NASA/SP—2005-7039/SUPPL66
July 2005

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  7121 Standard Drive
  Hanover, MD 21076-1320

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 citations published in this issue cover the period January 2005 through June 2005. 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.

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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.*

Aeronautics

Chemistry and Materials

Engineering

Life Sciences

Mathematical and Computer Sciences

Physics

Social and Information Sciences

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. 66)

JULY 2005

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*.

20050167880 NASA Langley Research Center, Hampton, VA, USA
Resonant Wingbeat Tuning Circuit using Strain-Rate Feedback for Ornithoptic Micro Aerial Vehicles
Raney, David L., Inventor; January 11, 2005; 9 pp.; In English
Patent Info.: Filed 14 Oct. 2003; US-Patent-6,840,476; US-Patent-Appl-SN-693848; US-Patent-Appl-SN-422181; NASA-Case-LAR-16539-1; No Copyright; Avail: CASI; A02, Hardcopy

A resonant wingbeat tuning circuit automatically tunes the frequency of an actuating input to the resonant frequency of a flexible wing structure. Through the use of feedback control, the circuit produces the maximum flapping amplitude of a mechanical ornithoptic system, tracking the resonant frequency of the vibratory flapping apparatus as it vanes in response to change in flight condition, ambient pressure, or incurred wing damage.
Official Gazette of the U.S. Patent and Trademark Office
Circuits; Tuning; Strain Rate; Flexible Wings; Resonant Frequencies; Feedback Control; Research Vehicles

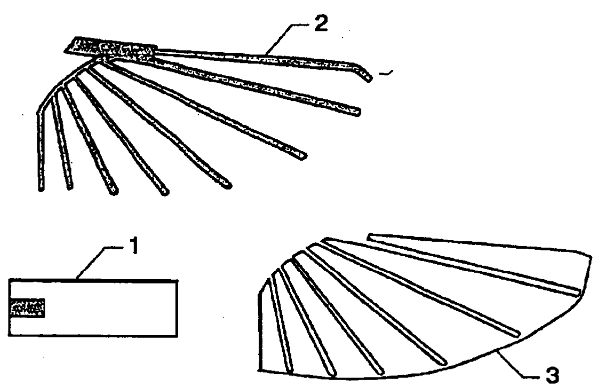


FIG. 1

24
COMPOSITE MATERIALS

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

20050168087 NASA Glenn Research Center, Cleveland, OH, USA
Rod-Coil Block Polyimide Copolymers
Meador, Mary Ann B., Inventor; Kinder, James D., Inventor; April 19, 2005; 10 pp.; In English
Patent Info.: Filed 13 May 2002; US-Patent-6,881,820; US-Patent-Appl-SN-147477; NASA-Case-LEW-17299-1; No Copyright; Avail: CASI; A02, Hardcopy

This invention is a series of rod-coil block polyimide copolymers that are easy to fabricate into mechanically resilient films with acceptable ionic or protonic conductivity at a variety of temperatures. The copolymers consist of short-rigid polyimide rod segments alternating with polyether coil segments. The rods and coil segments can be linear, branched or mixtures of linear and branched segments. The highly incompatible rods and coil segments phase separate, providing nanoscale channels for ion conduction. The polyimide segments provide dimensional and mechanical stability and can be functionalized in a number of ways to provide specialized functions for a given application. These rod-coil black polyimide copolymers are particularly useful in the preparation of ion conductive membranes for use in the manufacture of fuel cells and lithium based polymer batteries.
Official Gazette of the U.S. Patent and Trademark Office
Block Copolymers; Fabrication; Polyimides; Rods; Electric Coils

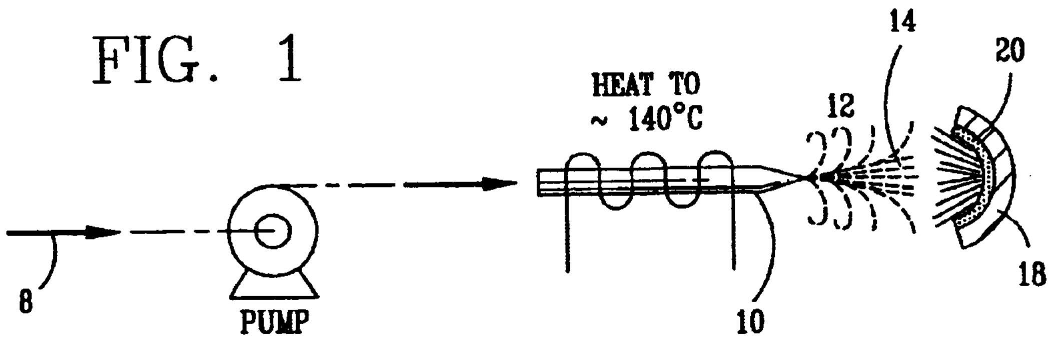
25
INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY

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*.

20050051403 NASA Kennedy Space Center, Cocoa Beach, FL, USA
High Temperature Decomposition of Hydrogen Peroxide
Parrish, Clyde F., Inventor; September 21, 2004; 7 pp.; In English
Patent Info.: Filed 6 Dec. 2001
Report No.(s): US-Patent-6,793,903; US-Patent-Appl-SN-014140; NASA-Case-KSC-12235; US-Patent-Appl-SN-276260; No Copyright; Avail: CASI; A02, Hardcopy

Nitric oxide (NO) is oxidized into nitrogen dioxide (NO2) by the high temperature decomposition of a hydrogen peroxide solution to produce the oxidative free radicals, hydroxyl and hydropemxyl. The hydrogen peroxide solution is impinged upon a heated surface in a stream of nitric oxide where it decomposes to produce the oxidative free radicals. Because the decomposition of the hydrogen peroxide solution occurs within the stream of the nitric oxide, rapid gas-phase oxidation of nitric oxide into nitrogen dioxide occurs.
Official Gazette of the U.S. Patent and Trademark Office
High Temperature; Nitric Oxide; Nitrogen Dioxide; Oxidation; Decomposition; Hydrogen Peroxide

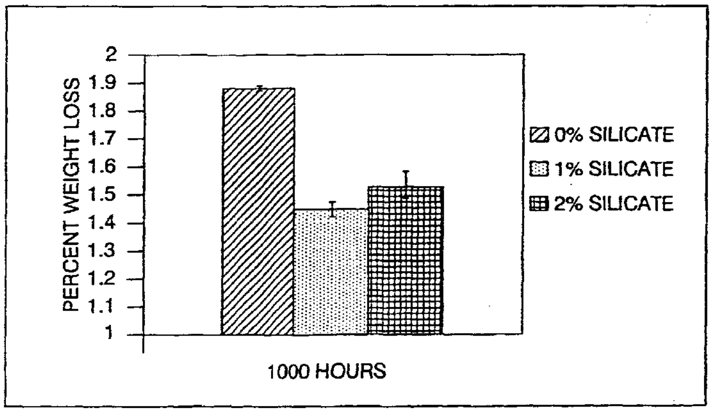
FIG. 1



20050051585 NASA Glenn Research Center, Cleveland, OH, USA
Organic Modification of a Layered Silicate by Co-Ion Exchange of an Alkyl Ammonium and a Mono-Protonated Diamine
Campbell, Sandi G., Inventor; December 07, 2004; 9 pp.; In English
Patent Info.: Filed 20 Sep. 2002; US-Patent-6,828,367; US-Patent-Appl-SN-251195; NASA-Case-LEW-17339-1; No Copyright; Avail: CASI; A02, Hardcopy

Co-Ion exchange of the interlayer cations of a layered silicate with a mono-protonated aromatic diamine and an alkyl ammonium ion into the silicate galleries. The presence of the alkyl ammonium ion provides low oligomer melt viscosity during processing. The presence of the diamine allows chemical reaction between the silicate surface modification and the

monomers. This reaction strengthens the polymer silicate interface, and ensures irreversible separation of the individual silicate layers. Improved polymer thermal oxidative stability and mechanical properties are obtained.
Official Gazette of the U.S. Patent and Trademark Office
Alkyl Compounds; Ammonia; Diamines; Ion Exchanging; Silicates



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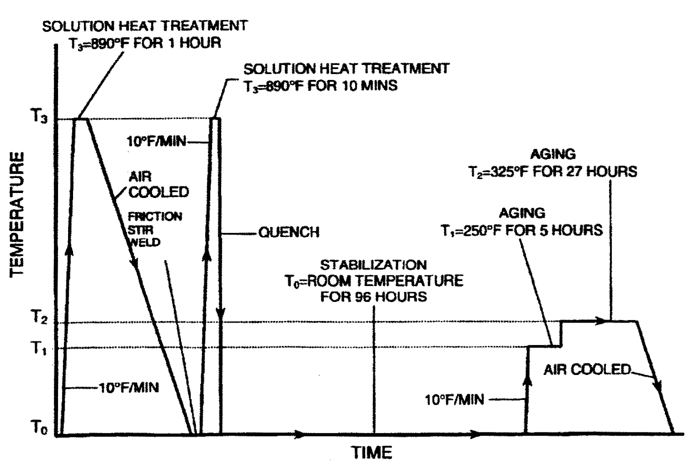
METALS AND METALLIC MATERIALS

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

20050051620 NASA Johnson Space Center, Houston, TX, USA
Heat Treatment of Friction Stir Welded 7X50 Aluminum
Petter, George E., Inventor; Figert, John D., Inventor; Rybicki, Daniel J., Inventor; Burnes, Timothy H., Inventor; October 12, 2004; 9 pp.; In English
Patent Info.: Filed 17 Mar. 2003; US-Patent-6,802,444; US-Patent-Appl-SN-390678; NASA-Case-MSC-23472-1; No Copyright; Avail: CASI; A02, Hardcopy

A method for treating alloy before and after friction stir welding, the method comprising the following steps. First solution heat treating a multiplicity of aluminum-zinc alloy engineered components for a first time period at a first temperature. First air cooling the components in ambient air at room temperatwe until the components are cooled to room temperature. Friction stir welding the components to form an assembly. Second solution heat treating the assembly for a second time period at a second temperature. Additional steps and embodiments are considered.
Official Gazette of the U.S. Patent and Trademark Office
Friction Stir Welding; Heat Treatment; Aluminum Alloys



20050168081 NASA Glenn Research Center, Cleveland, OH, USA

Blanch Resistant and Thermal Barrier NiAl Coating Systems for Advanced Copper Alloys

Raj, Sai V., Inventor; January 04, 2005; 11 pp.; In English

Patent Info.: Filed 20 May 2003; US-Patent-6,838,191; US-Patent-Appl-SN-441028; NASA-Case-LEW-17357-1; No Copyright; Avail: CASI; A03, Hardcopy

A method of forming an environmental resistant thermal barrier coating on a copper alloy is disclosed. The steps include cleansing a surface of a copper alloy, depositing a bond coat on the cleansed surface of the copper alloy, depositing a NiAl top coat on the bond coat and consolidating the bond coat and the NiAl top coat to form the thermal barrier coating. The bond coat may be a nickel layer or a layer composed of at least one of copper and chromium-copper alloy and either the bond coat or the NiAl top coat or both may be deposited using a low pressure or vacuum plasma spray.

