NASA/SP—2000-7039/SUPPL57
July 2000

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Introduction

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The citations published in this issue cover the period December 1999 through July 2000. This issue includes 10 major subject divisions separated into 76 specific categories and one general category/division. (See Table of Contents for the scope note of each category, under which are grouped appropriate NASA inventions.) This scheme was devised in 1975 and revised in 1987 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 *STAR* 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.

A typical citation and abstract presents the various data elements included in most records cited. This appears after the table of contents.

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Table of Contents

Select a category to view the collection of records cited. N.A. means no abstracts in that category.

12 Astronautics (General) N.A.

For extraterrestrial exploration, see *91 Lunar and Planetary Exploration*.

13 Astrodynamics N.A.

Includes powered and free-flight trajectories; and orbital and launching dynamics.

14 Ground Support Systems and Facilities (Space) N.A.

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators. *For related information, see also 09 Research and Support Facilities (Air)*.

15 Launch Vehicles and Space Vehicles N.A.

Includes boosters; operating problems of launch/space vehicle systems; and reusable vehicles. For related information, see also *20 Spacecraft Propulsion and Power.*

16 Space Transportation N.A.

Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques. For related information, see also *03 Air Transportation and Safety* and *18 Spacecraft Design, Testing and Performance*. For space suits, see *54 Man/System Technology and Life Support*.

17 Space Communications, Spacecraft Communications, Command and Tracking N.A.

Includes telemetry; space communication networks; astronavigation and guidance; and radio blackout. For related information, see also *04 Aircraft Communications and Navigation* and *32 Communications and Radar.*

18 Spacecraft Design, Testing and Performance N.A.

Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls. 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*.

19 Spacecraft Instrumentation N.A.

For related information, see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

20 Spacecraft Propulsion and Power N.A.

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*, *44 Energy Production and Conversion*, and *15 Launch Vehicles and Space Vehicles*.

Indexes

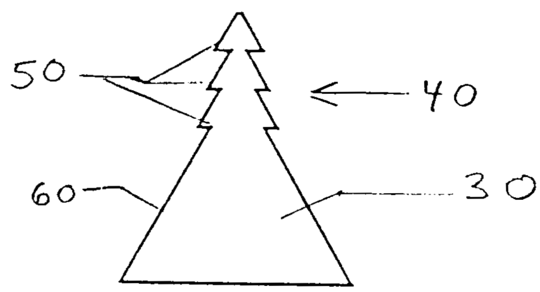
Two indexes are available. You may use the **Find** command under the **Tools** menu while viewing the PDF file for direct match searching on any text string. You may also view the indexes provided, for searching on *NASA Thesaurus* subject terms and author names.

Selecting an index above will link you to that comprehensive listing.

Typical Report Citation and Abstract

❶ **19970011223** NASA Langley Research Center, Hampton, VA USA
❷ **Serrated-Planform Lifting-Surfaces**
❸ McGrath, Brian E., Inventor, NASA Langley Research Center, USA; Wood, Richard M., Inventor, NASA Langley Research
❹ Center, USA; Oct. 22, 1996; 38p; In English
❺ Patent Info.: Filed 22 Oct. 1996; NASA-Case-LAR-15295-1; US-Patent-Appl-SN-734820
❻ Report No.(s): NAS 1.71:LAR-15295-1; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
❼ A set of serrated-planform lifting surfaces is provided which produces unexpectedly high lift coefficients at moderate to high angles-of-attack. Each serration, or tooth, is designed to shed a vortex. The interaction of the vortices greatly enhances the lifting capability over an extremely large operating range. Variations of the invention use serrated-planform lifting surfaces in planes different than that of a primary lifting surface. In an alternate embodiment, the individual teeth are controllably retractable and deployable to provide for active control of the vortex system and hence lift coefficient. Differential lift on multiple serrated-planform lifting surfaces provides an means for vehicle control. The important aerodynamic advantages of the serrated-planform lifting surfaces are not limited to aircraft applications but can be used to establish desirable performance characteristics for missiles, land vehicles, and/or watercraft.
❽ NASA
❾ *Angle of Attack; Lift; Vortex Shedding; Active Control; Lifting Bodies*

❿



Key

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9. Subject Terms
10. Patent Illustration

NASA PATENT ABSTRACTS BIBLIOGRAPHY

A Continuing Bibliography (Suppl. 57)

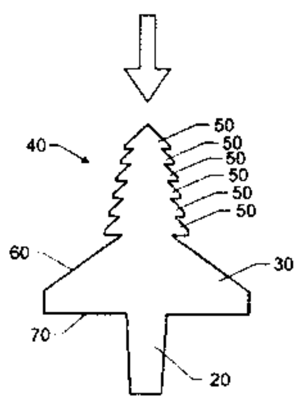
JULY 2000

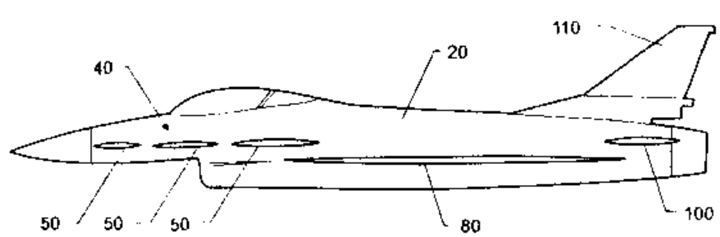
02
AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery. For related information see also 34 Fluid Mechanics and Heat Transfer.

20000025500 NASA Langley Research Center, Hampton, VA USA
Serrated-Planform Lifting-Surfaces
McGrath, Brian E., Inventor, NASA Langley Research Center, USA; Wood, Richard M., Inventor, NASA Langley Research Center, USA; May 11, 1999; In English
Patent Info.: Filed 22 Oct. 1996; NASA-Case-LAR-15295-1; US-Patent-5,901,925; US-Patent-Appl-SN-734820; No Copyright; Avail: US Patent and Trademark Office, Hardcopy

A novel set of serrated-planform lifting surfaces produce unexpectedly high lift coefficients at moderate to high angles-of-attack. Each serration, or tooth, is designed to shed a vortex. The interaction of the vortices greatly enhances the lifting capability over an extremely large operating range. Variations of the invention use serrated-planform lifting surfaces in planes different than that of a primary lifting surface. In an alternate embodiment, the individual teeth are controllably retractable and deployable to provide for active control of the vortex system and hence lift coefficient. Differential lift on multiple serrated-planform lifting surfaces provides a means for vehicle control. The important aerodynamic advantages of the serrated-planform lifting surfaces are not limited to aircraft applications but can be used to establish desirable performance characteristics for missiles, land vehicles, and/or watercraft.
Official Gazette of the U.S. Patent and Trademark Office
Aerodynamic Coefficients; Angle of Attack; Planforms; Vortex Shedding; Lifting Bodies





05
AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology. For related information see also 18 Spacecraft Design, Testing and Performance and 39 Structural Mechanics. For land transportation vehicles see 85 Urban Technology and Transportation.

20000045695 NASA Ames Research Center, Moffett Field, CA USA

Secondary Wing System for Use on an Aircraft

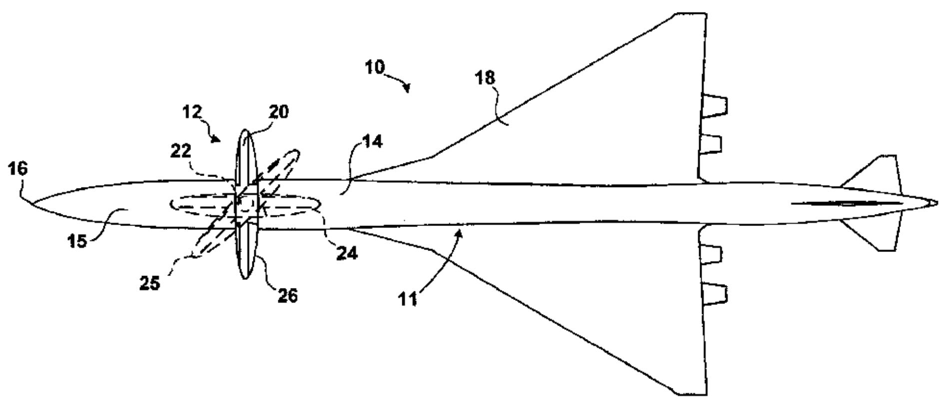
Smith, Brian E., Inventor, NASA Ames Research Center, USA; Nov. 30, 1999; 20p; In English

Patent Info.: Filed 13 Mar. 1997; NASA-Case-ARC-14122-1; US-Patent-5,992,796; US-Patent-Appl-SN-828826; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A secondary wing system for use on an aircraft augments the lift, stability, and control of the aircraft at subsonic speeds. The secondary wing system includes a mechanism that allows the canard to be retracted within the contour of the aircraft fuselage from an operational position to a stowed position. The top surface of the canard is exposed to air flow in the stowed position, and is contoured to integrate aerodynamically and smoothly within the contour of the fuselage when the canard is retracted for high speed flight. The bottom portion of the canard is substantially flat for rotation into a storage recess within the fuselage. The single canard rotates about a vertical axis at its spanwise midpoint. The canard can be positioned between a range of sweep angles during flight and a stowed position in which its span is substantially parallel to the aircraft fuselage. The canard can be deployed and retracted during flight. The deployment mechanism includes a circular mounting ring and drive mechanism that connects the canard with the fuselage and permits it to rotate and to change incidence. The deployment mechanism further includes retractable fairings which serve to streamline the wing when it is retracted into the top of the fuselage.

Author

Airspeed; Canard Configurations; Fuselages; Retractable Equipment; Rotation; Wings; Sweep Angle; Lift Augmentation



08
AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots. For related information see also 05 Aircraft Design, Testing and Performance.

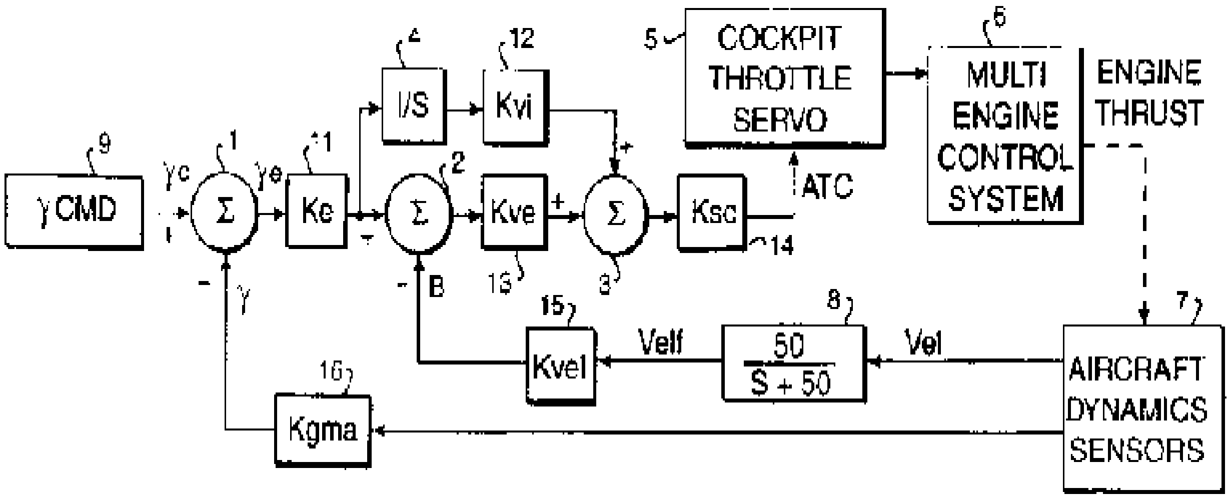
20000046788 NASA Dryden Flight Research Center, Edwards, CA USA

Emergency Control Aircraft System Using Thrust Modulation

Burken, John J., Inventor, NASA Dryden Flight Research Center, USA; Burcham, Frank W., Jr., Inventor, NASA Dryden Flight Research Center, USA; Mar. 21, 2000; 8p; In English

Patent Info.: Filed 1 Jul. 1997; NASA-Case-DRC-09600-7; US-Patent-6,041,273; US-Patent-Appl-SN-886656; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A digital longitudinal Aircraft Propulsion Control (APC system of a multiengine aircraft is provided by engine thrust modulation in response to comparing an input flightpath angle signal (gamma)c from a pilot thumbwheel. or an ILS system with a sensed flightpath angle y to produce an error signal (gamma)e that is then integrated (with reasonable limits) to generate a drift correction signal to be added to the error signal (gamma)e after first subtracting a lowpass filtered velocity signal Vel(sub f) for phugoid damping. The output error signal is multiplied by a constant to produce an aircraft thrust control signal ATC of suitable amplitude to drive a throttle servo for all engines. each of which includes its own full-authority digital engine control (FADEC) computer. An alternative APC system omits sensed flightpath angle feedback and instead controls the flightpath angle by feedback of the lowpass filtered velocity signal Vel(sub f) which also inherently provides phugoid damping. The feature of drift compensation is retained.
Official Gazette of the U.S. Patent and Trademark Office
Aircraft Control; Electronic Control; Engine Control; Error Signals; Feedback Control



23
CHEMISTRY AND MATERIALS (GENERAL)

20000046790 NASA Lewis Research Center, Cleveland, OH USA
Aromatic Diamines and Polyimides Based on 4,4’-Bis-(4-Aminophenoxy)-2,2’ or 2,2’,6,6’- Substituted Biphenyl
Chuang, Chun-Hua K., Inventor, NASA Lewis Research Center, USA; Mar. 14, 2000; 20p; In English; Division of US-Patent-Appl-SN-012173, filed 23 Jan. 1998
Patent Info.: Filed 24 Dec. 1998; NASA-Case-LEW-16384-2; US-Patent-6,037,499; US-Patent-Appl-SN-226633; US-Patent-Appl-SN-012173; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This invention relates the novel diamines. the polyimide oligomers and the polyimides derived therefrom and to the method of preparing the diamines, oligomers and the polyimides. The thermoplastic polyimides derived from the aromatic diamines of this invention are characterized as having a high glass transition temperature. good mechanical properties and improved processability in the manufacture of adhesives. electronic and composite materials for use in the automotive and aerospace industry. The distinction of the novel aromatic diamines of this invention is the 2.2’,6.6substituted biphenyl radicals which exhibit noncoplanar conformation that enhances the solubility of the diamine as well as the processability of the polyimides. while retaining a relatively high glass transition temperature and improved mechanical properties at useful temperature ranges.
Official Gazette of the U.S. Patent and Trademark Office
Diamines; Polyimides; Polyphenyls; Solubility; Thermoplasticity

Includes physical, chemical, and mechanical properties of laminates and other composite materials. For ceramic materials see 27 Nonmetallic Materials.

20000048259 NASA Langley Research Center, Hampton, VA USA

Fire Resistant, Moisture Barrier Membrane

St.Clair, Terry L., Inventor, NASA Langley Research Center, USA; Jan. 25, 2000; 6p; In English; Division of US-Patent-Appl-SN-772052, filed 9 Dec. 1996 and provision of US-Patent Appl-SN-008765, filed 15 Dec. 1995

Patent Info.: Filed 12 Feb. 1998; NASA-Case-LAR-15437-2; US-Patent-6,017,637; US-Patent-Appl-SN-022745; US-Patent-Appl-SN-772052; US-Patent-Appl-SN-008765; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A waterproof and breathable, fire-resistant laminate is provided for use in tents, garments, shoes, and covers, especially in industrial, military and emergency situations. The laminate permits water vapor evaporation while simultaneously preventing liquid water penetration. Further, the laminate is fire-resistant and significantly reduces the danger of toxic compound production when exposed to flame or other high heat source. The laminate may be applied to a variety of substrates and is comprised of a silicone rubber and plurality of fire-resistant, inherently thermally-stable polyimide particles.

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

Laminates; Waterproofing; Thermal Stability; Silicone Rubber; Polyimides; Heat Sources; Flame Retardants

20000048260 NASA Langley Research Center, Hampton, VA USA

Pistons and Cylinders Made of Carbon-Carbon Composite Materials

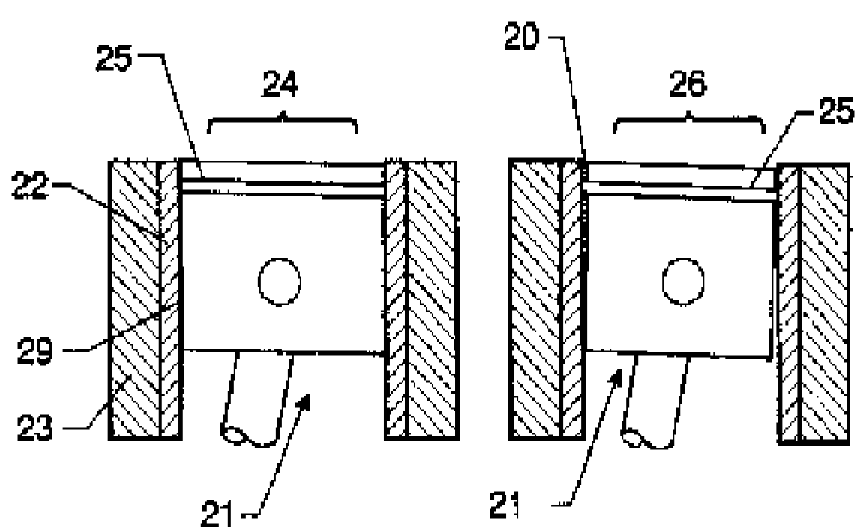
Rivers, H. Kevin, Inventor, NASA Langley Research Center, USA; Ransone, Philip O., Inventor, NASA Langley Research Center, USA; Northam, G. Burton, Inventor, NASA Langley Research Center, USA; Schwind, Francis A., Inventor, NASA Langley Research Center, USA; Apr. 04, 2000; 10p; In English; Provision of US-Patent-Appl-SN-012933, filed 6 Mar. 1996

Patent Info.: Filed 28 Feb. 1997; NASA-Case-LAR-15493-1; US-Patent-6,044,819; US-Patent-Appl-SN-808290; US-Patent-Appl-SN-012933; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

An improved reciprocating internal combustion engine has a plurality of engine pistons, which are fabricated from carbon-carbon composite materials, in operative association with an engine cylinder block, or an engine cylinder tube, or an engine cylinder jug, all of which are also fabricated from carbon-carbon composite materials.

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

Carbon-Carbon Composites; Technology Assessment; Pistons; Fabrication



20000050218 NASA Langley Research Center, Hampton, VA USA

Method for Fabricating Composite Structures Using Pultrusion Processing

Farley, Gary L., Inventor, NASA Langley Research Center, USA; Mar. 07, 2000; 8p; In English; Division of US-Patent-Appl-SN-511568, filed 4 Aug. 1995. See also US-Patent-6,033,510

Patent Info.: Filed 23 Sep. 1997; NASA-Case-LAR-15128-4; US-Patent-6,033,511; US-Patent-Appl-SN-936783; US-Patent-Appl-SN-511568; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A method for fabricating composite structures at a low-cost, moderate-to-high production rate. A first embodiment of the method includes employing a continuous press forming fabrication process. A second embodiment of the method includes employing a pultrusion process for obtaining composite structures. The methods include coating yarns with matrix material, weaving the yarn into fabric to produce a continuous fabric supply and feeding multiple layers of net-shaped fabrics having optimally oriented fibers into a debulking tool to form an undebulked preform. The continuous press forming fabrication process includes partially debulking the preform, cutting the partially debulked preform and debulking the partially debulked preform to form a net-shape. An electron-beam or similar technique then cures the structure. The pultrusion fabric process includes feeding the undebulked preform into a heated die and gradually debulking the undebulked preform. The undebulked preform in the heated die changes dimension until a desired cross-sectional dimension is achieved. This process further includes obtaining a net-shaped infiltrated uncured preform, cutting the uncured preform to a desired length and electron-beam curing (or similar technique) the uncured preform. These fabrication methods produce superior structures formed at higher production rates, resulting in lower cost and high structural performance.

