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,

4,501,470 Feb. 26, 1985

Christiansen-Bragg Optical Filter

Inventor: Pochi A. Yeh.
Assignee: Rockwell International Corporation.
Filed: Sept. 28, 1981.

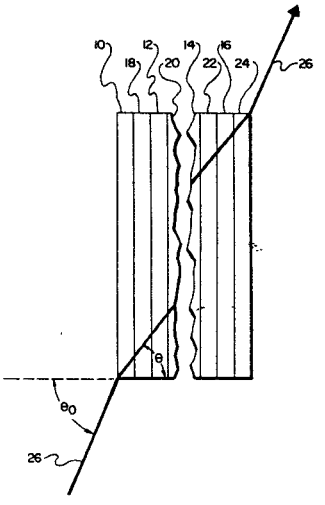
Abstract—Disclosed is an optical bandpass filter for transmitting light in a narrow band around the wavelength λ_c, including a first series of layers, each of thickness t, having a refractive index n_1 and a second series of layers, each of thickness t, having a refractive index n_2 and alternating with the first series. The thickness t is selected so that $t = \lambda_c/4n_c$ and $|\Delta| > \pi|D - 1/\lambda_c|$, where

$$\Delta = \frac{1}{n_c}\left[\frac{d}{d\lambda}(n_2 - n_1)\right]_{\lambda_c}$$

$$D = \frac{1}{2n_c}\left[\frac{d}{d\lambda}(n_2 + n_1)\right]_{\lambda_c}$$

and n_c is the common value of n_1 and n_2 at the wavelength λ_c. Also disclosed is a filter with each succeeding layer in the first and second series thicker than the preceding layer. The thickness of the thinnest layer is $\lambda_1/4_n$ and the thickness of the thickest layer is $\lambda_2/4n\cos\theta$, where λ_1 is the minimum wavelength to be reflected by the filter, λ_2 is the maximum wavelength, $n = (n_1 + n_2)/2$, and θ is the internal angle corresponding to θ_o, i.e., $\sin\theta_o = n\sin\theta$.

6 Claims, 4 Drawing Figures



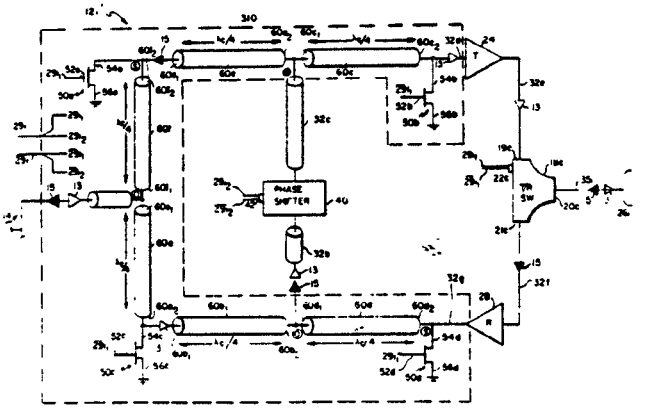
4,502,027 Feb. 26, 1985

Bidirectional Switch

Inventor: Yalcin Ayasli.
Assignee: Raytheon Company.
Filed: Oct. 24, 1983.

Abstract—A bidirectional switch for selectively switching a microwave frequency signal between one of two signal paths. The switch includes a pair of field effect transistors, and a pair of transmission lines coupled together at one end thereof to provide a common port. Each second end of each microwave transmission line is coupled to a drain electrode of one of such field effect transistors to provide a branch port at each second end of each microwave transmission line. The electrical lengths of each transmission line are selected in accordance with the operating wavelength of the circuit to provide an impedance corresponding to an open circuit at one end, when a short circuit is provided at the opposite end. A signal is coupled between the common port and a selected one of the branch ports, in response to a pair of complementary binary, control signals fed to the gate electrodes of the FET's. The control signals are used to select between one of the two signal paths by placing the FET having the drain electrode coupled to a selected branch port in a nonconducting state, and by placing the FET having the drain electrode coupled to an unselected branch port in a conducting state.

