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.

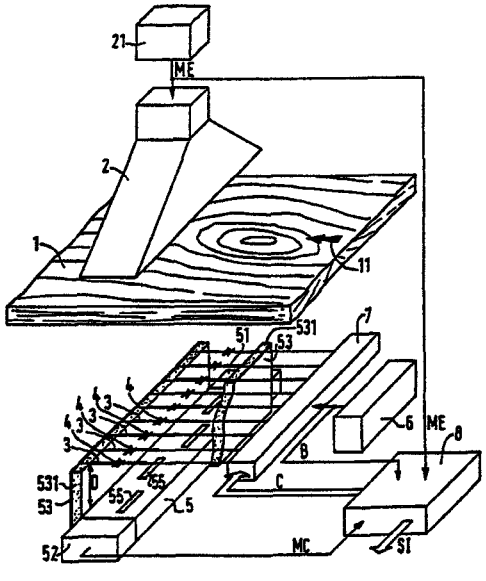
5,128,621 July 7, 1992

Device for Measuring, at a Plurality of Points, the Microwave Field Diffracted by an Object

Inventors: Patrice Berthaud and Jean-Charles Bolomey.
Assignee: Centre National de la Recherche Scientifique.
Filed: Apr. 20, 1988.

Abstract—An arrangement for measuring at a plurality of points, the microwave field diffracted by an object. A microwave radiation source illuminates an object. Electric doublet antennae loaded by diodes are disposed in line along the path of the radiation diffracted by the object. A guide structure, with coupling antennae, is disposed along the line of doublet antennae and collects the diffracted radiation. Electronic circuits control the whole so as to measure the diffracted field at the position of each doublet antenna.

21 Claims, 5 Drawing Sheets



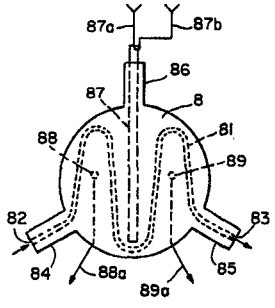
5,128,635 July 7, 1992

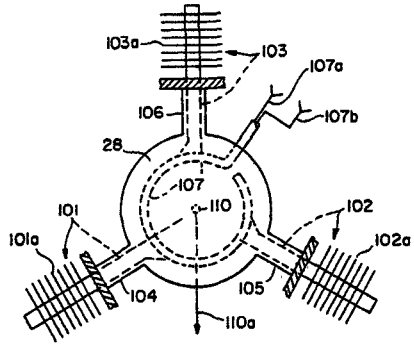
High-Power Ferrite Circulator Having Heating and Cooling Means

Inventors: Thomas J. Vaughan and Erich Pivit.
Assignee: Ant Nachrichtentechnik GmbH.
Filed: July 10, 1993.

Abstract—A high-power, high-frequency, Y-junction three port circulator containing at least one metal plate in the Y-junction covered with ferromagnetic material and an external magnet producing a magnetic field through the ferromagnetic material so that it is magnetized to saturation magnetization when the temperature of the material is within a predetermined temperature range; and a method and means of maintaining the temperature of the ferrite material within said predetermined range even while the circulator operates in a variable ambient environment at high power, including means connected to the metal plate for heating and cooling the plate, thereby controlling the temperature of the ferromagnetic material to maintain the temperature thereof within said predetermined temperature range.

14 Claims, 5 Drawing Sheets





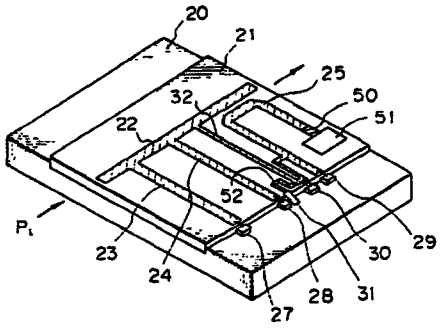
5,128,636 July 7, 1992

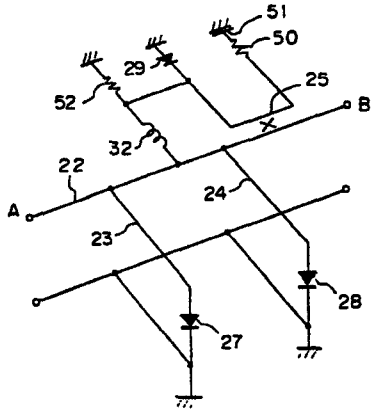
Diode Limiter

Inventors: Nagahisa Furutani and Hiroshi Mugiya.
Assignee: Fujitsu Limited.
Filed: Dec. 5, 1990.

