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.

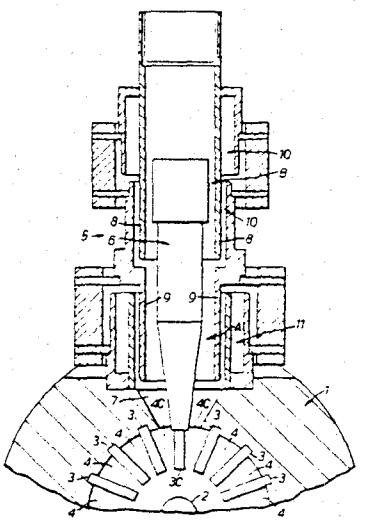
4,672,340 June 9, 1987

Multipactor Discharge Tuned Resonant Cavity Devices

Inventors: Maurice Esterson and Michael B. C. Brady
Assignee: English Electric Valve Company Limited.
Filed: May 30, 1979.

Abstract—A resonant cavity device—particularly a magnetron oscillator—has a separate resonator coupled to a resonant cavity of the device. The separate resonator consists of a resonant transmission line within which are two multipactor discharge arrangements, one being positioned at a distance along a resonant transmission line which is approximately $3\lambda/4$ from the end of the transmission line adjacent the cathode and the other of which is positioned at a distance along the resonant transmission line which is $\lambda/4$ from the same end of the transmission line. By controlling the multipactor discharges of the multipactor discharge devices appropriately three different frequencies of operation are available.

2 Claims, 1 Drawing Figure



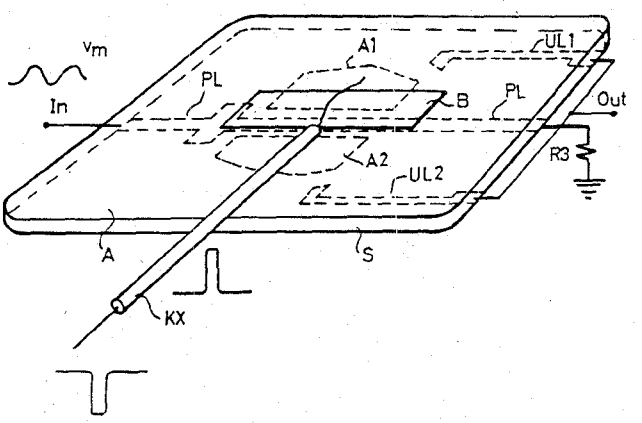
4,672,341 June 9, 1987

Sampling Circuit for Microwave Signals

Inventor: Claes E. S. Axell.
Assignee: Telefonaktiebolaget LM Ericsson.
Filed: Oct. 16, 1985.

Abstract—A sampling circuit for microwave signals includes a substrate (S), a planar microwave guide (PL) on one side of the substrate and a conductive surface on the other. A slotline is formed by a rectangular insulating area (B) on the other side, and a drive pulse conductor (KX) is connected to opposite edges of the insulating area for supplying the sampling pulses. On one side of the substrate there are two separate conductive surfaces (A1, A2), which together with the conductive surface (A) on the other side forms the capacitors included in the sampling circuit. Two discrete diodes (D1, D2) are connected between the microwave guide and the respective surface (A1, A2), and resistors (R1, R2) are connected between these surfaces and planar output waveguides (UL1, UL2) for the sampling circuit.

4 Claims, 4 Drawing Figures



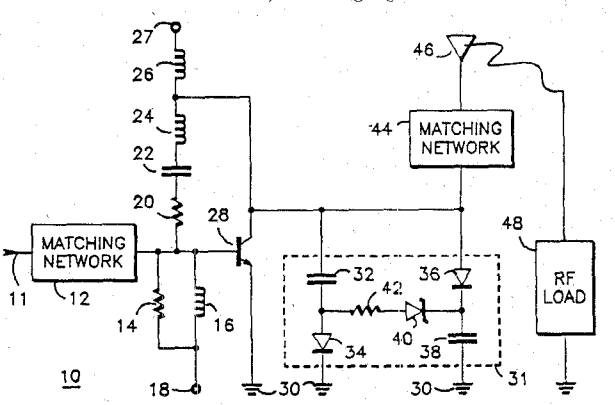
4,673,886 June 16, 1987

Adaptively Stabilized RF Amplifier

Inventors: Robert H. Bickley and D. Culver.
Assignee: Motorola, Inc.
Filed: Feb. 26, 1986.

