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.

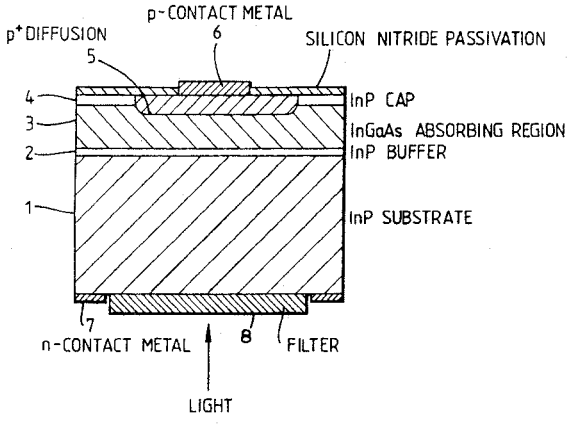
5,216,237 June 1, 1993

Optical Detector With Integral Filter and Having Fabry Perot Resonator System

Inventors: Simon Ritchie, Paul C. Spurdens, Mark D. Learmouth.
Assignee: British Telecommunications, plc.
Filed: Feb. 5, 1990.

Abstract—An optical detector such as a pin photodiode or avalanche photodiode is provided with an integral dielectric filter (8). The optical filter (8) preferably comprises a plurality of layers of silicon and silicon monoxide. If the detector is a PIN diode, the filter (8) may be provided on the underside of a substrate (1) before growth of the diode is commenced on the other side.

16 Claims, 4 Drawing Sheets



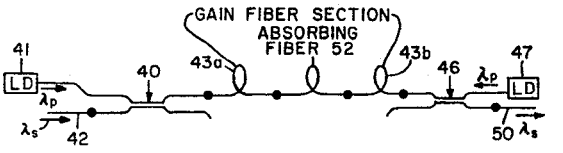
5,216,728 June 1, 1993

Optical Fiber Amplifier With Filter

Inventors: David Charlton, Douglas R. Cole, Douglas W. Hall.
Assignee: Corning Incorporated.
Filed: June 14, 1991.

Abstract—Disclosed is a fiber amplifier system including a gain fiber having a single-mode core doped with active dopant ions capable of producing stimulated emission of light at wavelengthλ_s when pumped with light of wavelength λ_p. Spliced to the gain fiber is a light-attenuating fiber having a core containing a dopant that attenuates light of wavelength λ_p but not λ_s. The amplifier is conventionally employed in a system including an incoming telecommunication fiber for introducing light of wavelength λ_s into an end of the gain fiber, the amplified signal being connected to an outgoing telecommunication fiber. The system further includes a pump source for introducing light of wavelength λ_p into an end of the gain fiber. Elements of the system can be arranged for forward pumping, counter pumping and dual ended pumping. Various interconnection schemes are disclosed for forming a series arrangement including the gain fiber, the attenuating fiber and the outgoing fiber.

21 Claims, 3 Drawing Sheets



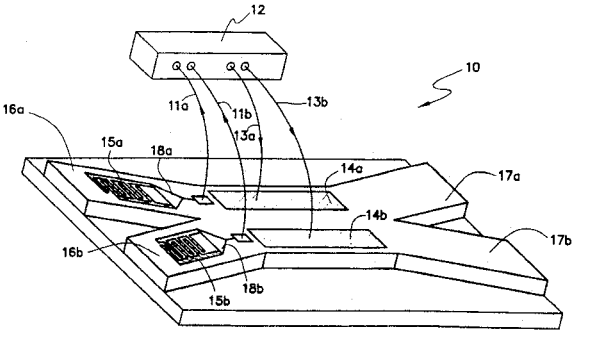
5,218,198 June 8, 1993

Optical Waveguide Switch Utilizing Means for Detecting a Tapped Off Fraction of the Input Signal

Inventors: Julian P. G. Bristow and Aloke Guha.
Assignee: Honeywell Inc.
Filed: June 8, 1992.

