specific surface area;
- PVP is a hydrophilic polymer with excellent binder properties for the nanocomposition of the present invention;
- detection at room temperature;
- fast response time;
- low cost, small size, simplicity in manufacture

Description EN

RO.180.**Title EN****Ternary sensitive layer for ethanol resistive sensor****Authors**

Bogdan-Catalin Serban, Octavian Buiu, Cornel Cobianu, Niculae Dumbravescu, Viorel Avramescu,

Institution

Proprietor: National Institute for Research and Development in Microtechnologies (IMT-Bucharest),

Patent no.

ROMANIAN PATENT APPLICATION A/00477, 31.07.2020

The technical problem solved by the present invention consists of designing new sensitive layers to the low-concentration ethanol vapor, used in the design of resistive sensor. The sensitive layers described in this invention are ternary nanocomposites of the type oxidized carbon nanohorns (CNHox) / SnO₂ / polyvinylpyrrolidone with stoichiometry 1/1/1 and 2/1/1 w/w ratio.

The use of ternary nanocomposites as a sensitive layer in the monitoring of ethanol vapors has several significant advantages:

- Both CNHox and SnO₂ have a high specific area/volume and affinity ratio for ethanol molecules;
- The two semiconductor materials, type p (CNHox) and type n (SnO₂) ensure a variation of the resistance of the sensitive layer to contact with ethanol vapors;
- PVP is hydrophilic polymer with excellent film forming properties;
- Room temperature detection;
- Low power consumption (below 2 mW);
- High sensitivity.

Description EN

The sensing mechanism is explained in terms of the overall response of a p-type semiconductor, where CNHox percolated between electrodes of the sensor, shunting the heterojunctions made between n-type SnO₂ or ZnO and p-type CNHox. The HSAB principle supported this mechanism, also.

Both types of sensing films have shown increased sensitivities at room temperature for ethanol vapor concentrations in dry air below 1 mg/L, as well as in the range of 25-50 mg/L and an electric power consumption below 2 mW, response time of 30 s, recovery time of 50 s, a good reversibility/reusability.

RO.181.**Title EN****Carbon dioxide sensor with surface acoustic wave****Authors**

Bogdan-Catalin Serban, Octavian Buiu, Cornel Cobianu, Roxana Marinescu

Institution

Proprietor: National Institute for Research and Development in Microtechnologies (IMT-Bucharest),

Patent no.

OSIM PATENT APPLICATION, A/00474, 31.07.2020

**Description
EN**

Carbon dioxide detection is important in various sectors of domestic and industrial activity, such as indoor air quality control, healthcare, agriculture, food technology, alcoholic beverage industry. The invention includes the design and manufacturing processes for a new gravimetric CO₂ sensor, employing carbon nanohorns functionalized with aminomethyl groups (abbreviated as CNH-CH₂-NH₂) as sensing layer, a quartz piezoelectric substrate and interdigital transducers. This type of functionalization confers selectivity to the nanohorn nanocarbon material by grafting aliphatic primary amine groups. Aliphatic amines, according to the HSAB theory, are hard bases and can interact reversibly, at room temperature with CO₂ (hard acid) to form carbamates. The sensing structure used is of the "delay line" type, having a double delay line in order to compensate the thermal drift. One of the delay lines is coated with CNH-CH₂-NH₂, the second delay line being the piezoelectric substrate without a sensitive layer. To obtain a signal due exclusively to the chemical interaction between CNH-CH₂-NH₂ and CO₂, the signal associated with the second delay line can be subtracted from the signal of the first delay line. The CNH-CH₂-NH₂-based sensing layer for gravimetric CO₂ sensor has several significant advantages:

- Improved mechanical properties and better processability of the sensing layer
- a high specific area / volume ratio, affinity for CO₂ molecules through HSAB-type interactions ("mass loading"), as well as a variation of the resistance of the sensitive layer to contact with them ("electric loading")
- Detection at room temperature
- Fast response
- Increased selectivity

RO.182.**Title EN****Hydrogen sulphide sensor with surface acoustic waves****Authors**

Bogdan-Catalin Serban, Octavian Buiu, Cornel Cobianu, Roxana Marinescu

Institution

Proprietor: National Institute for Research and Development in Microtechnologies (IMT-Bucharest)

Patent no.

OSIM PATENT APPLICATION, A/00469, 31.07.2020

**Description
EN**

The invention includes the design and manufacturing processes for a new gravimetric hydrogen sulphide sensor, employing carbon nanohorns functionalized with mercapto groups (-SH) and carbonothioyl (-C=S) groups (abbreviated as CNH-SH). The sensing layers described in this invention are based on carbon nanohorns subjected to H₂S / He plasma treatment. This type of functionalization ensures selectivity of nanohorns toward H₂S molecules by grafting sulphur-based groups such as SH and C = S. Moreover, the optimal degree of derivatization of carbon nanohorns, in order to obtain high sensitivities, can be tuned by changing the plasma power as well as the exposure time. Sensitive layers of the H₂S / He plasma-functionalized nanohorn type interact with hydrogen sulfide molecules. Adsorption of H₂S molecules alter the mechanical and electrical properties of the sensing layer, leading to changes in the propagation rate and frequency of the surface acoustic waves.

The process steps for the fabrication of the solid-state sensing films based on CNH-SH are shown below:

- Carbon nanohorn, purchased from Sigma Aldrich, are functionalized in H₂S / He plasma (60-40 v/v)
- The synthesized CNH-SH is washed with ethanol, acetone and deionized water.
- A dispersion of CNH-SH in dimethylformamide was subjected to ultrasonication at room temperature for 12 hours.
- The obtained dispersion is deposited by the spin coating method on the quartz substrate.
- The obtained film is heated to 120⁰C for 30 minutes.
- The obtained film is subjected to a final heat treatment, at 200⁰C, for 10 minutes.

RO.183.**Title EN****Resistive oxygen sensor and method of manufacturing it****Authors**

Bogdan-Catalin Serban, Octavian Buiu, Cornel Cobianu, Roxana Marinescu

Institution

Proprietor: National Institute for Research and Development in Microtechnologies (IMT-Bucharest), 077190, Voluntari (RO)

Patent no.

OSIM PATENT APPLICATION, ROMANIA, A/00470, 2020

**Description
EN**

Oxygen concentration monitoring is a process of cardinal importance in various sectors of domestic and industrial activity such as indoor air quality control (air conditioning and ventilation systems), combustion monitoring in industrial boilers, medical field (breathing monitoring, incubators), automotive industry (lambda probe), food technology and so forth. Along with electrochemical , optical , paramagnetic sensors, resistive oxygen sensors are a viable alternative to oxygen monitoring. The major drawback of these types of chemiresistive sensors is high operating temperature. The invention includes the design and manufacturing processes for a new resistive, room temperature oxygen sensor, employing organic - inorganic halide perovskites ($\text{CH}_3\text{NH}_3\text{PbI}_{3-x}\text{Cl}_x$) - oxidized carbon nano-onions (CNOs-ox) nanocomposite as sensing layer. The oxygen sensor includes a Si/SiO₂ substrate, interdigitated electrodes and a sensing layer obtained via spin coating method. The oxygen monitoring capability of the sensing layers was investigated by applying a current between the two electrodes and measuring the voltage at different values of the oxygen concentration at which the sensitive layer was exposed. From the detection principle point of view, the resistance of the sensitive layer varies with the oxygen concentration.

The claimed sensing layer used in the design and manufacturing of resistive oxygen sensor have several significant advantages

- the presence of CNOs-ox ensures a high specific surface area / volume ratio as well as a pronounced affinity for oxygen molecules.
- detection over a wide temperature range.
- rapid response of the sensor to variations in the value of oxygen concentration.
- reversibility.

RO.184.**Title EN****Benzene sensors and associated methods****Authors**

Bogdan -Catalin Serban, Octavian Buiu, Mihai Brezeanu, Cornel Cobianu, Cazimir . Bostan, C.Cristian Diaconu

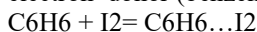
Institution

Honeywell International Inc.

Patent no.

U S 10,254,217 B2, Publication date: 9.04.2019

This invention introduces a novel, environmentally friendly, gas-phase benzene sensor based on the supramolecular chemistry principles and on Ultra-Violet Visible (UV-VIS) detection. It is well-known that benzene reacts with iodine and generates a charge - transfer complex which can be easily recognized due to its characteristic UV absorption band. This spectroscopic feature is attributed to a partial intermolecular charge transfer between an electron-acceptor (iodine) and an electron-donor (benzene):



However, there is major drawback when trying to manufacture a benzene sensor using iodine as sensing material. Although a solid, iodine is highly volatile and can sublimate even at room temperature. In order to stabilize it, iodine can be encapsulated in the cavity of either α -, β -, γ -cyclodextrines or their derivatives ((2-hydroxypropyl)- β -cyclodextrin). The cyclodextrine-iodine complex is stable due to the van der Waals forces which exist between the hydrophobic interior of the cyclodextrin (host molecule) and iodine as guest molecule. The dissociation of the iodine-cyclodextrine supramolecular assembly can be achieved above room temperature (>50°C). At the same time, benzene has a significantly larger affinity for iodine than for cyclodextrine. Therefore, when exposed to benzene, the supramolecular cyclodextrine-iodine complex is expected to liberate iodine, thus leading to a benzene-iodine reaction which can be optically detected.

Benzene sensor comprises a substrate having an iodine complex disposed thereon, a radiation source configured to project UV radiation onto the complex and a UV detector configured to detect a UV reflection off of the substrate having the iodine complex.

**Description
EN**

RO.185.**Title EN****Fluorescent polymers for oxygen sensing****Authors**

Bogdan-Catalin Serban, Octavian Buiu, Mihai Mihaila

Institution

Proprietor: Honeywell Romania

Patent no.

US 8,778,501 B2, Issued July 15, 2014; EP 2 461 155 B1, Issued 17.10.2012

Description**EN**

Recently, a lot of sensors based on the fluorescence quenching of organic molecules were developed in order to determine the concentration of oxygen. Fluorophores used for oxygen sensing have reduced adhesion to the substrate, thus leading to low stability and low reliability sensors. In order to overcome these issues, supporting materials such as silicones, Al_2O_3 are required. The fluorescent molecule could crystallize in the polymer matrix due to its poor solubility. In order to prevent aggregation and crystallization, the fluorescent molecule is immobilized by the polymeric substrate through covalent bonding. However, covalent immobilization alters the fluorescence properties of the fluorophore. In this invention, we propose a different pathway for the immobilization of fluorescent pyrene derivatives, by employing doping of polyanilines (PANIs) which avoids crystallization of the fluorophore in the polymer matrix and preserve the whole fluorescence. The proposed pyrene derivatives-based fluorophores are: 1-pyrene butyric acid (PBA), 1-pyrene acetic acid, 1-pyrene decanoic acid, 1 pyrene dodecanoic acid. The O_2 sensing layer is synthesized by doping the supporting material (undoped PANI) with the fluorophore (PBA) via the non-covalent immobilization of the dopant. This type of immobilization has the advantage that it leads to a minimum change in the molecular structure of the dopant and, as a consequence, it does not diminish its fluorescent properties. The O_2 sensing capability of the synthesized layer is proven by fluorescence spectroscopy performed at different air pressure values.

RO.186.**Title EN****Relative humidity sensor and method****Authors**

Bogdan-Catalin Serban, Cornel Cobianu, Mihai Brezeanu, Octavian Buiu, Cazimir Bostan, Alisa Stratulat

InstitutionProprietor: **Honeywell International Inc. Morris Plains, NJ 07950 (USA)****Patent no.**

EP 3,078,964 B1, Issued May 24, 2017

**Description
EN**

Capacitive sensors are viable solution for the RH detection, due to their highly linear response. Their most common drawback is the fact that they exhibit hysteresis. The present disclosure introduces an RH capacitive sensor employing a sensing layer based on polyimide and a hydrophobic filler. The sensor includes a first electrode, a second electrode disposed above a dielectric substrate, a sensitive layer, and a dust protection layer disposed above the sensitive layer. The sensitive layer is formed from a composition including a polyimide, i. e. P84®, Kapton®, and an organic hydrophobic filler, such as lignin with different molecular weight or an inorganic hydrophobic filler, such as talc. The composition can include about 0.5% weight lignin based on a total weight of the composition (wt/wt - %). Talc nanoparticles ($Mg_3Si_4O_{10}(OH)_2$) have a dimension in the range 1 nm to 100 nm. The composition can include about 0.25% weight talc nanoparticles based on a total weight of the composition (wt/wt %). Sensing layer was synthesized according to the following procedure:

Talc slurry (1%) was prepared from talc powder (average particle size $< 10 \mu m$) and DMF, ultrasonically stirred (at RT, for 6 hours), then mixed with simple polyimide and again ultrasonically stirred (at room temperature, for 24 hours) for full dispersion. The sensing solution was spin-coated (6.000 rpm) on upper surface of the first electrode and placed in an oven, for the curing process: at 85°C for 30 mins, at 150°C for 30 mins, at 300°C for 30 mins, at 400°C for 30 mins.

RO.187.**Title EN****Relative humidity sensor and method of forming relative humidity sensor****Authors**

Bogdan-Catalin Serban, Viorel-Georgel Dumitru, Octavian Buiu, Mihai Brezeanu

Institution

Proprietor: Honeywell International Inc. Morris Plains, NJ 07950 (US)

Patent no.

EP 3 150 999 B1/13.12.2017

**Description
EN**

A RH chemiresistor sensor is disclosed in this invention. The sensor includes a first electrode, a second electrode disposed above a dielectric substrate and a sensitive layer disposed above the electrodes. The sensing layer is calconcarboxylic acid - doped polyaniline. The dielectric substrate can be formed from PET, polycarbonate, glass, composite materials, etc. The first and second electrodes can be made from aluminum, copper, and chromium/ aluminum, among others. In order to synthesize the calconcarboxylic acid doped polyaniline polymer, the polyaniline (e.g., emeraldine base) can be doped by protonation of imine nitrogen atom with sulfonic groups, which are found in calconcarboxylic acid. The synthesis of calconcarboxylic acid doped polyaniline can be performed by mechanically mixing the emeraldine and the calconcarboxylic acid for 15 minutes to 60 minutes. The mixture can then be heated to increase the doping level. The calconcarboxylic acid doped polyaniline is dissolved in DMF and deposited via drop casting onto the electrodes. The humidity detection capability of the sensing layer is investigated by applying a voltage between the two electrodes and measuring the electrical current flowing through the sensitive layer at various levels of humidity. The calconcarboxylic acid doped polyaniline polymer absorbs water, and the changed geometry of the polymer increases the charge transfer across the polymer chain. The response of the RH sensor to changes in relative humidity is very fast, the current through the humidity sensor changes almost simultaneously after the relative humidity changes.

RO.188.**Title EN****Sensing layer for oxygen detection****Authors**

Bogdan-Catalin Serban, Cornel Cobianu, Mihai Brezeanu, Viorel Avramescu, Octavian Buiu, Viorel-Georgel Dumitru, Mihai Mihaila, Cazimir Bostan

Institution

Proprietor: Honeywell Romania S.R.L. 014459 Bucharest (RO)

Patent no.

EP 2,848,927 B1, Granted September 9, 2015

Description EN

Oxygen sensors are widely employed in aerospace, domestic and industrial boilers, automotive exhaust systems In harsh environment applications, especially at high relative humidity and high ambient temperature, metal oxide-based resistive oxygen sensors are an inexpensive alternative to the well-known potentiometric zirconia oxygen detectors. However, these sensors exhibit typical drawbacks such as selectivity issues, high power consumption, drift, material degradation, slow response time. This patent claims a novel nanocomposite sensing layer based on Sono-STFO40 ($\text{SrTi}_{0.6}\text{Fe}_{0.4}\text{O}_{2.8}$) and nanocarbonic materials such as single-walled carbon nanotubes (SWCNT), multi-walled carbon nanotubes (MWCNT), fullerene C60, fullerene C70, nanobuds, carbon nanofibers. The claimed sensing layer shows high sensitivity, fast response time, small drift and improved thermal and mechanical stability.

In an one example, the sensing layer was synthesized according to the following procedure:

- A Sono-STFO40 & SWCNTs matrix nanocomposite slurry was synthesized by mixing sono-STFO40 (powder, 50% w/w), single-wall CNTs (5%), terpineol (solvent, 35% w/w), hydroxypropyl cellulose (HPC)(binder, 5% w/w) and capric acid / caprylic acid (equimolecular mixture, surfactant, 5% w/w).
- Sono-STFO40 and sono-STFO40 & SWCNTs matrix nanocomposite were deposited on SOI-based micro-hotplate membranes using a dip pen nanolithography (DPN) system.

RO.189.**Title EN****Dye sensitized solar cells and method doing same****Authors**

Bogdan-Catalin Serban, Cristian Diaconu, Mihai Mihaila, Octavian Buiu

Institution

Proprietor: Honeywell Romania

Patent no.EP 2,838,128 B1, Issued 06 01 2016**Description****EN**

Dye-sensitized solar cells (DSSC) provide a technically and economically appropriate alternative concept to present day p-n junction photovoltaic cells. In contrast to the traditional systems where the semiconductor assumes both the task of light absorption and charge carrier transport, the two functions are separated in the case of DSSCs.

Light is absorbed by a sensitizer, which is anchored to the surface of a semiconductor. Charge separation takes place at the interface via photo-induced electron injection from the dye into the conduction band of the solid. Carriers are transported in the conduction band of the semiconductor to the charge collector. The use of sensitizers having a broad absorption band in conjunction with oxide films of nanocrystalline morphology permits the harvesting of a large fraction of sunlight, with nearly quantitative conversion of incident photon into electric current over a large spectral range extending from the UV to the near IR region. The present invention relates synthesis, design and application to the DSSC of new 10H- phenoxazine- or triphenylamine-based dyes (BCS-1) The dye design, based on the push-pull concept, consists of substituted phenoxazine or triphenylamine as an electron donor and a cyanoacrylic acid as an anchoring group and electron acceptor connected through a p-conjugated spacer.

