

Patent Annotations:

The patents annotated in this section have been selected by the authors of this issue as the most important patents of relevance to their field.

RECENT DEVELOPMENT OF ROTORCRAFT CONFIGURATION

1. **Ducted tail rotor for rotary wing aircraft providing torque reaction and yaw attitude control, Desjardin, R.A., Mccardle, F.H.: WO9302918 (1994).**

Commentary

The present invention describes rotary wing aircraft with ducted tail rotor. This tail rotor is located in a laterally directed duct located at the end of the tail cone and extends rearward from the aircraft cabin. The rotor consists of a rotor shaft, a rotor hub, a rotating control shaft, a stationary control shaft and an actuator.

2. **Hingeless rotor system, Weiland, E., Brunsch, K.: US4292009 (1981).**

Commentary

The invention discusses hingeless rotor system for use in helicopters. This system has various spars divided into three functional sections. These sections form the blade neck, which connects the lift producing portion of the respective rotor blade to the rotor mast. Other spar sections include the carrier spar sections.

3. **Bearingless rotor for single and tandem helicopters, Desjardins, A.D.: US4349317 (1982).**

Commentary:

The invention discusses a bearingless rotor system which has a flexible strap member attached to root of a rotor blade. A pitch rod is aligned with the pitch axis and mounted to the rotor blade root and to a pitch arm, which transmits control system variations through the way of a pitch link to the pitch rod. Tapered shoes are disposed adjacent the surfaces of the strap and are capable of applying a restoring force to the strap in opposition to flexural displacements of the strap member.

4. **Drive system for a variable diameter tilt rotor, Hager, L.N.: US6030177 (2000).**

Commentary:

The invention provides a drive system for variable diameter rotor system that includes a plurality of rotor blade assemblies with inner and outer blade segments. The outer blade segments are telescopically mounted to the inner blade segment. The drive system consists of a rotor hub, a gimbaled bearing and a blade actuation shaft.

5. **VTOL airplane with only one tiltable prop-rotor, Roger, N. C.: US20026382556 (2002).**

Commentary:

The invention provides a VTOL-capable tilt-rotor airplane having a single tiltable large-diameter prop-rotor attached

to an elongated power pod containing the collective and cyclical pitch mechanism, transmission and engine.

6. **Combined cycle compressed, air tip jet driven helicopter, Milot, M.: WO9625328A1 (1996).**

Commentary:

The invention discloses a helicopter drive system comprising of a combustion engine, air compressor, a rotor blade assembly including a hollow rotor hub and at least two hollow rotor blades.

7. **VTOL rotor wing drone aircraft, Girard, P.: US3794273 (1974).**

Commentary:

A VTOL aircraft and its structure is described that is capable of vertical take-off and landing and high speed cruising flight, utilizing a combine rotary and fixed wing.

8. **Canard rotor/wing, Rutherford, J.W., O'Rourke M., McDonnell, W. R., Smith B.T.: US5454530 (1995).**

Commentary:

Disclosed is a dual-mode high speed rotorcraft combining the efficiency of a helicopter with the high-speed capability of a fixed wing aircraft.

9. **Aircraft with a ducted fan in a circular wing, Bucher, F.: US5303879 (1994).**

Commentary:

The aircraft comprising of a rotor is explained with a vertical axis arranged in a housing for generating a lift exceeding the weight of the aircraft.

10. **VTOL aircraft with cruciform rotor wing, Girard, P.: US3792827 (1974).**

Commentary:

Discussed is an aircraft having a combined rotary and fixed wing providing aerodynamic support in vertical take-off and landing and in high speed cruising flight.

SECURING OF MARINE PLATFORMS IN ROUGH SEA

1. **System for connecting buoyant marine bodies, Han, L.: WO04024555 A1 (2004), SG109504 (2005) and US20057063036 (2005).**

Commentary:

The present invention is related to a system for two buoyant marine bodies connected in a side to side manner. This system comprises of first male and female coupling members having an opposing relationship and is fixed to the side of a first and second marine body and second male and female coupling members, which are fixed to the side of a first and second marine body.

2. **Constructive assembly for pontoons comprising separate assembly parts**, *Zwagerman, J.:* EP0272739 AI (1988).

Commentary:

The invention describes a constructive assembly having separate assembly parts with side-projections, corresponding side-recesses, the assembly parts comprising of cooperating recesses at their top for accommodating coupling elements for holding together assembled assembly parts.

CHIRP-MANAGED DIRECTLY-MODULATED DFB LASER

1. **Optical system comprising an FM source and a spectral reshaping element** *Mahgerefteh, D., Matsui, Y., Zheng, X., Johnson, B., Walker, D., Tayebati, P.:* WO05084268 A2 (2005).

Commentary:

The present invention describes the fiber optic communication system consisting of an optical signal source and an optical spectrum resaper.

