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.

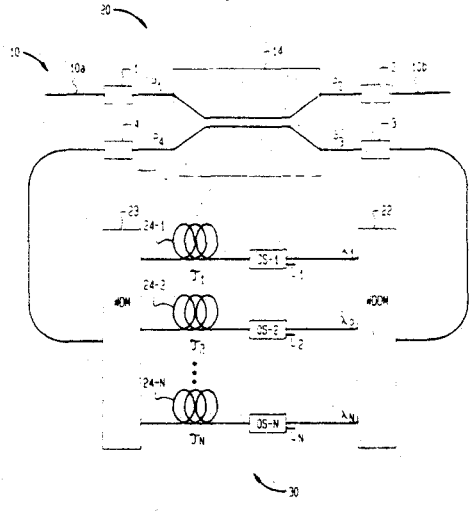
4,890,893 Jan. 2, 1990

Dark Fiber Switched Bandwidth Filter

Inventor: Lanny S. Smoot.
Assignee: Bell Communications Research, Inc.
Filed: Mar. 2, 1989.

Abstract—A device for affecting an individual bit rate limitation for each of a plurality of wavelength channels propagating in an optical fiber is disclosed. In a particular embodiment, the device comprises a directional coupler which is inserted into the optical fiber link. A recirculation path for a fraction of the power propagating in the fiber link extends between an output of the coupler and an input of the coupler. Illustratively, the recirculation path includes a wavelength division demultiplexer and an individual delay element for each wavelength channel. Optical switches may be utilized to block or permit passage of individual wavelength channels in the recirculation path.

10 Claims, 4 Drawing Sheets



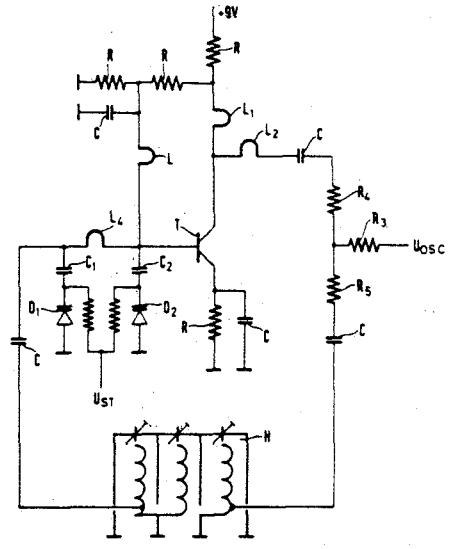
4,891,610 Jan. 2, 1990

UHF-Feedback Oscillator

Inventor: Peter E. Veith.
Assignee: AKG Akustische u. Kino-Geräte Gesellschaft m.b.H.
Filed: Feb. 16, 1989.

Abstract—A UHF-feedback oscillator for a frequency range of at least 300 MHz–1000 MHz includes an amplifier stage, a voltage controlled tuning filter and a feedback quadripole. The feedback quadripole comprises a two- or three-loop helical waveguide resonator. Thus, the oscillator is easily adjustable to its oscillating condition within the very wideband frequency range of between 300 MHz–1000 MHz and can be miniaturized in the simplest manner.

5 Claims, 3 Drawing Sheets



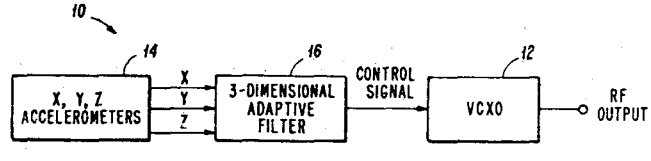
4,891,611 Jan. 2, 1990

Vibration Compensated Crystal Oscillator

Inventor: Marvin E. Frerking.
Assignee: Rockwell International Corp.
Filed: Mar. 9, 1989.

