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.

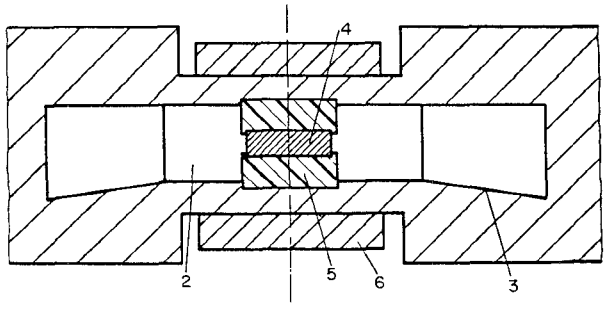
4,638,267 Jan. 20, 1987

Millimeter-Wave Circulator

Inventor: Wolfgang Holpp.
Assignee: Licentia Patent-Verwaltungs-GmbH.
Filed: Mar. 29, 1985.

Abstract—In a Y circulator, the ferrite body is so dimensioned that at the operating frequency, not the dominant mode, but two higher order modes are excited having their frequencies close to each other.

5 Claims, 6 Drawing Figures



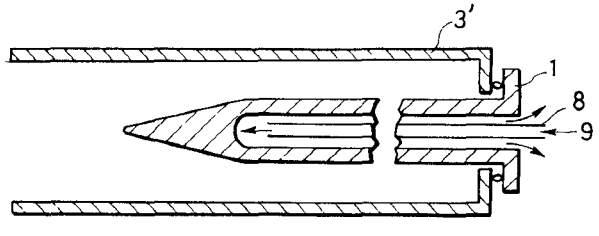
4,638,268 Jan. 20, 1987

Microwave Absorber Comprised of a Dense Silicon Carbide Body Which is Water Cooled

Inventors: Masakazu Watanabe and Akiyasu Okuno.
Assignee: NGK Spark Plug Co., Ltd.
Filed: July 24, 1984

Abstract—A microwave absorber, particularly, a microwave absorber intended for use in an electron beam accelerator, having an increased maximum power characteristic. The microwave absorber is formed of a body of dense silicon carbide having a hollow portion and a closed tip end portion. A pipe of high melting point glass or alumina is inserted into the hollow portion. Cooling water is guided through the pipe and circulated through the hollow portion of the body of the absorber.

3 Claims, 7 Drawing Figures



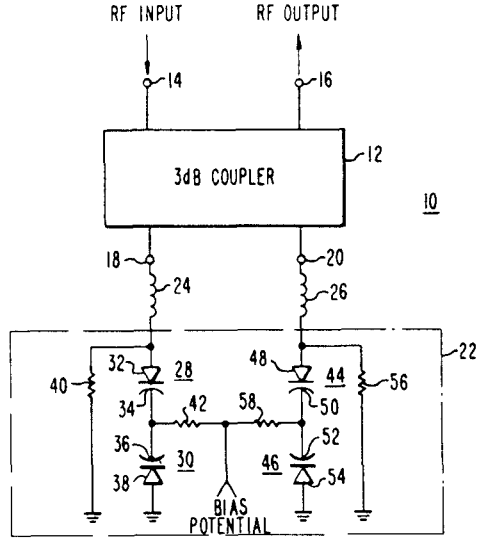
4,638,269 Jan. 20, 1987

Wide-Band Microwave Analog Phase Shifter

Inventors: Dale E. Dawson, Anthony L. Conti, Soong H. Lee, Gary F. Shade, and Lawrence E. Dickens.
Assignee: Westinghouse Electric Corp
Filed: May 28, 1985.

Abstract—A reflective hybrid analog phase shifter is detailed which is operable in the *X*-band, and which exhibits minimal phase shift variation with higher power loadings. A pair of back-to-back connected Schottky varactor diodes are serially connected to each of the phase shifting ports of a 3-dB coupler. The Scottky varactor diodes are reverse biased to permit continuous variation of the phase shift as a function of analog bias potential. A monolithically fabricated implementation of this circuit design is detailed.

