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.

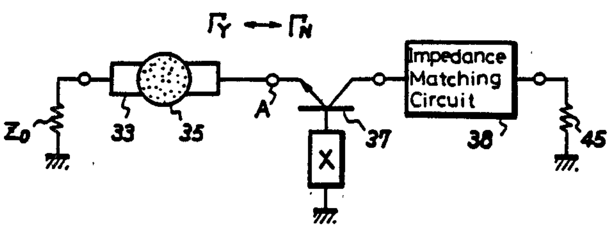
4,626,800 Dec. 2, 1986

YIG Thin-Film Tuned MIC Oscillator

Inventors: Yoshikazu Murakami, Seigo Ito, and Toshiro Yamada.
Assignee: Sony Corporation.
Filed: June 3, 1985.

Abstract—A tuned oscillator is disclosed which comprises an active element, a resonator electrically connected to the active element and made of a magnetic material using ferro-magnetic resonance phenomenon, and a magnetic circuit for applying a magnetic field to the resonator. The resonator is made of an YIG (yttrium, iron and garnet) thin film magnetic resonance element formed by a thin film forming technique and utilizes a uniform mode ferromagnetic resonance in the YIG thin film, and operating under the application of magnetic field of the magnetic circuit.

8 Claims, 27 Drawing Figures



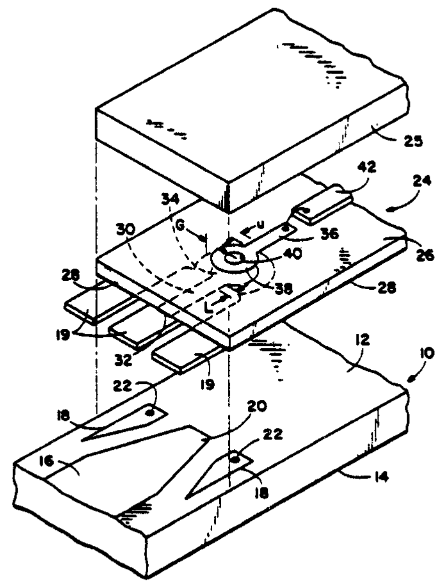
4,626,805 Dec. 2, 1986

Surface-Mountable Microwave IC Package

Inventor: Keith E. Jones.
Assignee: Tektronix, Inc.
Filed: Apr. 26, 1985.

Abstract—A surface-mountable microwave IC package uses printed transmission lines on a printed circuit board in lieu of plumbing between milled packages. A backside coplanar waveguide is connected to a topside microstrip line by a through-hole in a carrier substrate. To compensate for inductance added by the hole and transmission line ends, a gap is adjusted to provide compensation capacitance. Hermetic sealing of the package is assured by brazing a lead frame over the through-hole and using a solder sealed lid. The lid provides both a hermetic seal and shielding.

9 Claims, 7 Drawing Figures



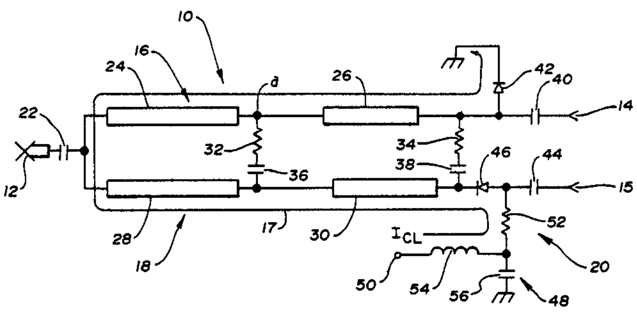
4,626,806 Dec. 2, 1986

RF Isolation Switch

Inventors: George C. Rosar and James R. Wilson.
Assignee: E. F. Johnson Company.
Filed: Oct. 10, 1985.

Abstract—A solid-state radio frequency switching circuit is provided that exhibits up to 25 dB isolation between output ports. The circuit integrates the switching versatility of a pin diode switch with the excellent signal isolation of a quarter wavelength combiner.

