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.

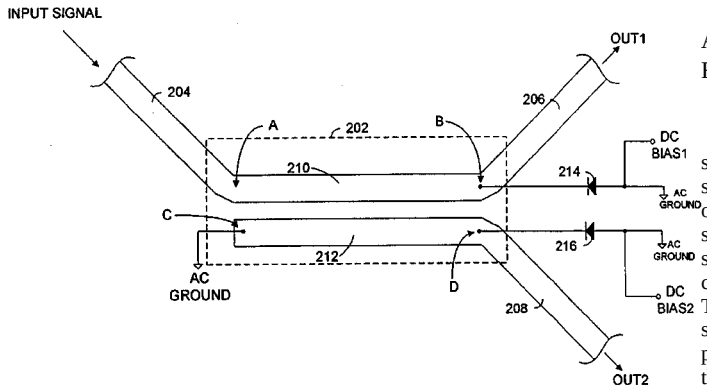
6,225,874 May 1, 2001

Coupling Structure as a Signal Switch

Inventor: John C Kerley.
Assignee: Agilent Technologies Inc.
Filed: May 29, 1998.

***Abstract*—**An AC signal is switched between two circuit branches using a transformer or at least one directional coupler as a coupling device. Electronically controlled switches shunt one of two terminals of the coupling device to AC ground. The input signal is propagated out of the nonshunted terminal to one of the two circuit branches. The electronically controlled switches may be relays, transistors, or diodes. Diodes prevent the AC signal from being shunted to AC ground when reverse biased and shunt the AC signal to AC ground when forward biased.

21 Claims, 4 Drawing Sheets



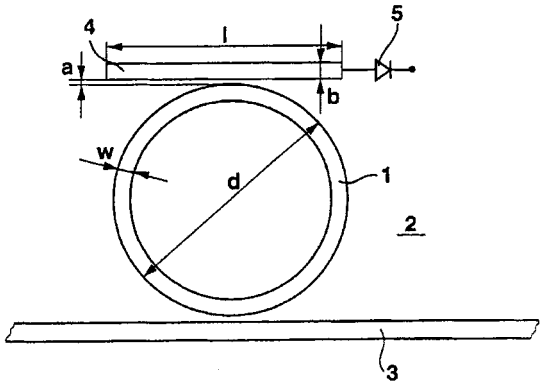
6,225,879 May 1, 2001

Unperturbed Ring Resonator With an Odd Overtone Vibration Mode

Inventors: Martin Schallner and Willibald Konrath.
Assignee: Robert Bosch GmbH.
Filed: October 23, 1998.

***Abstract*—**The ring resonator of a high Q-factor has a planar conducting ring **(1)** that is dimensioned in regard to its conductor width (w) and its diameter (d) so that it resonates in an odd harmonic or overtone vibration mode but not in its fundamental mode.

3 Claims, 1 Drawing Sheet



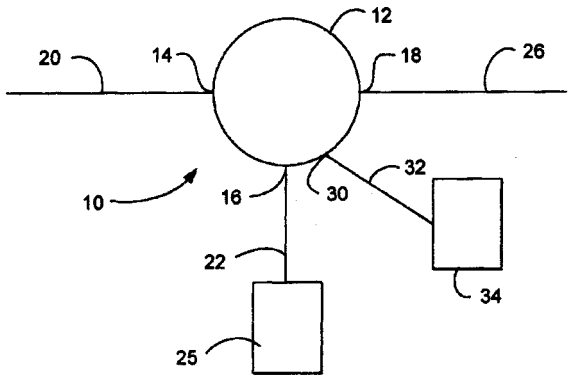
6,226,425 May 1, 2001

Flexible Optical Multiplexer

Inventors: Constance Chang-Hasnain, Marc Schwager, and Rang-Chen Yu.
Assignee: Bandwidth9
Filed: June 4, 1999.

***Abstract*—**A multiplexer has an optical circulator including at least first, second and third circulator ports. An optical fiber with a first optical transmission path is coupled to the first circulator port of the optical circulator. The optical fiber carries a wavelength division multiplexed optical signal, including signals $\lambda_1-\lambda_n$ and at least one signal λ_1 to be dropped by the multiplexer. A second optical transmission path is in optical communication with the second circulator port. A first filter is coupled to the second optical transmission path. The first filter passes a portion of the λ_1 signal, and reflects a first residual λ_1 signal and signals $\lambda_2-\lambda_n$ to the optical circulator. A third optical transmission path is in optical communication with the third circulator port and transmits the signals $\lambda_2-\lambda_n$ received from the optical circulator.

53 Claims, 7 Drawing Sheets



Publisher Item Identifier S 1531-1309(01)11073-1.

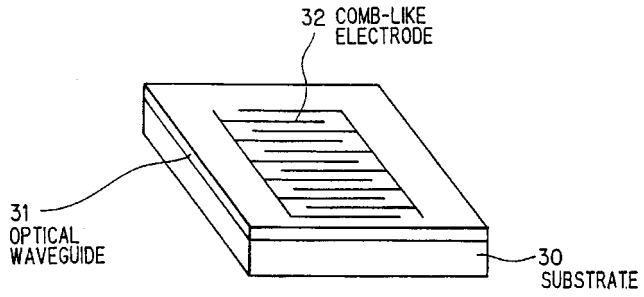
6,226,427 May 1, 2001

Optical Isolator

Inventor: Yidong Nuang.
Assignee: NEC Corporation.
Filed: Apr. 30, 1999.

***Abstract*—**Disclosed is an optical isolator, which has: a medium through which a light transmits and in which a dynamic diffraction grating that periodically repeats a refractive index distribution is formed; wherein the dynamic diffraction grating causes a propagation loss difference between an incident light which is supplied into the medium and a returning light which is supplied into the medium in a direction reverse to the incident light.

5 Claims, 6 Drawing Sheets



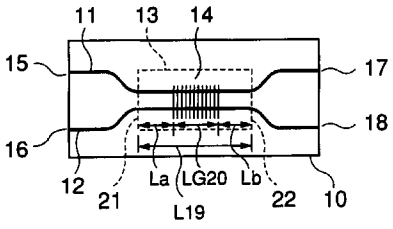
6,226,428 May 1, 2001

Optical Multiplexer/Demultiplexer With Optical Waveguides and a Diffraction Grating

Inventors: Takashi Saito and Yutaka Urino.
Assignee: NEC Corporation
Filed: July 21, 1998.

