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, DC 20231,

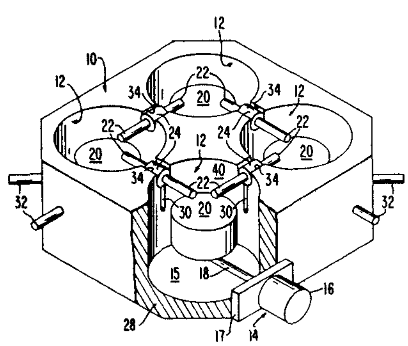
4,453,146 June 5, 1984

Dual-Mode Dielectric Loaded Cavity Filter with Nonadjacent Mode Couplings

Inventor: Slawomir J. Fiedziuszko.
Assignee: Ford Aerospace & Communications Corporation.
Filed: Sept. 27, 1982.

Abstract—An electromagnetic cavity filter (10) is formed by at least two cavities (12) having electrically conductive walls (40, 15). When more than two cavities (12) are employed, their midpoints do not have to be colinear; rather, it is sufficient that the angle formed by the midpoints of any three successively coupled cavities is an integral multiple of 90°. Thus, a folded "engine block" geometry can be realized such that the filter's input cavity (12) is proximate to the output cavity (12). This allows a canonic filter response. Each cavity (12) is the equivalent to two filter poles because two orthogonal modes of electromagnetic radiation can resonate there within. Electrically nonadjacent modes of proximate cavities (12), as well as electrically adjacent modes, can be coupled, permitting elliptic filter functions. Electrically nonadjacent modes are coupled by means of an iris (30) opening between the two cavities (12). Electrically adjacent modes are coupled by means of an electrically conductive probe (22) penetrating each of the two cavities (12). A dielectric resonator (20) can be disposed within each cavity (12) to reduce the physical size of the cavity (12) while preserving its electrical characteristics.

7 Claims, 5 Drawing Figures



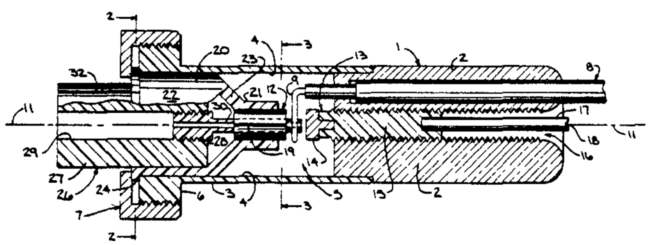
4,453,147 June 5, 1984

Modular Lumped Circuit Resonator

Inventors: Wojciech Froncisz and James S. Hyde.
Assignee: Medical College of Wisconsin, Inc.
Filed: Mar. 25, 1982.

Abstract—A structure for supporting a loop-gap resonator includes a cylindrical housing which defines a space into which microwave energy is injected. The resonator is mounted to a support element which is inserted into the space through an opening at one end of the housing The support element and attached resonator form an interchangeable module.

13 Claims, 5 Drawing Figures



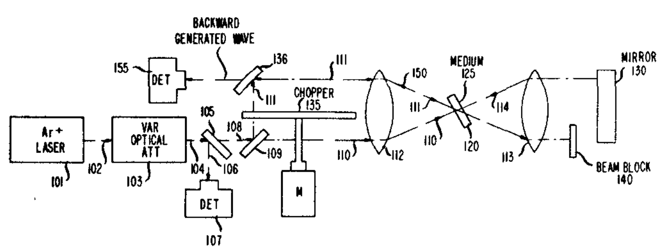
4,453,805 June 12, 1984

Optical Grating using a Liquid Suspension of Dielectric Particles

Inventors: Arthur Ashkin, Peter W. Smith, and Walter J. Tomlinson, III.
Assignee: Bell Telephone Laboratories, Incorporated.
Filed: Feb. 19, 1981.

