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,

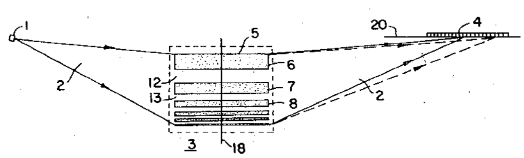
4,511,206 Apr. 16, 1985

Lensless Spectrum Analyzer

Inventors: Lars Thylén, Leif Stensland, and Gunnar Arvidsson.
Assignee: Institutet for Optisk Forskning.
PCT Filed: Apr. 26, 1982.

Abstract—The present invention relates to a lensless spectrum analyzer, preferably of integrated optical type, with a radiation source (1) connected to a waveguide (2) which is connected to an electrooptical deflector (3), exploiting Pockel's effect. The radiation from the deflector (3) is guided by the waveguide (2) on to a detection matrix (4). The electrooptical deflector (3) then consists of an electrode matrix (5) with the electrodes (6-11) arranged in or in the vicinity of an electrooptically active material (21). The electrodes (6-11) which are of different widths and are disposed at different distances from each other are arranged along a line (18) which is largely disposed at right angle to the incident radiation. By this means, the deflector acquires lens properties and can perform the desired Fourier transformation of the electric signal connected to the deflector (3). In the course of this transformation, the incident radiation is divided up into bundles of rays representing different Fourier components and focused along a focal line (20) along which the detection matrix (4) is arranged. Since the deflector possesses lens properties, it becomes possible to elaborate the entire device according to the invention in integrated form, enabling the device to be manufactured in its entirety by application of photolithographic technology.

7 Claims, 4 Drawing Figures



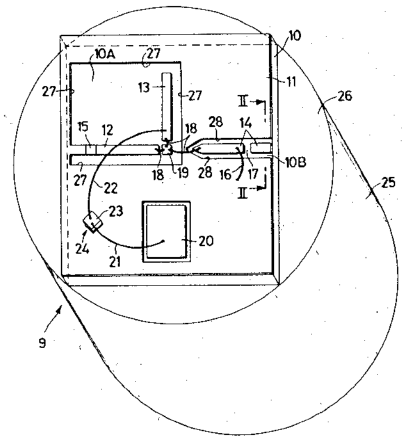
4,511,860 Apr. 16, 1985

Planar Microwave Oscillator Mounted on a Dielectric Cavity

Inventors: Ezio M. Bastida and Paolo Bergamini.
Assignee: CISE Centro Informazioni Studi Esperienze S.p.A.
Filed: July 7, 1982.

Abstract—A planar oscillator (9, 109) having a dielectric cavity (25, 125) and which is operative at microwave frequencies, said oscillator consisting of a dielectric material base (10, 110) one surface of which has, superposed thereto, a continuous layer (11, 111) of a conductive material which coats portions of said face; the remaining portions (10A, 10B, 110A', 110A'', 110B) of the surface have, superposed thereto, strips of a conductive material (12,13,14,112,113,114) which are separate from each other and are electrically connected to an active element (19,119), a dielectric cavity (25,125) adhering to the opposite surface of the dielectric material base (10,110), the layer of conductive material (11,111) providing a grounding plane and the strips of conductive material (12,13,14,112,113,114) providing transmission and output lines for the oscillator.

6 Claims, 4 Drawing Figures



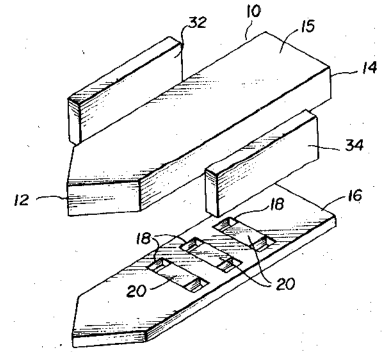
4,511,865 Apr. 16, 1985

Millimeter-Wave Signal Limiter Having Ferrite-Loaded Slots in Ground Plane of Image Guide

Inventor: Sammuel Dixon, Jr.
Assignee: The United States of America as represented by the Secretary of the Army.
Filed: Feb. 21, 1984.