3 Claims, 7 Drawing Figures



4,638,271 Jan. 20, 1987

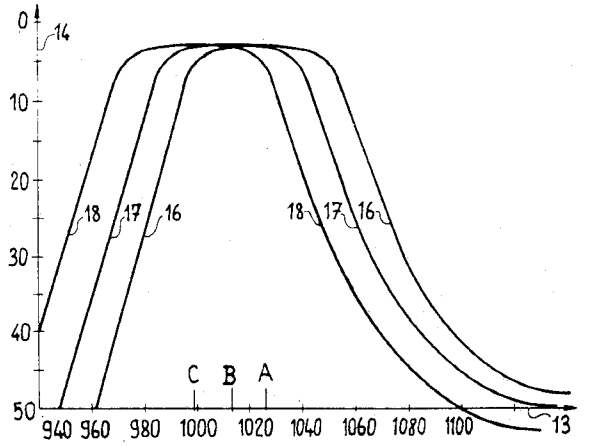
Method of Incrementally Adjusting the Center Frequency of a Microstrip-line Printed Filter by Manuevering Dielectric Layers

Inventors: Jean-René Jecko and Marcel Motola.
Assignee: Thomson-CSF.
Filed: May 25, 1984.

Abstract—A method is provided for adjusting the electrical characteristics and particularly the frequency of a microstrip-line printed filter with distrib-

uted constants. The method consists in depositing a strip of dielectric material on all the microstrip resonators of the filter.

3 Claims, 6 Drawing Figures



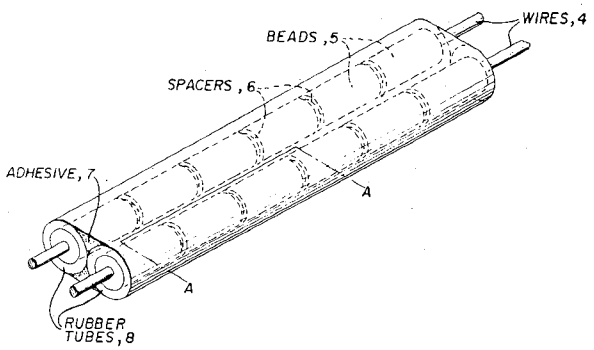
4,638,272 Jan. 20, 1987

Lossy Transmission Line Using Spaced Ferrite Beads

Inventor: Richard A. Ive.
Assignee: The Commonwealth of Australia.
Filed: May 4, 1984.

Abstract—A lossy transmission line in which the effective length of the line is reduced by providing resistive ferrite beads spaced along the line to provide constant power loss per unit length. Inductance ferrite beads may be included equally spaced along the line. Resistive beads are located with increasing frequency per unit length from the beginning of the line until a maximum bead density per unit length is achieved. The lossy line is suitable as a terminating unit for a portable travelling wave antenna and in other situations where size reduction is desirable.

8 Claims, 4 Drawing Figures



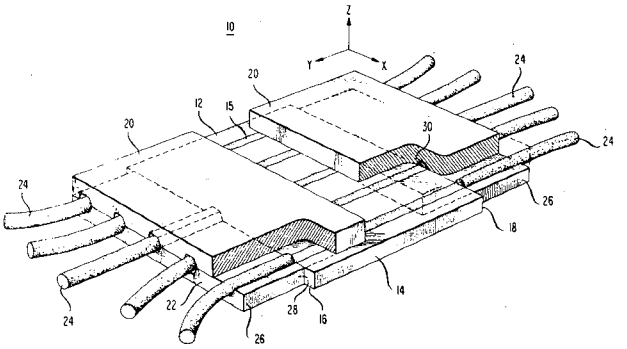
4,639,074 Jan. 27, 1987

Fiber–Waveguide Self-Alignment Coupler

Inventor: Edmond J. Murphy.
Assignee: AT&T Bell Laboratories.
Filed: June 18, 1984.

Abstract—An optical fiber-to-waveguide coupler is disclosed which automatically aligns five of the six possible degrees of freedom associated with the alignment process. Silicon v-grooves (22) are used to hold the fibers (24) in place in the silicon substrate (20), but in contrast to prior art arrangements, the silicon substrate overlaps the top surface (12) of the waveguide substrate (14). A cover plate (26) disposed over the silicon substate is cut and polished so that the endface of the cover plate (28) lies in the same plane as the ends of the fibers (30). When the endface of the cover plate is butted against the endface (16) of the waveguide substrate, and the silicon v-grooves have been etched to the proper predetermined depth, five of the six degrees of freedom are automatically aligned.