***Abstract*—**An optical circuit device includes a directional coupling section and at least one diffraction grating. The directional coupling section is comprised of first and second optical waveguides and having a length n times (n is an integer equal to or larger than two) the minimum length required to completely couple light inputted to the first optical waveguide with the second optical waveguide. The diffraction grating is formed in the directional coupling section and has a specific reflection characteristic. When input light beams having different wavelengths are inputted to the input side of the first optical waveguide, light having a reflection wavelength in the diffraction grating is demultiplexed/outputted to the input side of the second optical waveguide. Light beams having other wavelengths are outputted to the output side of the first or second optical waveguide. When the light having the reflection wavelength in the diffraction grating is inputted through one of the output sides of the first and second optical waveguides from which the light beams having other wavelengths are not outputted, the light having the reflection wavelength input through the output side of the optical waveguide is multiplexed with the output light beams having other wavelengths.

8 Claims, 8 Drawing Sheets



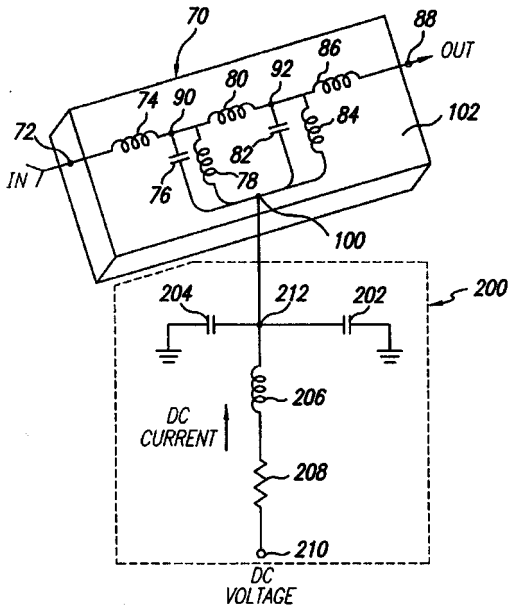
6,229,408 May 8, 2001

Zero Loss Bias "T"

Inventors: Alan F. Jovanovich and For Sander Lam.
Assignee: Intermec IP Corp.
Filed: May 19, 1999.

***Abstract*—**A zero loss bias "T" is provided for use in an RF receiver front end in order to bias a received RF signal with a DC current. The zero loss bias "T" permits a DC current to be introduced into an RF signal path of a filter having filter characteristics sufficient to pass frequencies only in a desired passband without associated losses to the RF signal. The filter may be provided by an LC filter having a ground coupling point. DC current is coupled to the RF signal path of the filter via the ground coupling point.

14 Claims, 2 Drawing Sheets



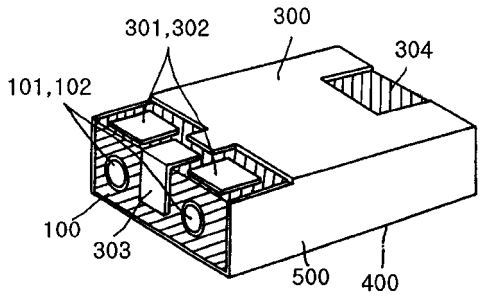
6,229,410 May 8, 2001

Integral Dielectric Filter

Inventors: Su Kil Lee, Sung Hwan Park, and Hong Seok Lee.
Assignee: Samsung Electro-Mechanics Co., Ltd.
Filed: June 11, 1999.

***Abstract*—**An integral type dielectric filter is disclosed, in which the insertion loss is minimized, and the damping characteristics desired by the user are satisfied. The dielectric filter includes a dielectric block having first and second faces facing toward each other and having a plurality of side faces. A ground electrode is coated on the entire faces of the dielectric block except the first face. A plurality of through holes pass through the first and second faces, with their surfaces being coated with a conductive material. Input and output electrodes are formed on a face of the dielectric block insulatingly from the ground electrode, for forming an electromagnetic coupling with internal electrodes of the plurality of the through holes. At least one metallic coupling region is formed between the input and output electrodes and between the through holes of the first face insulatingly from the ground electrode and from the input and output electrodes to form a capacitive coupling between the input and output electrodes and the through holes. Thus the insertion loss can be decreased compared with the conventional techniques, while improving the damping rate. Further, at least a nonmetallic coupling region is formed to realize an inductive coupling, and thus the damping characteristics can be improved at the high frequency side.

19 Claims, 15 Drawing Sheets



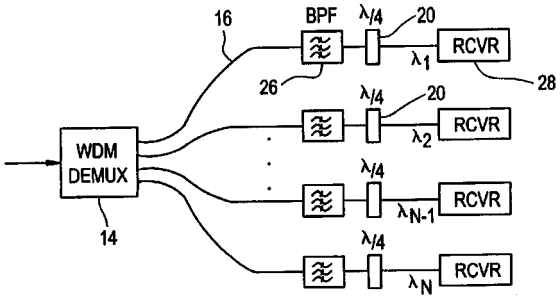
6,229,937 May 8, 2001

Circularly Polarized Fiber in Optical Circuits

Inventors: Daniel Aloysius Nolan and Mohammed Nazrul Islam.
Assignee: Corning Incorporated.
Filed: June 24, 1999.

***Abstract*—**The invention is directed to circularly polarized single mode waveguide fiber and to high data rate, multiplexed transmission systems that employ this fiber. The circularly polarized waveguide fiber attenuates the nonlinear effects present in such high performance transmission links. In particular, self phase modulation is attenuated by more than 30% and four wave mixing is essentially eliminated. This latter effect occurs because four wave mixing does not occur when a multiplexed link is made of a plurality of circularly polarized waveguide fibers which are arranged so that adjacent fibers have opposite circular polarization. The circularly polarized fiber enhances the nonlinear effect of cross phase modulation, a feature that can be used in optical switching components associated with the transmission link. In addition, the strength of the XPM in CPF is independent of the relative polarization states of the signal and control pulses.

15 Claims, 9 Drawing Sheets



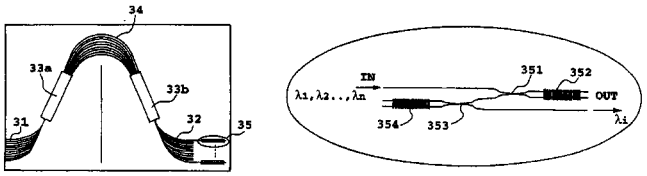
6,229,938 May 8, 2001

WDM Filter

Inventors: Yoshinori Hibino, Akira Himeno, Makoto Abe, Takuya Tanaka, Shin Kamei, and Akimasa Kaneko.
Assignee: Nippon Telegraph and Telephone Corporation.
Filed: January 31, 2000.

