Patent Abstracts

These Patent Abstracts of recently issued patents are intended to provide the minimum information necessary for readers to determine if they are interested in examining the patent in more detail. Complete copies of patents are available for a small fee by writing: U.S. Patent and Trademark Office, Box 9, Washington, D.C. 20231.

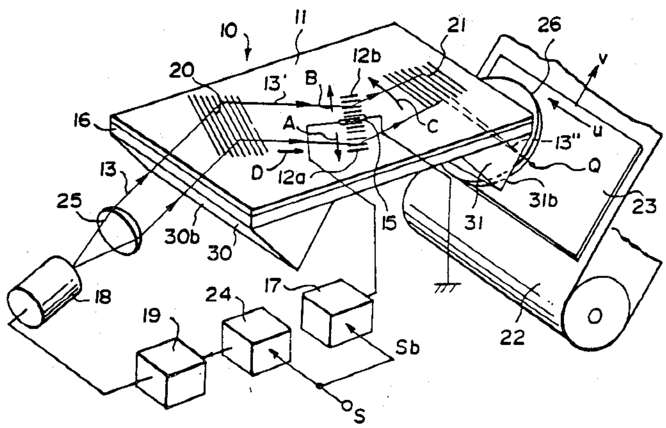
4,961,632 Oct. 9, 1990

Light Beam Deflector/Modulator

Inventors: Masami Hatori and Nobuharu Nozaki.
Assignee: Fuji Photo Film Co., Ltd.
Filed: Dec. 23, 1988.

Abstract—A waveguide-type light deflector or modulator includes an optical waveguide for guiding a light beam therethrough along a light path, and an interdigital transducer for generating surface elastic waves in the optical waveguide to diffract the light beam and for propagating the surface elastic waves in opposite directions across the light path, the interdigital transducer being transversely disposed to the light path in a substantially central position in the light path. In the light deflector, an alternating voltage with a continuously varying frequency is applied to the interdigital transducer to enable the surface elastic waves to continuously diffract and deflect the light beam. In the light modulator, the application of an alternating voltage to the interdigital transducer is controlled to vary the diffraction efficiency of the light beam, thereby to modulate the light beam.

6 Claims, 3 Drawing Sheets



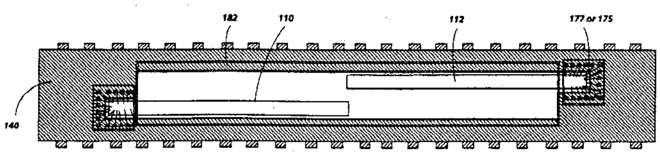
4,961,633 Oct. 9, 1990

VLSI Optimized Modulator

Inventors: Abd-el-Fattah A. Ibrahim and Hugh P. Campbell.
Assignee: Xerox Corporation.
Filed: Feb. 22, 1988.

Abstract—This invention relates to an electrooptic modulator device, such as a multigate light valve for an electrooptic line printer, wherein the different elements are uniquely combined in a package utilizing VLSI principles. A specially designed integrated circuit package is utilized to enable the bonding of one or two electrooptical devices as a single unit. As each electrooptical device has its chip pads at one end of the device, special modifications need to be made to joint the pads to the external connectors. The electrooptical crystal, which may be mounted on a glass plate, is bonded to the integrated circuit chip. Sonic bonding or the two layer metal technique may be used for the crystal to chip bonding.

8 Claims, 7 Drawing Sheets



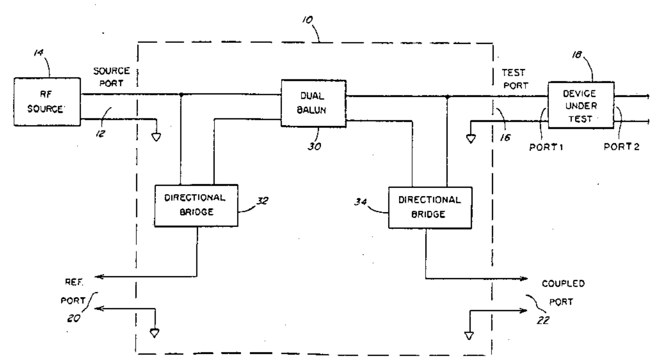
4,962,359 Oct. 9, 1990

Dual Directional Bridge and Balun Used as Reflectometer Test Set

Inventor: Joel P. Dunsmore.
Assignee: Hewlett-Packard Company.
Filed: June 29, 1989.

Abstract—A test set for use in measuring *S*-parameters with a network analyzer includes a first directional bridge, a second directional bridge and a single balun with two outputs mounted in an RF housing. A test signal from an RF signal source is transmitted through the test set to a device under test. The first directional bridge separates a signal from the device under test and the test signal, and provides the signal from the device under test to a coupled port. The second directional bridge separates the test signal and the signal from the device under test and provides the test signal to a reference port. The balun includes a coaxial transmission line with its outer conductor grounded at an intermediate location to define first and second balun sections. Ferrite beads are mounted on each of the balun sections. The ends of the first and second balun sections are coupled to the first and second directional bridges, respectively.

22 Claims, 16 Drawing Sheets



4,962,502 Oct. 9, 1990

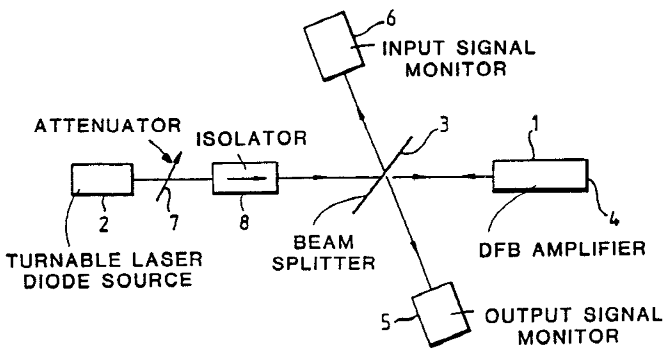
Optical Signal Processing Device

Inventor: Michael J. Adams.
Assignee: British Telecommunications Public Limited Company.
PCT Filed: Dec. 14, 1987.

Abstract—By using a DFB semiconductor laser amplifier (1) in reflection, it is possible to obtain a device with an optical limiting characteristic.

The output signal intensity of such an amplifier (1) is substantially independent of the input signal intensity where the input signal is detuned from an output peak on the short wavelength side of a stop band of the amplifier (1), and has an intensity above a threshold value. The amplifier (1) finds particular application for instance as an optical limiter or noise filter, in optical logic and communications systems.

11 Claims, 3 Drawing Sheets



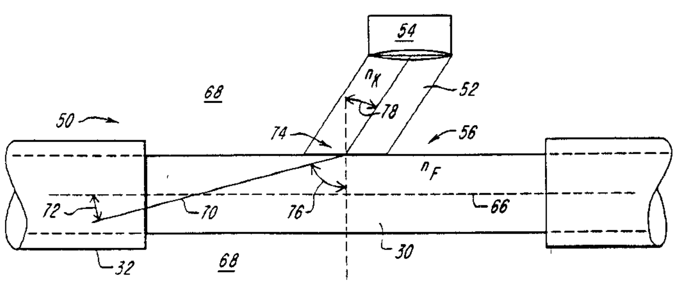
4,962,986 Oct. 16, 1990

Device for Coupling Light To and From a Light Guide

Inventors: M. ten Hompel, Christoph Gebauer, and Roland Scherer.
Assignee: Fraunhofer-Gesellschaft zur Forderung Der Angewandten Forschung e.V.
Filed: Apr. 13, 1989.

