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.

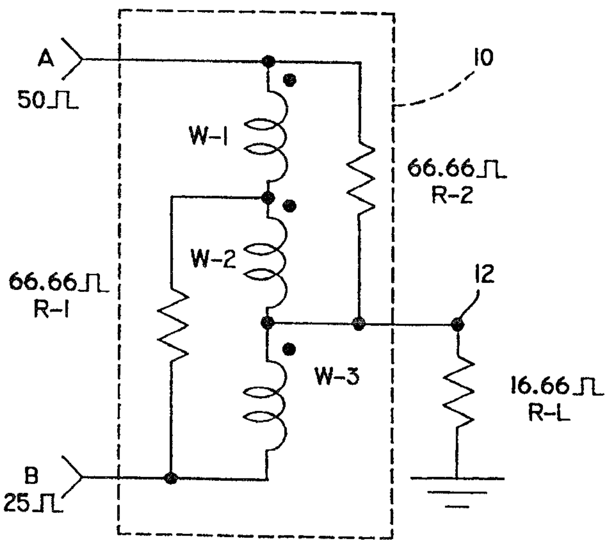
5,334,957 Aug. 2, 1994

RF High Power, Two and Three Way in Phase Combiner and Method

Inventor: Floyd A. Koontz.
Assignee: Harris Corporation.
Filed: Nov. 9, 1992.

Abstract—Two unequal impedance input port RF power combiner is used alone or as a component of a three equal input impedance input port RF power combiner with isolation between all ports. The combiner has a band pass of at least two octaves and the capacity to handle at least 5 kw. The combiner may be used in a transmission system and methods of isolation of the input ports by the resistive shunting of selected transformer windings are disclosed.

40 Claims, 1 Drawing Sheet



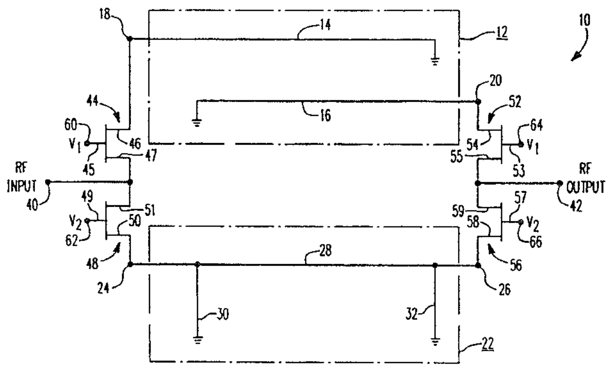
5,334,959 Aug. 2, 1994

180 Degree Phase Shifter Bit

Inventors: David M. Krafcsik and David W. Chan.
Assignee: Westinghouse Electric Corporation.
Filed: Apr. 15, 1993.

Abstract—An improved 180° phase shifter bit that uses embedded switches to selectively connect the RF input and RF output to a loosely coupled transmission line segment and a pi section of transmission line. A hybrid coupler is selected having characteristic impedance of less than 50 ohms and having coupling of less than −3 db. The result of this coupling choice is extremely low insertion loss. The resultant impedance mismatch is compensated for by providing oversized field effect transistors that allow RF signal in both the grounded coupler and the pi section of transmission lines that are 180° out of phase. The RF signal present in both the coupler and pi section of the transmission line results in a cancellation effect allowing recovery of the input/output impedance over an approximately one octave bandwidth.

9 Claims, 2 Drawing Sheets



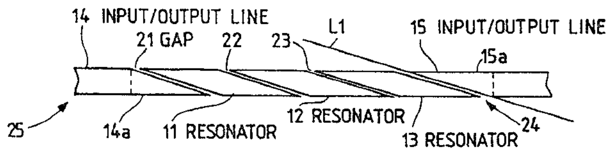
5,334,961 Aug. 2, 1994

Strip-Line Type Bandpass Filter

Inventors: Hirokazu Shirai, Morikazu Sagawa, Mitsuo Makimoto.
Assignee: Matsushita Electric Industrial Co., Ltd.
Filed: Aug. 6, 1992.

Abstract—A first bandpass filter comprises: a plurality of resonators and input/output lines formed such that a strip line formed in a substantially straight line is cut in an inclined direction to the straight line to form a plurality of resonators spaced apart by gaps, the resonators being coupled across the gaps. Each of the resonators may be formed in parallelogram. Each of the resonators may be formed in a substantial isosceles triangle. A second bandpass filter comprises: a plurality of resonators and a ground electrode, each of the resonators having an open-end strip line, one end of each of the strip line being connected to the ground electrode, width of each gap between the resonators varying along the each of resonators to make either of electrostatic or electromagnetic coupling between the resonators stronger than the other.