Abstract—In order to compensate for mechanical vibration that corrupts the RF output spectrum of a crystal oscillator, three accelerometers are mounted with the oscillator and aligned on mutually perpendicular axes. The outputs of the accelerometers are digitized and applied to adaptive transversal filters comprising a digital signal processor. The crystal oscillator is placed on a vibration table and its output is compared with an external frequency reference. The tap weights of the filters are then optimized so that the vibration components of the output spectrum of the oscillator are minimized. After the tap weights of the filters are determined and fixed, the filters provide vibration compensation for the oscillator. During operation of the crystal oscillator, the outputs of the filters are summed and applied to a varactor in the oscillator to compensate the output for the effects of mechanical vibration.

19 Claims, 3 Drawing Sheets



4,891,612 Jan. 2, 1990

Overlap Interfaces Between Coplanar Transmission Lines which are Tolerant to Transverse and Longitudinal Misalignment

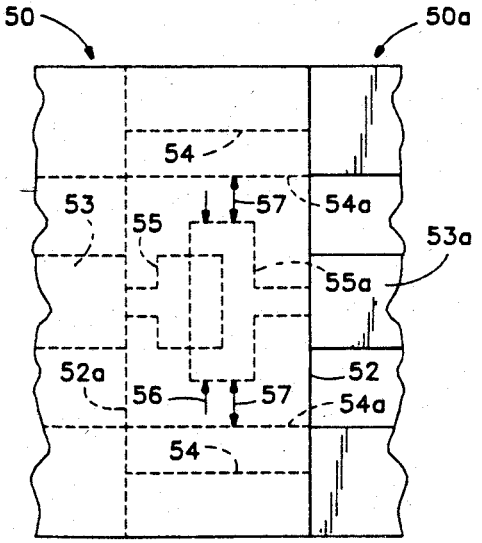
Inventors: K. Reed Gleason, Keith E. Jones, and Eric W. Strid.
Assignee: Cascade Microtech, Inc.
Filed: Nov. 4, 1988.

Abstract—An interface structure, for connecting a pair of coplanar transmission lines in end-to-end overlapping relation to each other, employs

1051-8207/91/0100-0014$01.00 © 1991 IEEE

dissimilarly-shaped overlapping end portions of the respective signal and/or ground lines of the transmission lines. The dissimilarly-shaped end portions are effective to minimize variations in the impedance of the interface structure due to variations in transverse and/or longitudinal alignment of the overlapping end portions of the respective transmission lines, thereby making the interface tolerant to misalignments.

10 Claims, 3 Drawing Sheets



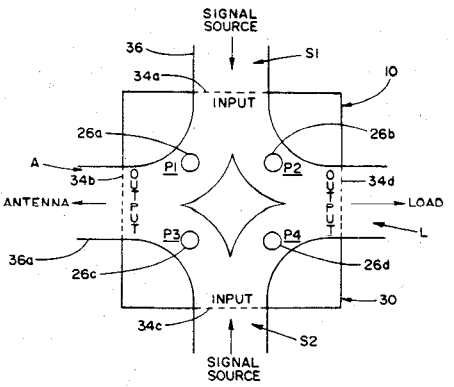
4,891,613 Jan. 2, 1990

Transfer Device for Combining, Dividing, and Switching Microwave Signals

Inventor: Victor Nelson.
Filed: Jan. 9, 1989.

Abstract—This microwave transfer device is a hollow body having an internal cavity and lateral input and output openings communicating with the cavity. A post in the cavity divides it into passages extending between input and output openings for passing microwave signals therebetween. Axially reciprocatable shorting pins are supported on the body and are selectively insertable in the passages to close off the passages, and retractable from the passages to open the same. By proper selective insertion and retraction of the pins, microwave signals applied at the input openings can be combined, divided, or switched, respectively, to the output openings.

10 Claims, 3 Drawing Sheets



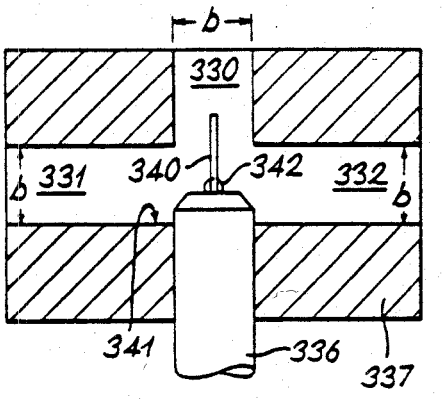
4,891,614 Jan. 2, 1990

Matching Asymmetrical Discontinuities in Transmission Lines

Inventor: Frans C. De Ronde.
Assignee: National Research Development Corp.
Filed: May 28, 1987.

