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 is 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.

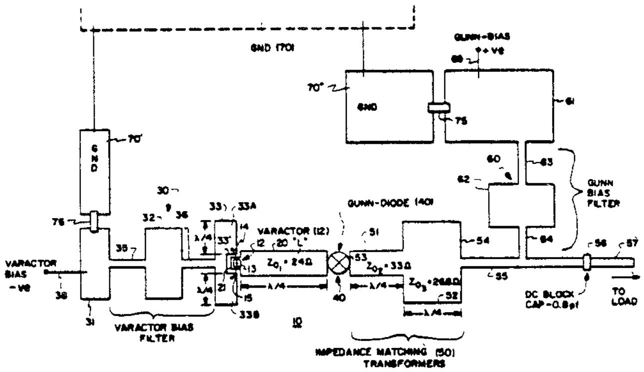
4,574,256 Mar. 4, 1986

Varactor Tuned Microstrip Oscillator for *Ka*-Band Operation

Inventor: Donald R. Singh.
Assignee: Honeywell Inc.
Filed: Dec. 31, 1984.

Abstract—A planar varactor tuned microstrip oscillator for *Ka*-band operation comprising a GaAs Gunn diode, a varactor diode, an impedance inverter microstrip line placing the varactor in shunt with the Gunn diode, an impedance matching transformer connected from the output of the Gunn diode to a load connection means, a source of negative bias potential for the varactor and a source of positive bias potential for the Gunn diode.

3 Claims, 1 Drawing Figure



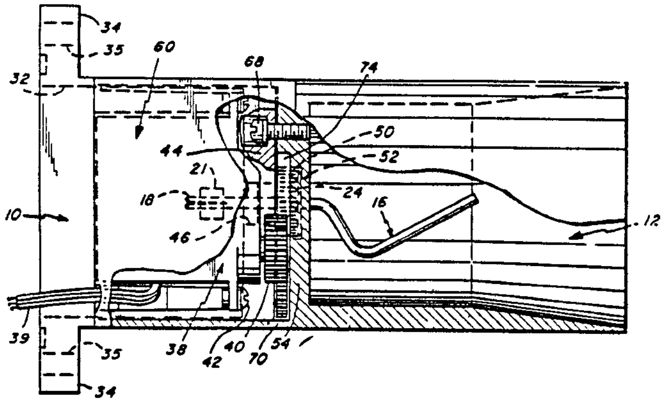
4,574,258 Mar. 4, 1986

Polarized Signal-Receiving Apparatus

Inventor: Donald C. Cloutier.
Assignee: M/A-COM, Inc.
Filed: Aug. 27, 1984.

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 portion 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.

15 Claims, 5 Drawing Figures



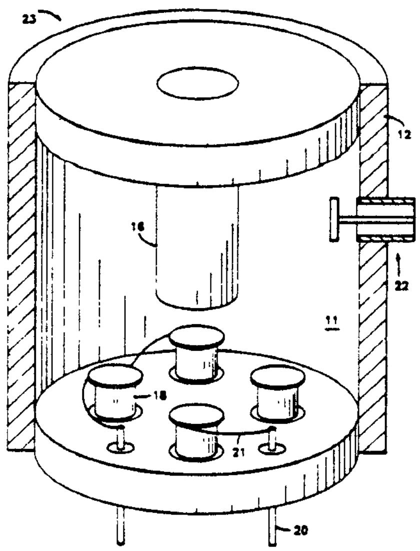
4,571,555 Feb. 18, 1986

Reentrant Coaxial Cavity Power Combiner

Inventors: Bernard E. Sigmon and Charles V. Evans.
Assignee: Motorola, Inc.
Filed: Mar. 30, 1984

Abstract—A plurality of negative resistance devices is spaced below a cylindrical center conductor of a single coaxial cavity. Each negative resistance device has a bias device connected to it by a bias wire. Extending radially through the outer wall of the coaxial cavity is a coax cable with an RF coupling probe. A tuning screw is placed axially through the interior of the center conductor for tuning the frequency of the power combiner.

