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.

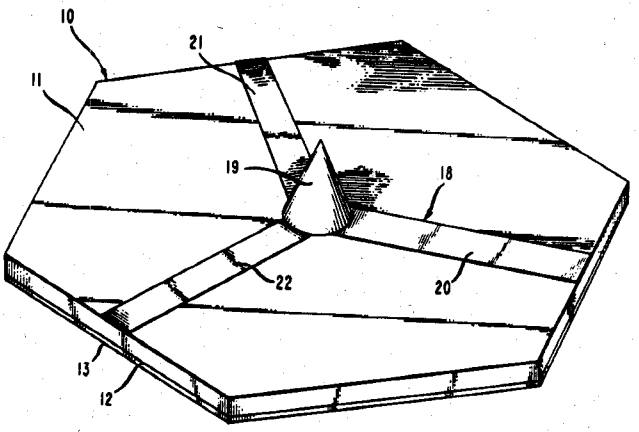
4,862,117 Aug. 29, 1989

Compact 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: Jan. 27, 1989.

Abstract—A millimeter-wave microstrip Y-junction circulator is provided comprising a section of microstrip dielectric substrate having a cone-shaped ferrite element mounted on one side thereof together with three, Y-junction oriented sections of microstrip conductor extending from the base of the ferrite element and an electrically conductive ground plane mounted on the other side thereof. The ferrite element is covered with a cone-shaped microstrip conductor which electrically interconnects the three Y-oriented sections of microstrip conductor. When the ferrite element is fabricated of a spinel type of ferrite, a small permanent magnet is mounted on the ground plane beneath the ferrite element to provide a unidirectional magnetic field which produces a circulator action with respect to RF energy applied to the three sections of microstrip conductor. If the ferrite element is fabricated of a hexagonal type of ferrite which produces its own internal oriented magnetic field, no external magnetic biasing means are required for the circulator.

5 Claims, 1 Drawing Sheet



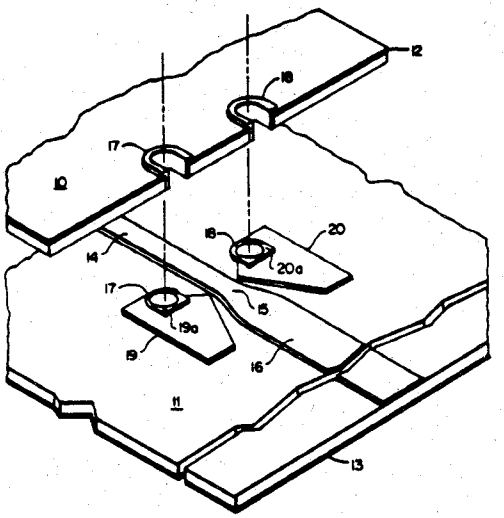
4,862,120 Aug. 29, 1989

Wide-Band Stripline to Microstrip Transition

Inventors: James Ruxton and John Catranis.
Assignee: Canadian Patents and Development Limited/Société Canadienne des Brevets et d'Exploitation Limiteé.
Filed: Feb. 29, 1988.

Abstract—The invention relates to a transition between a "stripline" and a "microstrip" transmission line which uses printed circuit board materials and processes. The transition, which includes a stripline region and a microstrip region, also includes a transitional region in which a quasi coaxial line section is provided in the stripline region near the termination of the upper ground plane. A double tapered double slot line is used to avoid discontinuity. The two slots taper to minimum width at the termination of the upper ground plane, and widen in the transition to the microstrip region. The transition is of wideband operation (e.g. from near dc to 20 GHz) and of high performance.

10 Claims, 2 Drawing Sheets



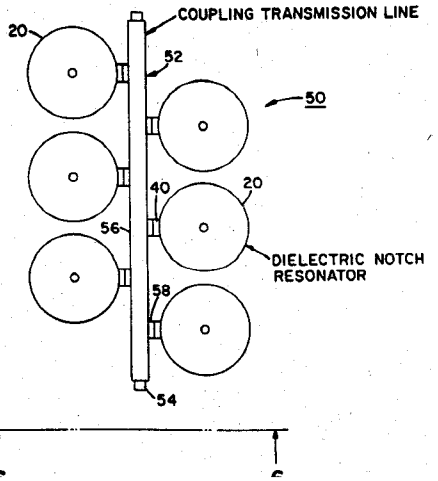
4,862,122 Aug. 29, 1989

Dielectric Notch Filter

Inventors: William D. Blair, Jr., Salvatore Bentivenga, and Gregory J. Lamont.
Assignee: Alcatel NA, Inc.
Filed: Dec. 14, 1988.