6 Claims, 4 Drawing Sheets



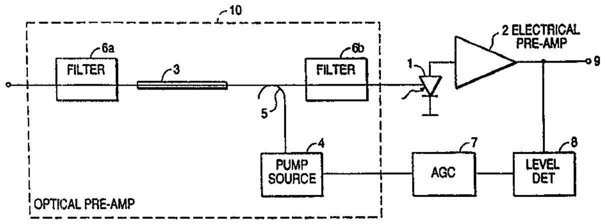
5,335,109 Aug. 2, 1994

Optical Receiver with Extended Dynamic Range

Inventor: Rolf Heidemann.
Assignee: Alcatel N.V.
Filed: Feb. 19, 1993.

Abstract—An optical amplifier is provided through which an incoming optical signal passes before entering an optical-to-electric transducer. The level of the optical signal output by the optical amplifier is controlled by a controller based on the electrical signal output by the transducer.

15 Claims, 1 Drawing Sheet



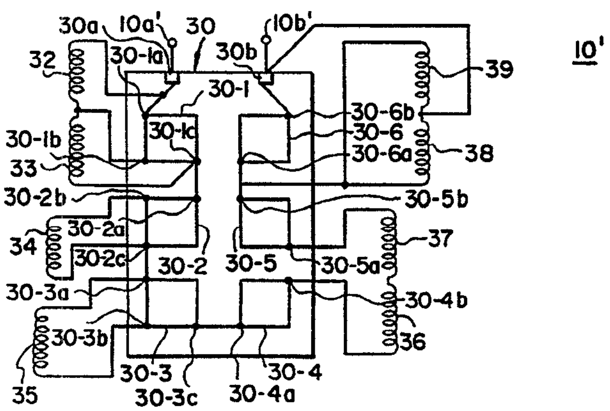
5,337,027 Aug. 9, 1994

Microwave HDI Phase Shifter

Inventors: Mooshi R. Namordi, Mark R. Lang, Michael J. Fithian.
Assignee: General Electric Company.
Filed: Dec. 18, 1992.

Abstract—A microwave phase shifter has a plurality of sequentially arranged, independently-actuatable sections, the total phase shift is the sum of all of the sections. The phase shifter has a common substrate, supporting several switching elements, with at least one switching element being assigned to each phase section; the switching elements are fastened to the common substrate with the element connections are all substantially in a first plane above the substrate. A first layer of a dielectric material is affixed adjacent to the first plane. Phase shift elements, such as microstriplines of a known length or inductive patterns of conductor, imparting the desired section phase shift, are fabricated upon a surface of the first dielectric layer furthest from the substrate, and are interconnected to and from the sections, or onto or off of the phase shifter at this level. Connections between the phase-shift elements and the switching element connection pads are by conductive pathways in this plane, with conductive vias formed through the intervening dielectric material. An additional dielectric layer is placed over the phase element conductive patterns, both for element protection and to support either control wiring, which can be routed as required in another surface plane and connected down to the control connection pads using other via connections, and/or for supporting a ground plane helping to define microstripline phase-shift elements.

17 Claims, 2 Drawing Sheets



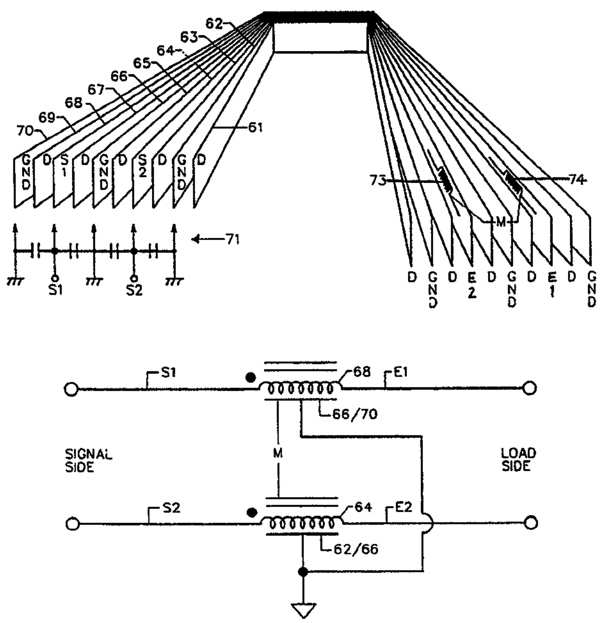
5,337,028 Aug. 9, 1994

Multilayered Distributed Filter

Inventor: Curtis B. White.
Assignee: Sundstrand Corporation.
Filed: May 27, 1992.