RO.190.**Title EN****CASTOL****Authors**

Bogdan-Catalin Serban, Octavian Buiu, Marius Bumbac, Cristina Nicolescu

Institution**IMT, UVT**

This project proposes creation of a low-cost working tool by correlating the response given by specialized sensor arrays with the evaluation of ripening, senescence, alteration of fresh fruits and vegetables. The sensors proposed for the architecture of developed devices of appreciation of changes in the controlled atmosphere in the storage spaces will measure the variation of CO₂ content, O₂, VOC and the relative humidity as efficient tools in discriminating the complex volatile mixtures produced by fresh fruits and vegetables. At the same time, basic phytochemical characteristics of the plant structure are evaluated such as antioxidant activity, total sugar content, phenols, tannins, acidity and enzymatic activity to establish patterns of respiration, perspiration and alteration processes. In parallel with recording of the sensor response, a qualitative and quantitative evaluation of the atmosphere of storage spaces will be made using techniques such as respirometer experiment, and other instrumental techniques. The technologies based on semi-selective gas sensor panels, also called electronic noses (EN), seem to be a promising alternative for appreciating the way of storing fruits and vegetables.

Description**EN**

The proposal is addressing to reduction of food waste levels. Our proposal is approaching this issue from the perspective of “Internet of Things” (IoT) paradigm, proposing a low-cost measurement platform consisting of sensors and a monitoring and decision taking methodology. The innovative character of the project idea consists of the presentation of correlating patterns of phytochemical characteristics, the degree of ripening, senescence, and alteration of fruits and vegetables with the response of sensor arrays

National Institute of Materials Physics

RO.191.

Title EN

Fast processing method for the manufacture of superconducting MgB₂ bulks

Authors

Mihail BURDUȘEL, Mihai Alexandru GRIGOROȘCUȚĂ, Gheorghe Virgil ALDICA, Petre BĂDICĂ

Institution

National Institute of Materials Physics

Patent no.

A/2019/00908 - 18.12.201

Description EN

The invention relates to a fast processing method for the manufacture of superconducting MgB₂ bulks used in current faults, electrical power equipments and motors, energy storage, transfer and generation, magnetic separation/purification, medical applications, scientific instruments and others. The process according to the invention consists in submission of dense superconducting bodies based on MgB₂ to a sintering process assisted by an intense electric field (SPS / FAST) using a fast heating rate with a speed of 1000 °C/min. and using modified molds with Al₂O₃ insulating cylinders.

RO.192.

Title EN

Process for photocatalytic reduction of water in the presence of heterogeneous photocatalysts mixed oxides of nickel, zinc and titanium

Authors

Neațu Ștefan, Neațu Florentina, Florea Mihaela, Trandafir Mihaela-Mirela

Institution

National Institute of Materials Physics

Patent no.

A/00716 din 08/11/2019

Description EN

The invention relates to the process of photocatalytic water reduction with molecular hydrogen formation in the presence of heterogeneous mixed oxide photocatalysts based on nickel, zinc and titanium. The process according to the invention consists in the photocatalytic reduction of water in the absence/presence of sacrificial agents at temperatures between 35 and 45 °C and pressures between 2 and 3 atm by using, according to the invention, nickel, zinc and titanium oxide mixed photocatalysts synthesized through a deposition-precipitation method.

RO.193.

Title EN	Selective oxidation process of <i>p</i>-cymene from renewable sources in the presence of heterogeneous mixed oxide catalysts
Authors	Neațu Florentina, Neațu Ștefan, Florea Mihaela
Institution	National Institute of Materials Physics
Patent no.	A/00242 din 04/04/2018
Description EN	The invention relates to the process of selective oxidation of <i>p</i> -cymene obtained from renewable sources, in the presence of heterogeneous cobalt (Co) heterogeneous catalysts. The process according to the invention consists in the selective oxidation of <i>p</i> -cymene from renewable sources in liquid phase in the presence of different oxidizing agents at temperatures between 80 and 150 °C and pressures between 8 and 40 atm by using, according to the invention, Co-based oxide catalysts synthesized by different methods.

RO.194.

Title EN	Equipment for viewing Anti-Stokes fluorescent security signs on documents
Authors	Secu Mihail, Galca Aurelian Catalin, Polosan Silviu, Gavrilă Alexandru, Cioca Mihai, Dobrescu Gabriel, Ighigeanu Adelina Maria
Institution	National Institute of Materials Physics
Patent no.	Utility model registered with OSIM
Description EN	The present invention is referring to equipment useful for the observation of the security prints based on Anti-Stokes inks. The equipment is composed by a circular illumination source with power supply and a CCD camera for the images recording and visualization centred in the source, all included into a closed box. The illumination source is a circular one, composed by 24 LEDs centred at 950nm with 50nm half-width and assures a spot-type illumination of about 1cm diameter and 1248mW/cm ² at 5cm distance. Fluorescence emitted by the Anti-Stokes ink printed characters on the document is acquired by the CCD camera and visualized as an image on the PC monitor. The effect of the daylight is minimized by the closed box

RO.195.

Title EN	Memcomputing in Ferroelectric Heterostructures
Authors	Georgia A. Boni, Lucian D. Filip, Cristina Chirila, Alin Iuga, Iuliana Pasuk, Luminita Hrib, Lucian Trupina, Ioana Pintilie, and Lucian Pintilie
Institution	National Institute of Materials Physics
Patent no.	A/2018/00363 din 23.05.2018
Description EN	Ferroelectric structures are important for technology due to their wide spectrum of properties and considerable potential for applications, one of the most known being ferroelectric random-access memory (FeRAM). A recent challenge for the research in the field of ferroelectric materials is the manufacturing of simple, two terminal electronic elements for memcomputing (memorizing and computing on the same physical platform), which are obtained so far from a resistive switching phenomena. Here we experimentally and theoretically demonstrate a novel property of ferroelectric structures: capacitive switching in two terminal multilayered structures. We examine both digital and analog storing schemes and the possibility of operating simple binary logic functions. The results are obtained by the fine control of polarization switching process in ferroelectric multilayers as Pb(Zr,Ti)O ₃ (PZT)/SrTiO ₃ (STO)/ Pb(Zr,Ti)O ₃ (PZT) or Pb(Zr,Ti)O ₃ (PZT)/BaTiO ₃ (BTO)/ Pb(Zr,Ti)O ₃ (PZT). New applications can be imagined based on these properties as non-destructive reading, memcomputing, building neuromorphic circuits or chaotic circuits.

RO.196.

Title EN	A new method of dielectric characterization in relation with polarization reversal for ferroelectric structures
Authors	Boni Georgia Andra, Chirila Cristina, Pintilie Lucian
Institution	National Institute of Materials Physics
Patent no.	A 2019 00723
Description EN	A new measurement method is proposed for dynamically characterizing the dielectric properties of the ferroelectric structures or for structures with nonlinear response in applied electric field. The proposed method is based on the analyzation of the current during a trapezoidal voltage pulse. The results are based on considering an equivalent parallel RpCp circuit for the ferroelectric structure and analyzation of the current for different temporal moments. Thus, the results are the evaluation of the Rp and Cp values in relation with different polarization degrees of the ferroelectric structure.

**National Institute for Research - Development of Machines
and Installations designed for Agriculture and Food
Industry -INMA Bucharest, Romania**

RO.197.

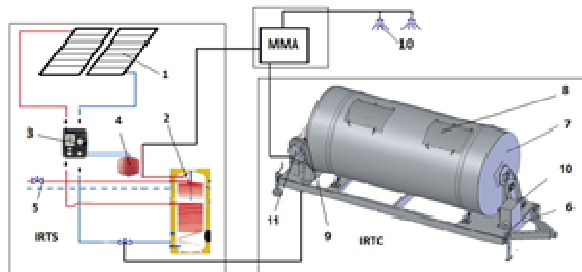
Title EN **INTEGRATED SYSTEM FOR THE RECOVERY OF THERMAL ENERGY BOTH SOLAR AND FROM THE COMPOSTING PROCESS**

Authors Ciupercă Radu, Zaica Ana, Nedelcu Anuța
National Institute for Research - Development of Machines
and Installations designed for Agriculture and Food Industry
Institution -INMA Bucharest, Romania

Patent no. **Patent application No. A-00722 / 11.11.2020**
The invention relates to an integrated system for the recovery of thermal energy both solar and from the composting process of biodegradable waste, which it transfers to an installation for the production of domestic hot water, intended for small farms and private households.

Description EN

(3) Agriculture and Food Industry



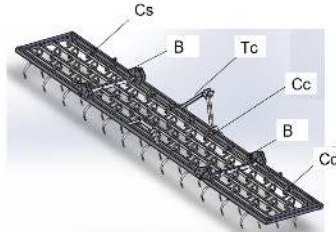
RO.198.

Title EN **MODULATED LOAD BEARING STRUCTURE FOR AGRICULTURAL MACHINERY**

Authors Muraru Vergil Marian, Cârdei Petru, Muraru Sebastian,
Muraru-Ionel Cornelia, Condruz Paula
National Institute for Research - Development of Machines
and Installations designed for Agriculture and Food Industry
Institution INMA Bucharest, Romania

Patent no. **Patent application No. A-00658/ 21.10.2020**
Description The invention relates to a modulated load bearing structure

EN with multiple applications for tillage machines on which active parts are mounted in different working variants, in order to extend the period of use depending on the size of agricultural holdings and the power of the tractor.
 (3) Agriculture and Food Industry



RO.199.

Title EN

MOBILE PLATFORM WITH ADJUSTABLE STRUCTURE FOR PHOTOVOLTAIC PANELS

Authors

Marin Eugen, Păun Anișoara, Manca Dragoș, Mateescu Marinela

Institution

National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry
 - INMA Bucharest, Romania

Patent no.

Patent application No. A-00626 / 07.10.2020

Description EN

The invention relates to a mobile platform with adjustable structure for photovoltaic panels intended to obtain electricity by optimally capturing solar radiation, in places where there is no other source of electricity required in agricultural or temporary construction site applications. The novelty of the invention consists in the realization of a mobile platform equipped with an adjustable structure with photovoltaic panels, which allows the adjustment of the angle of inclination to the horizontal, so as to result in optimal capture of solar radiation according to the hours of maximum radiation during the day, at an efficiency of solar energy conversion into electricity as high as possible.

(6)- Mechanical Engineering - Metallurgy



RO.200.

Title EN

INSTALLATION FOR BIOCOMPOST LOOSENING

Authors

Păun Anișoara, Ganea-Christiu Ioan, Matache Mihai, Caba Ioan Ladislau, Laza Evelin-Anda

Institution

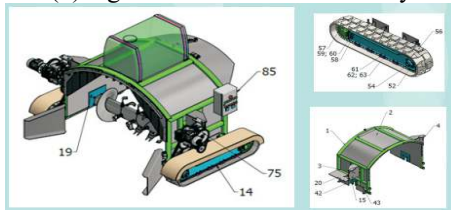
National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry
- INMA Bucharest, Romania

Patent no.

Patent application No. A-00402/ 14.07.2020

Description EN

The invention relates to a mobile installation with electromagnetic actuation intended for aeration and mixing of biocompost in agricultural units for its capitalization as fertilizer for vegetable growing and other agricultural sectors\
(3) Agriculture and Food Industry



RO.201.

Title EN

EQUIPMENT FOR DETACHING FROZEN SEA-BUCKTHORN FRUIT FROM BRANCHES

Authors

Milea Dumitru, Ciupercă Radu, Vișan Alexandra

Institution

National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry
- INMA Bucharest, Romania

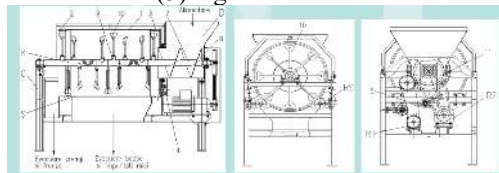
Patent no.

Patent application No. A 00398 / 13.07.2020

Description EN

The invention relates to the equipment that can function integrated within a technological flow of sea buckthorn processing, but also as independent equipment for detaching sea-buckthorn fruit from previously harvested and frozen branches, separating and evacuating the two resulting fractions - branches and leaves, respectively fruit and small impurities.

(3) Agriculture and Food Industry



NATIONAL

RO.202.**Title EN****INDUSTRIAL PLANT FOR JERUSALEM ARTICHOKE WASHING****Authors**

Olan Mihai, Vlăduț Valentin, Păun Anișoara, Voicea Iulian Florin, Paraschiv Gigel, Popa Diana, Isticioaia Simona, Apostol Livia

Institution

INMA Bucharest, Romania

Patent no.

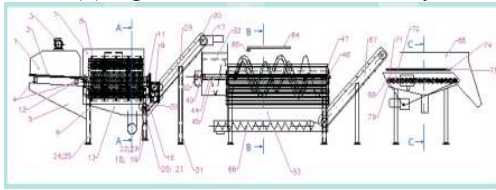
Patent application No. A-00891 / 12.12.2019

Description

The invention relates to an industrial plant for washing Jerusalem Artichoke tubers to be processed to produce bioethanol

EN

(3) Agriculture and Food Industry

**RO.203.****Title EN****SEMIMOUNTED EQUIPMENT FOR CHOPPING WOODEN VEGETABLE REMAINS, WITH COUPLING SYSTEM TO THE TRACTOR'S LATERAL COUPLING BARS****Authors**

Popa Lucreția, Ștefan Vasilica

Institution

INMA Bucharest, Romania

Patent no.

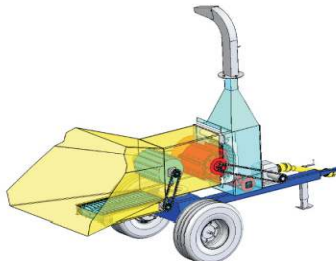
Patent application No. A-00744 / 14.11.2019

Description

The invention relates to semimounted equipment, intended for chopping wooden vegetable remains, provided with a coupling system to the tractor's lateral coupling bars, in order to avoid the interaction between the Cardan shaft and drawbar, while turning at row end, during the work in orchards or vineyards

EN

(3) Agriculture and Food Industry



NATIONAL

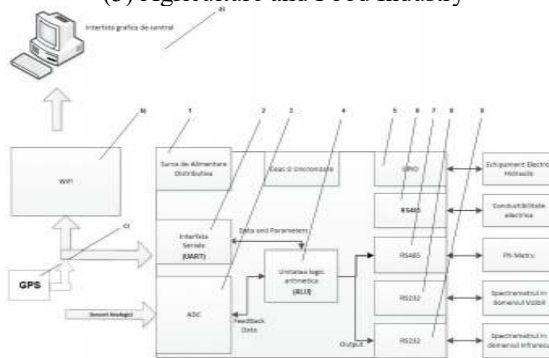
RO.204.**Title EN****DEVICE FOR MANAGING SOIL PROPERTY SCANNING PLATFORMS****Authors**

Muraru Sebastian Lucian, Constantinescu Oana-Mihaela
National Institute for Research - Development of Machines
and Installations designed for Agriculture and Food Industry
- INMA Bucharest, Romania

Institution**Patent no.****Patent application A-00734 / 13.11.2019****Description EN**

The invention relates to an intelligent electronic command and control device intended for the management of optoelectronic soil property scanning platforms (DEC)

(3) Agriculture and Food Industry

**RO.205.****Title EN****DEFLECTOR WITH AUTOMATIC AIR FLOW DIRECTION FOR SPRAYERS MACHINES IN VINEYARDS AND ORCHARDS****Authors**

Manea Dragoș, Matache Mihai, Marin Eugen, Gheorghe Gabriel

Institution

National Institute for Research - Development of Machines
and Installations designed for Agriculture and Food Industry
- INMA Bucharest, Romania

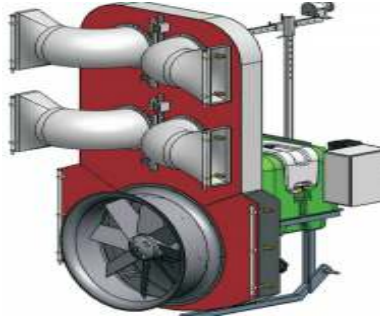
Patent no.**Patent application No. A – 00708 / 05.11.2019****Description EN**

The invention relates to a deflector with automatic direction of the air flow and solution particles according to the geometrical characteristics of the canopy, intended for pneumatic sprayers in

vineyards and orchards, equipped with axial fans.

(3) Agriculture and Food Industry

NATIONAL



RO.206.

Title EN

MOBILE PUMPING GROUP FOR WATER SUPPLY OF IRRIGATION INSTALLATIONS

Authors

Manea Dragoș, Murgescu Ion, Șovăială Gheorghe, Tociu Carmen, Ungureanu Nicoleta, Manole Emilia Sofia, Gîdea Mihai

Institution

National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania

Patent no.

Patent application No. A – 00586 /24.09.2019

Description EN

The invention relates to a mobile pumping group intended for the supply of pressurized water and liquid fertilizers for irrigation and fertilization of agricultural crops

(3) Agriculture and Food Industry



RO.207.**Title EN****UNIVERSAL MOBILE WATERING BOOM****Authors**

Manea Dragoș, Popescu Marian, Drăchici Iulian, Murgescu Ion, Șovăială Gheorghe

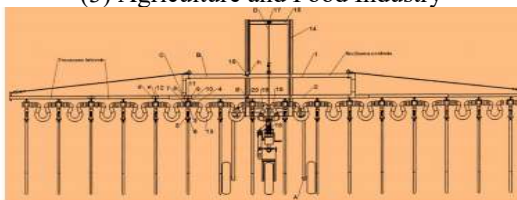
Institution

National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania

Patent no.**Patent application No. A – 00566 / 13.09.2019****Description EN**

The invention relates to a mobile watering boom for irrigation installations with drum and hose, which can be used to irrigate all agricultural crops in open field, low or high waist, through different irrigation methods: among the rows of plants, with continuous flow, by sprinkling or by dripping.

(3) Agriculture and Food Industry

**RO.208.****Title EN****SYSTEM FOR ATENUATING THE IMPACT ON SEEDS IN BUCKET BELT ELEVATORS****Authors**

Găgeanu Paul, Ganea-Christu Ioan, Găgeanu Iuliana

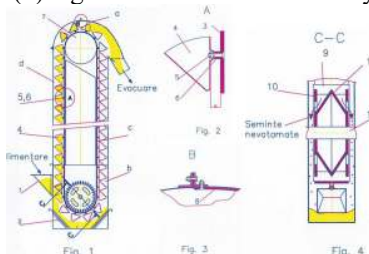
Institution

National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania

Patent no.**Patent application No. A-00627 / 31.08.2018****Description EN**

The invention refers to a system for attenuating the impact on seeds by attenuating hits upon contact with metallic components, destined for bucket belts, during loading, transport and unloading.