Abstract—The invention relates to matching asymmetrical discontinuities in transmission lines to give low reflection coefficients (less than five percent) over a wide frequency band (corresponding to at least an octave in wavelength). A group of asymmetrical discontinuities, such as impedance steps in a waveguide, are matched by considering a reference plane whose position varies with frequency at which the reflection coefficient for waves transmitted in one direction is equal to that for waves transmitted in the opposite direction. Matching elements are then provided that have a reflection coefficient at the reference plane which is equal and opposite to the reflection coefficient of the discontinuities. Matching is less difficult if the distance between the steps is less than a quarter of a guide wavelength at all frequencies in the wide band mentioned above and such an arrangement is a "reduced quarterwave transformer." The technique of using the reference plane can also be applied to a single impedance step where two matching elements on either side of the step are required. The invention has application to, for example, waveguide transitions (including coaxial to waveguide transitions), waveguide twists, waveguide tees, symmetrical waveguide five ports, planar transmission lines, optical transmission lines, and dielectric lenses.

49 Claims, 13 Drawing Sheets



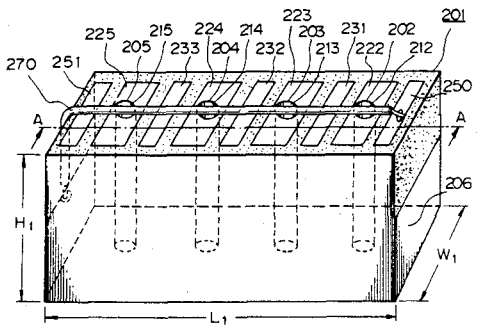
4,891,615 Jan. 2, 1990

Dielectric Filter with Attenuation Pole

Inventors: Tomokazu Komazaki, Katsuhiko Gunji, Norio Onishi, Yoshimitu Sakurai, Hiroyuki Horii, and Akira Mashimo.
Assignee: Oki Electric Industry Co.
Filed: Dec. 16, 1988.

Abstract—A dielectric filter with an attenuation pole having sharp attenuation characteristics. The dielectric block employed in the present dielectric includes a dielectric block single-block formed of TiO_2 or BaO, for example. The dielectric block of this type has a plurality of resonators extending from a top surface toward a bottom surface thereof, a plurality of adjusting patterns provided over the top surface thereof, an outer conductor formed by side surfaces and the bottom surface thereof, input and output electrodes, wherein the adjusting patterns, the outer conductor, input and output electrodes maybe plated, for example, by silver, and an insulated cable that may have one end connected to the outer conductor and another end connected to the output electrode is disposed over the plurality of resonators so as to be coupled thereto.

22 Claims, 3 Drawing Sheets



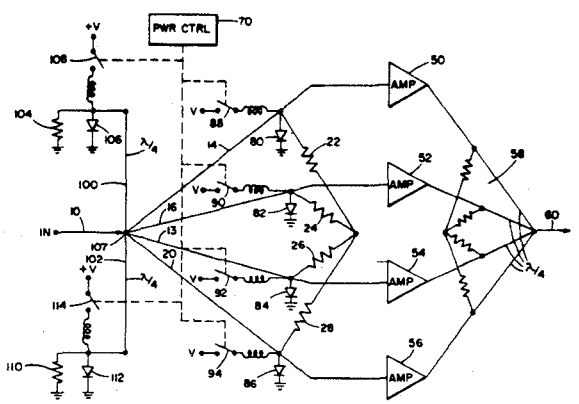
4,893,093 Jan. 9, 1990

Switched Power Splitter

Inventors: Edward A. Cronauer and Eileen T. Sarc.
Assignee: United Technologies Inc.
Filed: Feb. 2, 1989.