Abstract—The present invention reduces the volume and weight of capacitive and inductance devices, particularly used in filters, by combining the capacitive elements and inductive elements into the same construction. Accordingly, alternating conducting and dielectric sheets of material are wound into a coil. The conducting sheets can be variously connected to signal lines and to ground in order to form common mode, differential mode and/or mixed mode filters.

16 Claims, 9 Drawing Sheets

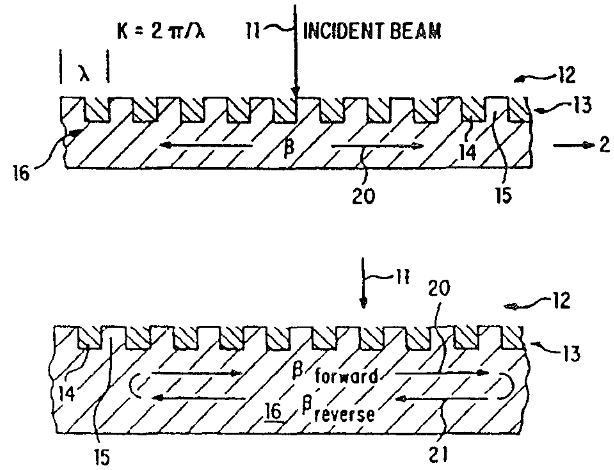


5,337,183 Aug. 9, 1994

Distributed Resonant Cavity Light Beam Modulator

Inventor: David Rosenblatt.
Assignee: Yeda Research and Development Co. Ltd.
Filed: Oct. 20, 1992.

Abstract—An optical apparatus consisting of a laser for producing a coherent polarized beam of electromagnetic radiation of a preselected wavelength. A substrate of silicon has a first transparent cover layer for receiving the polarized beam substantially normally incident thereto, and a second transparent guide layer for receiving the polarized beam from the first layer and for supporting at least one resonant mode. The first and second layers have a preselected index of refraction and a grating is interposed between them, having a grating period less than half the preselected wavelength. The layers and grating interact to produce a standing wave resonance by Bragg reflection. A control obtains a resonance wavelength in the guide layer equal to the predetermined radiation wavelength and thereby high reflectance to modulate the polarized beam. The grating can be optimized for angular bandwidth by controlling the grating's Fourier components either in a single layer or in two grating layers which can also include a termination.



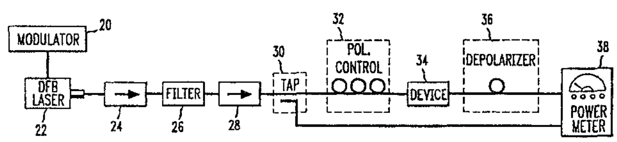
5,337,375 Aug. 9, 1994

Depolarizer Using Unpumped, Doped Optical Fiber and Method Using Same

Inventors: Bruce M. Nyman and Gregory M. Wolter.
Assignee: AT&T Bell Laboratories.
Filed: Dec. 31, 1992.

Abstract—Previous efforts to measure polarization dependent loss of optical components have been limited in uncertainty to more than 0.01 dB. This is because the power meter used in a test set contains polarization dependent loss which adversely affects the final readings. It is here disclosed that an unpumped erbium doped fiber can convert a received polarized signal into unpolarized amplified spontaneous emission of a longer wavelength if the fiber is of sufficient length to absorb the received signal. By locating the inventive unpumped erbium-doped fiber upstream of the power meter of a test set, the polarized signal to the power meter is coverted to an unpolarized signal and, therefore, the polarization dependent loss of the power meter can not influence the measurement obtained.

12 Claims, 2 Drawing Sheets



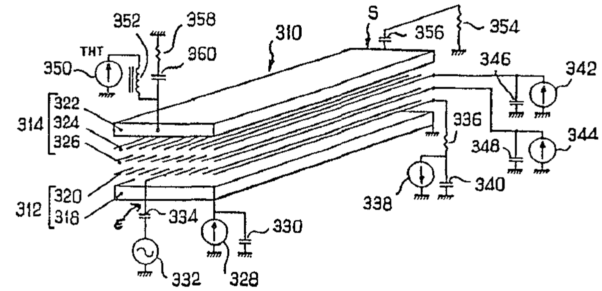
5,339,043 Aug. 16, 1994

Wave Propagation Signal Transmission Device and Applications of the Device to the Amplification of Such Signals

Inventor: Jacques Chahbazian.
Assignee: Prana Recherche et Development.
Filed: Dec. 20, 1991.