Abstract—An output transistor of an RF power amplifier remains stable so that it does not generate subharmonic spurious outputs. An adaptive stabilization network maintains the stability of the output by decreasing the impedance presented to the output transistor when voltage levels at the output transistor exceed a predetermined level. A combination consisting of a peak detector coupled to a Zener diode senses the predetermined level. A p-i-n diode couples to the Zener diode and to the output transistor so that the p-i-n diode becomes forward biased when the predetermined level is exceeded.

17 Claims, 1 Drawing Figure



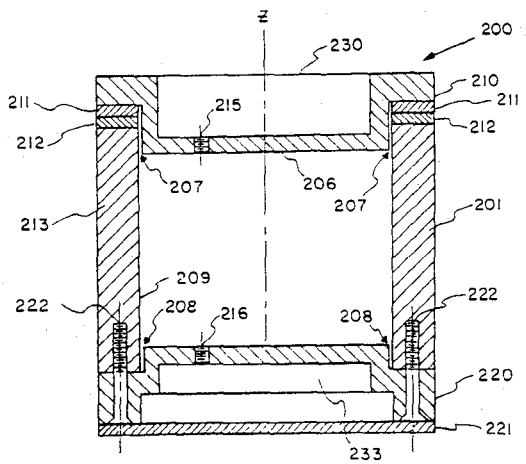
4,673,894 June 16, 1987

Oscillator Coupled Through Cylindrical Cavity for Generating Low-Noise Microwaves

Inventor: Robert G. Rogers.
Assignee: California Microwave, Incorporated.
Filed: Apr. 10, 1986.

Abstract—A microwave oscillator having very low phase noise characteristics has a reflection oscillator circuit coupled to a right-circular cylindrical resonant cavity designed to operate in the TE_{011} mode. The resonator length L and inner diameter D are restricted to a range of values such that $(D/L)^2$ is less than 2.5 but greater than 1.7. To suppress the TM_{111} resonant modes in the resonator, two techniques are employed. A single tuning post is disposed on either resonator end plate at a point where the TM_{111} electric field Z-component is a maximum. The post length is adjustably fixed to maximize the output microwave power at the cavity output port. Each end plate also has a continuous gap separating each plate from the housing to suppress electric field currents of the TM_{111} mode flowing on the inner surface of the resonator.

13 Claims, 4 Drawing Figures



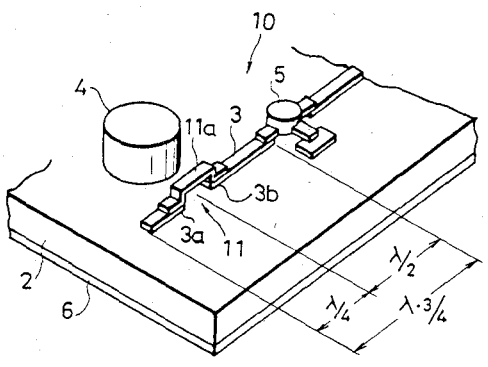
4,673,895 June 16, 1987

Oscillator Having Improved Coupling Between Stripline and Dielectric Resonator

Inventors: Akio Tadachi and Akira Takayama.
Assignee: Alps Electric Co., Ltd.
Filed: Aug. 26, 1986.

Abstract—An oscillator with a dielectric resonator capable of providing a designated output and being suited for mass production comprising an insulating substrate, a strip structure, a dielectric resonator located adjacent to the strip structure, the last two being mounted on the substrate, and an oscillatory transistor connected to one end of the strip structure. The strip structure consists of two spaced strip sections interconnected by an electrically-conductive bridge-shaped connector section having a conductor part, which is located further away from the insulating substrate and closer to the dielectric resonator than the two strip sections.

