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 USA.

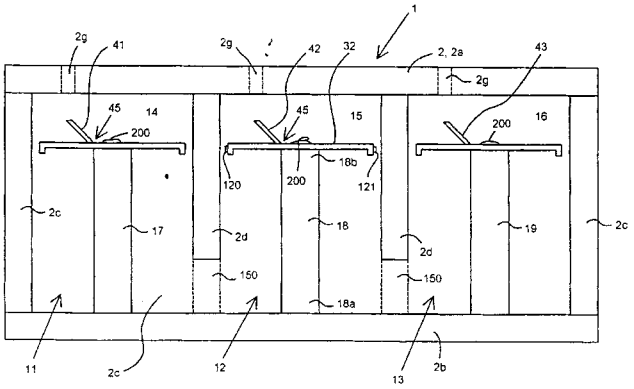
6,198,363 Mar. 6, 2001

Filter and Tuning Element

Inventors: Esa Vuoppola, Anssi Kotanen, Pauli Juntunen, and Mika Henriksson.
Assignee: ADC Telecommunications OY
Filed: Dec. 14, 1998.

Abstract*—**The invention relates to a filter and a frequency tuning element. The filter comprises a shell construction (**2a* to **2***d*) of conductive material with at least one section (**14** to **16**) and in the shell construction (**2***a* to **2***d*) at least one resonator (**17** to **19**) of conductive material in said at least one section (**14** to **16**) for forming at least one resonance circuit (**11** to **13**). In the filter (**1**) the resonator (**18**) comprises as its extreme ends a base (**18***a*) and a second end (**18***b*), in said filter (**1**) the base (**18***a*) of the resonator (**18**) being fastened to the shell construction (**2***a* to **2***d*) and the second end (**18***b*) of the resonator (**18**) being directed elsewhere toward the shell construction (**2***a* to **2***d*) at a distance therefrom, the resonator (**18**) comprising a means (**32**) which directs its surface toward the shell construction (**2***a* to **2***d*) and increases the cross-sectional area of the resonator to increase the capacitance between the resonator (**18**) and the shell construction (**2***a* to **2***d*). The filter (**1**) further comprises a frequency tuning element (**42**) of conductive material for tuning the resonance frequency of the resonator (**18**) of the resonance circuit (**12**). In accordance with the invention, the frequency tuning element (**42**) for tuning the resonance frequency of the resonance circuit and the means (**32**) fastened to the resonator (**18**) for increasing the cross-sectional area of the resonator form an integral whole, being a projection projecting from the means (**32**) for increasing the cross-sectional area, the resonance frequency of the resonance circuit (**12**) being tuned by adjusting the distance of said projection with respect to the shell construction (**2***a*).

20 Claims, 3 Drawing Sheets



Publisher Item Identifier S 1531-1309(01)09473-9.

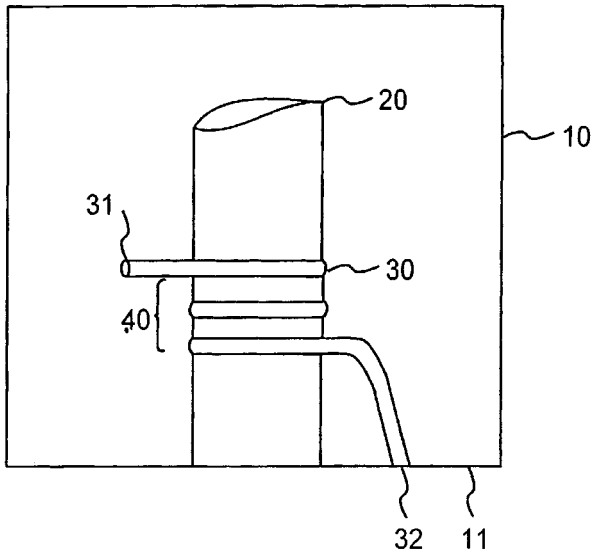
6,198,364 Mar. 6, 2001

Resonator Filter Having a Frequency Regulating Means With at Least One Turn

Inventor: Kimmo Karhu.
Assignee: ADC Telecommunications Oy
Filed: Oct. 24, 1997.

***Abstract*—**The invention relates to a resonator filter comprising a housing structure (**10**), at least one resonator conductor (**20**) in the housing structure, and a regulating means (**30**) for regulating the frequency band of the resonator filter. The regulating means (**30**) is substantially transverse with respect to the propagation direction of the resonator conductor so that the regulating means (**30**) forms at least one turn around the resonator conductor (**20**) transversely to the propagation direction of the resonator conductor.

11 Claims, 3 Drawing Sheets



6,198,367 Mar. 6, 2001

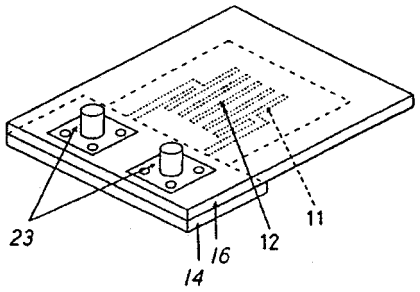
High-Frequency Circuit on a Single-Crystal Dielectric Substrate With a Through Hole in a Different Substrate

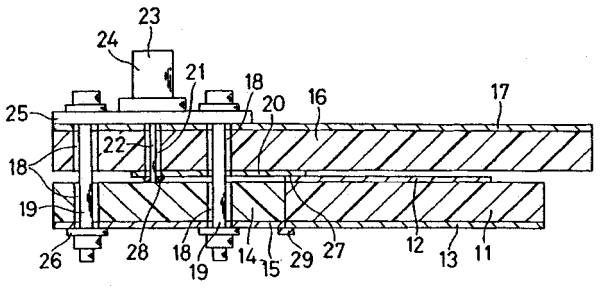
Inventors: Yoshinori Matsunaga and Tsuyoshi Nakai.
Assignee: Kyocera Corporation
Filed: Mar. 3, 1999.

