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.

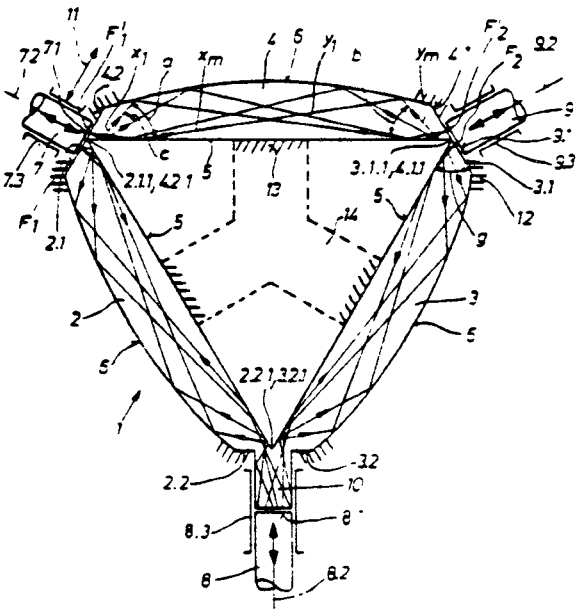
4,746,883 May 24, 1988

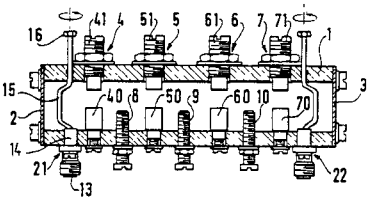
Evanescent-Mode Microwave Bandpass Filter with a Rotatable Crank Shape Coupling Antenna

Inventors: Marc Sauvage and Marie-Christine
Assignee: Alcatel Thomson Faiscaeux Hertziens.
Filed: June 13, 1986.

Abstract—The microwave bandpass filter in the form of a cutoff frequency waveguide (1) or evanescent mode guide, being besides tunable within a range of frequencies and having at least one terminal (21,22) of the coaxial type, has terminals each equipped with a crank-shaped coupling antenna (15) operable to be rotated about its longitudinal axis for filter tuning purposes

4 Claims, 1 Drawing Sheet





4,747,654 May 31, 1988

Optical Monomode Guidance Structure Including Low-Resolution Grating

Inventor: Alfredo Yi-Yan.
Filed: May 4, 1987.

Abstract—Optical guidance structure comprising a monomode input guide having a particular direction (De), two monomode output guides having directions (Ds_1, Ds_2) symmetrically inclined with respect to the direction (De) of the input guide and a widened junction zone between the input guide and the output guides. A diffraction grating is located between the input guide and the junction The grating has a spacing which defines only two diffraction directions of orders differing from zero, respectively +1 and −1 The spacing is chosen so that these two diffraction directions coincide with the directions of the first two output guieds.

11 Claims, 6 Drawing Sheets

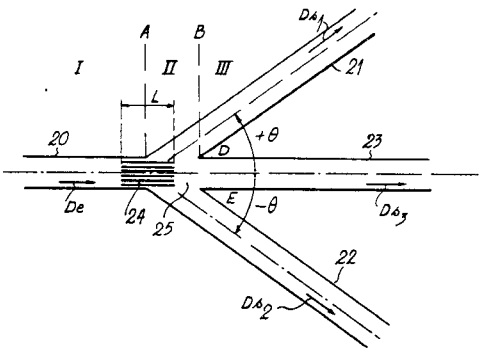
4,747,651 May 31, 1988

Three-Way Start Splitter for Optical Waveguides

Inventor: Albert Wiesmeier
Assignee: Daimler-Benz Aktiengesellschaft.
Filed Mar 14, 1986

Abstract—A bidirectional three-way star splitter for optical wave guides having coupler connections for the optical wave guides and output and input coupling elements between the individual coupler connections Three coupling elements are provided and include a plane-parallel glass or synthetic glass element of homogeneous composition. Additionally, each coupling element has a longitudinal inside surface which is constructed as a plane reflector and a longitudinal outside surface which is constructed as an elliptical reflector, the two longitudinal surfaces being joined at both ends by planar coupling surfaces adjoining the respective optical wave guides