1 Claim, 4 Drawing Figures



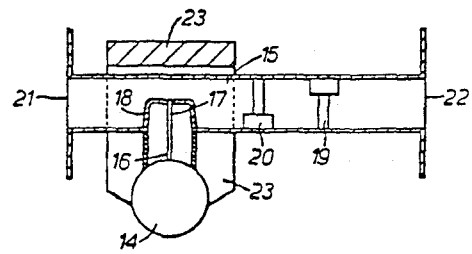
4,673,896 June 16, 1987

Microwave Transmitting and Receiving Arrangements

Inventors: Michael B. C. Brady and Archie W. Crook.
Assignee: English Electric Valve Company, Limited.
Filed: Dec. 14, 1983.

Abstract—A radar system having a common antenna for transmitting and receiving signals conventionally includes a branch duplexer which is bulky and inconvenient. By using a waveguide-section having an antenna port at one end and a receiver port at the other, and including a protection unit comprising p.i.n. diodes these difficulties are reduced. The diodes prevent transmitted energy from a magnetron reaching the receiver port but allow received energy, because of its lower amplitude, to pass.

19 Claims, 2 Drawing Figures



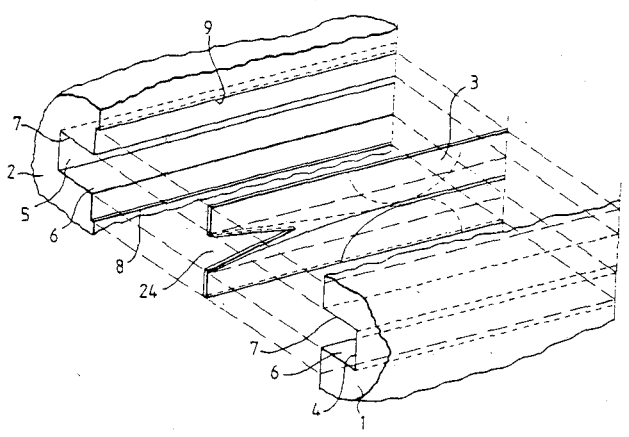
4,673,897 June 16, 1987

Waveguide Microstrip Mode Transducer

Inventors: Lye-Whatt Chua and Peter J. Gibson.
Assignee: U.S. Philips Corporation.
Filed: Oct. 8, 1985.

Abstract—A waveguide/microstrip mode transducer operable over a broad frequency range comprises a dielectric substrate (3) extending along an E-plane of a waveguide and having a conductive layer on each major surface, the two layers having three successive pairs of portions. A first pair (10, 11) form a microstrip line, a second pair (12, 13) form a balanced transmission line, and a third pair (14, 15) coupled the portions (14, 15) of the balanced line to opposite walls (6, 7) of the waveguide. The microstrip line is coupled to the balanced line in a manner which is independent of frequency over the operating frequency range, rather than by a resonant balun; the strip conductor portion (10) and the ground plane conductor portion (11) of the microstrip line respectively are the same width as, and taper smoothly to the width of the conductor portions (12, 13) of the balanced line connected thereto, and there are two regions (22, 23) respectively on opposite sides of the balanced line in which there is no conductor on both surfaces of the substrate (3) and which exhibit no resonance in the operating frequency range. In order to provide phase velocity matching between the waveguide and the transmission lines on the substrate (3), particularly when the substrate (3) has a high dielectric constant, the substrate (3) has a recess (24) of progressively increasing width along the waveguide.

9 Claims, 2 Drawing Figures



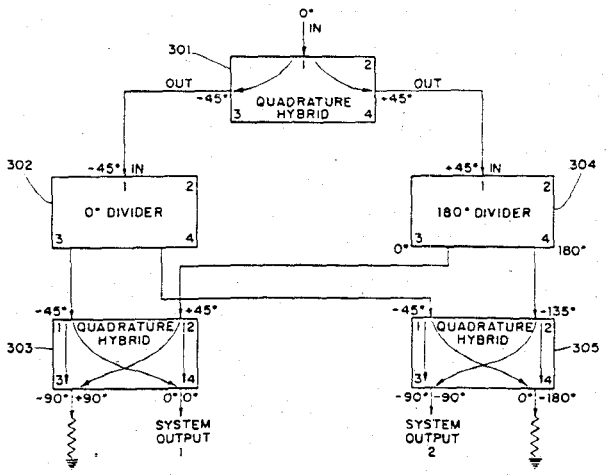
4,673,898 June 16, 1987

Wide-Band Quadrature Hybrid

Inventor: Kevin P. Redmond.
Assignee: Advanced Systems Research, Inc.
Filed: Feb. 28, 1986.

