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.

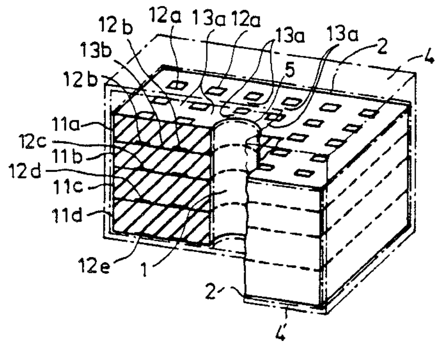
4,675,632 June 23, 1987

Coaxial Line Shape Resonator with High Dielectric Constant

Inventor: Minori Kawano.
Assignee: Mitsubishi Denki Kabushiki Kaisha.
Filed: Feb. 21, 1985.

Abstract—A high dielectric constant element suitable for making a coaxial line shape resonator comprises a number of sheets, for instance, of mica or plastic, each having plural pieces of conductive film or electrodes provided on one face with appropriate small gaps in between, the sheets being assembled in a pile to form a high dielectric constant element body that has high equivalent ϵ value without using a conventional high dielectric constant ceramic body. Fine adjustment of the resonance frequency of the coaxial line shape resonator is easily made by adjusting number of sheets per length.

5 Claims, 8 Drawing Figures



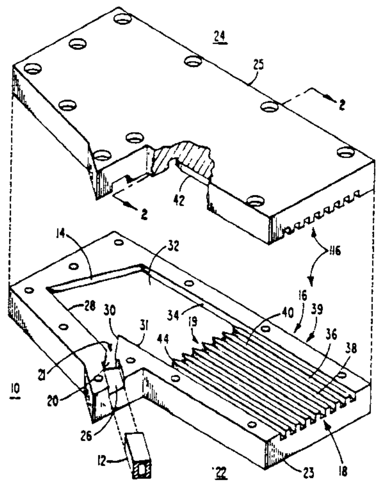
4,677,393 June 30, 1987

Phase-Corrected Waveguide Power Combiner/Splitter and Power Amplifier

Inventor: Arvind K. Sharma.
Assignee: RCA Corporation.
Filed: Oct. 21, 1985.

Abstract—A waveguide power combiner or splitter (divider) includes a common waveguide having an axis skewed relative to the axes of a line array of waveguides. A sectoral parabolic reflector is oriented with its focus at a port of the common waveguide with its axis parallel with the axes of the waveguides of the array for reflecting signals from the focal point to create a locus of constant phase at the ports of the waveguide array, whereby signal power originating at the common waveguide is divided equally among the waveguides of the waveguide array. A waveguide power amplifier includes a power splitter as described above, and an amplifier module located in each waveguide of the waveguide array to amplify the power therein to produce amplified signal in an output waveguide array. The amplified signals from the amplifier modules are combined by a second reflector driven by the output waveguide array and reflected to a common output port.

16 Claims, 18 Drawing Figures



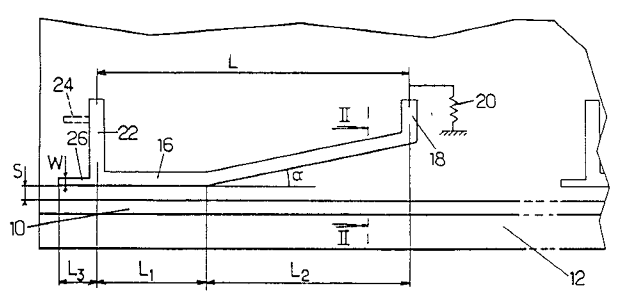
4,677,399 June 30, 1987

Wide-Band Directional Coupler for Microstrip Lines

Inventors: René Le Dain and Henri Havot.
Assignees: Etat Francais represente par le Ministre des PTT (Centre National d'Etudes des Telecommunications and the Etablissement Public de Telediffusion dit "Telediffusion de France."
Filed: Apr. 25, 1986.

Abstract—A wide-band directional coupler for microstrip lines has a microstrip line section whose conductive core is coupled to the core of the main line over a length $\lambda/4$ (λ being the wave length in a mid portion of the desired pass band). The section has a first fraction parallel to the main line and at a small distance therefrom so as to provide tight coupling and a second fraction diverging from the main line and closed on a matching impedance. The free end of the first fraction is connected to the load and has an extension projecting over a length less than $\lambda/16$ for forming a microcapacitor tapping energy from the main line.

