

Patent Abstracts

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6,242,992

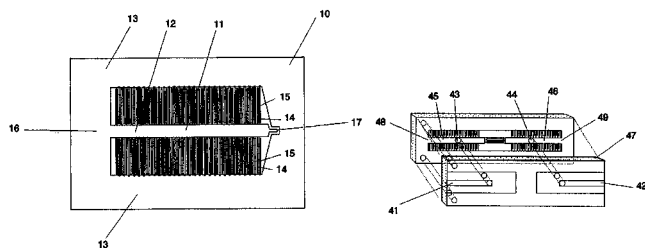
June 5, 2001

Interdigital Slow-Wave Coplanar Transmission Line Resonator and Coupler

Inventor: Kenneth Meade Lakin.
Assignee: TFR Technologies, Inc.
Filed: July 30, 1999.

Abstract—A interdigital, slow-wave coplanar transmission line resonator utilizing a coupler. Sections of interdigital, slow-wave coplanar transmission lines having lengths of an integral number of quarter waves act as resonators. In one embodiment shorted transmission lines proximately located to the resonators electromagnetically coupled to the resonators to provide input and output ports to the resonators. In another embodiment, transmission lines are connected by taps to the resonators to provide input and output ports.

16 Claims, 9 Drawing Sheets



6,243,505

June 5, 2001

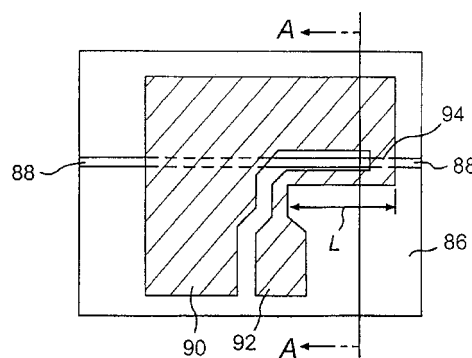
Narrow-Band Optical Modulator With Reduced Power Requirement

Inventors: Sergio Bosso, Emilio Casaccia, and Gianluca Gobetti.
Assignee: Pirelli Cavi e Sistemi S.p.A.
Filed: February 17, 2000.

Abstract—An optical modulator includes an optical waveguide and an electrode structure coupled to the waveguide such that a modulating signal applied to the electrode structure varies the refractive index of the waveguide so as to produce a modulated optical output signal. The electrode is fabricated in the form of a transmission line terminated in a short circuit. The ratio of the wavelength of the modulating signal to the effective length of the electrode is comprised between 2.1 and 4.0, and is preferably of approximately 2.7. The modulator can be

constructed to provide either phase or amplitude modulation. An optical transmission method having SBS suppression and an optical modulator system are further provided.

11 Claims, 14 Drawing Sheets



6,243,514

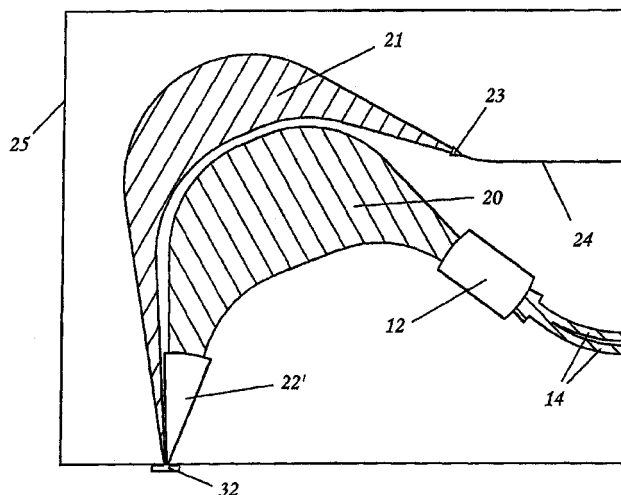
June 5, 2001

Optical Multiplexer/Demultiplexer

Inventor: George Horace Brooke Thompson.
Assignee: Nortel Networks Limited.
Filed: April 30, 1998.

Abstract—An optical multiplexer/demultiplexer with an improved spectral characteristic is provided by two diffraction gratings (21, 20) arranged optically in tandem and one being configured to embrace the other, the gratings also being arranged to provide free spectral ranges differing by a factor of at least two, and having a coupling (22') between them that carries over into the second grating information concerning the dispersion afforded by the first grating.

