Patent Abstracts

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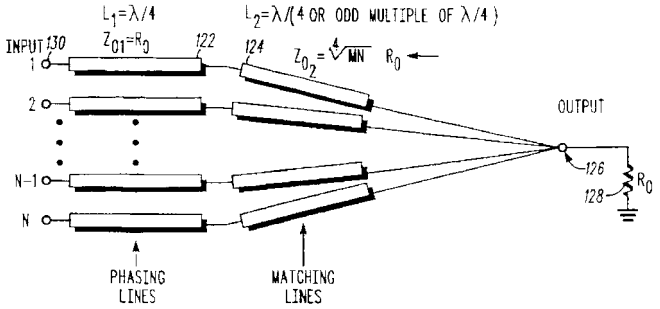
5,543,751 Aug. 6, 1996

Power Combiner for Use in a Radio Frequency System and a Method of Constructing a Power Combiner

Inventors: Robert B. Stedman and John E. Matz.
Assignee: Motorola, Inc.
Filed: July 21, 1995.

***Abstract*—**A power combiner including a plurality of phasing transmission lines (**122**) supporting a set of amplifiers (**104**) coupled thereto, and a plurality of matching transmission lines (**124**). The set of amplifiers (**104**) having a selectable number of amplifiers between a minimum and a maximum value. Each of the matching transmission lines (**124**) is coupled to one of the phasing transmission lines (**122**) at one end and coupled to a common node (**126**) at the other end. Each of the matching transmission (**124**) lines has a substantially equivalent characteristic impedance determined according to a function of the minimum and the maximum number of amplifiers in the set of amplifiers (**104**).

18 Claims, 3 Drawing Sheets



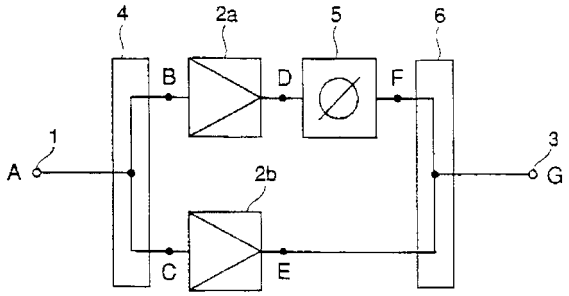
5,543,752 Aug. 6, 1996

Microwave Amplifier Circuit Having Reduced Harmonic Distortion

Inventor: Yoshihiro Tsukahara.
Assignee: Mitsubishi Denki Kabushiki Kaisha.
Filed: May 4, 1995.

***Abstract*—**A microwave amplifier circuit includes a divider having an input connected to an input terminal of the amplifier circuit, dividing an input signal applied to the input terminal into two divided signals, and outputting the divided signals to first and second output ends outputs, respectively. First and second microwave amplifiers having inputs respectively connected to the first and second outputs of the divider. A combiner mixer having first and second inputs and an output as the first input connected to the output of the first microwave amplifier through a 90° phase shifter, the second input connected to the output of the second microwave amplifier, and the output connected to the output terminal of the microwave amplifier circuit. Therefore, the doublet component of the output signal can be suppressed by combining the amplified signal which has shifted, the phase of the doublet component by 180° the amplified signal having the same phase as the input signal. As a result, in the microwave amplifier circuit, the passing phase of the signal passing through the amplifier circuit does not vary, gain at outside the band, i.e., gain in the high-frequency region, is suppressed and the IM3 frequency component is suppressed.

6 Claims, 8 Drawing Sheets



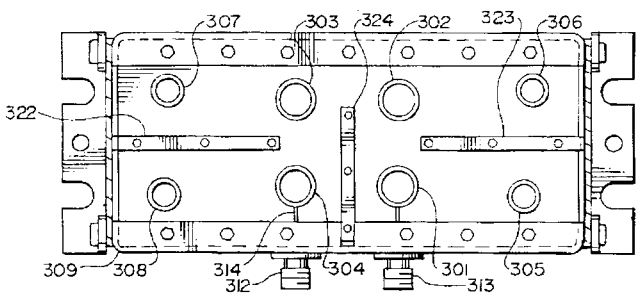
5,543,758 Aug. 6, 1996

Asymmetric Dual-Band Combine Filter

Inventor: Chia-Sam Wey.
Assignee: Allen Telecom Group, Inc.
Filed: Oct. 7, 1994.