26 Claims, 2 Drawing Sheets



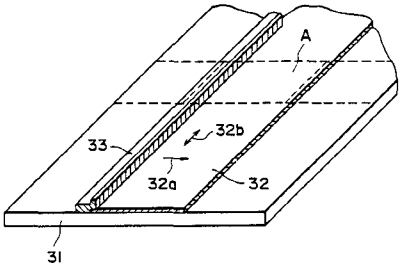
4,747,671 May 31, 1988

Ferroelectric Optical Modulation Device and Driving Method Therefor Wherein Electrode Has Delaying Function

Inventors: Tohru Takahashi, Hiroshi Inoue, Hoshiyuki Osada, Yutaka Inaba, and Junichiro Kanbe.
Assignee: Canon Kabushiki Kaisha.
Filed: Nov. 17, 1986.

Abstract—An optical modulation device is disclosed, which includes: a first substrate having thereon a signal transmission electrode connected to a signal source and a first electrode having a delay function connected to the transmission electrode; a second substrate having thereon a second electrode disposed opposite to said first electrode; and an optical modulation material, particularly a ferroelectric liquid crystal, disposed between the first and second electrodes. An optical modulation system, particularly a gradational display system, utilizing the delay function is also disclosed.

38 Claims, 6 Drawing Sheets



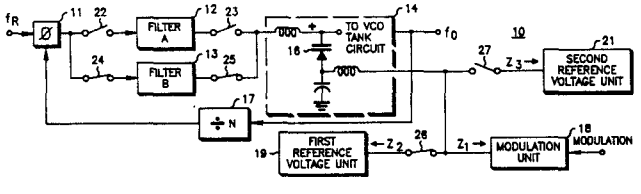
4,748,425 May 31, 1988

VCO Range Shift and Modulation Device

Inventor: Joseph P. Heck.
Assignee: Motorola, Inc.
Filed: Feb 18, 1987.

Abstract—A modulation and range shift device for use with a PLL frequency synthesizer VCO. The modulation signal is provided to the negative side of the tuning varactor (16) of the VCO (14). In addition, variable voltages can be applied to the negative side of the tuning varactor (16) to achieve range shift as desired. Component variations in the modulation section (18) need not be varied to accommodate changes in the loop filter (12 and 13) of the PLL circuit

6 Claims, 2 Drawing Sheets



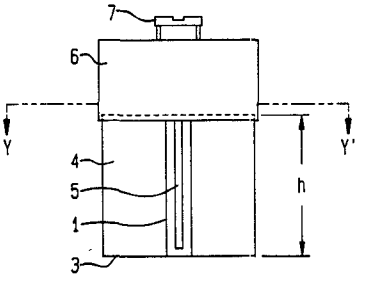
4,748,427 May 31, 1988

Microwave Resonating Cavity with Metallized Dielectric

Inventor: Carlo Buoli.
Assignee: GTE Telecommunicazioni, S p.A
Filed: Nov. 6, 1986

Abstract—A microwave resonating cavity including a hollow cylindrical body shaped in the form of a parallelepiped and consisting of a dielectric material coated by a metallic layer, said dielectric material having a high dielectric constant having a value greater than 30, and wherein said hollow body includes an upper base, a lower base, an external surface and an internal surface, and further includes a non-metallized area defining a metallized coupling line onto the external surface of the said hollow cylinder and wherein said hollow cylinder has an inner diameter ranging between 3 and 5 mm, an outer diameter ranging between 6 and 15 mm and a height ranging between 5 and 10 mm, and further including a metallic cap welded to the upper base of said hollow body, and further including an adjusting screw for fine adjustment of the resonating frequency.

4 Claims, 1 Drawing Sheet

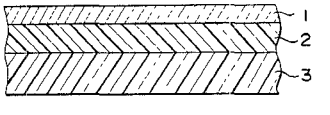


4,749,245 June 7, 1988

Thin Film Waveguide Device and Manufacturing Method for Making Same

Inventors: Nobuhiko Kawatsuki, Masao Uetsuki, and Junji Nakagawa.
Assignee: Kuraray Co., Ltd.
Filed: Mar. 6, 1986

Abstract—A thin film waveguide path comprises a waveguide path layer overlying a substrate but separated therefrom by at least one intermediate layer. The waveguide path layer comprises a first transparent high molecular material At least one intermediate layer comprises a second organic high molecular material having a solubility different from that of the first material and a lower refractive index lower than that of the first material, the substrate comprises a third high molecular material different from the first and second materials for supporting the waveguide path and intermediate layers.