***Abstract*—**It has been difficult to form a high-frequency electronic circuit using a single-crystal dielectric substrate, and down-sizing of high-frequency electronic circuits is also difficult because of necessity of a metal housing. A high-frequency electronic device comprises a single-crystal dielectric substrate provided with a first ground conductor layer and a first wiring conductor layer constituting a high-frequency electronic circuit, a first dielectric substrate provided with a second ground conductor layer, the single-crystal dielectric substrate and the first dielectric substrate being made into contact with each other

so that the top faces thereof form substantially the same plane, and a second dielectric substrate provided with a third ground conductor layer, the second dielectric substrate being attached to the top faces of the single-crystal dielectric substrate and the first dielectric substrate, wherein the first ground conductor layer is electrically connected with the second and third ground conductor layers, and the first wiring conductor layer is electrically connected with a second wiring conductor layer formed on the second dielectric substrate, and electrically connected with an external electric circuit via a second through conductor. A high-frequency electronic circuit excellent in characteristics can be obtained, and the down-sizing can be realized by eliminating a metal housing.

18 Claims, 8 Drawing Sheets





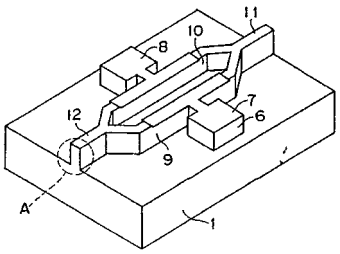
6,198,854 Mar. 6, 2001

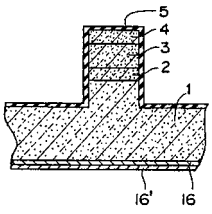
Mach–Zehnder Modulator

Inventor: Kazuhisa Takagi.
Assignee: Mitsubishi Denki Kabushiki Kaisha
Filed: Jan. 26, 1999.

***Abstract*—**A Mach–Zehnder modulator intensity modulating signal light using a simple drive circuit for the modulating voltage. The modulator includes two waveguides with respective multiple quantum well (MQW) structures. Well layers of the MQW structures of the two optical waveguides have different thicknesses or are made from different materials so the phase of light propagating through one waveguide advances and through the other waveguide is delayed in response to the same applied voltage. The phase-changed light signals are combined as an output light signal that is intensity modulated.

4 Claims, 6 Drawing Sheets





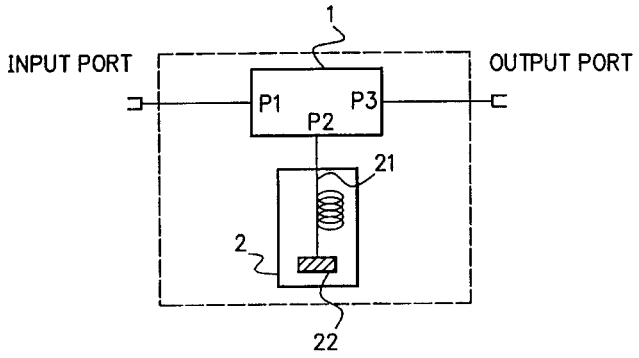
6,198,859 Mar. 6, 2001

Dispersion Compensating Device Using Dispersion Compensating Fiber Module

Inventor: Takayuki Handa.
Assignee: NEC Corporation
Filed: Dec. 3, 1997.

***Abstract*—**A dispersion compensating device for compensating dispersion of signal light. In an optical fiber communication system, distortion of optical pulse waveform caused by wavelength distortion is compensated. The signal light is inputted through an input port, propagating through a dispersion compensating fiber through a port of an optical circulator. The signal light is reflected by a totally internal highly reflective surface, again propagating through the dispersion compensating fiber reciprocally, thus being outputted through an output port of the optical circulator. Since the signal light propagates through the dispersion compensating fiber reciprocally, the dispersion compensating fiber is capable of compensating dispersion with one-half the length of the conventional example.

6 Claims, 1 Drawing Sheet



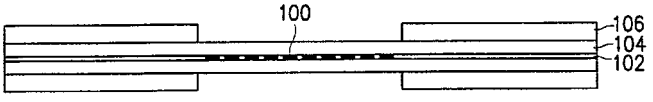
6,198,868 Mar. 6, 2001

Temperature Compensated Long Period Optical Fiber Grating Filter

Inventor: Joo-Nyung Jang.
Assignee: Samsung Electronics Co., Ltd.
Filed: Mar. 9, 2000.

***Abstract*—**Disclosed is a temperature compensated long period optical fiber grating filter. The long period optical fiber grating filter includes a core formed with a long period grating, a cladding surrounding the core, a coating coated over a portion of the cladding not surrounding the long period grating, and a re-coating coated over a portion of the cladding surrounding the long period and made of a material exhibiting an increase in refractive index in accordance with an increase in temperature, the re-coating serving to allow a coupling wavelength shift caused by the increase in refractive index to be carried out in a direction opposite to that of a coupling wavelength shift caused by a refractive all index difference between the core and the cladding. In accordance with this long period optical fiber grating filter, a temperature compensation can be more easily achieved without any inconvenience caused by an adjustment of refractive index in the filter or an addition of a material for avoiding a variation in refractive index depending on temperature.