Abstract—The invention provides apparatus comprising at least two beams of coherent radiation directed so as to intersect and form a standing wave pattern having a period Λ in an optically responsive medium The optically responsive medium is a colloidal suspension of dielectric particles in a liquid medium, the dielectric particles and liquid having different indices of refraction, and the diameter of the particles being less than or approximately equal to the period Λ. The dielectric particles are arranged into a grating by the electric fields carried by the beams of coherent radiation. In an embodiment of the invention, the dielectric particles are small dielectric spheres. The dielectric particles and the liquid may have approximately equal mass densities. A third beam of light may generate an output beam of light by degenerate four-wave mixing processes incorporating a dielectric grating made by the electric fields carried by the beams of coherent radiation.

6 Claims, 3 Drawing Figures



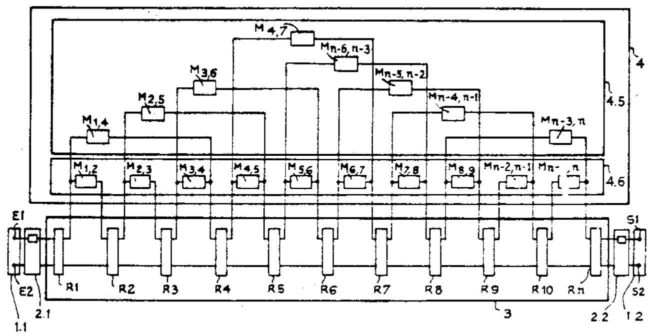
4,454,487 June 12, 1984

Odd Order Self-Corrected Electric Filters

Inventor: Corinne Darmouni.
Assignee: Thomson-CSF.
Filed: Mar. 19, 1982.

Abstract—The odd order auto-corrected electric filter comprises first input matching means for receiving the input signal and transmitting it to filter means for bringing about a broad band filtering of the signal and transmitting it to second output matching means. Correction means placed between at least two filter members bring about a self-correction of the envelope delay and/or an amplitude correction.

2 Claims, 8 Drawing Figures



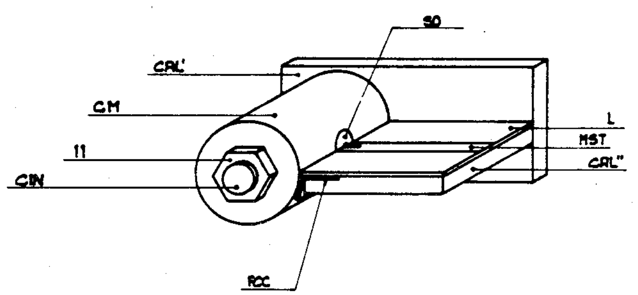
4,454,489 June 12, 1984

Temperature Stabilized Microwave Cavities

Inventors: Amedeo Donazzan and Enzo Pomé.
Assignee: TELETTRA-Telefonia Elettronica e Radio S.p.A.
Filed: July 2, 1981.

Abstract—The description covers temperature stabilized resonant microwave cavities not requiring hermetic sealing and easy to be frequency adjusted. Essentially, they consist of a pure quartz body with a metallized surface, except for small superficial areas used for the couplings.

5 Claims, 11 Drawing Figures



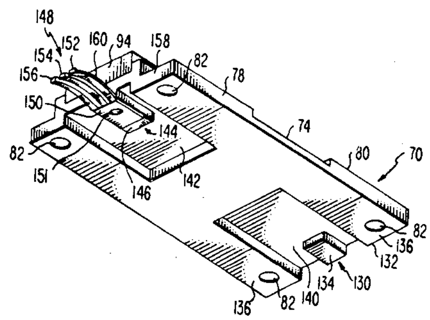
4,455,537 June 19, 1984

Microwave Circuit Interconnect System

Inventors: James N. La Prade and Raymond S. Wondowski.
Assignee: RCA Corporation.
Filed: July 6, 1981.

Abstract—A plane conductive contact surface on a support member for a first microwave circuit chip is parallel and coextensive with a planar spring finger contact element of a support member for a second microwave circuit chip. The contact surface and contact element are connected to the ground planes of the respective chips. The contact element resiliently engages the conductive contact when the support members are positioned adjacent to one another. The circuit elements on the opposite surface from the ground plane on the two chips are connected to one another by a wire which is centered over the spring finger contact element and the impedance of the connection comprising the wire and spring contact closely matches the impedance of the two microwave circuit chips. The resistance of the connection between the spring finger contact element and the conductive contact surface is low.