(3) Agriculture and Food Industry



NATIONAL

RO.209.

Title EN **AUTOMATIC STEERING SYSTEM FOR THE EQUIPMENT FOR ESTABLISHING AGROFORESTRY BELTS**

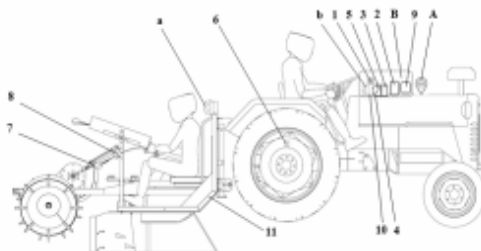
Authors Marin Eugen, Mateescu Marinela, Manea Dragos, Gheorghe Gabriel

Institution National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry
- INMA Bucharest, Romania

Patent no. **Patent application No. A-00954/ 26.11.2018**

Description EN The invention relates to an automatic steering system for the equipment for establishing agroforestry belts, intended for automatic steering on the row of the aggregates formed by agricultural wheeled tractor and planting equipment, when executing the planting of forest seedlings in worked land, in the form of square (the distances are equal both in row and between rows) or in the form of rectangle (the distance is greater between the rows and smaller on the row)

(3) Agriculture and Food Industry

**RO.210.**

Title EN **DEVELOPMENT OF INNOVATIVE TECHNOLOGIES INSIDE OF SMART FARMS**

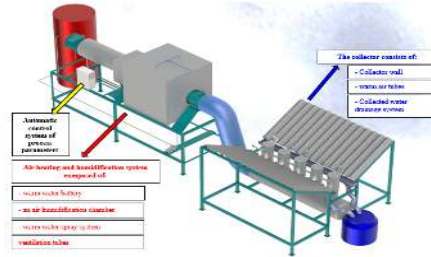
Authors Marin Eugen, Manea Dragos, Mateescu Marinela, Gheorghe Gabriel-Valentin

Institution National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry
- INMA Bucharest, Romania

Description EN In order to capitalize on renewable resources in terms of efficiency, care for the environment and climate action, the project develops the following a innovative system for conservation work of the soil, which uses advanced method management where data is collected and stored on the spot (such

as humidity, temperature, soil pH level) through smart sensors, and farmers will receive real-time information using a computer / smartphone, allowing them to make instant decisions, saving time and labor for on-farm inspections

(3) Agriculture and Food Industry



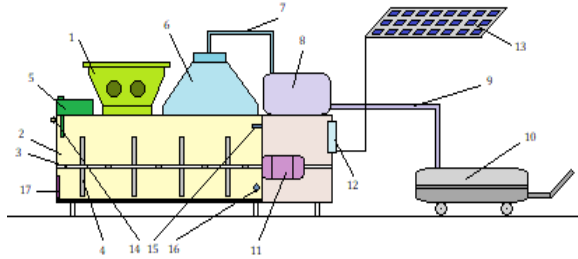
RO.211.

Title EN NOVEL TECHNOLOGIES USED FOR INCREASING THE PERFORMANCES OF COMPOSTING WASTES AND BY-PRODUCTS RESULTED FROM AGRICULTURE

Authors Nenciu Florin (INMA), Nae Gabriel (INMA), Vlăduț Valentin (INMA), Voicea Iulian (INMA), Vrînceanu Nicoleta (ICPA), Ungureanu Nicoleta (UPB-ISB)

Institution National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania

Description EN This present paper briefly presents the main elements developed by the project consortium, in terms of designing a novel technology, that may be used for composting at high efficiencies agricultural wastes, residues and by-products, resulted from the technical plant processing. The development of the composting technology involves two main elements: (A). Development and testing of various composting recipes, consisting of different vegetable mixtures and degradation conditions; (B). Development of a technological flow and an innovative composting installation, that has the potential to produce high quality compost.



RO.212.

Title EN

DETERMINATION OF WEAR OF THE ACTIVE ORGANS OF A SCARIFIER, IN ACCELERATED REGIME, DEPENDING ON THE TYPE OF MATERIAL USED

Authors

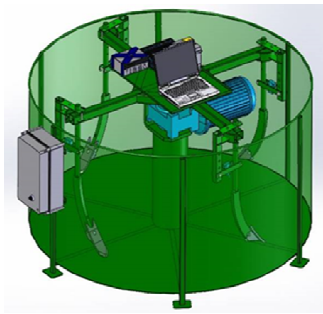
Vlăduțoiu Laurențiu Constantin (INMA), Tudor Andrei (UPB), Fechete-Tutunaru Lucian (UT Cluj), Grigore Andreea-Iulia (INMA), Sorică Elena (INMA)

Institution

**National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry
INMA Bucharest, Romania**

Description EN

In order to test the chisel type knives, a test stand (Fig. 1) made by the National Research-Development Institute for Machines and Installations for Agriculture and Food Industry - INMA Bucharest was used. With the help of this stand, different types of tillage knives can be tested in laboratory conditions, by modifying their functional parameters: working depth, angle of the tillage knives, working speed, granulation and humidity of the test environment.



National Institute for Laser, Plasma and Radiation Physics

RO.213.
Title EN

Process for obtaining superhydrophobic materials by laser ablation

Authors

Urzica Iuliana, Simon Agota, Udrea Cristian, Logofatu Petre Catalin, Pascu Mihail Lucian.

Institution

National Institute for Laser, Plasma and Radiation Physics, Bucharest-Magurele, Romania

Patent

Patent application No : A/00475 / 02.08.2019

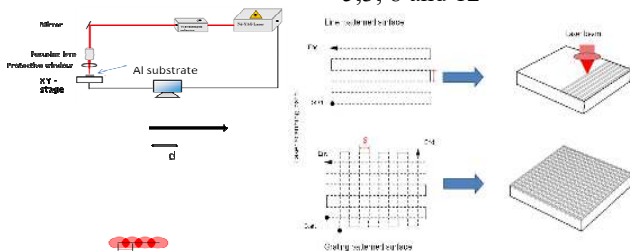
The invention relates the design and implementation of a flexible, adaptive and low cost innovative system for the production by laser ablation in different environments of materials with "lotus" effect, superhydrophobic materials, using a laser in ultra-short pulses.

**Description
EN**

The lotus leaf, the rice leaf, the butterfly wing and the water-strider spider legs have surfaces that possess several uniquely beneficial properties, such as extreme water repellency, self-healing, self-cleaning, anti-bacterial, anti-corrosion, enhanced heat transfer, drag reduction and improved corrosion resistance. Recently, superhydrophobic surfaces, for which water contact angle is higher than 150° and sliding angle less than 10° , have received attention due to the many potential applications ranging from biological to industrial processes and usable/ applicable properties, not only scientific but even in daily life.

Class

5,3, 8 and 12



RO.214.

Title EN

All-optical spatial light modulator based on functionalized DNA

Authors

Adrian Petris¹, Ionel Valentin Vlad¹, Petronela Gheorghe¹, Ileana Rau², Francois Kajzar²

Institution

¹National Institute for Laser, Plasma and Radiation Physics, Bucharest-Magurele, Romania

²University Politehnica of Bucharest, Faculty of Applied Chemistry and Materials Science, Bucharest, Romania

Patent

Patent application No. A/01038/2016 , 22/12/2016

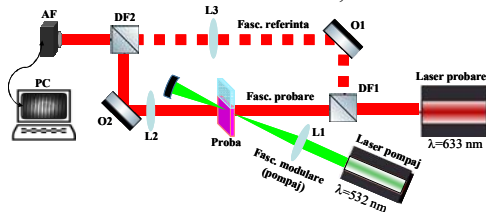
Description EN

The patent application describes an all-optical spatial light modulator for applications that require the modulation of the optical phase of a laser beam. The refractive index of DNA nonlinear optical (NLO) material functionalized with the CTMA surfactant and doped with the photoisomerisable cromophores DR1 or DO3 is modified according to the intensity distribution of a modulator laser beam.

A probe laser beam with the wavelength outside of the NLO material spectral sensitivity, superimposed on the modulator beam inside the material, will have the optical phase modulated according to the index distribution induced by the modulator beam in the NLO material.

Class

10, 5



RO.215.

Title EN

Love Wave Surface Acoustic Wave Sensor based on Nanoporous Gold

Authors

Dana Maria Miu, Cristian Viespe, Izabela Constantinoiu

Institution

National Institute for Laser, Plasma and Radiation Physics

Patent

A/00305, 02.06.2020

Description EN

The invention refers to a Love-Wave-Surface Acoustic Wave (LW-SAW) sensor, having nanoporous gold as immobilization layer, usable as a biosensor for the detection

of biological materials (proteins, nucleic acids, bacteria, viruses). The control of the gold layer morphology was performed by using the pulsed laser deposition method.

LW-SAW sensors with nanoporous gold have improved sensitivity, selectivity, response time and return time compared to LW-SAW sensors with dense gold immobilization layer. These improvements are due to the fact that the nanoporous gold layer has a higher specific surface area and higher reactivity compared to the dense gold layer. In optimizing the nanoporosity of the sensitive gold layer, the properties of the biological analytes were taken into account, so that the layer remains stable on the sensor substrate and allows their penetration in the volume of the layer.

LW-SAW sensors operate on the principle of modifying the propagation of the surface acoustic wave in the presence of an analyte. The change is noticed by the frequency deviation of the surface acoustic wave.

The patent claims the LW-SAW sensor with sensitive layer with modified morphology, consisting of nanoporous gold layer, with improved sensitivity, applicable in the detection of various biological materials (proteins, nucleic acids, bacteria, viruses).

Class 12

RO.216.

Title EN

Procedure for the Detection of Gases in Real Time Based on Fourier Analysis

Authors

Ionut Nicolae, Cristian Viespe, Dana-Maria Miu, Aurelian Marcu

Institution

National Institute for Laser, Plasma and Radiation Physics

Patent

Patent application No. A/00295/2020

The invention refers to a procedure for the detection of gases using Surface Acoustic Waves sensors (SAWs), based on Fourier spectrum analysis, which leads to increased precision of analyte detection.

Description EN

The SAW detection method currently used is based on measurement of the frequency variation of the fundamental frequency of the SAW oscillator in the presence of an analyte. The sensitivity of the method is therefore limited by this operating frequency, since the sensitivity is higher when the frequency is higher. An increase of the operating

frequency implies modification of the SAW sensor design, as well as more complex associated electronics.

Through the procedure in the present invention, detection is obtained through comparison of the position of one or more of the harmonic components of the Fourier spectrum of the SAW oscillator in the presence of the analyte, with a reference spectrum which is registered in the absence of any analyte. Based on the difference between the actual position of the harmonics and the reference spectrum, the presence of the analyte is deduced.

The advantage of this procedure consists in the increased sensitivity in comparison to the classical method used in SAWs. The increased sensitivity is obtained through the use of the harmonic frequencies, which are higher than the fundamental frequency, without the need to modify the fundamental frequency itself.

The invention has applications in the domain of detection of gases and Volatile Organic Components

Class

12

RO.217.

Title EN

A process for the analysis of ethylene from gas mixtures

Authors

Achim Cristina-Mihaela, Bratu Ana-Maria, Bercu Mioara-Elena, Dumitras Dan Constantin, Dutu Doru Constantin Adrian

Institution

National Institute for Laser, Plasma and Radiation Physics

Patent

Patent application No.A/00068/2019

Description

EN

The invention relates to a process for analyzing ethylene from gaseous mixtures by photoacoustic effect. The ethylene detection unit of a gas mixture, presented according to the process includes, the acoustic unit along with a laser tunable in frequency and amplitude, the manipulation of the gas mixture and the electronics required to determine the ethylene gas. The process according to the invention consists in determining the concentration of ethylene in the gas mixtures, based on the absorption of electromagnetic radiation with specific wavelength.

Applications: Environment - Pollution Control; Agriculture and Food Industry; Medicine - Health Care - Cosmetics; Chemical and Textile Industry; Safety, protection and rescue of people

Class

1, 3, 4, 9, 12.

RO.218.	
Title EN	Heterostructures based on inorganic perovskites for photoelectrochemical applications
Authors	Florin Andrei, Nicu Scarisoreanu, Valentin Ion, Maria Dinescu
Institution	National Institute for Laser, Plasma and Radiation Physics
Patent	A00830/02.12.2019 The invention is related to an original procedure for the obtaining of heterostructures based on LaFeO_3 and BiFeO_3 perovskites with enhanced photoelectrochemical stability. The heterostructures were manufactured via pulsed laser deposition technique on Nb doped SrTiO_3 conductive substrates. The functionality of these devices was tested in a three-electrode system coupled to a photoelectrochemical cell. The electrolyte in which the samples were tested is a strongly alkaline NaOH solution ($\text{pH} = 13.7$). The irradiation was performed using a laser diode emitting at 405 nm. The results confirm the great photoelectrochemical stability of heterostructures based on $\text{LaFeO}_3/\text{BiFeO}_3$ in strong alkaline experimental conditions.
Description EN	
Class	2
RO.219.	
Title EN	Method for obtaining pressure sensors based on thin films of ecological lead-free piezoelectric material ($\text{Ba}_{1-x}\text{Ca}_x$) ($\text{Zr}_y\text{Ti}_{1-y}$) O_3 deposited by pulsed laser deposition
Authors	Nicu Doinel Scarisoreanu, Nicoleta Enea, Cristian Viespe, Valentin Ion
Institution	National Institute for Laser, Plasma and Radiation Physics
Patent	A/00747 / Patent application No. 5787/18.11.2020 The technical problem solved by the present invention consists in obtaining new sensors type SAW- Surface acoustic wave for the detection of pressure variation. These sensors use as sensitive layers ecological materials based on a solid solution of calcium-doped barium titanate and zirconium-doped barium titanate ($(\text{Ba}_{1-x}\text{Ca}_x)$ ($\text{Zr}_y\text{Ti}_{1-y}$) O_3 - (BCTZ)). The sensor used was made on a single crystal substrate of SrTiO_3 . The sensitive thin film of BCZT is obtained by the method of pulsed laser deposition (PLD) in the oxygen atmosphere, at a temperature of 700 °C.
Description EN	

The use of the BCZT thin films as a sensitive layer in the SAW sensor confers some indisputable advantages:

- they are ecological materials - they do not contain toxic chemical elements;
- has a high dielectric constant (3000), small dielectric losses (0.001) and piezoelectric coefficient $d_{33} \sim 200$;
- adequate functionalization of the BCZT thin films ensures a frequency jump of 60 kHz and an ordinal response time of milliseconds;
- room temperature detection.

Class 12

RO.220.

Title EN

PROCESS FOR EXPERIMENTAL REALIZATION OF Ag / SiO₂ MULTILAYER BY OPTIMIZED THIN FILM DEPOSITIONS FOR METAMATERIAL APPLICATIONS

Authors

Petronela GAROI, Cristian VIESPE, Florin GAROI, Valentin CRĂCIUN

Institution

National Institute for Laser, Plasma and Radiation Physics, 409 Atomistilor Street, PO Box MG-36, Magurele 077125, Ilfov, Romania

Patent

A/00772/2020 / Patent application

Description EN

The invention refers to a process for making a recipe using the optimal deposition parameters, in order to obtain a Ag / SiO₂ multilayer using the magnetron sputtering technique. In the process of obtaining the recipe using the optimal deposition parameters, sputtering takes place successively from the SiO₂ and Ag targets, which are placed on two magnetrons in the deposition chamber and in O₂ (for the SiO₂ target) and Ar (for the Ag target) working gas flow, introduced using flowmeters. From the surface of the targets it is deposited individually, directly on the surface of the quartz substrate, the SiO₂ and Ag component layers, having good crystallographic quality of the layer on large deposition surfaces. This Ag / SiO₂ multilayer, obtained from thin coatings, has dielectric and plasmonic qualities which improve the properties of metamaterial structures and space microsattellites due to the low values of the refractive index.

Class

Invention Classification: **2. Energy and sustainable development**

RO.221.

Title EN	HPTLC densitometry method for the analysis of irradiated thioridazine solutions based on laser-induced fluorescence and fluorescence lifetime characterization
Authors	Tozar Tatiana, Boni Mihai, Andrei Relu Ionut, Staicu Angela, Pascu Mihail-Lucian
Institution	National Institute for Laser, Plasma, and Radiation Physics
Patent	Patent application No. A/00120 from 18.03.2021
Description EN	<p>Applications The invention relates to HPTLC (high performance thin layer chromatography) densitometry of a mixture of compounds based on the characterization of laser-induced fluorescence and fluorescence lifetime. The proposed method is based on scanning HPTLC plates, which contain separated compounds, with a picosecond pulsed laser diode and the collection and analysis of the fluorescence signal. Thus, the laser-induced fluorescence chromatograms, fluorescence spectra and time-resolved fluorescence signals are obtained. The described method was validated for thioridazine and the optical characterization of photoproducts resulting from the prior laser irradiated thioridazine solutions was obtained. The proposed method can be extended for densitometric analysis of all aromatic or heterocyclic compounds from a mixture.</p> <p>The invention can be applied in the technical fields of chemical engineering and technology and falls into the subfields of chemistry and engineering of organic substances, environmental chemistry, pharmaceutical chemistry, food chemistry, or biochemical technologies.</p>
Class	5. Industrial and laboratory equipments

National Research & Development Institute for Welding and Material Testing - ISIM TIMISOARA

RO.222.
Title EN
INSTALLATION FOR WATER DISINFECTION
Authors

Drd. Eng Emilia DOBRIN

Institution
**National Research & Development Institute for
Welding and Material Testing - ISIM TIMIȘOARA**
Patent

No.A /00067/2202/2021

Technical specification

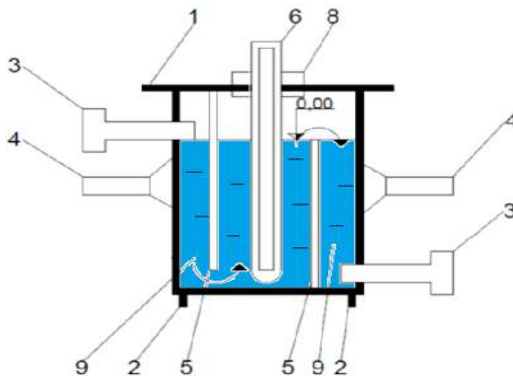
- Ultrasonic (US) generator: 500 W, 20 kHz
- Ultraviolet (UV) set: 160 W/cm², 1554 mm, 15mm

Applications

- Environmental protection activities
- Environmental preservation equipment

**Description
EN**

The installation assembly consists of a metal container (1) positioned on supports (2) which are connected to the water source for disinfection through an industrial tap (3) controlled from the distribution and automation box (11). The sonotrodes (4) are fixed to the wall of the metal container (1) which are driven by the ultrasonic generator (10) and the distribution and control box (11) together with the immersed UV lamp (7) protected by the tube (6) and fixed by the metal container (1) through a fixing assembly (8), it acts in the area (9) with plates (5) having the remote monitoring box (12) connected to the distribution and automation box (11).

