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.

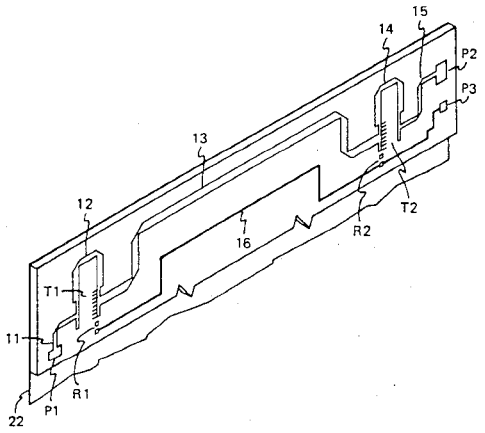
4,471,330 Sept. 11, 1984

Digital Phase Bit for Microwave Operation

Inventors: Ronald J. Naster, John A. Windyka, Wendell M. Kong, and Conrad E. Nelson.
Assignee: General Electric Company.
Filed: Nov. 1, 1982.

Abstract—A digital phase bit is provided for microwave operation, comprising a pair of FET switches and at least three transmission lines. The FETs when operated in a digital switching mode, present a small impedance when on and a high impedance when off. Each of two of the transmission lines exhibits a series inductive impedance over the operating frequency band and shunts a FET switch, two shunt combinations being interconnected by the third transmission line. When the switches are on, the signal path is effectively through the FET switch alone (and not branched) and a reference phase shift is produced. When the FET switches are off, a signal applied to the phase bit branches at each shunt combination. The inductive reactance of the transmission line and the capacitive reactance of the FET switch of each shunt combination then jointly produce a resonantly enhanced reactance over the band, causing a reflection and a maximum differential phase shift. The reflections are cancelled at the input port by a suitable choice of length and impedance for the third transmission line. The phase bit is suitable for monolithic fabrication on a common semiconductor substrate and is bidirectional when symmetrical FET switches are used.

6 Claims, 11 Drawing Figures



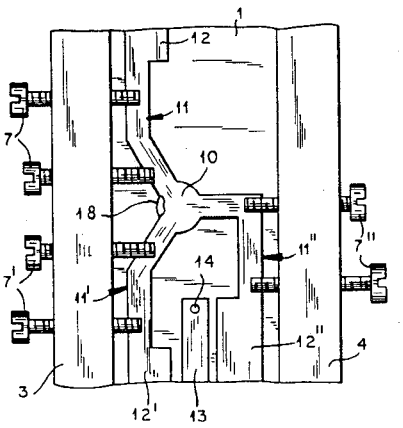
4,471,329 Sept. 11, 1984

Microwave Circuit Component for Superhigh-Frequency Signals

Inventor: Enzo Cavalieri d'Oro.
Assignee: Italtel Societa Italiana Telecomunicazioni S.p.A.
Filed: Mar. 4, 1982.

Abstract—A circuit component for use with signals of superhigh frequency, on the order of 10 GHz or more, has a waveguide structure with four conductive walls defining a channel of rectangular cross section, the channel bottom being overlain by a dielectric layer supporting at least one microstrip of copper or the like closely spaced from one of the lateral walls. The supporting layer preferably consists of a polymeric material of relatively low dielectric constant, e.g., between 2 and 3. The width and height of the channel are less than half the free-space wavelength of the highest frequency signal to be transmitted; the circuit is tuned by metallic screws which are threaded into the adjoining wall and partly overlie the microstrip at a low level, the axes of adjacent screws being separated by less than an eighth of that wavelength.

14 Claims, 5 Drawing Figures



4,471,325 Sept. 11, 1984

Power Combiner with Reentrant Coaxial Diode Oscillators

Inventor: Linda C. Wagner.
Assignee: Raytheon Company.
Filed: July 19, 1982.