6 Claims, 1 Drawing Figure



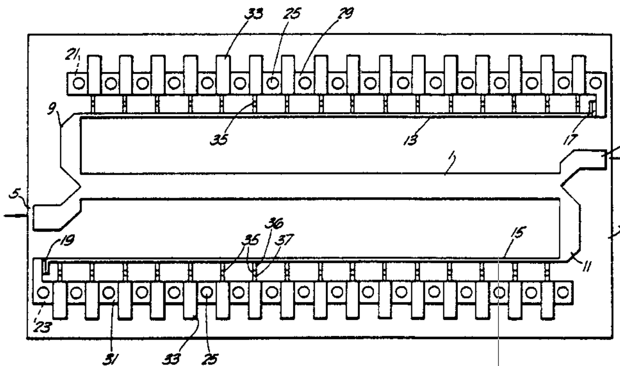
4,626,807 Dec. 2, 1986

Phase Shifting Device

Inventor: Kenneth Wilson.
Assignee: The General Electric Company
Filed: June 12, 1985

Abstract—A phase shifting device including a coupling device having an input port, an output port and a further port. The further port is connected to a transmission line, along the length of which are connected a number of switches. Each switch is operable to connect a low impedance across the transmission line such that an input signal applied to the input port is reflected at a connected one of the switches to produce an output signal at the output port whose phase is shifted relative to that of the input signal by an amount dependent on the length of transmission line traversed by the input signal Alternatively the capacitance of each of the switches may be operated so as to vary the propagation constant of the transmission line to thereby produce the required phase shift.

8 Claims, 3 Drawing Figures



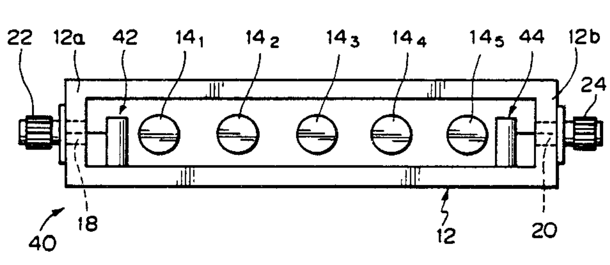
4,626,809 Dec. 2, 1986

Bandpass Filter with Dielectric Resonators

Inventors: Motoo Mizumura and Hisasuke Sei.
Assignee: NEC Corporation.
Filed: Sept. 20, 1985.

Abstract—A bandpass filter in which a plurality of dielectric resonators are arranged in an array is disclosed. Two metallic posts each having a length which is substantially equal to a quarter of the wavelength of the fundamental frequency (center frequency of the bandpass filter) are arranged one between the dielectric resonator located at one end of the array and an input connector and the other between the dielectric resonator located at the other end of the array and an output connector. This suppresses propagation of spurious modes, particularly propagation at a twice higher frequency than the fundamental frequency.

6 Claims, 10 Drawing Figures



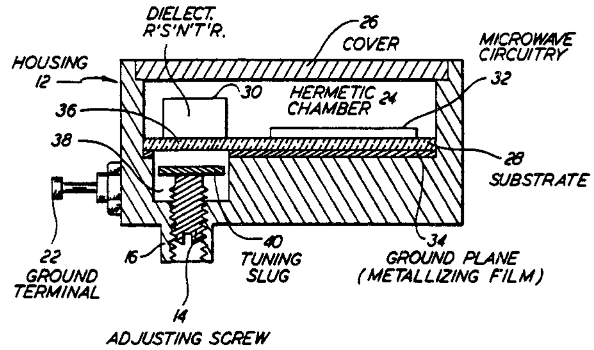
4,628,283 Dec. 9, 1986

Hermetically Sealed Oscillator with Dielectric Resonator Tuned through Dielectric Window by Adjusting Screw

Inventor: Allan Reynolds.
Assignee: The Narda Microwave Corporation
Filed: Nov 7, 1983.