Class
1, 4, 5


RO.223.

Title EN

Method of making rectangular and square tubes of aluminum alloys, by the process of friction stir welding (FSW)

Authors

VERBIȚCHI Victor; SÎRBU Nicușor-Alin;
VLASCICI Miomir

Institution

National Research & Development Institute for Welding and Material Testing – ISIM Timisoara

Patent

Patent application No. A 00242 / 06th.05.2020

Technical specification

- Tube cross section: (10 - 100 mm) x (10 - 100 mm);
- Material: aluminum alloy sheets, thickness range 2 - 5 mm;
- Friction stir welding (FSW) process for execution;
- Friction stir processing (FSP) for structure consolidation;

Application

- Target products: various setups; light constructions; outdoor welded structures;
- Areas of application: electro-technique, construction, manufacturing, rolling stock and automotive industries.

Novelty items

More efficient execution of rectangular or square tubes of aluminum alloys, alternative to extrusion, rolling or other welding technologies.

Description EN

Components (Figure 1)

1 - Model; 2 - Sheet A; 3 - Sheet B; 4 - Clamp (5 pcs.); 5 - Vise (2 pcs.); 6 - Screw (5 pcs.); 7 - FSW machine (table); 8 - FSW tool.

Claims

1. The method of making rectangular and square tubes of aluminum alloys by FSW, characterized in that, it uses a model 1, a sheet 2 and a sheet 3, bent as U-shaped profiles on the model 1, placed on a FSW machine 7, so that a FSW tool 8 rotates and moves between the sheets 2 and 3, to weld the sheets and make a tube.

2. Device for the method of making rectangular and square tubes of aluminum alloys, characterized in that, it has the following components: a model 1, a sheet 2 and a sheet 3, bent as U-profiles, fixed with flanges 4, vices 5 and screws 6, around the model 1, so that the a FSW tool 8 welds the sheets.

Class

6. Mechanical Engineering - Metallurgy

NATIONAL

537

RO.224.**Title EN****Method and device for FSW joining and FSP processing, with tilted parent metals****Authors**VERBIȚCHI Victor; DAȘCĂU Horia-Florin;
BOȚILĂ Lia-Nicoleta; COJOCARU Radu**Institution****National Research & Development Institute for Welding and Material Testing – ISIM Timisoara****Patent**

Patent application No. A 2020 00291 / 27th.05.2020

Technical specification

- Material: aluminum alloy sheets, thickness range 1 - 4 mm;
- Friction stir welding (FSW) process for execution;
- Friction stir processing (FSP) for structure strengthening;

Application

- Target products: components and parts for devices, electrical appliances, welded structures and transport means;
- Fields of application: electro-technique, manufacturing, constructions, rolling stock and automotive industries.
- Increasing the quality level of the parts made by FSW equipment, by improving the operation procedure.

Novelty items

Tilted parent metals, as a simple solution to reduce load and stress on the tool during FSW and FSP, instead of tilted tool drive, as a difficult solution for the same aim.

Description EN**Description (Figure 1)**

Method and device for FSW joining and FSP processing, with tilted parent metals (PM), characterized in that it uses a base plate 1, two clamping plates 2 and 3, screws 4 and accessories 5, 6; these pieces fix PM sheets 7; base plate 1 is tilted at an angle $\alpha = 1 - 3^\circ$ to the table 8 of a FSW (FSP) machine, using a calibrated part 9; processing tool 10 performs movements $v(z) = v(x) \operatorname{tg} \alpha$, correlated by software; tool shoulder progressively penetrates sheets 7; burrs decrease and productivity increases.

Claims

1. Method and device for FSW joining and FSP processing, with tilted parent metals;
2. Device for FSW joining and FSP processing, with tilted parent metals.

Class

6. Mechanical Engineering - Metallurgy

National Institute for Research and Development of Isotopic and Molecular Technologies

RO.225.

Title EN

Preparation, incorporation and application of radioactive waste in glasses based on B₂O₃-PbO

Authors

S. Rada, A. Dehelean

Institution

National Institute for Research and Development of Isotopic and Molecular Technologies

Patent

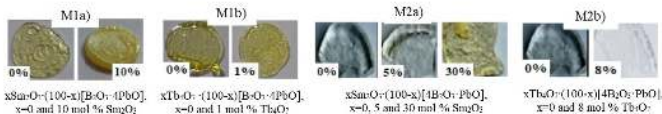
Patent application No. A/00097/25.02.2020

Description EN

The invention relates to preparation, incorporation and application of new glasses based on B₂O₃-PbO as an alternative for immobilization radioactive waste and capitalizing on the resulting products as luminescent materials. The experimental model developed for the testing of photoluminescent properties proves to be a good efficiency, selectivity depending on the nature of the component ions and an increased reproducibility. The proposed procedure allows: i) immobilization of a high level of radioactive waste in the glasses; ii) immobilization of the volatile components of the radioactive segment; iii) new applications of the resulting product for commercialization and not the final storage of radioactive waste.

Class

1. Environment - Pollution Control



RO.226.

Title EN

Nanostructures based on PHBV and Fe doped ZnO nanoparticles and their obtaining process

Authors

M. Stefan, M. Rapa, O. Pana, D. Vodnar, E. Matei, D. G. Barta, A. Popa, D. Toloman, C. Leostean, S. Macavei,

Institution

National Institute for Research and Development of Isotopic and Molecular Technologies

Patent

Patent application No. A/00322/19.06.2020

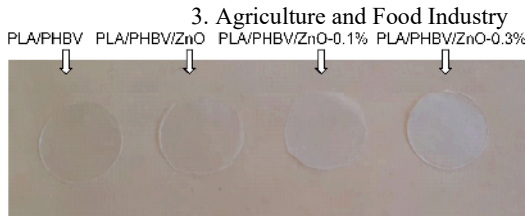
Description EN

The invention refers to nanostructures based on Fe-doped ZnO nanoparticles embedded in polyhydroxybutyrate-co-valerianate (PHBV) and to their obtaining procedure. The obtained nanostructures are uniformly deposited by

NATIONAL

electrospinning on PLA film designed for antimicrobial food packaging. According to the invention, the nanostructure composition consists in 8% solution of PHBV (in mass percentages) dissolved in a mixture of dichloromethane and ethanol as solvents, in volume ratio of 6:1, by stirring at 60 °C, 400 rpm for 30 minutes and 0...1% (in mass percentages) of Fe doped zinc oxide (ZnO:Fex%) ($x=0 \dots 0.3\%$) used as antimicrobial agent. The PLA film coating process consists in the electrospinning of the components mixture. The parameters used in electrospinning procedure are: flow rate of 0.4 - 3.6 mL / h, voltage in the range of +16.63 - 16.77 kV and the distance between the needle to the collector of 14 cm.

Class



RO.227.

Title EN

Automated cold plasma treatment line for the quick activation of leathers and fabric surfaces

Authors

Tudoran Cristian, Marcela Corina Roșu, Maria Coroș

Institution

National Institute for Research and Development of Isotopic and Molecular Technologies, (INCDTIM) Cluj-Napoca

Patent

RO201800648A, 2018-09-05

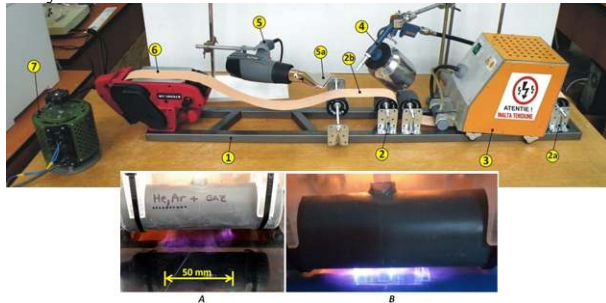
Description EN

The presented cold plasma treatment line was built by the authors with the goal to have in our laboratory an automated treatment system which can plasma treat narrow rolls of leather or textile materials, in order to obtain special properties on their surfaces: hydrophobic and/or hydrophilic surfaces, and also anti-fouling/self cleaning surfaces. This device enables us to obtain the aforementioned properties at laboratory scale, and the results can easily be up-scaled at industrial level. This treatment line is based on a new type of cold plasma applicator head with its power supply, which was developed by us previously during the PN-III-P1-1.2-PCCDI-2017-0743/44PCCDI/2018, PHYSforTel project. The entire treatment line resembles a full size industrial line and it contains the following components: a roll which

contains the material to be treated (leather / textile) (2b), a drive mechanism (2,2a,6,7) which moves the material through a dyeing stage or a spraying stage (4) (which deposits nanomaterials), the cold plasma treatment stage (3), which activates the material/leather surfaces right before the dyeing/painting process and a quick drying system (5,5a) which dries the material with hot air after its staining stage. All these components are held in place by a metallic frame (1). In the lower part of the picture, marked with (A) and (B) we present the aspect of the generated open-air plasma working in helium (A) and in argon (B). The plasma has a temperature of 36...40 °C for an input power of 50W and a gas flow rate of 5l/min.

Applications: textile and leather manufacturing research laboratories, surface engineering laboratories

Class 5-Industrial and laboratory equipments, 9-Chemical and Textile Industry



RO.228.

Title EN

Preparation technique of partially stabilized zirconia ceramics by the oxides addition

Authors

Simona RADA^{1, 2}, Mioara Zagrai¹, Marius Rada¹, Eugen Culea², Marius Manole, Radu Hendea

Institution

¹National Institute of for Research and Development of Isotopic and Molecular Technologies / ²Technical University of Cluj-Napoca, Romania

Patent

RO 132713 A0, Patent application No. A00160/07.03.2018

Description EN

The novel of invention relates to a preparation technique of new ceramic materials based on partially stabilized zirconia with other oxides after sintering at room temperature. This

technique combines the sintering method used in ceramics with the melt quenching method used in glasses and implies a high temperature solid state reaction process. The preparation scheme of the zirconia-ceramic materials is illustrated in Figure 1. By using oxides and carbonates as starting materials in the presented procedure, high purity ceramic products will be obtained – a requirement solicited by the medical field. The analysis of X-ray diffractions data (see Figure 2) shows that the invented ceramics noted with PI1 and PI2 have two main phases, namely cubic zirconia (c-ZrO₂) and tetragonal zirconia (t-ZrO₂) phases. The formation of tetragonal or/and cubic zirconia crystalline phases is highly desirable in technological and medical applications while the monoclinic zirconia (m-ZrO₂) phase has limited applications due to the volume expansion which yields micro-cracking and the mechanical instability in the ceramic. These high temperature zirconia crystalline phases were also detected in the commercial brands (BC1, BC2 and BC3) used for the dental applications. This preparation technique based on the use of other oxides (no expensive) for the stabilization of zirconia ceramics will allow: i) the obtaining of new optimized material having a low cost and higher purity; ii) the changes of color by adding of Fe₂O₃ content ; iii) the using of these products in the dental, medical and technologic field.

Applications: dental ceramics

Class

4

RO.229.

Title EN

Preparation, optimization and application technique of recycled materials provided from electrodes of the spent car batteries

Authors

Simona RADA^{1, 2}, Mioara ZAGRAI¹, Marius RADA¹, Eugen CULEA², Adrian BOT¹

Institution

¹National Institute of for Research and Development of Isotopic and Molecular Technologies / ²Technical University of Cluj-Napoca, Romania

Patent

RO 132873 A0, Patent application No. A00282/20.04.2018

Description
EN

The invention relates to a preparation and optimization technique of new materials obtained from the recycled electrodes from spent car batteries and doping with CuO powder. The recycled and copper-doped materials obtained by the melt quenching method (see Figure 1) were

investigated by X-ray diffraction analysis and measurements of Cyclic Voltammetry. The diffractograms shown in Figure 2 consist of diffraction peaks corresponding to the metallic lead phase with cubic structure, as main phase and some peaks corresponding to the PbO_2 and PbO crystalline phases. A simple inspection of cyclic voltammograms (see Figure 3) indicates that the oxidation and reduction processes depend on the composition of the material. The doping with 20 mol% CuO can improve the reversibility of the cyclic voltammetry, to reduce the amount of hydrogen evolution and to remove of passivation phenomena of the anodic electrode by increasing of residual current density in the potential range of 0 and 1V. Therefore, the metallic plates optimized with 20 mol% CuO have a great potential for development as electrode materials in car batteries applications. The invention proposes the efficient optimization of recycled lead from plates of a spent car battery by the incorporation of copper oxide using the melt quenching method and has the following advantages: i) the recycling of active mass of the spent electrodes by an eco-innovative, low cost and low energy consumption method; ii) the recovering of recycled materials in the environment from which they came from – like new electrodes for renewable batteries.

Applications: electrodes for batteries; grill of the car battery

Class

2

**National Institute for Research and Development in
Electrochemistry and Condensed Matter, (INCEMC)
Timisoara**

RO.230.**Title EN**

Electrohydrodynamic propeller for in-atmosphere propulsion; rotational device first flight

Authors

Marius Chirita, Adrian Ieta

Institution

INCEMC Timisoara, Romania

Patent

-

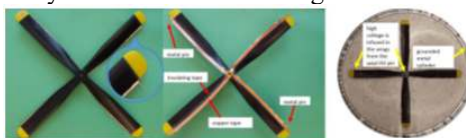
**Description
EN**

A rotary ionic engine with possible applications to in-atmosphere propulsion was produced. We designed EHD propeller-counter-electrode systems in which the propeller spins and flies. The EHD propellers are the first rotational ionic devices to fly. For a 12.6 cm diameter 2-blade propeller with a total mass of 8.29 g we obtained a thrust/power ratio of 11.16 N/kW and thrust/density ratio of 5.68 N/m² at a voltage of 27 kV at atmospheric pressure. The values are very competitive to the ones reported for the first ionic plane which had a sustained flight at about 5 N/kW and a designed/desired thrust density of 3 N/m².

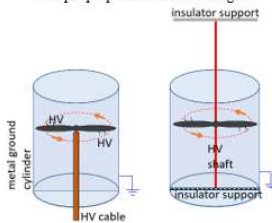
We have tested the propellers in different gases such as CO₂ and SF₆, and found out they perform much better than in air, with SF₆ being the best candidate. In CO₂ we obtained 15.95 N/kW and 1.75 N/m² at 21 kV, whereas in SF₆ we obtained 33.98 N/kW and 1.75 N/m² at 25.5 kV. Supplementary technical data and relevant videos can be found at:

<https://doi.org/10.1016/j.elstat.2019.05.004>

<https://www.youtube.com/watch?v=0g8z7wWIoJs>



Sample propeller electrode design



Left: propeller can rotate on the HV shaft. Right: propeller can fly along the HV shaft.

NATIONAL

**National Institute for Research and Development in
Constructions, Urbanism and Sustainable Spatial
Development URBAN-INCERC, Bucharest, Romania**

RO.231.

Title EN	Process for Producing White Portland Cement-Based Cementitious Tiling Materials, with Self-Cleaning Capacity
Authors	Andreea Hegyi, Elvira Grebenișan, Adrian-Victor Lăzărescu, Henriette Szilagyi, Vasile Meîță, Mihaela Sandu, Cornelia Baeră
Institution	NIRD URBAN INCERC
Patent	Patent application No. A00117/17.03.2021 The invention relates to a process for obtaining a composite material, based on white Portland cement, natural river aggregates, additives and TiO ₂ nanoparticles, with self-cleaning capacity and, respectively, finished elements, in the form of plates, intended for use in the production of finishes in the form of coatings by plating the surface of the outer or inner walls of buildings or other inclined or vertical elements thereof. The innovativeness of this invention consists in exploiting the local potential through the development of new compositions of cementitious materials and prefabricated elements that, by design, have self-cleaning capacity, under the effect of solar light radiation or artificial UV radiation and allow the preservation of the aesthetic appearance of buildings for a long time, reduce the degree of their degradation due to corrosion by, together with the ability to contribute to the reduction of air pollution by reducing the concentration of oxides of type NO _x , SO _x and water and soil pollution by substantially reducing the need for the use of substances intended for cleaning, maintenance and maintenance of construction surfaces. Claim 1: Process of making cement composites based on white Portland cement, respectively cladding elements, with self-cleaning capacity. Claim 2: Self-cleaning mortar based on white Portland cement. Claim 3: Micro-concrete with self-cleaning capacity, based on white Portland cement. Claim 4: Micro-concrete cladding element based on white Portland cement, with self-cleaning ability.
Description EN	

RO.232.

