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.

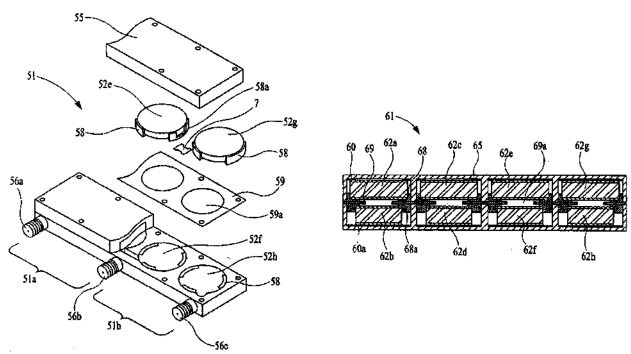
6,255,914 July 3, 2001

TM Mode Dielectric Resonator and TM Mode Dielectric Filter and Duplexer Using the Resonator

Inventors: Yohei Ishikawa, Seiji Hidaka, Norifumi Matsui, Tomoyuki Ise, and Kazuhiko Kubota.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Feb. 16, 2000.

***Abstract*—**A dielectric resonator designed so that there is substantially no loss in a conductor on the surface of a casing forming a shielded cavity, and so that the unloaded Q and the resonant frequency can be changed independently of each other. A cylindrical dielectric block having a pair of electrodes formed respectively on its two opposite surfaces is disposed in a metallic shielded-cavity casing so that one of the electrodes is in contact with an inner bottom surface of the shielded-cavity casing. This electrode is electrically connected to the shielded-cavity casing by soldering or the like. Input/output connectors are coupled to the other electrode on the cylindrical dielectric block.

17 Claims, 10 Drawing Sheets



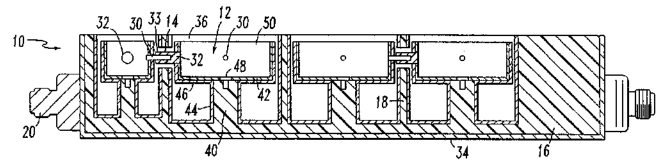
6,255,917 July 3, 2001

Filter With Stepped Impedance Resonators and Method of Making the Filter

Inventor: Richard D. Scott.
Assignee: Teledyne Technologies Incorporated.
Filed: Jan. 12, 1999.

***Abstract*—**A filter including first and second resonators and a coaxial cable connecting the resonators. Also, a filter including a housing and stepped impedance resonators wherein the high impedance portions of the stepped resonators are integral with the housing. Also, methods of manufacturing the filters.

53 Claims, 7 Drawing Sheets



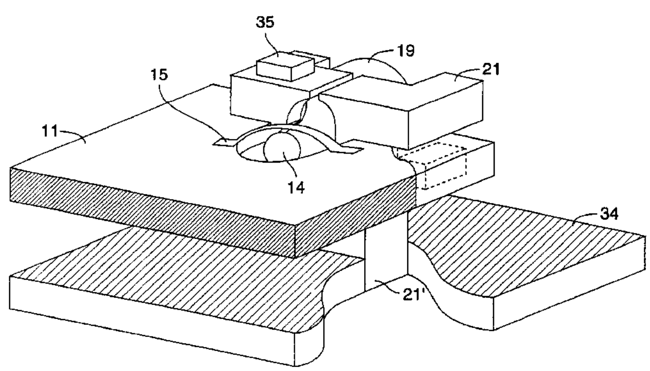
6,255,918 July 3, 2001

Microwave Ferrite Resonator Mounting Structure Having Reduced Mechanical Vibration Sensitivity

Inventors: Ronald A. Parrott and Christopher L. London.
Assignee: Verticom, Inc.
Filed: Apr. 1, 1999.

***Abstract*—**A coupling structure for a ferrite-based resonator comprises a short, stiff mounting rod and ferrite sphere are mechanically coupled to a substrate that provides support for a stiff coupling loop. The structure reduces differential movement between the sphere and the coupling loop, thereby reducing vibration-induced degradation of resonator performance. This resonator structure may be used in tunable, wideband oscillator, filter, or amplifier circuits, for example. In one embodiment, the mounting rod is a poor thermal conductor, thereby thermally isolating the sphere, which becomes nearly isothermal.

