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.

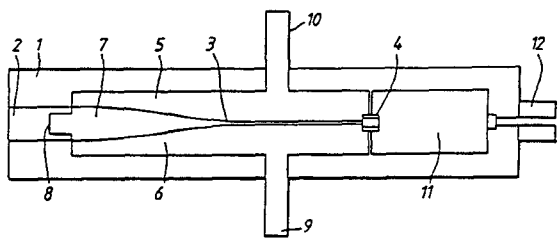
4,733,170 Mar. 22, 1988

Microwave Power Sensors

Inventors: Paul A. McAllister, Thomas G. McConnell, and Frederick R. Weston.
Assignee: Marconi Instruments Limited
Filed: May 28, 1986.

Abstract—A microwave power sensor utilizing a semiconductor power absorption element which is mounted on a finline structure within a waveguide channel. In order to check calibration of the sensor, a coaxial line is used to feed a relatively low frequency reference signal to the power sensor The power element is positioned between the input port of the waveguide and a coaxial line input port at which the reference signal is applied The use of a precise and accurate reference signal enables the power sensor to be used for microwave measurements.

13 Claims, 3 Drawing Figures



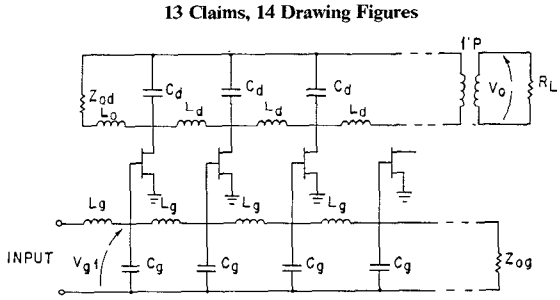
4,733,195 Mar. 22, 1988

Traveling-Wave Microwave Device

Inventors: Hua Q. Tserng and Bumman Kim.
Assignee: Texas Instruments Incorporated
Filed: July 15, 1986.

Abstract—A traveling-wave transistor structure (50) with the input and outoput transmission lines (54,58) terminated with unmatched impedances (70,72,74;80,82,84) to improve high-frequency response by reflection and phase shift to provide constructive interference is disclosed. Preferred embodiments include a π-gate (52,56) MESFET structure traveling-wave transistor with many periodically spaced gate feeding fingers (56) connecting gate (52) to gate transmission line (54) which parallels gate (52) This provides a compact structure and has large advantages at millimeter-wave frequencies. Source (60) may be grounded by vias (61) or may pass over gate transmission line (54) by air bridges to a ground on the same surface as the MESFET

13 Claims, 14 Drawing Figures



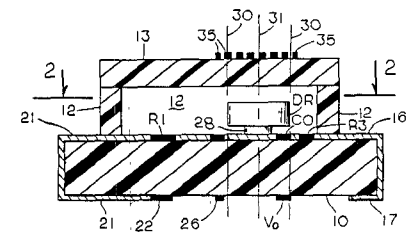
4,733,198 Mar. 22, 1988

Mechanically Tunable Sealed Microwave Oscillator

Inventors: Martin J. Blickstein and Lynn Carpenter.
Assignee: Murata Erie North America, Inc.
Filed: Oct. 6, 1986.

Abstract—A microwave oscillator has a sealed, dielectric case that encloses a dielectric resonator adjacent a circuit conductor Discrete conductive elements are removably mounted to the exterior of the case within a magnetic field generatable by the resonator. The oscillator may be tuned by selectively removing the discrete conductive elements from the case.

10 Claims, 8 Drawing Figures



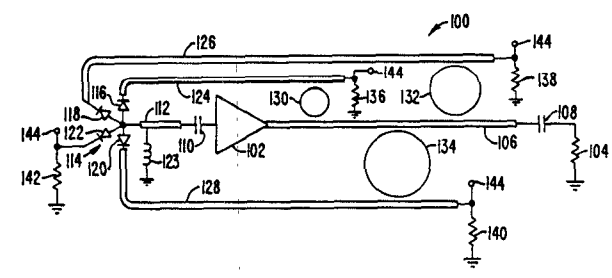
4,733,199 Mar. 22, 1988

Multifrequency Dielectric Resonator Oscillator Using Parallel Feedback

Inventor: Amarpal S. Khanna.
Assignee: Avantek, Inc.
Filed: Feb. 9, 1987.