Title EN	Sustainable Development of Local Communities in Romania, Through the Enhancement/Preservation of Historic Buildings
Authors	Anamaria BOCA, Tudor Panfil TOADER, Ioana Camelia TIȘE, Lidia Maria LUPAN
Institution	Faculty of Civil Engineering, Technical University of Cluj-Napoca NIRD URBAN-INCERC Cluj-Napoca Branch
Description EN	<p>Local communities within the reach of historical monuments can develop economically and culturally by their integrating and promotion in the tourist and cultural circuit. In Romania can be found numerous buildings with historical value, which are in various stages of degradation, or even abandoned. These monuments are at risk of losing their original value if interventions of rehabilitation and consolidation are not carried out. In order to identify the structures with historical value and propose an optimal solution for their rehabilitation, it is necessary to understand the initial conception, the technical details, the traditional materials used. This stage requires the collaboration of specialists in the field of architecture, engineering, topography, archeology or restoration.</p> <p>Preliminary research on the structural problems of historical monuments will be carried out in order to define the appropriate intervention techniques in accordance with the principles of conservation and restoration through the combined use of traditional materials and techniques with modern and innovative ones. Those communities where the historical monuments have been conserved and integrated in the tourist circuit, have attracted an increasing number of tourists and the economic activity have increased.</p> <p>These rehabilitated monuments should be promoted and included on a tourist route taking the example of TRANSROMANICA - The Romanesque route of European heritage. This will lead to the sustainable development of the communities they are part of, from both economically and cultural points of view. The economic growth will lead to increased jobs, development of infrastructure in the respective areas and possible investments.</p>

RO.233.**Title EN****Masonry Elements Based on Unburned Clay With the Addition of Industrial Waste****Authors**

Gabriela Călătan, Tudor Panfil Toader, Lidia Maria Lupan, Carmen Florean

Institution**NIRD URBAN-INCERC Cluj-Napoca Branch
Faculty of Civil Engineering, Technical University of Cluj-Napoca****Description
EN**

In this paper we studied the possibility and efficiency of industrial waste additions in the composition of clay mixtures suitable for making unburned clay bricks. For this purpose, the following wastes were used: ash from the Mintia thermal power plant, limestone sludge, gypsum sludge and dumped waste from the processing of imported ore, and a control sample of clay without additives.

The compositions of clay with ash and limestone sludge were made with the following proportions: 60% clay, 20% ash and 20% limestone sludge; 50% clay, 25% ash and 25% limestone sludge and 40% clay, 30% ash and 30% limestone sludge.

The clay compositions with piled waste and gypsum sludge were made in the following proportions: clay 70%, dumped waste 15%, and gypsum sludge 15%; clay 60%, dumped waste 20%, and gypsum sludge 20%; and 50% clay, 25% dumped waste, and 25% gypsum sludge.

No mixture has cracks when dried. All the values of densities of the specimens reached the equilibrium humidity, are included in the interval 1600 - 2000 kg/m³. The mechanical strengths are higher than the control sample. The composition with the addition of 25% ash and also 25% limestone sludge, has the highest mechanical strength of all mixtures; 8.2 N/mm² at 40 days from manufacture and 8.9 N/mm² at 1 year. The results confirm that industrial waste can be used as an additive in the clay matrix for making unburned clay bricks, resulting an environmentally friendly and healthy material.

RO.234.

Title EN

Influence of TiO₂ Nanoparticles on the Mold Resistance of Cementitious Composite Materials

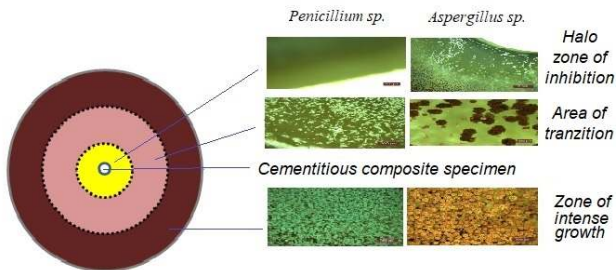
Authors

Elvira Grebenișan, Adrian-Victor Lăzărescu, Andreea Hegyi, Henriette Szilagyi, Vlad Stoian, Carmen Florean

Institution

**NIRD URBAN INCERC, Cluj- Napoca Branch
USAMV Cluj-Napoca**Description
EN

Mold contamination is one of the causes of building degradation, *Penicillium sp.*, *Aspergillus sp.* being one of the most common species that attacks these surfaces. The addition of TiO₂ nanoparticles in the cementitious composite matrix can induce its increased resistance to the development of the mold bio-film. Under natural or UV conditions, the resistance capacity of cementitious composites to the development of contaminant film development is observed by forming an inhibition halo with a diameter that varies according to the type of mold and the percentage content of nanoparticles in the mixture, identifying three zones of contamination: the inhibition zone, the intermediate zone and the zone with intense growth. Cementitious composites with 2% nano-TiO₂ addition show the best resistance to the action of *Penicillium sp.*, and samples with 3.6 - 5% nano-TiO₂ have a satisfactory behavior in both types of mold. The use of more than 5% TiO₂ nanoparticles in relation to the amount of cement is neither cost-effective nor economically motivated. The advantage of these types of cementitious composites with the addition of nano-TiO₂ is the possibility of creating surfaces that, in addition to the special aesthetic appearance, have the ability to reduce the risk of the development of mold bio-films and, implicitly, reduce maintenance and sanitation costs.



RO.235.

- Title EN** **Influence of Na₂SiO₃/NaOH Ratio on the Compressive Strength of Geopolymer Paste**
- Authors** Brăduț Alexandru Ionescu, Adrian-Victor Lăzărescu, Mihail Chira, Carmen Florean
- Institution** **NIRD URBAN-INCERC Cluj-Napoca Branch**
Faculty of Civil Engineering, Technical University of Cluj-Napoca
- Description EN** This paper presents the results of research on bulk densities and compressive strengths at the age of 7 days of fly ash-based geopolymer pastes produced using as alkaline activator solution Na₂SiO₃ and NaOH (10M). The geopolymer pastes were subjected to a heat treatment of 70°C and a duration of 24 hours. The ratio between Na₂SiO₃/NaOH studied for the 4 geopolymer pastes was 1;1,5; 2; 2,5.
Experimental results indicated an increase in apparent density at 7 days of age with increasing Na₂SiO₃/NaOH ratio:
-the density of geopolymer pastes increased with the increase of the ratio Na₂SiO₃/NaOH. For the four geopolymer pastes with the ratio na Na₂SiO₃/NaOH=1;1,5;2;2,5, it was between 1350 kg/m³ and 1380 kg/m³.
- increase in compressive strength with increasing Na₂SiO₃ / NaOH ratio, from 1 to 2,5. Thus, the obtained compressive strength was 26,29 N/mm² for a Na₂SiO₃/NaOH ratio = 1; 29.85 N/mm² for the ratio of 1,5; 32.51 N/mm² for the ratio of 2; respectively 34,54 N/mm² for the ratio of 2,5.
- the compressive strength of the sample with a ratio = 1 decreased by 23.9% compared to that of the geopolymer paste with a ratio = 2,5.
The aim of this study was to study the parameters that influence the mechanical strength of the alkali-activated geopolymer paste and to compare the results already obtained in the literature.

RO.236.

- Title EN** **Improving the Thermal Comfort in an Attic Using the Appropriate Thermal Insulation.**
- Authors** Tudor Andrei SĂLĂJANU, Tudor Panfil TOADER, Lidia Maria LUPAN, Anamaria BOCA
- Institution** **Faculty of Materials and Environmental Engineering,**
Faculty of Architecture and Urban Planning,

**Technical University of Cluj-Napoca
NIRD URBAN-INCERC Cluj-Napoca Branch**

Due to climate change, the summer months are getting hotter and hotter and this trend is getting worse. When designing or renovating buildings, we should pay special attention of the protection against summer overheating. In summer, excess heat is stored in thermal insulation materials.

So, the choice of these materials should be made in such a way as to take into account their contribution to an ambient and comfortable temperature in the building and to avoid the use of air conditioning devices that would generate additional energy consumption and emissions.

The study aimed to eliminate thermal discomfort during summer nights due to temperature fluctuations.

For the first case studied, thermal insulation with 15 cm mineral wool, the thermal phase shift was 6.8 h, at 22 o'clock in the evening, when the outside temperature was quite high.

To improve thermal comfort of the room, the mineral wool was replaced with 15 cm of wood fiber insulation boards. The thermal phase shift increased at 11.8 h, and the highest temperature was felt at 3 o'clock in the morning, when the outside temperature was low.

The replacement of mineral wool having a storage capacity of 1300 J / kg K, with wood fiber insulation boards having a storage capacity of 2100 J / kg K, considerably attenuated the heat flow from the outside to the inside of the building.

Thus, investing in compatible and sustainable materials means fewer replacements over time, less carbon emissions, less waste generated and lower life cycle costs.

Description
EN

RO.237.

Title EN **The Influence of Fly Ash on the Workability of Concrete with Self-Healing Properties**

Authors Tudor Panfil Toader, Carmen Dico, Carmen Florean
NIRD URBAN-INCERC Cluj-Napoca Branch

Institution **Faculty of Civil Engineering, Technical University of Cluj-Napoca**

Description
EN For the design and realization of the concrete mixtures with self-healing properties, one of the component materials that influences the self-healing capacity is the thermalpower plant ash from Mintia, Hunedoara. The influence of fly ash on the workability of concrete with self-healing properties was

analyzed by evaluating the amount of water required for the standard consistency and setting time of Portland CEM I 42.5 R cement paste, in case of its substitution (0%, 22.4%, 32.4%, 42.4% and 52.4%) with fly plant ash from Mintia.

The experimental results indicated that:

- increasing the need for water to obtain normal consistency paste, from 140 g (control paste with 0% ash from the thermalpower plant) to 150 g (paste with 52.4% ash from the thermalpower plant), as the cement amount replaced with fly ash has increased.

- increase of the initial setting time from 94 minutes to 200 minutes, as the amount of cement substituted by fly ash increased.

- the increase of final setting time from 110 minutes to 235 minutes, as the amount of cement replaced by fly ash increased.

The experimental results indicate the benefits of substituting a quantity of cement with thermalpower plant ash to increase the workability of the paste.

RO.238.

Title EN	The Autogenous Self-Healing Capacity of Cementitious Composite Materials Produced Using Local Origin Materials
Authors	Tudor Panfil Toader, Carmen Dico, Carmen Florean
Institution	NIRD URBAN-INCERC Cluj-Napoca Branch Faculty of Civil Engineering, Technical University of Cluj-Napoca
Description EN	The self-healing capacity determination of the cementitious composite, with average compressive strength $R_c = 54.3$ [N/mm ²], produced using local raw materials: Cement CEM I 42.5 R, Alesd, Bihor, Mintia fly ash, Hunedoara, natural river aggregates, 0-4 mm, Limestone slurry from Cluj-Napoca, superplasticizer additive Master Glenium 51, BASF, water, PVA fibers 8 mm, integral waterproofing additive by crystallization MasterLife WP 1000, BASF, was evaluated on prismatic specimens, at the age of 28 days Bending tensile strength tests indicated an average force of $P = 7046$ [N] and $R_{ti} = 16.5$ [N/mm ²], respectively. The cracking force required to induce the controlled cracking was 85% of the average breaking force at bending through tensile, respectively, $P = 6000$ [N]. Microscopic analysis of cracked

and conditioned specimens for 24 hours, 96 hours and 168 hours by exposure to wet-dry cycles (8 hours dry - 16 hours immersion in water) indicated the self-healing ability. The micro-cracks with an opening of 14-17 μm were closed in proportion of 99% after 24 h, those with an opening of 18-34 μm were closed after 96h, in a proportion of 98% and those between 35-60 μm were closed in a proportion of 95%, after 168 h.

RO.239.

Title EN	Bio-eco-innovative Thermal Insulation Products Obtained by Recycling and Reusing Post-Industrial Textile Waste, Natural Vegetable Fibers and Sheep Wool
Authors	Andreea Hegyi, Cezar Bulacu, Henriette Szilagyi, Adrian - Victor Lăzărescu, Vasile Meişă, Mihaela Sandu, Carmen Florean
Institution	NIRD URBAN INCERC MINET SA
Description EN	<p>The project proposes to achieve, up to the level of technological maturity of validation under laboratory conditions, new thermo-insulating products, eco-innovative, non-woven mattresses, based on recycled fibres from post-industrial textile waste, plant fibres and sheep wool.</p> <p>The aim of the project is to integrate and fully capitalize the postindustrial textile waste, natural plant fibers and sheep wool, in the framework of thermal-insulation products, as an ecological alternative to the classical thermal insulation products, usable in the construction field, with beneficial effects on population health, environmental protection and also to create new materials with high added value.</p> <p>This type of products contribute to the achievement of all previously stated objectives as follows:</p> <ul style="list-style-type: none"> - it contributes to the reduction of energy consumption by increasing the energy efficiency of existing and future buildings; - through the re-introduction into the circuit of production, recovery, mining, textile, industrial, energy, waste stored at the time of manufacturing the product became a waste; - use of sources of renewable raw material (natural fibres, plant and animal), had not been sufficiently exploited

up to the present;

- it contributes to the protection of the environment through the removal of large quantities of material, or deposited on land or disposed of through incineration (waste textiles, sheep wool);

offers substantial advantages over the air quality inside the rooms, as a result of water vapor permeability, desorption capacity of atmospheric moisture sorption and the ability of sheep's wool to reduce formaldehyde.

Acknowledgments

This work was supported by a grant of the Romanian Ministry of Education and Research, CCDI – UEFISCDI, project number PN-III-P2-2.1-PED-2019-0463, within PNCDI III.

RO.240.	
Title EN	THE ASSESSMENT OF NON-HAZARDOUS INDUSTRIAL BY-PRODUCTS AS SUSTAINABLE MATERIALS IN ENGINEERING APPLICATIONS
Authors	Dobrescu Cornelia-Florentina
Institution	NIRD "URBAN-INCERC"
Description EN	<p>The topic of the present study fit into the current international-spread approach focused on efficient solutions of sustainable development for ensuring the application long-term and integrated waste management in line with the principles of environmental protection and the concept of the circular economy. The laboratory tests have allowed both the quantification of the feasibility of industrial waste reuse as geo-materials in fulfilling adequate technical requirements, as well as the identification of benefits in geotechnical applications. The application of efficient and facile techniques for reusing industrial waste in the sustainable construction works are considered key tools in achieving the targets proposed by the national strategy for sustainable development and implicitly the global objectives of 2030 Agenda.</p>

RO.241.**Title EN**

Contributions regarding the development of LCA type cost analyzes in the construction materials sector

Authors

Silviu LAMBRACHE

Institution

NIRD "URBAN-INCERC"

Description**EN**

Regarding the resources used in construction and in particular the materials used, a new approach to assessing the cost of a construction material is currently being studied, namely by conducting an analysis of taking into account not only the initial costs of design / research, production (what lead to the formation of the acquisition cost) and implementation of the material. The new concept also analyzes the future costs that occur during its lifetime, respectively its operation and maintenance.

Cost analyzes related to construction materials must be performed in the initial stages of product development, so that certain changes can be made that can lead to an optimal cost. A complete life-cycle cost analysis for a construction material takes into account the lifetime costs for the material used, namely manufacturing, installation, use, maintenance and replacement costs due to physical wear and tear. Before calculating the lifetime cost / use of the material, future lifetime costs for specific time and annual periods must be converted to a certain set time period (present value) so that comparability and aggregation of costs can be achieved.

In order to make construction investment projects more efficient, great importance must be given to optimizing the costs related to the resources used in construction and especially the cost of construction materials (costs for repairs and replacements) due to their high share in the total cost, that contribute to a large extent of the formation for life-cycle cost, mainly due to the long duration of their use.

RO.242.**Title EN**

Innovative thermo-insulating and decorative coatings with sunflower seed husks

Authors

Irina Popa, Cristian Petcu, Alexandrina Mureșanu

Institution

NIRD "URBAN-INCERC", INCERC Bucharest Branch

Description**EN**

The work presents aspects of an experimental research in which basic recipes have been designed in order to obtain innovative products intended to be used in construction as

finishes, products containing sunflower seed husks, a vegetal waste resulting from the industry of edible sunflower oil.

The novelty consists both of the original nature of the resulting innovative material and especially of the type and characteristics of the finishing obtained when the material is applied in a multi-layered system. Three recipes were made in the research project, each of them having a continuous component (two acrylic film products and one silicon-acrylo-styrenic copolymers film product) and a discontinuous component (sunflower seed husks waste in three sorts, having maximum dimensions of 4 mm, 6 mm and 8 mm respectively).

Each of the three products has been applied to plasterboard surfaces in three- or four-layered systems. Due to the specific properties of the vegetal waste used, the resulting multi-layered coatings, having an approximate total thickness of only 3,15 – 6,25 mm, are defined mainly by their thermal insulating properties, thermal conductivity ranging from 0,172 W/m.K to 0,104 W/m.K, but also by an original decorative appearance.

Advantages: obtaining innovative thermal insulating and also decorating coatings, efficient production, acquisition and putting into operation costs for this innovative product and for the double-function coating respectively, and a new method for integrating this kind of industrial vegetal waste in construction, generating products with high added-value.

RO.243.
Title EN

Acoustic insulation for glass door and windows, influence depending on the different degrees of their opening

Authors

Marta Cristina ZAHARIA, Ioana Mihaela ALEXE, Ciprian ENE

Institution

NIRD URBAN-INCERC

In Romania, there were made researches about the acoustic insulation, considering different degrees of opening positions, for a type of glass door and for some windows and there were conducted during 2020 in project PN 19 33.03.01 concluded with MEC.

Description EN

Usually civil buildings have the facade walls made of opaque construction elements and glazed building elements. The studies performed about the fact that when there are façade walls with doors and windows on it, the acoustic insulation

made by them depends very much of the materials from which they are manufactured, on the type of configuration of glasses and frames and the dimensional characteristics, as well as the degree of sealing on the contour, respectively the degree of opening of them when there are open. Studies were made with acoustics laboratory experiments.

Here are presented comparative studies, between the results of the acoustic insulation of windows and the glass door, the airborne sound insulation index, R_w , that decreases from max.36 dB (for closed door) and max 32 dB (for the most sealed and closed windows) to min.9 dB (for the most bigger degree of opening that was tested), depending on the type of door or window configuration. Also the acoustical results show that for all analyzed windows and door, the resonance areas, in the graphs of R indices, occur when the wavelength dimensions of the resonant frequencies are in accordance with the size of the air space of the opening and the spacing between the glass sheets of the window and of the door.

RO.244.

Title EN	Digitalization of structural health and seismic monitoring of strategic buildings
Authors	Claudiu-Sorin DRAGOMIR, Iolanda-Gabriela CRAIFALEANU, Vasile MEIȚĂ, Daniela DOBRE, Emil-Sever GEORGESCU, Mihaela SANDU, Adelin CIȘMELARU
Institution	NIRD URBAN-INCERC New information on what is happening within a building, by incorporating high-density seismic instrumentation, can be used to make manual and automated real-time decisions . Within the National Network for the Seismic Monitoring and Protection of Building Stock from INCD URBAN-INCERC , the recent research studies are being conducted in the field of digitalization of structural health and seismic monitoring of buildings having as object real buildings, seismically instrumented with modern equipment. Research conducted in INCD URBAN-INCERC converges towards the development of a large monitoring system capable, in the future, to allow remote identification, in a very short time after a seismic event, of possible dangerous changes in the condition of the instrumented/monitored
Description EN	

building. The completion of the registered and processed data, from the sites where seismic sensors were installed, specific to different soil conditions and soil-structure interaction and of compared to the values of the accelerations from the seismic zoning map.

