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.

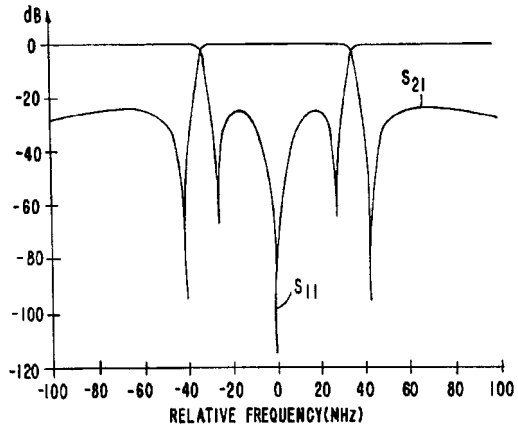
6,096,090 Aug. 1, 2000

Method of Designing an Electrical Filter and Filter Thus Obtained

Inventors: Marco Guglielmi and Graham Connor.
Assignee: Agence Spatiale Europeenne.
Filed: Feb. 20, 1998.

***Abstract*—**There is disclosed a method for designing an electrical filter comprising the steps of: a) selecting at least one determined function called seed function; b) determining the product of all these seed functions to define a transfer function generating function of the electrical filter; c) translating the electrical filter transfer function into transmission zeros and poles; d) and synthesizing those electrical filter dimensions that achieve the required zeros and poles. A particular application is aimed at a Chebycheff filter comprised of serially arranged resonant cavities and couplers, operating in the microwave range.

5 Claims, 4 Drawing Sheets



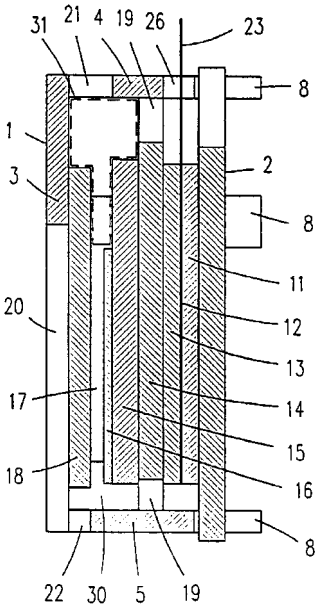
6,097,261 Aug. 1, 2000

Nonreciprocal Microwave Component having Adjustable Magnetic Field Strength

Inventor: Ralf Wendel.
Assignee: U.S. Philips Corporation.
Filed: Aug. 6, 1998.

***Abstract*—**A microwave component is described with a microwave guiding arrangement for conducting electromagnetic waves and with a gyromagnetic material which is arranged in operational connection with the electromagnetic waves and which can be energized by a magnetic field of adjustable field strength in that the gyromagnetic material, at least one magnet for generating the magnetic field, and a geometrically changeable magnetic tuning element are arranged in a magnetic circuit, said tuning element having a changeable magnetic permanence for the purpose of tuning the magnetic field strength. It is achieved in this microwave component that the tuning element is so designed that its operability is safeguarded also for different ways of incorporation of the microwave component in that the magnetic tuning element comprises a magnetically permeable strip which is arranged with sliding possibility, and the geometric shape of a spatial region forming part of the magnetic circuit and having a magnetic permeance value lower than that of the strip is changed by the displacement of this strip.

5 Claims, 10 Drawing Sheets



6,097,263 Aug. 1, 2000

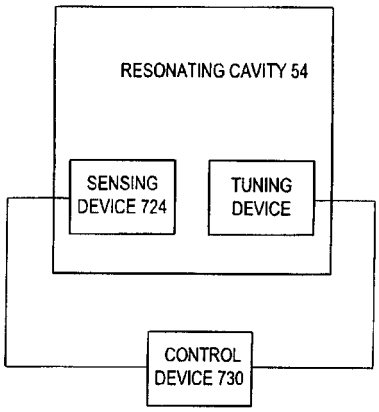
Method and Apparatus for Electrically Tuning a Resonating Device

Inventors: Carl H. Mueller, Zhihang Zhang, and Gerhard A. Koepf.
Assignee: Robert M. Yandrofski.
Filed: Jun. 27, 1997.

***Abstract*—**The present invention provides an electronically tunable resonating apparatus which uses a tunable dielectric material which is biased by an electric field to alter the resonant frequency in a resonating cavity. The electrodes which apply the electric field are connected to a variable voltage source. The electrodes can therefore apply a plurality of electric field strengths and provide a range of resonant frequencies in the resonating apparatus. The resonating apparatus is particularly useful for microwave and millimeterwave electromagnetic energy.

Publisher Item Identifier S 1531-1309(01)03562-0.

29 Claims, 10 Drawing Sheets



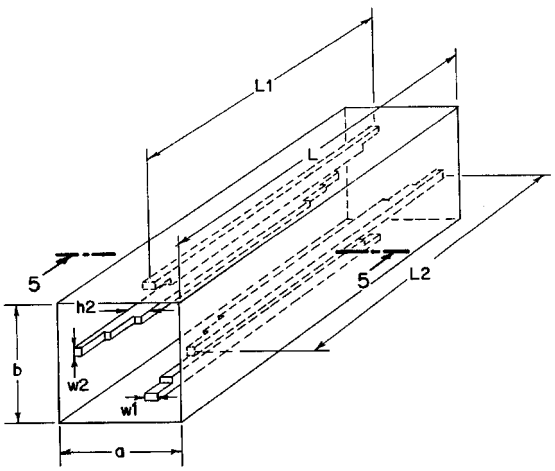
6,097,264 Aug. 1, 2000

Broad Band Quad Ridged Polarizer

Inventor: John M. Vezmar.
Assignee: Channel Master LLC.
Filed: Jun. 25, 1998.

***Abstract*—**A broad band waveguide polarizer having four axial ridges, one on each wall of the waveguide, is disclosed. The axial ridges are configured to provide different phase velocities for the orthogonal signal components of a linearly polarized input signal. The dimensions of the ridges are selected such that the net phase difference between the signal components is about 90 degrees at a predetermined signal frequency. The quad ridge polarizer may be manufactured as an integral die cast device.

12 Claims, 5 Drawing Sheets



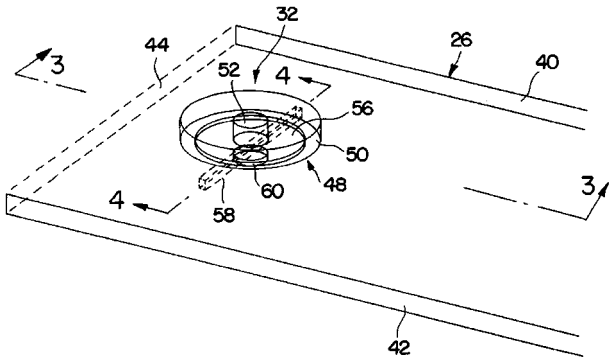
6,097,265 Aug. 1, 2000

Millimeter Wave Polymeric Waveguide-to-Coax Transition

Inventors: Steven S. Chan, Roger A. Davidheiser, Alfred E. Lee, and D. Ian Stones.
Assignee: TRW Inc.
Filed: Nov. 24, 1998.

***Abstract*—**A waveguide structure (10) that provides a transition from a polymeric waveguide (26) to a coaxial connection (48). The coaxial connection (48) includes an outer conductor (50) electrically connected to a top ground plate (36) of the waveguide (26) and an inner conductor (52) that extends into the polymeric material within the waveguide (26). The inner conductor (52) is electrically connected to a capacitive plate (56), and the capacitive plate (56) is electrically connected to an elongated conductive probe (58). The conductive probe (58) is electrically connected to a conductive post (60), which is electrically connected to a bottom ground plate (38) opposite to the top ground plate (36). The conductive probe (58) extends in a direction transverse to the propagation direction of electromagnetic waves, and acts to pick up the energy in the electromagnetic radiation. The capacitive plate (56) provides a shunt capacitance that resonates out the inductance caused by the conductive probe (58) and the inner conductor (52). The conductive probe (58) is positioned relative to a backshort surface (44) of the waveguide (26) a distance that is less than a quarter wavelength of the electromagnetic radiation of interest.

