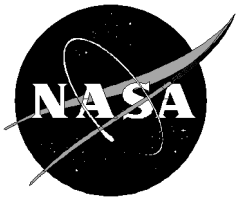
NASA/SP—2004-7039/SUPPL64
August 2004

NASA PATENT ABSTRACTS BIBLIOGRAPHY

A CONTINUING BIBLIOGRAPHY



National Aeronautics and
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**Scientific and Technical
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Introduction

Several thousand inventions result each year from research supported by the National Aeronautics and Space Administration. NASA seeks patent protection on inventions to which it has title if the invention has important use in government programs or significant commercial potential. These inventions cover a broad range of technologies and include many that have useful and valuable commercial application.

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The *NASA Patent Abstracts Bibliography* is a semiannual NASA publication containing comprehensive abstracts of NASA-owned inventions covered by U.S. patents. The citations included were originally published in NASA's *Scientific and Technical Aerospace Reports (STAR)* and cover *STAR* announcements made since May 1969.

The citations published in this issue cover the period September 2003 through June 2004. The range of subjects covered includes the NASA Scope and Subject Category Guide's 10 broad subject divisions separated further into 76 specific categories. However, not all categories have citations during the dates covered for this issue, therefore the Table of Contents does not include all divisions and categories. This scheme was devised in 1975 and revised in 1987 and 2000 in lieu of the 34 category divisions which were utilized in supplements (01) through (06) covering *STAR* abstracts from May 1969 through January 1974. Each entry consists of a citation accompanied by an abstract and, when appropriate, a key illustration taken from the patent or application for patent. Entries are arranged by subject category in ascending order.

Information About Patent Availability and Licenses

Patent Availability

How to obtain copies of NASA patents.

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Addresses for the NASA center patent counsels having knowledge of the invention.

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Information about the policies and procedures for licensing federally owned inventions in the custody of the National Aeronautics and Space Administration. Regulations on the licensing of government-owned inventions are available at: http://www.access.gpo.gov/nara/cfr/waisidx_02/37cfr404_02.html.

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Table of Contents

Subject Divisions/Categories

Document citations are grouped by division and then by category, according to the *NASA Scope and Coverage Category Guide.*

Indexes

Two indexes are available. You may use the find command under the tools menu while viewing the PDF file for direct match searching on any text string. You may also select either of the two indexes provided for linking to the corresponding document citation from *NASA Thesaurus* terms and personal author names.

NASA PATENT ABSTRACTS BIBLIOGRAPHY

A Continuing Bibliography (Suppl. 64)

AUGUST 2004

04
AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes all modes of communication with and between aircraft; air navigation systems (satellite and ground based); and air traffic control. For related information see also *06 Avionics and Aircraft Instrumentation, 17 Space Communications, Spacecraft Communications, Command and Tracking*, and *32 Communications and Radar*.

20030112144 NASA Ames Research Center, Moffett Field, CA, USA

Neighboring Optimal Aircraft Guidance in a General Wind Environment

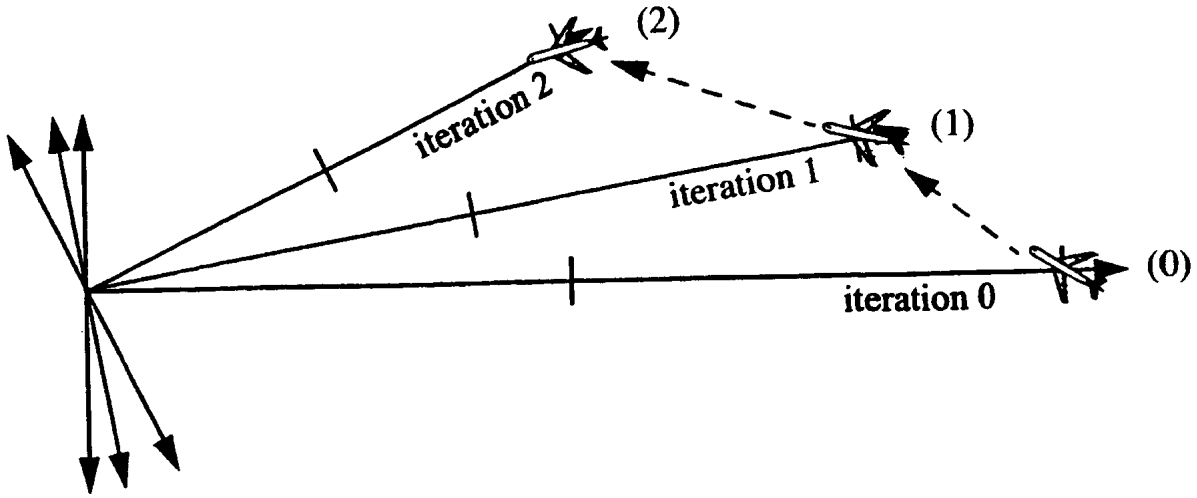
Jardin, Matthew R., Inventor; July 29, 2003; 13 pp.; In English

Patent Info.: Filed 14 Aug. 2001; US-Patent-6,600,991; US-Patent-Appl-SN-932566; NASA-Case-ARC-14554-1; No Copyright; Avail: CASI; A03, Hardcopy

Method and system for determining an optimal route for an aircraft moving between first and second waypoints in a general wind environment. A selected first wind environment is analyzed for which a nominal solution can be determined. A second wind environment is then incorporated; and a neighboring optimal control (NOC) analysis is performed to estimate an optimal route for the second wind environment. In particular examples with flight distances of 2500 and 6000 nautical miles in the presence of constant or piecewise linearly varying winds, the difference in flight time between a nominal solution and an optimal solution is 3.4 to 5 percent. Constant or variable winds and aircraft speeds can be used. Updated second wind environment information can be provided and used to obtain an updated optimal route.

Official Gazette of the U.S. Patent and Trademark Office

Aircraft Guidance; Optimal Control; Wind (Meteorology)



05
AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes all stages of design of aircraft and aircraft structures and systems. Also includes aircraft testing, performance, and evaluation, and aircraft and flight simulation technology. For related information see also *18 Spacecraft Design, Testing and Performance*; and *39 Structural Mechanics*. For land transportation vehicles see *85 Technology Utilization and Surface Transportation*.

20040013330 NASA Ames Research Center, Moffett Field, CA, USA

Method and System for Active Noise Control of Tiltrotor Aircraft

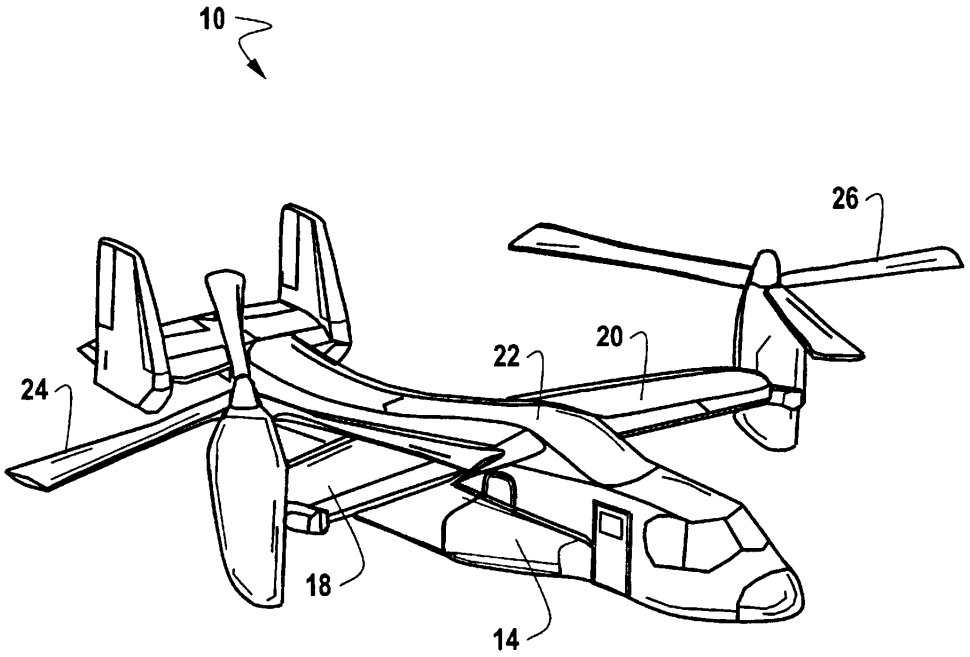
Betzina, Mark D., Inventor; Nguyen, Khanh Q., Inventor; December 30, 2003; 15 pp.; In English

Patent Info.: Filed 30 Apr. 2002; US-Patent-6,671,590; US-Patent-Appl-SN-139256; US-Patent-Appl-SN-287803; NASA-Case-ARC-14606-1; No Copyright; Avail: CASI; A03, Hardcopy

Methods and systems for reducing noise generated by rotating blades of a tiltrotor aircraft. A rotor-blade pitch angle associated with the tiltrotor aircraft can be controlled utilizing a swashplate connected to rotating blades of the tiltrotor aircraft. One or more Higher Harmonic Control (HHC) signals can be transmitted and input to a swashplate control actuator associated with the swashplate. A particular blade pitch oscillation (e.g., four cycles per revolution) is there-after produced in a rotating frame of reference associated with the rotating blades in response to input of an HHC signal to the swashplate control actuator associated with the swashplate to thereby reduce noise associated with the rotating blades of the tiltrotor aircraft. The HHC signal can be transmitted and input to the swashplate control actuator to reduce noise of the tiltrotor aircraft in response to a user input utilizing an open-loop configuration.

Official Gazette of the U.S. Patent and Trademark Office

Aircraft Control; Noise Reduction; Tilt Rotor Aircraft; Harmonic Control



07
AIRCRAFT PROPULSION AND POWER

Includes primary propulsion systems and related systems and components, e.g., gas turbine engines, compressors, and fuel systems; and onboard auxiliary power plants for aircraft. For related information see also *20 Spacecraft Propulsion and Power; 28 Propellants and Fuels*; and *44 Energy Production and Conversion*.

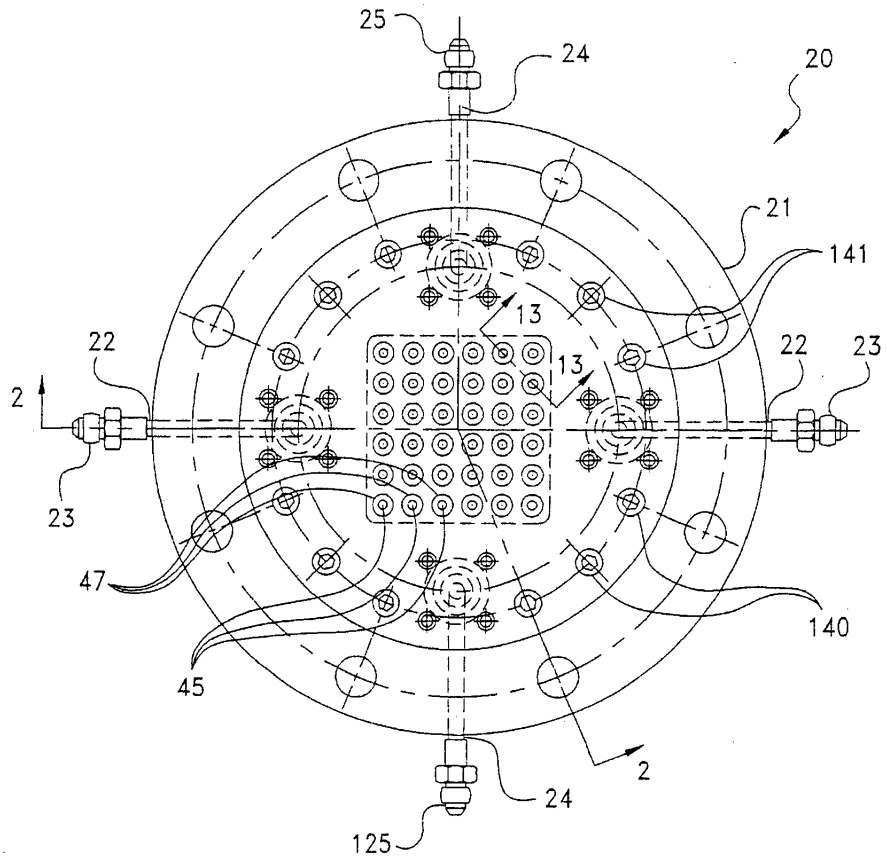
20030066318 NASA Glenn Research Center, Cleveland, OH, USA

Integrated Fuel Injection and Mixing System with Impingement Cooling Face

Mansour, Adel B., Inventor; Harvey, Rex J., Inventor; Tacina, Robert R., Inventor; Laing, Peter, Inventor; April 22, 2003; 23 pp.; In English

Patent Info.: Filed 27 Feb. 2001; No Copyright; Avail: CASI; A03, Hardcopy

An atomizing injector includes a metering set having a swirl chamber, a spray orifice and one or more feed slots etched in a thin plate. The swirl chamber is etched in a first side of the plate and the spray orifice is etched through a second side to the center of the swirl chamber. Fuel feed slots extend non-radially to the swirl chamber. The injector also includes integral swirler structure. The swirler structure includes a cylindrical air swirler passage, also shaped by etching, through at least one other thin plate. The cylindrical air swirler passage is located in co-axial relation to the spray orifice of the plate of the fuel metering set such that fuel directed through the spray orifice passes through the air swirler passage and swirling air is imparted to the fuel such that the fuel has a swirling component of motion. At least one air feed slot is provided in fluid communication with the air swirler passage and extends in non-radial relation thereto. Air supply passages extend through the plates of the metering set and the swirler structure to feed the air feed slot in each plate of the swirler structure.
Author
Fuel Injection; Impingement; Cooling; Mixing; Injectors; Atomizing; Swirling



18
SPACECRAFT DESIGN, TESTING AND PERFORMANCE

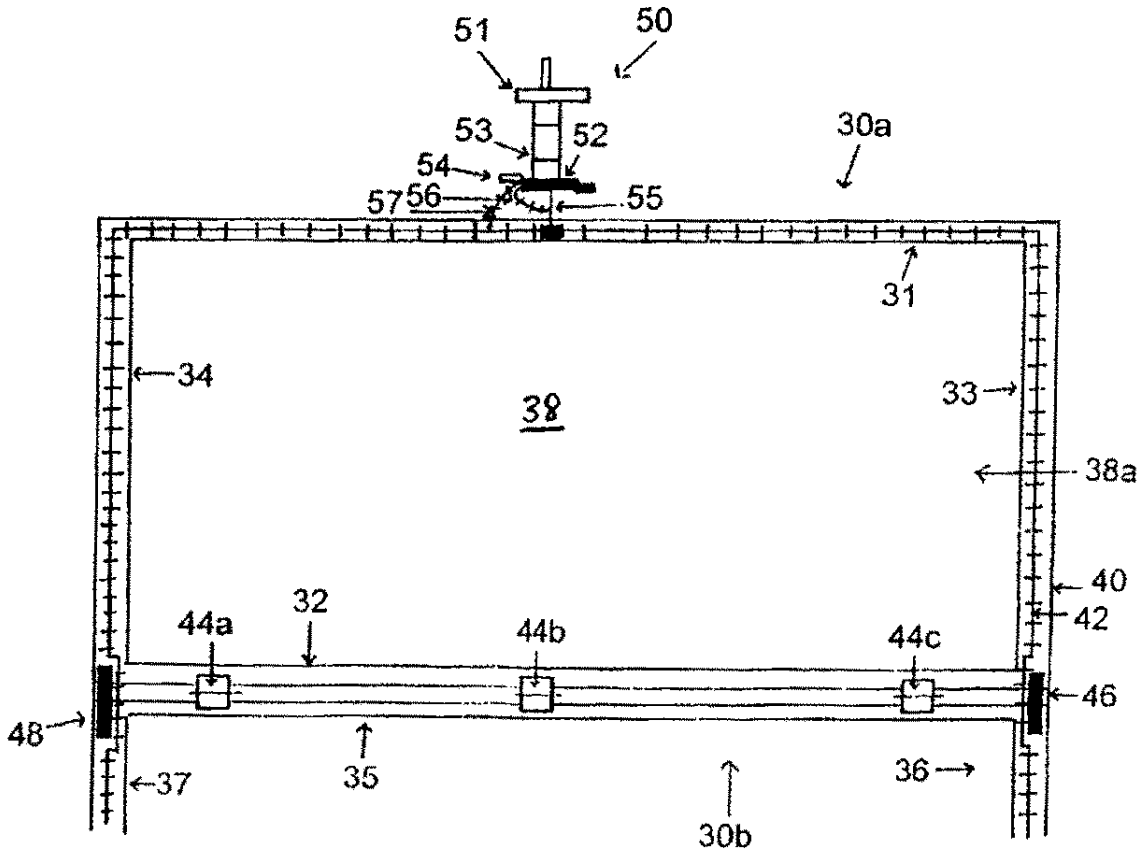
Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and spacecraft control and stability characteristics. For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance; 39 Structural Mechanics*; and *16 Space Transportation and Safety*.

20040015219 NASA Johnson Space Center, Houston, TX, USA
Apparatus and Method for Deploying a Hypervelocity Shield
Christiansen, Eric L., Inventor; Kerr, Justin H., Inventor; November 18, 2003; 28 pp.; In English; Original contains black and white illustrations
Patent Info.: Filed 30 Sep. 2002; US-Patent-6,647,855; US-Patent-Appl-SN-263293; NASA-Case-MSC-23443-1; No Copyright; Avail: CASI; A03, Hardcopy

Provided herein are apparatuses for deployment of at least one hypervelocity shield on a structure in exoatmospheric space. The apparatuses comprise a means of attaching to the structure at least at one place on the structure and further comprise at least one of the hypervelocity shields and a means of deploying said shields. Also provided are methods of deploying the hypervelocity shields using said apparatuses.

Author

Hypervelocity Impact; Deployment; Spacecraft Shielding



20
SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources. For related information see also *07 Aircraft Propulsion and Power, 28 Propellants and Fuels, 15 Launch Vehicles and Launch Operations*, and *44 Energy Production and Conversion*.

20030068300 NASA Marshall Space Flight Center, Huntsville, AL, USA

Combination Solar Sail and Electrodynamic Tether Propulsion System

Johnson, Charles L., Inventor; Matloff, Gregory L., Inventor; May 20, 2003; 8 pp.; In English

Patent Info.: Filed 14 Mar. 2002; US-Patent-6,565,044; US-Patent-Appl-SN-097698; NASA-Case-MFS-31503; No Copyright; Avail: CASI; A02, Hardcopy

A propulsion system for a spacecraft includes a solar sail system and an electrodynamic tether system is presented. The solar sail system is used to generate propulsion to propel the spacecraft through space using solar photons and the electrodynamic tether system is used to generate propulsion to steer the spacecraft into orbit and to perform orbital maneuvers around a planet using the planet's magnetic field. The electrodynamic tether system can also be used to generate power for the spacecraft using the planet's magnetic field.

Official Gazette of the U.S. Patent and Trademark Office

Solar Sails; Tethering; Electrodynamics; Spacecraft Propulsion; Propulsion System Configurations

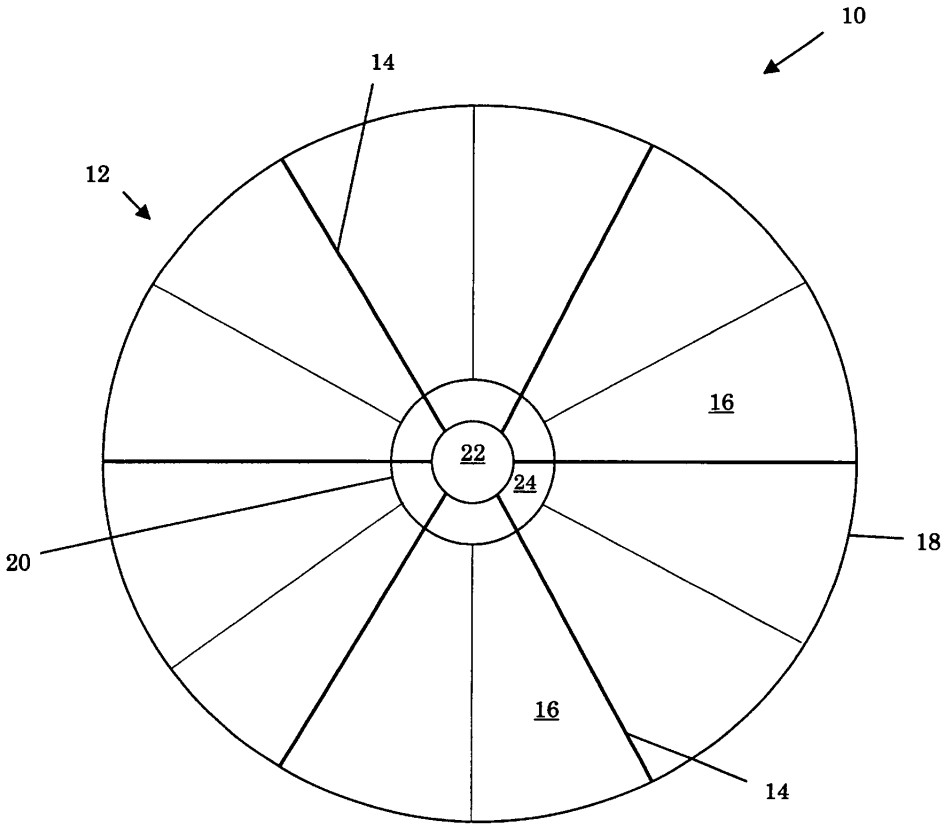


Fig. 1

24
COMPOSITE MATERIALS

Includes physical, chemical, and mechanical properties of laminates and other composite materials.

