Patent Abstracts

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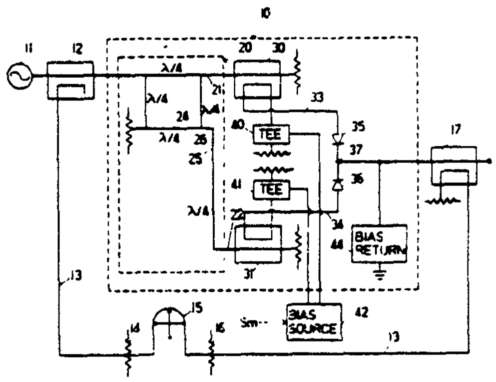
4,355,289 Oct. 19, 1982

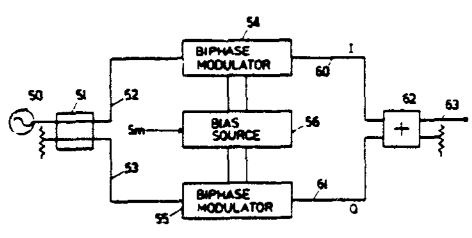
Phase Shift and Amplitude Modulator

Inventors: James B. Beyer, James B. Summers.
Assignee: Wisconsin Alumni Research Foundation.
Filed: July 14, 1980.

Abstract—A parallel type modulator is disclosed which utilizes a pair of bi-phase modulators (10), each of which are capable of independent phase and amplitude modulation. In each bi-phase modulator, a carrier frequency signal is split by a power splitter (20) into two signals 180° apart in phase which are passed through directional couplers (30 and 31) and a pair of PIN diodes (35 and 36) to a summing junction (37). A bias source circuit (42) delivers biasing current to the coupled outputs of the directional couplers (30, 31) and through the PIN diodes (35, 36) to the summing junction (37); this current is returned to ground through a bias return circuit (44) which conducts the DC or low frequency biasing signal but allows the carrier frequency output signal to be passed through to the output of each bi-phase modulator. Reduction of the bias current to one diode below null levels at which the intermediate signals cancel will cause a carrier frequency signal to appear at the summing junction which will be in phase with the signal passed through the other diode. A continuous variation of the bias current through one of the diodes at a level below the null current level will result in amplitude modulation of the output signal at the summing junction. The PIN diodes are always operated in their conducting regions so that large parasitic reactances at microwave frequencies are avoided. A parallel modulator can be formed of a pair of the bi-phase modulators provided with carrier frequency signals in quadrature, and with the outputs of each bi-phase modulator being summed to yield an output signal at the carrier frequency which can have an arbitrary phase angle and continuous modulation of amplitude.

21 Claims, 5 Drawing Figures





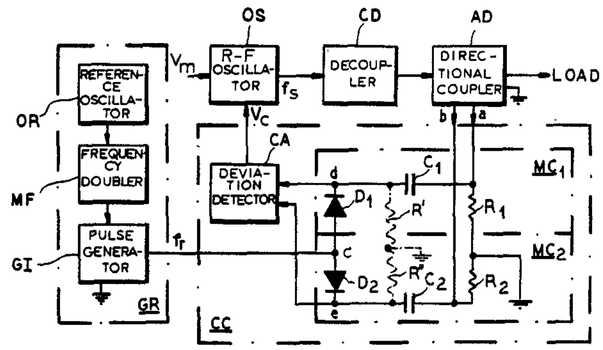
4,355,288 Oct. 19, 1982

Frequency-Stabilizing System for Generator of Microwave Oscillations

Inventor: Ezio Cottatellucci.
Assignee: Societa Italiana Telecomunicazioni Siemens S.P.A.
Filed: Apr. 22, 1980.

Abstract—A carrier oscillation in the microwave range is stabilized by a sequence of timing pulses produced by a crystal-controlled reference oscillator whose cadence is an aliquot fraction of the nominal carrier frequency. The pulses are used to obtain two phase-representing amplitude samples of the carrier wave from a pair of mutually phase-shifted pilot oscillations of the same frequency in each of a succession of nonconsecutive cycles thereof; a control voltage derived from these amplitude samples is fed back to the microwave oscillator via a frequency-correcting or phase-locking loop.