29 Claims, 2 Drawing Sheets



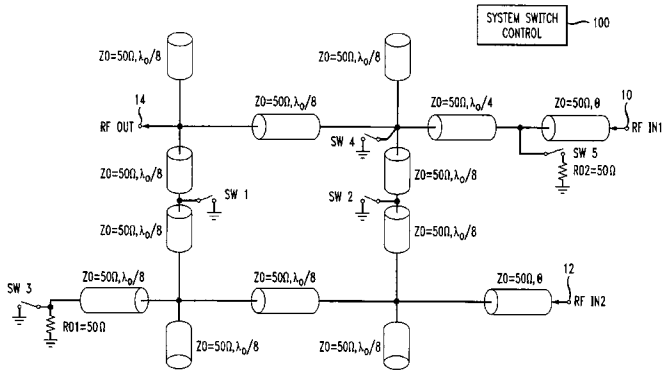
6,097,266 Aug. 1, 2000

Intelligent RF Combiner

Inventors: Gregg Scott Nardozza and Christopher Walker Rice.
Assignee: Lucent Technologies Inc.
Filed: Aug. 14, 1998.

***Abstract*—**An RF coupler incorporating a pair of branch circuits which combine first and second input signals supplied at the same impedance level, amplitude and phase into an output signal at the same impedance level, twice the amplitude and phase shifted with respect to the input signals when both input signals are present, and which, if only one of the input signals is present, passes that input signal through its branch circuit to the output without loss, while terminating the branch circuit associated with the absent input signal with an equal impedance.

14 Claims, 7 Drawing Sheets



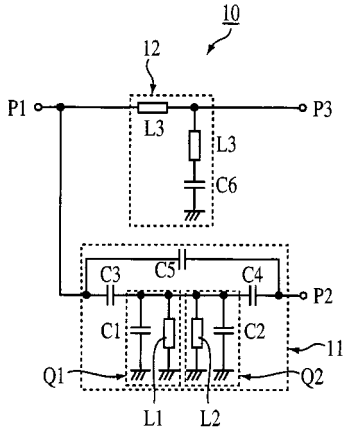
6,097,268 Aug. 1, 2000

Multilayer Duplexer with No Shielding Electrodes

Inventors: Takahiro Watanabe, Norio Nakajima, and Mitsuhide Kato.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Aug. 21, 1997.

***Abstract*—**A high-frequency component which requires no shielding electrodes and in which there are no limitations upon the places where plural sets of filter components can be formed. In one embodiment, a high-frequency component has first to third ports, and includes a BPF connected between the first port and the second port and a BRF connected between the first port and the third port. The BPF and BRF comprise transmission lines and capacitors formed on a plurality of laminated dielectric layers. In another embodiment, the component comprises an HPF and an LPF formed on a plurality of dielectric layers. In both cases, the passbands of the respective filters are predetermined not to substantially overlap one another.

6 Claims, 8 Drawing Sheets



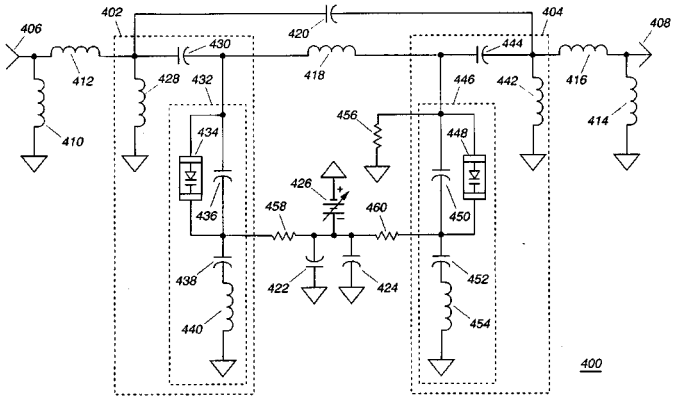
6,097,269 Aug. 1, 2000

Electrically Tunable Band Pass Filter with Symmetrical Low-Side and High-Side Protection

Inventor: Gilberto J. Hernandez.
Assignee: Motorola, Inc.
Filed: Feb. 1, 1999.

***Abstract*—**A tunable filter (400) provides dual injection mode operation over a continuously tunable frequency range (500). A combination of mirrored series resonant circuits (432, 446) tuned through varactors (434, 448) allows the frequency response to shift. The use of a series capacitor and shunted inductor (430, 428), (444, 442) mirrored onto each series resonator (432, 446) provides both high-side and low-side injection protection.

16 Claims, 5 Drawing Sheets



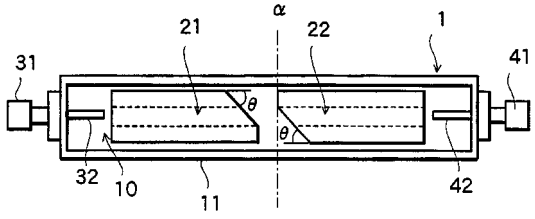
6,097,270 Aug. 1, 2000

Coaxial Dielectric Filter

Inventor: Yasunori Yamanobe.
Assignee: Sumitomo Metal Mining Co., Ltd.
Filed: Feb. 22, 1999.

***Abstract*—**A coaxial dielectric filter comprising a straight cutoff waveguide, at least two coaxial dielectric resonators disposed coaxially or substantially coaxially and at an interval in the cutoff waveguide in its lengthwise direction, a rod-like input-side antenna whose leading end stands close, or inserted, to the inside of an input-side inner conductor of the coaxial dielectric resonator disposed on the input side, and a rod-like output-side antenna whose leading end stands close, or inserted, to the inside of an output-side inner conductor of the coaxial dielectric resonator disposed on the output side. This filter is characterized in that an adjacent-side end of at least one of coaxial dielectric resonators adjacent to each other forms a slope which is inclined with respect to the cutoff waveguide in its cross section perpendicular to the lengthwise direction. In the adjustment of distance between the coaxial dielectric resonators adjacent to each other, the distance between the coaxial dielectric resonators on their adjacent sides can be adjusted simply not only when the coaxial dielectric resonator provided with the slope is moved in the lengthwise direction of the cutoff waveguide but also when it is moved in the width direction of the cutoff waveguide.

6 Claims, 9 Drawing Sheets



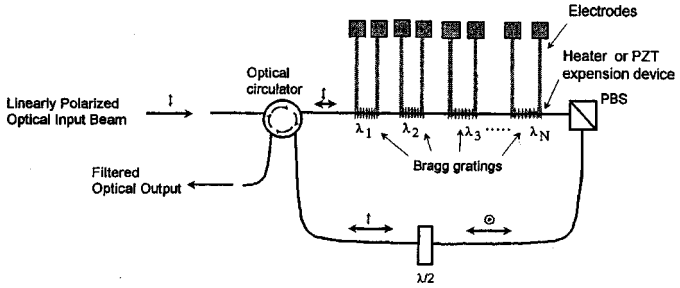
6,097,861 Aug. 1, 2000

7 Claims, 6 Drawing Sheets

Multi-Wavelength Channel Transmission Filter

Inventors: Kyong Hon Kim, Hak Kyu Lee, Joon Tae Ahn, and El Hang Lee.
Assignee: Electronics and Telecommunications Research Institute.
Filed: Jul. 9, 1998.

***Abstract*—**An improved multi-wavelength channel transmission filter, by which it is possible to selectively and simultaneously separate multiple wavelength channel signals without any optical time delays among, different wavelength channels, includes one optical circulator with four terminal ports, one polarization beam splitter (PBS), one half-wave plate, and a number of Brag, gratings formed in an optical waveguide for reflection of multi-wavelength channels by combining the wavelength characteristic of each Bragg grating which is determined in accordance with the grating structure.