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

Copper Alloys; Thermal Control Coatings; Nickel; Aluminum

27
NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials. For composite materials see *24 Composite Materials*.

20050051639 NASA Glenn Research Center, Cleveland, OH, USA

High-Solids Polyimide Precursor Solutions

Chuang, Chun-Hua, Inventor; August 31, 2004; 6 pp.; In English

Patent Info.: Filed 25 Jul. 2002; US-Patent-6,784,276; US-Patent-Appl-SN-202643; NASA-Case-LEW-17291-1; No Copyright; Avail: CASI; A02, Hardcopy

The invention is a highly concentrated stable solution of polymide precursors (monometers) having a solids content ranging from about 80 to 98 percent by weight in lower aliphatic alcohols i.e. methyl and/or ethylalcohol. the concentrated polyimide precursos solution comparisons effective amounts of at least one aromatic diamine, at least one aromatic dianhydride, and a monofunctional endcap including monoamines, monoanhydrides and lower alkyl esters of said monoanhydrides. These concentrated polyimide precursor solutions are particularly useful for the preparation of fibrous prepregs and composites for use in structural materials for military and civil applications.

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

Polyimides; Solids; Methyl Compounds; Fiber Composites

20050167877 NASA Langley Research Center, Hampton, VA, USA

Space Environmentally Durable Polyimides and Copolyimides

Connell, John W., Inventor; Smith, Joseph G., Jr., Inventor; Hergenrother, Paul M., Inventor; Watson, Kent A., Inventor; Thompson, Craig M., Inventor; January 11, 2005; 56 pp.; In English

Patent Info.: Filed 8 Mar. 2002; US-Patent-6,841,652; US-Patent-Appl-SN-0045670; US-Patent-Appl-SN-292262; NASA-Case-LAR-16176-1; No Copyright; Avail: CASI; A04, Hardcopy

Polyimides displaying low color in thin films, atomic oxygen resistance, vacuum ultraviolet radiation resistance, solubility in organic solvents in the imide form, high glass transition (T(sub g)) temperatures, and high thermal stability are provided. The poly(amide acid)s, copoly(amide acid)s, polyimides and copolyimides are prepared by the reaction of stoichiometric ratios of an aromatic dianhydride with diamines which contain phenylphosphine oxide groups in polar aprotic solvents. Controlled molecular weight oligomeric (amide acid)s and imides can be prepared by offsetting the stoichiometry according to the Carothers equation using excess diamine and endcapping with aromatic anhydrides The polyimide materials can be processed into various material forms such as thin films, fibers, foams, threads, adhesive film, coatings, dry powders, and fiber coated prepreg, and uses include thin film membranes on antennas, second-surface mirrors, thermal optical coatings, and multilayer thermal insulation (MLI) blanket materials.

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

Polyimides; Durability; Copolymers

28
PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; their storage and handling procedures; and aircraft fuels. For nuclear fuels see *73 Nuclear Physics*. For related information see also *07 Aircraft Propulsion and Power; 20 Spacecraft Propulsion and Power*; and *44 Energy Production and Conversion*.

20050168079 NASA Marshall Space Flight Center, Huntsville, AL, USA

Liquid Propellant Tracing Impingement Injector

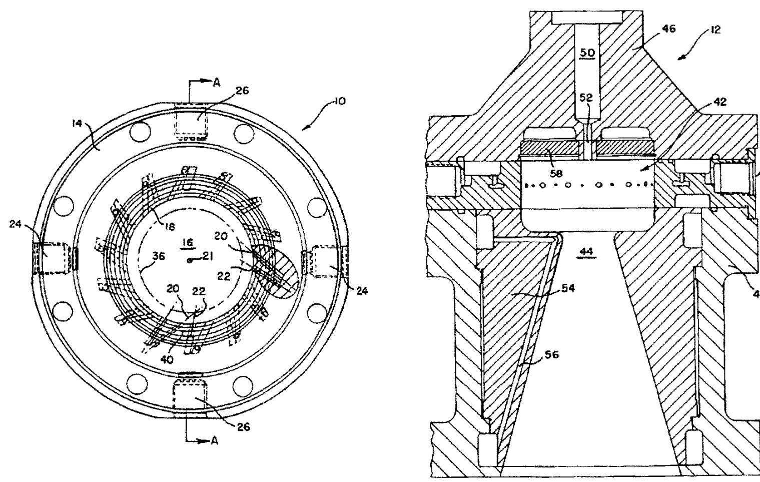
Xenofos, George D., Inventor; Myers, W. Neill, Inventor; Trinh, Huu, Inventor; Michaels, R. Scott, Inventor; March 1, 2005; 6 pp.; In English

Patent Info.: Filed 9 Jan. 2003; US-Patent-6,860,099; US-Patent-Appl-SN-263297; NASA-Case-MFS-31646; No Copyright; Avail: CASI; A02, Hardcopy

An injector for use with the rocket thruster has a plurality of fuel ports separated from a plurality of oxidizer ports. The oxidizer and fuel ports are paired together directing their respective fluids along a path with radial and tangential components so that the two fluids impinge at a predetermined spaced apart distance from the chamber wall of the combustion chamber at an impingement track. By providing the fuel at a steeper angle relative to the chamber walls than the oxidizer, the fuel can be utilized to provide a fuel rich zone near the chamber walls to assist in cooling the chamber walls during operation.

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

Impingement; Injectors; Liquid Rocket Propellants; Rocket Thrust



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*.

20050051591 NASA Kennedy Space Center, Cocoa Beach, FL, USA

Real Time Calibration Method for Signal Conditioning Amplifiers

Medelius, Pedro J., Inventor; Mata, Carlos T., Inventor; Eckhoff, Anthony, Inventor; Perotti, Jose, Inventor; Lucena, Angel, Inventor; October 05, 2004; 5 pp.; In English

Patent Info.: Filed 15 Oct. 2002; US-Patent-6,801,868; US-Patent-Appl-SN-283353; NASA-Case-KSC-12374; No Copyright; Avail: CASI; A01, Hardcopy

A signal conditioning amplifier receives an input signal from an input such as a transducer. The signal is amplified and processed through an analog to digital converter and sent to a processor. The processor estimates the input signal provided by the transducer to the amplifier via a multiplexer. The estimated input signal is provided as a calibration voltage to the amplifier immediately following the receipt of the amplified input signal. The calibration voltage is amplified by the amplifier and provided to the processor as an amplified calibration voltage. The amplified calibration voltage is compared to the amplified

input signal, and if a significant error exists, the gain and/or offset of the amplifier may be adjusted as necessary.
Official Gazette of the U.S. Patent and Trademark Office
Real Time Operation; Signal Processing; Amplifiers; Calibrating

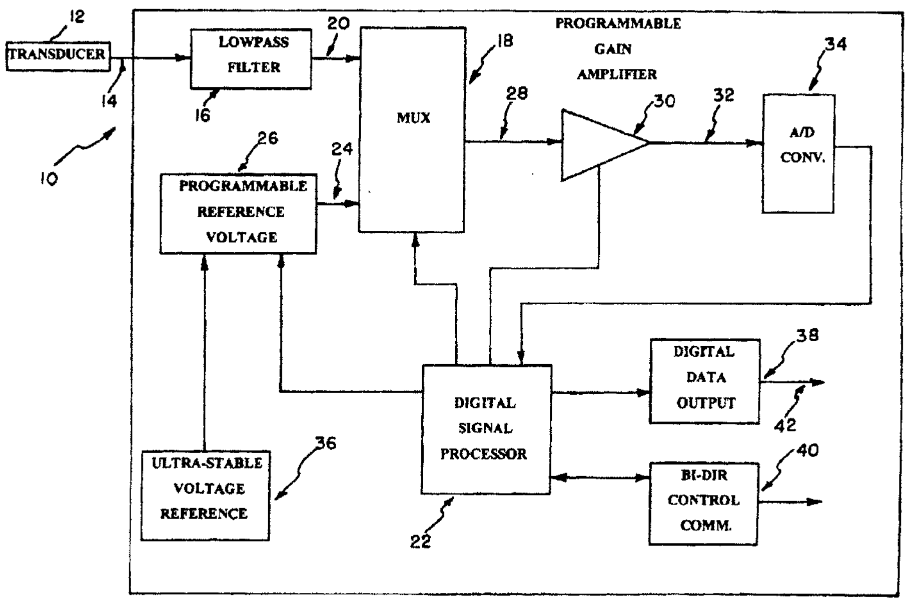


FIG.1

20050051595 NASA Pasadena Office, CA, USA
Digitally Synthesized Phased Antenna for Multibeam Global Positioning
Dunn, Charles E., Inventor; Young, Lawrence E., Inventor; December 07, 2004; 14 pp.; In English
Patent Info.: Filed 19 July 2002
Report No.(s): US-Patent-6,828,935; US-Patent-Appl-SN-176761; NASA-Case-NPO-200331-1CU; No Copyright; Avail: CASI; A03, Hardcopy

In a system according to the proposed technique, the signal received by each element of the array antenna would be subjected to downconversion, and spread-spectrum demodulation and correlation as necessary; this processing would be performed separately from, and simultaneously with, similar processing of signals received by the other antenna elements. For the GPS implementation, following downconversion to baseband, the signals would be digitized, and all subsequent processing would be digital. In In the digital process, residual carriers would be removed and each signal would be correlated with a locally generated model pseudo random-noise code, all following normal GPS procedure. As part of this procedure, accumulated values would be added in software and the resulting signals would be phase-shifted in software by the amounts necessary to synthesize the desired antenna directional gain pattern of peaks and nulls. The principal advantage of this technique over the conventional radio-frequency-combining technique is that the parallel digital baseband processing of the signals from the various antenna elements would be a relatively inexpensive and flexible means for exploiting the inherent multiple-peak/multiple-null aiming capability of a phased-array antenna. In the original intended GPS application, the peaks and nulls could be directed independently for each GPS signal being tracked by the GPS receiver. This will improve the SNR simultaneously for each GPS signal being tracked while steering multiple nulls toward sources of interference. The technique could also be applied to other code-division multiple-access communication systems.
Author
Digital Techniques; Antenna Arrays; Multibeam Antennas; Global Positioning System

