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.

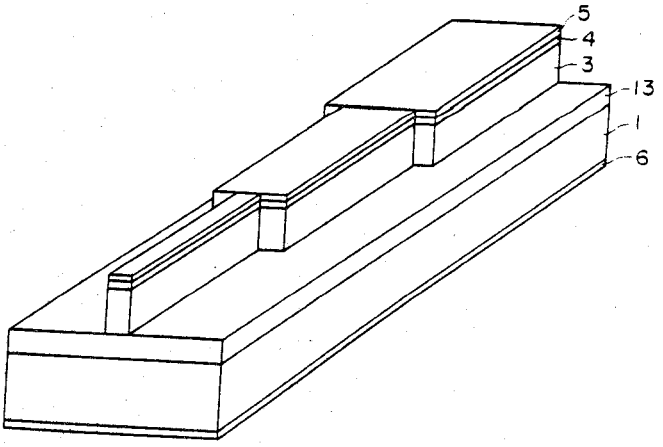
4,913,506 Apr. 3, 1990

Optical Modulation Device

Inventors: Masatoshi Suzuki, Shigeyuki Akiba; Hideaki Tanaka, and Katsuyuki Utaka.
Assignee: Kokusai Denshin Denwa Kabushiki Kaisha.
Filed: Feb. 16, 1989.

Abstract—An optical modulation device is disclosed in which a difference between the photon energy of incident light and the band-gap energy of the modulation waveguide layer is set to a value greater than 50 meV to thereby suppress the degradation of the modulation voltage and the modulation band width which is caused by an increase in the intensity of incident light and in that the optical modulation device is formed in a predetermined length to thereby decrease the modulation voltage. The energy gap of the optical waveguide layer of the optical modulation device is varied continuously or discontinuously in the direction of its thickness to provide a constant absorption coefficient thickwise of the optical waveguide layer so that the electric field intensity distribution in the optical waveguide layer is compensated for, by which overlap of the light distribution and the absorption coefficient is increased so as to decrease the modulation voltage and broaden the modulation band by the reduction of the length of the device. The composition, thickness and stripe width of the optical waveguide layer are changed so that its absorption coefficient increases from the light receiving end face of the optical waveguide layer toward its light emitting end face, thereby making the number of carriers absorbed per unit length substantially constant in the direction of travel of light.

14 Claims, 8 Drawing Sheets



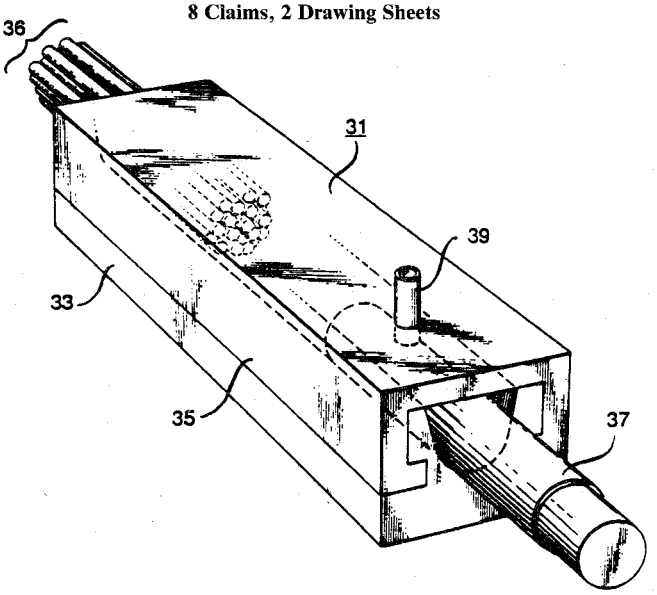
4,913,508 Apr. 3, 1990

Passive Optical Device

Inventors: Lee, L. Blyer, Jr. and Gary J. Grimes.
Assignee: AT&T Bell Laboratories.
Filed: Sept. 30, 1988.

Abstract—A relatively inexpensive and relatively efficient coupler is obtained by connecting two fiber collections with a polymer material, provided the numerical aperture of the two collections are relatively well-matched to each other and to the polymer region. This efficiency is achieved despite relatively large mismatches in the refractive index of the resin material relative to the fibers. Couplers for optical backplanes are produced in one embodiment utilizing plastic materials. In this technique, a collection of fibers is inserted on each end of an enclosure such as a tube that is filled with a polymer that is subsequently cured.