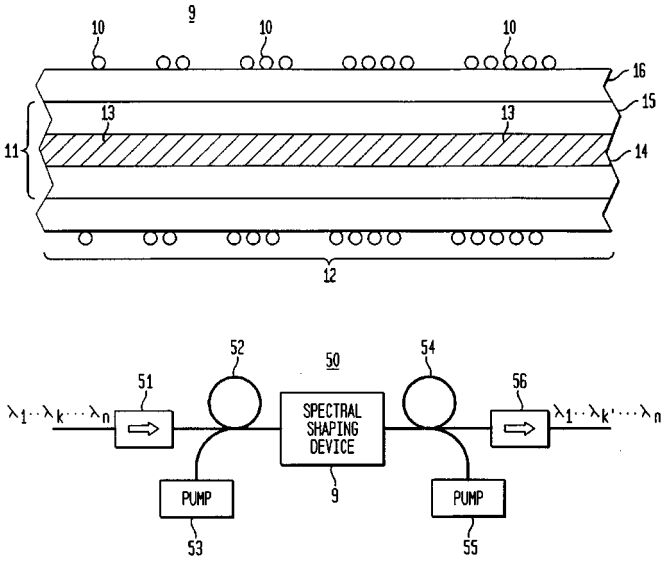
6,097,862 Aug. 1, 2000

7 Claims, 3 Drawing Sheets

Optical Fiber Grating Devices with Enhanced Sensitivity Cladding for Reconfigurability

Inventors: Anatoli A. Abramov, Benjamin John Eggleton, Rolando Patricio Espindola, and Arturo Hale.
Assignee: Lucent Technologies Inc.
Filed: Sep. 11, 1998.

***Abstract*—**In accordance with the invention, a reconfigurable optical fiber grating comprises an optical fiber grating with a temperature sensitive material surrounding the cladding region or incorporated into the cladding region. One or more heating elements are arranged to produce a temperature gradient along the length of the grating and thereby chirp the grating. In a preferred embodiment, a long period fiber grating is surrounded by a material in which dn/dT is 10 times as large as that of glass and in which n is close to but lower than that of the glass. A temperature gradient along the length of the grating results in a broadening of the resonance.



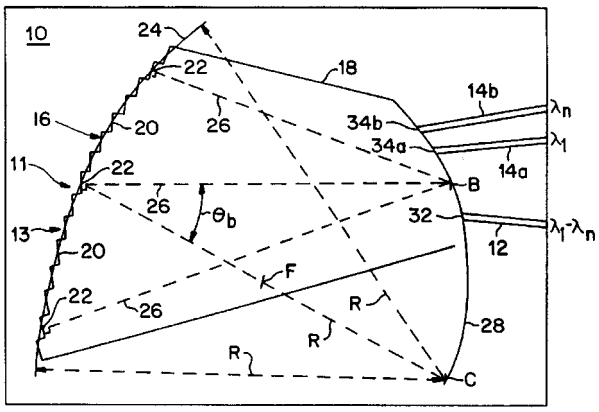
6,097,863 Aug. 1, 2000

2 Claims, 5 Drawing Sheets

Diffraction Grating with Reduced Polarization Sensitivity

Inventor: Dipakbin Qasem Chowdhury.
Assignee: Corning Incorporated.
Filed: Jun. 7, 1999.

***Abstract*—**A multiplexer/demultiplexer for routing different wavelength signals between a common pathway for conveying a plurality of the signals, and individual pathways for separately conveying the signals includes a reflective diffraction grating with reduced polarization sensitivity for dispersing the signals. The grating includes facets that are oriented for reducing efficiency variations within a transmission bandwidth and that are shaped for reducing differences between the diffraction efficiencies in two orthogonal directions of differentiation.



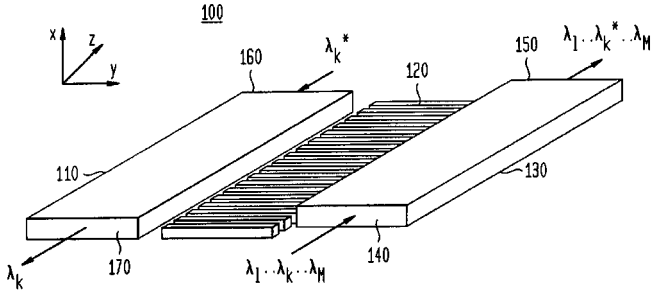
6,097,865 Aug. 1, 2000

Design and Method for Planar Coupled Waveguide Filter

Inventors: Rodney Clifford Alferness and Tomas Brenner.
Assignee: Lucent Technologies Inc.
Filed: Jul. 21, 1998.

***Abstract*—**A wavelength filter has a low index waveguide, a high index waveguide and a grating for coupling therebetween. The high index waveguide is in horizontal proximity to said low index waveguide. The low index waveguide and said high index waveguide have substantially different geometries which result in substantially different indices. A method for fabricating the wavelength filter is also disclosed.

14 Claims, 4 Drawing Sheets



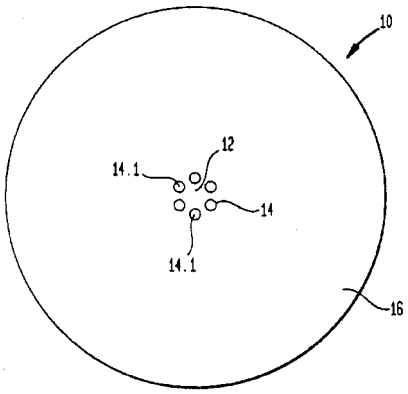
6,097,870 Aug. 1, 2000

Article Utilizing Optical Waveguides with Anomalous Dispersion at Vis-Nir Wavelenghts

Inventors: Jinendra Kumar Ranka and Robert Scott Windeler.
Assignee: Lucent Technologies Inc.
Filed: May 17, 1999.

***Abstract*—**Properly designed optical waveguides exhibit anomalous (positive) dispersion over a continuum of visible and near infrared wavelengths and, in one embodiment, the fiber has zero-dispersion at a visible wavelength (e.g., about 760 nm). Preferably, the zero-dispersion point occurs at a vis-nir wavelength where the normal (negative) material dispersion is relatively high and the effective refractive index difference between the core and the cladding is sufficiently large that the anomalous (positive) waveguide dispersion compensates the normal material dispersion. Illustratively, the optical waveguide is a microstructured fiber comprising a solid silica core surrounded by an inner cladding that includes a plurality of capillary air holes that allow for index-guiding within the core. The pattern formed by the cross-sections of the air holes, typically circles, may take on a variety geometric configurations, such as a closely packed hexagon or triangle. Alternatively, the cross-section of the air holes may form two mating, essentially semicircular regions on either side of a core that is supported by a pair of radial webs. As a result of the novel dispersion characteristics of the microstructured fibers combined with small effective area cores, we have demonstrated several applications of the invention that, in the prior art of standard single-mode fibers, have been possible only at wavelengths greater than about 1300 nm, including pulse compression, bright soliton propagation, fundamental mode-to-fundamental mode second harmonic generation, and broadband continuum generation in the visible.

55 Claims, 6 Drawing Sheets



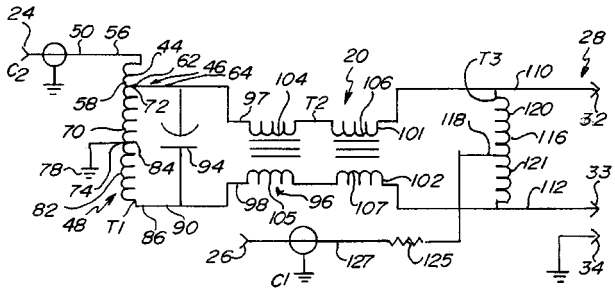
6,100,772 Aug. 8, 2000

High Frequency Test Balun with a Capacitor Across the Output

Inventors: John E. Decramer and Nathan Doose.
Assignee: BH Electronics, Inc.
Filed: Nov. 16, 1998.

***Abstract*—**A passive, highly efficient, low noise adapter device includes a Balun and noise reduction circuitry uniquely configured to converting an unbalanced signal line on a 50 ohm signal line to a balanced signal on a 100 ohm transmission line or vice versa. The device facilitates the use of commercially available and accepted test equipment for accurate transmission measurements on balanced twisted pairs of cables and connectors. A typical utilizational includes an adapter device connected between the 100 ohm twisted pair cable and suitable test equipment such as a network analyzer and/or a signal generator for determining losses in the telephone wire and connectors.

