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.

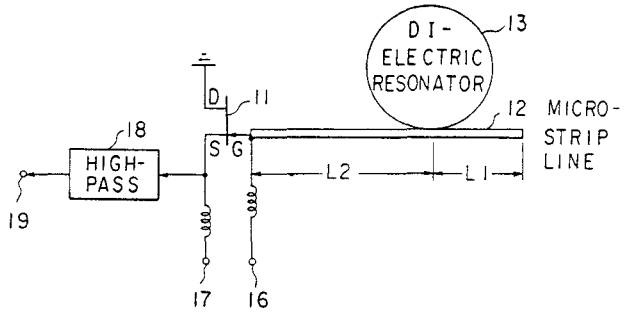
4,736,168 Apr. 5, 1988

Dielectric Resonator Controlled Oscillator Having a Raised Frequency-Multiplying Efficiency

Inventor: Eiji Nagata.
Assignee: NEC Corporation.
PCT Filed: July 23, 1986.

Abstract—In a dielectric resonator controlled oscillator with frequency multiplication, a line (12) has an open end and another end connected to a gate electrode of an FET (11) with a dielectric resonator (13) electromagnetically coupled to the line at a location along a total length of the line The total length is selected to make a combination of the line and the dielectric resonator have a substantially zero impedance for a higher harmonic frequency when seen from the gate electrode. More specifically, the total length is selected so as to be equal to about three quarters of a wavelength which a frequency multiplied oscillation, such as a frequency doubled oscillation, has in the line. The location is selected so as to optimize the oscillator for a fundamental oscillation of a fundamental frequency determined by the dielectric resonator.

3 Claims, 2 Drawing Sheets



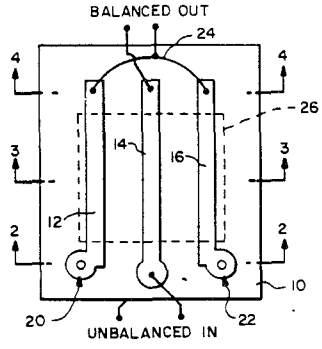
4,739,289 Apr. 19, 1988

Microstrip Balun Having Improved Bandwidth

Inventor: Stephen C. Cripps.
Assignee. Celeritek Inc
Filed: Nov. 24, 1986.

Abstract—A microstrip balun comprises a ceramic substrate having a ground plane on one surface and three elongated conductive strips on the opposite surface. First ends of the outer strips are interconnected with the ground plane through vias in the substrate. The unbalanced signal input is applied to the ground plane near the vias and one end of the inner strip. The other ends of the outer strips are interconnected, and the balanced signal output is taken at this interconnection and at one end of the inner strip. A portion of the ground plane beneath portions of the strips can be removed

5 Claims, 1 Drawing sheet



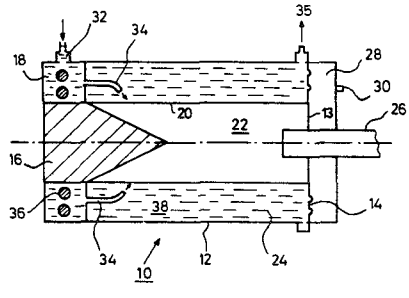
4,740,763 Apr. 26, 1988

Microwave Calorimeter

Inventors: Rolf Wilhelm and Paul G. Schüller
Assignee: Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e V
Filed: Nov 20, 1986.

Abstract—A microwave calorimeter for very high power, with a housing, which surrounds a feed chamber, into which a waveguide runs for feeding the microwaves, and an absorber-chamber which is separated from the feed chamber by a dielectric wall and contains a microwave-absorbing fluid, the fluid consisting at least in part of a compound whose capacity for the absorption of microwaves is less than that of water

13 Claims, 1 Drawing Sheet



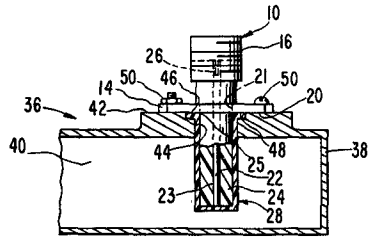
4,740,764 Apr. 26, 1988

Pressure-Sealed Waveguide to Coaxial Line Connection

Inventor: Richard Z. Gerlack.
Assignee: Varian Associates, Inc.
Filed: June 3, 1987.