Abstract—An optical switch with a waveguide used as a detector is disclosed. The switch can be used for circuit or packet switching. The waveguide is used to tap off a fraction of the input signal going into the switch. The waveguide then sends the tapped off signal to a local electronic control to decide if switching is necessary or not. This is determined by within the local electronic control associated with the switch. The switch is set or reset based on information in the electrical representation of the signal which reaches the local electronic control. The switch can be used with continuous input signals as well as data packet input signals. By spacing the timing of data in the header differently than in the data in the "data" portion of a signal, extremely high bandwidth available in pure optical communications can be maintained.

21 Claims, 8 Drawing Sheets



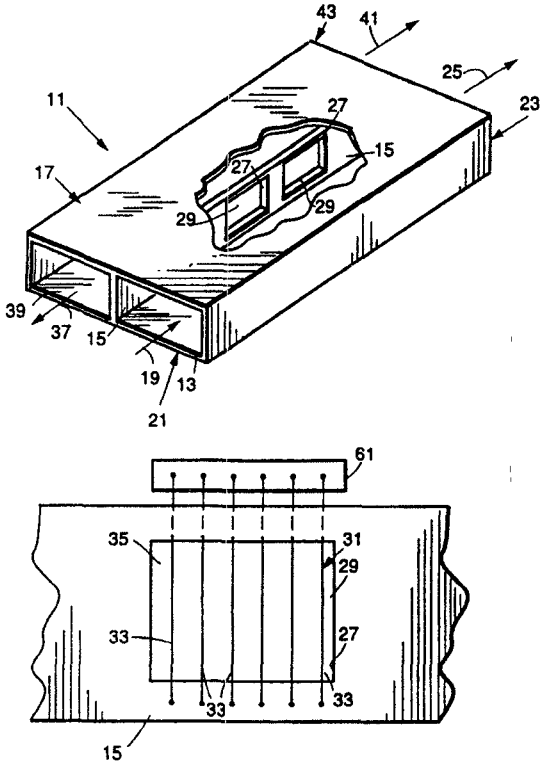
5,218,327 June 8, 1993

Variable/Switchable Coupler

Inventor: Matt Calabrese.
Assignee: Hughes Aircraft Company.
Filed: Mar. 27, 1991.

Abstract—A waveguide coupler wherein the coupling of power from one waveguide arm to an adjacent waveguide arm through an aperture in a common wall may be switched on and off at very high speed or controlled from zero to a maximum level by appropriately controlling how bias potential is applied to a reflective/absorptive element disposed in the aperture in the common wall.

7 Claims, 2 Drawing Sheets



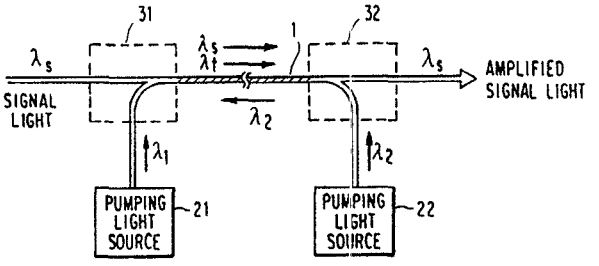
5,218,608 June 8, 1993

Optical Fiber Amplifier

Inventor: Yasuhiro Aoki.
Assignee: NEC Corporation.
Filed: Jan. 28, 1992.

Abstract—A signal light is coupled by a light coupler/splitter (31) with a 0.08 micron first pumping light (λ_1) generated by a first pumping light source (21), and the coupled light is launched into an Er-doped optical fiber (1). The signal light is optically amplified in the Er-doped optical fiber. A 1.48 micron second pumping light (λ_2) generated by second pumping light source (22) is launched into the Er-doped optical fiber (1) with a light coupler/splitter (32). This 1.48 micron pumping light contributes boost the amplified signal.