7 Claims, 5 Drawing Figures



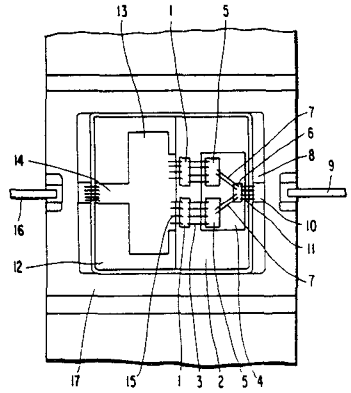
4,353,047 Oct. 5, 1982

$(1-X)BAO.XTIO_2$ System Dielectric Material for Use in a Microwave Device

Inventors: Tsutomu Noguchi, Yuji Kajiwara, Masanori Suzuki, Hideo Takamizawa.
Assignee: Nippon Electric Co., Ltd.
Filed: Apr. 28, 1981

Abstract—The present invention provides a dielectric material adapted for microwave integrated circuits (MIC) and an electric circuit making use of said dielectric material. More particularly, an oxide dielectric material principally consisting of $(1-x)BaO.xTiO_2$ $(0.7 \leq x \leq 0.95)$ and containing both 0.007 to 0.7 weight % of manganese and 0.037 to 3.7 weight % of zirconium, as a large dielectric constant, a small dielectric loss and a small temperature coefficient of dielectric constant and is uniform over a broad range, and especially it is possible to easily manufacture a substrate having a uniform dielectric constant and a uniform dielectric loss. Transistors and MIC's employing such substrates can attain uniform and excellent high-frequency characteristics.

8 Claims, 11 Drawing Figures



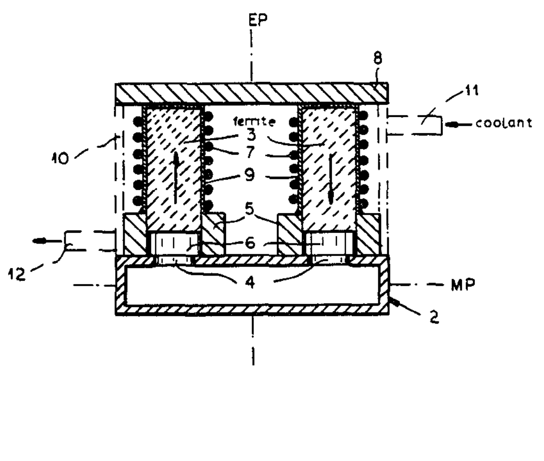
4,353,042 Oct. 5, 1982

Differential Phase Shifter for a Waveguide Carrying High-Power Microwaves

Inventors: Enzo C. D'Oro, Girolamo Ocera.
Assignee: Italtel S.p.A.
Filed: Dec. 16, 1980.

Abstract—A rectangular waveguide energized in the TE_{10} mode is externally provided on at least one of its major surfaces with one or more pairs of ferrite cores rising from that surface on opposite sides of its electric plane, an end face of each ferrite core being aligned with an aperture in the guide surface whereby two counterrotating magnetic fields in the interior of the guide induce corresponding fields in the two cores. The induced magnetic fields travel outward in the cores and are reflected at their remote ends for return to the guide with a phase shift controlled by a unipolar biasing current traversing a pair of coils which are respectively wound about these cores to generate two mutually opposite magnetic fields therein. The cores and their coils may be spacedly surrounded by an enclosure for the forced circulation of a cooling fluid therearound.

8 Claims, 2 Drawing Figures



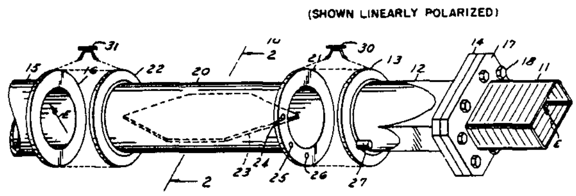
4,353,041 Oct. 5, 1982

Selectable Linear or Circular Polarization Network

Inventors: Lawrence G. Bryans, Loren R. Murchison.
Assignee: Ford Aerospace & Communications Corp.
Filed: Nov. 24, 1980.