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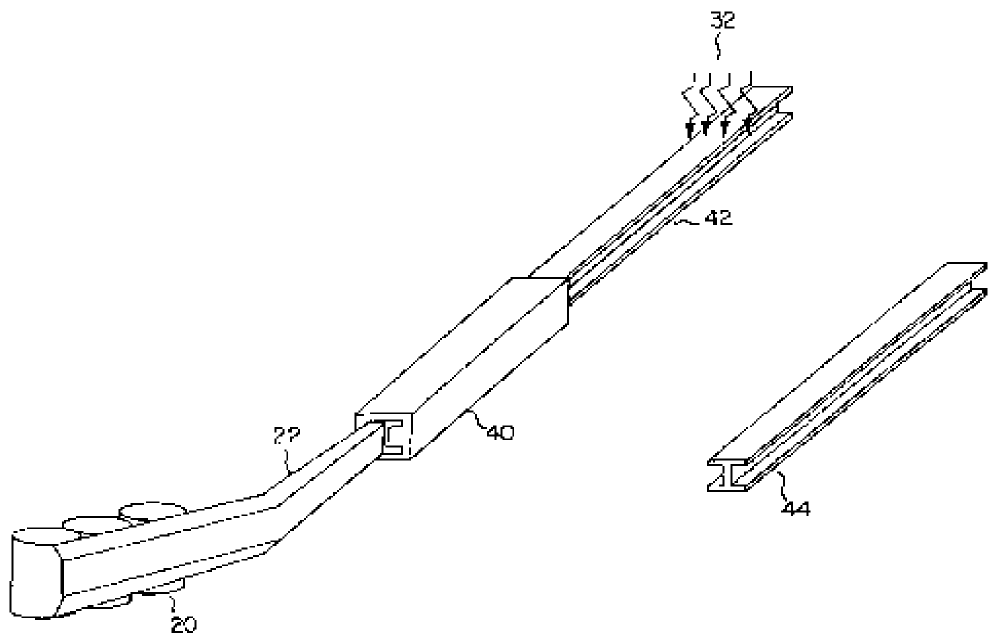
Technologies; Fabrication; Composite Structures; Pultrusion; Matrix Materials



20000050219 NASA Langley Research Center, Hampton, VA USA

Method for Fabricating Composite Structures Using Pultrusion Processing

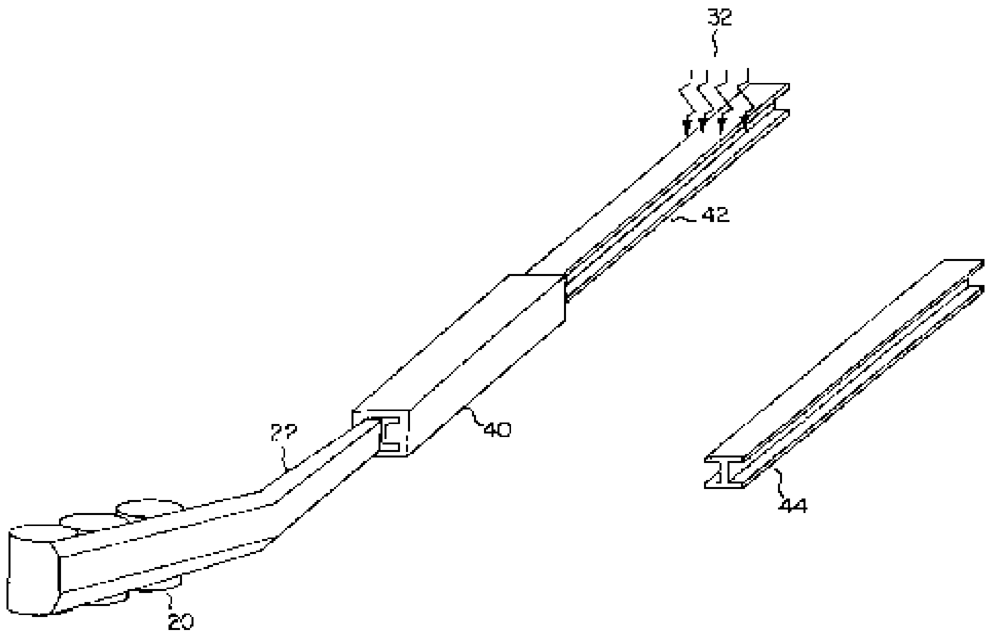
Farley, Gary L., Inventor, NASA Langley Research Center, USA; Mar. 07, 2000; 8p; In English; Division of US-Patent-Appl-SN-511568, filed 4 Aug. 1995. See also US-Patent-6,033,511

Patent Info.: Filed 23 Sep. 1997; NASA-Case-6,033510; US-Patent-6,033,510; US-Patent-Appl-SN-933735; US-Patent-Appl-SN-511568; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A method for fabricating composite structures at a low-cost, moderate-to-high production rate. A first embodiment of the method includes employing a continuous press forming fabrication process. A second embodiment of the method includes employing a pultrusion process for obtaining composite structures. The methods include coating yarns with matrix material, weaving the yarn into fabric to produce a continuous fabric supply and feeding multiple layers of net-shaped fabrics having optimally oriented fibers into a debulking tool to form an undebulked preform. The continuous press forming fabrication process includes partially debulking the preform, cutting the partially debulked preform and debulking the partially debulked preform to form a netshape. An electron-beam or similar technique then cures the structure. The pultrusion fabric process includes feeding the undebulked preform into a heated die and gradually debulking the undebulked preform. The undebulked preform in the heated die changes dimension until a desired cross-sectional dimension is achieved. This process further includes obtaining a net-shaped infiltrated uncured preform, cutting the uncured preform to a desired length and electronbeam curing (or similar technique) the uncured preform. These fabrication methods produce superior structures formed at higher production rates, resulting in lower cost and high structural performance.

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

Technologies; Fabrication; Composite Structures; Pultrusion; Preforms; Presses



25
INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY

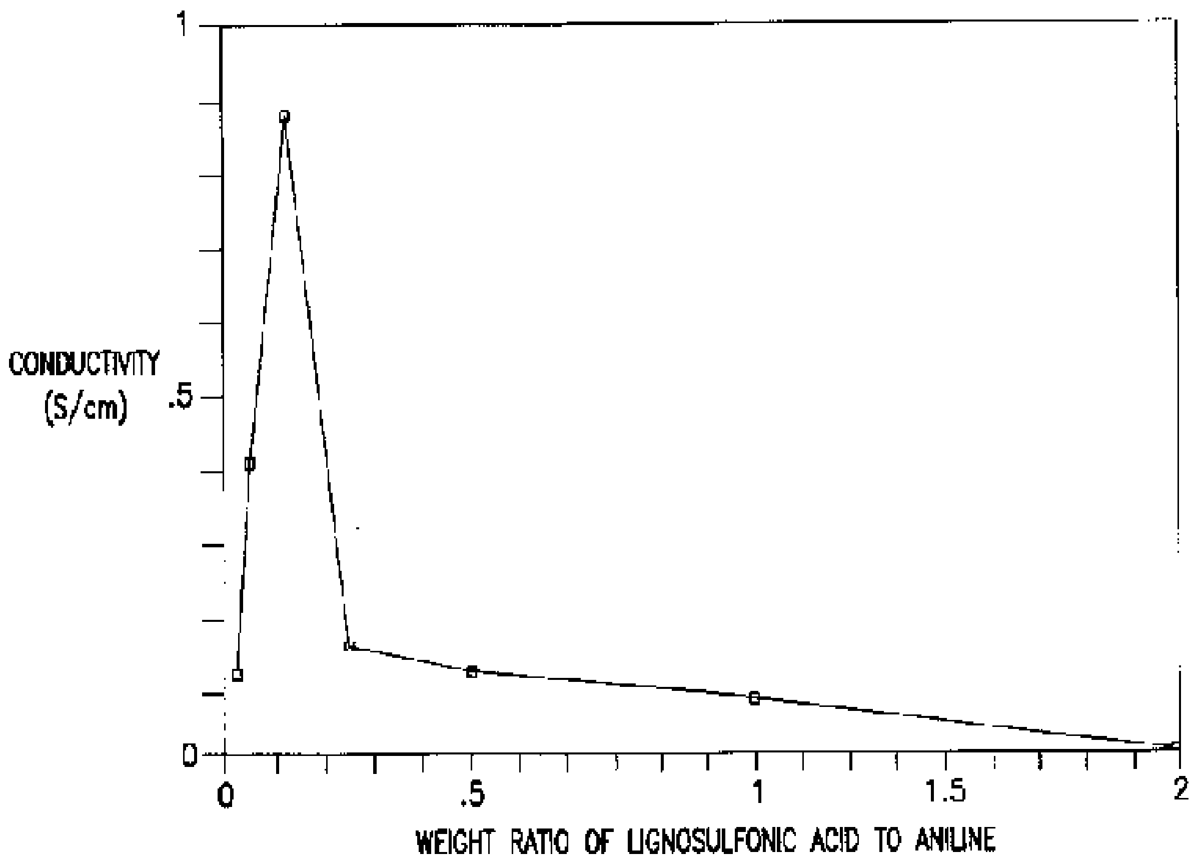
20000030656 NASA Kennedy Space Center, Cocoa Beach, FL USA

Conducting Compositions of Matter

Viswanathan, Tito, Inventor, NASA Kennedy Space Center, USA; Oct. 19, 1999; 10p; In English; Provisional application US-Patent-Appl-SN-040786, filed 3 Mar. 1997

Patent Info.: Filed 3 Mar. 1998; NASA-Case-KSC-11940; US-Patent-5,968,417; US-Patent-Appl-SN-034063; US-Patent-Appl-SN-040786; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

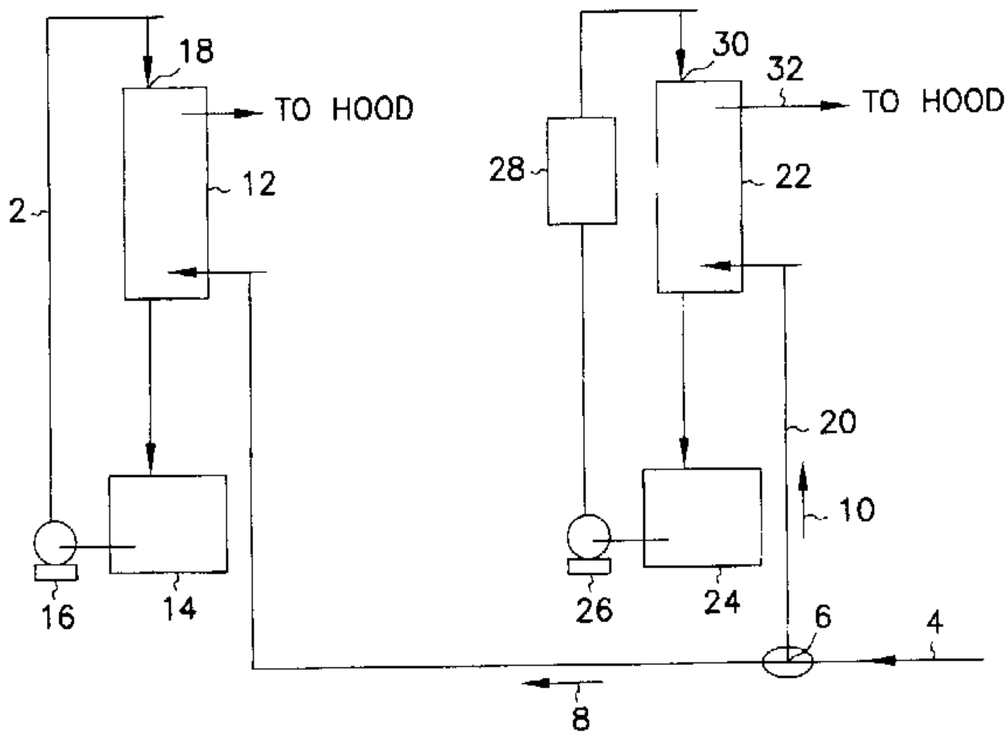
The invention provides conductive compositions of matter, as well as methods for the preparation of the conductive compositions of matter, solutions comprising the conductive compositions of matter, and methods of preparing fibers or fabrics having improved anti-static properties employing the conductive compositions of matter.
Official Gazette of the U.S. Patent and Trademark Office
Procedures; Technology Assessment; Conductivity Meters



20000045689 NASA Kennedy Space Center, Cocoa Beach, FL USA
Process and Equipment for Nitrogen Oxide Waste Conversion to Fertilizer
Lueck, Dale E., Inventor, NASA Kennedy Space Center, USA; Parrish, Clyde F., Inventor, NASA Kennedy Space Center, USA; Mar. 21, 2000; 34p; In English
Patent Info.: Filed 3 Dec. 1996; NASA-Case-KSC-11884-1; US-Patent-6,039,783; US-Patent-Appl-SN-772057; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

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: (1) directing a vapor stream containing at least nitrogen-containing oxidizing agent to a first contact zone; (2) contacting said vapor stream with water to form nitrogen oxide(s) from said at least one nitrogen- containing oxidizing agent; (3) directing said acid(s) as a second stream to a second contact zone; (4) 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 nitrite form present within said second stream to nitrate ion; (5) sampling said stream within said second contact zone to determine the relative amount of hydrogen peroxide within said second contact zone; (6) adding hydrogen

peroxide to said second contact zone when a level on hydrogen peroxide less than 0.1% by weight in said second stream is determined by said sampling; (7) 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 (8) removing sais solution of potassium nitrate from said second contact zone.
Author
Nitrogen Oxides; Waste Treatment; Fertilization; Nitrates; Oxidation; Potassium Hydroxides

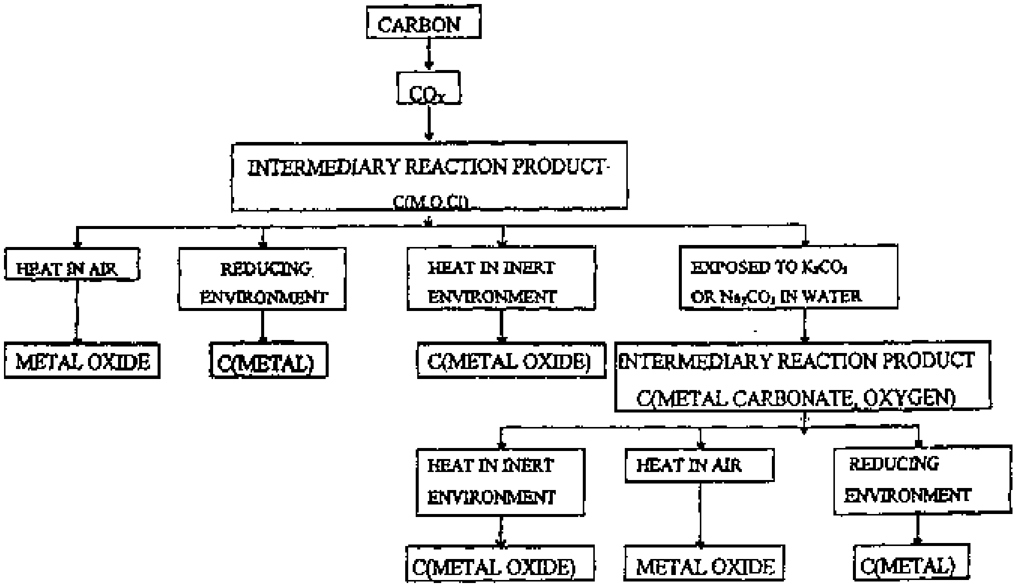


26
METALS AND METALLIC MATERIALS

20000046787 NASA Lewis Research Center, Cleveland, OH USA
Process for Producing Metal Compounds from Graphite Oxide
Hung, Ching-Cheh, Inventor, NASA Lewis Research Center, USA; Mar. 21, 2000; 6p; In English; Division of US-Patent-Appl-SN-833107, filed 4 Apr. 1997
Patent Info.: Filed 14 Oct. 1998; NASA-Case-LEW-16342-2; US-Patents-6,039,930; US-Patent-Appl-SN-172520; US-Patent-Appl-SN-833107; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A process for providing elemental metals or metal oxides distributed on a carbon substrate or self-supported utilizing graphite oxide as a precursor. The graphite oxide is exposed to one or more metal chlorides to form an intermediary product comprising carbon. metal. chloride. and oxygen This intermediary product can be flier processed by direct exposure to carbonate solutions to form a second intermediary product comprising carbon. metal carbonate. and oxygen. Either intermediary product may be further processed: a) in air to produce metal oxide: b) in an inert environment to produce metal oxide on carbon substrate: c) in a

reducing environment. to produce elemental metal distributed on carbon substrate. The product generally takes the shape of the carbon precursor.
Official Gazette of the U.S. Patent and Trademark Office
Procedures; Carbon; Substrates; Metal Oxides; Graphite



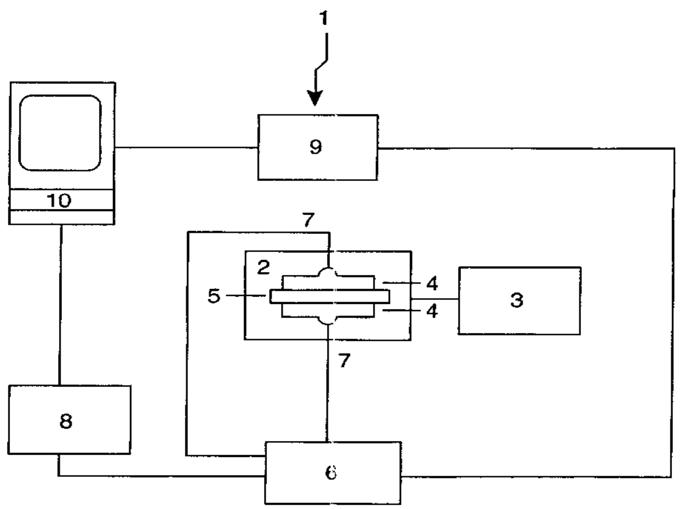
27
NONMETALLIC MATERIALS

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

20000025504 NASA Langley Research Center, Hampton, VA USA
Method of Making Thermally Stable, Piezoelectric and Proelectric Polymeric Substrates
Simpson, Joycelyn O., Inventor, NASA Langley Research Center, USA; St.Clair, Terry L., Inventor, NASA Langley Research Center, USA; Jun. 08, 1999; In English; Division of US-Patent-Appl-SN-524855, filed 7 Sep. 1995
Patent Info.: Filed 30 Aug. 1996; NASA-Case-LAR-15279-1; US-Patent-5,909,905; US-Patent-Appl-SN-706122; US-Patent-Appl-SN-524855; No Copyright; Avail: US Patent and Trademark Office, Hardcopy

A thermally stable, piezoelectric and pyroelectric polymeric substrate was prepared. This thermally stable, piezoelectric and pyroelectric polymeric substrate may be used to prepare electromechanical transducers, thermomechanical transducers, accelerometers, acoustic sensors, infrared sensors, pressure sensors, vibration sensors, impact sensors. in-situ temperature sensors, in-situ stress/strain sensors, micro actuators, switches, adjustable fresnel lenses, speakers, tactile sensors, weather sensors, micro positioners, ultrasonic devices, power generators, tunable reflectors, microphones, and hydrophones. The process for preparing these polymeric substrates includes: providing a polymeric substrate having a softening temperature greater than 100 C; depositing a metal electrode material onto the polymer film; attaching a plurality of electrical leads to the metal electrode coated polymeric substrate; heating the metal electrode coated polymeric substrate in a low dielectric medium: applying a voltage to the heated

metal electrode coated polymeric substrate to induce polarization; and cooling the polarized metal electrode coated polymeric electrode while maintaining a constant voltage.
Official Gazette of the U.S. Patent and Trademark Office
Coatings; Piezoelectricity; Pyroelectricity; Substrates; Polymeric Films; Conducting Polymers



20000030737 NASA Langley Research Center, Hampton, VA USA
Hollow Polyimide Microspheres
Weiser, Erik S., Inventor, NASA Langley Research Center, USA; St.Clair, Terry L., Inventor, NASA Langley Research Center, USA; Echigo, Yoshiaki, Inventor, NASA Langley Research Center, USA; Kaneshiro, Hisayasu, Inventor, NASA Langley Research Center, USA; Nov. 30, 1999; 8p; In English
Patent Info.: Filed 21 May 1999; NASA-Case-LAR-15831; US-Patent-5,994,418; US-Patent-Appl-SN-316865; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A shaped article composed of an aromatic polyimide has a hollow, essentially spherical structure and a particle size of about 100 to about 1500 microns, a density of about I to about 6 pounds/ft3 and a volume change of 1 to about 20% by a pressure treatment of 30 psi for 10 minutes at room temperature. A syntactic foam, made of a multiplicity of the shaped articles which are bounded together by a matrix resin to form an integral composite structure, has a density of about 3 to about 30 pounds/cu ft and a compression strength of about 100 to about 1400 pounds/sq in.
Official Gazette of the U.S. Patent and Trademark Office
Resins; Polyimides; Composite Structures; Compressive Strength; Aromatic Compounds

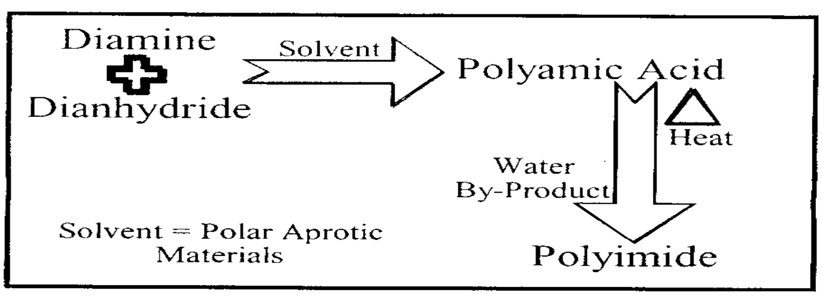


FIG. 1

20000031392 NASA Ames Research Center, Moffett Field, CA USA

High Temperature Resistant Organopolysiloxane Coating for Protecting and Repairing Rigid Thermal Insulation

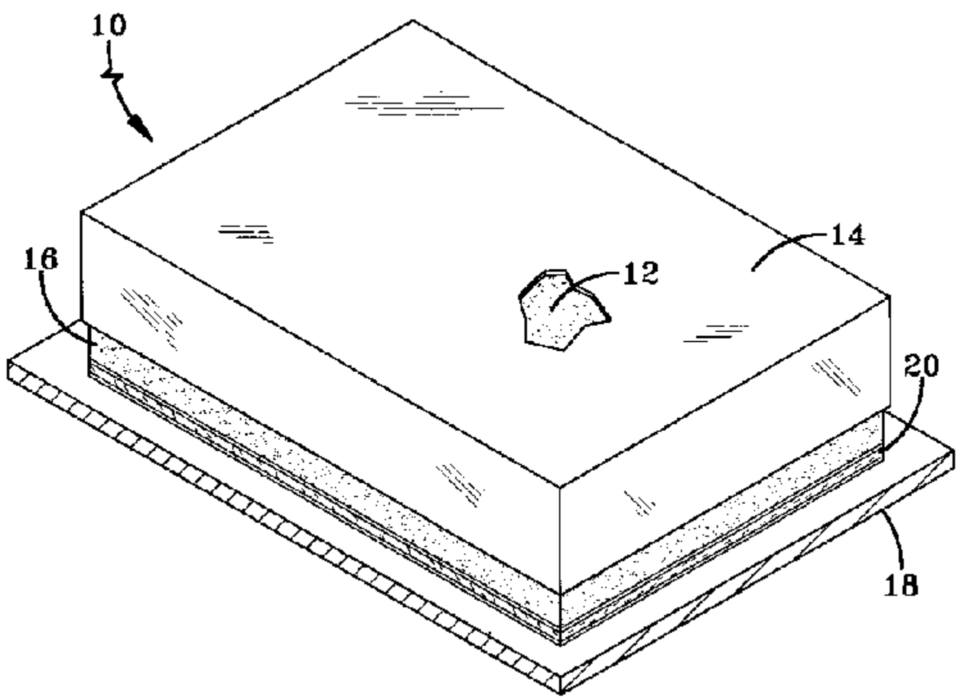
Leiser, Daniel B., Inventor, NASA Ames Research Center, USA; Hsu, Ming-Ta S., Inventor, NASA Ames Research Center, USA; Chen, Timothy S., Inventor, NASA Ames Research Center, USA; Nov. 16, 1999; 10p; In English

Patent Info.: Filed 13 Mar. 1997; NASA-Case-ARC-14077-1; US-Patent-5,985,433; US-Patent-Appl-SN-823665; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Ceramics are protected from high temperature degradation, including high temperature, oxidative, aeroconvective degradation by a high temperature and oxidation resistant coating of a room temperature curing, hydrolyzed and partially condensed liquid polyorganosiloxane to the surface of the ceramic. The liquid polyorganosiloxane is formed by the hydrolysis and partial condensation of an alkyltrialkoxysilane with water or a mixture of an alkyltrialkoxysilane and a dialkyldialkoxysilane with water. The liquid polyorganosiloxane cures at room temperature on the surface of the ceramic to form a hard, protective, solid coating which forms a high temperature environment, and is also used as an adhesive for adhering a repair plug in major damage to the ceramic. This has been found useful for protecting and repairing porous, rigid ceramics of a type used on reentry space vehicles.