5 Claims, 25 Drawing Figures



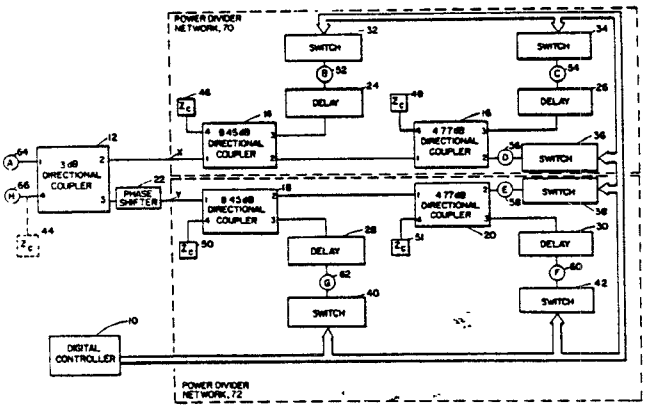
4,502,028 Feb. 26, 1985

Programmable Two-Port Microwave Network

Inventor: Bernard W. Leake.
Assignee: Raytheon Company.
Filed: June 15, 1982.

Abstract—An adjustable two-port microwave network having digitally controlled switches which enable the network to be set to a plurality reflection and transmission coefficients. The network facilitates the collection of a plurality of measurements which are necessary to characterize a nonlinear device An embodiment of the network is constructed using a 3-dB directional coupler feeding two identical power divider networks each comprising two cascaded directional couplers. One divider network is connected directly to the coupled port of the 3-dB directional coupler and the other divider network is connected through a phase shifter to the output port of the 3-dB directional coupler. The nonlinear device to be characterized is connected to the input port of the 3-dB directional coupler and for this application, the isolated port is terminated in its characteristic impedance.

51 Claims, 5 Drawing Figures



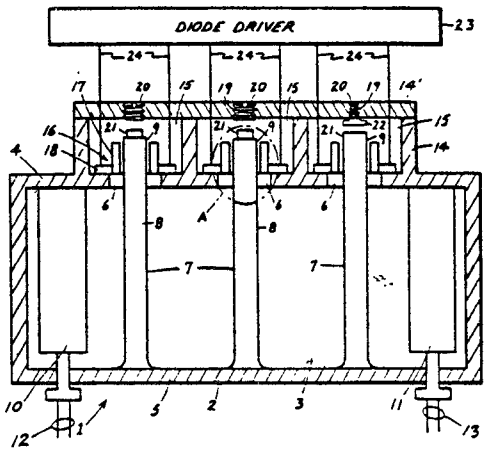
4,502,029 Feb. 26, 1985

Extended Resonator Electronically Tunable Bandpass Filter

Inventor: Robert E. Reed.
Assignee: International Telephone and Telegraph Corporation.
Filed: Feb. 17, 1983.

Abstract—An electronically tunable narrow-band tuned cavity filter includes a housing which bounds a tuned cavity, a plurality of resonator bars secured to the housing, extending across the tuned cavity and having respective extensions that pass through respective openings of the housing to the exterior of the tuned cavity, and a set of tuning capacitor plates for each of the resonator bars. The tuning capacitor plates associated with the respective resonator bar are arranged outside the tuned cavity around the extension is a compartment surrounding the opening, together with respective switching networks driven by an electronic drive and operative for including the capacitor plates in or excluding the same from electric circuit with the respective resonator bar The capacitor plates may be directly juxtaposed with associated facets of the extension to form respective tuning capacitors therewith. Dielectric spacers may be interposed between the capacitor plates and the associated facets of the extension to determine and maintain the size of the gap therebetween, and to suppress mechanical vibrations of the cantilevered resonator bar. The capacitor plates may be yieldably mounted on the support and urged toward the extension by respective springs. The extension of the resonator bar may be provided with a recess opening onto the respective facet, and an internally threaded bore opening into the recess, and externally threaded trimmer slug may be received in the bore and extend to a greater or lesser degree into the recess to thereby contribute to a greater or lesser degree to the total capacitance of the respective tuning capacitor.

