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.

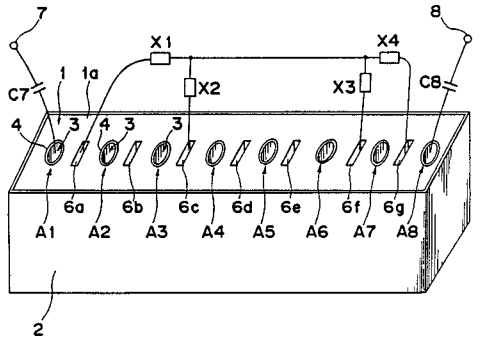
4,800,347 Jan. 24, 1989

Dielectric Filter

Inventors: Tadahiro Yorita and Motoharu Hiroshima.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Sept 3, 1987

Abstract—A dielectric filter includes a single block made of dielectric material having three or more through holes, in each of which an inner conductor is deposited, to define three or more dielectric resonators coupled in a cascade manner. Coupling holes are each formed between a pair of neighboring dielectric resonators. A bypass circuit, having a reactance component, is provided for connecting between two or more coupling holes; or for connecting the through hole of the dielectric resonator and a coupling hole; or for connecting the input terminal and one or more through holes of the dielectric resonators or the coupling holes. By selecting the holes to be interconnected and the value of the reactance of the bypass circuit, it is possible to provide a filter having a frequency characteristic in a desired format, including at least one pole at a selected point in an attenuation region thereof, without any increase in the number of dielectric resonator stages of the dielectric filter.

8 Claims, 14 Drawing Sheets



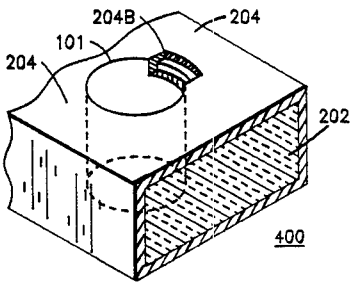
4,800,348 Jan. 24, 1989

Adjustable Electronic Filter and Method of Tuning Same

Inventors: George C. Rosar and David G. Clifford, Jr.
Assignee: Morotola, Inc.
Filed: Aug. 3, 1987.

Abstract—An adjustable electronic filter apparatus is disclosed comprising a dielectric block having one or more through-holes and having a conformal conductive coating substantially over all outside surfaces as well as each through-hole therein. Each through-hole so plated forms a resonator from a transmission line which includes an open portion, for providing capacitive reactance at a first end, and a short-circuited end as a base, for providing an associated distributed inductance at a second end thereof. A unique method of tuning the adjustable electronic filter, whether a single resonator, a plurality of resonators, or a plurality of intercoupled multi-resonator filters, is disclosed that permits bi-directional tuning for at least one resonator in each of the above exemplary embodiments. By selectively adjusting an inductive portion of the plating at the base of each resonator so tuned, a resonator is quickly and accurately adjusted to a desired frequency. The selective adjusting may be accomplished by subtractive processes, such as abrasion or laser trimming, or by an additive process, such as by adding conductive paint for partially filling in a removed or absent portion of the plating at the base of a resonator.

19 Claims, 3 Drawing Sheets



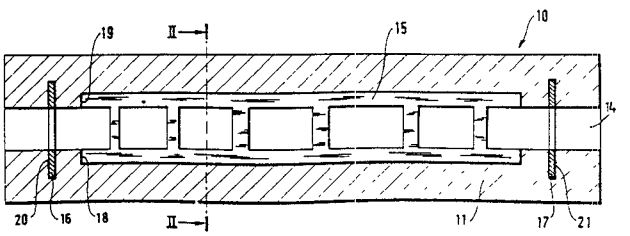
4,800,349 Jan. 24, 1989

E-Plane Type Wide-Band Composite Filter

Inventors: Mustafa Gurcan and Jean-Claude Cruchon.
Assignee: Alcatel Thomson Faisceaux.
Filed: Sept. 17, 1987.

Abstract—The present invention relates to an *E*-plane type wide-band composite filter comprising a conductive screening body (11, 12) having an elongate cavity (14) therein with a blade cut into a ladder shape disposed longitudinally therein. Said body comprises two portions held against each other on either side of a separation plane along which said ladder (15) is disposed, with two irises (16, 17) being disposed transversely at the inlet and at the outlet of said cavity (14), each closing off a portion thereof.

