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, DC 20231.

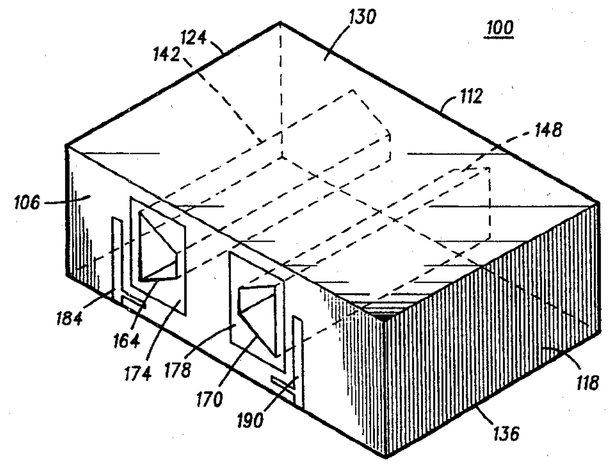
5,404,120 Apr. 4, 1995

Dielectric Filter Construction Having Resonators of Trapezoidal Cross Sections

Inventor: Darioush Agahi-Kesheh.
Assignee: Motorola, Inc.
Filed: Sept. 21, 1992.

Abstract—A dielectric filter having at least two adjacently positioned resonators extended therethrough. The two adjacently positioned resonators are of trapezoidal cross sections to thereby form trapezoidal resonators. By suitable selection of the configurations of such resonators, the amount of coupling between such adjacent resonators may be controlled. For instance, a minor base side of the first trapezoidal resonator may be positioned adjacent to a corresponding minor base side of the adjacent trapezoidal resonator, or a major base side of the first trapezoidal resonator may be positioned adjacent to a major base side of the adjacent trapezoidal resonator. Or, a minor base side of the first trapezoidal resonator may be positioned adjacent to a major base side of the second trapezoidal resonator. Such electromagnetic coupling between the adjacent resonators is controlled by the relative configurations of such resonators rather than by increasing the spacings between such adjacent resonators.

19 Claims, 4 Drawing Sheets



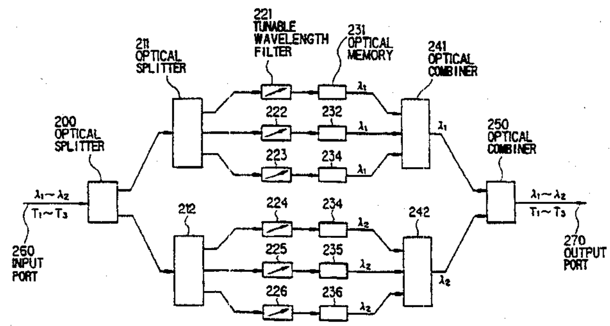
5,404,240 Apr. 4, 1995

Optical Switching System for Optical Wavelength-Division and Time-Division Multiplexed Signals

Inventors: Makoto Nishio and Takahiro Numai.
Assignee: NEC Corporation.
Filed: Feb. 14, 1992.

Abstract—An optical switching system for optical wavelength-division and time-division multiplexed signals includes a plurality of tunable wavelength filters, each of which selects a signal having a desired wavelength from an optical wavelength-division and time-division multiplexed signal, and a plurality of optical memory elements, each of which is supplied with an output signal of each of the plurality of tunable wavelength filters. Each optical memory element memorizes a light intensity of the output signal by being applied with a first control voltage and supplies an output port with the output signal, which is converted to have a predetermined wavelength in a desired time slot. The tunable wavelength filters and optical memory elements may by replaced by wavelength filters and tunable wavelength optical memories.

3 Claims, 15 Drawing Sheets



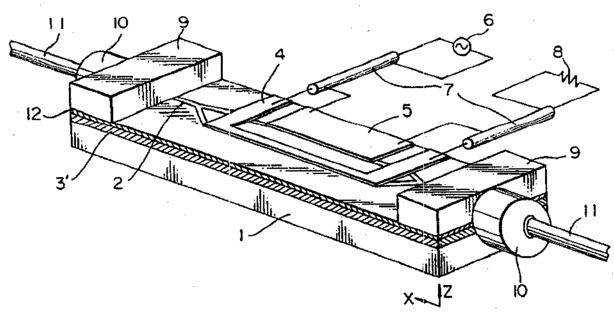
5,404,412 Apr. 4, 1995

Optical Waveguide Device

Inventors: Minoru Seino, Tadao Nakazawa, Takashi Yamane, Yoshinobu Kubota, Masaharu Doi, Kunio Sugeta, and Teruo Kurahashi.
Assignee: Fujitsu Limited.
Filed: Dec. 24, 1992.