***Abstract*—**A dual-band filter providing a bandpass characteristic over a first predetermined range of frequencies, and a notch, or band-reject characteristic over a second predetermined range of frequencies. In one embodiment, the notch characteristic occurs within the bandpass characteristic, yielding a filter frequency response with two asymmetric passbands separated by a reject band. This is particularly suited to cellular Band A receive filter applications, but the design is easily adapted to other uses. Appropriate tuning can restore symmetry to the passbands.

27 Claims, 5 Drawing Sheets



Publisher Item Identifier S 1051-8207(97)06870-0.

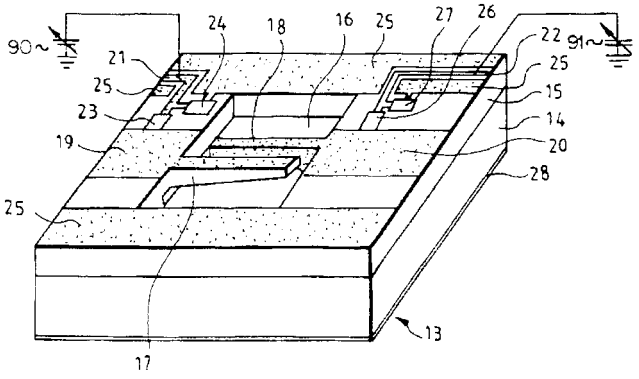
5,543,765 Aug. 6, 1996

Integrated Electronic Elements with Variable Electrical Characteristics, Especially for Microwave Frequencies

Inventor: Gérard Cachier.
Assignee: Thomson-CSF.
Filed: Apr. 20, 1994.

***Abstract*—**Disclosed are electronic elements with variable electrical characteristics, each element including at least one microcavity in which there shifts, with a limited clearance or range of play, at least one moving element made of an insulator material that is at least partially covered with electrically conductive material, and that works together with at least one microwave circuit of the substrate, and means creating an electrical field to shift the moving element.

20 Claims, 4 Drawing Sheets



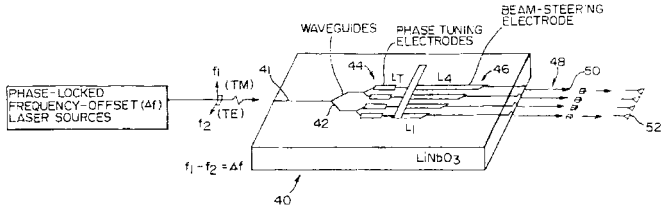
5,543,805 Aug. 6, 1996

Phased Array Beam Controller Using Integrated Electrooptic Circuits

Inventor: Suwat Thaniyavarn.
Assignee: The Boeing Company.
Filed: Oct. 13, 1994.

***Abstract*—**A photonic device for controlling phased array beam direction includes an electrooptic substrate; a plurality of waveguides formed in the substrate, each of which is capable of simultaneously propagating light signals with orthogonal polarizations; an input waveguide for inputting into each one of the plurality of waveguides a pair of copropagating polarized light signals having orthogonal polarizations and different frequencies; a plurality of electrodes on the substrate configured to phase shift the signals traveling through each waveguide by a different amount in response to a common applied voltage, thereby creating phase shifted polarized signals; and means for combining the phase-shifted polarized signals within each one of the waveguides and propagating these combined signal to an antenna element. The basic operating principle of the invention is based on the differential phase shift between optical waves of orthogonal polarizations traveling in an electrooptic optical waveguide. This differential phase shift is directly proportional to the voltage applied to a control electrode and to the length of that electrode. If the two optical waves are slightly offset in optical frequency, they produce a beat frequency when photodetected whose phase shift equals the optical differential phase shift. An array of such phase shifters forms the basis for the photonic beam controller of the invention.