Abstract—A switchable, parallel-feedback, multi-frequency dielectric resonator oscillator that generates microwave energy at any of several available frequencies is disclosed. The oscillator includes an amplifier that is operable for oscillation at a frequency determined by a parallel feedback dielectric resonator connected between its output and input terminals, and a switching circuit for selectively connecting any one of a plurality of dielectric resonators to the input terminal of the amplifier. The oscillation frequency of the oscillator is determined by a resonant frequency of whichever of the dielectric resonators is connected to the input terminal of the amplifier through the switching circuit.

8 Claims, 4 Drawing Figures



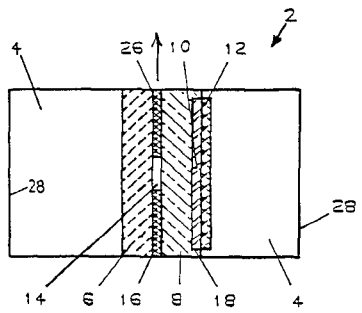
4,733,201 Mar. 22, 1988

Stacked Ferrite Resonance Isolator

Inventors: Joseph Helszajn and William Thorpe.
Assignee: Com Dev Ltd.
Filed: Mar. 18, 1986

Abstract—A finline resonance isolator has layers of hexagonal ferrite material that are stacked relative to one another so that the overall length of the isolator remains substantially constant as the number of layers of ferrite material increases The isolator has substrate materials that are arranged so that the plane of circular polarization is shifted to a center of the isolator. Isolators of the present invention are capable of producing improved responses over prior art isolators while reducing insertion loss and achieving a weight and volume saving.

11 Claims, 5 Drawing Figures



4,733,202 Mar. 22, 1988

Coupling Device Between an Electromagnetic Surface Wave Line and an External Microstrip Line

Inventors: Gérard Forterre and Julien Prevot.
Assignee: Thomson-CSF.
Filed: Oct. 22, 1986.

Abstract—A device for coupling between an electromagnetic surface wave device (OSEL), operating in a symmetrical field distribution mode and an external microstrip line operating in a disymmetric mode. Coupling between the access microstrip to the surface wave device and the external microstrip is provided by means of three line elements made from dielectric materials, held in position by three nonmagnetic metal parts, forming a transition between symmetric and disymmetric modes in steps·

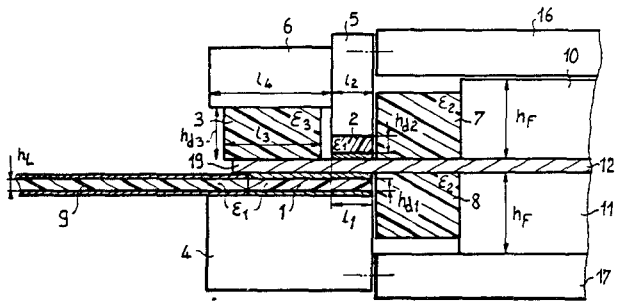
electromagnetic surface wave mode, a symmetric mode of the surface wave device,

three plate mode,

microstrip mode with reactance matching,

disymmetric microstrip mode of the external micro strip line.

16 Claims, 6 Drawing Figures



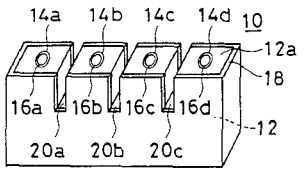
4,733,208 Mar. 22, 1988

Dielectric Filter Having Impedance Changing Means Coupling Adjacent Resonators

Inventors: Youhei Ishikawa; Kikuo Tsunoda, and Toshiro Hiratsuka.
Assignee: Murata Manufacturing Co , Ltd.
Filed: Aug. 16, 1985

Abstract—A dielectric filter comprises a cubic dielectric block in which a plurality of holes arranged in the longitudinal direction are formed vertically therethrough On outer surfaces of the dielectric block, an outer conductor is formed except on the upper surface On inner surfaces of a plurality of the holes, inner conductors constituting resonance elements in cooperation with the outer conductor are formed. Grooves are formed in the dielectric block between the adjacent resonance elements. Thereby, impedance of a part of a lengthwise direction of at least one of the adjacent resonance elements differs from that of the other part, at least in one of the even and odd modes. In order to have different impedances, notches may be formed on the dielectric block between the adjacent inner conductors or large and small diameter portions may be formed in the holes or further the two methods may be combined.