7 Claims, 5 Drawing Figures



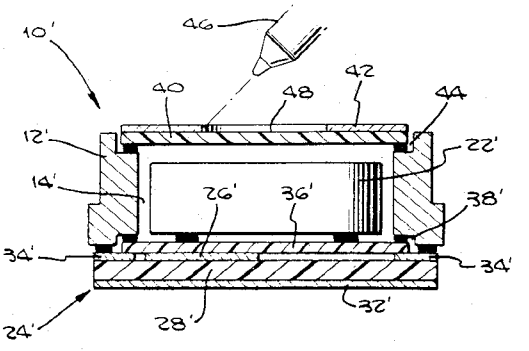
4,639,690 Jan. 27, 1987

Tunable Dielectric-Resonator-Stabilized Oscillator and Method of Tuning Same

Inventor: Gary K. Lewis.
Assignee: Litton Systems, Inc.
Filed: July 5, 1985.

Abstract—A dielectric-resonator-stabilized gallium-arsenide FET, negative resistance oscillator operating in the microwave region incorporating an improved form of dielectric resonator whose resonant frequency is tuned by the addition or removal of metal from the surface of a dielectric tuning plate in the resonator, and a method for tuning the oscillator to the desired frequency range with the resonator in place by use of a laser-trimming device are disclosed.

17 Claims, 8 Drawing Figures



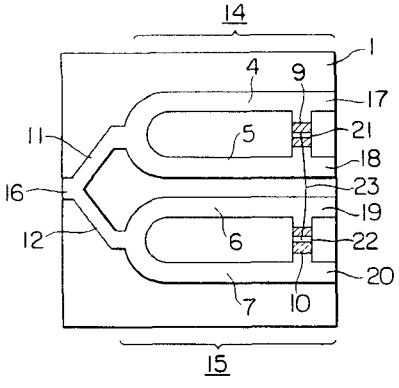
4,639,694 Jan. 27, 1987

Power Distribution Circuit Having Center Portions of Isolation Resistors Connected Together

Inventors: Kiyoharu Seino, Tadashi Takagi, and Fumio Takeda.
Assignee: Mitsubishi Denki Kabushiki Kaisha.
Filed: Apr 23, 1985.

Abstract—A power distribution circuit having two Wilkinson-type bi-distribution circuits each of which halves and then distributes its input and formed of a microstrip on a dielectric substrate or a semiconductor substrate. The input terminals of the two Wilkinson type bi-distribution circuits are connected, while substantially middle parts of resistances used as isolation resistances of the respective Wilkinson type bi-distribution circuits are connected by a metallic thin wire.

3 Claims, 4 Drawing Figures



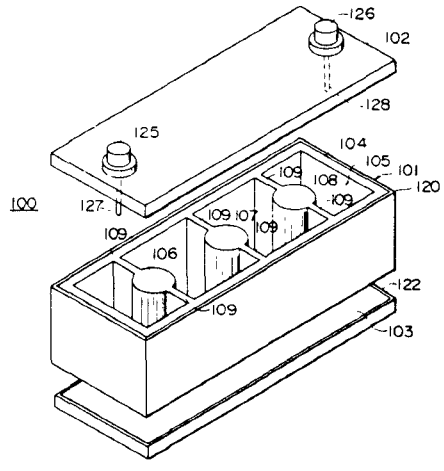
4,639,699 Jan. 27, 1987

Dielectric Resonator Comprising a Resonant Dielectric Pillar Mounted in a Conductively Coated Dielectric Case

Inventors: Toshio Nishikawa, Youhei Ishikawa, and Hidekazu Wada.
Assignee: Murata Manufacturing Co., Ltd
Filed: Sept. 30, 1983.

Abstract—A dielectric resonator is disclosed which includes a case having a resonator main body portion, an upper lid and a lower lid. Inside the case is a cylindrical dielectric material. The case is formed of a dielectric material having the same coefficient of linear expansion as the cylindrical dielectric material. In one embodiment, main body portion comprises a dielectric case side portion with the cylindrical dielectric material disposed concentrically in a concavity defined by the case side portion, with the cylindrical dielectric material being integrally coupled to the dielectric case side portion by four connecting portions. More specifically, in this embodiment, the case side portion of the main body portion and the cylindrical portion are simultaneously and integrally formed of the same dielectric material. A conductive film is formed to enclose a region surrounding the cylindrical dielectric material. In one embodiment, the conductive film is formed on the whole outer surface of the dielectric case side portion and conductive films are also formed on the lower surface of the upper lid and the upper surface of the lower lid.