Abstract—A diode limiter including a signal line connects an input terminal to which a high power electric pulse signal is applied and an output terminal connected to a receiver. A PIN diode conducts when the high power electric pulse signal is applied thereto and provides a low impedance connection of the signal line to ground. A directional coupler extracts a part of the high power electric pulse signal out of the signal line. A detector diode is inserted in the return direct current path of the PIN diode, a resistor is inserted into the path including the directional coupler, and a means is provided for applying the voltage generated in the resistor to the PIN diode.

9 Claims, 6 Drawing Sheets





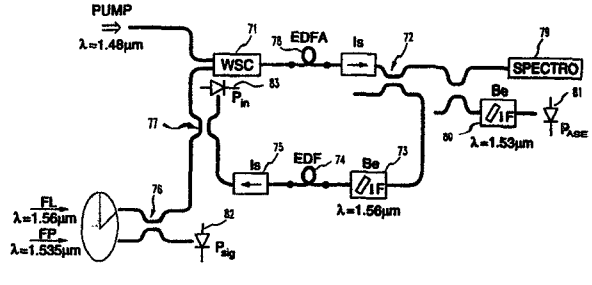
5,128,800 July 7, 1992

Gain Switchable Optical Fiber Amplifier

Inventor: Martin Zirngibl.
Assignee: AT&T Bell Laboratories.
Filed: June 19, 1991.

***Abstract*—An optical fiber amplifier has a lossy nonlinear medium connected between its input port and its output port. The resultant optical feedback loop permits remote gain switching of the optical amplifier.**

7 Claims, 6 Drawing Sheets



5,129,020 July 7, 1992

Wavelength Selective Optical Fiber Coupler

Inventors: Masayki Shigematsu and Masumi Fukuma.
Assignee: Sumitomo Electric Industries, Ltd.
Filed: Sept. 6, 1990.

***Abstract*—An optical fiber coupler constructed of single-mode optical fibers having claddings of differing refractive indices. The fibers are fused together and the fused portion is elongated in order to achieve the desired coupling and branching characteristics.**

10 Claims, 2 Drawing Sheets

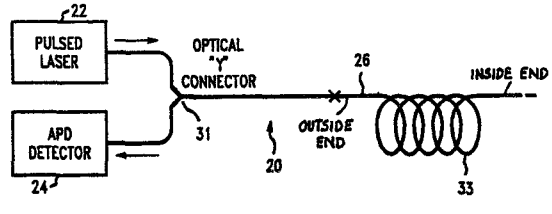
5,130,535 July 14, 1992

Methods of and Apparatus for Measuring Bending Loss Along a Length of Optical Fiber

Inventors: Raymond B. Kummer and Marcus W. Shute, Sr.
Assignee: AT&T Bell Laboratories.
Filed: Oct. 10, 1990.

***Abstract*—Variations in bending loss for relatively small radii bends along a length of optical fiber (26) are determined by using an optical time domain reflectometer (20) to measure the backscattering power as a function of distance along the fiber in one direction along the length of fiber by launching light energy into one end of the fiber. Then the backscattering power is measured as a function of distance along the fiber in the opposite direction from an opposite end by launching light energy into an opposite end of the fiber. Mathematical representations of backscattering forward and reverse signals for corresponding points along the length of the fiber are added to provide a quantity which is related to mode field diameter of the fiber. Variations in the mode field diameter are indicative of variations in the bending loss along the length of fiber. By measuring the bending loss at the end points of the length of fiber, the absolute bending loss along the length of fiber can be estimated from the above quantity.**