Abstract—A millimeter-wave planar slot excited image guide ferrite power limiter comprising a length of dielectric transmission line or waveguide for millimeter-wave frequencies located on a relatively thin conductive ground plane, forming thereby an image guide. The ground plane includes a plurality of selectively positioned slots along the length of the ground plane under the dielectric waveguide in which bodies of high anisotropy uniaxial barium ferrite material are placed and which collectively act as a passive ferrite power limiter when biased by an externally applied biasing magnetic field. A biasing magnetic field is provided by a pair of rare earth permanent magnets located along the sides of the image guide perpendicular to the orientation of the RF magnetic fields of the signal propagating down the dielectric waveguide. This leaves the top surface of the image dielectric guide accessible for other integrated circuit fabrication.

16 Claims, 4 Drawing Figures



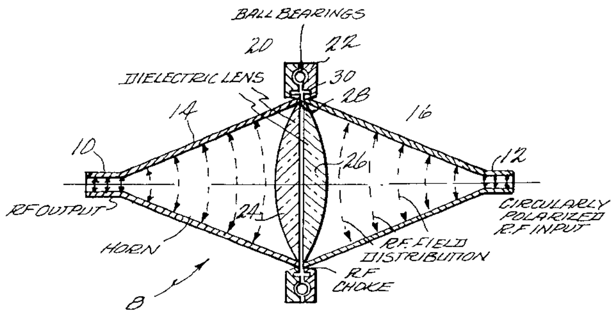
4,511,868 Apr. 16, 1985

Apparatus and Method for Transfer of RF Energy Through a Mechanically Rotatable Joint

Inventors: Robert E. Munson and Hussain A. Haddad.
Assignee: Ball Corporation.
Filed: Sept. 13, 1982.

Abstract—The wide ends of two similar horn structures are juxtaposed and joined by a rotary bearing extending thereabout which permits relative rotational motion between the two horn structures. A field shaping lens may be disposed at the relatively rotatable horn juncture to help insure substantially planar wavefront shapes across the relatively rotatable joint. An annular aperture may also be provided between the relatively rotatable horns and electrically loaded so as to present an approximate short-circuit electrical impedance at the intended frequency of operation.

23 Claims, 2 Drawing Figures



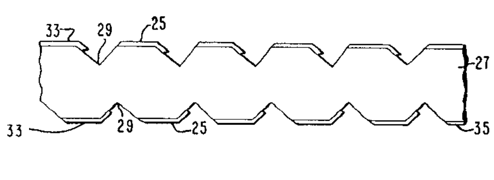
4,512,638 Apr. 23, 1985

Wire Grid Polarizer

Inventors: Sambamurthy Sriram, Kenneth Steinbruegge, and Emmanuel Supertzi.
Assignee: Westinghouse Electric Corp.
Filed: Aug. 31, 1982.

Abstract—An infrared wire grid polarizer is fabricated on an infrared transmissive substrate and consists of alternating transmissive and conductive zones disposed thereon These polarizers are particularly well suited for use with acoustic-optic tunable filters and can be employed as input and output polarizers therewith. A method of manufacturing a wire grid polarizer with at least 4000 conductors per millimeter is disclosed. The infrared transmissive substrate is selected from the group consisting of silicon crystal and gallium arsenide crystal

9 Claims, 10 Drawing Figures



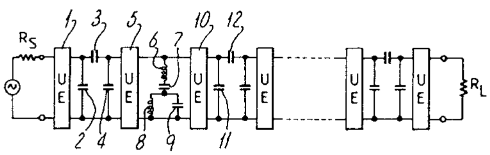
4,513,263 Apr. 23, 1985

Bandpass Filters

Inventor: Brian J. Minnis.
Assignee: U.S Philips Corporation.
Filed: Dec. 20, 1982.

Abstract—The specification describes four classes of microwave bandpass filter formed in triple plate stripline with portions of line having a commensurate length equal to a quarter-wavelength at the center of the stopband, enabling the widths of the pass and stop bands to be specified independently; lumped capacitors (C_s) are also used to assist in providing elements with high series capacitance. The four classes together cover a wide range of electrical specifications, and enable wide pass and stop bands and high selectively to be obtained. Each class corresponds to a bandpass S-plane prototype network configuration (Figs. 2, 5, 6, and 7, respectively) derived using exact synthesis procedures from a specification of transmission zero locations. The filters can be manufactured using photolithographic technology to have consistently accurate performance.