Abstract—A pressure sealed waveguide to coaxial line connection formed with a low cost, nonpressurizable waveguide to coaxial line adapter, an elastomeric sealing boot, and a specially configured mounting seat on a housing which contains a pressurizable waveguide cavity. The connection provides a low cost alternative to hermetically sealed waveguide to coaxial line adapters.

3 Claims, 1 Drawing Sheet



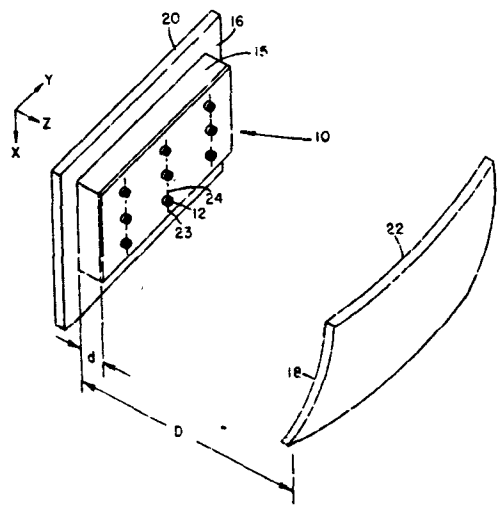
4,742,314 May 3, 1988

Solid-State Millimeter-Wave Power Combiner

Inventor: James W. Mink.
Assignee: The United States of America as represented by the Secretary of the Army.
Filed: Sept. 11, 1986.

Abstract—A plurality of millimeter-wave power sources are arranged in a planar matrix array located in a wave-beam resonator including two reflecting surfaces which are large in terms of the operating wavelength. One surface comprises a planar reflector located in relatively close proximity to the source array, while the other reflector is located in front of the array at a relatively larger distance and being partially transparent and curved, with the curvature being expressed by a pair of focal lengths which define a curvature in two perpendicular axial planes. Each source is emprised of an IMPATT or GUNN diode coupled to a short dipole or closed current loop structure, all lying in a plane parallel to the planar reflector and transverse to the longitudinal central axis of the resonator.

15 Claims, 3 Drawing Sheets



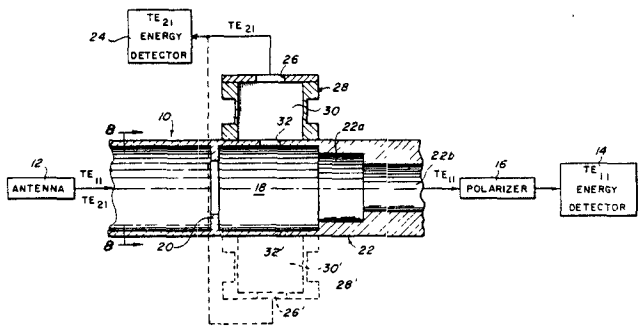
4,742,317 May 3, 1988

Mode Coupler for Monopulse Antennas and the Like

Inventor: Herbert L. Thall, Jr.
Assignee: General Electric company.
Filed: May 23, 1986

Abstract—A coupler for extracting energy in the TE_{21} mode from a circular waveguide propagating energy in both the TE_{11} and TE_{21} modes, characterized in that an annular iris on the inner circumference of the waveguide and a longitudinally stepped transition portion of the waveguide define therebetween a TE_{21} mode resonant cavity which is coupled via a narrow axially extending rectangular slot contained in the wall portion of the waveguide which defines the cavity. At least one external resonant chamber may be provided on the waveguide through which the TE_{21} mode energy is extracted and transmitted to a detector thereof via the slot, which chamber cooperates with the resonant cavity to define a multiple resonant filter for improving the matching to the TE_{21} mode while reducing the perturbation to the TE_{11} mode.