12 Claims, 5 Drawing Sheets



6,100,773 Aug. 8, 2000

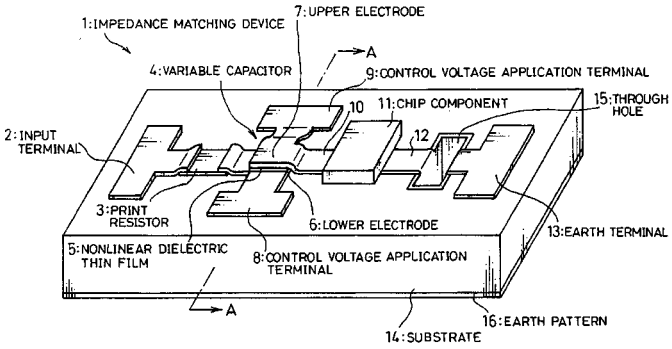
Impedance Matching Device

Inventors: Masumi Nakamichi and Yoshiyuki Masuda.
Assignee: Sharp Kabushiki Kaisha.
Filed: Sep. 18, 1998.

***Abstract*—**An impedance matching device includes a variable capacitor constituted by a nonlinear dielectric thin film and an upper electrode disposed on a lower electrode formed on a substrate. The nonlinear dielectric thin film is formed by a deposition, screen-printing, electroplating, or other technique, and changes its relative dielectric constant according to applied voltage. Therefore, the capacity of the variable capacitor is controlled and the impedance is matched, by simply controlling the applied voltage across the nonlinear dielectric thin film. Consequently, the arrangement makes it possible

to cut down the impedance matching device in size and cost, compared to an arrangement incorporating a capacitor and a coil for adjustment, effects a much simpler matching operation, and facilitates a manufacturing process.

20 Claims, 9 Drawing Sheets



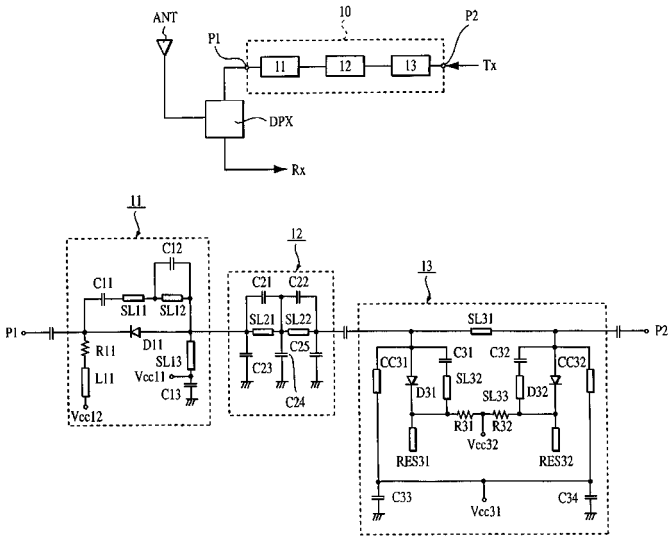
6,100,776 Aug. 8, 2000

High-Frequency Composite Transmission Section with Switch, LC Filter, and Notch Filter

Inventors: Koji Furutani and Ken Tonegawa.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Jan. 22, 1999.

***Abstract*—**The invention provides a high-frequency composite unit, wherein: a two-terminal switch constituting a transmission section, an LC filter, and a notch filter are connected between a first terminal and a second terminal; and said two-terminal switch, said LC filter, and said notch filter are integrated into a layered structure in which a plurality of dielectric layers are stacked. The above high-frequency composite unit has high performance, which can handle high-frequency signals of multiple frequency bands that are relatively adjacent.

1 Claim, 8 Drawing Sheets



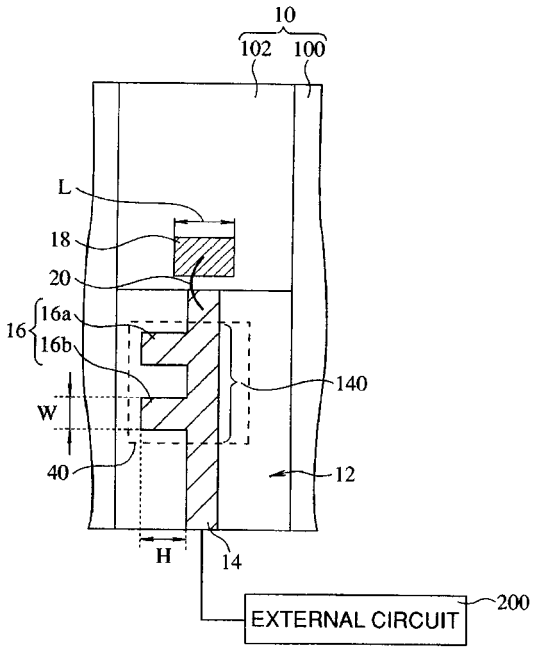
6,101,295 Aug. 8, 2000

High-Frequency Circuit, Optical Module Employing Same, and Method of Matching Impedance

Inventors: Naoyuki Mineo and Shunji Sakai.
Assignee: Oki Electric Industry Co., Ltd.
Filed: Jul. 8, 1998.

***Abstract*—**A high-frequency circuit exhibiting favorable characteristics even in frequency domains in excess of 40 GHz is obtained by configuring a matching circuit **40** with open stubs **16** joined to a microstrip line **14**.

18 Claims, 7 Drawing Sheets



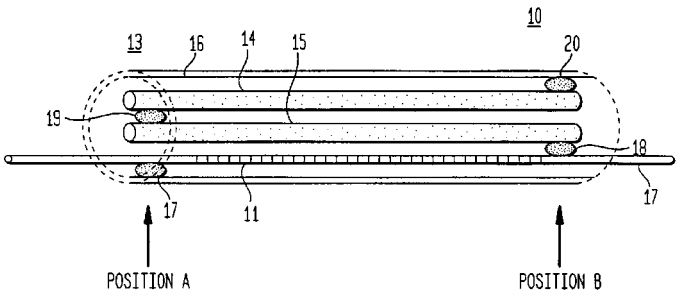
6,101,301 Aug. 8, 2000

Temperature-Compensated Optical Fiber Gratings with Fine Wavelength Tuning

Inventors: Jon W. Engelberth, Rolando Patricio Espindola, Sungho Jin, Paul Joseph Lemaire, and Hareesh Mavoori.
Assignee: Lucent Technologies Inc.
Filed: Apr. 17, 1998.

***Abstract*—**A temperature compensated optical fiber grating device comprises a longitudinally extending optical fiber grating having a length and a packaging assembly for the grating comprising a first longitudinally extending body of material having a first coefficient of thermal expansion (CTE) and second and third longitudinally extending bodies of material having CTE's lower than the first CTE. The three bodies are mechanically attached at alternate ends to form a composite structure having an effective negative CTE between two ends to which the grating is attached. The resulting grating device can be made in compact form having an overall length less than 30% more than the grating (and preferably less than 10%) and can reduce the temperature dependent wavelength change in the grating to less than 0.2 nm/100°C. and preferably less than 0.05 nm/100°C. In a preferred embodiment, the packaging bodies include a cylinder enclosing the grating.

16 Claims, 5 Drawing Sheets



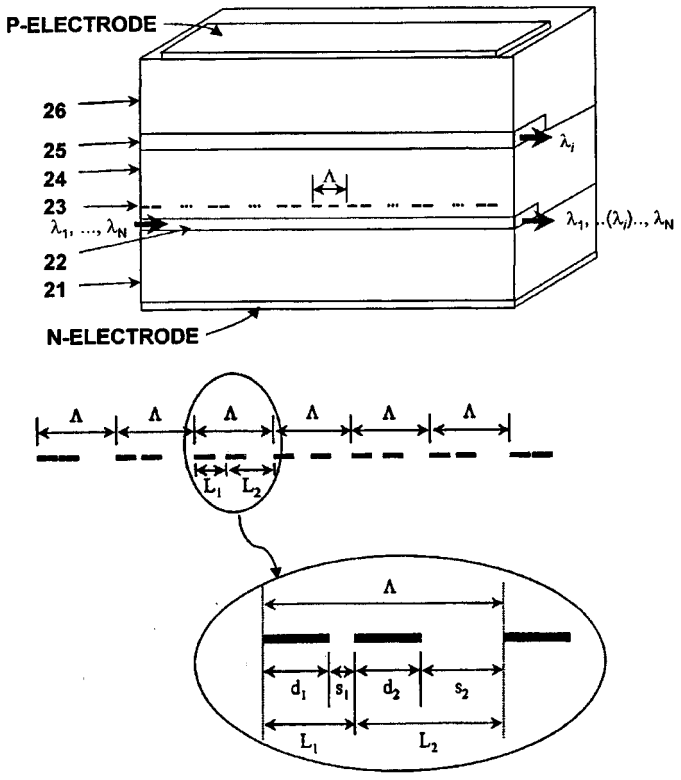
6,101,302 Aug. 8, 2000

Grating-Assisted Vertical Codirectional Coupler Having Pair Grating Structure

Inventors: Chan Yong Park, Dug Bong Kim, Seung Won Lee, and Jeong Soo Kim.
Assignees: Electronics and Telecommunications Research Institute and Korea Telecom.
Filed: Sep. 10, 1998.