Abstract—An improved, switched, power splitter is described in which a high frequency input signal is applied via an input to a plurality of amplifiers. First transmission lines are connected between the input and each of the amplifiers, the impedance of each of the first transmission lines being alterable to either a high or low level. A balanced resistance network is preferably coupled between the first transmission lines. Second transmission lines are connected in shunt across the first transmission lines, the impedance of each second transmission line being alterable to an impedance which is a predetermined percentage of the circuits input impedance. A control circuit switches the various transmission lines so that the impedance at the input remains balanced, no matter how many of the first transmission lines are in the high impedance state.

8 Claims, 3 Drawing Sheets



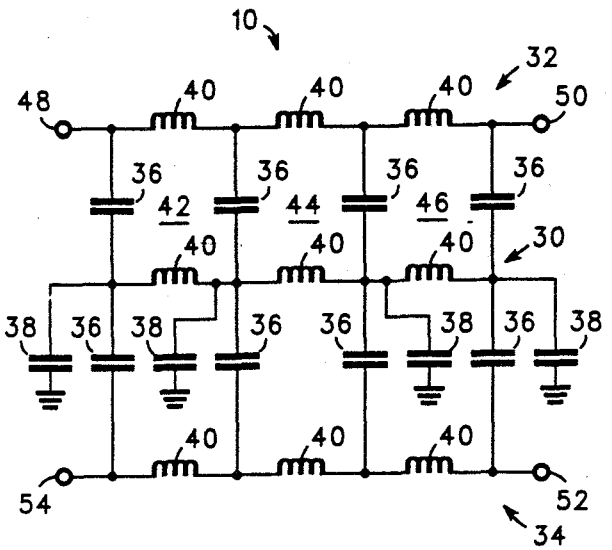
4,893,098 Jan. 9, 1990

90 Degree Broadband MMIC Hybrid

Inventors: Warren L. Seely and Joseph Staudinger.
Assignee: Motorola, Inc.
Filed: Dec. 5, 1988.

Abstract—A 90-degree hybrid is contemplated having three parallel signal paths, one of the signal paths is a central signal path that provides direct impedance to ground. The other two signal paths are capacitively coupled to the central signal path to provide a second impedance. Each signal path incorporates at least one inductor coupled in series along each of the signal paths. The signal paths are capacitively coupled to each other at each end of the inductors. To increase the bandwidth, additional hybrids are coupled in series, with each hybrid forming a section of the broadband hybrid.

4 Claims, 1 Drawing Sheet



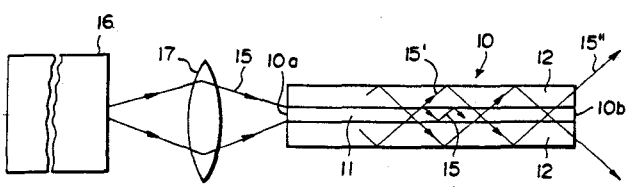
4,893,888 Jan. 16, 1990

Optical Wavelength Converter Device

Inventors: Yoji Okazaki, Koji Kamiyama, and Masaki Okazaki.
Assignee: Fuji Photo Film Co., Ltd.
Filed: Jul. 20, 1988.

Abstract—An optical wavelength converter device has a waveguide of a nonlinear optical material disposed in cladding and having a refractive index lower than the refractive index of the cladding for converting a fundamental guided through the waveguide into a second or third harmonic and radiating the second or third harmonic into the cladding. The nonlinear optical material comprises an organic nonlinear optical material having a maximum light absorption coefficient at a wavelength close to the wavelength of at least one of the fundamental and the second harmonic.