Abstract—A dielectric notch filter for attenuating frequencies of relatively narrow bandwidth in comparison to the center frequency of operation, and particularly for attenuating such narrow bandwidths in the ultra-high frequency electromagnetic spectrum. The dielectric notch filter comprises a plurality of dielectric notch resonators coupled to a transmission line at slightly less than the quarter wavelength of the center frequency of the attenuation frequency bandwidth so as to minimize interaction between the individual dielectric notch resonators. Each dielectric notch resonator comprises a dielectric resonator, an associated housing and a coupling reactance element which in turn comprises an inductive wire and a variable capacitor so as to null the reactive component of the dielectric resonator, thereby resulting in a highly attenuated resonant frequency having little imaginary component about said center frequency. By use of a plurality of such dielectric notch resonators, a bandwidth of frequencies can be attenuated through coupling of each resonator to the transmission line.

45 Claims, 4 Drawing Sheets



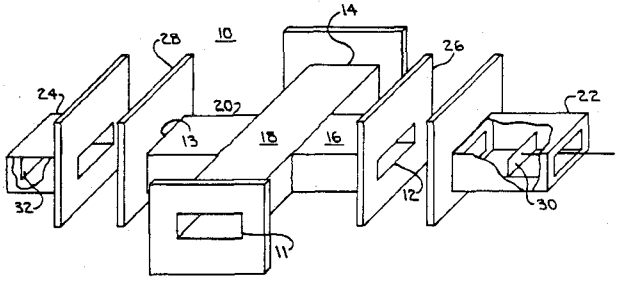
4,864,258 Sept. 5, 1989

RF Envelope Generator

Inventors: Robert V. Garver and Robert J. Tan.
Assignee: The United States of America as represented by the Secretary of the Army.
Filed: May 2, 1988.

Abstract—A microwave RF envelope generator or pulse shaper has a main waveguide with two opposing branches connected in shunt to the main waveguide and are terminated with variable positionable shorts. The characteristic impedance of the shunted combination of the two branches equal one half the characteristic impedance of the main waveguide. An incident RF pulse applied to an input of the main waveguide is transmitted to a four way junction formed at the intersection of the two branches. The incident pulse is divided at the junction. Divided pulses are then transmitted down each of the branches and to an output of the main waveguide. The pulses traveling down each branch will have their phases shifted when they are reflected by the variable positionable shorts. The lengths of the branches are adjusted by the variable shorts so that the phase of the reflected and inverted pulses will cancel the trailing portion of the pulse transmitted out towards the output of the main waveguide. The output pulse width is a function of the time it takes the divided pulses to travel down the branches and back.

7 Claims, 2 Drawing Sheets



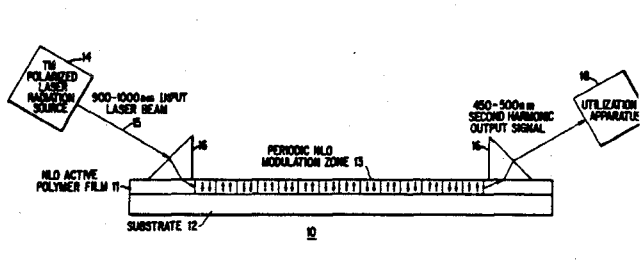
4,865,406 Sept. 12, 1989

Frequency Doubling Polymeric Waveguide

Inventors: Garo Khanarian and David R. Haas.
Assignee: Hoechst Celanese Corp.
Filed: Nov. 9, 1988.

Abstract—In one embodiment this invention provides a frequency doubling optical waveguide consisting of a substrate-supported polymeric thin film which exhibits second order nonlinear optical response, and which has a periodic structure for quasi-phase matching of propagating laser wave energy. In a preferred embodiment the waveguide has a two-dimensional channel structure for intensified single mode wave transmission.