4 Claims, 5 Drawing Sheets



6,255,919 July 3, 2001

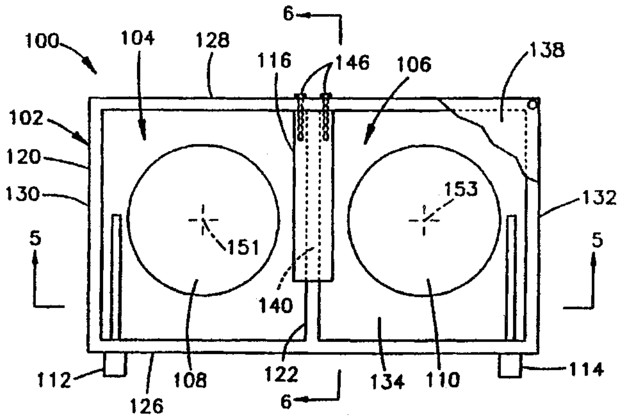
Filter Utilizing a Coupling Bar

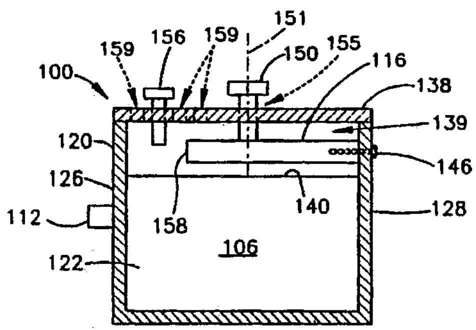
Inventor: David J. Smith.
Assignee: COM DEV Limited.
Filed: Sep. 17, 1999.

***Abstract*—**A filter apparatus includes an enclosure defining a plurality of cavities. A pair of resonators are located in a corresponding pair of the cavities. The filter apparatus further includes an elongated coupling structure operatively interposed between the pair of resonators. The elongated coupling structure is spaced from each of those resonators uniformly along its length

Publisher Item Identifier S 1531-1309(02)01591-X.

19 Claims, 3 Drawing Sheets





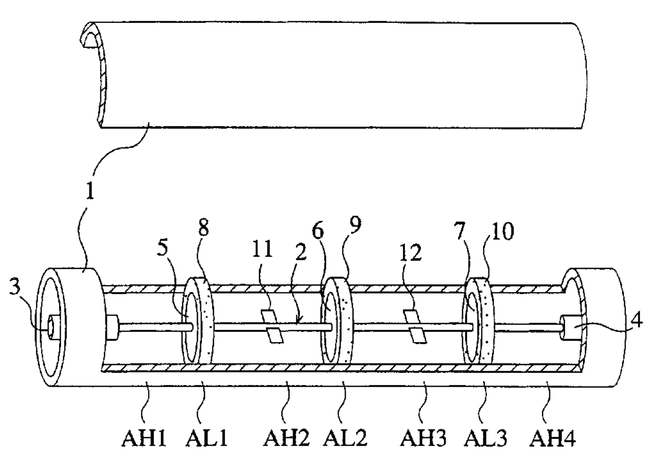
6,255,920 July 3, 2001

Low-Pass Filter

Inventors: Tetsu Ohwada, Moriyasu Miyazaki, and Kazuhiro Mukai.
Assignee: Mitsubishi Denki Kabushiki Kaisha.
Filed: July 12, 1999.

Abstract—A low-pass filter includes metal stub conductors mounted on a signal conductor at midpoints of adjacent high impedance sections of the signal conductor. The metal stub conductors prevent the occurrence of resonance between the high impedance sections, thereby providing a large attenuation value over a wide frequency band above the cutoff frequency of the low-pass filter.

5 Claims, 6 Drawing Sheets



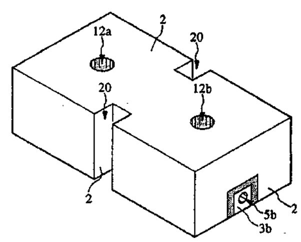
6,255,921 July 3, 2001

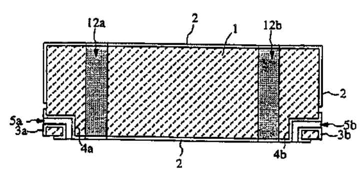
Dielectric Waveguide Resonator, Dielectric Waveguide Filter, and Method of Adjusting the Characteristics Thereof

Inventors: Shigeji Arakawa and Kikuo Tsunoda.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Dec. 6, 2000.