Author

High Temperature; Thermal Resistance; Polysiloxanes; Thermal Insulation



20000045692 NASA Langley Research Center, Hampton, VA USA

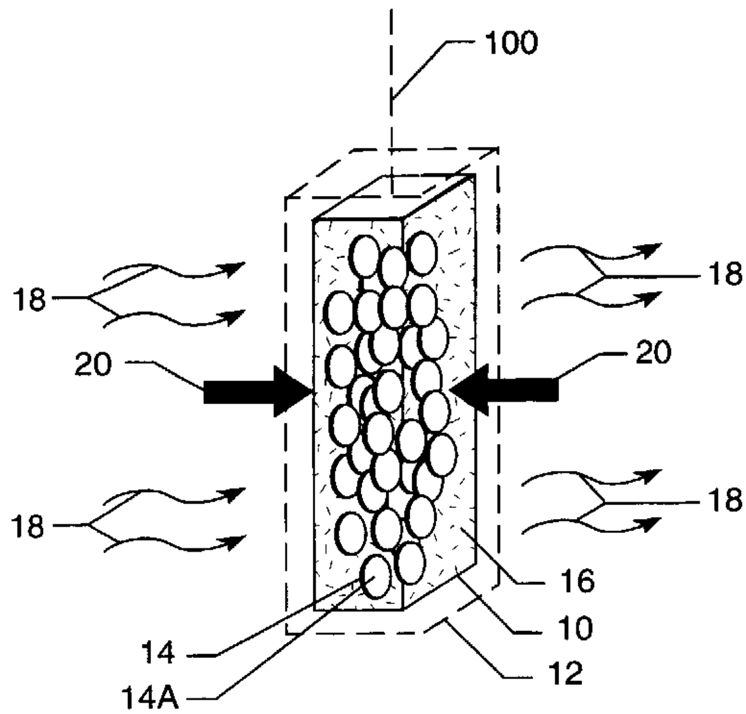
Molded Magnetic Article

Bryant, Robert G., Inventor, NASA Langley Research Center, USA; Namkung, Min, Inventor, NASA Langley Research Center, USA; Wincheski, Russell A., Inventor, NASA Langley Research Center, USA; Fulton, James P., Inventor, NASA Langley Research Center, USA; Fox, Robert L., Inventor, NASA Langley Research Center, USA; Apr. 25, 2000; 8p; In English; Provisional application of US-Patent-Appl-SN-015154, filed 10 Apr. 1996

Patent Info.: Filed 9 Apr. 1997; NASA-Case-LAR-15463-1; US-Patent-6,054,210; US-Patent-Appl-SN-846505; US-Patent-Appl-SN-015154; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A molded magnetic article and fabrication method are provided. Particles of ferromagnetic material embedded in a polymer binder are molded under heat and pressure into a geometric shape. Each particle is an oblate spheroid having a radius-to-thickness

aspect ratio approximately in the range of 15-30. Each oblate spheroid has flattened poles that are substantially in perpendicular alignment to a direction of the molding pressure throughout the geometric shape.
Author
Technology Assessment; Binders (Materials); Oblate Spheroids; Ferromagnetic Materials; Fabrication; Embedding



20000045698 NASA Langley Research Center, Hampton, VA USA

Reflective Silvered Polyimide Films Via In Situ Thermal Reduction Silver (I) Complexes

Southward, Robin E., Inventor, NASA Langley Research Center, USA; Thompson, David W., Inventor, NASA Langley Research Center, USA; St.Clair, Anne K., Inventor, NASA Langley Research Center, USA; Stoakley, Diane M., Inventor, NASA Langley Research Center, USA; Feb. 01, 2000; 4p; In English; Provisional application US-Patent-Appl-SN-037959, filed 20 Feb. 1997 Patent Info.: Filed 20 Feb. 1998; NASA-Case-LAR-15638-1; US-Patent-6,019,926; US-Patent-Appl-SN-026591; US-Patent-Appl-SN-037959; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Self-metallizing. flexible polyimide films with highly reflective surfaces are prepared by an in situ self-metallization procedure involving thermally initiated reduction of polymer-soluble silver(I) complexes. Polyamic acid solutions are doped with silver(I) acetate and solubilizing agents. Thermally curing the silver(I) doped resins leads to flexible. metallized films which have reflectivities as high as 100%. abrasion-resistant surfaces. thermal stability and, in some cases, electrical conductivity, rendering them useful for space applications.
Author
Reflectance; Polyimides; Silver; Metal Films; Technology Utilization; Thermal Stability

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry. For related information see also 60 Computer Operations and Hardware and 76 Solid-State Physics.

20000025507 NASA Pasadena Office, CA USA

Temperature Compensated Sapphire Resonator for Ultrastable Oscillator Operating at Temperatures Near 77 Deg Kelvin

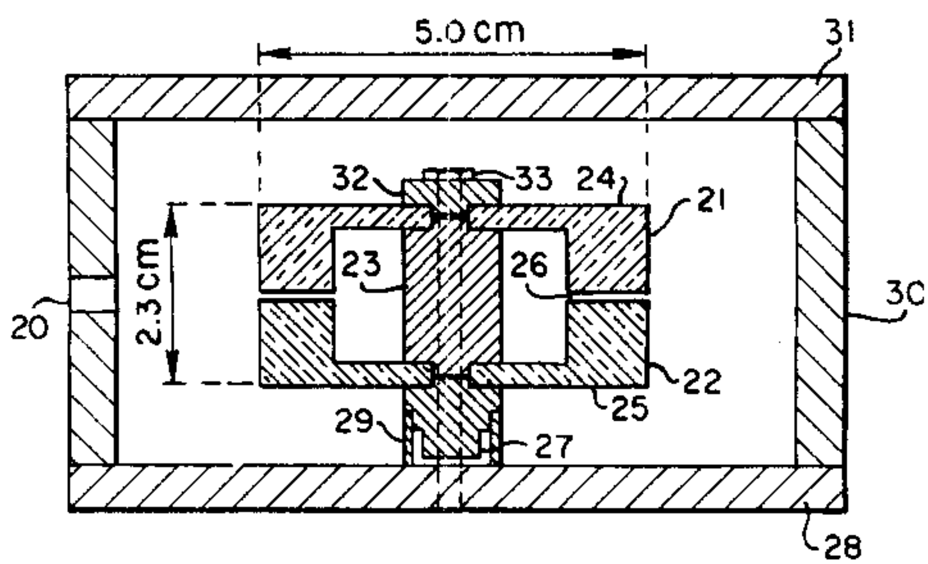
Dick, G. John, Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Santiago, David G., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Jun. 01, 1999; In English

Patent Info.: Filed 9 Aug. 1998; NASA-Case-NPO-19414-1-CU; US-Patent-5,909,160; US-Patent-Appl-SN-538433; No Copyright; Avail: US Patent and Trademark Office, Hardcopy

A sapphire resonator for an ultrastable oscillator capable of substantial performance improvements over the best available crystal quartz oscillators in a compact cryogenic package is based on a compensation mechanism enabled by the difference between copper and sapphire thermal expansion coefficients for so tuning the resonator as to cancel the temperature variation of the sapphire's dielectric constant. The sapphire resonator consists of a sapphire ring separated into two parts with webs on the outer end of each to form two re-entrant parts which are separated by a copper post. The re-entrant parts are bonded to the post by indium solder for good thermal conductivity between parts of that subassembly which is supported on the base plate of a closed copper cylinder (rf shielding casing) by a thin stainless steel cylinder. A unit for temperature control is placed in the stainless steel cylinder and is connected to the subassembly of re-entrant parts and copper post by a layer of indium for good thermal conduction. In normal use, the rf shielding casing is placed in a vacuum tank which is in turn placed in a thermos flask of liquid nitrogen. The temperature regulator is controlled from outside the thermos flask to a temperature in a range of about 40K to 150K, such as 87K for the WGH-811, mode of resonance in response to microwave energy inserted into the rf shielding casing through a port from an outside source.

Author

Oscillators; Resonators; Sapphire; Temperature Control; Cryogenic Temperature



20000030659 NASA Kennedy Space Center, Cocoa Beach, FL USA

Non-Intrusive Impedance-Based Cable Tester

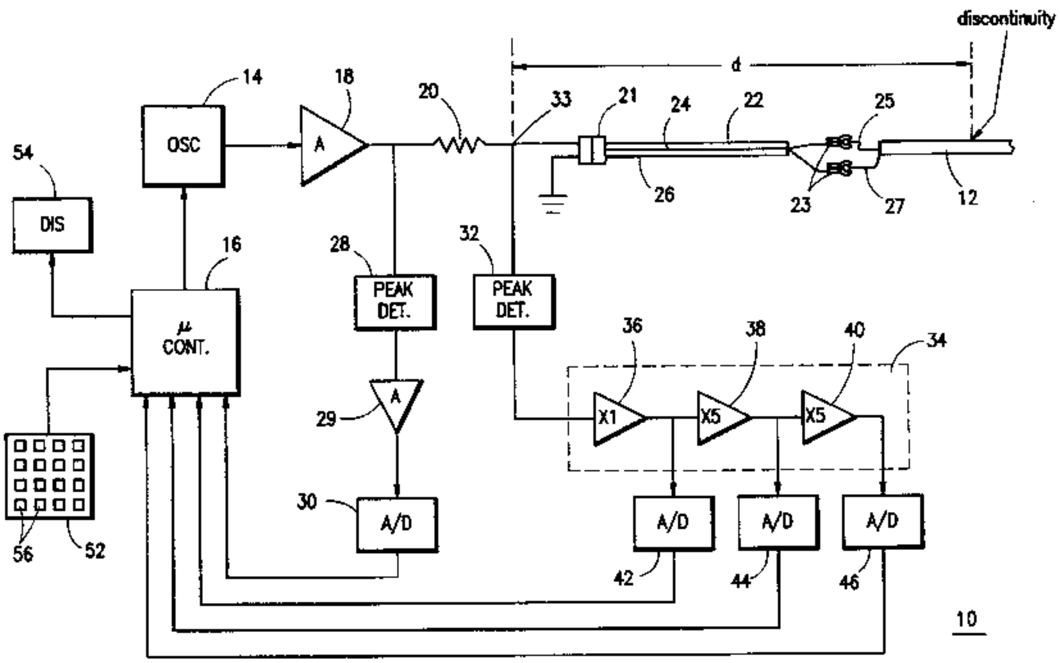
Medelius, Pedro J., Inventor, NASA Kennedy Space Center, USA; Simpson, Howard J., Inventor, NASA Kennedy Space Center, USA; Nov. 02, 1999; 8p; In English

Patent Info.: Filed 15 Aug. 1997; NASA-Case-KSC-11866; US-Patent-5,977,773; US-Patent-Appl-SN-912035; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A non-intrusive electrical cable tester determines the nature and location of a discontinuity in a cable through application of an oscillating signal to one end of the cable. The frequency of the oscillating signal is varied in increments until a minimum, close to zero voltage is measured at a signal injection point which is indicative of a minimum impedance at that point. The frequency of the test signal at which the minimum impedance occurs is then employed to determine the distance to the discontinuity by employing a formula which relates this distance to the signal frequency and the velocity factor of the cable. A numerically controlled oscillator is provided to generate the oscillating signal, and a microcontroller automatically controls operation of the cable tester to make the desired measurements and display the results. The device is contained in a portable housing which may be hand held to facilitate convenient use of the device in difficult to access locations.

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

Electric Potential; Impedance; Nonintrusive Measurement; Oscillators; Automatic Test Equipment



20000048262 NASA Pasadena Office, CA USA

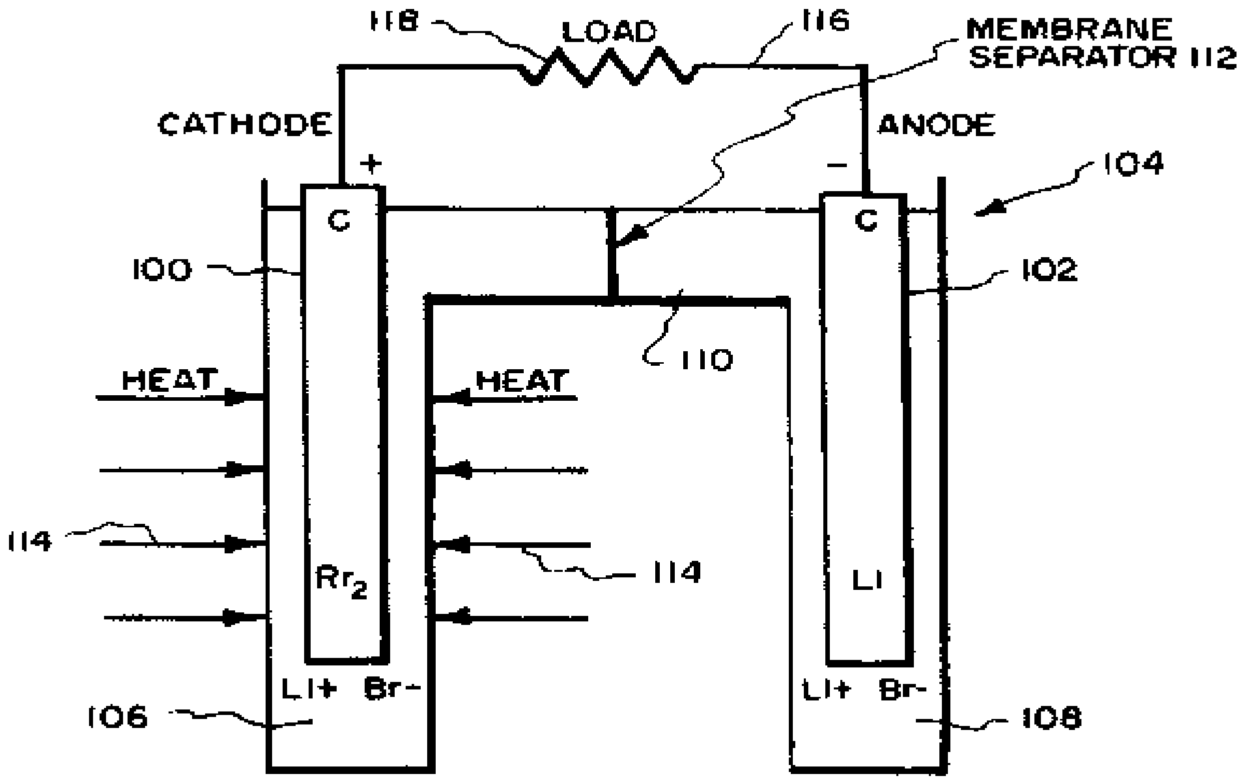
Thermally Regenerative Battery with Intercalatable Electrodes and Selective Heating Means

Sharma, Pramod K., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Narayanan, Sekharipuram R., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Hickey, Gregory S., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Mar. 28, 2000; 8p; In English

Patent Info.: Filed 20 Feb. 1998; NASA-Case-NPO-19824; US-Patent-6,042,964; US-Patent-Appl-SN-035408; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The battery contains at least one electrode such as graphite that intercalates a first species from the electrolyte disposed in a first compartment such as bromine to form a thermally decomposable complex during discharge. The other electrode can also be graphite which supplies another species such as lithium to the electrolyte in a second electrode compartment. The thermally decomposable complex is stable at room temperature but decomposes at elevated temperatures such as 50 C. to 150 C. The elec-

trode compartments are separated by a selective ion permeable membrane that is impermeable to the first species. Charging is effected by selectively heating the first electrode.
Official Gazette of the U.S. Patent and Trademark Office
Electric Batteries; Regeneration (Engineering); Thermal Batteries; Lithium; Electrodes

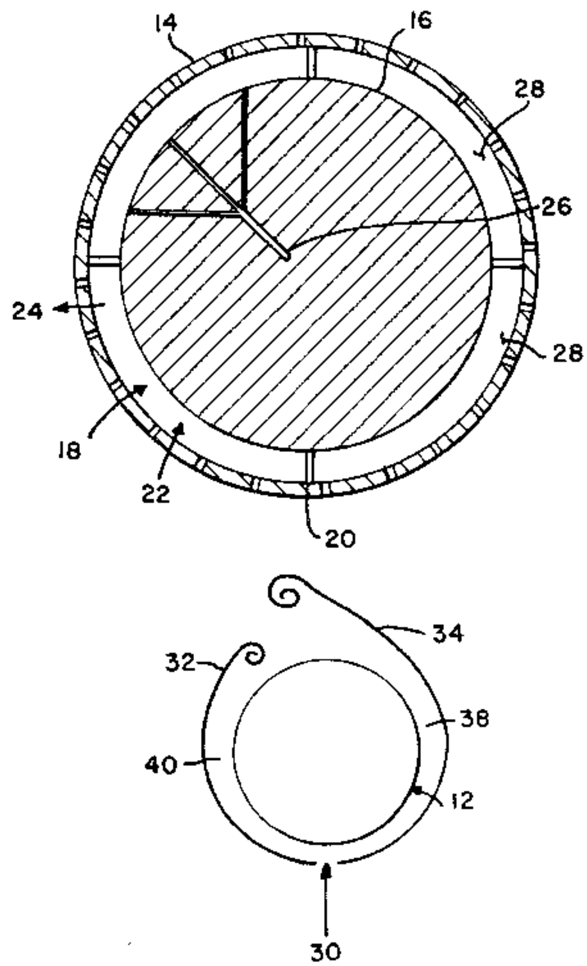


34
FLUID MECHANICS AND THERMODYNAMICS

20000025499 NASA Langley Research Center, Hampton, VA USA
Control and Augmentation of Passive Porosity through Transpiration Control
Banks, Daniel W., Inventor, NASA Langley Research Center, USA; Wood, Richard M., Inventor, NASA Langley Research Center, USA; Bauer, Steven X. S., Inventor, NASA Langley Research Center, USA; May 11, 1999; In English
Patent Info.: Filed 22 May 1992; NASA-Case-LAR-14682; US-Patent-5,901,929; US-Patent-Appl-SN-887002; No Copyright; Avail: US Patent and Trademark Office, Hardcopy

A device for controlling pressure loading of a member caused by a fluid moving past the member or the member moving through a fluid. The device consists of a porous skin mounted over the solid surface of the member and separated from the solid surface by a plenum. Fluid from an area exerting high pressure on the member may enter the plenum through the porous surface

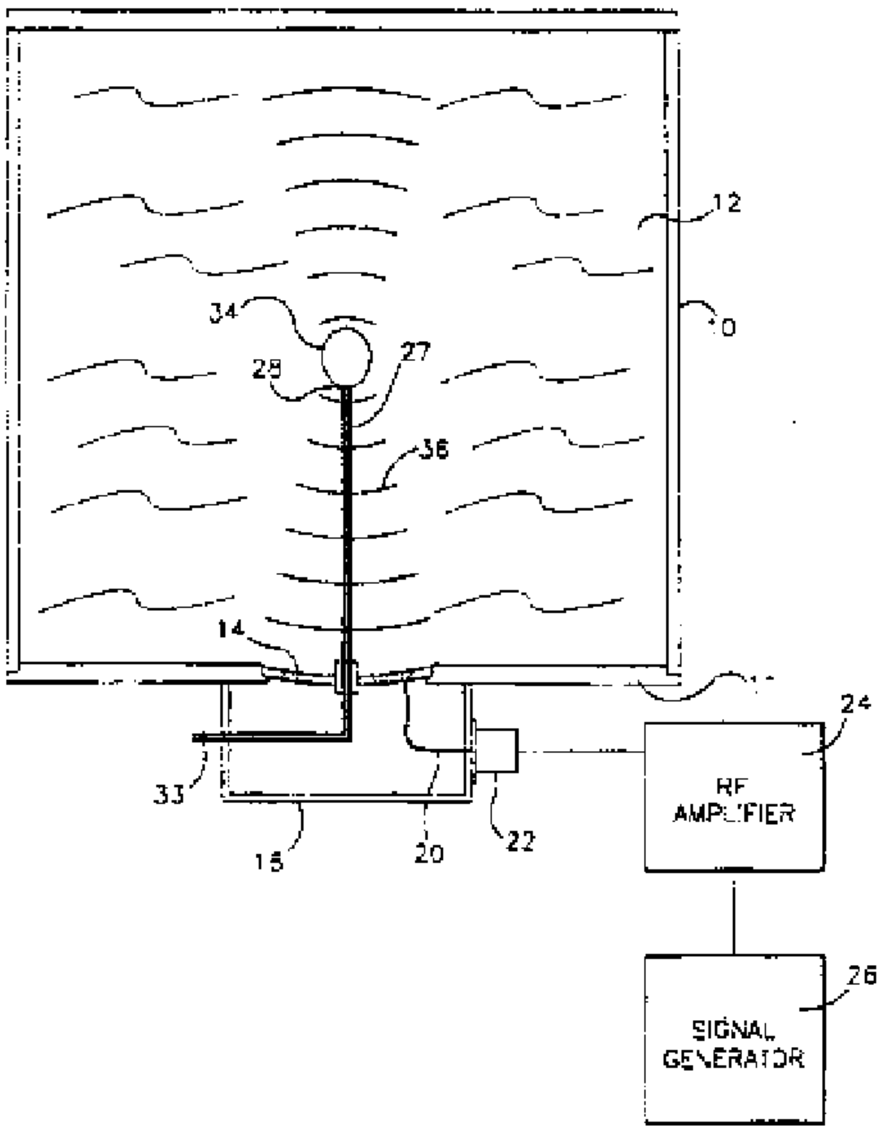
and exit into an area exerting a lower pressure on the member, thus controlling pressure loading of the member. A transpirational control device controls the conditions within the plenum thus controlling the side force and yaw moment on the forebody.
Official Gazette of the U.S. Patent and Trademark Office
Augmentation; Porosity; Transpiration; Aircraft Control; Skin (Structural Member)



20000031620 NASA Lewis Research Center, Cleveland, OH USA
System for Manipulating Drops and Bubbles Using Acoustic Radiation Pressure
Oeftering, Richard C., Inventor, NASA Lewis Research Center, USA; Dec. 21, 1999; 14p; In English
Patent Info.: Filed 17 Sep. 1997; NASA-Case-LEW-16469-1; US-Patent-6,003,388; US-Patent-Appl-SN-969536; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The manipulation and control of drops of liquid and gas bubbles is achieved using high intensity acoustics in the form of and/or acoustic radiation pressure and acoustic streaming. generated by a controlled wave emission from a transducer. Acoustic radiation pressure is used to deploy or dispense drops into a liquid or a gas or bubbles into a liquid at zero or near zero velocity from the discharge end of a needle such as a syringe needle. Acoustic streaming is useful in manipulating the drop or bubble during or after deployment. Deployment and discharge is achieved by focusing the acoustic radiation pressure on the discharge end of the needle, and passing the acoustic waves through the fluid in the needle. through the needle will itself, or coaxially through the fluid medium surrounding the needle. Alternatively, the acoustic waves can be counter-deployed by focusing on the discharge end of the needle from a transducer axially aligned with the needle, but at a position opposite the needle, to prevent premature