7 Claims, 2 Drawing Sheets



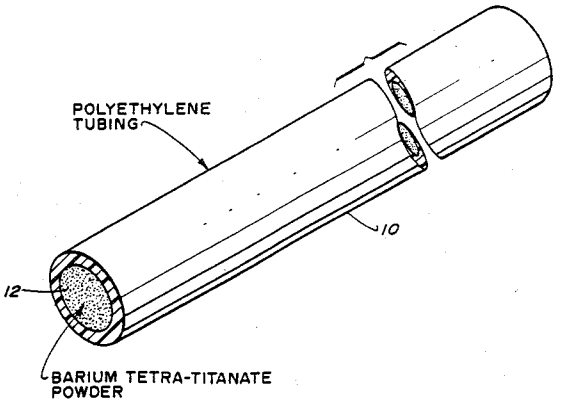
4,800,350 Jan. 24, 1989

Dielectric Waveguide Using Powdered Material

Inventors: William B. Bridges and William M. Bruno.
Assignee: The United States of America as represented by the Secretary of the Navy.
Filed: May 23, 1985.

Abstract—A flexible low-loss dielectric waveguide is made from a flexible low-dielectric constant hollow cylinder filled with high-dielectric constant powder. Alternatively, a rigid or semi-rigid waveguide comprises a groove formed in a low-dielectric constant substrate filled with high-dielectric-constant powder.

18 Claims, 2 Drawing Sheets



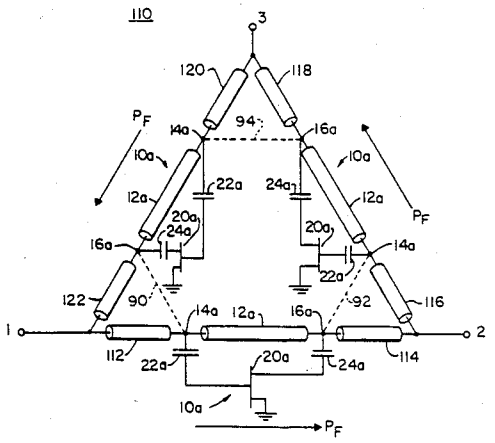
4,801,901 Jan. 31, 1989

Nonferrite Nonreciprocal Phase Shifter and Circulator

Inventor: Yalcin Ayasli.
Assignee: Hittite Microwave Corporation.
Filed: Mar. 13, 1987.

Abstract—A nonreciprocal phase shifter including a transmission medium connected between first and second terminals and having a predetermined phase shift which is the same in each direction and an amplifier circuit connected between the first and second terminals for introducing its inherent phase shift in one direction and a phase shift in excess of its inherent phase shift in the other direction for establishing a nonreciprocal phase shift; and a circulator made from such a phase shifter.

14 Claims, 4 Drawing Sheets



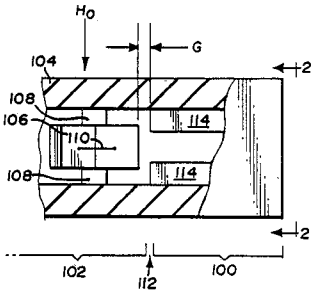
4,801,902 Jan. 31, 1989

Waveguide Circulator with I/O Port Impedance Matching Produced by Ferrite-Port Gap Dimensioning

Inventors: John C. Hoover and David E. Giese.
Assignee: Electromagnetic Sciences, Inc.
Filed: Sept. 28, 1987.

Abstract—Impedance matching between a waveguide circulator and its input/output ports is achieved by properly dimensioning a gap formed between a ferrite circulator element inside the waveguide circulator and at least a portion of the input/output port aperture itself. Typically, the I/O port aperture has at least a portion which is of lesser height dimension than the internal waveguide circulator cavity. Ridge waveguide or ridge-to-rectangular waveguide adaptor blocks, or the like, may emanate from such input/output circulator apertures.

14 Claims, 1 Drawing Sheet



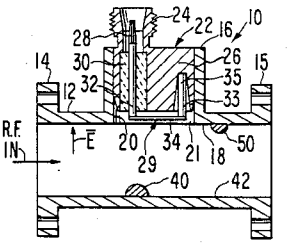
4,801,903 Jan. 31, 1989

Waveguide Loop Directional Coupler

Inventor: Hans J. Mohr.
Assignee: Varian Associates, Inc.
Filed: Sept. 8, 1986.

Abstract—A loop directional RF coupler between a waveguide and coaxial line maintains a high degree of directivity while providing substantially improved coupling values. A conductive loop assembly terminating the coaxial line is accepted into an aperture means defining an aperture in one wall of the waveguide section of the coupler. The aperture is greater in diameter than the largest transverse dimension of the loop, or of the loop assembly. A capacitive or inductive conductive obstacle is affixed to an interior wall of the waveguide section adjacent the aperture. A second conductive obstacle is positioned downstream of the first obstacle to compensate any mismatch.