9 Claims, 2 Drawing Sheets



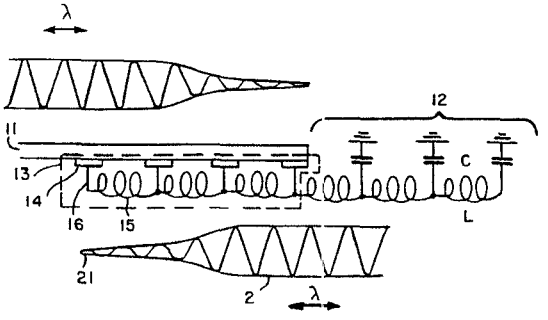
5,220,296 June 15, 1993

Coupler for Electrical Waveguides and Mechanical Waveguides

Inventors: Andreas von Flotow, Nesbitt Hagood, Tomas Valis.
Assignee: Massachusetts Institute of Technology.
Filed: Nov. 1, 1991.

Abstract—A system for coupling energy between electrical and mechanical waves includes a mechanical waveguide for propagating a mechanical wave having a mechanical wavelength at a given frequency, and an electromechanical energy converter for coupling energy between electrical and mechanical waves attached to a portion of the waveguide and capable of propagating an electrical wave having an electrical wavelength substantially equal to the mechanical wavelength at the given frequency. The portion has a length, measured in units of coupled wavelength, which is selected on the basis of the reciprocal of the coupling strength of the electromechanical converter and a selected amount of wave energy to be coupled. The function is based primarily on desired efficiency and may also be an odd integer multiple of the coupling strength reciprocal, preferably one. Piezoelectric elements are the preferred electromechanical energy conversion elements. This system is applicable to damping of structural waves, transferring structural waves from one mechanical waveguide to another, and for creating a linear motor.

24 Claims, 2 Drawing Sheets



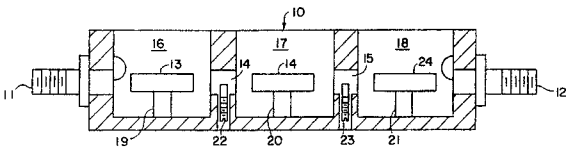
5,220,300 June 15, 1993

Resonator Filters With Wide Stopbands

Inventor: Richard V. Snyder.
Assignee: RS Microwave Company, Inc.
Filed: Apr. 15, 1992.

Abstract—A system for coupling two resonating cavities, where the coupling system provides a form of bandpass or bandstop filtering about the desired frequency mode and helps suppress undesired modes about the desired frequency mode and higher order modes. The system for coupling the two resonating cavities includes a tuned evanescent iris, where the tunability of the iris is provided by at least one tunable resonating capacitance element embedded in the iris.

16 Claims, 3 Drawing Sheets



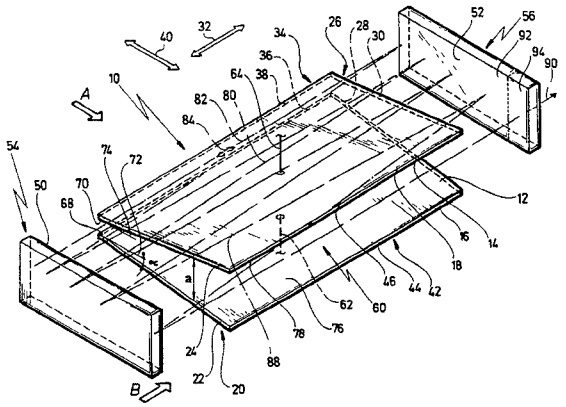
5,220,577 June 15, 1993

Waveguide Laser With Variable Waveguide Thickness

Inventor: Hams Opower.
Assignee: Deutsche Forschungsantalt fuer Luft und Raumfahrt e.V.
Filed: Aug. 15, 1991.