8 Claims, 2 Drawing Sheets



4,914,407 Apr. 3, 1990

Crossite Overlay Slow-Wave Structure and Components Made Thereof for Monolithic Integrated Circuits and Optical Modulators

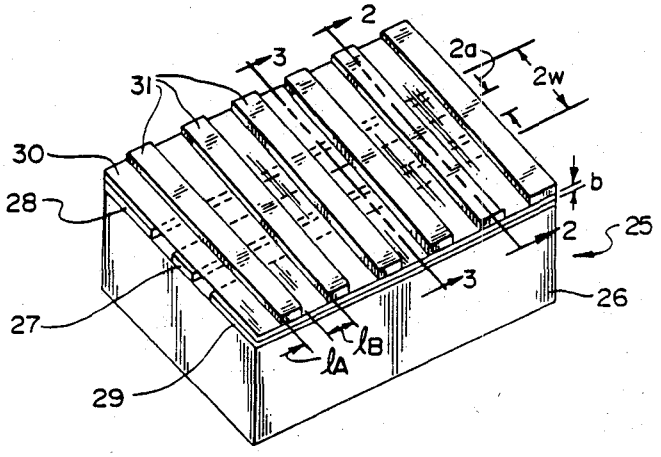
Inventor: Tatsuo Itoh.
Assignee: Board of Regents, University of Texas System.
Filed: June 7, 1988.

Abstract—A slow-wave structure for monolithic microwave circuits has a microstrip or coplanar waveguide disposed on a semiconductor substrate that is all covered with a dielectric layer, and aligned on top of this layer, is an array of spaced crosstie strips aligned transversed to the microstrip or coplanar waveguide. The wavelength of a microwave signal on the microstrip or coplanar waveguide is then from about one and one-half to one twentieth of its free space wavelength due to the slow-wave effect. The slow-wave structure facilitates coupling of the propagating microwave signal

1051-8207/91/0400-0090$01.00

with semiconductor structures such as a Schottky junction with a doped layer to provide electronic tuning of the slow-wave factor or to provide electrooptical modulation of a light beam confined in an optical channel waveguide. To provide stop band filters or resonators, the crossties are preferably arranged in a doubly-periodic structure having a first period much less than the wave length in the slow-wave structure at the operating frequency and a second period of about $\frac{1}{2}$ to $\frac{1}{4}$ of the wavelength of the microwave signal in the slow-wave structure.

20 Claims, 7 Drawing Sheets



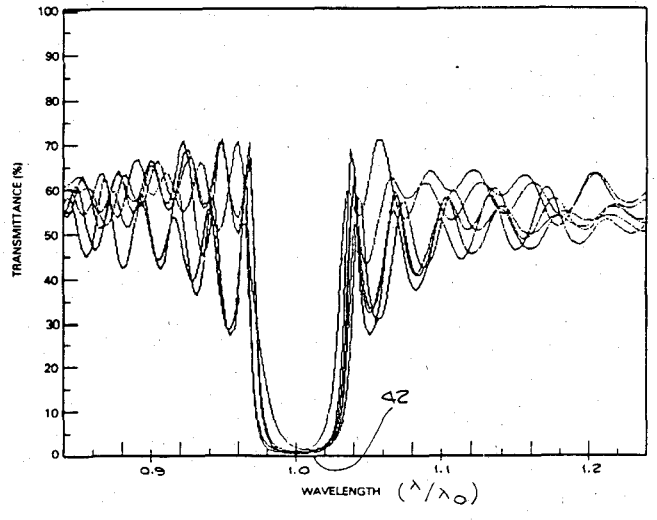
4,915,476 Apr. 10, 1990

Single-Notch Rugate Filters and a Controlled Method of Manufacture Thereof

Inventors: James T. Hall and Ronald T. Smith.
Assignee: Hughes Aircraft Company.
Filed: May 31, 1988.

Abstract—A process for forming a single-notch optical filter having a continually and accurately varying periodic profile. An optical medium is coated on a uniform substrate where the homogeneous optical medium produces a rugate filter, so that the profile of the refractive index follows a sinusoidal pattern and Bragg's law. As the optical medium is coated on the substrate, the depositing film is monitored by optical techniques, and feedback information is provided to a computer driven by a preprogrammed process control algorithm so that real time control of the manufacturing process may be accomplished.