23 Claims, 3 Drawing Sheets



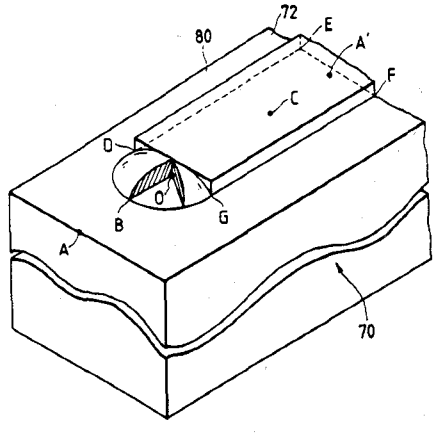
4,865,407 Sept. 12, 1989

Optical Waveguide Element, Method of Making the Same, and Optical Coupler Employing Optical Waveguide Element

Inventors: Akihiro Suzuki, Makoto Suzuki, Yutaka Hattori, Kazuyuki Miyaki, Masayuki Yoshida, Kazunari Taki, and Yoshinori Bessho.
Assignee: Brother Kogyo Kabushiki Kaisha.
Filed: Oct. 26, 1988.

Abstract—An optical waveguide element includes an optical waveguide formed on a light-transmissive dielectric substrate and having a higher refractive index than the refraction index of the substrate, the optical waveguide including a region having an effective refractive index which varies nonlinearly in a direction in which a light wave is propagated through the optical waveguide. The light wave guided through the optical waveguide enters the region, in which the angles of incidence and reflection of the guided wave at the boundary between the region and the substrate is gradually reduced due to the variation in the effective refractive index. When the angles of incidence and reflection of the guided wave becomes smaller than a critical angle, the guided wave is emitted out of the waveguide. Since the effective refractive index changes nonlinearly with respect to the distance the guided wave is propagated, the light emitted into the substrate tends to converge at a point, and the beam pattern of the emitted light is spread less.

9 Claims, 19 Drawing Sheets



4,866,396 Sept. 12, 1989

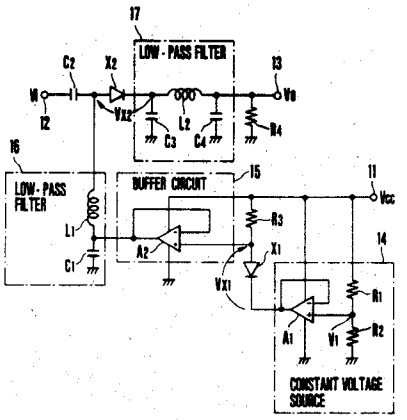
Temperature-Stabilized RF Detector

Inventor: Yoshiharu Tamura.
Assignee: NEC Corporation.
Filed: June 27, 1988.

Abstract—A temperature stabilized RF detector has a first diode connected between an input terminal for receiving an RF signal and an output terminal for outputting the detection signal of the RF signal, and a second diode connected between the input terminal and a constant voltage source through a buffer circuit. Connecting directions of the first and second diodes

are opposite to each other in a circuit for connecting the output terminal and the constant voltage source.

4 Claims, 1 Drawing Sheet



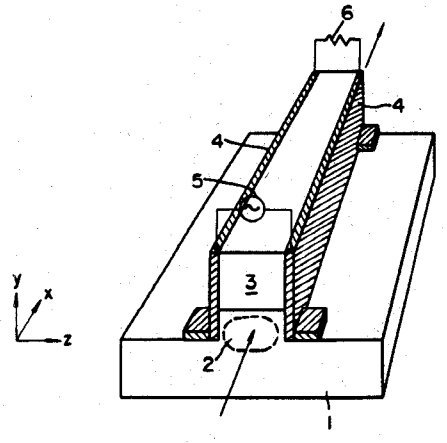
4,866,406 Sept. 12, 1989

Wide-Band Optical Modulator

Inventors: Makoto Minakata and Kazunori Miura.
Assignee: Sumitomo Special Metal Co., Ltd.
Filed: Aug. 17, 1987.

Abstract—The present invention provides a wide-band optical modulator comprising an optical waveguide which is provided on a substrate and comprises a substance having electro-optic effects, a laminate which is provided on the optical waqveguide and comprises a substance having a refractive index smaller than that of the optical waveguide, and two traveling-wave electrodes which are provided opposite to each other on the parallel side surfaces of the laminate in the traveling direction of light so as to hold the laminate there between. When the laminate provided on the optical waveguide is replaced by a gap, similar effects to those of the above-described optical modulator can be obtained.

