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.

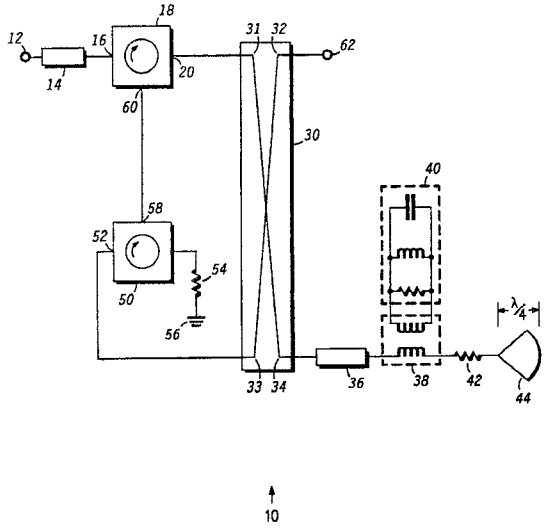
5,103,194 Apr. 7, 1992

Dielectric Resonator Feedback Stabilizer

Inventor: Bernard E. Sigmon.
Assignee: Motorola, Inc.
Filed: Dec. 24, 1990.

Abstract—A dielectric resonator feed back stabilizer comprising a circulator, 3-dB, 90° hybrid dielectric resonator, and isolator. The circulator provides an input electromagnetic signal from a source to the hybrid, which splits the input signal into two outputs with 90° relative phase difference. One hybrid output is to the load and the other is to a dielectric resonator with high Q. The dielectric resonator reflects a portion of the input signal corresponding to the dielectric resonator operating frequency back to the hybrid that splits the reflected signal into two outputs 90 degree relative phase difference. The first signal reflected back through the hybrid, 180 degrees out of phase with the hybrid input signal from the circulator, is cancelled by superposition with the hybrid input signal. The second reflected signal travels through an isolator to the circulator injection locks the source input signal.

20 Claims, 1 Drawing Sheet



10

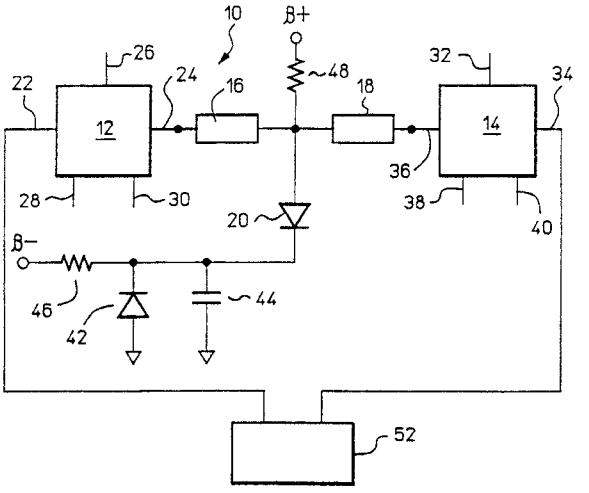
5,103,195 Apr. 7, 1992

Hybrid GaAs MMIC FET-PIN Diode Switch

Inventor: Joel P. Dunsmore.
Assignee: Hewlett-Packard Commpany.
Filed: Oct. 13, 1989.

Abstract—A hybrid transfer switch comprises at least a pair of GaAs MMIC FET SPDT switches coupled together by a transmission line. PIN diodes are coupled to the transmission line and to dc-bias circuitry. The hybrid switch performance closely approximates that of a mechanical/electromechanical transfer switch while providing improved repeatability.

27 Claims, 14 Drawing Sheets



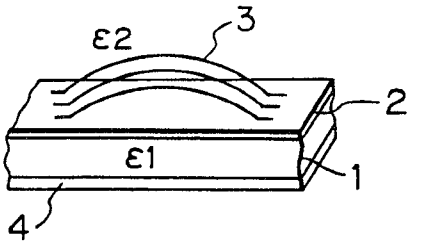
5,103,196 Apr. 7, 1992

Mimcrostrip Line Having a Changed Effective Line Length

Inventors: Yoshiaki Nakano and Akira Watanabe.
Assignee: Fujitsu Limited.
Filed: Nov. 19, 1990.