20030068923 NASA Glenn Research Center, Cleveland, OH, USA

Polyimides by Photochemical Cyclopolymerization

Meador, Michael A., Inventor; July 15, 2003; 9 pp.; In English

Patent Info.: Filed 5 Apr. 2001; US-Patent-6,593,389; US-Patent-Appl-SN-827140; NASA-Case-LEW-17133-1; No Copyright; Avail: CASI; A02, Hardcopy

The polyimides of this invention are derived from a Diels-Alder cyclopolymerization of a photochemically generated bisdiene with dienophiles, such as bismaleimides, trismaleimides and mixtures thereof with maleimide end-caps. Irradiation of one or more diketones produces two distinct hydroxy o-quinodimethane (photoenol) intermediates. These intermediates are trapped via a Diels-Alder cycloaddition with appropriate dienophiles, e.g., bismaleimide and/or trismaleimides to give the corresponding polyimides in quantitative yields. When bismaleimides, trismaleimides or mixtures thereof with maleimide end-caps are used as the dienophile, the resulting polyimides have glass transition temperatures (Tg) as high as 300 C. Polyimide films can be prepared by ultraviolet irradiation of high solids content varnishes of the monomers in a small amount of solvent, e.g., cyclohexanone, dimethyl formamide, N-methylpyrollidone and the like. These polyimides are characterized as having high glass transition temperatures, good mechanical properties and improved processing in the manufacture of adhesives, electronic materials and films.

Official Gazette of the U.S. Patent and Trademark Office

Polyimides; Photochemical Reactions; Polymerization

Includes the analysis, synthesis, and use of inorganic and organic compounds; combustion theory; electrochemistry; and photochemistry. For related information see category *34 Fluid Dynamics and Thermodynamics*. For astrochemistry see category *90 Astrophysics*.

20040000693 NASA Johnson Space Center, Houston, TX, USA

Microencapsulated Bioactive Agents and Method of Making

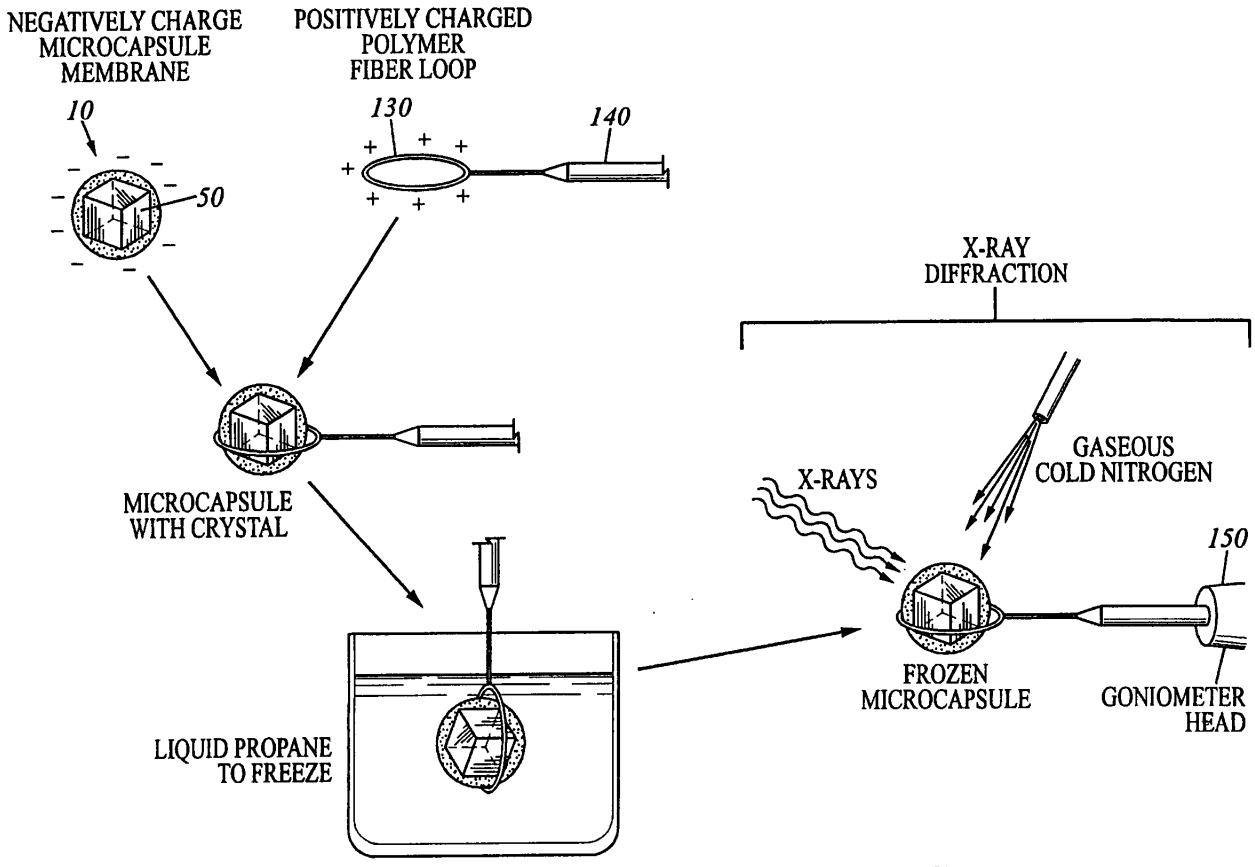
Morrison, Dennis R., Inventor; Mosier, Benjamin, Inventor; May 06, 2003; 23 pp.; In English

Patent Info.: Filed 6 Dec. 2000; US-Patent-6,558,698; US-Patent-Appl-SN-733391; US-Patent-Appl-SN-079766; US-Patent-Appl-SN-349169; NASA-CASE-MSC-22936-2; No Copyright; Avail: CASI; A03, Hardcopy

The invention is directed to microcapsules encapsulating an aqueous solution of a protein, drug or other bioactive substance inside a semi-permeable membrane. The microcapsules are formed by interfacial coacervation where shear forces are limited to 0-100 dynes per square centimeter. The resulting uniform microcapsules can then be subjected to dewatering in order to cause the internal solution to become supersaturated with the dissolved substance. This dewatering allows controlled nucleation and crystallization of the dissolved substance. The crystal-filled microcapsules can be stored, keeping the encapsulated crystals in good condition for further direct use in x-ray crystallography or as injectable formulations of the dissolved drug, protein or other bioactive substance.

Official Gazette of the U.S. Patent and Trademark Office

Encapsulating; Crystallography; Activity (Biology); Agents



20040013370 NASA Kennedy Space Center, Cocoa Beach, FL, USA

Zero-Valent Metal Emulsion for Reductive Dehalogenation of DNAPLS

Reinhart, Debra R., Inventor; Clausen, Christian, Inventor; Geiger, Cherie L., Inventor; Quinn, Jacqueline, Inventor; Brooks, Kathleen, Inventor; December 16, 2003; 7 pp.; In English

Patent Info.: Filed 2 Oct. 2001; US-Patent-6,664,298; US-Patent-Appl-SN-972296; NASA-Case-KSC-12246; No Copyright; Avail: CASI; A02, Hardcopy

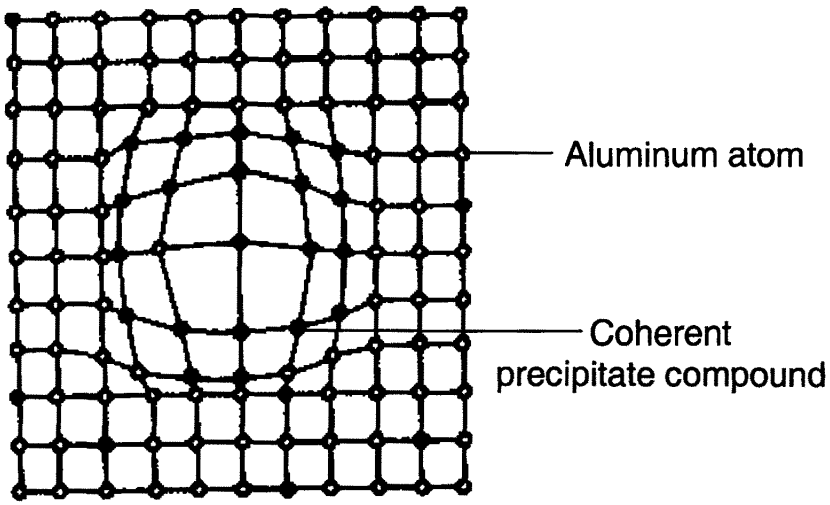
A zero-valent metal emulsion is used to dehalogenate solvents, such as pooled dense non-aqueous phase liquids (DNAPLs), including trichloroethylene (TCE). The zero-valent metal emulsion contains zero-valent metal particles, a surfactant, oil and water. The preferred zero-valent metal particles are nanoscale and microscale zero-valent iron particles
Official Gazette of the U.S. Patent and Trademark Office
Emulsions; Solvents; Liquids; Metal Particles; Halogenation

26
METALS AND METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals and metallic materials; and metallurgy.

20030068868 NASA Marshall Space Flight Center, Huntsville, AL, USA
Aluminum Alloy and Article Cast Therefrom
Lee, Jonathan A., Inventor; Chen, Po-Shou, Inventor; July 15, 2003; 9 pp.; In English
Patent Info.: Filed 11 Jul. 2002; US-Patent-6,592,687; US-Patent-Appl-SN-196389; US-Patent-Appl-SN-606108; US-Patent-Appl-SN-218675; US-Patent-Appl-SN-152469; No Copyright; Avail: CASI; A02, Hardcopy

A cast article from an aluminum alloy, which has improved mechanical properties at elevated temperatures, has the following composition in weight percent: Silicon 14 - 25.0, Copper 5.5 - 8.0, Iron 0.05 - 1.2, Magnesium 0.5 - 1.5, Nickel 0.05 - 0.9, Manganese 0.05 - 1.0, Titanium 0.05 - 1.2, Zirconium 0.05 - 1.2, Vanadium 0.05 - 1.2, Zinc 0.05 - 0.9, Phosphorus 0.001 - 0.1, and the balance is Aluminum, wherein the silicon-to-magnesium ratio is 10 - 25, and the copper-to-magnesium ratio is 4 - 15. The aluminum alloy contains a simultaneous dispersion of three types of Al3X compound particles (X=Ti, V, Zr) having a LI2, crystal structure, and their lattice parameters are coherent to the aluminum matrix lattice. A process for producing this cast article is also disclosed, as well as a metal matrix composite, which includes the aluminum alloy serving as a matrix and containing up to about 60% by volume of a secondary filler material.
Official Gazette of the U.S. Patent and Trademark Office
Aluminum Alloys; Mechanical Properties; Cast Alloys; Metal Matrix Composites

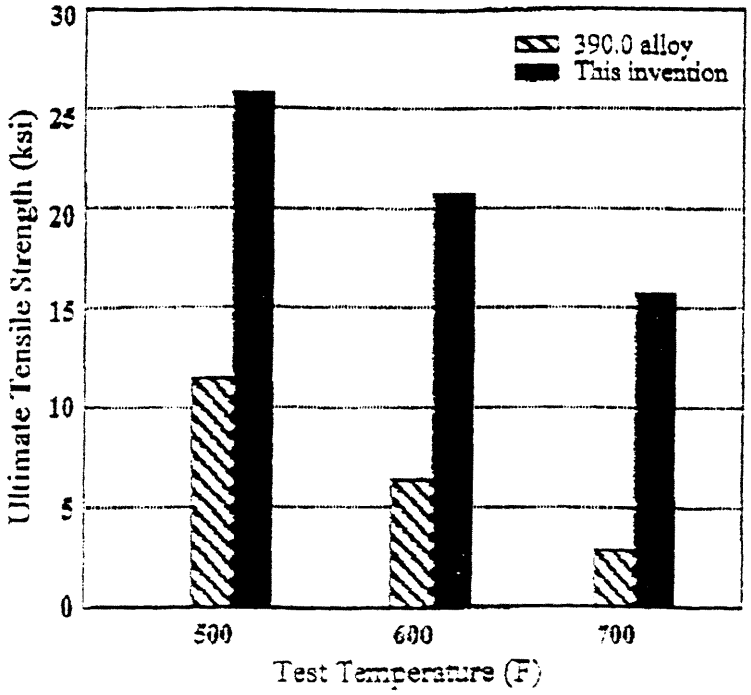


20040016328 NASA Marshall Space Flight Center, Huntsville, AL, USA
Process for Producing a Cast Article from a Hypereutectic Aluminum-Silicon Alloy
Lee, Jonathan A., Inventor; Chen, Po-Shou, Inventor; December 30, 2003; 6 pp.; In English; Original contains black and white illustrations
Patent Info.: Filed 2 Mar. 2001; US-Patent-6,669,792; US-Patent-Appl-SN-800312; US-Patent-Appl-SN-152469; NASA-Case-MFS-31294-7-CIP; No Copyright; Avail: CASI; A02, Hardcopy

A process for making a cast article from an aluminum alloy includes first casting an article from an alloy having the following composition, in weight percent: Silicon (Si) 14.0-25.0, Copper (CU) 5.5-8.0, Iron (Fe) 0-0.8, Magnesium (Mg)

0.5-1.5, Nickel (Ni) 0.05-1.2, Manganese (Mn) 0-1.0, Titanium (Ti) 0.05-1.2, Zirconium (Zr) 0.12-1.2, Vanadium (V) 0.05-1.2, Zinc (Zn) 0-0.9, Phosphorus (P) 0.001-0.1, Aluminum, balance. In this alloy the ration of Si:Mg is 15-35, and the ratio of Cu:Mg is 4-15. After an article is cast from the alloy, the cast article is aged at a temperature within the range of 400 F to 500 F for a time period within the range of four to 16 hours. It has been found especially advantageous if the cast article is first exposed to a solutionizing step prior to the aging step. This solutionizing step is carried out by exposing the cast article to a temperature within the range of 875 F to 1025 F for a time period of fifteen minutes to four hours. It has also been found to be especially advantageous if the solutionizing step is followed directly with a quenching step, wherein the cast article is quenched in a quenching medium such as water at a temperature within the range of 120 F to 300 F. The resulting cast article is highly suitable in a number of high temperature applications, such as heavy-duty pistons for internal combustion engines. Author

Casting; Aluminum Alloys; Silicon Alloys



32
COMMUNICATIONS AND RADAR

Includes radar; radio, wire, and optical communications; land and global communications; communications theory. For related information see also 04 Aircraft Communications and Navigation; and *17 Space Communications, Spacecraft Communications, Command and Tracking*; for search and rescue, see *03 Air Transportation and Safety*; and *16 Space Transportation and Safety*.

20040000336 NASA Marshall Space Flight Center, Huntsville, AL, USA

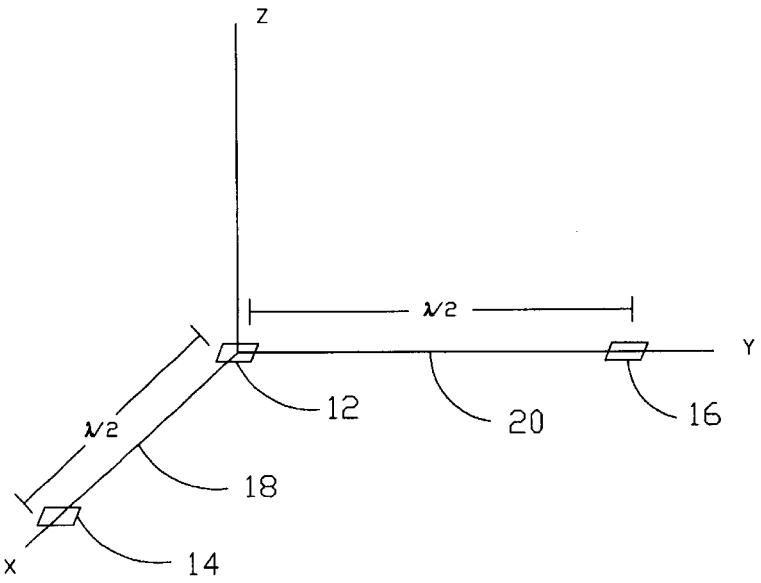
Passive Tracking System and Method

Arndt, G. Dickey, Inventor; Ngo, Phong H., Inventor; Chen, Henry A., Inventor; Phan, Chau T., Inventor; Bourgeois, Brian A., Inventor; Dusl, Jon, Inventor; Hill, Brent W., Inventor; September 09, 2003; 25 pp.; In English

Patent Info.: Filed 14 Nov. 2001; US-Patent-6,618,010; US-Patent-Appl-SN-994989; NASA-Case-MSC-23193-1; No Copyright; Avail: CASI; A03, Hardcopy

Systems and methods are disclosed for passively determining the location of a moveable transmitter utilizing a pair of phase shifts at a receiver for extracting a direction vector from a receiver to the transmitter. In a preferred embodiment, a phase difference between the transmitter and receiver is extracted utilizing a noncoherent demodulator in the receiver. The receiver includes an antenna array with three antenna elements, which preferably are patch antenna elements spaced apart by one-half wavelength. Three receiver channels are preferably utilized for simultaneously processing the received signal from each of the three antenna elements. Multipath transmission paths for each of the three receiver channels are indexed so that comparisons of the same multipath component are made for each of the three receiver channels. The phase difference for each received

signal is determined by comparing only the magnitudes of received and stored modulation signals to determine a winning modulation symbol.
Official Gazette of the U.S. Patent and Trademark Office
Transmitters; Antenna Arrays; Tracking (Position); Receivers

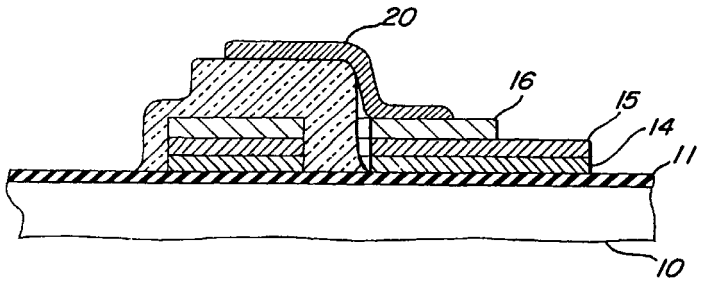


33
ELECTRONICS AND ELECTRICAL ENGINEERING

Includes development, performance, and maintainability of electrical/electronic devices and components; related test equipment; and microelectronics and integrated circuitry. for related information see also *60 Computer Operations and Hardware*; and *76 Solid-State Physics*. For communications equipment and devices see *32 Communications and Radar*.

20030068896 NASA Pasadena Office, CA, USA
Structure of Thin-Film Lithium Microbatteries
Whitacre, Jay F., Inventor; Bugga, Ratnakumar V., Inventor; West, William C., Inventor; May 06, 2003; 13 pp.; In English Patent Info.: Filed 8 Feb. 2001; US-Patent-6,558,836; US-Patent-Appl-SN-779595; NASA-Case-NPO-21015; No Copyright; Avail: CASI; A03, Hardcopy

A process for making thin-film batteries including the steps of cleaning a glass or silicon substrate having an amorphous oxide layer several microns thick; defining with a mask the layer shape when depositing cobalt as an adhesion layer and platinum as a current collector; using the same mask as the preceding step to sputter a layer of LiC(0)O2, on the structure while rocking it back and forth; heating the substrate to 300 C. for 30 minutes; sputtering with a new mask that defines the necessary electrolyte area; evaporating lithium metal anodes using an appropriate shadow mask; and, packaging the cell in a dry-room environment by applying a continuous bead of epoxy around the active cell areas and resting a glass slide over the top thereof. The batteries produced by the above process are disclosed.
Official Gazette of the U.S. Patent and Trademark Office
Electric Batteries; Thin Films; Lithium



20040000275 NASA Langley Research Center, Hampton, VA, USA

Method of Fabricating a Piezoelectric Composite Apparatus

Wilkie, W. Keats, Inventor; Bryant, Robert, Inventor; Fox, Robert L., Inventor; Hellbaum, Richard F., Inventor; High, James W., Inventor; Jalink, Antony, Jr., Inventor; Little, Bruce D., Inventor; Mirick, Paul H., Inventor; October 07, 2003; 14 pp.; In English

Patent Info.: Filed 29 Oct. 1999; US-Patent-6,629,341; US-Patent-Appl-SN-430677; NASA-Case-LAR-15816-1; No Copyright; Avail: CASI; A03, Hardcopy

A method for fabricating a piezoelectric macro-fiber composite actuator comprises providing a piezoelectric material that has two sides and attaching one side upon an adhesive backing sheet. The method further comprises slicing the piezoelectric material to provide a plurality of piezoelectric fibers in juxtaposition. A conductive film is then adhesively bonded to the other side of the piezoelectric material, and the adhesive backing sheet is removed. The conductive film has first and second conductive patterns formed thereon which are electrically isolated from one another and in electrical contact with the piezoelectric material. The first and second conductive patterns of the conductive film each have a plurality of electrodes to form a pattern of interdigitated electrodes. A second film is then bonded to the other side of the piezoelectric material. The second film may have a pair of conductive patterns similar to the conductive patterns of the first film.

