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, D.C. 20231.

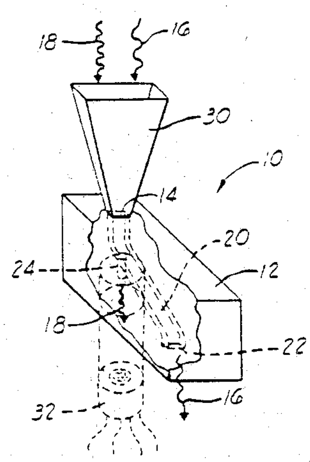
4,725,796 Feb. 16, 1988

Millimeter and Infrared Wavelength Separating Device

Inventors: Roger K. Youree and Vernon W. Ramsey.
Assignee: The Boeing Company.
Filed: Sept. 23, 1986.

Abstract—A wavelength separator for separating various electromagnetic signals in such a manner that the separated signals are not seriously attenuated or altered. Ideally, the separator functions best when the ratio of long-wavelength and short-wavelength is greater than 100.

11 Claims, 4 Drawing Figures



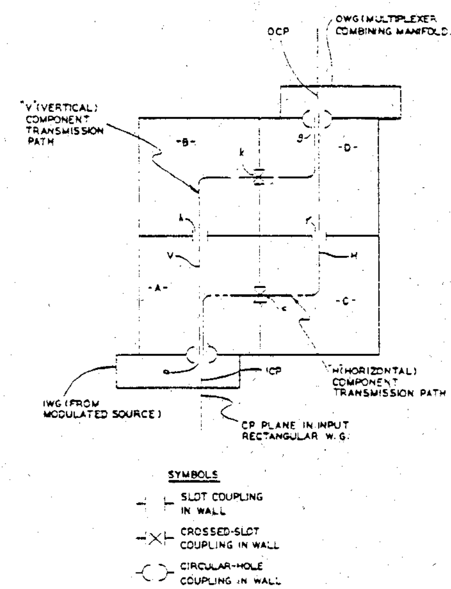
4,725,797 Feb. 16, 1988

Microwave Directional Filter with Quasi-Elliptic Response

Inventors: James D. Thompson and David S. Levinson.
Assignee: Hughes Aircraft Company.
Filed: June 1, 1987.

Abstract—Circularly polarized radiation is tapped off from an input waveguide through a input iris into an entry cavity, where it is resolved into two orthogonal linearly polarized components. These respectively proceed along two discrete paths to an exit cavity. In each path six independently tunable resonances—traversed by both direct and bridge couplings—provides enough degrees of freedom for quasi-elliptic filter functions. In the exit cavity the resultants from the two paths are combined to resynthesize circularly-polarized radiation, which traverses another iris to the output waveguide. In one layout, four resonant tri-mode cavities form a rectangular array—with entry and exit cavities at diagonally opposite corners and intermediate cavities for the two discrete paths in the two remaining corners. In another layout, six dual-mode cavities form a three-dimensional array: entry and exit cavities stacked one above the other, and two intermediate two-cavity stacks for the two discrete paths adjacent the entry/exit stack.

50 Claims, 10 Drawing Figures



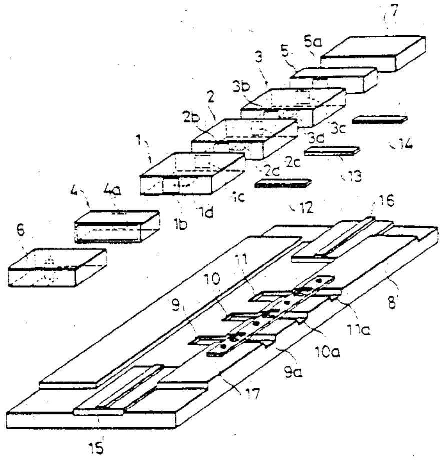
4,725,798 Feb. 16, 1988

Waveguide Filter

Inventor: Sadao Igarashi.
Assignee: Alps Electric, Ltd.
Filed: Sept. 2, 1986.