Abstract—This specification discloses a polarization network for selectively converting between linear and circular polarization. The network includes a twistable waveguide having a generally rectangular cross section. Coupled to the twistable rectangular waveguide is a transducer waveguide which acts as an interface between the rectangular waveguide and circular waveguide. A polarizer having a generally circular cross section is coupled to the transducer waveguide and can convert transmitted electromagnetic waves between linear and circular polarization. A coupling means permits relative rotation between the transducer waveguide and the polarizer and selective securing at any of three rotational positions. A first position permits a linearly polarized signal to pass through the polarizer remaining linearly polarized. A second position converts between a linearly polarized signal and a right hand circularly polarized signal A third position converts between a linearly polarized signal and a left hand circularly polarized signal. Second coupling means between the polarizer and circular horn waveguide permits arbitrary orientation of a linearly polarized signal within the cross-sectional plane.

6 Claims, 4 Drawing Figures



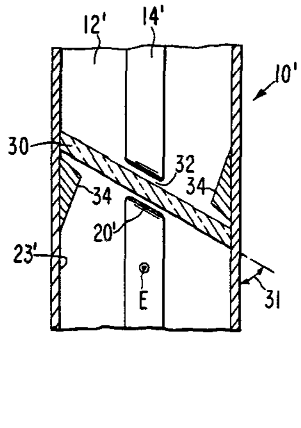
4,352,077 Sept. 28, 1982

Ridged Waveguide Window Assembly

Inventor: Richard Z. Gerlack.
Assignee: Varian Associates, Inc.
Filed: June 4, 1981.

Abstract—A window assembly for ridged waveguide has a slab of dielectric extending clear across the waveguide cross-section. The slab may be perpendicular to the waveguide or cross it at an angle. The waveguide ridge or ridges are notched so that the dielectric slab passes through the notch Inductive tuning posts may be added to make a broadband match. The window assembly has an excellent match over more than an octave frequency range.

13 Claims, 5 Drawing Figures



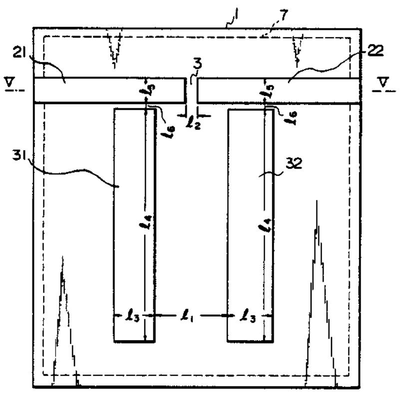
4,352,076 Sept. 28, 1982

Bandpass Filters

Inventors: Takeshi Saitoh, Hiroshi Hatashita, Toshio Nagashima, Susumu Yamamoto.
Assignee: Hitachi, Ltd.
Filed: Sept. 12, 1980

Abstract—In a bandpass filter of microstrip line structure, an input conductor, an output conductor, a first open end conductor, and a second open end conductor are provided. The first and the second open end conductors are located opposite to the input and the output conductors forming narrow gaps between said open end conductors and said input and output conductors. The mutual inductance between the first and the second open end conductors is adjusted by selecting the width of the gap between the first and the second open end conductors.

5 Claims, 10 Drawing Figures



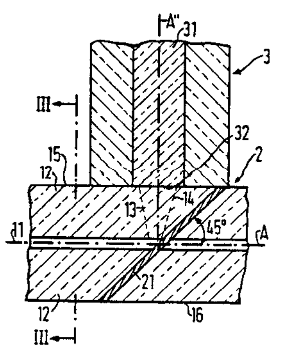
4,351,585 Sept. 28, 1982

Coupling Element for an Optical Waveguide

Inventors: Gerhard Winzer, Franz Auracher.
Assignee: Siemens Aktiengesellschaft.
Filed: Nov. 7, 1979.

Abstract—An improved coupling element for coupling light into and out of a light component, which coupling element consists of a single core of cladded glass fiber whose cladding has a diameter that amounts to at least 1 mm so that the cladding acts as a member for supporting the core in the coupling element. Preferably, at least one flat surface is formed on the cladding to facilitate attaching the branching waveguide or fiber.