Abstract—The wave propagation signal transmission device according to the invention comprises two coupled distributed-constant wave propagation lines. The lines include active members of amplifying signals in transit in the form of linear and continuous components in parallel relationship. In particular, a cathode **318**, and control grid **320**, decoupling/accelerating screen grids **324**, **326**, receive at E, HF signals to be amplified, and an anode **322** delivers, at *S*, amplified signals. Possible uses of the device according to the invention are high power and very wide band HF amplification and the generation of electromagnetic pulses very steep rise front and of long duration.

5 Claims, 3 Drawing Sheets



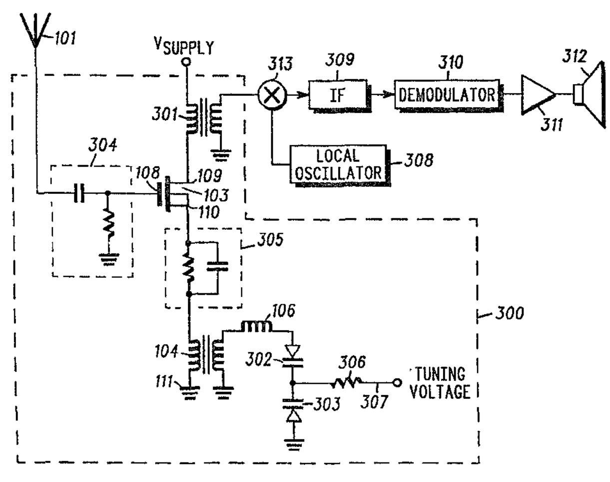
5,339,048 Aug. 16, 1994

Radio Frequency Amplifier

Inventor: Paul J. Weber.
Assignee: Motorola, Inc.
Filed: May 3, 1993.

Abstract—An amplifier for amplifying RF signals comprises a transistor, a first impedance, an impedance transformer, and a tuned resonant circuit. The amplifier receives the RF signals via a signal terminal of the transistor, wherein the RF signals are amplified by the transistor, the tuned circuit, the first impedance, and the impedance transformer. The degree of amplification is based on the impedance ratio between the impedance transformer and the first impedance, wherein the first impedance may be an output impedance matching transformer.

11 Claims, 1 Drawing Sheet



5,339,187 Aug. 16, 1994

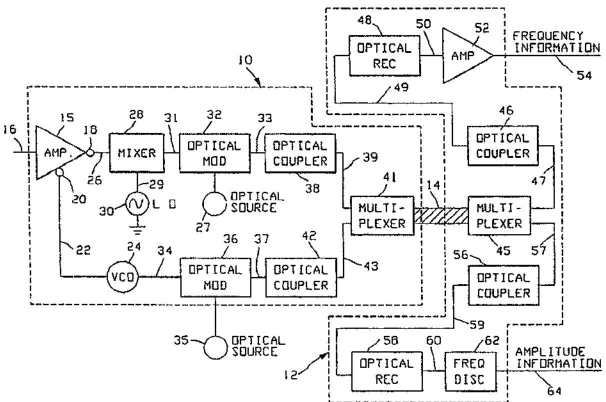
Wide Dynamic Range High Frequency Signal Transmission Utilizing a Logarithmic Amplifier

Inventor: George F. Nelson.
Assignee: Unisys Corporation.
Filed: Sept. 14, 1992

Abstract—A logarithmic video detector/r.f. limiter amplifier provides an amplitude-limited r.f. carrier version of an input signal. The amplitude-limited signal is either employed directly or is coupled to a mixer that produces a down-converted constant-amplitude signal which is applied to a first optical

modulator which in turn is coupled to an optical source. The optical modulator is coupled to an optical fiber that carries the frequency component of the input signal at a first light wavelength. The amplifier also supplies a signal which is dependent upon its logarithmic detector response that represents the amplitude component of the input signal. This signal is supplied to a VCO which drives a second optical modulator which is coupled to a second optical source and produces an optical signal of a second light wavelength. In a first embodiment, both optical signals are supplied to the receiver over the same optical fiber link. In a second embodiment the signals that contain frequency and amplitude information are each coupled over a separate optical fiber to the receiver. In a third embodiment, the signal that contains frequency information is coupled over an optical fiber while the signal that contains amplitude information is coupled as an electrical signal to the receiver.

16 Claims, 4 Drawing Sheets



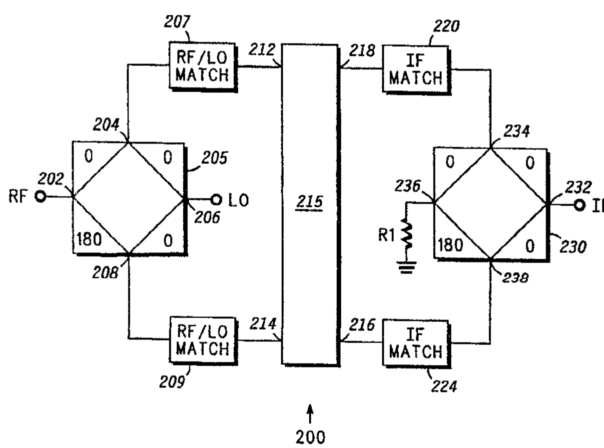
5,339,462 Aug. 16, 1994

Broadband Mixer Circuit and Method

Inventors: Joseph Staudinger, William B. Beckwith, Warren L. Seely.
Assignee: Motorola, Inc.
Filed: Nov. 4, 1991.

