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.

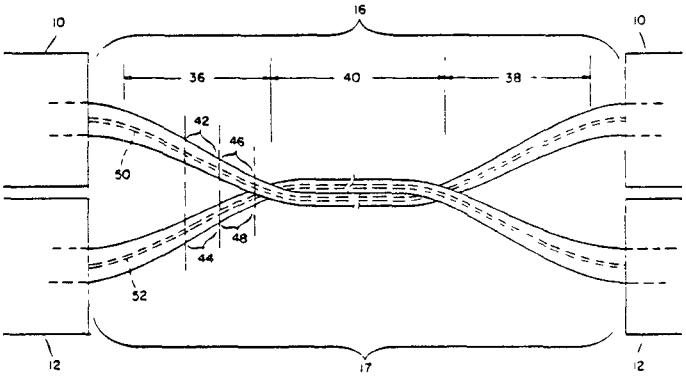
4,796,968 Jan. 10, 1989

Single-Mode Optical-Fiber Directional Coupler

Inventors: Joseph D. Coccoli, John R. Stemniski, and Donato Cardarelli.
Assignee: The Charles Stark Draper Laboratory Inc.
Filed. June 2, 1986

Abstract—A single-mode optical-fiber directional coupler including at least two optical fibers each having a core surrounded by a cladding material and having a region of reduced cladding diameter contiguous with a reduced-cladding diameter region of the other fiber throughout the length of an optical interaction area. Each reduced-cladding-diameter region is bounded on each end by a tapered region which gradually increases in diameter as it extends away from the reduced-cladding-diameter region toward a full-diameter region of each fiber. There is also a substrate and means for securing the reduced-cladding-diameter region to the substrate, means for supporting the fibers in their full-diameter region beyond each end of the optical interaction area, means for fastening the support means to the substrate and a medium surrounding the reduced-diameter regions and having an index of refraction similar to that of the cladding material. This invention also features a method of making such a directional coupler involving temperature gradients in temperature sensitive etchant placed along portions of the cladding areas of at least two optical fibers.

29 Claims, 4 Drawing Sheets



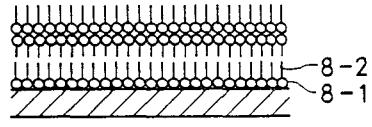
4,796,981 Jan. 10, 1989

Optical Element for Modulation of Light by Heating a Monomolecular Film

Inventors: Yukuo Nishimura, Masahiro Haruta, Yutaka Hirai, Kunihiro Sakai, and Hiroshi Matsuda.
Assignee: Canon Kabushiki Kaisha.
Filed: Nov. 26, 1984

Abstract—Optical modulation is effected by heating a monomolecular film or a built-up film of monomolecular layers.

13 Claims, 1 Drawing Sheet



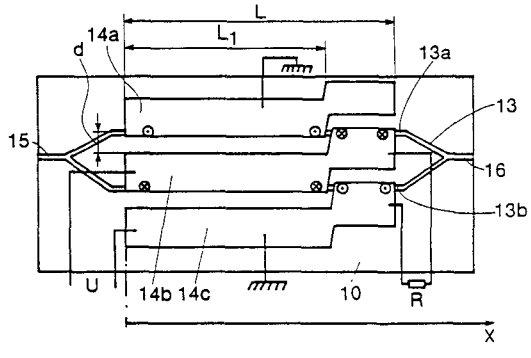
4,797,641 Jan. 10, 1989

Optoelectronic Modulator

Inventor: Anders G. Djupsjöbacka.
Assignee: Telefonaktiebolaget Lm Ericsson.
Filed: Mar 18, 1986.

Abstract—An optoelectronic modulator for generating an optical signal in which a wafer (10) of optoelectronic material has two parallel light wave conductors (13a, 13b) and three planar electrodes (14a, 14b, 14c). The latter are arranged so that two electrodes adjacent each other define by their long sides an elongate intermediate space with at most three sections, which are transversely displaced in relation to each other. One long side of one of the sections is situated approximately in the line of extension of the other long side in an adjacent section and the lightwave conductors (13a, 13b) are situated in the extension lines. The lightwave conductors are modulated in counter-phase in two adjacently situated sections by a modulating alternating voltage (U) which is connected to the electrodes. The ratio between the length (L_1) of the longest section and the length (L) of the electrodes is in the range of 0.70 to 0.95. By the electrode configuration, the modulator is given high upper boundary frequency and good pulse response.

