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, DC 20231.

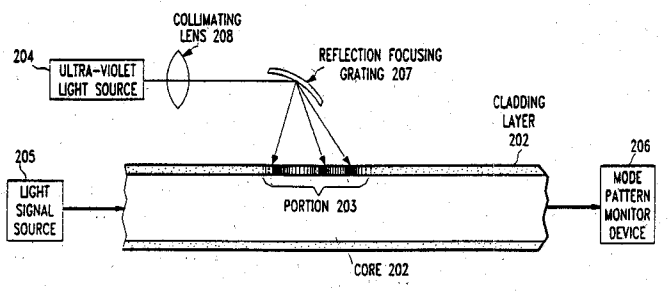
4,974,930 Dec. 4, 1990

Mode Scrambler with Noninvasive Fabrication in an Optical Fiber's Cladding

Inventors: Lee L. Blyler, Jr., Leonard G. Cohen, Gary J. Grimes, and Lawrence J. Haas.
Assignee: AT&T Bell Laboratories.
Filed: Nov. 13, 1989.

Abstract—A mode scrambling arrangement for a multimode optical fiber by irradiating the cladding using an ultra-violet light to change the index of refraction of the cladding. The cladding uses a material whose index of refraction is modified in response to ultra-violet light. The exposure time and intensity of the light required is determined by monitoring the mode pattern in the multimode fiber during the irradiation to provide the desired amount of mode scrambling.

13 Claims, 2 Drawing Sheets



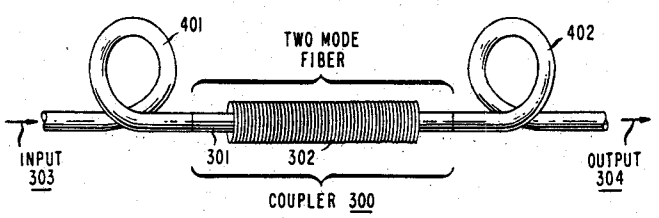
4,974,931 Dec. 4, 1990

Wavelength Selective Mode Couplers

Inventor: Craig D. Poole.
Assignee: AT&T Bell Laboratories.
Filed: Nov. 13, 1989.

Abstract—A mode coupler is disclosed which utilizes a circularly symmetric perturbation in an electromagnetic waveguide. Due to the circular symmetry of the perturbation, exact cross-sectional alignment of the perturbations is not needed when several of the devices are cascaded. Further, the mode coupling response is wavelength dependent, and therefore, may be employed in electromagnetic filtering applications.

8 Claims, 4 Drawing Sheets



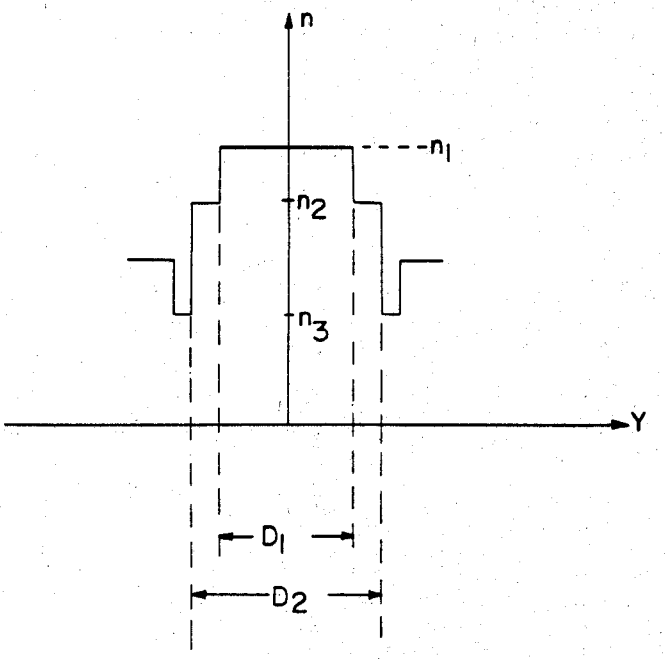
4,974,932 Dec. 4, 1990

Stepped-Index Optical Fiber for Transmission of High-Power Laser Radiation

Inventors: Kurt Nattermann and Hubert Bader.
Assignee: Schott Glaswerke.
Filed: Apr. 13, 1990.

Abstract—A stepped-index optical fiber is disclosed for transmission of high-power radiation, especially laser, radiation, which fiber is capable of transmitting radiation without substantially impairment of the beam quality (of the beam product), can be bent with a specific radius, and wherein the cross-sectional area of the beam on the input coupling surface of the fiber can be very large. Formulae are presented for calculating the dimensions of the fiber.

21 Claims, 1 Drawing Sheet



4,974,944 Dec. 4, 1990

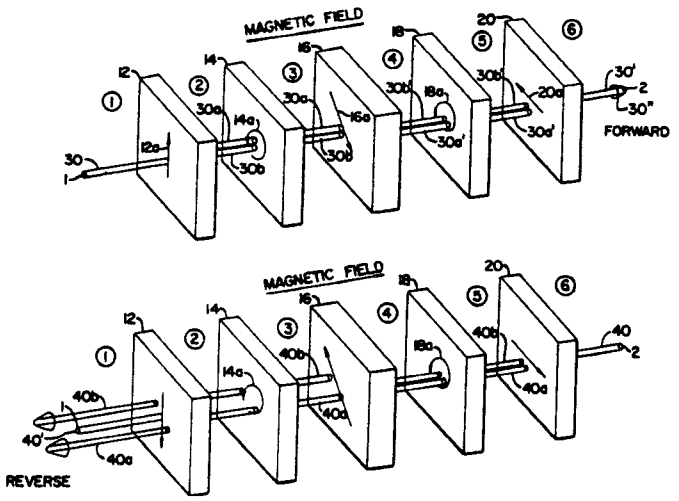
Optical Nonreciprocal Device

Inventor: Kok W. Chang.
Assignee: Hewlett-Packard Company.
Filed: July 21, 1988.

Abstract—An optical non-reciprocal device is disclosed for passing light in the forward direction and for reducing light passing in the reverse direction. Three anisotropic crystal members are arranged in a linear array. Each member has a walk off direction for separating light into ordinary and extraordinary rays. At least one nonreversible rotation element is interposed between every two adjacent anisotropic crystal members. Rotations of the elements and the orientations and thicknesses of the anisotropic crystal members are such that light in the forward direction is separated into

ordinary and extraordinary rays which substantially do not superpose each other upon emerging from the device so that light passing in the reverse direction is reduced in a manner which is substantially insensitive to temperature and wavelengths of the light passing in either direction.