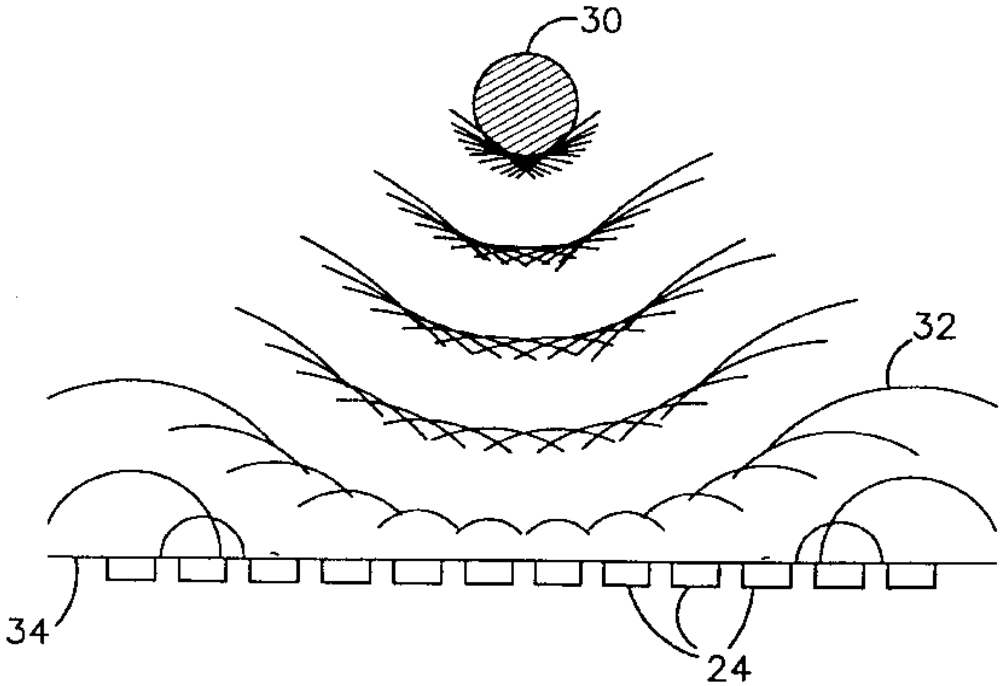
deployment of the drop or bubble. The acoustic radiation pressure can also be used for detecting the presence or absence of a drop or a bubble at the tip of a needle or for sensing various physical characteristics of the drop or bubble such as size or density.
Author
Drops (Liquids); Gases; Bubbles; Sound Waves; Acoustic Streaming; Acoustics; Radiation Pressure; Inventions; Patents



20000046789 NASA Lewis Research Center, Cleveland, OH USA
Manipulation of Liquids Using Phased Array Generation of Acoustic Radiation Pressure
Oeftering, Richard C., Inventor, NASA Lewis Research Center, USA; Feb. 29, 2000; 32p; In English
Patent Info.: Filed 17 Sep. 1997; NASA-Case-LEW-16470-1; US-Patent-6,029,518; US-Patent-Appl-SN-969537; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A phased array of piezoelectric transducers is used to control and manipulate contained as well as uncontained fluids in space and earth applications. The transducers in the phased array are individually activated while being commonly controlled to produce acoustic radiation pressure and acoustic streaming. The phased array is activated to produce a single pulse, a pulse burst or a continuous pulse to agitate, segregate or manipulate liquids and gases. The phased array generated acoustic radiation pressure is also useful in manipulating a drop, a bubble or other object immersed in a liquid. The transducers can be arranged in any number of

layouts including linear single or multi- dimensional, space curved and annular arrays. The individual transducers in the array are activated by a controller, preferably driven by a computer.
Official Gazette of the U.S. Patent and Trademark Office
Radiation Pressure; Piezoelectric Transducers; Phased Arrays; Liquids; Acoustic Streaming



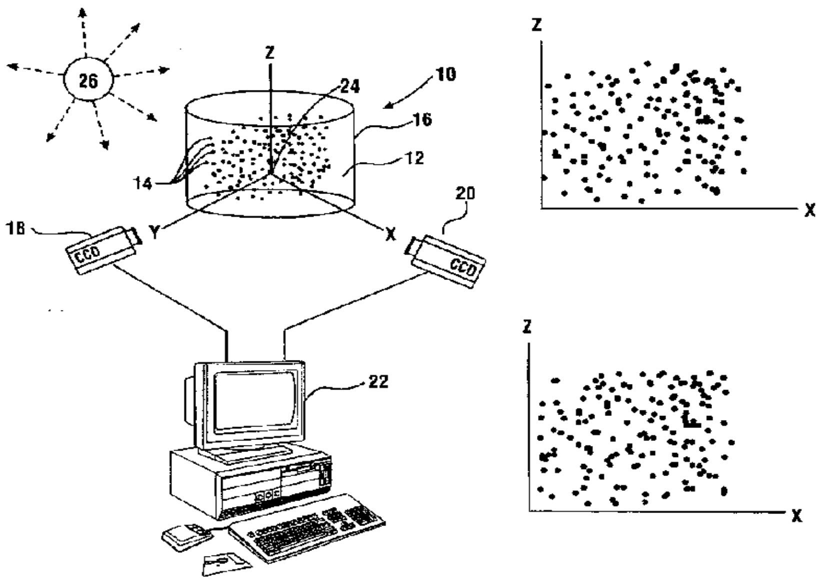
35
INSTRUMENTATION AND PHOTOGRAPHY

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 Aircraft Instrumentation, and 19 Space Instrumentation.

20000025506 NASA Lewis Research Center, Cleveland, OH USA
Stereo Imaging Velocimetry
McDowell, Mark, Inventor, NASA Lewis Research Center, USA; Glasgow, Thomas K., Inventor, NASA Lewis Research Center, USA; May 18, 1999; In English
Patent Info.: Filed 15 Dec. 1997; NASA-Case-LEW-16475-1; US-Patent-5,905,568; US-Patent-Appl-SN-990265; No Copyright; Avail: US Patent and Trademark Office, Hardcopy

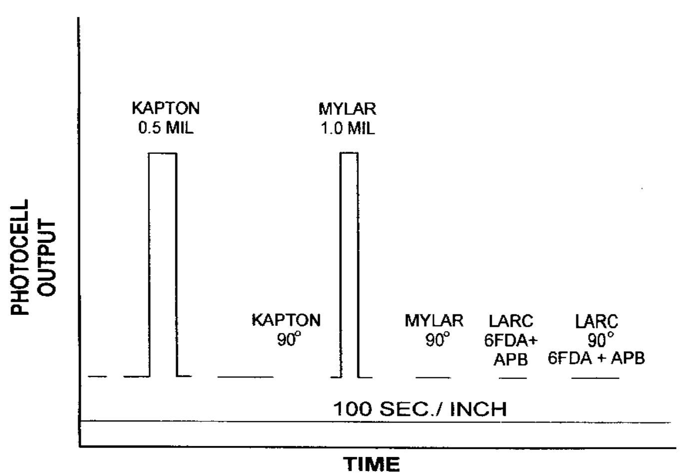
A system and a method for measuring three-dimensional velocities at a plurality of points in a fluid employing at least two cameras positioned approximately perpendicular to one another. The cameras are calibrated to accurately represent image coordinates in world coordinate system. The two-dimensional views of the cameras are recorded for image processing and centroid coordinate determination. Any overlapping particle clusters are decomposed into constituent centroids. The tracer particles are 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 therefrom The stereo imaging velocimetry technique of the present invention provides a full-field. quantitative, three-dimensional map of any optically transparent fluid which is seeded with tracer particles.
Official Gazette of the U.S. Patent and Trademark Office
Cameras; Image Processing; Imaging Techniques; Velocity Measurement; Stereoscopy



20000030736 NASA Langley Research Center, Hampton, VA USA
Substrate Material for Holographic Emulsions Utilizing Fluorinated Polyimide Film
Gierow, Paul A., Inventor, NASA Langley Research Center, USA; Clayton, William R., Inventor, NASA Langley Research Center, USA; St.Clair, Anne K., Inventor, NASA Langley Research Center, USA; Nov. 16, 1999; 4p; In English
Patent Info.: Filed 27 Jun. 1997; NASA-Case-LAR-15447-1; US-Patent-5,986,036; US-Patent-Appl-SN-883851; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

A new holographic substrate utilizing flexible. optically transparent fluorinated polyimides. Said substrates have 0 extremely low birefringence which results in a high signal to noise ratio in subsequent holograms. Specific examples of said fluorinated polyimides include 6FDA+APB and 6FDA+4BDAF.
Official Gazette of the U.S. Patent and Trademark Office
Polyimides; Substrates; Transparence; Holography



20000031393 NASA Ames Research Center, Moffett Field, CA USA

Surface Imaging Skin Friction Instrument and Method

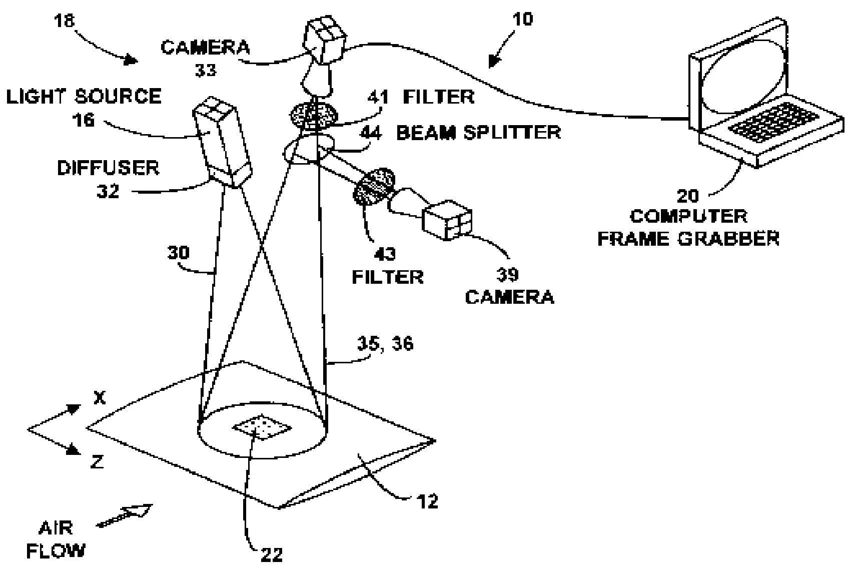
Brown, James L., Inventor, NASA Ames Research Center, USA; Naughton, Jonathan W., Inventor, NASA Ames Research Center, USA; Oct. 05, 1999; 20p; In English

Patent Info.: Filed 11 Jun. 1997; NASA-Case-ARC-14189-1; US-Patent-5,963,310; US-Patent-Appl-SN-873352; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A surface imaging skin friction instrument allowing 2D resolution of spatial image by a 2D Hilbert transform and 2D inverse thin-oil film solver, providing an innovation over prior art single point approaches. Incoherent, monochromatic light source can be used. The invention provides accurate, easy to use, economical measurement of larger regions of surface shear stress in a single test.

Author

Imaging Techniques; Skin Friction; Inventions; Patents



20000045696 NASA Pasadena Office, CA USA

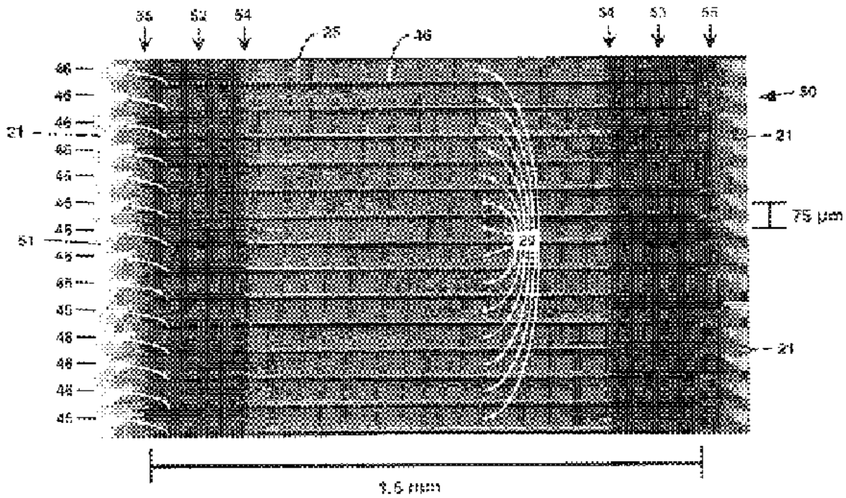
Micromachined Thermoelectric Sensors and Arrays and Process for Producing

Foote, Marc C., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Jones, Eric W., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Caillat, Thierry, Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Apr. 04, 2000; 36p; In English

Patent Info.: Filed 4 Nov. 1998; NASA-Case-NPO-20402-1-CU; US-Patent-6,046,398; US-Patent-Appl-SN-190416; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

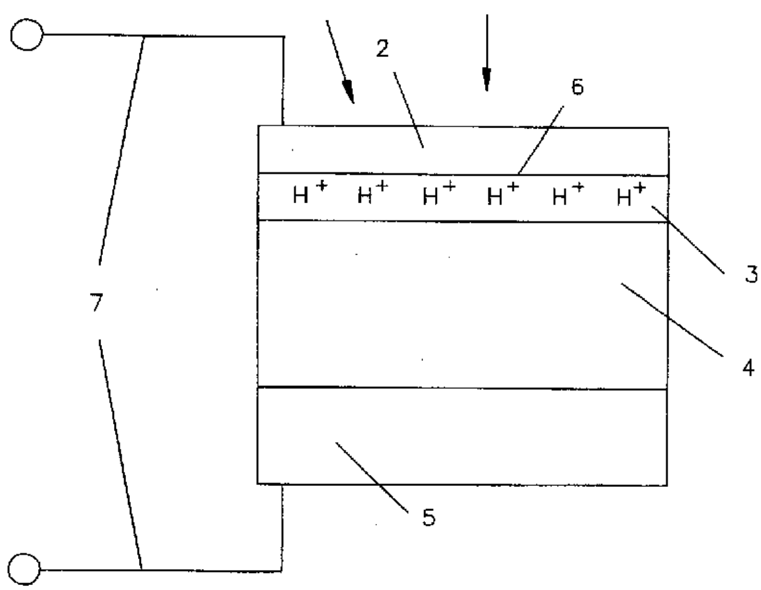
Linear arrays with up to 63 micromachined thermopile infrared detectors on silicon substrates have been constructed and tested. Each detector consists of a suspended silicon nitride membrane with 11 thermocouples of sputtered Bi-Te and Bi-Sb-Te thermoelectric elements films. At room temperature and under vacuum these detectors exhibit response times of 99 ms, zero frequency D* values of 1.4 x 10(exp 9) cmHz(exp 1/2)/W and responsivity values of 1100 V/W when viewing a 1000 K blackbody source. The only measured source of noise above 20 mHz is Johnson noise from the detector resistance. These results represent the best performance reported to date for an array of thermopile detectors. The arrays are well suited for uncooled dispersive point spectrometers. In another embodiment, also with Bi-Te and Bi-Sb-Te thermoelectric materials on micromachined silicon nitride

membranes, detector arrays have been produced with D* values as high as 2.2 x 10(exp 9) cm Hz(exp 1/2)/W for 83 ms response times.
Author
Micromachining; Thermoelectric Materials; Linear Arrays; Infrared Detectors; Thermopiles; Silicon Nitrides



20000046791 NASA Lewis Research Center, Cleveland, OH USA
Gas Sensing Diode and Method of Manufacturing
Hunter, Gary William, Inventor, NASA Lewis Research Center, USA; Feb. 22, 2000; 12p; In English
Patent Info.: Filed 29 May 1998; NASA-Case-LEW-16519-1; US-Patent-6,027,954; US-Patent-Appl-SN-093840; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A diode for sensing hydrogen and hydrocarbons and the process for manufacturing the diode are disclosed. The diode is a Schottky diode which has a palladium chrome contact on the C-face of an n-type 6H Silicon carbide epilayer. The epilayer is grown on the C-face of a 6H silicon carbide substrate. The diode is capable of measuring low concentrations of hydrogen and hydrocarbons at high temperatures, for example, 800 C. The diode is both sensitive and stable at elevated temperatures.
Author
Detection; Gas Analysis; Hydrogen; Sensitivity; Schottky Diodes; Manufacturing



20000048258 NASA Langley Research Center, Hampton, VA USA

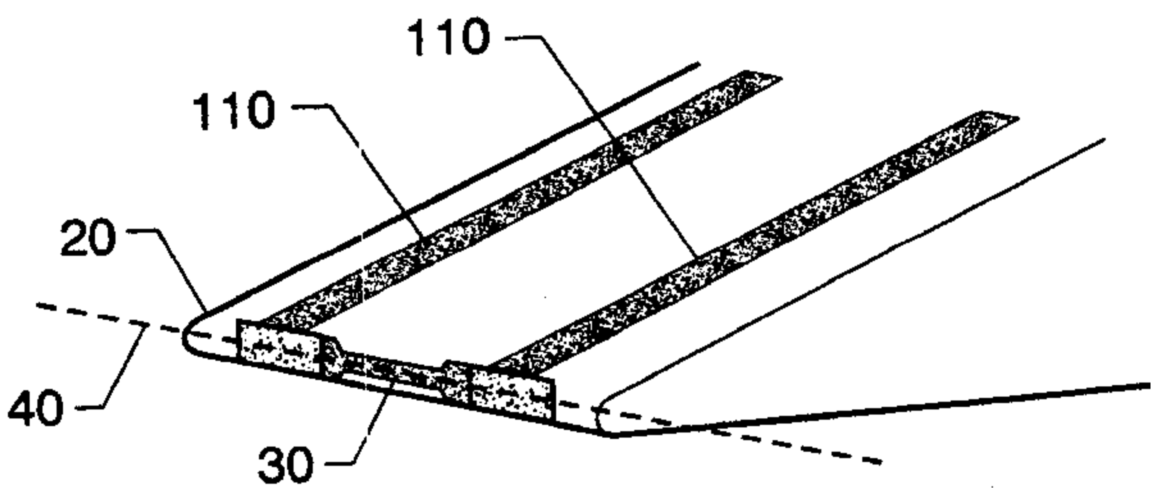
Method of Forming Micro-Sensor Thin-Film Anemometer

Sheplak, Mark, Inventor, NASA Langley Research Center, USA; McGinley, Catherine B., Inventor, NASA Langley Research Center, USA; Spina, Eric F., Inventor, NASA Langley Research Center, USA; Stephens, Ralph M., Inventor, NASA Langley Research Center, USA; Hopson, Purnell, Jr., Inventor, NASA Langley Research Center, USA; Cruz, Vincent B., Inventor, NASA Langley Research Center, USA; Feb. 01, 2000; 8p; In English; Division of US-Patent-Appl-SN-361601, filed 21 Nov. 1994

Patent Info.: Filed 15 Aug. 1996; NASA-Case-LAR-15112-2-CU; US-Patent-6,018,861; US-Patent-Appl-SN-698559; US-Patent-Appl-SN-361601; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A device for measuring turbulence in high-speed flows is provided which includes a micro- sensor thin-film probe. The probe is formed from a single crystal of aluminum oxide having a 14 deg half-wedge shaped portion. The tip of the half-wedge is rounded and has a thin-film sensor attached along the stagnation line. The bottom surface of the half-wedge is tilted upward to relieve shock induced disturbances created by the curved tip of the half-wedge. The sensor is applied using a microphotolithography technique.
Official Gazette of the U.S. Patent and Trademark Office

Procedures; Anemometers; Thin Films; Turbulence



37
MECHANICAL ENGINEERING

Includes auxiliary systems (nonpower); machine elements and processes; and mechanical equipment.

