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.

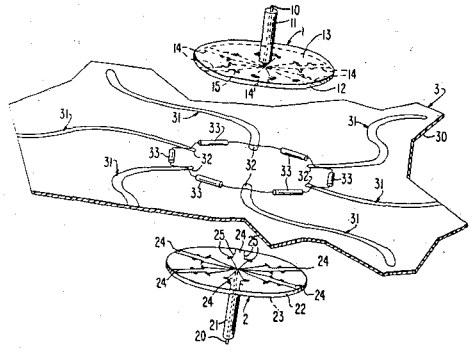
4,647,879 Mar. 3, 1987

Radial/Axial Power Divider/Combiner

Inventor: Yerriah P. Vaddiparty.
Assignee: Ford Aerospace & Communications Corporation.
Filed: July 8, 1985.

Abstract—An electromagnetic power divider/combiner comprises *N* radial outputs (31) having equal powers and preferably equal phases, and a single axial output (20). A divider structure (1) and a preferably identical combiner structure (2) are broadside coupled across a dielectric substrate (30) containing on one side the network of *N* radial outputs (31) and on its other side a set of *N* equi-spaced stubs (42) which are capacitively coupled through the dielectric substrate (30) to the *N* radial outputs (31). The divider structure (1) and the combiner structure (2) each comprise a dielectric disk (12,22, respectively) on which is mounted a set of *N* radial impedance transformers (14,24, respectively). Gross axial coupling is determined by the thickness of the dielectric layer (30). Rotating the disks (12,22) with respect to each other effectuates fine adjustment in the degree of axial coupling.

11 Claims, 3 Drawing Figures



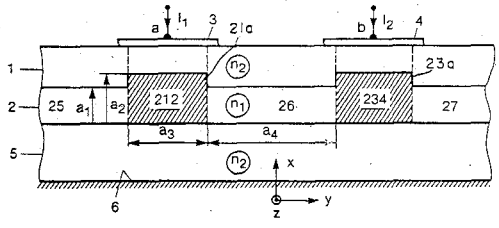
4,717,228 Jan. 5, 1988

Optical Directional Coupler with Amplification

Inventor: Lars Helge Thylén.
Assignee: Telefonaktiebolaget LM Ericsson.
PCT Filed: Nov. 18, 1985.

Abstract—An optical directional coupler with amplification having first, second and third waveguides respectively intended for incoming light for bar coupling of light from the first waveguide and for cross coupling of light from the first waveguide. The waveguides are transparent to the wave length of the incoming light and have a characteristic refractive index in the coupling area. The coupler also includes waveguide sections constituting coupling elements for the first, second and third waveguides as well as electrodes. An arrangement is provided for achieving optical amplification of light passing through the first and the second waveguide in the bar coupling state of the directional coupler and amplification of the light passing through the first and the third waveguides in the cross coupling state of the directional coupler by feeding a current to the electrodes according to which coupling state is desired.

8 Claims, 9 Drawing Figures



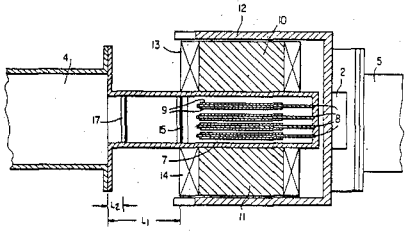
4,717,895 Jan. 5, 1988

High-Frequency, High-Power Waveguide Junction Circulator

Inventors: Erich Pivit, Wolfgang Hauth, Günter Mörz, and Sigmund Lenz.
Assignee: ANT Nachrichtentechnik GmbH.
Filed: July 29, 1986.

Abstract—A waveguide junction circulator for a high power application at a high operating frequency. The circulator includes a plurality of connecting waveguides, each of which has a standard height dimension corresponding to the operating frequency; a resonance cavity; a plurality of spaced and cooled, superposed metal plates covered with ferrite discs disposed in the cavity; a magnet disposed outside the cavity for generating a magnetic field oriented perpendicular to the ferrite discs and penetrating the cavity; and a plurality of junction arms each having one end communicating with the cavity and another end forming a connection with a respective one of the plurality of connecting waveguides. The circulator has a height dimension in its region penetrated by the magnetic field that is reduced by at least 20% compared to the standard height dimension of the connecting waveguides. Each connection presents a transition from the connecting waveguide to the junction arm that has a sudden change in cross section from the reduced height of the circulator to the standard height of the connecting waveguide. Reactance elements are provided in the junction arms to form multisection filters.