14 Claims, 23 Drawing Figures



4,513,264 Apr. 23, 1985

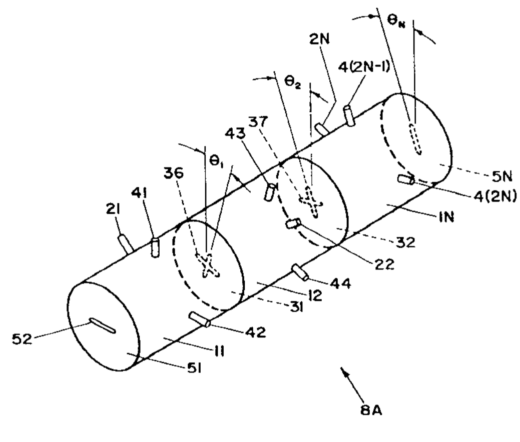
Bandpass Filter with Plurality of Waveguide Cavities

Inventors: James B. Dorey and Wai-Cheung Tang.
Assignee: Com Dev Ltd.
Filed: Dec. 13, 1982.

Abstract—A bandpass filter 8 has a plurality of cascaded waveguide cavities 11, 12 1N and intercavity coupling means 36, 37. One or more of the cavities 12, 1N is rotated relative to an input reference mode 52. The rotation causes quasi-orthogonal coupling structures to be introduced into said cavities 11, 12 1N. The rotation of one or more cavities enables symmetric or asymmetric amplitude and phase responses to be produced as desired.

The filter can be used in channel multiplexers for satellite communication systems.

12 Claims, 13 Drawing Figures



4,513,266 Apr. 23, 1985

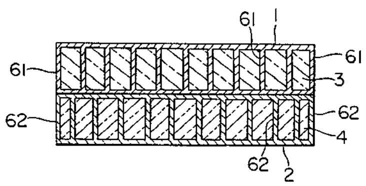
Microwave Ground Shield Structure

Inventor: Osamu Ishihara.
Assignee: Mitsubishi Denki Kabushiki Kaisha.
Filed: Oct. 19, 1982.

Abstract—the invention is connected with a microwave structure, and particularly with the improvement of a microwave circuit of the three-plate

construction having a plurality of independent circuits formed in an inner level that is sandwiched by two dielectric conductor boards having grounded conductive layers on their outer surfaces, wherein a plurality of through holes are formed to penetrate through the dielectric boards between the neighboring circuits and extending between the conductive layers on the outer surfaces of the boards, the inner surfaces of the through holes being metallized to connect the grounded conductive layers to provide a ground shield between the neighboring circuits.

2 Claims, 7 Drawing Figures



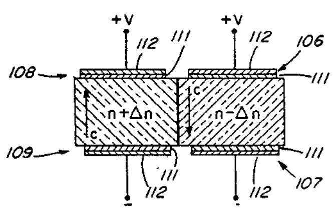
4,514,046 Apr. 30, 1985

Polarization-Insensitive Optical Switch and Multiplexing Apparatus

Inventors: W. John Carlsen and Paul Melman.
Assignee: GTE Laboratories Incorporated.
Filed: Dec. 16, 1983.

Abstract—Polarization-insensitive optical switch and dual channel carrier multiplexer includes a polarization beam splitter for receiving an input collimated beam which has arbitrarily polarized components, splitting the beam into the two components. One of the components is rotated by a $\frac{1}{2}$ wave plate so as to yield a polarized beam which is polarized in the same direction as the other beam. The two polarized beams are then applied to a polarization sensitive interferometric multimode fiber-optic switch and modulator. The output of the interferometric multimode fiber-optic switch and modulator contains two beams, both polarized in the same direction. One of the beams is rotated ninety degrees by a $\frac{1}{2}$ wave plate, and the two mutually perpendicularly polarized beams are then recombined by a polarization beam splitter operated in reverse to yield an output beam containing mutually perpendicular components

5 Claims, 6 Drawing Figures



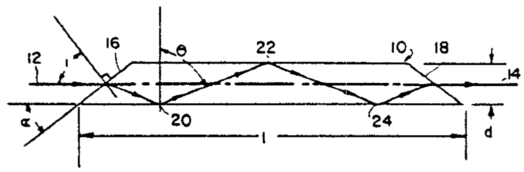
4,514,047 Apr. 30, 1985

On-Axis Achromatic Quarterwave Retarder Prism

Inventors: Haim M. Haskal and Robert A. Briones.
Assignee: Magnetic Peripherals Inc.
Filed: Oct. 12, 1982.