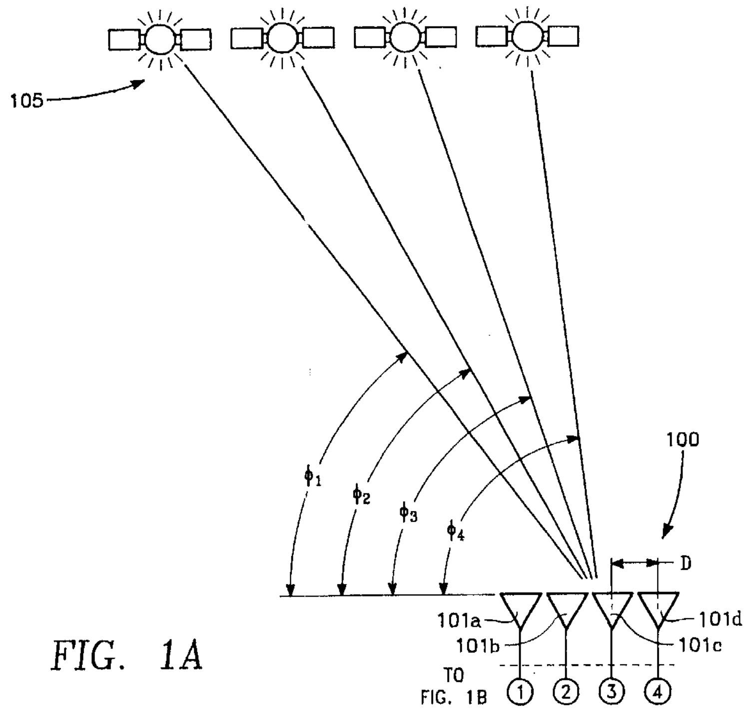
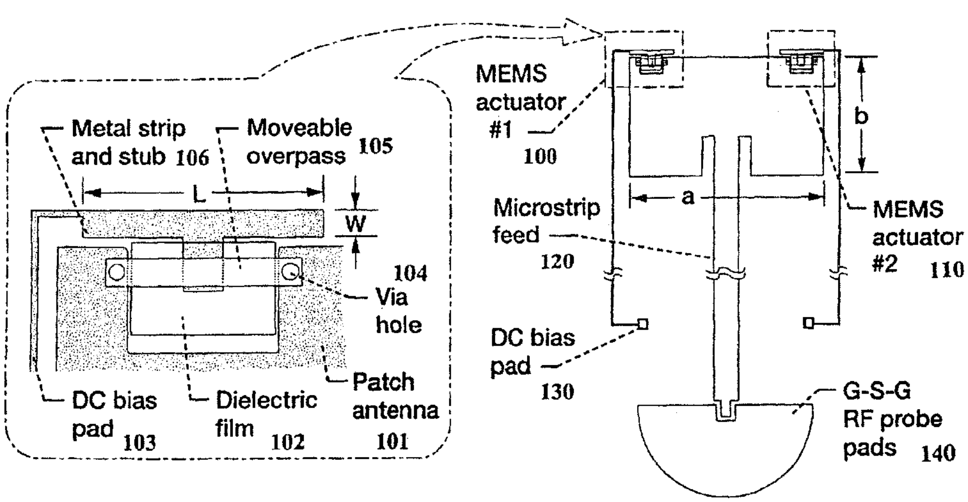


FIG. 1A

20050168090 NASA Glenn Research Center, Cleveland, OH, USA
Microelectromechanical Systems Actuator Based Reconfigurable Printed Antenna
Simons, Rainee N., Inventor; January 18, 2005; 14 pp.; In English
Patent Info.: Filed 31 Mar. 2003; US-Patent-6,844,852; US-Patent-Appl-SN-401863; NASA-Case-LEW-17389-1; No Copyright; Avail: CASI; A03, Hardcopy

A polarization reconfigurable patch antenna is disclosed. The antenna includes a feed element, a patch antenna element electrically connected to the feed element, and at least one microelectromechanical systems (MEMS) actuator, with a partial connection to the patch antenna element along an edge of the patch antenna element. The polarization of the antenna can be switched between circular polarization and linear polarization through action of the at least one MEMS actuator.
Author
Actuators; Microelectromechanical Systems; Patch Antennas; Antenna Components; Reconfigurable Hardware



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*.

20050167882 NASA Langley Research Center, Hampton, VA, USA

Methods for Anticipating Problems with Electrical Wiring

Yost, William T., Inventor; Cramer, K. Elliott, Inventor; Perey, Daniel F., Inventor; January 04, 2005; 10 pp.; In English

Patent Info.: Filed 21 Apr. 2003; US-Patent-6,838,995; US-Patent-Appl-SN-421409; US-Patent-Appl-SN-376364; NASA-Case-LAR-16327-1; No Copyright; Avail: CASI; A02, Hardcopy

Passive and active methods for anticipating problems with electrical wiring are provided. An insulative material in contact with an electrical conductor has at least one impurity that is impregnated in the insulative material and/or disposed thereon. An environment around the electrical conductor is monitored for the presence or the level of the impurity(ies) emanating from the insulative material in the form of a gaseous effluent. An alarm signal is generated when a predetermined level of the gaseous effluent is detected.

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Wiring; Manufacturing

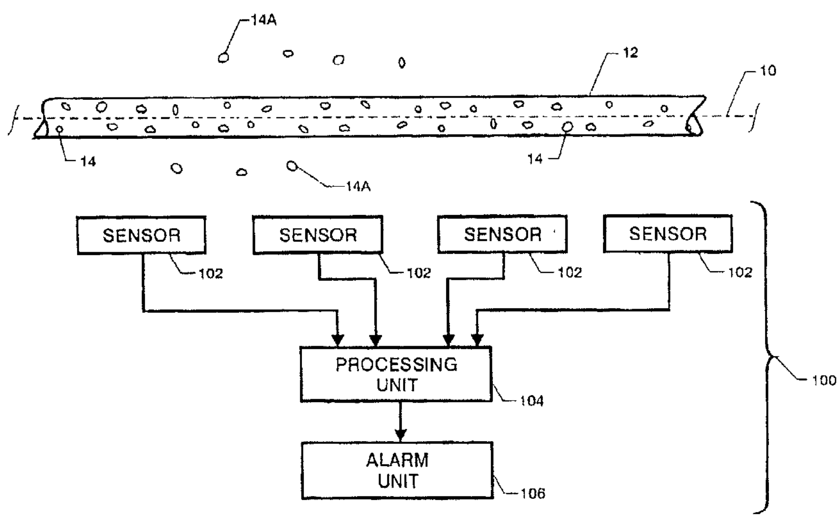


FIG. 1

20050168084 NASA Marshall Space Flight Center, Huntsville, AL, USA

Phase Modulator with Terahertz Optical Bandwidth Formed by Multi-Layered Dielectric Stack

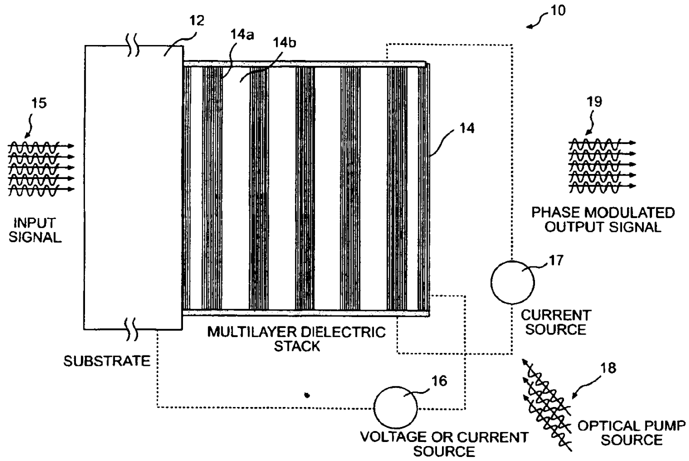
Keys, Andrew S., Inventor; Fork, Richard L., Inventor; April 26, 2005; 9 pp.; In English

Patent Info.: Filed 6 Jun. 2001; US-Patent-6,885,779; US-Patent-Appl-SN-877801; NASA-Case-MFS-31565; No Copyright; Avail: CASI; A02, Hardcopy

An optical phase modulator includes a bandpass multilayer stack, formed by a plurality of dielectric layers, preferably of GaAs and AlAs, and having a transmission function related to the refractive index of the layers of the stack, for receiving an optical input signal to be phase modulated. A phase modulator device produces a nonmechanical change in the refractive index of each layer of the stack by, e.g., the injection of free carrier, to provide shifting of the transmission function so as to produce phase modulation of the optical input signal and to thereby produce a phase modulated output signal.

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

Bandwidth; Dielectrics; Phase Modulation; Laminates; Optical Properties



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*.

20050167855 NASA Langley Research Center, Hampton, VA, USA
Electro-Active Device Using Radial Electric Field Piezo-Diaphragm for Control of Fluid Movement
Bryant, Robert G., Inventor; Working, Dennis C., Inventor; February 15, 2005; 19 pp.; In English
Patent Info.: Filed 13 Mar. 2003; US-Patent-6,856,073; US-Patent-Appl-SN-390675; US-Patent-Appl-SN-365033; NASA-Case-LAR-16363-1; No Copyright; Avail: CASI; A03, Hardcopy

A fluid-control electro-active device includes a piezo-diaphragm made from a ferroelectric material sandwiched by first and second electrode patterns configured to introduce an electric field into the ferroelectric material when voltage is applied thereto. The electric field originates at a region of the ferroelectric material between the first and second electrode patterns, and extends radially outward from this region of the ferroelectric material and substantially parallel to the plane of the ferroelectric material. The piezo-diaphragm deflects symmetrically about this region in a direction substantially perpendicular to the electric field. An annular region coupled to and extending radially outward from the piezo-diaphragm perimetrically borders the piezo-diaphragm, A housing is connected to the region and at least one fluid flow path with piezo-diaphragm disposed therein.
Official Gazette of the U.S. Patent and Trademark Office
Electric Fields; Fluid Flow; Piezoelectricity; Ferroelectric Materials

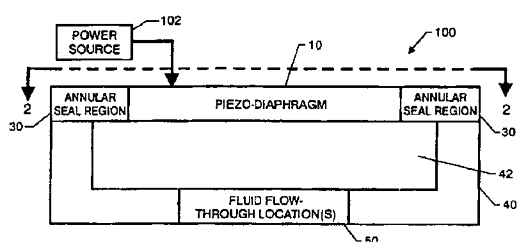


FIG. 1

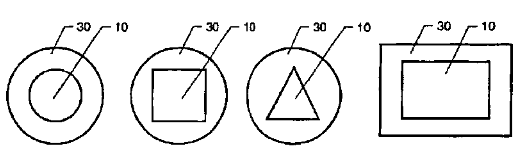


FIG. 2A FIG. 2B FIG. 2C FIG. 2D

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*.

20050051589 NASA Langley Research Center, Hampton, VA, USA

Method of Improving a Digital Image as a Function of its Dynamic Range

Woodell, Glenn, Inventor; Jobson, Daniel J., Inventor; Rahman, Zia-ur, Inventor; December 21, 2004; 12 pp.; In English

Patent Info.: Filed 25 Jun. 2001; US-Patent-6,834,125; US-Patent-Appl-SN-888701; NASA-Case-LAR-16012-1-CU; No Copyright; Avail: CASI; A03, Hardcopy

The present invention is a method of processing a digital image that is initially represented by digital data indexed to represent position on a display. The digital data is indicative of an intensity value I(sub i)(x,y) for each position (x,y) in each i-th spectral band. A classification of the image based on its dynamic range is then defined in each of the image's S spectral bands. The intensity value for each position in each i-th spectral band is adjusted to generate an adjusted intensity value for each position in each i-th spectral band in accordance with SIGMA (sup n)(sub n=1) W(sub n)(log I (sub i)(x,y) - log[I(sub i)(x,y)*F(sub n)(x,y)]), i=1,...,S where W(sub n) is a weighting factor, "*' is the convolution operator and S is the total number of unique spectral bands. For each n, the function F(sub n)(x,y) is a unique surround function applied to each position (x,y) and N is the total number of unique surround functions. Each unique surround function is scaled to improve some aspect of the digital image, e.g., dynamic range compression, color constancy, and lightness rendition. The adjusted intensity value to each position in each i-th spectral band of the image is then filtered with a filter function that is based on the dynamic range classification of the image.