17 Claims, 2 Drawing Sheets



5,130,678 July 14, 1992

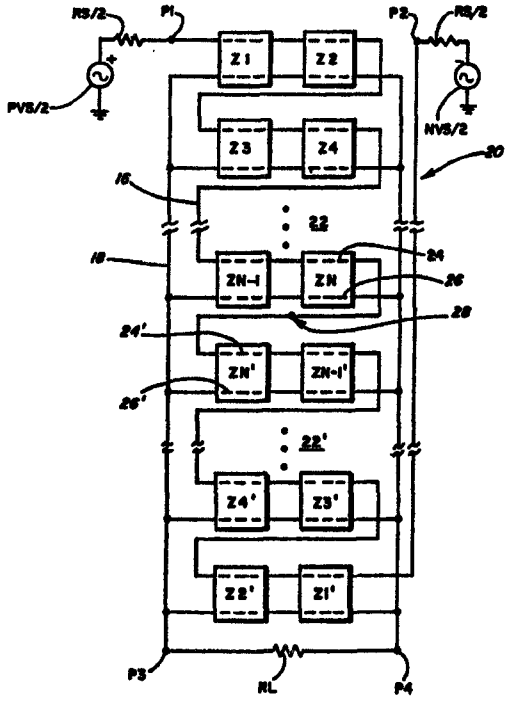
Transmission Line Transformer with DC Isolation

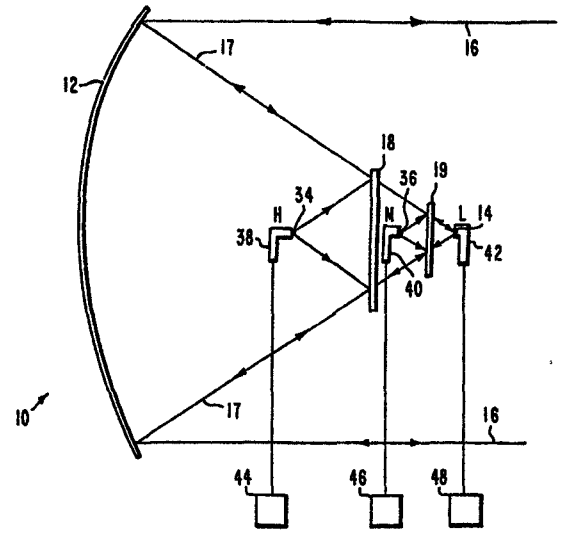
Inventor: Richard C. Edwards.
Assignee: Rockwell International Corporation.
Filed: Oct. 31, 1991.

***Abstract*—A transmission line transformer (20, 30, 31) with inherent dc isolation has two sets (22, 22') of transmission line elements (ZN) with characteristic impedances which vary from relatively high values near the transformer inputs (P1, P2) to relatively low values near an intermediate location (28, 28') are ordered in a mirror image symmetry with respect to one another relative to the intermediate location (28, 28') in plural element**

embodiments (20, 30). The primaries (24, 24') are connected in series, while the secondaries (26, 26') of adjacent pairs of transmission line elements (ZN, ZN') are connected in series with the series connected pair connected in parallel across the output terminals (P3, P4). A center line transmission element (CZN) at the intermediate location (28') has a substantial zero impedance, and an electrical length equal to twice that of the other elements. In an embodiment (31) for the special case of $N = 1$, the other transmission line elements of the two sets (22, 22') are eliminated and only a single center transmission line element (CZN) with approximately zero characteristic impedance is employed to obtain a broad-band flat frequency response.

30 Claims, 7 Drawing Sheets





5,131,060 July 14, 1992

Optical Waveguide Modulator Communications Device and Method of Modulating Light Using Same

Inventor: Hajime Sakata.
Assignee: Canon Kabushiki Kaisha.
Filed: July 9, 1991.