Abstract—A device for variably coupling light to and from a light guide is provided. The device couples light into or out of a light guide while the coupling device is moved relative to a fixed light guide or while a light guide is moved relative to the coupling device. In one embodiment, the present invention comprises moveably contacting with the core of the light guide a conducting solid having an index of refraction greater than the index of refraction of the medium surrounding the light guide. In an alternative embodiment, the present invention comprises sliding the core of the light guide into a chamber filled with a liquid having an index of refraction higher than the index of refraction of the medium surrounding the remainder of the light guide and placing a transducer in the chamber in contact with the fluid. In an application of the invention it provides information transmission path between a data source and a data receiver of the type that may move relative to each other as in the case of controlled industrial mechanisms.

13 Claims, 5 Drawing Sheets



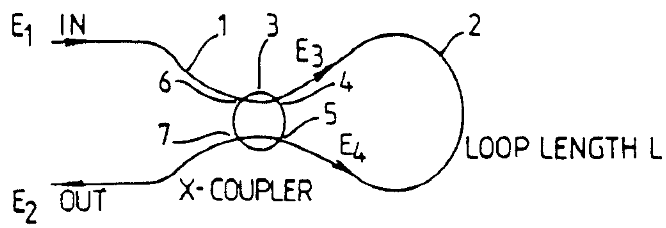
4,962,987 Oct. 16, 1990

Optical Device Producing an Intensity Dependent Phase Shift

Inventor: Nicholas J. Doran.
Assignee: British Telecommunications Public Limited Company.
PCT Filed: Oct. 20, 1987.

Abstract—An optical device comprises an optical waveguide (2) formed from at least a first material having a nonlinear refractive index n_2 coupled to a first pair of ports (4, 5) of an optical coupler (3). An optical signal input at one of the second pair of ports (6, 7) of the coupler (3) is split to provide two signals counter propagating around the waveguide loop (2). By selecting the coupling ratio and appropriate waveguide parameters to ensure an asymmetry in the device it is possible to produce an intensity dependent relative phase shift between the counter propagating signals, thereby to vary the device output. Embodiments of the invention may be used to perform logic functions on, to amplify, switch or otherwise modify an input signal.

14 Claims, 3 Drawing Sheets



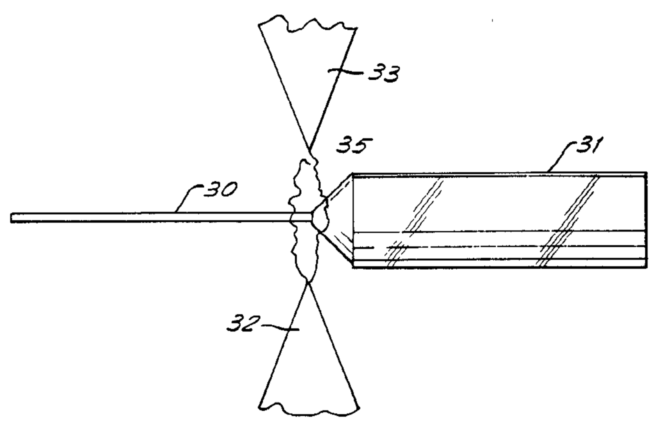
4,962,988 Oct. 16, 1990

Termination Interface Structure and Method for Joining an Optical Fiber to a Graded Index Rod Lens

Inventor: Thomas A. Swann.
Assignee: Optomec Design Company.
Filed: July 10, 1989.

Abstract—In order to make possible the provision of a good fusion joint with low losses between an optical fiber and a graded index (GRIN) glass rod lens with considerably larger diameter, the end of the GRIN lens to which the optical fiber is to be joined is tapered down radially the extent of at least one third the radius of the cylindrical lens at an angle approximately 45°. It is then possible to make a mechanically good fused joint with low transmission losses in the mid portion of the reduced-diameter end of the lens by heating the butt joint with an electric arc. The taper may be frusto-conical, convex or concave.

9 Claims, 4 Drawing Sheets



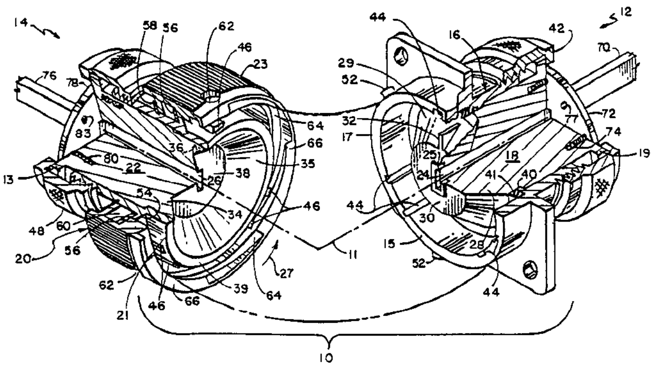
4,962,991 Oct. 16, 1990

Quick-Disconnect Waveguide Connector Assembly

Inventor: Ronald M. Carvalho.
Assignee: Raytheon Company.
Filed: Jan. 23, 1985.

Abstract—A quick connect/disconnect waveguide connector assembly is provided comprising first and second mating waveguide connectors. The first mating waveguide connector comprises a first outer member and a first insert disposed within the first outer member. The first insert has a mating portion having a generally conical shape truncated at a first face. The first insert further includes a waveguide slot disposed therethrough and intersecting the first face. The second mating waveguide connector comprises a second insert having a complementary mating portion. Such mating portion has a generally conical-shaped cavity therein truncated at a second face. The second insert further has a waveguide slot disposed therethrough and intersecting the second face. The second mating waveguide connector further comprises a second outer member rotatably mounted about the second insert. The first and second inserts include means for aligning the waveguide slots disposed therethrough with the waveguide slots having the same angular orientation about a common axis, upon mating the first and second inserts at the first and second mating portions thereof to engage the first and second faces thereof. The first and second outer members include means for locking the second outer member to the first outer member and maintaining the mating of the first and second inserts by rotating the second outer member about the first outer member through only a portion of a full turn.

7 Claims, 3 Drawing Sheets



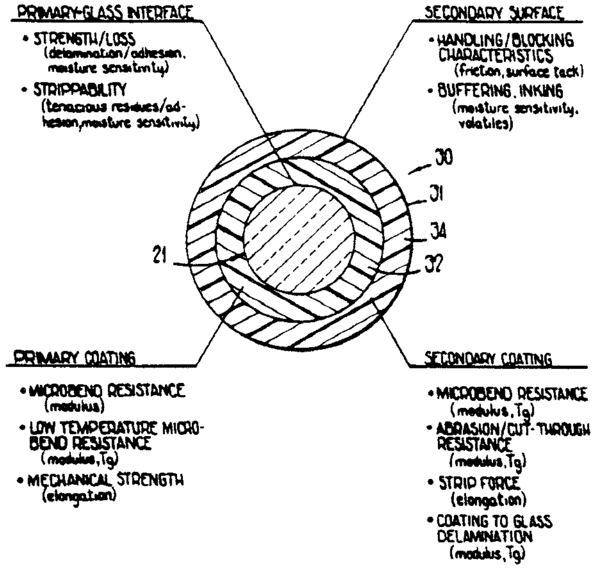
4,962,992 Oct. 16, 1990

Optical Transmission Media and Methods of Making Same

Inventors: J. Thomas Chapin, Addison G. Hardee, Jr., Lisa M. Larsen-Moss, Charles M. Leshe, Bob J. Overton, John W. Shea, Carl R. Taylor, and John M. Turnipseed.
Assignee: AT&T Bell Laboratories.
Filed: May 15, 1989.

Abstract—An optical fiber transmission medium (30) includes optical fiber (21) provided with a coating system (31) typically including two layers each of a different coating material. An inner layer (32) of a first coating material is called the primary coating and an outer layer is termed the secondary. In order to achieve desired performance characteristics, performance is related to properties of a coating system. The coating materials have well defined moduli and the second coating material has an elongation which is substantially less than in prior secondary coating materials. Adhesion levels which are optimized rather than maximized are substantially stable with respect to time. Curing of the coating materials may be accomplished simultaneously or in tandem with the application separately of the coating materials.