Abstract—This invention aims at providing an optical waveguide device capable of stably operating for an extended period of time. The optical waveguide device comprises an optical waveguide path formed inside a surface of an electrooptical substrate, a buffer layer formed on the optical waveguide path, and a driving electrode for impressing an electric field so as to change a refractive index of the optical waveguide path, wherein the buffer layer is made of a transparent dielectric or insulator of a mixture between silicon dioxide and an oxide of at least one element selected from the group consisting of the metal elements of the Groups III to VIII, Ib and IIb of the Periodic Table and semiconductor elements other than silicon, or a transparent dielectric or insulator of an oxide between silicon and at least one of the metal elements and semiconductor elements described above.

8 Claims, 27 Drawing Sheets



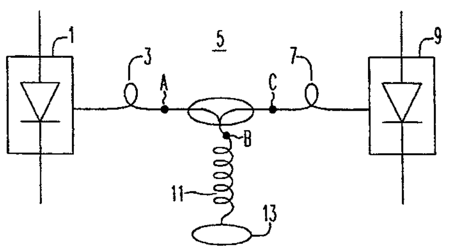
5,404,413 Apr. 4, 1995

Optical Circulator for Dispersion Compensation

Inventors: Jean-Marc P. Delavaux and Kinichiro Ogawa.
Assignee: AT&T Corp.
Filed: Dec. 14, 1993.

Abstract—Dispersion compensation is achieved in an optical communications system by using an optical circulator with first, second, and third ports. The first and third ports are connected to system optical fibers. The second port is connected to a dispersion compensating fiber and return means. The signal passes through the dispersion compensating fiber twice permitting shorter dispersion compensating fibers to be used than were previously used. A Faraday rotator may be used compensate for the polarization mode dispersion of the fiber.

21 Claims, 4 Drawing Sheets



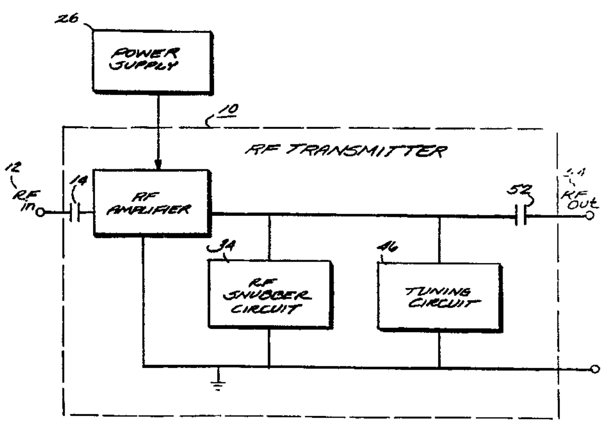
5,406,227 Apr. 11, 1995

Method and Apparatus for Controlling RF Spectral Splatter into Adjacent Channels When Activating an RF Transmitter

Inventor: James W. Williams.
Assignee: Ericsson GE Mobile Communications, Inc.
Filed: Aug. 30, 1993.

Abstract—A simple and effective "RF snubber" circuit resolves the problems associated with transient spectral noise caused by radio transmitter activation in nearby channels. By connecting an RF snubber circuit in parallel with the RF amplifier output, the rise time or turn-on characteristic of the RF signal generated by the transmitter is controlled. As a result, adjacent channel interference is substantially eliminated.

15 Claims, 4 Drawing Sheets



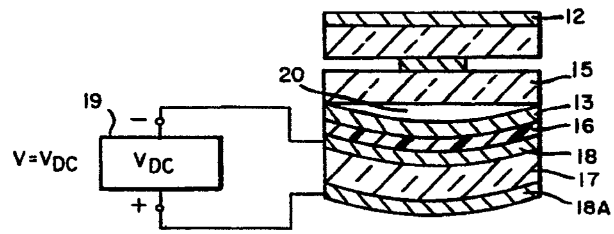
5,406,233 Apr. 11, 1995

Tunable Stripline Devices

Inventors: Benjamin S. Shih and Daniel E. Oates.
Assignee: Massachusetts Institute of Technology.
Filed: Mar. 28, 1994.

