Patent Abstracts

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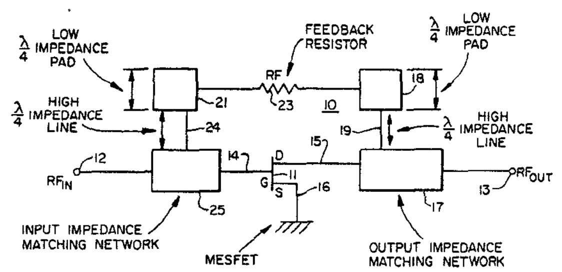
4,525,680 June 25, 1985

Microwave/Millimeter Wave Amplifier with RF Feedback

Inventors: Jing-Jong Pan and John B. Wilson.
Assignee: Harris Corporation.
Filed: Apr. 22, 1983.

Abstract—An RF MESFET amplifier having a feedback resistor further incorporates two sets of quarter wavelength low impedance pads and quarter wavelength high impedance lines in the resistor feedback path. These RF impedance elements prevent RF feedback as well as thermal noise generated by the feedback resistor from being coupled to the input. Moreover, they effectively isolate RF interaction between the drain and gate of the MESFET: as a result, the amplifier has excellent stability. The low impedance quarter wavelength pads serve as an RF bypass (to ground), while the high impedance quarter wavelength lines provide high attenuation near frequencies at the given wavelength. Consequently, thermal noise generated by the feedback resistor will be bypassed to ground and will not leak into the gate. The value of the feedback resistor can be selected and optimized to obtain the desired VSWR, bandwidth and gain flatness.

25 Claims, 5 Drawing Figures



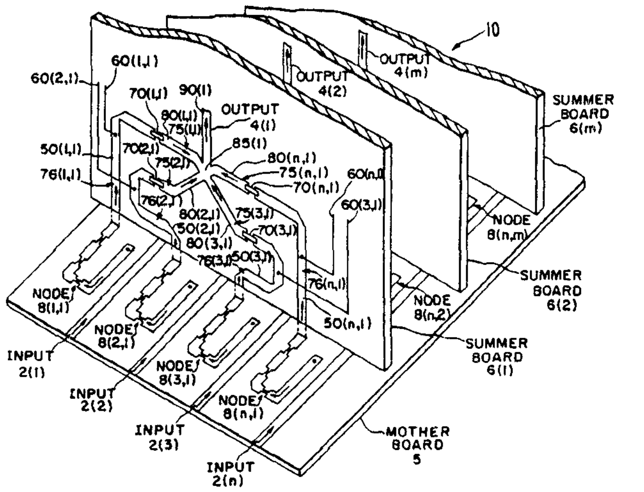
4,525,689 June 25, 1985

$N \times M$ Stripline Switch

Inventors: Gary L. Wagner and Michael J. Serrone.
Assignee: Ford Aerospace & Communications Corporation.
Filed: Dec. 5, 1983.

Abstract—A dynamic electronic switch (10) having n inputs (2) and m outputs (4), where n and m are any positive integers. The electromagnetic signal on any given input (2) may be switched onto any number of outputs (4), but any given output (4) may have no more than one input signal switched thereonto at any given time. Switching nodes (8), comprising at least one switching diode (11,13,15) and a directional edge coupler (17) embedded between two parallel ground planes (9,1) in a planar mother board (5), perform switching at each intersection of an input (2) and an output (4). Each output (4) is mounted on a planar dielectric summer board (6) positioned orthogonal to the mother board (5) The lengths of the extended transmission lines (76) associated with each output (4) are such that when an input signal is switched onto said output (4), the sum of the admittances of the $n-1$ unswitched extended transmission lines (76), measured between an associated summing junction (85) and ground, is substantially equal to zero.

4 Claims, 2 Drawing Figures



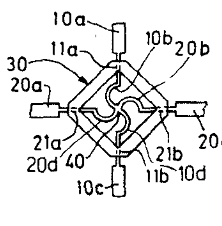
4,525,690 June 25, 1985

N-Port Coupler

Inventor: Frans C. De Ronde.
Assignee: U.S. Philips Corporation.
Filed: May 31, 1983.