8 Claims, 3 Drawing Figures



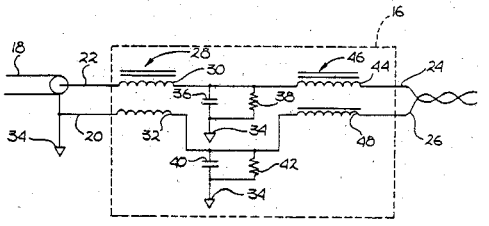
4,717,896 Jan. 5, 1988

Balun

Inventor: Martin H. Graham.
Assignee: And Yet, Inc.
Filed: Mar. 21, 1985.

Abstract—The present invention comprises a balun for intercoupling an at least partially unbalanced line and a substantially balanced line having similar line impedances which is capable of passing differential signals over a wide bandwidth while substantially attenuating any common mode signals. The balun comprises a pair of transformers with bifilar windings, each connected as a choke. Each conductor of the unbalanced line is coupled to a different one of two substantially identical inductances of the first transformer and the other side of each inductance is coupled through the second transformer to a different one of the two conductors of the balanced line. Each of the connections between the two transformers is coupled to ground with a substantially identical capacitance. The capacitance in conjunction with the inductance acts to filter out the common mode signals while allowing the differential mode signals to pass through the balun. The capacitance is coupled to each transmission line by a transformer with sufficient inductance to prevent differential signals in either direction from being shunted to ground. Preferably, a resistor is added in parallel to each of the capacitances to provide for common mode attenuation at the resonant frequency of the system capacitance and inductances.

2 Claims, 7 Drawing Figures



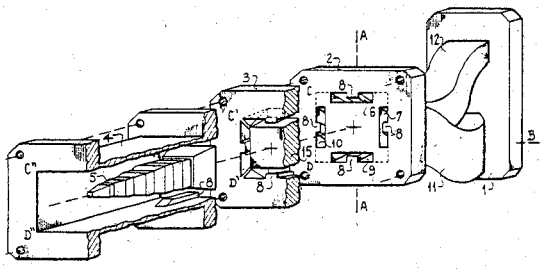
4,717,897 Jan. 5, 1988

Wide-Band Polarization Diplexer Device and an Antenna Associated with a Radar or a Countermeasure

Inventors: Claude Gehin and Jacky Tourneur.
Assignee: Thomson CSF.
Filed: July 11, 1980.

Abstract—A very wide pass band polarization diplexer having a power divider, a transition element and a wave guide containing an impedance adapter, and applicable to all devices requiring the use of a wave guide in which two waves in orthogonal modes propagate.

8 Claims, 4 Drawing Figures



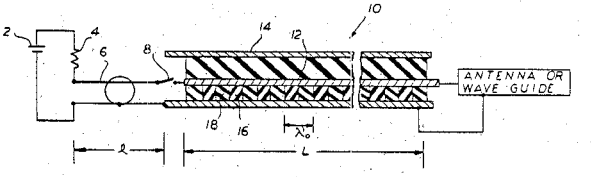
4,719,420 Jan. 12, 1988

Transmission Line Microwave Generator

Inventors: Hiroyuki Ikezi and Torkil H. Jensen.
Assignee: GA Technologies Inc.
Filed: Apr. 14, 1986.

Abstract—The present invention is a device for generating high power microwave pulses using a nonlinear dispersive transmission line connected by a switch means to a source cable means and a high voltage source. The closing of the switch means sends an electrical pulse propagating from the source cable means through the transmission line. The pulse decomposes into a short, high power pulse of microwaves which consists of an array of solitons. The output of the line may be coupled into an antenna, wave guide or other load.