Abstract—A waveguide filter is provided which comprises a plurality of waveguide resonators arranged in series in the longitudinal direction of the filter with each contacting tightly with adjacent ones, each of the waveguide resonators being composed of a rectangular dielectric having a length and a permittivity complying with the center frequency of a bandpass filter, on the periphery of which a metal film is provided except on the portions of induction windows of its two sides mutually opposed in the longitudinal direction. According to another feature, the metal film of each waveguide resonator is provided while keeping free additionally a no-electrode portion of the bottom side of the reactor, a supporting base on which the waveguide resonators are secured has concave portions formed therein so as to confront the respective no-electrode portions, and adjusting members made of dielectric material are provided slidably and retractably into the respective concave portions so as to vary the respective opening areas of the no-electrode portions.

6 Claims, 17 Drawing Figures



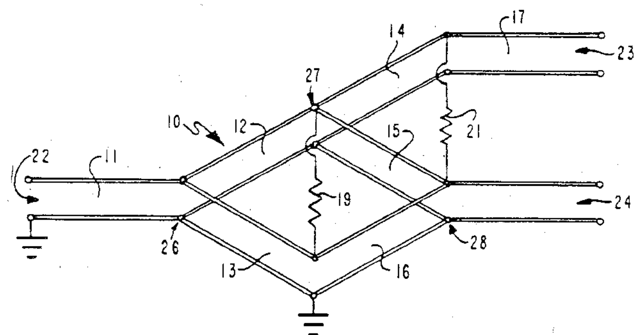
4,721,929 Jan. 26, 1988

Multistage Power Divider

Inventor: Michel W. Schnetzer.
Assignee: Ball Corporation.
Filed: Oct. 17, 1986.

Abstract—A multistage power divider particularly adapted for use in microwave circuits consists of a plurality of transmission lines and resistances uniquely arranged to achieve a wide range of power division and to give the power divider broad bandwidth and high isolation. The power divider is particularly easy to design and manufacture in stripline and microstrip constructions. The divider provides coupling in the range of 3 dB to 20 dB with high isolation and in a single-layer construction.

11 Claims, 2 Drawing Figures



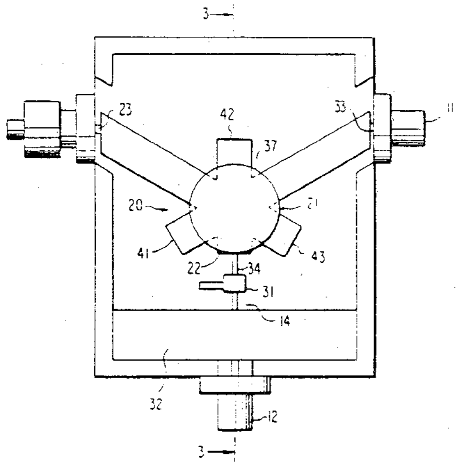
4,724,399 Feb. 9, 1988

Circuit Arrangement Comprising an Isolator Integral with an Admittance Element

Inventor: Wakoto Akinaga.
Assignee: NEC Corporation.
Filed: Feb. 20, 1986.

Abstract—In a circuit arrangement comprising a three port isolator (21) which has input, output, and dummy ports (33, 22, and 23), an admittance element (41 to 43) is connected at a position or positions selected between the input and the output ports, between the output and the dummy ports, and between the dummy and the input ports. When the isolator comprises a strip line conductor having branches connected to the input, the output, and the dummy ports, the admittance element may be an extension or extensions of the branches. The output port is connected to an amplifier (14) directly or through an inductance element (34). The connection of the admittance element makes it unnecessary to connect a matching circuit which is otherwise essential between the isolator and the amplifier.