***Abstract*—**The present invention provides a wavelength division multiplexing filter that requires lower costs, a smaller size, and a smaller amount of fiber routing operations. According to the present invention, a first module constitutes a first filter. A second module constituting a second filter is produced by connecting together circuits identical in number to a plurality of output ports of the first module, the circuits each comprising a combination of directional couplers and Bragg gratings both formed of silica-based-glass waveguides, the circuits each having a wavelength selection characteristic so as to correspond to each of the output ports. The second module is connected to the first module via an 8-fiber ribbon to simplify the integration and connection of the circuits.

44 Claims, 21 Drawing Sheets



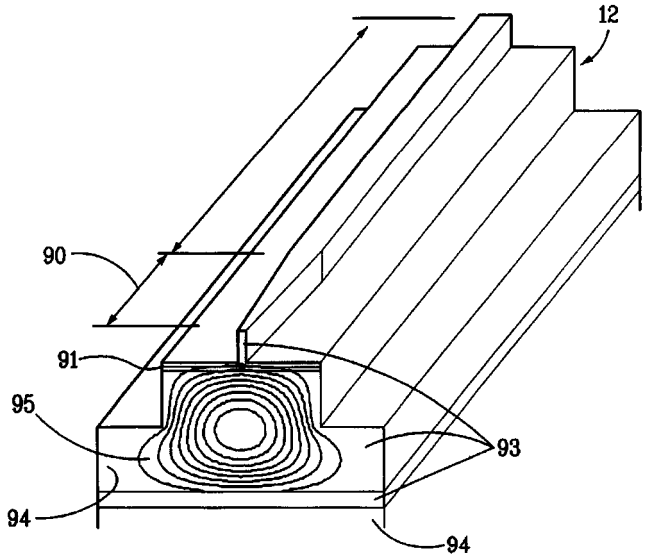
6,229,947 May 8, 2001

Tapered Rib Fiber Coupler for Semiconductor Optical Devices

Inventors: Gregory A. Vawter and Robert Edward Smith.
Assignee: Sandia Corporation.
Filed: October 6, 1997.

***Abstract*—**A monolithic tapered rib waveguide for transformation of the spot size of light between a semiconductor optical device and an optical fiber or from the fiber into the optical device. The tapered rib waveguide is integrated into the guiding rib atop a cutoff mesa type semiconductor device such as an expanded mode optical modulator or and expanded mode laser. The tapered rib acts to force the guided light down into the mesa structure of the semiconductor optical device instead of being bound to the interface between the bottom of the guiding rib and the top of the cutoff mesa. The single mode light leaving or entering the output face of the mesa structure then can couple to the optical fiber at coupling losses of 1.0 dB or less.

19 Claims, 13 Drawing Sheets



6,232,849 May 15, 2001

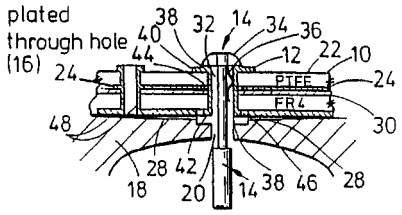
RF Waveguide Signal Transition Apparatus

Inventors: Stephen John Flynn and Andrew Patrick Baird.
Filed: April 30, 1998.

***Abstract*—**An RF waveguide signal transition apparatus for minimizing leakage at RF frequency is described which consists of providing a plurality of plated through-holes (**16**) of blind holes in a circuit board (**10**). The plated holes

(**16**) are disposed on the circumference of a circle around the RF waveguide to microstrip transition of probe (**14**) and each of the plated holes (**16**) is connected to a ground plane (**24**). The size of distribution of the plated holes provides a barrier to signal leakage at RF frequencies in the range 10.95–11.7 GHz and they also provide a transition impedance similar to the 50 ohm characteristic impedance providing satisfactory matching and minimizing leakage into the board. The apparatus can also be used to minimize leakage from microstrip to microstrip transitions passing through the circuit board.

7 Claims, 2 Drawing Sheets



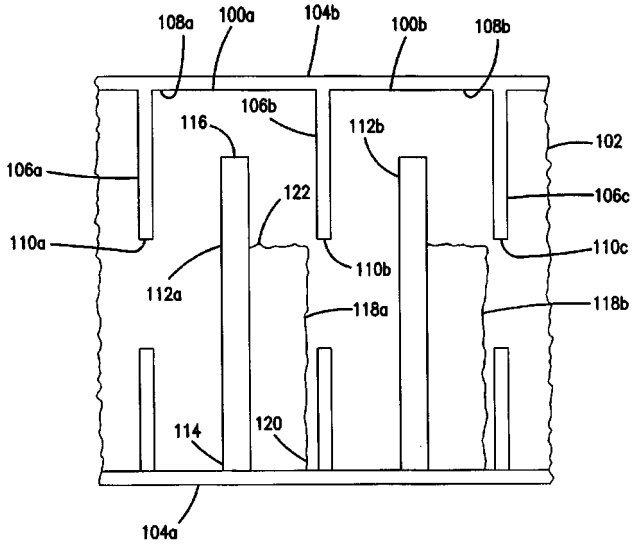
6,232,851 May 15, 2001

Coupling Structure for Cavity Resonators

Inventor: Guanghua Huang.
Assignee: ADC Solitra, Inc.
Filed: February 10, 1999.

***Abstract*—**A resonator filter comprising a housing formed with a conductive material. The housing defines a first cavity, a second cavity, and an intermediate wall positioned between the first and second cavities. The housing defines an opening between the first and second cavities. First and second center conductors are positioned within the first and second cavities, respectively. A coupling wire is connected between the first center conductor and the housing. The coupling wire and the center conductor have substantially equal thermal expansion coefficients.

13 Claims, 3 Drawing Sheets



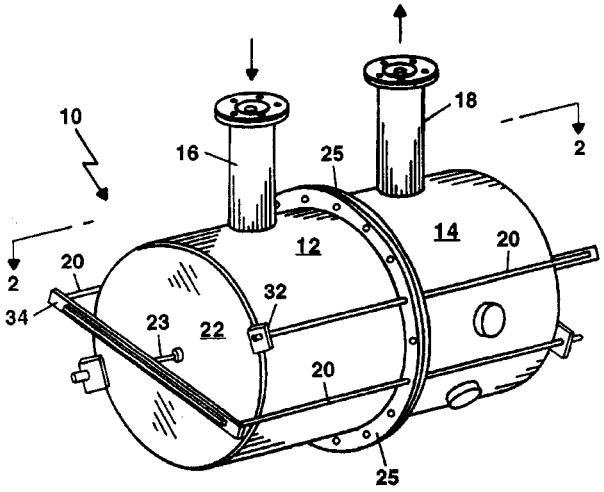
6,232,852 May 15, 2001

Temperature Compensated High Power Bandpass Filter

Inventors: Derek J. Small and John A. Lunn.
Assignee: Andrew Passive Power Products, Inc.
Filed: February 16, 1999.