Abstract—A microstrip line having a shortened line length, includes at least one conductive wire connected between two desired points of a strip conductor through a medium having a second dielectric constant that is smaller than a first dielectric constant. The strip conductor is formed on a substrate that has the first dielectric constant. The effective length of the microsstrip line is therefore shorter than the physical length of the microstrip line.

10 Claims, 4 Drawing Sheets



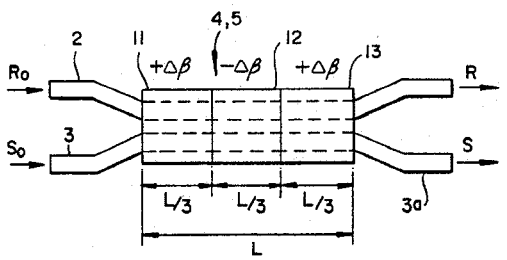
5,103,491 Apr. 7, 1992

Waveguide Type Optical Circuit Element

Inventor: Nobyuki Kuzuta.
Assignee: Shimadzu Corporation.
Filed: Jan. 4, 1990.

Abstract—A waveguide type optical circuit element having a directional coupler for converting light intensity between two waveguides, which is used as a polarity-independent optical switch or a variable optical divider for optical fiber communications and the like. The two waveguides (2), (3) have a coupling section length which is in a TE mode about three times a complete coupling length of the TE mode, and in a TM mode about one time a complete coupling length of the TM mode. Electrodes (4), (5) comprise three-part electrodes of different lengths which act as reverse $\Delta\beta$ electrodes for alternately reversing a direction of an electric field. This construction promotes the light-confinement effect of the waveguides, reduces the drive voltage necessary for carrying out an optical switching operation, and realizes optimal element characteristics in accordance with a ratio of variations in the propagation coefficient in the TE mode and TM mode of the directional coupler manufactured.

1 Claim, 10 Drawing Sheets



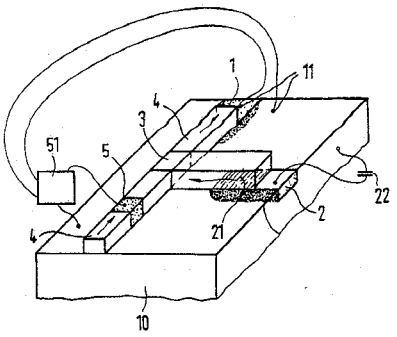
5,103,494 Apr. 7, 1992

Optoelectronic Arrangement

Inventor: Albrecht Mozer.
Assignee: Alcatel N.V.
Filed: July 10, 1990.

Abstract—Optical components made of inorganic crystals, e.g., lithium niobate, have the drawback that they cannot be integrated on a semiconductor substrate. In addition to linear optical characteristic, polymer plastics also have strong, nonlinear characteristics. According to the invention, these plastics are integrated on a semiconductor substrate and serve as polarizers, modulators, optical switches, etc. Additionally, they require less space than prior art crystals.

9 Claims, 1 Drawing Sheets



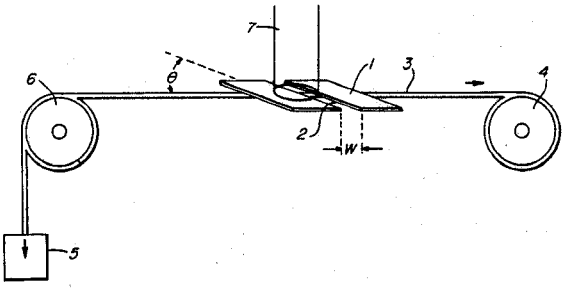
5,104,209 Apr. 14, 1992

Method of Creating an Index Grating in an Optical Fiber and a Mode Converter Using the Index Grating

Inventors: Kenneth O. Hill, Bernard Malo, Francois Bilodeau, and Derwyn C. Johnson.
Assignee: Her Majesty the Queen in right of Canada, as represented by the Minister of Communications.
Filed: Feb. 19, 1991.