Abstract—A stripline device using at least one strip conductor and at least one ground plane separated therefrom by a dielectric substrate. The ground plane is caused to move relative to the strip conductor so as to change the propagation velocity of the stripline device. In a particular embodiment, a layer of piezoelectric material is positioned adjacent the ground plane and a voltage is applied to the piezoelectric layer that causes its dimensions to change and provides a changing air gap between the substrate and the ground plane to change the propagation velocity accordingly.

17 Claims, 5 Drawing Sheets



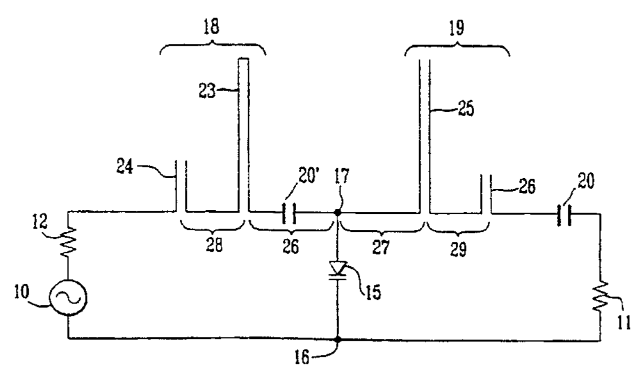
5,406,237 Apr. 11, 1995

Wideband Frequency Multiplier Having a Silicon Carbide Varactor for Use in High-Power Microwave Applications

Inventors: Richard J. Ravas, Harvey C. Nathanson, Marvin Cohn, and Edward C. Niehenke.
Assignee: Westinghouse Electric Corporation.
Filed: Jan. 24, 1994.

Abstract—The invention provides frequency multiplier circuitry that may be used in the output section of high-power microwave systems to efficiently provide higher output frequencies. Generally, one multiplier stage may be utilized to double the frequency of the input signal with several stages being cascaded to achieve even higher frequencies. The varactor diodes utilized in circuits of the invention are preferably constructed primarily of silicon carbide, which has many advantages when compared with current varactors constructed of GaAs or silicon. Some presently preferred embodiments utilize a four-terminal varactor bridge instead of a single varactor diode. The invention also teaches several significant techniques for improving the bandwidth of the circuitry, thus allowing variation of the frequency of the input signal without significantly attenuating the output signal.

12 Claims, 6 Drawing Sheets



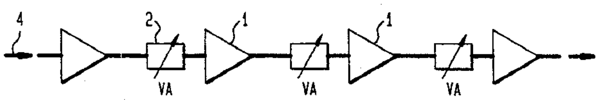
5,406,404 Apr. 11, 1995

Method of Mitigating Gain Peaking Using a Chain of Fiber Amplifiers

Inventors: David J. DiGiovanni, Jonathan A. Nagel, Richard G. Smart, James W. Sulhoff, and John L. Zyskind.
Assignee: AT&T Corp.
Filed: Nov. 2, 1993.

Abstract—The present invention relates to a method of mitigating gain peaking in a chain of fiber amplifiers by pumping the amplifiers at a predetermined wavelength to produce gain over a specified wavelength range.

11 Claims, 3 Drawing Sheets



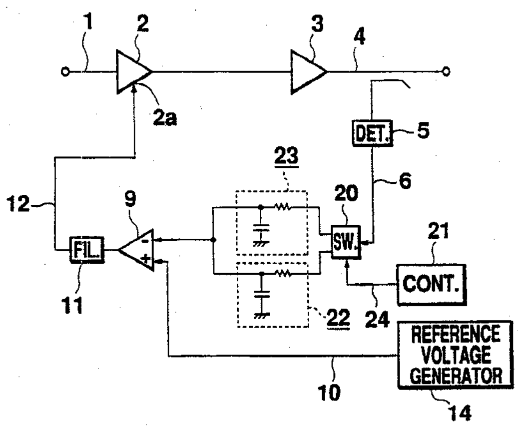
5,408,197 Apr. 18, 1995

Automatic Power Control Circuit for Controlling Transmitting Power of Modulated Radio Frequency Signal

Inventor: Atsushi Miyake.
Assignee: Mitsubishi Denki Kabushiki Kaisha.
Filed: Feb. 28, 1994.