15 Claims, 6 Drawing Figures



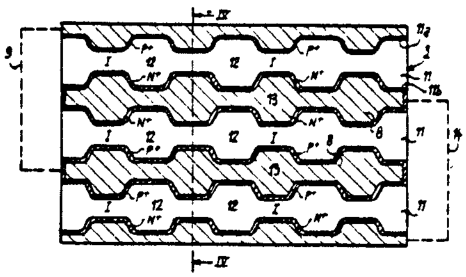
4,571,559 Feb. 18, 1986

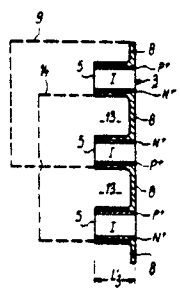
High-Power Waveguide Limiter Comprising p-i-n Diodes for Millimeter Waves

Inventors: Raymond Henry, Michel Heitzmann, and Jean V. Bouvet.
Assignee: Thomson-CSF.
Filed: Oct. 11, 1984.

Abstract—A high-power limiter comprising silicon p-i-n diodes for millimeter waves is formed by a waveguide associated with a silicon substrate wherein is formed a matrix of p-i-n diodes. The p-i-n diodes are formed throughout the thickness of the silicon substrate.

5 Claims, 11 Drawing Figures





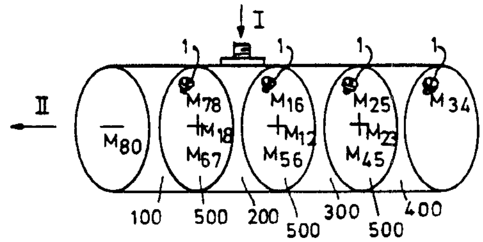
4,571,563 Feb. 18, 1986

Integrated Microwave Filter and Method of Constructing Same

Inventor: Richard J. Cameron.
Assignee: Agence Spatiale Europeenne.
Filed: Jan. 23, 1984.

Abstract—Cascaded dual-mode resonance cavities are separated by plates having each a cruciform iris therein, the arms of which have lengths determined by a direct and precise procedure starting from a conventional Butterworth prototype filter. The transfer function parameters are altered to change the filter response and the group delay performance is determined and compared to an ideal flat response for producing a penalty function signal from the difference in order to modify the parameters again in such direction that the penalty function signal is likely to be reduced. The process is repeated until the penalty function signal is minimum, whereby a compact structure is realized which provides an attenuation response having sharp cutoff slopes at the edges of the signal bandwidth together with a close to flat in-band group delay response.

2 Claims, 23 Drawing Figures



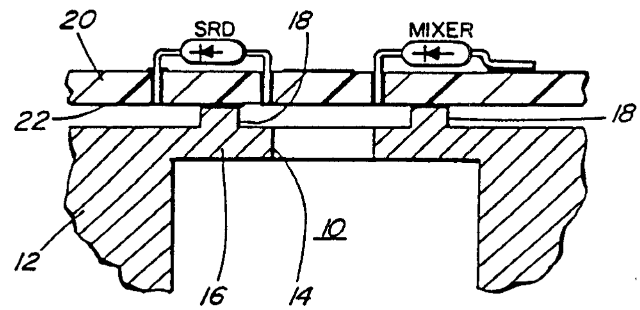
4,571,564 Feb. 18, 1986

Aperture-Coupled Microwave Apparatus

Inventor: Maciej E. Znojkiewicz.
Assignee: Northern Telecom Limited.
Filed: Sept. 15, 1983.

Abstract—In a microwave device, for example a microwave local oscillator with a harmonic mixer for feedback control, problems of coupling the mixer circuit to the RF cavity are overcome by providing a dc blocking capacitor of the mixer on a planar surface of a support extending across an aperture in one wall of the cavity. In preferred embodiments the capacitor is a planar device formed by a plurality of interdigitated fingers. These fingers are oriented to couple magnetically with the RF energy at the aperture in the cavity. The support conveniently comprises a printed circuit board having a ground plane on the same surface as the capacitor, which is located in a small opening in the ground plane. A second ground plane is provided on the opposite side of the printed circuit board, overlying the opening. The two ground planes are interconnected by plate-through-holes.

