Patent Abstracts

These Patent Abstracts of recently issued patents are intended to provide the minimun 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.

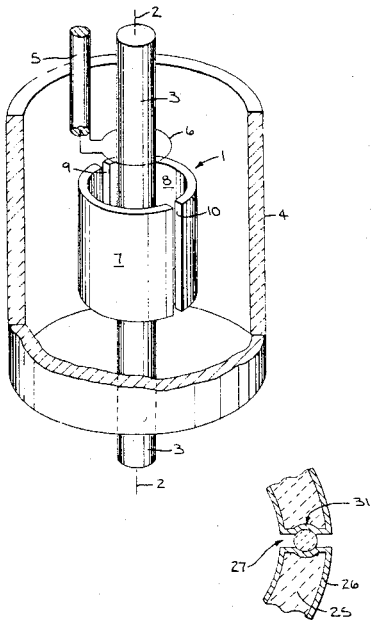
4,435,680 Mar. 6, 1984

Microwave Resonator Structure

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

Abstract—A microwave resonator is formed by a cylindrical loop and one or more gaps which extend along its length. The loop is formed from a machineable insulating material and a layer of electrically conductive material is deposited over its surfaces.

1 Claim, 7 Drawing Figures



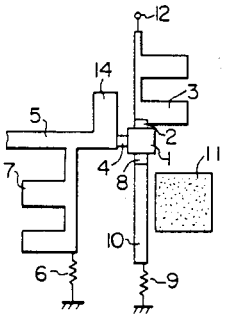
4,435,688 Mar. 6, 1984

FET Microwave Oscillator Being Frequency Stabilized by Capacitive Reactance Microstrip Stub Line

Inventors: Keiro Shinkawa, Masaki Noda, and Chuichi Sodeyama.
Assignee: Hitachi, Ltd.
Filed: July 24, 1981.

Abstract—A microwave oscillator circuit with an FET, a dielectric resonator and a micro-strip line has a capacitive reactance element connected between the source terminal of the FET and ground or between the source and drain terminals of the FET, so that the oscillation frequency fluctuations due to the power supply voltage fluctuations or the ambient temperature variations can be suppressed.

15 Claims, 9 Drawing Figures



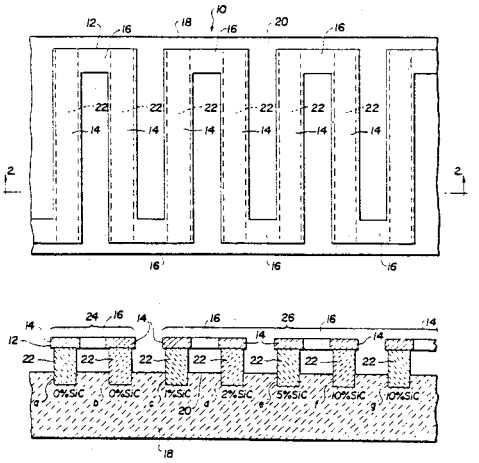
4,435,689 Mar. 6, 1984

Broadband Slow-Wave Structure Attenuator

Inventor: Hunter L. McDowell.
Assignee: The United States of America as represented by the Secretary of the Army.
Filed: May 10, 1982.

Abstract—A broadband attenuator section in a meander line slow wave structure is disclosed for attenuating signals reflected between the output and input of the slow wave structure. The attenuator section comprises a multi-element ceramic support structure intermediate the meander line conductor pattern and the substrate wherein the support elements are comprised of a beryllium oxidesilicon carbide ceramic composition with a taper in the percentage of silicon carbide being provided in the transition region from a loss free section of the slow wave structure to a lossy attenuator section. The taper in percentage involves the use of ceramic support elements arranged in a sequence of 1%, 2% and 5% silicon carbide composition prior to the main attenuator section which is comprised of 10% silicon carbide-90% beryllium oxide support elements.

18 Claims, 2 Drawing Figures



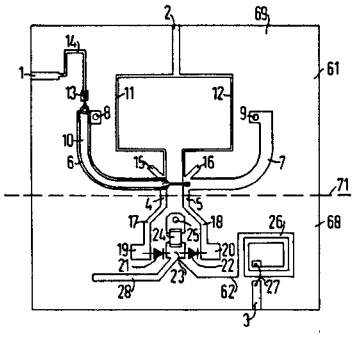
4,435,848 Mar. 6, 1984

Stripline Microwave Balanced Mixer Circuit

Inventor: Siegfried Sedlmair.
Assignee: Siemens Aktiengesellschaft.
Filed: Apr. 21, 1982.