Abstract—A quarterwave retarder prism such as can be used in optical recording has a shape similar to a dove prism, and has three internal reflections, with the retarder prism designed to have the emerging light beam on the same axis or collinear with the entering light beam such that the accumulated phase retardation in the device is one quarterwave over a wide range of wavelengths of light.

2 Claims, 2 Drawing Figures



$$\tan\frac{\delta}{2} = \frac{\cos\theta\sqrt{\sin^2\theta - n^{-2}}}{\sin^2\theta} \quad (1)$$

FOR $\delta = \frac{\pi}{6}$

$$\sin^2\theta = \frac{1+n^{-2} \pm \sqrt{(1+n^{-2})^2 - 4(n\cos\frac{\pi}{12})^{-2}}}{2(\cos\frac{\pi}{12})^{-2}} \quad (2)$$

$$\alpha + \sin^{-1}\left(\frac{\cos}{n(\lambda_0)}\right) - \theta(\lambda_0) = 0 \quad (3)$$

$\lambda = \lambda_0$, THE DESIGN WAVELENGTH

$$\frac{l}{d} = 3\tan\theta + (\tan\alpha)^{-1} \quad (4)$$

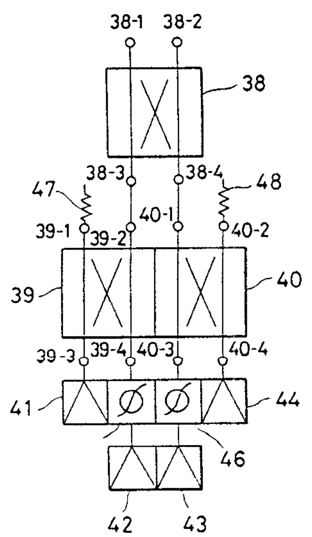
4,514,699 Apr. 30, 1985

Microwave Power Amplifier/Combiner

Inventors: Keiichiro Kariatsumari and Kenji Hirai.
Assignee: Tokyo Shibaura Denki Kabushiki Kaisha.
Filed: Dec. 21, 1982.

Abstract—A microwave power amplifier/combiner which is composed of $\pi/2$ hybrid coupler. This microwave power amplifier/combiner is constructed by associating a $\pi/2$ phase shifter with the $\pi/2$ hybrid coupler to form a 2-amplifier/combiner having a single input/output port and employing the 2-amplifier/combiner as one unit. 2^N-amplifier/combiner can be constructed by employing a desired number of the unit 2-amplifier/combiner. According to this amplifier/combiner, the microwave power amplifier/combiner which combines the outputs of a large number of power amplifiers can be combined by employing a small number of $\pi/2$ hybrid coupler.

18 Claims, 13 Drawing Figures



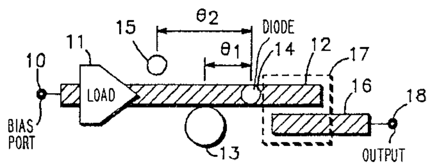
4,514,707 Apr. 30, 1985

Dielectric Resonator Controlled Planar Impatt Diode Oscillator

Inventors: Michael Dydyk and Herbert W. Iwer.
Assignee: Motorola, Inc
Filed: June 15, 1982.