***Abstract*—**In order to improve a high-frequency excited high-power laser comprising two resonator mirrors arranged opposite one another, a gas discharge chamber, a waveguide having two reflecting waveguide surfaces located opposite one another and facing the gas discharge chamber and a beam path having an initial wave bundle, which expands with spatial coherence as a wave bundle system due to multiple back and forth reflection in a transverse direction between the waveguide surfaces, such that the expansion of the wave bundle system with spatial coherence in the transverse direction at right angles to the initial direction can be achieved by other means, it is suggested that the tangents at two first waveguide surface regions reflecting the initial wave bundle, these tangents extending at right angles to the initial direction, extend parallel to one another and that a distance between second waveguide surface regions following the first waveguide surface regions which reflect the initial wave bundle become steadily larger, proceeding from the distance between the first waveguide surface regions, over an expansion path in the direction of the transverse direction with increasing expansion of the wave bundle system.

17 Claims, 5 Drawing Sheets



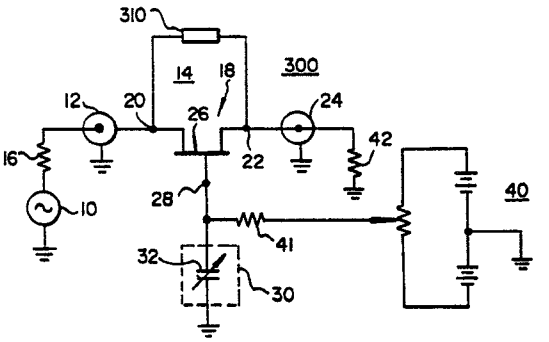
5,221,908 June 22, 1993

Wideband Integrated Distortion Equalizer

Inventors: Allen Katz and George P. Pallas.
Assignee: General Electric Co.
Filed: Nov. 29, 1991.

***Abstract*—**For use in a spacecraft for correcting amplifier distortion, a wideband distortion corrector avoids the need for directional couplers. The corrector includes a FET mounted in a miniature microwave-type housing. Signal flows through the source-to-drain channel. A gate impedance selected to be inductive at the operating frequency is coupled from the FET gate to the platform of the package, and may be simply a loop of bond wire. The channel connects by a strip transmission line to an amplifier, the distortion of which is to be corrected. For enhanced bandwidth, an inductor is coupled between the FET source and drain electrodes within the miniature housing. The platform of the package is coupled to the reference conductor of the transmission line. In one embodiment, direct bias voltage is applied by way of a bias tee across a strip transmission line and ground, and galvanic connections cause the bias to appear between the FET gate electrode and the channel.

12 Claims, 10 Drawing Sheets



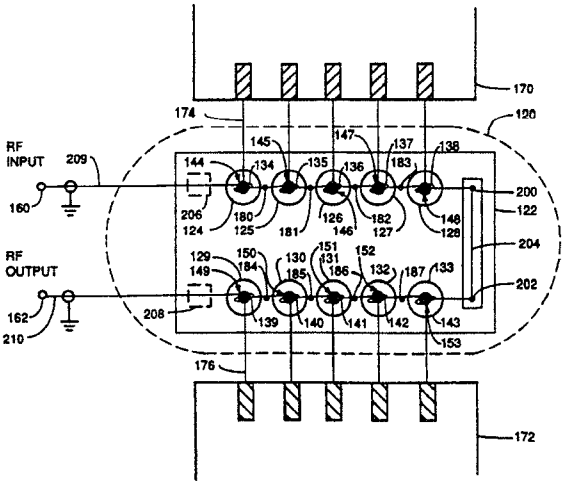
5,221,912 June 22, 1993

Yig Tuned Band Reject Filter for 2–18 GHz With Full One-Quarter Wavelength RF Coupling Loops

Inventors: William J. Keane, Christopher F. Schiebold, Dirk M. Hoekstra.
Filed: Oct. 24, 1993.

***Abstract*—**A YIG notch filter using full RF coupling loops and having a notch filter center frequency tunable as high as 18 GHz comprising a plurality of undoped YIG spheres of much smaller volume than used in the prior art and linearly arranged in an air gap. The spheres are suspended in cavities in a nonmagnetic block which are spaced much more closely than in the prior art. The 50 ohm stripline impedance inverters formed on a substrate and connecting the RF coupling loops of the spheres used in the prior art are eliminated. The quarter-wavelength impedance inverter function necessary to fabricate a notch filter is implemented by using the RF coupling loops themselves and measuring the distance from centerline to centerline of adjacent RF coupling loops. Twin insulated wires with up to one diameter separation for the RF coupling loops are preferred with the wires soldered together between the spheres.