***Abstract*—An optical modulator includes a substrate, a first waveguide layer formed on the substrate, a second waveguide layer stacked together with the first waveguide layer in a direction of a thickness thereof on the substrate, the second waveguide layer having a waveguide mode different from that of the first waveguide layer, a diffraction grating formed in a region where the waveguide modes of the first and second waveguide layers overlap each other, and an electrode. When the electrical signal is applied through the electrode, the wavelength of the light coupled by the diffraction grating is changed, and light output from the second waveguide layer is modulated in accordance with the electrical signal. A method of modulating light using the above optical modulator is also disclosed.**

20 Claims, 10 Drawing Sheets

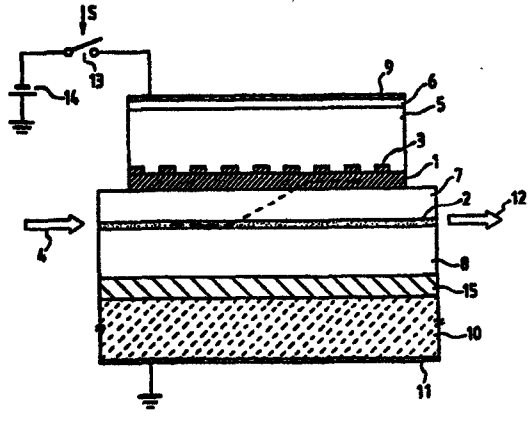
5,130,718 July 14, 1992

Multiple Dichroic Surface Cassegrain Reflector

Inventors: Te-Kao Wu and Kenneth C. Kelly.
Assignee: Hughes Aircraft Company.
Filed: Oct. 23, 1990.

***Abstract*—A triplex microwave reflector that includes a primary reflector and a pair of dichroic surfaces disposed between the primary reflector and the focal point of the primary reflector. Each of the dichroic surfaces reflects a specific band of microwave signal frequencies and transmits the others. Microwave signals reflected by one of the dichroic surfaces are focused at a front virtual focal point and microwave signals reflected by the other dichroic surfaces are focussed at a back virtual focal point. Microwave signals transmitted by both the front and back dichroic surfaces are focussed at the primary focal point.**

15 Claims, 3 Drawing Sheets



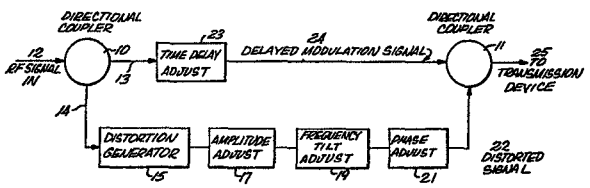
5,132,639 *July 21, 1992

Predistorter for Linearization of Electronic and Optical Signals

Inventors: Henry A. Blauvelt, Howard L. Loboda, and John S. Frame.
Assignee: Ortel Corporation.
*The portion of the term of this patent subsequent to Feb 12, 2008 has been disclaimed.
Filed: Feb. 8, 1991.

Abstract—An electronic circuit provides a linear output from an amplitude modulated transmission device such as a semiconductor laser which has inherent distortion. The distortion of the nonlinear device is compensated by applying a predistorted signal equal in magnitude and opposite in sign to the distortion introduced by the nonlinear device. The input signal is split into two or three paths with primary part of the signal applied directly to the device, with a time delay to compensate for delays in two secondary paths. One secondary path generates even order intermodulation products and the other generates odd order intermodulation products. These are recombined with the primary signal in proper phase and amplitude for cancelling distortion in the output device. A distortion generator in each secondary path generates adjustable amplitude intermodulation signals. A tilt adjustment is made to compensate the amplitude of the predistortion for frequency dependence of the amplitude of the distortion. Phase of the distortion signal is adjusted to be in proper phase relation with the distortion of the device. In the even order path there are means for adjusting predistortion at an intermediate frequency so that the distortion is cancelled near the upper, lower and intermediate portions of the frequency range of the device.

28 Claims, 5 Drawing Sheets



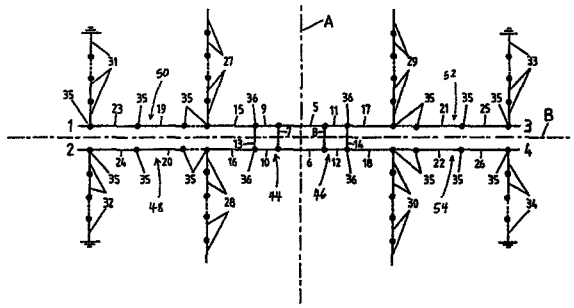
5,132,645 July 21, 1992

Wide-Band Branch Line Coupler

Inventor: Bernd Mayer.
Filed: Nov. 15, 1990.