Abstract—A system for providing a quadrature hybrid with a wide bandwidth and an extremely low amplitude imbalance. This system incorporates conventional quadrature hybrids as components and provide a system quadrature hybrid having a larger bandwidth and a far lower amplitude imbalance than that of any of the component quadrature hybrids. Typically, the system bandwidth improvement over that of the component hybrids is 60 percent, while the improvement in the imbalance is 6 to 1. These improvements are achieved using a system network consisting fundamentally of three conventional hybrids, a reversing divider and an in-phase divider, all of which are readily available components. This system provides a significant improvement over more complicated quadrature hybrid designs where filter networks are required to obtain wide bandwidth. The widest bandwidth components now available, including those using filter networks, can be incorporated in the present invention to provide an even wider system bandwidth.

6 Claims, 11 Drawing Figures



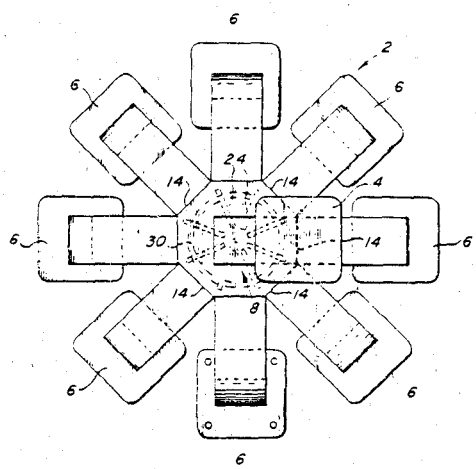
4,673,899 June 16, 1987

H-Plane Stacked Waveguide Power Divider/Combiner

Inventors: Nils V. Jespersen and John P. Quine.
Assignee: General Electric Company.
Filed: Sept 23, 1985

Abstract—A compact waveguide power combiner/divider is characterized by low reflection and dissipation losses. The device includes a radial waveguide having an inlet opening and a plurality of radial outlet openings, and a coupling pin is arranged in the radial waveguide to couple energy from the inlet opening with the radial waveguide. A mode suppression device is connected with the radial waveguide and contains a plurality of radially arranged slots corresponding with the outlet openings. A tuning mechanism arranged within the radial waveguide optimizes the coupling of undesired modes with the slots. An undesired mode absorption device is arranged in cooperation with the slots of the mode suppression device so that undesired modes are isolated from desired modes with low reflection and dissipation losses.

19 Claims, 10 Drawing Figures



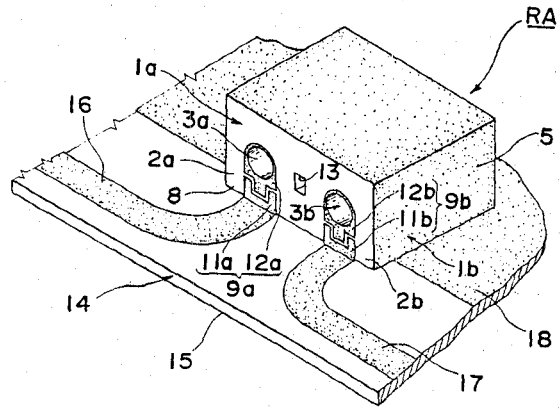
4,673,902 June 16, 1987

Dielectric Material Coaxial Resonator Filter Directly Mountable on a Circuit Board

Inventors: Tomoyuki Takeda and Yoji Ito.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Nov. 15, 1984.

