Patent Abstracts

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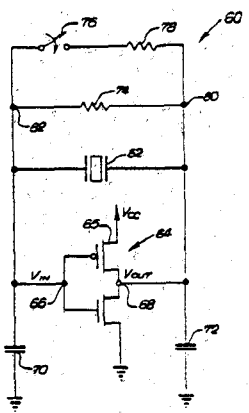
4,704,587 Nov. 3, 1987

Crystal Oscillator Circuit for Fast Reliable Start-up

Inventors: Kenneth W. Ouyang, Karl M. J. Lofgren, and Gerald W. Shearer.
Assignee: Western Digital Corporation.
Filed: Dec. 4, 1986.

Abstract—The present invention provides a circuit which facilitates fast and reliable start-up of an oscillator crystal without the amplification of undesirable frequencies of noise. A crystal is provided which is connected in parallel to an amplifying inverter having an input and an output. Grounded capacitors are connected respectively to the input and output of the inverter for stability. A first high resistance feedback path and a second low resistance feedback path are provided between output of the inverter and the input of the inverter. A switch is also provided for selectively engaging or disengaging the low resistance feedback path with the inverter at preselected points in time. During operation of the circuit in the preferred manner, the switch engages the low resistance feedback path with the inverter to allow maximum charge build-up at the stabilizing capacitors upon turn-on of a supply voltage, thus quickly generating a large input voltage at the inverter. The voltage at the input of the inverter quickly becomes equal to the voltage at the output of the inverter, resulting in high gain. Thereafter, the switch disengages the low resistance path from the inverter, creating a voltage transition. The voltage transition results in high level noise which may quickly be amplified by the high gain inverter to generate maximum amplitude at the crystal. The high resistance path keeps the inverter biased at high gain, while the opening of the low resistance path minimizes noise during subsequent oscillator operation.

8 Claims, 8 Drawing Figures



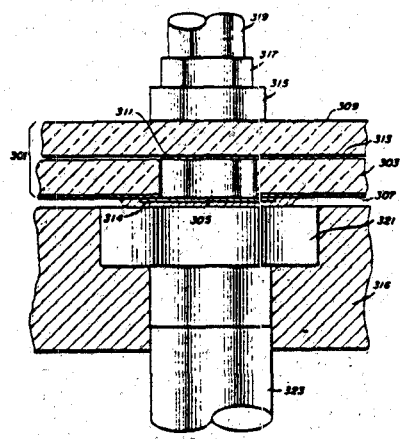
4,704,588 Nov. 3, 1987

Microstrip Circulator with Ferrite and Resonator in Printed Circuit Laminate

Inventor: Robert C. Kane.
Assignee: Motorola, Inc.
Filed: June 30, 1986.

Abstract—A microstrip circulator is disclosed in which a resonator (311) is metalized on one layer (309) of a multilayer printed circuit board (301) and a ferrite element (305) is disposed in another layer (303) of the circuit board. Input/output port termination mismatch due to port lead misalignment is eliminated and ferrite to resonator coupling is accomplished in a simple and repeatable manner.

16 Claims, 11 Drawing Figures



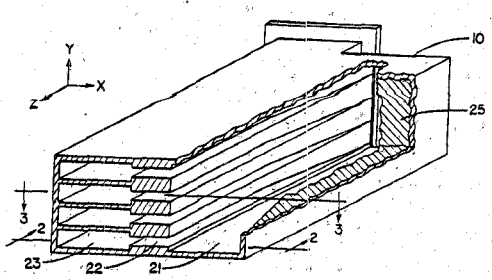
4,704,589 Nov. 3, 1987

Compact Waveguide Power Divider with Multiple Isolated Outputs

Inventor: Charles P. Moeller.
Assignee: The United States of America as represented by the United States Department of Energy.
Filed: May 27, 1986.

Abstract—A waveguide power divider (10) for splitting electromagnetic microwave power and directionally coupling the divided power includes an input waveguide (21) and reduced height output waveguides (23) interconnected by axial slots (22) and matched loads (25) and (26) positioned at the unused ends of input and output guides (21) and (23) respectively. The axial slots are of a length such that the wave in the input waveguide (21) is directionally coupled to the output waveguides (23). The widths of input guide (21) and output guides (23) are equal and the width of axial slots (22) is one half of the width of the input guide (21).