27 Claims, 2 Drawing Sheets



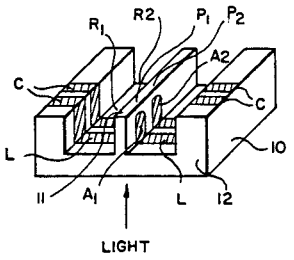
4,802,741 Feb. 7, 1989

In-Depth Electrode Light Valve Array Devices and Improved Fabrication Method Therefor

Inventor: Joseph Y. Kaukeinen.
Assignee: Eastman Kidak Company.
Filed: Oct. 9, 1987.

Abstract—A method of making a linear light valve array having a plurality of transversely driven, discretely addressable, electro-optic gates, includes the steps of (i) cutting parallel grooves of uniform depth to form a land region on a wafer of electro-optical material; (ii) holding a stencil having reference and address electrode patterns over the land region and groove portions of the wafer; and (iii) depositing conductive material through the stencil to form address and reference electrodes on opposing side walls of the land region. Linear and two-dimensional modulator devices made by such method are disclosed also.

10 Claims, 4 Drawing Sheets



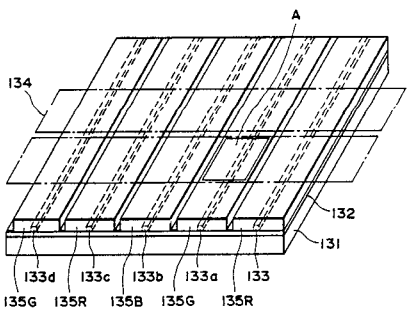
4,802,744 Feb. 7, 1989

Optical Modulation Apparatus

Inventors: Hitoshi Shindo, Masahiko Enari, and Mitsutoshi Kuno.
Assignee: Canon Kabushiki Kaisha.
Filed: Apr. 10, 1987.

Abstract—An optical modulation device includes: a first substrate having thereon a high-resistivity film having a sheet resistivity of 10^3 Ω/□ or above and a plurality of scanning electrode lines having a sheet resistivity of 10^2 Ω/□ or below and electrically connected to the high-resistivity film; a second substrate having thereon a plurality of data electrodes; and an optical modulation material disposed between the first and second substrates. At least one of the first and second substrates has thereon a pair of color filters of the same color disposed on both sides of at least one of the scanning electrode lines The difference in height between the high-resistivity film and the scanning electrode lines is less than 1000 Å.

38 Claims, 8 Drawing Sheets



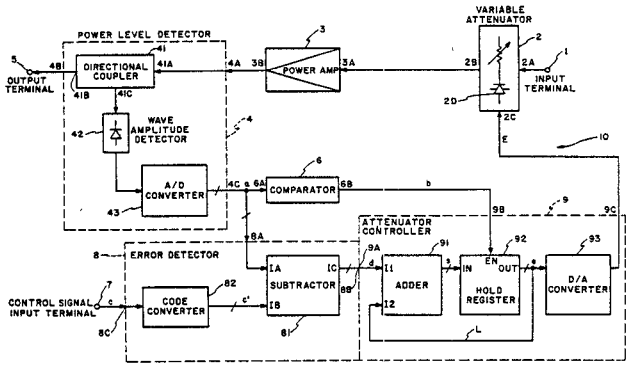
4,803,440 Feb. 7, 1989

Automatic Electrical Power Control Circuit

Inventors: Toshinori Hotta and Osamu Yamamoto.
Assignee: NEC Corporation.
Filed: Sept. 16, 1987.

Abstract—A power control circuit comprises a signal input, a controllable attenuator, an amplifier, an output, a power detector, a reference circuit, a comparator, an external control input, an error detector, and a controller. The comparator, error detector, and controller are digital circuits realized by a microprocessor. The attenuator is between the signal input and the input to the amplifier to regulate the amplifier's output. The power detector couples to the amplifier output to generate a measurement signal representing the power at the output. The reference circuit generates a reference signal representing a predetermined minimum output when the signal input is nonzero. The comparator compares the measurement and reference signals and generates a decision signal indicating if the signal input is nonzero. The external control input receives an external control signal. The error detector is coupled to the power detector and the external control input and computes the difference between the external control signal and the measurement signal. When the measurement signal is at or above the minimum power, the controller provides an integral of the computed difference to control the variable attenuator. When the measurement signal is below the minimum power, the controller keeps the attenuator at a prior constant value.