10 Claims, 11 Drawing Sheets



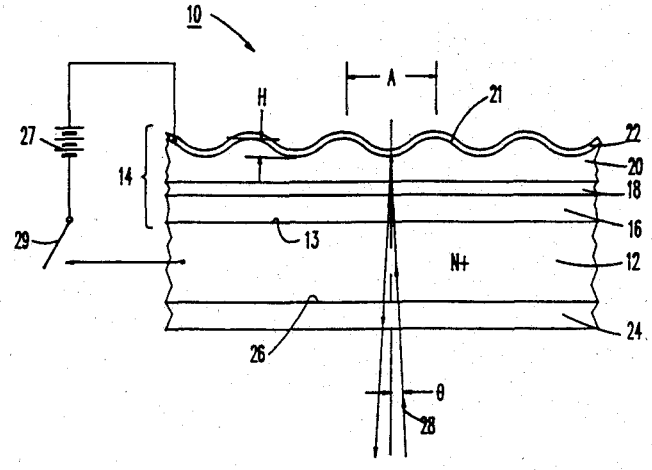
4,915,482 Apr. 10, 1990

Optical Modulator

Inventors: Reuben T. Collins, John R. Kirtley, Thomas N. Theis.
Assignee: International Business Machines Corporation.
Filed: Oct. 27, 1988.

Abstract—A method of modulating light incident to a semiconductor body comprising the steps of: coupling the incident light to the surface plasmon polariton mode at an interface of the semiconductor body; and selectively altering the absorption of the incident light by the semiconductor body so as to decouple the incident light from the surface plasmon polariton mode. The absorption can be selectively altered by establishing a quantum confined optical absorption region within the semiconductor body, and effecting a Stark shift of the quantum confined optical absorption region.

18 Claims, 2 Drawing Sheets



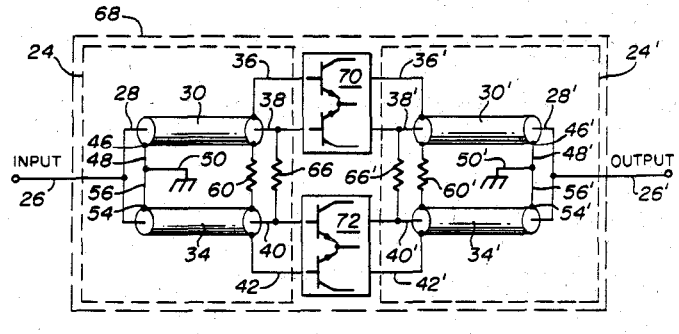
4,916,410 Apr. 10, 1990

Hybrid-Balun for Splitting/Combining RF Power

Inventor: E. M. Littlefield.
Assignee: E-Systems, Inc.
Filed: May 1, 1989.

Abstract—An in-phase hybrid and a balun in a single stage built with inexpensive coaxial cable which splits or combines RF power and simultaneously performs a balanced-to-unbalanced impedance transformation.

15 Claims, 1 Drawing Sheet



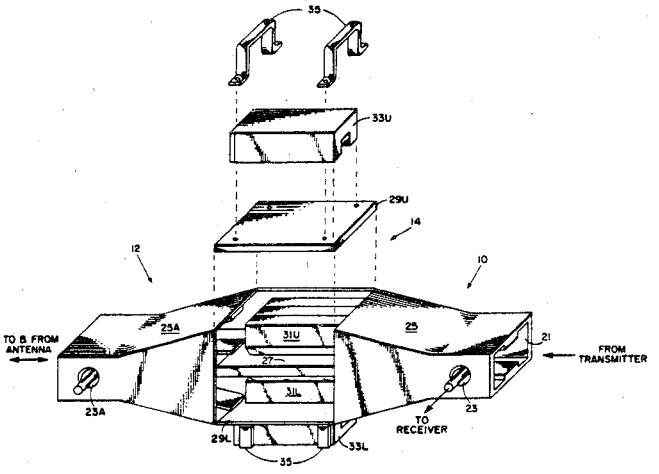
4,916,414 Apr. 10, 1990

Permanent Magnet Circulator Having U-Shaped Ferrites and Magnets

Inventors: Joseph Ranghelli, John P. Pehowich, and Gerald C. Dorman.
Assignee: Raytheon Company.
Filed: May 30, 1989.