7 Claims, 6 Drawing Sheets



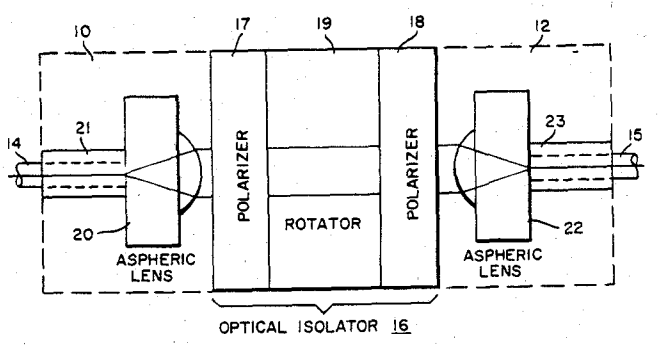
4,893,890 Jan. 16, 1990

Low-Loss, High-Isolation, Fiber-Optic Isolator

Inventor: George F. Lutes.
Filed: May 4, 1988.

Abstract—A low-loss, high-isolation, fiber-optic isolator for use in single-mode fiber systems utilizes a Faraday rotator and two polarizers, one at each end angularly oriented from each other at the angle of rotation for isolation, and two aspheric lens connectors to couple optical fibers to the Faraday isolator to reduce forward loss to about 2.6 dB and improve isolation to greater than 70 dB.

5 Claims, 2 Drawing Sheets



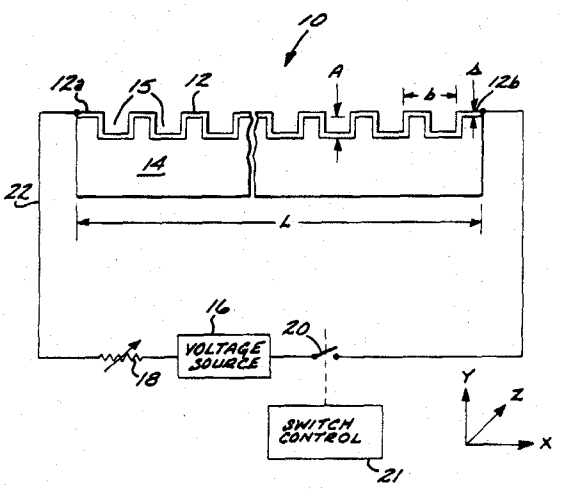
4,894,623 Jan. 16, 1990

Compact Tunable RF Generator Using a Current Carrying Diffraction Grating

Inventor: David B. Chang.
Assignee: Hughes Aircraft Co.
Filed: Jul. 25, 1988.

Abstract—A compact tunable generator of radio frequency (RF) electromagnetic energy is disclosed. A thin conducting film is applied to a diffraction grating formed from a nonconducting substrate. A voltage source is applied to the film so that a current flows in the convoluted plane of the film in a direction perpendicular to the grooves of the grating. The frequency of the RF energy radiated by this system is determined both by the grating spacing and the applied voltage. The power levels are adequate for testing sensitive receiver systems over a wide range of frequencies.

10 Claims, 1 Drawing Sheet



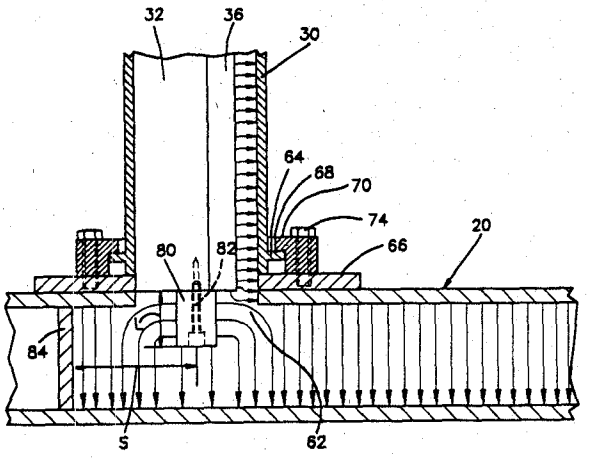
4,894,625 Jan. 16, 1990

Rectangular Waveguide to Circular Wrapped Rectangular Waveguide Transition

Inventors: Rex L. Niekamp and William A. Kerkhoff.
Assignee: Harris Corp.
Filed: Nov. 29, 1988.