17 Claims, 10 Drawing Sheets



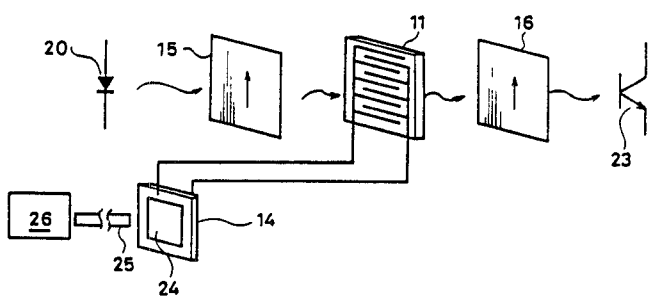
4,974,945 Dec. 4, 1990

Optical Modulator

Inventor: Akira Kumada.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Oct. 6, 1988.

Abstract—In an optical modulator, an electrooptic crystal is used. A pyroelectric body is connected to the electro-optic crystal through electrical interconnections. A polarizer and an analyzer are respectively arranged in spaced relation to an input side and an output side of the electro-optic crystal. The pyroelectric body receives heat generated by any of light, laser light, an electric resistor or heat generated from absorption of an electromagnetic wave or a radioactive ray. When heat energy is applied to the pyroelectric body, charges are produced in the pyroelectric body, so that a voltage based on the charges is applied to the electrooptic crystal. In this way, a plane of polarization in the electrooptic crystal is rotated so that the amount of light passing through the analyzer is varied in accordance with an applied heat energy.

6 Claims, 2 Drawing Sheets



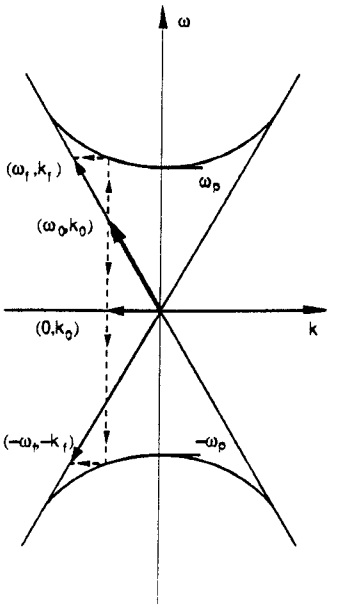
4,975,655 Dec. 4, 1990

Method and Apparatus for Upshifting Light Frequency by Rapid Plasma Creation

Inventors: John M. Dawson, Scott C. Wilks, Warren B. Mori, Chandrasekhar J. Joshi, and Andrew M. Sessler.
Assignee: Regents of the University of California.
Filed: June 14, 1989.

Abstract—Photons of an electromagnetic source wave are frequency-upshifted as a plasma is rapidly created around the path of this propagating source wave. The final frequency can be controlled by adjusting the gas density. A controlled time-varying frequency (chirped) pulse can be produced by using a controlled spatially varying gas density. The plasma must be created in a time which is short compared to the transit time of the light through the plasmas region. For very fast creation over one to at most a few light periods of an overdense plasma, static magnetic fields with short wavelengths are created.

15 Claims, 2 Drawing Sheets



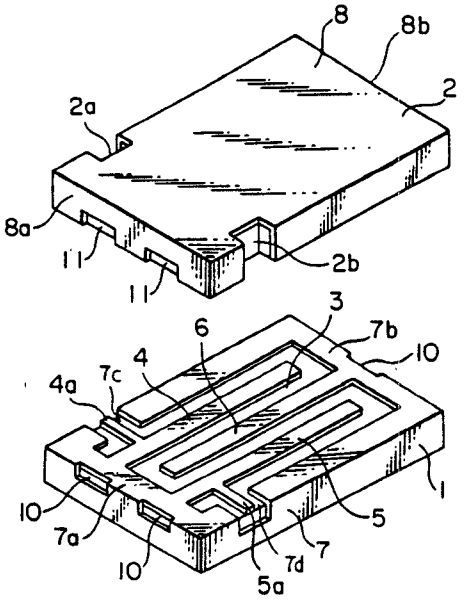
4,975,664 Dec. 4, 1990

Filter Device

Inventors: Kenji Ito and Hiroyuki Shimizu.
Assignee: NGK Spark Plug Co., Ltd.
Filed: Mar. 27, 1989.

Abstract—A filter device of a three-conductor structure type having a stripline pattern resonator consisting of a plurality of juxtaposed resonator conductors between two dielectric substrates which are stacked to each other, each of said dielectric substrates being provided with an outer conductor layer that surrounds the outer surface and side portion thereof and is connected to one ends of the juxtaposed resonator conductors, and openings for adjusting the frequency of response of the filter, each frequency adjusting opening being provided on the lateral portions of the outer conductor layers corresponding to said one end of the each resonator conductor. A conductor strip for increasing the frequency of response of the filter can be removably applied to each frequency adjusting opening.

7 Claims, 3 Drawing Sheets



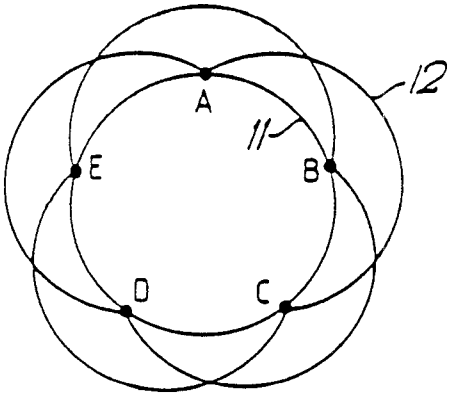
4,976,505 Dec. 11, 1990

Optical Switch Using Directionally Flexible Optical Fibers

Inventors: Stephen A. Cassidy and Peter Yennadhiou.
Assignee: British Telecommunications Public Limited Company.
Filed: Mar. 31, 1988.

Abstract—An optical switch that selectively transmits or does not transmit light from an input optical fiber (10) to an output optical waveguide (11, 12) has one of the input (10) and output (11, 12) optical waveguides an optical fiber that is flexible and mounted to be capable of movement towards and away from the other, and an electrode (14) arranged to subject the one optical waveguide to an electrostatic field. In use, application of an electrical potential to the electrode (14) causes the one optical waveguide to move in a direction to enable or prevent optical coupling between the waveguides and hence operation of the switch. The optical fiber is a *D*-fiber so that it is more flexible in that direction is providing the fiber with a degree of self-alignement. It is preferred that the one optical waveguide is entirely electrically nonconducting and that the optical switch includes more than one electrode (14) to provide a nonuniform electrostatic field. In this case the one optical waveguide is caused to move towards the region of highest electrostatic field density and so move towards or away from the other waveguide to enable or prevent optical coupling between them.

16 Claims, 1 Drawing Sheet



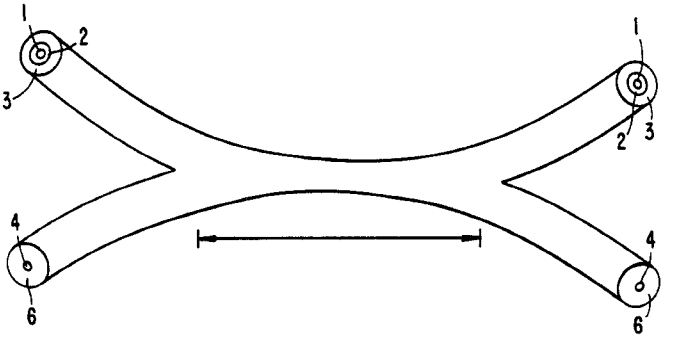
4,976,512 Dec. 11, 1990

Narrowband Fiberoptic Spectral Filter Formed From Fibers Having a Refractive Index with a *W* Profile and a Step Profile

Inventor: Ahmad Safaai-Jazi.
Filed: Apr. 5, 1989.