20 Claims, 12 Drawing Sheets



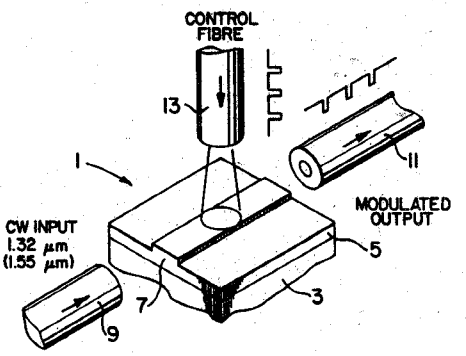
4,867,515 Sept. 19, 1989

All-Optical Modulator with a Channel Waveguide

Inventor: Richard J. F. Normandin.
Assignee: Canadian Patents and Development Ltd.
Filed: Aug. 5, 1988.

Abstract—All-optical modulators are disclosed which include a channel waveguide made of an optically nonlinear material and transmitting an infrared beam. A control light whose wavelength is shorter than the bandgap energy of the channel of the guide is directed to the guide to bring it to cutoff. Near 100% modulation was obtained for a silicon waveguide with less than 150 pJ with a subnanosecond initiation and recovery time in a three port, fiber optics, geometry suitable for use as a logic gate. The operation is largely wavelength independent and stable.

14 Claims, 5 Drawing Sheets



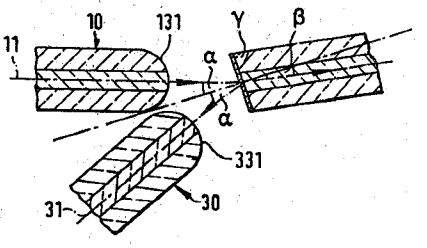
4,867,520 Sept. 19, 1989

Optical Fiber Multiplexer

Inventor: Edgar Weidel.
Assignee: Licentia Patent Verwaltungs GmbH.
Filed: Aug. 28, 1984.

Abstract—An optical multiplexer is disclosed which comprises three waveguides, one for admitting or emitting light and two for receiving light. Each waveguide has an end face. One of the receiving waveguides has an optical layer on its end face which is disposed at an angle to the optical axis of that waveguide. The waveguides are juxtaposed so that their optical axes intersect substantially at the end face of the one receiving waveguide. The optical layer transmits part of the light into the one receiving waveguide. The remainder of the light is reflected into the other receiving waveguide. The intervening space at least partly bounded by the end faces of the waveguides have an index of refraction different from the waveguides themselves.

15 Claims, 2 Drawing Sheets



4,868,524 Sept. 19, 1989

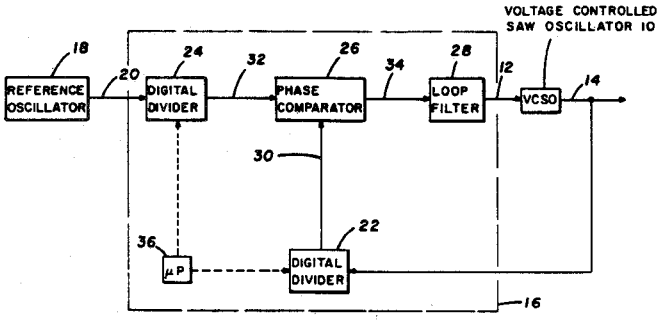
RF Circuit Utilizing a Voltage-Controlled Saw Oscillator

Inventors: Raymond J. Costlow and Alvin G. Bates.
Assignee: The Johns Hopkins University.
Filed: Oct. 20, 1988.

Abstract—An RF circuit to generate a stable carrier signal using a voltage-controlled SAW oscillator (VCSO) is disclosed. The invention teaches

the use of a phase lock loop circuit employing a temperature compensated crystal oscillator (TCXO), or similar stable oscillator, to stabilize the output of the VCSO.

6 Claims, 2 Drawing Sheets



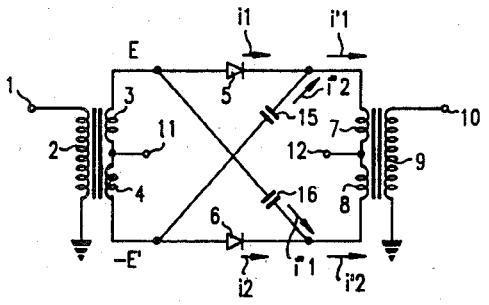
4,868,528 Sept. 19, 1989

Ring-Mounted Microwave Device

Inventors: Julien Prevot and Jean-Pierre Bonnet.
Assignee: Thomson Hybriddes et Microondes.
Filed: June 24, 1988.