Abstract—This invention relates to a method of creating an index grating in an optical fiber comprising disposing a slit mask containing one or more slits over a side of an optical fiber, illuminating the fiber through the slit mask by substantially monochromatic ultraviolet light for a short interval, whereby an index grating line is created and stored in the core of the fiber.

25 Claims, 3 Drawing Sheets



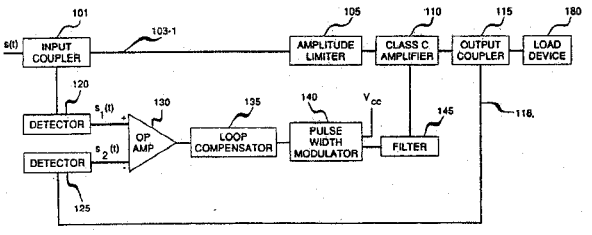
5,105,164 Apr. 14, 1992

High-Efficiency UHF Linear Power Amplifier

Inventors: Reed E. Fisher and Michael J. Koch.
Assignee: AT&T Bell Laboratories.
Filed: Feb. 28, 1989.

Abstract—An RF amplifier for a phase and envelope varying signal employs a class C operated device for high efficiency. In order to improve the linearity of the class C operated device, a signal corresponding to the envelope of the amplifier output is formed and a portion thereof is fed back to an envelope modulation element such as a pulse width modulator connected to the class C operated device to reduce distortion at the amplifier output.

6 Claims, 5 Drawing Sheets



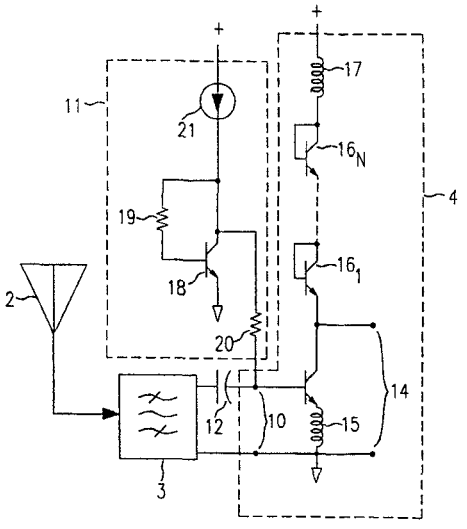
5,105,165 Apr. 14, 1992

Low-Distortion, Low-Noise Amplifier

Inventor: David E. Bien.
Assignee: AT&T Bell Laboratories.
Filed: Dec. 17, 1990.

Abstract—A bipolar or field-effect transistor amplifier with very large dynamic range for use as a preamplifier in a radio receiver, optical link receiver, or the like. The amount of gain is approximately an integral number. Diode-connected transistors in the collector load circuitry of a gain-providing transistor cancel the distortion from the nonlinear effects of the emitter-base junction of the gain-providing transistor at high input signal levels. The number of diodes corresponds to the amount of gain desired. To reduce the noise generated by the amplifier, the emitter of the gain-providing transistor has an inductor in series therewith and the collector load circuitry has an inductor therein, the ratio of the inductances substantially determining the gain of the amplifier.