28 Claims, 5 Drawing Sheets



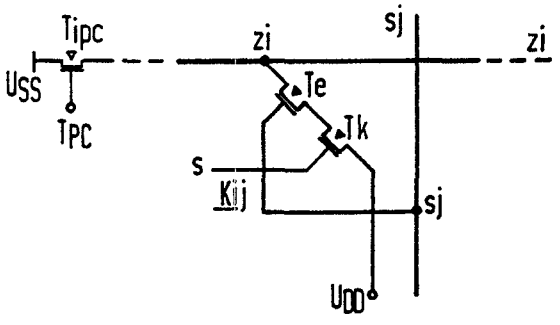
5,221,922 June 22, 1993

Broadband Signal Switching Matrix Network

Inventors: Gerhard Trumpp and Jan Wolkenhauer.
Assignee: Siemens Aktiengesellschaft.
Filed: Jan. 11, 1991.

***Abstract*—In a broadband signal switching matrix network having a cross-point matrix in FET technology whose switching elements, controlled by a holding memory cell, are each formed with a series circuit of a switching transistor and of an input transistor. Matrix output lines thereof are respectively connected to one terminal of the operating voltage source via a pre-charging transistor that is controlled by a pre-charging clock, that side of the series circuit connected opposite from the matrix output line being permanently connected to the other terminal of the operating voltage source (directly or via a transistor controlled by the output signal and individually associated to the matrix output line) in order to avoid sample clock lines that lead to the switching elements.**

6 Claims, 3 Drawing Sheets



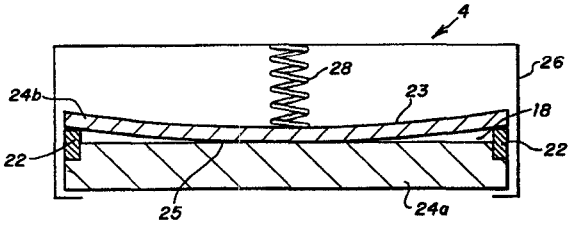
5,221,987 June 22, 1993

FTIR Modulator

Inventor: Richard H. Laughlin.
Filed: Apr. 10, 1992.

***Abstract*—A modulating device based on the principal of frustrated total internal reflection that functions over a wide range of angles and wave lengths. The modulator is comprised of two refractive elements that initially are in contact. The edges of the elements are forced apart by a piezo electric transducer and the elasticity of the second refracting element lifts the center of that element away from the first refracting element. The amount of reflection at the interface of the two refractive elements is a function of their spacing. This reflection is reduced to zero by the addition of a thin plastic layer on the surface of one of the refracting elements which allows total contact across the entire surface of the two refractive elements.**

24 Claims, 4 Drawing Sheets



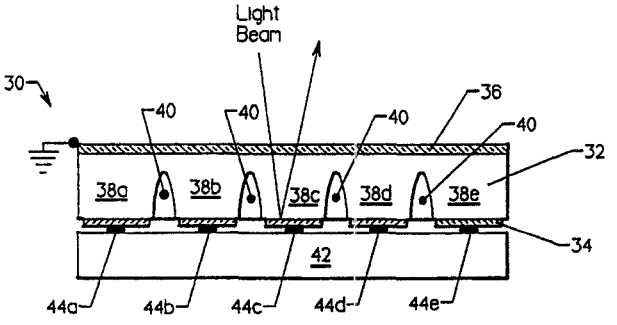
5,221,989 June 22, 1993

Longitudinal PLZT Spatial Light Modulator

Inventors: Eddy A. Stappaerts, William H. Steier, Gabriel G. Lombardi.
Assignee: Northrop Corporation.
Filed: Nov. 13, 1991.