Abstract—A microwave device of the diode-operated amplitude modulator or switch type is disclosed. The ring is formed by a source of symmetrical currents which powers the diodes connected to a load. When the diodes are off, they show a capacitance which gives a reactive current. To improve isolation or attenuation, the current in the load must be zero. This is obtained by mounting, on diagonals of the ring, two capacitors which give two currents that are equal and opposite to the two reactive currents.

4 Claims, 3 Drawing Sheets



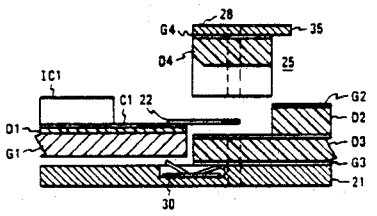
4,870,375 Sept. 26, 1989

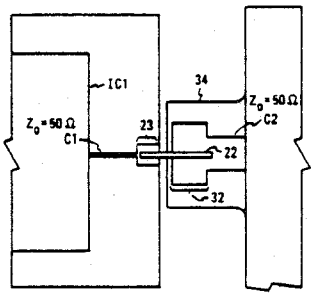
Disconnectable Microstrip to Stripline Transition

Inventors: James W. Krueger, Jr., Blake A. Carnahan, Allan A. Schill, Albert H. Berical, and Cousby Younger, Jr.
Assignee: General Electric Company.
Filed: Aug. 26, 1988.

Abstract—The invention relates to a microstrip to stripline transition which achieves good electrical performance and permits easy, solderless disconnection. The upper portion of the stripline is omitted permitting a flying lead bonded to the microstrip conductor, and which extends across a gap, to be held in contact with the stripline conductor by a removable filler block, which replaces the omitted upper portion of the stripline. The air gap, and the width of the stripline and microstrip conductors adjacent the air gap are dimensioned to form the electrical equivalent of a pi network to achieve a desired response. The filler block is held in place, in one embodiment, by an elongated conductor bridging the upper and lower ground planes of the stripline and which is cut away to form a short waveguide section encircling the transition. The waveguide section is dimensioned to favor only a desired TEM stripline mode and suppress undesired waveguide modes for increased transition efficiency over a desired band. The side walls of the waveguide section are made wide to reduce radiation from the stripline adjoining the transition.

9 Claims, 4 Drawing Sheets





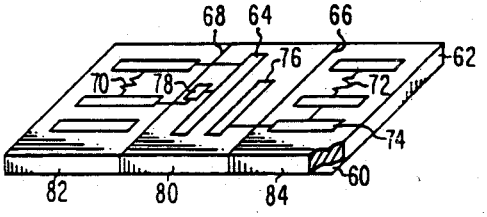
4,870,377 Sept. 26, 1989

Electronic Circuit Substrate Construction

Inventors: Richard Brown, Scott A. Bennett, and Virgil L. Lawson.
Assignee: General Electric Company.
Filed: Nov. 27, 1987.

Abstract—A microwave substrate is formed by thermocompression bonding a metalization system layer to two substrates having corresponding properties. One of the properties in one material is significantly different in value than that property in the other material. The substrates are selected from polycrystalline and monocrystalline ceramic materials. The bonded slabs are sliced and ground planes attached to form finished composite substrates.

9 Claims, 1 Drawing Sheet



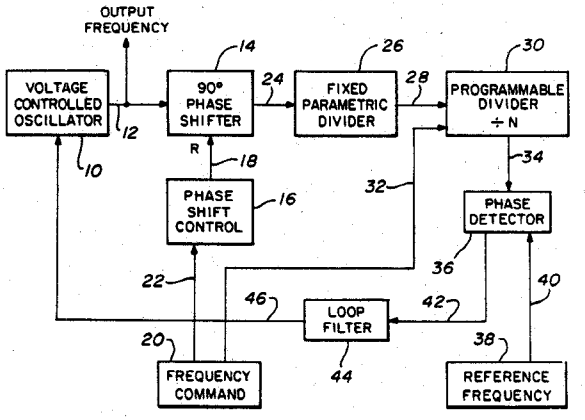
4,871,981 Oct. 3, 1989

Fast Hopping Microwave Frequency Synthesizer

Inventor: Jeffrey W. Franklin.
Assignee: E-Systems, Inc.
Filed: Nov. 21, 1988.