29 Claims, 15 Drawing Sheets



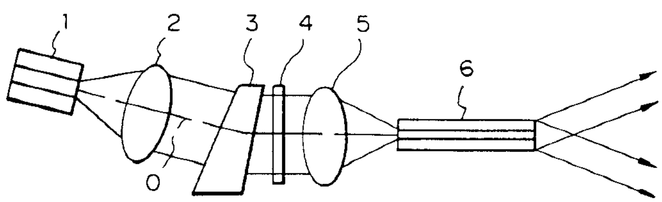
4,962,993 Oct. 16, 1990

Fiber-Type Light Conversion Device

Inventors: Sota Okamoto and Kiyofumi Chikuma.
Assignee: Pioneer Electronic Corporation.
Filed: May 30, 1989.

Abstract—A fiber-light conversion device comprises a fiber-type light conversion element for converting the wavelength of an incident light and an optical system which introduces a light beam from a light source to the light conversion device as the incident light. The optical system is provided with a phase-shifting device which rotates the plane of polarization of the incident light. With this provision it is possible to set the efficiency of light conversion at a maximum level without necessity of rotating the light conversion element.

6 Claims, 1 Drawing Sheet



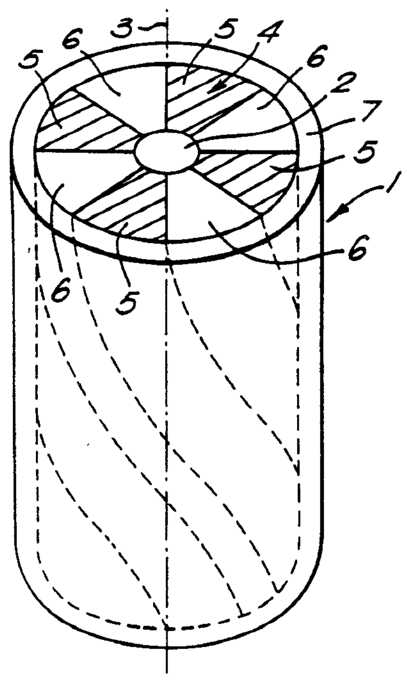
4,962,994 Oct. 16, 1990

Circular Birefringent Dielectric Wave Guide

Inventor: Carlo G. Someda.
Assignee: Pirelli General pic.
Filed: May 31, 1989.

Abstract—The wave guide has an annular core region divided into an integral number times eight annular sectors. Respective alternate sectors are of a first type 5 having a substantially constant refractive index and a second type 6 having a refractive index which varies substantially in inverse proportion to the square of the distance from the longitudinal axis 3 of the wave guide. The wave guide is twisted about the axis 3 such that the sectors 5, 6 extend helically. The circular birefringence of the wave guide is improved by the sectors 6 having a different elastooptic coefficient under torsional stresses to that of the sectors 5.

5 Claims, 1 Drawing Sheet



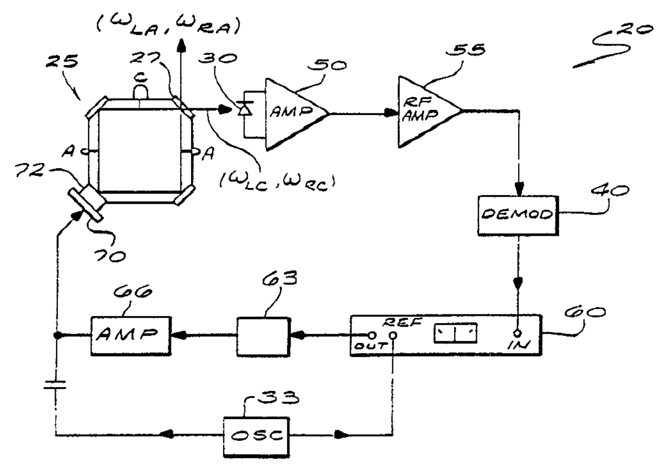
4,963,026 Oct. 16, 1990

Cavity Length Control Apparatus for a Multi-Oscillator

Inventor: Tae W. Hahn.
Assignee: Litton Systems, Inc.
Filed: Mar. 14, 1988.

Abstract—An apparatus and method for controlling the length of a multioscillator cavity. A photodiode mixes a pair of beams rotating in the same direction, one of said beams being substantially left circularly polarized, and the other beam being substantially right circularly polarized. A local oscillator causes the mixed beams to be modulated. An amplitude demodulator demodulates the modulated beams. An error detecting device responds to the amplitude demodulators, and an active integrator integrates the detected error. A piezotransducer responds to the output of the integrator for controlling the length of the multioscillator cavity.

16 Claims, 2 Drawing Sheets



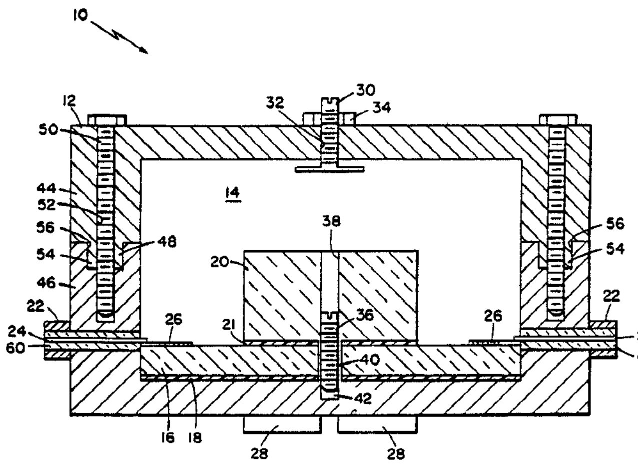
4,963,841 Oct. 16, 1990

Dielectric Resonator Filter

Inventor: Stephen M. Sparagna.
Assignee: Raytheon Company.
Filed: May 25, 1989.

Abstract—A dielectric resonator filter suitable for use at *L*-band includes a puck-shaped dielectric resonator attached directly to a dielectric substrate that is bonded to the cavity base in order to decrease vibration sensitivity while retaining a relatively high loaded *Q* of the dielectric resonator filter. The high value of *Q* is attained by the use of a low loss dielectric substrate with a dielectric constant sufficiently high that the electrical dimensions of the cavity approximate the free space or optimum model wherein the resonator is positioned at the center of the cavity. The disclosure describes a dielectric resonator filter having a loaded *Q* in excess of 6500 at 1.538 GHz with an insertion loss of 6 dB, while maintaining a vibration sensitivity of 2.2×10^{-8} G^{-1}. An arcuate segmented line comprising a plurality of tracks used as a coupling structure permits individual selection for each filter of the coupling, while not degrading the loaded *Q* value or the vibration performance.

22 Claims, 2 Drawing Sheets



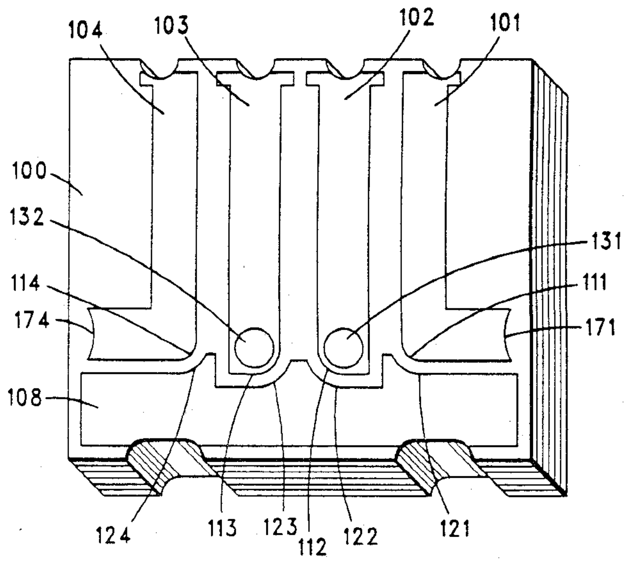
4,963,843 Oct. 16, 1990

Stripline Filter with Combline Resonators

Inventor: David S. Peckham.
Assignee: Motorola, Inc.
Filed: Oct. 31, 1988.