11 Claims, 4 Drawing Figures



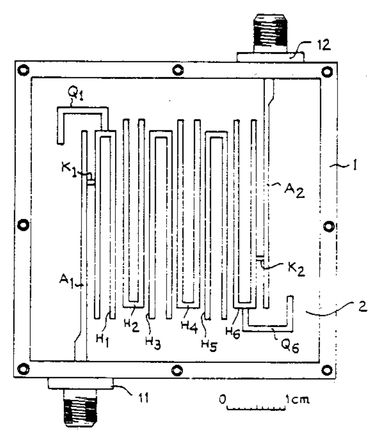
4,455,540 June 19, 1984

Bandpass Filter with Linear Resonators Open at Both Their Extremities

Inventors: Marie C. Henriot and Patrick Janer.
Assignee: Thomson-CSF.
Filed: July 21, 1982.

Abstract—A bandpass filter comprising n principal linear resonators open at both their extremities, has integrated therewith a band suppressor function by means of p auxiliary linear resonators (p being an integer comprised between 0 and $n+1$), tuned to a frequency which is to be rejected and respectively connected to p resonators of the n principal resonators at a point situated close to the middle of the principal resonator in question.

4 Claims, 6 Drawing Figures



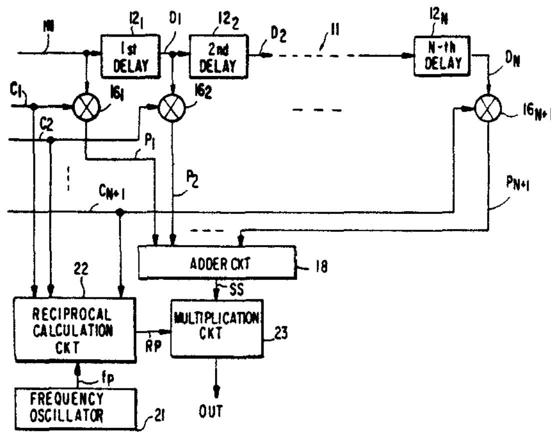
4,456,893 June 26, 1984

Equalizer Having a Substantially Constant Gain at a Preselected Frequency

Inventor: Susumu Otani.
Assignee: Nippon Electric Co., Ltd.
Filed: Aug. 16, 1982.

Abstract—An equalizer of a transversal filter type is given a substantially constant gain at a preselected frequency (f_p) in a predetermined frequency band of an input and an output signal. For this purpose, the output signal is given by multiplying the routine transversal filter output by a reciprocal of an absolute value of a sum of complex tap gains (C_1 to C_{N+1}). Alternatively, the input signal and successively delayed signals (IN and D_1 to D_N) may be multiplied by the reciprocal before summation. It is possible to approximate the reciprocal by omitting those of the tap gains which are near both ends (as C_1 and C_{N+1}).

5 Claims, 6 Drawing Figures



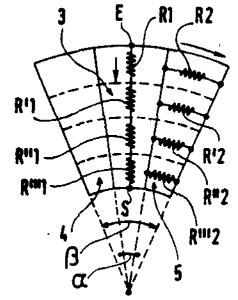
4,456,894 June 26, 1984

Distributed-Constant Resistance for use as a High Dissipation Load at Hyperfrequencies

Inventor: Gérard Lapart.
Assignee: Les Cables de Lyon.
Filed: Apr. 15, 1983.

Abstract—Conventional attenuators and matched loads for dissipating power at hyperfrequencies are uniform structures giving constant attenuation per unit length. This results in most power being dissipated at an input end. The present invention increases the maximum total power that such a resistance can dissipate by providing a nonuniform structure in which dissipation per unit length increases when going away from an input end, in such a manner that power is dissipated in a substantially uniform manner throughout the structure. A series resistance (3) between two parallel resistances (4 and 5) are in the shape of a sector of a circle.