Abstract—A signal mixing apparatus comprising first and second four port signal splitting/combining networks having no relative phase shift between three ports and 180° of phase shift between the remaining ports, coupled to a four port mixer element. The mixer element has two ports coupled to the first signal splitter/combiner network and having another two ports coupled to the second splitter/combiner, RF and LO signals input to the first splitter/combiner do not appear at the IF output from the second splitter/combiner or vice versa. The RF/IF signals cancel and the LO signal is trapped by a resonant circuit within the mixer. The RF and IF frequency bands may overlap.

26 Claims, 4 Drawing Sheets



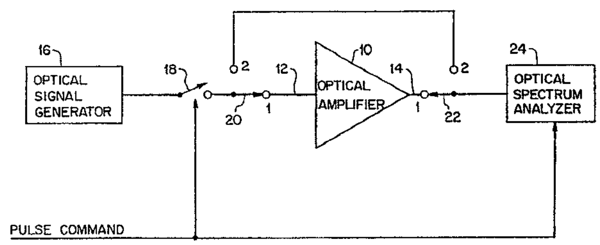
5,340,979 Aug. 23, 1994

Technique for Determining the Amplified Spontaneous Emission Noise of an Optical Circuit in the Presence of an Optical Signal

Inventors: Douglas M. Baney and John J. Dupre.
Assignee: Hewlett-Packard Company.
Filed: Sept. 25, 1992.

Abstract—A method for determining the amplified spontaneous emission noise of an optical circuit, such as an optical amplifier, in the presence of an optical signal includes applying a pulsed optical signal of prescribed intensity to an input of an optical circuit under test, and detecting an output signal from the optical circuit slightly after the pulsed optical signal is switched from on to off. The output signal immediately after the optical signal is switched off represents the amplified spontaneous emission noise of the optical circuit in the presence of an optical signal of the prescribed intensity. In a first embodiment, an optical spectrum analyzer is used for detecting the output signal. In a second embodiment, the output signal is passed through a narrow band optical filter to a photodetector. An electrical spectrum analyzer displays the detected waveform. When necessary, the observed output signal is extrapolated to a time immediately after the optical signal is switched off.

22 Claims, 7 Drawing Sheets



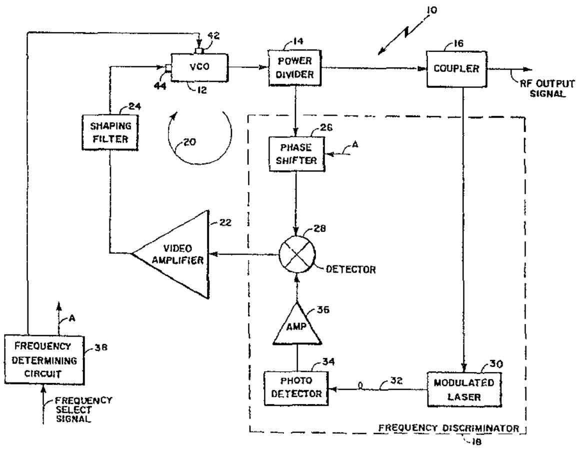
5,340,980 Aug. 23, 1994

Frequency Discriminator with Fiber Optic Delay Line

Inventors: Michael J. Bianchini, Richard A. Michalik, John A. Chiesa, Joanne Mistler.
Assignee: Raytheon Company.
Filed: Dec. 31, 1992.

Abstract—A microwave oscillator is shown to include an oscillator having an output and a control port and a feedback circuit disposed between the output and the control port of the oscillator. The feedback circuit includes a modulated laser, having an input and an output, the input responsive to a portion of a signal from the output of the oscillator and a photo detector having an input and an output, the input of the photo detector responsive to a signal from the output of the modulated laser delayed by a predetermined amount of time. The feedback circuit further includes a detector having a first and a second input and an output, the first input of the detector responsive to a signal from the output of the photo detector, the second input responsive to a portion of the signal from the output of the oscillator shifted in phase to be in phase quadrature with the signal at the first input of the detector and the output of the detector coupled to the control port of the oscillator. With such an arrangement, a microwave oscillator having improved FM noise performance than known microwave oscillators is provided.