9 Claims, 4 Drawing Sheets



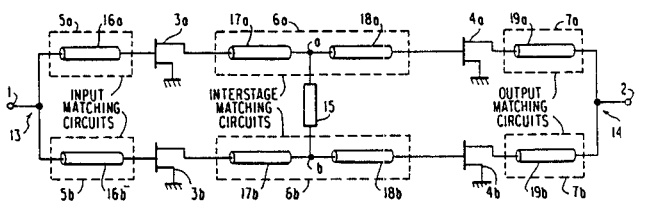
4,803,443 Feb. 7, 1989

Microwave Power Combining FET Amplifier

Inventors: Tadashi Takagi, Kiyoharu Seino, and Fumio Takeda.
Assignee: Mitsubishi Denki Kabushiki Kaisha.
Filed: Apr. 5, 1988.

Abstract—A microwave power combining FET amplifier includes T-type input and output branch circuits 13, 14 for power splitting and combining, and interstage matching circuits 6*a*, 6*b* laterally connected at their midpoints *a*, *b* by a resistance circuit 15 which absorbs odd propagation mode waves reflected back from the output combiner due to nonuniformities between the poststage FET's 4*a*, 4*b*

6 Claims, 2 Drawing Sheets



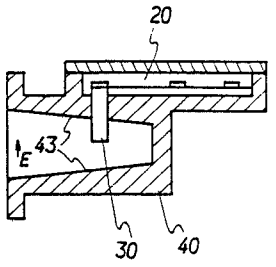
4,803,446 Feb. 7, 1989

Low-Noise Microwave Amplifier

Inventors: Hiroshi Watanabe and Massanobu Suzuki.
Assignee. New Japan Radio Co., Ltd
Filed: Aug. 7, 1987

Abstract—A low-noise microwave amplifier wherein a length of a pair of broad or wider walls inside the rectangular waveguide is shortened at least near a portion where a probe for introducing a microwave signal into the amplifying portion is provided A cutoff frequency of the waveguide near the portion where the probe is provided is raised and comes to 80 to 90 percent of the lower limit of the frequency of the desired amplification band of the amplifier An input microwave having a frequency component below the cutoff frequency is prevented from flowing into the amplifier, whereby the generation of oscillation is effectively prevented

3 Claims, 4 Drawing Sheets



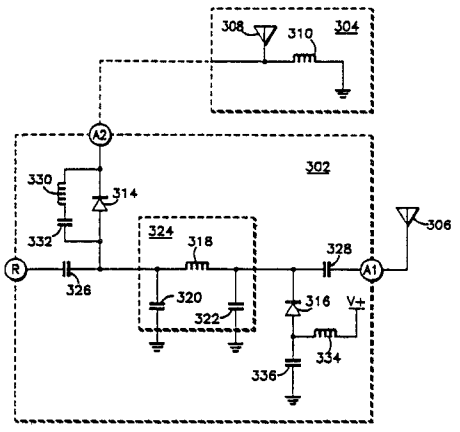
4,803,447 Feb. 7, 1989

Three-Terminal Remotely Controlled SPDT Antenna Switch

Inventors: Charles A. Schultz, Paul D. Marko, and Giovanni Jaramillo.
Assignee: Motorola, Inc.
Filed: Feb. 29, 1988.

Abstract—An antenna switch (302) includes a radio terminal (R) and first and second antenna terminals (A1 and A2) When the second antenna terminal (A2) is unterminated, the radio terminal (R) is coupled to the first antenna terminal (A1). When the second antenna terminal (A2) is connected to a remote antenna system (304), the switch automatically couples the radio terminal (R) to the second antenna terminal (A2). Thus, the switch does not require a separate control terminal (C) and control signal to switch between the first and second antenna terminals. Instead, the switch is controlled by the presence or absence of a dc current at the second antenna terminal (A2). The remote antenna system includes a remote antenna (308) and a low pass filter (310) coupled between the remote antenna and ground. An alternate embodiment is described which includes a dc amplifier (402)

6 Claims, 3 Drawing Sheets



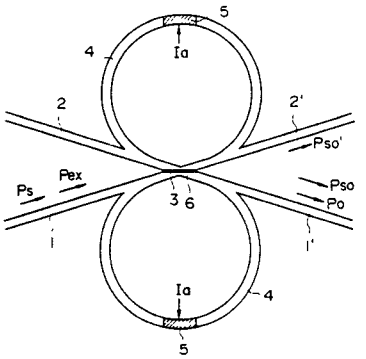
4,805,975 Feb. 21, 1989

Optical Waveguide Switch

Inventors: Katsuyuki Utaka, Kazuo Sakai, and Yuichi Matsushima.
Assignee Kokusai Denshin Denwa Kabushiki Kaisha.
Filed: Jan 13, 1988

Abstract—An optical waveguide switch is disclosed in which at least two optical waveguides intersect at a predetermined angle to each other to provide, on both sides of the intersection region, input side optical waveguide regions for receiving incident light and output side optical waveguide regions for outputting guided light, and in which the incident light is input into one of the input side optical waveguide regions and is output from a desired one of the output side optical waveguide regions. In accordance with the present invention, an optically nonlinear material whose refractive index undergoes a substantial variation, depending on the intensity of incident light, is disposed in the intersection region. A loop is provided in association with a corresponding one of the input side optical waveguide regions for essentially branching the guided light in the corresponding waveguide output side optical waveguide region for feedback to the corresponding input side optical waveguide region.