Abstract—A combline stripline filter includes a number of conductive strips, each connected to ground on one end and capacitively loaded to ground at the other end. Input and output pads will make a surface mountable connection to a printed circuit board. Tuning is provided for by removing ground over the extension ends of the outside resonators. The center resonators are tuned by removing metal from areas on the cover that are connected to the resonators by plated through holes. Undesired capacitance is compensated for by rounding the ends of the resonators and the opposing ground planes.

8 Claims, 2 Drawing Sheets



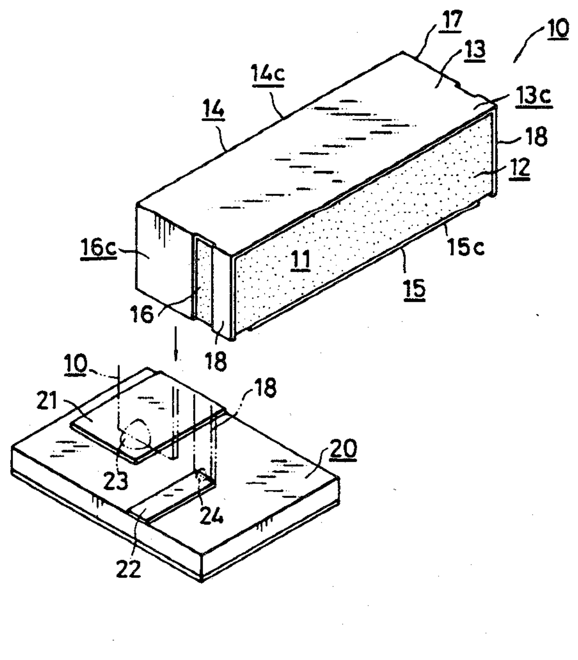
4,963,844 Oct. 16, 1990

Dielectric Waveguide-Type Filter

Inventors: Yoshihiro Konishi, Kenichi Konno, Ikuo Awai, and Hideo Hikuma.
Assignee: Uniden Corporation.
Filed: Sept. 12, 1989.

Abstract—A dielectric waveguide-type filter is fabricated by vapor depositing or coating all but one of the four sides extending in the axial direction of a six-sided dielectric block that is long in its axial direction lying perpendicular to its width and height with a conductive material and either leaving the fourth side surface open or forming it with a conductive pattern depending on whether the filter characteristics to be obtained are high-pass characteristics, band-pass characteristics or band-rejection characteristics, the conductive pattern, if formed, being formed in a configuration and distribution depending on the filter characteristics to be obtained. A pair of electrode patterns for electrical connection with an exterior circuit are provided by patterning of conductive material on the opposite axial end surfaces of the dielectric block or on the open surface at positions near the opposite axial end surfaces.

23 Claims, 17 Drawing Sheets



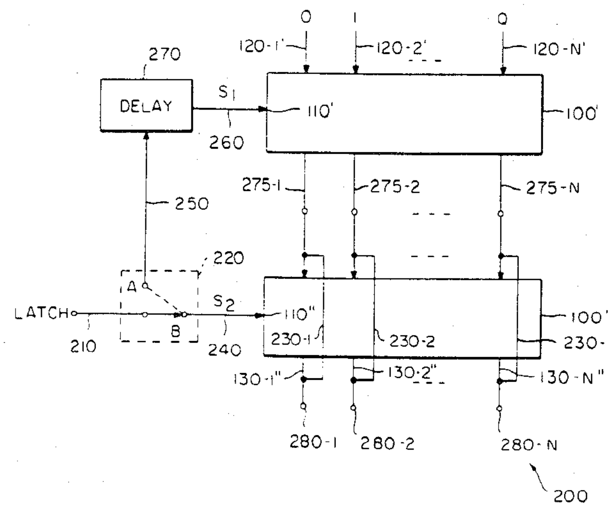
4,964,687 Oct. 23, 1990

Optical Latch and Method of Latching Data Using Same

Inventor: R. Aaron Falk.
Assignee: The Boeing Company.
Filed: Sept. 29, 1989.

Abstract—An optical latch includes first and second optical switches arranged in series. An input signal is received in the first optical switch and is passed through to the second optical switch. The second optical switch latches-up to this received signal. Then the first optical switch is disabled to isolate the second optical switch from inputs to the first optical switch. Feedback lines from the output of the second optical switch to the input of the second optical switch ensure that the second optical switch remains latched. Switching signals are provided at appropriate timing to ensure correct operation of the optical latch.

13 Claims, 3 Drawing Sheets



4,964,805 Oct. 23, 1990

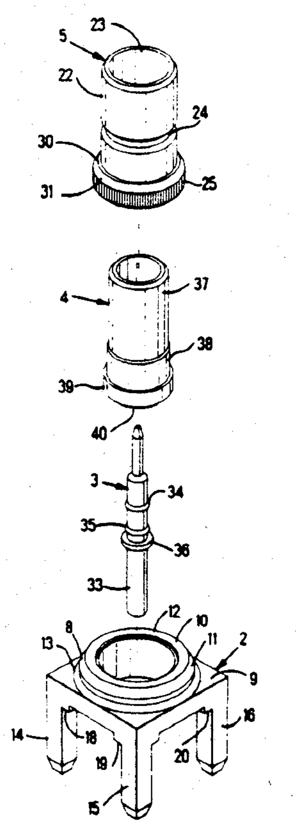
Microcoxial Connector Having Bipartite Outer Shell

Inventor: Andrew J. Gabany.
Assignee: AMP Incorporated.
Filed: Jan. 3, 1990.

Abstract—A coaxial electrical connector for printed circuit boards comprises an electrically conductive outer body (2) and (5) adapted to rest upon the surface of a printed circuit board, and having electrically conductive ground legs (14, 15, 16, and 17) supported by the body, the ground legs being a plurality of downwardly extending legs adapted to extend through apertures in the printed circuit board, to be electrically connected to conductive paths on the board; a center contact extending from within the body and having a first contact portion (33) which is adapted to extend through an aperture in the printed circuit board to be electrically connected to the conductive path on the board, and a second contact portion (32) which is adapted to mate with the center contact of a complimentary coaxial connector; and a dielectric insulating body (4) substantially surrounding the second contact portion (32). The electrically conductive outer body is a bipartite body having a lower base (6), substantially surrounding the first contact portion (33), and of a material composition suitable for solder connection to a printed circuit board; and an upper electrically conductive outer shell (5), substantially surrounding the second contact portion (32), and of a material

suitable for providing an electrical plating interface surface, and further, the upper shell (5) having an end captivated by press fit within a complimentary end of the loser base (6).

7 Claims, 3 Drawing Sheets



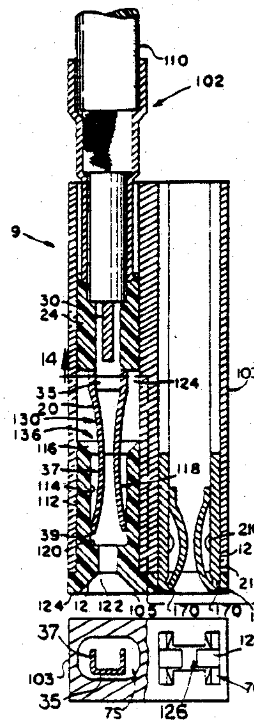
4,964,814 Oct. 23, 1990

Shielded and Grounded Connector System for Coaxial Cables

Inventors: John N. Tengler, Alan L. Roath, and John T. Venaleck.
Assignee: Minnesota Mining and Manufacturing Co.
Filed: Apr. 24, 1989.