10 Claims, 24 Drawing Figures



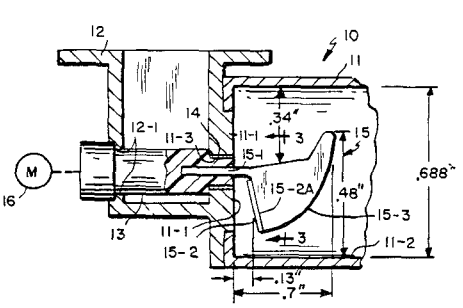
4,734,660 Mar. 29, 1988

Signal Polarization Rotator

Inventor: Frederick W. Lofgren.
Assignee: Northern Satellite Corporation.
Filed: May 23, 1986.

Abstract—The signal polarization rotator of this invention utilizes a rotatable signal transition structure having one section which acts as a coaxial transmission line center conductor, a section suspended over a first ground plane, a section above a second ground plane, the latter section varying in distance from the ground plane in an exponential, exponential like or linear taper, and optionally an extended section which in the preferred embodiment is used because of waveguide dimensions and acts as approximately a one-quarter wavelength gap radiator and a section coupled to the coaxial center conductor and the gap radiator.

16 Claims, 8 Drawing Figures



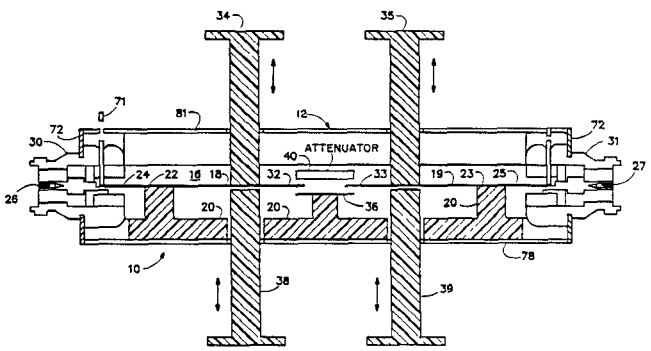
4,734,661 Mar. 29, 1988

Coax to Slab Line Connector and Programmable Attenuator Using the Same

Inventors: David H. Shores and John R. Snook.
Assignee: Tektronix, Inc.
Filed: Dec. 4, 1986.

Abstract—A programmable microwave attenuator includes coax to slab line connectors which use rigid pin inner conductor captivation at an inner conductor interface surface within the confines of the coaxial outer conductor to improve mechanical reliability and reduce frequency dependent insertion losses. Narrow gaps between the edges of the slab line inner conductor and the coaxial outer conductor reduce unwanted modes of microwave energy transmission by concentrating the electric field at the edges of the slab line inner conductor before it emerges from the coaxial outer conductor into the slab line. A similar gap exists between the edges of the slab line inner conductor and the slab line outer conductor so that unwanted modes of microwave energy transfer are minimized after the outer conductor interface surface.

11 Claims, 8 Drawing Figures



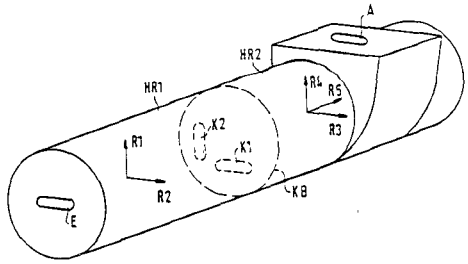
4,734,665 Mar. 29, 1988

Microwave Filter

Inventors: Uwe Rosenberg and Dieter Wolk.
Assignee ANT Nachrichtentechnik GmbH.
Filed: June 23, 1987.

Abstract—A microwave filter composed of at least two cavity resonators disposed adjacent one another, and a coupling aperture disposed between the resonators for coupling microwave energy between the resonators, one of the cavity resonators being operative to propagate microwave energy having a TE mode and the other of the cavity resonators being operative to propagate microwave energy having a TM mode, wherein the coupling aperture is constructed for coupling the TE mode in the one cavity resonator with the TM mode in the other cavity resonator.

4 Claims, 3 Drawing Figures



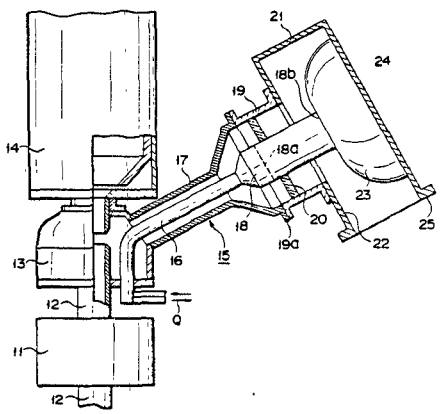
4,734,666 Mar. 29, 1988

Microwave Apparatus Having Coaxial Waveguide Partitioned by Vacuum-Tight Dielectric Plate

Inventors: Keiji Ohya and Yoshio Kawakami
Assignee: Kabushiki Kaisha Toshiba.
Filed: Apr. 17, 1987.