8 Claims, 7 Drawing Figures



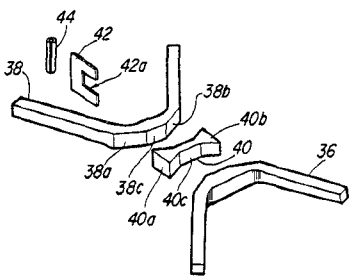
4,704,590 Nov. 3, 1987

Device for Coupling Microwave Energy

Inventor: Michael D. Schneider.
Assignee: Hughes Aircraft Company.
Filed: Sept. 26, 1985.

Abstract—A device for coupling or dividing electromagnetic energy, especially microwaves, between two circuits includes a pair of U-shaped conductors (36, 38) of rectangular cross-section which are coaxially disposed within corresponding slots (34, 36) in an electrically conductive base (30).The conductors have opposing, closely spaced stretches (36c, 38c) at an intersecting juncture in the slots where electromagnetic energy is coupled from one conductor to the other. The conductors are suspended in coaxial relationship within the slots by a pair of coplanar, C-shaped elements (42) which are slidably supported within a second pair of slots (43) in the base and each have cutouts (42a) therein in which the conductors are closely received. A spacer (40) maintains a preselected gap between the opposing stretches of the conductors and is provided with tapered ends (40a, 40b) which cooperate with beveled surfaces (38a, 38b) on the conductors to prevent relative lateral movement between the conductors.

13 Claims, 6 Drawing Figures



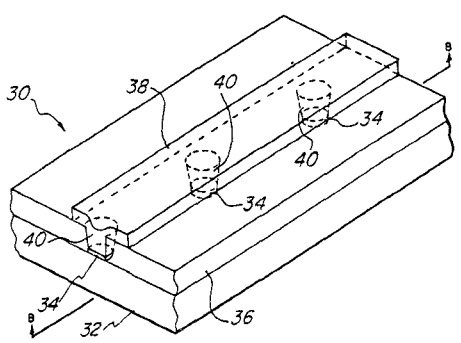
4,706,041 Nov. 10, 1987

Periodic Negative Resistance Microwave Structures and Amplifier and Oscillator Embodiments Thereof

Inventor: Burhan Bayraktaroglu.
Assignee: Texas Instruments Incorporated.
Filed: May 28, 1986.

Abstract—Structures (30) with IMPATT type diodes (34) located periodically along a transmission line (38–32) to simulate a distributed diode are disclosed. Preferred embodiments include incorporation of the periodic diode structures as the gain element of microwave amplifiers and oscillators. Preferred embodiments also place capacitors between the diodes to fix nodes in the electric field and increase the effective structure size.

23 Claims, 28 Drawing Figures



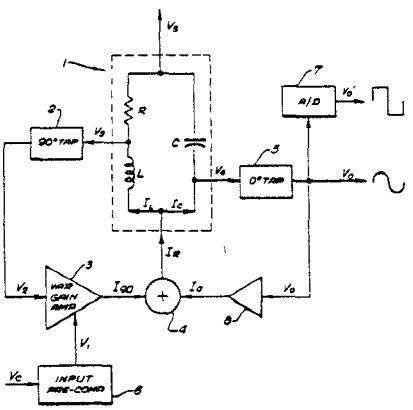
4,706,045 Nov. 10, 1987

Voltage-Controlled Oscillator with Dual Loop Resonant Tank Circuit

Inventors: Kenneth W. Ouyang and Richard W. Hull.
Assignee: Western Digital Corporation.
Filed: Dec. 10, 1986.

Abstract—A voltage-controlled oscillator (VCO) has an *LC* tank circuit which is pumped by two out-of-phase feedback components. The combined effect of the two out-of-phase feedback components results in an effective feedback signal that is a function of the ratio of the magnitude of the two out-of-phase components. The magnitude of one of these feedback components is controlled by a CMOS subthreshold Gilbert multiplier The frequency of oscillation of an oscillating signal within the *LC* tank circuit changes according to a control voltage applied to the Gilbert multiplier.