Abstract—A narrowband optical fiber spectral filter comprises a fiber optic coupler formed from a *W* fiber and step index fiber. The *W* index fiber comprises a core having a high index of refraction. The core is surrounded by an inner cladding that has a very low index of refraction. An outer cladding surrounds the inner cladding and has an index of refraction that is greater than that of the inner cladding but less than that the core. The core of the step index fiber is surrounded by an outer cladding that preferably has the same index of refraction as the outer cladding of the first fiber. The two fibers are fused together to form a fiberoptic coupler that has an interaction region of predetermined length. The resulting fiberoptic coupler has different transmission characteristics for the two component fibers at which light can transfer between the fibers. The dispersion characteristics are the same for only a very narrow range of wavelengths. The resulting spectral filter thus has a narrower bandwidth than obtained by modifying other parameters of a fiberoptic spectral filter.

7 Claims, 2 Drawing Sheets



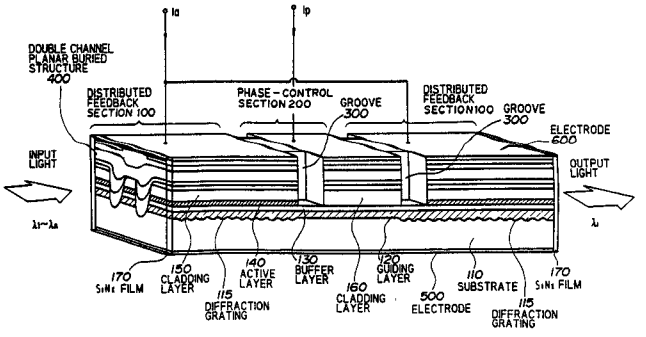
4,976,513 Dec. 11, 1990

Tunable Wavelength Filter

Inventor: Takahiro Numai.
Assignee: NEC Corporation.
Filed: Nov. 14, 1988.

Abstract—A tunable wavelength filter comprises a plurality of distributed feedback sections and a phase-control section provided between the distributed feedback sections. The bandgap energy of the phase-control section is greater than that of the distributed feedback sections. In the tunable wavelength filter, electric current injected into the phase-control section is controlled to vary the optical length, so that light having a predetermined wavelength is transmitted through the tunable wavelength filter.

3 Claims, 2 Drawing Sheets



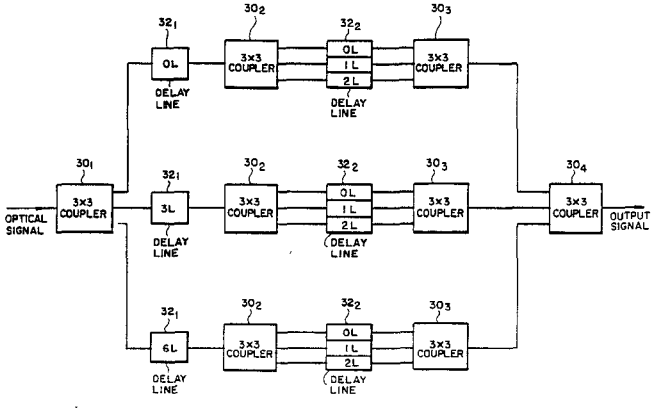
4,976,518 Dec. 11, 1990

Fiber-Optic Transversal Filter/Variable Delay Line

Inventor: William K. Burns.
Assignee: The United States of America as represented by the Secretary of the Navy.
Filed: Sept. 13, 1989.

Abstract—An optical transversal filter comprises a plurality of optically power splitting devices, e.g., 3 × 3 single mode optical couplers, interspersed with fiber optical delay segments. In a n-column system the number of optical couplers in each column is given by the progression, 1, 3, $9 \cdots 3^{(n-1)}$ and only two different lengths of the fiberoptic delay segments are required. Fiberoptic delay segments of the appropriate delays are connected to the three outputs of each of the composite such that the fiber optic delay segments connected to the last column provide 3^n taps. The outputs can be combined in a single fiber and multiple inputs can be used. Variable weight output taps are provided by connecting each output to an optical intensity modulator or switch.

14 Claims, 5 Drawing Sheets



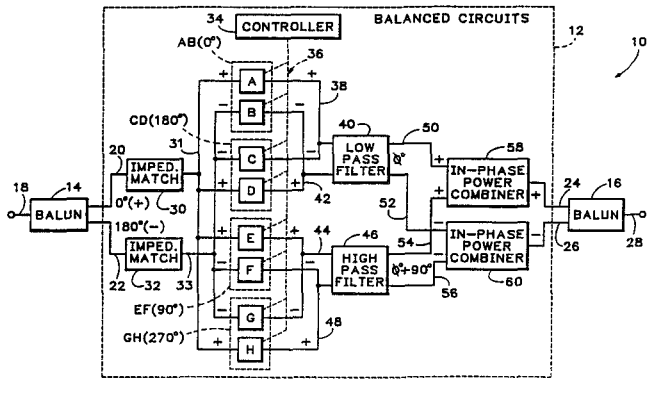
4,977,382 Dec. 11, 1990

Vector Modulator Phase Shifter

Inventors: Allen F. Podell, Scott W. Mitchell, Sanjay B. Moghe, and Fazal Ali.
Assignee: Pacific Monolithics.
Filed: Aug. 23, 1988.

Abstract—A monolithic microwave integrated circuit (MMIC) phase shifter is implemented in push-pull configuration with the quadrant selection and vector modulation functions combined. These functions are provided by four sets of adjustable gate-width dual-gate FET's and a pair of lumped element filter networks with a relative differential phase shift of 90°.

24 Claims, 4 Drawing Sheets



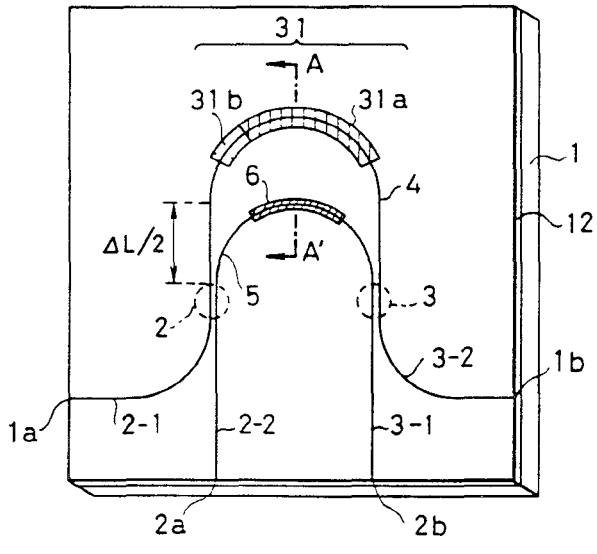
4,978,188 Dec. 18, 1990

Integrated Optical Device and Method for Manufacturing Thereof

Inventors: Masao Kawachi, Norio Takato, Kaname Jinguji, Akio Sugita, and Shin Sumida.
Assignee: Nippon Telegraph and Telephone Corporation.
Filed: Oct. 13, 1989.