8 Claims, 3 Drawing Figures



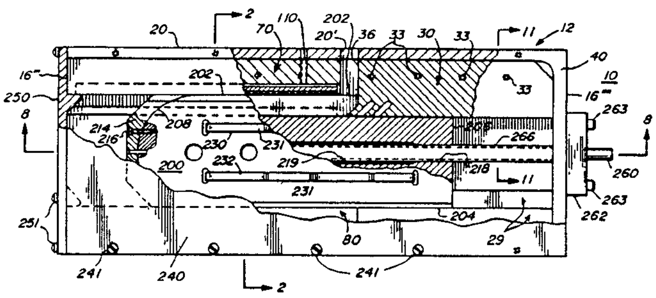
4,677,400 June 30, 1987

Variable Line Extender for Wave Guide

Inventors: Robert K. Griffith, Norman Hardy, Edley V. McKnight, and Vladimir K. Vavra.
Assignee: Honeywell Inc.
Filed: Apr. 8, 1985.

Abstract—A variable line extender for wave guide comprising an elongated electrically conductive housing member and an electrically conductive slide member, the slide member having a convex shaped rounded end and a U-shaped recess extending transversely continuously from one end of the slide longitudinally along one side thereof, around the rounded end, and then along the other side back to the first end, with said housing having a pair of wave guide shaped ports in register with the U-shaped recess of the slide member. Means are provided for adjusting the relative longitudinal position of the slide with respect to the housing so as to vary the length of the path between the ports.

11 Claims, 15 Drawing Figures



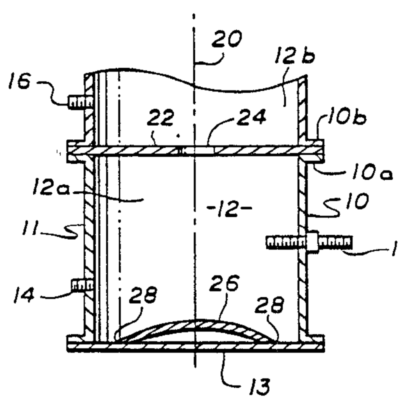
4,677,403 June 30, 1987

Temperature-Compensated Microwave Resonator

Inventor: Rolf Kich.
Assignee: Hughes Aircraft Company.
Filed: Dec. 16, 1985.

Abstract—A microwave resonator is disclosed which includes a temperature-compensating structure within the resonator cavity configured to undergo temperature-induced dimensional changes which substantially minimize the resonant frequency change otherwise caused by temperature-induced changes in the waveguide body cavity. The temperature-compensating structure includes both bowed and cantilevered structures on the cavity endwall, as well as structures on the cavity sidewall such as a tuning screw of temperature-responsive varying diameter.

23 Claims, 6 Drawing Figures



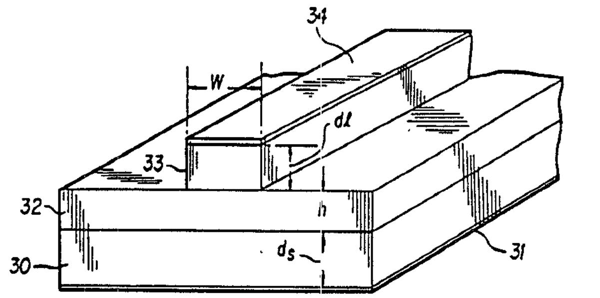
4,677,404 June 30, 1987

Compound Dielectric Multiconductor Transmission Line

Inventor: Hermann B. Sequeira.
Assignee: Martin Marietta Corporation.
Filed: Dec. 19, 1984.

Abstract—This is a transmission line particularly suitable for millimeter-wave transmission that comprises a dielectric guiding slab layer sandwiched between a dielectric substrate layer and a dielectric strip, the long axis of the dielectric strip defining the direction of transmission The outer surfaces of the strip and the substrate are clad with a conducting layer.