Abstract—An automatic power control circuit controls the output power of a transmitting RF signal having envelope fluctuations generated by the modulation. The circuit uses a feedback signal, which is a difference signal between an envelope provided by detecting the RF output signal, and a reference voltage corresponding to the transmitting power. At this time, fluctuation components included in the envelope and generated by the modulation is removed by the use of a low-pass filter. This circuit secures the sharpness in the leading edge of the burst signal by reducing the time constant of the low-pass filter in the rise time of the burst signal and increasing the time constant of the low-pass filter in the data periods.

21 Claims, 6 Drawing Sheets



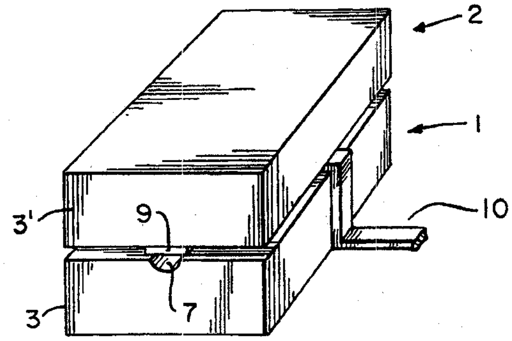
5,408,206 Apr. 18, 1995

Resonator Structure Having a Strip and Groove Serving as Transmission Line Resonators

Inventors: Aimo Turunen and Heli Jantunen.
Assignee: LK-Products Oy.
Filed: May 6, 1993.

Abstract—The present invention relates to a resonator structure composed of two dielectric pieces. On the upper surface of a first piece (**1**) is provided a groove (**7**) extending across the entire surface and coated with an electrically conductive agent, said coating being at least in one end connected with an electrically conductive coating serving as a ground plane, so that the groove (**7**) forms a transmission line resonator. On the upper surface of the second piece (**2**) is provided a conductive strip (**9**) running in the middle of the surface, said strip forming a transmission line resonator. The pieces (**1, 2**) are placed with the upper surfaces thereof against each other and attached to each other so that the groove (**7**) and the strip (**9**) are against one another in parallel, whereby the groove and the strip together form a resonator.

16 Claims, 3 Drawing Sheets



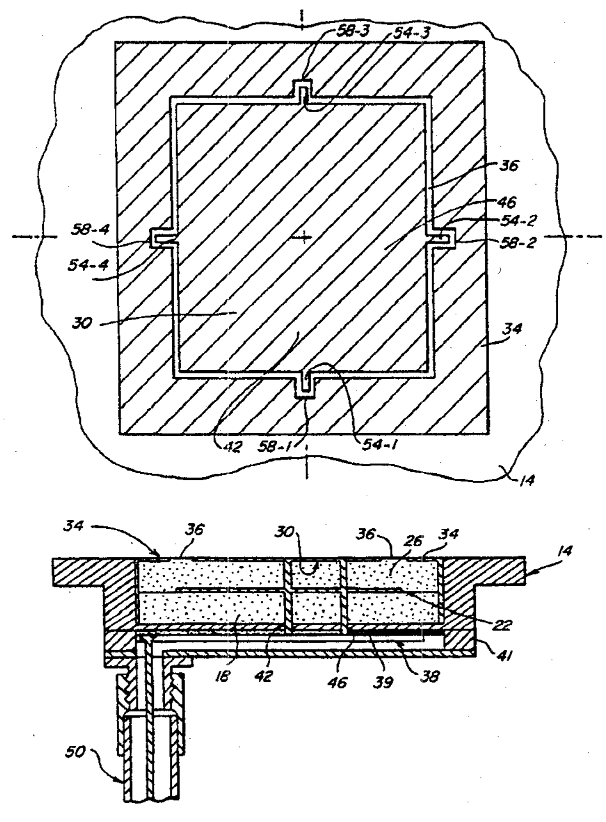
5,408,241 Apr. 18, 1995

Apparatus and Method for Tuning Embedded Antenna

Inventors: Murray G. Shattuck, Jr., Frank B. Bilek, and Thomas A. Metzler.
Assignee: Ball Corporation.
Filed: Aug. 20, 1993.

Abstract—An apparatus and method for tuning a multiradiating element embedded microstrip antenna is disclosed. In one embodiment, the lower resonant frequency of an antenna is tuned using trimmable tabs integral with an upper radiating element and/or scrapable recessed edges on the ground plane surrounding the upper element and/or trimmable tabs interconnected with the ground means and extending inwardly towards the upper element.