Abstract—A four-port wide-band branch line coupler which distributes, to two output ports and over a wide bandwidth, a signal that is fed into an input port at any constant ratio with a phase difference of 90°, so that no power emanates from an isolated port. If a signal is fed into the isolated port, this power is also distributed to both output ports, so that no power emanates from the input port. The coupler has two identical rings consisting of quarter-wave length line sections that are connected by two half-wave length line sections and are connected, by series circuits made of half-wave length line sections with individual branch circuits connected in parallel to them, to the four ports. The circuit can be dimensioned for construction in microstrip technology or coaxial cable technology. Further, the circuit can be made of concentrated elements so that it can be used in microwave monolithic integrated circuits.

12 Claims, 11 Drawing Sheets



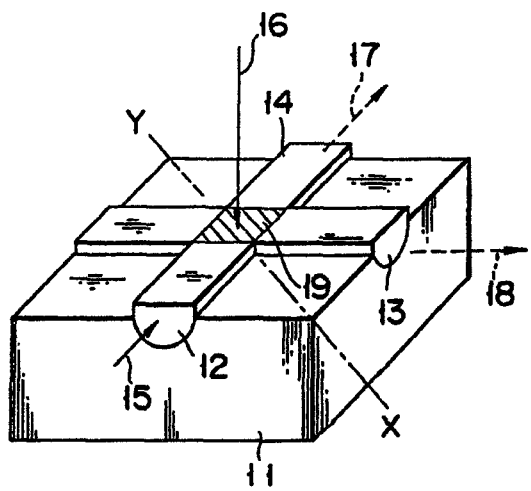
5,133,027 July 21, 1992

Optcal Waveguide Apparatus for Controlling a Signal Light Traveling Through an Optical Waveguide by Means of Other Light

Inventors: Jun Funazaki, Yoshinori Ohta, Takashi Mizusaki, Hideo Adachi, and Atsushi Yusa.
Assignee: Olympus Optical Co., Ltd.
Filed: May 9, 1991.

Abstract—An optical waveguide apparatus comprising a substrate made of material the refractive index of which is changed by an electric effect, and an optical waveguide which is formed on a portion of the substrate and allows passage of guided light. In the apparatus, the optical waveguide includes an optical path changing section for periodically producing an electromotive force under the control of one of control light and guided light.

14 Claims, 8 Drawing Sheets



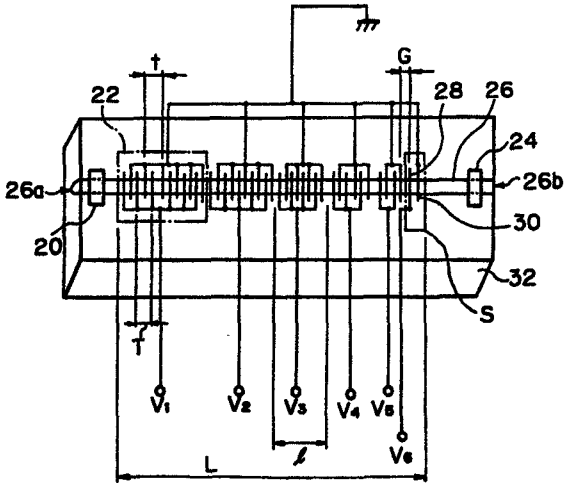
5,133,028 July 21, 1992

Optical Wavelength Filter and a Driving Method Thereof

Inventors: Hideaki Okayama, Hiroki Yaegashi, and Toshimasa Ishida.
Assignee: Oki Electric Industry Co. Ltd.
Filed: Aug. 29, 1991.