5 Claims, 2 Drawing Sheets



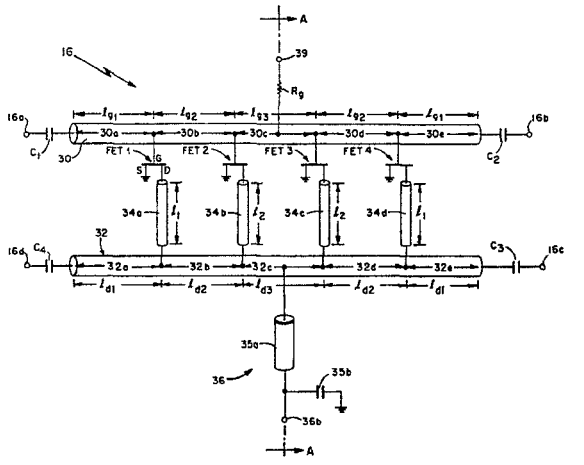
5,105,166 Apr. 14, 1992

Symmetric Bidirectional Amplifier

Inventors: Toshikazu Tsukii, S. Gene Houng, and Manfred J. Schindler.
Assignee: Raytheon Company.
Filed: Mar. 26, 1991.

Abstract—A transceiver module includes a bidirectional amplifier having a pair of symmetric signal paths for amplification of both transmit and receive signals is described. The amplifier is a bi-directional amplifier and includes a pair of symmetric signal paths. The amplifier is disposed between a pair of RF switches to provide a pair of signal paths between two terminals of the module. A phase shifter is coupled between one of the terminals of the module and one of the RF switches, wherein the second terminal of the module is coupled directly to the other one of the pair of switches.

21 Claims, 7 Drawing Sheets



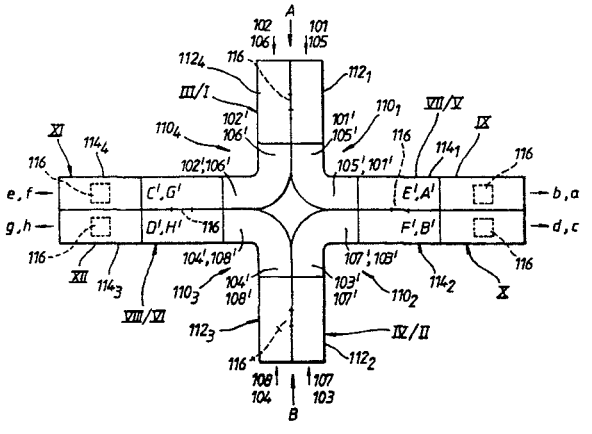
5,105,170 Apr. 14, 1992

Waveguide Coupling Networks

Inventor: Jai S. Joshi.
Assignee: British Aerospce Public Limited Company.
Filed: July 13, 1990.

Abstract—A waveguide coupling network for the output or input network of a shared power amplification module comprises a plurality of waveguides interconnected by side or top wall coupling to make up a network in which the phase and amplitude coherence of the network is substantially preserved.

6 Claims, 9 Drawing Sheets



5,105,171 Apr. 14, 1992

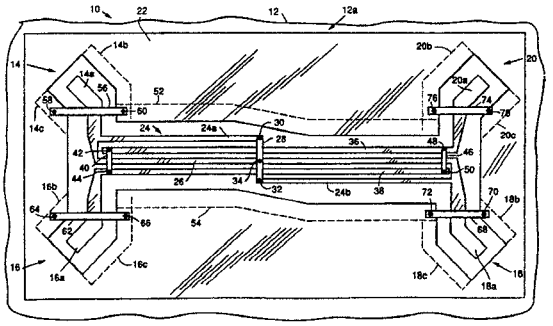
Coplanar Waveguide Directional Coupler and Flip-Clip Microwave Monolithic Integrated Circuit Assembly Incorporating the Coupler

Inventors: Cheng P. Wen and Gregory S. Mendolia.
Assignee: Hughes Aircraft Company.
Filed: Apr. 29, 1991.