4 Claims, 5 Drawing Sheets



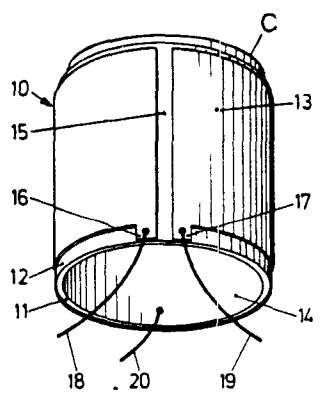
4,742,320 May 3, 1988

Resonator Structure Comprising Metal-Coated Tubular Carrier and Having Slits in the Metal Coating

Inventors: Heinz Pfizenmaier, Franz Straus, and Ewald Schmidt.
Assignee: Robert Bosch GmbH.
Filed: Mar. 26, 1986.

Abstract—To improve the space factor of a barium titanate resonator, the resonator is a tubular carrier (11) having metal layers on the inner and outer surfaces. At least one of the metal layers is axially interrupted by a slit. Terminal connections for the resonator are located adjacent the slit on the interrupted layer, and on the continuous layer. For shielding, preferably, the continuous layers at the outside and end tabs may additionally be provided More than one axially staggered inner/outer electrode layer system may be provided on one tubular carrier.

21 Claims, 1 Drawing Sheet



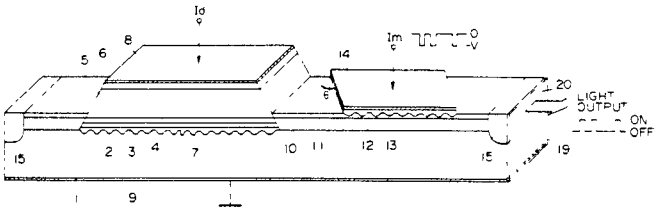
4,743,087 May 10, 1988

Optical External Modulation Semiconductor Element

Inventors: Katsuyuki Utaka, Shigeyuki Akiba, Yukitoshi Kushiro, and Yukio Noda.
Assignee. Kokusai Denshin Denwa Kabushiki Kaisha.
Filed: May 30, 1985

Abstract —An optical modulation element is disclosed in which a diffraction grating is formed along a waveguide for guiding unmodulated incident light and inclined to the direction of travel of the light, and a structure is provided for changing the refractive index of the waveguide portion where the diffraction grating is formed. The refractive index of the waveguide portion can be effected by voltage application, by current injection, or by light irradiation

8 Claims, 5 Drawing Sheets



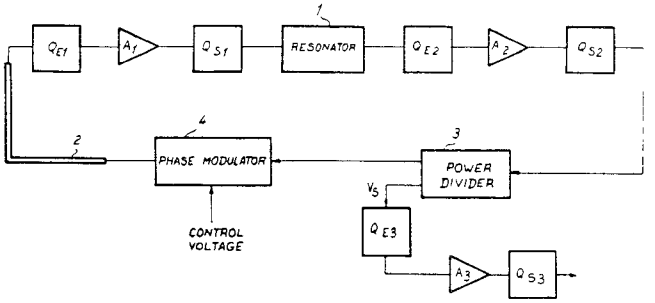
4,743,865 May 10, 1988

Quartz-Crystal Microwave Oscillator of the Common-Emitter Transmission type With Two Transistors and a Predetermined Loaded *Q* Factor

Inventor: Jacques Chauvin.
Assignee: Compagnie d'Electronique et de Piezoelectricite Cepe
Filed: July 9, 1987

Abstract —The resonant frequency of a quartz-crystal microwave oscillator is the fundamental frequency in the partial mode of the crystal and makes it possible to maintain the loaded *Q* of the resonator at a high value. This microwave oscillator is provided with two amplifying stages and has a signal-to-noise ratio of the order of 160 dB.