Abstract—Microwave dielectric resonator apparatus which, for example, may be a microwave oscillator frequency stabilized by a dielectric resonator or may be a microwave filter whose critical frequency is determined by a dielectric resonator, has the dielectric resonator environmentally protected in a hermetic chamber. As the hermetic integrity of the chamber would be destroyed by having a tuning slug therein at the end of a screw threaded into a tapped hole through a chamber wall for rotation by a screwdriver outside the chamber, the tuning slug is instead located within a non-hermetic chamber at the end of a screw threaded into a tapped hole through a wall of the nonhermetic chamber serving also as an outer wall of a housing enclosing both chambers. The chambers have an interface which is transparent to microwave fields and proximate the dielectric resonator and tuning slug. The interface preserves the hermetic integrity of the hermetic chamber and transmits part of the microwave field developed by the dielectric resonator, when it resonates, to the nonhermetic chamber to be variously interfered with by the tuning slug as the slug is moved by rotation of the screw into different positional relationships of interference with the transmitted field part. As known per se, such interference alters the distribution and amount of microwave energy stored in the resonating dielectric resonator, and thereby alters the microwave frequency at which the dielectric resonator resonates. By using a puck of barium titanate as the dielectric resonator, a resonant frequency of 12 GHz is typically obtainable with a range of stable adjustment thereabout in the vicinity of 20 MHz.

35 Claims, 5 Drawing Figures



4,628,287 Dec. 9, 1986

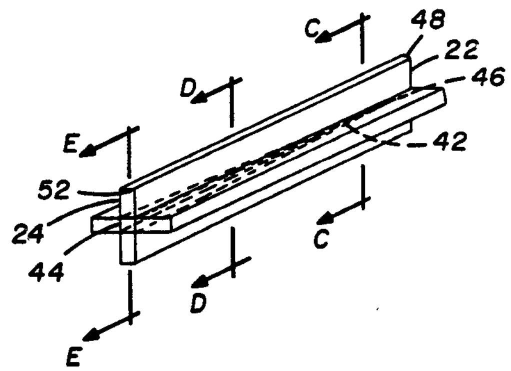
Multiport Rectangular TE_{10} to Circular TE_{01} Mode Transducer Having Pyrimidal-Shaped Transducing Means

Inventors: William H. Zinger and Jerry A. Krill.
Assignee: The Johns Hopkins University
Filed: Sept. 16, 1983

Abstract—A method and device for transducing multiple rectangular TE_{10} modes to circular TE_{01} mode. Multiple TE_{10} modes are transitioned into an intermediate mode which is transitioned into a circular TE_{01} mode and vice

versa. Unique pyramidal structure provides overmoded high power operation without cooling and/or pressurization.

6 Claims, 24 Drawing Figures



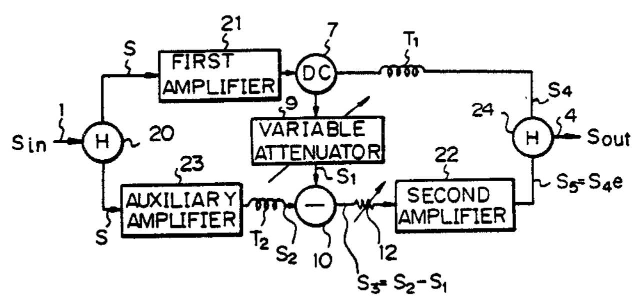
4,629,996 Dec. 16, 1986

Feed-Forward Microwave Power Amplifier with Difference Signal Distortion Cancellation Circuit

Inventors: Tatsuo Watanabe and Kiyohiko Suzuki.
Assignee: Kokusai Denshin Denwa Co., Ltd.
Filed: Nov. 15, 1984.

Abstract—A feed-forward microwave power amplifier having a divider for dividing an input signal into two parts, a first main amplifier for amplifying one of the divided signals, means for providing a part of the output of the first amplifier as a signal S_1, means for providing a signal S_2 by another output of the divider, a subtractor for providing the difference between S_2 and S_1, a second amplifier having the same gain as that of the first amplifier for amplifying this difference, a 3 dB coupler for coupling an output S_4 of the first amplifier and an output S_4e, where e is a constant, of the second amplifier to provide coupled power which is free from distortion, and adjusting means for adjusting the level of signals S_1 and S_2 so that S_2 is higher than S_1, and the value e is in the range between 0.2 and 0.5. The particular features of the present invention, compared with a prior feed forward amplifier, are the use of a 3 dB coupler, and the configuration of the second amplifier which accepts not only the distortion component but also some desired component of the output of the first amplifier.