4 Claims, 4 Drawing Sheets



6,243,564

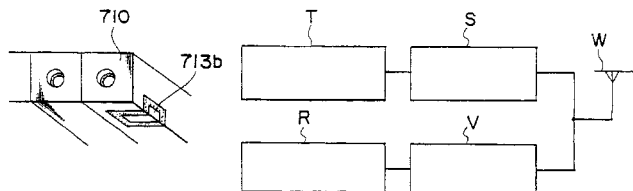
June 5, 2001

Dielectric Filter Having Coupling Windows Between Resonators, and Transceiver Using the Dielectric Filter

Inventor: Tadahiyo Yorita.
 Assignee: Murata Manufacturing Co., Ltd.
 Filed: February 14, 2000.

Abstract—A dielectric filter in which both the resonant frequency of each resonator and the degree of coupling between resonators can be adjusted independently. The dielectric filter includes at least first and second dielectric blocks, each having a through bore extending between first and second end faces thereof and a plurality of side surfaces extending between those end faces. Substantially all of the faces of the dielectric blocks, including the bore, are covered with a conductive film to define a first dielectric resonator whose electric energy component varies in the direction of an axis of the through bore. A first coupling electrode is formed, isolated from the conductive film, on at least one and preferably bridging between two of the side surfaces of the first dielectric block for coupling an input signal applied thereto to the first dielectric resonator. A second coupling electrode is formed, isolated from the conductive film, on a second one of the side surfaces of the first dielectric block in a location wherein the electric energy component in the first dielectric block is at a relatively high level so that electric energy in the first dielectric block exits the first dielectric block via the second coupling electrode. The second dielectric block has a first side surface which abuts the second side surface of the first dielectric block. A third coupling electrode is formed on the first side surface of the second dielectric block at a location corresponding to the second coupling electrode such that electric energy leaving the first dielectric block via the second coupling electrode enters the second dielectric block via the third coupling electrode and sets up an electromagnetic field in the second dielectric block whose electric energy component varies in the direction of the through bore of the second dielectric block. A fourth coupling electrode is formed on at least one and preferably bridging between two of the surfaces of the second dielectric block at a location where the resonant electric energy component in the second dielectric block is relatively high such that electric energy in the second dielectric block leaves the dielectric block via the fourth coupling electrode.

42 Claims, 22 Drawing Sheets



6,246,048

June 12, 2001

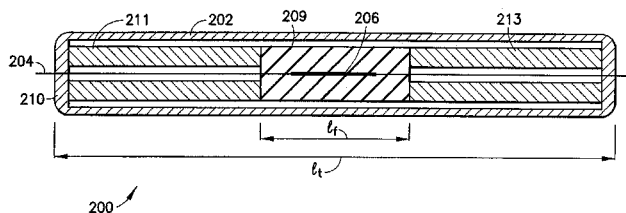
Methods and Apparatus for Mechanically Enhancing the Sensitivity of Longitudinally Loaded Fiber Optic Sensors

Inventors: Rogerio T. Ramos, Raghu Madhavan, Tsutomu Yamate, Stephen C. Balkunas, and Robert J. Schroeder.
 Assignee: Schlumberger Technology Corporation.
 Filed: May 18, 1999.

Abstract—An optical fiber is provided with a Bragg grating formed along a portion of its core and a mechanical structure arranged adjacent to the Bragg grating for amplifying longitudinal strain on the fiber in the vicinity of the grating. The mechanical structure is designed to convert ambient pressure into

longitudinal strain on the fiber in the vicinity of the grating and to allow the fiber to pass through the structure so that several pressure measuring apparatus may be arranged along a single optical fiber. An intermediate structure is provided between the fiber and the mechanical structure for minimizing buckling of the fiber. The methods of the invention include converting pressure into longitudinal strain on an optical fiber, amplifying the effect of pressure on the longitudinal strain, measuring pressure by determining the spectral location related to peaks (or minimums) of light reflected from an optical grating subjected to longitudinal strain.