Abstract—An IMPATT diode oscillator wherein the diode is coupled to a first transmission line in turn coupled to a bias port at one end and to a coupled line transformer formed with a second transmission line at the other. A stabilizing load is coupled to the first transmission line between the diode and the bias port. A first tunable resonator controlling the fudamental frequency of the oscillator and a second tunable resonator controlling the second harmonic frequency of the oscillator are coupled to the first transmission line between the diode and the stabilizing load so that independent control of the fundamental and the second harmonic is attained in a temperature-stable device

17 Claims, 5 Drawing Figures



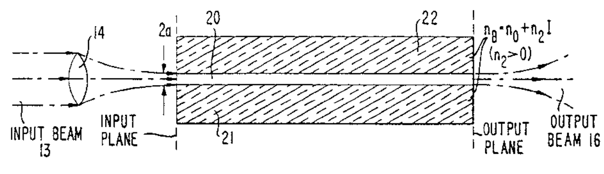
4,515,429 May 7, 1985

Nonlinear and Bistable Optical Waveguide Devices

Inventors: Peter W. Smith and Walter J. Tomlinson, III.
Assignee: AT&T Bell Laboratories.
Filed: May 27, 1980.

Abstract—Several types of nonlinear characteristics are provided in an optical device wherein at least two optical materials are constructed to provide a waveguide structure. At least one of the materials has a dominant nonlinear characteristic over the length of the waveguide that is commonly referred to as the Kerr effect. The index of refraction in this material is a function of the light intensity in the waveguide. By selecting materials that provide either positive or negative Kerr coefficients, and by constructing the device with the nonlinear material either as the core or as the cladding layer, power output versus input characteristics that exhibit both limiting and amplification can be provided. A bistable characteristic is provided in one of the embodiments by terminating the waveguide structure with a mirror. Specific embodiments using carbon disulfide and polydiacetylene as the nonlinear materials are disclosed.

2 Claims, 14 Drawing Figures



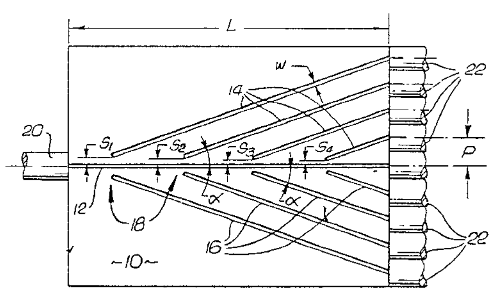
4,515,428 May 7, 1986

Integrated Optical Star Coupler

Inventor: Talal K. Findakly.
Assignee: TRW Inc.
Filed: Sept. 13, 1982

Abstract—A single-mode integrated optical star coupler employing weighted directional coupling between pairs of nonparallel waveguides formed on a substrate Light launched into an input waveguide is split into desired, and usually equal-power proportions among a plurality of output waveguides, without the use of conventional Y-section branches and with a minimum of waveguide bends. At each nonparallel coupling point, light in a first waveguide is coupled, to a predetermined degree, into a second waveguide with one end in a close, nonparallel relationship with the first waveguide. In one embodiment, the waveguides are all coupled to the input waveguide in this manner. In other embodiments, the input waveguide power is first split between two principal output waveguides, and other output waveguides are coupled to the principal output waveguides.

8 Claims, 5 Drawing Figures



4,515,431 May 7, 1985

Fiber-Optic Amplifier

Inventors: Herbert J. Shaw, Marvin Chodorow, and Michel J. F. Digonnet.
Assignee: The Board of Trustees of the Leland Stanford Junior University.
Filed: Aug. 11, 1982.

Abstract—An optical fiber bidirectional amplifier includes a pair of small diameter optical fibers, arranged in a side-by-side configuration, the first fiber providing a pumping source and the second fiber doped with a material which will lase at the frequency of the signal to be amplified. The signal to be amplified propagates through the second fiber to stimulate emission of coherent light from the lasing material, resulting in amplification of the signal The refractive indexes of the first and second fibers are substantially identical, but the coupling characteristic provided by the geometrical relationship between the pair of fibers yields a wavelength-dependent coupling efficiency Specifically, the coupling efficiency at the wavelength of the pumping source is relatively high, while the coupling efficiency at the wavelength of the signal to be amplified is relatively low. Thus, the pumping illumination is coupled from the first fiber to the second fiber to stimulate the doping material in the second fiber, while the signal to be amplified remains relatively uncoupled, and is amplified by the coherent light emitted by the lasing material.

14 Claims, 12 Drawing Figures