5 Claims, 9 Drawing Figures



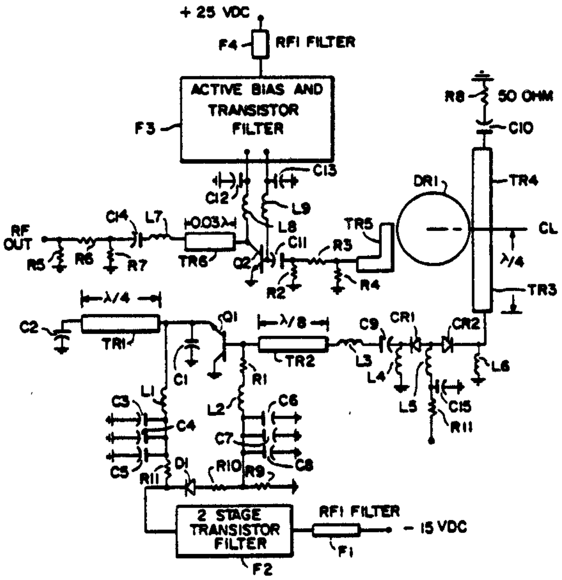
4,630,004 Dec. 16, 1986

Dielectric Resonator Stabilized Microstrip Oscillator

Inventors: Edward C. Niehenke and Patrick A. Green.
Assignee: The United States of America as represented by the Secretary of the Air Force.
Filed: Apr. 11, 1985.

Abstract—A microstrip *L*-band bipolar dielectric resonator stabilized oscillator (DRO) devised in a moderate size (2′×5″×3.6″), low-cost, reproducible circuit. Embedment of back to back varactors in the DRO provide voltage tuning for phase lock application without compromise of noise performance. Extremely low phase noise with a low $1/f$ noise corner is achieved and the DRO is essentially constant in frequency and output power over temperature, all due to unique circuit configuration. An internal buffer amplifier and dc regulatory circuits provide a DRO that is insensitive to frequency pulling due to load changes and power supply voltage leads. New standards of performance are accomplished that permit simplified stalo configuration with lower phase noise.

4 Claims, 5 Drawing Figures



4,630,009 Dec. 16, 1986

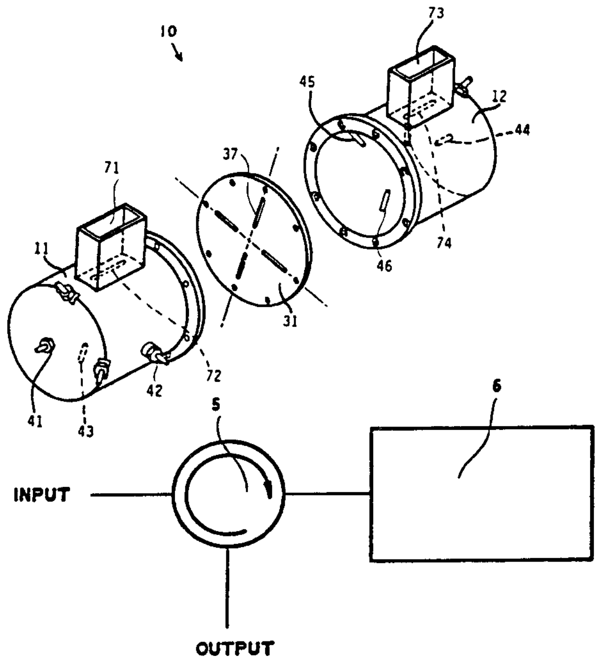
Cascade Waveguide Triple-Mode Filters Usable as a Group Delay Equalizer

Inventor: Wai-Cheung Tang.
Assignee: Com Dev Ltd.
Filed: Jan. 24, 1984.