Abstract—A circulator for duplexing microwave signals is shown to consist of a pair of folded magic-*T* hybrid junctions with a nonreciprocal phase shift section disposed between the parallel ports of such junctions, the nonreciprocal phase shift section being made up of *U*-shaped ferrites supported between the insides of *H*-plane walls in a rectangular waveguide and *U*-shaped permanent magnets adjustably supported on the outsides of the *H*-plane walls so that the magnetic flux in the *U*-shaped ferrites may be changed as required.

7 Claims, 2 Drawing Sheets



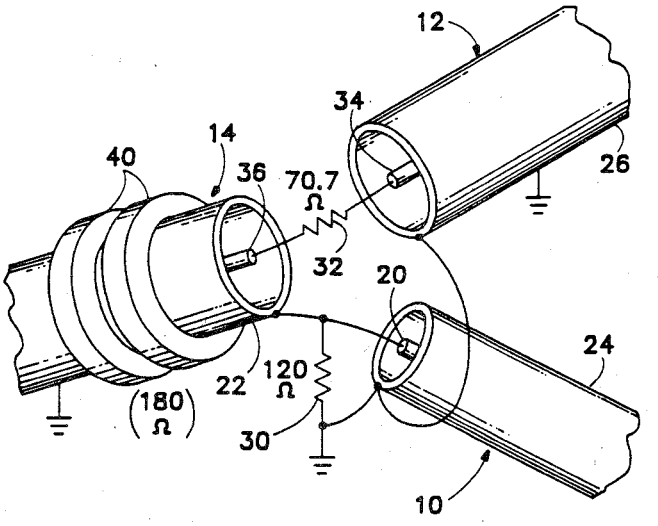
4,916,415 Apr. 10, 1990

Balanced, Impedance Matched, Coupling Device

Inventors: Clifford H. Moulton and Valdis E. Garuts.
Assignee: Tektronix, Inc.
Filed: Jan. 17, 1989.

Abstract—A single-ended to differential coupling device includes an input coaxial transmission line feeding sections of output coaxial transmission line across a break or gap between the outer conductors of the output transmission lines. A shunt resistor across the input transmission line and a series resistor interposed between the center conductors of the output transmission lines provide exact impedance matching in conjunction with plural ferrite toroids disposed about at least one of the transmission lines to prevent shorting of the input signal.

28 Claims, 4 Drawing Sheets



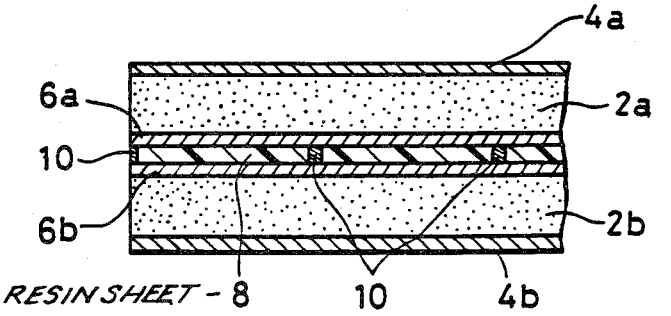
4,916,417 Apr. 10, 1990

Microstripline Filter

Inventors: Youhei Ishikawa, Jun Hattori, and Hideyuki Kato.
Assignee: Murata Mfg. Co., Ltd.
Filed: Aug 22, 1989.

Abstract—A filter employing Triplate type microstripline as the base element comprises first and second dielectric substrates which are superposed with each other so as to hold a resin sheet therebetween, and are contained in a metal case. The respective dielectric substrates are provided on outer major surfaces with ground electrodes to be electrically connected with the metal case. Resonance electrodes are provided on inner major surfaces of the respective dielectric substrates to be electrically connected with relating ground electrodes through end surfaces of the dielectric substrates. The resin sheet holds metal pins passing through the same along the direction of thickness thereof, so that the respective resonance electrodes of the first and second dielectric substrates are electrically connected with each other by the metal pins.

31 Claims, 2 Drawing Sheets



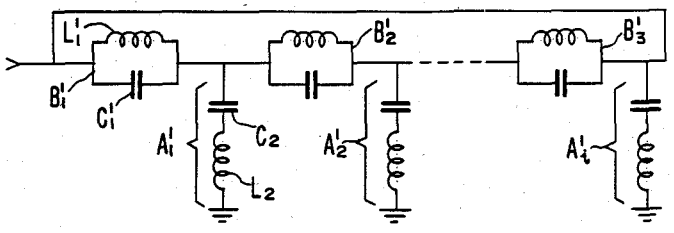
4,916,418 Apr. 10, 1990

Double Tuned Bird Cage Coil

Inventor: Alan R. Rath.
Assignee: Varian Associates, Inc.
Filed: Mar. 31, 1989.