Abstract—A transition is provided between a first rectangular waveguide and a second circular wrapped rectangular waveguide. The second waveguide takes the form of an elongated metallic annular wall having upper and lower ends and a partition member extending radially inward from the annular wall and having an inner edge located near the central axis of the annular wall. The partition member extends longitudinally for a length corresponding with that of the annular wall. An elongated metal probe is secured to the lower end of the partition member. The first rectangular waveguide has parallel rectangular broad walls interconnected by narrower walls. The first waveguide is oriented perpendicular to the central axis of the annular wall and has a circular aperture in one of the broad walls facing the lower end of the second waveguide with the aperture being in coaxial alignment with the annular wall. The first and second waveguides are secured together in such a manner that the probe extends through the aperture into the interior of the first waveguide.

9 Claims, 3 Drawing Sheets



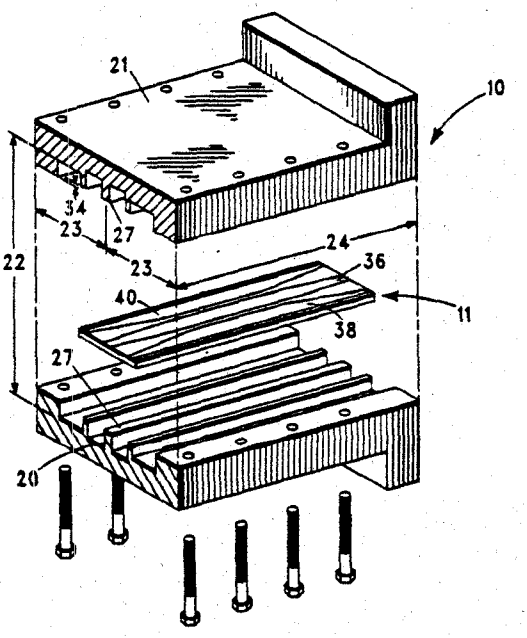
4,894,627 Jan. 16, 1990

Directional Waveguide-Finline Coupler

Inventor: Robert C. Kane.
Assignee: Motorola, Inc.
Filed: Jan. 3, 1989.

Abstract—A waveguide coupler for coupling energy from one waveguide to another, using a finline mode coupler. The coupler use a mode converter that changes the propagation mode in a waveguide from waveguide mode to finline mode. Finline mode waves are coupled into an adjacent waveguide via a slot in a wall, common to both waveguides wherein lies a finline coupler. After the finline mode waves are coupled into the adjacent waveguide, the finline mode converter reconverts the finline mode propagation to waveguide mode.

9 Claims, 2 Drawing Sheets



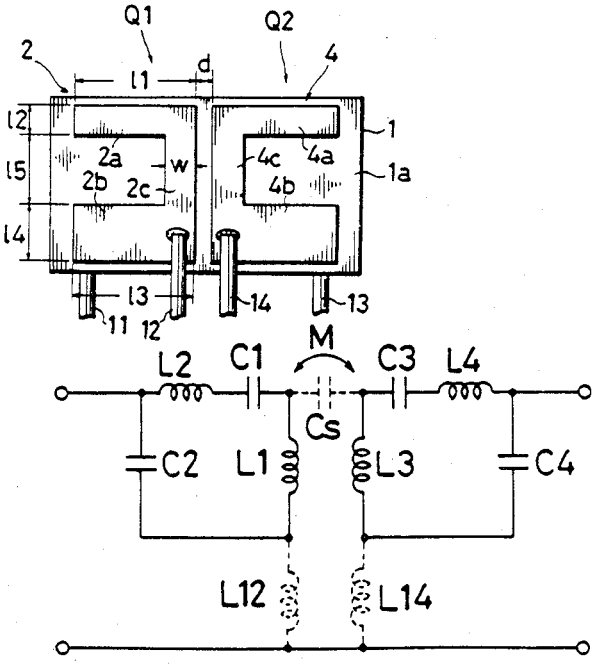
4,894,629 Jan. 16, 1990

Bandpass Filter Having Magnetically Coupled Resonators

Inventors: Hisatake Okamura, Teruhisa Tsuru, and Masahiko Kawaguchi.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Mar. 2, 1987.