ADSORPTION REFRIGERATION: A SURVEY OF NOVEL TECHNOLOGIES

1. **Solid adsorbent heat pump system**, *Shelton, S.:* US4610148 (1986).

Commentary:

The invention refers to the mechanism of heat pump system with a pair of solid adsorbent beds connected to a heat pump loop and a reversible heat transfer loop.

2. **Adsorption refrigerator based on separator heat pipe**, *Xia, Z.Z., Wang, R. Z., Wu, J. Y.:* CN1595017 (2005).

Commentary:

The present invention describes a high efficient and reliable adsorption refrigerator and its mechanism based on isolation heat pipe which is used in refrigeration plant technical field. The invention has simple structure, automatic operation effective use of low grade heat energy and no pollution, it is a green energy-saving refrigeration component.

3. **Thermal regenerative sorption device**, *Critoph, R.E.:* US20036629432 (2003).

Commentary:

Mechanism of the thermal regenerative compressive device 20 is discussed, which has a plurality of sorbent vessels 10 arranged circumferentially about a rotational axis X partly within a toroidal conduit 21. The compressive device is capable of achieving greater efficiencies than existing adsorption devices.

4. **Refrigerating equipment and air conditioner**, *Honda, S., Ishii, K., Tomoari, K., Suzuki, T.:* JP11083235 (1999).

Commentary:

The invention explains the solution for an adsorption type refrigerating cycle 100 wherein a refrigerant is evaporated in evaporation condensers 60 and 70 at the time when adsorption cores 20 and 30 adsorb the refrigerant and the refrigerant is condensed in the evaporation condensers 60 and 70 when the adsorption cores 20 and 30.

5. **Electro-adsorption chiller: a miniaturized cooling cycle with applications from microelectronics to conventional air-conditioning**, *Ng, K.C., Gordon, J. M., Chua, H. T., Chakraborty, A.:* US6434955 (2002).

Commentary:

The invention presents a novel modular and miniature chiller which symbiotically combines absorption and thermoelectric cooling devices.

6. **Adsorbent bed coating on metals and processing for making the same**, *Maier-Laxhuber, P., Engelhardt, R.:* US5585145 (1996).

Commentary:

Adsorbent bed coating for use on a metallic surface is provided which includes a powder-like solid adsorbent bed with a grain diameter between 1 and 50 μm bonded by a mass component of less than 50%.

7. **Auxiliary active motor vehicle heating and air-conditioning system**, *Rockenfeller, U., Kirol, L., Sarkisian, P., Khalili, K.:* US20016282919 (2001).

Commentary:

The invention discloses an auxiliary active heating and air conditioning system for a passenger area of a motor vehicle comprising a heat exchanger.

8. **Adsorbed air conditioner for driver's cab of diesel locomotive**, *Wang, R. Z., Jiang, Z. S., Xu, Y. X.:* CN1294989 (2001).

Commentary:

The current invention deals with adsorbed air conditioner for driver's cab which includes an adsorber, condenser, cistern, backflow preventing U-pipe, vacuum valve, evaporator, cold accumulator, airflow shifter, blower, coiler, pressure balancer, pump and pin-pipe heat exchanger.

9. **Solar energy composite energy system based on solid adsorption refrigerator**, *Wang, R Z., Zhai, X. Q.:* CN1719158 (2006).

Commentary:

A solar composite energy system is described based on solid adsorption refrigerating machine in the energy-saving field.

CURRENT STATE OF INTELLECTUAL PROPERTY IN MICROFLUIDIC NUCLEIC ACID ANALYSIS

1. **Microfabricated cell sorter for chemical and biological materials**, *Spence, C.F., Fu, A.Y., Quake, S.R., Arnold, F.H.:* US20036540895 (2003).

Commentary:

The invention discusses a microfabricated device for sorting cells like reporter labeled cells. The device consists of a chip having a substrate into which is micro fabricated at least one analysis unit. Every analysis unit consists of a main channel and a detection region along a portion of its length. Down streaming adjacently from the detection region the main channel consists of a discrimination region which is also called the branch point leading to two main branches. Cells are streamed through the detection region in a way that one cell average occupies the detection region at a time.

2. **Microfluidic nucleic acid analysis**, *Hong, J., Studer, V., Anderson, W., Quake, S., Leadbetter, J.:* WO04040001 (2004).

Commentary:

The invention refers to the microfluidic nucleic analysis where nucleic acid from cells and viruses are sampled according to microfluidic techniques.

3. **Fluid handling methods for use in mesoscale analytical devices**, *Wilding, P., Kricka, L.J., Zemel, J.N.:* US5635358 (1997).