36 Claims, 3 Drawing Sheets



6,246,299

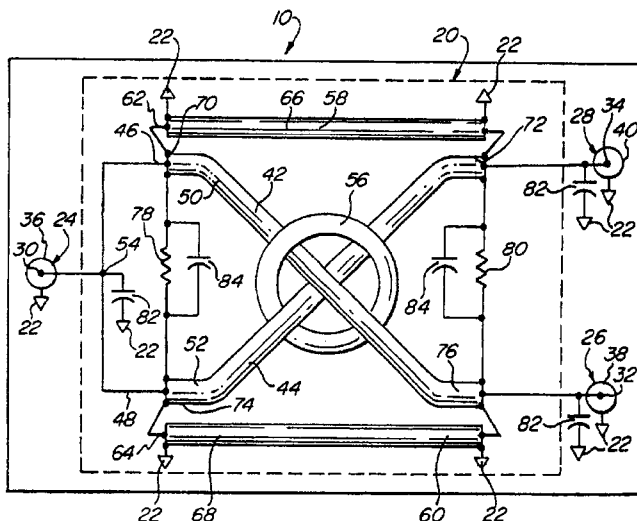
June 12, 2001

High Power Broadband Combiner Having Ferrite Cores

Inventor: Bernard J. Werlau.
 Assignee: Werlatone, Inc.
 Filed: July 20, 1999.

Abstract—A signal combiner assembly having a common ground plane and first and second coaxial cable connectors is provided. Each of the first and second coaxial cable connectors includes an inner conductor and an outer conductor, the outer conductors being connected to the common ground plane. First and second coaxial cables, each having an inner conductor and an outer conductor, are also provided. The inner conductor of the first coaxial cable extends between the inner conductor of the first coaxial cable connector and a sum port, while the inner conductor of the second coaxial cable extends between the inner conductor of the second coaxial cable connector and the sum port. The first and second coaxial cables passing through a hole provided in a piece of magnetic material from opposite sides of the hole. Preferably, the piece of magnetic material is formed from a ferrite and takes the shape of a toroid or squaroid.

21 Claims, 2 Drawing Sheets



6,246,301

June 12, 2001

16 Claims, 4 Drawing Sheets

High-Frequency Circuit Apparatus

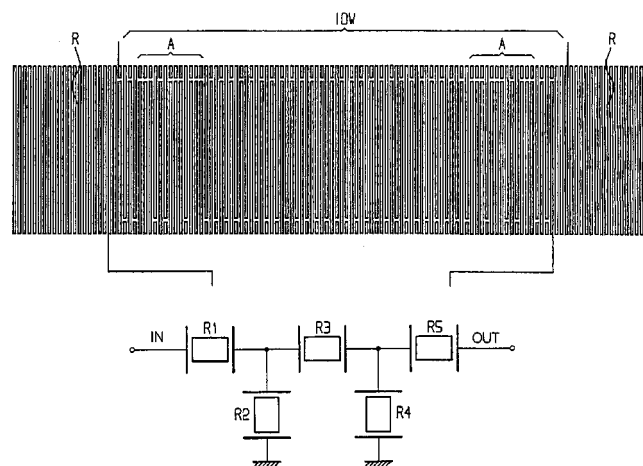
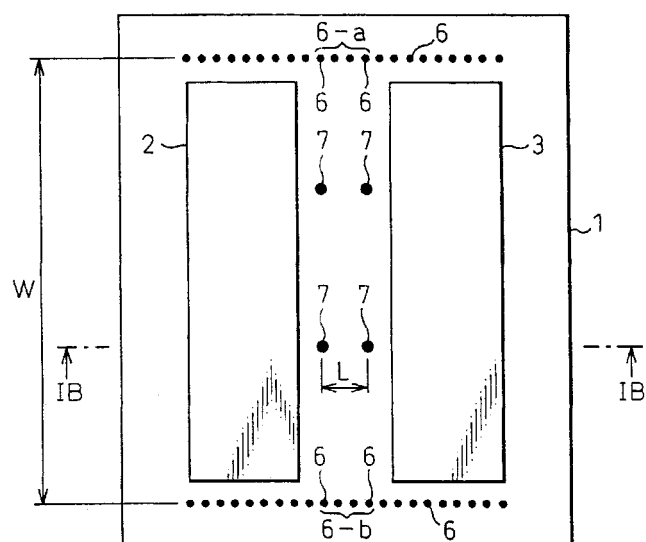
Inventors: Hiroyuki Sogo and Jun Oyama.

Assignee: Fujitsu Limited.

Filed: March 18, 1999.