12 Claims, 5 Drawing Sheets



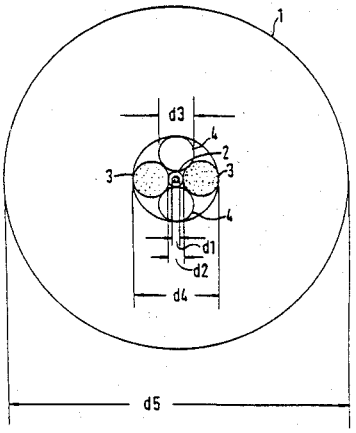
4,805,986 Feb. 21, 1989

Method of Producing Polarization-Maintaining Single-Mode Optical Waveguides and Preforms Used Therein

Inventor: Herbert Weissert.
Assignee: Standard Elektrik Lorenz AG.
Filed: July 21, 1987

Abstract—A method of producing polarization-maintaining single-mode optical waveguides is provided wherein the preform from which the optical waveguide is produced consists of a tube, a rod of core and cladding material centrally disposed in said tube, and two differently doped pairs of filler rods disposed about said rod, the two rods of each pair being disposed diametrically opposed to each other with respect to said rod. Maximum polarization maintenance of the optical waveguide being produced is achieved by choosing the diameter ratios so that each filler rod rests against the central rod, against the inside wall of the tube, and directly against the two filler rods of the respective other pair.

11 Claims, 1 Drawing Sheet



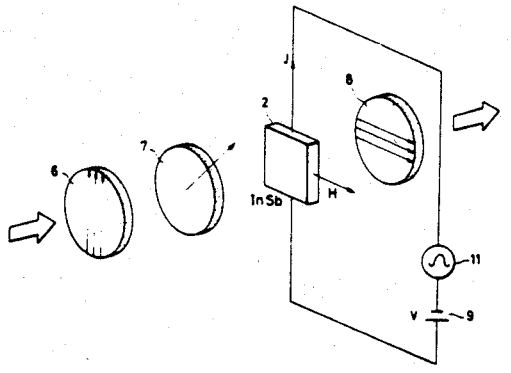
4,806,855 Feb. 21, 1989

Magnetic-Electro-Optic Effect Light Modulator

Inventor: Takeshi Morimoto.
Assignee: Sumitomo Electric Industries, Ltd.
Filed: Aug. 5, 1987.

Abstract—A magneto-electro-optic effect light modulator has a rectangular solid-like semiconductor element made of one member selected from the group of an n-type semiconductor, a p-type semiconductor and an intrinsic semiconductor. The semiconductor element has no pn-junction and has a band-gap corresponding to the energy of infrared light concerned. Also provided are a magnet for applying a magnetic field H to the semiconductor element and electrodes for passing an electric current through the semiconductor element access the magnetic field. A power source supplies an electric current passing through the semiconductor element in order to modulate the light incident upon the semiconductor element. An entrance polarizer disposed in front of the semiconductor element linearly polarizes the infrared-light transmitting therethrough. An exit polarizer disposed behind the semiconductor element linearly polarizes the infrared-light transmitting therethrough, the exist polarizer has a polarization plane different from the entrance polarizer. The light modulator utilizes the population inversion caused by a cooperation of current J and magnetic field H to modulate the light incident upon the semiconductor element.

6 Claims, 4 Drawing Sheets



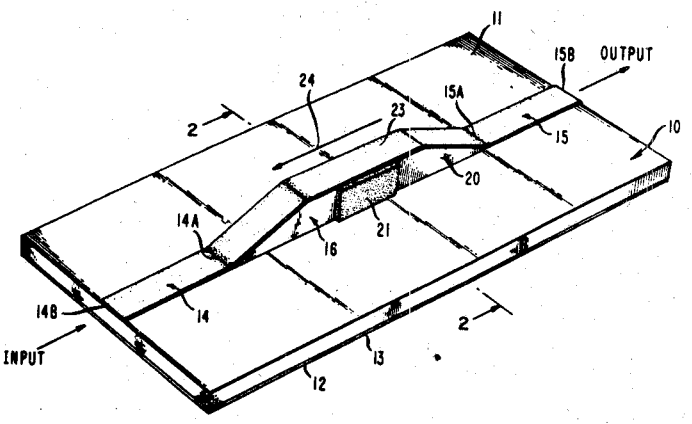
4,806,886 Feb. 21, 1989

Microstrip Resonance Isolator

Inventors: Richard A. Stern and Richard W. Babbitt.
Assignee: The United States of America as represented by the Secretary of the Army.
Filed: Mar. 1, 1988.