7 Claims, 7 Drawing Sheets



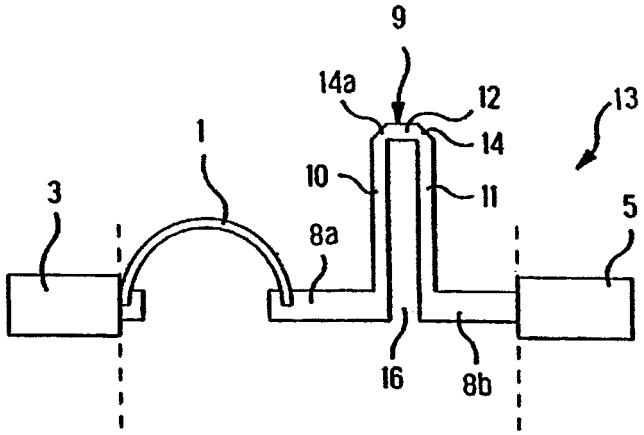
6,201,453 Mar. 13, 2001

18 Claims, 8 Drawing Sheets

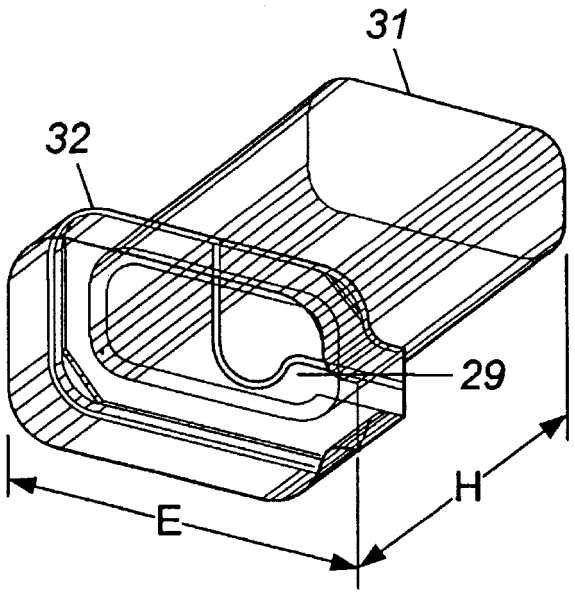
H-Plane Hermetic Sealed Waveguide Probe

Inventors: Steven S. Chan, Daniel C. Yang, and Jerry M. Dickson.
Assignee: TRW Inc.
Filed: Nov. 19, 1998.

***Abstract*—**An H-plane waveguide probe includes a microstrip formed on a dielectric substrate with a loop conductor generally configured in the shape of waveguide on one side and adapted to capture an incoming H-plane signal. A transition conductor formed on an opposing side of the substrate with a first leg and a second leg, connected together by a bend portion. The first leg of the transition conductor is generally parallel to the H-plane for coupling microwave energy from the waveguide to the microstrip. The second leg of the transition conductor is parallel to the E-field and is used to change the direction of the captured microwave energy along the H-plane direction to the E-plane direction. In order to optimize power transfer, the impedance of the loop conductor is selected to be about the same as the waveguide. The transition conductor is used to convert the E-field energy to a 50Ω impedance, for example, for connection to an external microwave circuit.



17 Claims, 2 Drawing Sheets



6,201,456 Mar. 13, 2001

Dielectric Filter, Dielectric Duplexer, and Communication Device, With Non-Electrode Coupling Parts

Inventors: Toshiro Hiratsuka, Tomiya Sonoda, and Kenichi Iio.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Oct. 28, 1998.

***Abstract*—**A dielectric filter includes electrodes formed on both principal surfaces of a dielectric substrate wherein each electrode has a plurality of openings which are formed so that the locations of the plurality of openings formed in one electrode disposed on one principal surface of the dielectric substrate correspond to the locations of the openings formed in the other electrode disposed on the other principal surface of the dielectric substrate. The dielectric substrate is disposed between upper and lower conductive cases. A nonelectrode coupling part is formed between openings thereby coupling resonators with each other or coupling a resonator with input/output means. Thus, the invention provides a resonator which can be easily coupled to another resonator or input/output means and also provides a filter having a wide-band characteristic.

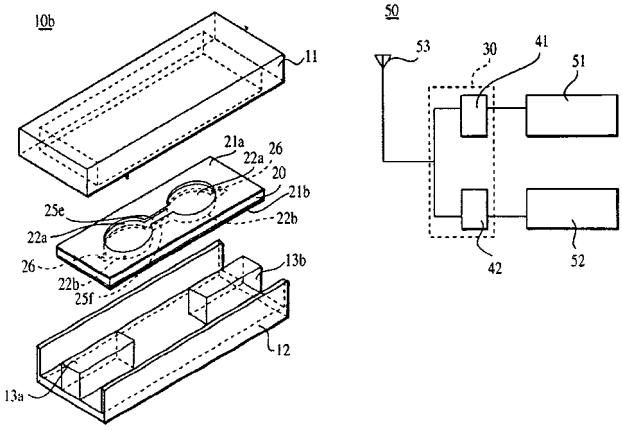
16 Claims, 9 Drawing Sheets

6,201,454 Mar. 13, 2001

Compensation Structure for a Bond Wire at High Frequency Operation

Inventors: Noyan Kinayman and Nitin Jain.
Assignee: The Whitaker Corporation
Filed: Mar. 30, 1999.

***Abstract*—**An improved frequency response for a bond wire (**1**) at high frequency operation is realized by using a matching element (**13**) including a meander line (**9**) structure. The frequency response is improved at an operating frequency by design. The matching element (**13**) compensates the bond wire (**1**) by tuning it as a length of high impedance transmission line and then completing the combined length of the bond wire (**1**) and matching element (**13**) to a length of half of a guided wavelength at the operating frequency



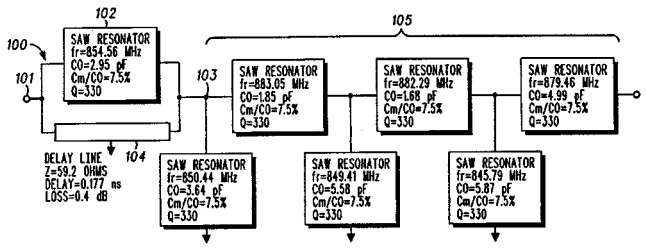
6,201,457 Mar. 13, 2001

Notch Filter Incorporating Saw Devices and a Delay Line

Inventor: Thomas S. Hickernell.
Assignee: CTS Corporation
Filed: Nov. 18, 1998.

***Abstract*—**A notch filter (**100**) includes a parallel coupled delay line (**104**) and surface acoustic wave resonator (**102**) which provides a pole at a desired passband. The surface acoustic wave resonator (**102**) and the delay line (**104**) are configured to provide a zero at an undesired frequency or stopband. In this way, the notch filter (**100**) augments the stopband rejection of an associated cascaded surface acoustic wave ladder filter (**105**). The notch filter (**100**) also provides a pole at a desired frequency or passband such that losses due to the notch filter (**100**) at the desired passband are minimized, thereby improving overall insertion loss performance.