***Abstract*—**The present invention relates to an optical filter for selecting a wavelength to be used in an optical communication and optical switching equipment and, more particularly, to an optical filter in order to reduce a sidelobe deteriorating its characteristics. The optical filter according to the present invention includes a plurality of pair gratings formed in a cladding layer, wherein a period of the grating pairs is constant throughout the optical filter, wherein the pair gratings are divided into two unit gratings, and wherein intervals between unit grating within pair grating are spatially different.

5 Claims, 4 Drawing Sheets



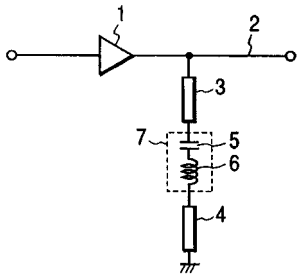
6,104,259 Aug. 15, 2000

Harmonic Suppression Circuit

Inventor: Masao Miyaura
Assignee: Alps Electric Co., Ltd.
Filed: Feb. 22, 1999.

***Abstract*—**Disclosed herein is a harmonic suppression circuit having a first microstrip line and a second microstrip line each having the same characteristic impedance. One end of the first microstrip line is electrically connected to a transmission line over which a signal having a predetermined frequency is transmitted, and one end of the second microstrip line is grounded. The length of the first microstrip line and the length of the second microstrip line are respectively set to the length corresponding to 1/8 of the wavelength with respect to the predetermined frequency. Series impedance means comprised of capacitance means and inductance means is electrically connected between the other end of the first microstrip line and the other end of the second microstrip line. The reactance of the capacitance means and the reactance of the inductance means at the predetermined frequency are respectively set to 3/4 of the characteristic impedance of each microstrip line.

3 Claims, 3 Drawing Sheets



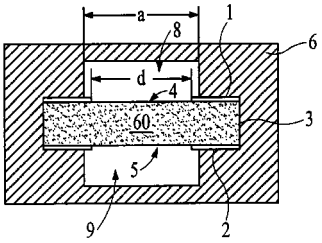
6,104,261 Aug. 15, 2000

Dielectric Resonator Having a Resonance Region and a Cavity Adjacent to the Resonance Region, and a Dielectric Filter, Duplexer and Communication Device Utilizing the Dielectric Resonator

Inventors: Tomiya Sonoda, Toshiro Hiratsuka, Yutaka Ida, Shigeyuki Mikami, and Kiyoshi Kanagawa.
Assignee: Murata Manufacturing Co., Ltd.
Filed: May 20, 1998.

***Abstract*—**The invention provides a dielectric resonator for example in the TE010 mode characterized in that electrodes are formed on both principal surfaces of a dielectric plate in such a manner that influence of spurious waves propagating in a space between the electrodes and a conductive plate is prevented thus preventing the reduction in Qo and degradation in the attenuation characteristic in the frequency ranges outside the passband. The inner diameter of the cavity is selected such that when the cavity is regarded as a waveguide the cutoff frequency of the waveguide becomes higher than the resonant frequency of a resonance region and such that the inner diameter of the cavity is greater than a nonelectrode part.

5 Claims, 12 Drawing Sheets



6,104,263 Aug. 15, 2000

Capacitive Tuning Screw Having a Compressible Tip

Inventor: Joel D. Bickford.
Assignee: Hewlett-Packard Company.
Filed: May 28, 1997.

***Abstract*—**A tuning screw with a slotted tip suited for microwave and millimeter wave applications. The slotted tip provides compression upon insertion into the conductive device and the spring character of the screw tip fingers press against the conductor walls ensuring good electrical connection.

8 Claims, 4 Drawing Sheets

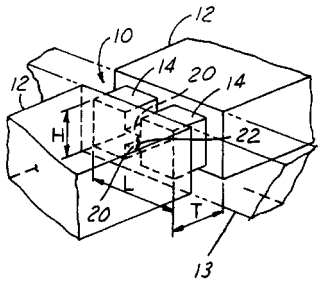
6,104,262 Aug. 15, 2000

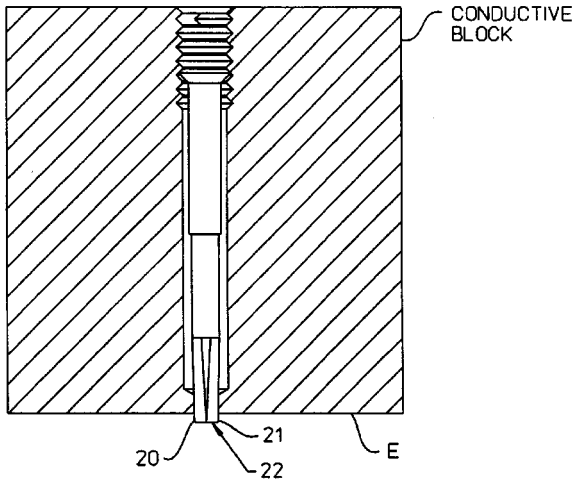
Ridged Thick Walled Capacitive Slot

Inventor: Rolf Kich.
Assignee: Hughes Electronics Corporation.
Filed: Oct. 6, 1998.

***Abstract*—**A capacitive coupler for a microwave circuit that has a first cavity and a second cavity separated by a wall. The separating wall has an aperture that, due to its shape, is capacitive. The aperture has a pair of elongated walls separated by a pair of side walls. The elongated walls and the side walls each have a thickness substantially thicker than what is now the industry standard. At least one of the elongated walls has a ridge. Because the distance between the first elongated wall and the second elongated wall is substantially greater than that previously known, the aperture may be easily manufactured.

16 Claims, 3 Drawing Sheets





6,104,264 Aug. 15, 2000

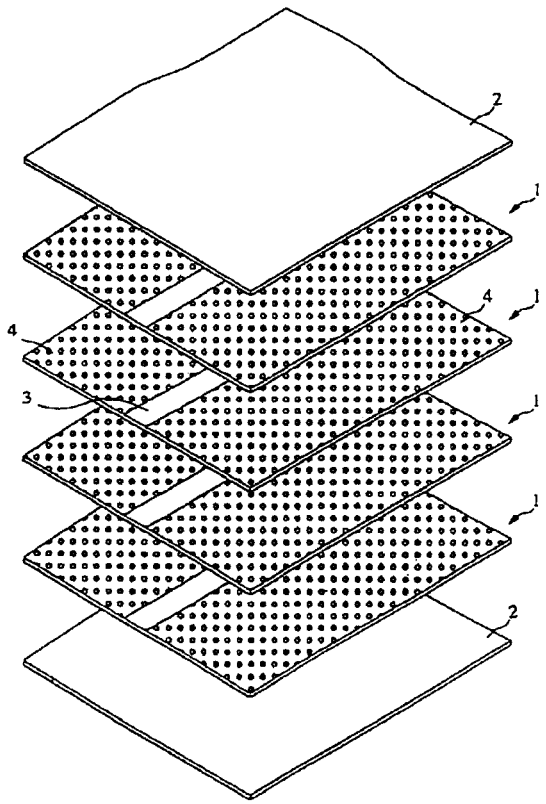
Dielectric Waveguide of a Laminated Structure

Inventors: Yohei Ishikawa, Toru Tanizaki, Hiroshi Nishida, and Atsushi Saitoh.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Feb. 5, 1998.

***Abstract*—**A dielectric waveguide has a plurality of dielectric ceramic sheets each having a high-dielectric-constant portion and a low-dielectric-constant portion. The dielectric ceramic sheets are laminated and baked and electrode films

are formed on the outer surfaces thereof. Thus, a dielectric waveguide is obtained in which the high-dielectric-constant portion serves as a propagating area and the low-dielectric-constant portion serves as a nonpropagating area.