Abstract—A microstrip resonance isolator is provided comprising a dielectric waveguide element which is mounted on the top surface of a length of microstrip transmission line dielectric substrate having an electrically conductive ground plane on the bottom surface of the substrate. The waveguide element has a rectangular rod-shaped central section and two oppositely-inclined ramp-shaped sections at the ends of the central section. The dielectric constant of the waveguide element is substantially more than the dielectric constant of the microstrip transmission substrate. A microstrip conductor is provided on the top surface of the substrate from one end thereof to the other end thereof and passes over the top surface of the dielectric waveguide element. A thin, rectangular substrate of hexagonal, grain-oriented ferrite material is mounted on one side of the waveguide element between the ramp-shaped end sections. The ferrite substrate material is given a predetermined unidirectional magnetic orientation in a direction which is parallel to the plane of the side of the waveguide element on which the ferrite substrate is mounted and is substantially perpendicular to the plane of the microstrip dielectric substrate top surface, so that the ferrite substrate and the dielectric waveguide element cooperate to form a dielectric waveguide resonance isolator and the ends of the microstrip conductor act as the terminals of the microstrip isolator.

5 Claims, 1 Drawing Sheet



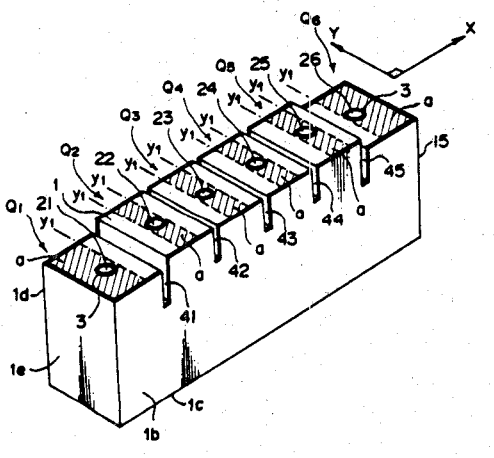
4,806,889 Feb. 21, 1989

Ceramic Filter

Inventors: Fumihito Nakano, Kiyoshi Hagawa, Kenji Endo, Kohei Wada, and Katsuya Jindou.
Assignee: TDK Corporation.
Filed: Apr. 28, 1988.

Abstract—A dielectric ceramic body for use in a band-pass filter. The ceramic body has a plurality of through holes formed to extend transversely from one side surface to another side surface which is opposite to the one side surface and arranged in series along a longitudinal direction of the body. Slits are formed on one of the aforementioned two side surfaces between respective two holes. The slits have depths which increase toward end portions of the ceramic body.

15 Claims, 11 Drawing Sheets



4,806,890 Feb. 21, 1989

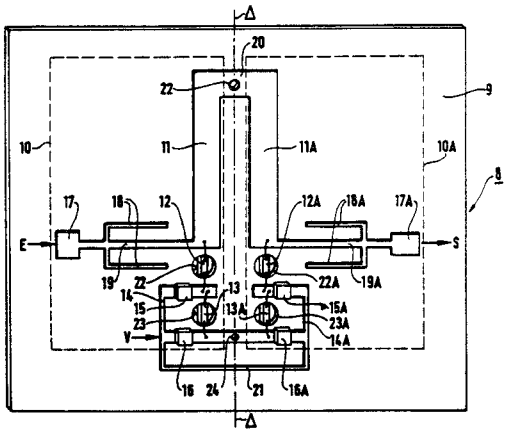
Tunable Microwave Filter

Inventors: Mustafa Gurcan and Maurice Bernaud.
Assignee: Alcatel Thomson Faisceaux Hertziens.
Filed: Feb. 10, 1988.