Abstract—A conducting film is formed on a dielectric block in a dielectric waveguide resonator, and a through-hole is formed in the dielectric block. The unloaded Q is set by selecting the outside dimensions of the dielectric block. The resonance frequency is set by selecting the size and location of the through-hole as well as the outside dimensions of the dielectric block. A terminal electrode is formed on the outer surface of the dielectric block. A coupling hole is formed in the dielectric block and a coupling electrode is formed on the inner surface of the coupling hole. One end of the coupling electrode is connected to the terminal electrode and the other end of the coupling electrode is either connected to the conducting film formed on the outer surface of the dielectric block or terminated inside the dielectric block. The above structure allows an increase in the degree of freedom in the design of the characteristics including the resonance frequency and unloaded Q of the dielectric waveguide resonator. The invention also provides a dielectric waveguide filter with a simple coupling mechanism whereby it is possible to couple to an external circuit without having to use an additional member and without electromagnetic leakage.

22 Claims, 21 Drawing Sheets





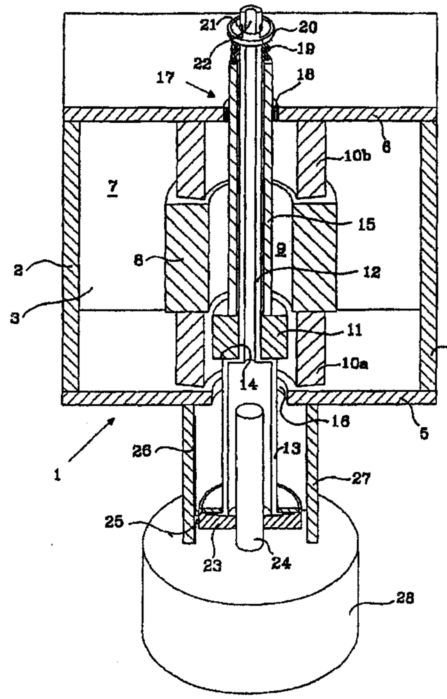
6,255,922 July 3, 2001

Microwave Resonator With Dielectric Tuning Body Resiliently Secured to a Movable Rod by Spring Means

Inventors: Jan Malmström, Jan Sjöholm, and Joak Ostin.
Assignee: Allogon AB.
Filed: May 18, 1998..

Abstract—A microwave resonator comprising a cavity (**7**) with a dielectric resonator device (**8**, **11**) including a movable dielectric tuning body (**11**), which is mechanically coupled to an electrical motor (**28**). The tuning body is carried by an electrically nonconductive rod (**12**, **13**) which is provided with a resiliently biased (**19**) clamping element (**15**) adapted to clamp the plunger (**11**) against a stop means (**14**) on the rod.

19 Claims, 1 Drawing Sheet



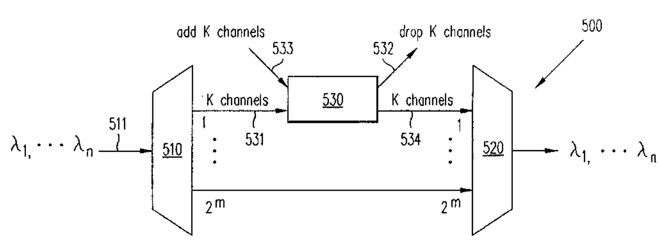
6,256,433 July 3, 2001

Expandable Interleaving Optical Add/Drop Filter Module

Inventors: Huali Luo, Joseph C. Chon, Jerry R. Bautista, and Sheau-Sheng Chen.
Assignee: Wavesplitter Technologies, Inc.
Filed: Sep. 24, 1999.

Abstract**—**An optical add/drop filter (OADF) module is provided that is capable of only utilizing one filter to drop and add multiple channels from a multiplexed signal. In one embodiment, a demultiplexer separates the input signal into groups of signals or channels to be dropped. This group of channels is coupled to one input of a 2×2 interleaving OADF, which in one embodiment is an unbalanced Mach–Zehnder Interferometer, while another group of channels to be added back to the multiplexed signal is coupled to the other input. One output of the OADF drops one group of channels, while the other output transmits the added group of channels to an input of a multiplexer, which combines the group of added channels with the other groups of channels from the outputs of the demultiplexer. In another embodiment, a multi-window filter formed from an unbalanced Michelson Interferometer outputs two signals, each having either odd or even wavelength signal components. The signal to be dropped is input back to an optical circulator, which drops the signal from an exit port. The other signal is input to a second optical circulator, which combines the two signals into a single signal with both even and odd wavelength signals. Consequently, large numbers of channels can be dropped and added using only a single filter, thereby reducing leakage loss due to propagation through multiple filters.