8 Claims, 6 Drawing Figures



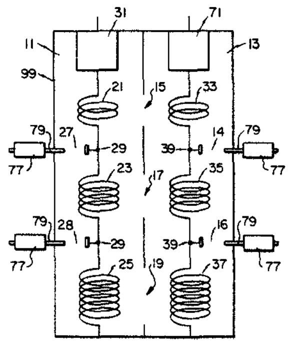
4,456,895 June 26, 1984

Band Selectable Tunable Bandpass Filter

Inventors: Harvey L. Landt and Glenn R. Snider.
Assignee: Rockwell International Corporation.
Filed: May 25, 1982.

Abstract—A two resonator bandpass filter that is tunable is disclosed with each resonator consisting of three series connected inductors and a tuning capacitors. The inductors comprising each resonator are contained in a common enclosure isolated from each other by a ground shield having a fixed aperture opening for electromagnetic coupling between the two resonators. Shorting plugs are used as the bandswitching techniques for switching the bands of the resonators. Variable capacitors in each of the resonator's circuit provide for tuning of each band to a desired frequency.

2 Claims, 4 Drawing Figures



4,458,217 July 3, 1984

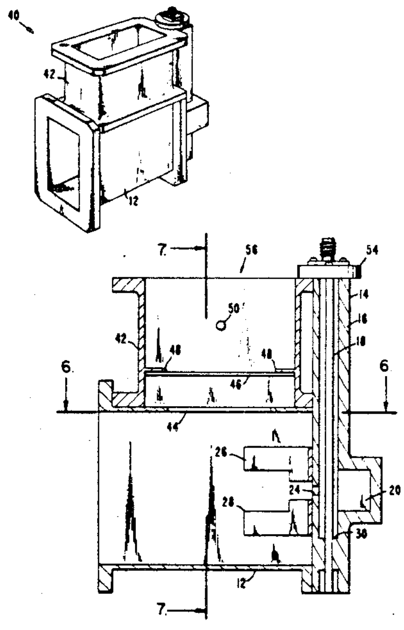
Slot-Coupled Microwave Diplexer and Coupler Therefor

Inventors: Mon N. Wong and Frank A. Taormina.
Assignee: Hughes Aircraft Company.
Filed: Oct. 5, 1981.

Abstract—A compact power coupler comprises a first waveguide short-circuited at one end, a resonant cavity slot-coupled to the shorted end of the first waveguide, and a coaxial transmission line coupled to the resonant cavity. Power at 6 gigahertz is coupled from the waveguide to the transmission line in

a unit that is 3.5 inches long. Alternatively, a second waveguide can be slot-coupled to a narrow-wall of the first waveguide (a quarter-wavelength from the short-circuit) to couple 4 gigahertz power, thereby forming a compact diplexer.

10 Claims, 7 Drawing Figures



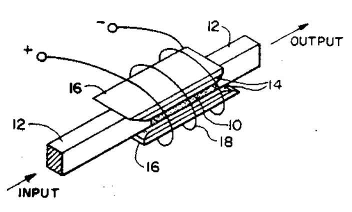
4,458,218 July 3, 1984

Dielectric Waveguide Reciprocal Ferrite Phase Shifter

Inventors: Richard W. Babbitt and Richard A. Stern.
Assignee: The United States of America as represented by the Secretary of the Army.
Filed: June 14, 1982.

Abstract—A dielectric waveguide reciprocal ferrite phase shifter is provided for use in a dielectric waveguide transmission line. The phase shifter is comprised of a length of ferrite of the same cross-sectional dimension as that of the dielectric waveguide and in fact becomes a section of the transmission line. The length of ferrite bears a thin plastic layer on its top and bottom surface and metal plates on each piece of plastic. The length of this multilayer structure then has a wire coil wrapped around in order to provide a d.c. magnetic biasing field along the length of the ferrite thereby enabling magnetization of the ferrite resulting in a reciprocal phase shift or change in electrical length within the structure.