29 Claims, 8 Drawing Figures



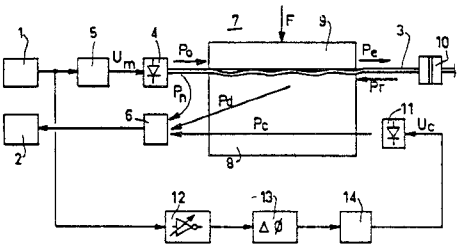
4,502,753 Mar. 5, 1985

Termination Device Using a Directional Coupler Which Compensates for the Parasitic Radiation from a Light Source Via a Compensation Signal

Inventor: Alain Flocon.
Assignee: Telecommunications Radioelectriques T.R.T.
Filed: July 22, 1982.

Abstract—A device for coupling a light source and an optical detector to one end of an optical fiber employed for two-way transmission of information. So as to reduce the effect of parasitic radiation coming from the light source and reaching the detector, a second light source is used which is arranged in such a way that it likewise excites the detector and is modulated by a compensation signal. The compensation signal is derived from the information signal modulating the first light source and its phase and amplitude are controlled so as to compensate for the modulation of the parasitic radiation. This increases the transmission range and makes it possible to use the same radiation wavelength for the two transmission directions.

6 Claims, 2 Drawing Figures



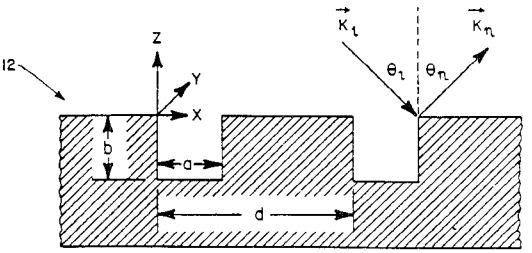
4,502,756 Mar. 5, 1985

Bandpass Filter Formed by Serial Gratings Operating in a Wood's Anomaly Region

Inventors: Phillip R. Peterson and Athanasios Gavrielides.
Assignee: The United States of America as represented by the Secretary of the Navy
Filed: Sept. 30, 1982

Abstract—A bandpass filter is comprised by a plurality of reflection gratings operating in a Wood's anomaly region and arranged in serial relationship. Specifically, the gratings are serially arranged in two substantially parallel rows with the gratings in the first row offset laterally from the gratings in the second row. Further, the input to each grating is at substantially the same angle of incidence such that the output of one grating is the direct input to the next succeeding one of the gratings

1 Claim, 5 Drawing Figures



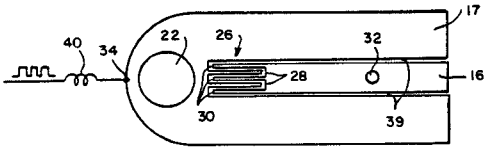
4,503,404 Mar. 5, 1985

Primed Microwave Oscillator

Inventor: Joseph E. Racy.
Assignee: Sanders Associates, Inc.
Filed: Mar. 7, 1983.

Abstract—A primed oscillator for microwave amplification includes a single tank conductor (16) coupled to a coupling conductor (17) by an interdigitated coupler (26). The coupling conductor (17) is connected to the cathode of an IMPATT diode (22) which is triggered by the application of a back-biasing trigger pulse that biases it into its negative-resistance region. When a keying pulse is applied to the IMPATT diode (22), the diode couples power through the interdigitated coupler (26) to the tank circuit (16) to cause oscillations that are initially in phase with any incoming signals, but the frequency of the oscillations is determined by the configuration of the tank circuit (16), not by the frequency of the incoming signal. If the incoming signal is near enough to the resonant frequency, and if the duration of the keying pulses is short enough, the output of the primed oscillator appears to a band-limited receiver to be an amplified version of the input signal. In another version, the amplifying element is a GaAs FET (66) with a tank conductor (70) connected to its gate. The tank conductor is in turn coupled to a coupling conductor (62) for positive feedback at the resonant frequency of the tank (70).