10 Claims, 4 Drawing Sheets



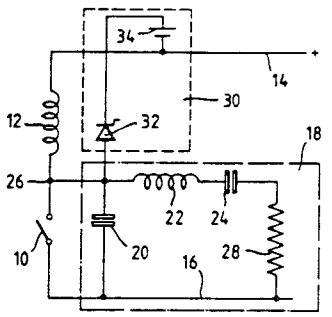
4,743,858 May 10, 1988

RF Power Amplifier

Inventor: Jeremy K. A. Everard.
Assignee: U S. Philips Corp.
Filed: June 20, 1986

Abstract —An RF power amplifier, typically a high efficiency, class-E amplifier in which a reactive load circuit (18) is connected to a semiconductor switching device (10), the load circuit being designed to have the required input load angle and loaded *Q* so that the voltage across the device (10) goes to zero with zero slope before it switches on and passes current, is provided with a step recovery diode (32) connected to the device (10) to limit the voltage swing across the device (10) with no significant loss of efficiency. This allows the voltage-handling capability required of the device to be reduced or the amplifier output power to be increased by increasing the supply voltage

5 Claims, 2 Drawing Sheets



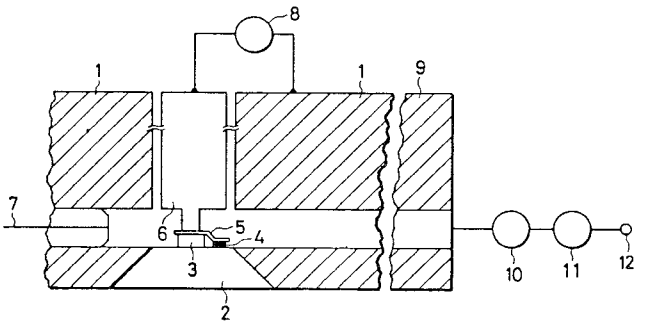
4,745,374 May 17, 1988

Extremeley High Frequency Semiconductor Oscillator Using Transit Time Negative Resistance Diode

Inventors: Jun-ichi Nishizawa and Kaoru Motoya
Assignee: Zaidan Hojin Handotai Kenkyu Shinkokai
Filed. June 17, 1986

Abstract —An extremely high frequency semiconductor oscillator which produces a large but substantially noise-free output power with minimized fluctuation of output power for changes in device temperature is realized by using, as its power-producing component, a semiconductor transit time diode having a frequency-dependent negative resistance mounted in a cavity resonator of a waveguide means provided with a tuning short at one side of the waveguide means and being designed to perform carrier injection by a combination of tunnel and avalanche phenomena

6 Claims, 5 Drawing Sheets



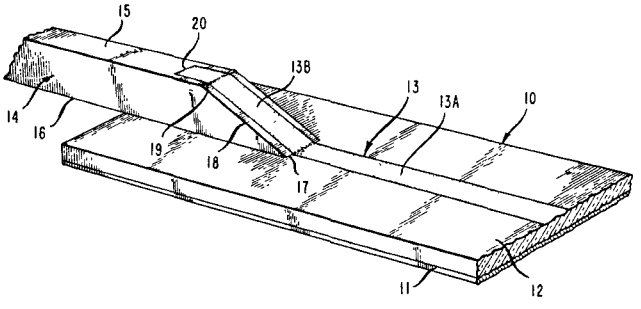
4,745,377 May 17, 1988

Microstrip to Dielectric Waveguide Transition

Inventors: Richard A. Stern and Richard W. Babbitt.
Assignee: The United States of America as represented by the Secretary of the Army.
Filed: June 8, 1987.