Abstract—A high-frequency circuit apparatus includes two high-frequency circuits (2, 3) mounted on a printed circuit board (1), two rows of first plated through holes (6) which connect upper and lower ground plates (4, 5) on the upper and lower surfaces of the printed circuit board (1) and which are arrayed in a first direction so that the two high-frequency circuits (2, 3) are disposed between the first plated through holes, and at least two columns of second plated through holes (7) which are arrayed in a second direction different from the first direction, between the two high-frequency circuits to connect the ground plates on the upper and lower surfaces of the printed circuit board, to thereby form a waveguide resonator. A variable capacitance diode can be provided to be connected to a conductor pattern which is electrically isolated from the ground plates and the ground plates so as to adjust the resonance frequency of the waveguide resonator.

17 Claims, 12 Drawing Sheets



6,246,303

June 12, 2001

Dielectric Filter

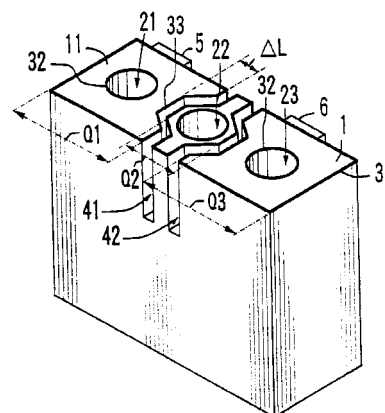
Inventor: Kenji Endo.

Assignee: TDK Corporation.

Filed: January 19, 1999.

Abstract—A block type dielectric filter including a dielectric block and a plurality of through holes wherein a resonance frequency at individual resonating portions can be set at a specific value even when the dielectric filter is miniaturized. The resonance frequencies can be varied at the individual resonating portions simply by creating a slight change in a coupling factor. The plurality of through holes are provided extending from one surface of the dielectric block toward an opposite surface. Surfaces, except for an open end surface, of said dielectric block are clad with a conductive material layer and a groove is provided on the open end surface between a set of adjacent through holes. The groove is provided offset toward a through hole by an offset quantity.

31 Claims, 6 Drawing Sheets



6,246,302

June 12, 2001

Reactance Filter With Surface Wave Resonators

Inventors: Peter Müller and Maximilian Pitschi.

Assignee: Siemens Matsushita Components GmbH & Co. KG.

Filed: August 28, 1997.

Abstract—A reactance filter, particularly in a branching circuit (ladder type), with surface wave resonators wherein omission weighted normal finger transducers are employed between reflectors such that the arrangement and plurality of the active fingers of the interdigital transducer are particularly formed for changing the capacitance relationship (static to dynamic capacitance) such that a narrow filter bandwidth is achieved.

6,246,814

June 12, 2001

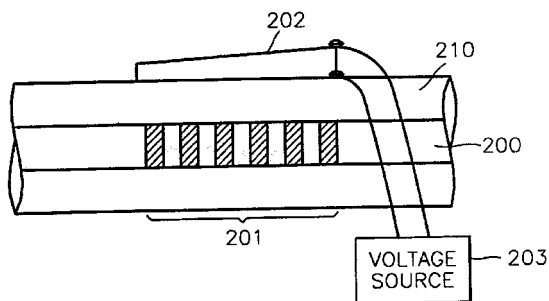
8 Claims, 8 Drawing Sheets

Tunable Chirped Fiber Grating Device and Method for Forming Chirped Fiber Grating

Inventor: Moo-youn Park.
 Assignee: SamSung Electronics Co., Ltd.
 Filed: December 31, 1998.

Abstract—A tunable chirped grating device for an optical fiber, wherein the grating has equal spacings between index perturbations. A piezoelectric element is bonded to the optical fiber for changing the perturbation spacings according to an applied voltage, and a voltage source applies the voltage to the piezoelectric element. Since a predetermined piezoelectric element is bonded to an optical fiber provided with a grating having regular spacings and the perturbation spacings can be differently deformed by applying different electric field to respective perturbation positions by the piezoelectric element, then the resulting in a chirped grating device, whose manufacturing procedure is simple and which has flexibility, can provide adjustable chirping rates of the reflected wavelengths waves.