Abstract—A multiply tuned bird cage results from the combination of low pass and high pass filter elements to yield a band reject network behaving as a low pass network at a low-frequency and a high-pass network at a high frequency. A band pass bird cage coil is obtained by adding a parallel LC combination to each leg of a bird cage coil to create additional poles in the impedance curve $z(f)$.

7 Claims, 5 Drawing Sheets



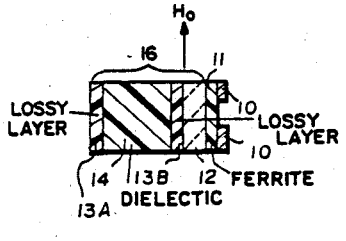
4,918,410 Apr. 17, 1990

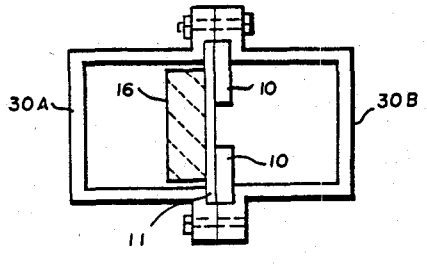
Isolator for Microwave Electromagnetic Radiation

Inventors: Adalbert Beyer and Ingo Wolff.
Assignee: Britist Telecommunications, Public Limited Company.
Filed: May 7, 1985.

Abstract—An insert for nonreciprocal waveguide device comprises a layer of ferrite and a layer of energy absorbing material with a spacer layer between them. The device works by reason of asymmetrical interaction of the microwave energy and the ferrite whereby energy is preferentially absorbed in the reverse direction. The spacer layer affects the distribution of electromagnetic fields so that there is a relatively low attenuation associated with one direction and a relatively high attenuation associated with the reverse direction.

27 Claims, 1 Drawing Sheet





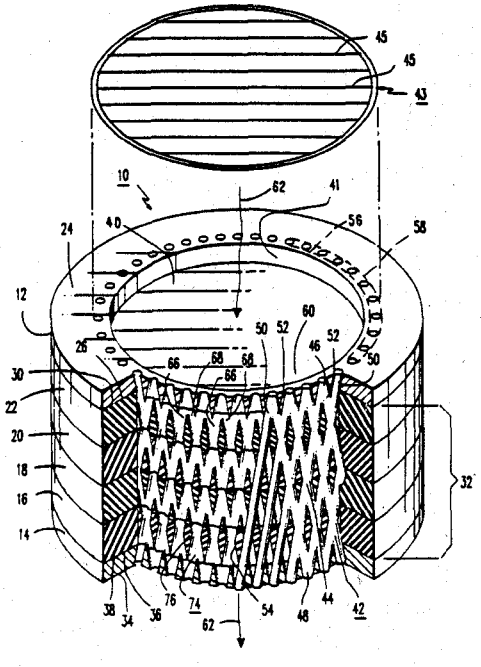
4,918,411 Apr. 17, 1990

Dielectric Aperture Assembly and Method for Fabricating the Same

Inventors: John H. Staehlin and James A. Bingham.
Assignee: Westinghouse Electric Corp.
Filed: Oct. 31, 1988.

Abstract—A fabricated dielectric aperture assembly includes a first layer of electrically conductive material having an opening therethrough to define a first aperture, a second layer of electrically conductive material spaced from the first electrically conductive layer and having an opening therethrough to define a second aperture and a plurality of solid dielectric layers interposed between the first and second layers of electrically conductive material. The first and second layers of electrically conductive material with the multiple layers of dielectric material interposed therebetween from a generally laminar assembly. A grid-like structure is embedded in the laminar assembly and extends between the first and second electrically conductive layers. The grid-like structure has an inner wall, an outer wall portion, an interior bounded by the inner wall and a plurality of openings extending from the inner wall to the outer wall. The grid-like structure has a body portion embedded in the plurality of layers of solid dielectric material, a first end portion embedded in the first electrically layer in surrounding relation with the first aperture and a second end portion embedded in the second electrically conductive layer in surrounding relation with the second aperture. The grid-like structure defines a waveguide for providing an Rf signal transmission path through the portion of each layer of dielectric material positioned in the interior portion of the waveguide between the first and second apertures.