12 Claims, 6 Drawing Sheets



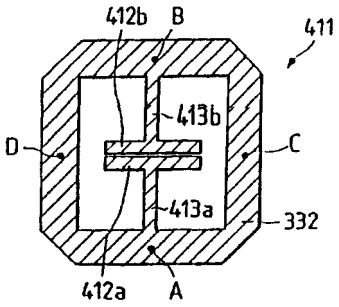
6,201,458 Mar. 13, 2001

Plane Type Strip-Line Filter in Which Strip Line is Shortened and Mode Resonator in Which Two Types Microwaves are Independently Resonated

Inventors: Michiaki Matsuo, Morikazu Sagawa, and Mitsuo Makimoto.
Assignee: Matsushita Electric Industrial Co., Ltd.
Filed: Mar. 4, 1999.

***Abstract*—**A strip-line filter is provided with upper- and lower-stage resonators having the same electromagnetic characteristics. Each of the resonators has a one-wavelength square-shaped strip line and four open-end transmission lines connected to four coupling points A,C,B and D (or E,G,F and H) of each resonator which are spaced 90 degrees in electric length in that order. The square-shaped strip lines have a pair of parallel coupling lines closely placed in parallel to each other to electromagnetically couple the resonators. Therefore, the filter can be manufactured in a small size. A first microwave resonated in each resonator is electromagnetically influenced by two open-end transmission lines connected to two coupling points A and B (or E and F), and a second microwave resonated in each resonator is electromagnetically influenced by two open-end transmission lines connected to two coupling points C and D (or G and H). Therefore, resonance wavelengths of the microwaves can be longer than a line length of each square-shaped strip line. Also, the resonance wavelengths can be adjusted by trimming the transmission lines. Also, because all constitutional elements are made of strip lines, the filter can be made plane.

5 Claims, 22 Drawing Sheets



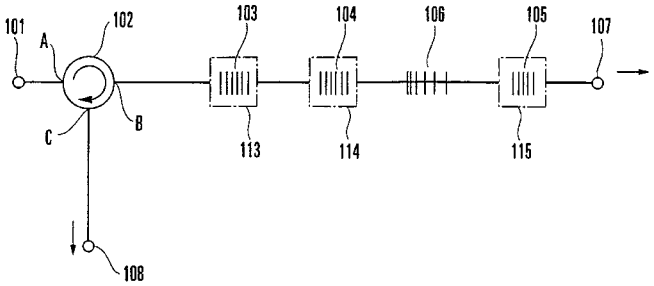
6,201,904 Mar. 13, 2001

Optical Demultiplex Circuit

Inventor: Hiroyuki Kato.
Assignee: NEC Corporation
Filed: Jan. 27, 2000.

***Abstract*—**An optical demultiplex circuit includes an optical circulator, a chirped fiber grating, and a fiber Bragg grating. The optical circulator has a first port for receiving an optical signal, a second port for outputting the optical signal input to the first port, and a third port for outputting the optical signal input to the second port. The chirped fiber grating selectively reflects optical signals output from the second port and outputs them to the second port. The chirped fiber grating has a wide reflection wavelength band and side lobes. The fiber Bragg grating is inserted between the second port and the chirped fiber grating and reflects, of the optical signals output from the second port, only optical signals in a narrow wavelength band corresponding to the side lobes of the chirped fiber grating.

8 Claims, 7 Drawing Sheets



6,201,906 Mar. 13, 2001

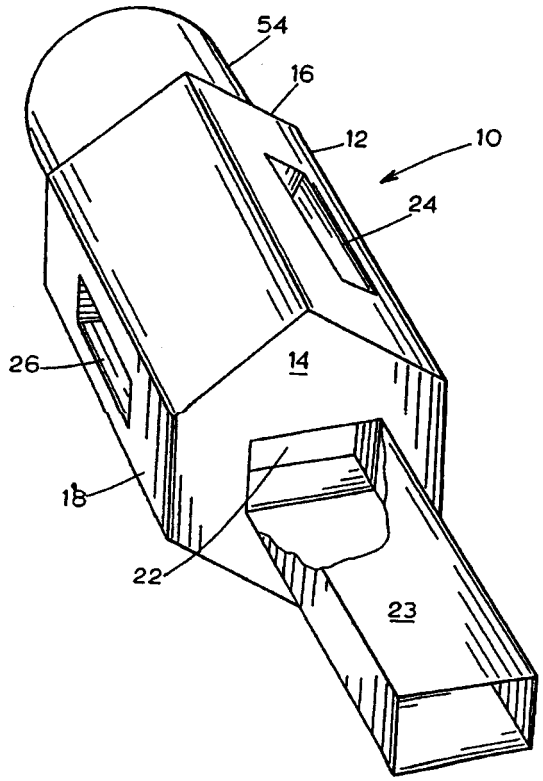
Compact Waveguide "T" Switch

Inventors: Rolf Kich and Michael N. Ando.
Assignee: Hughes Electronics Corporation
Filed: Mar. 5, 1999.

***Abstract*—**A compact "T" switch for use in a waveguide communication system switch includes a housing, a rotor, and a motor. The housing includes a pair of ends and an interconnecting sidewall enclosing a cylindrical cavity. One of the housing ends including an entry port, and the sidewall includes a plurality circumferentially spaced exit ports. The rotor is rotatably disposed within the housing cylindrical cavity, and includes an input end having an input port aligned with the housing entry port and an outer surface having a plurality of output ports for alignment with the housing exit ports. The rotor includes a primary or first passage connecting the input port to one of the output ports and further includes at least one secondary passages connecting a pair of the output ports. A motor is provided for rotating the rotor within the cavity for aligning each of the output ports with an adjacent one of the exit ports, thereby permitting

the first passage to be connected to a selected one of the exit ports, and further permitting the secondary passage to interconnect a pair of the remaining exit ports.