3 Claims, 3 Drawing Figures



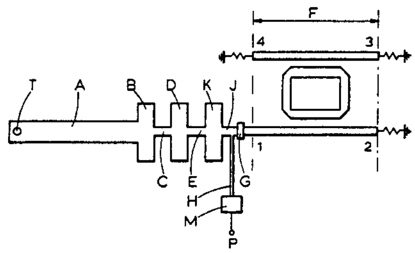
4,348,646 Sept. 7, 1982

Time-Delay-Triggered Trapatt Oscillator with Directional Filter

Inventors: Barrie H. Newton, Peter L. Booth, Robert Davies.
Assignee: U.S. Philips Corporation.
Filed: May 19, 1980.

Abstract—A time-delay-triggered TRAPATT oscillator comprising a length of delay line with a TRAPATT diode at one end and a matching filter at the other end, and a constant resistance directional filter at the output end of the matching filter.

2 Claims, 1 Drawing Figure



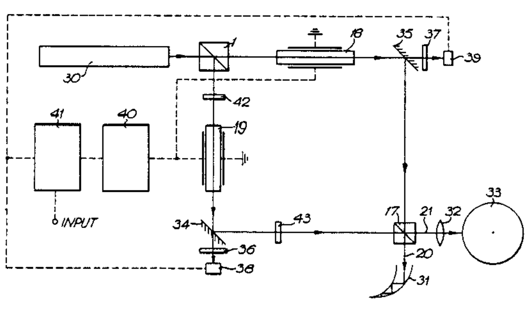
4,335,939 June 22, 1982

Optical Modulators and Apparatus Including Such Modulators

Inventors: John E. Stovell, John Aughton, Alberto Yi.
Assignee: Crosfield Electronics Limited.
Filed: Apr. 14, 1980.

Abstract—An optical modulator which is capable of passing the greatest intensity of light incident upon it when the light incident upon it is either unpolarized or has a partial or variable state of polarization, comprises a beam splitter (1) to resolve the light beam incident upon it into two plane polarized components having mutually perpendicular polarization states, one or more electro-optic cell or cells (2,18,19,22,23) which is or are arranged to receive both components of the light beam and, in use change the state of polarization of both of the components to a corresponding extent in dependence upon an electrical modulation signal applied to it or them. The optical modulator also includes analyzer means (1,17) arranged to receive the output from the electro-optic cell or cells (2,18,19,22,23) the arrangement being such that the intensity of the light output from the analyzer means (1,17) is a function of the change of the state of polarization generated in both components during their passage through the electro-optic cell or cells (2,18,19,22,23). The beam splitter and the analyzer means may be formed by the same piece of apparatus (1) and in this case the modulator preferably includes a half wave plate in the light path of both components to change their polarization states.

18 Claims, 16 Drawing Figures



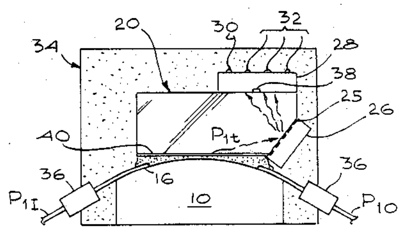
4,335,933 June 22, 1982

Fiber Optic Wavelength Demultiplexer

Inventor: John P. Palmer.
Assignee: General Dynamics, Pomona Division.
Filed: June 16, 1980.

Abstract—An optical fiber wavelength demultiplexer including an optical fiber mounted and adhered to a curved surface having a clad single fiber core, a planar surface extending partially into and along the fiber through the cladding, a prism mounted on the surface having a reflective diffraction grating surface positioned to receive signals from the fiber travelling in one direction and demultiplex such signals, and an array of photodiodes mounted adjacent the prism to receive the demultiplexed signals.