Abstract—An integrated optical device includes a substrate; a single-mode optical waveguide having a cladding layer disposed on the substrate and a core portion embedded in the cladding layer for transmitting light therethrough; and a stress applying film disposed on a desired portion of the cladding layer for adjusting stressinduced birefringence of the single-mode optical waveguide by irreversibly changing the stress exerted on the core portion by a trimming technique. The integrated optical device can be manufactured by the steps of forming a cladding layer on a substrate; forming a single-mode optical waveguide having a core portion embedded in the cladding layer for transmitting light therethrough; and forming, on the cladding layer, a stress applying film for exerting a stress on the singlemode optical waveguide to irreversibly change the stress by trimming the film. The device exhibits a precisely adjusted birefringence and a desired polarization dependence or independence, and is effective for constructing an integrated optical device for optical communication, for optical sensing or for optical signal processing, in which the polarization characteristics play an important role.

19 Claims, 16 Drawing Sheets



4,978,189 Dec. 18, 1990

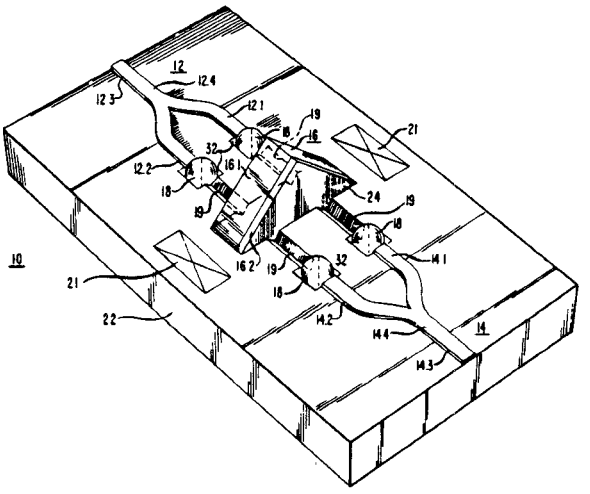
Hybrid Optical Isolator, Circulator or Switch, and Systems Utilizing Same

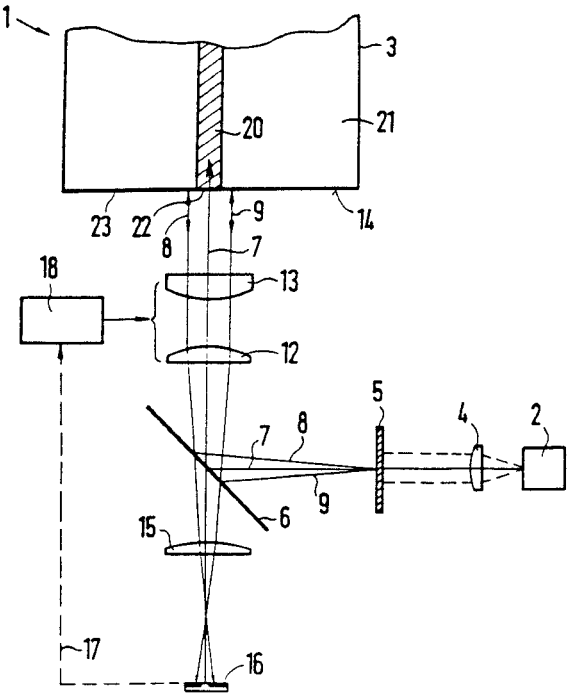
Inventors: Greg E. Blonder, Charles H. Henry, Rudolf F. Kazarinov, and Raymond Wolfe.
Assignee: AT&T Bell Laboratories.
Filed: Nov. 14, 1989.

Abstract—An optical circulator/isolator is implemented in a semiconductor package formed by a semiconductor substrate, which supports integral thin film waveguide polarization splitters and combiners, and a semiconductor lid, which supports four spherical lenses and a polarization rotator. The latter is a composite of at least two adjacent slabs of optically active material, one slab serving as a nonreciprocal 45° rotator (e.g., a Faraday

rotator) and the other as a reciprocal 45° rotator (e.g., halfwave device). The lenses, serving both as beam expanders/condensers and as collimators, are positioned between the waveguide ends and major surfaces of the composite slab. When used with means for reversing the direction of the magnetic field in the nonreciprocal rotator, the device functions also as a switch. Also described are system architectures made possible by these devices; e.g., a single-fiber LAN having a ring architecture for non-interfering counter flow of information and a single fiber, bidirectional FTTH system for handling CATV and POTS.

17 Claims, 9 Drawing Sheets





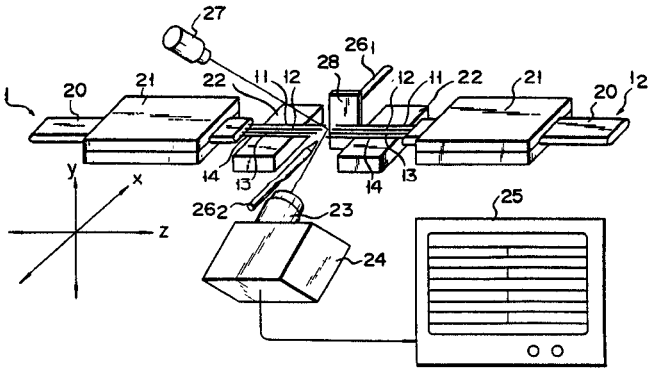
4,978,201 Dec. 18, 1990

Method for Measuring Splice Loss of an Optical Fiber

Inventors: Takeshi Yamada, Tsutomu Onodera, and Hiroyuki Taya.
Assignee: Fujikura Ltd.
Filed: Jan. 26, 1989.

Abstract—In a method for estimating a splice loss of a spliced portion of a fusion-spliced optical fiber, an amount of axial deviation attained prior to or immediately after heating a pair of optical fibers and an amount of axial deviation attained upon completion of heat treatment on the optical fibers are first detected to provide a difference between the axial deviations, and a splice loss originated from an opposite-phase core distortion is estimated based on the difference between the axial distortions.

7 Claims, 12 Drawing Sheets



4,978,190 Dec. 18, 1990

Servo-Controlled Light Coupling Between a Light-Emitting Component and an Optical Fiber

Inventor: Gustav Veith.
Assignee: Alcatel N.V.
Filed: Sept. 8, 1989.