8 Claims, 5 Drawing Sheets



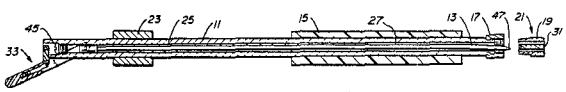
4,797,642 Jan. 10, 1989

Zero-Setback Sliding Load for Network Analyzer Calibration

Inventor: Robert E. Rennard.
Assignee: Hewlett-Packard Company.
Filed: Dec. 31, 1987.

Abstract—A sliding load for calibrating a microwave network analyzer provides an alignment of its center conductor relative to a reference plane defined by its outer conductor. The sliding load includes a latching assembly which in an unlatched condition allows the center conductor to move freely in an axial direction relative to the outer conductor. The center conductor can then project forward of the outer conductor for visual alignment with a mating center conductor of a network analyzer connector. Once the center conductors are mated, the outer conductor of the sliding load and the connector can be butted at the reference plane. The latching assembly can then be rotated into its latched condition in which a spring is compressed. The compressed spring forces the center conductor to retract against a screw stop. The screw stop is adjusted so that when the center conductor is forced against it, the desired alignment of the center conductor and the reference plate is achieved. As a result of this alignment, the sliding load does not obscure or exaggerate the contribution of network analyzer connector setback to changes in signals transmitted by the network analyzer. Thus, the network analyzer can be more accurately characterized and calibrated so that it, in turn, can characterize devices under test more precisely.

11 Claims, 4 Drawing Sheets



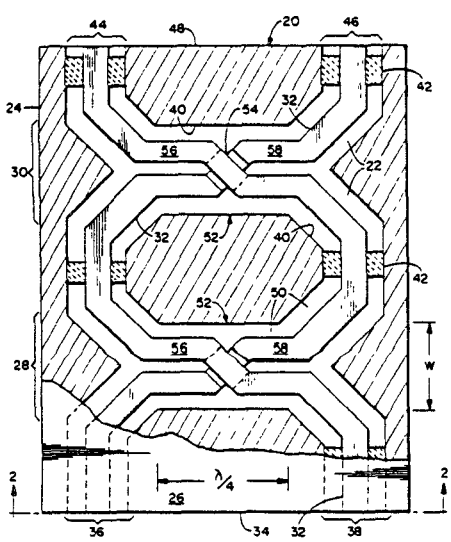
4,797,643 Jan. 10, 1989

Coaxial Hybrid Coupler and Crossing Element

Inventors: Mon N. Wong and Samuel S. Wong.
Assignee: Hughes Aircraft Company.
Filed: Oct. 23, 1987.

Abstract—A microwave crossover by which an electromagnetic wave can crossover from one waveguide to another waveguide is formed completely within a planar structure having two hybrid couplers arranged in tandem with output ports of the first coupler connected to input ports of the second coupler. Each coupler is formed of an electrically conductive housing and two electrically conducting bars disposed therein and insulated therefrom. The bars are disposed in a common plane and are equally spaced from top and bottom walls of the housing. A central portion of each bar is angled relative to end portions of the bars to permit a crossing over of the bars at the central portions thereof. Each of the central portions is formed with a notch which engages with the notch of the other bar while maintaining a gap therefrom, the notches permitting the crossover to occur in the foregoing plane. Ends of the bars protrude through openings in the housing in the form of coaxial transmission lines. The crossing of the bars has the effect of a twist of central conductors of the coaxial lines resulting in a relocation of the ports of the coupler such that the two input ports are on an input side of the coupler, and two output ports are on an output side of the coupler. This arrangement of the ports permits the connection of two couplers in tandem to provide for the planar configuration of the microwave crossover.

42 Claims, 4 Drawing Sheets



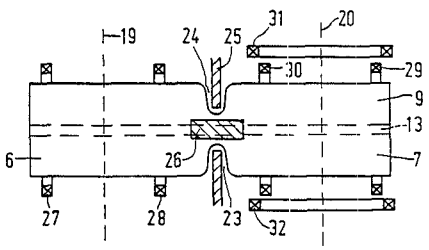
4,798,434 Jan. 17, 1989

Optical Polarization Regulator Having a Waveguide Structure

Inventors: Hans O. B. Dammann, Elke B. Pross, Gert Rabe, Wolfgang F. M. Tolksdorf, and Manfred B. Zinke.
Assignee: U.S. Philips Corp.
Filed: Sept. 9, 1987.