7 Claims, 5 Drawing Figures



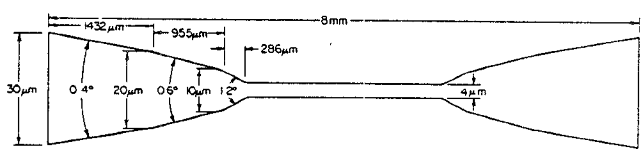
4,678,267 July 7, 1987

Parabolic Optical Waveguide Horns and Design Thereof

Inventors: William K. Burns and A. Fenner Milton.
Assignee: The United States of America as represented by the Secretary of the Navy.
Filed: June 30, 1981.

Abstract—Coupling between narrow- and wide-channel optical waveguides is found to be very efficiently performed by coupling regions in the form of parabolas. Design equations for parabolic coupling regions are given.

2 Claims, 3 Drawing Figures



4,679,007 July 7, 1987

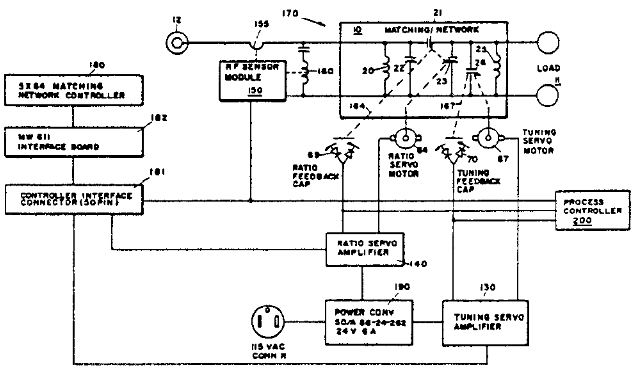
Matching Circuit for Delivering Radio Frequency Electromagnetic Energy to a Variable Impedance Load

Inventors: George Reese, Richard Spielmaker, and Douglas Schatz.
Assignee: Advanced Energy, Inc.
Filed: May 20, 1985.

Abstract—A matching circuit is provided for delivering radio frequency electromagnetic energy from a radio frequency power supply to a variable impedance load such as a gas plasma. The matching network couples and impedance matches the power supply to the load. The matching network includes a ratio circuit for establishing a voltage ratio between the power supply and the load and a tuning circuit for tuning out a complex portion of the reactance of the load. Separation and control of the ratio and tuning variables is achieved through provision of a ratio control circuit comprising a lumped quarter wave transformer and a tuning control circuit comprising a

variable tuning capacitance and a tuning inductance electrically connected in parallel to the load. The lumped quarter wave transformer comprises first and second ratio inductances electrically connected parallel to the load; a first variable ratio capacitance electrically connected in series with the load; and second and third variable ratio capacitances electrically connected parallel to the load. Ratio and tuning inductances are provided comprising toroidal-shaped forms having layers of electrically conductive material deposited or applied thereover. The ratio and tuning capacitances are provided with electrically floating butterfly-shaped rotors ganged on drive shafts driven by high speed torque motors.

17 Claims, 18 Drawing Figures



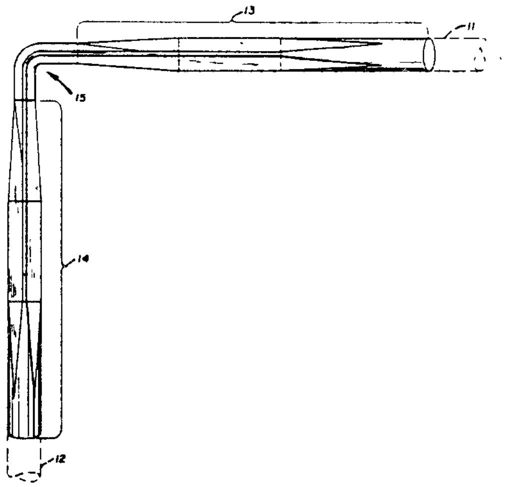
4,679,008 July 7, 1987

Sharp Mode-Transducer Bend for Overmoded Waveguide

Inventors: Edward P Irzinski, Jerry A. Krill, and William H. Zinger.
Assignee: The Johns Hopkins University.
Filed: Dec. 27, 1984.

Abstract—A sharp, mode-transducing bend structure for circular TE_{01} overmoded waveguide systems is formed by first transducing from circular TE_{01} waveguide into multiport rectangular TE_{01} waveguide, performing the desired bend, and then transducing from the multiport rectangular TE_{10} waveguide back into the circular TE_{01} waveguide.