Digitalization of structural health and seismic monitoring of buildings are active research approaches from which the dynamic characteristics are obtained in structural identification and a damage detection could be possible using a specialized software. All financial investments in this field will lead to a dense network from which useful information related to the behavior of structural systems will make possible **the adoption of measures to increase urban resilience.**

In the future stages, **INCD URBAN-INCERC**, through its specialists, will continue with **digitalization of structural health and seismic monitoring of buildings for the entire network of national research institutes in Romania.**

RO.245.
Title EN

Assessment methods for resilient construction to extreme weather conditions and dynamic actions

Authors

Florina FILIP, Adrian CIOBANU, Monica CHERECHEȘ, Aurelia BRADU, Ionel PUSCASU, Marius MĂRȚ

Institution

NIRD “URBAN-INCERC” Iasi Branch

For a sustainable global future we must prepare with new test methods related to system-system interactions that can spread rapidly in the value chain, in the construction sector (structural and functional safety, medical units, emergency systems, support infrastructures for energy sources and security of energy supply, etc).

Description EN

The increasing frequency and severity of climate change disrupts systems in which extreme weather events like ice, temperature conditions, extensive droughts, earthquakes and others are emerging and systemic risks.

The implementation of a program for testing the effect of environmental and dynamic actions on buildings, has the role of learning from systems behavior triggered by extreme weather events, which can be used in the analysis of the response of structures.

Such an analysis framework with a direct impact on the

performance of existing and new constructions, as well for the related installations, represents an area in which INCD URBAN-INCERC has special competencies and attributions.

Application /Features:

Adapting the built space through experimental testing in the field of environmental and dynamic-seismic actions (vibrations and shock) on buildings, equipment and industrial installations.

Correction/completion, as appropriate, of specific national standards, regulations in construction required by the economic environment and in particular of factors generating innovative products in high-tech fields such as nuclear energy, aeronautics, constructions of special importance, in order to meet the demands generated by the forecasted climatic conditions.

Activities for designing specific or complex technical solutions with the role of contributing to reducing the vulnerability of constructions and the associated risks.

RO.246.

Title EN

Influence of the Self Compacting Concrete mix design on the mechanical properties

Authors

Aurelia Bradu, Adrian Ciobanu, Monica Cherecheș, Florina Filip, Marius Mârț

Institution

NIRD „URBAN - INCERC”, Iasi Branch

**Description
EN**

Self compacting concrete (SCC) is a relatively new material, with high fluidity and ability to spread into place under its own weight. Contrasted with mix design of traditional concrete, which has a well-developed sizing method, the establishment of the self-compacting concrete recipe is guided only by the international recommendations. SCC constituents are similar to conventionally vibrated concrete, but the dosage differs significantly. Its composition allows a few combinations in terms of component materials and dosages used. This situation increases the degree of difficulty to design recipes due to the large number of variables which should be taken into account.

In order to evaluate the influence of mix design on the mechanical characteristics of SCC were studied 3 different classes made by same constituent material and designed in 2 different ways.

RO.247.	
Title EN	Cities under COVID-19: revisiting the compaction versus sprawl dilemma
Authors	Vasile MEIȚĂ, Alexandru-Ionuț PETRIȘOR, Cristian-Mihai ȘURGHIE, Mihaela SANDU, Alexandra-Marina BARBU, Andreea Cătălina POPA
Institution	NIRD URBAN-INCERC, Bucharest, Romania The dilemma of compact versus sprawled city was at the core of the debates concerning urban sustainability, considering the socioeconomic and environmental impacts of both models of urban development. The recent ongoing pandemics crisis due to COVID-19 has challenged the urban development models through the need for social distancing, but also new requirements in terms of the public space and green infrastructure, as well as rethinking the transportation and economic activities. All together they seem to lean the balance towards sprawl. This work examines, from an urban planning perspective, the new challenges in the context of the existing debate.
Description EN	
RO.248.	
Title EN	Integration into the European tourist circuit of Romanian rural cultural values
Authors	Vasile MEIȚĂ, Alexandru-Ionuț PETRIȘOR, Cristian-Mihai ȘURGHIE, Mihaela SANDU, Alexandra-Marina BARBU, Andreea Cătălina POPA
Institution	National Institute for Research and Development in Constructions, Urbanism and Sustainable Spatial Development URBAN-INCERC, Bucharest, Romania In the cultural landscape of Gorj County is noted The <i>Cioabă-Chințescu</i> , built around 1820. It can be said that this construction contributes to the provision of a special cultural identity. By making special types of interventions that match the architectural value and local importance of this construction, The <i>Cioabă-Chințescu</i> cule contribute to the restoration of the traditional local landscape.
Description EN	For the touristic exploitation of the fortification, it is proposed to create a green space that integrates the fortification. The concept of landscaping derived from a local traditional popular motif, which has been transposed into a fitting, combining natural elements, minerals and plants.

The cule is the central element of the landscape, from which a route starts, during which visitors can consult the information panels or admire the building from the observation points. The panels include information about both the history of the belt and the local history.

The cule is highlighted during the four seasons, due to the elements of vegetation, which change their chromatic according to the season. Vegetation includes local species such as oak, sessile, ash, but also grass species and ornamental plants.

RO.249.

Title EN

CEMENT-BASED MATRIX MATERIALS WITH SELF-REPAIRING PROPERTIES GENERATED BY DISPERSE, POLYMERIC COATED REACTIVE GRAINS

Authors

Constantin-Dorinel VOINIȚCHI, Flavius-Valeriu CLADOVEANU, Miron ZĂPCIU, Adriana NICOLAE, Nicoleta-Adaciza IONESCU, Cătălin DIMA, Vasile MEIȚĂ, Claudiu-Lucian MATEI, Henriette SZILÁGYI, Cornelia BAERĂ, Andreea-Cristina HEGYI, Mihaela SANDU, György DEÁK, Mihaela-Andreea MONCEA, Florina-Diana DUMITRU, Ana-Maria PANAIT

Institution Patent

INCERTRANS SA, NIRD URBAN-INCERC, INCDPM
Patent application No. A/00022 / 20.01.2020

Description EN

The invention refers to cement-based matrix materials with self-repairing properties, generated by the use of an intelligent addition consisting in disperse, polymeric coated reactive grains. The present research is focused on the possibility of efficient polymeric encapsulation of some specific types of reactive grains, the feasibility of the concept in terms of smart addition compatibility to the cementitious matrix and also the self-healing performance of the composite under induced, controlled damage.

Specific claims:

1. Identifying the reactive grains with suitable characteristics for optimum results: clicker grains.
2. Identifying the efficient coating technique: the encapsulation with the polymer film by immersing the reactive grains in polystyrene solution/melt.
3. The cement-based matrix material with self-repair

capacity: Cementitious composites containing the smart grains addition (polymeric coated reactive grains), with similar physical and mechanical characteristics with respect to the reference, addition free composite and also able to self-develop the crack sealing processes when damage is induced.

Acknowledgments: This research is supported by the Programme: Innovative solutions for transport infrastructure protection by the use of building materials with special self-maintenance and self-repair properties”, Programme code: 6 PS / 13.09.2019, financed by the Romanian Government.

RO.250.

3D reconstruction of a Romanian Historical Monument (Cula) using the UAV photogrammetry

Title EN

Authors

Antonio-Valentin TACHE, Oana-Cătălina POPESCU, Vasile MEIȚĂ, Gabriela VOLOACĂ

Institution

National Institute for Research and Development in Constructions, Urban Planning and Sustainable Development URBAN-INCERC București

Description EN

The poster is based on the research carried out within the project „3D reconstruction of the immovable cultural heritage using intelligent photogrammetry solutions based on UAV and 3D Scanner. Case study: Cula Șiacu, Slivilești commune, Gorj county” (2019-2022) within the NUCLEU Program. One of the project objectives is to present how the use of innovative systems and technologies – such as the UAV digital photogrammetry – can be used to create 3D models in order to document cultural heritage objects in Romania. The aim of this approach is to show how to integrate 3D digital representations in urban and spatial planning activities, contributing to the rehabilitation, preservation and capitalization of the cultural heritage.

GIS and BIM systems have been increasingly used for storing and managing cultural heritage information, allowing their use in further analysis. Features of historical buildings can be recorded by using remote sensing technology and image-based techniques (such as photogrammetry) represent important tools for documenting the cultural heritage.

The poster presents a 3-step photogrammetry method that we used to develop the 3D model of the Cula Șiacu construction. A UAV platform was used, together with GPS and special software. The data collected facilitate in-depth analysis and interpretations of this Romanian cultural asset, ensuring trans-disciplinary cooperation in the management and protection of heritage resources.

The method has multiple advantages. Restoring this historical building has positive consequences on tourism, with a major impact on the local economy, generating income for public authorities and also for local people.

RO.251.

Title EN **Blockchain technology and research and development**

Authors

Mircea-Iosif Rus, Adrian – Victor Lăzărescu, Larissa
Margareta Bătrâncea

Institution

NIRD URBAN-INCERC Cluj-Napoca Branch
Faculty of Business, Babes Bolyai University of Cluj-Napoca

Description EN

Blockchain technologies, which store blocks of information that are distributed across an entire network, are considered to be a major breakthrough in the field, as they ensure a high level of traceability and security of business transactions.

It is estimated that these technologies will have a significant impact on digital services and will transform business models in a wide range of areas, such as health, insurance, finance, energy and, last but not least, research and development.

Since 2013, the European Commission has been funding projects in the field of blockchain technology through the European Union's research programs FP7 and Horizon 2020. Thus, in FP7, through the ICT sub-program, the aim was to make progress in the field of science and technology, by supporting cooperation and access to information, for which the amount of 9.1 billion euros was allocated.

The Horizon 2020 program provided for the financing of lines of activity aimed at issues related to strategies related to the position of industrial and technological leader in the field of ICT, in particular

advanced electronic computing systems and technologies, which also included blockchain technology. The funded activities included specific research infrastructures, such as

laboratories for large-scale experimentation and infrastructures for key generic technologies and their integration into advanced products and innovative intelligent systems etc.

RO.252.
Title EN

IT model for evaluating the cost of intermodal transport to tourist resorts in Romania

Authors

Antonio-Valentin TACHE, Cristina IVANA, Oana-Cătălina POPESCU, SR I arch. Vasile MEIȚĂ,

Institution

National Institute for Research and Development in Constructions, Urban Planning and Sustainable Development URBAN-INCERC București

The poster is based on the research carried out within the project „*SMART platform for assessing the cost of multimodal transport to the tourist resorts in Romania (ROsmarTTravel), Contract no. 298PED*” (2020-2022) within the PNCDI 3 Program. One of the project objectives is to present a simulation of the accessibility indicator (an indicator that expresses the combined effect of the alternative modes of transport) to the Romanian tourist resorts. The aim of this approach is creating an excellent IT product, very useful for tourists for calculating the fastest combined route from any point of the national territory to a tourist resort of national interest.

Description EN

The result of the project is a software application in the OpenGIS system, which uses the ArcGIS software (Network Analyst, Spatial Analyst), ArcGIS Server and the Python programming language, the software design concept being modular with a menu-based graphical interface so that it is easily accessible to the uninitiated user.

The poster presents the methodology for processing data regarding the updating of the national road network and the updating of the database on the hourly chart of the means of transport (in particular, road and rail) to the stations of tourist interest.

This application is very useful for all passengers who use combined transport (railway - road network), because it benefits the right time for traveling from any point in Romania to any tourist resort of national or local interest.

RO.253.**Title EN****URBAN ACTIONS: A toolkit proposal for the regeneration of public spaces through urban acupuncture****Authors**

Teodora Ungureanu, Gabriela Voloacă, Andreea Popa, Vasile Meişă

InstitutionInstitutul Național de Cercetare – Dezvoltare în Construcții, Urbanism și Dezvoltare Teritorială Durabilă
Universitatea de Arhitectură și Urbanism “Ion Mincu”**Patent**

The research presents a proposal for fast urban interventions in congested cities. Inspired by the current COVID 19 pandemic crisis, the toolkit explores new ways of creating open public spaces through temporary and innovative interventions and how these actions can impact the city in the longer term.

The proposal for the toolkit is composed of 5 steps:
mapping potential places for future interventions: the toolkit should provide a guide for types of possible short-term intervention ;

**Description
EN**

identifying possible solutions: this phase should also include the identification of actors that can be involved in the implementation and use;

implementation and experiment: this phase consists of the implementation of the project and on-site adjusting, based on observations and on-site experience;

use and analysis: the analysis is an essential part of the project. This is required in order to proceed to the next step;

long term effects and solutions: based on the analysis, future actions are possible: permanent interventions, similar interventions in other urban spaces, changes in the local urban normative.

**Regional Institute of Gastroenterology and Hepatology
"Prof Dr. O Fodor" Cluj-Napoca**

RO.254.**Title EN**

Method for Obtaining Functionalized Nanostructures with Applicability in Phototherapy of Pancreatic Cancer

Authors

Mocan Lucian, Matea Cristian, Iancu Cornel, Mocan Teodora

Institution**Regional Institute of Gastroenterology and Hepatology****Patent**

Patent No. 131846/28.08.2020

Description EN

The invention relates to a process for preparing a product to be applied in targeted photo-thermal therapy of pancreatic cancer. According to the invention, the process consists in that, in the first stage, citrate-stabilized gold nanoparticles are obtained, they being functionalized by covalent binding with anti-JAG-1 antibody, after which the so-functionalized nanoparticles are subjected to successive stages of centrifugation and redispersion by ultra-sound in double distilled water, for removing secondary reaction products.

Class

4

RO.255.**Title EN**

Process for Obtaining Silver-Gold Bimetallic Nanoparticles Functionalized with Mannan for Targeted Therapy of Macrophages in Tuberculosis

Authors

Flaviu Tăbăran, Cristian Tudor Matea, Teodora Mocan, Lucian Mocan

Institution

Regional Institute of Gastroenterology and Hepatology "Prof Dr. O Fodor"
University of Agricultural Science and Veterinary Medicine Cluj-Napoca

Patent

Patent application No. A/10051/2020

Description EN

The invention relates to a process for obtaining a product with antimicrobial (antituberculous) applicability with increased accumulation in macrophages. The process, according to the invention, consists in the fact that, in the first stage, synthesized silver-gold bimetallic nanoparticles (AuAgNP) by modified Turkevich method are stabilized, initially with citrate, which is then replaced with diethyl polyethylene glycol, after which it is functionalized by covalent bonding with Mannan polyglucide. The nanoparticles thus functionalized are subjected to successive stages of centrifugation and redispersion by ultrasound in double-distilled water to eliminate secondary reaction products.

Class

4

Agricultural Research - Development Station Secuieni

RO.256.

Title EN

Cultivation technology and industrial potential for capitalization at the Romanian genotypes of monoecious hemp for seed, registered in the European Catalogue of Plant Varieties

Authors

Diana Popa, Alexandra Buburuz, Valentin Vlăduț, Elena Trotuș, Simona Isticioaia, Gheorghe Matei

Institution

ARDS Secuieni

Industrial hemp is considered to be the perfect crop for future circular bioeconomy, being able to be harvested and used for many different purposes: food, feed, cosmetics, construction materials, machinery parts, bio plastics, textiles and energy.

Whereas, at European level, the hemp seeds market (including the oil obtained from them and any other derived products) is growing, in the pedoclimatic conditions of the center of Moldova, research was conducted in order to obtain/establish the suitable monoecious hemp varieties. Why? To obtain a suitable seed for the European market requirements, hence to elaborate the related technological sequences that enhance the agroproductive capacity of the monoecious hemp varieties.

Description EN

In an industrial value chain of hemp, suitable varieties, adapted technologies for cultivation and harvesting, as well as a full plant capitalization (root, stems, fiber, leaves, flowers, seeds) would maximize economic efficiency at the level of all factors involved: producer, seed multiplier, cultivator (farmer) and processor.

The results obtained (varieties and appropriate technology) are quantifiable both in terms of the existence of a technological and capitalization supply to cover the market requirements, as well as by generating economic benefits for farmers and undeniable positive effects on the environment.



RO.257.

Title EN	Ecological cultivation technology for Certified 1 seed production at monoecious hemp varieties patented by ARDS Secuieni
Authors	Diana Popa, Alexandra Buburuz, Elena Trotuș, Valentin Vlăduț, Simona Isticioaia, Gabriel Teliban
Institution	ARDS Secuieni
Description EN	<p>Hemp has been considered a traditional source of nutritious food in Europe for centuries. While the seeds are particularly rich in high-quality protein and have a unique spectrum of essential fatty acids, the flowers and leaves are rich in cannabinoids, terpenes and polyphenols, the needed compounds for a healthy lifestyle.</p> <p>Considering that the food market based on vegetable consumption has an upward trend, with high potential in the future, hemp is the perfect source of sustainable protein, the crop being suitable and recommended for ecological farming. Hemp cultivation requires a low input and has positive effects on soils and biodiversity, its processing does not produce waste, because all parts of the plant can be used or processed and also has phytoremediation capabilities.</p> <p>The monoecious hemp varieties for seed created at ARDS Secuieni have a high agroproductive potential and a high suitability for different soil and climatic conditions around the globe, the seed demand thus exceeding the Romanian area.</p> <p>Given the mentioned considerations, research was carried out at ARDS Secuieni in order to establish some technological links in ecological cultivation system, which would allow the seed multiplication of these genotypes, with emphasis on the maximum capitalization of their agroproductive potential. The sequences are applicable in all areas suitable for ecological hemp cultivation, aiming to cover the internal and external seed request. Socio-economic and environmental effects include: expanding of ecological hemp areas, increasing of ecologically certified production, with the effect of maximizing economic efficiency, environmental protection and significant improvements of life quality.</p>
Class	3

RO.258.**Title EN***Lophanthus anisatus* – Importance and Technology**Authors**

Oana Mirzan

Institution

Agricultural Research and Development Station Secuieni, România

**Description
EN**

The plants of *Lophanthus anisatus* are extremely valuable from a beekeeping point of view, being listed by American specialists among the top four honey species in the world. And that's because it has all the advantages on its side: it blooms for a long time, does not require treatment and has a high capacity to secrete nectar and pollen. At the same time, a series of analyzes showed that *Lophanthus* honey has special medicinal properties and does not crystallize.