Commentary:

Devices and methods for studying fluid cells containing samples are highlighted in this invention. Composition of these devices includes solid substrate, a mesoscale flow system and a component for inducing flow of cells in the sample through the flow system. These devices are used in a wide range of automated sensitive and rapid tests for analysis of a fluid cell containing sample.

4. **Microfluidic devices having embedded metal conductors and methods of fabricating said devices**, *Rhine, D.B., Smekal, T.:* US20046787339 (2004).

Commentary:

Microfluidic devices with embedded metal conductors are discussed. This device consists of an electronic component, a layer of electrically conducting material and a first sublayer of electrically insulating material. This device is used for performing electric field lysis, the polymerase chain reaction and in providing low cost and simple methods for fabricating microfluidic devices.

5. **Nucleic acid amplification utilizing microfluidic devices**, *Enzelberger, M.M., Liu, J., Quake, S.R.:* US20056960437 (2005).

Commentary:

The present invention refers to microfluidic devices and methods are provided as in various types of thermal cycling reactions. The microfluidic devices are beneficial in conducting a number of different analyses, including various primer extension reactions and nucleic acid amplification reactions.

6. **NANO-PCR: Methods and devices for nucleic acid amplification and detection**, *Goel, A.:* WO06076022 (2006).

Commentary:

The invention discusses the methods, compositions and devices for amplification of nucleic acid sequence. The new methods provide precision and control, improved fidelity and accuracy over the PCR process.

7. **Pseudoradial electrophoresis chip**, *Liu, S.R.:* WO0168898 (2001).

Commentary:

Microfabricated capillary array electrophoresis chip is discussed which includes a planar substrate having a first major surface defining converging first and second elongate separation channels.

8. **Microfabricated capillary array electrophoresis device and method**, *Simpson, P.C., Mathies, R.A., Woolley, A.T.:* US20046749734 (2004).

Commentary:

Methods and devices are provided for capillary array electrophoresis (CAE) micro-plate with an array of separation channels connected to an array of sample reservoirs on the plate.

9. **Three dimensional microfluidic device having porous membrane**, *Turner, S.W., Kameoka, J., Park, H.Y., Craighead, H.G.:* US2003180711 (2003).

Commentary:

The present invention discusses a three dimensional microfluidic device formed by placing a membrane between two micropatterned chips.

10. **Heat exchanging, optically interrogated chemical reaction assembly**, *Chang, R., Christel, L., Kovacs, G., McMillan, W., Northrup, M.A., Petersen, K., Pourahmadi, F., Young, S., Yuan, R., Dority, D.B.:* US20036565815 (2003).

Commentary:

The present invention describes a reaction vessel and apparatus for performing heat-exchanging reactions. The apparatus comprises of at least one heating surface, a heat source and optics positioned to optically interrogate the chamber.

RECENT PATENTS IN SOLAR ENERGY COLLECTORS AND APPLICATION

1. **Receiver tube with receiver tubular jacket and parabolic trough collector containing the same**, *Kuckelkorn, T.:* US20040163640A1 (2004).

Commentary:

The invention highlights the mechanism and structure of a parabolic trough collector.

2. **Thermally controlled solar reflector facet with heat recovery**, *Blackmon, J. B., Jones, N. E., Drubka, R. E.:* US20046911110 (2004).

Commentary:

The invention refers to high concentration central receiver system and methods for improved reflectors and a unique heat removal system.

3. **Solar collection system**, *Anderson, J. D.:* *US20026363928 (2002).*

Commentary:

The invention provides the mechanism of solar tracking which is utilized in connection with a solar energy collection system.

4. **Solar energy captivation system**, *Anderson, J. D.:* *MX2003276A (2004).*

Commentary:

The invention explains the solar tracking mechanism employed in relation with a solar energy system.

5. **Freeze protection apparatus for solar hot water system**, *Hayes, M. R.:* *NZ0542896A (2005).*

Commentary:

The present invention discusses a freeze protection apparatus to prevent damage to solar water heating systems. This apparatus consists of special temperature sensors and electronically controlled valves.

6. **Diffusion driven desalination apparatus and process**, *Klausner, J. F., Mei, R.:* *US20056919000 (2005).*

Commentary:

The invention discusses a diffusion driven desalination apparatus and process which includes structure for receiving a heated water stream. Waste heat from a power plant can be used to provide the heated water stream and power plants can use the waste heat generated to inexpensively provide purified water.

RECENTLY PATENTED FACILITIES AND APPLICATIONS IN COLD SPRAY ENGINEERING

1. **Pseudo CMOS dynamic logic with delayed clocks**, *Van Steenkiste, T. H.:* *US20050211799 A1 (2005).*

Commentary:

The present invention provides structures and methods for pseudo-CMOS dynamic logic with delayed clocks which includes a dynamic pseudo-nMOS logic gate and a dynamic pseudo-pMOS logic gate coupled consisting of a delayed enable clock transistor coupled to a source region of at least two input transistors connected to a delayed enable clock transistor coupled to a drain of at least two input transistors.