***Abstract*—**A bandpass filter makes use of at least one waveguide cavity that is thermally compensated to minimize drift of a resonant frequency of the cavity with thermal expansion of cavity components. The compensation relies on deformation of the shape of at least one cavity surface in response to thermally-induced dimensional changes of the cavity. A control rod is used to limit the movement of a point on the deformed surface, while the rest of the surface moves with the thermal expansion. The control rod is made of a material having a coefficient of thermal expansion that is significantly different than that of other filter components. The rod may also be arranged to span more thermally expandable material than defines the filter such that, as the filter expands, the point of deflection is moved toward the interior of the filter beyond its original position. A similar effect may be accomplished by connecting the control rod to an end deflecting rod that does the actual limiting of the movement of the deflection point. If the end deflecting rod has a coefficient of thermal expansion that is higher than that of the control rod, the end deflecting rod will expand with temperature relative to the end of the control rod, forcing the deflection point inward.

25 Claims, 3 Drawing Sheets



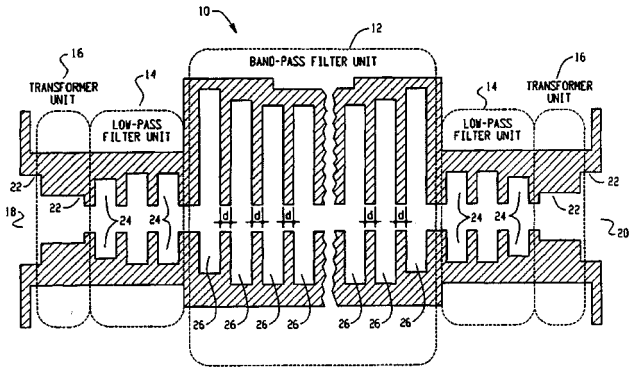
6,232,853 May 15, 2001

Waveguide Filter Having Asymmetrically Corrugated Resonators

Inventor: Rousslan Goulouev.
Assignee: COM DEV Limited.
Filed: March 12, 1999.

***Abstract*—**A waveguide filter is provided having a plurality of asymmetrical corrugated resonators. The filter may also include an input section and an output section including a low-pass filter unit and a transformer unit. The low-pass filter unit includes a plurality of symmetrically corrugated slots, and the transformer unit includes at least one stepped transformer section for matching the filter to an external waveguide line. Each of the asymmetrically corrugated resonators may include a pair of opposed slots of different depth, a long slot and a short slot. The resonators provide at least one reflection zero and two transmission zeros to the frequency response of the filter, thus providing high-pass, band-pass and low-pass filter properties in a single filter structure.

32 Claims, 5 Drawing Sheets



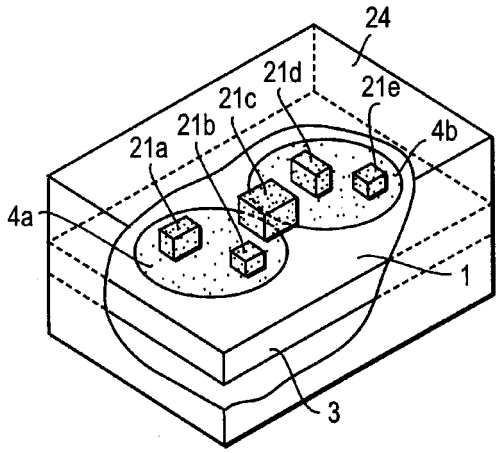
6,232,854 May 15, 2001

Dielectric Resonator Device, Dielectric Filter, Oscillator, Sharing Device, and Electronic Apparatus

Inventors: Shigeyuki Mikami, Toshiro Hiratsuka, Tomiya Sonoda, Yutaka Ida, and Kiyoshi Kanagawa.
Assignee: Murata Manufacturing Co., Ltd.
Filed: April 23, 1999.

***Abstract*—**In a dielectric resonator device, electrodes having electrode nonformation sections opposite to each other and having substantially the same shape and size are formed on the opposite main faces of a dielectric plate. The portion of the dielectric plate sandwiched between the electrode nonformation sections opposite to each other is used as a dielectric resonator section. Further, the characteristics of the dielectric resonator device are adjusted by attaching dielectric chips inside of the dielectric resonator section or between adjacent dielectric resonator sections.

18 Claims, 16 Drawing Sheets



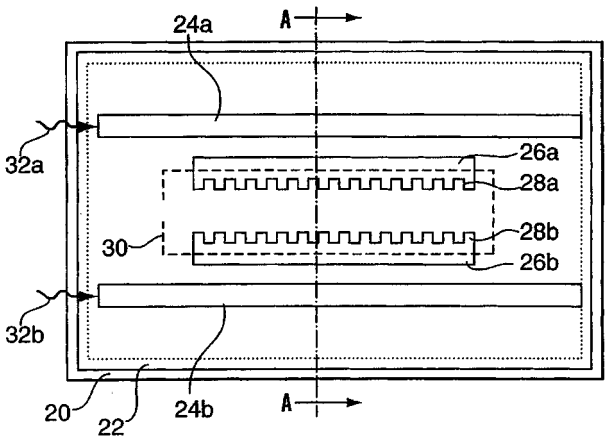
6,233,378 May 15, 2001

Optical Switch Utilizing Two Unidirectional Waveguide Couplers

Inventor: De-Gui Sun.
Assignee: Nu-Wave Photonics Inc.
Filed: May 15, 2000.

***Abstract*—**An optical waveguide switch using two unidirectional waveguide couplers with coupling gratings is provided. Each unidirectional waveguide coupler compromises two waveguide channels and a coupling grating along one waveguide channel. Two such waveguide couplers with coupling gratings are positioned on a substrate to form a symmetric couple–pair. An optical signal launched into the input port of the first coupler may exit from the output port of the second coupler. A modulating electrode is used to eliminate the coupling gratings on the two couplers, and the optical signal launched into the input port of the first coupler exits from its own output port. Similarity, this process can also be performed for an optical signal launched into the second coupler. Thus an effective 2×2 switching performance is implemented with this structure. $\mathrm{M}\times\mathrm{N}$ switching performance may also be implemented with several 2×2 waveguide switches.