***Abstract*—A spatial light modulator comprises a plate of non-ferroelectric PLZT ceramic. An array of pixels is formed by depositing a reflecting coating in the desired array on one side of the plate. A longitudinal electric field is applied so that the light entering the plate from the side opposite the reflecting coating experiences a polarization-independent refractive index change when the electric field is applied as it propagates parallel to the electric field. The required voltages may be decreased when a partially reflecting coating is deposited on the side opposite the reflecting coating. Grooves in the plate effectively isolate the pizels from electrical and mechanical crosstalk.**

11 Claims, 2 Drawing Sheets



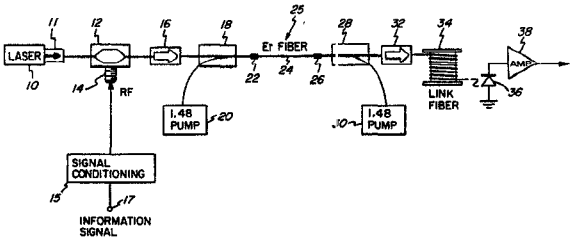
5,222,089 June 22, 1993

Optical Signal Source for Overcoming Distortion Generated by an Optical Amplifier

Inventor: David R. Huber.
Assignee: General Instrument Corporation.
Filed: Jan. 8, 1992.

***Abstract*—An amplified signal source is provided for transmitting modulated information signals over a fiber optic communication link, which may have high fiber dispersion. A continuous wave laser produces an optical carrier at a wavelength λ_2. The optical carrier is intensity modulated to provide a substantially chirp free output signal. The output signal is amplified in an optical amplifier and coupled for transmission over a link fiber that can have a minimum dispersion at a wavelength λ_2 that is different than λ_1. The nonzero gain slope of the optical amplifier does not significantly degrade the substantially chirp free output signal.**

18 Claims, 1 Drawing Sheet



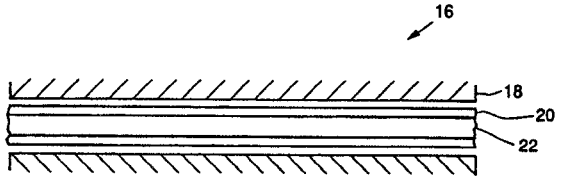
5,222,161 June 22, 1993

Method and Apparatus for Compressing a Light Pulse

Inventors: David B. Chang and Victor Vali.
Assignee: Hughes Aircraft Company.
Filed: Feb. 24, 1992.

Abstract—This invention discloses a method and apparatus for shortening the length of a pulse of light. Generally, the method entails altering the index of refraction of an optical medium (14) through which the pulse of light is traveling at an area of the medium (14) where the front end of the pulse of light is located, such that the front end of the pulse of light travels slower than the back end, thus enabling the back end to catch up with the front end in order to shorten the length of the pulse. To accomplish this, it is proposed to generate an electric field across the optical medium (14) by a charge carrying medium (12) positioned relative to the optical medium (14), such that the index of refraction is altered by the electro-optic effect. In addition, it is possible to alter the index of refraction of the optical medium (14) by surrounding the optical medium (14) with a piezoelectric material (20) and applying an electric field to the piezoelectric material (20) such that the piezoelectric material (20) compresses the optical medium (14), thus altering the index of refraction.

20 Claims, 1 Drawing Sheet



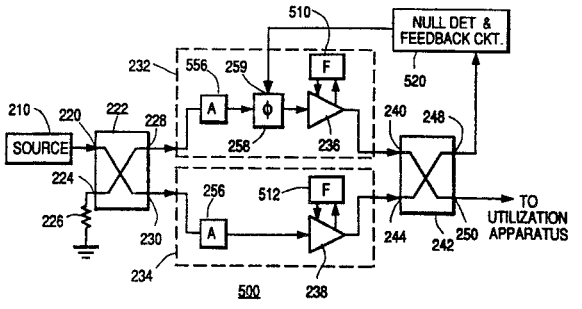
5,222,246 June 22, 1993

Parallel Amplifiers With Combining Phase Controlled From Combiner Difference Port

Inventor: Herbert J. Wolkstein.
Assignee: General Electric Company.
Filed: Nov. 2, 1990.

