Patent Abstracts

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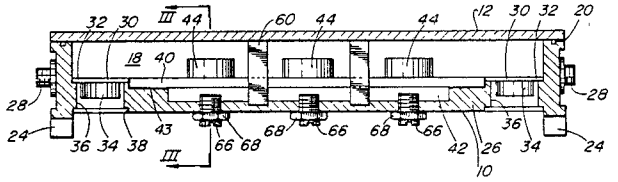
4,686,496 Aug. 11, 1987

Microwave Bandpass Filters Including Dielectric Resonators Mounted on a Suspended Substrate Board

Inventors: Barry A. Syrett and Paul A. Kennard.
Assignee: Northern Telecom Limited.
Filed: Apr. 8, 1985.

Abstract—A dielectric resonator microwave bandpass filter includes a printed circuit board supported within a cut-off waveguide, with dielectric resonators and coupling loops on an upper surface of the board and a well beneath the board so that the resonators are well spaced from ground planes. Tuning screws beneath the resonators, and coupling adjustment screws above the board adjacent to the coupling loops and between adjacent resonators, provide for adjustments to provide desired filter characteristics within a wide range. Isolators within the waveguide have ports coupled to the resonators via microstrip transmission lines comprising conductive tracks on the board and ports coupled to coaxial connectors in end walls of the waveguide The waveguide is formed from a cast body and a flat lid.

20 Claims, 3 Drawing Figures



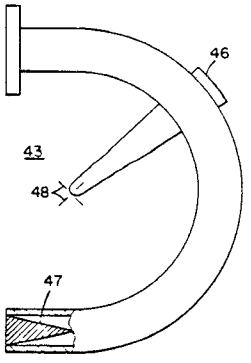
4,686,497 Aug. 11, 1987

Adjustable Waveguide Short Circuit

Inventor: Douglas D. Tang.
Assignee: GTE Laboratories Incorporated.
Filed: June 12, 1986.

Abstract—An adjustable waveguide short circuit using a thin partition or rectangular pin parallel to the *E*-field in the waveguide and movable along longitudinal slots centrally located on the two broad walls of the waveguide.

9 Claims, 7 Drawing Figures



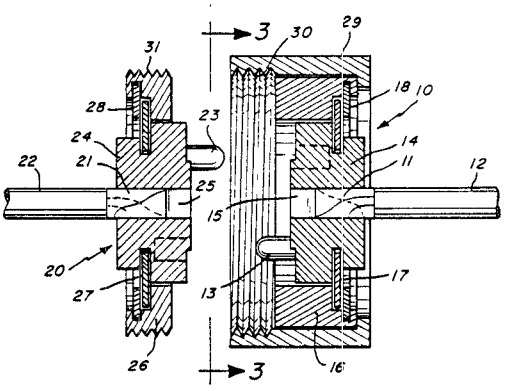
4,686,498 Aug. 11, 1987

Coaxial Connector

Inventors: Kenneth Carr and Arthur A. Blaisdell.
Assignee: M/A-COM, Inc.
Filed: Apr. 15, 1985.

Abstract—A coaxial connector having a pair of members, each of substantially the same construction, and each including means at an outer side thereof for receiving a first coax cable and means at an inner side thereof defining a section of waveguide. In each member there is a transition means that intercouples the coax cable and the section of waveguide. The pair of members are supported together by a support means and there is further provided alignment means for holding the sections of waveguide in alignment.

17 Claims, 12 Drawing Figures



4,688,004 Aug 18, 1987

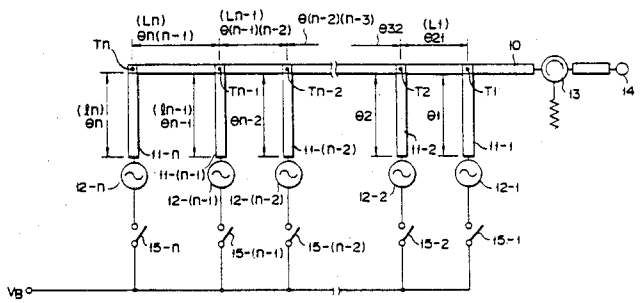
Frequency-Changeable Microwave Signal Generator Having Plural Selectively Operated Oscillators