8 Claims, 6 Drawing Sheets



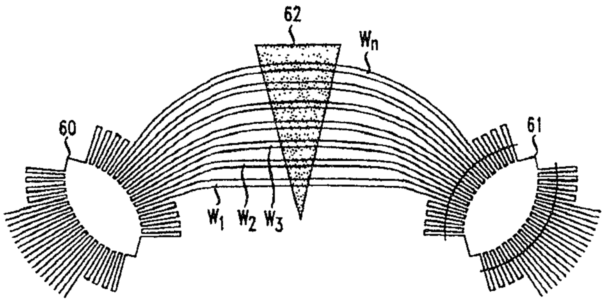
5,341,444 Aug. 23, 1994

Polarization Compensated Integrated Optical Filters and Multiplexers

Inventors: Charles H. Henry, Michele A. Milbrodt, Henry H. Yaffe.
Assignee: AT&T Bell Laboratories.
Filed: Mar. 19, 1993.

Abstract—In accordance with the invention the birefringence induced by compressive strain in silica waveguides on silicon substrates is compensated with a high index patch—such as silicon nitride—placed adjacent the core. The patch is disposed sufficiently close to the core to optically couple with the transmitted optical mode. The patch is preferably wider than the core to intersect the exponential tail of the transmitted optical mode. Such a high index patch preferentially couples TE polarization modes. By choosing an appropriate length for the patch, both strain and bend birefringence can be compensated.

11 Claims, 3 Drawing Sheets



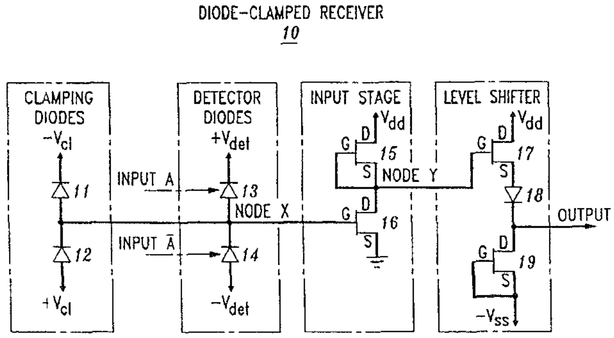
5,343,032 Aug. 30, 1994

Diode-Clamped Optical Receiver

Inventors: Leo M. F. Chirovsky and Anthony L. Lentine.
Assignee: AT&T Bell Laboratories.
Filed: Apr. 8, 1993.

Abstract—An optical receiver, e.g., receiver **10** (FIG. 1), has differential optical input beams and generates an electrical output. The voltage at an electrical node between series-connected optical detector diodes is clamped within a predefined voltage range by series-connected clamping diodes, to prevent the voltage from increasing when consecutive logic one optical input beams are received. Variable bandwidth and low energy dissipation are achieved since the resistors of high input impedance and transimpedance receivers are not required. A second optical receiver, e.g., receiver **20** (FIG. **2**) is a monolithic, diode-clamped S-SEED with complementary optical input beams and complementary optical output beams

19 Claims, 3 Drawing Sheets



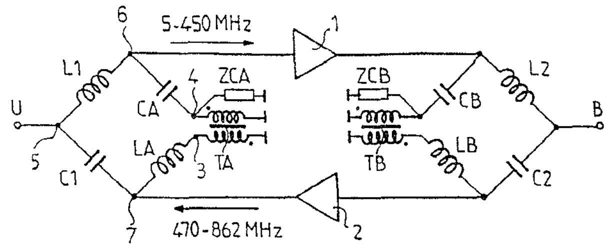
5,343,158 Aug. 30, 1994

Amplifier Device for a Cable Television Distribution Network

Inventors: Joël Gris and François Charpail.
Assignee: U.S. Philips Corporation.
Filed: Aug. 21, 1992.

Abstract—The device comprises a first path provided with an amplifier (**1**) amplifying in a first frequency band, and a second path provided with an amplifier (**2**) amplifying in a direction opposite to that of the first amplifier and in a second frequency band other than the first frequency band, a first filter element (**L1**) having a low pass characteristic for transmitting the signals of the first path, and a second filter element (**C1**) having a high pass characteristic for transmitting the signals of the second path. The two paths are combined by a third filter element (CA) having a high pass characteristic, arranged in series with a fourth filter element (LA) having a low pass characteristic, whose junction point is connected to ground by a matched impedance (ZCA), and a signal polarity inverting element (TA) is inserted in series between two of the filter elements.