39 Claims, 50 Drawing Figures



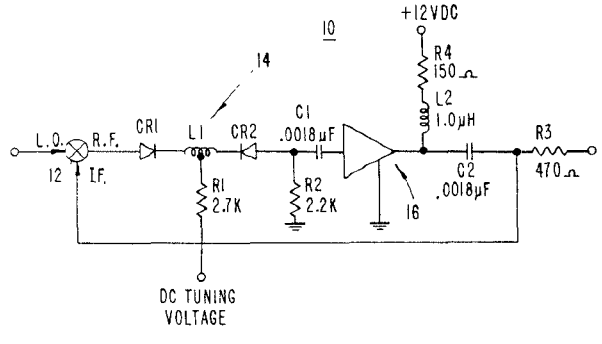
4,641,101 Feb. 3, 1987

Wide-Band Microwave Regenerative Divider with Varactor Tuning

Inventor: Harold N. Selim.
Assignee IFR, Inc
Filed: Oct. 25, 1984.

Abstract—A wide-band microwave regenerative divider with varactor tuning in which a double-balanced mixer is incorporated in a feedback loop with a varactor-tuned filter and an RF amplifier in the forward loop, with the RF amplifier output fed directly back to the mixer. A series resonant circuit formed by two serially connected back-to-back varactors interconnected by an inductor is tuned by application of a dc tuning voltage to a center tap of the inductor. In the preferred embodiment two regenerative dividers are connected in series in a YIG oscillator system which includes a programmable tuning circuit connected between the VCO tuning signal input for the YIG oscillator and the tuning voltage inputs of the respective regenerative dividers.

15 Claims, 3 Drawing Figures



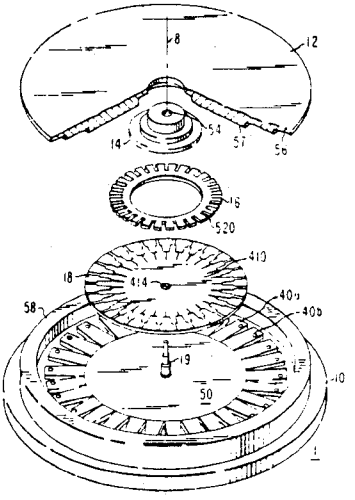
4,641,106 Feb. 3, 1987

Radial Power Amplifier

Inventors: Erwin F. Belohoubek and Daniel W. Bechtle.
Assignee: RCA Corporation.
Filed: May 21, 1985.

Abstract—A radial power amplifier includes a coaxial input port and a radial power splitter. The radial power splitter includes a radial transmission line and a number of radial transmission line to microstrip transitions spaced about the radial transmission line for splitting input signal equally among a number of microstrip terminals. A like number of amplifier modules have their input terminals coupled to the microstrip terminals by intermediary coaxial transmission lines. A radial power combiner symmetrical with the radial power splitter includes a second set of microstrip terminals, one terminal being to adjacent to the output terminal of each amplifier module. The second set of microstrip terminals is coupled by a microstrip to radial transmission line transition to a second radial transmission line. The amplified signals from the amplifier modules converge along the second radial transmission line towards the common output port at which the amplified signal appears.

17 Claims, 16 Drawing Figures



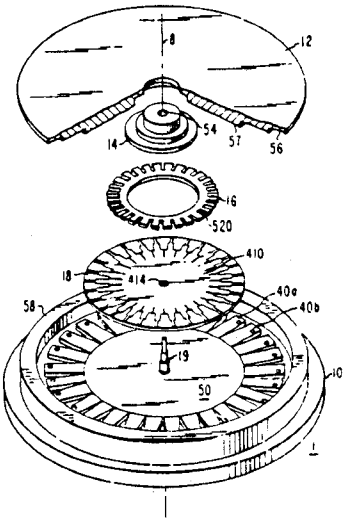
4,641,107 Feb. 3, 1987

Printed Circuit Radial Power Combiner with Mode-Suppressing Resistors Fired at High Temperature

Inventor: David Kalokitis.
Assignee: RCA Corporation.
Filed: May 21, 1985.