5 Claims, 5 Drawing Figures



4,570,133 Feb. 11, 1986

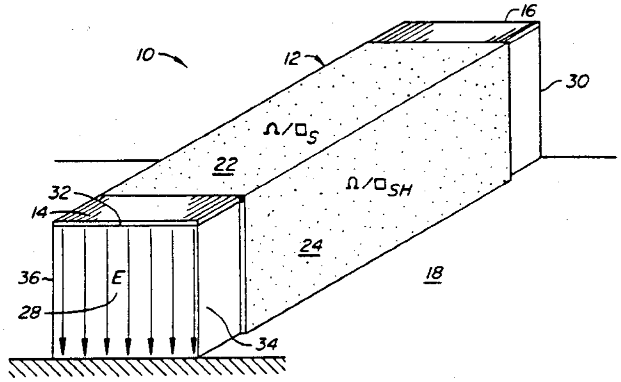
Microwave Attenuator

Inventor: Helmut Bacher.
Filed: Feb. 9, 1984.

Abstract—According to the invention, a microstrip microwave frequency attenuator comprises a distributed series resistance medium and distributed shunt resistance medium, wherein the shunt resistance medium is disposed parallel to the direction established for electric fields in the microstrip between the signal path and ground through the energy supporting medium. In the

preferred embodiment, the series resistance path has a resistance value per unit length equal to about one-third of the resistance value per unit length compared to the shunt resistance path between the series resistance path and the ground plane.

18 Claims, 7 Drawing Figures



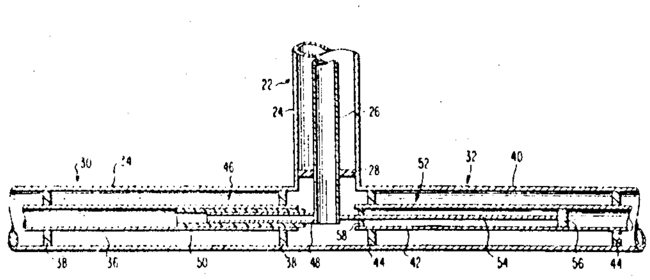
4,570,134 Feb. 11, 1986

Compact Hybrid Providing Quadrature Phase Relation Between Two Outputs

Inventor: Oakley M. Woodward.
Assignee: RCA Corporation.
Filed: Apr. 19, 1984.

Abstract—A hybrid uses stubs to provide 90 degrees of phase shift between output lines for feeding a circularly polarized antenna. Capacitive and inductive stubs have low and high characteristic impedances for broad bandwidth. The stubs can be located in the output lines for compactness, or in a T-section between an input line and the output lines, for compactness, to minimize undesired phase shift, and for ease of connection. The hybrid can include one quarter wave transformers having a characteristic impedance of geometric mean of the hybrid and antenna for improved axial ratio.

13 Claims, 8 Drawing Figures



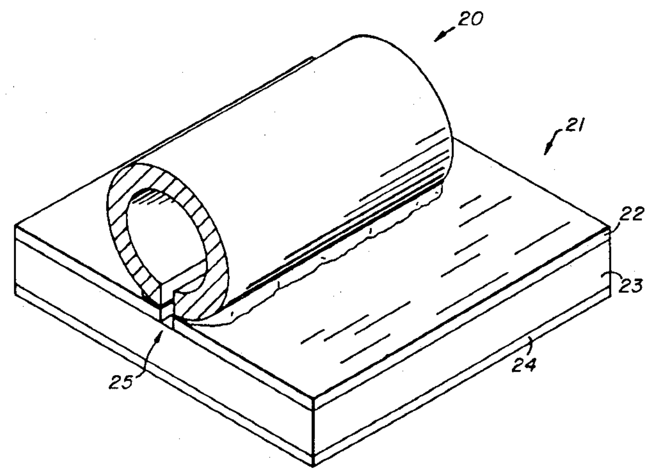
4,570,137 Feb. 11, 1986

Lumped-Mode Resonator

Inventor: Raymond F. DiSilvestro.
Assignee: Motorola, Inc.
Filed: Sept. 4, 1984.