7 Claims, 2 Drawing Sheets



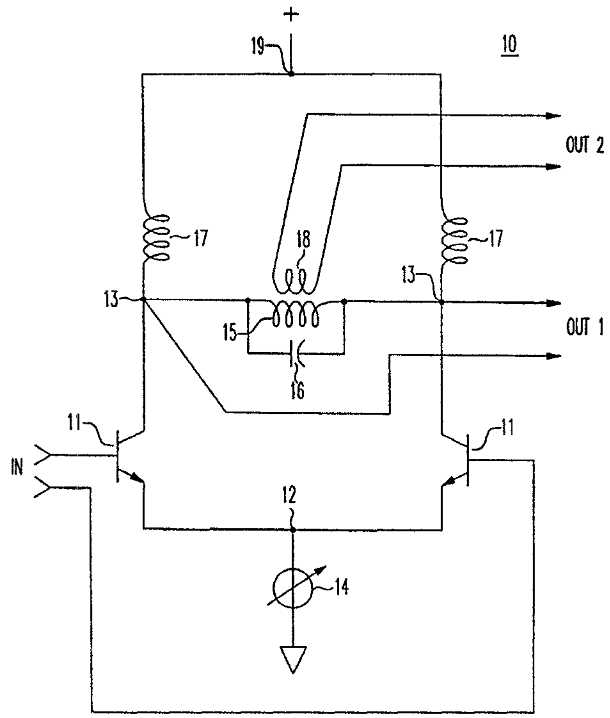
5,343,162 Aug. 30, 1994

RF Variable Gain Tuned Output Amplifier Which Maintains High Q in Saturation

Inventor: Paul C. Davis.
Assignee: AT&T Bell Laboratories.
Filed: Apr. 6, 1993.

Abstract—An amplifier with variable gain which maintains high Q when saturated. A resonant circuit is connected between collector outputs of a differential pair of transistors and RF chokes couple DC supply current to the transistors. The chokes have a high impedance at the desired frequency. The emitters of the differential pair of transistors couple together to form a common output which is connected to a current source. The amount of current from the current source substantially controls the gain of the amplifier. Because the resonant circuit is not shunted with a low impedance even when one of the transistors saturates, the Q of the resonant circuit is maintained.

6 Claims, 1 Drawing Sheet



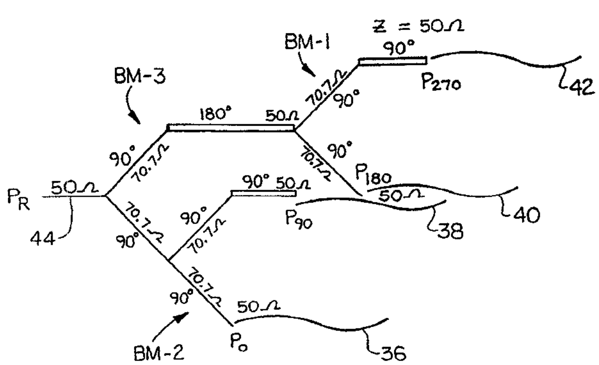
5,343,173 Aug. 30, 1994

Phase Shifting Network and Antenna and Method

Inventors: Miroslaw Balodis and Hassan Zamat.
Assignee: MESC Electronic Systems, Inc.
Filed: June 28, 1991.

Abstract—A method of and apparatus for transmitting or receiving circularly polarized signals is disclosed. The technique employs a phase shifting network for connection between an antenna and a radio transmitter or receiver to produce a phase shift when transmitting or eliminate a phase shift when receiving. In one preferred embodiment, a dielectric substrate has a phase shifting network or printed circuit lines defining a signal transmission paths between a radio connection terminal and a plurality of antenna element connection terminals for coupling a multi-element antenna and a radio. Each transmission path is phase shifted relative to an adjacent path by a predetermined amount by each path having progressively equally different electrical length to provide equal phase shift of a radio frequency signal progressively through the transmission paths. Adjacent path pairs are progressively joined at combiner nodes of equal power division by shunt connection line segments to that the power at each antenna connection terminal is equal to the power at the radio connection terminal divided by the number (typically four) of antenna terminals.

40 Claims, 4 Drawing Sheets



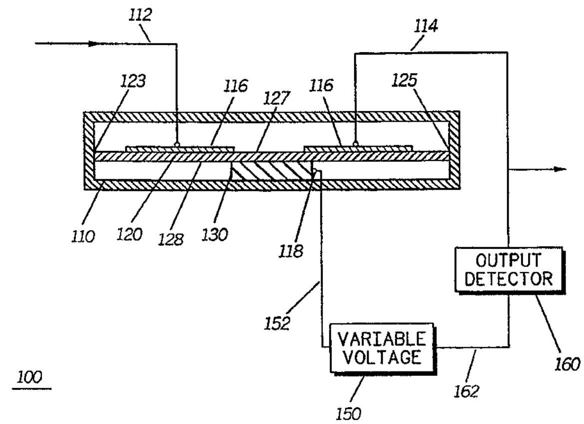
5,343,175 Aug. 30, 1994

Mechanically Tuned Saw Device and Method of Tuning Same

Inventor: Roger A. Davenport.
Assignee: Motorola, Inc.
Filed: Sept. 7, 1993.