Abstract—A coaxial cable termination system, includes a coaxial cable terminator including a coaxial cable having signal and shield conductors and insulation separating the conductors, an electrical contact electrically connected to the signal conductor, the electrical contact having a contacting portion for electrically connecting with an external member inserted to engagement with respect thereto, and a strain relief body molded directly to at least part of the coaxial cable and electrical contact for holding the same in relatively fixed positions with respect to each other; a housing having an opening for receiving therein at one end the terminator to hold the same in position to make electrical connection with an external member inserted into the housing means to engage the electrical contact; and an insulator inserted into the opening from the opposite end to insulate the contact from the housing wall bounding the opening. Novel tube-like insulators and bow type contacts also are included.

48 Claims, 6 Drawing Sheets



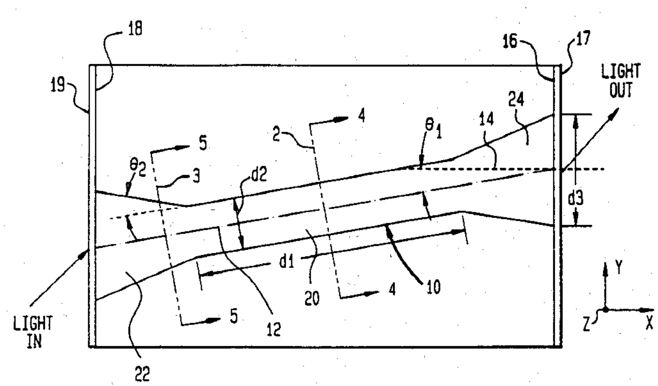
4,965,525 Oct. 23, 1990

Angled-Facet Flared-Waveguide Traveling-Wave Laser Amplifiers

Inventor: Chung-En Zah.
Assignee: Bell Communications Research, Inc.
Filed: Nov. 13, 1989.

Abstract—The effective reflectivity of angled antireflection-coated facets of a traveling-wave laser amplifier is significantly reduced by flaring the waveguiding portion of the amplifier in the immediate vicinity of the facets. In this way, low-reflectivity facets are achieved with simple low-cost antireflection coatings, thereby providing economical amplifiers characterized by wide bandwidth and high output saturation power.

12 Claims, 1 Drawing Sheet



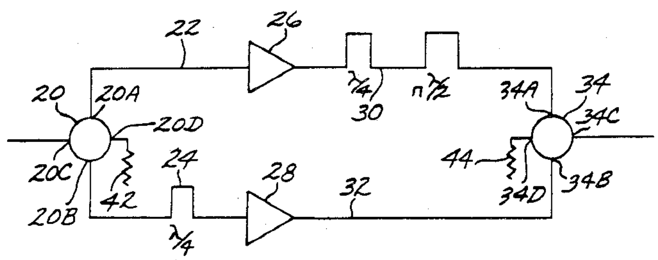
4,965,527 Oct. 23, 1990

Gain Equalizer for Microwave Balanced Amplifier Configuration

Inventors: Robert T. Clark and Rick A. Crist.
Assignee: Hughes Aircraft Company.
Filed: Sept. 20, 1989.

Abstract—A gain-equalized balanced microwave transistor amplifier configuration is disclosed. Two microwave amplifier circuits provide the power amplification. An input power divider divides the input signal into two signal components that are fed to the respective amplifier circuits by two transmission lines. The outputs for the amplifier circuits are fed to an output combiner by two additional transmission lines to provide a combined output signal. The desired gain equalization is provided through the loss of power due to phase error introduced by unequal transmission line lengths connecting the microwave transistor amplifiers to the output power combiner.

22 Claims, 6 Drawing Sheets



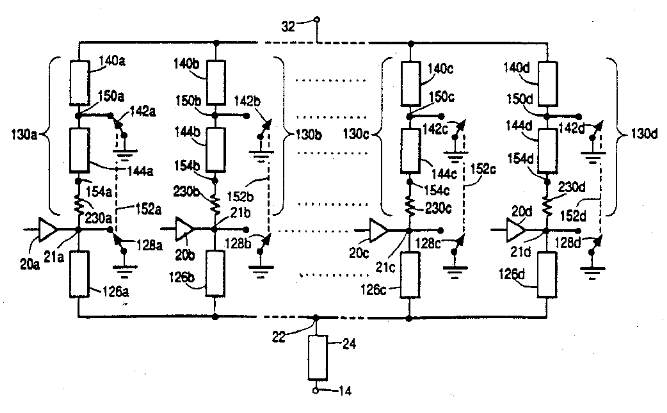
4,965,530 Oct. 23, 1990

Parallelled Amplifier with Switched Isolation Resistors

Inventor: Allen Katz.
Assignee: General Electric Company.
Filed: Sept. 26, 1989.

Abstract—A paralleled amplifier arrangement includes a plurality of amplifier modules, the output ports of which are coupled to a common combining node. Switches are coupled to the output ports for selectively decoupling one or more of the amplifier modules from the combining node during those intervals in which the amplifier modules are held in reserve or are nonfunctional. Each amplifier module is associated with an isolation resistor which is coupled to all the isolation resistors. In order to reduce losses attributable to the isolation resistors when the decoupling switches are operated, the isolation resistors are each coupled to a switched network that decouples the isolation resistors associated with the decoupled amplifier modules.

17 Claims, 5 Drawing Sheets



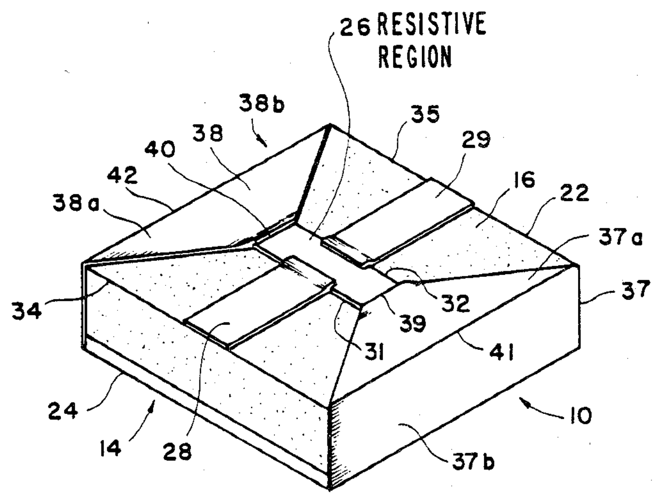
4,965,538 Oct. 23, 1990

Microwave Attenuator

Inventor: Joseph J. Mickey, III.
Assignee: Solitron Devices, Inc.
Filed: Feb. 22, 1989.

Abstract—A microwave attenuator is constructed on an insulative substrate which supports a resistive region, input/output electrodes and shunt electrodes. The shunt electrodes are preferably constructed using trapezoidally shaped portions on the face of the insulative substrate, on which the resistive region is formed, to increase the width of the electrodes. The shunt electrodes extend down to a ground plane on the face of the insulative substrate opposite the face on which the resistive region is formed. In one embodiment, the shunt electrodes form a wide strip on the outside of a rectangular substrate. In another embodiment, the shunt electrodes extend from the resistive region through holes positioned close to the resistive region. In a third embodiment, the insulative substrate is formed in a block *H*-shape with the resistive region formed on the cross portion on one of the "*H*" faces and the shunt electrodes connects the resistive region to the ground plane that is formed on the opposing "*H*" face, by passing between the long parallel portions of the block *H*-shape.

5 Claims, 3 Drawing Sheets



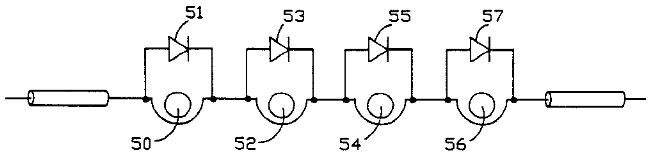
4,965,539 Oct. 23, 1990

Microwave Notch Filter Using Pin Diode Shunted YIG Resonators

Inventor: Marinus L. Korber, Jr.
Assignee: Watkins-Johnson Company.
Filed: June 2, 1989.