Abstract—An n-port high frequency coupler for coupling opposite strip-type ports (10a, 10c) and (20a, 20c). The coupler includes transmission line stubs (10b, 10d and 20b, 20d), each having a width less than the width of the ports and being connected at one end to the corresponding port and electrically connected at the opposite end, in a central zone (40) of the coupler to the other stubs A resonant transmission line loop is coupled to the stubs at locations which are symmetrically-disposed with respect to the central zone. The loop has a width which is substantially equal to the width of the ports and a mean length effecting establishment of a resonant frequency just below the passband of the coupler.

8 Claims, 4 Drawing Figures



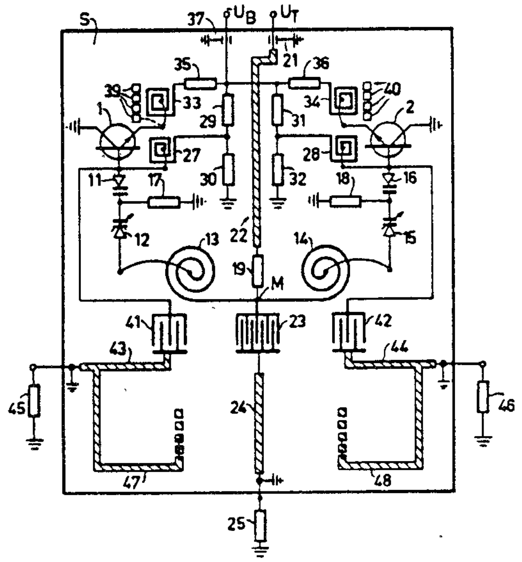
4,527,130 July 2, 1985

Push-Pull Microwave Oscillator with Fundamental and Second Harmonic Outputs

Inventor: Georg Lütteke.
Assignee: U.S. Philips Corporation.
Filed: Sept. 10, 1982.

Abstract—A push-pull microwave oscillator circuit, including two transistors, for producing the second harmonic of a fundamental frequency at a symmetry point of the circuit which is connected to the bases of the transistors through identical arrangements of circuit elements The circuit includes tuning means coupled to at least one of the transistors, an output and an input. The output, which is utilized to provide to a phase comparison means an output signal at the fundamental of the second harmonic frequency, is coupled to the base of at least one of the transistors by a capacitive impedance The input, which is utilized to receive a tuning signal produced by the phase comparison means in response to the output signal, is coupled to the tuning means.

7 Claims, 2 Drawing Figures



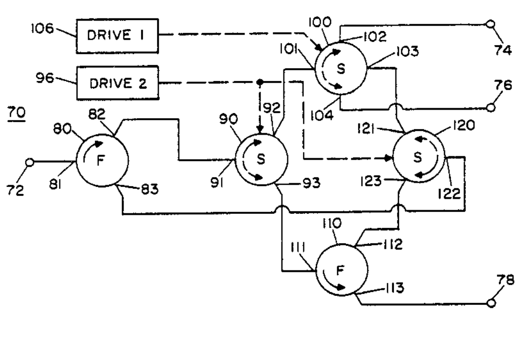
4,527,134 July 2, 1985

Reciprocal RF Switch

Inventor: Ernest Wantuch.
Assignee: Premier Microwave Corp.
Filed: Sept. 7, 1983.

Abstract—Single-pole, multi-throw reciprocal RF switches are arranged using fixed and switchable three-port and four-port nonreciprocal circulators.

13 Claims, 8 Drawing Figures



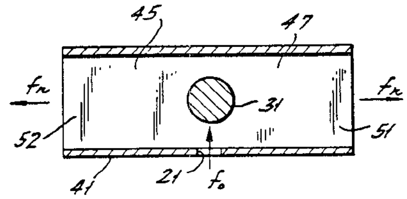
4,527,137 July 2, 1985

Evanescent Resonator Frequency Multiplier

Inventor: Joseph H. Hartley.
Assignee: The United States of America as represented by the Secretary of the Army.
Filed: Oct. 24, 1983.

Abstract—A frequency multiplier for electromagnetic waves in which multiples of the input frequency propagate, while the input frequency evanesces. A rectangular waveguide or other suitable wave conveying element with a cutoff frequency above the input frequency but below the output frequency contains the multiplying structure. The input frequency is multiplied using a post located in the waveguide or other element adjacent to the source of input waves. The post may define a multiplier gap between one of its surfaces and a wall of the waveguide or other element, in which case the multiplier gap may contain a multipactor between its surfaces which generates multiples of the input frequency. The multiplier gap may alternatively contain a nonlinear element responsive to a high electric field, such as a ferroelectric material, which also generates multiples of the input frequency. Alternatively, the post may be surrounded by a nonlinear element of ferromagnetic material responsive to a strong magnetic field. In either embodiment, waves at the same frequency as the input waves cannot propagate, but waves above the cutoff frequency propagate through the waveguide or other element to an output aperture.