14 Claims, 9 Drawing Sheets



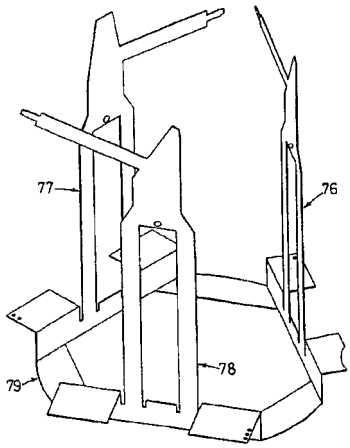
6,107,895 Aug. 22, 2000

Circulator and Components Thereof

Inventors: Roger John Butland, Alexander Grigorievich Schuchinsky, and Gerald Leigh Therkleson.
Assignee: Deltec Telesystems International Limited.
Filed: Apr. 2, 1997.

***Abstract*—**A circulator having integrally formed conductors (20, 21, and 22) which may be folded to form overlaying conductors of a circulator. The circulator includes a lens (44) for shaping a biasing magnetic field distribution to compensate for nonuniformity of magnetic field strength caused by irregularities of a magnetic circuit or the shape of a magnet (45) or ferrite (40, 41). The characteristics of ferrite discs (40, 41) are preferably correlated with the characteristics of a permanent magnet (45) so that variations of permeability of the ferrite (40, 41) are minimized over a specified temperature range.

15 Claims, 12 Drawing Sheets



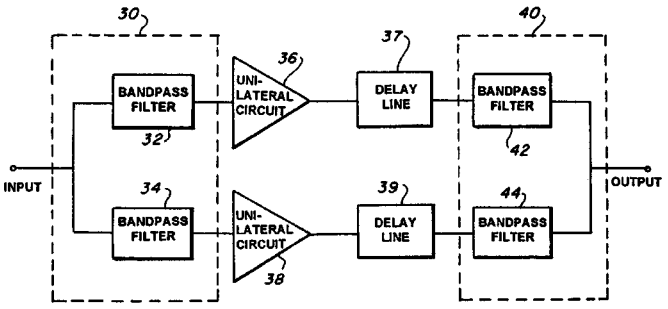
6,107,898 Aug. 22, 2000

Microwave Channelized Bandpass Filter Having Two Channels

Inventor: Christen Rauscher.
Assignee: The United State of America as represented by the Secretary of the Navy.
Filed: Apr. 30, 1998.

***Abstract*—**A channelized active bandpass filter having only two branches which provide respective frequency-selective feed-forward signal paths. The two signal paths have overlapping frequency response bands such that the combination of the two paths provides a composite filter with a bandpass response. The two branches may be provided with bandpass transfer characteristics of different orders and shapes, such as a second-order response and a fourth-order response. Two-way signal splitting and combining to define the two channels may be performed with in-phase splitters and combiners, for example, or diplexer circuits, each composed of two bandpass filters with different characteristics but overlapping frequency responses and preferably approximately equal center frequencies. Combinations of the two splitting and combining arrangements are also usable.

3 Claims, 5 Drawing Sheets



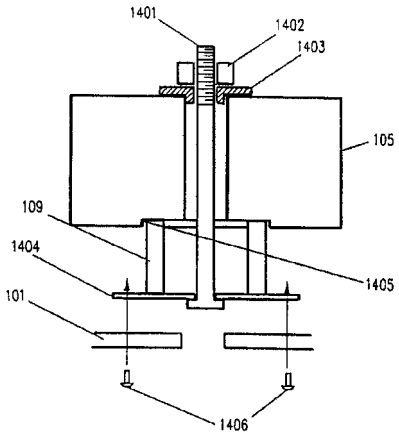
6,107,900 Aug. 22, 2000

Dielectric Resonator Having a Through Hole Mounting Structure

Inventors: Yuki Satoh, Masami Hatanaka, Toshio Ishizaki, Yuji Saka, and Toshiaki Nakamura.
Assignee: Matsushita Electric Industrial Co., Ltd.
Filed: Jul. 10, 1997.

***Abstract*—**The dielectric notch filter of the invention includes: a transmission line for transmitting a high-frequency signal; input and output terminals provided at both ends of the transmission line; a ground conductor for supplying a ground potential; and a dielectric resonator connected to the ground conductor and the transmission line. The dielectric notch filter further includes an impedance matching element connected to the ground conductor and the transmission line in parallel with the dielectric resonator. The dielectric resonator includes: a cavity connected to the ground conductor; a dielectric block provided in the cavity; a coupling device coupled with an electromagnetic field produced in the cavity; and a coupling adjusting line for connecting the coupling device to the transmission line and for adjusting the degree of electromagnetic coupling.

12 Claims, 23 Drawing Sheets



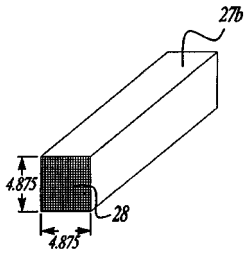
6,107,901 Aug. 22, 2000

Reduced-Size Waveguide Device

Inventors: David D. Crouch and Kenneth W. Brown.
Assignee: Raytheon Company.
Filed: Jun. 16, 1998.

Abstract*—**An apparatus for propagating electromagnetic waves at a predetermined reduced guide wavelength. A waveguide (**27b*) is provided for receiving and guiding the electromagnetic waves. A dielectric (**28**) is disposed in the waveguide (**27***b*) to decrease the guide wavelength of the received electromagnetic waves. The dielectric (**28**) allows the width of the waveguide (**27***b*) to be reduced without significantly compromising its power-carrying capability.

14 Claims, 3 Drawing Sheets



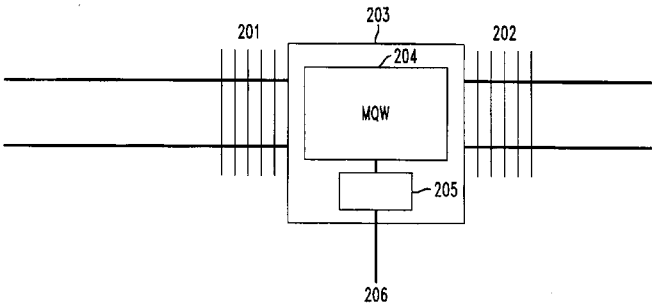
6,108,469 Aug. 22, 2000

Wavelength Selective Resonant Gratings

Inventor: Jerry Chia-yung Chen.
Assignee: Lucent Technologies Inc.
Filed: Nov. 30, 1998.

***Abstract*—**A wavelength selective resonant grating exhibits transmission resonances when a single gap between two sections of a split gratings is used to provide a phase shift which is not a quarter wavelength in length or $\pi/2$ in phase. When the phase is changed to non $-\pi/2$ values (or the gap differs from a quarter wave), the transmission resonance moves from the center of the stop band. Appropriate adjustments of the phase over a π interval allow tuning of the resonance across the entire stop band. The resonant optical wavelength grating can, illustratively, be used as wavelength filter, wavelength monitor, or as part of an Add/Drop arrangement.

14 Claims, 6 Drawing Sheets



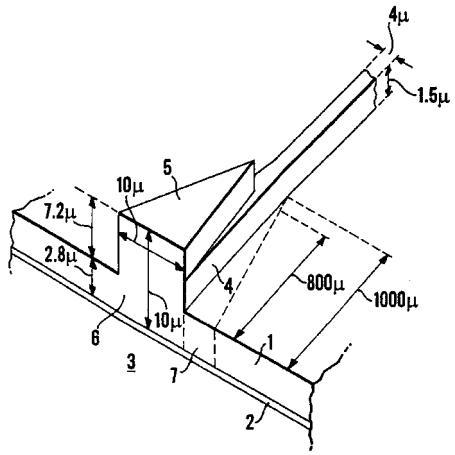
6,108,478 Aug. 22, 2000

Tapered Rib Waveguide

Inventors: Arnold Peter Roscoe Harpin, Andrew George Rickman, Robin Jeremy Richard Morris, and Mehdi Asghari.
Assignee: Bookham Technology Limited.
Filed: Feb. 6, 1998.