Abstract—The invention relates to an optical polarization regulator having a waveguide structure for converting the polarization state of an optical beam passing through and comprising devices for adjusting the coupling constants K of the TE and TM modes of the optical beam and for adjusting the difference $\Delta\beta$ of the propagation constants β_{TE} and β_{TM} of these modes. The waveguide structure is a magneto-optical element (8, 9, 13). The coupling constant K is adjusted by a magnetic field acting upon the waveguide structure (8, 9, 13) and the difference $\Delta\beta$ is adjusted by a mechanical deformation force exerted on the waveguide structure.

18 Claims, 1 Drawing Sheet



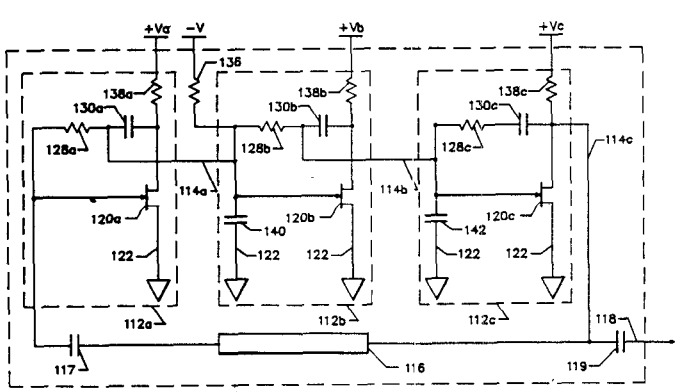
4,799,028 Jan. 17, 1989

Zero Phase Shift Active Microwave Oscillators with Resistive Feedback in Field Effect Transistor Amplifiers

Inventors: Gary R. Weaver, Bryce M. Smith, Gregory L. Horvath, and Bernard L. Walsh, Jr.
Assignee: Hughes Aircraft Company.
Filed: July 2, 1986.

Abstract—A microwave oscillator in a loop configuration comprises three substantially identical amplifier stages each having its own phase shift at a selected oscillating frequency. A transmission delay element having a phase shift at the selected oscillating frequency, is also in the loop configuration, so that the oscillator has zero phase shift around the loop at the oscillating frequency. Each amplifier stage has at least one active component with resistive feedback, which is connected to dc blocking and filtering capacitors. Capacitor values between 2.2 and 5.1 pF are used making the oscillator design amenable to cost effective conventional hybrid and semiconductor processes.

20 Claims, 2 Drawing Sheets



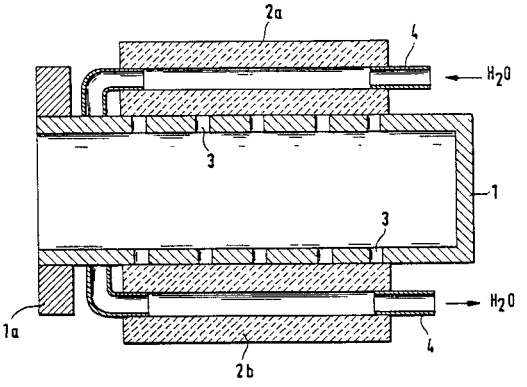
4,799,031 Jan. 17, 1989

Waveguide Device for Producing Absorption or Attenuation

Inventors: Manfred Lang and Walter Höppler.
Assignee: Spinner GmbH, Elektrotechnische Fabrik
Filed: Nov. 30, 1987.

Abstract—A waveguide device for producing absorption or attenuation includes a waveguide section which is provided with an external absorber material. For allowing a transfer of the high-frequency power into the absorber material, the wave section is provided with coupling apertures via which the absorber material is in connection with the interior of the waveguide section.