18 Claims, 10 Drawing Figures



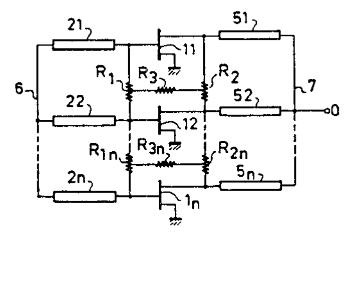
4,528,524 July 9, 1985

Hyperfrequency Power Oscillator

Inventor: Alain Bert
Assignee: Thomson-CSF
Filed: Sept. 22, 1983.

Abstract—A power oscillator for transmitter equipment operating at hyperfrequencies such as microwave links and radar. A plurality of elementary oscillators are coupled in parallel. Each elementary oscillator comprises a field effect transistor (FET) (11) connected in the common drain configuration with a first microstrip (51) connected to its gate and a second (21) connected to its source. Adjacent gates are interconnected by first resistances (R1) and adjacent sources by second resistances (R2). The resistances serve to balance the oscillators and to suppress parasitic oscillation. The free ends of the gate microstrips (21) are interconnected to synchronize the oscillators and the free ends of the source microstrips (51) are interconnected to constitute the oscillator outlet. The FETs may be disposed in a line or in a ring.

6 Claims, 8 Drawing Figures



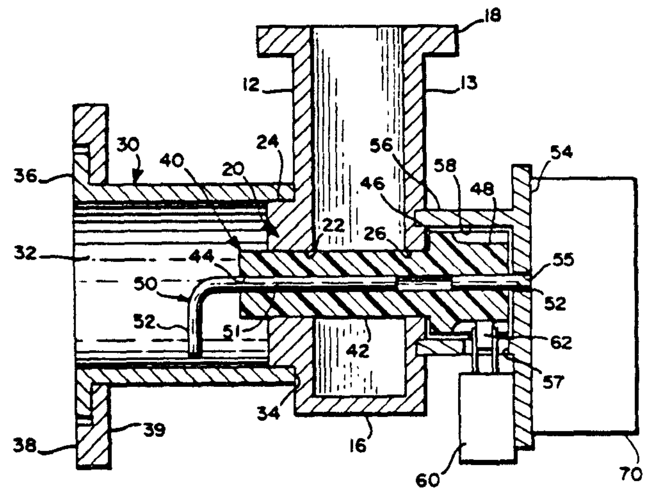
4,528,528 July 9, 1985

Waveguide Polarization Coupling

Inventor: Eugene P. Augustin.
Assignee: Boman Industries.
Filed: Apr. 2, 1982.

Abstract—A rotatable coupling probe is disposed within a waveguide housing to provide accurate rotation of the plane of polarization between a rectangular input waveguide element and a circular output waveguide element, the rotation being controlled by an external sensing switch and motor unit connected to the probe.

14 Claims, 2 Drawing Figures



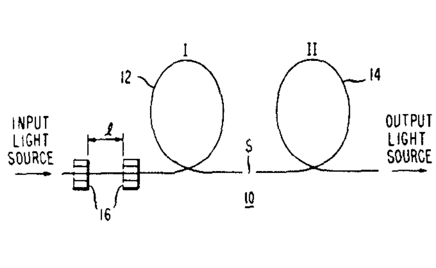
4,529,262 July 16, 1985

Inline Optical Fiber Attentuator

Inventors: Arthur Ashkin, Joseph M. Dziedzic, Jay R. Simpson, and Rogers H. Stolen.
Assignee: AT&T Bell Laboratories.
Filed: May 9, 1983.