7 Claims, 5 Drawing Figures



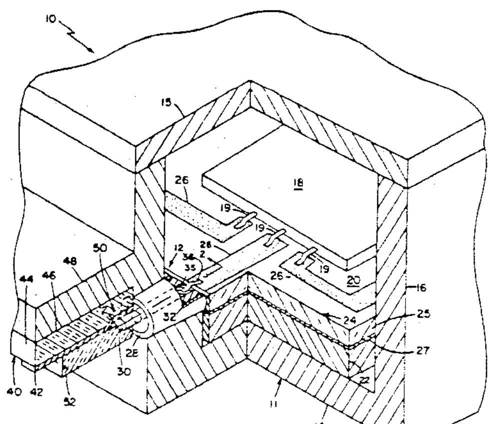
4,724,409 Feb. 9, 1988

Microwave Circuit Package Connector

Inventor: George R. Lehman.
Assignee: Raytheon Company.
Filed: July 31, 1986.

Abstract—A sealed, electrically conducting package having a strip transmission line disposed therein. The package comprises a connector mounted in a wall of the package at a first end of the connector, with a second end of the connector protruding into the package. The connector has an electrically conductive shell which is substantially cylindrical at the first end of the connector and secured to the wall. A center conductor is disposed longitudinally through the connector, the center conductor having a generally circular cross-section at the first end of the connector and having a generally semicircular cross section, comprising a rounded portion and a planar portion, at the second end of the connector. The shell is disposed about substantially only the rounded portion of the center conductor at the second end of the connector. An electrically conductive member is coupled between the planar portion of the center conductor and the strip transmission line. With such arrangement, the connector itself provides electrical transition between a coaxial transmission line mode (at the first end of the connector) and a strip transmission line mode (at the second end of the connector) thereby decreasing the overall size and complexity of the package due to the elimination of the conventional input/output circuit section for providing transition between a coaxial transmission line mode and a strip transmission line mode.

8 Claims, 2 Drawing Figures



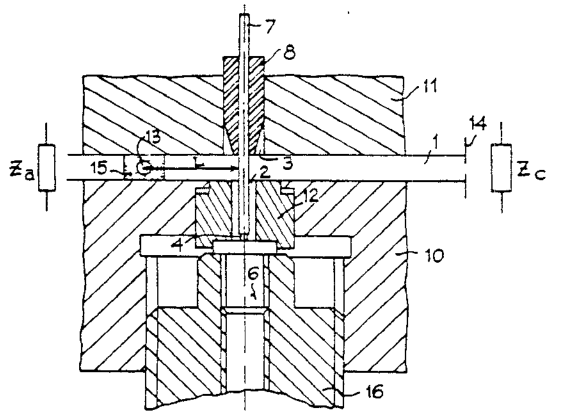
4,727,338 Feb. 23, 1988

Hyperfrequency Oscillator Operating in the Millimetric Band

Inventors: Narguise Mamodaly and Alain Bert.
Assignee: Thomson-CSF.
Filed: May 12, 1986.

Abstract—The invention concerns a negative resistance hyperfrequency oscillator, operating in the millimetric band, comprising a waveguide delimited on one side by an aris and a useful load and on the other side by a supplementary load, wherein a Gunn or IMPATT diode is polarized and coupled to the waveguide by means of an aerial, the resonator cavity of this oscillator being delimited by the iris and by a dielectric resonator placed in the waveguide between the aerial and the supplementary load, and double coupling being provided between the resonator and the guide and between the diode to the guide to produce a stable and relatively noiseless oscillator. The invention can be applied to hyperfrequency systems, for synchronizing hyperfrequency sources and conjugating their power.

11 Claims, 3 Drawing Figures



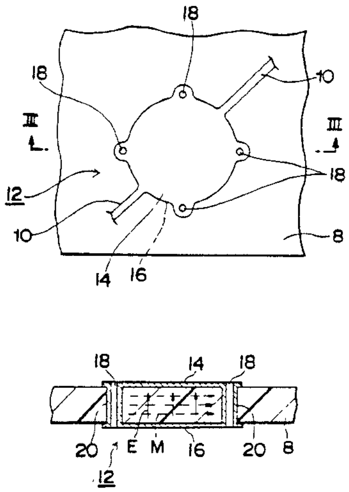
4,727,342 Feb. 23, 1988

Dielectric Resonator

Inventors: Youhei Ishikawa and Jun Hattori.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Sept. 22, 1986.