21 Claims, 4 Drawing Sheets



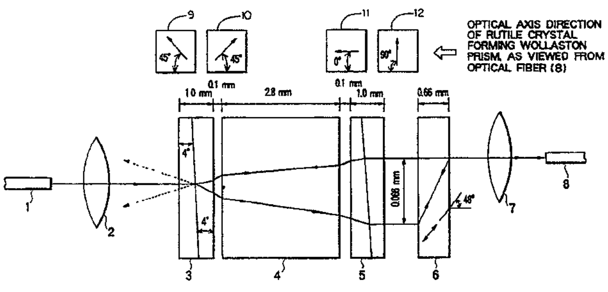
5,408,354 Apr. 18, 1995

Optical Isolator

Inventor: Tadatoshi Hosokawa.
Assignee: Chichibu Cement Co., Ltd.
Filed: Feb. 16, 1993.

Abstract—An optical isolator according to the invention comprises a first birefringent element for separating an incident light beam into two light beams that are vertical to each other in the polarization direction and are not parallel with each other in the propagation direction, a 45° Faraday rotator, a second birefringent element that is identical with the first birefringent elements in terms of the light beam-separation angle but is different by 45° from the first polarizer in terms of the angle the separated two light beams make to the polarization of the beams, and at least one birefringent crystal plane plate that has a function capable of converging two parallel light beams, with the planes of polarization at right angles with each other, into a single beam.

3 Claims, 2 Drawing Sheets



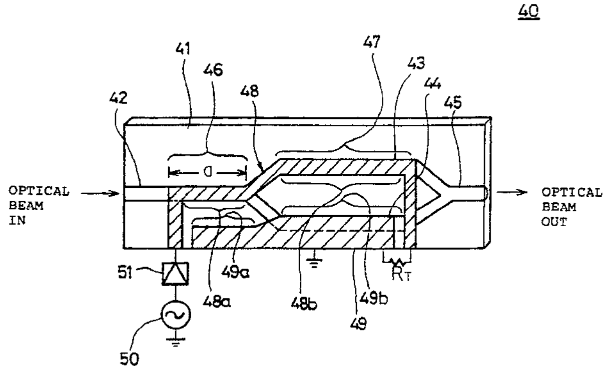
5,408,544 Apr. 18, 1995

Optical Modulator for Producing a Controllable Chirp

Inventor: Minoru Seino.
Assignee: Fujitsu Limited.
Filed: June 29, 1994.

Abstract—An optical modulator comprises an optical waveguide provided on an electrooptic substrate and formed of a first region for optical phase modulation and a second region for optical amplitude modulation cascaded with each other on the substrate, a signal electrode covering the optical waveguide for the first and second regions, and a ground electrode covering a surface of the substrate for the first and second regions, wherein the signal electrode includes an electrode strip extending on the surface of the substrate to continuously cover the optical waveguide from the first region to the second region, and wherein the ground electrode includes an electrode strip extending from the first region to the second region and covering the optical waveguide only in the first region.

19 Claims, 12 Drawing Sheets



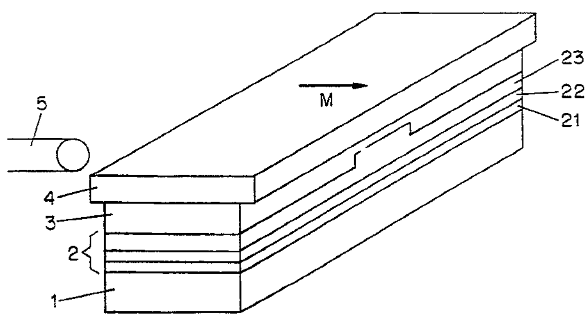
5,408,565 Apr. 18, 1995

Thin-Film Magnetooptic Polarization Rotator

Inventors: Miguel Levy and Richard M. Osgood.
Assignee: The Trustees of Columbia University in the City of New York.
Filed: Feb. 22, 1993.

Abstract—In a polarization rotator device, a thin-film magnetooptic medium is magnetized by a thin-film magnet. To serve as an optical isolator, the device may include polarizers. In such an optical isolator, in which the magnetooptic medium was formed as a Bi-YIG triple-layer structure and the thin-film magnet as a single-crystal iron-cobalt layer, an extinction ratio better than −20 dB was realized.