15 Claims, 7 Drawing Sheets



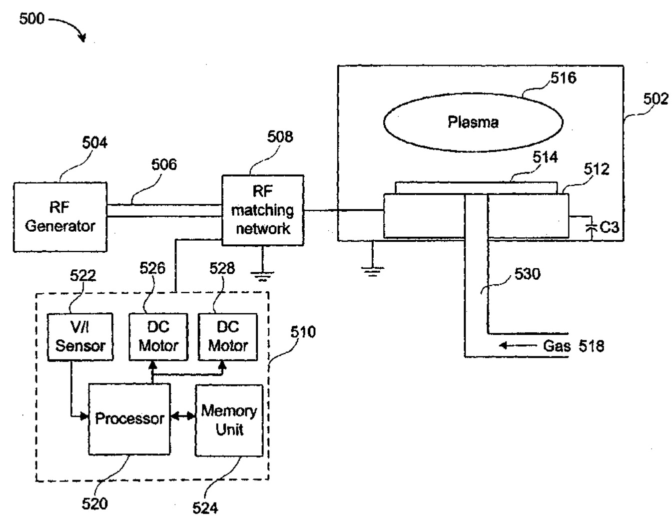
6,259,334 July 10, 2001

Methods for Controlling an RF Matching Network

Inventor: Arthur M. Howald.
Assignee: Lam Research Corporation.
Filed: Dec. 22, 1998.

Abstract**—**Disclosed are methods and devices for tuning an impedance matching network to a tune point where power reflection is at a minimum. The impedance matching network is coupled between an rf generator and a load to transmit rf power to the load. The impedance matching network includes a set of variable impedance elements. The method includes measuring a network impedance value of the impedance matching network including the load at current values of the variable impedance elements. The method further includes computing directions (i.e., increasing or decreasing) and relative rates of change for the variable impedance element values in response to the network impedance of the network such that the directions and relative rates of change for the variable impedance elements are adapted to change the reflected power in the direction of the most rapid decrease in reflected power. In addition, the method includes driving the variable impedance elements by adjusting the variable impedance elements in the computed directions by the computed relative rates of change such that the variable impedance elements are driven to new current values in the direction of the most rapid decrease in reflected power. The method also includes repeating operations (a) through (c) until a desired level of tuning precision is obtained at the current values of the variable impedance elements.

20 Claims, 13 Drawing Sheets



6,259,845 July 10, 2001

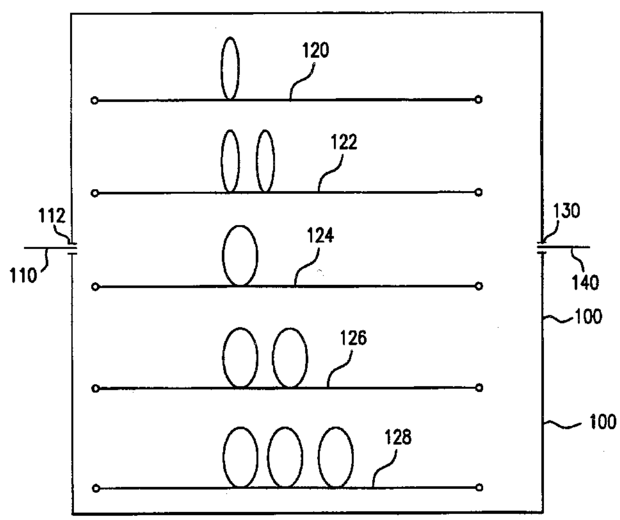
Dispersion Compensating Element Having an Adjustable Dispersion

Inventor: Harshad P. Sardesai.
Assignee: Ciena Corporation.
Filed: Aug. 20, 1998.

Abstract**—**In accordance with the present invention, a dispersion compensation module is coupled to a transmission optical fiber. The dispersion compensation module includes segments of optical fiber of varying length, some of which have a positive dispersion while other have a negative dispersion. Selected optical fiber segments are coupled to one another to provide a desired net dispersion to offset the dispersion associated with the transmission optical fiber.

Thus, rather than provide a unique segment of DCF for each span, the same dispersion compensation module can be used for spans of varying length and fiber types by simply connecting appropriate segments of fiber within the module.