Abstract—A dielectric resonator employing the TM mode as its resonance mode, which is provided with a dielectric base plate on which an electronic circuit is formed and a pair of electrodes formed in face-to-face relation to each other on respective major surfaces of the dielectric base plate. A plurality of through-holes are defined between the pair of electrodes on their circumferential portions and both of the electrodes are connected with each other by way of conductive material formed on the inner surfaces of the through-holes.

5 Claims, 5 Drawing Figures



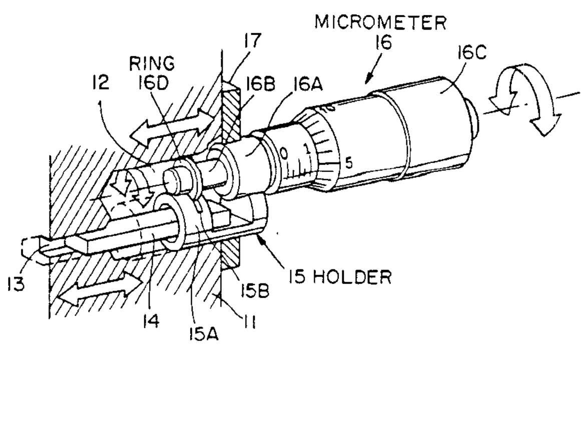
4.727,343 Feb. 23, 1988

Precision Tuning

Inventor: Justin B. Stone.
Assignee: Millitech Corporation.
Filed. Sept 29, 1986.

Abstract—A Gunn diode oscillator tuning mechanism includes a waveguide wall formed with a cavity at the outside of the wall for accommodating a tuning mechanism. A tuning rod opening extends between the inside of the waveguide wall and the cavity to snugly accommodate a sapphire rod. A holder carries the fixed end of the sapphire rod and is slidable in the cavity. The holder is formed with a circumferential sectoral slot that engages an annular ring on the rotatable translatable shaft of a micrometer adjacent to the holder seated in a holding plate at the outside of the waveguide wall

8 Claims, 2 Drawing Figures



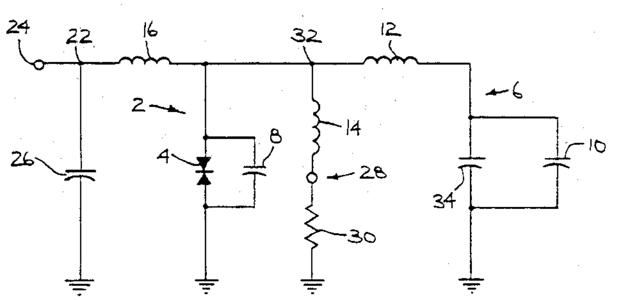
4,728,907 Mar. 1, 1988

Frequency/Temperature Compensated Millimeter Wave Oscillator

Inventor: Leonard D. Cohen.
Assignee: Eaton Corporation.
Filed: Dec. 4, 1986.

Abstract —Frequency/temperature compensation of millimeter wave lumped active element oscillators is disclosed by use of a simple capacitive compensating element, and including printed circuit versions in which the temperature compensating capacitor is printed in-situ with the circuit elements.

26 Claims, 14 Drawing Figures



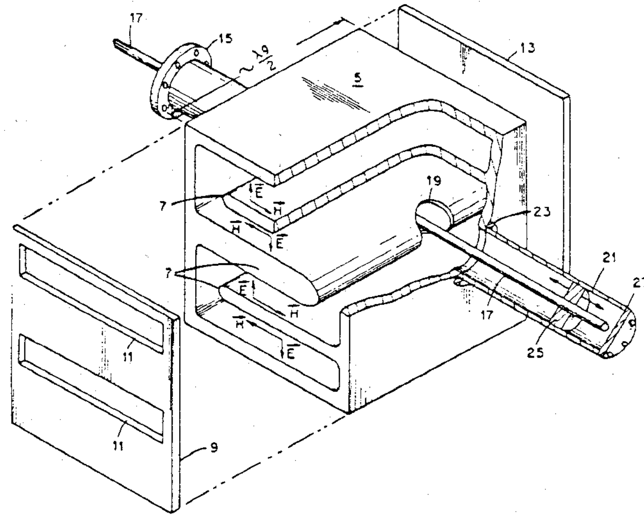
4,728,910 Mar. 1, 1988

Folded Waveguide Coupler

Inventor: Thomas L. Owens.
Assignee: The United States of America as represented by the United States Department of Energy.
Filed: Oct. 27, 1986.