Abstract—In a microwave apparatus with an air-tight window plate, first and second coaxial waveguide assemblies are coupled to each other so that a coaxial waveguide is formed. The first and second inner conductor sections of the first and second assemblies have first and second metal blocks. The first metal block is fitted in the second metal block by a shinkage fit and the first outer conductor section of the first assembly is air-tightly welded to the second outer conductor section of the second assembly. An RF matching annular groove is defined between the first and second metal blocks.

8 Claims, 7 Drawing Figures



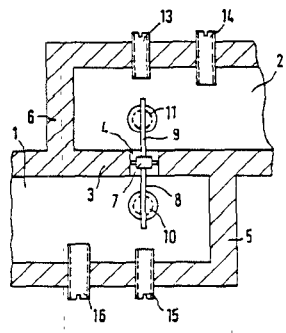
4,734,667 Mar. 29, 1988

Arrangement for Coupling Waveguide Modes Between Two Waveguides via a Semiconductor Element

Inventors: Michael Alberty and Walter Gross.
Assignee: ANT Nachrichtentechnik GmbH.
Filed: Feb. 4, 1987.

Abstract—An arrangement for coupling waveguide modes between two waveguides via a semiconductor element. The two waveguides each have a short-circuiting end wall and a common side wall constituting a common partition wall between the waveguides so that the two waveguides extend parallel to, and overlap one another at least over a partial length where they are separated from one another by the common side wall. The common partition wall is provided with a coupling aperture and the semiconductor element is inserted into the coupling aperture between the two waveguides and is in ground contact with the common partition wall. The semiconductor element has two connecting arms, one connecting arm extending as a coupling probe into one of the waveguides and the other connecting arm extending as a coupling probe into the other waveguide.

8 Claims, 4 Drawing Figures



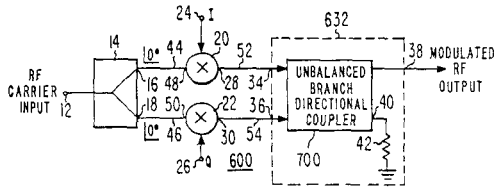
4,736,170 Apr. 5, 1988

Unbalanced Quarternary PSK Modulator Using Unbalanced Quadrature Coupler

Inventors: You-Sun Wu, and Donald E. Aubert.
Assignee: RCA Corporation.
Filed: May 8, 1987.

Abstract—An unbalanced quarternary phase-shift keying modulator provides relatively higher signal power for one of two signal information channels The carrier to be modulated is split into two equal-amplitude, equal-phase portions, each of which is applied to a biphase modulator Each of the information signals is also applied to one of the biphase modulators, for producing two equal-amplitude, phase modulated carriers, each biphase modulated by one of the information signals. The modulated carriers are applied to the ports of a quadrature hybrid coupler which is other than a 3 dB (equal-amplitude) coupler In one embodiment, the coupler is a 7 dB coupler The modulated carrier applied to the through port of the coupler appears with reference amplitude and phase at the output of the hybrid. The modulated carrier applied to the other or coupled port appears at the output with relatively reduced amplitude and a relative phase shift In one embodiment, the phase shift is 90°. The resulting sum signal is quarternary keyed by the information signals. Waveguide and microstrip unbalanced couplers are described

10 Claims, 4 Drawing Sheets



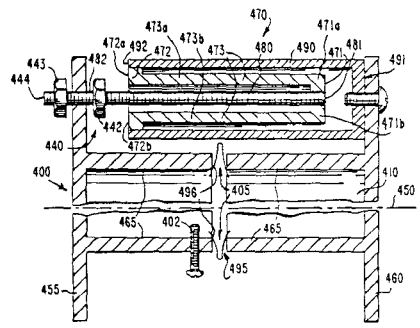
4,736,173 Apr. 5, 1988

Thermally Compensated Microwave Resonator Utilizing Current-Null Segmentation

Inventors: Richard V. Basil, Jr., and Juri G. Leetmaa.
Assignee: Hughes Aircraft Company.
Filed. Nov. 3, 1986.