Abstract—A surface acoustic wave device (**100**) having a tunable output includes a piezoelectric substrate (**120**) having a surface wave propagation structure, and a mechanism (**130**), mechanically coupled to the substrate (**120**), for mechanically deforming the substrate (**120**) in order to modify the output (**114**) of the surface acoustic wave device (**100**).

16 Claims, 2 Drawing Sheets



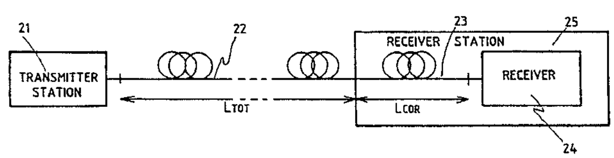
5,343,322 Aug. 30, 1994

System of Very-Long-Distance Digital Transmission by Optical Fiber with Compensation for Distortions at Reception

Inventors: Francis Pirio and Jean Thomine.
Assignee: France Telecom.
Filed: Dec. 23, 1992.

Abstract—A system for very-long-distance transmission of a digital signal between a transmitter station and a receiver station, wherein the transmitter and receiver stations are connected by a monomode optical fiber with negative chromatic dispersion at the operating wavelength of the system, having a length of at least one thousand kilometers. The receiver station comprises device to compensate for the distortions due to the nonlinear effects and to the chromatic dispersion introduced by the transmission line, the compensation device carrying out a positive chromatic dispersion of the received signal, the amplitude of the positive chromatic dispersion being a function notably of the amplitude of the negative chromatic dispersion induced by the optical fiber as well as of the mean on-line optical power of the signal transmitted on the optical fiber.

12 Claims, 2 Drawing Sheets



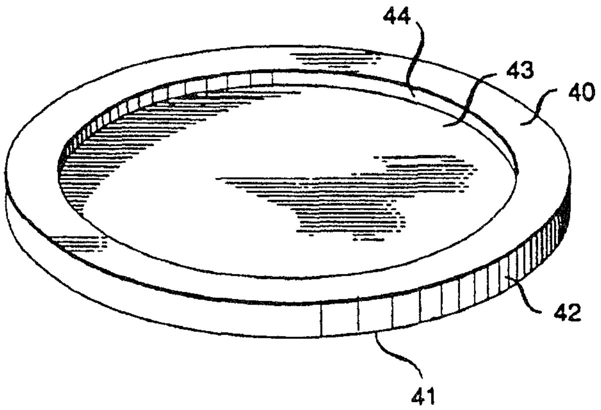
5,343,490 Aug. 30, 1994

Whispering Mode Micro-Resonator

Inventor: Samuel L. McCall.
Assignee: AT&T Bell Laboratories.
Filed: Sept. 11, 1992.

Abstract—Device for electromagnetic emission depends on total internal reflection-on whispering gallery mode cavitation about the periphery of a disk-shaped element of sub-wavelength thickness. As a laser, operating above threshold, the design is alternative to that of the Surface Emitting Laser for integration in integrated circuitry-either all-optic or electro-optic. Operating below threshold, it may serve as a Light Emitting Diode. The same operational considerations-based on improved efficacy for whispering gallery mode devices as due to relevant dimension(s) of sub-wavelength thickness-is of consequence for a category of devices serving other than as simple emitters. Such three port devices may serve as switches, modulators, etc.

27 Claims, 5 Drawing Sheets



5,343,542 Aug. 30, 1994

Tapered Fabry-Perot Waveguide Optical Demultiplexer

Inventors: Jeffrey A. Kash, Bardia Pezeshki, Franklin F. Tong.
Assignee: International Business Machines Corporation.
Filed: Apr. 22, 1993.

Abstract—This invention covers apparatus for providing a compact, high resolution waveguide optical demultiplexer or spectrometer for application in optical communications. With this invention, incoming light composing many discrete wavelengths or optical channels is spectrally resolved by the waveguide demultiplexer such that the wavelength channels are separated spatially. The two major elements of this invention are a waveguide having a partial mirror along its length to reflect optical frequencies therein, and an optical resonator where one of its resonating mirrors is the partial mirror of the waveguide. Selected frequencies are then extracted from the waveguide and resonated in the resonator

8 Claims, 4 Drawing Sheets