37 Claims, 10 Drawing Sheets



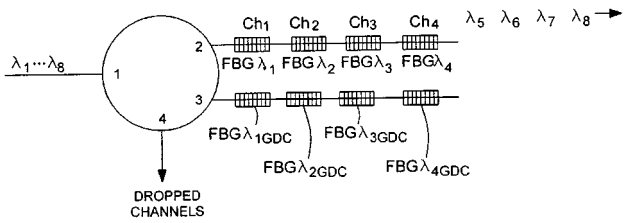
6,201,907 Mar. 13, 2001

Optical Drop Circuit Having Group Delay Compensation

Inventor: Mark Farries.
Assignee: JDS Fitel Inc.
Filed: Mar. 25, 1999.

***Abstract*—**The present invention relates to multi-wavelength filtering devices and more particularly to a multi-channel multiplexer/demultiplexor using at least one multi-port optical circulator and a plurality of Bragg optical fiber gratings or other wavelength selective means. Advantageously a drop or add/drop optical circuit including the combination of a Bragg grating providing a strong reflective response for substantially completely separating a single channel of a band of wavelengths from a plurality of other channels in a multi-channel signal, with a Bragg grating of lower reflective response which is capable of providing group delay compensation to lessen the effects of group delay introduced by the strong Bragg grating with isolation between the Bragg gratings provides a device for accurately and efficiently separating channels from a multiple channel signal with low loss.

21 Claims, 7 Drawing Sheets



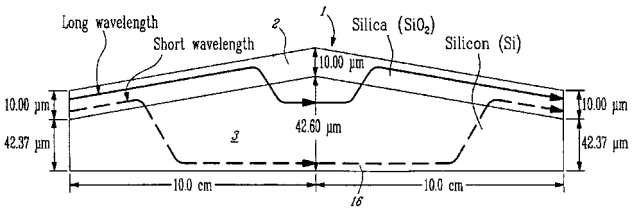
6,201,914 Mar. 13, 2001

Tapered Waveguide for Optical Dispersion Compensation

Inventors: Michel Duguay, Dominique Brichard, Vincent Delisle, Uwe Langbein, and Udo Trutschel.
Assignee: Université Laval
Filed: Apr. 15, 1998.

***Abstract*—**The optical device provides dispersion adjustment or compensation using resonant coupling between a first waveguide and a second waveguide which has a variable thickness and a significantly different index of refraction. The two waveguides are optically coupled about a lateral coupling surface, and as light propagates down the waveguide, it passes from one waveguide to the other at a predetermined position along the propagation axis depending on the thickness of the second waveguide. Mode converters are used at the input and output of the device to provide for more efficient operation. The first waveguide can be made of silica and the second waveguide of silicon, thus providing a differential in the index of refraction of about 2. For dispersion compensation, in which shorter wavelengths need to be retarded with respect to longer wavelengths, the profile of the thickness of the second waveguide is such that shorter wavelengths spend more time in the silicon than do longer wavelengths. The shorter wavelength components are thus slowed down more than the longer wavelength components in the optical communications signal.

19 Claims, 7 Drawing Sheets



6,201,949 Mar. 13, 2001

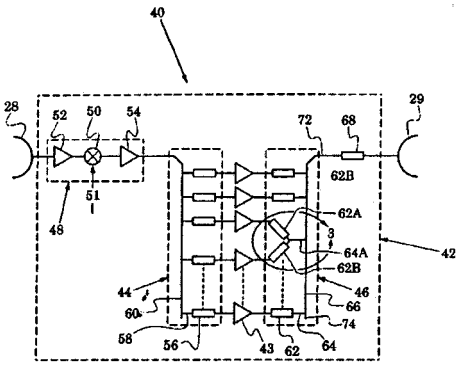
Multiplexer/Demultiplexer Structures and Methods

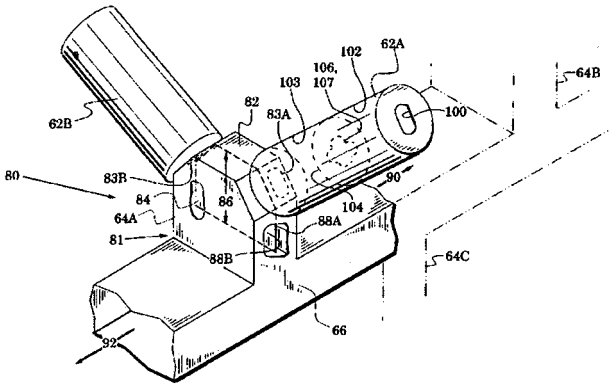
Inventors: Rolf Kich and Devon J. Gray.
Filed: May 22, 1998.

***Abstract*—**A multiplexer/demultiplexer structure is provided which multiplexes multiple channel signals through a common tee of a tee/manifold mulitplexer arrangement. This multiplexing significantly reduces the number of tees required for a given number of multiplexed channels. Accordingly, mulitplexer/demulitplexer design time is reduced and fabricated multiplexers/demultiplexers are lighter, smaller and less expensive. The tee multiplexing is facilitated with multiple access apertures that are isolated by

a septum. The septum forms reduced-height waveguides which define a path length between apertures that is sufficient to significantly reduce higher-order modes and, therefore, aperture interactions.

24 Claims, 5 Drawing Sheets





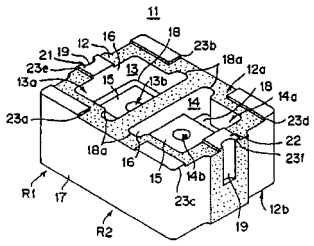
6,204,738 Mar. 20, 2001

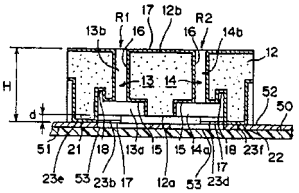
Dielectric Filter, Dielectric Duplexer, Mounting Structure Thereof, and Communication Device

Inventors: Jun Toda, Takashi Maruyama, Jinsei Ishihara, and Hideyuki Kato.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Apr. 14, 1999.