15 Claims, 1 Drawing Sheet



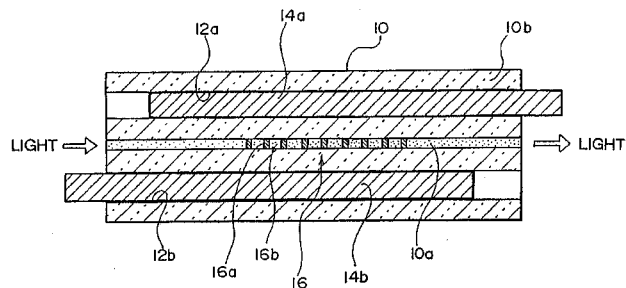
6,246,815

June 12, 2001

Grating Element, Light Wavelength Selection Utilizing the Same, and Optical Signal Transmitting System

Inventors: Takumi Fujiwara and Akira Ikushima.
 Assignees: Toyota Jidosha Kabushiki Kaisha and Toyota School Foundation.
 Filed: August 11, 1997.

Abstract—A core section (10a) is formed in an optical fiber (10) made of a glass material and, electrodes (14a and 14b) are inserted into the clad section (10b) of the fiber (10). When the core section (10a) is irradiated with ultraviolet rays in prescribed intensity patterns while a high voltage is applied to the electrodes (14a and 14b), a grating section (16) in which non linear areas (16a) and normal areas (16b) are alternately formed is formed in the section (10a). The characteristics of the grating section (16) can be changed by utilizing an electrooptic effect by impressing a prescribed electric field upon the section (16) through the electrodes (14a and 14b). A grating element constituted in such a way can be utilized as an optical functional element, such as the wavelength switch, because the Bragg wavelength of the element changes when a voltage is applied.



6,249,194

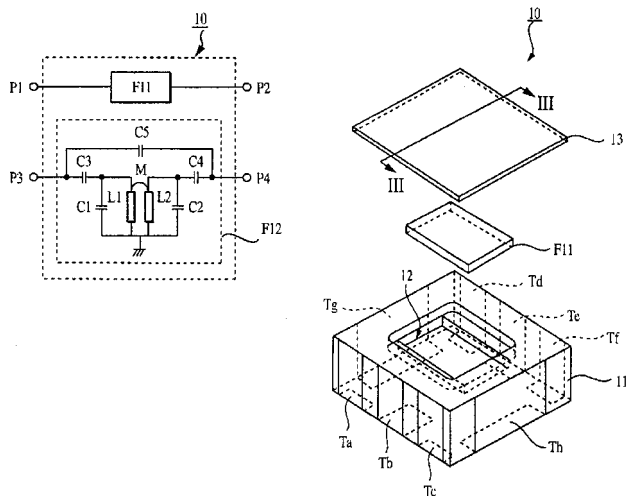
June 19, 2001

Composite Filter Comprising LC and Saw Filters and Radio Communication Apparatus Using the Filter

Inventors: Takahiro Watanabe, Norio Nakajima, and Akihiro Ochii.
 Assignee: Murata Manufacturing Co., Ltd.
 Filed: November 12, 1998.

Abstract—A composite filter, with a laminated body formed by laminating a dielectric layer and an electric conductor layer; a concave portion provided on at least one major surface of said laminated body; external terminals provided on at least a side surface of said laminated body; an LC filter made of an inductance element and a capacitance element respectively formed by said electric conductor layer of said laminated body; a surface acoustic wave filter arranged in said concave portion of said laminated body; a cover sealing said concave portion; two of said external terminals constituting the input terminals of said surface acoustic wave filter and of said LC filter respectively and two of said external terminals constituting the output terminals of said surface acoustic wave filter and of said LC filter respectively; and said surface acoustic wave filter and said LC filter are independent without being connected to each other in said laminated body. The above composite filter has a reduced number of parts and a simpler assembly process. A radio communication apparatus can advantageously use the disclosed composite filter.