Abstract—An improved combiner of microwave power out of a plurality of coaxial diode oscillators is shown to be made up of a circular cylindrical cavity dimensioned to operate in the TM_{020} mode at a selected microwave frequency, with such oscillators being disposed about the periphery of both end planes of such cavity and each individual one of such oscillators being reentrant at an angle of 180° so as to double the number of such oscillators as compared with

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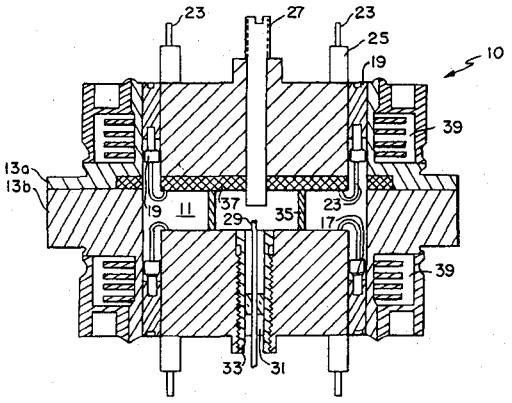
the number of straight coaxial diode oscillators that may be disposed about the periphery of such cavity.

2 Claims, 3 Drawing Figures



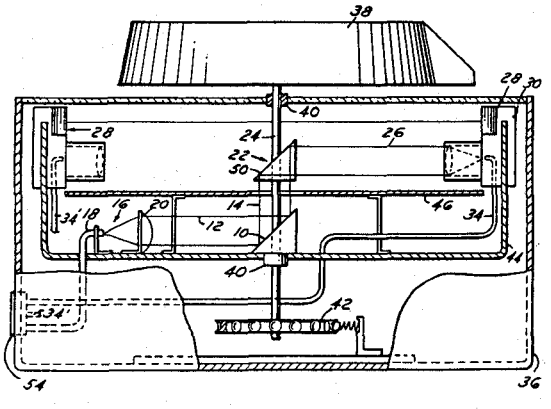
4,470,662 Sept. 11, 1984

Rotary Optic Switch

Inventor: Alexander M. Mumzhiu.
Assignee: Mid-West Instrument.
Filed: Apr. 7, 1983.

Abstract—A rotary optic switch for alternatively coupling a single light path to any one of a plurality of other light paths upon the relative rotation of a light deflecting means. A first deflecting means deflects light from a first radial path to an axial path. A rotatable second light deflecting means deflects light from the axial path parallel to the axis of rotation of the second light deflecting means to a second radial path which moves responsive to the rotation of the second deflecting means. Light is supplied to the first radial light path by a first optic element. A plurality of second optic elements are located circumaxially around the axis of rotation of the second light deflecting means and can be alternatively optically coupled to the first optic element by rotation of the second light deflecting means aligning the second radial light path with each of the second optic elements.

17 Claims, 3 Drawing Figures



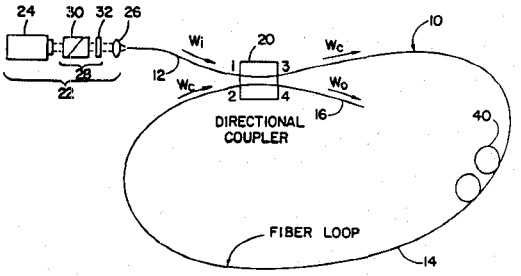
4,469,397 Sept. 4, 1984

Fiber-Optic Resonator

Inventors: Herbert J. Shaw, Marvin Chodorow, and Loren F. Stokes.
Assignee: Board of Trustees of the Leland Stanford Junior University.
Filed: Sept. 29, 1982.

Abstract—A fiber-optic resonator comprises a single strand of optical fiber forming a loop and a fiber-optic directional coupler for optically closing the loop. The length of the loop is selected to cooperate with the phase shift of the coupler to provide a resonant cavity, and the coupling constant is selected to provide full or maximum resonance with zero output power.

31 Claims, 10 Drawing Figures



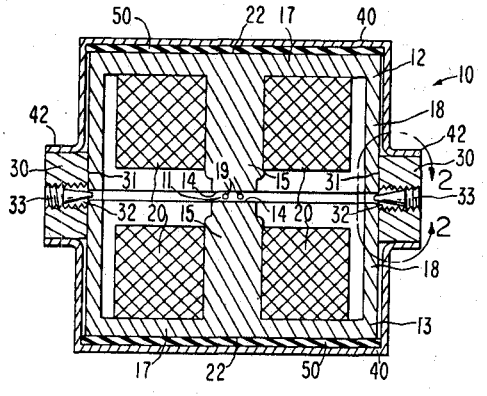
4,468,643 Aug. 28, 1984

Magnetic Circuit Adjustable by Tapered Screws

Inventor: Dale M. Barger.
Assignee: Varian Associates, Inc.
Filed: July 6, 1982.