18 Claims, 7 Drawing Figures



4,318,586 Mar. 9, 1982

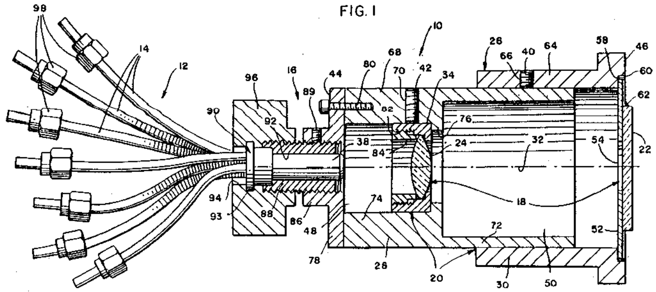
Distributive Couplers for Fiber Optics

Inventor: Lawrence J. Coyne.
Assignee: Bunker Ramo Corporation.
Filed: Apr. 3, 1980.

Abstract—A distributive coupler for use with at least one set of optical fibers includes a fiber optic terminal for supporting the end portions of each set of optical fibers. In a reflective mode, the coupler is adapted for use with one set of optical fibers by directing light transmitted through any one or more of the optical fibers back onto the set of optical fibers. A reflecting element is utilized to reflect transmitted light toward the set of optical fibers and a focusing element is utilized to focus reflected light onto the set of optical fibers. In a transmissive mode, the coupler is adapted for use with two sets of optical fibers by directing light transmitted through any one or more of the optical fibers onto the other set of optical fibers. A shaping element is utilized for shaping light transmitted toward the other set of optical fibers and a focusing element is utilized for focusing transmitted light onto the other set of optical fibers. The coupler also includes telescoping housing segments for adjusting the position of the optical elements relative to each fiber optic terminal. With these features of construction, the distributive coupler produces substantially uniform illumination of all of the optical fibers of a set of optical fibers.

22 Claims, 5 Drawing Figures

FIG. I



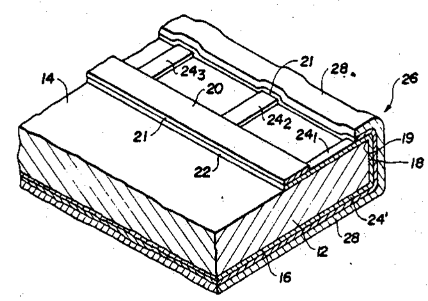
4,310,812 Jan. 12, 1982

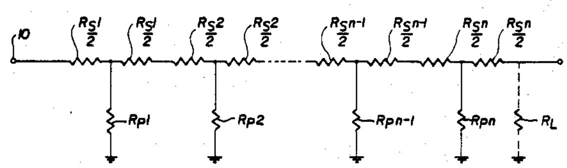
High Power Attenuator and Termination Having a Plurality of Cascaded Tee Sections

Inventor: Roger C. DeBloois.
Assignee: The United States of America as represented by the Secretary of the Army.
Filed: Aug. 18, 1980.

Abstract—An attenuator and termination having a relatively flat frequency response for attenuating and dissipating electrical energy is comprised of a plurality of cascaded tee attenuator sections formed on a substantially flat surface ceramic substrate comprised of alumina, for example. The attenuator sections are configured from a single thin film series resistor comprised of gold and a plurality of shunt resistors formed from a layer of cermet which underlies the gold film resistor. The cermet shunt resistors extend away from the series resistor to the side edge of the substrate where they terminate in a ground contact configuration which wraps around the side and lower surface of the substrate.

11 Claims, 4 Drawing Figures





4,303,303 Dec. 1, 1981

Mechanical Optical Switching Device

Inventor: Tsutomu Aoyama.
Assignee: Nippon Electric Company, Ltd.
Filed: Nov. 27, 1979.

Abstract—A mechanical switch for light transmitted over optical fibers has one input collimating and a pair of output converging lenses. One optical fiber

transmits incoming light, bearing information signals onto said input lenses. A first triangular prism path normally directs the incoming light emerging from the input lens onto one of the output lenses. A mechanical switch selectively inserts a parallelogram prism into a path followed by light emerging from the input lens in order to switch the light onto a second triangular prism and thereby direct the light to the other output lens, when the parallelogram prism is switched into the path from the input lens. Optical fibers are individually associated with each of the output lens for transmitting light which is outgoing from the mechanical switch.

11 Claims, 4 Drawing Figures