4,749,949 June 7, 1988

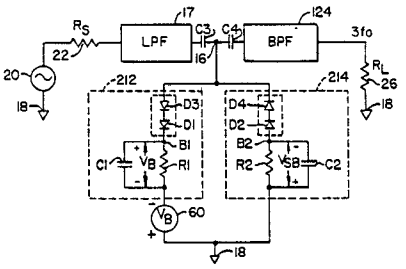
Self-Biasing Diode Microwave Frequency Multiplier

Inventors: Robert D. Albin and Frank K. David
Assignee: Hewlett-Packard Company.
Filed: Apr. 29, 1986.

Abstract—A microwave frequency multiplier employs a first diode and a second diode each coupled in anti-parallel relationship across a signal input of a finline structure, each of the diodes being associated with signal-induced biasing elements for self biasing the diodes. A bias is caused to occur at

internal nodes which increase with increased input power for a broad range of input power levels The presence of such biasing results in waveform clipping at higher signal levels Relative to prior art, the conversion loss will remain optimum up to high input power over an entire high-power input range. Additional external bias may be employed in alternative embodiments

8 Claims, 3 Drawing Sheets



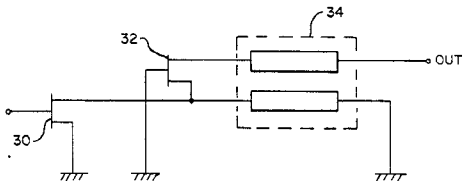
4,749,959 June 7, 1988

Multiple FET Device Having Direct-Coupled Stages for Improved Microwave Operation

Inventors: Stephen C. Cripps, John R. Anderson, and Gary J. Policky.
Assignee Celeritek, Inc
Filed: Nov. 24, 1986

Abstract—A field effect transistor microwave circuit device includes first and second field effect transistors having common source connections with a pair of coupled transmission lines connecting the drain of a first transistor to the source of the second transistor and the source of the first transistor to the gate of the second transistor The cross coupled transmission lines function as a balun between the transistors. The device is formed in III–V semiconductor and has an increased operating range in microwave frequencies. In alternative embodiments, the balun is connected to the circuit output thereby permitting the cascading of a plurality of FET devices. The balun can be integrated into the device structure or connected as a discrete element in a hybrid circuit arrangement

12 Claims, 2 Drawing Sheets



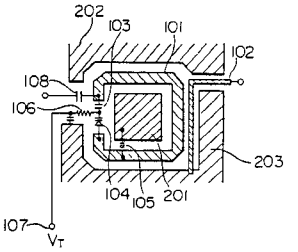
4,749,963 June 7, 1988

Oscillator Having Stripline Loop Resonator

Inventors: Mitsuo Makimoto, Isao Ishigaki, Morikazu Sagawa, and Motoi Ohba.
Assignee: Matsushita Electric Industrial Co
Filed Dec 9, 1986.

Abstract—A high-frequency oscillator comprising a ring type inductive resonator of a microstrip line constituted in a rectangular or annular loop Capacitors are serially connected to both ends of the line, thereby improving the low-noise, separation and stability characteristics by use of the steep-phase characteristic of the ring-shaped resonator

5 Claims, 7 Drawing Sheets



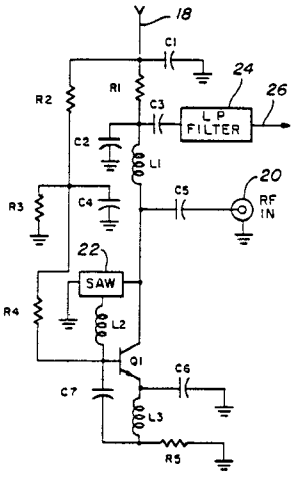
4,749,964 June 7, 1988

Superregenerative Detector Having a SAW Device in the Feedback Circuit

Inventor: Darrell L. Ash.
Assignee: R. F. Monolithics, Inc
Filed: Dec. 8, 1986

Abstract—A superregenerative detector utilizing a single transistor and having a surface acoustic wave device in the feed back loop coupling the output to the input to cause oscillation wherein the surface acoustic wave device is a low loss delay line formed as a single phase unidirectional transducer on a quartz substrate.