Abstract—An apparatus and method is disclosed for providing a lumped-mode resonator having increased mechanical stability through mounting of the gap of the lumped-mode resonator to a fixed surface. Temperature stability is also enhanced through attaching the resonator to a printed circuit capacitor whose capacitance will vary in a manner to offset any changes in the inductance of the resonator due to temperature variations. This will maintain a substantially constant resonant frequency over varying temperature conditions.

9 Claims, 4 Drawing Figures



4,568,891 Feb. 4, 1986

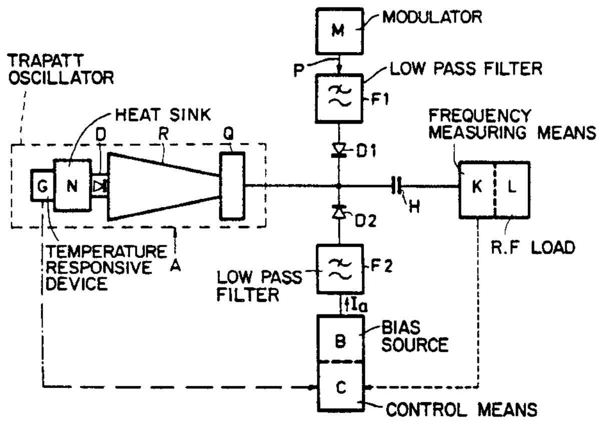
RF Oscillator Arrangement

Inventor: Robert Davies.
Assignee: U.S. Philips Corporation.
Filed: May 25, 1984.

Abstract—In an RF oscillator arrangement comprising a diode (D), such as a TRAPATT diode, operable to produce pulses of RF energy when dc pulses (P) above a critical level (I_k) are applied to the diode (D), the frequency of oscillation is markedly dependent on the temperature of the diode (D). To reduce variations of the frequency over a wide operating range of ambient temperatures, a direct current (I_a) below the critical level (I_k) is passed through the diode (D) to heat it, the heating current (I_a) being controlled by measuring the temperature of a heat-sink (N) on which the diode (D) is

mounted and which is substantially at ambient temperature, or by measuring the oscillating frequency.

5 Claims, 3 Drawing Figures



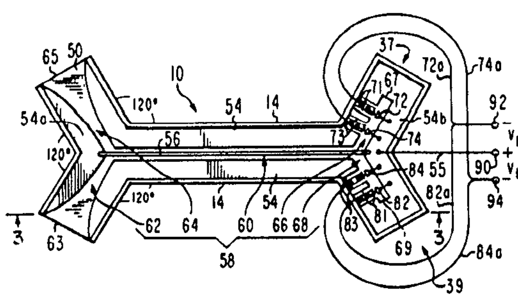
4,568,893 Feb. 4, 1986

Millimeter Wave Finline Reflection Phase Shifter

Inventor: Arvind K. Sharma.
Assignee: RCA Corporation
Filed: Jan. 31, 1985.

Abstract—A millimeter-wave reflection phase shifter employs a finline structure within a waveguide network which has a central leg and four arms which together form two symmetric Y-junctions. The finline forms a septum within the waveguide and includes a conductive layer having a central gap or slot therein which extends along the leg and into each of the arms. Means for shorting the slot arms disposed at one end of the leg controls the phase shift experienced by a signal propagating through the phase shifter This phase shifter may provide multiple selectable phase shifts.

11 Claims, 5 Drawing Figures



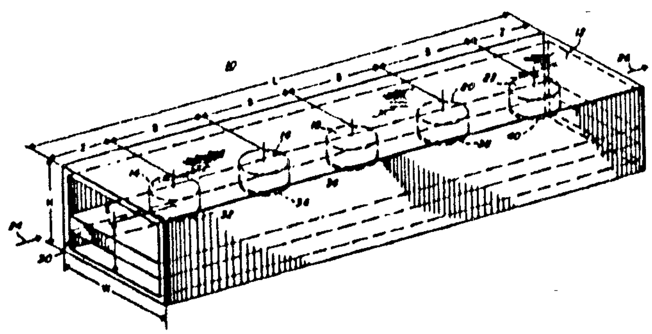
4,568,894 Feb. 4, 1986

Dielectric Resonator Filter to Achieve a Desired Bandwidth Characteristic

Inventors: Mark A. Gannon and Francis R. Yestor, Jr.
Assignee: Motorola, Inc.
Filed: Dec 30, 1983.