20000025428 NASA Langley Research Center, Hampton, VA USA

Carbon Fiber Reinforced Carbon Composites Rotary Valves for Internal Combustion Engines

Northam, G. Burton, Inventor, NASA Langley Research Center, USA; Ransone, Philip O., Inventor, NASA Langley Research Center, USA; Rivers, H. Kevin, Inventor, NASA Langley Research Center, USA; Jun. 01, 1999; In English; Provisional application US-Patent-Appl-SN-013306, filed 6 Mar. 1996

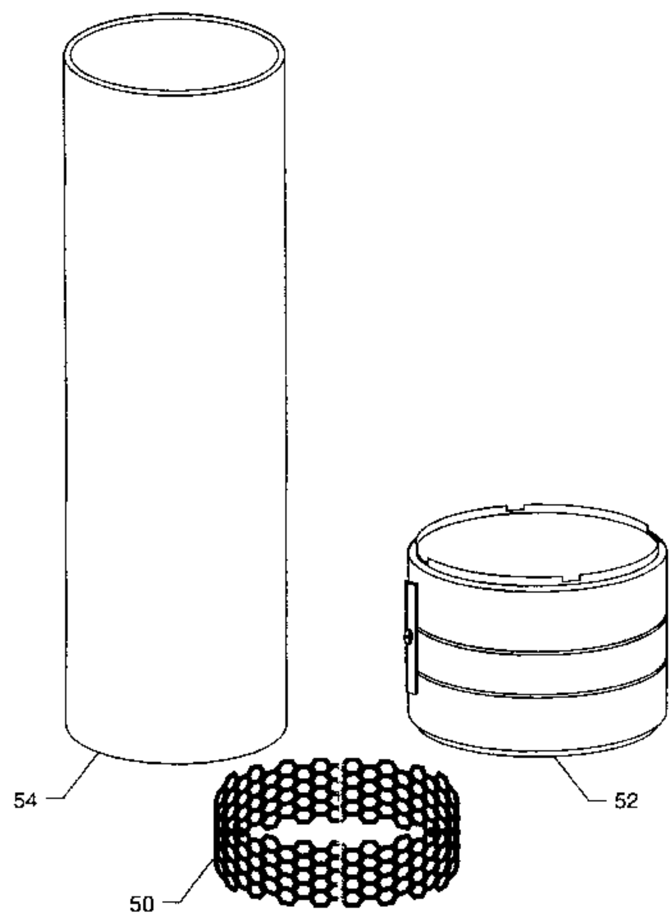
Patent Info.: Filed 6 Mar. 1997; NASA-Case-LAR-15498-1; US-Patent-5,908,016; US-Patent-Appl-SN-812826; US-Patent-Appl-SN-013306; No Copyright; Avail: US Patent and Trademark Office, Hardcopy

Carbon fiber reinforced carbon composite rotary, sleeve, and disc valves for internal combustion engines and the like are disclosed. The valves are formed from knitted or braided or warp-locked carbon fiber shapes. Also disclosed are valves fabricated from woven carbon fibers and from molded carbon matrix material. The valves of the present invention with their very low coefficient of thermal expansion and excellent thermal and self-lubrication properties, do not present the sealing and lubrication prob-

lems that have prevented rotary, sleeve, and disc valves from operating efficiently and reliably in the past. Also disclosed are a sealing tang to further improve sealing capabilities and anti-oxidation treatments.
Official Gazette of the U.S. Patent and Trademark Office
Carbon Fibers; Carbon-Carbon Composites; Fiber Composites; Internal Combustion Engines; Valves

20000025501 NASA Langley Research Center, Hampton, VA USA
Inductive Systems for Bonding and Joining Pipes
Buckley, John D., Inventor, NASA Langley Research Center, USA; Fox, Robert L., Inventor, NASA Langley Research Center, USA; Johnson, Samuel D., Inventor, NASA Langley Research Center, USA; Copeland, Carl E., Inventor, NASA Langley Research Center, USA; Coultrip, Robert H., Inventor, NASA Langley Research Center, USA; Jul. 06, 1999; In English; Provisional Application US-Patent-Appl-SN-015968, filed 3 Apr. 1996
Patent Info.: Filed 3 Apr. 1997; NASA-Case-LAR-15273-1; US-Patent-5,919,387; US-Patent-Appl-SN-840110; US-Patent-Appl-SN-015968; No Copyright; Avail: US Patent and Trademark Office, Hardcopy

A method for bonding or joining plastic or metallic pipe using induced energy is provided. A susceptor is placed between the two pipes to be joined and a magnetic flux is induced onto the susceptor. The second pipe may be a coupling device. The magnetic flux may be induced by a tank circuit or an induction heating gun. The induction heating gun may be formed with a hinged heating head. The susceptor may be a perforated metal ring or a wire coil. The susceptor is coated with a material compatible with the pipes, for example, a plastic adhesive material, magnetic flux is an induction heating gun having a hinged heating head.
Official Gazette of the U.S. Patent and Trademark Office
Bonding; Induction Heating; Magnetic Flux; Pipes (Tubes); Joints (Junctions)



20000030740 NASA Langley Research Center, Hampton, VA USA

Ferroelectric Fluid Flow Control Valve

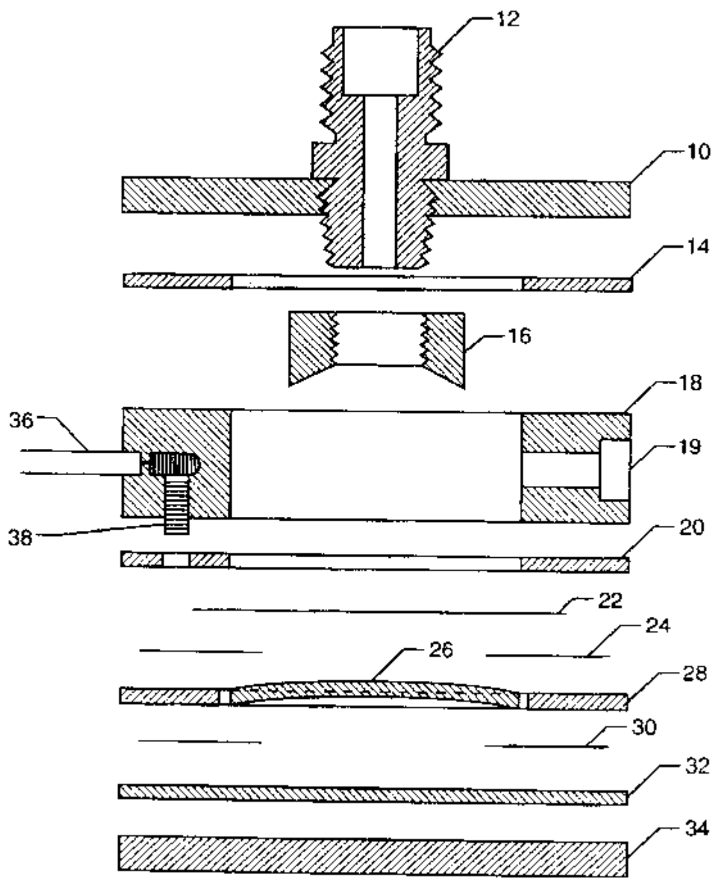
Jalink, Antony, Jr., Inventor, NASA Langley Research Center, USA; Hellbaum, Richard F., Inventor, NASA Langley Research Center, USA; Rohrbach, Wayne W., Inventor, NASA Langley Research Center, USA; Oct. 05, 1999; 6p; In English; Provisional application US-Patent-Appl-SN-015969, filed 3 Apr. 1996

Patent Info.: Filed 3 Apr. 1997; NASA-Case-LAR-15407-1; US-Patent-5,961-096; US-Patent-Appl-SN-832260; US-Patent-Appl-SN-015969; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

An active valve is controlled and driven by external electrical actuation of a ferroelectric actuator to provide for improved passage of the fluid during certain time periods and to provide positive closure of the valve during other time periods. The valve provides improved passage in the direction of flow and positive closure in the direction against the flow. The actuator is a dome shaped internally prestressed ferroelectric actuator having a curvature, said dome shaped actuator having a rim and an apex. and a dome height measured from a plane through said rim said apex that varies with an electric voltage applied between an inside and an outside surface of said dome shaped actuator.

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

Control Valves; Ferroelectricity; Fluid Flow



20000031619 NASA Lewis Research Center, Cleveland, OH USA

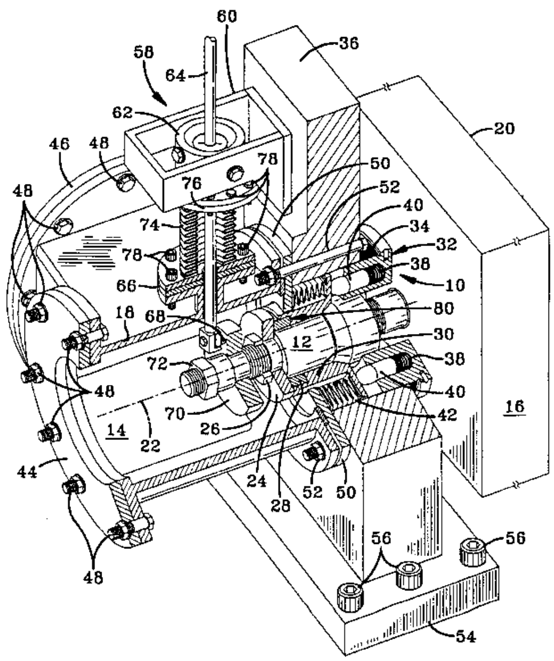
Dynamic Face Seal Arrangement

Dellacorte, Christopher, Inventor, NASA Lewis Research Center, USA; Dec. 28, 1999; 8p; In English

Patent Info.: Filed 15 Nov. 1996; NASA-Case-LEW-15870-1; US-Patent-6,007,068; US-Patent-Appl-SN-753346; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

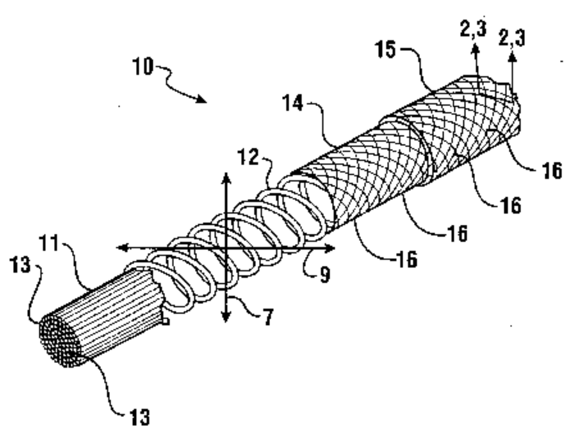
A radial face seal arrangement is disclosed comprising a stationary seal ring that is spring loaded against a seal seat affixed to a rotating shaft. The radial face seal arrangement further comprises an arrangement that not only allows for preloading of the stationary seal ring relative to the seal seat, but also provides for dampening yielding a dynamic seating response for the radial

face seal arrangement. The overall seal system, especially regarding the selection of the material for the stationary seal ring, is designed to operate over a wide temperature range from below ambient up to 900 C.
Author
Seals (Stoppers); Seats; Inventions; Patents



20000048261 NASA Lewis Research Center, Cleveland, OH USA
Resilient Braided Rope Seal
Steinetz, Bruce M., Inventor, NASA Lewis Research Center, USA; Kren, Lawrence A., Inventor, NASA Lewis Research Center, USA; Mar. 21, 2000; 12p; In English; Continuation-in-part of abandoned US-Patent-Appl-SN-739342, filed 17 Oct. 1996
Patent Info.: Filed 9 Apr. 1998; NASA-Case-LEW-16231-2; US-Patent-6,039,325; US-Patent-Appl-SN-057898; US-Patent-Appl-SN-739342; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

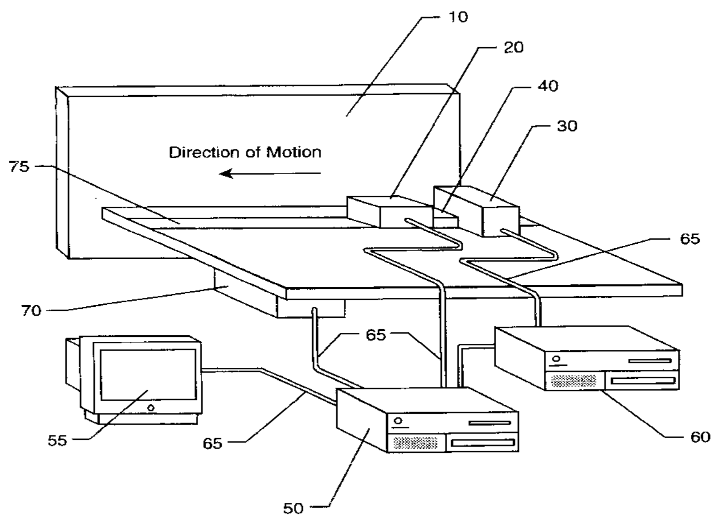
A resilient braided rope seal for use in high temperature applications includes a center core of fibers. a resilient canted spring member supporting the core and at least one layer of braided sheath fibers tightly packed together overlying the spring member. The seal provides both improved load bearing and resiliency. Permanent set and hysteresis are greatly reduced.
Official Gazette of the U.S. Patent and Trademark Office
High Temperature; Hysteresis; Seals (Stoppers)



Includes product sampling procedures and techniques; and quality control.

20000030735 NASA Langley Research Center, Hampton, VA USA
Method and Apparatus for the Portable Identification of Material Thickness and Defects Using Spatially Controlled Heat Application
Cramer, K. Elliott, Inventor, NASA Langley Research Center, USA; Winfree, William P., Inventor, NASA Langley Research Center, USA; Dec. 14, 1999; 16p; In English
Patent Info.: Filed 4 Mar. 1997; NASA-Case-LAR-15524-1; US-Patent-6,000,844; US-Patent-Appl-SN-810058; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A method and a portable apparatus for the nondestructive identification of defects in structures. The apparatus comprises a heat source and a thermal imager that move at a constant speed past a test surface of a structure. The thermal imager is off set at a predetermined distance from the heat source. The heat source induces a constant surface temperature. The imager follows the heat source and produces a video image of the thermal characteristics of the test surface. Material defects produce deviations from the constant surface temperature that move at the inverse of the constant speed. Thermal noise produces deviations that move at random speed. Computer averaging of the digitized thermal image data with respect to the constant speed minimizes noise and improves the signal of valid defects. The motion of thermographic equipment coupled with the high signal to noise ratio render it suitable for portable, on site analysis.
Official Gazette of the U.S. Patent and Trademark Office
Thickness; Defects; Thermography; Nondestructive Tests



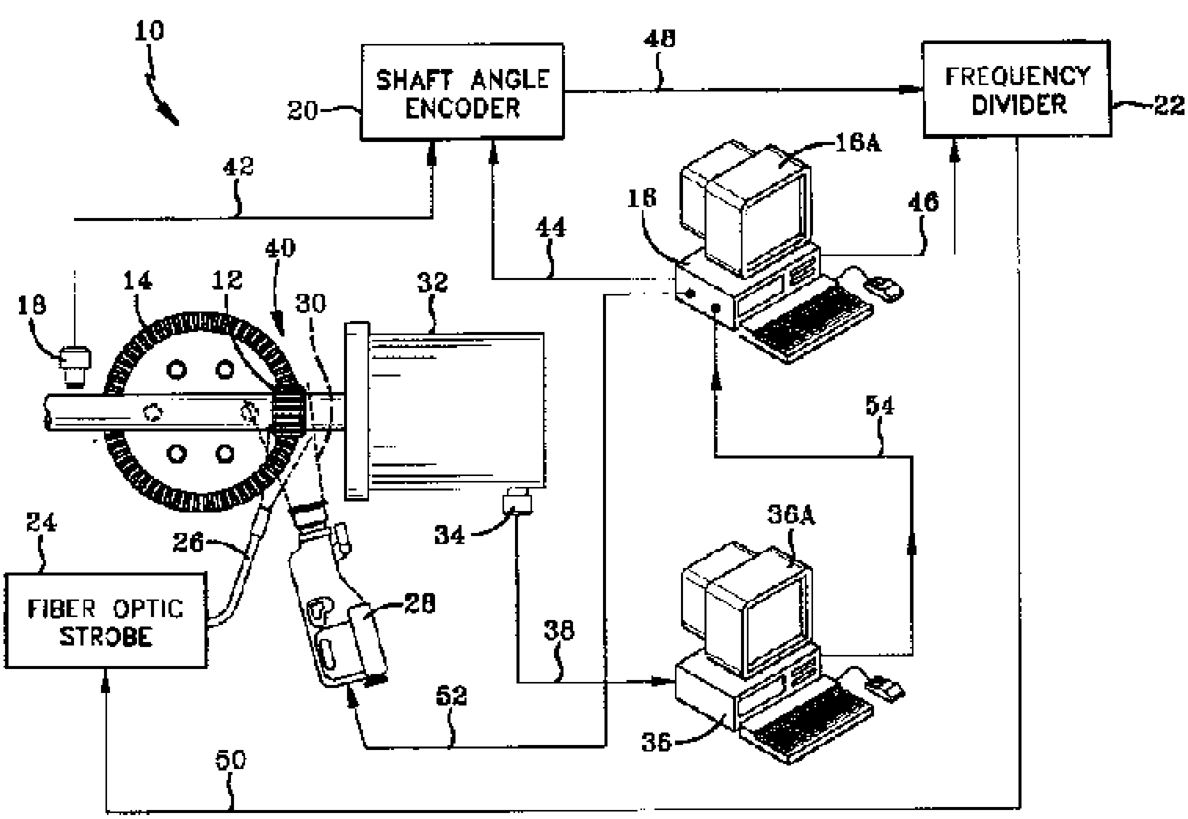
20000030738 NASA Langley Research Center, Hampton, VA USA
Method and Apparatus for Evaluating Multilayer Objects for Imperfections
Heyman, Joseph S., Inventor, NASA Langley Research Center, USA; Abedin, Nurul, Inventor, NASA Langley Research Center, USA; Sun, Kuen J., Inventor, NASA Langley Research Center, USA; Oct. 19, 1999; 10p; In English; Continuation of US-Patent-Appl-SN-571687, filed 13 Dec. 1995, which is a continuation of abandoned US-Patent-Appl-SN-873407, filed 15 Apr. 1992
Patent Info.: Filed 9 Jun. 1997; NASA-Case-LAR-14581-3-SB; US-Patent-5,969,253; US-Patent-Appl-SN-872492; US-Patent-Appl-SN-571687; US-Patent-Appl-SN-873407; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A multilayer object having multiple layers arranged in a stacking direction is evaluated for imperfections such as voids, delaminations and microcracks. First. an acoustic wave is transmitted into the object in the stacking direction via an appropriate transducer/waveguide combination. The wave propagates through the multilayer object and is received by another transducer/waveguide combination preferably located on the same surface as the transmitting combination. The received acoustic wave is correlated with the presence or absence of imperfections by, e.g., generating pulse echo signals indicative of the received acoustic wave. wherein the successive signals form distinct groups over time. The respective peak amplitudes of each group are sampled and curve fit to an exponential curve. wherein a substantial fit of approximately 80-90% indicates an absence of

imperfections and a significant deviation indicates the presence of imperfections. Alternatively, the time interval between distinct groups can be measured. wherein equal intervals indicate the absence of imperfections and unequal intervals indicate the presence of imperfections.
Official Gazette of the U.S. Patent and Trademark Office
Defects; Voids; Microcracks; Sound Waves

20000031621 NASA Lewis Research Center, Cleveland, OH USA
Video Imaging System Particularly Suited for Dynamic Gear Inspection
Broughton, Howard, Inventor, NASA Lewis Research Center, USA; Nov. 02, 1999; 10p; In English
Patent Info.: Filed 27 Aug. 1997; NASA-Case-LEW-16345-1; US-Patent-5,978,500; US-Patent-Appl-SN-944027; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A digital video imaging system that captures the image of a single tooth of interest of a rotating gear is disclosed. The video imaging system detects the complete rotation of the gear and divide that rotation into discrete time intervals so that each tooth of interest of the gear is precisely determined when it is at a desired location that is illuminated in unison with a digital video camera so as to record a single digital image for each tooth. The digital images are available to provide instantaneous analysis of the tooth of interest, or to be stored and later provide images that yield a history that may be used to predict gear failure, such as gear fatigue. The imaging system is completely automated by a controlling program so that it may run for several days acquiring images without supervision from the user.
Author
Digital Television; Imaging Techniques; Cameras; Inventions; Patents



Includes structural element design and weight analysis; fatigue; and thermal stress. For applications see 05 Aircraft Design, Testing and Performance and 18 Spacecraft Design, Testing and Performance.

20000030657 NASA Kennedy Space Center, Cocoa Beach, FL USA

Ultrasonic Bolt Gage

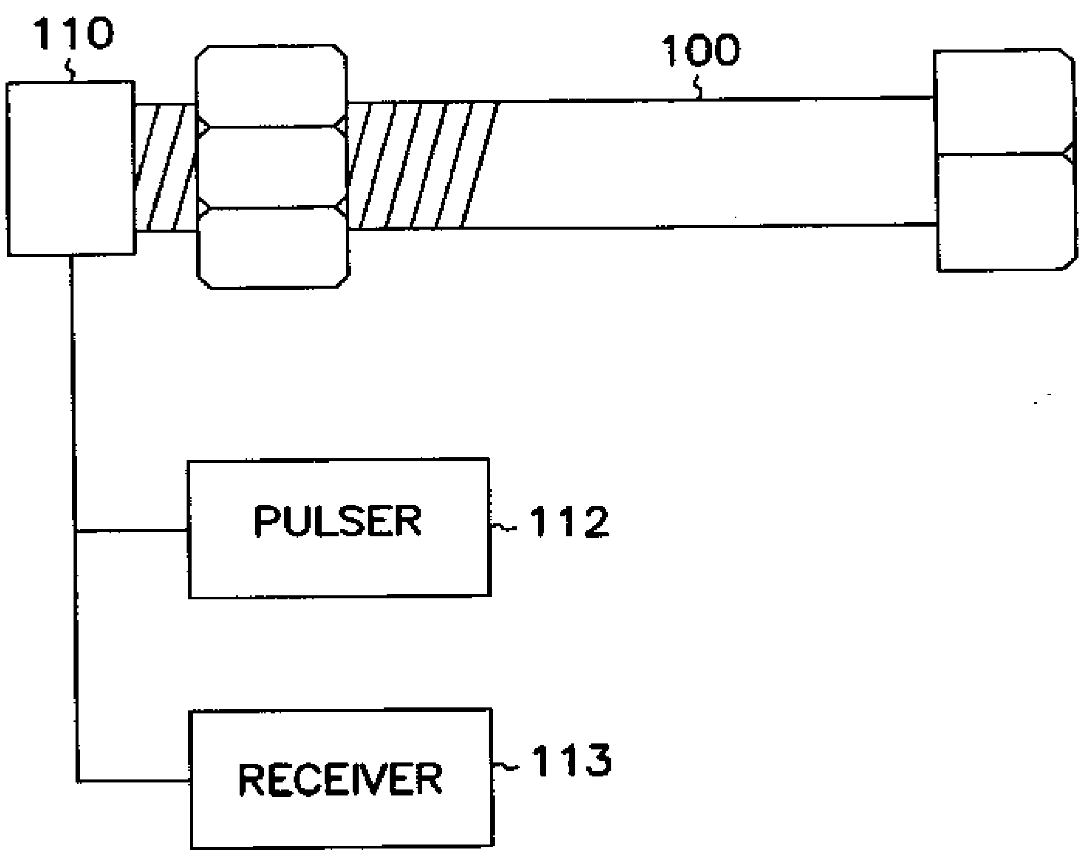
Gleman, Stuart M., Inventor, NASA Kennedy Space Center, USA; Rowe, Geoffrey K., Inventor, NASA Kennedy Space Center, USA; Oct. 26, 1999; 14p; In English

Patent Info.: Filed 25 Sep. 1997; NASA-Case-KSC-11929; US-Patent-5,970,798; US-Patent-Appl-SN-936788; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

An ultrasonic bolt gage is described which uses a crosscorrelation algorithm to determine a tension applied to a fastener, such as a bolt. The cross-correlation analysis is preferably performed using a processor operating on a series of captured ultrasonic echo waveforms. The ultrasonic bolt gage is further described as using the captured ultrasonic echo waveforms to perform additional modes of analysis, such as feature recognition. Multiple tension data outputs, therefore, can be obtained from a single data acquisition for increased measurement reliability. In addition, one embodiment of the gage has been described as multi-channel, having a multiplexer for performing a tension analysis on one of a plurality of bolts.