Abstract—A stripline tuning fork microwave balanced mixer circuit which includes two diodes (21,22) and a differential transformer (61) whereby matching is accomplished in the differential transformer (61) and in the circuit arrangement between the differential amplifier and the diodes (21,22) for matching the resistance to the input terminals (1,2) and a transforming circuit (24,25,26) which suppresses the frequency range of the input signals following the diodes and has simultaneous high frequency blocking for matching to the intermediate frequency signal output at terminal (3). This latter circuit can be utilized so that it functions as a blocker for the sum frequencies of the two input signals and the balanced push-pull mixer circuit of the invention can be used in sensitive receivers used in the microwave range.

16 Claims, 4 Drawing Figures



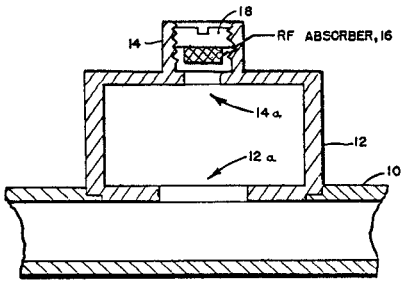
4,437,073 Mar. 14, 1984

Equalizer Cavity with Independent Amplitude Control

Inventor: Herbert L. Thal, Jr.
Assignee: The United States of America as represented by the Secretary of the Air Force.
Filed: Feb. 9, 1982.

Abstract—An equalizer cavity apparatus which is directionally coupled to a rectangular waveguide utilizes a circular waveguide with an adjustable RF absorber therein to lower the quality factor, Q, of the equalizer cavity.

6 Claims, 2 Drawing Figures



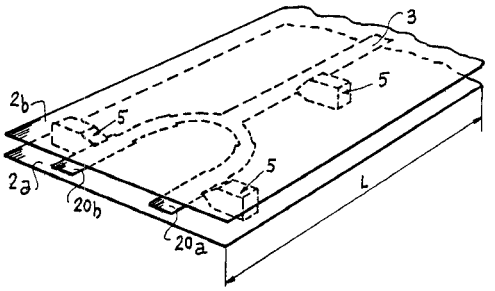
4,437,074 Mar. 13, 1984

Ultrahigh-Frequency Transmission Line of the Three-Plate Air Type and Uses Thereof

Inventors: Georges Cohen and Jean Heroux.
Assignee: Thomson-CSF.
Filed: Dec. 14, 1981.

Abstract—The present invention provides an ultrahigh-frequency transmission line of the three-plate air type comprising two parallel conducting plates, the space separating these two plates being filled with air, a central conducting strip placed between said two plates and a plurality of dielectric material supports spread out along each side of said strip, each support comprising a notch in each of which said strip is positioned so as to be held in place.

15 Claims, 6 Drawing Figures



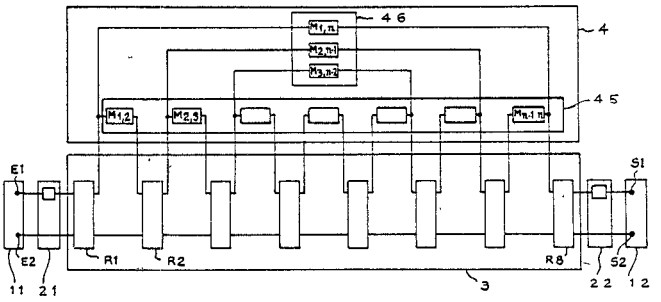
4,437,075 Mar. 13, 1984

Self-Corrected Electric Filters

Inventor: Corinne Darmouni.
Assignee: Thomson-CSF.
Filed: Jan. 7, 1982.

Abstract—A self-corrected electric filter with localized constant elements having two inputs, two outputs, input and output matching means, a group of an even number of filter elements in cascade for filtering the wide band signal, group delay time correction means comprising adjacent secondary couplings connected between at least two successive filter elements and secondary nonadjacent couplings connected between at lest two nonadjacent filter elements.