Abstract—An inline single-mode fiber attenuator (10) is disclosed which may be formed by a tandem combination of a birefringent polarization-preserving fiber (12) and a single polarization fiber (14). The birefringent fiber functions as a variable wave plate and the single polarization fiber functions as a fiber polarizer. By continuously changing the local birefringence of the birefringent fiber with for example, tension, pressure, or temperature, the phase difference between the two polarization components of light traveling through the birefringent fiber is continuously modified. The difference in phase causes suppression of one of the polarization components as it enters the fiber polarizer and, therefore, the output of the fiber polarizer, the sum of the two polarizations, is attenuated The attenuator may be tuned by changing the local birefringence of the birefringent fiber. An inline optical fiber bandpass filter may be formed by cascading a plurality of appropriately arranged inline fiber attenuators formed in accordance with the present invention

16 Claims, 5 Drawing Figures



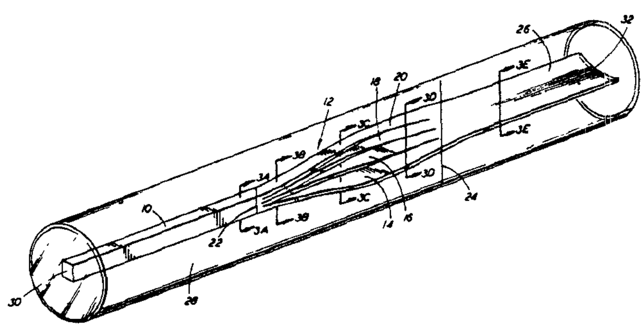
4,530,565 July 23, 1985

Optical Transformer Using Curved Strip Waveguides to Achieve a Nearly Unchanged *F*/Number

Inventor: David A. Markle.
Assignee: The Perkin-Elmer Corporation.
Filed: Dec. 20, 1982.

Abstract—A transformer assembly particularly adapted, among other possible uses, for use in ring field illumination systems such as, for example, systems used in microlithography, said optical transformer assembly including an elongated member of glass or fused silica having a nearly circular or rectangular shape at one end for receiving a nonuniform input beam of light and through a gradual transitional intermediate section to an arcuate shape at the other end for outputting a uniformly illuminated arcuate shaped beam of light.

4 Claims, 9 Drawing Figures



4,531,103 July 23, 1985

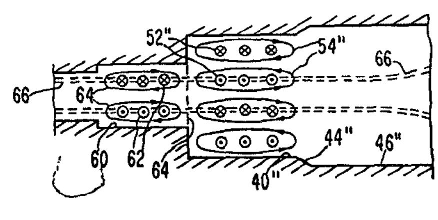
Multidiameter Cavity for Reduced Mode Competition in Gyrotron Oscillator

Inventors: Steven J. Evans and Robert S. Symons.
Assignee: Varian Associates, Inc.
Filed· Dec 10, 1982

Abstract—In a gyro-monotron oscillator a single "monotron" cavity is used to interact with the electron beam. To handle very high powers without excessive cavity loss, the cavity is excited in a higher order mode such as TE_{0m1} Other modes can be resonant in the cavity, interfering with the operation when their frequency is near the operating frequency.

To increase the mode separation, an upstream section of the cavity is made smaller, to support only a lower order mode such as TE_{011}. Also, the beam is prebunched by this lower order, interference-free mode so has less tendency to interact with spurious modes in the higher order cavity.

8 Claims, 5 Drawing Figures



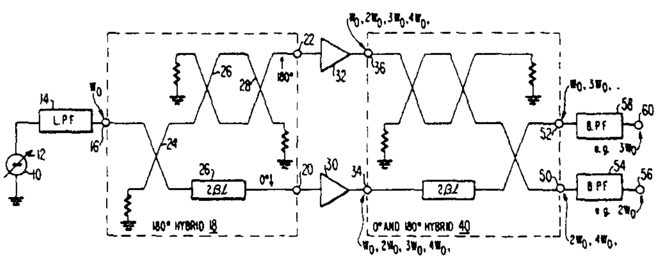
4,531,105 July 23, 1985

Frequency Multiplier Circuit for Producing Isolated Odd and Even Harmonics

Inventor: Mahesh Kumar.
Assignee: RCA Corporation.
Filed: Dec. 23, 1982

Abstract—A 180° hybrid receptive of a fundamental frequency signal which may be adjusted over a range of frequencies produces the fundamental frequency signal at two output ports phased 180° apart. Each of the output ports is coupled to a nonlinear active device which produces the fundamental frequency and odd and even harmonics thereof A 180° and 0° hybrid is coupled to receive at respective input ports the signal from the active devices and to produce at one output port all the odd harmonics and to produce at the other output port all of the even harmonics of the fundamental frequency. The even and odd harmonics of the fundamental frequency appearing at the two output ports of the 0° and 180° hybrid are isolated from one another.