11 Claims, 4 Drawing Figures



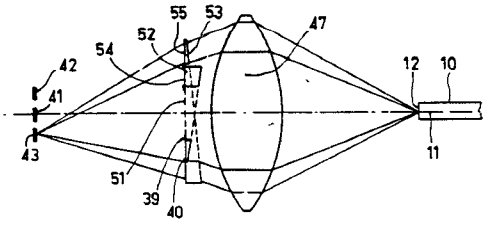
4,504,111 Mar. 12, 1985

Method of Multiplexing Transmission Channels in a Step-Index Optical Fibre and Device for Carrying out the Method

Inventor: Jean J. Hunzinger.
Assignee: U.S. Phillips Corporation.
PCT Filed: Feb. 17, 1981.

Abstract—An optical multiplexer wherein a plurality of channels are formed in a step index optical fiber by groups of light rays which propagate along the fiber by consecutive total reflections at the core/cladding interface. The rays are grouped depending on their angle with the fiber axis so that for each channel, at any point of the fiber, the rays of a given group are situated between two cones whose common apex is formed by that point and which are rotationally symmetrical about a common axis parallel to the fiber axis. The cones define the portion of the angular aperture relating to each channel. The aperture portions relating to all the channels are moreover juxtaposed. A multi-axial optical system directs each of a plurality of light signals along a region defined by the cones so as to inject the light signal into the aperture portion of the associated channel for each channel at the fiber input and reception means which are specific of the aperture portion of said channel at the output.

16 Claims, 6 Drawing Figures



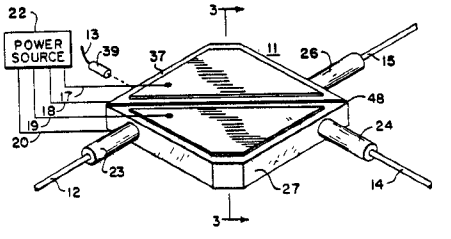
4,504,121 Mar. 12, 1985

Interferometric Multimode Fiber-Optic Switch and Modulator

Inventors: W. John Carlsen and Paul Melman.
Assignee: GTE Laboratories Incorporated.
Filed: Nov. 2, 1981.

Abstract—Interferometric multimode fiber-optic switches and modulators include combinations of various components. Two electrooptical crystals have a dielectric beam-splitting coating affixed to portions thereof. The coated portions of the two crystals are juxtaposed. Means are provided for varying indices of refraction of the two crystals with respect to each other. Light entering into the first crystal and traveling within the two crystals can be switched to selectively exit from one crystal or from the other by varying the index of refraction of one of the crystals with respect to that of the other. By interferometric principle of operation, the phase relation of light is transformed into spatial direction. The crystals can be selected from the group consisting of lithium niobate, lithium tantalate, and barium strontium niobate. The dielectric beam-splitting coating can be formed of multiple layers of material such as zirconium oxide and silicon dioxide. The indices of refraction of the crystals are varied by applying electric fields of one polarity at opposite surfaces thereof. Light enters the various crystals, and is reflected, and is transmitted at various surfaces thereof so that, upon entering a particular area within the crystals, reinforcement or interference of light can occur.

21 Claims, 5 Drawing Figures



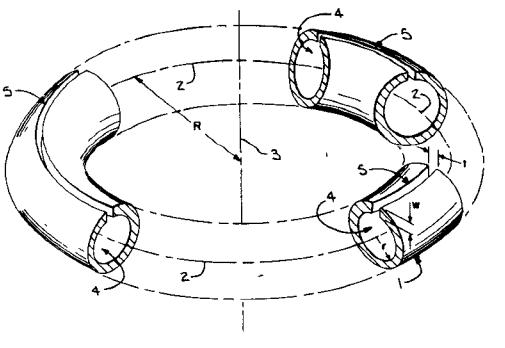
4,504,788 Mar. 12, 1985

Enclosed Loop-Gap Resonator

Inventors: Wojciech Froncisz and James S. Hyde.
Assignee: The Medical College of Wisconsin, Inc.
Filed: Sept. 3, 1982.