Abstract—A bandpass filter has a plurality of cascade waveguide cavities each resonating in three independent orthogonal modes. The cavities can be cylindrical or have a square cross section. Where the cavities are circular, each cavity resonates in TE_{111} or TE_{010} modes simultaneously. Where the cavities have a square cross section, each cavity resonates in TE_{011} and TM_{110} modes simultaneously. Between each triple-mode cavity, there is located an iris having an aperture with four separate radial slots that are offset from a center of the iris. The filter is capable of producing an elliptic function response. In a variation of the invention, an allpass filter has an output that is short circuited and, when used in conjunction with a circulator, it functions as a group delay

equalizer. Previous triple-mode filters are not capable of producing an acceptable result relative to dual-mode filters.

24 Claims, 17 Drawing Figures



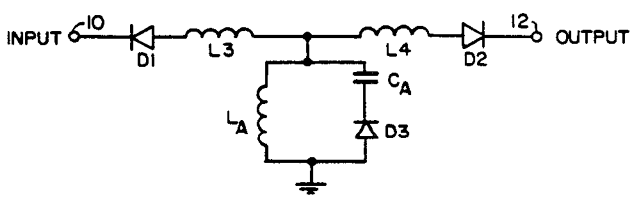
4,630,010 Dec. 16, 1986

Low-Pass T-Section Digital Phase Shifter Apparatus

Inventor: Binboga S. Yarman.
Assignee: The United States of America as represented by the Secretary of the Air Force.
Filed: Aug. 20, 1985.

Abstract—A low-pass T-section digital phase shifter apparatus having a pair of serially connected inductor–diode combinations connected in series which includes a parallel circuit connected between the common junction and ground. The parallel circuit has an inductor in parallel with a series capacitor and diode to provide a balanced insertion loss at each diode switching state. When the diodes are in the forward-biased state, they act as closed short-circuit switches. When the diodes are reversed-biased, the inductance in the series circuit resonates with the diode capacitance to provide a short path to the RF signal to pass the center frequency of the RF signal at the desired phase

2 Claims, 4 Drawing Figures



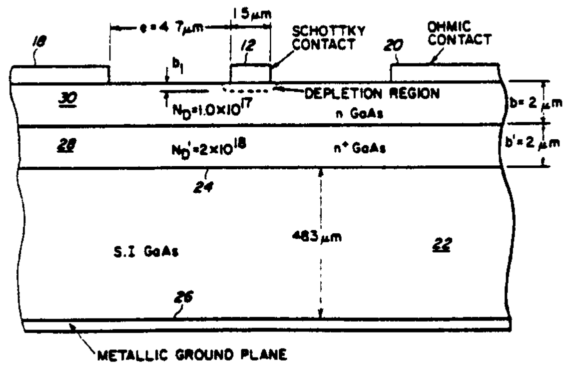
4,630,011 Dec. 16, 1986

Microwave and Millimeter-Wave Phase Shifter

Inventors: Robert E. Neidert and Clifford M. Krowne.
Assignee: The United States of America as represented by the Secretary of the Navy.
Filed: Dec. 12, 1985.

Abstract—A variable phase shifter based on the slow-wave effect for operation in the millimeter-wave region, comprising a GaAs substrate for mechanical support; an n^+ doped semiconductor layer disposed on the GaAs substrate for operation as a first ground plane; an n doped semiconductor layer disposed on the n^+ semiconductor layer with a thickness to permit only one mode at millimeter-wave frequencies to propagate, while suppressing higher order millimeter-wave modes; and a Schottky metal microstrip with first and second ends disposed on top of the n doped semiconductor layer. Means are provided in the form of ohmic contacts for electrically connecting the n^+ semiconductor layer to ground electrical potential. These ohmic contacts are disposed on top of the n doped layer, but are provided with a very large surface area contact to the n doped layer in order to significantly reduce the resistance between the ohmic contact and to the n^+ semiconductor layer. Means are included for providing an electrical bias voltage between the Schottky metal microstrip and the n^+ doped layer. The propagating phase velocity of millimeter waves propagating along the Schottky metal microstrip can be varied in accordance with the bias voltage to obtain a desired phase shift between the first and second ends of the metal microstrip In one embodiment, a metallic second ground plane is disposed on the other face of the semiconductor substrate. In a preferred embodiment, the n doped semiconductor layer is approximately 2 microns or less in thickness.