21 Claims, 2 Drawing Sheets



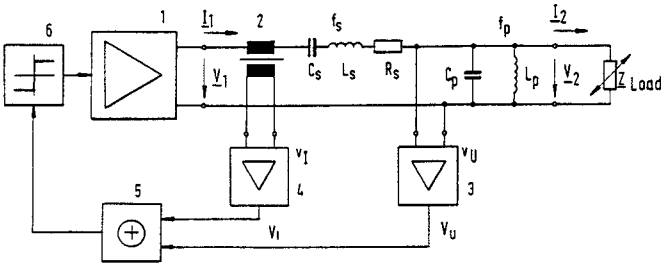
4,922,210 May 1, 1990

Feedback-Coupled High-Frequency Power Oscillator

Inventors: Gerhard Flachenecker, Karl Fastenmeier, and Heinz Lindenmeier.
Assignee: Erbe Elektromedizin GmbH.
Filed: July 18, 1989.

Abstract—A high-frequency power oscillator is built around a power amplifier utilizing semiconductors in a complementary or quasi-complementary stage which operate in a switching mode of operation. The output of the amplifier supplies high-frequency oscillations to a load impedance through an output filter composed of a series-resonant circuit and a parallel-resonant circuit. A feedback driving voltage is obtained from the output filter in a manner providing a first portion of the driving voltage from a voltage present in the parallel-resonant circuit for voltage feedback and a second portion of the driving voltage obtained by current inverse feedback from the current in the series-resonant circuit. These two components of the driving voltage are combined in an addition circuit and supplied to an input of the power amplifier through a pulse modification stage. In the case of high load impedances the operating frequency is as close as possible to the resonant frequency of the parallel resonant circuit and the superimposed current inverse feedback prevents the provision of an operating frequency that would approach the resonant frequency of the series-resonant circuit even when the losses in the series-resonant circuit are small. The ability to use a low-loss series-resonant circuit makes possible increased operation reliability, safety and efficiency.

22 Claims, 5 Drawing Sheets



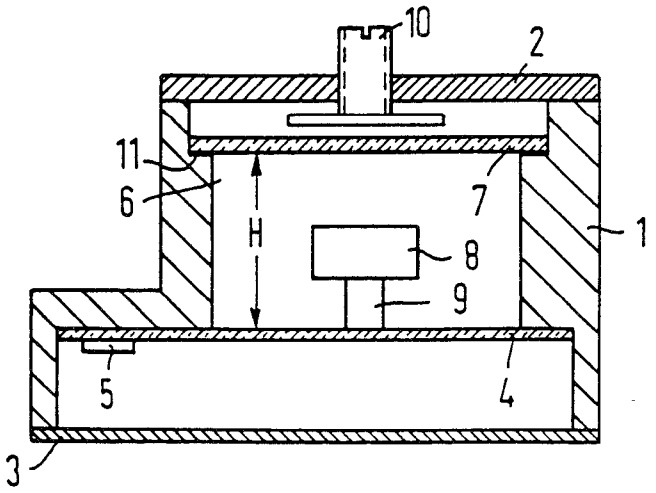
4,922,211 May 1, 1990

Microwave Oscillator in which the Delectric Resonator is Hermetically Sealed

Inventors: Klaus Otremba and Volker Sartorius.
Assignee: Siemens Aktiengesellschaft.
Filed: Mar. 6, 1989.

Abstract—A microwave oscillator that has a dielectric resonator that has properties that are dependent on the atmospheric humidity and that should be sealed in a hermetically air tight container to eliminate variations in its characteristics. The dielectric resonator is mounted in a hermetically sealed air tight cavity inside a metal housing in which the electrical circuit is mounted and is arranged at a position relative to coupling elements on a film printed circuit board that has a metallized surface on one side thereof.