15 Claims, 7 Drawing Sheets



6,249,195

June 19, 2001

4 Claims, 3 Drawing Sheets

Dielectric Filter, Dielectric Duplexer, and Transceiver Having Circular and Polygonal Electrode Openings

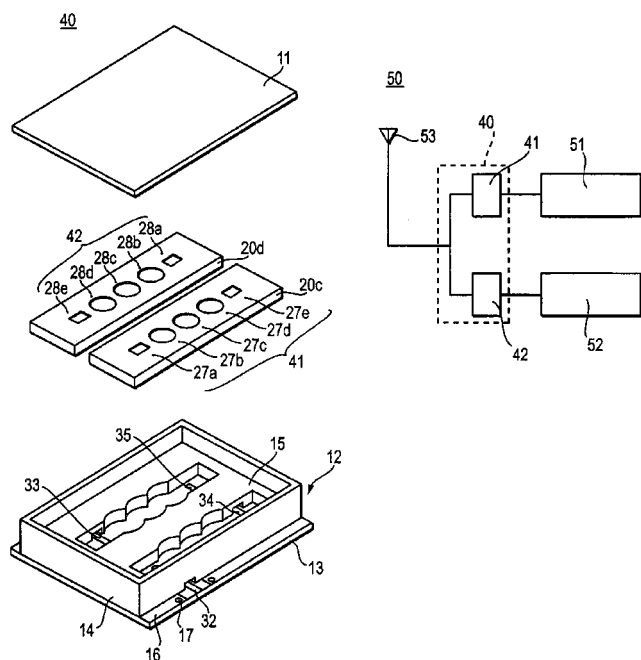
Inventors: Shigeyuki Mikami, Toshiro Hiratsuka, Tomiya Sonoda, and Kiyoshi Kanagawa.

Assignee: Murata Manufacturing Co., Ltd.

Filed: September 7, 1999.

Abstract—A dielectric filter provided in this invention has insertion-loss characteristics of 2 dB or lower in the range of 1 to 2% of a specific band. The dielectric filter includes an upper case and a lower case, a dielectric substrate, an electrode formed on mutually opposing surfaces thereof, and a plurality of pairs of openings formed in the electrodes on the two opposing surfaces, so as to form a plurality of dielectric resonators, and input-output couplers for coupling to each of an input-stage dielectric resonator and an output-stage dielectric resonator among the plurality of dielectric resonators. In the input-stage and output-stage dielectric resonators, the opening of the electrode is rectangular or polygonal, whereas in at least one of the dielectric resonators other than the input-stage and output-stage dielectric resonators, it is substantially circular.

17 Claims, 11 Drawing Sheets



6,249,196

June 19, 2001

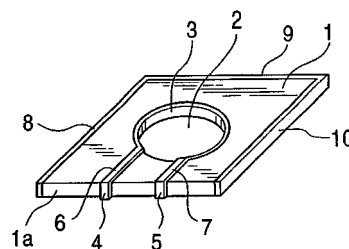
Resonator for Uniformly Varying Inductance or Impedance in Longitudinal Direction of Conductor Line

Inventors: Isao Ishigaki and Shuichi Shibuya.

Assignee: Alps Electric Co., LTD.

Filed: December 14, 1999.

Abstract—A resonator includes an insulating plate having a circular through hole, an arc-shaped conductor line formed in the periphery of the through hole and on the top face of the insulating plate or in the inner wall of the through hole, a first electrode connected to one end of the conductor line and a second electrode connected to the other end of the conductor line wherein both first electrode and the second electrode are provided on a side face of the insulating plate.



6,249,624

June 19, 2001

Method and Apparatus for Forming a Bragg Grating With High Intensity Light

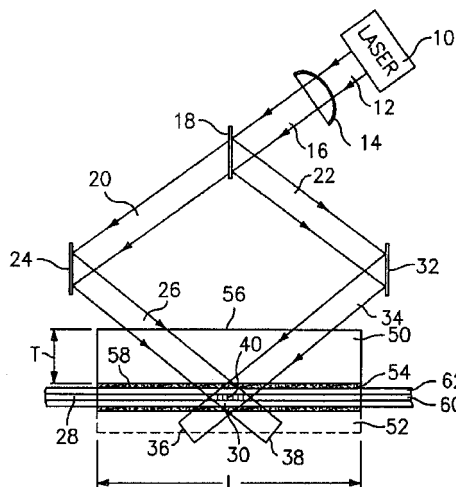
Inventors: Martin A. Putnam and Robert N. Brucato.

Assignee: CiDRA Corporation.

Filed: December 4, 1998.