15 Claims, 6 Drawing Figures



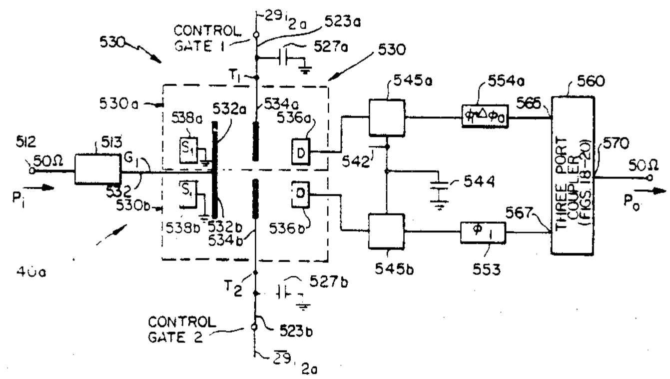
4,458,219 July 3, 1984

Variable Phase Shifter

Inventor: James L. Vorhaus.
Assignee: Raytheon Company.
Filed: Mar. 1, 1982.

Abstract—A phase shifter includes three cascade interconnected phase shift stages. Each stage includes a quadrature coupler and a pair of field effect transistors (FET), having a pair of gates, a drain, and a source, connected in a common (grounded) source configuration. The drain of each FET is coupled to an input port of the quadrature coupler to provide two signal paths having an electrical pathlength difference corresponding to a 90° differential phase shift. In the third stage, a length of transmission line is coupled between a drain of one of the FET's and one input port of the coupler to provide a signal path having an electrical pathlength corresponding to a 180° phase shift. An input signal is fed to one of the gates of each FET of the first stage, and voltage level control signals are fed to the second one of gates of each FET of the first stage, to control the amplitude of the signal coupled to each drain. The phase shift of the input signal at the output of the quadrature coupler is selected by controlling the ratio of the amplitudes of the signals coupled to each drain. The phase shift of the input signal through succeeding stages is selected in response to a second set of control signals fed to the second gates of each FET which select the signal paths through each stage.

7 Claims, 25 Drawing Figures



4,458,222 July 3, 1984

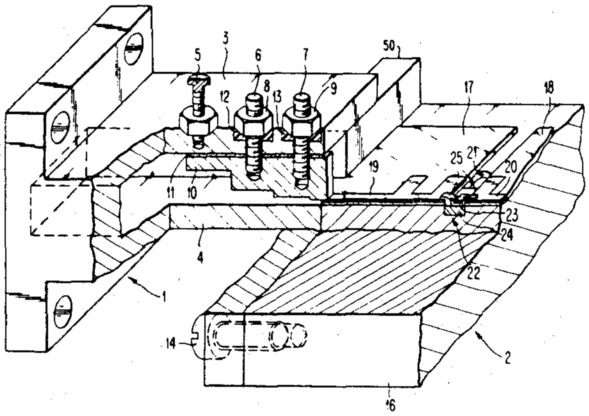
Waveguide to Microstrip Coupler Wherein Microstrip Carries DC Biased Component

Inventors: Dov Herstein and Leonard S. Rosenheck.
Assignee: Microwave Semiconductor Corporation.
Filed: May 6, 1981.

Abstract—An apparatus for coupling a waveguide structure to a printed circuit transmission line connected to a solid state device requiring a dc bias comprising: a hollow waveguide connector; a base mounted onto that connector and supporting the transmission line; a transition element, preferably a coupling ridge, for RF coupling the waveguide connector to the transmission line; a connecting means for feeding the dc bias voltage from an external bias network through the wall of the waveguide connector and the transition element to the transmission line. The connecting means, and the transition element are dc insulated from the other parts of the waveguide connector. The

built-in dc bias eliminates the need for biasing network, RF chokes, filters, and dc blocks mounted on the printed circuit.

9 Claims, 4 Drawing Figures



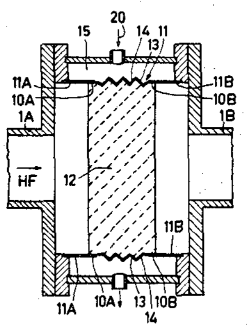
4,458,223 July 3, 1984

Microwave Window Assembly Having Cooling Means

Inventor: Wolfgang Schmidt.
Assignee: U.S. Phillips Corporation.
Filed: Sept. 23, 1983.