8 Claims, 5 Drawing Figures



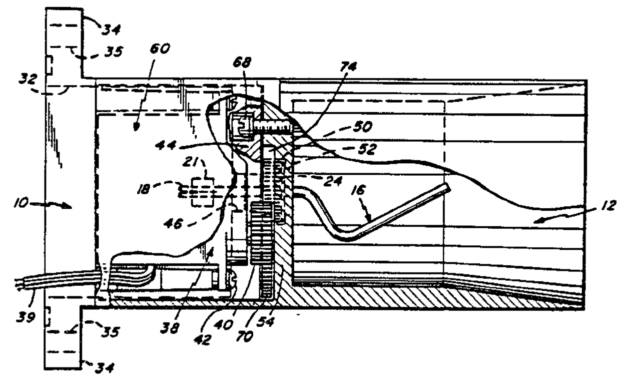
4,679,009 July 7, 1987

Polarized Signal Receiving Apparatus

Inventor: Donald C. Cloutier.
Assignee: M/A-COM, Inc.
Filed: Feb 27, 1986.

Abstract—A polarized receiving apparatus in which there is provided a first waveguide for transmitting polarized signals and a second waveguide secured to the first for receiving polarized signals at one end thereof. An antenna means is provided having integrally formed portions including a receiver probe portion disposed in the second waveguide and extending generally axially of the second waveguide for receiving one polarization of the incident signal, a launch probe portion concentric with the axis of the first waveguide and extending generally axially of the first waveguide for launching said signal therein, and a drive portion intermediate the receiver and launch probe portions with said drive portions including a first gear. A drive source is supported in a housing member which defines the first waveguide and this drive source comprises at least a second gear adapted to mesh with the first gear for driving the antenna means.

18 Claims, 5 Drawing Figures



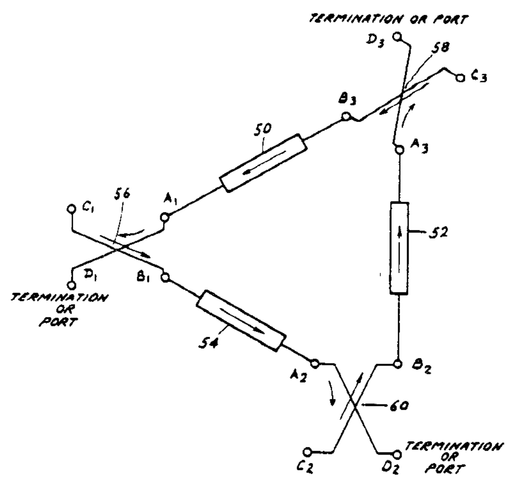
4,679,010 July 7, 1987

Microwave Circulator Comprising a Plurality of Directional Couplers Connected Together by Isolation Amplifiers

Inventor: Inder J. Bahl.
Assignee: ITT Gallium Arsenide Technology Center, a division of ITT Corporation.
Filed: Dec. 20, 1985.

Abstract—A gallium arsenide isolator has a common gate FET for amplifying a microwave signal, the common gate FET being connected to a common drain FET for transmitting the microwave signal and for isolating the common gate FET from signals traveling in a direction opposite to the microwave signal. One or more L–C networks are connected at one end between the input and output of the isolator and at the other end to ground. The circulator includes three arms each having a gallium arsenide isolator. Each of the arms is coupled to another one of the arms by means of a four port coupler which permits transmission of a signal from one port to a second diagonally opposite port, the third port receiving a fixed fraction of the power and the fourth port receiving effectively no power.

3 Claims, 2 Drawing Figures



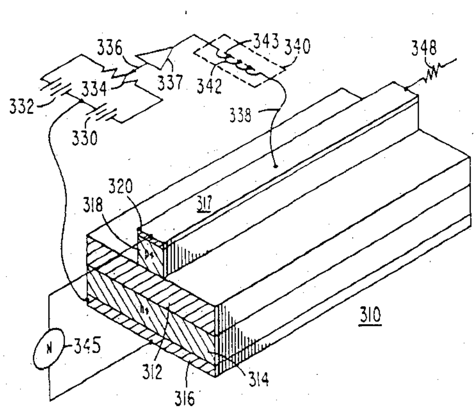
4,675,628 June 23, 1987

Distributed p-i-n Diode Phase Shifter

Inventor: Arye Rosen.
Assignee: RCA Corporation.
Filed: Feb. 28, 1985.