18 Claims, 4 Drawing Sheets



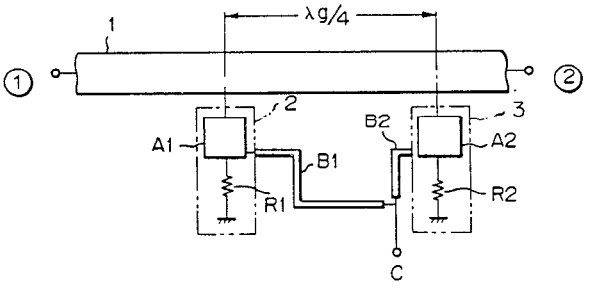
4,799,032 Jan. 17, 1989

Directional Coupler

Inventor: Hideo Sugawara.
Assignee: Fujitsu Limited.
Filed: Aug. 12, 1987

Abstract—A directional coupler includes a main line (1) and two conductive pads (2a, 3a) which are capacitively coupled to the main line (1) in a lumped constant fashion The conductive chips (2a, 3a) are separated by a distance of $\lambda g/4$. Signals on the conductive pads (2a, 3a) are transferred, through first and second conductive patterns (B1, B2) narrower than the main line, to an output terminal The first conductive pattern and the second conductive pattern are different in length by 80 $g/4$, and a loose and directional coupling signal is obtained at the output terminal.

9 Claims, 6 Drawing Sheets



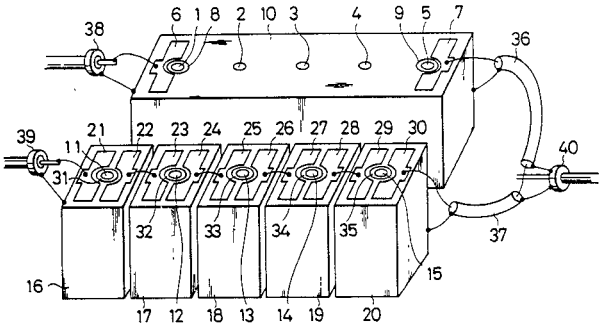
4,799,033 Jan. 17, 1989

Microwave Separator

Inventors: Sadao Igarashi and Moriaki Ueno.
Assignee: Alps Electric Co , Ltd
Filed: Mar 19, 1987.

Abstract—A microwave separator for separating a microwave signal to those having frequencies included in two frequency bands by means of a first band pass filter intended for the low frequency band and a second filter intended for the high frequency band, characterized in that said first band pass filter is of the comb line type and that said second band pass filter is of the coaxial type in which plural coaxial type resonators are connected to one another in series through capacitors As the result, microwave signals can be reliably separated at two adjacent frequency bands without any signal loss and the return losses of the band pass filters can be improved accordingly.

1 Claim, 5 Drawing Sheets



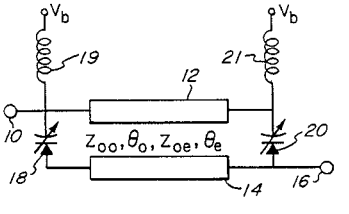
4,799,034 Jan. 17, 1989

Varactor Tunable Coupled Transmission Line Band Reject Filter

Inventors: Lawrence H. Silverman, Randy Teague, and Richard Kaminsky.
Assignee: General Instrument Corporation.
Filed: Oct. 26, 1987

Abstract—A tunable coupled transmission line band reject filter for use in the microwave frequency range includes a coupled transmission line having first and second line sections. Each line section has an input end and an output end. A transmission line exhibits a natural notch at a particular frequency. A first varactor is coupled between the input ends of the first and second sections A second varactor is coupled between the output ends of the first and second sections A dc bias voltage across the varactor diodes controls the center frequency of the resulting notch filter.

9 Claims, 2 Drawing Sheets



4,799,035 Jan. 17, 1989

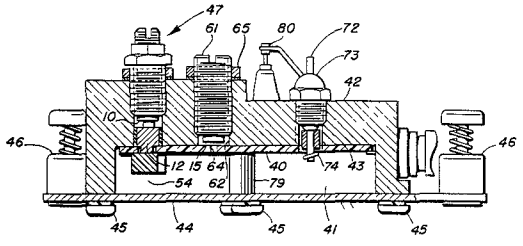
Microwave Diode Tuning Circuit

Inventors: Ronald L. Chilluffo and Ellis J. Gottlieb.
Assignee: Allied-Signal Inc
Filed: Nov 6, 1987

Abstract—A microwave diode tuning circuit including an IMPATT diode holder of coaxial form and an adjustable capacitor connected in a parallel resonant circuit by microstrip transmission line. The tuning circuit includes a stabilization network and a bias insertion network. Optionally, the tuning

circuit may include a hybrid junction for coupling two such diode tuning circuits together, the diode holder includes an internally externally threaded sleeve providing means for continuously adjusting, through a limited range, the inductance of the resonant circuit.