Abstract—A coplanar waveguide directional coupler (116, 134) may be formed on a surface (102*a*, 106*a*) of a substrate (102) and/or a microwave monolithic integrated circuit (MMIC) chip (106), with the MMIC chip (106)

being flip-chip mounted on the substrate (102). The directional coupler (116, 134) includes an input port (114, 136), a coupled port (126, 154), a direct port (122, 152) and an isolation port (1118, 150) formed on the surface (102*a*, 106*a*). At least two parallel first striplines (24, 26) are formed on the surface (102*a*, 106*a*), having first ends connected to the input port (114, 136) and second ends connected to the direct port (122, 152). At least two parallel second striplines (36,38) are formed on the surface (102*a*, 106*a*), having first ends connected to the coupled port (126, 154) and second ends connected to the isolation port (118, 150). The second striplines (36, 38) are interdigitated with the first striplines (24, 26) to provide tight signal coupling therebetween. First and second main ground planes (52, 54) are formed on the surface (102*a*, 106*a*) and extend parallel to and on opposite respective sides of the interdigitated first and second striplines (24, 26, 36, 38). The input port (114, 136), coupled port (126, 154), direct port (122, 152) and isolation port (118, 150) each include a coplanar waveguide section having a center conductor (14*a*, 16*a*, 18*a*, 20*a*) connected to the ends of the respective striplines (24, 26, 36, 38), and first and second ground planes (14*b*, 14*c*), (16*c*, 16*c*), (18*b*, 18*c*, (20*b*, 20*c*) that extend parallel to the center conductor (14*a*, 16*a*, 18*a*, 20*a*) on opposite sides thereof and are connected in circuit to the main ground planes (52, 54).

12 Claims, 3 Drawing Sheets



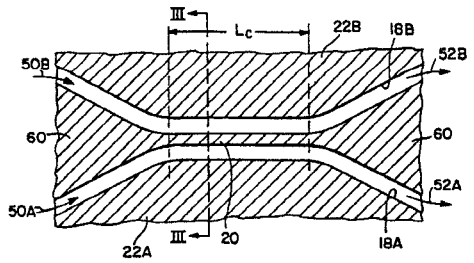
5,105,232 Apr. 14, 1992

Quantum Field-Effect Directional Coupler

Inventors: Jesûs A. del Alamo and Cristopher C. Eugster.
Assignee: Massachusetts Institute of Technology.
Filed: Mar. 28, 1991.

Abstract—A quantum field-effect directional coupler is described comprised of two quantum waveguides closely spaced apart with an adjacent gate electrode over the space between waveguides. The coupling of electron probability density between waveguides is controlled by the voltage applied to the gate electrode. The coupler implements a voltage-controlled current switch Several couplers can be connected to perform multiplex/demultiplexing functions.

16 Claims, 5 Drawing Sheets



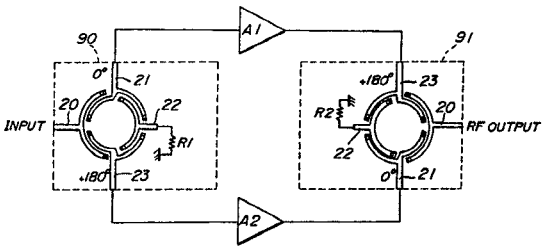
5,107,223 Apr. 21, 1992

Phase Inverter and Push–Pull Amplifier Using the Same

Inventors: Fuminori Sakai and Hidetake Suzuki.
Assignee: Fujitsu Limited.
Filed: Jan. 18, 1990.

Abstract—A phase inverter includes first, second, third, and fourth terminals, a first coupling circuit coupled between the first and second terminals, a second coupling circuit coupled between the second and third terminals, a third coupling circuit coupled between the third and fourth terminals, and a fourth coupling circuit coupled between the first and fourth terminals. The first to fourth terminals and the first to fourth coupling circuits are arranged into a ring. The first coupling circuit is of a type different from a type of the fourth coupling circuit. The second and third coupling circuits are identical in type. Two output signals having a phase difference of 180° are drawn from the second and fourth terminal when an input terminal is applied to the first terminal, and an output signal is drawn from the first terminal when two input signals having a phase difference of 180° are applied to the second and fourth terminals. A push–pull amplifier using two phase inverter each having the previously mentioned configuration is also provided.