12 Claims, 4 Drawing Sheets



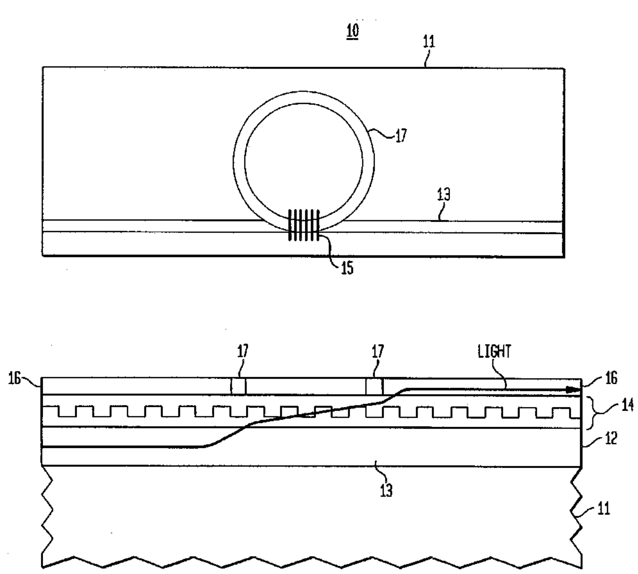
6,259,847 July 10, 2001

Optical Communication System Including Broadband All-Pass Filter for Dispersion Compensation

Inventors: Gadi Lenz, Christi Kay Madsen, and Joseph Shmulovich.
Assignee: Lucent Technologies Inc.
Filed: Apr. 7, 1999.

Abstract—In accordance with the invention, an optical all-pass filter comprises a substrate-supported multilayer waveguiding structure comprising a first layer including a waveguiding optical ring resonator, a second layer including an optical grating optically coupled to the ring resonator, and a third layer including a relatively straight waveguide optically coupled to the grating. The waveguide can be made with standard index material matched to an optical communication system, and the ring can be made of higher index material. The grating sandwiched between them provides phase matching between these two index mismatched structures, facilitating efficient power transfer between them.

6 Claims, 2 Drawing Sheets



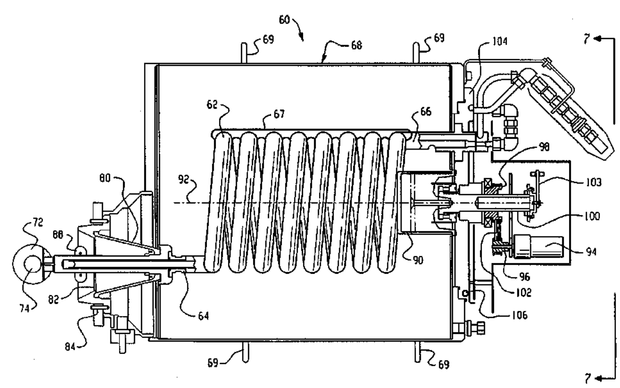
6,262,638 July 17, 2001

Tunable and Matchable Resonator Coil Assembly for Ion Implanter Linear Accelerator

Inventor: Ernst F. Scherer.
Assignee: Axcelis Technologies, Inc.
Filed: Sep. 28, 1998.

Abstract—A resonator circuit capable of resonating at a predetermined frequency is provided. The resonator circuit comprises a fixed position coil inductor (**62**) having a longitudinal axis (**92**) and a capacitor (**88**, **82**) electrically connected in parallel with each other to form a resonator (**60**), so that respective first and second ends of the inductor and the capacitor are electrically coupled together at a high-voltage end (**64**) and a low-voltage end (**66**) of the resonator (**60**). A radio frequency (RF) input coupling (**70**) is coupled directly to the inductor (**62**) at the low-voltage end (**66**) of the resonator. A high-voltage electrode (**72**) is coupled to the high-voltage end (**64**) of the resonator. A first resonator tuning mechanism is provided for varying the inductance of the inductor, comprising a plunger (**90**) movable within the coil of the inductor (**62**) along the longitudinal axis (**92**). A second resonator tuning mechanism is provided for varying the capacitance of the capacitor (**88**, **82**). The first tuning mechanism provides fine tuning of the resonator by means of varying the inductance of the inductor (**62**), and the second tuning mechanism provides coarse or initial tuning of the resonator by means of varying the capacitance of the capacitor (**88**, **82**).

23 Claims, 4 Drawing Sheets



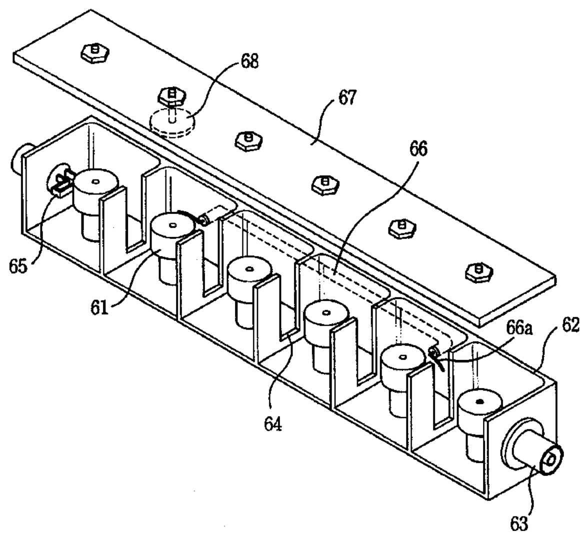
6,262,639 July 17, 2001

Bandpass Filter With Dielectric Resonators

Inventors: Tae Won Shu, Young Cheol Yoo, Chang Su Jang, Han Jong Ryu, and Su Dug Seo.
Assignee: ACE Technology.
Filed: May 27, 1999.