1 Claim, 2 Drawing Sheets



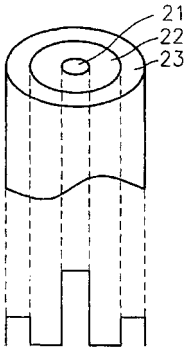
6,233,386 May 15, 2001

Optical Fiber for Use in Bragg Grating and Fiber Bragg Grating Using the Same

Inventors: Un-chul Paek. and Kyung-hwan Oh.
Assignee: SamSung Electronica Co., Ltd.
Filed: June 22, 1999.

***Abstract*—**An optical fiber for use in a fiber Bragg grating and a fiber Bragg grating using the same are provided. The optical fiber includes a core made of a material obtained by adding germanium oxide (GeO_2) to silica (SiO_2), for guiding light, and a cladding made by adding a material having a negative thermal expansion coefficient to silica (SiO_2), the cladding having a refractive index lower than that of the core. Therefore, the change in Bragg wavelength depending on temperature can be minimized by forming the optical fiber using a material having a negative thermal expansion coefficient.

22 Claims, 2 Drawing Sheets



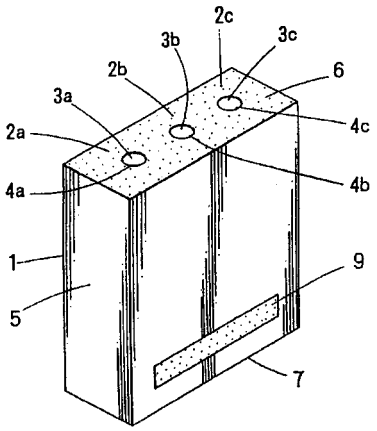
6,235,341 May 22, 2001

Method of Preparing a High Frequency Dielectric Filter Device Using Screen Printing

Inventor: Seigo Hino.
Assignee: NGK Spark Plug Co., Ltd.
Filed: April 1, 1997.

***Abstract*—**A high frequency dielectric filter device having a plurality of coaxial dielectric resonators arranged in parallel with each other wherein a portion having no conductor layer is formed on an outer peripheral surface close to a short-circuit end surface of a dielectric substrate in the direction diagonal to through-holes for the dielectric resonators, thereby easily and simultaneously obtaining polarization and coupling between the coaxial dielectric resonators with each other, that is, obtaining inter-stage coupling and an attenuation pole in the high band side of a center frequency.

1 Claim, 6 Drawing Sheets



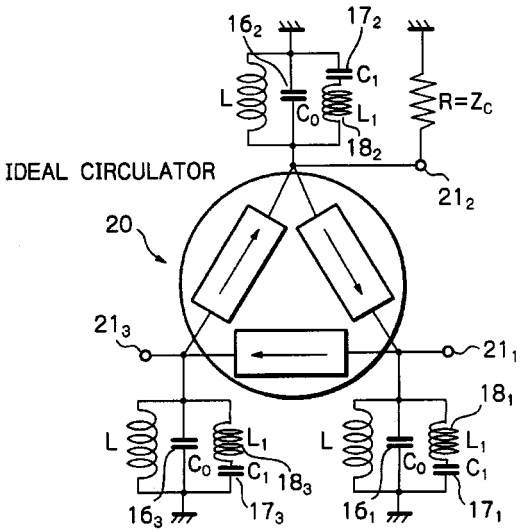
6,236,285 May 22, 2001

Lumped Element Circulator Having a Plurality of Separated Operation Bands

Inventors: Yoshihiro Konishi, Taro Miura, Akira Usami, and Yoshifumi Misu.
Assignees: K Laboratory Co. and TDK Corporation.
Filed: September 4, 1998.

***Abstract*—**A lumped element circulator having a plurality of operation bands, has a circulator element with a plurality of signal ports and a grounded terminal, and resonance circuits connected between the signal ports and the grounded terminal, respectively, each of the resonance circuits having a plurality of resonance points. The number of the operation bands is equal to the number of the resonance points of each of the resonance circuits.

3 Claims, 7 Drawing Sheets



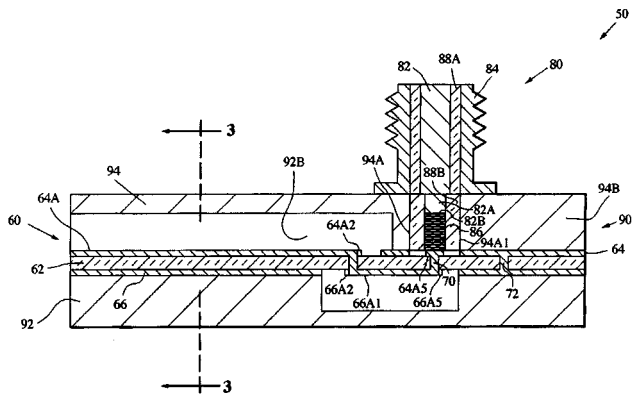
6,236,287 May 22, 2001

Wideband Shielded Coaxial to Microstrip Orthogonal Launcher Using Distributed Discontinuities

Inventors: Clifton Quan, Edward L. Robertson, Rosie M. Jorgenson, Mark Y. Hashimoto, and David E. Roberts.
Assignee: Raytheon Company
Filed: May 12, 1999.

***Abstract*—**A coaxial-to-microstrip vertical transition includes a dielectric substrate having formed on a first surface thereof a primary microstrip conductor trace, and on a second surface a secondary microstrip conductor trace. A first conductive via extends through the dielectric substrate and electrically connects the primary conductor trace to the secondary conductor trace. A second conductive via is spaced from the first conductive via and extends through the dielectric substrate to electrically connect the secondary conductor trace to the coaxial center conductor. A bottom microstrip ground plane layer is defined on the second substrate surface. A conductive base plate structure has a cavity formed therein, the substrate positioned such that the base plate structure is in contact with the bottom ground plane layer, and the secondary conductor trace is positioned over the cavity. The substrate is positioned between a cover structure and the base plate structure, the cover structure disposed in spaced relation with respect to the first surface of the substrate. A coaxial transmission line structure includes an outer shield and a coaxial center conductor structure disposed within the outer conductor and transverse to the substrate, the center conductor passed through an opening in the cover structure to contact the second via. A conductive plate structure is positioned between the plane of the cover structure and the substrate, providing shielding surrounding the center conductor between the cover and the substrate.