28 Claims, 15 Drawing Sheets



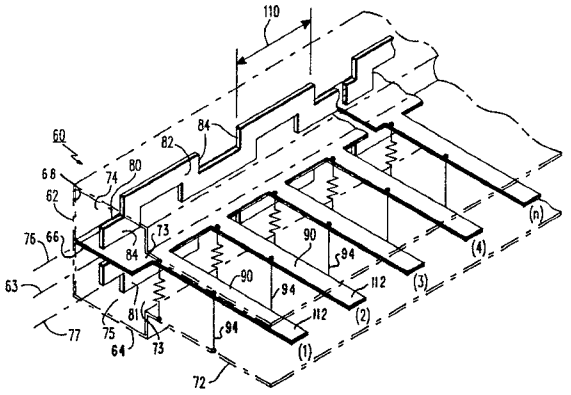
5,107,232 Apr. 21, 1992

Wide-Band Stripline Divider Having Meander Input Lines Disposed in a Trough

Inventor: Gary E. Evans.
Assignee: Westinghouse Electric Corp.
Filed: July 2, 1990.

Abstract—A wide bandwidth microwave power divider is formed of a conductive enclosure having a longitudinal axis and a common wall lying therealong forming a pair of partially enclosed compartments. A pair of isolated input meander striplines having longitudinally spaced antisymmetrically disposed jogs at which power is radiated lie on opposite sides of the common wall. A plurality of output striplines one each in the vicinity of a jog are coupled to the common wall and extend outwardly of the trough. The striplines are responsive to carry the radiated signal or power from the input. A pair of parallel ground planes extend from the trough on opposite sides of the output striplines to confine the signal or power. Termination means near a proximal end of the striplines extend between the ground planes for electrically isolating the trough. A load extends between the ground planes for absorbing any imbalance in the power radiated to the striplines.

10 Claims, 4 Drawing Sheets



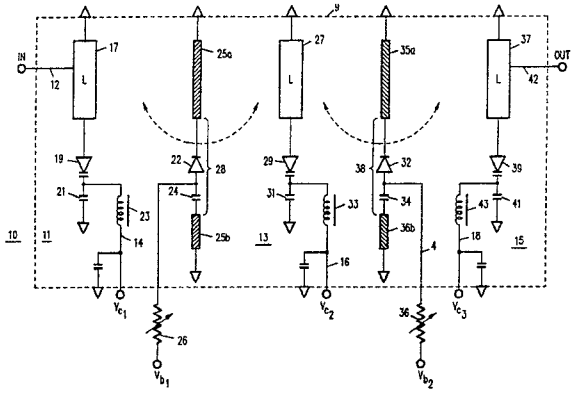
5,107,233 Apr. 21, 1992

Amplitude Correction of Field Coupled Varactor-Tuned Filters

Inventor: David E. Stoft.
Assignee: Hewlett-Packard Company.
Filed: Oct. 15, 1990.

***Abstract*—In a multistage, varactor-tuned bandpass filter utilizing electromagnetic field coupling between successive filter stages, the effective area of a coupling window provided in the RF shielding separating the filter stages is varied as a function of the varactor tune voltage to provide a flat frequency response over the filter frequency range. The bias current through a PIN diode connected across the coupling window is controlled by varactor tune voltage to effectively decrease the window area with increasing filter frequency.**

11 Claims, 5 Drawing Sheets



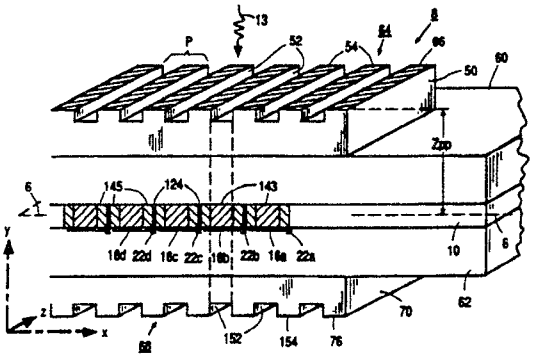
5,107,357 Apr. 21, 1992

Low Insertion Loss Optical Beam Steerer

Inventors: William J. Cassarly and John C. Ehlert.
Assignee: General Electric Company.
Filed: Jan. 18, 1991.