Abstract—A dielectric material coaxial resonator which includes at least one dielectric material block member having a through-opening axially formed in it in one direction, an inner conductive layer formed on an inner peripheral surface of the through-opening, an outer conductive layer formed on an outer wall surface of the dielectric material block member, an open end face which is provided on at least one end face of the dielectric material block member where the through-opening is opened and at which an outer surface of the dielectric material block member is exposed, and capacitor electrodes formed on the open end face so as to constitute a single resonator unit.

21 Claims, 15 Drawing Figures



4,673,903 June 16, 1987

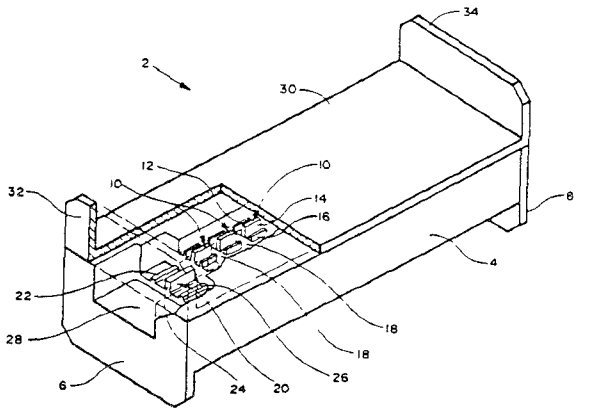
Evanescent-Mode Triple Ridge Low-Pass Harmonic Filter

Inventor: Abdelmegid K. Saad.
Assignee: Com Dev Ltd.
Filed: Nov. 2, 1984.

Abstract—A waveguide low-pass filter has successive groups of three separate ridges spaced longitudinally in said filter. A center ridge of each filter has a larger cross-sectional area than two side ridges which are the same size.

All ridges are parallel to one another in a longitudinal direction. The groups are associated with shunt capacitances and the spaces between adjacent groups are associated with series inductances in an evanescent mode. In operation, the filter is capable of supporting a TE_{10} mode in the passband and three modes, TE_{10}, TE_{20} and TE_{30}, in the stopband. The filter has a relatively higher power handling capability as compared to previous evanescent mode low-pass harmonic filters

8 Claims, 7 Drawing Figures



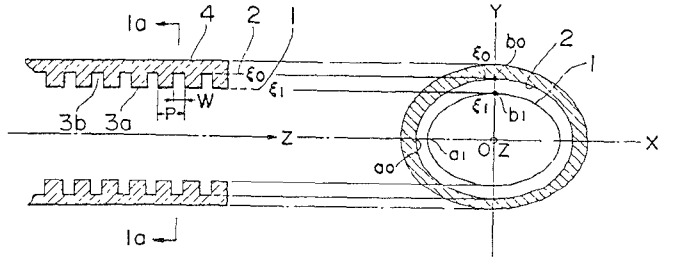
4,673,905 June 16, 1987

Corrugated Elliptical Waveguide or Horn

Inventors: Seiichi Yamawaki, Tomoki Obuchi, Noboru Toyama, and Kazuyoshi Shogen.
Assignee: NEC Corporation.
Filed. Aug 20, 1985.

Abstract—A corrugated elliptical waveguide medium comprises a corrugated hybrid mode excitation member having an elliptical transverse cross-section for propagating electromagnetic energy therethrough The excitation member is provided with longitudinally spaced apart parallel corrugations with the teeth of the corrugations defining an inner ellipse and the grooves of the corrugations defining an outer ellipse The depths of the corrugation grooves on the major and minor axes of the ellipsis are dimensioned such that the tangential electric and magnetic field components of the energy in a circumferential direction are zero on the inner ellipse.

2 Claims, 8 Drawing Figures



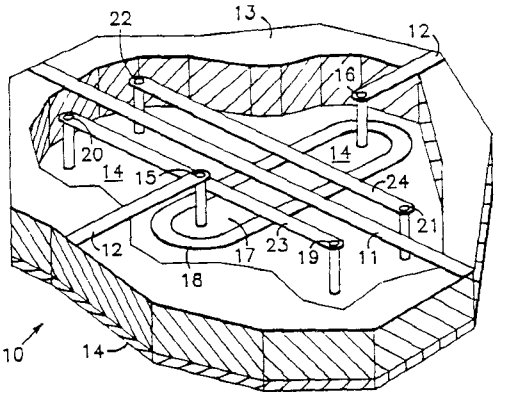
4,675,620 June 23, 1987

Coplanar Waveguide Crossover

Inventor: Craig L. Fullerton.
Assignee: Motorola, Inc
Filed· Mar 3, 1986.