Inventors: Kenji Hirai and Yoshinori Kimura.
Assignee: Kabushiki Kaisha Toshiba.
Filed: Sept. 3, 1986

Abstract—A frequency-changeable microwave signal generator has a plurality of microwave signal oscillators, a plurality of branch lines connected to the microwave signal oscillators, a transmission line connected to the plurality of branch lines and provided with an output port at one end thereof, and a means for selectively operating one of the microwave signal oscillators The line lengths of the branch lines are set such that the output impedance of the microwave signal oscillator connected thereto, which is measured from a branch point for connecting the transmission line and the branch line, is at

maximum when the microwave signal oscillators are inoperative. The relation $L = (\lambda/2)(k-1)$ (k is a natural number) is satisfied where L is a distance along the transmission line between adjacent branch portions of the branch lines connected to the transmission line, and λ is a predetermined operational wavelength.

20 Claims, 7 Drawing Figures



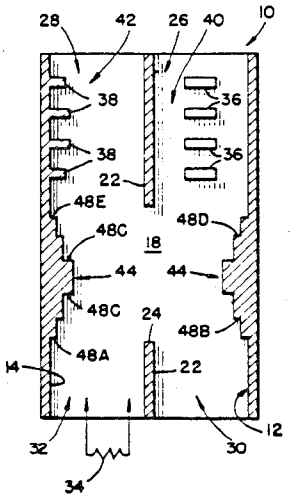
4,688,006 Aug. 18, 1987

Phase Compensated Hybrid Coupler

Inventors: Mon N. Wong and Wilbur J. Linhardt.
Assignee: Hughes Aircraft Company.
Filed: Oct. 2, 1985.

Abstract—A phase compensated waveguide hybrid coupler is formed with a pair of waveguides of rectangular cross section and sharing a common short wall. An aperture in the short wall provides for the coupling of electromagnetic energy between a first of the waveguides and a second of the waveguides. Such coupling introduces a 90° phase shift. An input terminal is located at an end of the first waveguide. Phase compensation is introduced by a set of capacitive irises located in the first waveguide and by a set of inductive irises located in the second waveguide. The capacitive and inductive irises are located on a side of said coupling aperture away from said input terminal.

8 Claims, 5 Drawing Figures



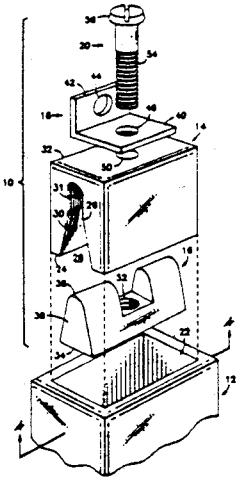
4,688,008 Aug. 18, 1987

Locking, Adjustable Waveguide Shorting Piston

Inventors: David R. Pollard and Robert H. Goldbach.
Assignee: Motorola, Inc.
Filed: Feb. 3, 1986.

Abstract—A waveguide shorting device having a shorting block and a wedge is disclosed. The shorting block contains a channel which is tapered so that it matches a taper of the wedge. A screw extends through the shorting block and engages a threaded hole in the wedge. Tightening the screw causes the wedge to be received in the channel and the shorting block to expand. Expansion of the shorting block clamps the shorting piston in a locked position within a waveguide.

12 Claims, 4 Drawing Figures



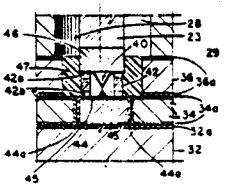
4,689,583 Aug. 25, 1987

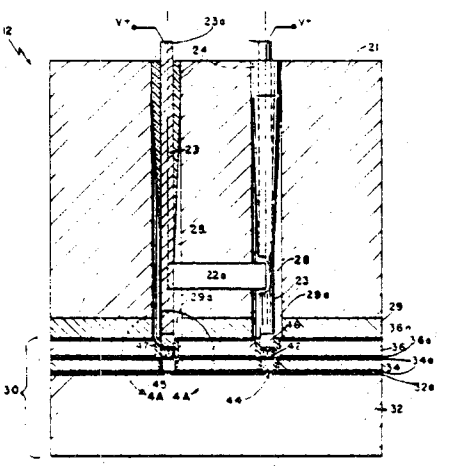
Dual Diode Module with Heat Sink, for Use in a Cavity Power Combiner

Inventors: George Jerinic, Robert Steele, and James R. Fines.
Assignee: Raytheon Company.
Filed: Feb. 13, 1984.