Abstract—The bandpass filter according to the present invention includes a housing having a plurality of cavities, wherein said plurality of cavities are isolated from each other by partitions and wherein each said partition have a coupling window; input/output connectors formed at both ends of said housing so as to pass output signals from a transmitter; coupling loops connected to said input/output connectors so as to excite an applied signal power and to combine resonance modes; dielectric resonators installed in said cavities of said housing so as to resonate a signal power transmitted from said coupling loop to the desired frequency band, said dielectric resonators including: a first resonator group formed in both said cavities which are adjacent to said coupling loops; and a second resonator group formed in said cavities which are positioned between both said cavities which are adjacent to said coupling loops, wherein said resonators of said second resonator group are stepped resonators; a plurality of frequency controllers corresponding to said dielectric resonators, being disposed on a top of said dielectric resonators and being apart from said dielectric resonators by a predetermined distance, whereby the second resonator group removes a needless wave characteristic generated by resonance of the higher-order mode, by moving a higher-order mode characteristic from the first resonator group to a higher frequency band than a fundamental mode frequency.

8 Claims, 14 Drawing Sheets



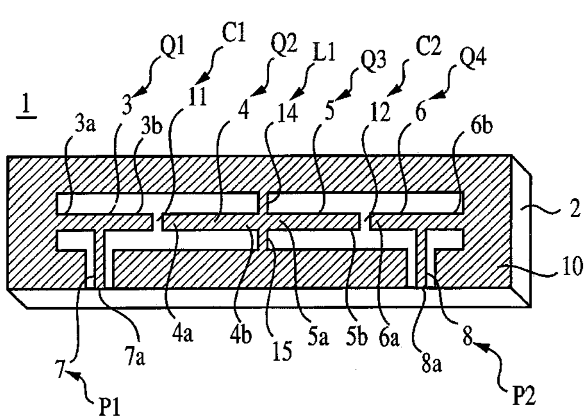
6,262,640 July 17, 2001

Coplanar Line Filter and Duplexer

Inventor: Tatsuya Tsujiguchi.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Sep. 14, 2000.

***Abstract*—**The present invention provides a coplanar line filter or a duplexer, comprising: a dielectric substrate; a plurality of $\lambda/4$ coplanar resonators provided on said dielectric substrate, said plurality of $\lambda/4$ coplanar resonators comprising; a first center conductor having electrical length corresponding to a quarter wavelength; and a ground conductor provided with a gap from said first center conductor; a capacitive coupling portion comprising a gap provided between said first center conductors of a pair of said $\lambda/4$ coplanar resonators; and a inductive coupling portion, comprising a guide conductor which electrically connects said first center conductor and ground, provided at a joint portion of a pair of said $\lambda/4$ coplanar resonators; said plurality of $\lambda/4$ coplanar resonators being connected in series with said capacitive coupling portion and said inductive coupling portion provided alternately. By the above structure and arrangement, a small-scale coplanar line filter or duplexer of simple design is obtained.

8 Claims, 6 Drawing Sheets



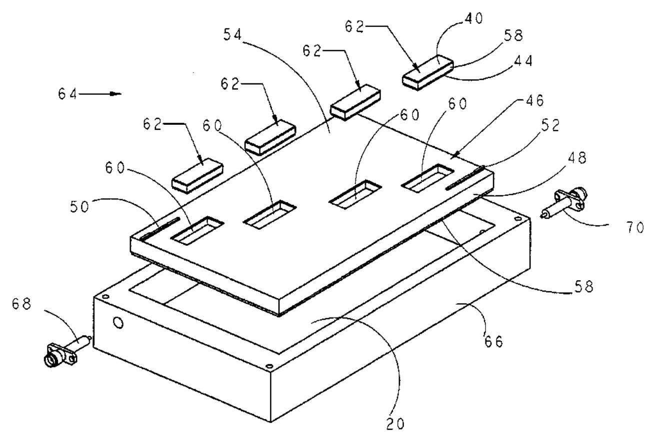
6,263,220 July 17, 2001

Non-Etched High Power HTS Circuits and Method of Construction Thereof

Inventor: Raafat R. Mansour.
Assignee: COM DEV Ltd.
Filed: Mar. 9, 1998.