Abstract—An optical module is used for communication over optical waveguides. To couples laser light to or from the optical waveguide (3) with as little loss as possible, the laser diode (2) must be precisely aligned with respect to the core region (22) of the end face (14) of the optical waveguide. In conventional modules, this requires costly and complicated mechanical couplers, which nevertheless do not have the necessary long-term stability. To solve the problem of how to provide a low-cost laser-to-fiber coupling which exhibits longterm stability, the optical module (1) is provided with a control facility (16, 17, 18) that controls the coupling of light on the basis of measurements of the differences in reflection factor between the core region (22) and the cladding region (23) of the end face of the optical waveguide (3). For this measurement and control, use can be made of low-priced components employed in CD players.

9 Claims, 3 Drawing Sheets

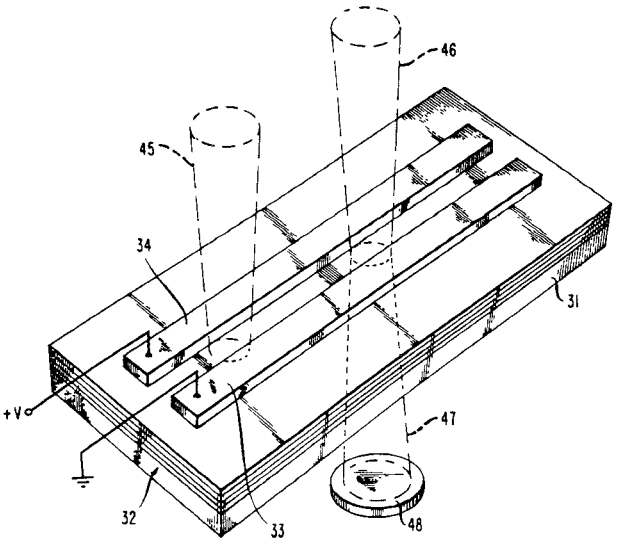
4,978,853 Dec. 18, 1990

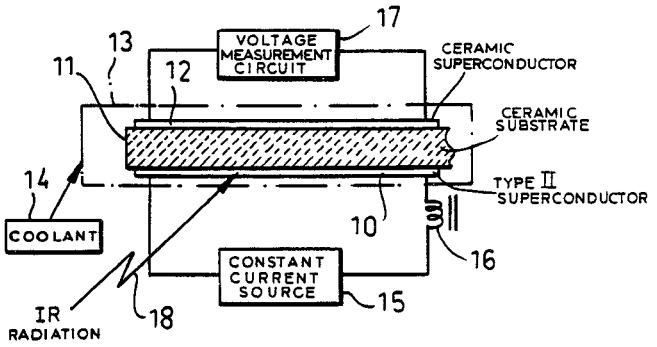
Flux-Motion Induced Bolometer Based on Ceramic Superconductive Elements

Inventor: Mohamed A. Hilal.
Assignee: International Superconductor Corp.
Filed: Mar. 17, 1989.

Abstract—A novel high sensitivity superconductive bolometer is presented in which the detector is kept in its superconducting state during the functional phase. Operation is based on detecting an induced fluxoid motion following a temperature rise caused by impinging infrared radiation. The superconductive-flux-motion-induced bolometer consists of a superconductive film and a pick-up film which are electrically insulated from each other. As the temperature of the current carrying film rises, fluxoid motion is triggered, sweeping through both films so that a voltage is detected in the pick-up film. The superconductive-flux-motion-induced bolometer has higher sensitivity for detection of infra-red radiation than any bolometer known heretofore.

9 Claims, 4 Drawing Sheets





4,978,910 Dec. 18, 1990

Electrooptic Apparatus for the Measurement of Ultrashort Electrical Signals

Inventors: Wayne H. Knox and David A. B. Miller.
Assignee: AT&T Bell Laboratories.
Filed: June 26, 1989.

Abstract—An electrooptic measuring apparatus having both high voltage sensitivity and femtosecond time resolution includes coplanar transmission lines fabricated on a semi-insulating multiple quantum well structure. An electrical signal, such as from a high speed electronic device, injected onto the transmission lines creates an electrical field parallel to the layer planes of the multiple quantum well structure. Excitonic electroabsorption by the multiple quantum well structure, in response to the parallel field, changes the transmissivity of the multiple quantum well structure. An external light beam directed through the multiple quantum well structure is modulated by the changes in transmissivity. By detecting this modulation, a sampling of the electrical signal is achieved.

10 Claims, 4 Drawing Sheets

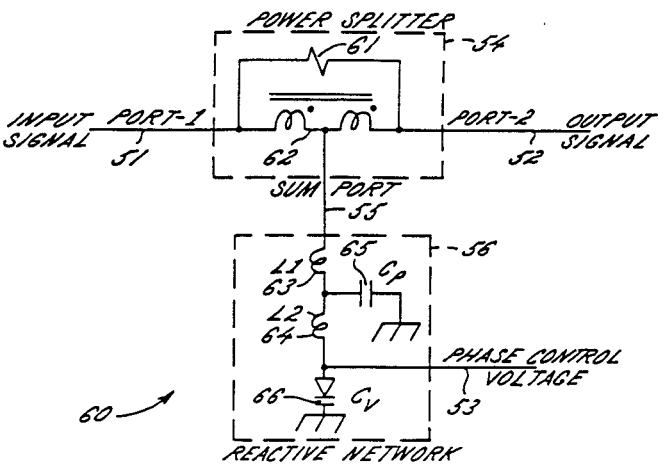
4,978,931 Dec. 18, 1990

Tunable Phase Shifter Having Wide Instantaneous Bandwidth

Inventors: Stuart L. Carp and Allen P. Edwards.
Assignee: Hewlett-Packard Company.
Filed: June 8, 1989.

Abstract—A phase shifter providing constant group delay and a wide instantaneous bandwidth is taught. In one embodiment, an input port is connected to an output port with a power splitter formed of a transformer connected between the input port and the output port, and having a center tap serving as a sum port. An impedance, such as a resistor, is connected in parallel with the transformer between the input port and the output port. A reactive network is connected between the sum port and ground, including one or more variable reactance device, such as a varactor, which alter the reactance of the reactive network in response to a control signal. Additional reactive elements are included in the reactive network to provide additional poles and zeros which change frequency in response to the variable reactance elements, in order to provide a group delay which is constant for various reactance values provided by the reactive network between the lowest frequency of interest and a higher frequency of interest.

17 Claims, 5 Drawing Sheets



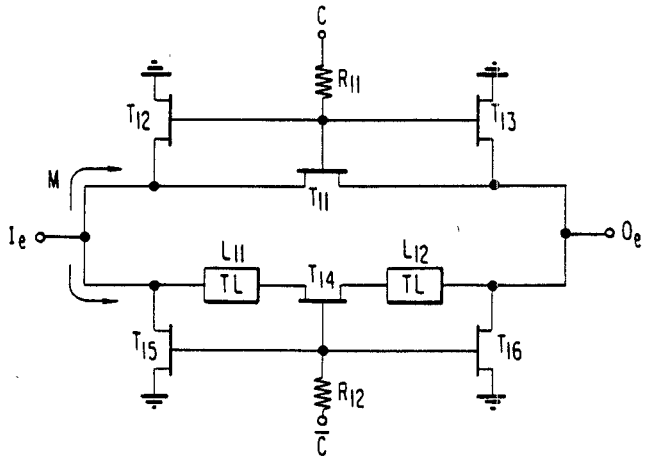
4,978,932 Dec. 18, 1990

Microwave Digitally Controlled Solid-State Attenuator Having Parallel Switched Paths

Inventors: Ramesh K. Gupta and Bernard D. Geller.
Assignee: Communications Satellite Corporation.
Filed: July 7, 1988.