Abstract—A composite diode module is provided having an impedance matching member integrally formed within the module. The module includes a base member, a heat sink holder member having an aperture, a gold plated diamond heat sink which is disposed in the aforementioned aperture, and an encapsulant holder member having a second aperture. IMPATT diodes are disposed in dielectric spacers bonded to one end of the heat sink in alignment with the second aperture. A bias pin member is then bonded on the second end of the IMPATT and an encapsulant having selected electrical properties is provided in the second pair of apertures to secure the diode and to provide the diode module with a predetermined impedance characteristic. In a preferred embodiment, the module includes a pair of IMPATT diodes. With this arrangement, the module may be used in power combiners.

17 Claims, 5 Drawing Figures





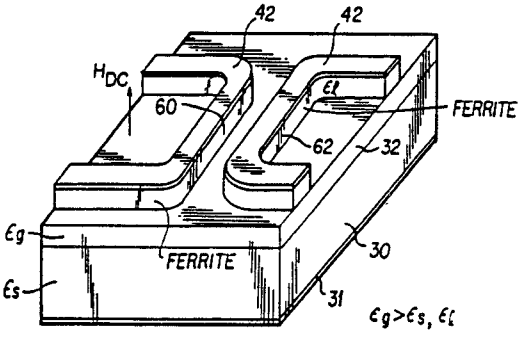
4,689,584 Aug. 25, 1987

Dielectric Slab Circulators

Inventor: Hermann B. Sequeira.
Assignee: Martin Marietta Corporation.
Filed: Nov. 27, 1985.

Abstract—A transmission line comprising a multi-layer dielectric slab structure including: a dielectric substrate layer (30) having a thickness d_s and permittivity ϵ_s; a conductive ground plane (31) on the bottom surface of the dielectric substrate layer (30); a dielectric guiding layer (32) having a thickness h and permittivity ϵ_g, where $\epsilon_g > \epsilon_s$, attached to the top surface of dielectric substrate layer (30); at least one elongated and relatively narrow dielectric loading strip layer (33) having a width W, thickness d_1, and permittivity ϵ_1, where $\epsilon_g > \epsilon_1$, attached to the top surface of the dielectric guiding layer (32); and a conductive coating (34) on the top surface of the dielectric loading strip layer (32). Such a structure permits single mode propagation over a relatively wide band. Radiation losses due to coupling of the desired mode to the substrate modes and the conductors are futhermore reduced and the polarization of the dominant mode is such as to render said structure relatively insensitive to small deviations from parallelism among the different interfaces. This invention is directed to circulator devices implemented in such a multi-layer dielectric slab structure.

14 Claims, 25 Drawing Figures



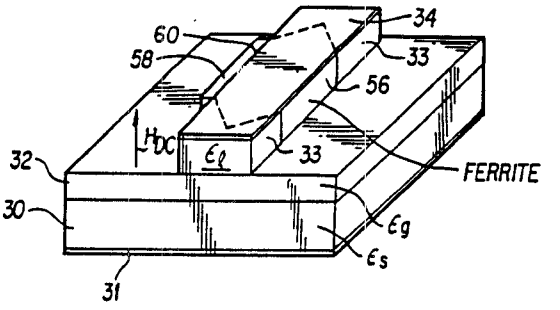
4,689,585 Aug. 25, 1987

Dielectric Slab Signal Isolators

Inventor: Hermann B. Sequeira.
Assignee: Martin Marietta Corporation.
Filed: Nov. 27, 1985