Abstract—The ends of a loop-gap resonator are extended along a closed path to define an enclosed chamber with a gap extending along its length. A lumped circuit resonator is formed and the magnetic field is confined to the chamber. Openings may be formed in the chamber wall to direct magnetic flux through sample materials outside the chamber, and the cross-sectional area of the chamber may be altered to control the energy density distribution of the magnetic field.

5 Claims, 8 Drawing Figures



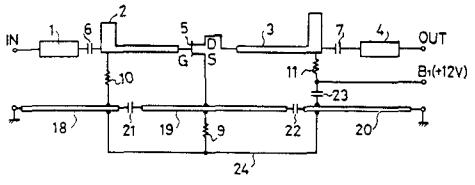
4,504,796 Mar. 12, 1985

Microwave Circuit Apparatus

Inventor: Sadao Igarashi.
Assignee: Alps Electric Co., Ltd.
Filed: Sept. 30, 1982.

Abstract—A microwave circuit apparatus is disclosed which includes at least one first microstrip line; at least one second microstrip line; at least one capacitor interposed between the first and second microstrip lines; and a functional element having a first electrode thereof connected high frequency-wise to the first microstrip line, and in which the second microstrip line is grounded with respect to a power source.

3 Claims, 10 Drawing Figures



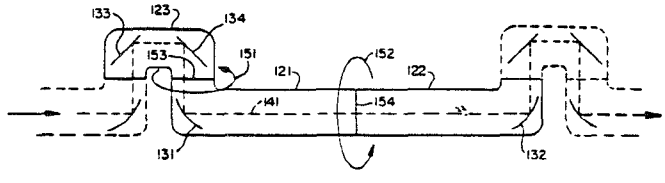
4,504,806 Mar. 12, 1985

Modular Beam Waveguide

Inventors: James K. Conn and Sharadchandra D. Patel.
Assignee: Harris Corporation.
Filed: July 19, 1982.

Abstract—Modular-configured beam waveguide for transmitting microwave energy is formed of a plurality of cascaded modules each module containing a pair of reflecting surfaces, e.g., mirrors with the mirrors prealigned with one another and mounted in a supporting conduit or tube. Each tube or conduit module has a pair of orthogonal axes about which its joints with adjacent modules may rotate, so that with a plurality of such modules interconnected with one another, the overall configuration of serially connected modules may follow substantially any desired path. If desired, a module may be configured of a single L-shaped tube or cylinder at the bend of the L of which there is interiorly disposed an aligned mirror, either flat or curved, e.g., substantially elliptically configured for focussing purposes. The tubular construction may be conductive or nonconductive, its prime purpose being to provide support, rigidity and strength, as well as impermeability to external environmental conditions. Each open end of the tabular subsection of a module is of preferably circular crosssection with a rotationally mounted fitting for coupling to one of the legs of another L-shaped module subsection.

31 Claims, 12 Drawing Figures



4,504,805 Mar. 12, 1985

Multiport Combiner for Multi-frequency Microwave Signals

Inventors: Ernest P. Ekelman, Jr., and Edward L. Ostertag.
Assignee: Andrew Corporation.
Filed: June 4, 1982.

Abstract—A combiner for transmitting and receiving co-polarized microwave signals in a selected propagation mode in at least two different frequency bands, the combiner comprising a main waveguide dimensioned to simulataneously propagate signals in the different frequency bands, at least a portion of the main waveguide being overmoded; at first and second junctions spaced along the length of the main waveguide for coupling signals in the different frequency bands in and out of the main waveguide, at least the first junction being located in an overmoded portion of the main waveguide and having side-arm waveguide means associated therewith for propagating signals in one of the different frequency bands; filtering means disposed within the main waveguide and operatively associated with the first and second junctions, the filtering means having (1) a stopband characteristic for coupling signals in a first one of the frequency bands between the main waveguide and the first junction and the side-arm waveguide means associated therewith, and (2) a passband characteristic for passing signals in a second one of the frequency bands past the first junction, the filtering means and the first junction suppressing spurious excitation of signals in undesired propagation modes different from the selected mode; and means for coupling signals in the second frequency band between the main waveguide and the second junction.

41 Claims, 20 Drawing Figures