***Abstract*—**The invention provides a dielectric filter, comprising: a dielectric block including a first surface and a second surface opposite to each other; a resonator hole extending between the first surface and second surface of the dielectric block, said resonator hole including a large-sectional area portion, a small-sectional area portion and a step portion between the large-sectional area portion and the small-sectional area portion; an inner conductor provided on the inner surface of the resonator hole; an outer conductor provided on the outer surface of the dielectric block; the inner conductor being electrically left unconnected to the outer conductor at the first surface of the dielectric block and being electrically connected to the outer conductor at the second surface of the dielectric block; and a seat portion provided on the first surface of the dielectric block such that the first surface serves as a mounting surface of the dielectric filter.

19 Claims, 8 Drawing Sheets





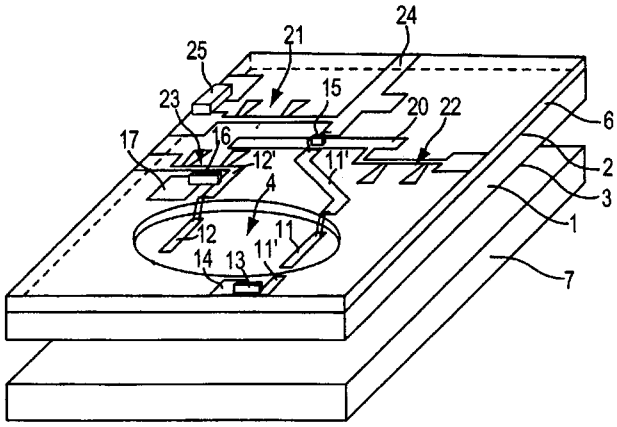
6,204,739 Mar. 20, 2001

Dielectric Resonant Apparatus

Inventors: Koichi Sakamoto, Takatoshi Kato, Kenichi Iio, and Sadao Yamashita.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Feb. 23, 1999.

***Abstract*—**Electrodes are formed on respective two main surfaces of a dielectric sheet wherein each electrode has an opening formed at a location corresponding to the location of the opening formed in the other electrode. The part defined by the openings serves as a dielectric resonator. Coupling lines are formed directly in the electrode opening. Transmission lines are formed on a circuit board. The coupling lines and the corresponding transmission lines are connected to each other via bonding wires. This structure makes it possible to minimize the external Q of a resonant circuit using the dielectric resonator. If an oscillator is produced using this resonant circuit, it is possible to achieve a large frequency modulation with and large output.

6 Claims, 10 Drawing Sheets



6,204,740 Mar. 20, 2001

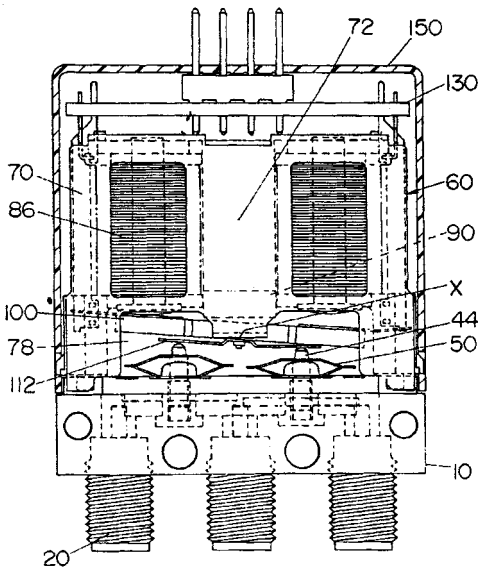
Coaxial Relay

Inventor: Atsushi Nakahata.
Assignee: Matsushita Electric Works, Ltd.
Filed: Apr. 21, 2000.

***Abstract*—**A coaxial relay is build up from a contact block and an electromagnet block. The contact block carries a plurality of coaxial connectors each composed of a core conductor and a shield conductor surrounding the core conductor. The core conductors extend into a shield chamber to define thereat respective coaxial contacts. At least one movable blade is disposed within the shield chamber for closing and opening the two adjacent coaxial contacts. The movable blade is provided with a dielectric actuator which projects on the top of the contact block and is engaged with a return spring secured to the contact block for urging the movable blade in a direction of opening the coaxial contacts. The

electromagnet block carries at least one electromagnet and an armature which is engageable with the actuator when the electromagnet block is assembled to the contact block. The armature moves about a pivot axis from a first position of opening the coaxial contacts to a second position of closing the same. The electromagnet includes a frame of a nonmagnetic material which holds the electromagnet and has its lower end secured to the contact block. The frame has a retainer mechanism for pivotally supporting the armature. Thus, a magnetic gap distance between the electromagnet and the armature can be fixed and does not vary a the time of assembling the electromagnet block to the contact block, so that the relay can have a reliable armature movement in response to the excitation of the electromagnet.

13 Claims, 10 Drawing Sheets



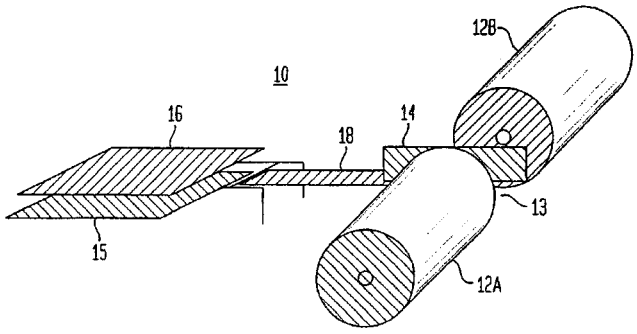
6,205,267 Mar. 20, 2001

Optical Switch

Inventors: Vladimir J. Aksyuk, Bradley P. Barber, David J. Bishop, Clinton R. Giles, Lawrence W. Stulz, and Rene R. Ruel.
Assignee: Lucent Technologies
Filed: Nov. 20, 1998.