Official Gazette of the U.S. Patent and Trademark Office

Piezoelectric Actuators; Fiber Composites; Fabrication

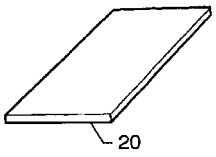


FIG. 1

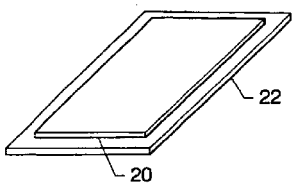


FIG. 2

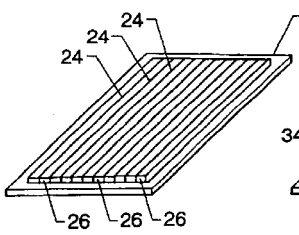


FIG. 3

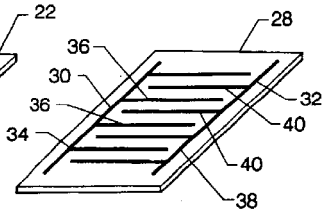


FIG. 4

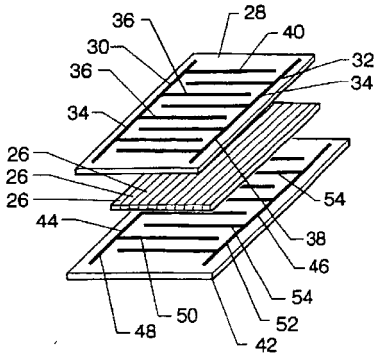


FIG. 5

20040013357 NASA Marshall Space Flight Center, Huntsville, AL, USA

Radio Frequency Trap for Containment of Plasmas in Antimatter Propulsion Systems Using Rotating Wall Electric Fields

Sims, William Herbert, III, Inventor; Martin, James Joseph, Inventor; Lewis, Raymond A., Inventor; December 23, 2003; 11 pp.; In English; Original contains black and white illustrations

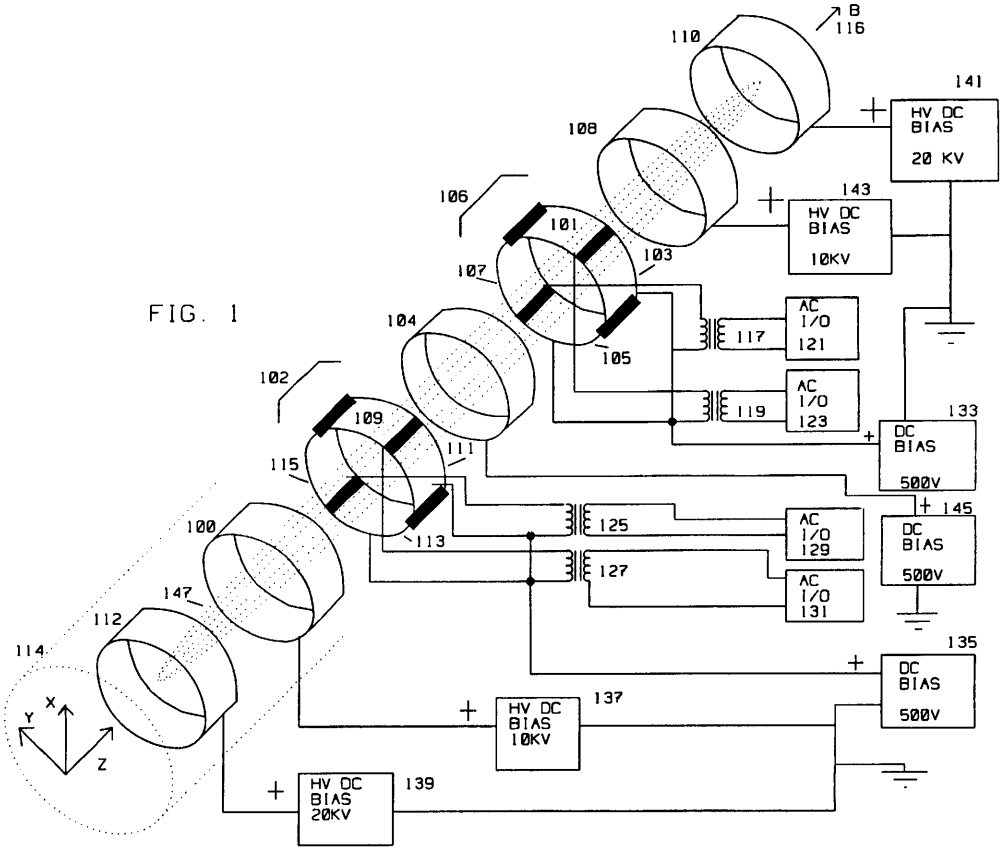
Patent Info.: Filed 31 Jan. 2003; US-Patent-6,667,487; US-Patent-Appl-SN-361034; NASA-Case-MFS-31780-1; No Copyright; Avail: CASI; A03, Hardcopy

A containment apparatus for containing a cloud of charged particles comprises a cylindrical vacuum chamber having a longitudinal axis. Within the vacuum chamber is a containment region. A magnetic field is aligned with the longitudinal axis of the vacuum chamber. The magnetic field is time invariant and uniform in strength over the containment region. An electric field is also aligned with the longitudinal axis of the vacuum chamber and the magnetic field. The electric field is time invariant, and forms a potential well over the containment region. One or more means are disposed around the cloud of particles for inducing a rotating electric field internal to the vacuum chamber. The rotating electric field imparts energy to the charged particles within the containment region and compress the cloud of particles. The means disposed around the outer surface of the vacuum chamber for inducing a rotating electric field are four or more segments forming a segmented ring, the segments confo&ng to the outer surface of the vacuum chamber. Each of the segments is energized by a separate alternating voltage. The sum of the voltages imposed on each segment establishes the rotating field. When four segments form a ring, the rotating field is obtained by a signal generator applying a sinusoidal signal phase delayed by 90,180 and 270 degrees in sequence to the four segments.

Official Gazette of the U.S. Patent and Trademark Office

Plasmas (Physics); Radio Frequencies; Matter-Antimatter Propulsion; Electric Fields; Rotation; Traps; Equipment

FIG. 1



20040016329 NASA Kennedy Space Center, Cocoa Beach, FL, USA

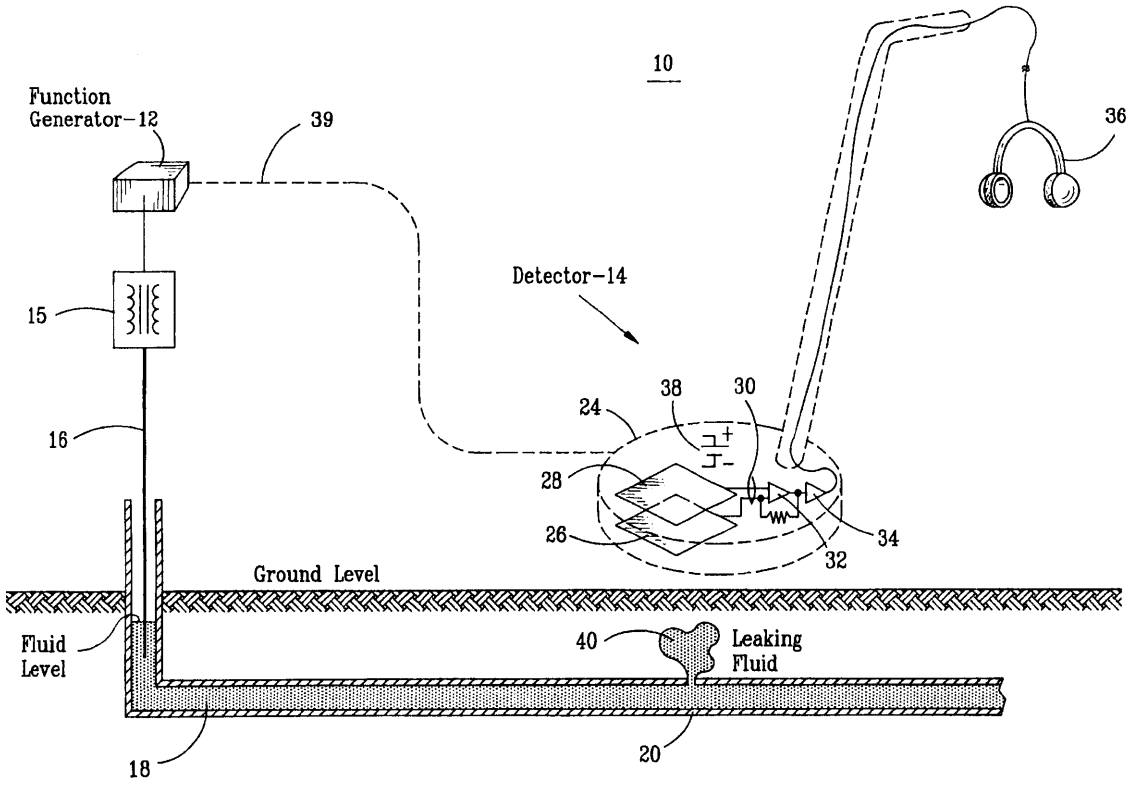
Leak and Pipe Detection Method and System

Youngquist, Robert C., Inventor; November 18, 2003; 6 pp.; In English

Patent Info.: Filed 6 Dec. 2001; US-Patent-6,650,125; US-Patent-Appl-SN-007487; NASA-Case-KSC-12255; No Copyright; Avail: CASI; A02, Hardcopy

A method and system for locating leaks of conductive fluids from non-conductive pipes and other structures or for locating non-conductive pipes or structures having conductive fluid contained therein, employ a charge generator to apply a time varying charge to the conductive fluid, and a capaci- tive type detector that can detect the variable charge that is induced in the fluid. The capacitive detector, which prefer- ably includes a handheld housing, employs a large conduc- tive pickup plate

that is used to locate the pipe or leak by scanning the plate over the ground and detecting the induced charge that is generated when the plate comes in close proximity to the pipe or leak. If a leak is encountered, the resulting signal will appear over an area larger than expected for a buried pipe, assuming the leak provides an electrically conductive path between the flow and the wet surrounding ground. The detector uses any suitable type of indicator device, such as a pair of headphones that enable an operator to hear the detected signal as a chirping sound, for example.
Author
Capacitors; Conducting Fluids; Signal Detectors



34
FLUID MECHANICS AND THERMODYNAMICS

Includes fluid dynamics and kinematics and all forms of heat transfer; boundary layer flow; hydrodynamics; hydraulics; fluidics; mass transfer and ablation cooling. For related information see also *02 Aerodynamics*.

20030068861 NASA Glenn Research Center, Cleveland, OH, USA
Stereo Imaging Velocimetry System and Method
McDowell, Mark, Inventor; August 05, 2003; 22 pp.; In English
Patent Info.: Filed 30 Aug. 2002; US-Patent-6,603,535; US-Patent-Appl-SN-232862; NASA-Case-LEW-17241-1; No Copyright; Avail: CASI; A03, Hardcopy

A system and a method is provided for measuring three dimensional velocities at a plurality of points in a fluid employing at least two cameras positioned approximately perpendicular to one another. Image frames captured by the cameras may be filtered using background subtraction with outlier rejection with spike-removal filtering. The cameras may calibrated to accurately represent image coordinates in a world coordinate system using calibration grids modified using warp transformations. The two-dimensional views of the cameras may be recorded fur image processing and particle track determination. The tracer particles may be tracked on a two-dimensional basis and then stereo matched to obtain three-dimensional locations of the particles as a function of time so that velocities can be measured there from.
Official Gazette of the U.S. Patent and Trademark Office
Velocity Measurement; Three Dimensional Motion; Cameras; Imaging Techniques

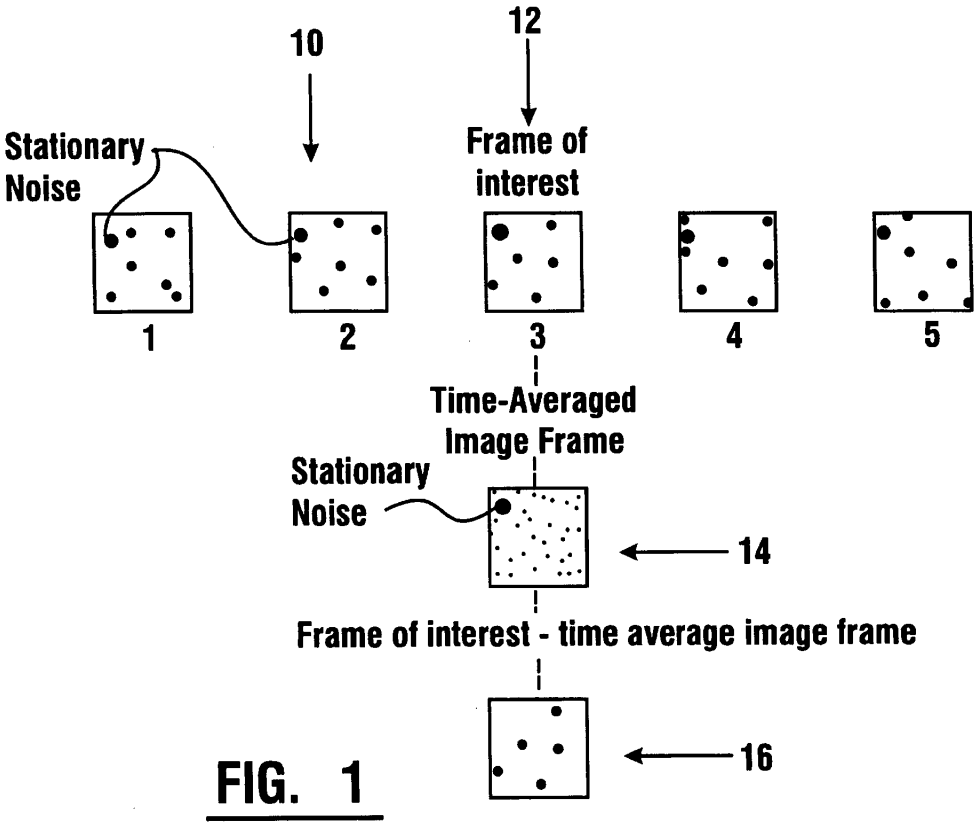


FIG. 1

20040015217 NASA Johnson Space Center, Houston, TX, USA

Measurement System and Method

Arndt, G. Dickey, Inventor; Ngo, Phong H., Inventor; Carl, James R., Inventor; Byerly, Kent A., Inventor; November 18, 2003; 25 pp.; In English

Patent Info.: Filed 14 Sep. 2001; US-Patent-6,650,280; US-Patent-Appl-SN-953612; US-Patent-Appl-SN-254642; NASA-Case-MSC-23311-1; No Copyright; Avail: CASI; A03, Hardcopy

System and methods are disclosed for fluid measurements which may be utilized to determine mass flow rates such as instantaneous mass flow of a fluid stream. In a preferred embodiment, the present invention may be utilized to compare an input mass flow to an output mass flow of a drilling fluid circulation stream. In one embodiment, a fluid flow rate is determined by utilizing a microwave detector in combination with an acoustic sensor. The acoustic signal is utilized to eliminate 2pi phase ambiguities in a reflected microwave signal. In another embodiment, a fluid flow rate may be determined by detecting a phase shift of an acoustic signal across two different predetermined transmission paths. A fluid density may be determined by detecting a calibrated phase shift of an acoustic signal through the fluid. In another embodiment, a second acoustic signal may be transmitted through the fluid to define a particular 2pi phase range which defines the phase shift. The present invention may comprise multiple transmitters/receivers operating at different frequencies to measure instantaneous fuel levels of cryogenic fuels within containers positioned in zero or near zero gravity environments. In one embodiment, a moveable flexible collar of transmitter/receivers may be utilized to determine inhomogenuities within solid rocket fuel tubes.

Official Gazette of the U.S. Patent and Trademark Office

Fluid Flow; Flow Velocity; Methodology; Acoustics; Measuring Instruments

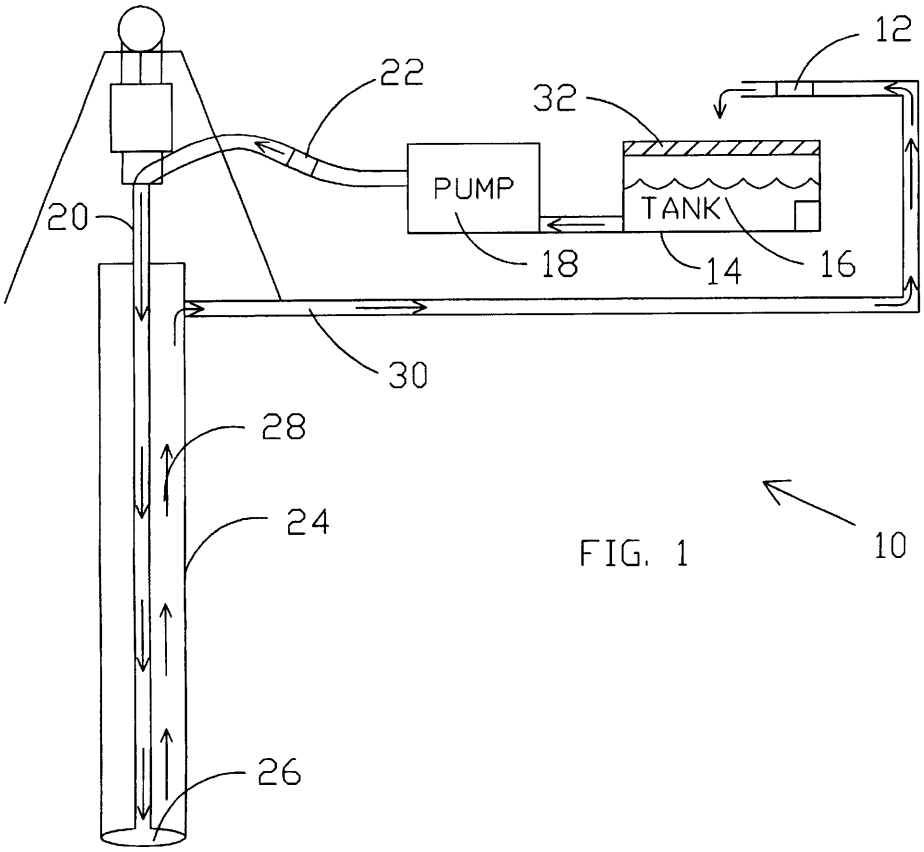


FIG. 1

35
INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography. For aerial photography see *43 Earth Resources and Remote Sensing*. For related information see also *06 Avionics and Aircraft Instrumentation*; and *19 Spacecraft Instrumentation and Astrionics*.

20030053086 NASA Marshall Space Flight Center, Huntsville, AL, USA

Video Image Stabilization and Registration

Hathaway, David H., Inventor; Meyer, Paul J., Inventor; May 06, 2003; 13 pp.; In English

Patent Info.: Filed May 10, 2002; US-Patent-6,560,375; US-Patent-Appl-SN-143539; US-Patent-Appl-SN-364919; US-Patent-Appl-SN-099056; NASA-Case-MFS-31243-2-CON; No Copyright; Avail: CASI; A03, Hardcopy

A method of stabilizing and registering a video image in multiple video fields of a video sequence provides accurate determination of the image change in magnification, rotation and translation between video fields, so that the video fields may be accurately corrected for these changes in the image in the video sequence. In a described embodiment, a key area of a key video field is selected which contains an image which it is desired to stabilize in a video sequence. The key area is subdivided into nested pixel blocks and the translation of each of the pixel blocks from the key video field to a new video field is determined as a precursor to determining change in magnification, rotation and translation of the image from the key video field to the new video field.