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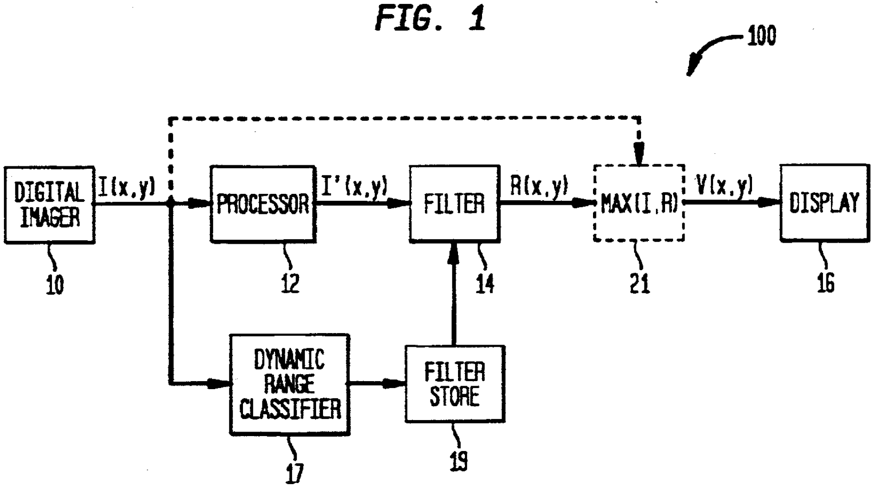
Digital Data; Dynamic Range; Image Classification

FIG. 1



20050051590 NASA Glenn Research Center, Cleveland, OH, USA

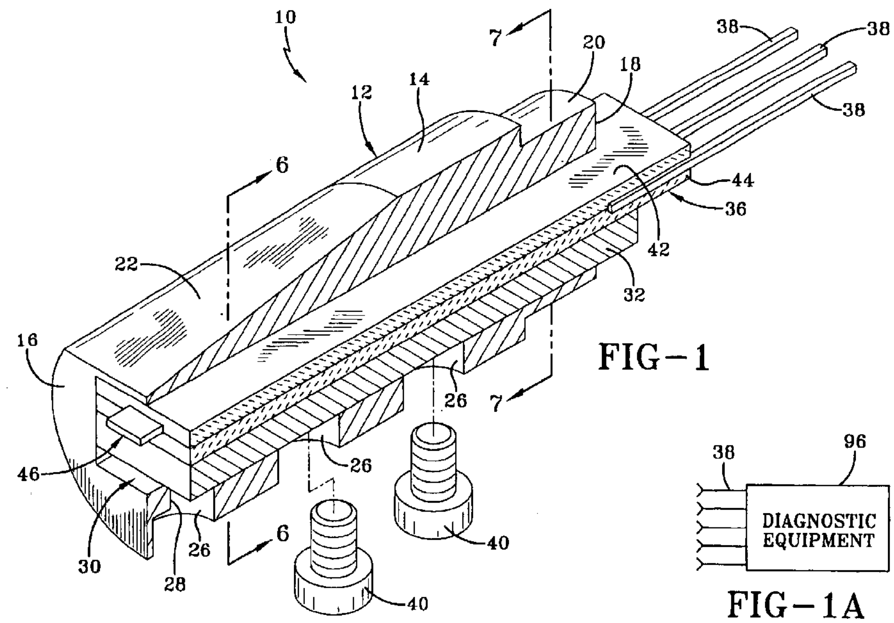
Method of Assembling a Silicon Carbide High Temperature Anemometer

Okojie, Robert S., Inventor; Fralick, Gustave C., Inventor; Saad, George J., Inventor; September 21, 2004; 10 pp.; In English

Patent Info.: Filed 5 Aug. 2003; US-Patent-6,794,213; US-Patent-Appl-SN-637083; NASA-Case-LEW-17222-2; 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 bondpads 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
Anemometers; Assembling; Silicon Carbides; High Temperature; Engine Monitoring Instruments

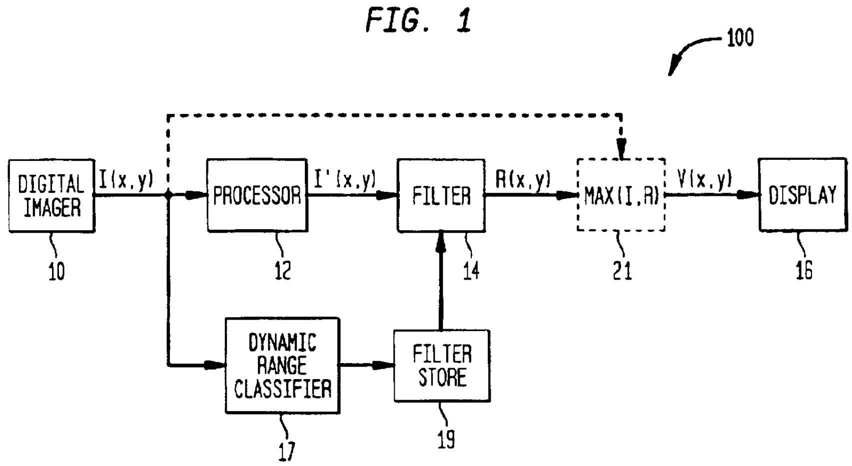


FIG−1

FIG−1A

20050167859 NASA Langley Research Center, Hampton, VA, USA
Methods of Improving a Digital Image Having White Zones
Wodell, Glenn A., Inventor; Jobson, Daniel J., Inventor; Rahman, Zia-Ur, Inventor; January 11, 2005; 12 pp.; In English
Patent Info.: Filed 25 Jun. 2001; US-Patent-6,842,543; US-Patent-Appl-SN-888816; NASA-Case-LAR-16332-1-CU; No Copyright; Avail: CASI; A03, Hardcopy

The present invention is a method of processing a digital image that is initially represented by digital data indexed to represent positions on a display. The digital data is indicative of an intensity value I,(x,y) for each position (x,y) in each i-th spectral band. The intensity value for each position in each i-th spectral band is adjusted to generate an adjusted intensity value for each position in each i-th spectral band in accordance with SIGMA (sup N)(sub n=1)W(sub n)(log I(sub i)(x,y)-log[I(sub i)(x,y)*F(sub n)(x,y)]), i = 1,...,S where W(sub n) is a weighting factor, "*’ is the convolution operator and S is the total number of unique spectral bands. For each n, the function F(sub n)(x,y) is a unique surround function applied to each position (x,y) and N is the total number of unique surround functions. Each unique surround function is scaled to improve some aspect of the digital image, e.g., dynamic range compression, color constancy, and lightness rendition. The adjusted intensity value for each position in each i-th spectral band of the image is then filtered with a filter function to generate a filtered intensity value R(sub i)(x,y). To Prevent graying of white zones in the image, the maximum of the original intensity value I(sub i)(x,y) and filtered intensity value R(sub i)(x,y) is selected for display.
Official Gazette of the U.S. Patent and Trademark Office
Digital Data; Image Processing



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*.

20050167901 NASA Ames Research Center, Moffett Field, CA, USA

Ultrafast Laser Beam Switching and Pulse Train Generation by Using Coupled Vertical-Cavity, Surface-Emitting Lasers (VCSELS)

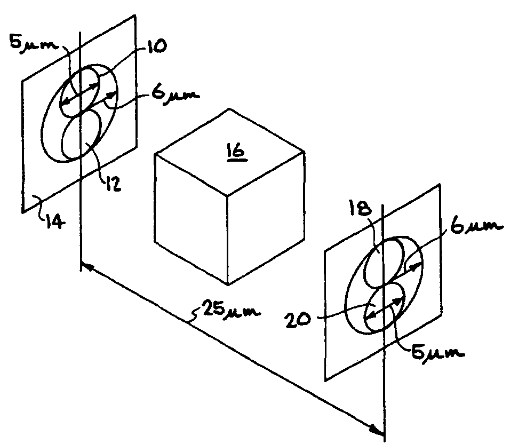
Goorjian, Peter M., Inventor; Ning, Cun-Zheng, Inventor; March 08, 2005; 8 pp.; In English

Patent Info.: Filed 10 Jun. 2002; US-Patent-6,865,208; US-Patent-Appl-SN-171554; NASA-Case-ARC-14682-1; No Copyright; Avail: CASI; A02, Hardcopy

Ultrafast directional beam switching is achieved using coupled VCSELs. This approach is demonstrated to achieve beam switching frequencies of 40 GHz and more and switching directions of about eight degrees. This switching scheme is likely to be useful for ultrafast optical networks at frequencies much higher than achievable with other approaches.

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

Cavities; Surface Emitting Lasers; Beam Switching

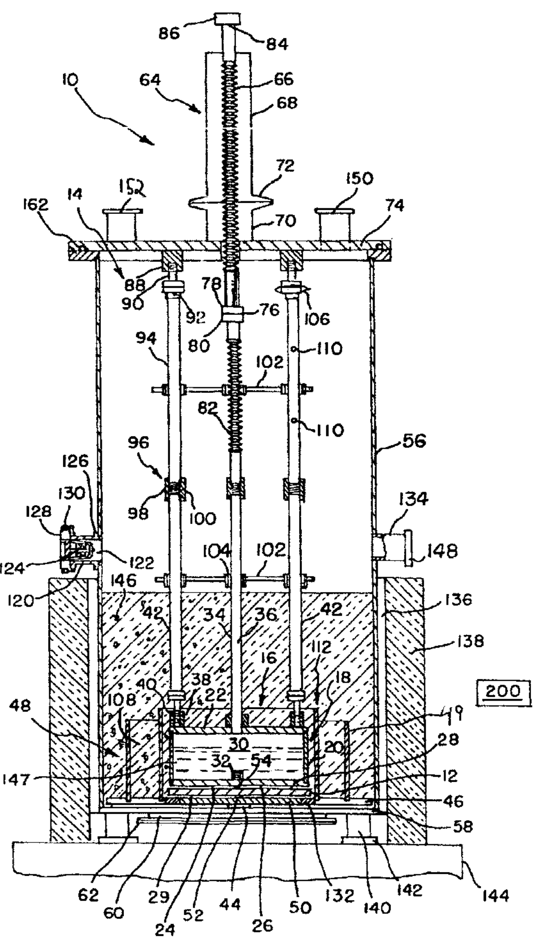


37
MECHANICAL ENGINEERING

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*.