12 Claims, 4 Drawing Sheets



4,749,966 June 7, 1988

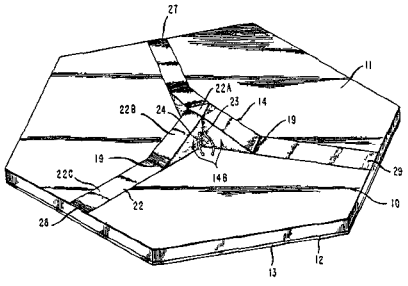
Millimeter-Wave Microstrip Circulator

Inventors: Richard A. Stern and Richard W. Babbitt.
Assignee The United States of America as represented by the Secretary of the Army
Filed: July 1, 1987

Abstract—A millimeter-wave microstrip Y-junction circulator is provided comprising a monolithic, wye-shaped ferrite element disposed on one surface of a section of microstrip dielectric substrate having three, Y-junction oriented sections of microstrip conductor on the same one substrate surface and an electrically conductive ground plane on the opposite substrate surface. The ferrite element has a central right prism-shaped portion with two equilateral triangular-shaped prism bases and three rectangular prism faces and three downwardly-sloping arm portions which extend radially outwardly from the prism faces of the central portion. The top base of the ferrite element central portion and the top surface of the ferrite arm portions which do not rest on the substrate are provided with microstrip conductors which cooperate with the ground plane to convey millimeter wave signals applied to the three Y-junction oriented microstrip sections on the substrate to the ferrite element

central portion. A permanent magnet mounted on the ground plane beneath the bottom prism base causes the ferrite element central portion to act as a circulator to selectively couple the three microstrip sections on the substrate

5 Claims, 3 Drawing Sheets



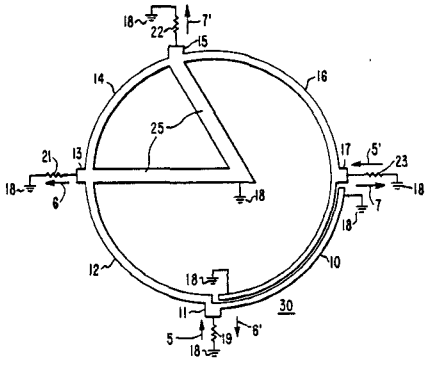
4,749,969 June 7, 1988

180° Hybrid Tee

Inventors: Daniel C. Boire and James E. Degenford.
Assignee: Westinghouse Electric Corp.
Filed: July 17, 1987.

Abstract—A hybrid ring structure 180° phase shifting apparatus or device capable of taking a single electrical input signal of predetermined frequency, splitting said signal into two isolated independent output signals utilizing engraving upon the substrate on one side only wherein said device is fully operable and compatible to operate in hybrid micro-electronic functions.

23 Claims, 6 Drawing Sheets



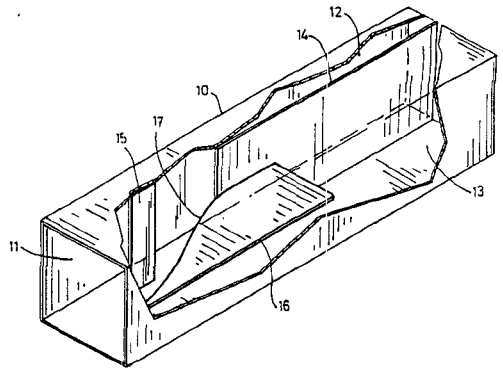
4,749,970 June 7, 1988

Compact Orthomode Transducer

Inventor: Emmanuel Rammos.
Assignee: Agence Spatiale Europeenne
Filed: July 10, 1986.