3 Claims, 6 Drawing Figures



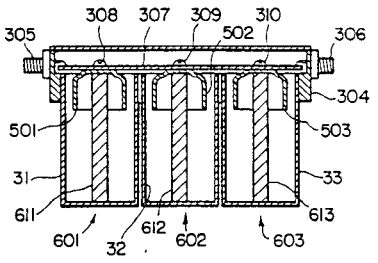
4,437,076 Mar. 13, 1984

Coaxial Filter Having a Plurality of Resonators Each Having a Bottomed Cylinder

Inventors: Mitsuo Makimoto, Yokoama, Haruyoshi Endo, Ko Kikuchi, and Sadahiko Yamashita.
Assignee: Matsushita Electric Industrial Co., Ltd.
Filed: Feb. 16, 1982.

Abstract—In a coaxial filter arrangement having a plurality of coaxial resonators each having a bottomed metallic cylinder interposed between a dielectric plate and one end of a center conductor of each resonator, the peripheral wall portion of the metallic cylinder is received in the bore of an outer conductor having an open end and a closed end connected to the other end of the center conductor. In one embodiment, the bottom of the metallic cylinder has a convex portion at its center so that the bottom center projects outwardly. In another embodiment, an annular metallic member is interposed between the dielectric plate and the outer surface of the flat bottom of the metallic cylinder. Since the distance between bottoms of metallic cylinders of adjacent resonators is made large with this arrangement, influence due to leakage flux of electromagnetic field is small, while stray capacitance is negligibly small, thereby providing a filter having high performance and low loss.

12 Claims, 13 Drawing Figures



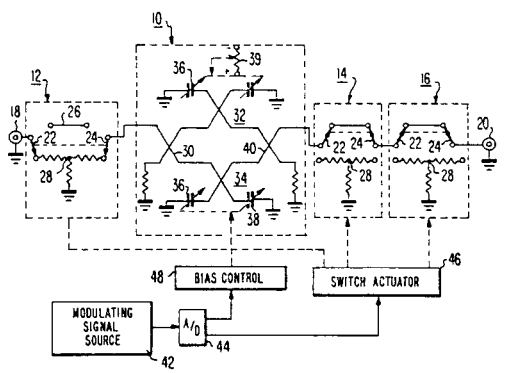
4,438,415 Mar. 20, 1984

Digital Programmable Attenuator

Inventor: Samuel Hopfer.
Assignee: General Microwave Corporation.
Filed: Jan. 29, 1982

Abstract—A digitally programmable attenuator for high speed and a large dynamic range is constructed with a phase-controlled attenuator for small steps of attenuation and an attenuator of switched resistive pads for larger steps. The attenuators are connected in tandem and actuated combinatorially with the phase-controlled attenuator being switched into operation for the small steps, and the resistive pads being switched into operation for the large steps. A phase-controlled attenuator is constructed to permit adjustment of the attenuator characteristic, and a switched-pad attenuator is constructed to be phase shiftless.

20 Claims, 5 Drawing Figures



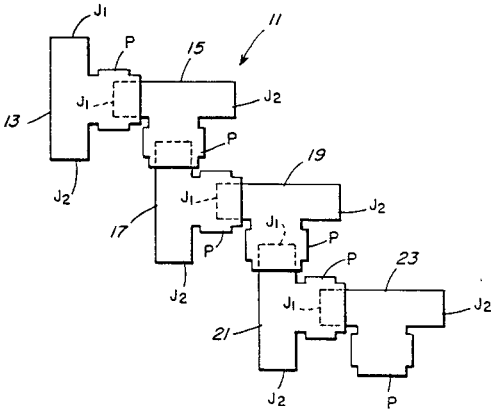
4,438,416 Mar. 20, 1984

Picosecond Delay Device

Inventors: Norman H. Schiller and Robert R. Alfano.
Assignee: Hamamatsu Corporation.
Filed: Jan. 25, 1982.

Abstract—An electric device for use in delaying the time of arrival of an electrical signal with fixed increments of delay in the picosecond range and having a minimum delay time in picoseconds is disclosed. In one embodiment of the invention, the device comprises a plurality of small T shaped RF coaxial connectors fixedly coupled together in series with the connectors themselves serving as delay elements. One of the unconnected (open) ports of the connector at one end of the series is used as the entrance port for the device and the other unconnected ports of the connectors in the series are used as exit ports for the device. An electrical signal introduced into the device through the entrance port and then exciting through one of the exit ports is delayed according to the total path length travelled by the signal in passing from the entrance port to the particular exit port selected to be used as the exit port, each port in the path travelled by the signal from the entrance port to the exit port producing a time delay in the order of picoseconds, the exact number of picoseconds for a port depending on the specific type of connector employed. In another embodiment of the invention, a plurality of transmission lines having different lengths between about 10 to 100 mm etched on a printed circuit board are connected to individual double pole double throw switches which are coupled together in series, each transmission line causing a time delay of a signal passing through it of a different number of picoseconds.