20050050956 NASA Kennedy Space Center, Cocoa Beach, FL, USA
Thermal Insulation Testing Method and Apparatus
Fesmire, James E., Inventor; Augustynowicz, Stanislaw D., Inventor; November 30, 2004; 10 pp.; In English
Patent Info.: Filed 11 Dec. 2002
Report No.(s): US-Patent-6,824,306; US-Patent-Appl-SN-318665; No Copyright; Avail: CASI; A02, Hardcopy

A test apparatus and method of its use for evaluating various performance aspects of a test specimen is disclosed. A chamber within a housing contains a cold mass tank with a contact surface in contact with a first surface of a test specimen. The first surface of the test specimen is spaced from the second surface of the test specimen by a thickness. The second surface of the test specimen is maintained at a a constant temperature by a liquid disposed within the cold mass tank. A boil-off flow rate of the gas is monitored and provided to a processor along with the temperature of the first and second surfaces of the test specimen. The processor calculates thermal insulation values of the test specimen including comparative values for heat flux and apparent thermal conductivity k-value). The test specimen may be placed in any vacuum pressure level ranging from about 0.01 millitorr to 1,000,000 millitorr with different residual gases as desired. The test specimen may be placed under a mechanical load with the cold mass tank and another factors may be imposed upon the test specimen so as to simulate the actual use conditions.
Official Gazette of the U.S. Patent and Trademark Office
Thermal Insulation; Mechanical Engineering; Cryogenics; Thermal Conductivity



20050051584 NASA Glenn Research Center, Cleveland, OH, USA

Self-Tuning Impact Damper for Rotating Blades

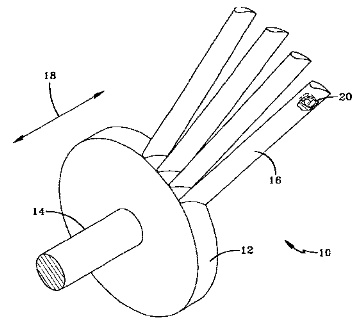
Pufy, Kirsten P., Inventor; Brown, Gerald V., Inventor; Bagley, Ronald L., Inventor; December 07, 2004; 18 pp.; In English

Patent Info.: Filed 1 Feb. 2000; US-Patent-6,827,551; US-Patent-Appl-SN-498794; NASA-Case-LEW-16833-1; No Copyright; Avail: CASI; A03, Hardcopy

A self-tuning impact damper is disclosed that absorbs and dissipates vibration energy in the blades of rotors in compressors and/or turbines thereby dramatically extending their service life and operational readiness. The self-tuning impact damper uses the rotor speed to tune the resonant frequency of a rattling mass to an engine order excitation frequency. The rating mass dissipates energy through collisions between the rattling mass and the walls of a cavity of the self-tuning impact damper, as well as though friction between the rattling mass and the base of the cavity. In one embodiment, the self-tuning impact damper has a ball-in-trough configuration with tire ball serving as the rattling mass.

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

Rotation; Rotor Blades (Turbomachinery); Tuning; Damping



20050051586 NASA Glenn Research Center, Cleveland, OH, USA

Design and Manufacturing Processes of Long-Life Hollow Cathode Assembles

Patterson, Michael J., Inventor; Verhey, Timothy R., Inventor; Soulas, George C., Inventor; December 14, 2004; 17 pp.; In English

Patent Info.: Filed 8 Aug. 2002; US-Patent-6,829,920; US-Patent-Appl-SN-216681; NASA-Case-LEW-16056-7; No Copyright; Avail: CASI; A03, Hardcopy

A process for testing an impregnated insert of a Hollow Cathode Assembly (HCA) subsequent to every exposure of the HCA to air, and prior to ignition, using a heater and an oil-free assembly having a base pressure of less than 5.0 x 10(exp -6) torr. The process comprises the steps of: installing the HCA in a vacuum; energizing the heater to a particular current level; de-energizing the heater after one-half hour; again energizing the heater to a particular current level; and de-energizing the heater for at least one-half hour.

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

Hollow Cathodes; Manufacturing; Service Life

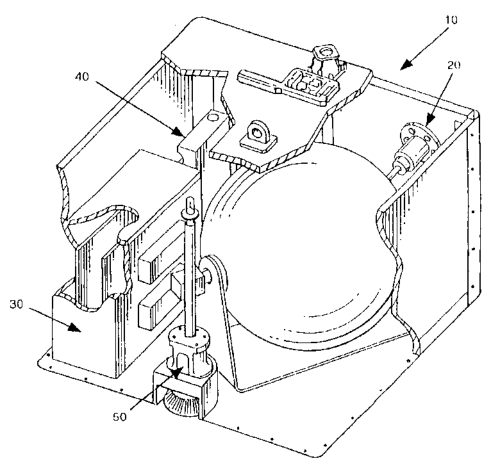


FIG. 1

20050051621 NASA Marshall Space Flight Center, Huntsville, AL, USA

Method of Fabricating Protective Coating for a Crucible with the Coating Having Channels Formed Therein

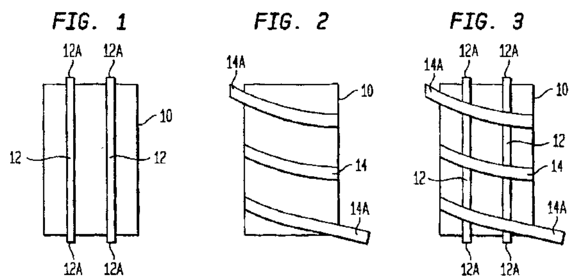
Grugel, Richard N., Inventor; October 12, 2004; 6 pp.; In English

Patent Info.: Filed 13 Jun. 2002; US-Patent-6,802,999; US-Patent-Appl-SN-173536; NASA-Case-MFS-31698-1; No Copyright; Avail: CASI; A02, Hardcopy

A method is provided for the fabrication of a protective coating for a crucible with channels being formed in the coating. A material is adhered to the outer wall of the crucible to form a pattern thereon. The outer wall of the crucible along with the pattern of material adhered thereto is next coated with another material. The material used to form the pattern should extend through the outer material coating to define at least one port therein. Next, the crucible with its pattern of material and outer coating material is heated to a temperature of transformation at which the pattern of material is transformed to a fluidic state while the crucible and outer coating material maintain their solid integrity. Such transformation could also be accomplished by using a solvent that causes the pattern of material to dissolve. Finally, the material in its fluidic state is removed via the at least one port formed in the outer material coating thereby leaving channels defined in the coating adjacent the outer wall of the crucible.

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

Refractory Coatings; Fabrication; Crucibles; Grooves



20050051636 NASA Glenn Research Center, Cleveland, OH, USA

Noncontacting Finger Seal

Proctor, Margaret P., Inventor; Steinetz, Bruce M., Inventor; November 02, 2004; 19 pp.; In English

Patent Info.: Filed 8 Feb. 2003; US-Patent-6,811,154; US-Patent-Appl-SN-361168; NASA-Case-Lew-17129-1; No Copyright; Avail: CASI; A03, Hardcopy

An annular finger seal is adapted to be interposed between a high pressure upstream region and a lower pressure downstream region to provide noncontact sealing along a rotatable member. The finger seal comprises axially juxtaposed downstream and upstream finger elements, each having integrally spaced fingers. The downstream fingers each have a lift pad, whereas the upstream fingers lack a pad. Each pad extends in a downstream direction. Each upstream finger is spaced from the rotating member a greater distance than each pad. Upon sufficient rotational speed of the rotating member, each pad is operative to lift and ride on a thin film of fluid intermediate the rotating member and the Pad.

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

Seals (Stoppers); Cushions; Rotating Bodies

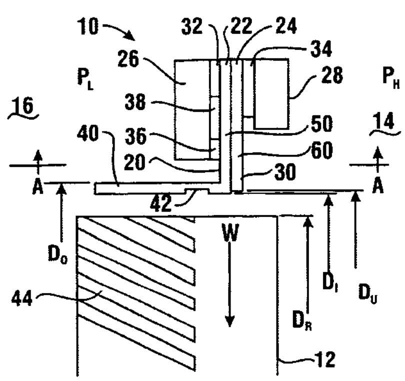
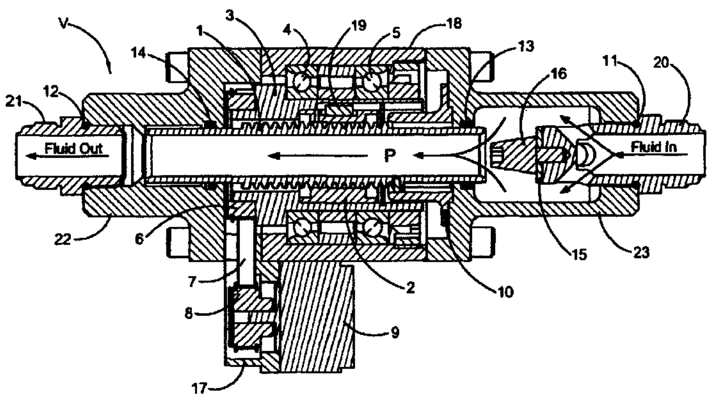


FIG. 1

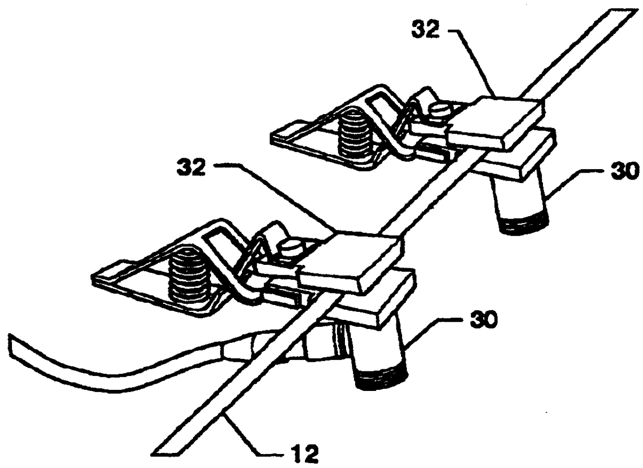
20050051637 NASA Marshall Space Flight Center, Huntsville, AL, USA
Electro-Mechanical Coaxial Valve
Patterson, Paul R, Inventor; October 12, 2004; 4 pp.; In English
Patent Info.: Filed 30 Aug. 2002; US-Patent-6,802,488; US-Patent-Appl-SN-232974; NASA-Case-MFS-31761-1; No Copyright; Avail: CASI; A01, Hardcopy

Coaxial valves usually contain only one moving part. It has not been easy, then, to provide for electric motor actuation. Many actuators being proposed involve designs which lead to bulky packages. The key facing those improving coaxial valves is the provision of suitable linear actuation. The valve herein indudes a valve housing with a flow channel there-through. Arranged in the flow channel is a closing body. In alignment with the closing body is a ball screw actuator which includes a ball nut and a cylindrical screw. The ball nut sounds a threaded portion of the cylindrical screw. The cylindrical screw is provided with a passageway there-through through which fluid flows. The cylindrical screw is disposed in the flow channel to become a control tube adapted to move toward and away from the valve seat. To rotate the ball nut an actuating drive is employed driven by a stepper motor.
Official Gazette of the U.S. Patent and Trademark Office
Valves; Actuators; Electromechanical Devices; Screws



20050051754 NASA Langley Research Center, Hampton, VA, USA
Non-Destructive Evaluation of Wire Insulation and Coatings
Madaras, Eric I, Inventor; Anastasi, Robert F., Inventor; November 02, 2004; 26 pp.; In English
Patent Info.: Filed 1 Aug. 2002; US-Patent-6,810,743; US-Patent-Appl-SN-212563; US-Patent-Appl-SN-396498; US-Patent-Appl-SN-433622; US-Patent-Appl-SN-311967; NASA-Case-LAR-16262-1; No Copyright; Avail: CASI; A03, Hardcopy