***Abstract*—An optical beam scanner or spoiler includes an array of electrically controlled liquid crystal phase shifters. Each element of the phase shifter includes an active region where proper phase shift occurs, and also includes another region, generally near the edges of the element, in which light transmission does not occur or in which improper modulation results. The inefficient regions reduce the light transmission or modulation efficiency of the array. An aperture illuminator includes a Talbot plane phase plate (also known as a Fresnel image phase plate) interposed between the incident light beam and the liquid crystal array. The phase plate includes a transparent substrate with a binary pattern of regions of relatively higher and lower index of refraction in a repeating pattern with a period P. In a particular embodiment of the invention, the regions are physically raised and lowered portions of a surface. The phase plate generates an interference pattern of energy maxima and minima, and is located so the maxima fall on the active regions of the liquid crystal array, and the minima on the inactive portions. A second phase plate similar to the first (or a second pass through the first phase plate in a reflective system) reduces the magnitude of far-field grating lobes created by the first phase plate.**

10 Claims, 5 Drawing Sheets



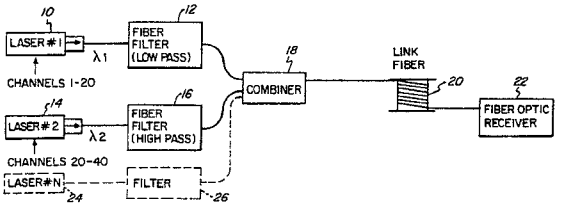
5,107,360 Apr. 21, 1992

Optical Transmission of RF Subcarriers in Adjacent Signal Bands

Inventor: David R. Huber.
Assignee: General Instrument Corporation.
Filed: Nov. 5, 1990.

***Abstract*—Apparatus is provided for optically transmitting a plurality of AM modulated RF subcarriers in adjacent octaves. A first laser is modulated to produce a first optical output signal containing a plurality of subcarriers in a first octave. A second laser is modulated to produce a second optical output signal containing a plurality of subcarriers in a second octave. The first output signal is optically filtered to attenuate distortion products falling in the second octave. The second output signal is optically filtered to attenuate distortion products falling in the first octave The filtered first and second output signals are combined for communication over an optical transmission medium. Where the transmission medium is a single-mode optical fiber, filtering can be accomplished using single-mode transversal filters.**

20 Claims, 2 Drawing Sheets



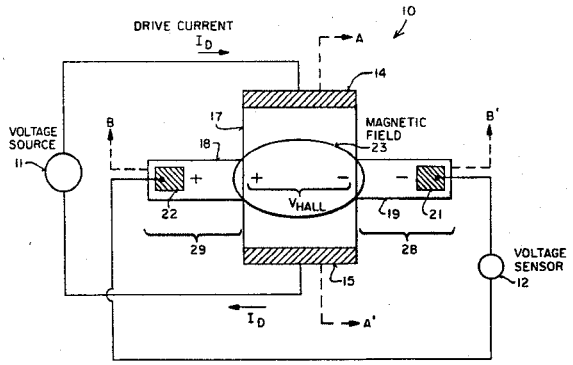
5,107,460 Apr. 21, 1992

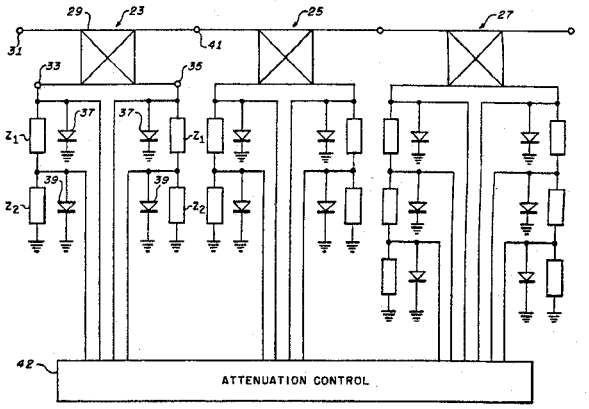
Spatial Optical Modulator

Inventor: James A. Matthews.
Assignee: MicroUnity Systems Engineering.
Filed: June 11, 1990.