Abstract—A transmission line comprising a multi-layer dielectric slab structure including: a dielectric substrate layer (30) having a thickness d_s and permittivity ϵ_s; a conductive ground plane (31) on the bottom surface of the dielectric substrate layer (30); a dielectric guiding layer (32) having a thickness h and permittivity ϵ_g, where $\epsilon_g > \epsilon_s$, attached to the top surface of dielectric substrate layer (30); at least one elongated and relatively narrow dielectric loading strip layer (33) having a width W, thickness d_1, and permittivity ϵ_1, where $\epsilon_g > \epsilon_1$, attached to the top surface of the dielectric guiding layer (32); and a conductive coating (34) on the top surface of the dielectric loading strip layer (32). Such a structure permits single mode propagation over a relatively wide band. Radiation losses due to coupling of the desired mode to the substrate modes and the conductors are furthermore reduced and the polarization of the dominant mode is such as to render said structure relatively insensitive to small deviations from parallelism among the different interfaces. This invention is directed to multi-layer dielectric slab structures implemented in the form of a signal isolator.

7 Claims, 25 Drawing Figures



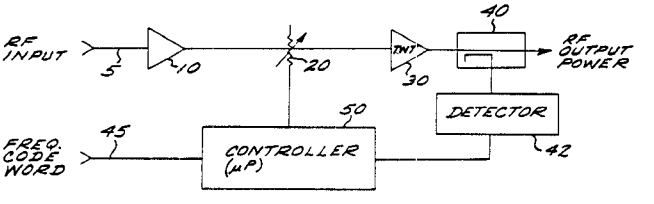
4,691,173 Sept. 1, 1987

RF Input Drive Saturation Control Loop

Inventors: Larry R. Mollett and Robert W. Goczalk.
Assignee: Hughes Aircraft Company.
Filed: Dec. 22, 1986

Abstract—A system for optimizing the RF input drive to a TWT amplifier over a frequency band of interest is disclosed. The system includes a microprocessor-based controller, an RF detector for detecting the TWT output, and a variable attenuator for adjusting the input drive to the TWT. The controller comprises an analog-to-digital converter for converting the video detector signals and providing digital RF level signals which are representative of the TWT output power level. Frequency data is also provided to the controller indicating the frequency of the RF exciter signals driving the TWT. The controller is, therefore, provided with frequency and RF level information, and is adapted to control the attenuator to adjust the TWT input drive for optimum TWT output. The system is operable in a calibration mode wherein the controller follows a calibration algorithm to determine the optimum attenuator setting, resulting in the maximum RF output, for each frequency of interest. The optimum attenuator setting is stored in an EEPROM for each drive frequency. The system is further operable in a normal mode wherein the controller sets the attenuator at the predetermined optimum setting for the present exciter frequency.

17 Claims, 7 Drawing Figures



4,691,177 Sept. 1, 1987

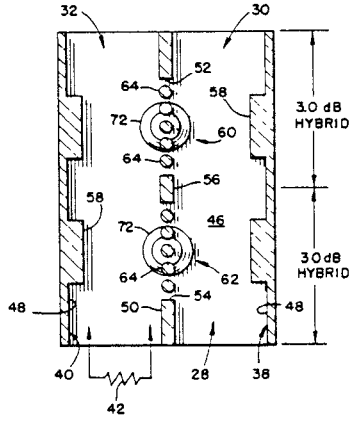
Waveguide Switch with Variable Short Wall Coupling

Inventors: Mon N. Wong and Ann L. Peebles.
Assignee: Hughes Aircraft Company
Filed: Oct. 2, 1985.

Abstract—A waveguide switch operable at microwave frequencies is formed of two waveguides of rectangular cross section with a longer wall and a shorter wall, the two waveguides sharing a common shorter wall. Two coupling

windows are disposed within the common wall for coupling electromagnetic energy between the two waveguides, each coupling window introducing a 90° phase shift. Each window couples one-half the power of an electromagnetic wave from a first of the guides to a second of the guides. The common wall is parallel to the electric field of the coupled wave, with each wave being a TE wave. A 90° phase shift is introduced by each coupling with the result that utilization of both windows produces a summation of the two waves in the second of the waveguides and a cancellation of the two waves in the first of the waveguides Gates are employed for selectively closing off either one or both of the windows to retain all of the power in the first waveguide, or to close off only one of the waveguides for an equal distribution of the power in both waveguides.