44 Claims, 3 Drawing Sheets



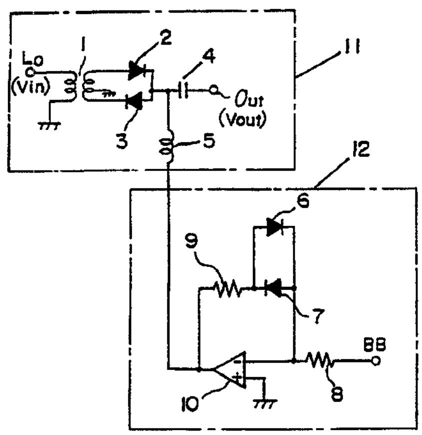
5,410,279 Apr. 25, 1995

Balanced-Type Phase Modulator for Use in Microwave Band

Inventor: Masakazu Nishida.
Assignee: NEC Corporation.
Filed: May 4, 1994.

Abstract—There is provided a phase modulator having a low signal loss characteristic and a simple circuitry configuration, comprising a phase modulating circuit and a linearizer connected thereto, wherein the phase modulating circuit includes a transformer to which high-frequency signal is inputed, a first p-i-n diode connected to one of the terminals of the secondary coil of the transformer, a second p-i-n diode connected to the other terminal of the secondary coil with the reverse polarity to the first p-i-n diode, and a capacitor and a choke coil connected to the connecting point between the first and second p-i-n diodes, and the linearizer includes an operational amplifier whose output terminal is connected to the choke coil, a signal input terminal connected to the inverting input terminal of the operational amplifier, a feedback resistor connected to the output terminal of the operational amplifier, and two diodes connected, in parallel and with reverse polarity, between the feedback resistor and the inverting input terminal of the operational amplifier.

4 Claims, 2 Drawing Sheets



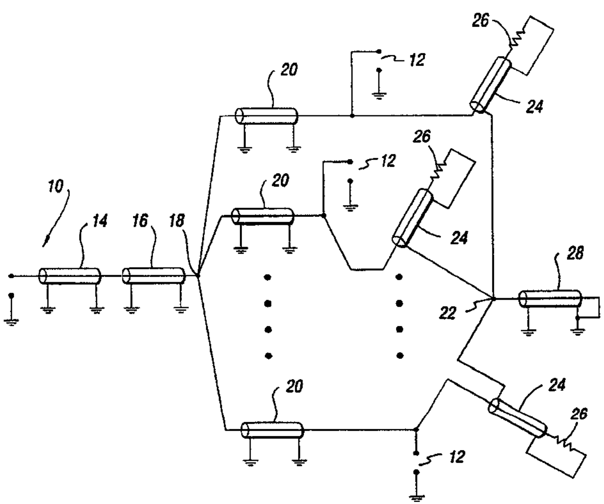
5,410,281 Apr. 25, 1995

Microwave High-Power Combiner/Divider

Inventor: Richard J. Blum.
Assignee: Sierra Technologies, Inc.
Filed: Mar. 9, 1993.

Abstract—Provided is a microwave apparatus for dividing input power to plural outputs or, alternatively, combining power from plural inputs to a single output. The apparatus includes a plurality of isolation resistors, removed from the body of the apparatus by means of respective coaxial transmission line segments. This configuration combines the properties of isolation between the various input/output ports, and effective cooling of the isolation resistors to facilitate high-power conditions and a bandwidth of at least one octave.

6 Claims, 2 Drawing Sheets



5,410,623 Apr. 25, 1995

Optical Device Having Two Optical Waveguides Connected and a Method of Producing the Same

Inventors: Kouji Minami, Kuniaki Okada, Renzaburo Miki, Hiroyuki Yamamoto, Yoshio Yoshida, and Yukio Kurata.
Assignee: Sharp Kabushiki Kaisha.
Filed: Aug. 24, 1993.

Abstract—An optical device includes: a first dielectric slab waveguide having an effective refractive index N_1; a second dielectric slab waveguide having an effective refractive index N_2; and a third dielectric slab waveguide having a length one and an effective refractive index N_3, the third dielectric slab waveguide being formed between the first dielectric slab waveguide and the second dielectric slab waveguide so as to connect the first dielectric slab waveguide with the second dielectric slab waveguides optically, wherein the length I and the effective refractive index N_3 substantially satisfy following equations:

$$N_3 = \sqrt{N_1 N_2}$$

$$l = \frac{\lambda}{\sqrt[4]{N_3^2 - n_1^2 \sin^2\theta}}$$

where λ is a free-space wavelength of light traveling in the optical device and the light travels from the first dielectric slab waveguide to the third dielectric slab waveguide at an incident angle Θ in a single mode.

5 Claims, 7 Drawing Sheets