8 Claims, 8 Drawing Figures



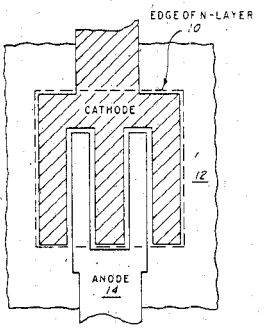
4,719,434 Jan. 12, 1988

Varactor Trimming for MMIC's

Inventors: Bentley N. Scott and Gailon E. Brehm.
Assignee: Texas Instruments Incorporated.
Filed: Oct. 8, 1986.

Abstract—Varactors are incorporated in a monolithic microwave integrated circuit (MMIC) to provide voltage-programmable impedance matching at inputs and/or outputs. This permits the impedance variations normally caused by manufacturing variations in (e.g.) doping or epitaxial thickness to be easily compensated by adjusting the varactor bias, after all major manufacturing steps are completed. Integrated varactors are also used to provide temperature compensation in an MMIC. A temperature-sensitive voltage is generated off-chip and supplied to each on-chip varactor. Each varactor may include a respective voltage-shifting network, so that different varactors implement different capacitance (temperature) functions, to optimally compensate different portions of the MMIC.

8 Claims, 6 Drawing Figures



4,719,435 Jan. 12, 1988

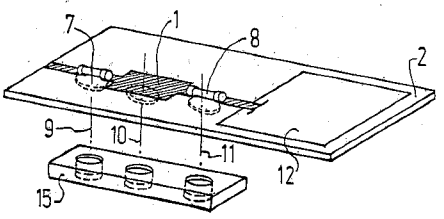
Resonant Microstrip-Line Circuit

Inventor: Thierry Maitre.
Assignee: U.S. Philips Corporation.
Filed: May 5, 1986.

Abstract—The invention relates to a device for the fine adjustment of a resonant microstrip-line formed on an insulating substate (2), tuned by a varicap diode (7,8) which makes it possible to adjust the shape of the curve

representing the tuning frequency of the strip line as a function of the direct voltage controlling the diode. One or more blind holes are provided in the surface of the substrate opposite the strip line, and a base part (15) with one or more threaded holes, into which cylinders are screwed, is fitted under the strip line. The cylinders are placed facing the blind holes and are aligned with the holes to enable entry into them. The cylinders and the base part are electrically conductive and connected to ground.

7 Claims, 2 Drawing Figures



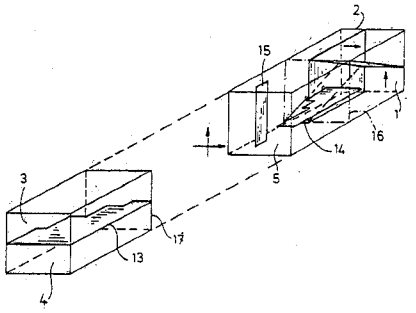
4,720,691 Jan. 19, 1988

Compact Waveguide Apparatus Acting as a Magic T

Inventor: Emmanual Rammos.
Assignee: Agence Spatiale Europeenne.
Filed: Sept. 4, 1986.

Abstract—A rectilinear waveguide junction apparatus in which the input and output guides are parallel to the longitudinal axis of the apparatus. This apparatus is characterized in that it takes the form of a parallelipiped guide the internal volume of which is divided up by metal partitions which form two parallel input guides, two parallel output guides and a main intermediate guide of same section as the parallelipiped guide. This apparatus is used in very high frequency circuits, for example the supply circuits for satellite or radar antennas.

5 Claims, 10 Drawing Figures



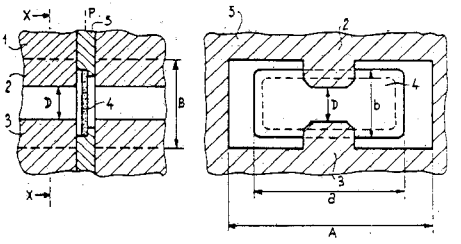
4,720,693 Jan. 19, 1988

Ridged Rectangular Waveguide Provided with a Sealed Window

Inventor: Jacques Tikes.
Assignee: Thomson-CSF.
Filed: Dec. 30, 1985.