Abstract—The two magnet structures for establishing therebetween a magnetic field for a multi-stage electromagnetically-tuned filter are provided with tapered machine screws each of which can change the separation between the structures at the point where that screw is mounted so that the pole pieces defining the magnetic field can be tilted in any direction with respect to each other while the filter is operating.

9 Claims, 2 Drawing Figures



4,468,085 Aug. 28, 1984

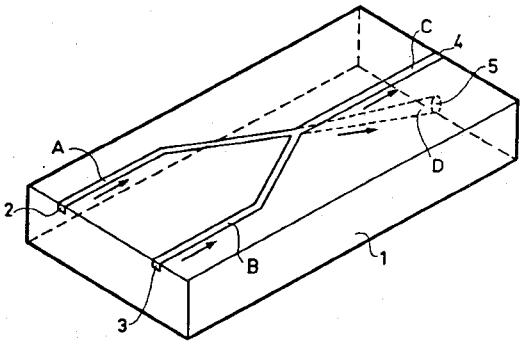
Hybrid Optical Junction and Its Use in a Loop Interferometer

Inventors: Michel Papuchon, Hervé J. Arditty, and Claude Puech.
Assignee: Thomson-CSF.
Filed: Oct. 2, 1981.

Abstract—An integrated optical device including at least one hybrid optical junction with two input paths and two output paths, for transmitting light energy from the input to the output paths as a function of phase difference between the inputs. The junction includes a Y-shaped node formed by three

monomodal optical waveguides situated in a refractive medium with a lower refractive index than that of the three waveguides.

13 Claims, 6 Drawing Figures



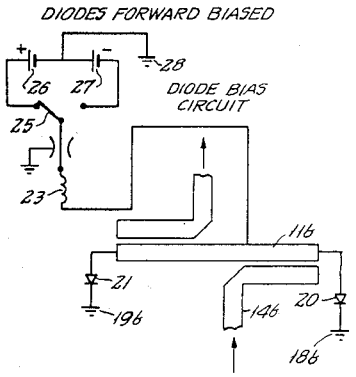
4,467,296 Aug. 21, 1984

Integrated Electronic-Controlled Diode Filter Microwave Networks

Inventors: Morris Cohen and Leon M. Underkofler.
Assignee: Loral Corporation.
Filed: Aug. 23, 1982.

Abstract—The disclosure relates to improved filter networks for use in the microwave region employing TTL logic and capable of changing a network from a "bandpass state" to an "all-stop state", or an "all pass state", or from a "low-pass state" to an "all pass state". Provision is also made for the increase or decrease in the selectivity of a low-pass filter.

5 Claims, 18 Drawing Figures



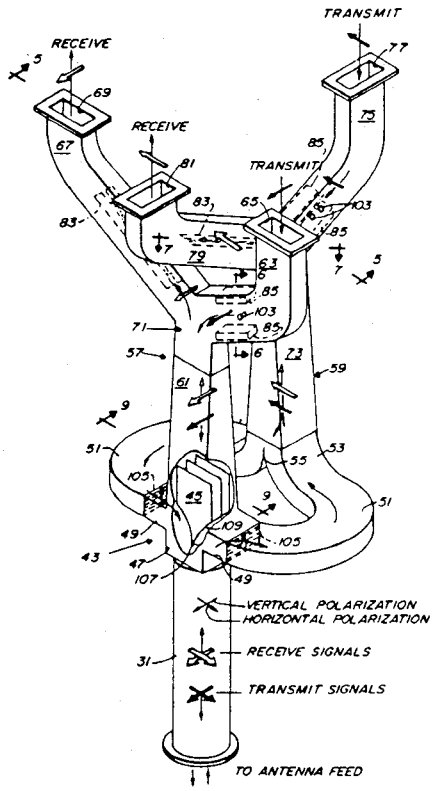
4,467,294 Aug. 21, 1984

Waveguide Apparatus and Method for Dual-Polarized and Dual-Frequency Signals

Inventors: James M. Janky and Albert L. Horley.
Assignee: Vitalink Communications Corporation.
Filed: Dec. 17, 1981.

Abstract—A waveguide apparatus guides a first pair of horizontally polarized transmit and receive frequency signals independently of and in parallel with a second pair of vertically polarized transmit and receive frequency signals. The waveguide apparatus is constructed to operate across the 3.7 to 6.425 Giga-Hertz band with a very narrow bandwidth for the transmit frequency and a very narrow bandwidth for the receive frequency and with a single size of rectangular waveguide for separating the transmit and receive frequencies. This construction simplifies frequency separation filtering techniques and provides effective operation over this broadband with an apparatus which is efficient in terms of space, compact and implemented by a simple package.