Abstract —A resonant cavity waveguide coupler for ICRH of a magnetically confined plasma. The coupler consists of a series of inter-leaved metallic vanes disposed within an enclosure analogous to a very wide, simple rectangular waveguide that has been "folded" several times. At the mouth of the coupler, a polarizing plate is provided which has coupling apertures aligned with selected folds of the waveguide through which rf waves are launched with magnetic fields of the waves aligned in parallel with the magnetic fields confining the plasma being heated to provide coupling to the fast magnetosonic wave within the plasma in the frequency usage of from about 50—200 mHz. A shorting plate terminates the back of the cavity at a distance approximately equal to one-half the guide wavelength from the mouth of the coupler to ensure that the electric field of the waves launched through the polarizing plate apertures are small while the magnetic field is near a maximum. Power is fed into the coupler folded cavity by means of an input coaxial line feed arrangement at a point which provides an impedance match between the cavity and the coaxial input line.

9 Claims, 5 Drawing Figures



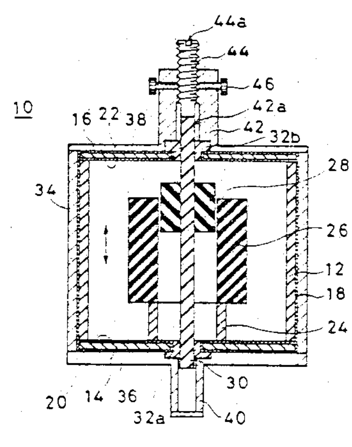
4,728,913 Mar. 1, 1988

Dielectric Resonator

Inventors: Youhei Ishikawa, Hidekazu Wada; and Kouichi Takehara.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Jan. 17, 1986.

Abstract —A dielectric resonator comprises a shield electrode defining a resonant space and cylindrical dielectric resonator element disposed and supported fixedly in the resonant space, to which an input and output are coupled. Into the hollow portion of the dielectric resonator element, a tuning unit made of a dielectric material is inserted so as to be displaceable in an axial direction therein. The tuning unit is coupled to a supporting axis which is displaceable axially, thus causing the tuning unit to displace in that direction. A resonance frequency of the dielectric resonator varies as the tuning unit displaces.

14 Claims, 9 Drawing Figures



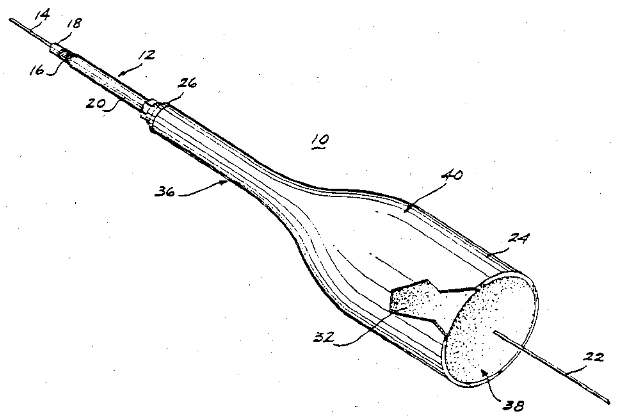
4,730,172 Mar. 8, 1988

Launcher for Surface Wave Transmission Lines

Inventor: Greg A. Bengeult.
Assignee: The Boeing Company.
Filed: Sept. 30, 1986.