Abstract—Disclosed is a microwave notch filter which includes a plurality of serially connected YIG tuned resonators, each YIG resonator including a coupling wire and a PIN diode connected in parallel with the coupling wire. A first interconnect interconnects one end of the plurality of serially connected YIG resonators to an RF signal source, and a second inter-connect interconnects another end of the plurality of serially connected YIG band reject filters to a load. An inductor connects one of the interconnects to a circuit ground potential, and an inductor means connects the other interconnect to a dc voltage source, whereby the PIN diodes in the YIG resonators can be forward-biased or reverse-biased by an applied dc voltage. The dc voltage source selectively provides a positive dc voltage and a negative dc voltage which effectively controls the functioning of said YIG band reject filters. The PIN diodes are serially connected with like polarities whereby application of a negative voltage reverse-biases said diodes and application of a positive voltage causes said diodes to short-circuit said YIG resonators.

7 Claims, 5 Drawing Sheets



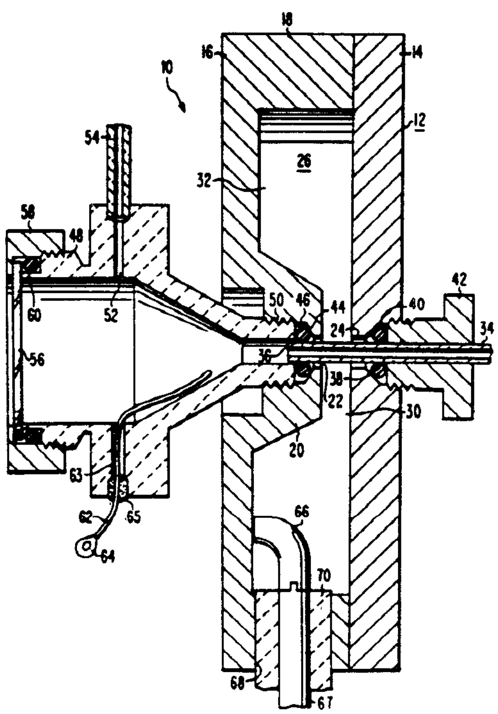
4,965,540 Oct. 23, 1990

Microwave Resonant Cavity

Inventor: James J. Sullivan.
Assignee: Hewlett-Packard Company.
Filed: May 1, 1989.

Abstract—A microwave resonant cavity for a spectroscopic light source includes a housing having therein a chamber formed by side walls and a cylindrical outer wall. The side walls having aligned openings therethrough which are on the longitudinal axis of the outer wall. A refractory tube which is adapted to contain a gaseous plasma extends through the aligned openings and across the chamber in the housing. The portion of the side walls of the chamber adjacent the openings are closer together than the remaining portions of the side walls so that the chamber has a first portion around the refractory tube which is narrower than a second portion of the chamber around the first portion. A coupling loop is electrically coupled to a side wall of the chamber within the second portion of the chamber and is connector to a coaxial connector that extends through the outer wall of the housing to deliver microwave power to the chamber. This provides a resonant cavity in which the plasma formed in the refractory tube is very short for increased power and greater brightness of the plasma. This also provides a resonant cavity which requires no tuning and is more stable.

30 Claims, 4 Drawing Sheets



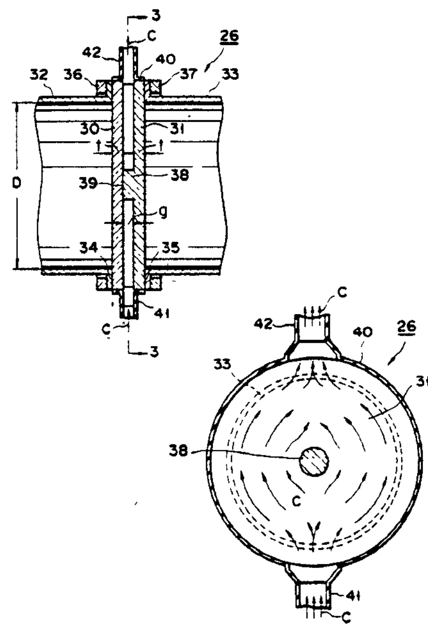
4,965,541 Oct. 23, 1990

Waveguide Provided with Double Disk Window Assembly Having Dielectric Disks

Inventor: Yukio Okazaki.
Assignee: Kabushiki Kaisha Toshiba.
Filed: May 23, 1989.

Abstract—In a double disk window assembly for a waveguide, first and second dielectric disks face each other and are coupled to waveguide segments, respectively. The second dielectric disk has a central coupling section which is mechanically coupled to the center region of the first dielectric disk. The first and second dielectric disks are sealed to define a gap through which a coolant passes.

11 Claims, 9 Drawing Sheets



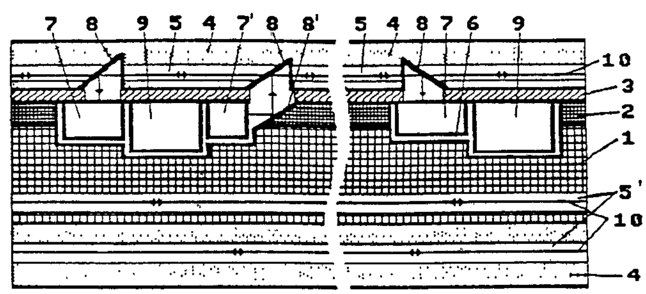
4,966,430 Oct. 30, 1990

Semiconductor Circuit

Inventor: Edgar Weidel.
Assignee: Telefunken Systemtechnik GmbH.
Filed: Oct. 10, 1989.

Abstract—An integrated semiconductor circuit arrangement composed of a substrate with an electrical portion, configured, for example, of an integrated circuit in planar CMOS or bipolar technology, an optical connecting layer disposed thereabove which includes at least one integrated (connecting) light waveguide, and an electro-optical and/or opto-electrical transducer disposed in a recess in the substrate, electrically connected to the integrated circuit and optically coupled to the light waveguide.

15 Claims, 1 Drawing Sheet



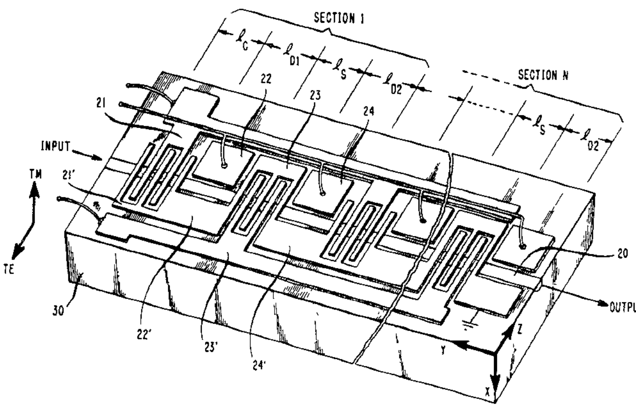
4,966,431 Oct. 30, 1990

Integrated-Optic Endless Polarization Transformer

Inventor: Fred L. Heismann.
Assignee: AT&T Bell Laboratories.
Filed: Aug. 10, 1989.

Abstract—Cascadability and simplicity of design and operation are primary attributes of a novel electrooptic polarization transformer for reset-free endless polarization control that allows general polarization transformations from any arbitrarily varying input and into any arbitrarily varying output polarization by producing adjustment elliptical birefringence of constant total phase retardation in a single-mode waveguide. Here, a particular transformation is obtained by adjusting the azimuth of linear birefringence and the ratio of linear to circular birefringence. In this integrated-optic realization, the endless polarization transformer includes at least one cascadable transformer section comprising a first TE ↔ TM mode converter followed by a first TE/TM phase shifter followed by a second TE ↔ TM mode converter and a second TE/TM phase shifter. The sections are formed over a birefringent waveguide capable of supporting propagation of TE and TM optical signal modes.