22 Claims, 10 Drawing Figures



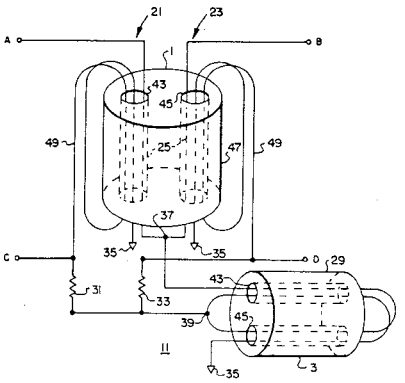
4,467,293 Aug. 21, 1984

Ferrite-Type Directional Coupler

Inventor: Thomas R. Apel.
Assignee: Rockwell International Corporation.
Filed: Sept. 18, 1981.

Abstract—A directional coupler with a first and second transformer, having their primary windings connected in series, provides a sample of the current flow through the series connected primary windings. A third transformer provides a voltage sample of the voltage that results from the current flow through the primary windings of the first and second transformers. The voltage sample and the current sample are vectorially combined by a vector adder to obtain a first signal that is representative of the reflected power components of the current and voltage samples and also to provide a second signal that is representative of the forward power components of the current and voltage samples.

10 Claims, 9 Drawing Figures



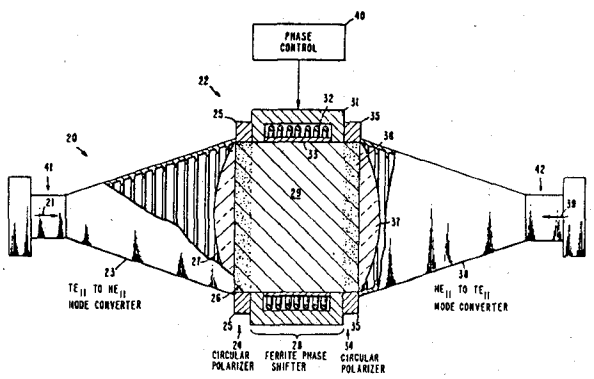
4,467,292 Aug. 21, 1984

Millimeter-Wave Phase-Shifting Device

Inventors: James S. Ajioka and Raymond Tang.
Assignee: Hughes Aircraft Company.
Filed: Sept. 30, 1982.

Abstract—A millimeter-wave phase shifter for use at high millimeter-wave frequencies is disclosed. The phase shifter employs continuous aperture ferrite and corrugated horns to make a reciprocal phase shifter in the frequency range of interest. Applied linearly polarized energy is expanded in cross-section by means of a first corrugated horn. The expanded energy is focused by a first lens, circularly polarized and applied to a ferrite phase shifting section. The phase shift applied to the energy is controlled by means of phase control circuitry and a yoke and coil arrangement. The phase-shifted energy is then converted to linearly polarized energy by a second circular polarizer focused by a second lens and contracted in cross-section by a corrugated horn. The use of the corrugated horns, polarizers, lenses and ferrite phase shifting components allows a much larger device to be fabricated and hence physical tolerances are reduced by an order of magnitude for the frequency range of interest. In addition, both the efficiency and power handling capability are greatly improved. Both reciprocal and nonreciprocal phase shifters are disclosed.

9 Claims, 3 Drawing Figures



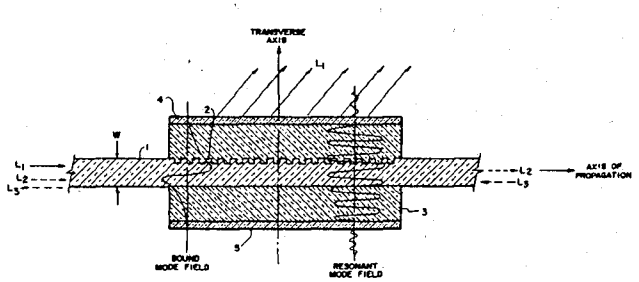
4,466,694 Aug. 21, 1984

Wavelength Selective Optical Coupler

Inventor: Robert I. MacDonald.
Assignee: Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence of Her Majesty's Canadian Government.
Filed: June 8, 1979.