Abstract—An attenuator element has a reference path and a relative attenuation path. The reference path is formed by a *T*-network of two FET's operated in the passive mode and a shunt path and the attenuation path is formed with a similar structure, with the FET's in the shunt path having a different channel width. Instead of a *T*-network, a Pi-network of transistors can be used. The respective gates of the FET's along the reference path are connected to a first control input corresponding to either zero volts or the pinch-off voltage and the respective gates of the transistors on the attenuation path are connected to a complementary control input having a voltage corresponding to the other of zero volts and the pinch-off voltage. Another type of attenuator element is formed with a reference path having a transmission line and an attenuation path formed by a resistive *T*-network, with the attenuation and reference paths being alternately selectable by two single pole, double throw switches. The switches can also be formed by FET's operated in the passive mode, and be controlled by a control signals corresponding to either zero volts or the pinch-off voltage. Using one type or mixing both types of attenuator elements, an attenuator device is formed. The attenuator may be used in any attenuator application, and is especially applicable to on-board transponder applications in a communications satellite, and phased array antenna and radar applications.

29 Claims, 4 Drawing Sheets



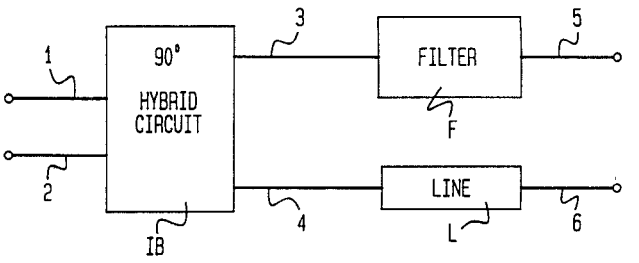
4,978,933 Dec. 18, 1990

Wideband Microwave Hybrid Circuit with In-Phase or Phase-Inverted Output Signals

Inventor: Franco Marconi.
Assignee: Siemens Telecommunicazioni S.p.A.
Filed: Sept. 29, 1988.

Abstract—To an output terminal of a hybrid circuit with output signals mutually phase shifted 90 degrees is connected a half-wave line section while to the second output terminal is connected a low attenuation filtering network having a phase characteristic which is −90 degrees at the center frequency and varies with the frequency like a half-wave line section.

9 Claims, 2 Drawing Sheets



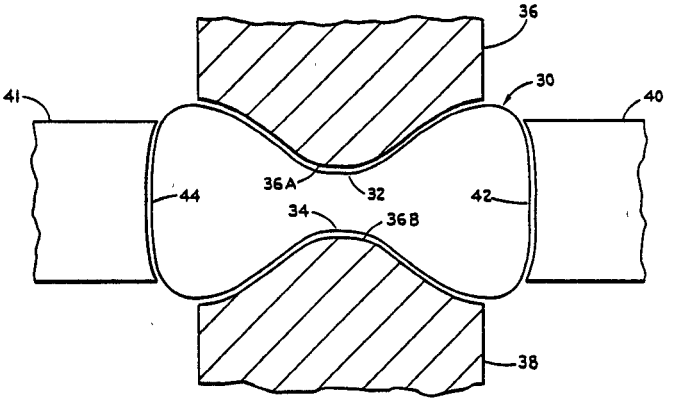
4,978,934 Dec. 18, 1990

Semiflexible Double-Ridge Waveguide

Inventor: Saad M. Saad.
Assignee: Andrew Corporation.
Filed: June 12, 1989.

Abstract—A semi-flexible double-ridge waveguide comprises a corrugated tube formed into a special dumbbell-shaped cross-section defined by parameters which are conveniently optimized to realize improved power-handling capability as well as improved attenuation and VSWR factors across extended dominant-mode operational bandwidths. The dumbbell-shaped cross-section efficiently removes the problems typically associated with the use of conventional rigid waveguide, including difficulty of installation as well as the need for precise alignment of components, by combining flexibility and ease of manufacture, even for long lengths of waveguide, through use of a continuous, uncomplicated and relatively inexpensive process. The dumbbell-shaped cross-section is totally devoid of corners and other abrupt protrusions and is defined by a geometric equation in which specific parameters can be correlatively optimized to improve desired electrical properties of the waveguide. The waveguide is rendered "semi-flexible" by the provision of helical corrugations having a staggered disposition of opposing corrugation crests and troughs, whereby the breakdown air gap and, consequently, the maximum power rating is increased.

11 Claims, 10 Drawing Sheets



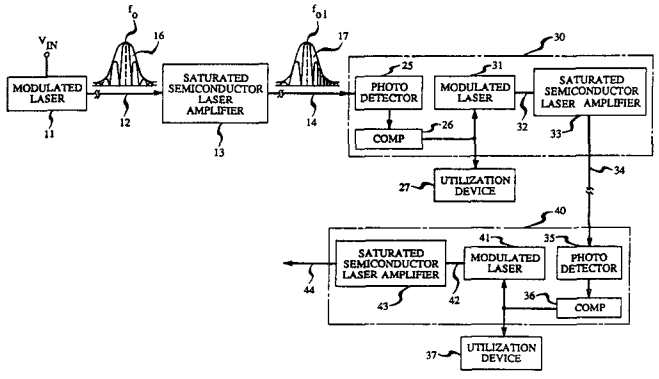
4,979,234 Dec. 18, 1990

Saturated Semiconductor Laser Amplifier for Compensation of Optical Fibre Dispersion

Inventors: Govind P. Agrawal and Nils A. Olsson.
Assignee: AT&T Bell Laboratories.
Filed: Dec. 20, 1988.

Abstract—The span of an optical dispersion-limited fiber for propagating optical pulses is improved by simultaneously chirping and amplifying the stream by means of a saturated semiconductor laser amplifier. The chirp causes a compression of the pulses as they propagate through an initial portion of the fiber, whereby the span of the fiber is increased.

12 Claims, 1 Drawing Sheet



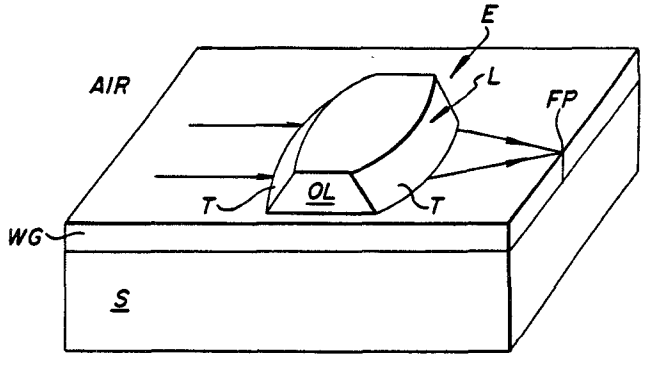
4,979,788 Dec. 25, 1990

Achromatic Mode-Index Elements for Integrated Optical Systems

Inventor: John C. Brazas, Jr.
Assignee: Eastman Kodak Company.
Filed: Mar. 5, 1990.