20 Claims, 2 Drawing Sheets



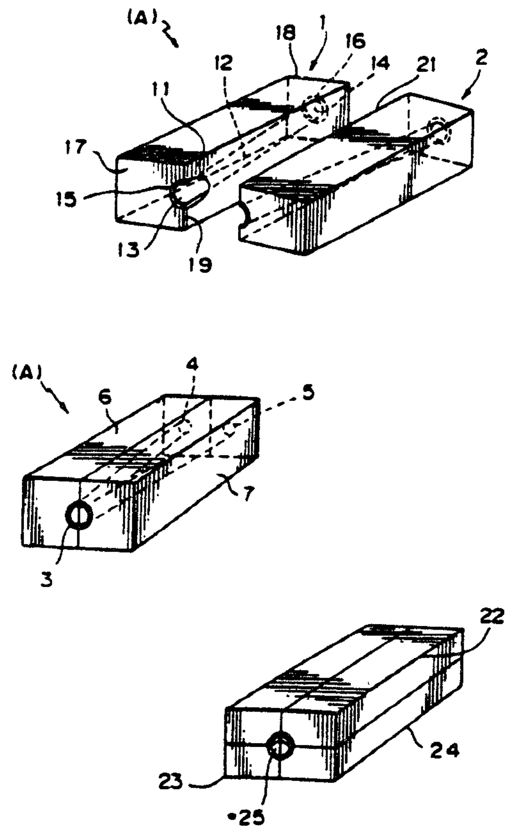
4,966,432 Oct. 30, 1990

Optical Coupler and Process for Preparation Thereof

Inventors: Hiroshi Okada, Masatoshi Toda, Shingo Suzuki, Manabu Kagami, and Masayoshi Komiya.
Assignee: Mitsubishi Rayon Company, Ltd.
Filed: Oct. 24, 1989.

Abstract—An optical coupler comprising N number (where N stands for an integer of not less than 2) of optical fibers having one ends integrated and the other ends branched and N number of optical coupler parts, wherein the top end of each light branching-coupling optical fiber has a plane of $360°/N$ including an inclined branching fiber abutting plane inclined at an angle θ to the optical fiber axis and a light-coupling plane vertical to the abutting plane, each of the optical coupler parts is constructed by inserting the light branching-coupling optical fiber in an optical fiber-retaining hole of a block having the same plane as the branching fiber-abutting plane of the optical fiber and a light-coupling plane vertical to the abutting plane, and the branching fiber-abutting planes of the optical coupler parts are engaged with each other to construct a optical coupler.

2 Claims, 6 Drawing Sheets



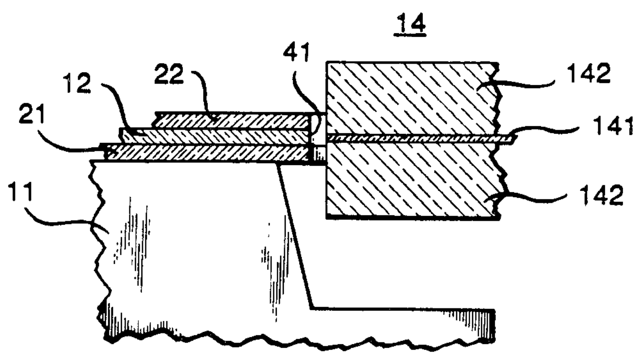
4,966,433 Oct. 30, 1990

Device Including a Component in Alignment with a Substrate-Supported Waveguide

Inventor: Greg E. Blonder.
Assignee: AT&T Bell Laboratories.
Filed: Aug. 23, 1989.

Abstract—In an optical device such as, e.g., an optical communications coupler or an optical gyroscope, a substrate-supported waveguide is aligned with a device component such as, e.g., an optical fiber or a photodetector. Optical alignment of such component relative to the waveguide is facilitated as the component is located in a preferentially etched groove in the substrate supporting the waveguide. In the case of an optical fiber connection, optical coupling is facilitated by a ledge structure overhanging a sloping etched wall of a groove holding the fiber. In the case of a photodetector, an etched groove may be essentially perpendicular to the direction of light propagation.

12 Claims, 4 Drawing Sheets



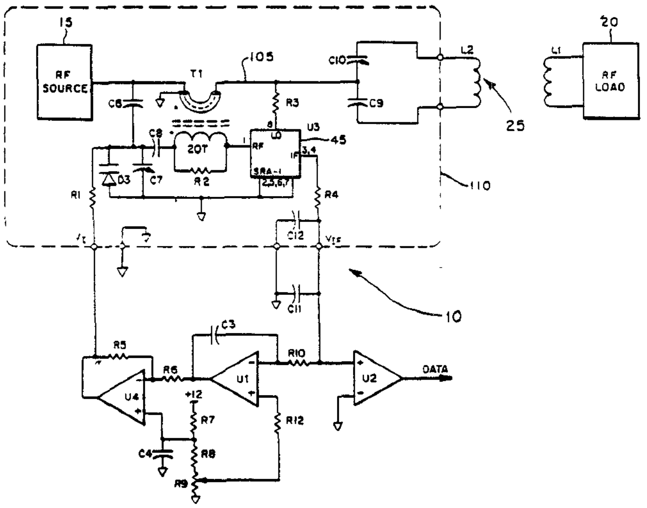
4,967,159 Oct. 30, 1990

Self-Balancing Reflectometer

Inventor: Michael R. Manes.
Assignee: Abbott Laboratories.
Filed: Feb. 23, 1989.

Abstract—A preferred embodiment of a self-balancing reflectometer is disclosed in conjunction with a system including an RF source, an RF load, and an RF transmission channel that carries RF signals transmitted by the source to the load. The self-balancing reflectometer includes a load current sampler that generates a first sample signal related to load current by a first fixed value of gain and a load voltage sampler that generates a second sample signal related to load voltage by a voltage-responsive second variable value of gain. The first sample signal is subtracted from the second sample signal and the resulting difference signal is applied to the RF port of a double balanced mixer. The RF voltage signal appearing at the load is applied to the LO port of the mixer, which generates an IF signal that varies with both rapid load impedance modulation corresponding to load data and long term basal variations in load impedance unrelated to load data. A high gain amplifier generates output data signals corresponding to the load data and an integrator generates a gain adjustment voltage which varies with the long term variations. The gain adjustment voltage is applied to the load voltage sampler to vary the second variable value of gain in a manner to drive the difference signal to zero, thus automatically balancing the reflectometer. At the balance point, the value of the gain adjustment voltage is related to the value of load impedance by a known formula. The reflectometer is selectably responsive to either the rear or imaginary component of load impedance.

46 Claims, 2 Drawing Sheets



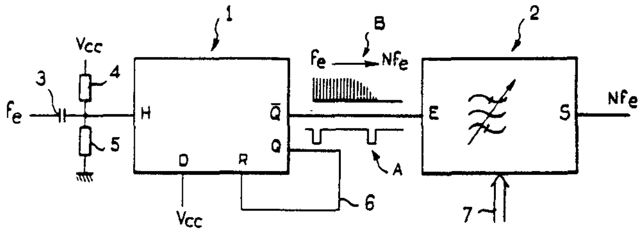
4,967,160 Oct. 30, 1990

Frequency Multiplier with Programmable Order of Multiplication

Inventors: Didier Quievy and Francis Desjouis.
Assignee: Thomson-CSF.
Filed: June 22, 1989.

Abstract—This frequency multiplier circuit with variable multiplication order is of the type comprising a comb generator that receives, at input, a signal at the base frequency to be multiplied, and gives, at output, a composite pulse signal having a plurality of harmonic lines of the base frequency, said comb generator being followed by a pass-band filter that can be tuned selectively to one of these harmonic lines. The comb generator is formed by logic means having two complemented outputs, a synchronous input, the actuation of which controls the changing of these outputs from one logic state to the other, and a asynchronous input, the actuation of which controls, independently of the state of the synchronous input, the changing of these outputs to the states complementary to those generated by the actuation of the synchronous input. The base frequency signal is biased beforehand so that its excursion takes place around the transition voltage controlling the change from one logic state to the other, said signal being applied to the synchronous input of the logic means, and a first output of these means is connected to asynchronous input and the second output delivers said composite pulse signal to the pass-band filter.