15 Claims, 4 Drawing Figures



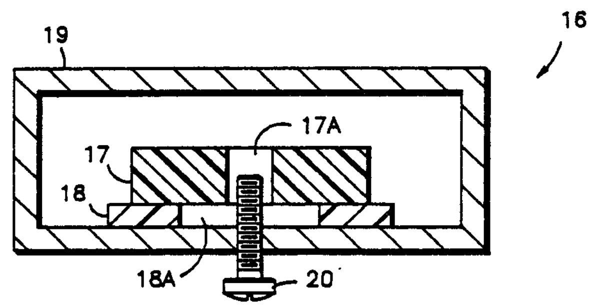
4,630,012 Dec. 16, 1986

Ring-Shaped Dielectric Resonator with Adjustable Tuning Screw Extending Upwardly into Ring Opening

Inventors: Ronald D. Fuller and Benny W. Lowe.
Assignee: Motorola, Inc.
Filed: Dec. 27, 1983.

Abstract—A ring-shaped dielectric resonator tuned by inserting a bolt from below the resonator into an opening of the resonator. The bolt causes the dielectric constant of the opening to change. The change in the dielectric constant changes the electric field, which in turn changes the magnetic field of the resonator.

1 Claim, 3 Drawing Figures



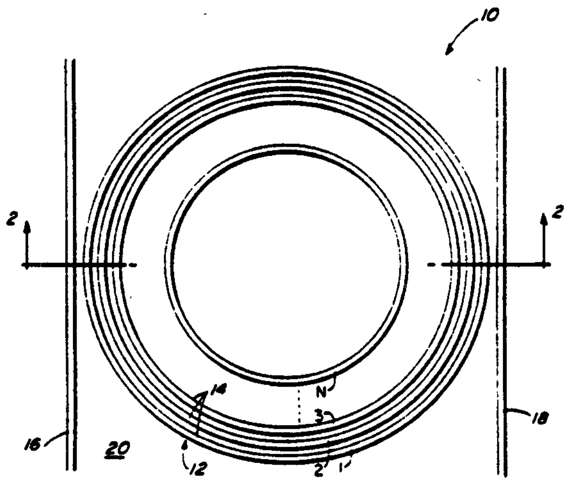
4,630,885 Dec. 23, 1986

Multichannel Optical Waveguide Resonator

Inventor: John R. Haavisto.
Assignee: Northrop Corporation.
Filed: Mar. 2, 1984.

Abstract—A multichannel optical waveguide resonator having a plurality of evanescently coupled optical dielectric waveguide rings and an input optical waveguide and an output optical waveguide located adjacent to one of the waveguide rings. The input and output dielectric waveguides are located for evanescent wave coupling of light into and out of one of the waveguide rings. The perimeters of the waveguide rings and the spacing therebetween are selected for evanescent coupling between the waveguides and so that light in the input waveguide reinforces with light in one of the concentric waveguides to create a resonator having an increased effective perimeter.

14 Claims, 3 Drawing Figures



4,631,494 Dec. 23, 1986

Conductive Housing and Biasing System for Microwave Integrated Circuits

Inventor: Harry J. Gould.
Filed: July 20, 1984.

Abstract—A processing system for microwave signals including a conductive housing having a waveguide probe for the input, a coaxial output connection, and a section for receiving a microwave integrated circuit therein. The section contains two high-impedance recesses therein, each of which is spaced a quarter-wavelength at microwave frequencies from the input and output portions of the integrated circuit. The high-impedance recesses, reflected to the input and output sections, provide low-impedance coupling therebetween for microwave signals. A dielectric member is interposed between the ground plane of the integrated circuit and the conductive housing to provide dc isolation therebetween and enable a single polarity voltage supply to establish the bias and operating voltages for the microwave integrated circuit.

14 Claims, 4 Drawing Figures