The present invention uses the generation and detection of acoustic guided waves to evaluate the condition of the insulation on electrical wiring. Low order axisymmetric and flexural acoustic modes are generated in the insulated wire and travel partially in the center conductor and partially in the outer insulation. The stiffness of the insulation and the insulation's condition affect the overall wave speed and amplitude of the guided wave. Analysis of the received signal provides information about the age or useful life of the wire insulation. In accordance with the present invention, signal transmission occurs at one location on the electrical wire to be evaluated, and detection occurs at one or more locations along the electrical wire. Additional receivers can be used to improve measurement accuracy. Either the transmission transducer or one or more receiver transducers may be angled at other than 90 degrees to the wire. Generation of the guided waves can be accomplished by imparting a pressure pulse on the wire. Alternative embodiments include generation via a laser, such as a Q-switched laser or a laser diode.
Official Gazette of the U.S. Patent and Trademark Office
Nondestructive Tests; Wire; Insulation; Coating



20050167856 NASA Glenn Research Center, Cleveland, OH, USA

Mechanically Resilient Polymeric Films Doped with a Lithium Compound

Meador, Mary Ann B., Inventor; Kinder, James D., Inventor; February 15, 2005; 8 pp.; In English

Patent Info.: Filed 16 Jun. 2004; US-Patent-6,855,433; US-Patent-Appl-SN-874008; US-Patent-Appl-SN-147477; NASA-Case-LEW-17299-2; No Copyright; Avail: CASI; A02, Hardcopy

This invention is a series of mechanically resilient polymeric films, comprising rod-coil block polyimide copolymers, which are doped with a lithium compound providing lithium ion conductivity, that are easy to fabricate into mechanically resilient films with acceptable ionic or protonic conductivity at a variety of temperatures. The copolymers consists of short-rigid polyimide rod segments alternating with polyether coil segments. The rods and coil segments can be linear, branched or mixtures of linear and branched segments. The highly incompatible rods and coil segments phase separate, providing nanoscale channels for ion conduction. The polyimide segments provide dimensional and mechanical stability and can be functionalized in a number of ways to provide specialized functions for a given application. These rod-coil black polyimide copolymers are particularly useful in the preparation of ion conductive membranes for use in the manufacture of fuel cells and lithium based polymer batteries.

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

Doped Crystals; Lithium Compounds; Polymeric Films; Fabrication

20050167857 NASA Glenn Research Center, Cleveland, OH, USA

Mouse Cleaning Apparatus and Method

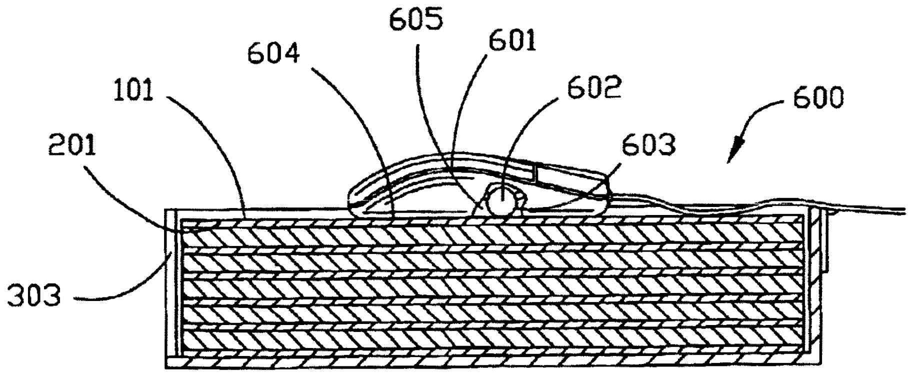
Williams, Glenn L., Inventor; February 08, 2005; 11 pp.; In English

Patent Info.: Filed 3 Oct. 2002; US-Patent-6,852,170; US-Patent Appl-SN-264189; NASA-Case-LEW-17236-1; No Copyright; Avail: CASI; A03, Hardcopy

The method of using the mouse pad cleaning apparatus is disclosed and claimed. The method comprises the steps of uncovering the mouse cleaning surface, applying the mouse and ball of the mouse to the cleaning surface, moving the mouse in a rotational pattern on the mouse cleaning surface, removing the mouse form the mouse cleaning surface, washing the cleaning surface, and covering the mouse cleaning surface. A mouse pad cleaning apparatus comprising a plurality of substrates, each said substrate having adhesive thereon, said plurality of substrates residing in and affixed to a receptacle. A single substrate having adhesive, which may be washable or non-washable, thereon may be employed. The washable adhesive may be an organopolysiloxane or gelatinous elastomer.

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

Equipment; Cleaning



20050167886 NASA Ames Research Center, Moffett Field, CA, USA

Wide Operational Range Thermal Sensor

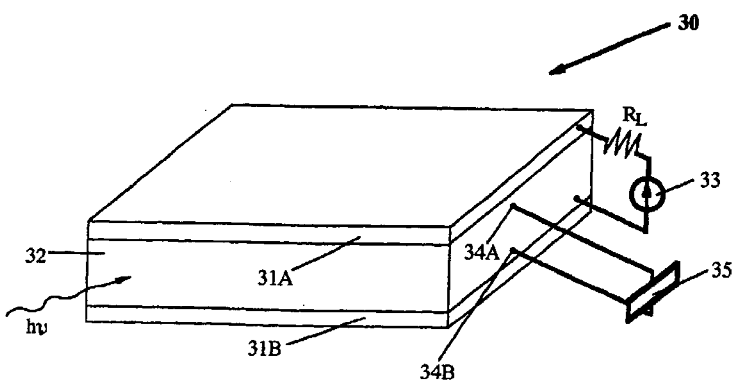
Goebel, John H., Inventor; McMurray, Robert E., Jr., Inventor; January 04, 2005; 8 pp.; In English

Patent Info.: Filed 25 Apr. 2002; US-Patent-6,838,669; US-Patent-Appl-SN-135014; NASA-Case-ARC-14577-1; No Copyright; Avail: CASI; A02, Hardcopy

Bolometer system and method for detecting, at BLIP levels, presence of radiation over a broad range of wavelengths in an infrared spectrum and in a temperature range from 20 K to as high as room temperature. The radiation is received by a Si crystal having a region that is doped with one or more of In, Ga, S, Se, Te, B, Al, P, As and Sb in a concentration ratio in a range such as 5 x 10(exp -11) to 5 x 10(exp -6). Change in electrical resistance delta R due to receipt of the radiation is measured through a change in voltage difference or current within the crystal, and the quantity delta R is converted to an estimate of the amount of radiation received. Optionally, incident radiation having an energy high enough to promote photoconductivity is removed before detection.

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

Bolometers; Temperature Sensors



20050167897 NASA Langley Research Center, Hampton, VA, USA

Membrane Tension Control

Su, Ji, Inventor; Harrison, Joycelyn S., Inventor; March 15, 2005; 8 pp.; In English

Patent Info.: Filed 22 Oct. 1999; US-Patent-6,867,533; US-Patent-Appl-SN-696527; US-Patent-Appl-SN-161113; NASA-Case-LAR-16220-1; No Copyright; Avail: CASI; A02, Hardcopy

An electrostrictive polymer actuator comprises an electrostrictive polymer with a tailorable Poisson's ratio. The electrostrictive polymer is electroded on its upper and lower surfaces and bonded to an upper material layer. The assembly is rolled tightly and capped at its ends. In a membrane structure having a membrane, a supporting frame and a plurality of threads connecting the membrane to the frame, an actuator can be integrated into one or more of the plurality of threads. The electrostrictive polymer actuator displaces along its longitudinal axis, thereby affecting movement of the membrane surface.

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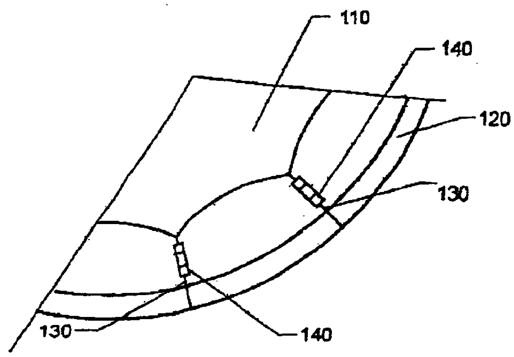
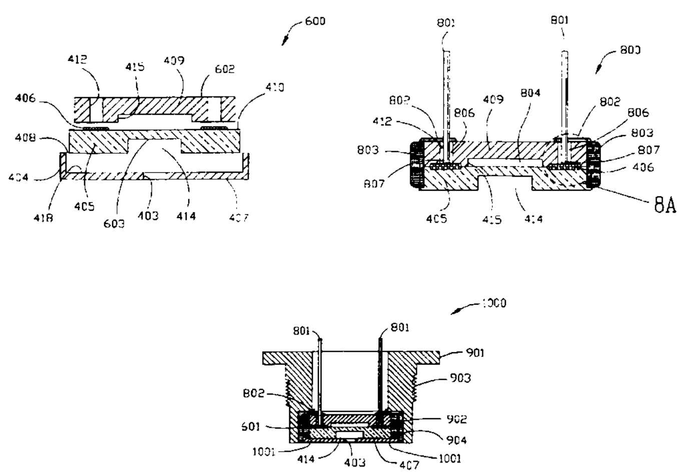
Membrane Structures; Tension; Actuators; Electrostriction



20050169205 NASA Glenn Research Center, Cleveland, OH, USA
MEMS Direct Chip Attach Packaging Methodologies and Apparatuses for Harsh Environments
Okojie, Robert S., Inventor; January 25, 2005; 30 pp.; In English
Patent Info.: Filed 03 Oct. 2002; US-Patent-6,845,664; US-Patent-Appl-SN-263980; NASA-Case--LEW-17256-1; No Copyright; Avail: CASI; A03, Hardcopy

Methods of bulk manufacturing high temperature sensor sub-assembly packages are disclosed and claimed. Sensors are sandwiched between a top cover and a bottom cover so as to enable the peripheries of the top covers, sensors and bottom covers to be sealed and bound securely together are disclosed and claimed. Sensors are placed on the bottom covers leaving the periphery of the bottom cover exposed. Likewise, top covers are placed on the sensors leaving the periphery of the sensor exposed. Individual sensor sub- assemblies are inserted into final packaging elements which are also disclosed and claimed. Methods of directly attach- ing wires or pins to contact pads on the sensors are disclosed and claimed. Sensors, such as pressure sensors and accelerometers, and headers made out of silicon carbide and aluminum nitride are disclosed and claimed. Reference cavities are formed in some embodiments disclosed and claimed herein where top covers are not employed.
Official Gazette of the U.S. Patent and Trademark Office
Manufacturing; Microelectromechanical Systems; Chips (Electronics); High Temperature



38
QUALITY ASSURANCE AND RELIABILITY

Includes approaches to, and methods for reliability analysis and control, quality control, inspection, maintainability, and standardization.