Abstract—A power amplifier arrangement includes a power divider for dividing the signal to be amplified into equal-amplitude components. Each component is amplified by a signal amplifying path. The amplified signals are applied to a phase-sensitive power combiner. The combined signal appears at the sum port and a phase-related difference signal appears at a difference port of the combiner. The difference signal is processed to produce a control signal for controlling the relative phases of the signals passing through the signal amplifying paths.

11 Claims, 5 Drawing Sheets



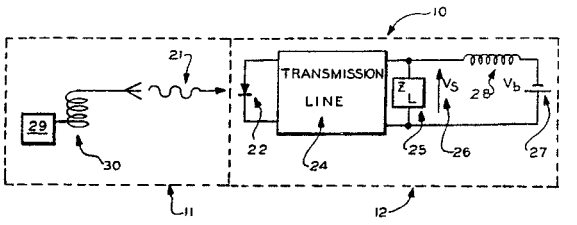
5,223,802 June 29, 1993

Optically Controlled Resonant Tunnel Diode Oscillator

Inventors: James F. Harvey, Robert A. Lux, Thomas P. Higgins, Arthur Paolella, Dana J. Sturzebecher.
Assignee: The United States of America as represented by the Secretary of the Army.
Filed: Apr. 1, 1992.

Abstract—An optically controlled resonant tunnel diode oscillator assembly having a resonant tunnel diode (RTD) which, when voltage biased, oscillates at a free running frequency; an optical signal delivery system, such as a light intensity modulator connected to optical fibers; and other oscillator circuitry which one skilled in the art could readily adapt to the concepts of the present invention. In operation, the free running oscillation of the RTD can be frequency modulated or can be intensity locked to the intensity modulated optical signal delivered via the optical signal delivery system.

9 Claims, 5 Drawing Sheets



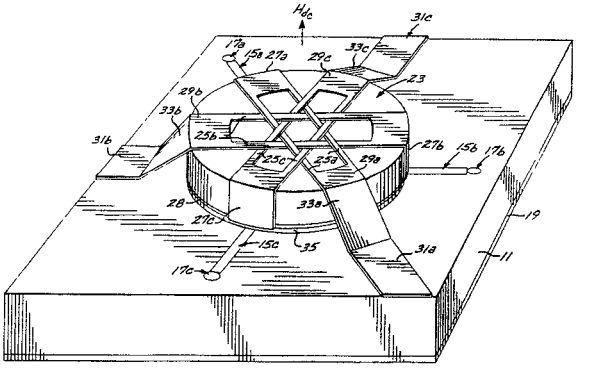
5,223,805 June 29, 1993

Common Node Reactance Network for a Broadband Cross Beam Lumped-Element Circulator

Inventors: Mark A. Talcott, Kim Poulson, Om Gandhi.
Assignee: Hughes Aircraft Company.
Filed: Oct. 11, 1991.

Abstract—A microwave circulator circuit having a multiple port lumped-element circulator, and a common node reactance network for coupling the lumped element circulator to the common ground plane of the microwave circuit with which the circulator circuit is utilized.

3 Claims, 5 Drawing Sheets



5,223,808 June 29, 1993

Planar Ferrite Phase Shifter

Inventors: Jar J. Lee and James V. Straham.
Assignee: Hughes Aircraft Company.
Filed: Feb. 25, 1992.

Abstract—A microwave ferrite phase shifter wherein three parallel microstrip lines are disposed on a planar ferrite substrate surface opposite a ground plane disposed on an opposite planar surface of the substrate, the lines defining two sets of quadrature E-fields within the substrate to produce a circularly polarized wave therein, the amount of phase shift between the input and output ports of the phase shifter being determined by the magnitude of a magnetic field produced in the substrate in the direction of its axis by a current-carrying coil, for example.

4 Claims, 2 Drawing Sheets