13 Claims, 3 Drawing Sheets



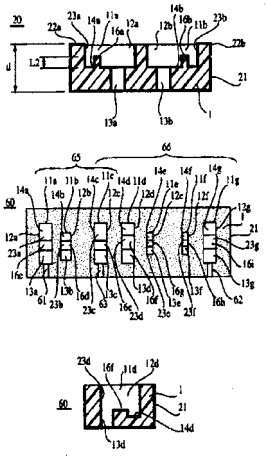
6,236,288 May 22, 2001

Dielectric Filter Having at Least One Stepped Resonator Hole With a Recessed or Protruding Portion, the Stepped Resonator Hole Extending From a Mounting Surface

Inventor: Tatsuya Tsujiguchi.
Assignee: Murata Manufacturing Co., Ltd.
Filed: March 31, 1998.

Abstract*—**A dielectric filter (**10**, **20**) is provided with resonator holes **11a* and **11***b*, and the resonator holes **11***a* and **11***b* have large-sectional area portions **12***a* and **12***b* and small-sectional area portions **13***a* and **13***b*, respectively. On the step portions **14***a* and **14***b* between the large-sectional area portions **12***a* and **12***b* and the small-sectional area portions **13***a* and **13***b*, grooves **15***a* and **15***b* or protruding portions **16***a* and **16***b* substantially surround the small-sectional area portions **13***a* and **13***b*, respectively. Inner conductors **23***a* and **23***b* formed on the inner surfaces of the resonator holes **11***a* and **11***b* are directly connected to input and output electrodes **22***a* and **22***b* formed on outer surfaces of a dielectric block **1**.

24 Claims, 8 Drawing Sheets



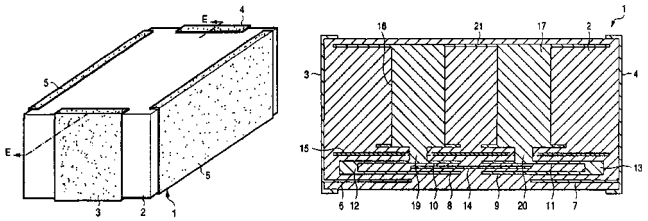
6,236,290 May 22, 2001

Multilayer Filter

Inventors: Toshiyuki Abe and Norimasa Ishitobi.
Assignee: TDK Corporation
Filed: June 11, 1999.

***Abstract*—**Input–output terminal electrodes **3** and **4** are overlaid in both respective edge faces of the multilayer body **1** of a multilayer filter. Ground electrodes **5** and **5** are overlaid on both respective sides of the multilayer body **1**. Through-hole electrodes **16** and **17** for use as a pair of inductance elements are formed in the multilayer body. One ends of the inductance elements are each electrically coupled to the input–output terminal electrodes **3** and **4**, the other ends being connected to the conductive layer formed as a sealed electrode **21**. Paralleled capacitors connected to the inductance elements are formed in the multilayer body **1**. The ratio W/d of the diameter d of the through-hole electrodes **16** and **17** to width W between the ground electrodes **5** and **5** on both edge faces of the multilayer body **1** is set at not less than **1.6** and not greater than **11.4**.

4 Claims, 5 Drawing Sheets



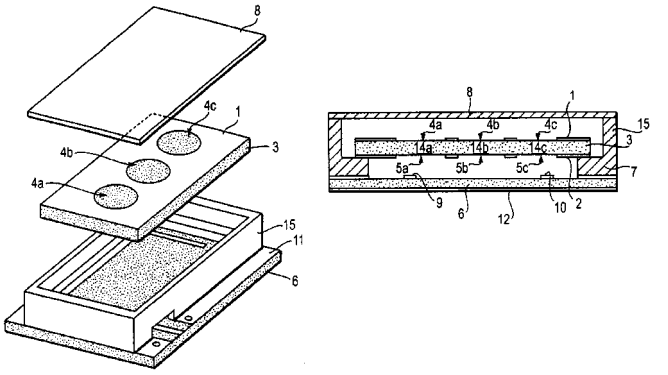
6,236,291 May 22, 2001

Dielectric Filter, Duplexer, and Communication Device

Inventors: Tomiya Sonoda, Toshiro Hiratsuka, and Kiyoshi Kanagawa.
Assignee: Murata Manufacturing Co., Ltd.
Filed: April 6, 1999.

***Abstract*—**A dielectric filter includes a case, a substrate having microstrip lines formed thereon, and a dielectric plate having nonelectrode parts serving as dielectric resonators. The case includes a supporting part for supporting the lower surface of the dielectric plate and includes a side wall surrounding the side faces of the dielectric plate wherein the supporting part and the side wall are formed in an integral fashion. The substrate is bonded to the case and the dielectric plate is mounted on the supporting part of the case. A metal cover is then placed on the case such that the opening of the case is closed with the cover. In the dielectric filter constructed in the above-described manner, warping of the case for supporting the dielectric plate is suppressed and thus the stress exerted on the dielectric plate is reduced. As a result, the dielectric plate is prevented from being separated from the case and also prevented from having a crack. The above-described structure also allows the dielectric filter to be formed into a small size. The invention also provides a duplexer and a communication device using such a dielectric filter.

10 Claims, 6 Drawing Sheets



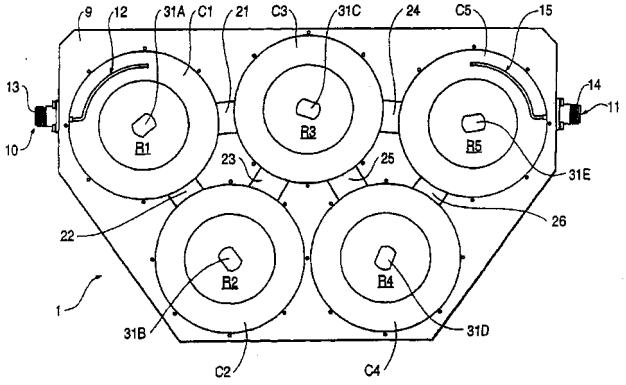
6,236,292 May 22, 2001

Bandpass Filter

Inventor: Rafi Hershtig.
Assignee: Delaware Capital Formation, Inc.
Filed: June 30, 1999.

***Abstract*—**A bandpass filter having three waveguide cavities probelessly coupled in a tri-section for producing an asymmetric response about a passband. In another aspect, the bandpass filter also includes first and second waveguide tri-sections coupled in series via a common waveguide cavity, providing a bandpass waveguide filter having transmission zeros on only one side a filter passband.