20050168091 NASA Langley Research Center, Hampton, VA, USA
Tributary Analysis Monitoring System
Woodard, Stanley, E., Inventor; Coffey, Neil C., Inventor; Taylor, Bryant D., Inventor; Woodman, Keith L., Inventor; April 12, 2005; 16 pp.; In English
Patent Info.: Filed 30 Sep. 2004; US-Patent-6,879,893; US-Patent-Appl-SN-675502; US-Patent-Appl-SN-411012; NASA-Case-LAR-16516-1; No Copyright; Avail: CASI; A03, Hardcopy

A monitoring system for a fleet of vehicles includes at least one data acquisition and analysis module (DAAM) mounted on each vehicle in the fleet, a control module on each vehicle in communication with each DAAM, and terminal module located remotely with respect to the vehicles in the fleet. Each DAAM collects/analyzes sensor data to generate analysis results that identify the state of a plurality of systems of the vehicle. Each vehicle's control module collects/analyzes the analysis results from each onboard DAAM to generate vehicle status results that identify potential sources of vehicle anomalies. The terminal module collects/analyzes the analysis results and vehicle status results transmitted from each control module from the fleet of vehicles to identify multiple occurrences of vehicle anomalies and multiple occurrences of those vehicle systems operating at a performance level that is unacceptable. Results of the terminal module's analysis are provided to organizations responsible for the operation, maintenance and manufacturing of the vehicles in the fleet as well as the plurality of systems used in the fleet.
Author
Systems Health Monitoring; Data Acquisition; Multisensor Fusion

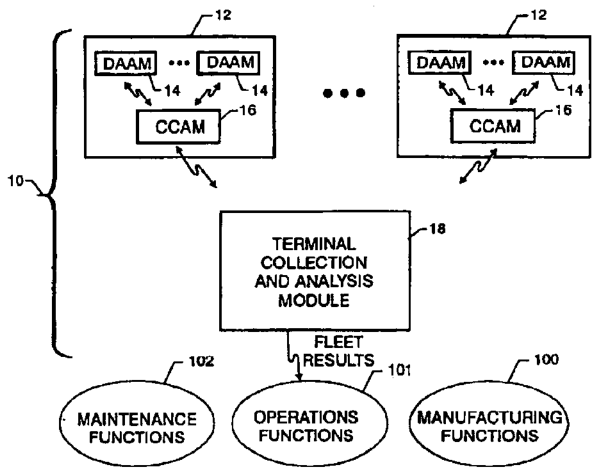


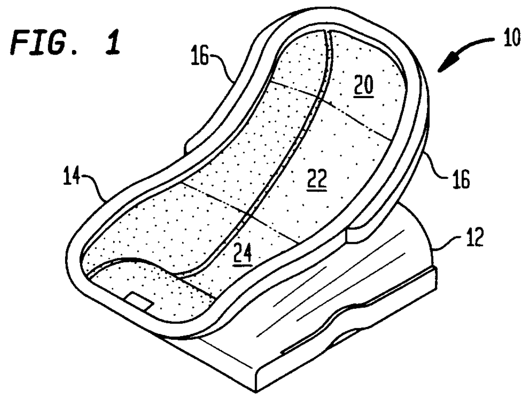
FIG. 1

51
LIFE SCIENCES (GENERAL)

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*.

20050051638 NASA Marshall Space Flight Center, Huntsville, AL, USA
Health Monitoring System for Car Seat
Elrod, Susan Vinz, Inventor; Dabney, Richard W., Inventor; October 26, 2004; 9 pp.; In English
Patent Info.: Filed 18 Mar. 2003; US-Patent-6,809,643; US-Patent-Appl-SN-391487; NASA-Case-MFS-31714-1; No Copyright; Avail: CASI; A02, Hardcopy

A health monitoring system for use with a child car seat has sensors mounted in the seat to monitor one or more health conditions of the seat's occupant. A processor monitors the sensor's signals and generates status signals related to the monitored conditions. A transmitter wireless transmits the status signals to a remotely located receiver. A signaling device coupled to the receiver produces at least one sensory (e.g., visual, audible, tactile) output based on the status signals.
Official Gazette of the U.S. Patent and Trademark Office
Systems Health Monitoring; Children; Transport Vehicles

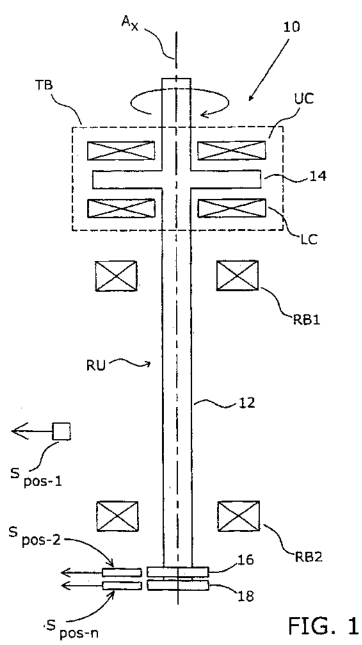


61
COMPUTER PROGRAMMING AND SOFTWARE

Includes software engineering, computer programs, routines, algorithms, and specific applications, e.g., CAD/CAM. For computer software applied to specific applications, see also the associated category.

20050051634 NASA Lewis Research Center, Cleveland, OH, USA
Software for System for Controlling a Magnetically Levitated Rotor
Morrison, Carlos R., Inventor; October 26, 2004; 17 pp.; In English
Patent Info.: Filed 4 Dec. 2003; US-Patent-6,809,450; US-Patent-Appl-SN-729589; NASA-Case-LEW-17293-2; No Copyright; Avail: CASI; A03, Hardcopy

In a rotor assembly having a rotor supported for rotation by magnetic bearings, a processor controlled by software or firmware controls the generation of force vectors that position the rotor relative to its bearings in a 'bounce' mode in which the rotor axis is displaced from the principal axis defined between the bearings and a 'tilt' mode in which the rotor axis is tilted or inclined relative to the principal axis. Waveform driven perturbations are introduced to generate force vectors that excite the rotor in either the 'bounce' or 'tilt' modes.
Official Gazette of the U.S. Patent and Trademark Office
Computer Programs; Rotors; Magnetic Suspension; Electronic Control; Magnetic Bearings; Automatic Control



73
NUCLEAR PHYSICS

Includes nuclear particles; and reactor theory. For space radiation see *93 Space Radiation*. For atomic and molecular physics see *72 Atomic and Molecular Physics*. For elementary particle physics see *77 Physics of Elementary Particles and Fields*. For nuclear astrophysics see *90 Astrophysics*.

20050051588 NASA Marshall Space Flight Center, Huntsville, AL, USA
Radio-Frequency Driven Dielectric Heaters for Non-Nuclear Testing in Nuclear Core Development
Sims, William Herbert, III, Inventor; Godfroy, Thomas J., Inventor; Bitteker, Leo, Inventor; October 05, 2004; 14 pp.; In English
Patent Info.: Filed 16 Jun. 2003; US-Patent-6,800,835; US-Patent-Appl-SN-463935; NASA-Case-MFS-31823; No Copyright; Avail: CASI; A03, Hardcopy

Apparatus and methods are provided through which a radio-frequency dielectric heater has a cylindrical form factor, a variable thermal energy deposition through variations in geometry and composition of a dielectric, and/or has a thermally isolated power input.
Official Gazette of the U.S. Patent and Trademark Office
Radio Frequencies; Heating Equipment; Dielectrics

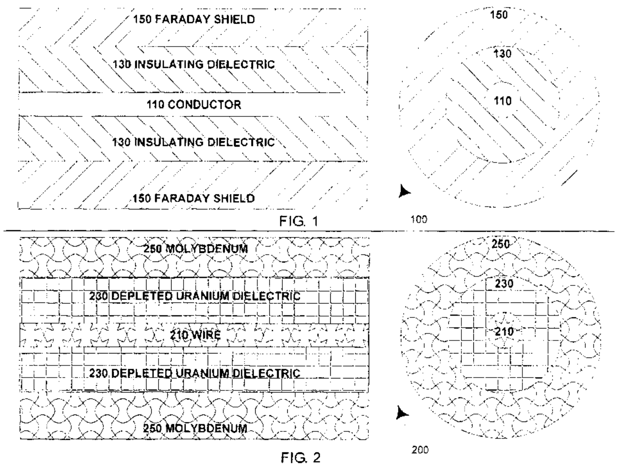


FIG. 1
FIG. 2

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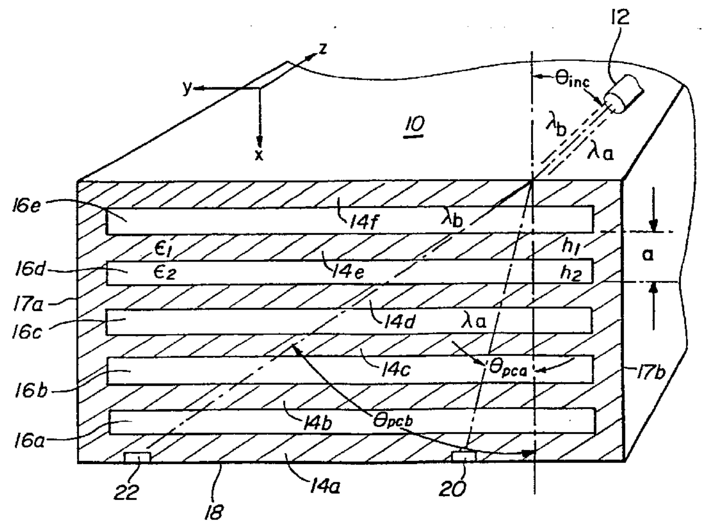
OPTICS

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*.

20050051577 NASA Pasadena Office, CA, USA
Strongly-Refractive One-Dimensional Photonic Crystal Prisms
Ting, David Z., Inventor; November 30, 2004; 21 pp.; In English
Patent Info.: Filed 27 Jun. 2002; US-Patent-6,825,982; NASA-Case-NPO-30232; US-Patent-Appl-SN-185829; No Copyright; Avail: CASI; A03, Hardcopy

One-dimensional (1D) photonic crystal prisms can separate a beam of polychromatic electromagnetic waves into constituent wavelength components and can utilize unconventional refraction properties for wavelength dispersion over significant portions of an entire photonic band rather than just near the band edges outside the photonic band gaps. Using a ID photonic crystal simplifies the design and fabrication process and allows the use of larger feature sizes. The prism geometry broadens the useful wavelength range, enables better optical transmission, and exhibits angular dependence on wavelength with reduced non-linearity. The properties of the 1 D photonic crystal prism can be tuned by varying design parameters such as incidence angle, exit surface angle, and layer widths. The ID photonic crystal prism can be fabricated in a planar process, and can be used as optical integrated circuit elements.
Author
Prisms; Crystal Optics; Photonics; Wave Dispersion