Abstract—An optical coupler for a fiber optic communication system, which couples one band of wavelengths out of the fiber while allowing others to be carried further. This allows wavelength division multiplexing of different signals within a single fiber. The preferred embodiment of the invention is comprised of a waveguide having aperiodic corrugations in one wall and a Fabry-Perot type resonator enclosing the waveguide around the corrugations with its axis transverse thereto.

7 Claims, 6 Drawing Figures



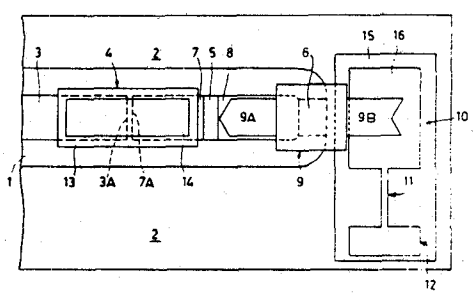
4,465,990 Aug. 14, 1984

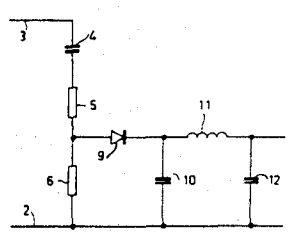
Microwave Detector Arrangement

Inventor: Peter J. Gibson.
Assignee: U.S. Philips Corporation.
Filed: Oct. 13, 1981.

Abstract—A microwave detector arrangement operable over a broad range of frequencies including the series resonant frequency of a detector diode (9) for detecting microwave energy in a transmission line of characteristic impedance Z_0, suitably a coplanar line. A first portion of line, including a strip conductor (3), is terminated by a network, including a capacitance (4) and a first resistance (5) in series with one another and with the parallel combination of a second resistance (6) and the diode (9). The capacitance (4) provides dc isolation, while the detector output is taken across a capacitance (10) in series with the diode (9). The first and second resistances (5,6) are respectively $2Z_0/3$ and $3Z_0/2$, so that the terminating impedance provides a reasonable match to the line over a broad frequency range.

13 Claims, 3 Drawing Figures





4,465,989 Aug. 14, 1984

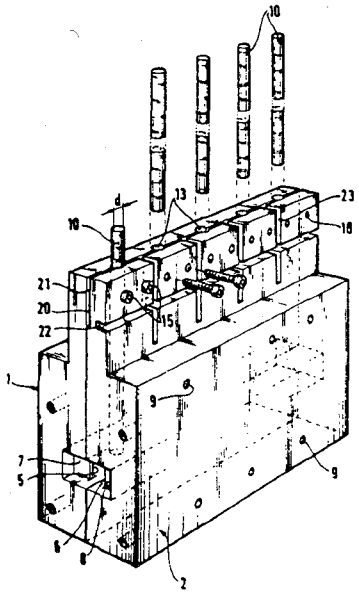
Temperature-Stabilized Microwave Filter

Inventors: Jean-Pierre Boujet, Gérard Gaille, and Charles Jousselin.
Assignee: Compagnie Industrielle Des Telecommunications.
Filed: Oct. 20, 1982.

Abstract—In a temperature-stabilized microwave filter, each resonant cavity (5) is tuned by means of a tuning rod (10) of a thermally stable material. A first end of each tuning rod (10) extends into the respective cavity (5) without touching its surface. A second end is clamped, remotely of the cavity (5), into the filter body (1-2). At the position of this second end the filter body (1-2) has a bore (13) of substantially the same diameter as the tuning rod (10). The tuning rods (10) are clamped by pairs of retaining screws (15) accommodated in clearance holes in the filter body on one side of a longitudinal grove (21)

intersecting the bore (13) and anchored into the filter body (1-2) on the other side of the groove (21).

5 Claims, 6 Drawing Figures



4,465,988 Aug. 14, 1984

Slow-Wave Circuit with Shaped Dielectric Substrate

Inventor: Robert R. Moats.
Assignee: The United States of America as represented by the Secretary of the Air Force.
Filed: Nov. 15, 1982.

Abstract—The substrate is ladder shaped and is located between a serpentine metallic meander line conductor and a metallic ground plane. Conductive shields are disposed in slot-like openings of the substrate between adjacent parallel transverse segments of the meander line to decrease dispersion and increase the bandwidth to a full octave.

7 Claims, 8 Drawing Figures