Abstract—A method and corresponding apparatus for maintaining constant bandwidth over a frequency spectrum in a microwave, dielectric resonator waveguide filter. Bandwidth is determined by the product of the resonant center frequency and the interresonator coupling coefficient. To maintain constant bandwidth while changing center frequency, the interresonator coupling coefficient must be chosen such that it varies inversely with changes in center frequency. The interresonator coupling coefficient is a function of the physical dimensions of the waveguide and the dielectric resonators, the dielectric constant and the spatial location of the resonators within the waveguide Once the physical and spatial parameters have been established, the center frequency of the filter may be adjusted by altering the thickness of the resonators without changing the filter bandwidth

13 Claims, 4 Drawing Figures



4,568,895 Feb. 4, 1986

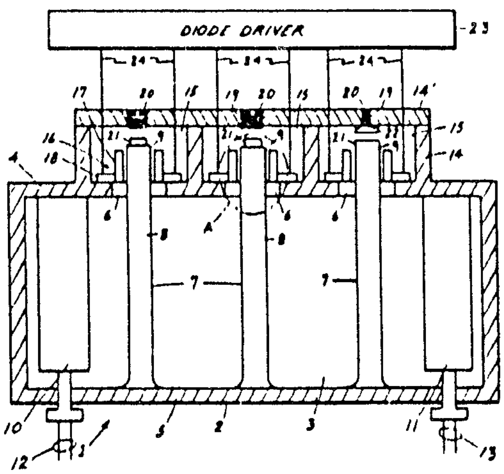
Capacitor Arrangements, Especially for an Electronically Tunable Bandpass Filter

Inventor: Robert E. Reed.
Assignee: International Telephone and Telegraph Corporation.
Filed: Feb. 17, 1983.

Abstract—A capacitor arrangement which is especially suited for use in an electronically tunable narrow-band tuned cavity filter includes two capacitor plate portions which are juxtaposed to one another to form a capacitor. One of the capacitor plate portions may be provided with a recess and with an internally threaded bore which opens into the recess, and an externally threaded trimmer slug may be received in the bore and extend to a greater or lesser degree into the recess and thus to contribute to a greater or lesser degree to the total capacitance of the capacitor. A dielectric spacer may be interposed between the capacitor plate portions to determine the size of the gap there between and to maintain the gap size constant. One of the capacitor plate

portions may be mounted on a support for movement toward and away from the other capacitor plate portion and be urged toward the latter in a yieldable manner so as to avoid undue stressing of the dielectric spacer resulting either from vibrations or from thermal expansion. When the capacitor arrangement is to be used in a tuned cavity filter including a plurality of resonator bars which are mounted in a cantilevered fashion, a portion of the respective resonator bar may be used as one of the capacitor plate portions, and a set of the capacitor arrangements of this construction may be arranged around the respective resonator bar so as to suppress oscillations of the latter in all transverse directions.

19 Claims, 8 Drawing Figures



4,568,897 Feb. 4, 1986

Millimeter-Wave Cutoff Switch

Inventors: Richard A. Stern and Elio A. Mariani.
Assignee. The United States of America as represented by the Secretary of the Army.
Filed: June 20, 1983.

Abstract—A millimeter-wave cutoff switch in a dielectric waveguide having a semi-insulating core and a semiconducting epitaxial layer. A controller affixed to the epitaxial layer is alternately switched to vary the conductivity of the epitaxial layer, thereby influencing wave propagation in the waveguide. When the waveguide is properly dimensioned such that the operating frequency lies in the high-loss section near the cutoff frequency on the loss versus frequency characteristic curve, an applied reverse bias voltage produces a switching function in the loss characteristics associated with the wave propagating in the guide, thereby resulting in low-loss propagation.

8 Claims, 6 Drawing Figures