Abstract—Mode-index optical elements comprise an optical waveguide having a optical overlay of substantially uniform thickness. The contour of the overlay in the plane of the overlay controls the direction of propagation of radiation within the waveguide. According to the invention, mode-index optical elements are optimally achromatized (i.e., rendered as insensitive as possible to radiation wavelength changes) over a desired wavelength range by properly selecting the respective thicknesses and bulk refractive indices of the overlay and waveguide components. Specifically, such parameters are chosen so that, for a given waveguide substrate (e.g., quartz) and superstrate (e.g., air), the deviation of the ratio of the respective effective refractive indices of the waveguide element (N_E) and waveguide material (N_{WG}) from a mean or nominal value is minimized over the desired wavelength range of achromatization.

7 Claims, 12 Drawing Sheets



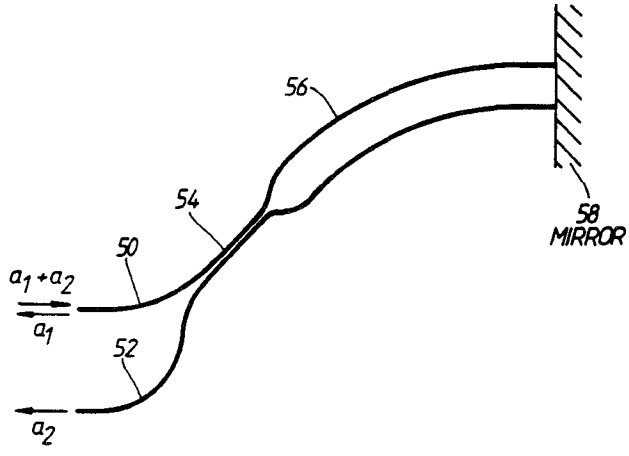
4,979,790 Dec. 25, 1990

Guided-Wave Optical Wavelength Duplexer

Inventor: Robert G. Walker.
Assignee: Plessey Overseas Limited.
Filed: Oct. 26, 1989.

Abstract—A guided-wave optical wavelength duplexer fabricated as an integrated optical device, comprising input ports (2, 4) for light at different wavelengths (a_1, a_2) coupled to first and second waveguides (6, 8) formed on a substrate surface, the first and second waveguides having first and second coupler regions (10, 12) to enable light to be transferred from one waveguide to the other, the first and second waveguides as at (26) between the first and second coupler regions being formed as circular arcs having the same center to provide an accurately defined optical path length difference, so that light at a first wavelength (a_1) is output through one output port (14) and the second component (a_2) is output through another output port (16).

10 Claims, 3 Drawing Sheets



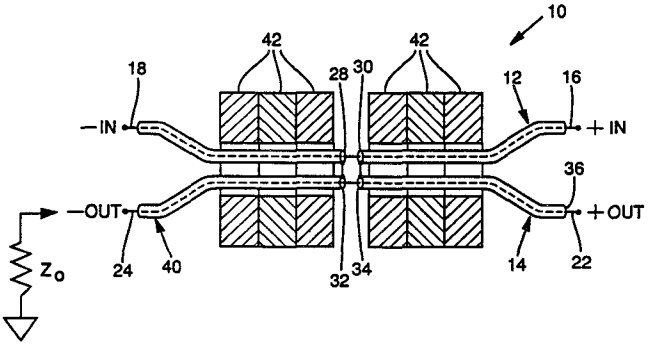
4,980,654 Dec. 25, 1990

Transmission Line Transformer

Inventor: Clifford H. Moulton.
Assignee: Tektronix, Inc.
Filed: Apr. 6, 1990.

Abstract—A transmission line transformer that can balance imperfectly balanced signals, and can convert a balanced input to an unbalanced output. The transformer includes two unbalanced transmission lines each having a characteristic impedance Z_o. The outer conductor of each is interrupted at its midpoint and is connected to the corresponding interrupted outer conductor of the other. An input signal applied across the ends of the first line's center conductor yields a balanced outer signal across the ends of the second line's center conductor. An unbalanced output can be obtained by terminating one end of the second line with an impedance Z_o.

5 Claims, 1 Drawing Sheet



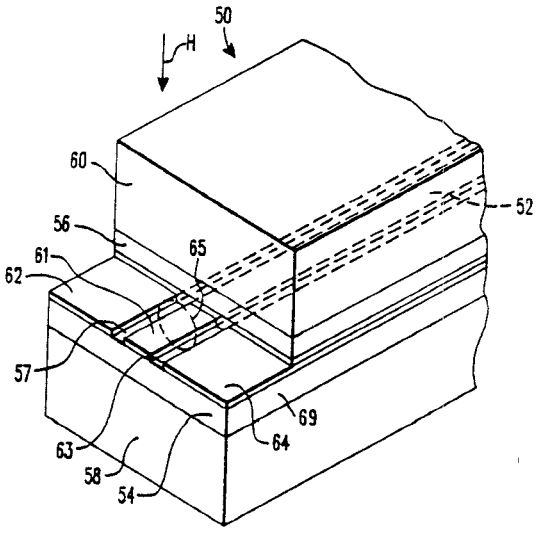
4,980,657 Dec. 25, 1990

Coplanar Waveguide Frequency Selective Limiter

Inventors: Steven N. Stitzer and John D. Adam.
Assignee: Westinghouse Electric Corp.
Filed: Sept. 29, 1989.

Abstract—A frequency selective limiting device is described incorporating a planar ferrite member and at least one signal-carrying conductor positioned thereon. A conductor is located on the ferrite member to confine a portion of an RF magnetic field produced by the microwave signals within the ferrite member. In one embodiment of the invention, the conductor comprises coplanar ground planes positioned adjacent to the signal-carrying conductor, thereby forming a coplanar waveguide. Alternatively a pair of coplanar conductors may form a slot line. In another embodiment a second ferrite member is positioned in confronting relationship with the first ferrite member carrying the conductors.

15 Claims, 4 Drawing Sheets



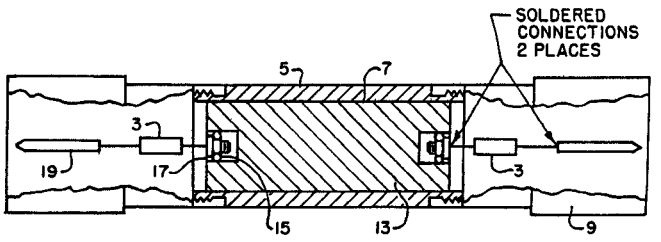
4,980,658 Dec. 25, 1990

Gigahertz Bandpass Passive Integrator

Inventors: Lynn M. Miner and Donald E. Voss.
Assignee: The United States of America as represented by the Secretary of the Air Force.
Filed: Sept. 1, 1989.