Abstract—A method and apparatus for forming a Bragg grating using a high intensity light includes a pair of focused writing beams 26, 34 that simultaneously intersect and interfere with each other at a region 30 of a photosensitive optical fiber 28. The beams 26, 34 have a high intensity (e.g., at least about 500 mJoules/cm²) and pass through an interface medium 50 that is substantially transparent to the wavelength of the writing beams 26, 34. The medium has a thickness T set such that the intensity of the beams at the surface 56 of the medium 50 is below a surface damage intensity such that no ablations occur on the fiber 28 or the surface 56 when the fiber 28 is exposed to the beams 26, 34.

22 Claims, 2 Drawing Sheets



6,252,461

June 26, 2001

Technique for Wideband Operation of Power Amplifiers

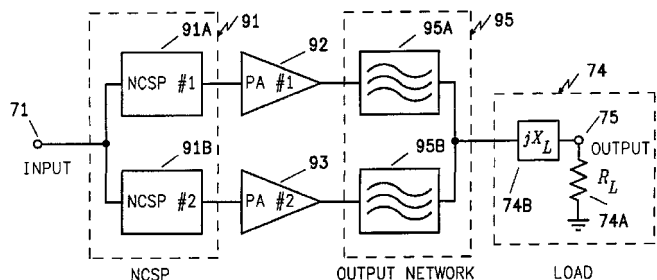
Inventor: Frederick Herbert Raab

Filed: August 24, 1998.

Abstract—A method and a circuit for power amplification over a wide frequency range based upon the use of minimum-rating filters or matching networks, negative-component signal processing, and single or multiple amplifiers. The filters and matching networks are preferably designed to minimize the required ratings of the amplifier(s) driving them. The signal processor or generator

preferably uses negative components to produce a driving signal that is compensated for the ripple in the filter, matching network, and load. The outputs of multiple amplifiers optimized for different frequency ranges can be combined into a single load with flat frequency response, resistive loads presented to the amplifiers, and no inherent power loss in the combining network.

48 Claims, 27 Drawing Sheets



6,252,473

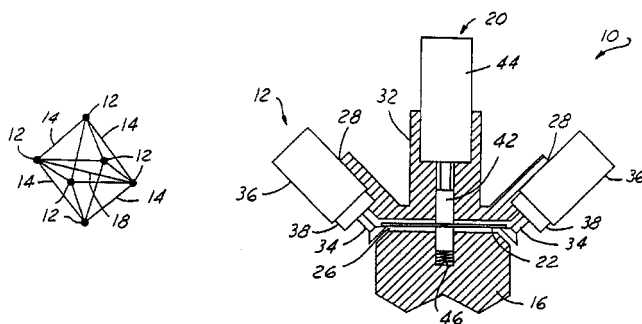
June 26, 2001

Polyhedral-Shaped Redundant Coaxial Switch

Inventor: Michael N. Ando.
Assignee: Hughes Electronics Corporation.
Filed: January 6, 1999.

Abstract—A three dimensional microwave switch having a plurality of waveguide transmission lines configured in an octahedral shape having microwave I/O ports at the corners. Individual actuators selectively move respective reeds within the waveguide transmission lines between a signal-attenuating position abutting the interior surface of the waveguide transmission line and a signal-conducting position substantially coaxial with the waveguide transmission line and abutting the signal lines of the I/O microwave ports couple to opposite ends of the waveguide transmission line.

10 Claims, 4 Drawing Sheets



6,252,475

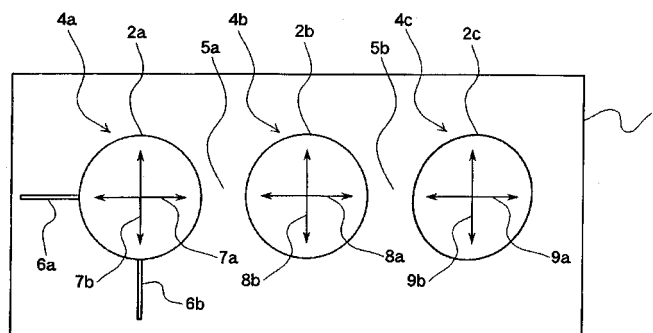
June 26, 2001

High-Frequency Circuit Element

Inventors: Akira Enokihara and Kentaro Setsune.
Assignee: Matsushita Electric Industrial Co. Ltd.
Filed: June 11, 1999.