Abstract—A power splitter/combiner includes a radial waveguide and a coaxial common port coupled to the center of the radial waveguide. The radial waveguide has a plurality of transmission lines around its periphery at equally spaced locations. Because of its symmetry, the power at each of the peripheral transmission lines is related to the power at the common port in proportion to the number of peripheral transmission lines. For operation at high frequencies, the radial waveguide, the transmission lines and the transition from radial waveguide to the transmission lines have their structural details defined by a printed circuit (PC) board having a low temperature dielectric material. The PC board includes a plurality of radial slots to control undesired circumferential modes. A resistance arrangement is coupled across the open end of each radial slot to dissipate circumferential power. The resistance arrangement includes a copper ring including a like number of radial slots, and at least one thick-film resistor fired at high temperature onto the ring near the open end of each radial slot. A bond wire couples each thick film resistance arrangement across its associated slot. The ring with fired-on resistors is bonded at low temperature onto the printed circuit board with radial slots in the ring registered with the radial slots on the printed circuit board.

15 Claims, 16 Drawing Figures



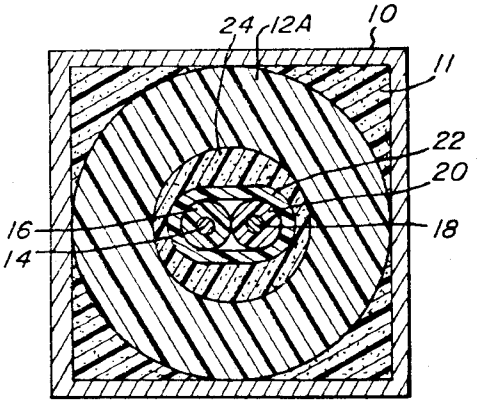
4,641,111 Feb. 3, 1987

Microwave Coupler

Inventor: Harry F. Chapell.
Assignee: Sage Laboratories, Inc.
Filed: Sept. 12, 1985.

Abstract—A microwave coupled line device constructed to equalize even and odd mode delay and comprising an outer conductor and first and second inner conductors at least one of which has insulation bonded thereto and separated by the thickness of said insulation therebetween. There is also provided an insulating sleeve disposed in the outer conductor and adapted to accommodate the first and second inner conductors. Means are provided for filling the void between the insulating sleeve and the outer conductor with an insulating material preferably having a dielectric constant in the range of 2.6–3.5.

16 Claims, 4 Drawing Figures



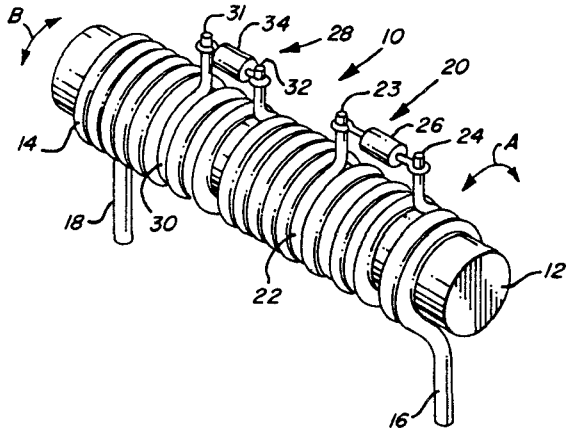
4,641,115 Feb. 3, 1987

Radio-Frequency Chokes Having Two Windings and Means for Dampening Parasitic Resonances

Inventor: Peter D. Bailey.
Assignee: Texscan Corporation
Filed: June 4, 1984.

Abstract—Radio-frequency chokes for use in combining and separating radio frequency signals and single phase ac power in the equipment used in cable transmission and distribution systems. The radio-frequency chokes include a conductor wound on a magnetic core to form a primary winding upon which first and second swamping circuits are mounted. Each of the swamping circuits include a secondary winding with a resistor connected across the ends thereof with the swamping circuits effectively dampening parasitic resonances in the primary winding which occur in the frequency range of from about 5 MHz to at least 800 MHz.

31 Claims, 9 Drawing Figures



4,641,116 Feb. 3, 1987

Microwave Filter

Inventors: Junichi Shibata and Hiroshi Kojima.
Assignee: Pioneer Ansafone Manufacturing Corporation.
Filed: Nov. 25, 1985.

Abstract—A microwave bandpass filter having a wide bandwidth, low loss, and yet which requires only a relatively small circuit area. A generally annularly shaped unit-wavelength resonator is formed on a dielectric substrate, disposed between input and output matching circuits. The unit-wavelength resonator is formed by a pair of semi-annular strips disposed opposite one another and having opposing stubs defining therebetween a gap of predetermined width.

5 Claims, 6 Drawing Figures