2. **Cold spray apparatus having powder preheating device**, *Kim, H.-J., Kweon, Y.-G.:* *WO2005061116 A1 (2005).*

Commentary:

Cold spray apparatus is discussed in detail which consists of a powder preheating device aiding in obtaining high deposition rate and excellent coating layer. A manufacturing method of nano-structured super-high hardness WC-Co

coating having high abrasive wear resistance and fracture toughness by spraying WC-Co powder using the cold spray apparatus is also highlighted.

3. **Method and device for cold gas spraying**, *Heinrich, P., Kreye, H., Stoltenhoff, T., Schmidt, T., Borchert, R., Ballhom, R.:* *US20060027687 A1 (2006).*

Commentary:

The invention provides methods and apparatus for cold gas spraying by supplying energy to particles with microwave technology.

4. **Cold spray formation of thin metal coatings**, *Liu, J.:* *US20060090593A1 (2006).*

Commentary:

This invention discloses the methods of adaptation of cold spray process for coating fine metal particles like aluminium and copper. Problems such as cold spraying of very fine particles are avoided by this process.

5. **CSP methods for producing layers of nanocrystalline materials**, *Schoenung, J. M., Kim, G., Ajdelsztajn, L.:* *WO2005079209 A2 (2005).*

Commentary:

This invention provides means for depositing or near-net-shape forming nanostructured metals, alloys and composites with desired hardness/strength, low porosity, and low oxidation, using a cold spray process (CSP). The cold spray process is an efficient, fast and cost-effective means of producing such quality nanostructured deposits.

6. **Porous coated member and manufacturing method thereof using cold spray**, *Ko, K. H., Lee, H. Y.:* *WO2005078150 A1 (2005).*

Commentary:

The invention presents manufacturing method using cold spray for porous coated member used for thermal and mechanical applications.

DEACIDIFICATION OF OILS BY SOLVENT EXTRACTION

1. **Refining of palm oils**, *Swoboda, P.A.T.:* *GB2144143 (1985).*

Commentary:

The invention discusses the process of refining palm oil by the solvent extraction of the oil and with alcohol, in a mixture with upto 25% water, and an alkali wash. The preferred solvents are azeotropic mixtures of ethanol or isopropanol with water.

2. **Countercurrent liquid/liquid extraction to fractionate complex mixtures containing medium and long chain fatty acid triglycerides**, *Besserman, M.A., Morrison, L.R. Jr., Weber, V.L.:* *US5104587 (1992).*

Commentary:

The invention highlights the countercurrent liquid/liquid extraction process for fractionating complex triglyceride mixtures to remove impurities selectively such as MMM

triglycerides from MML/MLM triglycerides and MML/MLM triglycerides from the impurities such as MLL/LML and LLL triglycerides.

3. **Process for obtaining micronutrient enriched rice bran oil**, *Cherukuri, R.S.V., Cheruvanky, R., Lynch, I., McPeak, D.L.: US5985344 (1999)*.

Commentary:

The present invention refers to a cost effective enrichment process for enhancing anti-oxidant content of rice bran oil from crude rice bran oil (CrRBO). The anti-oxidant enriched rice bran oil is useful in pharmaceutical, therapeutic and dietary preparations.

4. **Solvent extraction of glyceride oils**, *Parson A.M. GB1444551 (1972)*.

Commentary:

The invention discusses the solvent extraction process of glyceride oils by combining the polyunsaturated fatty acid content of an edible oil with solvents. These oils are safflower seed, sunflower seed, maize and cottonseed oils. The solvent comprises dimethyl formamide or N methyl pyrrolidone.

DEVICES FOR UMBILICAL CORD BLOOD COLLECTION

1. **Method and device for recovering blood from an umbilical cord**, *Zimmermann, H, Brombach, T., Stieglitz, T., Fuhr, G.: WO04080304 A1 (2004)*.

Commentary:

The invention puts into limelight the methods and collective devices for recovering blood from an umbilical cord. The tissue containing the blood from the umbilical cord is subjected to a pressure, due to which the blood from the umbilical cord flows into at least one receiving device (20), inside a chamber (10), the pressure being effective in a uniform manner on the tissue surface in the chamber.

2. **Method and device for extracting and/or collecting blood from placenta and/or umbilical cord**, *Tan, K.K., Huang, S. N., Tang, K.Z., Ng, S.C.: WO06059958 A1 (2006)*.

Commentary:

The invention discusses the method device for collecting blood from a delivered placenta and/or umbilical cord for obtaining stem cells. The device consists of a compartment for supporting the umbilical cord that contains a flexible membrane and at least one outlet opening through which the umbilical cord can extend.