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

Ultrasonic Scanners; Bolts; Fasteners; Measuring Instruments



20000069797 Stress Photonics, Inc., Madison, WI USA

Full Field Photoelastic Stress Analysis

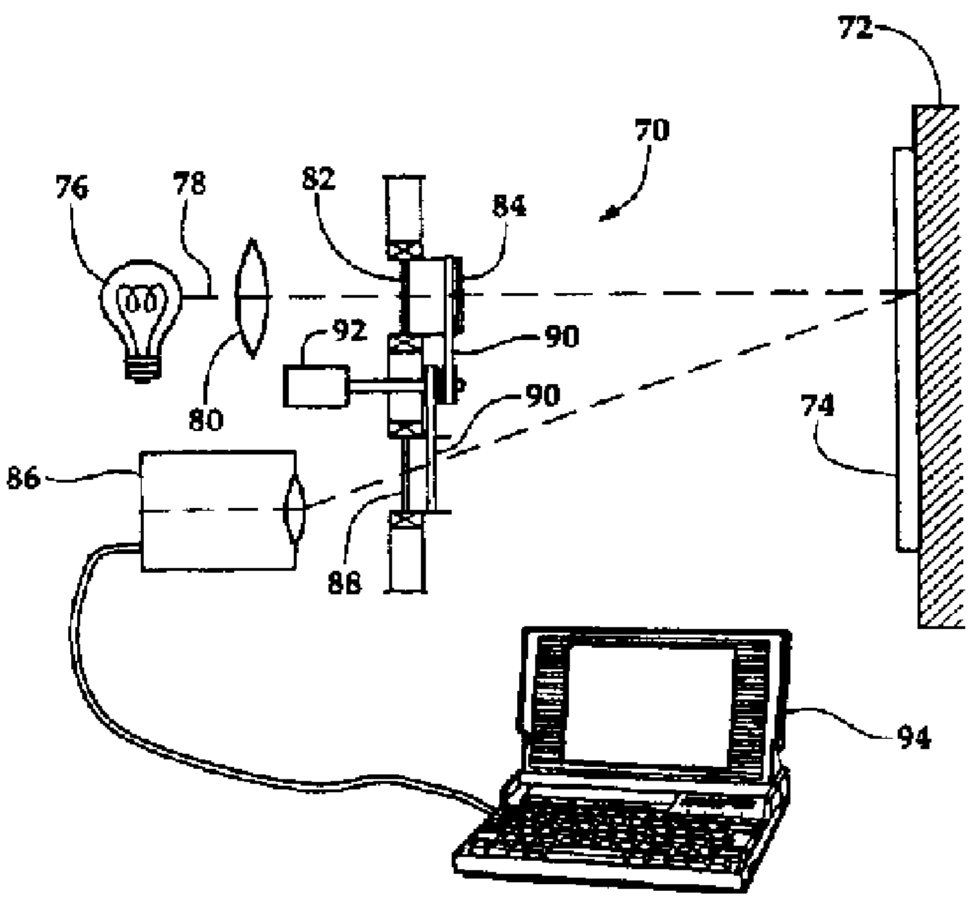
Lesniak, Jon R., Inventor, Stress Photonics, Inc., USA; Apr. 25, 2000; 1p; In English

Patent Info.: Filed 2 Jun. 1997; US-Patent-6,055,053; US-Patent-Appl-SN-867475; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

A structural specimen coated with or constructed of photoelastic material, when illuminated with circularly polarized light will, when stressed: reflect or transmit elliptically polarized light, the direction of the axes of the ellipse and variation of the elliptically light from illuminating circular light will correspond to and indicate the direction and magnitude of the shear stresses for each illuminated point on the specimen. The principles of this invention allow for several embodiments of stress analyzing apparatus, ranging from those involving multiple rotating optical elements, to those which require no moving parts at all. A simple polariscope may be constructed having two polarizing filters with a single one-quarter waveplate placed between the polarizing filters. Light is projected through the first polarizing filter and the one-quarter waveplate and is reflected from a sub-fringe birefringent coating on a structure under load. Reflected light from the structure is analyzed with a polarizing filter. The two polarizing filters and the one-quarter waveplate may be rotated together or the analyzer alone may be rotated. Computer analysis of the variation in light intensity yields shear stress magnitude and direction.

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

Stress Analysis; Photoelastic Materials; Shear Stress; Polarized Light; Luminous Intensity; Computer Techniques; Birefringent Coatings



Includes specific energy conversion systems, e.g., fuel cells; global sources of energy; geophysical conversion; and windpower. For related information see also 07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, and 28 Propellants and Fuels.

20000025503 NASA Lewis Research Center, Cleveland, OH USA

High Temperature Solar Reflector, Its Preparation and Use

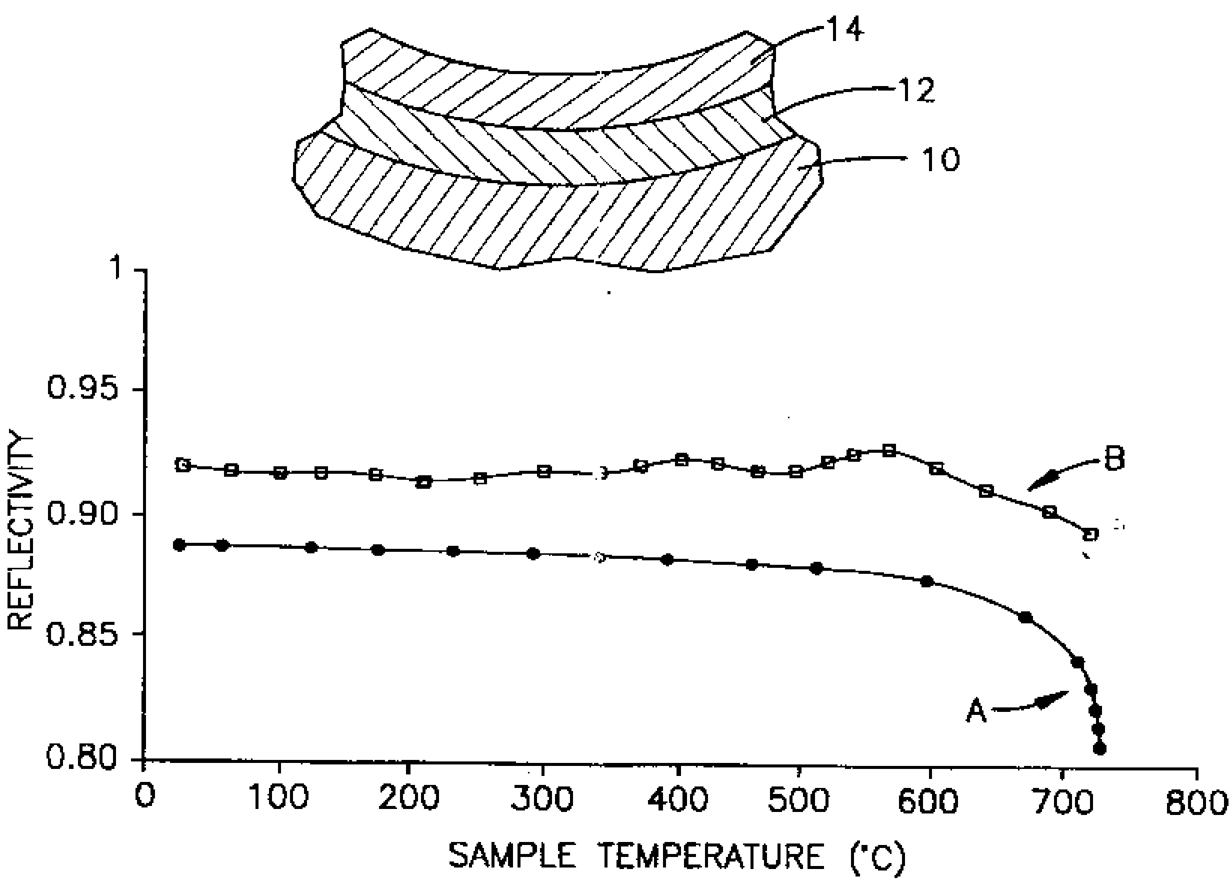
Jaworske, Donald A., Inventor, NASA Lewis Research Center, USA; Jun. 15, 1999; In English

Patent Info.: Filed 26 Jun. 1997; NASA-Case-LEW-16411-1; US-Patent-5,912,777; US-Patent-Appl-SN-903195; No Copyright; Avail: US Patent and Trademark Office, Hardcopy

A coating-substrate combination having high specular reflectivity at high temperatures reaching 8000 C in a vacuum is described. The substrate comprises pure nickel metal or a nickel-containing metal alloy such as stainless steel having a highly polished reflective surface. The coating is a layer of silver deposited on the substrate to a thickness of 300 A to 3000 A. A 300 A to 5000 A protective coating of silica, alumina or magnesium fluoride is used to cover the silver and to protect it from oxidation. The combination is useful as a parabolic shaped secondary concentrator for collecting solar radiation for generating power or thermal energy for satellite uses. The reflective layer and protective coating preferably are applied to the reflective surface of the substrate by electron beam evaporation or by ion sputtering.

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

High Temperature; Nickel Alloys; Protective Coatings; Solar Reflectors; Reflectance



20000030739 NASA Lewis Research Center, Cleveland, OH USA

Method for Fabricating Soft Tissue Implants with Microscopic Surface Roughness

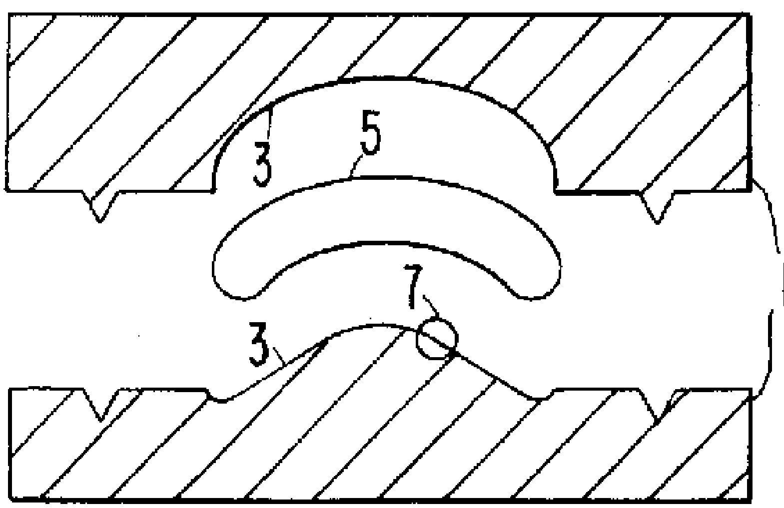
Banks, Bruce A., Inventor, NASA Lewis Research Center, USA; Rutledge, Sharon K., Inventor, NASA Lewis Research Center, USA; Oct. 12, 1999; 16p; In English

Patent Info.: Filed 22 Sep. 1997; NASA-Case-LEW-15805-1; US-Patent-5,965,076; US-Patent-Appl-SN-936492; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A method for fabricating soft tissue implants using a mold. The cavity surface of an initially untextured mold. made of an organic material such as epoxy. is given a thin film coating of material that has pinholes and is resistant to atomic particle bombardment. The mold cavity surface is then subjected to atomic particle bombardment, such as when placed in an isotropic atomic oxygen environment. Microscopic depressions in the mold cavity surface are created at the pinhole sites on the thin film coating. The thin film coating is removed and the mold is then used to cast the soft tissue implant. The thin film coating having pinholes may be created by chilling the mold below the dew point such that water vapor condenses upon it; distributing particles, that can partially dissolve and become attached to the mold cavity surface, onto the mold cavity surface; removing the layer of condensate, such as by evaporation; applying the thin film coating over the entire mold surface; and, finally removing the particles, such as by dissolving or brushing it off. Pinholes are created in the thin film coating at the sites previously occupied by the particles.

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

Fabrication; Procedures; Technology Assessment; Softness; Tissues (Biology); Implantation; Organic Materials; Surface Roughness; Thin Films



20000031618 NASA Langley Research Center, Hampton, VA USA

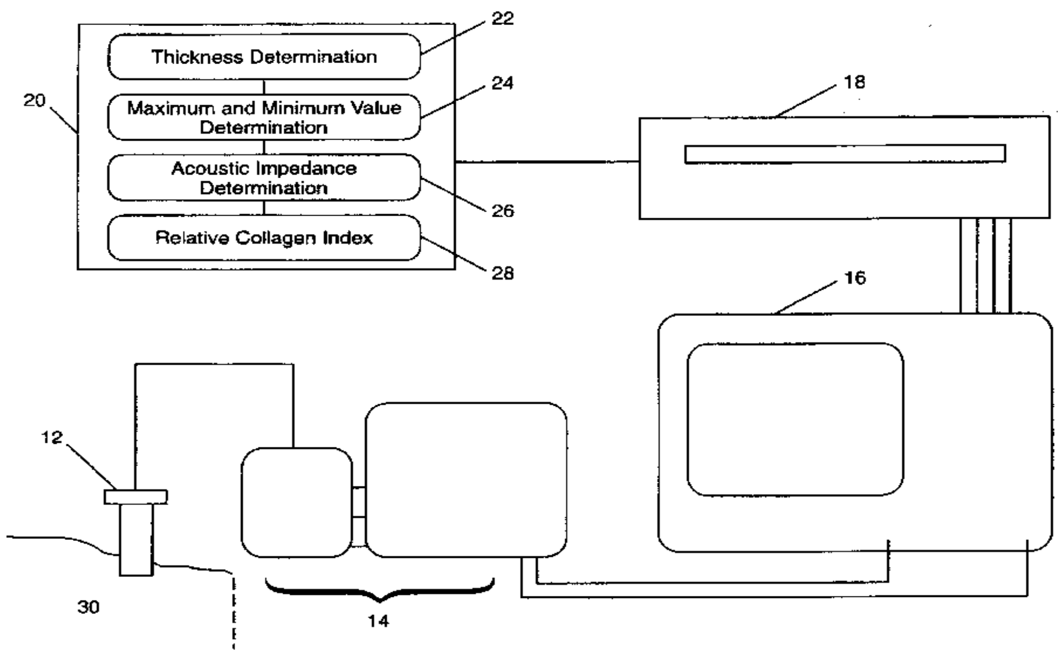
Method of and Apparatus for Histological Human Tissue Characterization Using Ultrasound

Yost, William T., Inventor, NASA Langley Research Center, USA; Cantrell, John H., Inventor, NASA Langley Research Center, USA; TalEr, George A., Inventor, NASA Langley Research Center, USA; Dec. 28, 1999; 10p; In English; Continuation of US-Patent-Appl-SN-592833, filed 26 Jan. 1996

Patent Info.: Filed 21 Apr. 1998; NASA-Case-LAR-15040-2; US-Patent-6,007,489; US-Patent-Appl-SN-071452; US-Patent-Appl-SN-592833; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A method and apparatus for determining important histological characteristics of tissue, including a determination of the tissue's health. Electrical pulses are converted into meaningful numerical representations through the use of Fourier Transforms.

These numerical representations are then used to determine important histological characteristics of tissue. This novel invention does not require rectification and thus provides for detailed information from the ultrasonic scan.
Author
Inventions; Patents; Histology; Tissues (Biology); Health



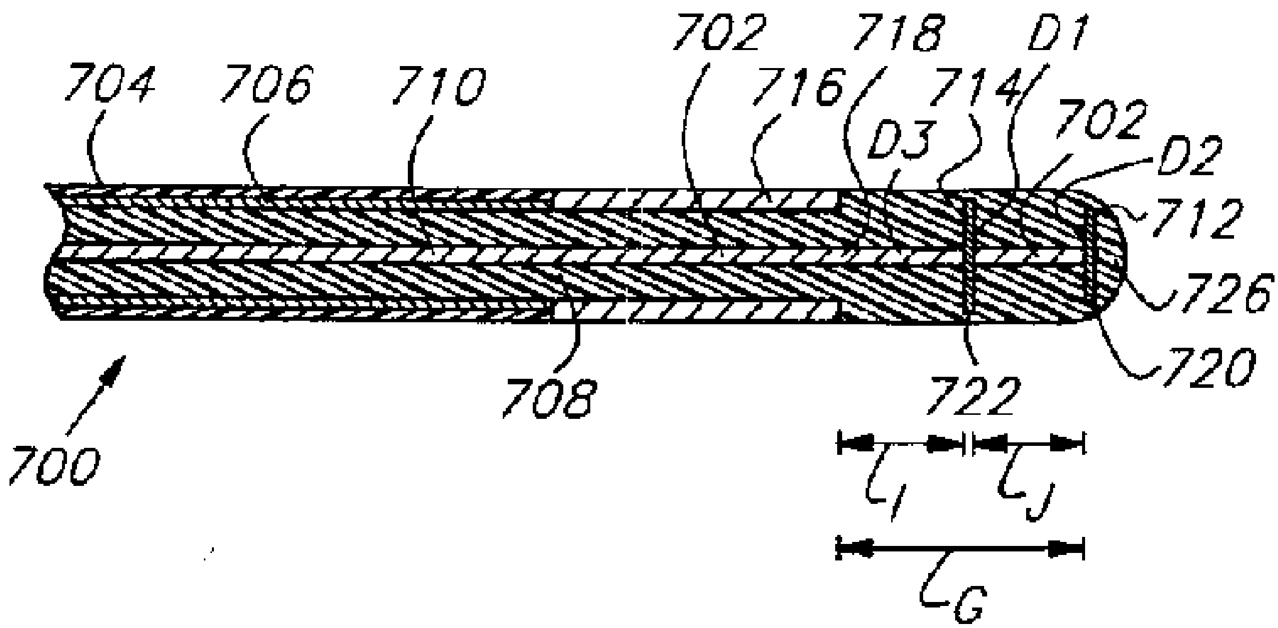
52
AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

20000025505 NASA Johnson Space Center, Houston, TX USA
Microwave Treatment for Cardiac Arrhythmias
Arndt, G. Dickey, Inventor, NASA Johnson Space Center, USA; Carl, James R., Inventor, NASA Johnson Space Center, USA; Raffoul, George W., Inventor, NASA Johnson Space Center, USA; Pacifico, Antonio, Inventor, NASA Johnson Space Center, USA; May 18, 1999; In English
Patent Info.: Filed 17 Apr. 1996; NASA-Case-MSC-22483-1; US-Patent-5,904,709; US-Patent-Appl-SN-641045; No Copyright; Avail: US Patent and Trademark Office, Hardcopy

Method and apparatus are provided for propagating microwave energy into heart tissues to produce a desired temperature profile therein at tissue depths sufficient for thermally ablating arrhythmogenic cardiac tissue to treat ventricular tachycardia and other arrhythmias while preventing excessive heating of surrounding tissues, organs, and blood. A wide bandwidth double-disk antenna is effective for this purpose over a bandwidth of about six gigahertz. A computer simulation provides initial screening capabilities for an antenna such as antenna, frequency, power level, and power application duration. The simulation also allows optimization of techniques for specific patients or conditions. In operation, microwave energy between about 1 Gigahertz and 12 Gigahertz is applied to monopole microwave radiator having a surface wave limiter. A test setup provides physical testing of microwave radiators to determine the temperature profile created in actual heart tissue or ersatz heart tissue. Saline solution pumped over the heart tissue with a peristaltic pump simulates blood flow. Optical temperature sensors disposed at various tissue

depths within the heart tissue detect the temperature profile without creating any electromagnetic interference. The method may be used to produce a desired temperature profile in other body tissues reachable by catheter such as tumors and the like.
Official Gazette of the U.S. Patent and Trademark Office
Arrhythmia; Heart; Heating; Medical Equipment; Microwaves



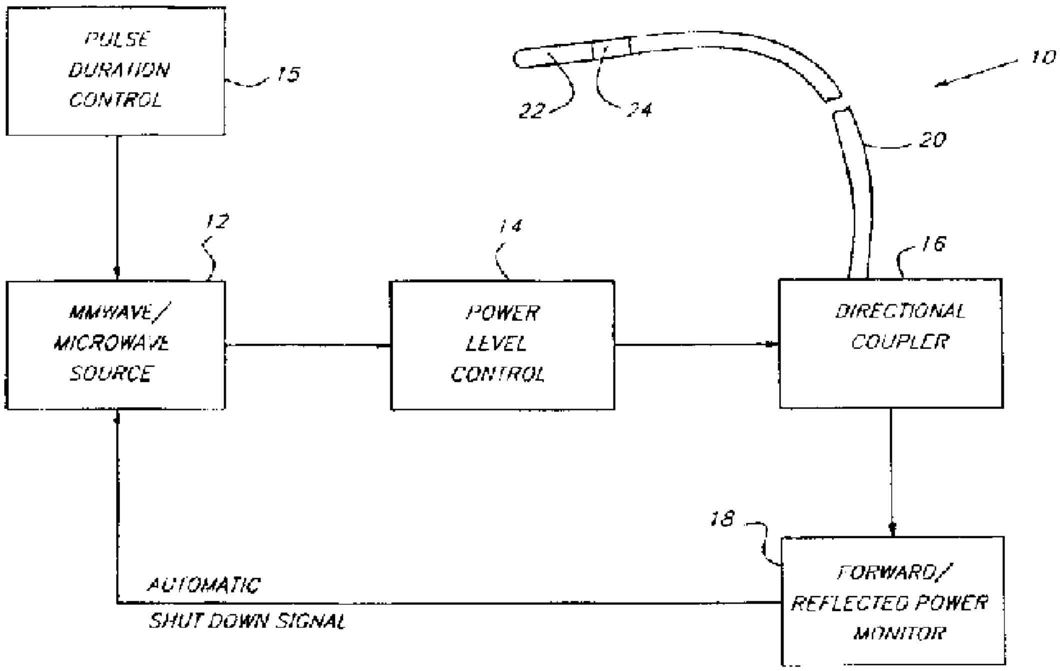
20000045690 NASA Johnson Space Center, Houston, TX USA