Author

Image Motion Compensation; Pattern Registration; Image Rotation; Magnification; Video Data; Field Of View

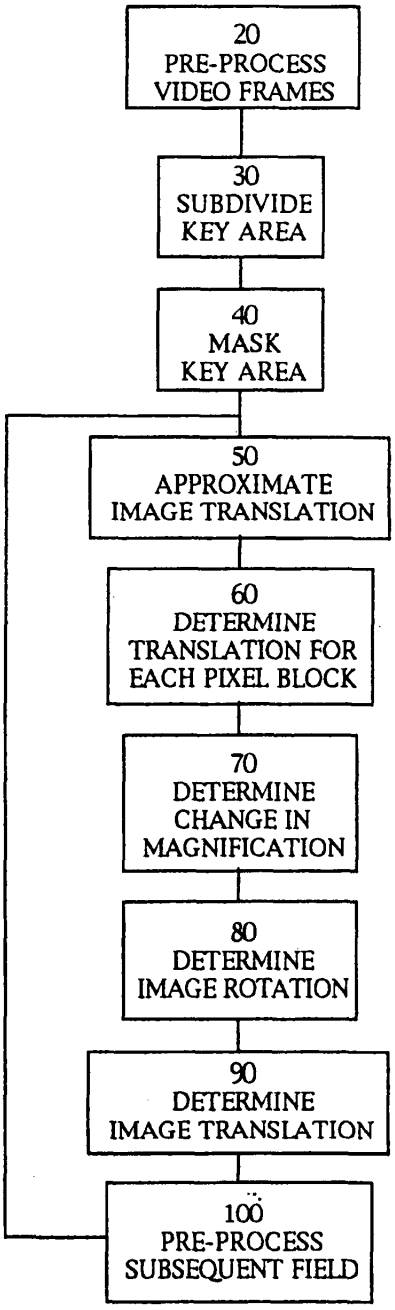


FIG. 1

20030068840 NASA Langley Research Center, Hampton, VA, USA

Edge Triggered Apparatus and Method for Measuring Strain in Bragg Gratings

Froggatt, Mark E., Inventor; May 20, 2003; 9 pp.; In English

Patent Info.: Filed 24 Mar. 2000; No Copyright; Avail: CASI; A02, Hardcopy

An apparatus and method for measuring strain of gratings written into an optical fiber. Optical radiation is transmitted over one or more contiguous predetermined wavelength ranges into a reference optical fiber network and an optical fiber network under test to produce a plurality of reference interference fringes and measurement interference fringes, respectively. The

reference and measurement fringes are detected, and the reference fringes trigger the sampling of the measurement fringes. This results in the measurement fringes being sampled at 2(pi) increments of the reference fringes. Each sampled measurement fringe of each wavelength sweep is transformed into a spatial domain waveform. The spatial domain waveforms are summed to form a summation spatial domain waveform that is used to determine location of each grating with respect to a reference reflector. A portion of each spatial domain waveform that corresponds to a particular grating is determined and transformed into a corresponding frequency spectrum representation. The strain on the grating at each wavelength of optical radiation is determined by determining the difference between the current wavelength and an earlier, zero-strain wavelength measurement. Official Gazette of the U.S. Patent and Trademark Office

Bragg Gratings; Frequency Distribution; Optical Properties; Radiation Spectra; Strain Measurement

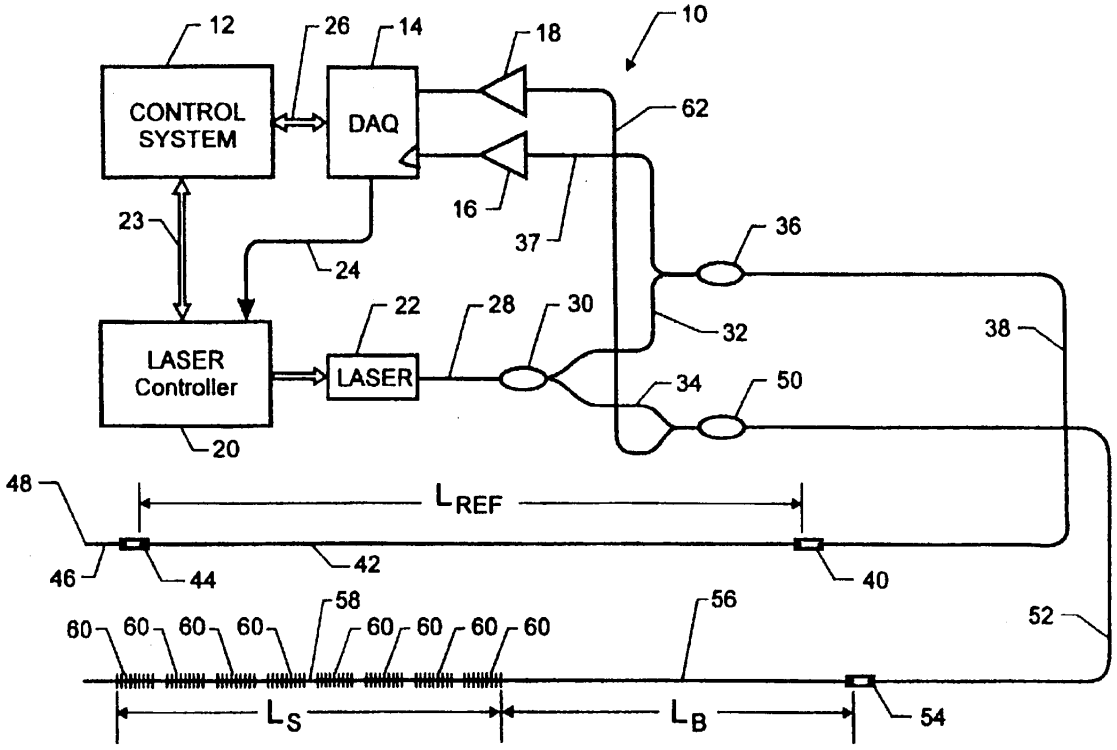


FIG. 1

20030068895 NASA Glenn Research Center, Cleveland, OH, USA

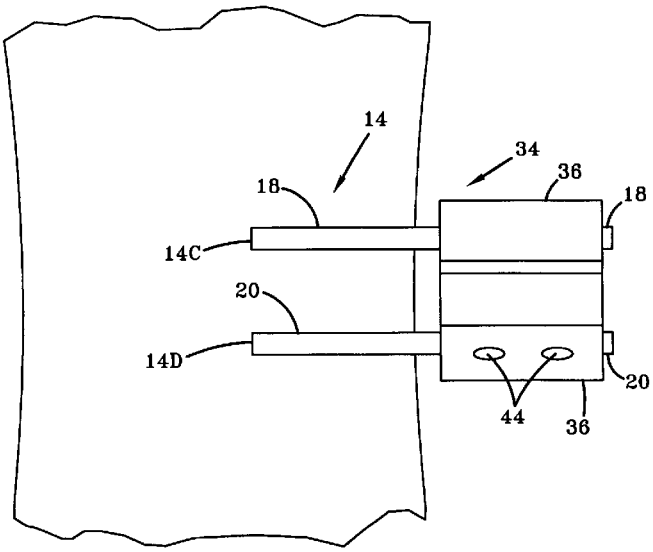
Capacitive Extensometer

Perusek, Gail P., Inventor; June 24, 2003; 21 pp.; In English

Patent Info.: Filed 7 May 2001; US-Patent-6,581,481; US-Patent-Appl-SN-853920; NASA-Case-LEW-16638-2; No Copyright; Avail: CASI; A03, Hardcopy

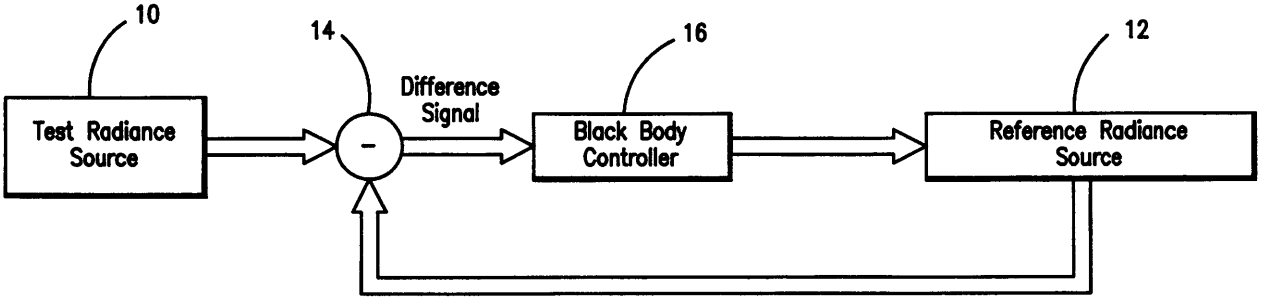
The present invention provides for measurements of the principal strain magnitudes and directions, and maximum shear strain that occurs in a porous specimen, such as plastic, ceramic or porous metal, when it is loaded (or subjected to a load). In one embodiment the invention includes a capacitive delta extensometer arranged with six sensors in a three piece configuration, with each sensor of each pair spaced apart from each other by a predetermined angle, such as 120 degrees. Official Gazette of the U.S. Patent and Trademark Office

Capacitance; Extensometers; Magnitude; Porosity; Shear Strain



20030068909 NASA Stennis Space Center, Bay Saint Louis, MS, USA
Radiant Temperature Nulling Radiometer
Ryan, Robert, Inventor; July 1, 2003; 13 pp.; In English
Patent Info.: Filed 4 May 2001; US-Patent-6,585,410; US-Patent-Appl-SN-849945; NASA-Case-SSC-00124; No Copyright; Avail: CASI; A03, Hardcopy

A self-calibrating nulling radiometer for non-contact temperature measurement of an object, such as a body of water, employs a black body source as a temperature reference, an optomechanical mechanism, e.g., a chopper, to switch back and forth between measuring the temperature of the black body source and that of a test source, and an infrared detection technique. The radiometer functions by measuring radiance of both the test and the reference black body sources; adjusting the temperature of the reference black body so that its radiance is equivalent to the test source; and, measuring the temperature of the reference black body at this point using a precision contact-type temperature sensor, to determine the radiative temperature of the test source. The radiation from both sources is detected by an infrared detector that converts the detected radiation to an electrical signal that is fed with a chopper reference signal to an error signal generator, such as a synchronous detector, that creates a precision rectified signal that is approximately proportional to the difference between the temperature of the reference black body and that of the test infrared source. This error signal is then used in a feedback loop to adjust the reference black body temperature until it equals that of the test source, at which point the error signal is nulled to zero. The chopper mechanism operates at one or more Hertz allowing minimization of l/f noise. It also provides pure chopping between the black body and the test source and allows continuous measurements.
Official Gazette of the U.S. Patent and Trademark Office
Body Temperature; Infrared Radiation; Radiometers; Infrared Detectors



20030112153 NASA Langley Research Center, Hampton, VA, USA
Single Vector Calibration System for Multi-Axis Load Cells and Method for Calibrating a Multi-Axis Load Cell
Parker, Peter A., Inventor; October 07, 2003; 19 pp.; In English

Patent Info.: Filed 8 Jan. 2001; US-Patent-6,629,446; US-Patent-Appl-SN-758115; NASA-Case-LAR-16020-1; No Copyright; Avail: CASI; A03, Hardcopy

A single vector calibration system is provided which facilitates the calibration of multi-axis load cells, including wind tunnel force balances. The single vector system provides the capability to calibrate a multi-axis load cell using a single directional load, for example loading solely in the gravitational direction. The system manipulates the load cell in three-dimensional space, while keeping the uni-directional calibration load aligned. The use of a single vector calibration load reduces the set-up time for the multi-axis load combinations needed to generate a complete calibration mathematical model. The system also reduces load application inaccuracies caused by the conventional requirement to generate multiple force vectors. The simplicity of the system reduces calibration time and cost, while simultaneously increasing calibration accuracy. Official Gazette of the U.S. Patent and Trademark Office

Calibrating; Weight Indicators; Measuring Instruments; Loads (Forces)

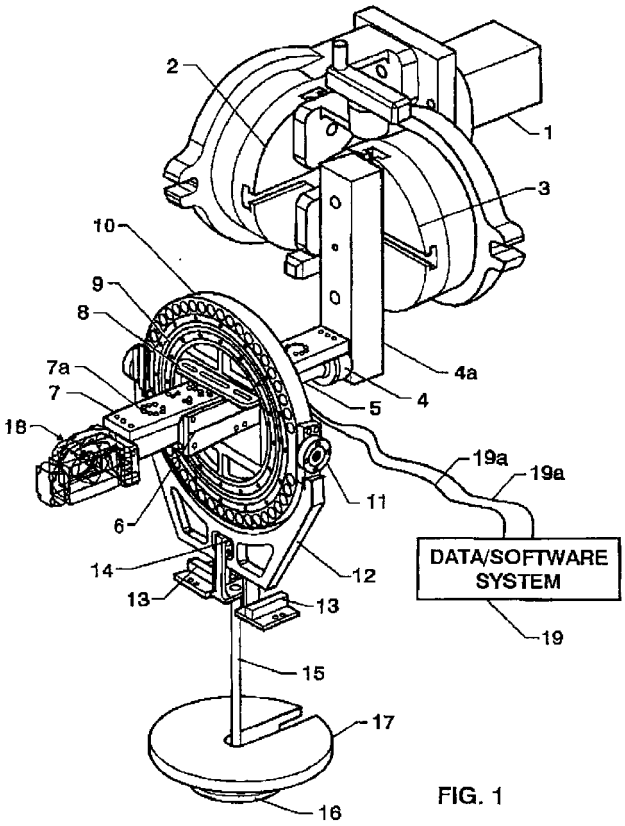


FIG. 1

20030112199 NASA Pasadena Office, CA, USA

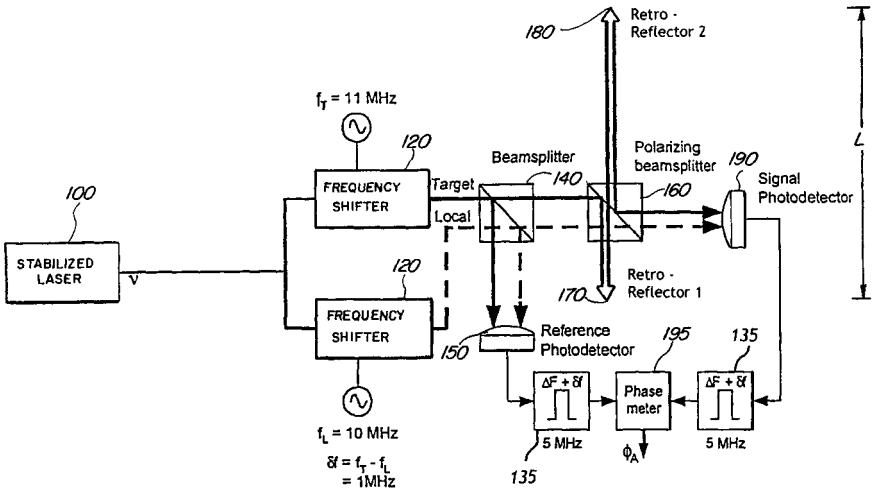
High Precision Laser Range Sensor

Dubovitsky, Serge, Inventor; Lay, Oliver P., Inventor; November 11, 2003; 8 pp.; In English

Patent Info.: Filed 7 May 2002; US-Patent-6,646,723; US-Patent-Appl-SN-143169; NASA-Case-NPO-30804; No Copyright; Avail: CASI; A02, Hardcopy

The present invention is an improved distance measuring interferometer that includes high speed phase modulators and additional phase meters to generate and analyze multiple heterodyne signal pairs with distinct frequencies. Modulation sidebands with large frequency separation are generated by the high speed electro-optic phase modulators, requiring only a single frequency stable laser source and eliminating the need for a fist laser to be tuned or stabilized relative to a second laser. The combination of signals produced by the modulated sidebands is separated and processed to give the target distance. The resulting metrology apparatus enables a sensor with submicron accuracy or better over a multi- kilometer ambiguity range. Official Gazette of the U.S. Patent and Trademark Office

Distance Measuring Equipment; Electro-Optics; Lasers; Modulators



20030112454 NASA Ames Research Center, Moffett Field, CA, USA

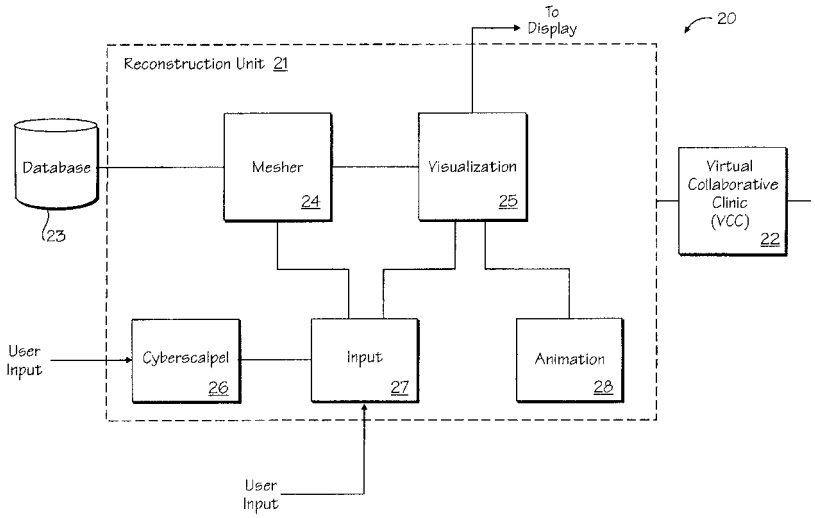
Method and Apparatus for Virtual Interactive Medical Imaging by Multiple Remotely-Located Users

Ross, Muriel D., Inventor; Twombly, Ian Alexander, Inventor; Senger, Steven O., Inventor; August 19, 2003; 38 pp.; In English; Avail: CASI; A03, Hardcopy

A virtual interactive imaging system allows the displaying of high-resolution, three-dimensional images of medical data to a user and allows the user to manipulate the images, including rotation of images in any of various axes. The system includes a mesh component that generates a mesh to represent a surface of an anatomical object, based on a set of data of the object, such as from a CT or MRI scan or the like. The mesh is generated so as to avoid tears, or holes, in the mesh, providing very high-quality representations of topographical features of the object, particularly at high- resolution. The system further includes a virtual surgical cutting tool that enables the user to simulate the removal of a piece or layer of a displayed object, such as a piece of skin or bone, view the interior of the object, manipulate the removed piece, and reattach the removed piece if desired. The system further includes a virtual collaborative clinic component, which allows the users of multiple, remotely-located computer systems to collaboratively and simultaneously view and manipulate the high-resolution, three-dimensional images of the object in real-time.

Author

Imaging Techniques; Rotation; High Resolution



20040000339 NASA Johnson Space Center, Houston, TX, USA

Detector Apparatus and Method

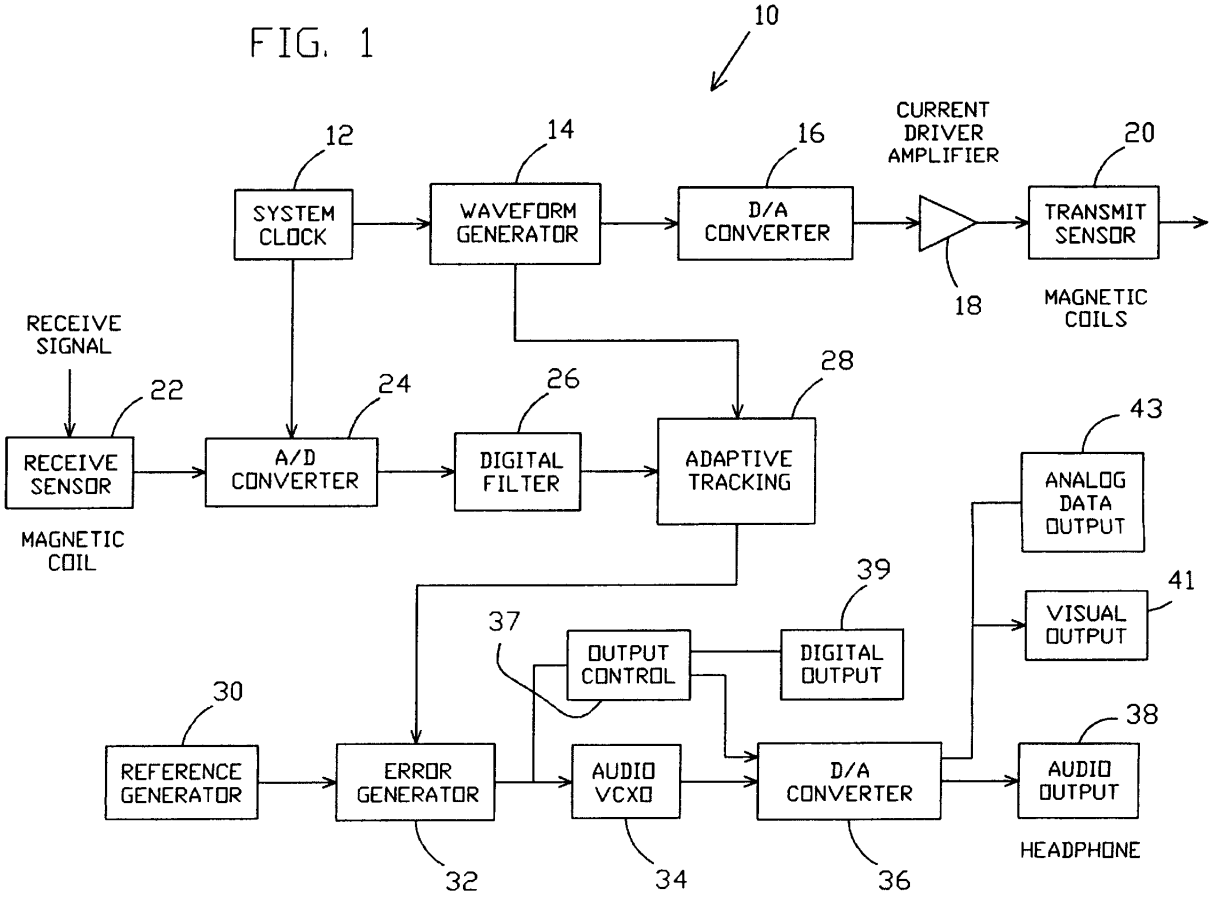
Arndt, G. Dickey, Inventor; Ngo, Phong H., Inventor; Carl, James R., Inventor; Byerly, Kent A., Inventor; Dusl, John, Inventor; May 06, 2003; 16 pp.; In English

Patent Info.: Filed 30 Oct. 2001; No Copyright; Avail: CASI; A03, Hardcopy

Transceiver and methods are included that are especially suitable for detecting metallic materials, such as metallic mines, within an environment. The transceiver includes a digital waveform generator used to transmit a signal into the environment and a receiver that produces a digital received signal. A tracking module preferably compares an in-phase and quadrature transmitted signal with an in-phase and quadrature received signal to produce a spectral transfer function of the magnetic transceiver over a selected range of frequencies. The transceiver initially preferably creates a reference transfer function which is then stored in a memory. Subsequently measured transfer functions will vary depending on the presence of metal in the environment which was not in the environment when the reference transfer function was determined. The system may be utilized in the presence of other antennas, metal, and electronics which may comprise a plastic mine detector for detecting plastic mines. Despite the additional antennas and other metallic materials that may be in the environment due to the plastic mine detector, the magnetic transceiver remains highly sensitive to metallic material which may be located in various portions of the environment and which may be detected by sweeping the detector over ground that may contain metals or mines.

Official Gazette of the U.S. Patent and Trademark Office

Mine Detectors; Transmitter Receivers; Waveforms; Transfer Functions



36
LASERS AND MASERS

Includes lasing theory, laser pumping techniques, maser amplifiers, laser materials, and the assessment of laser and maser outputs. For cases where the application of the laser or maser is emphasized see also the specific category where the application is treated. For related information see also *76 Solid-State Physics*.