Abstract—A passive cylindrical integrator assembly is disclosed which provides an output voltage into 50 ohm load that is proportional to the time integral of the input voltage. The device has a bandpass of greater than 1000 MHz plus and a risetime which is less than 350 picoseconds. The device produces negligible overshoot for very fast rising and falling signals. The construction of the device uses low cost materials and is configured into a cylindrical shape. The cylindrical housing concentrically supports front and rear connectors or center pins. Each center pin is connected to a 470 ohm $\frac{1}{4}$ watt resistor. The resistors are in turn held in place by a screw and nut in contact with the graphite material which fills the center of the cylinder. A dielectric film surrounds the graphite material insulating it from the outer housing wall.

3 Claims, 5 Drawing Sheets



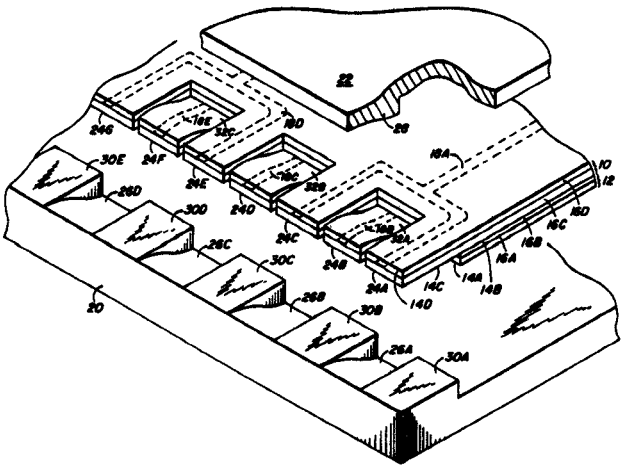
4,980,659 Dec. 25, 1990

Microwave Dual-Level Transition

Inventor: William A. Allard.
Assignee: Raytheon Company.
Filed: Aug. 24, 1989.

Abstract—A stripline transition between two layers of a multilayer microwave stripline assembly. Two stripline layers are sandwiched between metal plates. The metal plates have formed therein complementary curved transition regions and force a stripline to undergo a gradual transition from a first layer to a second layer of the assembly.

11 Claims, 3 Drawing Sheets



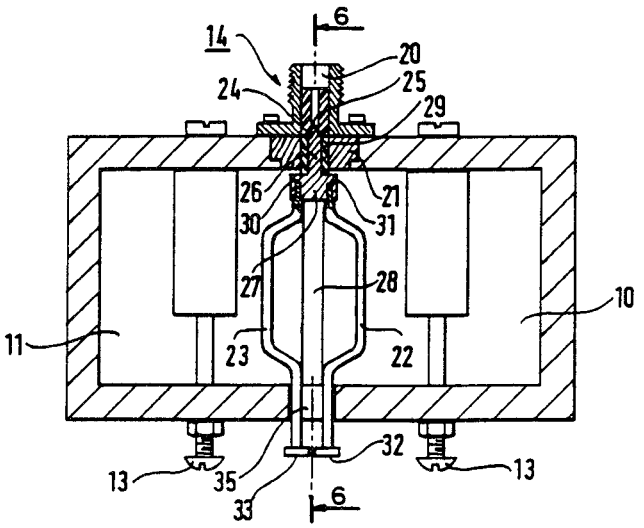
4,980,662 Dec. 25, 1990

Multiplexed Microwave Filter, and Method of Adjusting Such a Filter

Inventors: Catherine Simon, Robert Le Roux, and Marc Sauvage.
Assignee: Alcatel N.V.
Filed: May 26, 1989.

Abstract—A multiplexed microwave filter comprising at least two elementary filters (10, 11) provided with respective coupling antennas of crankshaft or any other shape, and including a common access (14), which access is provided with a crankshaft-shaped coupling antenna which is rotatable about its axis in order to adjust coupling between the antenna and the corresponding elementary filter, in which the common access is situated astride the various elementary filters and includes as many crankshaft-shaped antennas (22, 23) as there are elementary filters (10, 11).

3 Claims, 3 Drawing Sheets



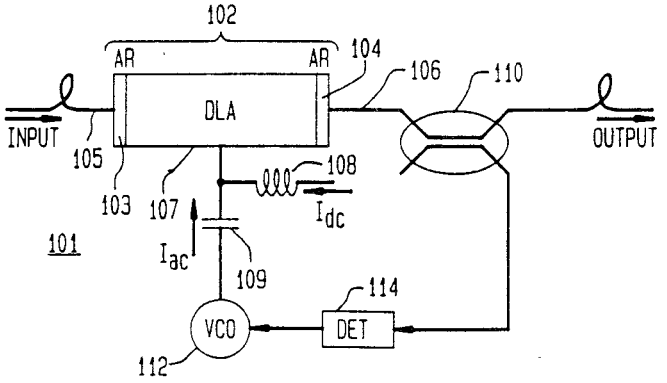
4,980,891 Dec. 25, 1990

Clocked Optical Regenerator and Other Optoelectronic Functional Circuits

Inventor: Hossein Izadpanah.
Assignee: Bell Communications Research, Inc.
Filed: Dec. 22, 1989.

Abstract—A diode laser amplifier used as a clocked optical regenerator and other diode laser amplifier optoelectronic functional circuits are disclosed. In the regenerator circuit (101), the input optical pulse data signal to be regenerated is inputed to a diode laser amplifier (102), the gain of which is modulated by a clock signal electronically recovered from and synchronized with the input data signal. By modulating the gain so that it is substantially attenuated during essentially half of each bit interval, and at a high gain level during the other half of the bit interval, each pulse in the input signal is both amplified and "cleaned up" produce an output pulse signal that is an amplified, reshaped and retimed version of the input optical signal. In other embodiments the modulated diode laser amplifier (102) is used as an electrooptic modulator by modulating the amplifier gain with an electrical information signal, the amplifier optic input being either a stream of unmodulated optical pulses or a CW dc light input. The modulated diode laser amplifier also functions as a channel selector in a time-division-multiplexed optical communications system in which the modulating electrical signal is used to gate to the amplifier output the input optical pulses associated only with a selected one of the multiplexed channels.

11 Claims, 3 Drawing Sheets



4,980,925 Dec. 25, 1990

Monopulse First Detector Array

Inventors: Martin R. Blustine, Eileen Conaty, Clifford A. Drubin, and Thomas L. Korzeniowski.
Assignee: Raytheon Company.
Filed: Jan. 3, 1989.

Abstract—In a millimeter wave monopulse first detector array for use in seeker applications in a guided missile employing quasi-optical, or Gaussian beam, signal transmission, a first detector is shown to include a patch antenna array, a mixer and a power divider in a monolithic implementation for extraction of the monopulse information in a radar receiver.

5 Claims, 1 Drawing Sheet