8 Claims, 2 Drawing Figures



4,438,436 Mar. 20, 1984

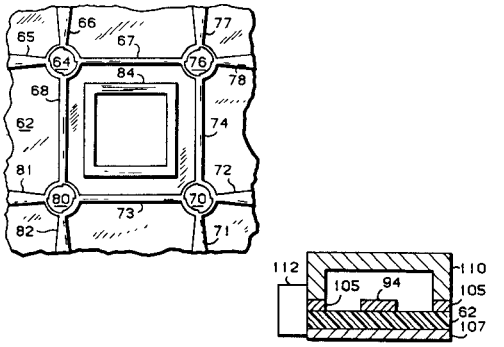
Millimeter-Wave Monopulse Comparator Circuit

Inventor: Earl R. Murphy.
Assignee: Motorola Inc.
Filed: Dec. 4, 1981.

Abstract—An improved monopulse comparator circuit is achieved by a unique circuit layout. Four hybrid junctions are arranged on a low dielectric constant substrate and are interconnected in such way as to form a closed square figure. Distances between adjacent hybrid junctions are thus minimized. Input lines which connect the comparator circuit to a monopulse antenna array are disposed on the substrate external to the closed figure, as are output lines which connect the comparator to a monopulse guidance system. Right angle microstrip to waveguide transitions are used so that the comparator circuit need not be integrated onto the same substrate as the antenna array and the

guidance system. The entire comparator layout is channelized to increase isolation between closely spaced lines.

3 Claims, 6 Drawing Figures



4,439,004 Mar. 27, 1984

Optical Waveguide and Modulator and Process for Fabricating Same

Inventors: Robert G. Hunsperger and Gordon A. Shifrin.
Assignee: Hughes Aircraft Company.
Filed: Oct. 27, 1982.

Abstract—Disclosed is an improved optical waveguide and modulator and an ion implantation process for fabricating same. The process includes the step of implanting high energy protons in a suitable semiconductive substrate material, such as gallium arsenide, to form a semiinsulating wave guiding layer therein for efficiently sustaining light propagation. The relatively large difference between the refractive indices of the high resistivity proton implanted layer and of the underlying low resistivity substrate result in highly efficient coupling and modulation of light passing through the proton implanted layer. The letter is partly the result of the relatively high resistivity attainable by proton implantation and partly the result of the sharp profile of ion dosage versus proton implantation distance into the substrate.

10 Claims, 4 Drawing Figures

Fig 1

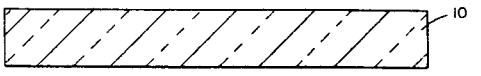


Fig 2

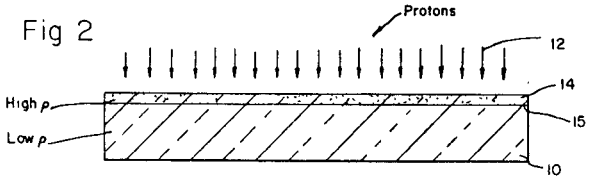


Fig 3

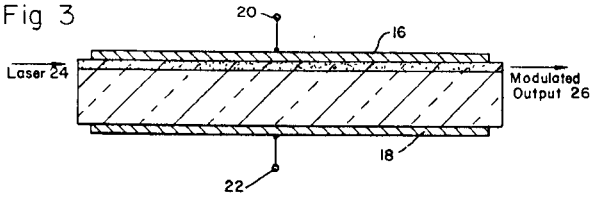
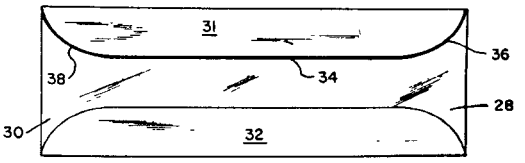