Abstract—A thin waveguide window having a broad band of operating frequencies is composed of a metallic frame provided with an opening and a leak-tight closure plate of dielectric material. The frame permits a reduction in dimensions of the plate, with the result that any spurious frequencies introduced by the plate are rejected from the operating frequency band. By giving the plate an oblong shape, it is possible to balance its inductive components by means of its capacitive components at the mid-band frequency. A matching transformer formed by the ridges which are more closely spaced in the vicinity of the window than in the remainder of the waveguide permits matching throughout the frequency band.

8 Claims, 14 Drawing Figures



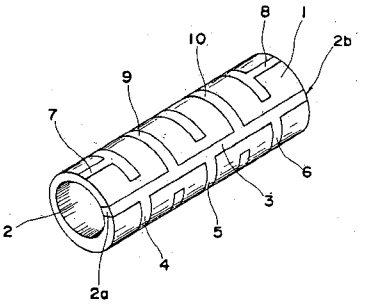
4,721,931 Jan. 26, 1988

Stripline Filter

Inventors: Toshio Nishikawa, Youhei Ishikawa, Jun Hattori, and Hideyuki Kato.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Apr. 30, 1987.

Abstract—A stripline filter includes a cylindrical substrate made of a dielectric material and having inner and outer surfaces with opposite ends thereof opened. A ground electrode is deposited on the inner surface, and on the inner surface, interdigitated electrodes are deposited. Alternately, the ground electrode may be deposited on the outer surface, and the interdigitated electrodes may be deposited on the inner surface. Thus, the stripline filter can be arranged in a compact size. Also, the ground electrode provided on the outer surface prevents electromagnetic waves generated from the interdigitated electrodes from being emitted out.

8 Claims, 6 Drawing Figures



4,721,932 Jan. 26, 1988

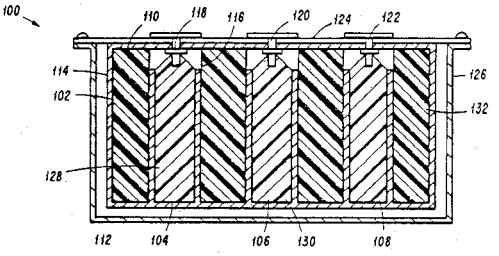
Ceramic TEM Resonator Bandpass Filters with Varactor Tuning

Inventor: James B. West.
Assignee: Rockwell International Corporation.
Filed: Feb. 25, 1987.

Abstract—A ceramic TEM resonator bandpass filter with varactor tuning is disclosed. The varactor is located within the resonator holes of a ceramic TEM resonator filter, and is positioned within said holes immediately above the upper extent of the metal plating forming the resonator in said resonator

holes. The placement of the varactor in such a manner reduces the interference caused by the varactor in the interresonator coupling. A new apparatus for positioning the varactor within the resonator hole is disclosed and basically includes a conductive rod which at its top end receives the varactor.

5 Claims, 4 Drawing Figures



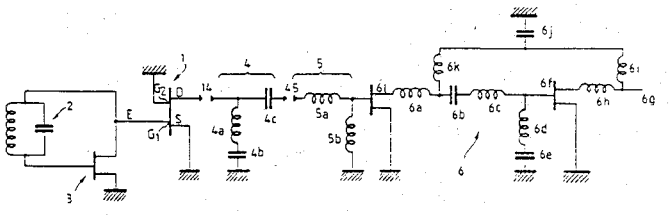
4,723,113 Feb. 2, 1988

Very High Frequency Harmonic Generator

Inventor: Jean-Félicien Marcoux.
Assignee: Enertec.
Filed: Sept. 3, 1986.

Abstract—A very high frequency harmonic generator utilizes a type III–V (e.g. GaAs) FET. An input signal is applied to the gate of the FET at a sufficient level to induce non-linear functioning of the FET. This causes an output signal to appear between the source and drain having frequency components of at least the tenth harmonic of the input signal. The device is particularly applicable to the generation of microwave signals.