Abstract—A tunable microwave filter comprises two branches of the same type each of which is connected to ground (22, 24) at each end and each of which includes a series-connected variable capacitance diode (13, 13A) controlled by a dc signal (V), said filter being disposed on the first face (9) of a plane substrate (8), with each branch comprising in series:

- a micro-strip transmission line (11, 11A);
- a second variable capacitance diode (12, 12A) situated between the first diode (13, 13A) and the micro-strip transmission line (11, 11A); and
- the input (E) and the output (S) of said filter taking place at the points interconnecting the micro-strip transmission lines (11, 11A) and the second variable capacitance diodes (12, 12A) of respective ones of the first and second branches. The filter is applicable, in particular, to space telecommunications

6 Claims, 1 Drawing Sheet



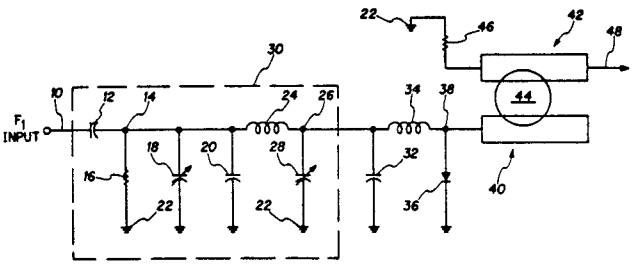
4,806,891 Feb. 21, 1989

Broad-Band Signal Frequency Multiplier Apparatus Using Dielectric Resonator Means

Inventor: Pramode C. Kandpal.
Assignee: Rockwell International Corporation.
Filed. Mar 11, 1988

Abstract—A frequency multiplier circuit is created by using a step recovery diode along with its signal source and reactive circuit to produce a comb of frequencies This comb of frequencies is then applied to a dielectric resonator circuit for filtering all but the desired harmonic of the source Correct positioning of the dielectric resonator on its parallel positioned input and output transmission lines, can be used to affect the phase of reflected signals to further enhance the signals which are reflected back to the step recovery diode thereby increasing the efficiency or further generation of harmonics of the desired frequency applied to the dielectric resonator and thus, output by the multiplier circuit The multiplier frequency obtained is determined by the natural resonant frequency of the dieelectric resonator chosen thereby providing a basic device which can be used as a source for many different output frequencies

7 Claims, 2 Drawing Sheets



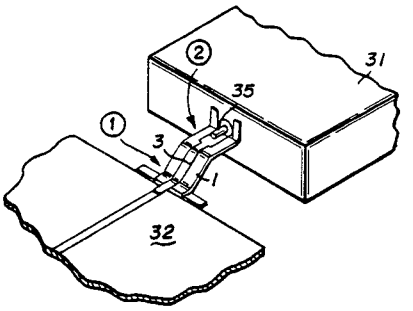
4,806,892 Feb. 21, 1989

Inclined RF Connecting Strip

Inventors: J. Carlton Thorpe and Francis X. Konsevich.
Assignee: TRW Inc.
Filed: Nov 9, 1987.

Abstract—A microstrip type transmission line connects RF signals between separate spaced microwave components and defines a RF connecting strip having a flexible insulator base and a ski slope shaped geometry. The RF connector includes a thin wide strip of dielectric material, a first thin narrow flat electrical conductor containing a tab portion extending beyond the front end of said dielectric material; a second thin wide electrical conductor having first portion covering the underside of said dielectric strip, said conductor being greater than said length of said dielectric layer to define first and second tab end portions extending beyond the end of said dielectric material; said first and second conductors being attached to said dielectric material and together therewith forming a sandwich, said sandwich having a first bend located at a position between the front and back ends of said dielectric to form a first straight portion and a second straight portion forming an incline; and, further containing, a second bend located proximate the front end of said dielectric to form a straight portion extending parallel essentially to said first portion thereof

9 Claims, 2 Drawing Sheets



4,807,953 Feb. 28, 1989

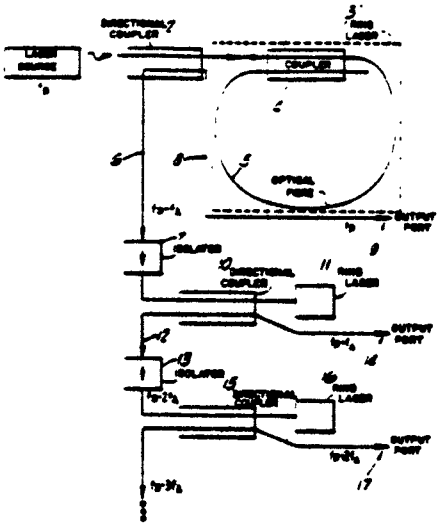
Apparatus and Method for Frequency Locking Electromagnetic Optical Signals

Inventors: David W. Smith, David Cotter, and Richard Wyatt
Assignee: British Telecommunications Public Limited Company.
PCT Filed. May 9, 1986