Abstract—Inside a parallelepipedic guide section there is provided at least one partition located so as to divide the inner volume of the guide section into a main waveguide portion capable of supporting an orthogonally polarized signal and two secondary waveguide portions extending in the same direction as the main waveguide portion. The secondary waveguide portions are so dimensioned such that one of these waveguide portions is capable of supporting a horizontally polarized signal and that the second waveguide portion is capable of supporting a vertically polarized signal.

7 Claims, 4 Drawing Sheets



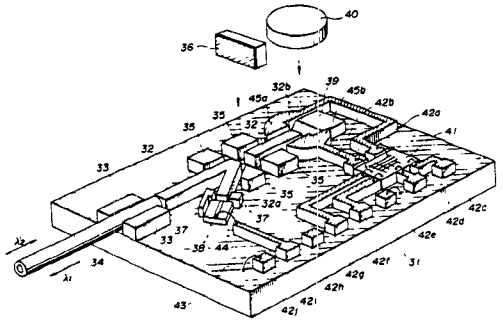
4,750,799 June 14, 1988

Hybrid Optical Integrated Circuit

Inventors: Masao Kawachi, Yasufumi Yamada, Mitsuho Yasu, Hiroshi Terui, and Morio Kobayashi.
Assignee: Nippon Telegraph and Telephone Corporation.
Filed: July 10, 1985.

Abstract—A hybrid optical integrated circuit having a high-silica glass optical waveguide formed on a silicon substrate, an optical fiber and an optical device coupled optically to the optical waveguide, and an optical fiber guide and an optical device guide on the substrate for aligning the optical fiber and the optical device at predetermining positions, respectively, relative to the optical waveguide. Islands carrying electrical conductors are disposed on the substrate. A first electrical conductor film is formed on the substrate Second electrical conductor films are formed on the top surfaces of the optical waveguide, the optical fiber guide, the optical device guide and the islands and are electrically isolated from the first electrical conductor film. An electrical conductor member is provided to feed electric power from the first and second electric conductor films to the optical device which needs the power supply. The optical waveguide, the optical fiber guide, the optical device guide and the islands are formed from the same high-silica glass optical waveguide film Alignment of various portions is facilitated when assembling the circuit. A high coupling efficiency is realized with a low cost.

12 Claims, 20 Drawing Sheets



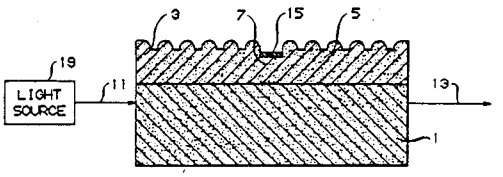
4,750,801 June 14, 1988

Optical Waveguide Resonator Filters

Inventor: Rodney C. Alferness.
Assignee: American Telephone and Telegraph Company, AT&T Bell Laboratories.
Filed: Sept 30, 1985.

Abstract—An optical filter using first and second grating sections separated by a changed refractive index section operates as a narrow-band grating resonator.

7 Claims, 1 Drawing Sheet



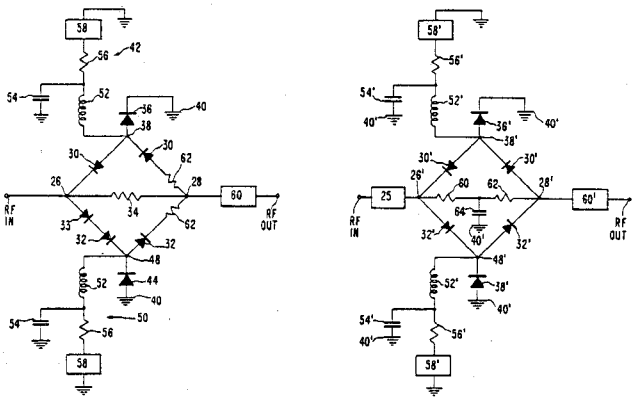
4,752,743 June 21, 1988

Linearizer for TWT Amplifiers

Inventors: David Pham, Allan Podell, and John A. Steck.
Assignee: Varian Associates, Inc.
Filed: Sept. 26, 1986.