9 Claims, 3 Drawing Sheets



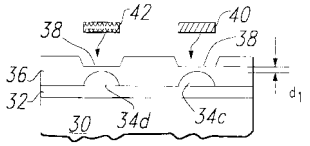
5,546,480 Aug. 13, 1996

Hybrid All-Optical Silica Waveguide Modulator Using Nonlinear Electrooptic Components

Inventor: Jerry Leonard.
Assignee: Texas Instruments Incorporated.
Filed: Apr. 28, 1995.

***Abstract*—**Generally, the present invention is an optically controlled optical waveguide circuit comprising a substrate **30**, an inorganic waveguide core **34** disposed within one or more cladding layers **36** upon the substrate **30**, and an active cladding drop-in component **40** comprising a nonlinear optical material adjacent to the waveguide core wherein the phase of an optical signal within the waveguide core may be modulated by controlling the index of refraction of the active cladding region. An embodiment of the present invention uses an inorganic waveguide **34** with a drop-in component of nonlinear silica **40** as an active cladding to provide a phase modulator for a Mach–Zehnder interferometer which can be used to implement high-speed low-loss switching of optical signals.

14 Claims, 1 Drawing Sheet



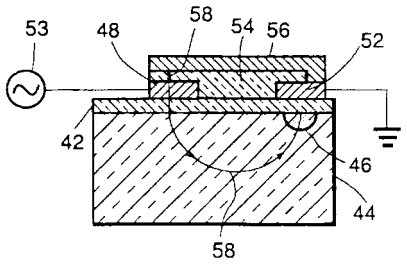
5,548,668 Aug. 20, 1996

Velocity-Matched Electrodes for Electrooptic Travelling-Wave Modulators and Method for Forming the Same

Inventor: James H. Schaffner.
Assignee: Hughes Aircraft Company.
Filed: Oct. 25, 1994.

***Abstract*—**Velocity-matched electrodes that are sufficiently index-matched to use in linearized directional-coupler modulators are provided by placing a low dielectric constant material layer over the travelling-wave modulator electrodes, followed by a metal layer that is electrically connected to a ground electrode. The low dielectric constant layer between the grounded metal layer and the active electrode lowers the effective radio frequency (rf) dielectric constant, which lowers the rf index of refraction. The rf index of refraction is matched to the optical index of refraction by controlling the thickness of the low dielectric constant layer, which is deposited with standard rf sputtering techniques that allow for precise control over the layer thickness. As a result, more precise velocity matching and greater reproducibility than with prior velocity matching techniques is achieved.

16 Claims, 5 Drawing Sheets



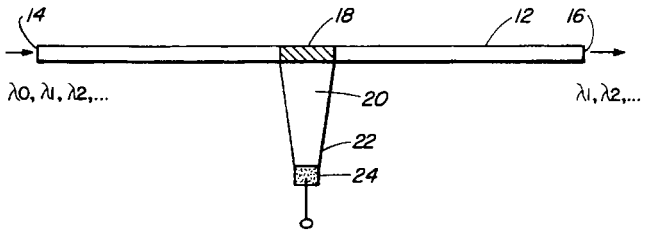
5,548,671 Aug. 20, 1996

Programmable, Differential Wavelength Discriminator

Inventors: Chi Wu and Ernst A. Munter.
Assignee: Northern Telecom Limited.
Filed: Oct. 13, 1994.

***Abstract*—**A programmable wavelength discriminator for isolating individual wavelength carriers from an optical signal including a plurality of wavelength carriers. The discriminator preferably has a pair of waveguides, with each waveguide having imprinted therein a reflecting grating whose period is chosen to reflect the wavelength to be isolated. A receiver such as a photodetector interrogates the selected wavelength. A programmable optical switch determines through which waveguide the composite optical signal will travel. A method of isolating discrete wavelengths from an optical signal comprising a plurality of wavelengths is also discussed.