20040015110 NASA Marshall Space Flight Center, Huntsville, AL, USA

Video Guidance Sensor System with Laser Rangefinder

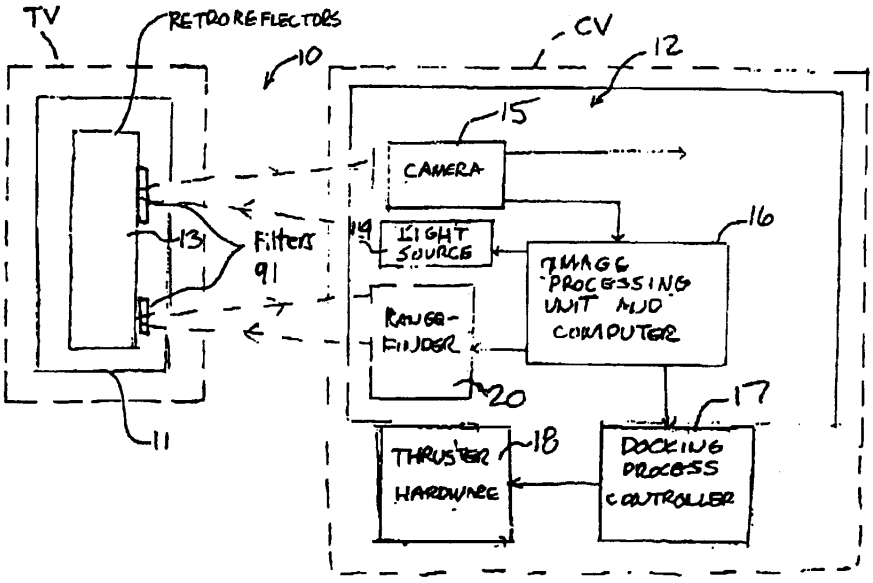
Howard, Richard T., Inventor; Johnston, Albert S., Inventor; Book, Michael L., Inventor; Bryan, Thomas C., Inventor; December 02, 2003; 7 pp.; In English

Patent Info.: Filed 2 May 2002; US-Patent-6,658,329; US-Patent-Appl-SN-138887; NASA-Case-MFS-31399-1; No Copyright; Avail: CASI; A02, Hardcopy

A video guidance sensor system for use in automated docking of a chase vehicle with a target vehicle wherein the chase. vehicle includes a laser rangefinder that uses pulse or phase time of flight measurement to measure distance. The laser rangefinder includes a diode laser pulse or phase driver that produces an output signal to a timing element and simultaneously operates a laser diode. The laser diode produces an intense light beam of a predetermined wavelength which is directed to retroreflectors that are positioned on a passive target. The laser rangefinder includes an avalanche photodetector that produces a corresponding output signal when detecting light reflected from the retroreflectors. The timing element measures a time interval between the output of the laser diode and the detection of light and supplies a corresponding output signal to a computer in order to determine the range of the target vehicle relative to the chase vehicle.

Official Gazette of the U.S. Patent and Trademark Office

Guidance Sensors; Laser Range Finders; Automatic Control; Video Signals



37
MECHANICAL ENGINEERING

Includes mechanical devices and equipment; machine elements and processes. For cases where the application of a device or the host vehicle is emphasized see also the specific category where the application or vehicle is treated. For robotics see *63 Cybernetics, Artificial Intelligence, and Robotics*; and *54 Man/System Technology and Life Support*.

20030068301 NASA Langley Research Center, Hampton, VA, USA

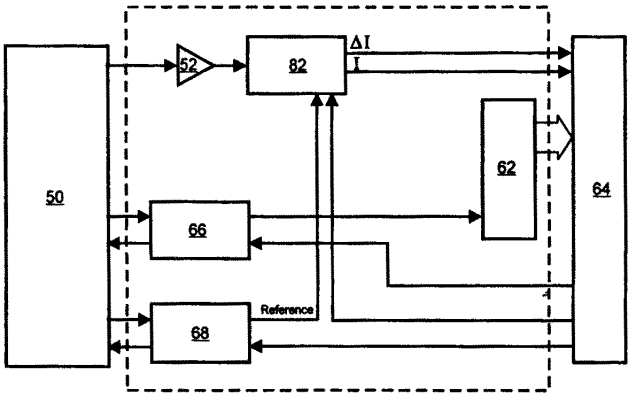
Method for Balancing Detector Output to a Desired Level of Balance at a Frequency

Sachse, Glenn W., Inventor; June 03, 2003; 20 pp.; In English

Patent Info.: Filed 28 Dec. 1999; US-Patent-6,574,031; US-Patent-Appl-SN-476347; US-Patent-Appl-SN-019473; US-Patent-Appl-SN-067917; NASA-Case-LAR-15361-2; No Copyright; Avail: CASI; A03, Hardcopy

A multi-gas sensor is provided which modulates a polarized light beam over a broadband of wavelengths between two

alternating orthogonal polarization components. The two orthogonal polarization components of the polarization modulated beam are directed along two distinct optical paths. At least one optical path contains one or more spectral discrimination elements, with each spectral discrimination element having spectral absorption features of one or more gases of interest being measured. The two optical paths then intersect, and one orthogonal component of the intersected components is transmitted and the other orthogonal component is reflected. The combined polarization modulated beam is partitioned into one or more smaller spectral regions of interest where one or more gases of interest has an absorption band. The difference in intensity between the two orthogonal polarization components is then determined in each partitioned spectral region of interest as an indication of the spectral emission/absorption of the light beam by the gases of interest in the measurement path. The spectral emission/absorption is indicative of the concentration of the one or more gases of interest in the measurement path. More specifically, one embodiment of the present invention is a gas filter correlation radiometer which comprises a polarizer, a polarization modulator, a polarization beam splitter, a beam combiner, wavelength partitioning element, and detection element. The gases of interest are measured simultaneously and, further, can be measured independently or non-independently. Furthermore, optical or electronic element are provided to balance optical intensities between the two optical paths.
Official Gazette of the U.S. Patent and Trademark Office
Gas Detectors; Light Beams; Polarized Light; Output; Polarizers; Frequency Distribution



20030068314 NASA Ames Research Center, Moffett Field, CA, USA
Masked Proportional Routing
Wolpert, David H., Inventor; June 10, 2003; 15 pp.; In English
Patent Info.: Filed 5 Aug. 1999; US-Patent-6,577,601; US-Patent-Appl-SN-369380; NASA-Case-ARC-14366-1; No Copyright; Avail: CASI; A03, Hardcopy

Distributed approach for determining a path connecting adjacent network nodes, for probabilistically or deterministically transporting an entity, with entity characteristic mu from a source node to a destination node. Each node i is directly connected to an arbitrary number J(mu) of nodes, labeled or numbered j=jl, j2, ... jJ(mu). In a deterministic version, a J(mu)-component baseline proportion vector p(i;mu) is associated with node i. A J(mu)-component applied proportion vector p*(i;mu) is determined from p(i;mu) to preclude an entity visiting a node more than once. Third and fourth J(mu)-component vectors, with components iteratively determined by Target(i;n(mu);mu),=alpha(mu).Target(i;n(mu)-1;mu)j+beta(mu).p* (i;mu)j and Actual(i;n(mu);+a(mu)j. Actual(i;n(mu)-l;mu)j+beta(mu).Sent(i;j'(mu);n(mu)-1;mu)j, are computed, where n(mu) is an entity sequence index and alpha(mu) and beta(mu) are selected numbers. In one embodiment, at each node i, the node j=j'(mu) with the largest vector component difference, Target(i;n(mu);mu)j'- Actual (i;n(mu);mu)j'. is chosen for the next link for entity transport, except in special gap circumstances, where the same link is optionally used for transporting consecutively arriving entities. The network nodes may be computer-controlled routers that switch collections of packets, frames, cells or other information units. Alternatively, the nodes may be waypoints for movement of physical items in a network or for transformation of a physical item. The nodes may be states of an entity undergoing state transitions, where allowed transitions are specified by the network and/or the destination node.
Official Gazette of the U.S. Patent and Trademark Office
Connectors; Communication Networks; Probability Theory; Nodes (Standing Waves)

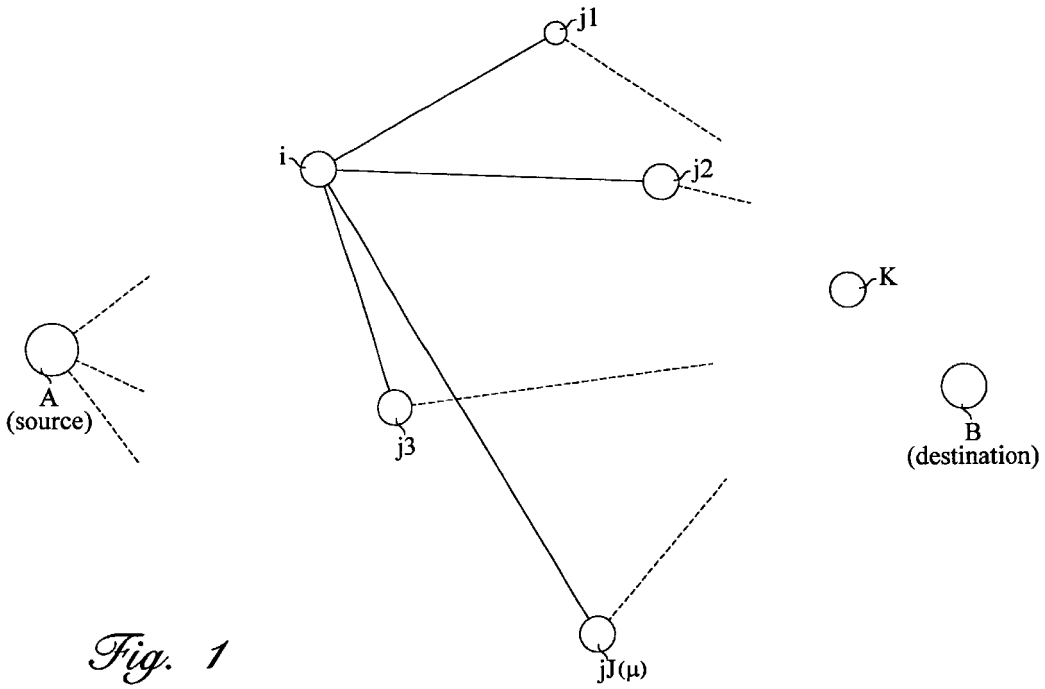
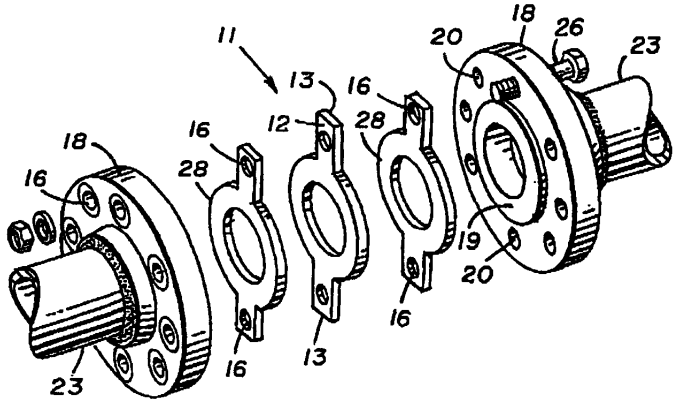


Fig. 1

20030068316 NASA Marshall Space Flight Center, Huntsville, AL, USA
Gasket Assembly for Sealing Mating Surfaces
Bryant, Melvin A., III, Inventor; June 17, 2003; 6 pp.; In English
Patent Info.: Filed 16 Oct. 2000; No Copyright; Avail: CASI; A02, Hardcopy

A pair of substantially opposed mating surfaces are joined to each other and sealed in place by means of an electrically-conductive member which is placed in proximity to the mating surfaces. The electrically-conductive member has at least one element secured thereto which is positioned to contact the mating surfaces, and which softens when the electrically-conductive member is heated by passing an electric current therethrough. The softened element conforms to the mating surfaces, and upon cooling of the softened element the mating surfaces are joined together in an effective seal. Of particular significance is an embodiment of the electrically-conductive member which is a gasket having an electrically-conductive gasket base and a pair of the elements secured to opposite sides of the gasket base. This embodiment is positioned between the opposed mating surfaces to be joined to each other. Also significant is an embodiment of the electrically-conductive member which is an electrically-conductive sleeve having an element secured to its inner surface. This embodiment surrounds cylindrical members the bases of which are the substantially opposed mating surfaces to be joined, and the element on the inner surface of the sleeve contacts the outer surfaces of the cylindrical members.
Author
Gaskets; Sealing; Bonding



20040000331 NASA Kennedy Space Center, Cocoa Beach, FL, USA

Liquid Galvanic Coatings for Protection of Imbedded Metals

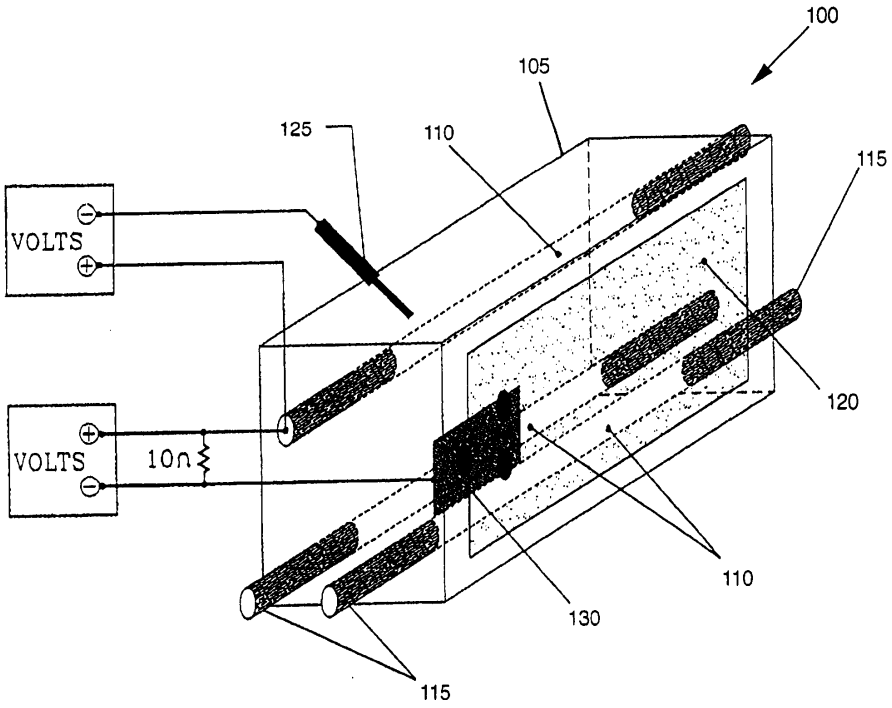
MacDowell, Louis G., Inventor; Curran, Joseph J., Inventor; September 30, 2003; 10 pp.; In English

Patent Info.: Filed 15 Oct. 2001; No Copyright; Avail: CASI; A02, Hardcopy

Coating compositions and methods of their use are described herein for the reduction of corrosion in imbedded metal structures. The coatings are applied as liquids to an external surface of a substrate in which the metal structures are imbedded. The coatings are subsequently allowed to dry. The liquid applied coatings provide galvanic protection to the imbedded metal structures. Continued protection can be maintained with periodic reapplication of the coating compositions, as necessary, to maintain electrical continuity. Because the coatings may be applied using methods similar to standard paints, and because the coatings are applied to external surfaces of the substrates in which the metal structures are imbedded, the corresponding corrosion protection may be easily maintained. The coating compositions are particularly useful in the protection of metal-reinforced concrete.

Official Gazette of the U.S. Patent and Trademark Office

Coatings; Corrosion Prevention; Metals



20040000332 NASA Langley Research Center, Hampton, VA, USA

Fast-Acting Valve

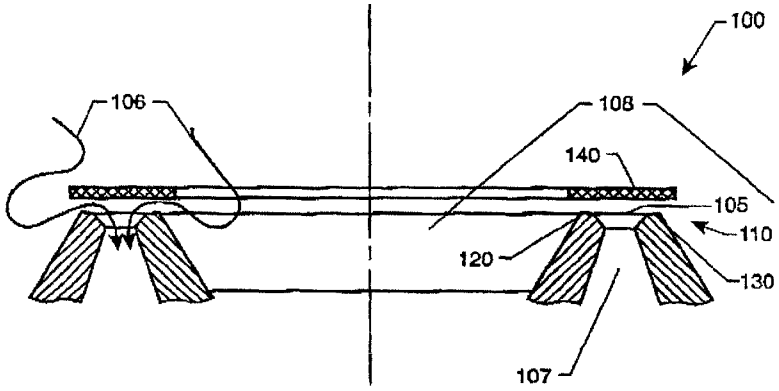
Wojciechowski, Bogdan V., Inventor; Pegg, Robert J., Inventor; September 16, 2003; 24 pp.; In English

Patent Info.: Filed 27 Jul. 2000; US-Patent-6,619,322; US-Patent-Appl-SN-628100; NASA-Case-LAR-15642-1; No Copyright; Avail: CASI; A03, Hardcopy

A fast-acting valve includes an annular valve seat that defines an annular valve orifice between the edges of the annular valve seat, an annular valve plug sized to cover the valve orifice when the valve is closed, and a valve-plug holder for moving the annular valve plug on and off the annular valve seat. The use of an annular orifice reduces the characteristic distance between the edges of the valve seat. Rather than this distance being equal to the diameter of the orifice, as it is for a conventional circular orifice, the characteristic distance equals the distance between the inner and outer radii (for a circular annulus). The reduced characteristic distance greatly reduces the gap required between the annular valve plug and the annular valve seat for the valve to be fully open, thereby greatly reducing the required stroke and corresponding speed and acceleration of the annular valve plug. The use of a valve-plug holder that is under independent control to move the annular valve plug between its open and closed positions is important for achieving controllable fast operation of the valve.

Official Gazette of the U.S. Patent and Trademark Office

Valves; Ring Structures; Orifices



20040000694 NASA Johnson Space Center, Houston, TX, USA

Inflatable Vessel and Method

Raboin, Jasen L., Inventor; Valle, Gerard D., Inventor; Edeen, Gregg A., Inventor; delaFuente, Horacio M., Inventor; Schneider, William C., Inventor; Spexarth, Gary R., Inventor; Pandya, Shalini Gupta, Inventor; Johnson, Christopher J., Inventor; April 15, 2003; 41 pp.; In English

Patent Info.: Filed 2 Apr. 2001; US-Patent-6,547,189; US-Patent-Appl-SN-826403; US-Patent-Appl-SN-236785; US-Patent-Appl-SN-217325; NASA-Case-MSC-23092-1; No Copyright; Avail: CASI; A03, Hardcopy

An inflatable module comprising a structural core and an inflatable shell, wherein the inflatable shell is sealingly attached to the structural core. In its launch or pre-deployed configuration, the wall thickness of the inflatable shell is collapsed by vacuum. Also in this configuration, the inflatable shell is collapsed and efficiently folded around the structural core. Upon deployment, the wall thickness of the inflatable shell is inflated; whereby the inflatable shell itself, is thereby inflated around the structural core, defining therein a large enclosed volume. A plurality of removable shelves are arranged interior to the structural core in the launch configuration. The structural core also includes at least one longeron that, in conjunction with the shelves, primarily constitute the rigid, strong, and lightweight load-bearing structure of the module during launch. The removable shelves are detachable from their arrangement in the launch configuration so that, when the module is in its deployed configuration and launch loads no longer exist, the shelves can be rearranged to provide a module interior arrangement suitable for human habitation and work. In the preferred embodiment, to provide efficiency in structural load paths and attachments, the shape of the inflatable shell is a cylinder with semi-toroidal ends.

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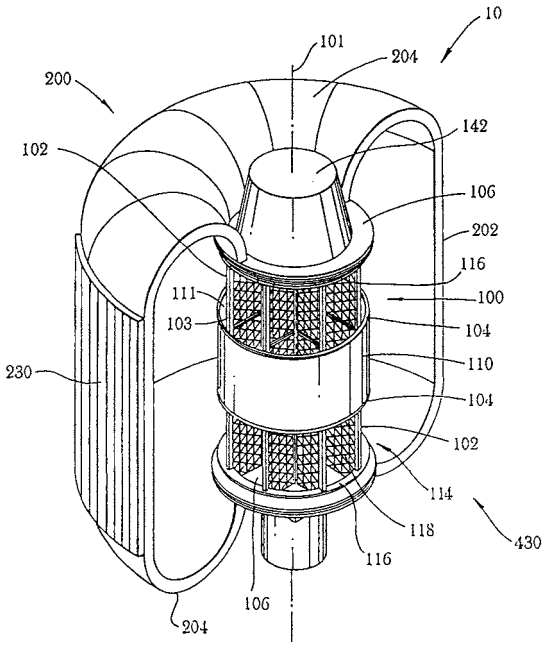
Inflatable Structures; Modules; Cylindrical Shells; Toroidal Shells



20040000696 NASA Johnson Space Center, Houston, TX, USA

Method of Constructing a Microwave Antenna

Arndt, G. Dickey, Inventor; Carl, James, Inventor; Ngo, Phong, Inventor; January 28, 2003; 14 pp.; In English; No Copyright; Avail: CASI; A03, Hardcopy

A method, simulation, and apparatus are provided that are highly suitable for treatment of benign prostatic hyperplasia (BPH). A catheter is disclosed that includes a small diameter disk loaded monopole antenna surrounded by fusion material having a high heat of fusion and a melting point preferably at or near body temperature. Microwaves from the antenna heat prostatic tissue to promote necrosing of the prostatic tissue that relieves the pressure of the prostatic tissue against the urethra as the body reabsorbs the necrosed or dead tissue. The fusion material keeps the urethra cool by means of the heat of fusion of the fusion material. This prevents damage to the urethra while the prostatic tissue is necrosed. A computer simulation is provided that can be used to predict the resulting temperature profile produced in the prostatic tissue. By changing the various control features of the catheter and method of applying microwave energy a temperature profile can be predicted and produced that is similar to the temperature profile desired for the particular patient.