13 Claims, 4 Drawing Sheets



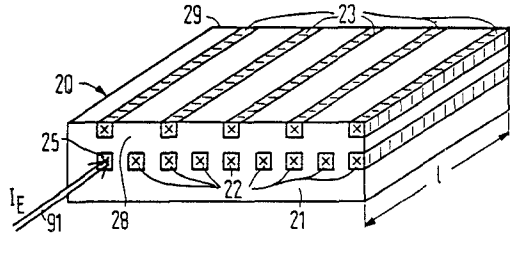
4,799,749 Jan. 24, 1989

Integrated Resonator Matrix for Wavelength-Selective Separation or Joining of Channels in the Frequency Domain of Optical Communications Technology

Inventors: Manfred Börner, Reinhard Müller, and Gert Trommer.
Assignee: Siemens Aktiengesellschaft.
PCT Filed: Feb. 25, 1986.

Abstract—Integrated resonator matrix for wavelength-selective separation or joining of channels in the frequency domain of optical communications technology. Arrangement of optical resonators which are composed of dielectric waveguides which are mirrored at their ends predominantly with reflectors having high reflection factors close to the value one and whose longitudinal extent between the reflectors is great in comparison to the transverse dimensions perpendicular thereto, all optical resonators are integrated such on a substrate to form a matrix-like arrangement, referred to as resonator matrix. Two types of resonators can be distinguished, whereby the resonators of the first type are highly coupled to one another and act as coupled resonators (22, 221, 222), whereas the resonators of the second type act as wavelength-selective useful resonators (23, 231, 232) and, compared to the couplings between the resonators of the first type, are weakly coupled to one another or, respectively, to the resonators of the first type and form at least two useful resonator groups which are not coupled to one another (or are coupled to one another as little as possible) whereby a useful resonator group contains one or more useful resonators.

48 Claims, 14 Drawing Sheets



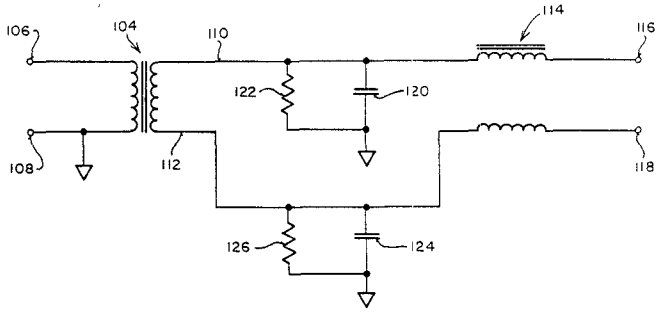
4,800,344 Jan. 24, 1989

Balun

Inventor: Martin H. Graham.
Assignee: And Yet, Inc.
Filed: Aug 27, 1987.

Abstract—The present invention comprises a balun for intercoupling an at least partially unbalanced line and a substantially balanced line having similar line impedances which is capable of passing differential signals over a wide bandwidth while substantially attenuating any common mode signals. The balun comprises a pair of transformers with bifilar windings, each connected as a choke. Each conductor of the unbalanced line is coupled to a different one of two substantially identical inductances of the first transformer and the other side of each inductance is coupled through the second transformer to a different one of the two conductors of the balanced line. Each of the connections between the two transformers is coupled to ground with a substantially identical capacitance. The capacitance in conjunction with the inductance acts to filter out the common mode signals while allowing the differential mode signals to pass through the balun. The capacitance is coupled to each transmission line by a transformer with sufficient inductance to prevent differential signals in either direction from being shunted to ground. Preferably, a resistor is added in parallel to each of the capacitances to provide for common mode attenuation at the resonant frequency of the system capacitance and inductances.

4 Claims, 3 Drawing Sheets



4,800,345 Jan. 24, 1989

Spiral Hybrid Coupler

Inventors: Allen F. Podell and Robert H. Benton.
Assignee: Pacific Monolithics.
Filed: Feb. 9, 1988.

Abstract—The disclosed coupler is in a spiral form having approximately $1\frac{1}{4}$ turns and a length of just over $\frac{1}{4}$ wavelength of a designed frequency. The coil includes an interdigitated section with two conductor portions for each conductor. In the overlapped turn portion, the inner conductors are narrower than the outer conductor. Further, conductor pads are disposed adjacent the coupler conductors for connection to associated couplers to vary the bandwidth of the coupler.

25 Claims, 5 Drawing Sheets