Abstract—Disclosed is a surface signal launcher for coupling RF signals between a coaxial cable in a single-wire surface wave transmission line. The signal launcher includes a shell-like, electrically conductive launcher horn that is installed at the juncture of the coaxial cable and the surface wave transmission line with the launcher horn concentrically surrounding the portion of the surface wave transmission line that is immediately adjacent the coaxial cable. The coaxial cable outer conductor is electrically connected to the forward end of the launcher horn with the center conductor of the coaxial cable being connected to one end of the surface wave transmission line. To prevent signal reflection at the interface between the coaxial cable and the launcher horn, the diameter of the launcher horn forward end is established to provide an impedance that is equal to the characteristic impedance of the coaxial cable. Aft of the forward end, the diameter of the launcher horn smoothly increases as a function of axial distance in a manner that establishes an impedance/axial distance relationship that corresponds to a Chebyshev impedance taper.

6 Claims, 6 Drawing Figures



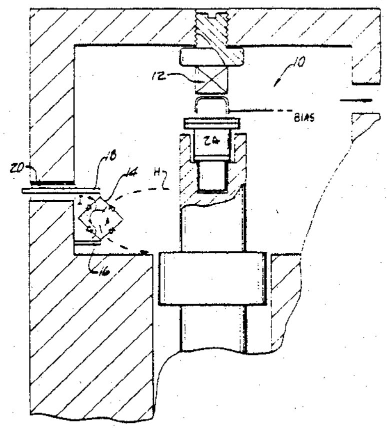
4,730,169 Mar. 8, 1988

Injection Locking and Tuning Circuit for Microwave Diode Oscillator

Inventor: Hsiu Y. Li.
Assignee: Hughes Aircraft Company.
Filed: Aug. 14, 1986.

Abstract—A four-diode bridge is positioned within the cavity of a Gunn diode oscillator. A subharmonic signal is applied to the diode bridge and the diode bridge couples an odd harmonic of the injected signal into the cavity. The cavity is thus caused to resonate at the odd harmonic of the injected signal. The injected signal can be changed using a frequency synthesizer in order to provide a microwave oscillator with multiple-channel operation. The diode bridge provides a feedback signal indicative of the phase of cavity oscillation. The feedback signal is applied to varactor which pretunes the Gunn diode oscillator and thereby provides phase-locked control.

20 Claims, 2 Drawing Figures



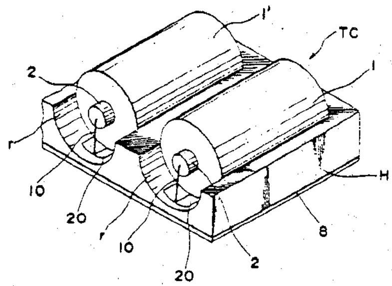
4,730,173 Mar. 8, 1988

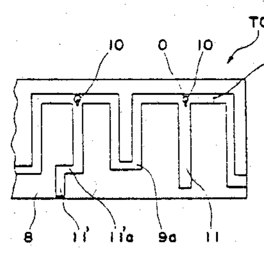
Asymmetrical Trap Comprising Coaxial Resonators, Reactance Elements, and Transmission Line Elements

Inventor: Kikuo Tsunoda.
Assignee: Murata Manufacturing Co., Ltd.
Filed: June 3, 1986.

Abstract—An improved asymmetrical trap which includes at least one dielectric material coaxial resonator, a capacitor inserted between an inner conductor of the coaxial resonator and a first signal transmission line, with an outer conductor of the coaxial resonator being grounded so as to produce a series resonance at a first frequency through the combination of the capacitor and coaxial resonator, and a second transmission line connected, at their corresponding ends, in parallel with opposite ends of the series connection of the coaxial resonator and capacitor, and opened or short-circuited at their other far ends, so that anti-resonance is produced at a second frequency through the combination of the capacitor, coaxial resonator and second transmission line.

3 Claims, 15 Drawing Figures





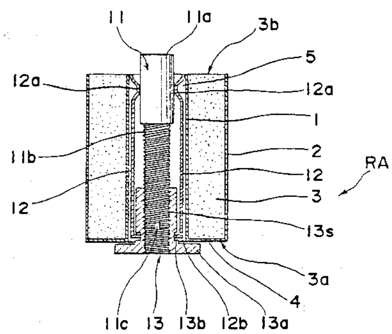
4,730,174 Mar. 8, 1988

Dielectric Material Coaxial Resonator with Improved Resonance Frequency Adjusting Mechanism

Inventors: Toshio Nishikawa, Koji Saito, and Toshiro Hiratsuka.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Dec. 18, 1986.