Abstract—A bandpass filter comprising a plurality of resonators coupled by a magnetic induction coupling. Each of the resonators includes an equivalent circuit having an LC series circuit and a capacitance element connected in parallel, the LC series circuit including one capacitance element and two inductance elements connected in series to both sides of the one capacitance element. This construction realizes the magnetic induction coupling by utilizing the inductance elements constituting the resonators, without necessitating a separate coupling means such as a capacitance element.

15 Claims, 23 Drawing Sheets



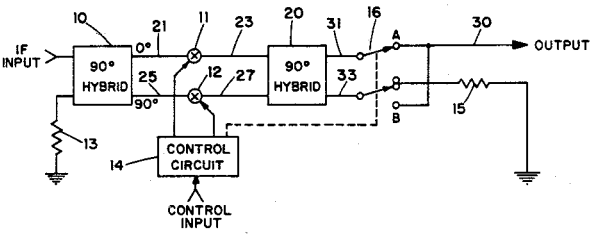
4,896,123 Jan. 23, 1990

Quadraphase Modulator

Inventor: Dov Taub.
Filed: Feb. 17, 1989.

Abstract—A quadraphase modulato comprising a first and a second quadrature hybrid, a first and a second phase reversal switch, a selector switch and a switch control means. The quadrature hybrids are connected in tandem by means of two lines connected between the two output ports of the first hybrid and the two input ports of the second hybrid with a phase reversal switch being connected in series with each of these lines. The input port of the quadraphase modulator is one of the input ports of the first hybrid while the output port of the quadraphase modulator is one or the other of the two output ports of the second hybrid. The positions of the phase reversal switches determine the port at which the output signal will appear and its relative phase, which maybe 0, 90, 180, or 270 degrees. The switch control means sets the positions of the phase reversal switches and thus the phase of the output signal and the output port of the second hybrid at which the output signal will appear. The switches control means automatically sets the selector switch to the proper output port to receive the output signal, thereby providing at the selector switch, a single output port for the quadrature modulator. Due to the use of tandem quadrature hybrids that inherently produce signals at low loss that are very nearly in precise quadrature, the present invention provides improved phase accuracy, insensitivity to amplitude imbalance and typically 3-dB less loss than conventional quadraphase modulators.

11 Claims, 1 Drawing Sheet



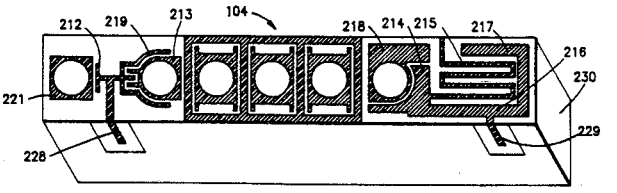
4,896,124 Jan. 23, 1990

Ceramic Filters Having Integral Phase Shifting Network

Inventor: Dale G. Schwent.
Assignee: Motorola, Inc.
Filed: Oct. 31, 1988.

Abstract—An integral phase shifting network of a transmitter filter provides a means to reduce the size and increase the efficiency of an antenna coupling network. The network to shift the phase of the transmitter filter is printed by depositing conductive material directly on a ceramic block using low-loss circuit elements and can be tuned easily by removing conductive material if required in certain applications. By utilizing an integral phase shifting network, either transmit or receive filters having a highly reactive and capacitive out-of-band impedance in the receive or transmit band, respectively, can be connected to a common antenna port without external transmission lines.

9 Claims, 1 Drawing Sheet



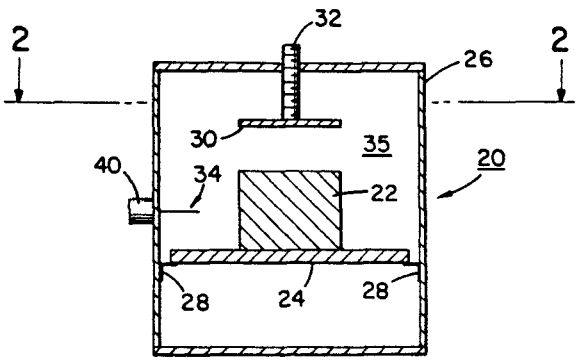
4,896,125 Jan. 23, 1990

Dielectric Notch Resonator

Inventors: William D. Blair, Jr., Salvatore Bentivenga, and Gregory J. Lamont.
Assignee: Alcatel N.A., Inc.
Filed: Dec. 14, 1988.