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Microwave Antennas; Methodology; Computerized Simulation

FIG. 1

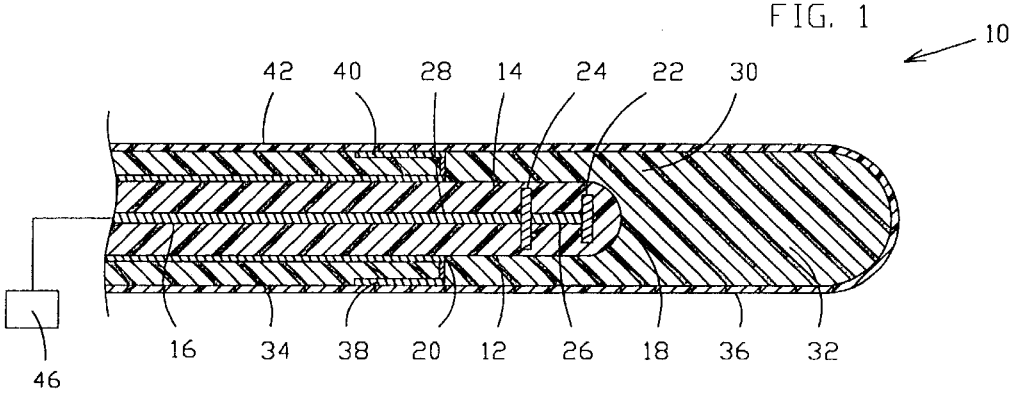


FIG. 2

	FREQ	TIME	DEPTH												
	KHZ	SECONDS	1	2	3	4	5	6	7	8	9	10	11	12	13
EXAMPLE 1	918	120	38	51	56	57	56	55	53	51	49	47	46	44	43
EXAMPLE 2	918	180	38	51	57	58	58	57	55	53	51	49	48	46	45
EXAMPLE 3	450	120	38	50	55	56	56	54	53	51	49	47	46	44	43

TEMP °C

20040013331 NASA Pasadena Office, CA, USA

Chromatic Modulator for High Resolution CCD or APS Devices

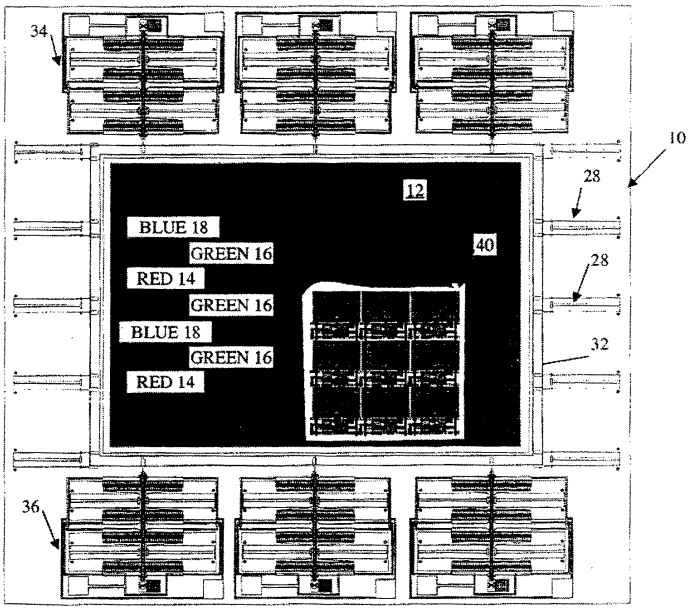
Hartley, Frank T., Inventor; Hull, Anthony B., Inventor; December 23, 2003; 10 pp.; In English

Patent Info.: Filed 1 Mar. 2002; US-Patent-6,667,826; US-Patent-Appl-SN-087683; NASA-Case-NPO-20896; No Copyright; Avail: CASI; A02, Hardcopy

A system for providing high-resolution color separation in electronic imaging. Comb drives controllably oscillate a red-green-blue (RGB) color strip filter system (or otherwise) over an electronic imaging system such as a charge-coupled device (CCD) or active pixel sensor (APS). The color filter is modulated over the imaging array at a rate three or more times the frame rate of the imaging array. In so doing, the underlying active imaging elements are then able to detect separate color-separated images, which are then combined to provide a color-accurate frame which is then recorded as the representation of the recorded image. High pixel resolution is maintained. Registration is obtained between the color strip filter and the underlying imaging array through the use of electrostatic comb drives in conjunction with a spring suspension system.

Official Gazette of the U.S. Patent and Trademark Office

Charge Coupled Devices; Pixels; Sensors; Modulators; High Resolution; Color



20040013344 NASA Marshall Space Flight Center, Huntsville, AL, USA

Fabrication of Large Bulk High Temperature Superconducting Articles

Koczor, Ronald, Inventor; Hiser, Robert A., Inventor; November 25, 2003; 4 pp.; In English

Patent Info.: Filed 20 Dec. 2001; US-Patent-6,653,259; US-Patent-Appl-SN-028295; NASA-Case-MFS-31380-1; No Copyright; Avail: CASI; A01, Hardcopy

A method of fabricating large bulk high temperature superconducting articles which comprises the steps of selecting predetermined sizes of crystalline superconducting materials and mixing these specific sizes of particles into a homogeneous mixture which is then poured into a die. The die is placed in a press and pressurized to predetermined pressure for a predetermined time and is heat treated in the furnace at predetermined temperatures for a predetermined time. The article is left in the furnace to soak at predetermined temperatures for a predetermined period of time and is oxygenated by an oxygen source during the soaking period.

Official Gazette of the U.S. Patent and Trademark Office

Fabrication; Superconductors (Materials); Refractory Materials; Crystallinity

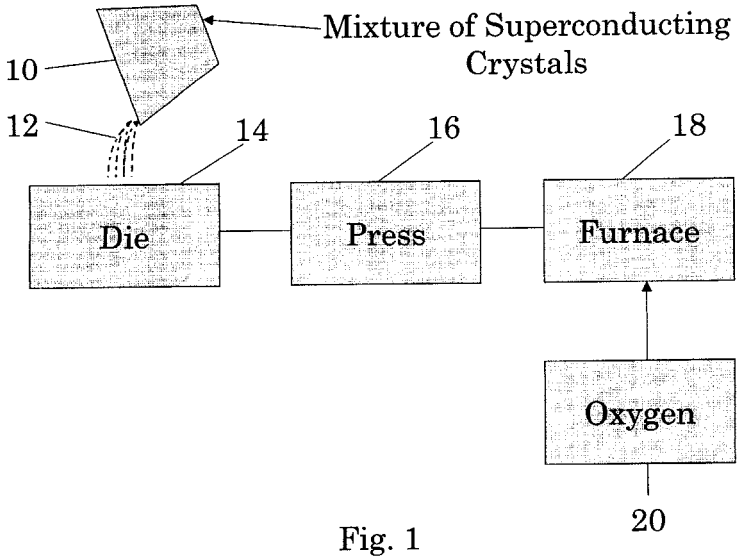


Fig. 1

20040013345 NASA Glenn Research Center, Cleveland, OH, USA

Silicon Carbide High Temperature Anemometer and Method for Assembling the Same

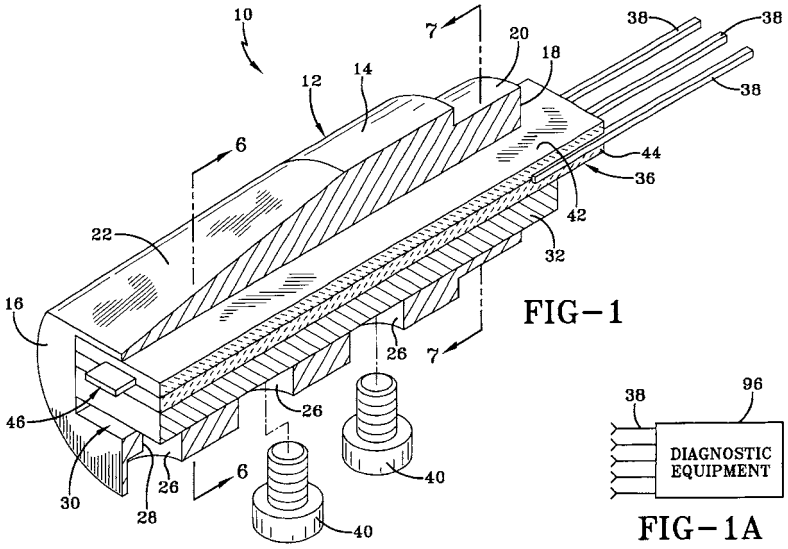
Okojie, Robert S., Inventor; Fralick, Gustave C., Inventor; Saad, George J., Inventor; November 18, 2003; 10 pp.; In English

Patent Info.: Filed 29 Apr. 2002; US-Patent-6,647,809; US-Patent Appl-SN-233182; NASA-Case-LEW-17222-1; No Copyright; Avail: CASI; A02, Hardcopy

A high temperature anemometer includes a pair of substrates. One of the substrates has a plurality of electrodes on a facing surface, while the other of the substrates has a sensor cavity on a facing surface. A sensor is received in the sensor cavity, wherein the sensor has a plurality of bondpads, and wherein the bond pads contact the plurality of electrodes when the facing surfaces are mated with one another. The anemometer further includes a plurality of plug-in pins, wherein the substrate with the cavity has a plurality of trenches with each one receiving a plurality of plug-in pins. The plurality of plug-in pins contact the plurality of electrodes when the substrates are mated with one another. The sensor cavity is at an end of one of the substrates such that the sensor partially extends from the substrate. The sensor and the substrates are preferably made of silicon carbide.

Official Gazette of the U.S. Patent and Trademark Office

Silicon Carbides; Anemometers; High Temperature; Sensors



FIG−1

FIG−1A

20040013356 NASA Glenn Research Center, Cleveland, OH, USA

Radio Frequency Telemetry System for Sensors and Actuators

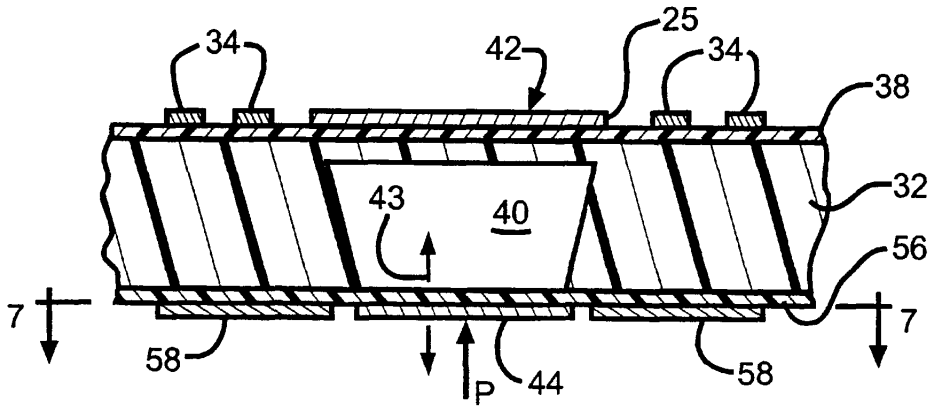
Simons, Rainee N., Inventor; Miranda, Felix A., Inventor; December 23, 2003; 11 pp.; In English; Original contains black and white illustrations

Patent Info.: Filed 20 Aug. 2002; US-Parent-6,667,725; US-Patent-Appl-SN-196391; NASA-Case-LEW-17167-1; No Copyright; Avail: CASI; A03, Hardcopy

The present invention discloses and teaches apparatus for combining Radio Frequency (RF) technology with novel micro-inductor antennas and signal processing circuits for RF telemetry of real time, measured data, from microelectromechanical system (MEMS) sensors, through electromagnetic coupling with a remote poweringheceiving device. Such technology has many applications, but is especially useful in the biomedical area.

Official Gazette of the U.S. Patent and Trademark Office

Telemetry; Radio Frequencies; Actuators; Sensors



20040013498 NASA Goddard Space Flight Center, Greenbelt, MD, USA

Fiber Optic Connector Polishing Fixture Assembly

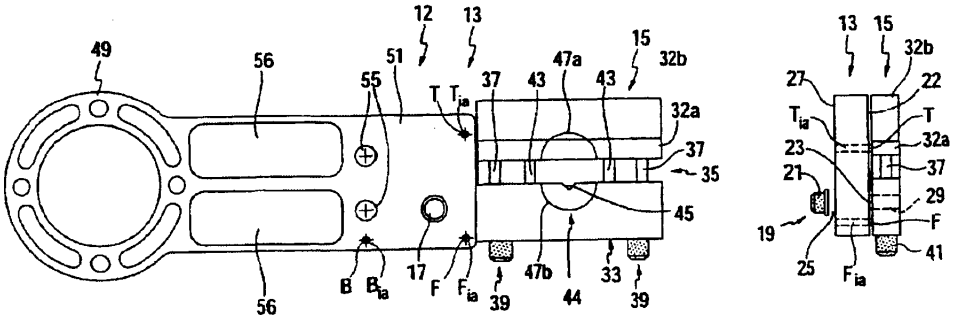
Kolasinski, John R., Inventor; Moszczienski, Joseph Roch, Inventor; November 18, 2003; 18 pp.; In English; Original contains black and white illustrations

Patent Info.: Filed 13 Mar. 2001; US-Patent-6,648,522; US-Patent-Appl-SN-804646; NASA-Case-GSC-14064-1; No Copyright; Avail: CASI; A03, Hardcopy

A fiber optic connector polishing fixture assembly for sup- porting a terminus of a fiber optic cable before a polishing surface. The assembly comprises: a fiber optic polishing fixture adapted to support the terminus before the polishing surface; a fixture support connected to the fixture for sup- porting the fixture before the polishing surface; and an adjustable connection between the fixture and the fixture support having user accessible adjustment controls for allowing a user to operate the controls to shift the fixture and fixture support relative to one another for substantially eliminating an apex offset of the terminus with respect to the polishing surface.

Official Gazette of the U.S. Patent and Trademark Office

Fiber Optics; Polishing; Fixtures



20040015111 NASA Goddard Space Flight Center, Greenbelt, MD, USA

1-Way Bearing

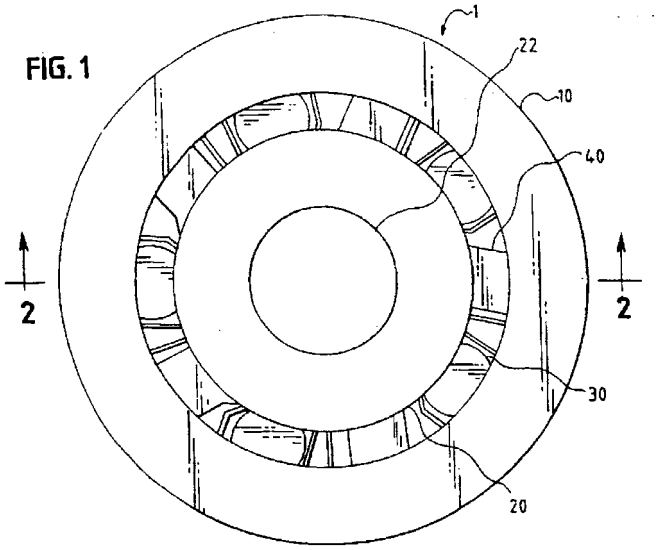
Vranish, John M., Inventor; November 04, 2003; 14 pp.; In English

Patent Info.: Filed 1 Mar. 2002; US-Patent-6,640,949; US-Patent-Appl-SN-095343; US-Patent-Appl-SN-273478; NASA-Case-GSC-13905-1; No Copyright; Avail: CASI; A03, Hardcopy

A one-way bearing is provided having sprags and rolling bearings both disposed between an inner and an outer race. The sprags may comprise three-dimensional sprags for preventing rotation in a non-preferential direction. The roll- ing bearings may comprise thrust rollers for transmitting axial, tilt, and radial loads between the inner and outer races.

Official Gazette of the U.S. Patent and Trademark Office

Bearings; Rotation



20040015211 NASA Marshall Space Flight Center, Huntsville, AL, USA

Solar Powered Automobile Interior Climate Control System

Howard, Richard T., Inventor; December 16, 2003; 9 pp.; In English

Patent Info.: Filed 30 Dec. 2002; US-Patent-6,662,572; US-Patent-Appl-SN-340380; NASA-Case-MFS-31751; No Copyright; Avail: CASI; A02, Hardcopy

There is provided a climate control system for a parked vehicle that includes a solar panel, thermostatic switch, fans, and thermoelectric coolers. The solar panel can serve as the sole source of electricity for the system. The system affords convenient installation and removal by including solar panels that are removably attached to the exterior of a vehicle. A connecting wire electrically connects the solar panels to a housing that is removably mounted to a partially opened window on the vehicle. The thermostatic switch, fans, and thermoelectric coolers are included within the housing. The thermostatic switch alternates the direction of the current flow through the thermoelectric coolers to selectively heat or cool the interior of the vehicle. The interior surface of the thermoelectric coolers are in contact with interior heat sinks that have air circulated across them by an interior fan. Similarly, the exterior surface of the thermoelectric coolers are in contact with exterior heat sinks that have air circulated across them by an exterior fan.

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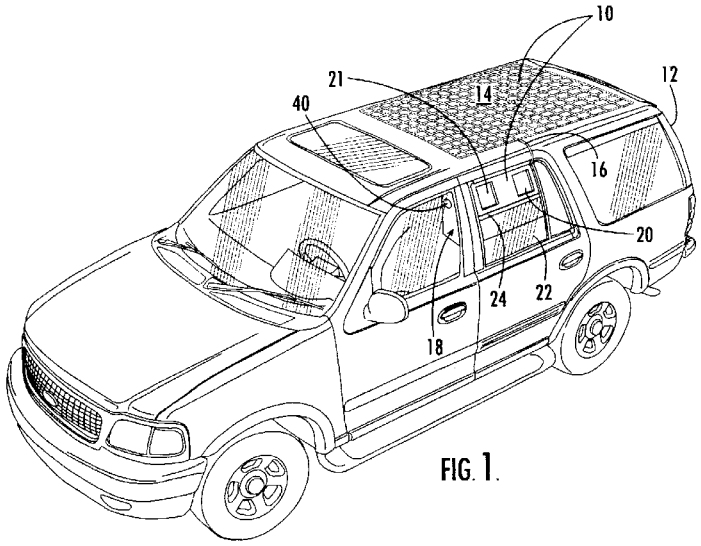
Automobiles; Climate; Solar Cells; Control Systems Design



20040015213 NASA Glenn Research Center, Cleveland, OH, USA

Heat Treatment Devices and Method of Operation Thereof to Produce Dual Microstructure Superalloys Disks

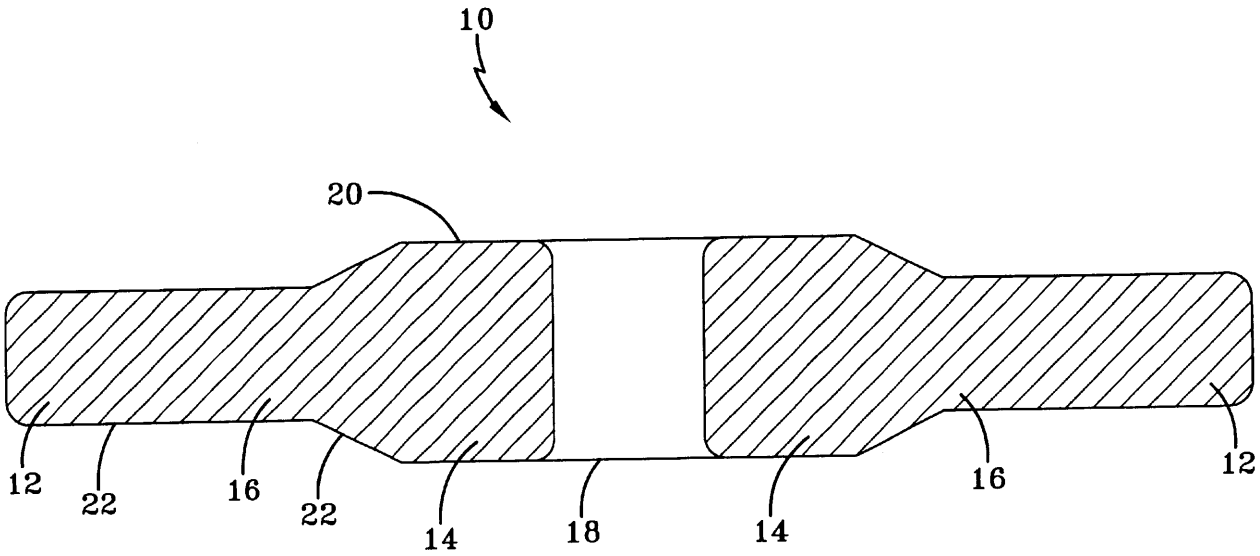
Gayda, John, Inventor; Gabb, Timothy P., Inventor; Kantzos, Peter T., Inventor; December 9, 2003; 10 pp.; In English; Original contains black and white illustrations

Patent Info.: Filed 8 Apr. 2002; US-Patent-6,660,110; US-Patent-Appl-SN-118625; NASA-Case-LEW-17206-1; No Copyright; Avail: CASI; A02, Hardcopy

A heat treatment assembly and heat treatment methods are disclosed for producing different microstructures in the bore and rim portions of nickel-based superalloy disks, particu- larly suited for gas turbine applications. The heat treatment assembly is capable of being removed from the furnace and disassembled to allow rapid fan or oil quenching of the disk. For solutioning heat treatments of the disk, temperatures higher than that of this solvus temperature of the disk are used to produce coarse grains in the rim of each disk so as to give maximum creep and dwell crack resistance at the rim service temperature. At the same time, solution temperature lower than the solvus temperature of the disk are provided to produce fine grain in the bore of the disk so as to give maximum strength and low cycle fatigue resistance.