6 Claims, 2 Drawing Figures



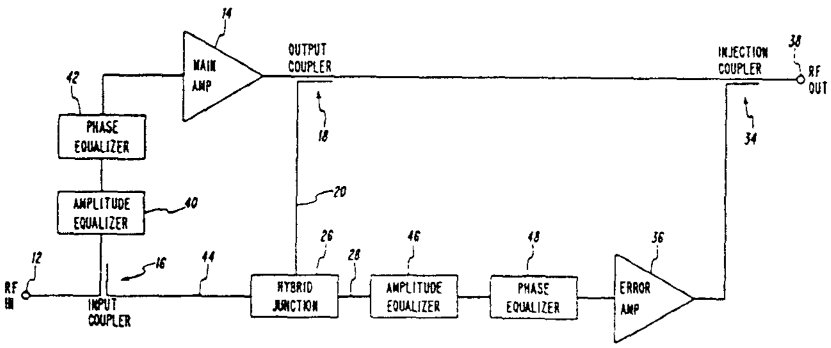
4,532,478 July 30, 1985

Phase Adjusted Feedforward System Utilizing a Single Amplitude/Phase Equalizer

Inventor: Edward G. Silagi.
Assignee. Rockwell International Corporation.
Filed: May 30, 1984.

Abstract—There is disclosed a feedforward system which reduces the phase and amplitude equalizer circuits necessary to provide for circuit operation. The main and error amplifiers of a phase adjusted feedforward system are constructed to have essentially equivalent delay and gain characteristics. The two loops formed by the main and error amplifiers are then phase and amplitude equalized by use of one phase/amplitude equalizer in the small signal loop between the output coupler and the hybrid junction. The circuit may be implemented with less complex structure, thereby resulting in additional circuit simplification and less cost.

6 Claims, 7 Drawing Figures



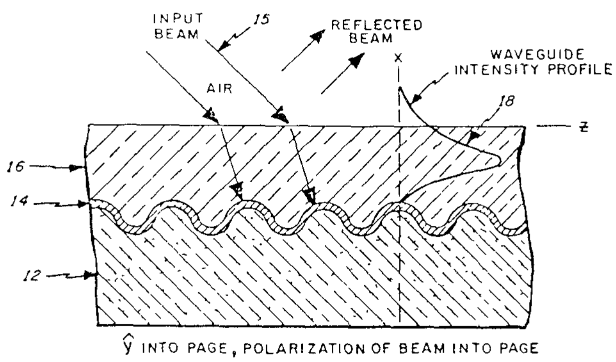
4,531,809 July 30, 1985

Optical Waveguide Coupling Device

Inventors: Gary. M. Carter, Yung-Jui Chen and Sukant K. Tripathy.
Assignee: GTE Laboratories Incorporated.
Filed: Sept. 8, 1983

Abstract—An optical waveguide coupling device which can perform switching functions by changing input light intensity, and associated method of construction thereof, in which the device comprises a base substrate etched to provide an optical grating having a predetermined grating period and amplitude A thin metal film is deposited on the grating. Subsequently, a polymer film is deposited over the thin metal film, thus forming an optical waveguide The field for the waveguide mode is nearly zero at the metal-polymer film interface, thus eliminating the loss of energy in the thin metal film The metal film, in essence, reflects the input beam so that substantially no energy is lost via transmission through the thin metal film and thus all available energy is for coupling into the waveguide mode

20 Claims, 12 Drawing Figures



4,532,483 July 30, 1985

Coaxial RF Matching Transformer Having Line Sections Simultaneous Adjustable While Retaining a Fix Transformer Line Length

Inventor: Wolfram Schminke.
Assignee: BBC Brown, Boveri & Company Limited
Filed: May 18, 1983.

Abstract—A radio-frequency matching transformer including a wave guide (W) having a fixed length. The waveguide is subdivided into sections (W_1, W_2) which have different characteristic impedances and the lengths of which are interdependently adjustable. A hollow cylinder is provided within the waveguide displaceable therein such that the operating frequency and the transformation ratio can be adjusted within wide ranges without a conversion of the transformer being required. This results in considerable advantages with respect to the known quarter-wave transformer

4 Claims, 6 Drawing Figures