Abstract—A microwave window assembly has a ceramic window (12) with a thickness of more than 10 mm, corresponding to a half wavelength of the microwave energy. The window (12) has a metallized side surface and is connected by means of a soldered joint to a frame (11). The frame (11) is constructed in two parts (11A, 11B) which are soldered to respective edge parts (10A, 10B) of the side surface of the window, while the side surface between the two parts (11A, 11B) of the frame is covered with a layer (13) electrically connecting the two frame parts (11A, 11B).

9 Claims, 3 Drawing Figures



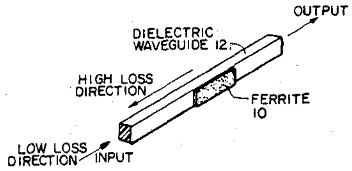
4,459,567 July 10, 1984

Dielectric Waveguide Ferrite Resonance Isolator

Inventors: Richard A. Stern and Richard W. Babbit.
Assignee: The United States of American as represented by the Secretary of the Army.
Filed: June 14, 1982.

Abstract—A dielectric waveguide ferrite resonance isolator capable of operating in the millimeter frequency range in a dielectric waveguide transmission line is provided. The isolator comprises a thin sheet of hexagonal ferrite material that has been affixed to a side of the dielectric waveguide and then placed between the pole pieces of an electromagnet in order to magnetize and fully orient the ferrite material.

15 Claims, 3 Drawing Figures



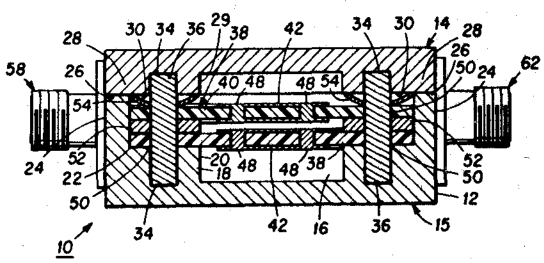
4,459,568 July 10, 1984

Air-Stripline Overlay Hybrid Coupler

Inventor: Donnie L. Landt.
Assignee: Rockwell International Corporation.
Filed: Feb. 2, 1982.

Abstract—A microwave circuit is disclosed which may be employed to form a low loss, high isolation, quadrature coupler operating over a wide frequency range. The coupler includes two quarter-wave transmission lines formed on air-stripline circuit boards and held in close proximity within a housing to provide microwave coupling. The lines are separated by precise spacing elements located between the stripline circuit boards. A plurality of alignment pins retain the stripline boards in exact geometrical positions with respect to one another in the coupler configuration. Wave spring washers retained on the alignment pins cooperate with the housing to insure proper board spacing for optimal performance.

11 Claims, 3 Drawing Figures



4,459,570 July 10, 1984

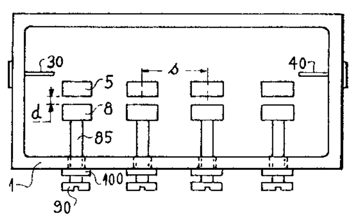
Ultra-High-Frequency Filter With a Dielectric Resonator Tunable in a Large Bandwidth

Inventors: Jacques Delaballe, Jean Fouillet, Yves Le Nohaic, and Alexandre Osias.
Assignee: Thomson-CSF.
Filed: Aug. 27, 1981.

Abstract—A dielectric resonator ultra-high frequency filter tunable in a large band width in which each dielectric resonator is constituted by a dielectric

component with a high dielectric constant, which is fixed relative to an enclosure and a component made from the same dielectric material which is movable relative to the first component, in such a way that the distance d between facing surfaces of these two dielectric components varies, leading to a variation in the tuning frequency of the filter by modifying the coupling conditions.

5 Claims, 3 Drawing Figures



4,459,571 July 10, 1984

Varactor-Tuned Helical Resonator Filter

Inventor: Robert J. Fraser.
Assignee: Motorola, Inc
Filed: Dec. 20, 1982.

Abstract—A helical cavity resonator filter utilizes varactor tuning diodes positioned within each helical resonator coil. The diodes are positioned along the longitudinal axes of the coils so as not to interfere with the nonaxial electromagnetic fields of the cavities associated with each helical resonator coil.

3 Claims, 3 Drawing Figures