Abstract—The disclosure is directed to a dielectric material coaxial resonator provided with an improved resonance frequency adjusting mechanism which is arranged to eliminate deviations of the resonance frequency after adjustment for adjusting the resonance frequency.

7 Claims, 6 Drawing Figures



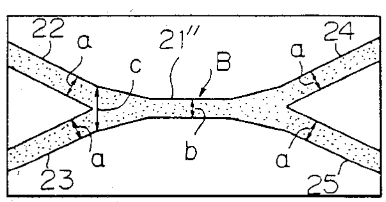
4,730,884 Mar. 15, 1988

Bipolar Voltage-Controlled Optical Switch Using Intersecting Waveguides

Inventors: Minoru Seino, Hirochika Nakajima, Ippei Sawaki, and Hidehiro Mishiro.
Assignee: Fujitsu Limited.
Filed: July 29, 1986.

Abstract—An optical switch comprising: an electrode-optic crystal substrate (1,1′); a central waveguide (21); a pair of input waveguides (22,23), and a pair of output waveguides (24,25). A refractive-index-changed region (R′) is provided symmetrically within some part of the central waveguide. Switching from the straight-through state to the branching state or vice versa is carried out by introducing a change in the refractive index of the index-changed region.

15 Claims, 22 Drawing Figures



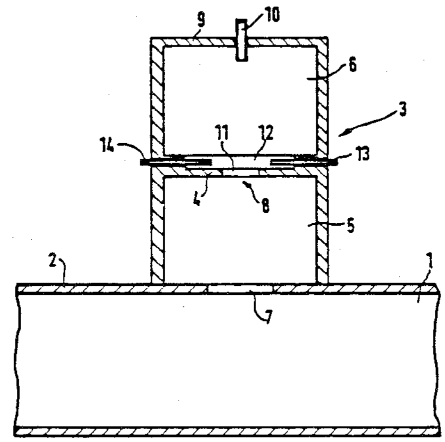
4,731,593 Mar. 15, 1988

Attenuation and Time Delay Equalizer for a Waveguide Filter

Inventor: Franz-Josef Görtz.
Assignee: ANT Nachrichtentechnik GmbH.
Filed: Oct. 8, 1986.

Abstract—An arrangement for the equalization of attenuation and time delay in a microwave filter utilizing waveguide technology. An equalizer composed of a multicircuit cavity resonator is coupled via a first coupling aperture to a waveguide which is connected to the filter. The resonator includes at least two individual waveguide sections coupled to each other via a second coupling aperture. The coupling apertures are dimensioned so that the resonator is critically coupled with respect to time delay characteristics. The resonator includes a power-absorbing tuning device for tuning all of the waveguide sections to substantially the same quality factor. The second coupling aperture presents a stepped cross section defining a first area and a second area having a larger cross section than the first area. The resonator further includes at least two screws arranged symmetrically with respect to the longitudinal axis of the resonator and protruding laterally into the second area of the second coupling aperture. The screws influence the time delay of the equalizer as a function of their depth of penetration into the second area.

13 Claims, 3 Drawing Figures



4,731,596 Mar. 15, 1988

Bandpass Filter for Hyperfrequencies

Inventors: Jean-Claude Cruchon, Gilbert Prost, and Jean-Pierre Marquet.
Assignee: Alcatel Thomson Faisceaux Hertziens
Filed: Feb. 26, 1986.

Abstract—This highly reproducible stripline bandpass filter comprises, between its two leads. (A and B), n half-wave resonators (1–7) connected in series. Suitable capacitors (C0–C7) provide a powerful coupling between the successive elements of the series circuit. Quarter-wave resonators (10, 11, 70, 71) each having one end connected to the series circuit provide a steep-edge amplitude/frequency response at the limits of the passband of the hyperfrequency, wide-band filter so obtained.

2 Claims, 5 Drawing Figures