Abstract—A method and apparatus for generating a plurality of electromagnetic signals, primarily optical signals, having line widths centered on frequencies fixed relatively to a reference frequency. The apparatus comprises a reference frequency signal source such as a gas laser (1) which generates a reference signal having a frequency f_p. This reference signal is fed to a leading one (3) of a plurality of optical fiber ring lasers (3, 11, 16) connected together in series by optical fibers (6, 12) The characteristics of the injected signal and the form of the waveguide ring (5) defined by the ring laser (3) is such that stimulated Brillouin scattering occurs in the waveguide ring to generate a scattered signal with a frequency $f_p - f_A$ traveling in an opposite direction to the injected signal. This scattered signal is passed by the optical fibers (6) via an isolation device (7) to the next ring laser (11) in series Directional couplers (2, 10, 15) are provided to guide the injected signals, including the reference signal to respective output ports (9, 14, 17) The stimulated Brillouin scattering

effect causes each scattered wave to be offset from the corresponding injected wave by a fixed frequency (f_A)

10 Claims, 1 Drawing Sheet



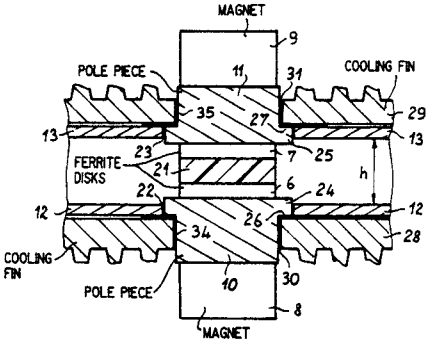
4,808,949 Feb. 28, 1989

Integrated Hyperfrequency Circulator

Inventor: Gérard Forterre.
Assignee: Thomson Hybrides et Microondes.
Filed: Feb. 9, 1988

Abstract—A hyperfrequency circulator is provided in which the gyrator is integrated in the waveguide, comprising a waveguide whose two main faces are pierced with two holes, aligned with the center of symmetry of the junction. Through these holes a one-piece gyrator passes formed by at least one magnet, a pole piece, a solid dielectric resonator and a second pole piece. The gyrator is cylindrical in shape, and the pole pieces each have a flange of the same diameter as the holes in the waveguide, the cooling plates immobilizing the one piece gyrator in the waveguide.

9 Claims, 2 Drawing Sheets



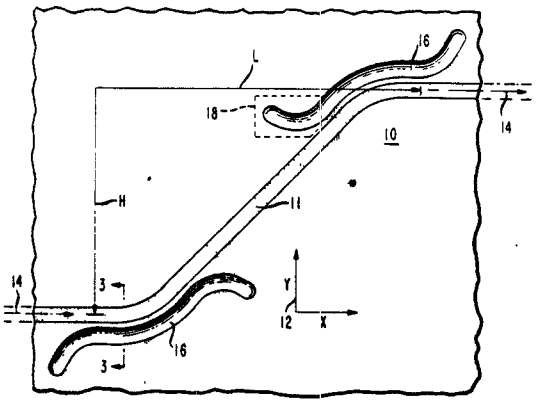
4,810,049 Mar. 7, 1989

Reducing Bend and Coupling Losses in Integrated Optical Waveguides

Inventors: Frederick H. Fischer, Edmond J. Murphy, and Trudie C. Rice.
Assignee American Telephone and Telegraph Company, AT&T Bell Laboratories.
Filed: Apr 2, 1987.

Abstract—A groove is disposed in a substrate longitudinally along the outside radius of a bent integrated optical waveguide to constrain the mode of optical energy propagating therein such that the optical energy that would normally be radiated is confined to the waveguide, thereby reducing transmission loss through the bend. Further, to reduce coupling loss between an integrated optical waveguide and an optical fiber, two grooves are disposed longitudinally along either side of the integrated optical waveguide to constrain the mode of optical energy propagating in the waveguide to approximate the mode of the optical energy propagating in the optical fiber. To further reduce both bend and coupling losses, the ends of the grooves bend away from the waveguide.

37 Claims, 2 Drawing Sheets



4,810,052 Mar. 7, 1989

Fiber-Optic Bidirectional Data Bus Tap

Inventor: John J. Fling.
Assignee: Litton Systems, Inc.
Filed: Jan. 7, 1986

Abstract—A fiber-optic data bus tap includes a tap coupler for coupling signals traveling in either direction in a data bus fiber into one of two lengths of a tap fiber. The signals are then guided to a receiver. The tap fiber may include a fiber-optic coupler formed between the two lengths thereof for splitting the signal coupled from the data bus between the two lengths of the tap fiber so that they both carry the same information. The receiver is coupled to one of the two lengths of the tap fiber. One of the lengths of the tap fiber may terminate in a mirror so that signals are reflected back to the tap coupler where a portion of the reflected signal is transmitted to the receiver. A transmitter may be coupled to the power splitter for supplying signals to the tap fiber for input to the data bus The system may employ a light emitting diode as a transceiver instead of having a separate receiver and transmitter.

12 Claims, 3 Drawing Sheets