In addition to its important role in beekeeping, *Lophanthus anisatus* has many uses. It can be grown in parks and planters as a decorative plant, highlighted by its beautifully colored inflorescences in blue-purple, covering a long period of flowering. For culinary purposes, the plant is used as an ingredient in salads and various dishes, due to its specific aroma expressed by a mixture of anise and fennel. In medicine, this fruit of nature is endowed with many therapeutic properties: it strengthens the immune system, stimulates blood circulation, relieves stress and fights depression.

The advantages of *Lophanthus anisatus* species cultivation in organic farming is obtaining natural products that meet the requirements of consumers and protecting the environment by using ecological technology, while maintaining productive potential.



RO.259.

Title EN	Sweet Sorghum: An alternative for Romanian agriculture
Authors	Simona - Florina Isticioaia ¹ , Paula - Luclia Pintilie ¹ , Andreea Pintilie ¹ , Diana - Lorena Popa ¹ , Alexandra Leonte ¹ , Valentin Vlăduț ² , Iulian Voicea ² , Gheorghe Matei ³
Institution	¹ Agricultural Research and Development Station Secuieni, România ² National Institute of Research and Development for Machinery and Installations for Agriculture and Food Industry București, România ³ University of Craiova, România
Description EN	Sorghum is a species of major importance in human nutrition, providing food to the population of 30 African and Asian countries (more than 500 million people). Due to its high drought tolerance and its ability to withstand high temperatures and to efficiently exploit water in Africa, sorghum is the basis of food safety. A great advantage of sorghum is that it is a versatile species that can be cultivated under various pedoclimatic conditions. This advantage has increased the importance of species currently being seen globally as a solution to mitigate the negative effects of climate change. Worldwide, more than 50 % of the sorghum production is used for animal nutrition, but there is currently increasing interest in the use of sorghum in human food, especially as a source of gluten-free food and preparation of beverages. In the developing countries need to be developed and implemented to cope up with future changes in climate suitable technologies. Improvement of some crop management sequences of sorghum is a matter of great importance for our country, in order to obtain high yields to ensure the necessary food, feed, raw material in the production of bioethanol - considered a fuel of the future. In the conditions of the Center of Moldova (Romania), we have established some technological sequences on sorghum: the sowing epoch, the sowing density, the fertilization of the crop and the control of the weeds.
Class	3

Research and Development Station for Cattle Breeding Dancu Iasi

RO.260.
Title EN
REVIVE – Functional Kefir with Cocoa and Maca Powder
Authors

 NECULAI-VALEANU Andra-Sabina¹; MADESCU Bianca-Maria^{1,2}; ARITON Adina-Mirela¹, RIMBU Cristina-Mihaela²
Institution
¹Research and Development Station for Cattle Breeding Dancu Iasi, ²University of Applied Life Science “Ion Ionescu de la Brad”, Iasi, Romania

The invention relates to the dairy industry, in particular to the manufacture of fermented dairy products, namely to the process of obtaining functional kefir from cow milk, enriched with biologically active compounds from maca and cocoa powder. The process according to the invention involves the use of whole fat fresh cow's milk, homogenized, pasteurized, without preservatives or stabilizers, the addition of maca powder (0.1% 0.5%) and cocoa powder (0.5 2%), inoculation with kefir grains and fermentation until the coagulation forms, cooling and storage. Pasteurized milk, supplemented with probiotic microorganisms from kefir offers well-known benefits, but the association with the nutrients and active substances in Cocoa and Maca also gives it its qualities a prebiotic. The fermentative capacity of kefir is enhanced by the nutrients from the two plants, and the developing the microbial populations of kefir increases the microbiological benefit of the product. As customers seek more streamlined ways to support their active lifestyles, functional products with defined health benefits are becoming very popular. A solution for improving the nutraceutical benefits of kefir is the enrichment with components capable of conferring unique health benefits in addition to basic nutrition. Dysbiosis caused by the consumption of food additives or as a result of some anti-infectious treatments may be prevented or ameliorated using this “LIVE” product, natural and innovative, perfectly adapted for the human microbiome.

Description EN
Class

3

RO.261.

Title EN

BEET-BERRY VEGAN KEFIR – Plant-based Kefir Fortified with Beetroot and Blueberry powder

Authors

NECULAI-VALEANU Andra-Sabina¹; MADESCU Bianca-Maria^{1,2}; ARITON Adina-Mirela¹, RIMBU Cristina-Mihaela²;

Institution

¹Research and Development Station for Cattle Breeding Dancu Iasi, ² University of Applied Life Science “Ion Ionescu de la Brad”, Iasi, Romania

Description EN

The invention relates to the vegan products industry, in particular to the manufacture of fermented non-dairy products, namely to the process of obtaining a functional non-Dairy Kefir-Like product, enriched with biologically active compounds from beetroot and blueberry powder. The process according to the invention involves the use of millet milk, without preservatives or stabilizers, the addition of beetroot powder (0.1% 0.5%) and blueberry powder (0.5 1%), inoculation with a mix of lactobacilli cultures and probiotic cultures to start the fermentation process, fermentation until the coagulation forms, cooling and storage. Millet is a plant still cultivated intensively in Romania, which makes it available in large quantities for development of plant-based dairy alternative products in the vegan niche. A number of factors related to the individual (celiac disease, disease Crohn’s disease, intestinal dysbiosis) or products consumed by the population, have led to an overall increase in incidence of lactose intolerance, thereby reducing the consumption of milk and dairy products, even those which offers multiple benefits through their consumption (eg kefir). Of the non-dairy milks, millet milk is a healthy choice for those who have dairy, gluten, soy, or nut allergies or intolerances. Enriching plant-kefir with ingredients capable of conferring specific health benefits in addition to basic nutrients is an excellent way to improve the nutraceutical properties of this plant-based drink, especially for those consumers who suffer from allergies and intolerance. The global market of plant-based milk and subproducts, as well as the demand for functional foods are projected to grow steadily in upcoming years, driven also by the innovations in this field such as functional vegan milk subproducts.

Class

3

**Scientific Research Centre for CBRN Defense and Ecology
Bucharest (CCSACBRNE)**

RO.262.

Title EN

Mobile plasma system for decontamination of waters contaminated with highly toxic compounds

Authors

Nicoleta PETREA*, Răzvan PETRE*, Raluca GINGHINĂ*,
Sasha Alexandra YEHIĂ**, Sorin VIZIREANU**

Institution

***Scientific Research Centre for CBRN Defense and Ecology Bucharest (CCSACBRNE)**

****National Institute for Laser, Plasma and Radiation Physics Măgurele (INFLPR)**

**Description
EN**

Environmental pollution with organic compounds is a topical issue internationally. These compounds, used in agriculture and other different industries, affect the environment and create long term problems. These compounds pollute the soil and water, either through intentional use or accidental propagation.

Despite having available a wide variety of pollutant decontamination technologies, from physical (ultrafiltration, nanofiltration, reverse osmosis, sonolysis, electrooxidation, UV light irradiation) to chemical methods, such as advanced oxidative methods, there is continuous concern for developing new decontamination methods and technologies that are more efficient and economically advantageous.

Plasma decontamination is a relatively new decontamination method, with high efficiency on a wide range of chemical agents in a relatively short time, minimal toxicity and low aggressiveness towards the environment, and non-corrosive.

This paper presents the results of research conducted both in the laboratory and in situ, for the depollution of aqueous solutions contaminated with different concentrations (5, 10, 20 ppm) of highly toxic compounds: simulants of neurotoxic ACR (Dimethyl methylphosphonate), vesicants (Thiodiglycol, 2-Chloroethyl ethyl sulfide) and organophosphorus pesticides (Parathion).

The experiments were performed with a mobile plasma system at atmospheric pressure, in a mixture of argon and nitrogen (nitrogen being the reactive gas), at a power of 100 W and decontamination times of 10 and 20 minutes.

The high degree of decontamination obtained after the treatment of contaminated aqueous solutions proves the efficiency of the mobile plasma decontamination system, which could find applications in the field of environmental protection, for the depollution of surface and wastewater, contaminated with toxic substances.

Romanian Inventors Forum

RO.263.

Title	Process for obtaining mouthwash
Authors	Kamel EARAR, Andrei Victor SANDU, Dragoş Ioan VIRVESCU, Ion SANDU, Gheorghe G. BĂLAN, Ioan Gabriel SANDU, Dragoş Nicolae FRĂȚILĂ
Institution	Romanian Inventors Forum
Patent	Patent application RO 2021

Description	<p>The invention relates to a process for obtaining mouthwash, with multiple implications in the sanitization of the oral cavity, especially for the formation of dental caries and dental tartar, with use in the pharmaceutical and cosmetic industry. The invention uses a hydroethanolic solution of extracts of essential oils from aromatic plants (mint, basil, rosemary and / or cardamom), chamomile flowers and green tea, in the form of clear supernatants, obtained after extraction, filtration and centrifugation at 15,000 rpm, in which disperse thymol, pineapple juice supernatant, sea salt, sodium dicarbonate, and after pasteurization add an aqueous solution of perhydrol (3%), after which the mixture is stabilized with disodium glycerol phosphate and a natural emulsifier, in good ratios default;</p>
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RO.264.

Title	Composition and process for treating old wood artifacts against insects, fungi and water
Authors	D.E. COLBU, I. SANDU, V. VASILACHE, I.C.A. SANDU, G. COLBU, I.G. SANDU, N. COLBU, A.V. SANDU
Institution	Alexandru Ioan Cuza University of Iasi
Patent	Patent RO1234566 (A2)

Description	<p>Process for treating old wood artifacts against insects, fungi and water involves preparing a colloidal nanodispersion based on red oil, an alcoholic solution of a mixture of propolis and tannin and an alcoholic extract of teak wood, in a volumetric ratio of 90:6:4, applying in a differentiated manner, on small artifacts, by immersion for 10-30 minutes or on large structures, by brushing, injection or spraying, with the repetition of the operation for 2-5 times, at intervals of 25 hours, cleaning and consolidating by nanofilm, subjecting to microstructural stabilization by application of a mixture of wax, paraffin, fine dust of teak wood and pigment in a mass ratio of 5:3.5:1.4:0.1 and varnishing or lacquering surfaces for esthetic purposes and weather and mechanical protection.</p>
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RO.265.

Title	Composition and method for wet cleaning of old paints, polychrome artifacts and polishes
Authors	C.T. IURCOVSCI, I. SANDU, V. VASILACHE, A.V. SANDU, I.C.A. SANDU, I.G. SANDU
Institution	Alexandru Ioan Cuza University of Iasi
Patent	Patent RO134763 (A2)
Description	The invention relates to a process for wet cleaning of paintings polychrome artifacts and ancient gilded surfaces for conservation purposes and for bringing them to museum exhibitions. According to the invention the process consists in preparing an aqueous mixture of clear supernatants from saponaria basil corn silk and chamomile tea and from celery parsley and horse radish juice respectively mixed in a volumetric ratio of 1:1:1:1:2:2:2 formulating the stabilized mixture in wetting softening wiping washing and deglazing reglazing systems with double distilled water calf bile ammonia a mixture of isopropyl alcohol acetone and glycerin respectively and applying it on surfaces of 1...4 cm 2 in gradual steps and adjacent areas based on a visual grid up to completing the application while monitoring the effectiveness of the cleaning process at intervals of 7 days for a period of 6 months.

RO.266.

Title	Procedure for obtaining mouthwash for pregnancy gingivitis
Authors	Gabriela STOLERIU, Daciana Elena BRANISTEANU, Madalina Nicoleta MATEI, Andrei Victor SANDU, Ioan Gabriel SANDU, Dragos Nicolae FRATILA
Institution	Romanian Inventors Forum
Patent	Patent application RO 2021
Description	In order to prevent pregnancy gingivitis, for proper hygiene and to prevent diseases due to the action of dental plaque, biofilm, bacteria and food debris in the oral cavity, an aqueous nanodispersion based on seven supernatants is used, four obtained by separate centrifugation of juices pomegranate, pineapple, aloe vera and ginger, in which, after mixing, three more are dispersed in the form of 1/5 aqueous concentrates obtained by means of a rotavapor from teas in the form of an infusion of herbs of chamomile, mint and echinacea, after which the obtained system is stabilized with disodium glycerol phosphate and a natural emulsifier, then pasteurized, and finally in this mixture is dispersed fine powder of sodium dicarbonate by mechanical stirring and hydrogen peroxide (1%) in a volumetric ratio of 4: 1.

BIOTEHNOS S.A.

RO.267.

Title	Innovative combinations of renewable sources' bioactive compounds with restoring action on dermal & epidermal homeostasis
Authors	<i>Brindusa Dumitriu¹, Mariana Luiza Tanase¹, Laura Olariu^{1,*2}, Carmen Gaidau³, Petre Badica⁴, Dan Batalu⁵</i>
Institution	<ol style="list-style-type: none"> 1. BIOTEHNOS, Otopeni, Romania 2. Academy of Romanian Scientists - associate member, Bucharest, Romania, * 3. The R&D National Institute for Textiles and Leather (INCDTP)- Division Leather and Footwear Research Institute (ICPI), Bucharest, Romania 4. National Institute of Materials Physics, Magurele, Romania 5. University Politehnica of Bucharest, Romania
Description	<p>In the context of the circular economy, with a focus on waste capitalization from leather industry, the studies aimed to configure innovative structural groups by associating keratin fractions from wool with plant extracts from organic farming. The applications pointed out the biomedical field, especially the delayed healing wounds issues, one of the first aspects being the restoring dermo-epidermal homeostasis, chronically affected. Two variants of keratin fractions (Espe and Valke) obtained by original biotechnologies were selected, as well as <i>Viola tricolor</i>, <i>Arctium lappa</i> and <i>Centaurea cyanus</i> extracts, in order to accomplish their effectiveness in cell regeneration on keratinocytes and fibroblasts. The screening was performed by advanced techniques of cellular and enzymatic analysis (flow cytometry and zymography), on standardized cell lines, HS27 and HaCaT, highlighting mechanisms of epidermal differentiation (membrane overexpression of involucrin, cytokeratin and transglutaminase related to cell sequentiality) and extracellular matrix proteins' turn-over (collagen synthesis / vs degradative enzyme activity). The results indicate innovative variants of therapeutic association designed to accelerate the intrinsic healing process through selective contributions on convergent mechanisms of skin recovery stages. They give the advantage of using bioproducts with minimal toxicity, configured on principles of maximizing biological activity through well-selected structural components: keratin fragments, polyphenols, flavones. The economic added value will be gained through more efficient raw materials sources due to capitalization of leather waste and medicinal plants ecological culture, preventing the depletion of spontaneous flora and customized agricultural technologies in order to obtain a reproducible content of active compounds. Studies developed through BIOTEHNER Project, ctr.5PTE-2020.</p>

DFR Systems SRL

RO.268.

Title

Installation for removal of organic pollutants from wastewater based on photocatalysis and biological processes

Institution

Ioana Corina MOGA¹, Ileana Cristina COVALIU², Mihai NIȚĂ-LAZĂR³, Gigel PARASCHIV², Iuliana PAUN^{2,3}, Daniel MITRU^{2,3}, Alina BANCIU³, Stefan DOBRESCU¹, Gabriel PETRESCU¹, Adrian Gabriel TĂNASĂ¹

Authors

¹DFR Systems SRL

²University POLITEHNICA of Bucharest

³Research and Development Institute for Industrial Ecology ECOIND Bucuresti

Patent no.

Research project code PN-III-P2-2.1-PTE-2019-0628

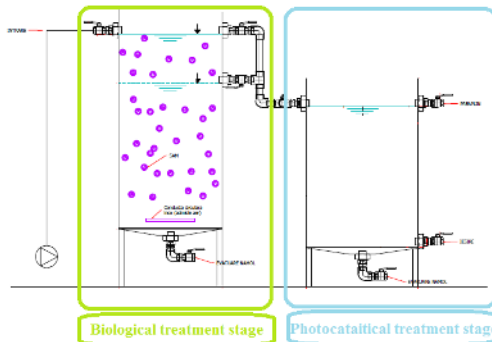
Description

The wastewater treatment plant proposed by the authors to treat a high content of organic matter, resulted from the need to remove three of the disadvantages linked to conventional biological treatment: low efficiency, high amount of sludge and high retention times. The authors propose to increase the efficiency of removal of organic pollutants from wastewater to CO₂ and H₂O by using two stages of degradation:

- 1) biological stage - based on the degradation of organic pollutants with the help of microorganisms, by improving the technology with mobile bed biofilm fixed on SAMs.
- 2) photocatalytic stage - based on the degradation of organic pollutants by photocatalysis performed by TiO₂ (semiconductor nanoparticles) under the action of UV radiation.

Class

1



RO.269.**Title**

Multi-channel electrochemical probe for monitoring the evolution of sediments

Institution

Radu POPA¹, Ioana Corina MOGA¹, Vily Marius CIMPOIAȘU², Iulian PETRISOR², Keneth H. NEALSON³, Alexandru DATCU-MANEA¹, Roxana AVRAM¹

Authors

¹DFR Systems SRL

²University of Craiova

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Patent no.

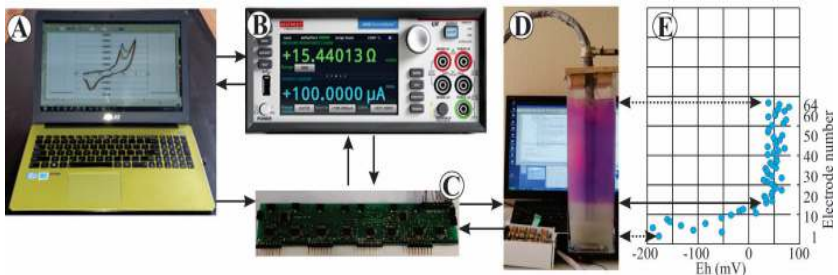
Research project code PN-III-P2-2.1-PTE-2019-0198

Description

The multi-channel probe for monitoring the evolution of sediments proposed by the authors will be connected to an electrochemical measuring instrument. The multi-channel probe allows the analysis of the evolution of aerobic / anaerobic stratification in sediments at a very good resolution (<1 mm) without mechanically disturbing the sediment gradients, a performance not achieved by another probe on the market. Chemical gradients in sediments are easily disturbed by probes moved by micro-manipulators. The multi-channel probe makes these measurements accurately, but without moving the electrodes through the sediment. The ability to monitor the evolution of sediments without physical disturbances is very important in the analysis of how sediments increase and decrease, and how their state changes between aerobic and anaerobic.