Author

Heat Treatment; Nickel Alloys; Heat Resistant Alloys; Heating Equipment



20040015214 NASA Johnson Space Center, Houston, TX, USA

Medium Frequency Pseudo Noise Geological Radar

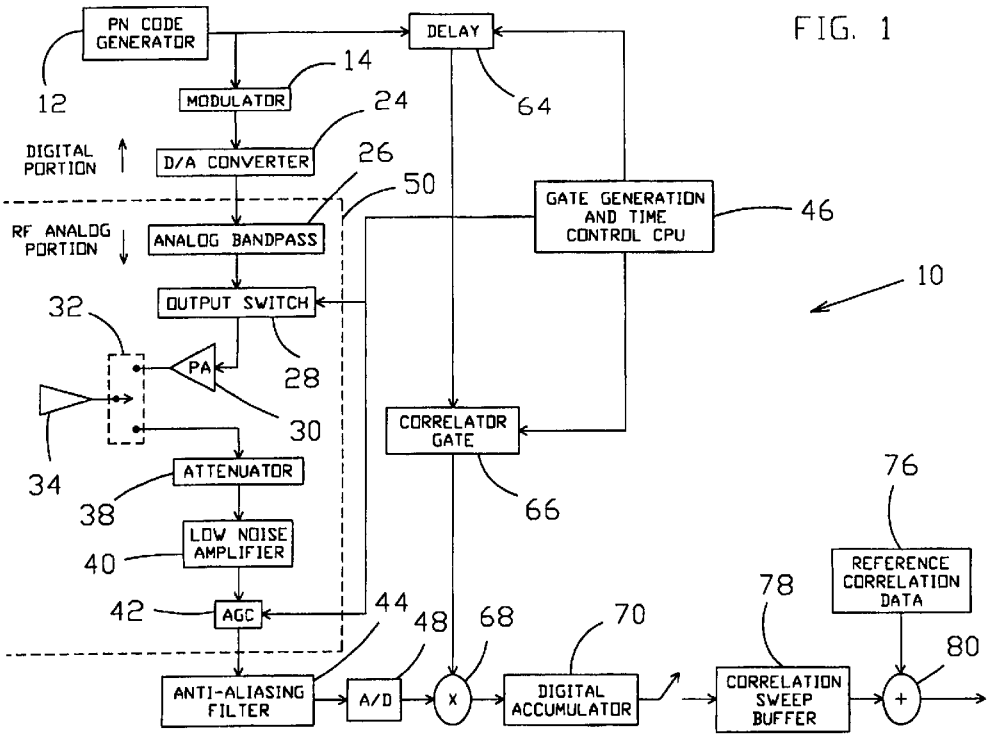
Arndt, G. Dickey, Inventor; Carl, James R., Inventor; Byerly, Kent A., Inventor; Amini, B. Jon, Inventor; November 25, 2003; 19 pp.; In English

Patent Info.: Filed 21 Feb. 2002; US-Patent-6,651,739; US-Patent-Appl-SN-793817; NASA-Case-MSC-23029-1; No Copyright; Avail: CASI; A03, Hardcopy

System and methods are disclosed for transmitting and receiving electromagnetic pulses through a geological formation. A preferably programmable transmitter having an all-digital portion in a preferred embodiment may be operated at frequencies below 1 MHz without loss of target resolution by transmitting and over sampling received long PN codes. A gated and stored portion of the received signal may be correlated with the PN code to determine distances of interfaces within the geological formation, such as the distance of a water interfaces from a wellbore. The received signal is oversampled preferably at rates such as five to fifty times as high as a carrier frequency. In one method of the invention, an oil well with multiple production zones may be kept in production by detecting an approaching water front in one of the production zones and shutting down that particular production zone thereby permitting the remaining production zones to continue operating.

Official Gazette of the U.S. Patent and Trademark Office

Electromagnetic Pulses; Geology; Radar Transmission; Frequency Distribution; Noise (Sound)



20040015216 NASA Kennedy Space Center, Cocoa Beach, FL, USA

Method and Apparatus for Characterizing Pressure Sensors using Modulated Light Beam Pressure

Youngquist, Robert C., Inventor; November 25, 2003; 5 pp.; In English

Patent Info.: Filed 12 Oct. 2001; US-Patent-6,651,481; US-Patent-Appl-SN-983045; NASA-Case-KSC-12183; No Copyright; Avail: CASI; A01, Hardcopy

Embodiments of apparatuses and methods are provided that use light sources instead of sound sources for characterizing and calibrating sensors for measuring small pressures to mitigate many of the problems with using sound sources. In one embodiment an apparatus has a light source for directing a beam of light on a sensing surface of a pressure sensor for exerting a force on the sensing surface. The pressure sensor generates an electrical signal indicative of the force exerted on the sensing surface. A modulator modulates the beam of light. A signal processor is electrically coupled to the pressure sensor for receiving the electrical signal.

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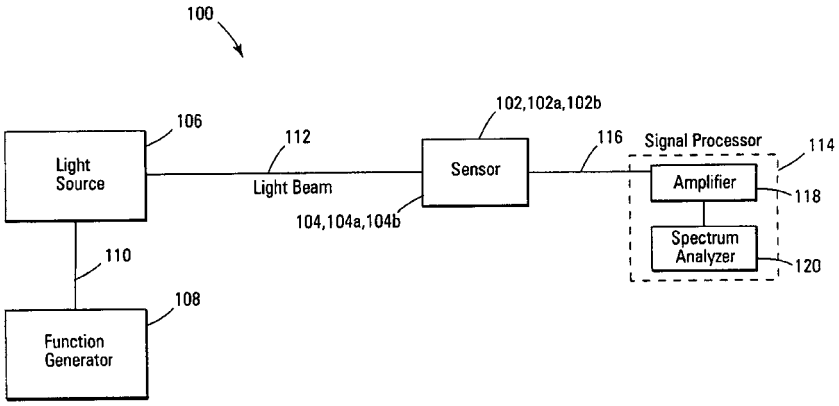
Light Beams; Light Sources; Pressure Sensors; Modulators; Methodology; Measuring Instruments



Includes general research topics related to plant and animal biology (non-human); ecology; microbiology; and also the origin, development, structure, and maintenance of animals and plants in space and related environmental conditions. For specific topics in life sciences see *categories 52 through 55*.

20030068889 NASA Glenn Research Center, Cleveland, OH, USA

Removal of Biologically Active Organic Contaminants using Atomic Oxygen

Banks, Bruce A., Inventor; Banks, Michael A., Inventor; Banks, Eric B., Inventor; May 06, 2003; 12 pp.; In English

Patent Info.: Filed 23 Jun. 2000; US-Patent-6,558,621; US-Patent-Appl-SN-606227; NASA-Case-LEW-161871-1; No Copyright; Avail: CASI; A03, Hardcopy

Biomedical devices that are to come into contact with living tissue, such as prosthetic and other implants for the human body and the containers used to store and transport them, are together cleaned of non-living, but biologically active organic materials, including endotoxins such as lipopolysaccharides, and assembled into a hermetically sealed package without recontamination. This is achieved by cleaning both the device and package components together in an apparatus, which includes a hermetically sealed chamber, in which they are contacted with atomic oxygen which biocleans them, by oxidizing the biologically active organic materials. The apparatus also includes means for manipulating the device and container and hermetically sealing the cleaned device into the cleaned container to form the package. A calibrated witness coupon visually indicates whether or not the device and container have received enough exposure to the atomic oxygen to have removed the organic materials from their surfaces. Gamma radiation is then used to sterilize the device in the sealed container.

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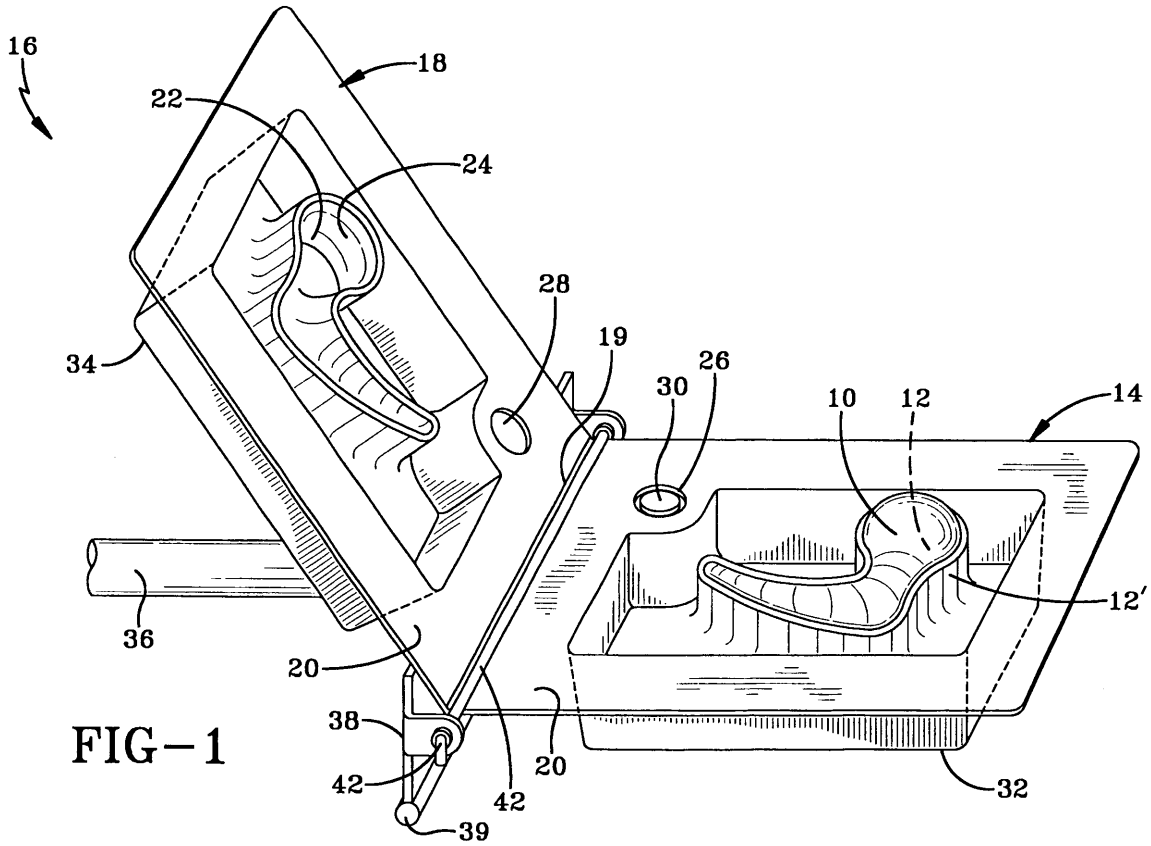
Activity (Biology); Cleaning; Contaminants; Organic Materials



FIG–1

20030068891 NASA Ames Research Center, Moffett Field, CA, USA

Advanced Sensor Systems for Biotelemetry

Hines, John W., Inventor; Somps, Christopher J., Inventor; Ricks, Robert D., Inventor; Mundt, Carsten W., Inventor; June 24, 2003; 17 pp.; In English; US-Patent-6,582,365; No Copyright; Avail: CASI; A03, Hardcopy

The present invention relates to telemetry-based sensing systems that continuously measures physical, chemical and biological parameters. More specifically, these sensing systems comprise a small, modular, low-power implantable biotelemetry system capable of continuously sensing physiological characteristics using implantable transmitters, a receiver, and a data acquisition system to analyze and record the transmitted signal over several months. The preferred embodiment is a preterm labor and fetal monitoring system. Key features of the invention include Pulse Interval Modulation (PIM) that is used to send temperature and pressure information out of the biological environment. The RF carrier frequency is 174-216 MHz and a pair of RF bursts (pulses) is transmitted at a frequency of about 1-2 Hz. The transmission range is 3 to 10 feet, depending on the position of the transmitter in the body and its biological environment. The entire transmitter is encapsulated in biocompatible silicone rubber. Power is supplied by on-board silver-oxide batteries. The average power consumption of the current design is less than 30 microW, which yields a lifetime of approximately 6 - 9 months. Chip-on-Board technology (COB) drastically reduces the size of the printed circuit board from 38 x 28 mm to 22 x 8 mm. Unpackaged dies are flip-chip bonded directly onto the printed circuit board, along with surface mount resistors and capacitors. The invention can monitor additional physiological parameters including, but not limited to, ECG, blood gases, glucose, and ions such as calcium, potassium, and sodium.

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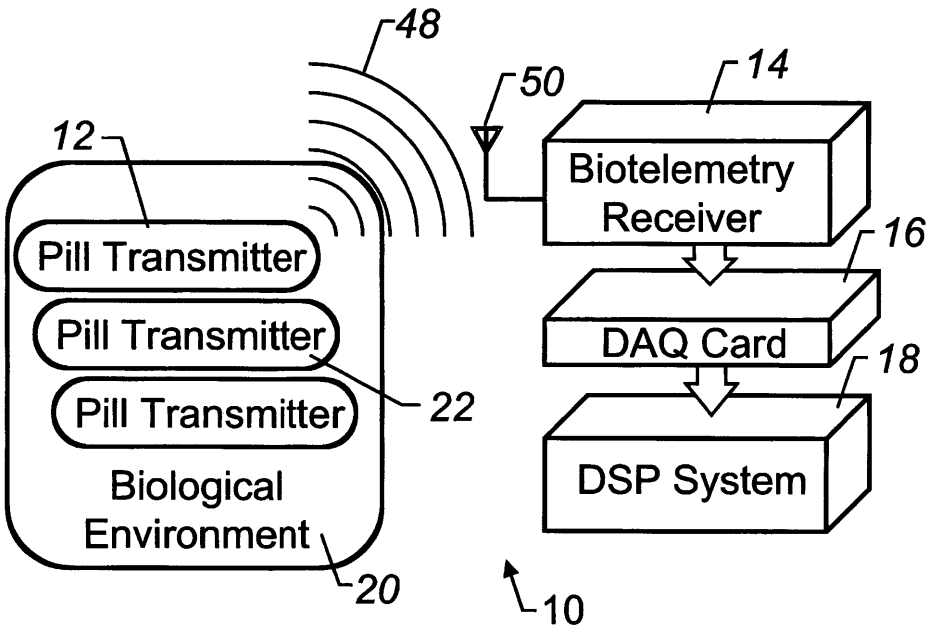
Biotelemetry; Data Acquisition; Electrocardiography; Physiology; Pulse Modulation; Bioassay



20030068897 NASA Langley Research Center, Hampton, VA, USA

Physiological Feedback Method and System

Pope, Alan T., Inventor; Severance, Kurt E., Inventor; November 12, 2002; 14 pp.; In English

Patent Info.: Filed 28 Jan. 2000; US-Patent-6,478,735; US-Patent-Appl-SN-494160; US-Patent-Appl-SN-118772; US-Patent-Appl-SN-170784; NASA-Case-LAR-15396-1; No Copyright; Avail: CASI; A03, Hardcopy

A method and system provide physiological feedback for a patient and/or physician. At least one physiological effect experienced by a body part of a patient is measured noninvasively. A three-dimensional graphics model serving as an analogous representation of the body part is altered in accordance with the measurements. A binocular image signal representative of the three-dimensional graphics model so-altered is displayed for the patient and/or physician in a virtual reality environment.

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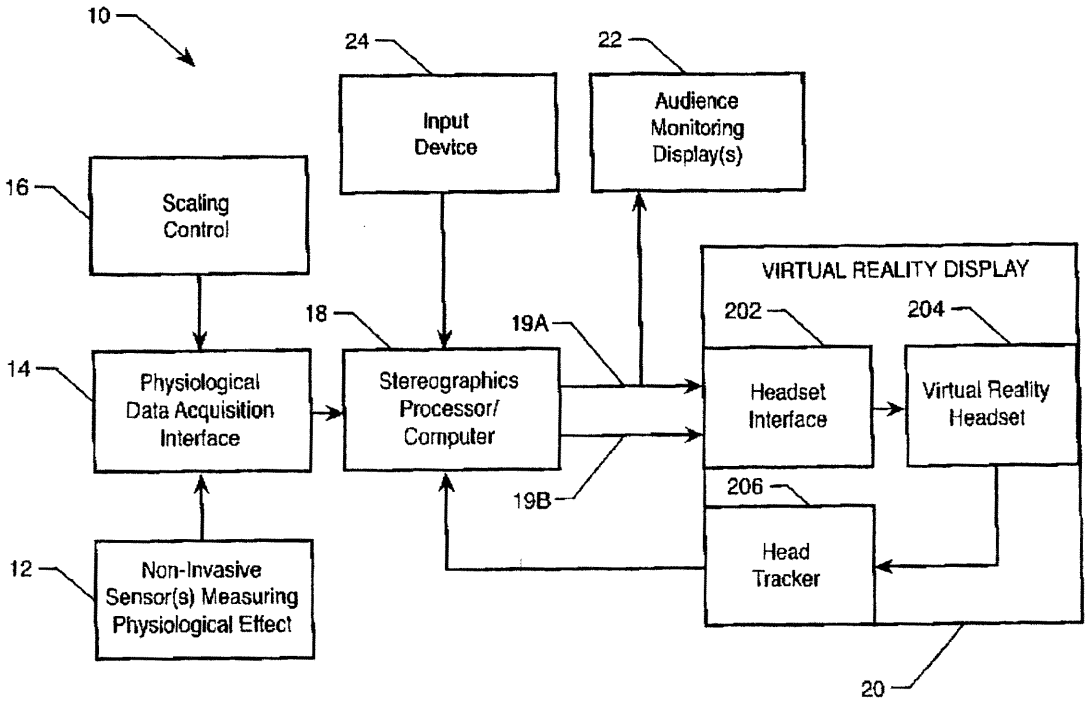
Feedback; Virtual Reality; Physiological Effects



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AEROSPACE MEDICINE

Includes the biological and physiological effects of atmospheric and space flight (weightlessness, space radiation, acceleration, and altitude stress) on the human being; and the prevention of adverse effects on those environments. For psychological and behavioral effects of aerospace environments, see *53 Behavioral Sciences*. For the effects of space on animals and plants see *51 Life Sciences*.

20040000338 NASA Johnson Space Center, Houston, TX, USA

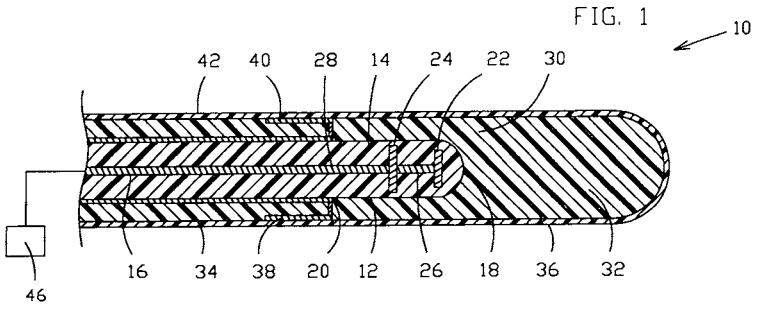
Method for Selective Thermal Ablation

Arndt, G. Dickey, Inventor; Carl, James, Inventor; Ngo, Phong, Inventor; Raffoul, George W., Inventor; July 15, 2003; 14 pp.; In English; No Copyright; Avail: CASI; A03, Hardcopy

A method, simulation, and apparatus are provided that are highly suitable for treatment of benign prostatic hyperplasia (BPH). A catheter is disclosed that includes a small diameter disk loaded monopole antenna surrounded by fusion material having a high heat of fusion and a melting point preferably at or near body temperature. Microwaves from the antenna heat prostatic tissue to promote necrosing of the prostatic tissue that relieves the pressure of the prostatic tissue against the urethra as the body reabsorbs the necrosed or dead tissue. The fusion material keeps the urethra cool by means of the heat of fusion of the fusion material. This prevents damage to the urethra while the prostatic tissue is necrosed. A computer simulation is provided that can be used to predict the resulting temperature profile produced in the prostatic tissue. By changing the various control features of the catheter and method of applying microwave energy a temperature profile can be predicted and produced that is similar to the temperature profile desired for the particular patient.

Official Gazette of the U.S. Patent and Trademark Office

Medical Equipment; Ablation; Monopole Antennas; Microwaves; Prostate Gland



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CYBERNETICS, ARTIFICIAL INTELLIGENCE AND ROBOTICS

Includes feedback and control theory, information theory, machine learning, and expert systems. For related information see also *54 Man/System Technology and Life Support*.