Endothelium Preserving Microwave Treatment for Atherosclerosis

Carl, James R., Inventor, NASA Johnson Space Center, USA; Arndt, G. Dickey, Inventor, NASA Johnson Space Center, USA; Fink, Patrick W., Inventor, NASA Johnson Space Center, USA; Beer, N. Reginald, Inventor, NASA Johnson Space Center, USA; Henry, Phillip D., Inventor, NASA Johnson Space Center, USA; Pacifico, Antonio, Inventor, NASA Johnson Space Center, USA; Raffoul, George W., Inventor, NASA Johnson Space Center, USA; Apr. 04, 2000; 24p; In English; Continuation-in-part of US-Patent-Appl-SN-641045, filed 17 Apr. 1996
Patent Info.: Filed 5 Aug. 1998; NASA-Case-MSC-22724-1; US-Patent-6,047,216; US-Patent-Appl-SN-129832; US-Patent-Appl-SN-641045; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Method and apparatus are provided to treat atherosclerosis wherein the artery is partially closed by dilating the artery while preserving the vital and sensitive endothelial layer thereof Microwave energy having a frequency from 3 GHz to 300 GHz is propagated into the arterial wall to produce a desired temperature profile therein at tissue depths sufficient for thermally necrosing connective tissue and softening fatty and waxy plaque while limiting heating of surrounding tissues including the endothelial laser and/or other healthy tissue, organs, and blood. The heating period for raising the temperature a potentially desired amount, about 20 C., within the atherosclerotic lesion may be less than about one second. In one embodiment of the invention, a radically beveled waveguide antenna is used to deliver microwave energy at frequencies from 25 GHz or 30 GHz to about 300 GHz and is focused towards a particular radial sector of the artery. Because the atherosclerotic lesions are often asymmetrically disposed, directable of focussed heating preserves healthy sectors of the artery and applies energy to the asymmetrically positioned lesion faster than a non-directed beam. A computer simulation predicts isothermic temperature profiles for the given conditions and man be used

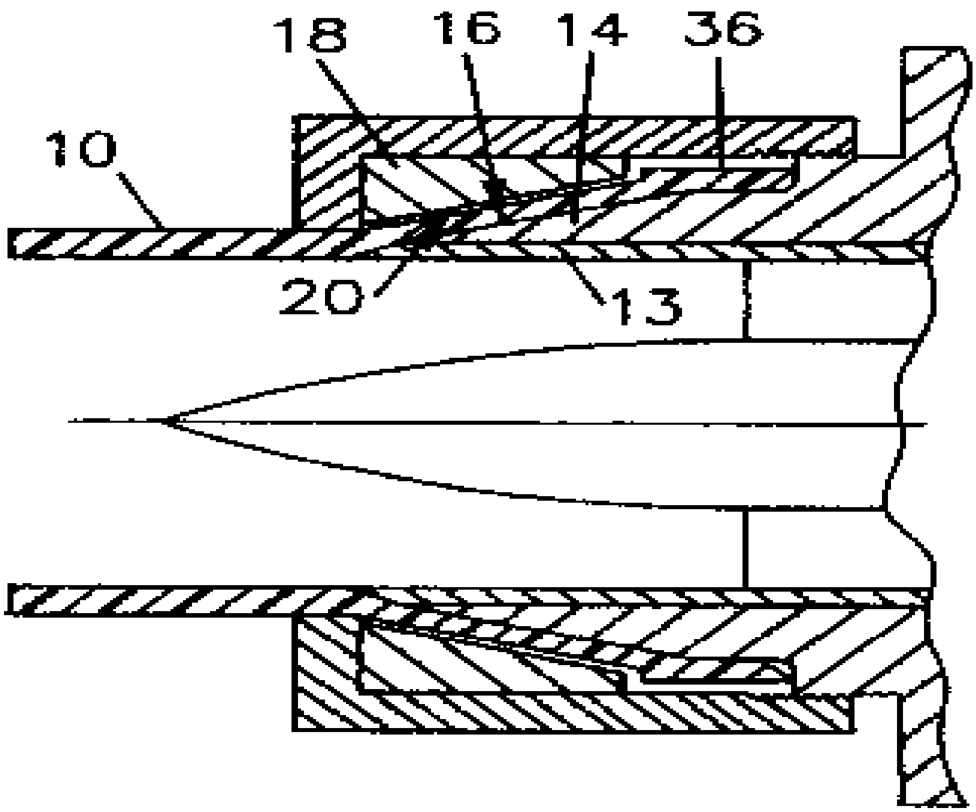
in selecting power, pulse duration, beam width, and frequency of operation to maximize energy deposition and control heat rise within the atherosclerotic lesion without harming healthy tissues or the sensitive endothelium cells.
Official Gazette of the U.S. Patent and Trademark Office
Arteriosclerosis; Microwave Frequencies; Endothelium; Softening; Sensitivity; Pulse Duration; Heating; Energy Transfer; Computerized Simulation; Clinical Medicine



20000048263 NASA Johnson Space Center, Houston, TX USA
Tubular Coupling
Rosenbaum, Bernard J., Inventor, NASA Johnson Space Center, USA; Apr. 18, 2000; 6p; In English
Patent Info.: Filed 21 Sep. 1998; NASA-Case-MSC-22865-1; US-Patent-6,050,987; US-Patent-Appl-SN-157759; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A system for coupling a vascular overflow graft or cannula to a heart pump. A pump pipe outlet is provided with an external tapered surface which receives the end of a compressible connula. An annular compression ring with a tapered internal bore surface is arranged about the cannula with the tapered internal surface in a facing relationship to the external tapered surface. The angle of inclination of the tapered surfaces is converging such that the spacing between the tapered surfaces decreases from one end of the external tapered surface to the other end thereby providing a clamping action of the tapered surface on a cannula which increases as a function of the length of cannula segment between the tapered surfaces. The annular compression ring is disposed within a tubular locking nut which threadedly couples to the pump and provides a compression force for urging the annular ring onto the cannula between the tapered surfaces. The nut has a threaded connection to the pump body. The threaded coupling to the pump body provides a compression force for the annular ring. The annular ring has an annular enclosure space in which excess cannula material from the compression between the tapered surfaces to "bunch up" in the space and serve as an enlarged annular ring segment to assist holding the cannula in place. The clamped cannula provides a seamless joint connection to the pump pipe

outlet where the clamping force is uniformly applied to the cannula because of self alignment of the tapered surfaces. The nut can be easily disconnected to replace the pump if necessary.
Official Gazette of the U.S. Patent and Trademark Office
Cardiovascular System; Cannulae; Clamps; Couples; Heart; Joints (Junctions); Self Alignment



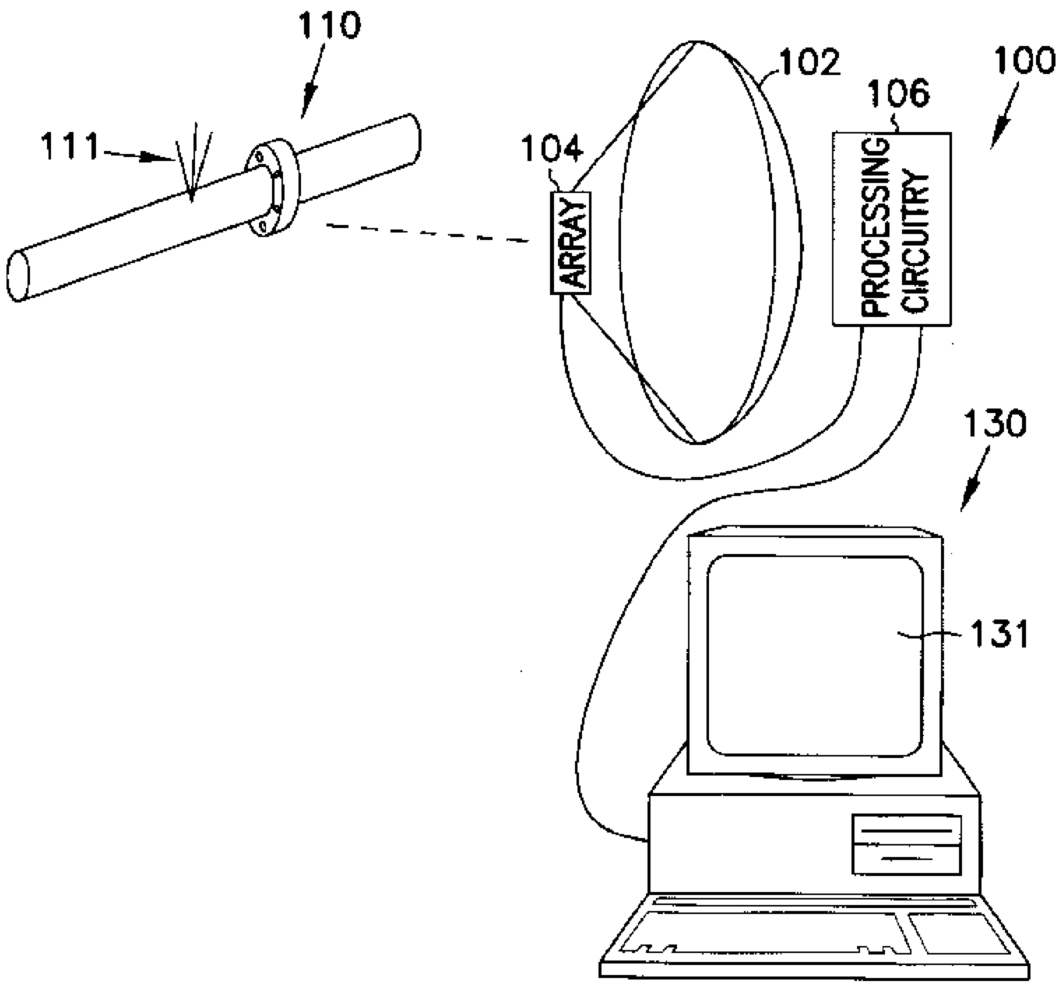
71
ACOUSTICS

Includes sound generation, transmission and attenuation. For noise pollution see 45 Environmental Pollution.

20000030658 NASA Kennedy Space Center, Cocoa Beach, FL USA
Ultrasonic Imaging System
Youngquist, Robert C., Inventor, NASA Kennedy Space Center, USA; Moerk, Steven, Inventor, NASA Kennedy Space Center, USA; Nov. 09, 1999; 10p; In English
Patent Info.: Filed 28 Apr. 1997; NASA-Case-KSC-11909; US-Patent-5,979,239; US-Patent-Appl-SN-845900; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

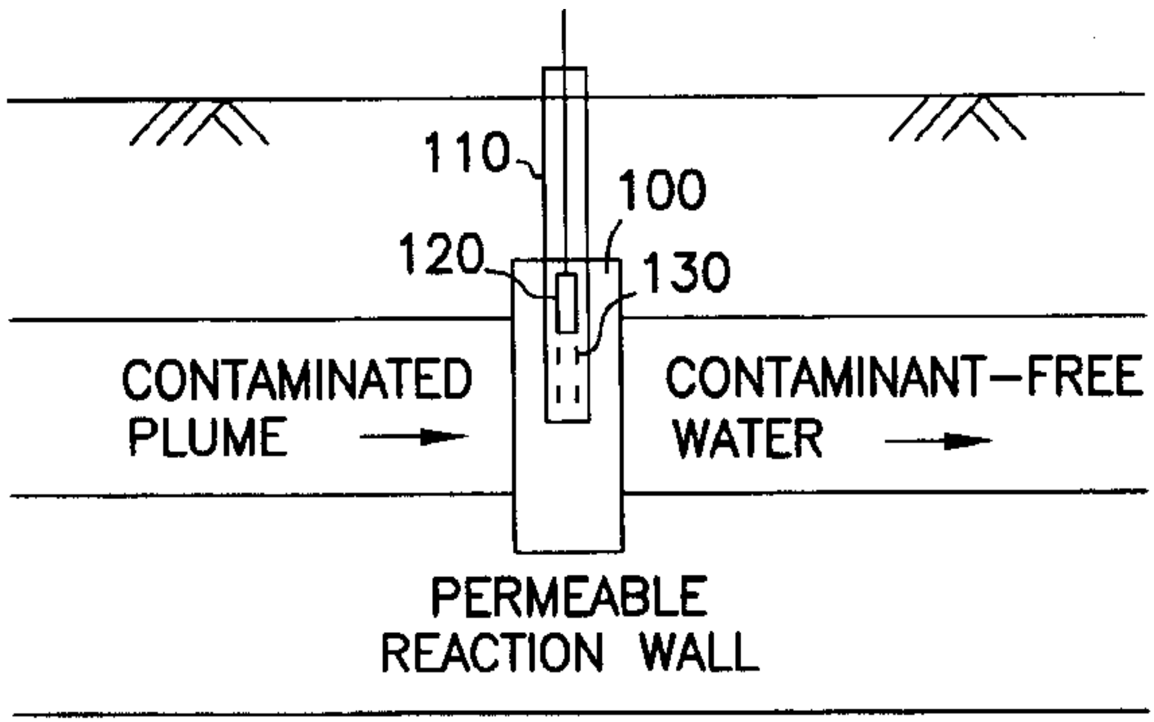
An imaging system is described which can be used to either passively search for sources of ultrasonics or as an active phase imaging system. which can image fires. gas leaks, or air temperature gradients. This system uses an array of ultrasonic receivers

coupled to an ultrasound collector or lens to provide an electronic image of the ultrasound intensity in a selected angular region of space. A system is described which includes a video camera to provide a visual reference to a region being examined for ultrasonic signals.
Official Gazette of the U.S. Patent and Trademark Office
Ultrasonics; Imaging Techniques; Search Radar



20000045694 NASA Kennedy Space Center, Cocoa Beach, FL USA
Use of Ultrasound to Improve the Effectiveness of a Permeable Treatment Wall
Quinn, Jacqueline W., Inventor, NASA Kennedy Space Center, USA; Clausen, Christian A., Inventor, NASA Kennedy Space Center, USA; Geiger, Cherie L., Inventor, NASA Kennedy Space Center, USA; Reinhart, Debra R., Inventor, NASA Kennedy Space Center, USA; Ruiz, Nancy, Inventor, NASA Kennedy Space Center, USA; Jan. 11, 2000; 12p; In English
Patent Info.: Filed 31 Jul. 1997; NASA-Case-KSC-11959; US-Patent-6,013,232; US-Patent-Appl-SN-904028; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A method for increasing the effectiveness of a permeable treatment wall is described. The method includes the introduction of ultrasonic radiation in or near the wall. A permeable treatment wall is also described which has an ultrasonic radiation generating transducer in or near the wall. Permeable treatment walls are described as having either a well vertically extending into the wall, or a rod vertically extending into the treatment wall. Additionally, a method for adapting a permeable treatment wall to allow for the introduction of ultrasonic radiation in or near the wall is described.
Author
Walls; Ultrasonic Radiation; Permeability; Surface Treatment



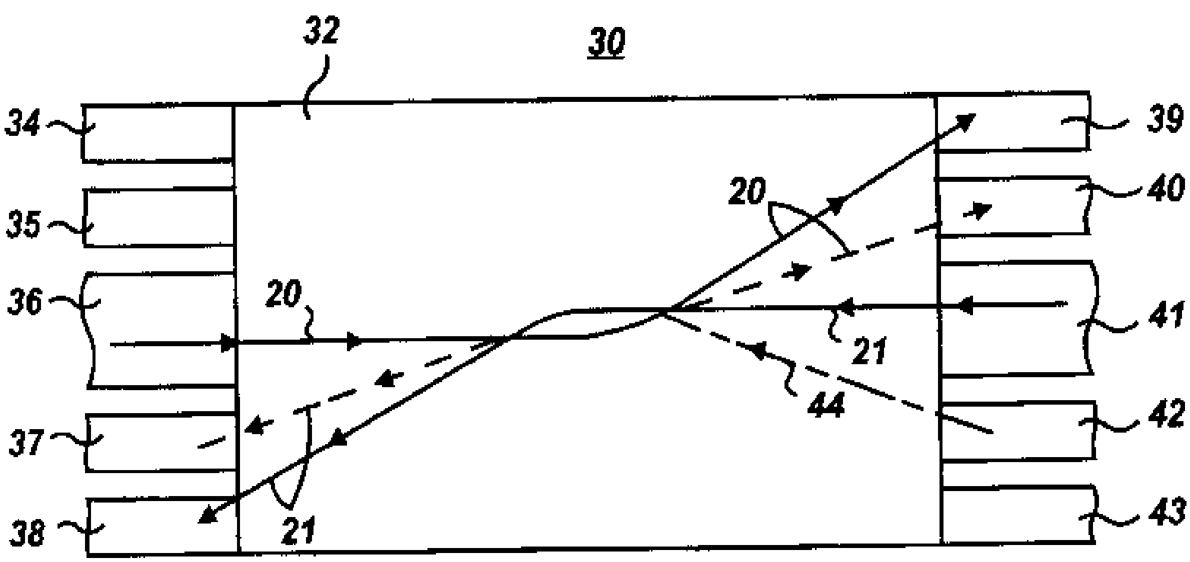
74
OPTICS

Includes light phenomena; and optical devices. For lasers see 36 Lasers and Masers.

20000030655 NASA Ames Research Center, Moffett Field, CA USA
Photonic Switching Devices Using Light Bullets
Goorjian, Peter M., Inventor, NASA Ames Research Center, USA; Oct. 05, 1999; 20p; In English; Continuation-in-part of US-Patent-Appl-SN-528621, filed 25 Aug. 1995
Patent Info.: Filed 25 Apr. 1997; NASA-Case-ARC-14057-3; US-Patent-5,963,683; US-Patent-Appl-SN-845733; US-Patent-Appl-SN-528621; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A unique ultra-fast, all-optical switching device or switch is made with readily available, relatively inexpensive, highly nonlinear optical materials. which includes highly nonlinear optical glasses, semiconductor crystals and/or multiple quantum well semiconductor materials. At the specified wavelengths. these optical materials have a sufficiently negative group velocity dispersion and high nonlinear index of refraction to support stable light bullets. The light bullets counter-propagate through, and interact

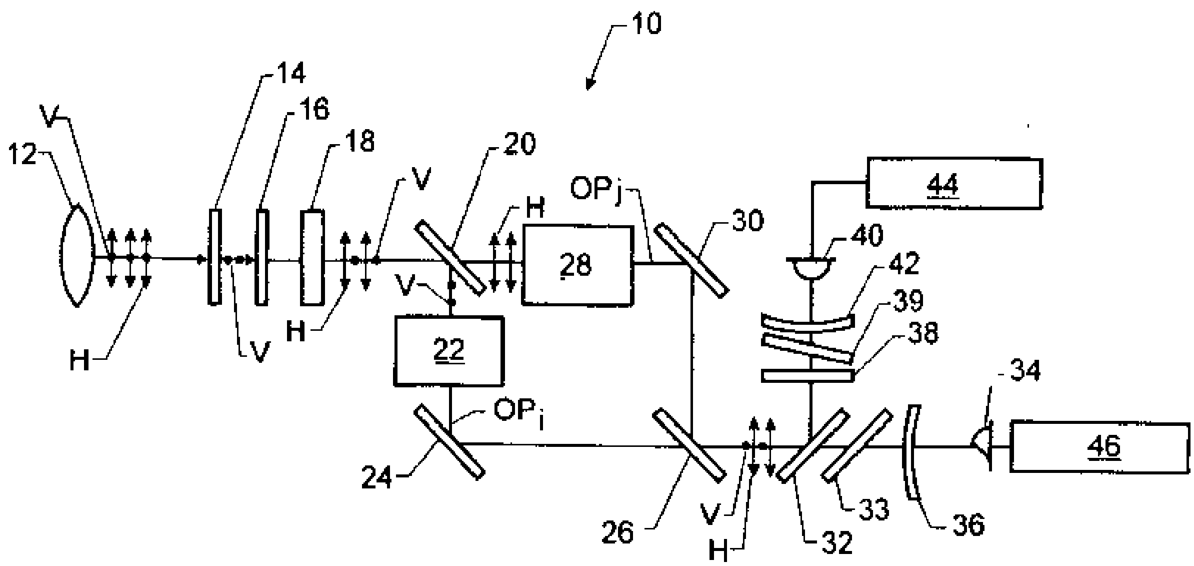
within the waveguide to selectively change each others' directions of propagation into predetermined channels. In one embodiment, the switch utilizes a rectangularly planar slab waveguide. and further includes two central channels and a plurality of lateral channels for guiding the light bullets into and out of the waveguide. An advantage of the present all-optical switching device lies in its practical use of light bullets, thus preventing the degeneration of the pulses due to dispersion and diffraction at the front and back of the pulses. Another advantage of the switching device is the relative insensitivity of the collision process to the time difference in which the counter-propagating pulses enter the waveguide. since. contrary to conventional co-propagating spatial solitons, the relative phase of the colliding pulses does not affect the interaction of these pulses. Yet another feature of the present all-optical switching device is the selection of the light pulse parameters which enables the generation of light bullets in nonlinear optical materials. including highly nonlinear optical glasses and semiconductor materials such as semiconductor crystals and/or multiple quantum well semiconductor materials.
Official Gazette of the U.S. Patent and Trademark Office
Diffraction; Optical Switching; Quantum Wells; Semiconductors (Materials); Sensitivity; Waveguides



20000031617 NASA Langley Research Center, Hampton, VA USA
Multi-Gas Sensor
Sachse, Glenn W., Inventor, NASA Langley Research Center, USA; Wang, Liang-Guo, Inventor, NASA Langley Research Center, USA; LeBel, Peter J., Inventor, NASA Langley Research Center, USA; Steele, Tommy C., Inventor, NASA Langley Research Center, USA; Rana, Mauro, Inventor, NASA Langley Research Center, USA; Dec. 28, 1999; 20p; In English; Provisional application US-Patent-Appl-SN-067917, filed 8 Dec. 1997 and provisional application US-Patent-Appl-SN-073822, filed 5 Feb. 1998
Patent Info.: Filed 5 Feb. 1998; NASA-Case-LAR-15361-1; US-Patent-6,008,928; US-Patent-Appl-SN-019473; US-Patent-Appl-SN-067917; US-Patent-Appl-SN-073822; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