Abstract—An optical modulator utilizing a magnetic semiconductor device, whose operation is based on the Hall effect, includes a magnetic material formed on a semiconductor substrate. When an incoming beam of light having a dominant polarization direction is directed onto the magnetic material it becomes modulated. The result is an outgoing beam of light which has a rotated plane of polarization when compared to the dominant polarization direction. The direction of the rotated plane of polarization is indicative of the information stored in the magnetic material. The modulator of the present invention further includes a means for writing the information to the magnetic material and a semiconductor sensor means for electrically verifying the contents of the magnetic material.

14 Claims, 10 Drawing Sheets





5,109,232 Apr. 28, 1992

Dual-Frequency Antenna Feed with Apertured Channel

Inventor: Thomas D. Monte.
Assignee: Andrew Corporation.
Filed: Feb. 20, 1990.

Abstract—A dual-band feed arrangement for a microwave antenna provides microwave communication in a lower band and in a substantially widened upper band to provide simultaneous microwave communication for three signals. One signal in the lower band propagates between the outer and inner conductors of a coaxial waveguide in the TE_{11} coaxial mode, and two signals in the upper band propagate in the inner conductor in TE_{11} circular waveguide mode. A combiner, having a conically shaped section with a plurality of irises through its sidewall, is coupled to the coaxial waveguide to provide a transformation from the TE_{11} modes to the HE_{11} waveguide modes for each of the three signals. A dielectric rod extends from within the inner conductor and into the horn antenna for propagating the second signal out of and into the antenna.

23 Claims, 4 Drawing Sheets

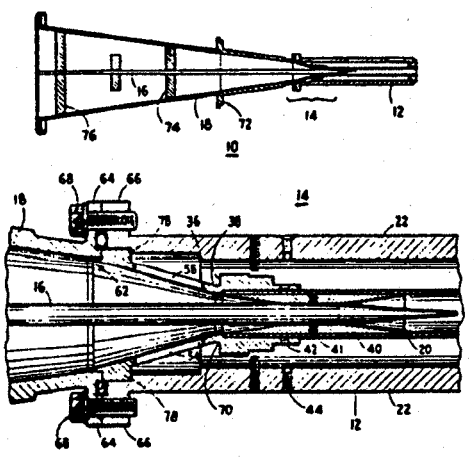
5,109,204 Apr. 28, 1992

High-Power RF Precision Attenuator

Inventor: Lyndon Keefer.
Assignee: Honeywell Inc.
Filed: Dec. 3, 1990.

Abstract—A precision variable attenuator includes quadrature hybrid circuits, each having a first pair of isolated ports corresponding to the input and output ports of the attenuator. The second pair of isolated ports each are terminated with variable impedances in a manner to provide equal reflection coefficients at each port. Signals incident to the input port are coupled to the second pair of isolated ports and reflected therefrom to be coupled to the output port.

9 Claims, 2 Drawing Sheets



5,109,441 Apr. 28, 1992

Fiber-Optic External Modulator

Inventor: Joseph B. Glaab.
Assignee: General Instrument Corporation.
Filed: Jan. 18, 1991.

Abstract—An improved external optical modulator provides reduced noise and distortion. An optical carrier to be modulated is split into a plurality of portions. A first portion of the carrier is modulated with an information signal. A second portion of the carrier is processed to provide an attenuating signal. The modulated carrier portion is combined with the attenuating signal to provide an attenuated optical carrier having improved apparent percentage modulation. In a preferred embodiment, the first carrier portion comprises a substantially greater amount of optical carrier power than the second carrier portion.

15 Claims, 2 Drawing Sheets