Abstract—A plurality of circular or elliptical first, second, and third strip conductors are formed on the surface of a substrate made of a dielectric single crystal. The first, second, and third strip conductors are coupled to one another via gap portions. A ground plane is formed on the entire rear surface of the substrate. A first coupling terminal and a second coupling terminal are inductively coupled to the first planar circuit resonator in directions where first and second coupling terminal excite the two resonant modes of the first planar circuit resonator, which are orthogonally polarized.

21 Claims, 10 Drawing Sheets



6,252,476

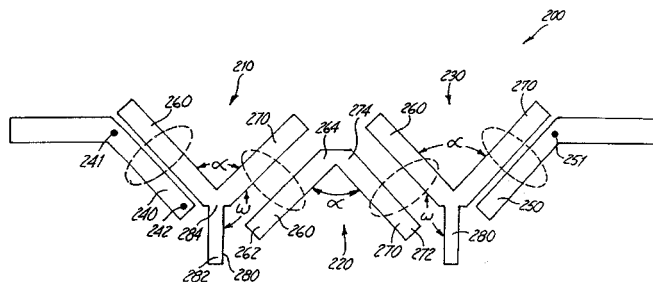
June 26, 2001

Microstrip Resonators and Coupled Line Bandpass Filters Using Same

Inventor: Leo G. Maloratsky.
Assignee: Rockwell Collins, Inc.
Filed: April 19, 2000.

Abstract—Disclosed are microstrip resonators and bandpass filters using the same. The bandpass filters of the present invention include an input, an output and multiple resonators coupled between the input and the output. A first resonator coupled in series between the input and the output includes a first line conductor having first and second ends and a second line conductor having first and second ends. The first and second line conductors are positioned relative to one another such that the second end of the first line conductor is connected to the second end of the second line conductor, forming a first angle of the first resonator between the first and second line conductors. The first angle of the first resonator is substantially less than 180 degrees so that a physical length of the resonator, taken in a direction from the input to the output, is less than an electrical length of the first resonator. The first open ended line conductor connected to the second ends of the first and second line conductors at the point where the resonator is bent. The length of the open ended line conductor is equal to a guided quarter-wavelength of a second (or third, etc.) harmonic of a center frequency of a passband of the filter. The bandpass filter of the present invention exhibits better attenuation for second and higher harmonics.

13 Claims, 5 Drawing Sheets



6,252,871

June 26, 2001

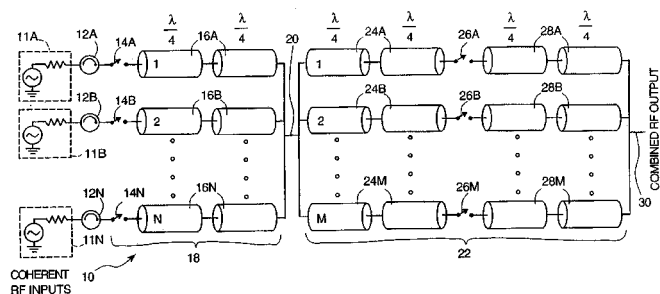
Switchable Combiner/Splitter

Inventors: Richard D. Posner and Thuan Tran.
Assignee: Powerwave Technologies, Inc.
Filed: July 1, 1998.

Abstract—An apparatus for either combining a plurality of high frequency RF signal inputs or splitting a single RF frequency input into a plurality of RF signal outputs employs a switchable combining/splitting section and a switchable matching section. The switchable combining/splitting section operates to

either combine the RF signal inputs to a common summed output or to take a matched input and to split it into a plurality of outputs. The matching section operates to switchably match the impedance presented by the combining/splitting section to achieve a minimum or zero insertion loss through the apparatus.

20 Claims, 4 Drawing Sheets



Abstract—

6,253,008

June 26, 2001

Optical Filter and Method of Making the Same

Inventors: Michiko Harumoto and Masakazu Shigehara.
Assignee: Sumitomo Electric Industries, Ltd.
Filed: June 9, 1999.

Abstract—The present invention relates to an optical filter having a long-period grating which couples, in signal light propagating through a core region, core mode light having a predetermined wavelength to cladding mode light, thereby attenuating the core mode light; and a method of making the same.

In particular, in the filter area provided with the long-period grating, the intervals of individual parts exhibiting its average refractive index is constant along the advancing direction of the signal light, whereas values of maximum points and minimum points of a refractive index modulation function defining the refractive index vary along the advancing direction of the signal light.

9 Claims, 9 Drawing Sheets