10 Claims, 8 Drawing Figures



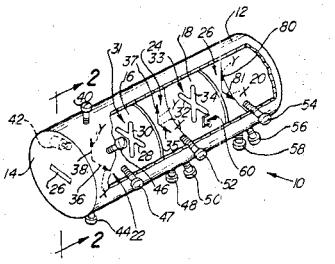
4,721,933 Jan. 26, 1988

Dual-Mode Waveguide Filter Employing Coupling Element for Asymmetric Response

Inventors: Craig Schwartz, Louis Hendrick, and Joseph Elliott.
Assignee: Hughes Aircraft Company.
Filed: Sept. 2, 1986.

Abstract—A dual-mode circular-type waveguide filter (10) has a cylindrical waveguide body (12) separated by septums (16,18) into a plurality of resonant waveguide cavities (22,24,26). Mutually orthogonal electromagnetic fields (37,81) in adjacent cavities (24,26) are electromagnetically coupled with each other by an internal coupling element (60) which is mounted on one of the septums (18) and extends into the adjacent cavities. The coupling element comprises an elongate, conductive wire which includes a first portion (62) extending into one of the cavities and forming a magnetic loop, and a second portion (64) extending into the adjacent cavity and forming an electric probe. The coupling element provides an asymmetrical stopband pole (72a) in the frequency response (70) of the filter.

15 Claims, 7 Drawing Figures



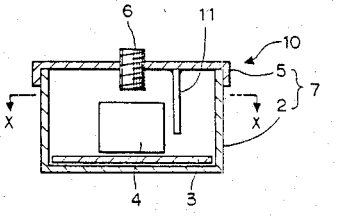
4,724,403 Feb. 9, 1988

Microwave Oscillator

Inventor: Akira Takayama.
Assignee: Alps Electric Co.
Filed: Apr. 23, 1986.

Abstract—A microwave oscillator of the type in which a dielectric resonator is disposed inside a conductive housing, characterized in that a conductive rod-like member is disposed inside the housing and arranged in parallel with the axis of the dielectric resonator with one end connected electrically to the housing and the other end left free. Preferrably, the rod-like member is made so thin as to interrupt little the magnetic flux generated by the dielectric resonator, and the resonance frequency of the housing is selected lower than that of the dielectric resonator.

4 Claims, 10 Drawing Figures



4,724,408 Feb. 9, 1988

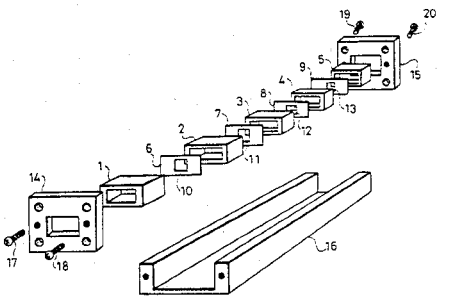
Waveguide Filter

Inventor: Sadao Igarashi.
Assignee: Alps Electric Co., Ltd.
Filed: Aug. 26, 1986.

Abstract—A waveguide filter comprises waveguides with length corresponding to the center frequency of a band pass filter, and shunt plates. Each shunt inductor plate has sufficient size to cover an opening of the wave guide and includes an induction window smaller than the opening, and each opening is

opposed to each induction window. The waveguides and the shunt inductor plates are alternately arranged in close contact state, and the center frequency of the filter scarcely deviates.

2 Claims, 12 Drawing Figures



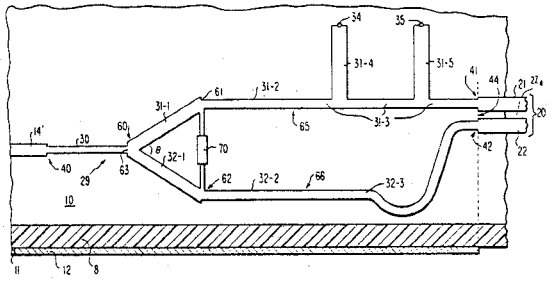
4,725,792 Feb. 16, 1988

Wide-Band Balun Realized by Equal-Power Divider and Short-Circuit Stubs

Inventor: Ross W. Lampe, Jr.
Assignee: RCA Corporation.
Filed: Mar. 28, 1986.