Abstract—The input signal to a TWT amplifier is predistorted in amplitude and phase to the inverse of the amplifier transfer characteristic by an adjustable circuit including a phase linearizing section and an amplitude linearizing section, both in series with the input signal and amplifier. Each section includes two pairs of back-to-front Schottky diodes. Preferably an additional diode is in series with one pair for the amplitude section. The diodes of each pair are of like polarity and opposite to the diodes of the other pair of the section. Additional diodes are connected between the pair junctions and ground, and adjustable dc bias fed into these junctions. Additional resistors and capacitors bridge the pairs, and are arranged into a phase delay network in one of the sections.

4 Claims, 5 Drawing Sheets



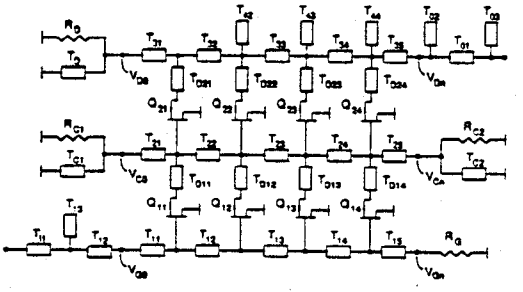
4,752,746 June 21, 1988

Wide-Band Microwave Matrix Amplifier

Inventor: Karl B. Niclas.
Assignee: Watkins-Johnson Company.
Filed: Feb. 18, 1987.

Abstract—A microwave amplifier that both multiplicatively and additively amplifies microwave frequency signals. The amplifier, herein coined a matrix amplifier, is a distributed amplifier with two or more tiers (rows) of transistors. Each tier has a plurality of transistors which additively amplify the signal entering that row of the amplifier, and each row multiplicatively amplifies the output of the previous row. The gates of the transistors in each row are sequentially coupled to an input transmission line having a series of transmission elements. The outputs of all the transistors from each row are sequentially coupled to the input transmission line of the next tier, except that the outputs of the last tier are coupled to an output transmission line for transmitting the output of the amplifier to an output node. Furthermore, each transmission line has (1) at least one line termination at one of its ends for absorbing signals incident on that end of the transmission line, and (2) biasing means for dc biasing the transmission line at a corresponding voltage potential.

8 Claims, 15 Drawing Sheets



DESCRIPTION OF CIRCUIT COMPONENTS

- Q_{mn} — TRANSISTOR n ON TIER m
- T_{In} — INPUT MATCHING TRANSMISSION LINE ELEMENTS
- T_{On} — OUTPUT MATCHING TRANSMISSION LINE ELEMENTS
- T_{1n} — GATE LINE TRANSMISSION LINE ELEMENTS
- T_{2n} — CENTER LINE TRANSMISSION LINE ELEMENTS
- T_{3n} — DRAIN LINE TRANSMISSION LINE ELEMENTS
- T_{D1n} — TRANSFORMING TRANSMISSION LINE ELEMENTS (1. TIER)
- T_{D2n} — TRANSFORMING TRANSMISSION LINE ELEMENTS (2. TIER)
- T_{on} — DRAIN LINE OPEN-CIRCUIT SHUNT STUBS
- R_G — GATE LINE TERMINATION
- R_{Cn} — CENTER LINE TERMINATIONS
- R_D — DRAIN LINE TERMINATION
- T_{Gn} — CENTER LINE SHORT-CIRCUIT SHUNT STUBS
- T_D — DRAIN LINE SHORT-CIRCUIT SHUNT STUB

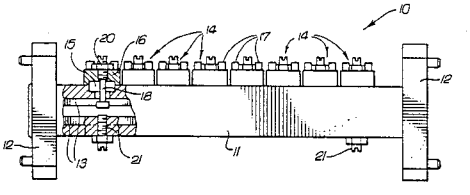
4,752,753 June 21, 1988

Coaxial Waveguide Band Reject Filter

Inventors: Glen E. Collins and Michael A. Claggett.
Assignee: WAVECOM.
Filed: Sept. 4, 1986.

Abstract—The present invention relates to a waveguide band reject filter employing TEM coaxial type resonators that partially protrude into the top wall of the waveguide in such a way as to produce a predetermined frequency selective discontinuity. By proper choice of location, number of resonators, resonator configuration and protrusion, a spurious free highly efficient frequency selective band reject filter response can be obtained.