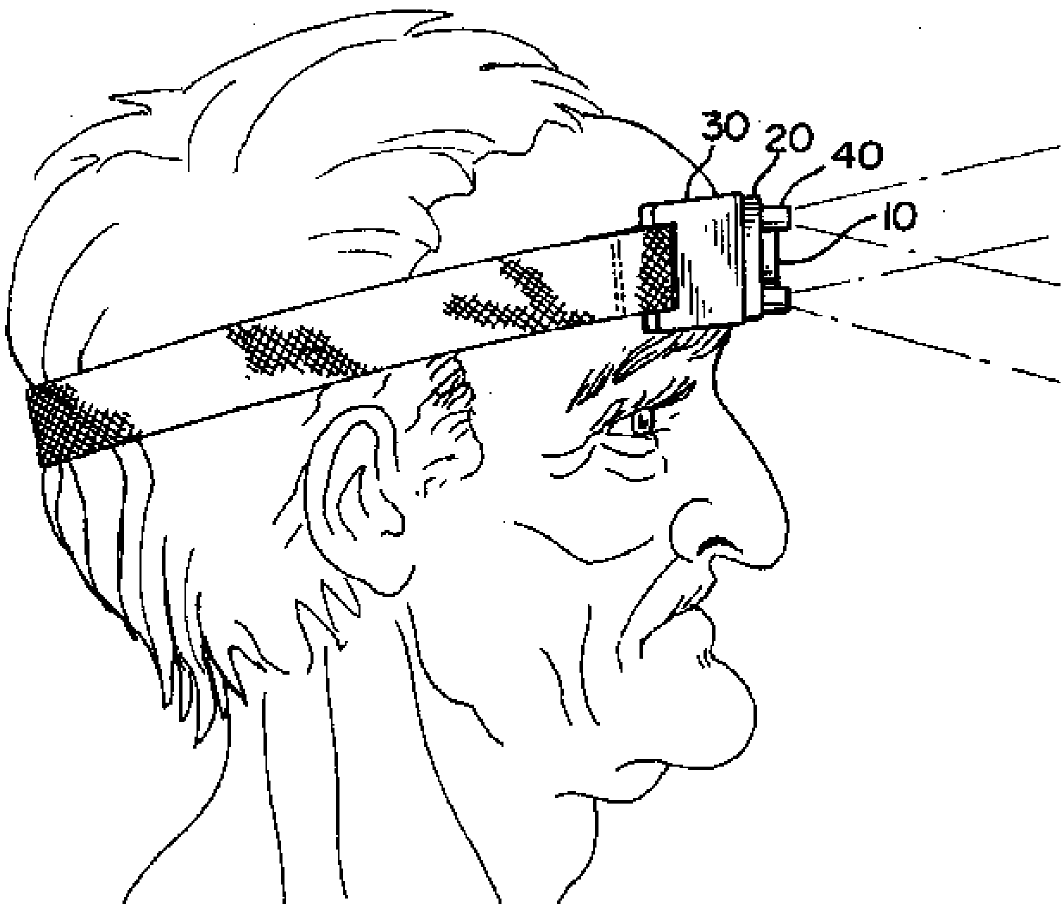
A multi-gas sensor is provided which modulates a polarized light beam over a broadband of wavelengths between two alternating orthogonal polarization components. The two orthogonal polarization components of the polarization modulated beam are directed along two distinct optical paths. At least one optical path contains one or more spectral discrimination element, with each spectral discrimination element having spectral absorption features of one or more gases of interest being measured. The two opti-

cal 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.
Author
Gas Detectors; Inventions; Patents; Light Beams; Light Emission; Spectral Bands; Spectral Emission



20000045691 NASA Pasadena Office, CA USA
Optical-to-Tactile Translator
Langevin, Maurice L., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Moynihan, Philip I., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Apr. 25, 2000; 10p; In English
Patent Info.: Filed 7 Aug. 1998; NASA-Case-NPO-20230-1; US-Patent-6,055,048; US-Patent-Appl-SN-137865; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche
An optical-to-tactile translator provides an aid for the visually impaired by translating a near-field scene to a tactile signal corresponding to said near-field scene. An optical sensor using a plurality of active pixel sensors (APS) converts the optical image within the near-field scene to a digital signal. The digital signal is then processed by a microprocessor and a simple shape signal is generated based on the digital signal. The shape signal is then communicated to a tactile transmitter where the shape signal is converted into a tactile signal using a series of contacts. The shape signal may be an outline of the significant shapes determined in the near-field scene, or the shape signal may comprise a simple symbolic representation of common items encountered repeatedly. The user is thus made aware of the unseen near-field scene, including potential obstacles and dangers, through a series of

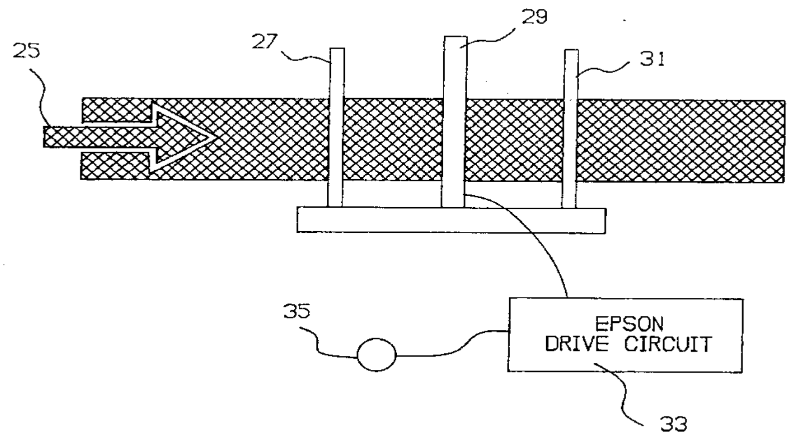
tactile contacts. In a preferred embodiment, a range determining device such as those commonly found on auto-focusing cameras is included to limit the distance that the optical sensor interprets the near-field scene.
Author
Optical Measuring Instruments; Digital Electronics; Transmitters; Near Fields; Images



20000045697 NASA Johnson Space Center, Houston, TX USA
Method and Apparatus for Improved Spatial Light Modulation
Soutar, Colin, Inventor, NASA Johnson Space Center, USA; Juday, Richard D., Inventor, NASA Johnson Space Center, USA; Apr. 25, 2000; 24p; In English; Division of US-Patent-Appl-SN-327762, filed 24 Oct. 1994
Patent Info.: Filed 27 Jul. 1998; NASA-Case-MSC-22378-2; US-Patent-6,055,086; US-Patent-Appl-SN-123016; US-Patent-Appl-SN-327762; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A method and apparatus for modulating a light beam in an optical processing system is described. Preferably, an electrically-controlled polarizer unit and/or an analyzer unit are utilized in combination with a spatial light modulator and a controller. Preferably, the spatial light modulator comprises a pixelated birefringent medium such as a liquid crystal video display. The combination of the electrically controlled polarizer unit and analyzer unit make it simple and fast to reconfigure the modulation described by the Jones matrix of the spatial light modulator. A particular optical processing objective is provided to the controller. The controller

performs calculations and supplies control signals to the polarizer unit, the analyzer unit, and the spatial light modulator in order to obtain the optical processing objective.
Author
Technology Assessment; Light Modulation; Light Beams; Optical Equipment; Light Modulators



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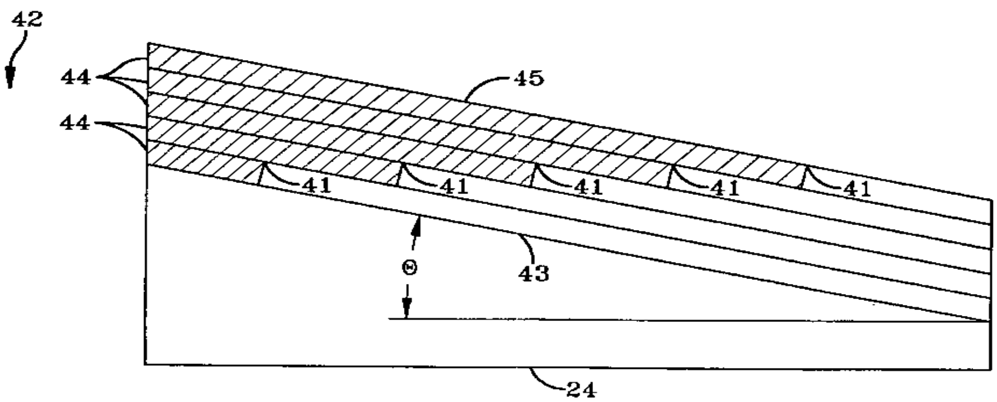
SOLID-STATE PHYSICS

Includes superconductivity. For related information, see also 33 Electronics and Electrical Engineering and 36 Lasers and Masers.

20000025502 NASA Lewis Research Center, Cleveland, OH USA
Method for Growth of Crystal Surfaces and Growth of Heteroepitaxial Single Crystal Films Thereon
Powell, J. Anthony, Inventor, NASA Lewis Research Center, USA; Larkin, David J., Inventor, NASA Lewis Research Center, USA; Neudeck, Philip G., Inventor, NASA Lewis Research Center, USA; Matus, Lawrence G., Inventor, NASA Lewis Research Center, USA; Jun. 22, 1999; In English
Patent Info.: Filed 3 Jul. 1997; NASA-Case-LEW-16374-1; US-Patent-5,915-194; US-Patent-Appl-SN-887804; No Copyright; Avail: US Patent and Trademark Office, Hardcopy

A method of growing atomically-flat surfaces and high-quality low-defect crystal film of polytypic compounds heteroepitaxially on polytypic compound substrates that are different than the crystal film. The method is particularly suited for the growth of 3C-SiC. 2H-AlN, and 2H-GaN on 6H-SiC.
Official Gazette of the U.S. Patent and Trademark Office
Crystal Surfaces; Epitaxy; Single Crystals; Substrates; Crystal Growth



Subject Term Index

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LICENSES FOR COMMERCIAL USE: INQUIRIES AND APPLICATIONS FOR LICENSE

NASA inventions, abstracted in this bibliography, are available for nonexclusive or exclusive licensing in accordance the Department of Commerce Patent License Regulations (37 CFR Part 404). It is significant that all licenses for NASA inventions shall be by express written instruments and that no license will be granted or implied in a NASA invention except as provided in the Department of Commerce Patent License Regulations (37 CFR Part 404).

Inquiries concerning the NASA Patent Licensing Program or the availability of licenses for the commercial use of NASA–owned inventions covered by U.S. patents or pending applications for patent should be forwarded to the NASA Patent Counsel of the NASA installation having cognizance of the specific invention, or the Associate General Counsel for Intellectual Property, code GP, National Aeronautics and Space Administration, Washington, D.C. 20546. Inquiries should refer to the NASA Case Number, the Title of the Invention, and the U.S. Patent Number or the U.S. Application Serial Number assigned to the invention as shown in this bibliography.

The NASA Patent Counsel having cognizance of the invention is determined by the first three letters or prefix of the NASA Case Number assigned to the invention. The addresses of NASA Patent Counsels are listed alongside the NASA Case Number prefix letters in the following table.

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PATENT LICENSING REGULATIONS

NATIONAL AERONAUTICS AND SPACE ADMINITRATION
14 CFR Part 1245
Patents and Other Intellectual Property Rights

AGENCY: National Aeronautics and Space Administration (NASA).

Action: Final rule.

SUMMARY: NASA is amending 14 CFR Part 1245 by removing Subpart 2, "Licensing of NASA Inventions." The Department of Commerce has issued similar regulations which prescribe the terms, conditions, and procedures upon which a federally–owned invention may be licensed. These regulations are codified at 37 CFR Part 404, *"Licensing of Government Owned Inventions."* NASA began granting licenses in accordance with the Department of Commerce regulations on March 13, 1995. All licenses agreements executed prior to this date will operate under the previous regulations.

EFFECTIVE DATE: March 13, 1995.

FOR FURTHER INFORMATION CONTACT:
John G. Mannix, (202) 358–2424.

List of Subjects in 14 CFR Part 1245
Authority delegations (Government agencies), Inventions and patents.

Under the authority, 42 U.S.C. 2473, 14 CFR Part 1245 is amended as follows:

PART 1245 — [AMENDED]

Subpart 2 — [Removed and Reserved]

In 14 CFR Part 1245, Subpart 2 (consisting of SS 1245.200 through 1245.214) is removed and reserved.

Dated: April 24,1995.

Edward A. Frankle,
General Counsel.

[FR Doc. 95 10583 Filed 4–28–95, 8:45 am]

BILLING CODE 7510 01 M

Code of Federal Regulations 37
CFR Part 404
Licensing of Government Owned Inventions

Sec.

Sec. 404.1 Scope of part.
This part prescribes the terms, conditions, and procedures upon which a federally owned invention, other than an invention in the custody of the Tennessee Valley Authority, may be licensed. It supersedes the regulations at 41 CFR Subpart 101–4.1. This part does not affect licenses which (a) were in effect prior to July 1, 1981; (b) may exist at the time of the Government's acquisition of title to the invention, including those resulting from the allocation of rights to inventions made under Government research and development contracts; (c) are the result of an authorized exchange of rights in the settlement of patent disputes; or (d) are otherwise authorized by law or treaty.

Sec. 404.2 Policy and objective.
It is the policy and objective of this subpart to use the patent system to promote the utilization of inventions arising from federally supported research or development.

Sec. 404.3 Definitions.
(a) *'Federally owned invention'* means an invention, plant, or design which is covered by a patent, or patent application in the United States, or a patent, patent application, plant variety protection, or other form of protection, in a foreign country, title to which has been assigned to or otherwise vested in the United States Government.

(b) *'Federal agency'* means an executive department, military department, Government corporation, or independent establishment, except the Tennessee Valley Authority, which has custody of a federally owned invention.

(c) *'Small business firm'* means a small business concern as defined in section 2 of Pub. L. 85–536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration.

(d) *'Practical application'* means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is being utilized and that its benefits are to the extent permitted by law or Government regulations available to the public on reasonable terms.

(e) *'United States'* means the United States of America, its territories and possessions, the District of Columbia, and the Commonwealth of Puerto Rico.

Sec. 404.4 Authority to grant licenses.
Federally owned inventions shall be made available for licensing as deemed appropriate in the public interest. Federal agencies having custody of federally owned inventions may grant nonexclusive, partially exclusive, or exclusive licenses thereto under this part.

Sec. 404.5 Restrictions and conditions on all licenses granted under this part.
(a) (1) A license may be granted only if the applicant has supplied the Federal agency with a satisfactory plan for development or marketing of the invention, or both, and with information about the applicant's capability to fulfill the plan.

(2) A license granting rights to use or sell under a federally owned invention in the United States shall normally be granted only to a licensee who agrees that any products embodying the invention or produced through the use of the invention will be manufactured substantially in the United States.

(b) Licenses shall contain such terms and conditions as the Federal agency determines are appropriate for the protection of the interests of the Federal Government and the public and are not in conflict with law or this part. The following terms and conditions apply to any license:

(1) The duration of the license shall be for a period specified in the license agreement unless sooner terminated in accordance with this part.

(2) The license may be granted for all or less than all fields of use of the invention or in specified geographical areas, or both.

(3) The license may extend to subsidiaries of the licensee or other parties if provided for in the license but shall be nonassignable without approval of the Federal agency, except to the successor of that part of the licensee's business to which the invention pertains.

(4) The licensee may provide the license the right to grant sublicenses under the license, subject to the approval of the Federal agency. Each sublicense shall make reference to the license, including the rights retained by the Government, and a copy of such sublicense shall be furnished to the Federal agency.

(5) The license shall require the licensee to carry out the plan for development or marketing of the invention, or both, to bring the invention to practical application within a period specified in the license, and to continue to make the benefits of the invention reasonably accessible to the public.

(6) The license shall require the licensee to report periodically on the utilization or efforts at obtaining utilization that are being made by the licensee, with particular reference to the plan submitted.

(7) Licenses may be royalty–free or for royalties or other consid–eration.

(8) Where an agreement is obtained pursuant to Sec.404.5(a) (2) that any products embodying the invention or produced through use of the invention will be manufactured substantially in the United States, the license shall recite such agreement.

(9) The license shall provide for the right of the Federal agency to terminate the license, in whole or in part, if:

(i) The Federal agency determines that the licensee is not executing the plan submitted with its request for a license and the licensee cannot otherwise demonstrate to the satisfaction of the Federal agency that it has taken or can be expected to take within a reasonable time effective steps to achieve practical application of the invention;

(ii) The Federal agency determines that such action is necessary to meet requirements for public use specified by Federal regulations issued after the date of the license and such requirements are not reasonably satisfied by the licensee;

(iii) The licensee has willfully made a false statement of or willfully omitted a material fact in the license application or in any report required by the license agreement; or

(iv) The licensee commits a substantial breach of a covenant or agreement contained in the license.

(10) The license may be modified or terminated, consistent with this part, upon mutual agreement of the Federal agency and the licensee.

(11) Nothing relating to the grant of a license, nor the grant itself, shall be construed to confer upon any person any immunity from or defenses under the antitrust laws or from a charge of patent misuse, and the acquisition and use of rights pursuant to this part shall not be immunized from the operation of state or Federal law by reason of the source of the grant.

Sec. 404.6 Nonexclusive licenses.

(a) Nonexclusive licenses may be granted under federally owned inventions without publication of availability or notice of a prospective license.

(b) In addition to the provisions of Sec. 404.5, the nonexclusive license may also provide that, after termination of a period specified in the license agreement, the Federal agency may restrict the license to the fields of use or geographic areas, or both, in which the licensee has brought the invention to practical application and continues to make the benefits of the invention reasonably accessible to the public. However, such restriction shall be made only in order to grant an exclusive or partially exclusive license in accordance with this subpart.

Sec. 404.7 Exclusive and partially exclusive licenses.

(a) (1) Exclusive or partially exclusive domestic licenses may be granted on federally owned inventions three months after notice of the invention's availability has been announced in the Federal Register, or without such notice where the Federal agency determines that expeditious granting of such a license will best serve the interest of the Federal Government and the public; and in either situation, only if;

(i) Notice of a prospective license, identifying the invention and the prospective licensee, has been published in the Federal Register, providing opportunity for filing written objections within a 60–day period;

(ii) After expiration of the period in Sec. 404.7(a)(1)(i) and consideration of any written objections received during the period, the Federal agency has determined that;

(A) The interests of the Federal Government and the public will best be served by the proposed license, in view of the applicant's intentions, plans, and ability to bring the invention to practical application or otherwise promote the invention's utilization by the public;

(B) The desired practical application has not been achieved, or is not likely expeditiously to be achieved, under any nonexclusive license which has been granted, or which may be granted, on the invention;

(C) Exclusive or partially exclusive licensing is a reasonable and necessary incentive to call forth the investment of risk capital and expenditures to bring the invention to practical application or otherwise promote the invention's utilization by the public; and

(D) The proposed terms and scope of exclusivity are not greater than reasonably necessary to provide the incentive for bringing the invention to practical application or otherwise promote the invention's utilization by the public;

(iii) The Federal agency has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the country in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with the antitrust laws; and

(iv) The Federal agency has given first preference to any small business firms submitting plans that are determined by the agency to be within the capabilities of the firms and as equally likely, if executed, to bring the invention to practical application as any plans submitted by applicants that are not small business firms.

(2) In addition to the provisions of Sec. 404.5, the following terms and conditions apply to domestic exclusive and partially exclusive licenses;

(i) The license shall be subject to the irrevocable, royalty–free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall reserve to the Federal agency the right to require the licensee to grant sublicenses to responsible applicants, on reasonable terms, when necessary to fulfill health or safety needs.

(iii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iv) The license may grant the licensee the right of enforcement of the licensed patent pursuant to the provisions of Chapter 29 of Title 35, United States Code, or other statutes, as determined appropriate in the public interest.

(b) (1) Exclusive or partially exclusive licenses may be granted on a federally owned invention covered by a foreign patent, patent application, or other form of protection, provided that;

(i) Notice of a prospective license, identifying the invention and prospective licensee, has been published in the Federal Register, providing opportunity for filing written objections within a 60–day period and following consideration of such objections;

(ii) The agency has considered whether the interests of the Federal Government or United States industry in foreign commerce will be enhanced; and

(iii)The Federal agency has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the United States in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with antitrust laws.

(2) In addition to the provisions of Sec. 404.5 the following terms and conditions apply to foreign exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty–free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iii)The license may grant the licensee the right to take any suitable and necessary actions to protect the licensed property, on behalf of the Federal Government.

(c) Federal agencies shall maintain a record of determinations to grant exclusive or partially exclusive licenses.

Sec. 404.8 Application for a license.

An application for a license should be addressed to the Federal agency having custody of the invention and shall normally include:

(a) Identification of the invention for which the license is desired including the patent application serial number or patent number, title, and date, if known;

(b) Identification of the type of license for which the application is submitted;

(c) Name and address of the person, company, or organization applying for the license and the citizenship or place of incorporation of the applicant;

(d) Name, address, and telephone number of the representative of the applicant to whom correspondence should be sent;

(e) Nature and type of applicant's business, identifying products or services which the applicant has successfully commercialized, and approximate number of applicant's employees;

(f) Source of information concerning the availability of a license on the invention;

(g) A statement indicating whether the applicant is a small business firm as defined in Sec.404.3(c)

(h) A detailed description of applicant's plan for development or marketing of the invention, or both, which should include:

(1) A statement of the time, nature and amount of anticipated investment of capital and other resources which applicant believes will be required to bring the invention to practical application;

(2) A statement as to applicant's capability and intention to fulfill the plan, including information regarding manufacturing, marketing, financial, and technical resources;

(3) A statement of the fields of use for which applicant intends to practice the invention; and

(4) A statement of the geographic areas in which applicant intends to manufacture any products embodying the invention and geographic areas where applicant intends to use or sell the invention, or both;

(i) Identification of licenses previously granted to applicant under federally owned inventions;

(j) A statement containing applicant's best knowledge of the extent to which the invention is being practiced by private industry or Government, or both, or is otherwise available commercially; and

(k) Any other information which applicant believes will support a determination to grant the license to applicant.

Sec. 404.9 Notice to Attorney General.

A copy of the notice provided for in Sec. 404.7(a)(1)(i) and (b)(1)(i) will be sent to the Attorney General.

Sec. 404.10 Modification and termination of licenses.

Before modifying or terminating a license, other than by mutual agreement, the Federal agency shall furnish the licensee and any sublicensee of record a written notice of intention to modify or terminate the license, and the licensee and any sublicensee shall be allowed 30 days after such notice to remedy any breach of the license or show cause why the license shall not be modified or terminated.

Sec. 404.11 Appeals.

In accordance with procedures prescribed by the Federal agency, the following parties may appeal to the agency head or designee any decision or determination concerning the grant, denial, interpretation, modification, or termination of a license:

(a) A person whose application for a license has been denied.

(b) A licensee whose license has been modified or terminated, in whole or in part; or

(c) A person who timely filed a written objection in response to the notice required by Sec. 404.7(a)(1)(i) or Sec. 404.7(b)(1)(i) and who can demonstrate to the satisfaction of the Federal agency that such person may be damaged by the agency action.

Sec. 404.12 Protection and administration of inventions.

A Federal agency may take any suitable and necessary steps to protect and administer rights to federally owner inventions, either directly or through contract.

Sec. 404.13 Transfer of custody.

A Federal agency having custody of a federally owned invention may transfer custody and administration, in whole or in part, to another Federal agency, of the right, title, or interest in such invention.

Sec. 404.14 Confidentiality of information.

Title 35, United States Code, section 209, provides that any plan submitted pursuant to Sec. 404.8 (h) and any report required by Sec. 404.5(b)(6) may be treated by the Federal agency as commercial and financial information obtained from a person and privileged and confidential and not subject to disclosure under section 552 of Title 5 of the United States Code.

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