10 Claims, 4 Drawing Sheets



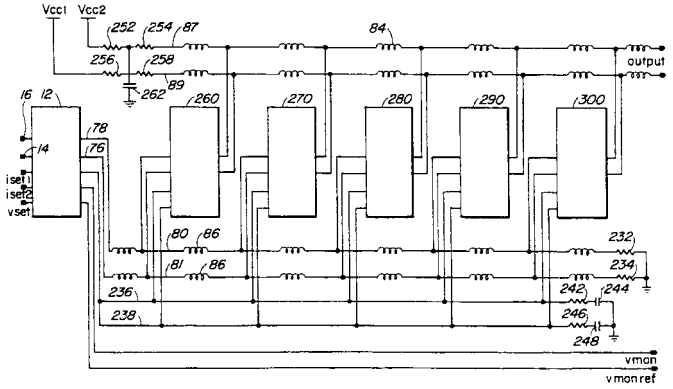
5,550,513 Aug. 27, 1996

High-Frequency, Differential Limiting Distributed Amplifier

Inventor: Thomas Y. Wong.
Assignee: Northern Telecom Limited.
Filed: June 22, 1995.

***Abstract*—**A fully differential distributed amplifier for providing a high-frequency, high-power output. The inherent base-collector capacitance of the output power transistors of each distributed amplifier is matched with on-chip inductances to create artificial transmission lines for both the input and output paths. The distributed amplifier circuit may be used as a driver for a Mach–Zehnder optical modulator. In this application an output of 3-V peak-to-peak per modulator arm is delivered at 10 Gb/s.

13 Claims, 5 Drawing Sheets



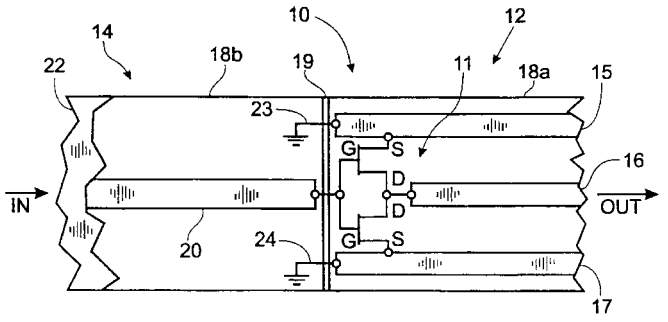
5,550,518 Aug. 27, 1996

Miniature Active Conversion Between Microstrip and Coplanar Waveguide

Inventor: Clifford A. Mohwinkel.
Assignee: Endgate Corporation.
Filed: June 12, 1995.

***Abstract*—**An active device, such as a field-effect transistor (FET) or monolithic microwave integrated circuit (MMIC), converts microwave signals between a microstrip transmission line (microstrip) and a coplanar wave guide (CPW). In microstrip-to-CPW conversion using a simple FET, a gate connection is made to the microstrip signal conductor. A drain connection is made to the center conductor on the CPW. Two FET source terminals are connected respectively to each CPW ground strip. The ground strips are electrically coupled to the microstrip ground plane with a minimum length connection so the inductance common to the FET input and output is minimized. The FET can be reconnected so as to reverse the input and output, providing for conversion of signals from CPW to microstrip. Conversion from microstrip to an intermediate CPW and back to microstrip provides for mounting an intermediate circuit, such as an amplifier or other MMIC, directly on the CPW.