9 Claims, 6 Drawing Sheets



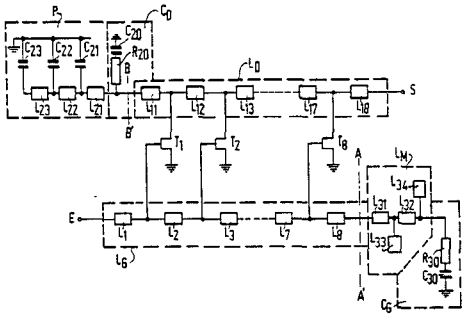
4,754,234 June 28, 1988

Broad-Band Distributed Amplifier for Microwave Frequencies

Inventor: Patrice Gamand.
Assignee: U S. Philips Corporation
Filed: Feb. 25, 1987.

Abstract—A broadband distributed amplifier comprised of a plurality of field effect transistors whose gates are connected to junctions between serially-connected inductors forming a gate transmission line, whose drains are connected to junctions between serially-connected inductors forming a drain transmission line, and whose sources are connected to ground. The distribution of the amplifier stages along the gate and drain transmission lines is effected such that these transmission lines are periodically loaded by their own impedances and by the transistor gate and drain capacitances, thus forming artificial lines, and such that a microwave frequency input signal applied to the input of the gate transmission line effects the production of an amplified microwave frequency output signal at the output of the drain transmission line. The gate and drain transmission line output and input, respectively, are terminated by loads The drain transmission line input only includes biasing means, whereas the gate transmission line output includes means for compensating for the characteristic impedance variations of the artificial line as a function of the frequency.

10 Claims, 1 Drawing Sheet



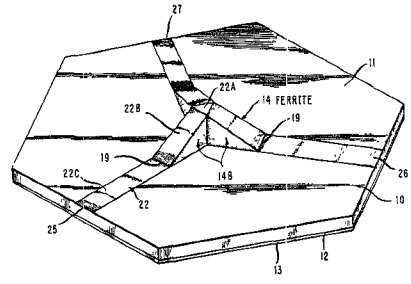
4,754,237 June 28, 1988

Switchable Millimeter-Wave Microstrip Circulator

Inventors: Richard A. Stern and Richard W. Babbitt.
Assignee: The United States of America as represented by the Secretary of the Army.
Filed: Sept. 21, 1987

Abstract—A millimeter wave switchable microstrip Y-junction circulator is provided comprising a monolithic, wye-shaped ferrite element disposed on one surface of a section of microstrip dielectric substrate having three, Y-junction oriented sections of microstrip conductor on the same one substrate surface and an electrically conductive ground plane on the opposite substrate surface. The ferrite element has a central right prism-shaped portion with two equilateral triangular-shaped prism bases and three rectangular prism faces and three downwardly-sloping arm portions which extend radially outwardly from the prism faces of the central portion. The top base of the ferrite element central portion and the top surface of the ferrite arm portions which do not rest on the substrate are provided with microstrip conductors which cooperate with the ground plane to convey millimeter wave signals applied to the three Y-junction oriented microstrip sections on the substrate to the ferrite element central portion. Each ferrite arm portion has a lateral opening therethrough and a single turn of electric control current wire is threaded through all three openings to create a magnetic field in the ferrite central portion which causes it to act as a circulator to selectively couple the three microstrip sections on the substrate.

5 Claims, 3 Drawing Sheets



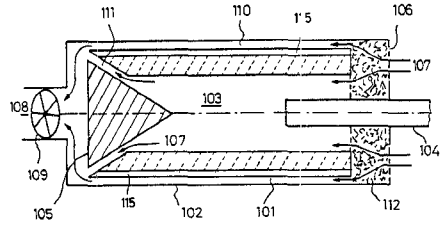
4,754,238 June 28, 1988

Microwave Absorber Using Gaseous Cooling Fluid

Inventors: Paul G. Schüller and Rolf Wilhelm.
Assignee: Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e.V.
Filed: Nov 20, 1986.