Abstract—There is provided an optical wavelength filter that is constituted by a waveguide route formed on a surface of a substrate; a front-stage polarizer disposed in the waveguide route for transmitting as an input light either TM mode light or TE mode light; a plurality of mode-converters disposed in the wave-guide route for mode converting one TM/TE-mode light transmitted from the front stage polarizer having a conversion wavelength corresponding to an output light of the optical wavelength filter into the other TE/TM-mode light; and a rear stage polarizer disposed in the waveguide route for transmitting as the output light of the optical wave-length filter the other TE/TM-mode light; the mode-converters being constituted by a finger-type electrode for control and a finger-type electrode for earthing interdigitally coupled for each other and disposed along the waveguide route.

12 Claims, 15 Drawing Sheets



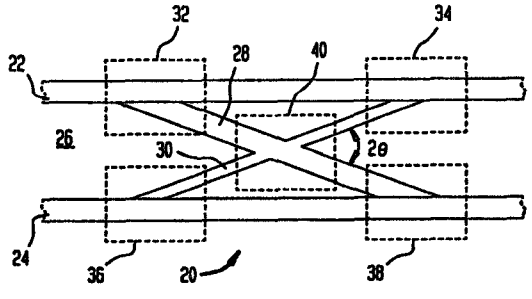
5,133,029 July 21, 1992

Adiabatic Polarization Splitter

Inventors: Jane E. Baran and David A. Smith.
Assignee: Bell Communications Research, Inc.
Filed: June 28, 1991.

Abstract—A 2 × 2 polarization beam splitter comprising two parallel waveguides and two crossing waveguides coupled in an X-configuration to the parallel waveguides by four adiabatic γ-junctions which transfer only one of the two orthogonal polarization modes across the junctions, e.g., the TE mode. The crossing waveguides may be of different widths and cross at a very shallow angle so that little cross-talk occurs at the crossing.

14 Claims, 1 Drawing Sheet



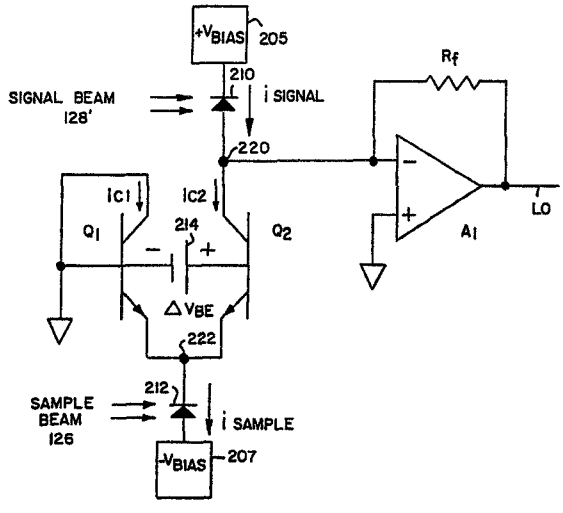
5,134,276 July 28, 1992

Noise Cancelling Circuitry for Optical Systems with Signal Dividing and Combining Means

Inventor: Philip C. D. Hobbs.
Assignee: International Business Machines Corporation.
Filed: Oct. 9, 1990.

Abstract—A noise suppression system is described for use with a laser measurement system in which a beam sampler divides the laser beam into a signal beam and a sample beam. The signal beam is passed through an optical system before being received at the detector while the sample beam is received directly at the detector. The beam sampler is selected such that the received sample beam has a slightly greater steady-state intensity than the received signal beam. The detector circuitry includes two linear wideband photodetectors which produce respective signal and sample currents of opposite polarity. The sample photocurrent is subdivided into two component currents, one of which as substantially the same direct current (dc) value as the signal photocurrent. This component is combined with the signal photocurrent to cancel undesirable noise components in the original laser beam. In a second embodiment of the invention, the dividing circuitry is controlled in a feedback loop to keep the dc portion of the output current at zero.