***Abstract*—**An optical switch uses a MEMS device to insert a highly reflective shutter in a gap between a pair of coaxially aligned fibers. When the switch is closed, an input optical signal passes with little loss through the gap. When the switch is open and the shutter is positioned in the gap, an input optical signal incident on the shutter is reflected back into the input fiber. Such light is diverted by an optical circulator into a new path.

17 Claims, 2 Drawing Sheets



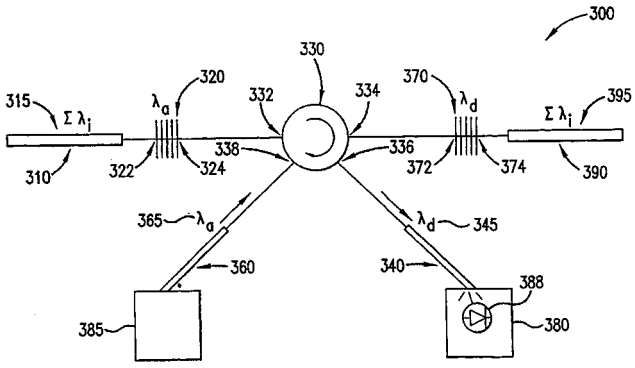
6,205,269 Mar. 20, 2001

Optical Add/Drop Multiplexer

Inventor: Paul A. Morton
Assignee: Ciena Corporation
Filed: Apr. 6, 1999.

***Abstract*—**An add/drop multiplexer includes first and second fiber grating connected to a four-port optical circulator having first and second input/output ports, an add port, and a drop port, wherein the first fiber grating is connected to the first input/output port and the second fiber grating is connected to the second input/output port. Add signals provided to the add port of the circulator are reflected by the first fiber grating back to the optical circulator and propagate, along with one or more input optical signals, to the second fiber grating. One or more of the input optical signals are reflected by the second fiber grating back to the optical circulator and propagate to the drop port of the circulator.

11 Claims, 2 Drawing Sheets



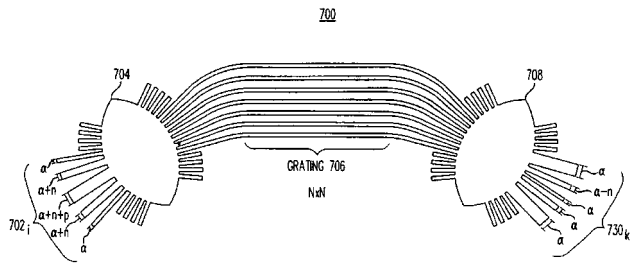
6,205,273 Mar. 20, 2001

Waveguide Grating Router Having a Predetermined Composite Amplitude Spectrum

Inventor: Jerry Chia-yung Chen.
Assignee: Lucent Technologies Inc.
Filed: Mar. 2, 1999.

***Abstract*—**In a waveguide grating router, a predetermined composite transmission spectrum output is achieved by eliminating loss imbalances through the use of variable loss elements. The variable loss elements are introduced to the waveguide grating router's waveguide ports, such that the loss of a transmitted signal is independent of wavelength. The waveguide grating router includes at least one input waveguide and a plurality of output waveguides. The variable loss element is introduced to a predetermined group of output waveguides to produce a predetermined composite amplitude spectrum of the output signals. To provide a predetermined composite amplitude output spectrum, the variable loss elements may be implemented in a variety of ways, including a method of varying the cross-sectional areas of the router's waveguide ports to introduce more loss.

16 Claims, 5 Drawing Sheets



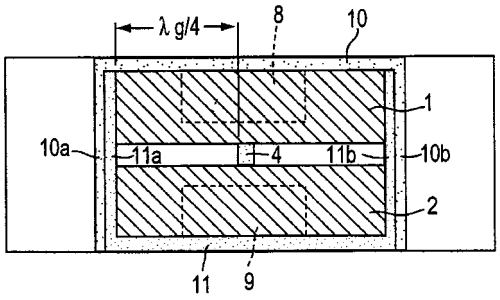
6,208,218 Mar. 27, 2001

Nonreciprocal Circuit Device Including Dielectric Wave Guide, Dielectric Wave Guide Device and Radio Device

Inventors: Yutaka Ishiura, Hiromu Tokudera, and Katsuyuki Ohira.
Assignee: Murata Manufacturing Co., Ltd.
Filed: May 11, 1999.

***Abstract*—**A dielectric wave guide nonreciprocal circuit device wherein the efficiency of applying a DC magnetic field to ferrite plates is increased, the effect on other components of magnetic field leakage from magnets is reduced, and changes in the DC magnetic field, when other magnetic bodies are nearby, are reduced. The dielectric wave guide has dielectric strips clasped between conductive plates. Ferrite plates are provided at a center portion where the dielectric strips converge. Magnets are provided in concavities formed in outer sides of the conductive plates. A closed magnetic path is formed by surrounding the whole structure with magnetic members having side walls.

22 Claims, 7 Drawing Sheets



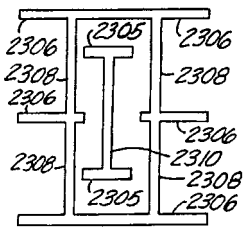
6,208,220 Mar. 27, 2001

Multilayer Microwave Couplers Using Vertically-Connected Transmission Line Structures

Inventor: James J. Logothetis.
Assignee: Merrimac Industries, Inc.
Filed: Jun. 11, 1999.

***Abstract*—**A microwave coupler is constructed in a multilayer, vertically-connected stripline architecture provided in the form of a microwave integrated circuit that has a homogeneous, multilayer structure. Such a coupler has a vertically-connected stripline structure in which multiple sets of stripline layers are separated by interstitial groundplanes, and wherein more than one set of layers has a segment of coupled stripline. A typical implementation operates at frequencies from approximately 0.5 to 6 GHz, although other frequencies are achievable.