Abstract—A dielectric notch resonator particularly suitable for use in a band reject filter operable at ultra-high frequencies comprises a dielectric resonator and an associated housing that results in a reactance having an imaginary component effectively nulled by a coupling reactance mechanism forming part of the dielectric notch resonator so as to present a relatively low resistive impedance load at a given center frequency and frequencies in a narrow bandwidth thereabout. The coupling reactive mechanism comprises an inductive wire and a serially connected variable capacitor so as to null the reactive component of the dielectric resonator at a particular center frequency and to modify the symmetry of the rejected frequency bandwidth by adjusting the capacitance of the variable capacitor.

38 Claims, 3 Drawing Sheets



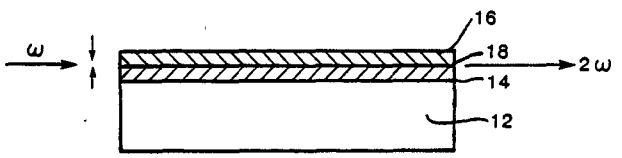
4,896,931 Jan. 30, 1990

Frequency Doubling Device

Inventor: Jacob Khurgin.
Assignee: North American Phillips Corp.
Filed: Aug. 18, 1988.

Abstract—A device for doubling the frequency of electromagnetic radiation. The device includes a nonlinear substrate having a nonlinear optical waveguide of a differing refractive index disposed thereon. The waveguide layer includes an inverted polarization interface at which the direction of polarization of the waveguide abruptly changes in sign. Radiation directed across the device parallel to the phase of the inverted polarization interface will be doubled in frequency by the interface. The inverted polarization interface may be achieved in a number of ways. The interface may be directly grown on the substrate or a single layer waveguide may be cleaved and flipped over upon itself. Finally, the waveguide may be formed by the growth of asymmetric mirror image quantum wells on either side of a plane to form the interface.

9 Claims, 3 Drawing Sheets



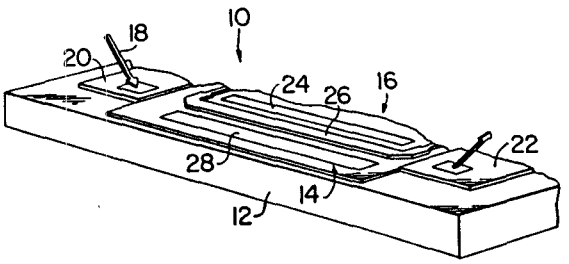
4,897,622 Jan. 30, 1990

Single Sideband Waveguide Modulator

Inventors: Peter K. Cheo and Gerald Meltz.
Assignee: United Technologies Corp.
Filed: Dec. 22, 1988.

Abstract—A novel single sideband electro-optic modulator includes a planar waveguide structure allowing only circularly polarized optical and microwaves to propagate therein with equal phase velocities comprises a strip loaded GaAlAs/GaAs/GaAlAs structure with appropriate microstrip electrodes. The present modulator is readily fabricated using established microelectronic fabrication techniques and a modified MOCVD epitaxial growth process.

14 Claims, 2 Drawing Sheets



4,897,623 Jan. 30, 1990

Noncontacting Printed Circuit Waveguide Elements

Inventor: John Reindel.
Assignee: The United States of America as represented by the Secretary of the Navy.
Filed: Apr. 13, 1988.

Abstract—Arrays of printed circuit elements are placed in the E-plane inside waveguides to reflect and pass selected bands of frequencies. The elements make no contact with the guide walls but are suspended on dielectric substrates and are held in place with foam dielectric.

15 Claims, 4 Drawing Sheets