20050167854 NASA Langley Research Center, Hampton, VA, USA

Optically Stimulated Electron Emission Contamination Monitor and Method

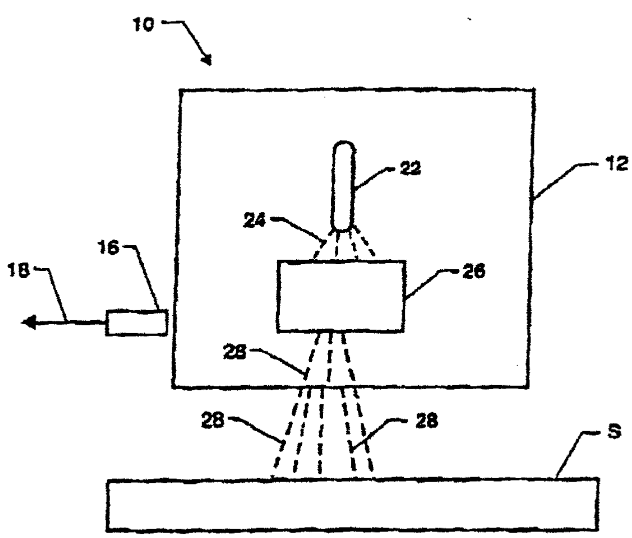
Welch, Christopher S., Inventor; Perey, Daniel F., Inventor; February 15, 2005; 8 pp.; In English

Patent Info.: Filed 11 Sep. 2003; US-Patent-6,856,403; US-Patent-Appl-SN-662161; NASA-Case-LAR-16091-1; No Copyright; Avail: CASI; A02, Hardcopy

An apparatus and method for performing quality inspections on a test surface based on optically stimulated emission of electrons. In one embodiment, the apparatus comprises a device for producing optical radiation having a plurality of different spectrum lines, selecting at least one of the spectrum lines, and directing the selected spectrum line to the test surface, and circuitry for detecting a current of photoelectrons emitted from the test surface, generating a signal indicative of photoelectron current, and for indicating a condition of quality based on the generated signal indicative of the photoelectron current. In one embodiment, the method comprises producing optical radiation having a plurality of different spectrum lines, selecting at least one of the spectrum lines and directing the selected spectrum line to the test surface, detecting a current of photoelectrons emitted from the test surface and generating a signal indicative of photoelectron current, and indicating a condition of quality based on the generated signal indicative of the photoelectron current.

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

Contamination; Electron Emission; Optical Properties; Stimulated Emission



20050167858 NASA Ames Research Center, Moffett Field, CA, USA

Diffraction-Based Optical Switch

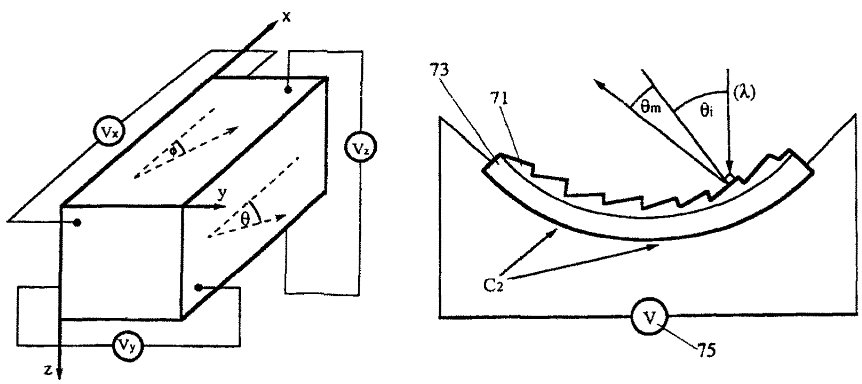
Sperno, Stevan M., Inventor; Fuhr, Peter L., Inventor; Schipper, John F., Inventor; January 25, 2005; 15 pp.; In English

Patent Info.: Filed 18 Jan. 2002; US-Patent-6,847,749; US-Patent Appl-SN-058873; NASA-Case-ARC-14638-1; No Copyright; Avail: CASI; A03, Hardcopy

Method and system for controllably redirecting a light beam, having a central wavelength lambda, from a first light-receiving site to a second light-receiving site. A diffraction grating is attached to or part of a piezoelectric substrate, which is connected to one or two controllable voltage difference sources. When a substrate voltage difference is changed and the diffraction grating length in each of one or two directions is thereby changed, at least one of the diffraction angle, the diffraction order and the central wavelength is controllably changed. A diffracted light beam component, having a given wavelength, diffraction angle and diffraction order, that is initially received at a first light receiving site (e.g., a detector or optical fiber) is thereby controllably shifted or altered and can be received at a second light receiving site. A polynomially stepped, chirped grating is used in one embodiment. In another embodiment, an incident light beam, having at least one of first and second wavelengths, lambda1 and lambda2, is received and diffracted at a first diffraction grating to provide a first diffracted beam. The first diffracted beam is received and diffracted at a second diffraction grating to produce a second diffracted beam. The second diffracted beam is received at a light-sensitive transducer, having at least first and second spaced apart light detector elements that are positioned so that, when the incident light beam has wavelength lambda1 or lambda2 (lambda1 not equal to lambda2), the second diffracted beam is received at the first element or at the second element, respectively; change in a selected physical parameter at the second grating can also be sensed or measured. A sequence of spaced apart light detector elements can be positioned along a linear or curvilinear segment with equal or unequal spacing.

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

Diffraction; Optical Switching; Control Theory



20050168089 NASA Marshall Space Flight Center, Huntsville, AL, USA

Fabrication of Fiber Optic Grating Apparatus and Method

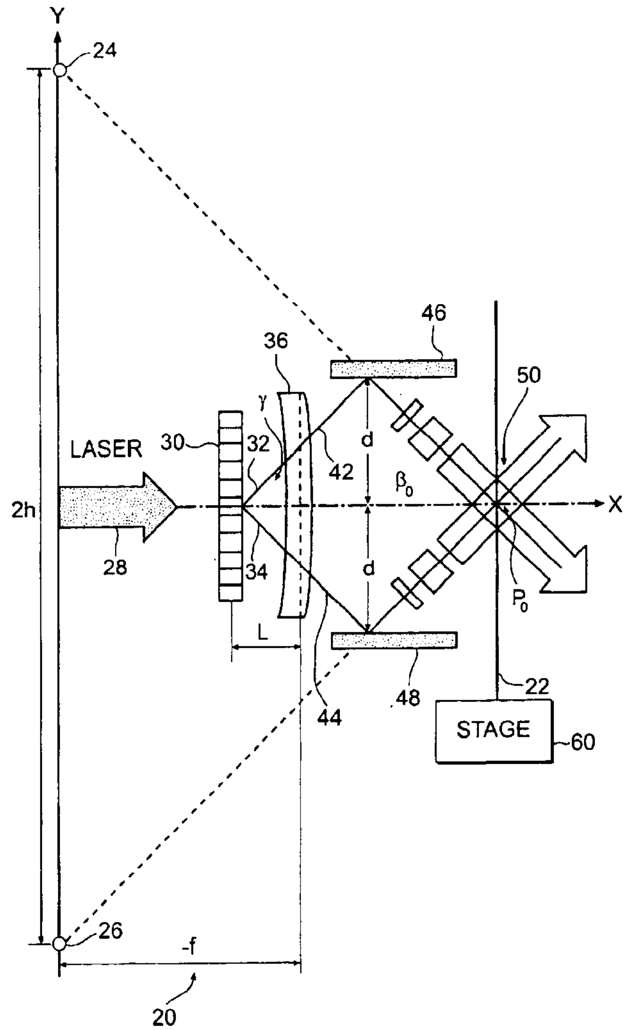
Wang, Ying, Inventor; Sharma, Anup, Inventor; Grant, Joseph, Inventor; March 29, 2005; 8 pp.; In English

Patent Info.: Filed 8 Apr. 2002; US-Patent-6,873,762; US-Patent-Appl-SN-118626; NASA-Case-MFS-31569-1; No Copyright; Avail: CASI; A02, Hardcopy

An apparatus and method for forming a Bragg grating on an optical fiber using a phase mask to diffract a beam of coherent energy and a lens combined with a pair of mirrors to produce two symmetrical virtual point sources of coherent energy in the plane of the optical fiber. The two virtual light sources produce an interference pattern along the optical fiber. In a further embodiment, the period of the pattern and therefore the Bragg wavelength grating applied to the fiber is varied with the position of the optical fiber relative the lens.

Author

Bragg Gratings; Optical Fibers; Coherent Light



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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*.

20050167896 NASA Glenn Research Center, Cleveland, OH, USA

Method for the Production of Nanometer Scale Step Height Reference Specimens

Abel, Phillip B., Inventor; Powell, Anthony, Inventor; Neudeck, Philip G., Inventor; March 22, 2005; 27 pp.; In English

Patent Info.: Filed 17 Jul. 2002; US-Patent-6,869,480; US-Patent-Appl-SN-198668; NASA-Case-LEW-17157-1; No Copyright; Avail: CASI; A03, Hardcopy

Methods are disclosed that provide for structures and techniques for the fabrication of ordered arrangements of crystallographically determined nanometer scale steps on single crystal substrates, particularly Sic. The ordered nanometer scale step structures are produced on the top surfaces of mesas by a combination of growth and etching processes. These structures sometimes referred to herein as artifacts are to enable step-height calibration, particularly suitable for scanning probe microscopes and profilometers, from less than one nanometer (nm) to greater than 10 nm, with substantially no atomic scale roughness of the plateaus on either side of each step.

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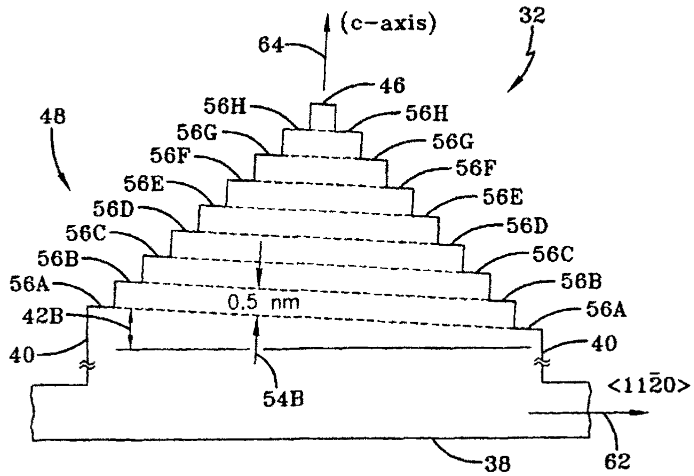
Fabrication; Scale Height; Single Crystals; Crystallography



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DOCUMENTATION AND INFORMATION SCIENCE

Includes information management; information storage and retrieval technology; technical writing; graphic arts; and micrography. For computer program documentation see *61 Computer Programming and Software*.

20050051006 NASA Ames Research Center, Moffett Field, CA, USA
System, Method and Apparatus for Conducting a Keyterm Search
McGreevy, Michael W., Inventor; November 23, 2004; 76 pp.; In English
Patent Info.: Filed 2 Mar. 2001
Report No.(s): US-Patent-6,823,333; US-Patent-Appl-SN-800309; NASA-Case-ARC-14512-1; No Copyright; Avail: CASI; A05, Hardcopy

A keyterm search is a method of searching a database for subsets of the database that are relevant to an input query. First, a number of relational models of subsets of a database are provided. A query is then input. The query can include one or more keyterms. Next, a gleaning model of the query is created. The gleaning model of the query is then compared to each one of the relational models of subsets of the database. The identifiers of the relevant subsets are then output.
Official Gazette of the U.S. Patent and Trademark Office
Data Bases; Search Profiles; Information Retrieval

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