***Abstract*—**A high power superconductive circuit has a thin film of high temperature superconductive material on a substrate. The circuit is formed from wafers that are placed into corresponding grooves within the substrate and held in place by adhesive. The grooves can be blind grooves or they can be through holes and the wafers will have a corresponding size and shape. The wafers include a thin film of high temperature superconductive material and can form resonators or an input or output. A circuit constructed in this manner has a relatively high power handling capability compared to circuits created by etching.

17 Claims, 8 Drawing Sheets



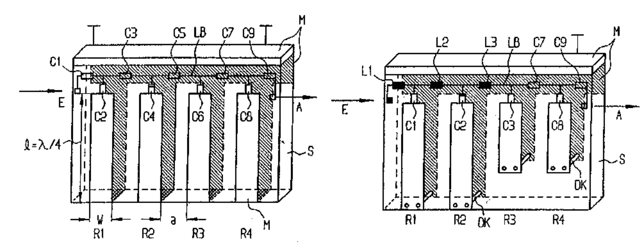
6,265,954 July 24, 2001

Microwave Filter

Inventor: Heinz Krause.
Assignee: Siemens Aktiengesellschaft.
Filed: Dec. 16, 1997..

***Abstract*—**In the proposed stripline filter, the individual stripline resonators are folded, partially arranged on the upper side, partially arranged on the underside of the substrate. The stripline filter, which is utilized in cross-over frequency shunts in a frequency range of up to one GHz, exhibits high selectivity, low losses and, thus, high quality, high constancy, low volume and a cost-beneficial manufacturability in mass production.

10 Claims, 5 Drawing Sheets



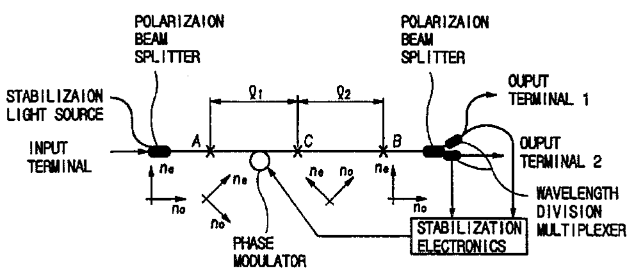
6,266,458 July 24, 2001

Tunable Optical Filtering System Using Fiber-Optic Polarimetric Interferometer

Inventors: Joon Tae Ahn, Hak Kyu Lee, Min-Yong Jeon, Dong Sung Lim, and Kyong-Hon Kim.
Assignee: Electronics and Telecommunications Research Institute.
Filed: Oct. 13, 1999.

***Abstract*—**The present invention provides a tunable optical filtering system using fiber-optic polarimetric interferometer. The tunable optical filtering system using fiber-optic polarimetric interferometer in accordance with the present invention comprises a stabilization light source, a first polarization beam splitter, a first optical fiber node, a number of polarization maintaining optical fibers, a phase modulator, a stabilization electronics, a second optical fiber node, a second polarization beam splitter, and two wavelength division optical multiplexers. The stabilization light source supplies stabilization light. The first polarization beam splitter polarizes the stabilization light and the input light to be filtered and generates polarized light. The first optical fiber node connects the output of the first polarization beam splitter with polarization maintaining fibers with the angle of 45 degree between their birefringent axes and splits the polarized light. The number of polarization maintaining optical fibers carries the split light by the first optical fiber node. The phase modulator maintains phase difference between two birefringent axes of the polarization maintaining fibers. The stabilization electronics supply feedback signal to the phase modulator. The second optical fiber node connects the polarization maintaining fibers with the input of second polarization beam splitter with the angle of 45 degree between their birefringent axes, receives split light by said first optical fiber node, and generates interference signals. The second polarization beam splitter divides the interference signals into output signals by polarization axes. The wavelength division optical multiplexers divide the output signals into signals for the stabilization electronics and filtered signals by wavelengths.

3 Claims, 2 Drawing Sheets



6,266,463 July 24, 2001

Chirped Optical Fiber Grating

Inventors: Richard Ian Laming, Michael Kevan Durkin, and Valeria Gusmeroli.
Assignee: Pirelli Cavi e Sistemi S.p.A.
Filed: June 18, 1998.