Fig 4



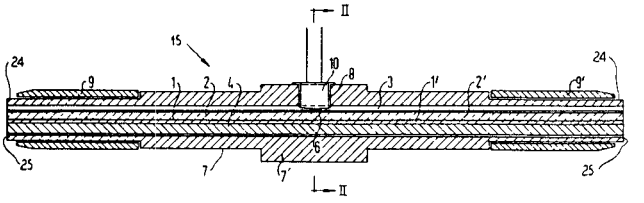
4,439,005 Mar. 27, 1984

Branching Element for Optical Waveguides

Inventor: Gerhard Winzer.
Assignee: Siemens Aktiengesellschaft.
Filed: Aug. 15, 1979.

Abstract—A branching device for branching a light component out of an optical waveguide characterized by a pair of carriers each supporting a waveguide, a supporting arrangement for supporting the carriers with the end surfaces of the waveguide spaced apart by a reflective layer of a beam divider sandwiched between the end surfaces and a detector arranged to receive the light coupled by the reflective layer from the waveguides A method of forming the device preferably provides a common member having a waveguide, severing the member along a plane extending obliquely to the axis of the waveguide to form the two halves or carrier members, optically polishing the cut surfaces of the halves, applying a reflective layer of the beam divider on a polished cut surface of one of the carrier members. Then the carriers are formed into a waveguide unit with the polished, cut surfaces separated by the layer of the beam divider. The waveguide unit is then either assembled in a support carrier or directly positioned within a tubular sleeve member having an opening for the photo detector and the parts are arranged so that the light component will be received by the photo detector.

22 Claims, 2 Drawing Figures



4,439,747 Mar. 27, 1984

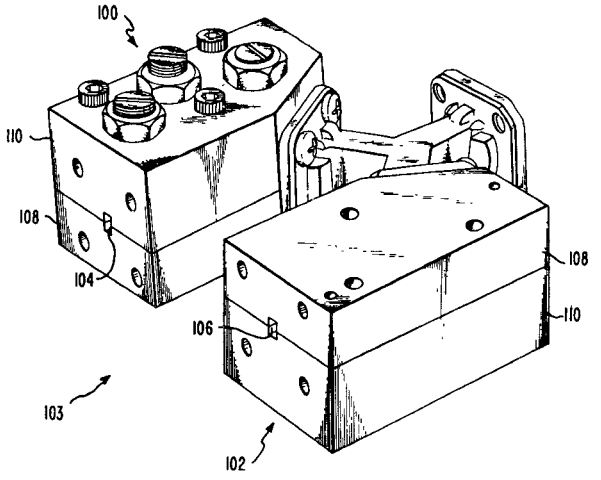
Method for Improving Selectivity in Cylindrical TE_{011} Filters by TE_{211}/TE_{311} Mode Control

Inventors: Donald E. Kreinheder and Terrance D. Lingren.
Assignee: Hughes Aircraft Co.
Filed: June 7, 1982.

Abstract—A method for designing low loss cylindrical TE_{011} mode resonators which permits selective placement of a transmission null at a frequency near the TE_{011} resonance frequency. The frequencies of the TE_{211} and TE_{311} modes, that are naturally excited in the resonator, are controlled by the angular displacement of the resonator input port and output port and by the relative amplitude of the TE_{011} mode compared to the TE_{211} and TE_{311} modes. Proper placement of the transmission nulls improves the selectivity of the TE_{011}

resonator, and/or can be used to filter out unwanted noise at the frequency of the transmission null A lumped constant analog circuit model is presented to assist in design of the resonator.

6 Claims, 16 Drawing Figures



4,439,748 Mar. 27, 1984

Corrugated Waveguide or Feedhorn Assembled from Grooved Pieces

Inventor: Corrado Dragone.
Assignee: Bell Telephone Laboratories, Incorporated.
Filed: June 28, 1982.

Abstract—The present invention relates to a rectangular corrugated waveguide or feedhorn wherein a plurality of adjacent grooves of a predetermined depth and crosssection are formed, preferably by numerical machining, in a major exposed surface of each of four plates of an electrically conductive material. The four plates are then secured together to form a rectangular corrugated passage there between where the ends of the line of grooves in one plate substantially meet and are aligned with the ends of corresponding grooves in another plate to form a solid line of electrically conductive material at the corners of the passage.

11 Claims, 5 Drawing Figures