Abstract—A microstrip to dielectric waveguide transition is provided comprising a length of rectangular dielectric waveguide which has one end tapered in such a manner that the height of the waveguide top surface above the waveguide bottom surface decreases linearly from full height to zero height at the tapered end of the length of waveguide. The bottom surface of the waveguide length is mounted on the top surface of a planar microstrip dielectric substrate having an electrically conductive metallic ground plane on the bottom substrate surface and a length of microstrip conductor on the top substrate surface aligned with the waveguide length and abutting the tapered end of the waveguide length. A second length of microstrip conductor is mounted on the tapered portion and part of the untapered portion of the top surface of the waveguide length and is electrically connected to the first microstrip conductor at the tapered end of the waveguide length. The dielectric constant of the microstrip substrate should be no greater than the dielectric constant of the dielectric waveguide length and preferably should be much less.

6 Claims, 1 Drawing Sheet



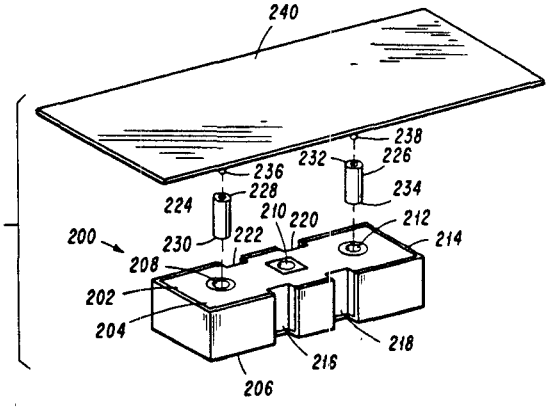
4,745,379 May 17, 1988

Launcherless and Lumped Capacitorless Ceramic Comb-Line Filters

Inventors: James B. West and James C. Cozzie.
Assignee: Rockwell International Corp.
Filed: Feb. 25, 1987

Abstract—An inhomogeneous ceramic dielectric microwave RF TEM resonator filter having a plurality of unplated notches in the ceramic for enhancing direct interresonator coupling The filter is implemented without the lumped coupling capacitors which are typically associated with each resonator of a TEM resonator filter. Furthermore, the launching resonators which are typically used to couple in and out of the filter are eliminated by using coaxial probe capacitors inserted in each of the end resonators. The non-end resonators can be made to look as long as the end resonators, with probes therein, by including a conductor pad disposed upon the block top surface and connecting the internal plating of the non-end resonators

1 Claim, 2 Drawing Sheets



4,746,879 May 24, 1988

Digitally Temperature Compensated Voltage-Controlled Oscillator

Inventors: John Y. Ma and Steven Weiss.
Filed: Aug 28, 1986.

Abstract—A digitally temperature compensated oscillator (TCO) system is provided which is capable of ascertaining and memorizing in an EEPROM-based look-up table, appropriate digital values of a temperature-compensating tuning voltage to the TCO during calibration An on-board temperature sensing mechanism tracks variations in temperature in the TCO and produces an analog voltage value corresponding to the instantaneous temperature The voltage value of the sensor output is digitized and designated to constitute an address into the EEPROM based look-up table. As the temperature changes, the digitized output of the temperature sensor and hence the address to the EEPROM changes accordingly The TCO tuning voltage value corresponding to the address represented by the measured temperature is extracted from the values stored within the EEPROM table and then converted into a corresponding analog voltage which is used to drive the voltage-controlled oscillator (VCO) in order to maintain the output frequency of the TCO stabilized at a desired value.

The EEPROM contained within the TCO is preferably calibrated during production, under the control of a calibration and test circuit which regulates the calibration and testing of a TCO in a chamber whose temperature is ramped over a desired temperature range. The TCO includes an on-board microprocessor which allows integration of several of the TCO functions, including the analog-to-digital and the storage and retrieval of data to and from the EEPROM containing the look-up table and extremely simplifies the calibration and test procedure.

16 Claims, 7 Drawing Sheets