14 Claims, 10 Drawing Figures



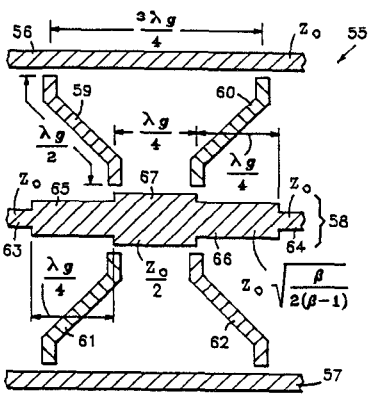
4,706,049 Nov. 10, 1987

Dual Adjacent Directional Filters/Combiners

Inventor: Michael Dydyk.
Assignee: Motorola, Inc.
Filed: Oct 3, 1985.

Abstract—A dual adjacent directional filter is disclosed for the splitting and combining of signals. This device is composed of a six port filter wherein if the appropriate signal is entered into the center port two signals having the same frequency as the input signal and equally divided amplitudes will output to the corresponding two output ports This device is comprised of two transmission lines being equally divided by an impedance matching transmission line. Between the impedance matching transmission line and the regular transmission lines is located a filtering device of either a loop type transmission line; resonator; or transmission stubs

9 Claims, 10 Drawing Figures



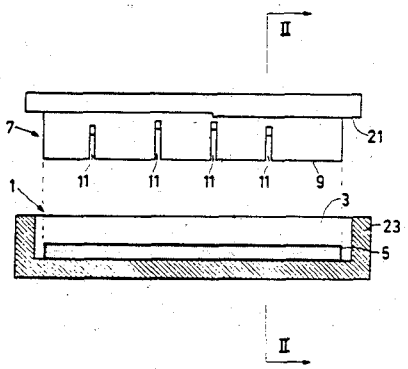
4,706,051 Nov. 10, 1987

Method of Manufacturing a Waveguide Filter and Waveguide Filter Manufactured by Means of the Method

Inventors: Pieter J. Dieleman, Willem Goedbloed, Roelof P. De Jong, and Theodorus M. Oosterwijk.
Assignee: U.S. Philips Corporation.
Filed: Dec. 9, 1986.

Abstract—A waveguide filter (43) comprising a series of resonant cavities (45) separated by walls (47) each formed with an iris opening (49) is assembled from two complementary box-like bodies (25) each having an open side (31) and internal partitions forming portions of the walls (47) between the cavities. Each box-like body is manufactured by impact extrusion using an open-topped box-like die (1) in which a slug of material (5) is placed, and a punch (7) which has smaller dimensions than the die and slots (11) for forming the respective partitions. The punch is driven into the die with a force such that the material of the slug is displaced into the slots in the punch and into the space between the punch and the die.

6 Claims, 6 Drawing Figures



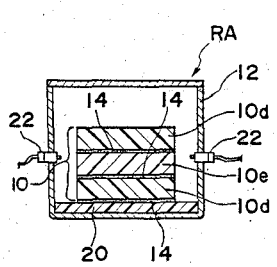
4,706,052 Nov. 10, 1987

Dielectric Resonator

Inventors: Jun Hattori and Youhei Ishikawa.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Dec. 6, 1985.

Abstract—A dielectric resonator provided with a plurality of dielectric resonator units which are combined into one unit, with a boundary being formed between adjacent dielectric resonator units, a connecting material for rigidly connecting said adjacent dielectric resonator units to each other, a support member for placing said dielectric resonator units thereon, a metallic conductive case accommodating said dielectric resonator units on said support member therein, and input and output members for electrical connection of said dielectric resonator with an external circuit, whereby a resonant frequency of spurious mode is shifted into a frequency zone higher than a resonant point by causing said spurious mode to pass through boundary surfaces or layers.

12 Claims, 10 Drawing Figures



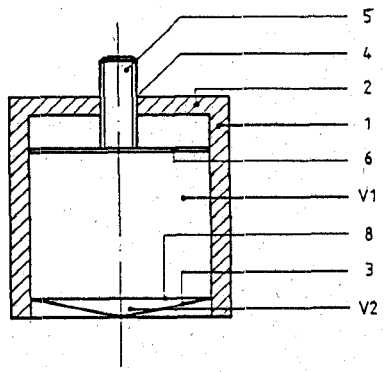
4,706,053 Nov. 10, 1987

Microwave Metallic Cavity

Inventor: Andrea Giavarini.
Assignee: GTE Telecommunicazioni, S.p.A.
Filed: Mar. 31, 1986.