8 Claims, 11 Drawing Sheets



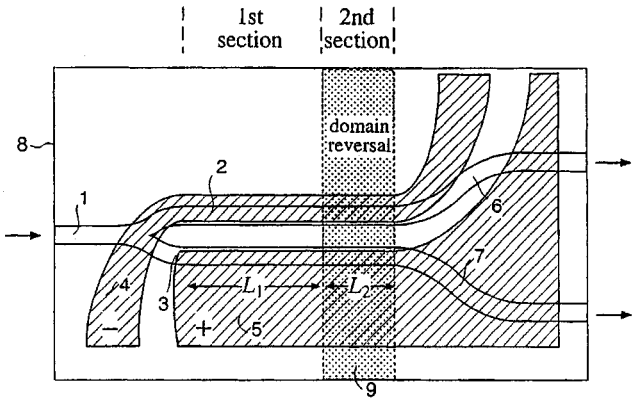
6,236,772 May 22, 2001

Linearized Y-Fed Directional Coupler Modulators

Inventors: Robert F. Tavlykaev and Ramu Ramaswamy.
Assignee: Advanced Photonics Technology, Inc.
Filed: May 2, 2000.

***Abstract*—**The subject invention pertains to electro–optic devices and, in particular, to an integrated-optic modulator with a linearized transfer curve. In a specific embodiment, an integrated-optic modulator with a linearized transfer curve can be formed in an electro–optic substrate and comprises an input Y-junction, a section of two coupled waveguides, followed by two output waveguide bends. Light from a CW optical source can be launched into the input Y-junction and amplitude modulated by applying an external voltage to the electrodes positioned on the top surface of the substrate. The modulator can be driven in both the uniform and Db configuration. By properly adjusting the length of the sections in the coupler with respect to the coupling length, the linearity of the transfer curve is improved. The subject invention is further concerned with realizing modulators with suppressed nonlinear distortions for analog optical links, for example fiber-optic communication links and cable television systems. Third-order harmonics and intermodulation distortions of the Y-fed modulator can be significantly suppressed, thus, increasing the dynamic range of an analog optical system that incorporates the modulator. A two-section linearized Y-fed modulator with a domain reversal in a ferroelectric material is described which utilizes a simple uniform electrode structure fully compatible with high-speed applications.

11 Claims, 8 Drawing Sheets



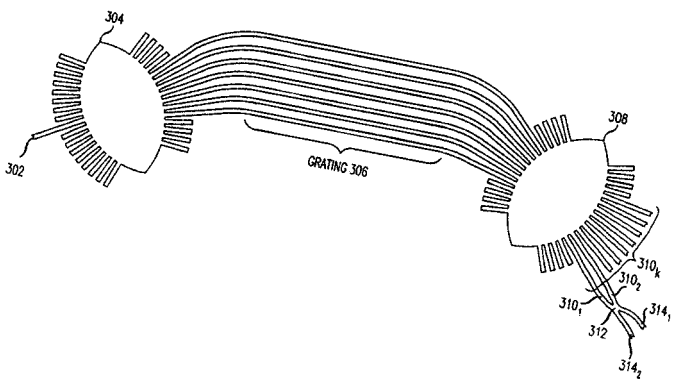
6,236,781 May 22, 2001

Duplicated-Port Waveguide Grating Router Having Substantially Flat Passbands

Inventors: Christopher Richard Doerr and Randy Clinton Giles.
Assignee: Agere Systems Optoelectronics Guardian Corp.
Filed: September 30, 1999.

***Abstract*—**A duplicated-port waveguide grating router is provided that includes a first free space region configured to receive an optical signal from at least one input waveguide. An optical grating comprising a plurality of waveguides is connected to the first free space region. The optical grating is defined by a plurality of unequal length waveguides. Connected to the optical grating is a second free space region, A plurality of output waveguides are connected to the second free space region, wherein the plurality of output waveguides includes at least two adjacent waveguides having ends remote from the second free space region. A 2×2 coupler having two input ports connected to the remote ends of the two adjacent waveguides and two output ports, which are the output ports of the duplicated-port waveguide grating router. The duplicated-port waveguide grating router provides substantially identical specifiable passband and widths within the two output ports. The 2×2 coupler, for example an evanescent coupler, realizes a substantially 90° phase difference between optical signals propagated within the two adjacent output waveguides that are coupled to produce the two identical, substantially flat passband spectral responses.

8 Claims, 4 Drawing Sheets



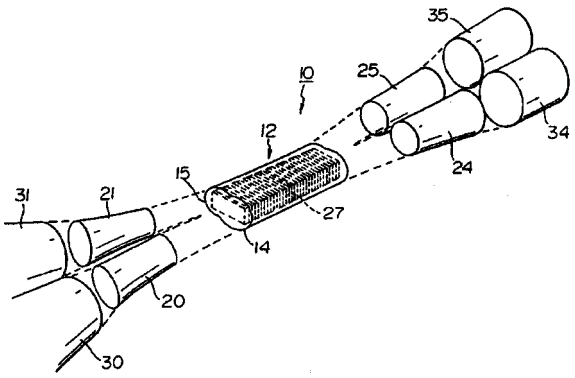
6,236,782 May 22, 2001

Grating Assisted Coupler Devices

Inventors: Anthony S. Kewitsch, George A. Rakuljic, Phil A. Willems, and Xiaolin Tong.
Assignee: Arroyo Optics, Inc.
Filed: August 4, 1998.

***Abstract*—**An add/drop filter for optical wave energy incorporates a Bragg grating in a very narrow waist region defined by merged lengths of elongated optical fibers. Light is propagated into the waist region via adiabatically tapered fibers and is transformed from two longitudinally adjacent fibers into two orthogonal modes within the air–glass waveguide of the waist and reflected off the grating from one fiber into the other. The geometry of the waist region is such that the reflected drop wavelength is polarization independent, without lossy peaks in the wavelength band of interest. Additionally, back reflection are shifted out of the wavelength band of interest. High strength gratings are written by photosensitizing the waist region fibers by constantly in-diffusing pressurized hydrogen or deuterium. For narrow spectral bandwidth gratings, dimensional variations must be minimized or compensated, and the grating is apodized by both a.c. and d.c. variations in writing beams at a net constant power. A coupler device employing these precisely is arranged in a support structure which facilitates writing, testing and adjustment of gratings, and also provides temperature compensation and wavelength adjustment.