***Abstract*—**A method of fabricating a chirped optical fiber grating so that the grating has a predetermined desired wavelength-dependent response across an operational bandwidth comprises apodising the grating so that a degree of apodization at a longitudinal position along the grating corresponds to the desired response at the optical wavelength reflected at that longitudinal position along the grating.

16 Claims, 6 Drawing Sheets

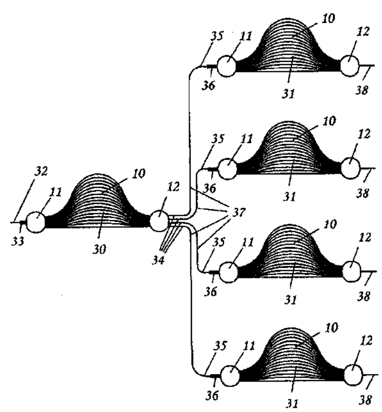
6,266,464 July 24, 2001

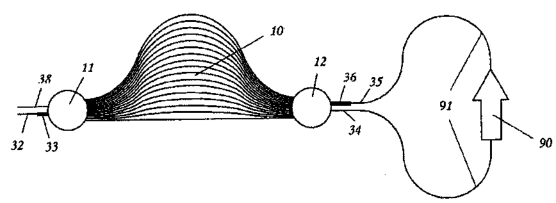
Optical Arrayed Waveguide Grating Devices

Inventors: Stephen Day, James E. Whiteaway, Alan Fielding, and Terry Clapp.
Assignee: Nortel Networks Limited.
Filed: Dec. 23, 1999.

***Abstract*—**It is found that the use of a multimode interference (MMI) section to flatten the pass-bands of an arrayed waveguide grating (AWG) multiplexer/demultiplexer or comb filter introduces undesirable nonlinear wavelength dispersion into those pass-bands if that MMI section mixes modes of more than two different orders. This dispersion can be substantially compensated by the use of a tandem arrangement of two AWG's with MMI's of differing length chosen to provide complementary dispersions. In the case of a comb filter, an equivalent compensation can be achieved by arranging for the light to make a second passage through the AWG in the reverse direction.

4 Claims, 13 Drawing Sheets





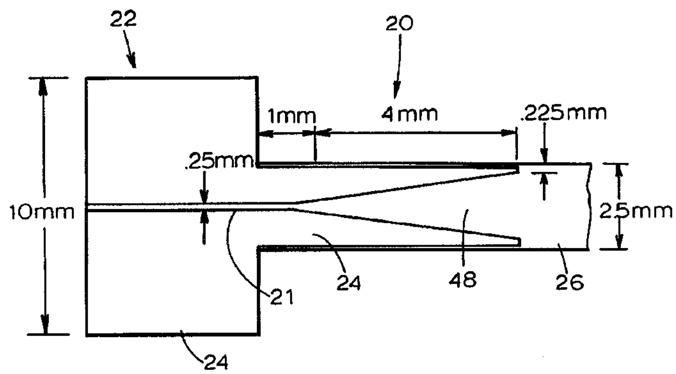
6,268,781 July 31, 2001

Planar Waveguide-to-Stripline Adapter

Inventor: James H. Schaffner.
Assignee: Hughes Electronics Corporation.
Filed: Feb. 24, 2000.

***Abstract*—**A planar waveguide-to-microstrip adapter, a waveguide antenna and a downconverter all formed on a single dielectric substrate. The waveguide-to-stripline adapter is connected to the waveguide antenna and includes a tapered section attached to a microstrip line. The tapered section, which may be linear or may follow some other more complex taper function such as a Chebyshev function, adapts a signal propagating within the waveguide antenna to the microstrip line or vice versa.

12 Claims, 4 Drawing Sheets



6,269,202 July 31, 2001

Highly Temperature Stable Filter for Fiberoptic Applications and System for Altering the Wavelength or Other Characteristics of Optical Devices

Inventors: Ho-Shang Lee, Ming-Ching Lo, and Brian Chiang.
Assignee: Dicon Fiberoptics, Inc.
Filed: Oct. 10, 1997.

***Abstract*—**The optical thickness of an optical device such as an interference filter or optical isolator is altered by applying stress thereto. This changes the frequency or isolation characteristics of the filter or isolator. The two sides of the device may be clamped to a member having a temperature expansion coefficient which is different from that of the device in order to apply tension or compression to the device in response to temperature changes. In this manner, the shifts in optical characteristics of the device due to temperature change is at least partially cancelled by the shifts in optical characteristics induced by stress applied by the member.

23 Claims, 6 Drawing Sheets