13 Claims, 3 Drawing Sheets



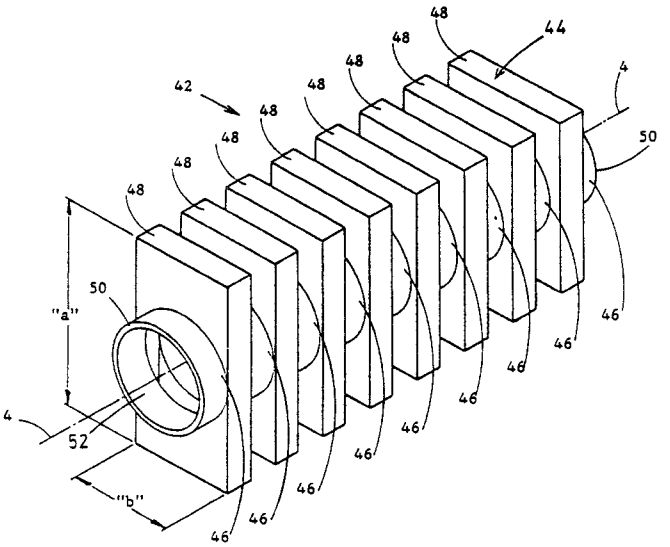
4,922,213 May 1, 1990

Polarizers with Alternatingly Circular and Rectangular Waveguide Sections

Inventor: Subir Ghosh.
Assignee: Com Dev. Ltd.
Filed: Oct. 11, 1988.

Abstract—A polarizer has a plurality of short waveguide sections arranged so that rectangular-shaped sections alternate with circular-shaped sections. The two end sections are both circular. The rectangular sections have a minimum size at least as large as the minimum diameter of the circular sections. The size of the rectangular sections progressively changes from section to section with all sections of the polarizer being symmetrical about the centre point of the polarizer. The length of each section is less than half a wavelength at maximum operating frequency. The structure of the polarizer is simple and straightforward so that computer-aided analysis and design methods can easily be used. The polarizer has a relatively large bandwidth and can interface directly with corrugated circular waveguides.

13 Claims, 11 Drawing Sheets



4,922,214 May 1, 1990

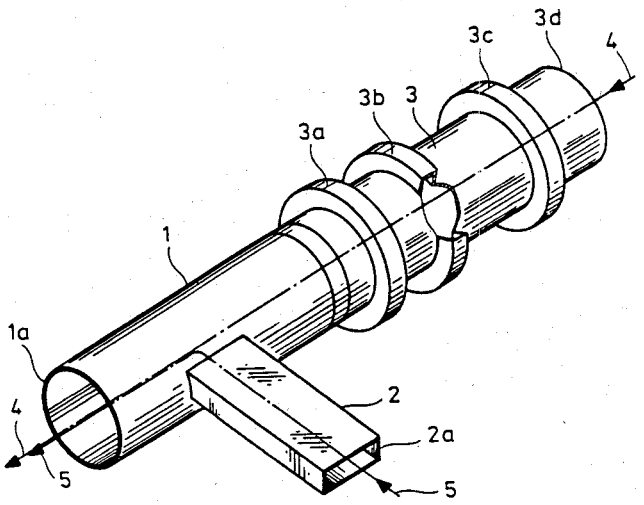
Apparatus to Couple Laser Radiation and Microwave Energy Using a Microwave Waveguide

Inventor: Peter Kalkert.
Assignee: URANIT GmbH.
Filed: July 8, 1988.

Abstract—An apparatus for the coupling of laser radiation into a microwave waveguide, in which the laser radiation and the microwave enter the waveguide perpendicular to one another and, after the microwave is deflected, exit the waveguide colinearly. To enlarge the cross section of the laser beam to be coupled and to be able to adjust it to the microwave waveguide, the invention provides that the entry aperture for the laser beam

incorporates a corrugated bandstop filter, and that the entry aperture for the microwave is configured in the manner of an orthomode coupler.

20 Claims, 1 Drawing Sheet



4,922,215 May 1, 1990

Power Divider in Waveguide Form

Inventors: Jean-Pierre Bergero and Claude Couasnard.
Assignee: Thomson-CSF.
Filed: Feb. 21, 1989.

Abstract—Disclosed is a power divider in waveguide form, for a microwave power transmission circuit, working at high power in the rectangular TE_{10} mode. This power divider is formed by the juxtaposition of: a rectangular, input waveguide working in its fundamental mode, receiving the power to be divided through one of its ends, and having another closed end; a circular waveguide propagating the TM_{01} mode connected to the rectangular, input waveguide by a lateral opening in such a way that the axes of the two guides are perpendicular; a group of ***n*** output waveguides, placed at the output of the circular waveguide and distributed in a ring before its free end, working in the TE_{10} mode, each transmitting a fraction of the power introduced into the input. The device can be applied to microwave power transmission circuits.

4 Claims, 3 Drawing Sheets