76 Claims, 5 Drawing Sheets



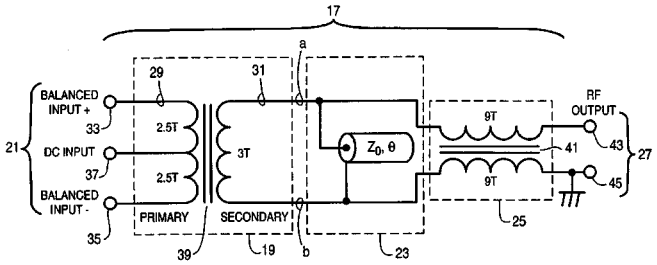
6,239,668 May 29, 2001

RF Balun and Transformer With Shunt Compensation Transmission Line

Inventors: Rudolph Menna and Philip Miguelez.
Assignee: General Instrument Corporation.
Filed: April 14, 1999.

***Abstract*—**The RF transformer of the present invention couples a transmission line between a magnetic transformer and a balun. The location and function of the transmission line improves frequency response across a wide operational bandwidth by permitting the circuit to be tuned, thereby providing a greater degree of impedance matching.

14 Claims, 4 Drawing Sheets



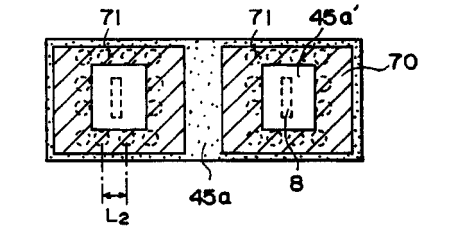
6,239,669 May 29, 2001

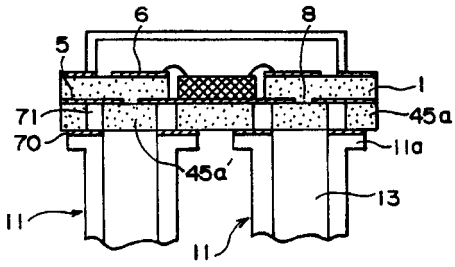
High Frequency Package

Inventors: Shinichi Koriyama, Mikio Fujii, and Kenji Kitazawa.
Assignee: Kyocera Corporation.
Filed: April 27, 1998.

***Abstract*—**A high-frequency package comprising a dielectric substrate, a high-frequency element that operates in a high-frequency region and is mounted in a cavity formed on said dielectric substrate, and a microstrip line formed on the surface or in an inner portion of said dielectric substrate and electrically connected to said high-frequency element, wherein a signal transmission passage of a waveguide is connected to a linear conducting passage or to a ground layer constituting the microstrip line. In the junction portion of the waveguide, for example, an end of the linear conducting passage is electromagnetically opened, so that the end portion works as a monopole antenna inside the waveguide that is connected. The high-frequency package makes it possible to connect the waveguide without adversely affecting the sealing of the high-frequency element and to transmit high-frequency signals with a low loss.

8 Claims, 21 Drawing Sheets





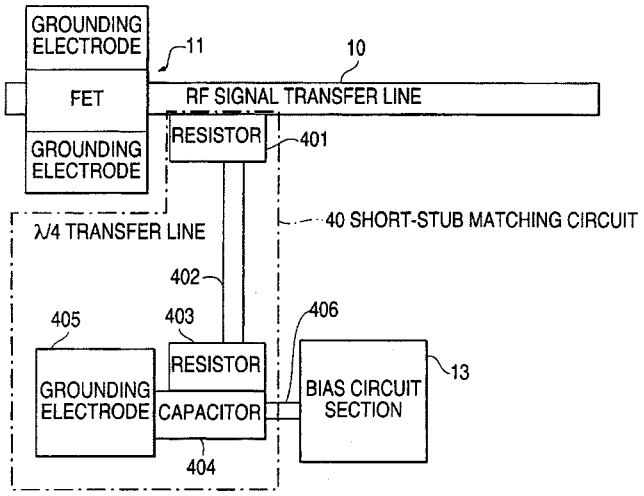
6,239,670 May 29, 2001

Short-Stub Matching Circuit

Inventor: Naoki Shida.
Assignee: NEC Corporation.
Filed: March 8, 1999.

***Abstract*—**A short-stub matching circuit connected to a signal transfer line, includes at least one resistor element having a distributed constant effect which is inserted in a transfer path between the signal transfer line and a grounding conductor.

11 Claims, 9 Drawing Sheets



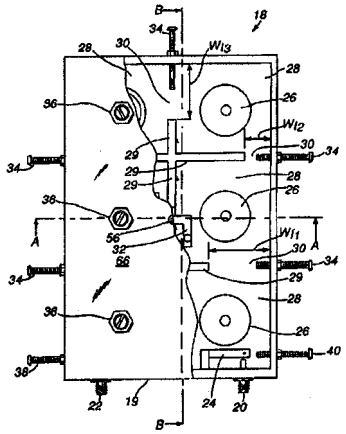
6,239,673 May 29, 2001

Dielectric Resonator Filter Having Reduced Spurious Modes

Inventors: Robert J. Wenzel, William G. Erlinger, Paul Bartley, and Lucy Bartley.
Assignee: Bartley Machines & Manufacturing.
Filed: September 23, 1999.

***Abstract*—**A dielectric resonator filter operating in a magnetic dipole mode includes a plurality of dielectric resonators disposed in a plurality of dielectric resonator cavities. A plurality of coupling mechanism provide an in-line coupling factor between respective resonators of electrically adjacent dielectric resonator cavities. At least one cross-coupling device provides cross-coupling between respective resonators of nonadjacent dielectric resonator cavities. A magnitude and sign of the in-line coupling factors and the cross-coupling factor, provide a dielectric resonator filter, for which a desired amplitude and phase response can be provided.

23 Claims, 15 Drawing Sheets



6,239,674 May 29, 2001

Elliptical Resonator With an Input/Output Capacitive Gap

Inventors: Akira Enokihara and Kentaro Setsune.
Assignee: Matsushita Electric Industrial Co., Ltd.
Filed: December 21, 1994.

***Abstract*—**A resonator having high Q-value has a compact structure with little loss caused by the conductor's resistance. The resonator includes a high-frequency circuit element. Two points on the circumference of the conductor of elliptical shape which forms the resonator at which both of the two dipole modes of the resonant modes of the resonator polarizing orthogonally are excited equally and are located at neighboring positions input/output bonding points. The input/output terminals are bonded to the resonator at the input/output bonding points.

20 Claims, 14 Drawing Sheets