9 Claims, 4 Drawing Figures



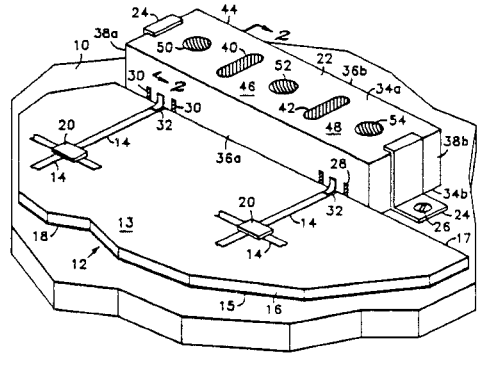
4,691,179 Sept 1, 1987

Filled Resonant Cavity Filtering Apparatus

Inventors: Stephen C Blum and John Deriso
Assignee: Motorola, Inc.
Filed: Dec.-4, 1986

Abstract—An apparatus that utilizes a solid, dielectric-filled waveguide filter in a microstrip circuit is disclosed. The microstrip circuit couples directly into and out from the waveguide filter through slot openings in waveguide filter walls without penetrating the interior of the waveguide Adjustment of the coupling is accomplished through varying the length of the slot. Resonant frequency tuning of the filter is accomplished using additional slots, or by removing metallic plating from metallized cavities which extend into the waveguide core from a central region of a waveguide broad wall

23 Claims, 3 Drawing Figures



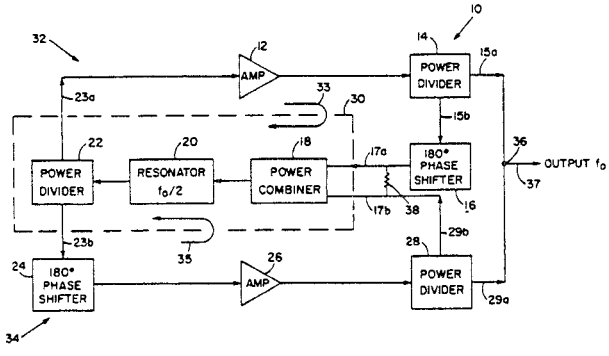
4,692,714 Sept. 8, 1987

Single Resonator Push-Push Oscillator

Inventor: Zvi Galani.
Assignee: Raytheon Company.
Filed: Oct. 20, 1986

Abstract—A microwave frequency oscillator utilizing a push-push configuration to provide a low noise highly stable output signal at twice the frequency of a single resonator. The single resonator is connected in the feedback loop of two amplifiers Additional circuit elements insure the proper oscillation conditions and relative phase are maintained. The use of a single resonator makes possible the application of various noise reduction techniques

6 Claims, 2 Drawing Figures



4,692,720 Sept. 8, 1987

Arrangement for Producing a Junction Between a Microstrip Line and a Coplanar Transmission Line

Inventor: Franz Auracher.
Assignee: Siemens Aktiengesellschaft
Filed: Mar. 28, 1985

Abstract—An arrangement for producing a broadband junction between a microstrip line and a coplanar transmission line in the following called "twin band line" provides that the microstrip line and the twin band line (ZL) extend at right angles relative to one another The ground electrode of the microstrip line and the ground electrode of the twin band line lie immediately one on top of the other. The strip-shaped other electrodes of the microstrip line and the narrower strip-shaped electrode of the asymmetrical twin band line which extends at right angles thereto and coplanar to the wider ground electrode of the twin band line are connected to one another in a broadband manner by one or more ribbons or wires of metal. The arrangement is advantageously employable as a fast integrated optical modulator with cutoff frequencies in the GHz range, whereby the spacing between the coplanar electrodes expediently constricts conically in the longitudinal direction thereof The arrangement is also advantageously employable for connecting a twin band line to the rigid inner conductor of a coaxial cable.

3 Claims, 3 Drawing Figures