Abstract—A microwave absorber with a microwave-absorbing material, a protective housing surrounding this, and a waveguide leading into the protective housing, through which waveguide the microwaves to be absorbed can be conducted to the absorbing material, the microwave absorbing material forming a solid body with a hollow, one one side of which the waveguide opens, a termination element being arranged on the side of the hollow opposite to the waveguide, and the housing being provided with an inlet and an outlet for a cooling fluid.

12 Claims, 1 Drawing Sheet



4,754,239 June 28, 1988

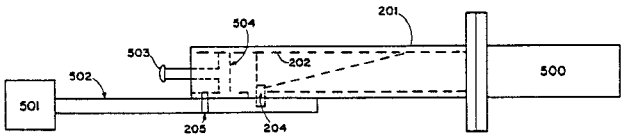
Waveguide to Stripline Transition Assembly

Inventor: Darrel F. Sedivec.
Assignee: The United States of America as represented by the Secretary of the Air force.
Filed: Dec 19, 1986.

Abstract—The transition between a rectangular waveguide and stripline is accomplished with an assembly which contains: a waveguide flange, a waveguide section, and a tapered wedge The waveguide flange physically connects

with the rectangular waveguide and the waveguide section. The waveguide section has the tapered wedge housed within it along its top, and is electrically connected to the ground planes of the stripline. The tapered wedge is electrically connected with the center conductor of the stripline, to provide a transition between the rectangular waveguide and the stripline. Optimum impedance matching and voltage standing wave ratio can be empirically determined in the assembly by inputting signals into the stripline or waveguide, and taking impedance measurements while moving a reflecting panel which rests behind the tapered wedge to different positions in the slotted waveguide section.

4 Claims, 2 Drawing Sheets



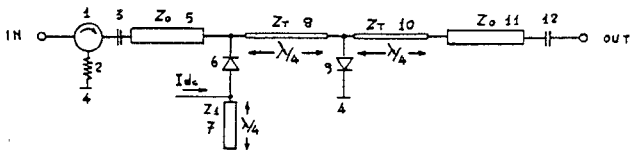
4,754,240 June 28, 1988

p-i-n Diode Attenuators

Inventor: Franco Marconi.
Assignee: GTE Telecomunicazioni, S.p.A.
Filed: Nov 6, 1986.

Abstract—A p-i-n diode variable attenuator featuring decoupling values higher than those achievable using the technique used so far, is described. This result has been achieved by implementing the line sections which the p-i-n diodes are connected to with a characteristic impedance different than the characteristic impedance input and output to/from the attenuator.

16 Claims, 3 Drawing Sheets



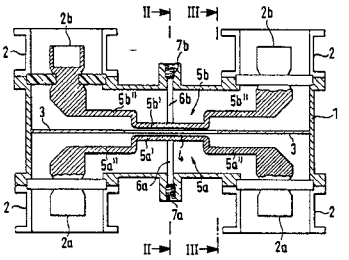
4,754,241 June 28, 1988

3 dB Directional Coupler

Inventor: Georg Spinner.
Filed. May 14, 1987.

Abstract—A 3 dB directional coupler includes a housing accommodating two spaced apart coupling lines connecting the inner conductors of coaxial lines and coupled to each other via a coupling aperture in a partition wall which extends in said housing. The housing is thus divided into two housing parts whose cross section is defined by a long side and a short side the difference of which substantially corresponds to the width of each coupling line while the cross sectional circumference of each coupling line corresponds essentially to the circumference of the inner conductors. Outside the coupling path, the coupling lines are provided with homogenous sections of sufficient length to reduce field inhomogeneities before the coupling path.

8 Claims, 1 Drawing Sheet



4,754,242 June 28, 1988

Resonator

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

Abstract—A resonator comprising an equivalent circuit including an *LC* series circuit having a first capacitance element and inductance elements connected in series to both sides of the first capacitance element, and a second capacitance element connected parallel to the *LC* series circuit. A plurality of resonators having this construction may be magnetically connected in series to provide a filter, by utilizing the two inductance elements constituting parts of the resonator and without necessitating separate coupling members such as capacitors or coils.

2 Claims, 4 Drawing Sheets