19 Claims, 5 Drawing Sheets



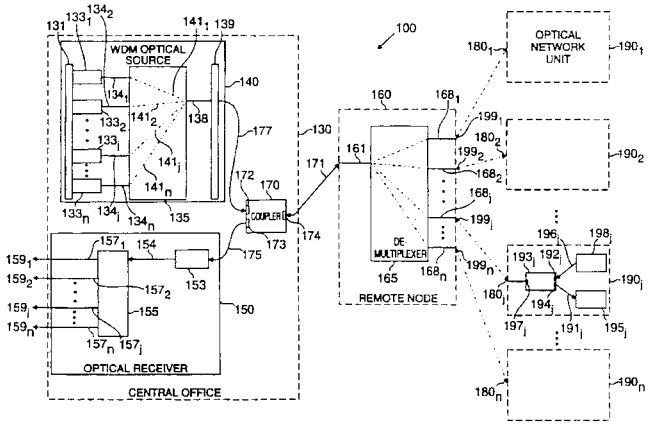
5,550,666 Aug. 27, 1996

Wavelength-Division-Multiplexed Multifrequency Optical Source and Broadband Incoherent Optical Source

Inventor: Martin Zirngibl.
Assignee: Lucent Technologies Inc.
Filed: June 17, 1994.

***Abstract*—**A wavelength-division-multiplexing multifrequency optical source is used to provide downstream transmission of information signals at discrete optical wavelengths from a central office to a plurality of optical network units. A passive optical demultiplexer in a remote node routes the downstream information signals to the optical networks according to optical wavelength. Broadband incoherent sources are used to provide upstream information signals at discrete optical wavelengths which are multiplexed and then routed to the central office for demultiplexing by the passive optical demultiplexer. A wavelength-selective coupler in the central office and in each optical network unit combines and segregates downstream and upstream signals of different optical wavelengths for routing to a desired destination.

46 Claims, 3 Drawing Sheets



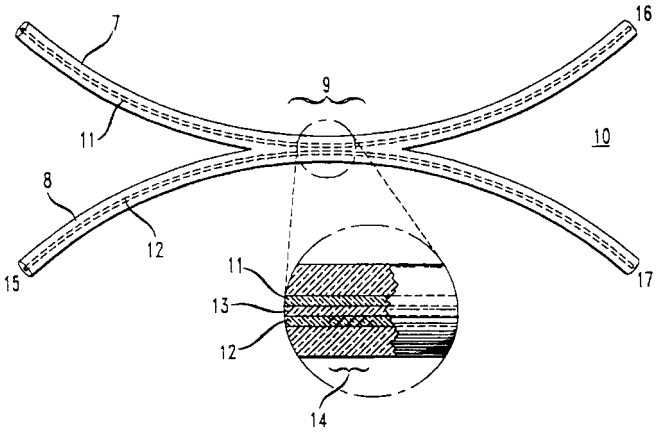
5,550,940 Aug. 27, 1996

Optical Tapping Filters Employing Long Period Gratings

Inventors: Ashish M. Vengsarkar and Kenneth L. Walker.
Assignee: Lucent Technologies Inc.
Filed: Feb. 24, 1995.

***Abstract*—**In accordance with the invention, an optical filter comprises a plurality of optical fibers having a coupling region where the axially extending cores are closely spaced within a common cladding. The coupling region includes a long period grating for selectively shifting light of selected wavelengths from guided modes into nonguided modes. These nonguided modes are picked up by an adjacent core and light of the selected wavelengths is thus shifted from one core to another. The result is an optical filter particularly useful as a demultiplexer or a tapping device. In one embodiment the grating is formed in one of the cores. In an alternative embodiment, it is formed in the common cladding.

6 Claims, 2 Drawing Sheets



5,551,074 Aug. 27, 1996

Balanced Reflection Transformer

Inventor: Michael W. Vice
Assignee: Watkins-Johnson Company.
Filed: Jan. 19, 1995.

***Abstract*—**A mixer comprising four FET transistors in a MMIC, a reflection transformer having tri-filar windings, an IF balun, an RF balun, a local oscillator balun, a pair of load resistors, a pair of series resistors, and a pair of series capacitors. The mixer is packaged in a lidded header similar to a large TO-8 metal package.

8 Claims, 3 Drawing Sheets