***Abstract*—**A tapered rib waveguide tapering from a large, multi-mode optical waveguide to a smaller, single-mode optical waveguide, the tapered rib waveguide comprising two portions (**4**, **5**) formed of the same material: a lower portion (**4**) which tapers laterally from the large waveguide to the smaller waveguide and an upper portion (**5**) formed on the lower portion (**4**), which tapers to a point (or other form of termination), the dimensions of the two portions (**4**, **5**) being such that substantially all of a fundamental mode propagated in the large multi-mode waveguide is coupled to the smaller, single-mode waveguide.

19 Claims, 3 Drawing Sheets



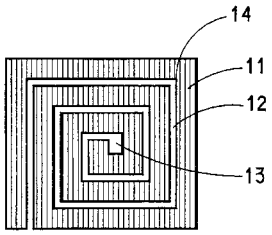
6,108,569 Aug. 22, 2000

High Temperature Superconductor Mini-Filters and Mini-Multiplexers with Self-Resonant Spiral Resonators

Inventor: Zhi-Yuan Shen.
Assignee: E. I. du Pont de Nemours and Company.
Filed: May 15, 1998.

***Abstract*—**High temperature superconductor mini-filters and mini-multiplexers utilize self-resonant spiral resonators and have very small size and very low cross-talk between adjacent channels.

20 Claims, 18 Drawing Sheets



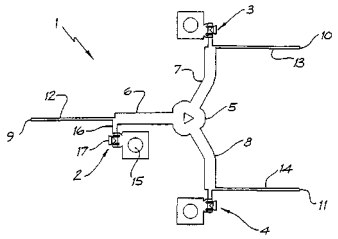
6,111,475 Aug. 29, 2000

High Frequency Multi-Port Switching Circuit

Inventor: Steve Giugni.
Assignee: The Commonwealth of Australia Commonwealth Scientific and Industrial Research Organization.
Filed: Mar. 5, 1998.

***Abstract*—**This invention concerns a multi-port switching circuit which may operate at frequencies up to and even beyond 100 GHz. The invention may be implemented as a GaAs based monolithic microwave integrated circuit. The circuit comprises at least three ports arranged in a star configuration around a central ring. A single switching device is associated with each port. Each switching device is connected to two transmission lines to provide impedance matching and an interconnecting path around the ring. The transmission lines are initially chosen to have a length of a quarter wavelength at the center of the band of operation of the switch. The matching lines and the lines which form the interconnecting ring are then subject to an optimization procedures in which each pair of the switching devices is in turn modeled in their ON state which the remainder of the switching devices is modeled in their OFF state. The optimization procedure aims to achieve low transmission and insertion loss, while provide good isolation.

10 Claims, 3 Drawing Sheets



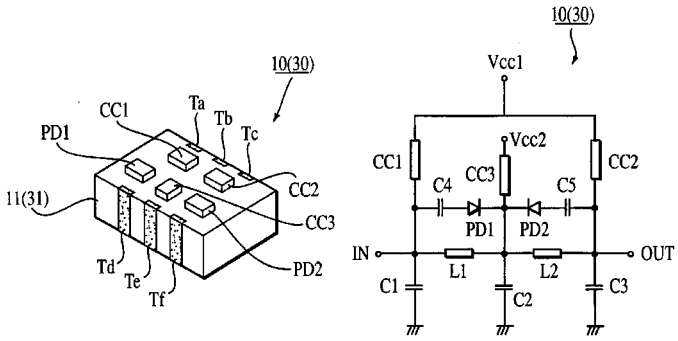
6,111,478 Aug. 29, 2000

Filter with a Switch Having Capacitance

Inventors: Koji Furutani, Norio Nakajima, and Ken Tonegawa.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Oct. 8, 1998.

***Abstract*—**A filter 10 (30) includes a laminate body 11 (31), PIN diodes PD1 and PD2 of switching elements and choke coils CC1–CC2 are mounted on a top surface or a principal face of the laminate body 11, and six external electrodes Ta–Tf extend on a side surface from the top surface to the bottom surface of the laminate body 11 (31). Three external electrodes Ta–Tc among the external electrodes Ta–Tf are formed on one side surface of the laminate body 11 (31), and three other external electrodes Td–Tf are formed on the opposing side surface of the laminate body laminate body 11 (31). The external electrode Ta is an input terminal, the external electrodes Tb and Te are control terminals for controlling a voltage supplied to the PIN diode PD, the external electrode Tc is an output terminal, and the external electrodes Td and Tf are ground terminals.

11 Claims, 6 Drawing Sheets



6,111,482 Aug. 29, 2000

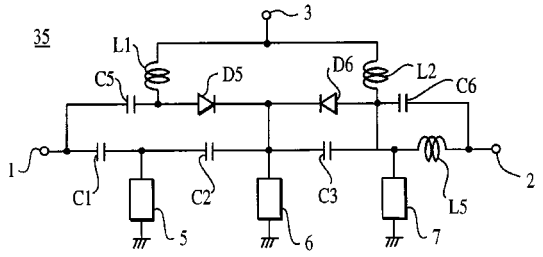
Dielectric Variable-Frequency Filter Having a Variable Capacitance Connected to a Resonator

Inventor: Masayuki Atokawa.
Assignee: Murata Manufacturing Co., Ltd.
Filed: May 29, 1998.

***Abstract*—**A dielectric resonator 5 is electrically connected to an input terminal 1 through a coupling capacitor C1. A dielectric resonator 6 is electrically connected to an output terminal 2 through a coupling capacitor C3. The dielectric resonators 5 and 6 are electrically connected to each other through a

coupling capacitor C2. A voltage control terminal 3 is electrically connected to the cathode of a variable-capacitance diode D1 and to one end of the coupling capacitor C1 through a choke coil L1. The anode of the variable-capacitance diode D1 is electrically connected to the dielectric resonator 6. That is, the variable-capacitance diode D1 comprises a path interconnecting at least two of said dielectric resonators in a filter 15.

17 Claims, 6 Drawing Sheets



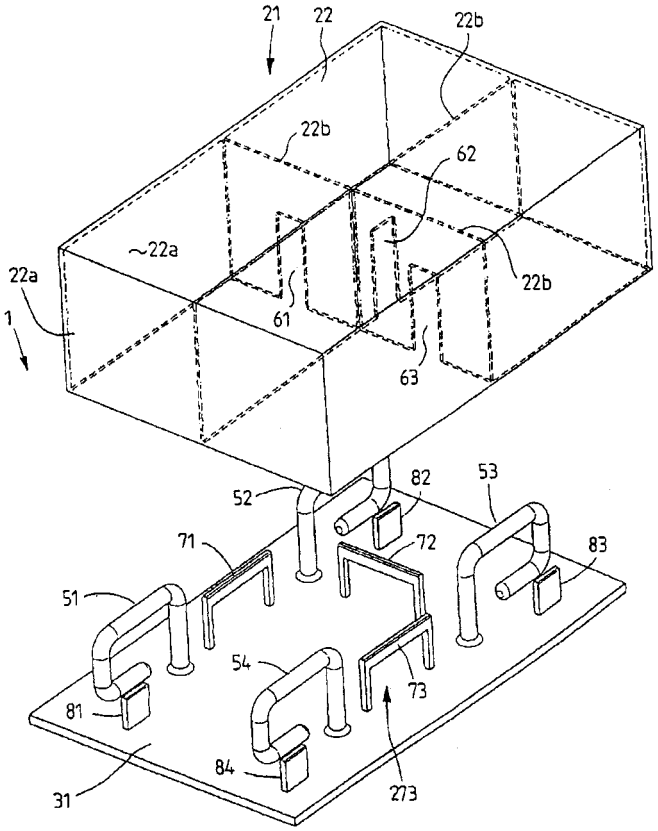
6,111,483 Aug. 29, 2000

Filter, Method of Manufacturing Same, and Component of a Filter Shell Construction

Inventor: Ari Haapakoski.
Assignee: ADC Solitra Oy.
Filed: Feb. 2, 1999.