Abstract—A microwave metallic cavity, whose resonating frequency is stabilized versus operating temperature variations. Stabilization is achieved by implementing the cavity with a conical base having a thickness and a coefficient of linear expansion smaller than that of the cavity cylindrical body. In this way the volume enclosed by the conical base to in inverse ratio versus operating temperature variations, so as to compensate for the variation in volume of the cavity cylindrical body, which results in stabilization of the resonating frequency.

14 Claims, 3 Drawing Figures



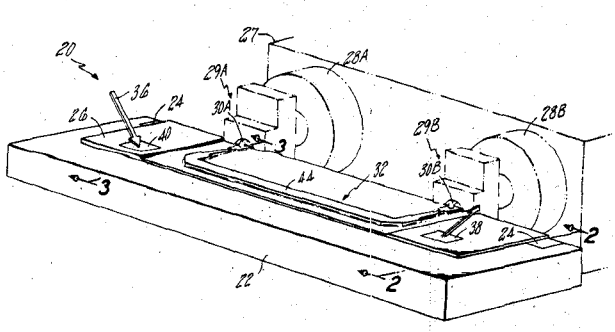
4,707,060 Nov. 17, 1987

Broad-Band Infrared Electro-Optic Modulator Having a Buried Microstrip Network

Inventors: Peter K. Cheo and Meyer Gilden.
Assignee: United Technologies Corporation.
Filed: Apr. 4, 1985.

Abstract—A microwave infrared modulator having a novel three dimensional structure is presented. The modulator includes a waveguide and metal base with a dielectric wafer buried therebetween. The buried wafer allows for conventional microstrip structures to be employed with larger microstrip electrode dimensions than would otherwise be possible.

7 Claims, 4 Drawing Figures



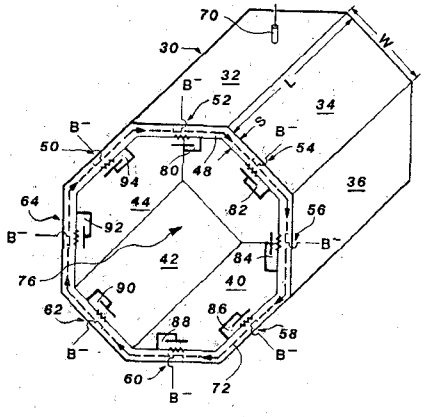
4,707,668 Nov. 17, 1987

Method and Apparatus for Transferring and Injecting RF Energy from a Generator to a Resonant Load

Inventor: William J. Hoffert.
Assignee: The United States of America as represented by the Department of Energy.
Filed: May 5, 1986.

Abstract—Improved apparatus and method are provided for the coherent amplification and injection of radio-frequency (RF) energy into a load cavity using a plurality of amplifier tubes. A plurality of strip line cavities (30, 32, 34, 36, 40, 42, 44) are laterally joined to define a continuous closed cavity (48), with an amplifier tube (50, 52, 54, 56, 58, 60, 62, 64) mounted within each resonant strip cavity. RF energy is injected into the continuous cavity (48) from a single input (70) for coherent coupling to all of the amplifier tubes for amplification and injection into the load cavity (76).

11 Claims, 4 Drawing Figures



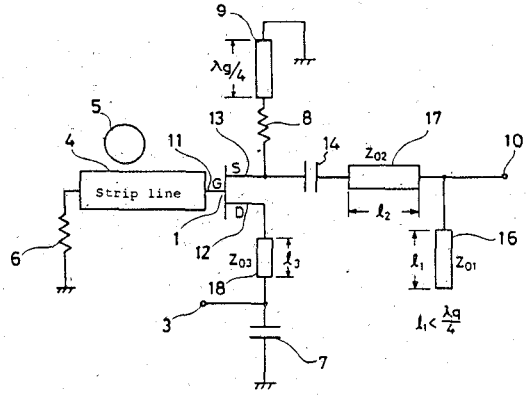
4,707,669 Nov. 17, 1987

Dielectric Resonator Microwave Oscillator Having Enhanced Negative Resistance

Inventors: Tsuyoshi Mekata, Hiroshi Saka, and Toshihide Tanaka.
Assignee: Matsushita Electric Industrial Co.
Filed: May 20, 1986.