Abstract—In a microwave resonator, a variable cavity-wall segmentation along the location of a propagational current null is employed for thermal-compensation purposes by utilizing it in conjunction with supplemental mechanisms which operate to counteract thermally-induced variations in the resonator's characteristic geometry Because dimensional variations at a current null will have minimum impact on resonator coupling parameters, a variably-configured current-null segmentation serves in a minimal-impact fashion to absorb those thermally-induced dimensional variations which occur transverse to the null. Of the three specific mechanisms disclosed for variational counteraction in the typical context of a resonator having both longitudinal and transverse extent with respect to a propagational axis, the first is a thermally-invariant assembly which provides thermal stabilization by inhibiting variations in the resonator's characteristic longitudinal extent. The second is a thermally-responsive structure configured to provide thermal compensation by affirmatively introducing *longitudinal* variations which are inversely proportional to otherwise-uncompensated transverse variations. The third mechanism, which may be employed in conjunction with either of the other two and which may take the form of thermally-invariant inserts configured as part of the resonant cavity's longitudinal walls, provides a further degree of thermal stabilization by inhibiting thermally-induced variations in the resonator's characteristic transverse dimensions.

16 Claims, 3 Drawing Sheets



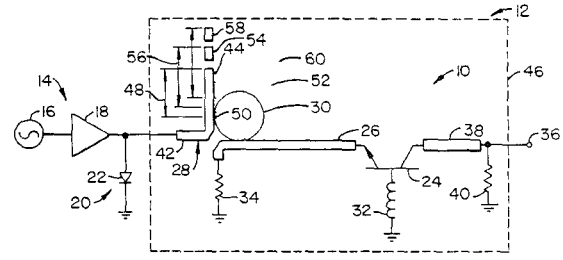
4,737,737 Apr. 12, 1988

Transmission Injection-Locked Dielectric Resonator Oscillator

Inventor: Amarpal S. Khanna.
Assignee: Avantek, Inc.
Filed. July 22, 1986

Abstract—A dielectric resonator oscillator utilizing transmission-type injection-locking for frequency stabilization is disclosed as including a transistor, two microstrip lines, and a dielectric resonator. One microstrip line is coupled to the transistor, while the other microstrip line receives the broadband signal The dielectric resonator is positioned adjacent to and between the first and second microstrip lines and is operable for coupling an injection-locking signal into the transistor for locking the oscillation frequency of the oscillator The two microstrip lines are preferably oriented at right angles so that various sizes of the dielectric resonator can be accommodated

11 Claims, 1 Drawing Sheet



4,737,740 Apr. 12, 1988

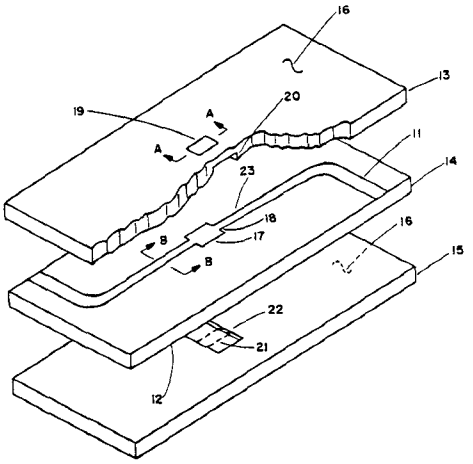
Discontinuous-Taper Directional Coupler

Inventors: George L. Millican and Joseph A Mosko.
Assignee. The United States of America as represented by the Secretary of the Navy.
Filed: May 26, 1983.

Abstract—A stripline coupler exhibiting higher coupling coefficients and improved scattering properties in the plus 10 GHz range, utilizes a section of discrete areal dimension in each of two tapered striplines, such that said sections form a discontinuity in the taper, in conjunction with perforations of

the bilateral ground planes coincident with each section. The dielectric separating each stripline from the ground plane is modified in the region in the perforations to reduce the dielectric constant in the region.

7 Claims, 5 Drawing Sheets



4,737,741 Apr. 12, 1988

Orthogonal Mode Electromagnetic Wave Launcher

Inventor: Mon N. Wong.
Assignee: Hughes Aircraft Company
Filed: Oct. 20, 1986.

Abstract—A launcher of cross-polarized electromagnetic radiation is provided with increased bandwidth by inserting a set of axially directed ridges on the interior surfaces of waveguide walls of the launcher for concentrating electric fields of radiations of the different polarizations. A first radiation radiated by a probe in a back section of the launcher waveguide propagates forward into a front section of the launcher waveguide. A second radiation is radiated into the front section by a probe therein, there being a vane disposed in the front section for inhibiting the propagation of the second radiation into the back section The front section is flared to provide a larger exit aperture at a front end of the front section A second and a fourth of the ridges are tapered towards the back section to permit a smooth transition in the propagation of the first radiation into the front section.

24 Claims, 4 Drawing Sheets