16 Claims, 11 Drawing Sheets



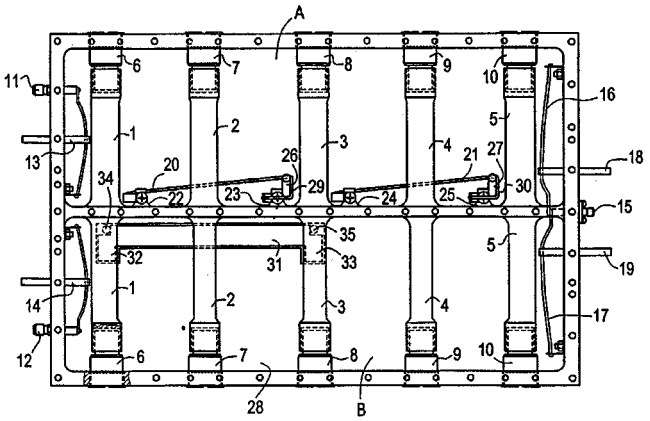
6,208,221 Mar. 27, 2001

Microwave Diplexer Arrangement

Inventors: Dieter Pelz and Natalie Trembath.
Assignee: Alcatel
Filed: May 13, 1999.

***Abstract*—**An adjustable microwave diplexer comprising two combline filter sections (A and B). Each filter section has at least three tunable resonator elements (**1**,**2**,**3** and **4**). Non-adjacent resonator elements of one section (A) are inductively coupled by an adjustable coupling element (**20**,**21**), and nonadjacent resonator elements of the other section (B) are capacitively coupled by an adjustable capacitor element (**31**). This arrangement provides the means to achieve adjustable transmission zeros above the passband of filter A and below the passband of filter B to provide the diplexer with two highly selective filters.

17 Claims, 3 Drawing Sheets



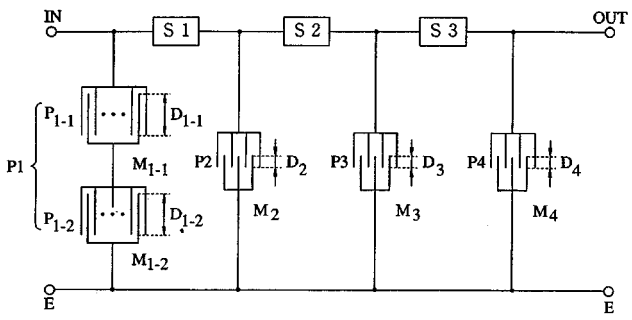
6,208,223 Mar. 27, 2001

Receiving Filter of a Saw Separator With Greater Electrode Interdigitated Width in First Stage Parallel Resonator

Inventors: Hajime Shimamura, Yoshiaki Fujita, Masaaki Umezawa, and Tomokazu Komazaki.
Assignee: Oli Electric Industry, Co., Ltd.
Filed: Dec. 15, 1998.

***Abstract*—**A receiving filter of a SAW separator that prevents temperature increase, and enables to improve electric power-resisting property and attains high performance. A series arms and parallel arms of a transmitting filter and receiving filter are equipped with ladder type filters comprising SAW resonators. In the receiving filter, the number of pairs of finger electrodes of a parallel arm resonator P**1** arranged at the first stage viewed from input side is larger than the number of pairs of finger electrodes of parallel arm resonators P**2**, … at other stages. Or interdigitated width of finger electrodes of the parallel resonator at the first stage is made longer than interdigitated width of finger electrodes of each of parallel resonators at other stages.

14 Claims, 8 Drawing Sheets



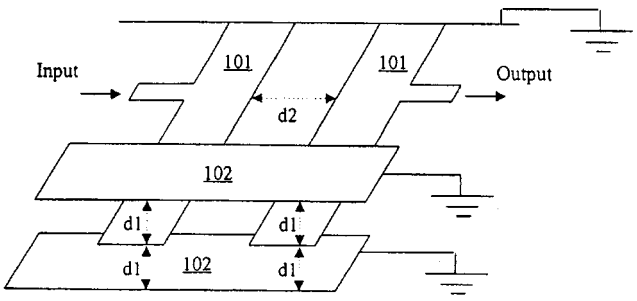
6,208,226 Mar. 27, 2001

Planar Comb(-)Line Filters With Minimum Adjacent Capacitive(-)Coupling Effect

Inventors: Kouth Chen and Ching-Kuang C. Tzuang.
Assignee: Industrial Technology Research Institute
Filed: Jul. 14, 1999.

***Abstract*—**A comb-line filter is disclosed which includes: (a) a top metal plate and a bottom metal plate; (b) a pair of resonators sandwiched between the top and bottom metal plates and in a parallel and spaced relationship with respect to the top and bottom metal plates; (c) a pair of resonator extensions extending from the pair of resonators, respectively, and (d) a pair of capacitor plates provided above and below the pair of resonators, respectively. The pair of capacitor plates and the pair of resonators extensions are grounded so as to provide a double-parallel capacitor groups. The comb-line filter can be constructed such that the ratio of the separation between the two resonators (d**2**) and the separation between the resonator and the capacitor plate (d**1**) is above about 3. By doing so, the coupling capacitance can be reduced to 0.1 pF or lower. In a more preferred embodiment, the ratio of d**1**/d**2** is maintained to below 10, and the coupling capacitance will be essentially zero (less than 0.01 pF).

9 Claims, 7 Drawing Sheets



6,208,227 Mar. 27, 2001

Electromagnetic Resonator

Inventors: Stephen K. Remillard, Donald E. Richied, Edward A. Freeman, Nikolay Ortenberg, Peter Winandy, and James D. Hodge.
Assignee: Illinois Superconductor Corporation
Filed: Jan. 19, 1998.

***Abstract*—**An electromagnetic resonator has a resonant element made of a high-temperature superconducting material such as $YBa_2Cu_3O_{7-x}$. The resonant element has a substrate coated with a thermally conductive layer such as silver, over which the high-temperature superconductor material is placed. The thermally conductive layer distributes heat along the length of the resonant element to minimize the effects of localized heating at, for instance, the center of the resonator. The resonant element is held to a housing by a mounting mechanism including a post made of polycrystalline alumina. The polycrystalline alumina transfers heat away from the center of the resonant element and may be used to suppress spurious response due to second harmonic resonance.

5 Claims, 8 Drawing Sheets