***Abstract*—**The invention relates to a filter, a method of manufacturing a filter and a component of a filter shell construction. The filter involved is particularly a multi-circuit filter comprising a plurality of resonance circuits and a conductive shell construction (21) comprising a wall construction (22, 22a, 22b) having walls, and a first and second end which close the shell construction providing the shell construction with a section construction defined by the wall construction and the ends, the section construction comprising one or more sections. The filter also comprises resonance circuit resonators in the section construction of the shell construction (2) in one or more sections (11 to 14) thereof. The filter further comprises coupling adjusting elements for adjusting the couplings between the different resonance circuits of the filter. In accordance with the invention, the resonators, at least in the areas on the side of the end, and the coupling adjusting elements are constructions provided at the end from the material of the end by impact extrusion.

39 Claims, 6 Drawing Sheets



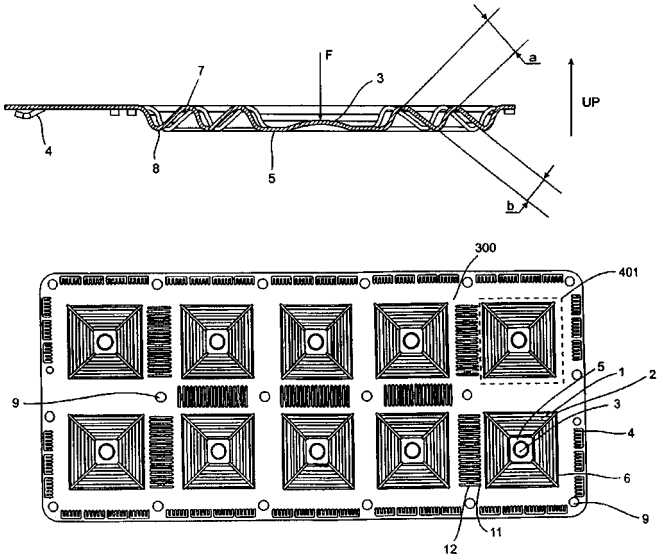
6,111,484 Aug. 29, 2000

Filter Tuning Device and Tuning Plate Including a Number of Such Devices

Inventors: Bo Uno Egon Henningsson and Sven Patrik Lindell.
Assignee: Telefonaktiebolaget LM Ericsson.
Filed: May 28, 1998.

***Abstract*—**The present invention relates to a tuning device in radio filter equipment for mobile telephony in which one or more cavities in the equipment should be tuned to the right frequency. The invention also relates to a tuning plate including a number of such tuning devices. The tuning device preferably includes regular or square formed depressed parts in the tuning plate. The depressed part converges each to a square formed central plate which is provided with an elevation or bulb. By turning a tuning screw on the equipment a force is developed on the plate and the surrounding depressed parts. This implies that the tuning can be made automatically, more secure and with less risk for intermodulation.

7 Claims, 12 Drawing Sheets



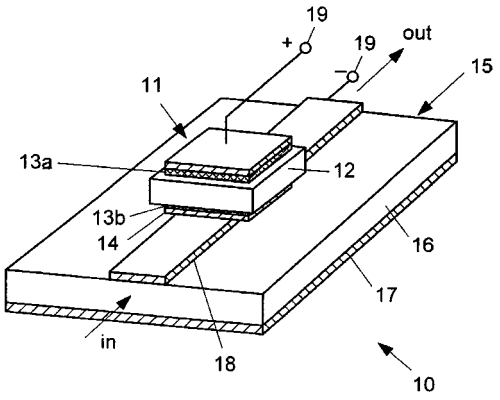
6,111,485 Aug. 29, 2000

Arrangement and Method Relating to Filtering of Signals

Inventors: Erik Carlsson, Spartak Gevorgian, Erik Kollberg, Peter Linner, and Erland Wikborg.
Assignee: Telefonaktiebolaget LM Ericsson.
Filed: Jun. 18, 1998.

***Abstract*—**A superconducting notch or band reject filter arrangement includes a superconducting dielectric resonator and a waveguide arrangement including a microstrip line to which the resonator is connected. The resonator is a parallel-plate resonator with a chip of a nonlinear dielectric material device on which superconductors are arranged and the waveguide arrangement includes a contact device or a coupling device, the resonator being connected to the contact device of the waveguide arrangement in such a way that electric contact is provided, and the filter arrangement is frequency tunable. Through the arrangement, the insertion losses are low.

30 Claims, 4 Drawing Sheets



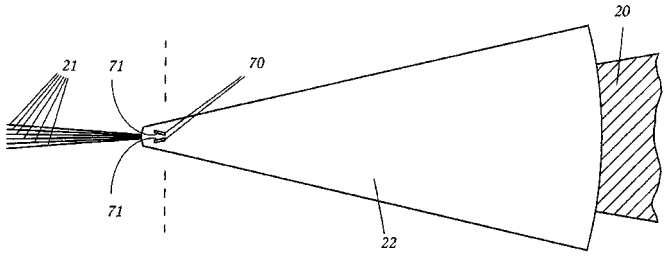
6,111,996 Aug. 29, 2000

Optical Multiplexer/Demultiplexer

Inventor: George Horace Brooke Thompson.
Assignee: Northern Telecom Limited.
Filed: Mar. 13, 1998.

***Abstract*—**An monolithic version of optical multiplexer/demultiplexer with an improved spectral characteristic is provided by two diffraction gratings arranged optically in tandem and with a field stop in the coupling between them, the gratings also being arranged to provide free spectral ranges differing by a factor of at least two, and having a coupling between them that carries over into the second grating information concerning the dispersion afforded by the first grating. The field stop is constituted by a pair of etched troughs arranged in the pattern of an open chevron.

4 Claims, 8 Drawing Sheets



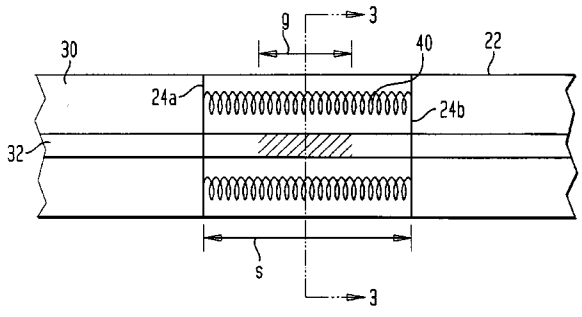
6,111,999 Aug. 29, 2000

Fiber Device Having Variable Refractive Index Region Proximal the Core

Inventors: Rolando Patricio Espindola, Jefferson Lynn Wagener, and Robert Scott Windeler.
Assignee: Lucent Technologies Inc.
Filed: Sep. 24, 1998.

***Abstract*—**A device for changing the power levels of signals transmitted by an optical fiber, along with signal modulation and wavelength routing, comprises a length of optical fiber in which for a predetermined section of the length of the fiber, the fiber core is surrounded by a cladding having one or more variable refractive index (VRI) regions disposed therein in close proximity to the core. A grating region is disposed along the length of the fiber overlapping the VRI region. The VRI regions have an index of refraction lower than that of the core to change the effective index of the guided light and thereby define a tunable grating.

21 Claims, 3 Drawing Sheets



6,112,000 Aug. 29, 2000

Reflective Array Multiplexer with Polarization Compensation

Inventors: Ernest Eisenhardt Bergmann, Gustav Edward Derkits, and Ralph Stephen Jameson.
Assignee: Lucent Technologies Inc.
Filed: Aug. 29, 1998.

***Abstract*—**An optical multiplexer is formed that overcomes the polarization dependence of conventional DWDM routers and is also significantly smaller than prior art routers. A reflective router is formed that utilizes one-half of a star coupler, with a reflective surface formed along the planar face of the coupler so as to form a "folded" arrangement. First and second waveguide arrays are coupled to opposing quadrants of the folded coupler, with the reflective surface providing the coupling therebetween. A quarter wave plate (or Faraday rotator) and reflective surface are disposed at the output of the second waveguide array and are used to provide a TE/TM mode conversion to the optical signals exiting the second array (thereby canceling out any polarization-dependent effects). The reflective surface beyond the quarter wave plate re-directs the optical signal back through the second waveguide array. The signal will then again reflect through the folded coupler and exit the multiplexer through the first waveguide array. The pair of reflective surfaces function to "fold" the router along two axes, thereby reducing the overall size of the router by 75% when compared with prior art arrangements.

9 Claims, 5 Drawing Sheets