6 Claims, 2 Drawing Sheets



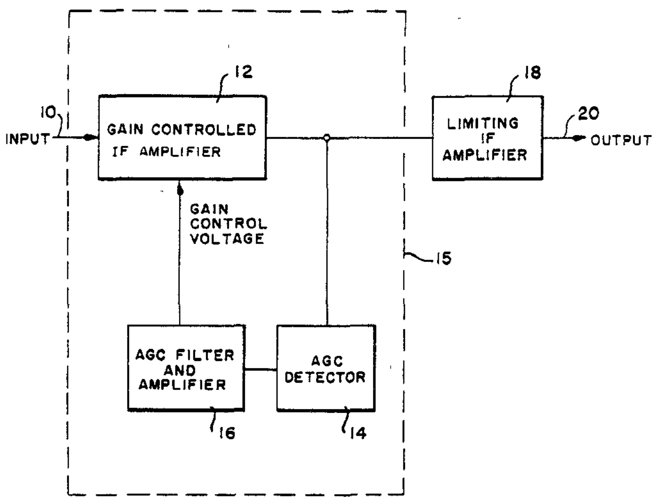
4,967,163 Oct. 30, 1990

Combined Limiting/AGC IF System

Inventor: James E. Kietzer.
Assignee: The United States of America as represented by the Secretary of the Navy.
Filed: Sept. 17, 1973.

Abstract—A gain control system for a receiver that combines some of the features of both limiting and AGC. The AGC loop of the present invention has a relatively long time constant which reduces the gain so that the desired signal is only 10–15 dB into limiting. This degree of limiting provides instantaneous control of small changes in signal level, but prevents the receiver from instantaneously opening to full gain in the case of loss of signal. This prevents erroneous data from being received during a time interval in which it is expected that the original signal will return.

1 Claim, 2 Drawing Sheets



4,967,167 Oct. 30, 1990

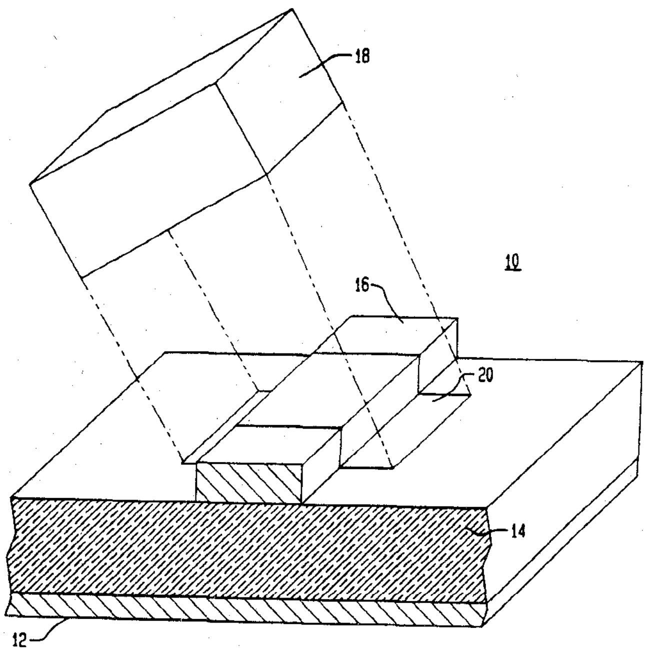
Microwave Transmission Line and Method of Modulating the Phase of a Signal Passed Through Said Line

Inventor: Richard A. Neifeld.
Assignee: The United States of America as represented by the Secretary of the Army.
Filed: Feb. 5, 1990.

Abstract—A microwave transmission line is provided including a class of dielectric materials known as relaxor dielectrics having very high dielectric constants of greater than 1000, low dielectric loss and large variations of the real part of the dielectric constant with varying temperature. The phase of a

microwave signal passed through such a transmission line is modulated by subjecting the transmission line to light that is absorbed in the dielectric layer causing a variation in the dielectric constant and a change in the velocity of the continuous microwave signal passing through the transmission line.

8 Claims, 1 Drawing Sheet



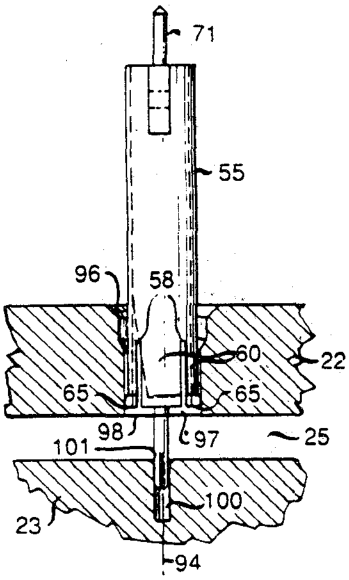
4,967,168 Oct. 30, 1990

Coaxial-Wave Guide Coupling Assemblages

Inventors: Edward V. Bacher and Robert E. Myer.
Assignee: AT&T Bell Laboratories.
Filed: Aug. 31, 1989.

Abstract—Coaxial units are disclosed for coupling an RF amplifying microstrip to splitter and combiner wave guides, respectively, of a splitter-combiner apparatus. Each coaxial unit comprises an outer conductor sleeve and an inner conductor pin projecting forward of the sleeve, both the sleeve and pin having forward portions that are resiliently compressible radially inward, and the sleeve being radially enlarged at its front end. The coaxial unit is coupled at its front to its associated wave guide by having its sleeve and pin forward portions, respectively, received in, and radially inwardly compressed in, large and small bores respectively formed in the metallic plates on opposite sides of the dielectric chamber of the associated wave guide. Those forward portions make direct yieldable-pressure electrical contacts with metallic walls of these bores at locations adjacent to the openings of such bores into that chamber. Each coaxial unit has a terminal post projecting from its sleeve away from its pin, and each such unit is secured to the structure of the associated amplifier by being bolted thereto, with part of the body of the unit being received in an end recess in the amplifier structure, and with the unit's terminal post being soldered to a printed conductor of the amplifier.

6 Claims, 3 Drawing Sheets



4,967,169 Oct. 30, 1990

FET Monolithic Microwave Integrated Circuit Variable Slope Gain-Equalizer

Inventors: Horng-Jye Sun and Bruce C. Morley.
Assignee: Teledyne MEC.
Filed: July 31, 1989.

Abstract—A MMIC variable slope gain-equalizer varies the conductance of depletion mode Schottky gate FET's to controllably insert frequency dependent resonant members in a modified bridged-T configuration. Resistors connected from circuit input port to output port define the arms of the "T" and a T-node to which a first frequency dependent resonant member is connected in series with a first FET. A second FET and a second frequency dependent resonant member are each connected in series between the circuit ports, bridging the T. Preferably a third frequency dependent resonant member is series connected with the second frequency dependent member. Each frequency dependent resonant member resonates at about the highest frequency of interest, typically about 18 GHz. When the first FET is on and the second FET off, maximum attenuation at lower frequencies is inserted into the circuit, and when the first FET is off and the second FET on, minimum attenuation is inserted at lower frequencies. Intermediate levels of FET conductivity produce intermediate levels of frequency dependent attenuation. In a first embodiment, FET conductivity is controlled by two push-pull control voltages. A second embodiment uses a single control voltage to vary conductivity. The first embodiment operates at about 0–18 GHz, while the second embodiment operates at about 2–18 GHz. Each embodiment realizes a variable slope gain-versus frequency temperature function of between about -0.6 dB/GHz to about -0.2 dB/GHz with a 0 to $+3$ VDC control voltage change.

23 Claims, 6 Drawing Sheets