Abstract —A monolithic chip phase shifter consists of a p-i-n diode which is laterally elongated and shaped into microstrip-like transmission line. The transmission line has characteristics determined in part by the capacitances associated with the intrinsic layer of the diode. Alternating-current (ac) signals are coupled through the transmission line. Direct-voltage reverse bias, no bias or direct-current forward bias are applied to select the appropriate value of equivalent shunt capacitance of the transmission line to provide the desired phase shift of the ac signals passing therethrough. A high-impedance coupling device couples the bias to the transmission line to prevent leakage of signal to the bias source.

18 Claims, 18 Drawing Figures



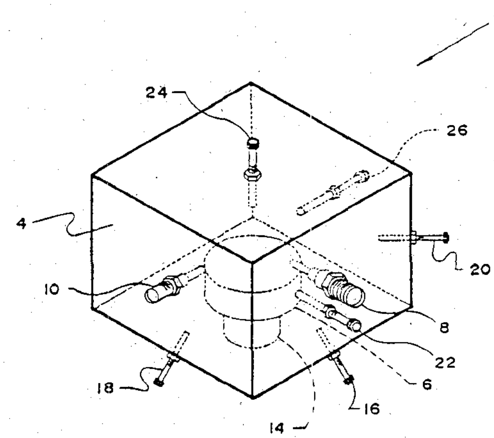
4,675,630 June 23, 1987

Triple Mode Dielectric Loaded Bandpass Filter

Inventors: Wai-Cheung Tang, David Siu, Bruce C. Beggs, and Joseph Sferrazza.
Assignee: Com Dev Ltd.
Filed: Dec. 3, 1985.

Abstract —A triple mode dielectric loaded bandpass filter has at least one cavity resonating in three independent orthogonal modes. A triple mode cavity can be mounted adjacent to either single, dual or triple mode cavities. Intercavity coupling is achieved through the iris having two separate apertures that together form a T-shape. The cavities can be planar mounted. The filter is designed for use in the satellite communication industry and results in substantial savings in weight and size when compared to previous filters.

16 Claims, 12 Drawing Figures



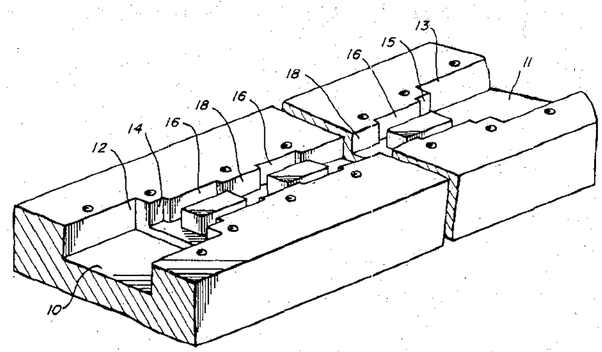
4,675,631 June 23, 1987

Waveguide Bandpass Filter

Inventor: Michael C. Waggett.
Assignee: M/A-COM, Inc.
Filed: Jan. 17, 1985.

Abstract —A waveguide bandpass filter having multiple waveguide sections including alternating ridge waveguide sections and evanescent waveguide sections. The ridge waveguide sections define a resonant cavity and the evanescent waveguide sections reactively load the resonant cavity thus intercoupling the ridge waveguide sections so as to provide a low loss filter having high attenuation, not only at adjacent stop band frequencies, but also at harmonics of the pass band.

12 Claims, 10 Drawing Figures



4,678,011 July 7, 1987

Waveguide Directional Coupler Family with a Common Housing Having Different Sets of Conductive Block Insertable Therein

Inventors: Krishna Praba and Charles E. Profera, Jr.
Assignee: RCA Corporation.
Filed: Mar. 21, 1986.

Abstract—A family of waveguide branch directional couplers having various coupling values is adapted for using the same housing dimensions for all members of the family. The housing includes a conductive block defining first and second spaced-apart parallel rectangular through waveguides. The block also defines a chamber extending between the through waveguides. One or more further conductive blocks in the form of rectangular parallelepipeds are fastened within the chamber and dimensioned to coact with the chamber dimensions to define at least two rectangular branch waveguides extending between the through waveguides. The dimensions of the further blocks are selected to adjust the branch waveguide dimensions to provide the various coupling values.

2 Claims, 16 Drawing Figures