Class

5



RO.270.

Title Water treatment plant for small domestic applications
Ioana Corina MOGA¹, Simina Daniela ȘTEFAN², Mihai
Institution LESNIC¹, Gheorghe PĂUNA¹, Mircea ȘTEFAN³,
Alexandru DATCU-MANEA¹, Andreea Maria MONEA¹,
Gabriel PETRESCU¹

Authors ¹DFR Systems SRL
²University POLITEHNICA of Bucharest
³University Titu Maiorescu

Patent no. Research project D type (POC), no. 7223/27.05.2020
(SMIS 105558)

Description The water treatment plant has an increased efficiency in the elimination of pollutants based on iron and manganese in the conditions of low investment and reduced operating and maintenance costs. Thus, the following main treatment stages are used: efficient aeration without the use of oxidation reagents; filtration and catalytic oxidation on new, cheap, existing/ produced in Romania materials. Advanced oxidation processes have been shown to be very effective in advanced water treatment containing non-biodegradable and highly toxic organic compounds; final clarification; disinfection as it is necessary to eliminate all microorganisms and pathogens, so that the treated water is used by the population in conditions of maximum safety.

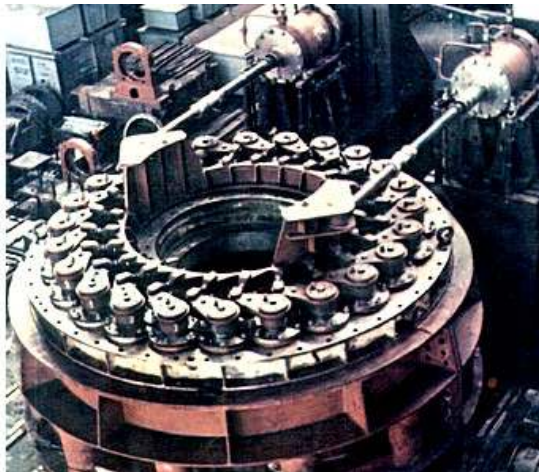
Class 1



Speeh Hidroelectrica SA

RO.271.

Title	Pneumo-hydraulic plant designed for driving the servomotors of the director device and pallets of the rotors of the Kaplan and Francis turbine with programmable logic controller
Authors	DAIA Florian Petre, TIRIPLICĂ PETRE, TIRIPLICĂ Ion, NEMȚOIU Simona Greta
Institution	SPEEH HIDROELECTRICA SA
Description	The designed plant makes up a new working notion and a modern constructive solution of the "Group of Oil under Pressure (GUP)" afferent to the hydraulic turbines. It is based upon a modern working notion, where the functions designed for supervising the pneumo-hydraulic magnitudes and the control functions of the implementing elements, too, are provided by a Programmable Logic Controller. It is made up by using the most up-to-dated hydraulic and pneumatic components, providing this way a high safety and reliability in operation.



Biodez SRL

RO.272.

Title	BIODEZ A5 – SPECIAL ANTISEPTIC & DESINFECTANT NON-PATHOGENIC, NON-POLLUTING & ECO-PROTECTING
Authors	COMAN Ioan; CREANGA Steofil; NECULAI-VALEANU Andra-Sabina
Institution	SC BIODEZ SRL
Patent	-
Description	<p>The chemical formulation registered at OSIM under the name of Biodez A5 is part of a special, modern class of PURE OXYSANITIZING BIOCIDES, which is characterized by two distinct features, namely:</p> <ul style="list-style-type: none">• Not harmful (toxic, allergenic, caustic for human and animal health)• Does not affect the environment <p>The product is par excellence a “BIO” formula because its archetypal model is hydrogen peroxide, synthesized naturally and constantly by neutrophils, as an element in the fight against viruses, bacteria and micromycetes.</p>
Class	3

INOVESS GROUP

RO.273.

Title iSentinel® EVOBUILDING - THE EVOLUTIVE
**DISASTER INTELLIGENT PROTECTION
 SOLUTIONS SAFEBUILDING**

Authors Mircea MANOLESCU, Paul Georgian TURCU, Diana
 Mihaela CALOTA

Institution INOVESS GROUP

Patent Patent Application A/373/2020

An open and fully customizable intelligent safe building driven by AI and IoT integrative solutions for life saving and industrial plants, buildings, facilities, assets and environment protection in case of major earthquake or other disasters and terrorist actions.

Applications: intelligent proactive protection for avoiding the devastating consequences of earthquakes on buildings and industrial plants and early warning and escape information by alarm, voice instructions, other indicators or independent AI actions for human life saving in case of disaster or terrorist actions.

Description Our intelligent solutions are acting on two independent synergic paradigms:
 - the objective/technical paradigm and
 - the subjective/ human reactions driven paradigm
 The objective/technical paradigm is structured on three levels, detection / decision / execution allowing to integrate IA assistance with collaborative inputs from any other technical detector or complementary logical condition and outputs to any existing or future execution systems which allows to fulfill future user's needs. As the solution's architecture is a modular one it is possible to start with only three base modules and to add some others following and satisfying the increasing needs of the users.

Class

12

Independent Inventor

Ion CRISTESCU

RO.274.

Title

Chemical reactor processor isotopic

Authors

Ion Cristescu

Patent

- Patent RO 131756 B1 /2020

Description

The invention refers to a chemical reactor processor isotopic, modular continuous heterogeneous system with recirculating of reaction mass and destination of production fissile isotopes of thorium and uranium nuclear fuels CANDU advanced cycle. The parts components: module (G) reactor generator isotopes azotates, alkalis Th(IV), U(VI), lanthanides and yttrium – views in longitudinal and cross section, in communication with: centrifugal filter separator phases (7) with separator rotor (8) – view in longitudinal section; module (E) extractor reactor complexes isotopes azotates Th(IV), U(VI), lanthanides, yttrium with tributyl phosphates (TBP) – view in cross section; module (R) reextractor reactor isotopes azotates Th(IV), U(VI), lanthanides, yttrium – view in cross section; crystallizer (13) isotopic azotate Th(IV), sodium azotate, phosphoric acid and cylinder rotor (14) for recirculating ascending, descending of aqueous solutions – views in longitudinal and cross section. This crystallizer (13) is in communication with condenser (15) vapours water, nitric acid – view in longitudinal section. Advantages: chemical reactor processor isotopic realizes high grade purification of thorium, has advanced chemical stability at the corrosive action of nitric acid, has good stability at the action of ionizing radiations, realizes a specific productivity phosphoric acid (strategic product) as technical indicator: 322 kg H₃PO₄/ton thorium ore (crude monazite), realizes a rate of processing of thorium and uranium ores more 50% in comparison with apparatuses, plants well known because of intensification processes and maybe with complete automation.

Applications

Independent Inventor**Constantin CROITORU****RO.275****Title EN****Natural food acidifier and process for preparing the same****Authors****CROITORU CONSTANTIN****Patent no.****RO 131638 / 30.01.2018****Description
EN**

The invention relates to a natural acidifier in the liquid state intended for use in various branches of the food industry and to a process for obtaining it, which uses the by-product called vinasse, which remains in the boiling pot after the wine distillation. The process by which vinasse is obtained is more economically advantageous than other world-renowned processes for the following reasons: it has clear criteria for the selection of lots of wine and vinasses; ensures sustainable clarification and efficient protein stabilization of vinasse through simple technological operations such as sulphating/add SO₂, bentonite treatment/bentonization and filtration. The elements of originality, novelty and patentability refer to: the simultaneous ensuring of tartaric, metallic and partially biological stabilization only by applying the ion exchange technique with indigenous cationic resin that retains in its pores all cations as to prevent tartaric precipitation (retains Ca²⁺ and K⁺), possible copper casse and iron casse (retains Cu²⁺ and Cu⁺, as well as Fe²⁺ and Fe³⁺), as well as the presence of cations (Mg²⁺, Mn²⁺...) from the structure of enzymatic systems that can act as potential sources of biological instability in the acidic medium of vinasse treaties; preservation and taste improvement of concentrated vinasse by reverse osmosis with a treatment with high purity microgranulated gum arabic, followed by homogenization, storage for dynamic refining of the constituents by homogenizations and final filtration

Class no.

3

RO.276**Title EN****Authors****Patent no.****Process for elaborating natural distillates of stone fruits****CROITORU CONSTANTIN (SOLE AUTHOR)****Patent no RO 131640 / 30.01.2018****Description
EN**

The invention relates to a process for the elaboration of natural distillates from stone fruits having superior sensory qualities and a high degree of innocuousness, being intended for human consumption. The elaborated process valorizes the stone fruits unfit for consumption in fresh state and which cannot be used in other branches of the food industry, it can be applied at industrial level and in the conditions of the current technical endowments, in most of the vinification units provided with distilleries. The process is characterized by elements of novelty, inventiveness and patentability in each technological stage of elaboration, starting with fruit processing (washing them simultaneously with treatment for antioxidant and antimicrobial protection, enzymatic treatment with a complex preparation, separation of juice from the enzyme mash/pulp fruits followed by reconstitution of the initial mash/pulp fruits), continuing with the prefermentative stage of separate collection and preparation of the mash/pulp fruits as such, of the juice and reconstituted mash/pulp fruits (pH correction with 5 % aqueous solution of organic acids up to pH 2.9 ... 3 and not at lower values), then with fermentative stage (inoculation with two selected strains of *Saccharomyces cerevisiae* yeasts, of which the first for increasing the acidity of the fermentative medium, the second for releasing varietal aromas from precursors by enzymatic hydrolysis,...), the postfermentative stage (enzymatic treatment with 5 g/hl product with β -glucosidase activity for release varietal aromas), distillation stage (improving the olfactory profile of the middle distillates by adding a proportion of 1 ... 2 % alcoholic extract from whole fruits,...) and ending with the aged stage (treatment with 4 g/l oak chips with strong preoasting,...).

Class no.

3

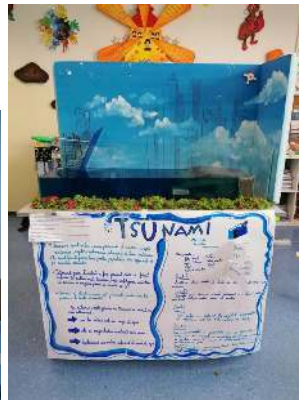


PARADIS
INTERNATIONAL COLLEGE

**Mountain formation - Volcanism and sediment folding
(Class IV C)**



PROTECTIVE MEASURES AGAINST TSUNAMI WAVES (Class IV B)



Smart lightning (Class IV A)



PROJECTS

Clasa a IV-a A		Iluminat inteligent
Clasa a IV-a B		Masuri de protectie impotriva tsunami
Clasa a IV-a C		Formarea munților- Vulcanismul și Cutarea sedimentelor
Clasa a VII-a		The Cave
Clasa a X-a		GunPowder Heart Dissection Index Of Refraction Soda Sugar Concentration
Eduard Ignat Horia Apălimariței	IV C	Evoluția dinozaurilor
Maia Sava Cristian Ghidireac	IX	Electric arc experiment
David Grigore	IV A	Crearea bazelor spatiale cu ajutorul resurselor locale
Malina Matricala Alex Ciobanu	XI	The physics behind guitar strings
Malina Matricala Ștefan Albu Tudor Burlacu Teo Matricala Ianis Cotoc Thea Bursucanu Vlad Mihai Liviu Albu Alex Ciobanu		The guitar shovel project



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* * *

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Coordonator Euroinvent:
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Președinte al Forumului Inventatorilor din România

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Ilie BOSTAN, Smaranda BOSTAN, Cezarina CALOIAN, Simion CRISTEA
Adrian CRÎȘMARU, Loredana GAȘPAR, Bogdan GAVRILEAN, Lavinia GERMAN
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P R E F A Ț Ă

Brandul EUROINVENT, susținut de Forumul Inventatorilor Români și de Europe Direct Iași, reprezintă un proiect modern, care a permis în ultimii 13 ani realizarea unei manifestări complexe, cu multiple ținte, adresându-se tuturor creatorilor de bunuri materiale și spirituale (inventatori, universitari, cercetători științifici, artiști etc.). S-a dorit acest lucru, pentru a atrage atenția guvernanților asupra faptului că inventica este un segment al creativității naționale, care asemănător artei și științei, trebuie să fie subvenționată de stat, iar brevetarea să fie gratuită. Mai mult, proprietatea intelectuală și cea industrială să fie protejate prin legi diferite, să nu mai existe sistemul de re-brevetare a invențiilor, ci doar cel de transfer tehnologic, sub formă de Patent (licența de aplicare).

O invenție, o dată brevetată, trebuie să rămână în portofoliul inventatorului și în zestrea unei națiuni sub forma unui brevet, respectiv patent din fondul personal sau public (Fondul Național de Invenții), de unde la cerere să fie transferată ca licență de aplicare în baza unui contract, prin Oficiul de Stat pentru Invenții și Mărci (OSIM). Juridic, pentru a proteja inventatorul este preferat sistemul de re-patentare și nu cel de re-brevetare.

Această sărbătoare a științei, tehnicii și artei românești, organizată sub sigla „Zilele Europei la Iași”, se desfășoară prin implicarea tuturor actorilor și vectorilor sociali: studenți, cadre didactice universitare, cercetători, artiști, mass media, mediul de afaceri, autorități etc. Un aport deosebit în aceste manifestări îl au cele cinci universități de prestigiu ale Iașului, care s-au remarcat prin performanță și tradiție de-a lungul istoriei lor, fiind recunoscute atât în țară, cât și în străinătate ca principalii formatori de inteligență românească și surse veridice ale cercetării fundamentale și tehnologice performante. Implicarea celor cinci universități în toate edițiile de până acum a condus la formarea și dezvoltarea de lideri ai creativității în domeniile lor de specializare.

Prin aceste manifestări se dorește o participare activă, printr-o bună conlucrare și dialog între inventatori, studenți, specialiști din diverse domenii, artiști, mediul academic și cel industrial.

EUROINVENT înseamnă un eveniment complex alcătuit din: Salonul European de Invenții și Cercetare Științifică, Salonul de Carte și Salonul de Artă, un rol important avându-l Workshop-ul organizat sub sigla „Cercetarea tehnico-științifică în contextul contemporan european”, unde se dezbate teme actuale de cercetare și aspecte moderne ale celor trei tipuri de proprietate: intelectuală, industrială și culturală, având în vedere printre altele, stimularea actului de creație și protecția dreptului de autor.

În ultimii patru ani acest workshop s-a alăturat componentei principale a EUROINVENT-ului, cunoscut sub titlul: Conferința Internațională de Cercetări Inovative (ICIR – International Conference for Innovative Research).

Cu ocazia zilelor dedicate inventatorilor sau instituțiilor de cercetare și de învățământ din țările participante la această manifestare, se vor prezenta sistemele actuale de transfer tehnologic, dinamica brevetării și alte aspecte privind ingineria creativității, respectiv rezultatele deosebite obținute de către școlile de invenție în formarea tinerilor.

La actuala ediție, organizată on line din cauza pandemiei, cititorii care vor parcurge prezentările de pe pagina web și autorii celor trei saloane vor putea vota invențiile, temele de cercetare, cărțile și operele de artă pe care le consideră meritorii. Cele mai apreciate vor recompensate cu un premiu de popularitate din partea publicului.

Volumul de față cuprinde un număr de 15 lucrări, selectate de un grup de referenți, în acord cu direcțiile de cercetare din învățământul superior ieșean și evenimentele care vor fi marcate la a 13-a ediție a EUROINVENT.

Sub genericul „Cercetarea românească în conext european”, lucrările au fost grupate pe următoarele secțiuni: Știința Conservării Bunurilor de Patrimoniu Cultural și Natural, Științe Conexe, Invenție și Istoria Neamului Românesc. Au fost acceptate lucrări în limba română și engleză, cu o bibliografie recentă și selectivă.

Prof.univ.emerit dr. Ion SANDU,
Președinte de Onoare al Forumului Inventatorilor Români

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- **World Invention Intellectual Property Associations – WIIPA**

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International Conference on Innovative Research ICIR is a part of **EUROINVENT**, a complex event which brings together contributions of consecrated schools from higher education, academic research and also of individual researchers and inventors. During the Conference leading researchers, engineers and scientists will present actual research issues in the field of Materials Science and Engineering.

All accepted papers, after the peer review, from EUROINVENT 2021 International Conference on Innovative Research will be published in:

- **Materials / Coatings** (MDPI Publisher – Indexed by Web of Science – ISI and Elsevier SCOPUS, IF 3.0 & 2.3 – Q2)
- **Archives of Metallurgy and Materials** (Indexed by Web of Science – ISI and Elsevier SCOPUS, IF 0.586)
- **Acta Physica Polonica A** (Indexed by Web of Science – ISI and Elsevier SCOPUS, IF 0.545) – articles related to journal's topic
- **IOP - Journal of Physics: Conference Series** (Indexed by Web of Science – ISI and Elsevier SCOPUS)
- **European Journal of Materials Science and Engineering** (Indexed by DOAJ, Chemical Abstracts, CiteFactor)
- **International Journal of Conservation Science** (Indexed by Web of Science – ISI and Elsevier SCOPUS)

and which covers the entire range of basic and applied aspects of the synthesis and characterization, modelling, processing and application of advanced engineering materials.

The Book of Abstracts of the Conference has the following ISSN: P 2601-4580 & L 2601-4599.

Topics of interest for submission include, but are not limited to: Synthesis and characterization of materials; Processing and applications of materials; Procedures and technologies for material processing; Materials & Life Science

The ICIR 2016-2020 Conference Proceedings have been published in IOP Conference Series: Materials Science and Engineering – Volume 877, 572, 374, 209 and respectively Volume 133 – indexed by SCOPUS and Web of Science. The ICIR 2015 Conference Proceedings have been published in KEY ENGINEERING MATERIALS (volume 660) and indexed by SCOPUS.

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