10 Claims, 4 Drawing Sheets



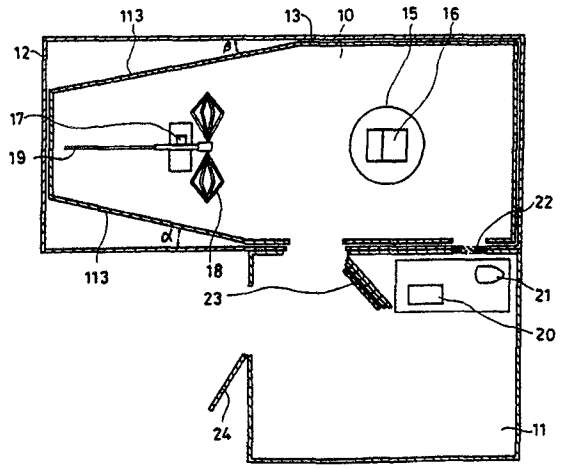
5,134,405 July 28, 1992

Electromagnetically Anechoic Chamber and Shield Structures Therefor

Inventors: Katsuo Ishihara and Yoshio Tomiyama.
Assignee: Matsushita Electric Industrial Co., Ltd.
Filed: Feb. 27, 1989.

Abstract—The present invention relates to an electromagnetically anechoic chamber for EMC (Electromagnetic Compatibility) tests of electronic devices. The floor, ceiling and side wall of the anechoic chamber have panels of electromagnetic wave absorber having many ferrite tiles, and shield members comprising double layered shield members of copper sheets and iron sheets for absorbing and reflecting the foreign electromagnetic wave.

4 Claims, 7 Drawing Sheets



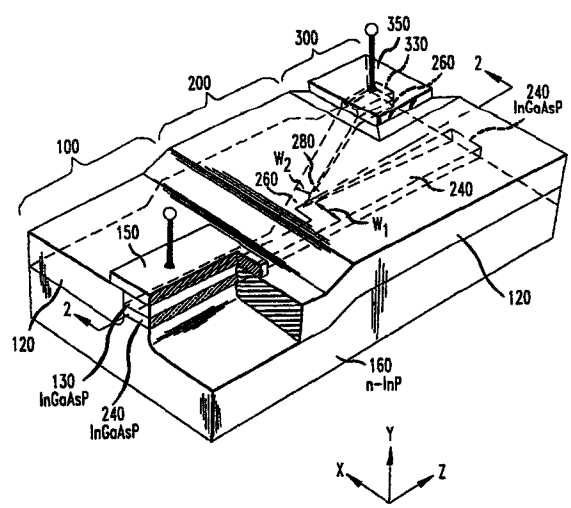
5,134,671 *July 28, 1992

Monolithic Integrated Optical Amplifier and Photodetector

Inventors: Uziel Koren and Kang-Yih Liou.
Assignee: AT&T Bell Laboratories.
*The portion of the term of this patent subsequent to June 3, 2009 has been disclaimed.
Filed: Aug. 3, 1990.

Abstract—An optical amplifier and photodetector are monolithically integrated, with the photodetector being optically coupled to the optical amplifier through a low radiative loss and low back reflectivity branching waveguide. Because of the low reflectivity, the branching waveguide, although having a truncated wedge tip, is able to redirect a small portion of optical radiation from the amplifier to the photodetector without deleteriously affecting the performance of the optical amplifier. The branching waveguide is realized by employing between the branches of the waveguide, a junction region having a gradual decrease in effective refractive index such as to decrease the difference between the refractive indices at the optical interface of the truncated wedge tip as seen by optical radiation incident thereto from the optical amplifier.

17 Claims, 6 Drawing Sheets



5,134,672 July 28, 1992

Optical Waveguide Type Star Coupler

Inventors: Katsuyuki Imoto, Masataka Nakazawa, and Yasuo Kimura.
Assignees: Hitachi Cable, Ltd. and Nippon Telegraph & Telephone Corporation.
Filed: Apr. 16, 1990.

Abstract—An optical waveguide star coupler includes a light propagating core provided on a substrate. An exciting light and a signal light are supplied to the light propagating core. The light propagating core includes a plurality of Y-branching waveguides connected one after another to provide a multi-stage waveguide structure. A signal light inputted in the core is combined during the propagation through the core with the exciting light so that the signal light is amplified.

4 Claims, 5 Drawing Sheets