Abstract—The present invention consists of a crossover for coplanar waveguides. A pair of microstrip/strip line conductors are transitioned into coplanar conductors on opposite sides of a substrate This places the electrical and magnetic fields in an orthogonal relation so as to reduce the possible interference. Once crossed the coplanar conductors are transitioned back to microstrip/strip line conductors

7 Claims, 5 Drawing Figures



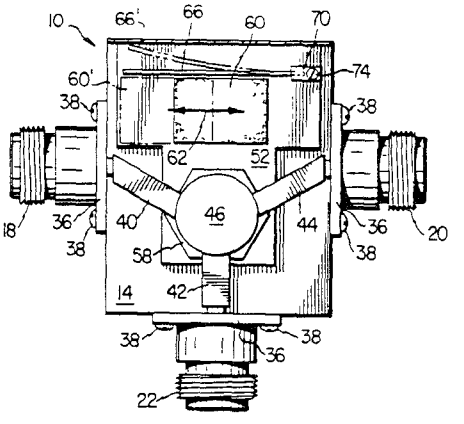
4,675, 621 June 23, 1987

Temperature-Compensated Circulator

Inventors: Stewart L. Brown and Andrew J. Cartin
Assignee: Decibel Products, Inc.
Filed: Nov. 12, 1985.

Abstract—A microwave ferrite circulator has a conductive junction with three equal angular conductors connected to serve as ports of the circulator. Ferrite plates are positioned on opposite sides of the conductive junction. Magnetic members form a magnetic coupling path between a permanent magnet and the ferrite plates. A bimetal strip is positioned in the magnetic coupling path between the magnet and the ferrite plates for altering the coupling as a function of temperature to thereby compensate for changes in tuning due to changes in temperatures of the circulator.

7 Claims, 5 Drawing Figures



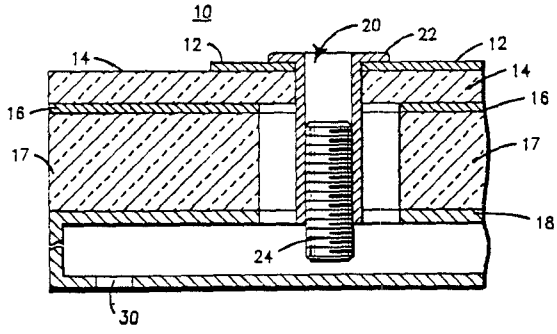
4,675,623 June 23, 1987

Adjustable Cavity to Microstrip Line Transition

Inventors: Michael E. Nowak and Christopher R. Bach.
Assignee: Motorola, Inc.
Filed: Feb. 28, 1986.

Abstract—Disclosed is a coupling arrangement which comprises an enclosed cavity with an aperture in one of its walls. An adjustable probe is positioned within the aperture to allow energy within the cavity to be coupled onto the probe. A microstripline transition is connected at one end to the adjustable probe and at the other end to external circuitry. The arrangement allows variable coupling of energy within the cavity onto the probe without requiring cumbersome procedures for fine adjustment.

7 Claims, 2 Drawing Figures



4,675,625 June 23, 1987

Rolled Delay Line of the Coplanar Line Type

Inventor: Joseph E. Johnston.
Assignee: Rogers Corporation.
Filed: July 31, 1985

Abstract—A time delay device for adjusting the arrival time of an electronic signal at a specific area in a circuit pattern is presented. The time delay device is comprised of a coplanar flexible circuit having a conductive pattern consisting of a signal line in a ground shield. The signal line is serpentine and makes one or more passes back and forth on the dielectric surface of the flexible circuit. The ground plane covers substantially the entire surface of the laminate except for a small gap on either side of the signal line. This circuit laminate is then tightly rolled up and permanently packaged in a suitable sheath or by encapsulation.

34 Claims, 25 Drawing Figures