20030112118 NASA Ames Research Center, Moffett Field, CA, USA

Method for Constructing Composite Response Surfaces by Combining Neural Networks with other Interpolation or Estimation Techniques

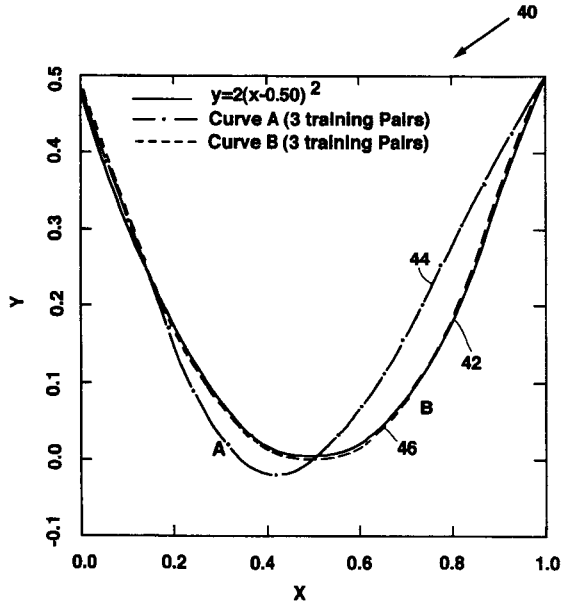
Rai, Man Mohan, Inventor; Madavan, Nateri K., Inventor; August 12, 2003; 15 pp.; In English

Patent Info.: Filed 13 Aug. 1999; US-Patent-6,606,612; US-Patent-Appl-SN-374491; US-Patent-Appl-SN-113318; US-Patent-Appl-SN-096660; NASA-Case-ARC-14281-1; No Copyright; Avail: CASI; A03, Hardcopy

A method and system for design optimization that incorporates the advantages of both traditional response surface methodology (RSM) and neural networks is disclosed. The present invention employs a unique strategy called parameter-based partitioning of the given design space. In the design procedure, a sequence of composite response surfaces based on both neural networks and polynomial fits is used to traverse the design space to identify an optimal solution. The composite response surface has both the power of neural networks and the economy of low-order polynomials (in terms of the number of simulations needed and the network training requirements). The present invention handles design problems with many more parameters than would be possible using neural networks alone and permits a designer to rapidly perform a variety of trade-off studies before arriving at the final design.

Official Gazette of the U.S. Patent and Trademark Office

Design Optimization; Neural Nets; Estimating



Includes sound generation, transmission, and attenuation. For noise pollution see *45 Environment Pollution*. For aircraft noise see also *02 Aerodynamics* and *07 Aircraft Propulsion and Power*.

20040000330 NASA Langley Research Center, Hampton, VA, USA
System for Multiplexing Acoustic Emission (AE) Instrumentation
Prosser, William H., Inventor; Perey, Daniel F., Inventor; Gorman, Michael R., Inventor; Scales, Edgar F., Inventor; September 30, 2003; 7 pp.; In English
Patent Info.: Filed 15 Jun. 1999; US-Patent-6,628,567; US-Patent-Appl-SN-333199; NASA-Case-LAR-15612-1; No Copyright; Avail: CASI; A02, Hardcopy

An acoustic monitoring device has at least two acoustic sensors with a triggering mechanism and a multiplexing circuit. After the occurrence of a triggering event at a sensor, the multiplexing circuit allows a recording component to record acoustic emissions at adjacent sensors. The acoustic monitoring device is attached to a solid medium to detect the occurrence of damage.

Official Gazette of the U.S. Patent and Trademark Office
Multiplexing; Acoustic Emission; Acoustic Measurement

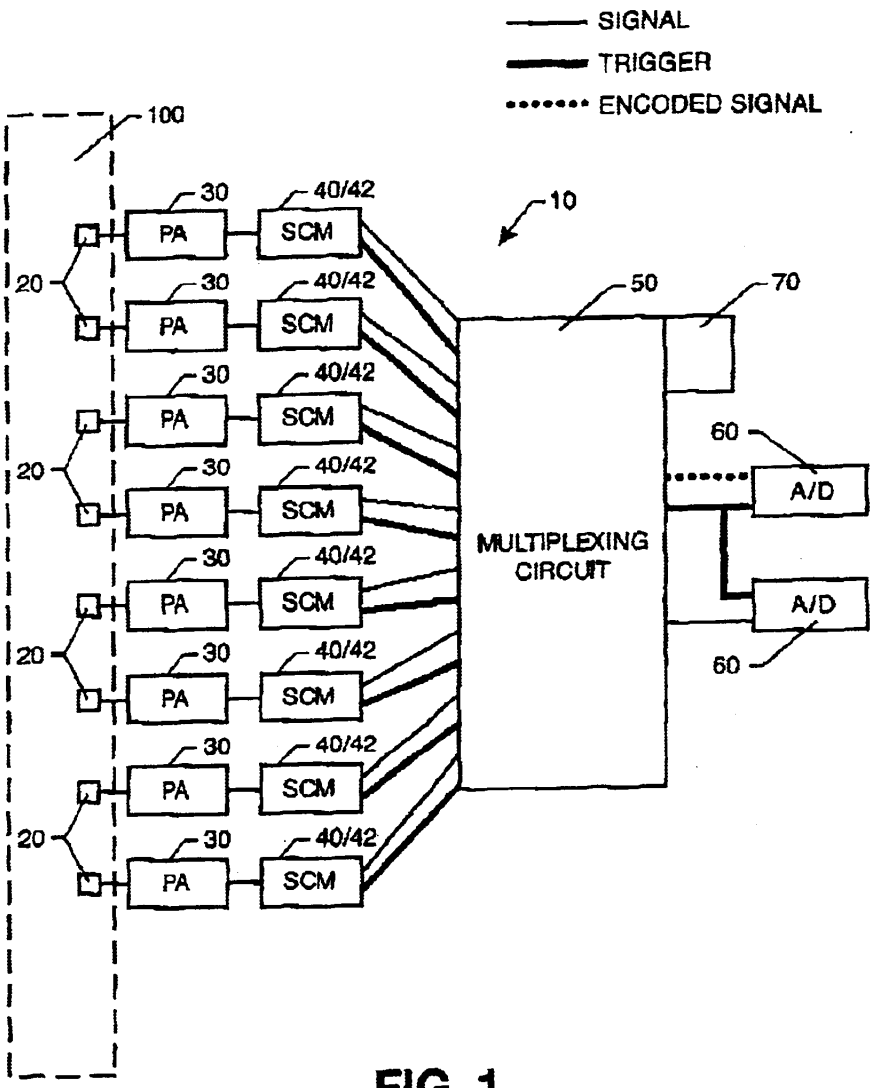


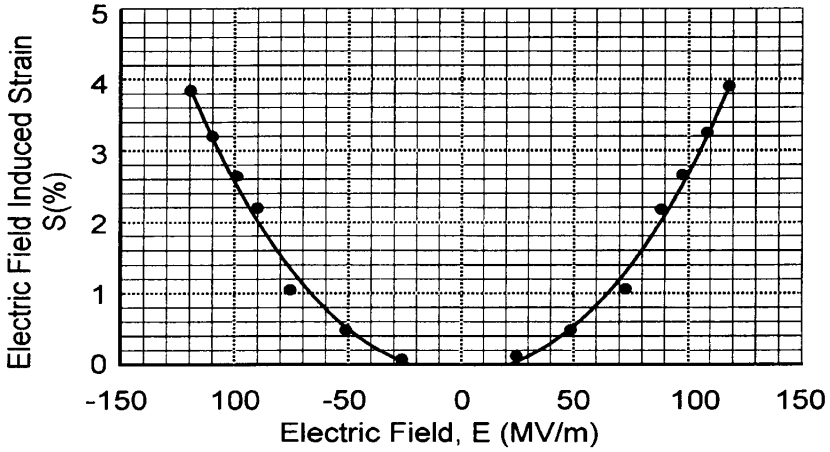
FIG. 1

72
ATOMIC AND MOLECULAR PHYSICS

Includes atomic and molecular structure, electron properties, and atomic and molecular spectra. For elementary particle physics see *73 Nuclear Physics*.

20030112380 NASA Langley Research Center, Hampton, VA, USA
Electrostrictive Graft Elastomers
Su, Ji, Inventor; Harrison, Joycelyn S., Inventor; St.Clair, Terry L., Inventor; February 04, 2003; 9 pp.; In English
Patent Info.: Filed 23 Oct. 2000; US-Patent-6,515,077; US-Patent-Appl-SN-696528; US-Patent-Appl-SN-161160; US-Patent-Appl-SN-161113; NASA-Case-LAR-16038-1; No Copyright; Avail: CASI; A02, Hardcopy

An electrostrictive graft elastomer has a backbone molecule which is a non-crystallizable, flexible macromolecular chain and a grafted polymer forming polar graft moieties with backbone molecules. The polar graft moieties have been rotated by an applied electric field, e.g., into substantial polar alignment. The rotation is sustained until the electric field is removed. In another embodiment, a process for producing strain in an elastomer includes: (a) providing a graft elastomer having a backbone molecule which is a non-crystallizable, flexible macromolecular chain and a grafted polymer forming polar graft moieties with backbone molecules; and (b) applying an electric field to the graft elastomer to rotate the polar graft moieties, e.g., into substantial polar alignment.
Official Gazette of the U.S. Patent and Trademark Office
Electrostriction; Elastomers



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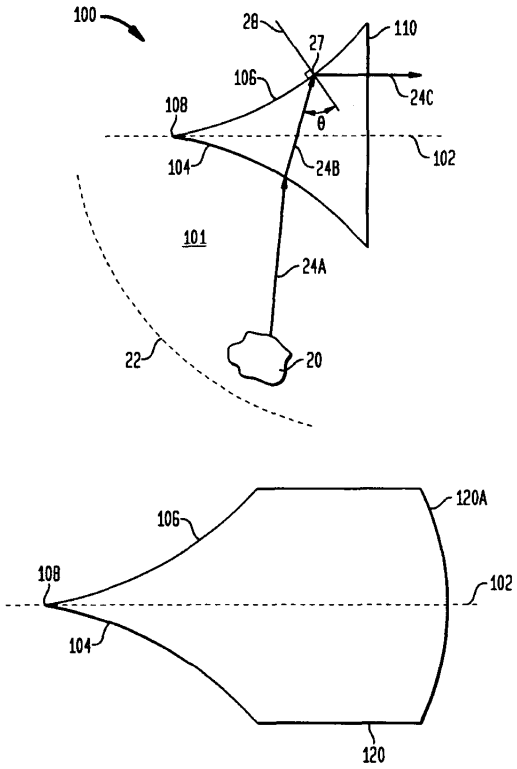
OPTICS

Includes light phenomena and the theory of optical devices; for specific optical devices see also *35 Instrumentation and Photography*. For lasers see *36 Lasers and Masers*.

20030068890 NASA Marshall Space Flight Center, Huntsville, AL, USA
Panoramic Refracting Conical Optic
Lindner, Jeffrey L., Inventor; June 17, 2003; 7 pp.; In English
Patent Info.: Filed 17 Jun. 2002; No Copyright; Avail: CASI; A02, Hardcopy

An optical device having a semi-spherical or hemispherical field-of-view is provided. A conically-shaped piece of optical material has an annular surface satisfying Snell's Law for total internal reflection with respect to light passing through the piece and incident on the annular surface from within the piece.
Official Gazette of the U.S. Patent and Trademark Office
Optical Equipment; Refraction



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SOLID-STATE PHYSICS

Includes condensed matter physics, crystallography, and superconductivity. For related information see also *33 Electronics and Electrical Engineering*; and *36 Lasers and Masers*.

20040000691 NASA Johnson Space Center, Houston, TX, USA

X-Ray Crystallography Reagent

Morrison, Dennis R., Inventor; Mosier, Benjamin, Inventor; July 29, 2003; 22 pp.; In English

Patent Info.: Filed 24 Jan. 2001; US-Patent-6,599,449; US-Patent-Appl-SN-774169; US-Patent-Appl-SN-079766; US-Patent-Appl-SN-349169; NASA-Case-MSC-22936-4; No Copyright; Avail: CASI; A03, Hardcopy

Microcapsules prepared by encapsulating an aqueous solution of a protein, drug or other bioactive substance inside a semi-permeable membrane by are disclosed. The microcapsules are formed by interfacial coacervation under conditions where the shear forces are limited to 0-100 dynes per square centimeter at the interface. By placing the microcapsules in a high osmotic dewatering solution. the protein solution is gradually made saturated and then supersaturated. and the controlled nucleation and crystallization of the protein is achieved. The crystal-filled microcapsules prepared by this method can be conveniently harvested and stored while keeping the encapsulated crystals in essentially pristine condition due to the rugged. protective membrane. Because the membrane components themselves are x-ray transparent, large crystal-containing microcapsules can be individually selected, mounted in x-ray capillary tubes and subjected to high energy x-ray diffraction studies to determine the 3-D smucture of the protein molecules. Certain embodiments of the microcapsules of the invention have composite polymeric outer membranes which are somewhat elastic, water insoluble, permeable only to water, salts, and low molecular weight molecules and are structurally stable in fluid shear forces typically encountered in the human vascular system.

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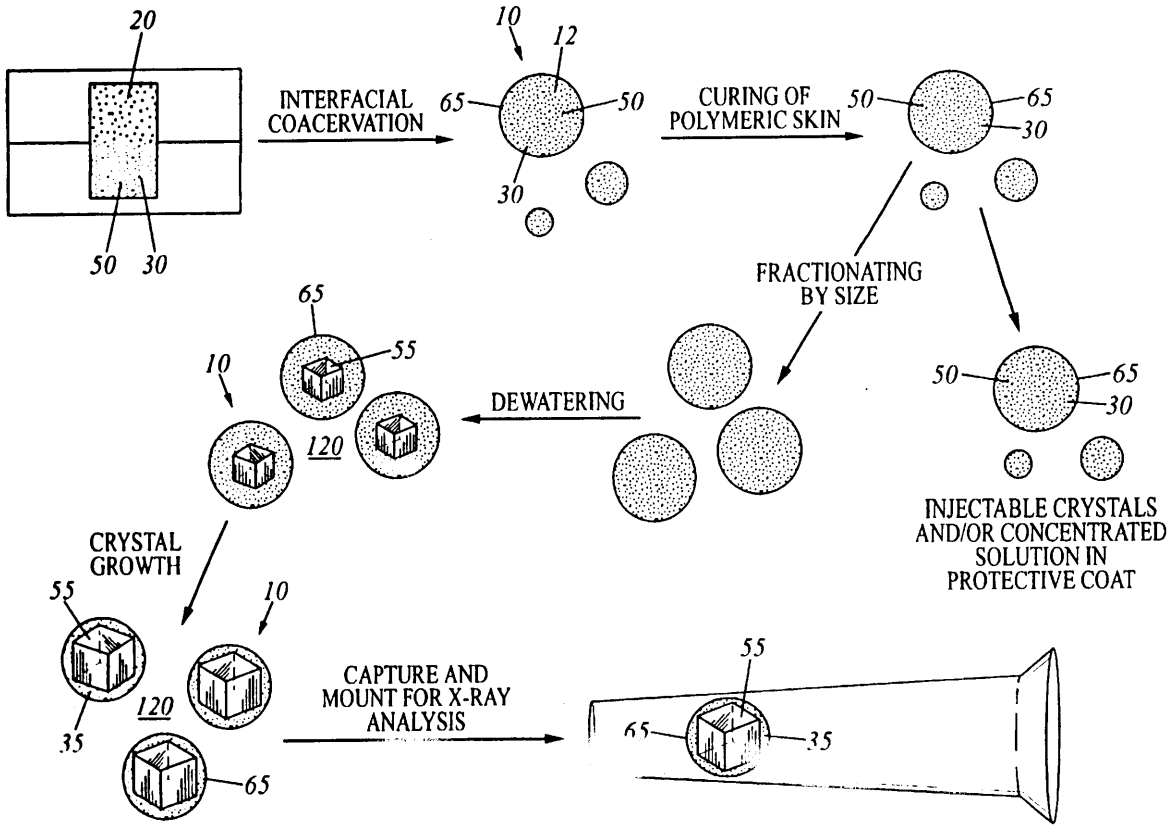
Crystallography; X Rays; Reagents; Protein Crystal Growth; Encapsulating



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TECHNOLOGY UTILIZATION AND SURFACE TRANSPORTATION

Includes aerospace technology transfer; urban technology; surface and mass transportation. For related information see also *03 Air Transportation and Safety, 16 Space Transportation and Safety*, and *44 Energy Production and Conversion*. For specific technology transfer applications see also the category where the subject is treated.

20030112106 NASA Langley Research Center, Hampton, VA, USA

Base Passive Porosity for Vehicle Drag Reduction

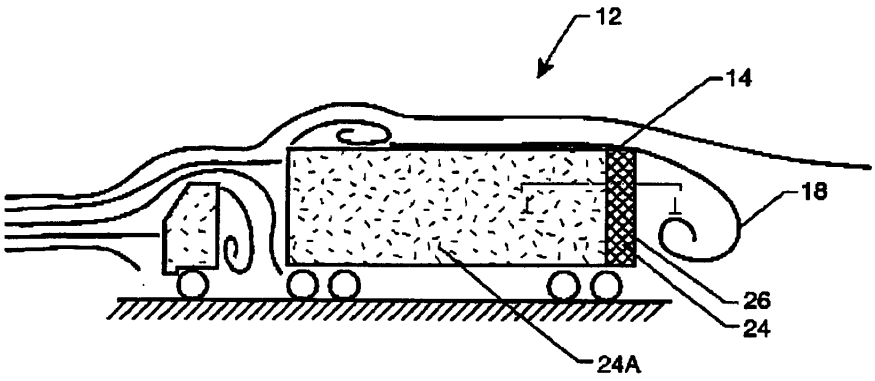
Bauer, Steven X. S., Inventor; Wood, Richard M., Inventor; September 09, 2003; 13 pp.; In English

Patent Info.: Filed 13 Sep. 2001; US-Patent-6,616,218-B2; US-Patent-Appl-SN-951857; NASA-Case-LAR-16348-1; No Copyright; Avail: CASI; A03, Hardcopy

A device for controlling drag on a ground vehicle. The device consists of a porous skin or skins mounted on the trailing surface and/or aft portions of the ground vehicle. The porous skin is separated from the vehicle surface by a distance of at least the thickness of the porous skin. Alternately, the trailing surface, sides, and/or top surfaces of the ground vehicle may be porous. The device minimizes the strength of the separation in the base and wake regions of the ground vehicle, thus reducing drag.

Author

Drag Reduction; Surface Vehicles; Porous Plates; Porous Boundary Layer Control



20040000274 NASA Kennedy Space Center, Cocoa Beach, FL, USA

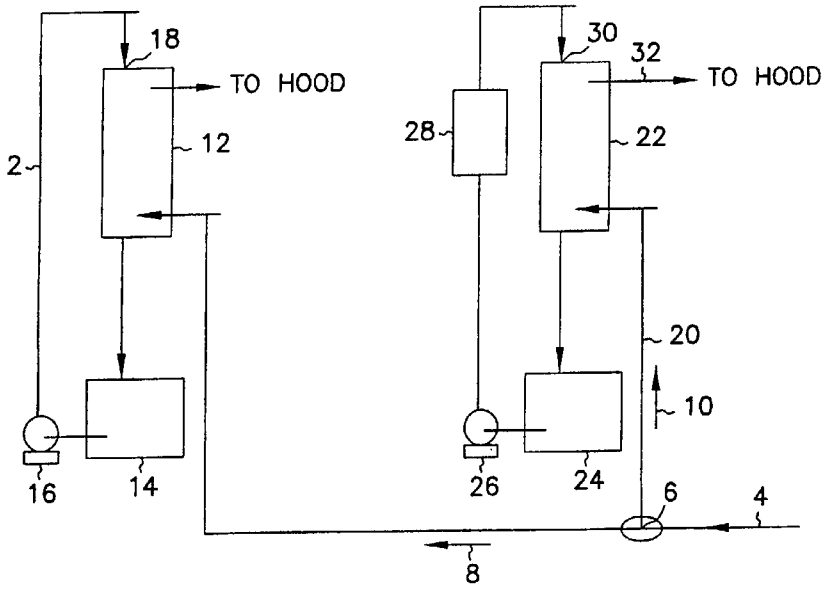
Process for Nitrogen Oxide Waste Conversion to Fertilizer

Lueck, Dale E., Inventor; Parrish, Clyde F., Inventor; November 04, 2003; 33 pp.; In English

Patent Info.: Filed 17 Feb. 2000; No Copyright; Avail: CASI; A03, Hardcopy

The present invention describes a process for converting vapor streams from sources containing at least one nitrogen-containing oxidizing agent therein to a liquid fertilizer composition comprising the steps of: a) directing a vapor stream containing at least one nitrogen-containing oxidizing agent to a first contact zone; b) contacting said vapor stream with water to form nitrogen oxide(s) from said at least one nitrogen-containing oxidizing agent; c) directing said acid(s) as a second stream to a second contact zone; d) exposing said second stream to hydrogen peroxide which is present within said second contact zone in a relative amount of at least 0.1% by weight of said second stream within said second contact zone to convert at least some of any nitrogen oxide species or ions other than in the nitrate form present within said second stream to nitrate ion; e) sampling said stream within said second contact zone to determine the relative amount of hydrogen peroxide within said second contact zone; f) adding hydrogen peroxide to said second contact zone when a level of hydrogen peroxide less than 0.1 % by weight in said second stream is determined by said sampling; g) adding a solution comprising potassium hydroxide to said second stream to maintain a pH between 6.0 and 11.0 within said second stream within said second contact zone to form a solution of potassium nitrate; and h) removing said solution of potassium nitrate from said second contact zone. Official Gazette of the U.S. Patent and Trademark Office

Nitrogen Oxides; Waste Utilization; Fertilizers; Vapors; Oxidation



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