Abstract—A dielectric resonator microwave oscillator in which the gate of a FET is connected to a resonance circuit. An inductor is connected to the drain of the FET, and the output is taken from the source of the FET. This dielectric resonator microwave oscillator has enhanced negative resistance and positively starts the oscillation even when there is a low reflection coefficient of the resonance circuit. Using a circuit which consists of a capacitor and inductor between the source and the output terminal, a further increasing of negative resistance at the gate of the FET is obtained.

12 Claims, 20 Drawing Figures



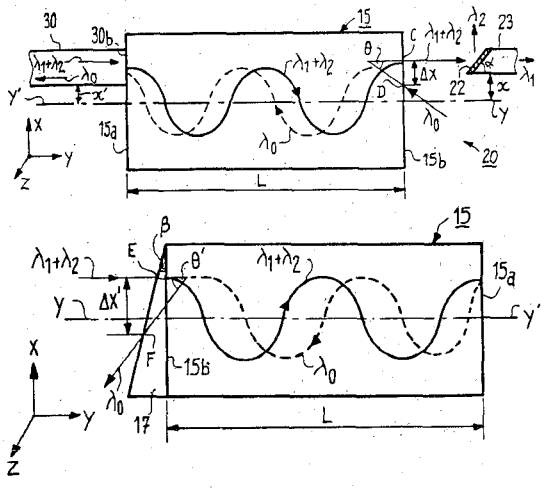
4,708,425 Nov. 24, 1987

Bidirectional Optical Wavelength Multiplexer–Demultiplexer

Inventors: Mohamed Gouali, Gerald Roullet, and Oliver Voisin.
Assignee: Lignes Telegraphiques et Telephoniques Ltt.
Filed: Oct. 9, 1984.

Abstract—A bidirectional optical wavelength multiplexing–demultiplexing device comprises a self-focusing lens having an index gradient and situated between the transmission fibre and filtering means and of which the length is such that the spatial separation between the outgoing wavelengths and the return wavelength is maximum, which permits decoupling of the return channel from the outgoing channels.

12 Claims, 8 Drawing Figures



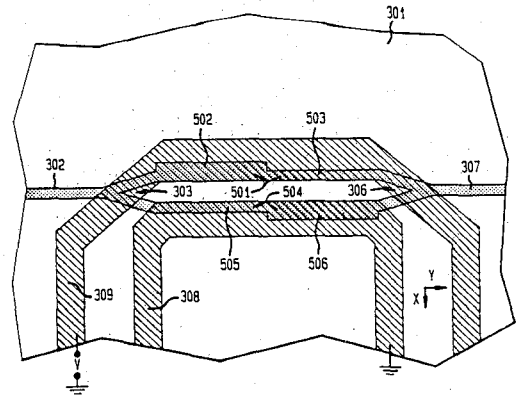
4,709,978 Dec. 1, 1987

Mach–Zehnder Integrated Optical Modulator

Inventor: Janel L. Jackel.
Assignee: Bell Communications Research, Inc.
Filed: Feb. 21, 1986.

Abstract—A Mach–Zehnder interferometric modulator includes a Z-cut crystal substrate of $LiNbO_3$ an input waveguide section (302), an input branching section (303) for dividing an optical signal on the input waveguide into two substantially equal portions, first and second branch waveguides (304, 305) each having an electrode associated therewith (309, 308), an output branching section (306) for recombining the light from each branch waveguide into a single optical signal on an output waveguide section (307). The two branch waveguides are spaced close enough to maximize the field overlap between the applied electrical field and the optical field in the waveguides but are optically decoupled to prevent cross-coupling of light between the branches. This decoupling is achieved by using structures which change the propagation constant of one of the branches with respect to the other along the modulation length.

9 Claims, 5 Drawing Figures



4,710,729 Dec. 1, 1987

Microwave Oscillator Comprising a Dielectric Resonator Insensitive to Mechanical Vibrations

Inventors: Daniel Doyen and Tarcisio Vriz.
Assignee: U.S. Philips Corporation.
Filed: Sept. 2, 1986.

Abstract—A microwave oscillator (11) stabilized by a dielectric resonator (12) constituted by a housing (13) accommodating the dielectric resonator circuit and having a fixing surface (14) and by a support (15) having an outer surface (16) on which the housing (13) is secured. The interface between the housing (13) and the support (15) has space-defining means (17, 18, 19) such that the housing (13) is subjected to flexural strain when fixed by its fixing surface (14) on the other surface (16) of the support (15).

5 Claims, 4 Drawing Figures