Abstract—A balun comprises a one-to-two, equal-power, matched power divider having branch transmission lines whose lengths differ by 1/2 wavelength at a design frequency. The shorter of these two branch transmission lines has two 1/4 wavelength long, shorted stub transmission lines branching therefrom 1/4 wavelength apart.

10 Claims, 3 Drawing Figures



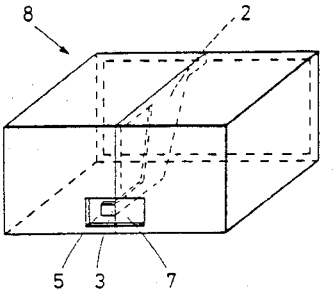
4,725,793 Feb. 16, 1988

Waveguide–Microstrip Line Converter

Inventor: Sadao Igarashi.
Assignee: Alps Electric Co., Ltd.
Filed: Sept. 25, 1986.

Abstract—A waveguide-microstrip line converter for mode conversion in transmitting signals from a waveguide to a microstrip line or in the reverse, which comprises a dielectric body, a probe formed integrally with and within the dielectric body, and a conductive layer formed over the surface of the dielectric body excluding a surface to be brought into contact with a waveguide and an area surrounding the connecting part of the probe. The conductive layer is formed over the entire surface of the dielectric body, and then part of the conductive layer is removed by etching to provide the uncoated surface to be brought into contact with the waveguide and the probe. Thus the probe is continuous with the conductive layer and is an integral part of the dielectric body, so that the performance of the probe is unaffected by vibration and the high frequency resistance across the short-circuit waveguide is reduced to reduce signal transmission loss.

1 Claim, 4 Drawing Figures



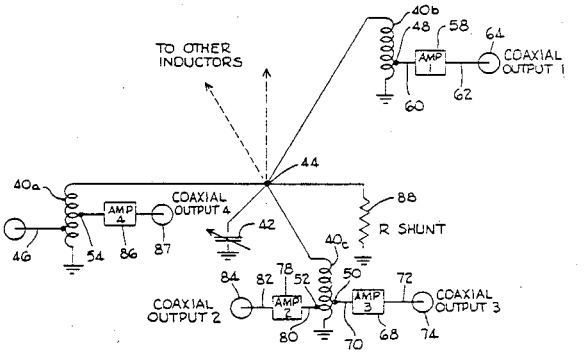
4,725,794 Feb. 16, 1988

Receiver Multicoupler Using No-Loss Signal Splitter

Inventor: Daniel A. Barczys.
Filed: June 24, 1987.

Abstract—A receiver multicoupler having multiple, isolated outputs generated from a single input comprising a no loss signal splitting network connected to the input having insignificant power absorption and being in the form of parallel tuned circuits providing multiple voltage outputs from a single input and a plurality of very high input resistance voltage amplifiers, each of the amplifiers having an input connected to the signal splitting network, and each of the amplifiers acting as an impedance transformation device and supplying isolation.

11 Claims, 7 Drawing Figures



4,725,795 Feb. 16, 1988

Corrugated Ridge Waveguide Phase Shifting Structure

Inventors: James S. Ajioka, Robert T. Clark, and Dean C. Quick.
Assignee: Hughes Aircraft Co.
Filed: Aug. 19, 1985.

Abstract—A differential phase shifting structure is disclosed, employing corrugated ridges in square or round waveguides or in coaxial lines operating in the TE_{11} mode. The structure provides a substantially constant differential phase shift between two waves polarized orthoganally to each other. The corrugations in the ridge provide a series inductance which can be optimized with the shunt capacitance of the ridge to provide a characteristic impedance matching that of the unloaded structure. The corrugated ridges provide increased differential phase shift per unit length. The differential phase shifting structure is particularly well suited to such applications as circular polarizers, quarter wave plates or polarization rotating half-wave plates.

14 Claims, 14 Drawing Figures