Abstract—A microwave frequency synthesizer which simultaneously provides increased frequency coverage, reduced channel spacings and improved settling times with a single phase-locked-loop. A VCO and a parametric divider enables a wide frequency coverage to be used in a phase-locked-loop. The fast hopping capability is primarily derived from the wide loop bandwidth which, in turns, is permitted by using a high reference frequency. The small channel spacings are created by using a 90° phase shifter installed in the feedback path of the phase-locked-loop. The 90° phase shifter permits channel spacings as small as 1/4 the reference frequency value.

18 Claims, 1 Drawing Sheet



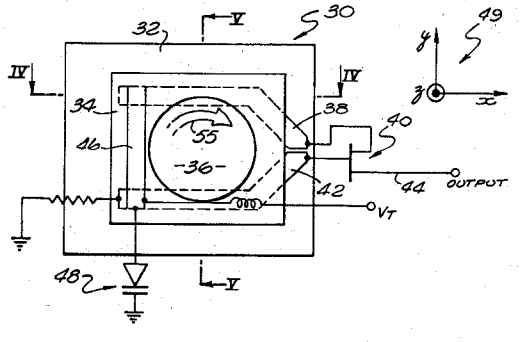
4,871,983 Oct. 3, 1989

Electronically Tuned Dielectric Resonator Stabilized Oscillator

Inventor: Joseph M. Graycar.
Assignee: Litton Systems, Inc.
Filed: July 6, 1988.

Abstract—An electronically tuned dielectric resonator stabilized oscillator has a dielectric resonator that is fine tuned by an electronic method of tuning which includes a varactor coupled to a microstrip. This varactor microstrip transmission line is positioned below the dielectric resonator but above the plane in which a transmission line for the carrier frequency resides. By not placing the fine tuning microstrip line on the same plane as the main oscillator line, spurious oscillation between the fine tuning transmission line and the primary carrier wave resonator frequency line are minimized. Additionally, the fine tuning microstrip line is positioned orthogonal to the pathways along which the main signal transmission lines are coupled.

11 Claims, 4 Drawing Sheets



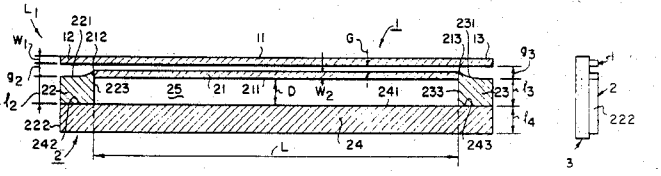
4,871,988 Oct. 3, 1989

Microwave Transmission Line of the Symmetrical Type and with Two Coplanar Conductors

Inventors: Luc Riviere and Alain Carenco.
Filed: June 13, 1988.

Abstract—This invention relates to an increase in the low longitudinal resonance frequencies of microwave transmission lines known as symmetrical lines, comprising two coplanar and parallel narrow conductive strips. According to the invention, the line further comprises a longitudinal and wide planar conductive strip which is parallel to one of the narrow strips at a sufficient distance not to substantially disturb the characteristic impedance of the initial symmetrical line and which is connected to the narrow strip by small planar end conductors thereby forming a longitudinal flat cavity. The cavity offers a first resonance frequency much greater than those of the initial symmetrical line and consequently affords a higher useful frequency bank of signals to be transmitted. The end conductors allow the line to be connected to coaxial connectors. In other embodiments, the cavity is divided into several resonant subcavities in order to raise the passband.

9 Claims, 2 Drawing Sheets



4,872,744 Oct. 10, 1989

Single Quantum Well Optical Modulator

Inventors: Joseph H. Abeles, Alexander Kastalsky, and Robert F. Leheny.
Assignee: Bell Communications Research, Inc.
Filed: Jan. 15, 1988.

Abstract—High-speed optoelectronic devices which are suitable for use in an optical integrated circuit design. The devices comprise a monolithic planar structure wherein exciton-resonant light propagates along a single mode waveguide containing a single quantum well as the absorbing media. Optical absorption is controlled by the bleaching effect induced by free carriers whose electrical conduction makes possible optical detection and monolithic high speed, gate-controlled transistor structures.

19 Claims, 4 Drawing Sheets