Letters

Corrections to "An Empirical Relationship for Electromagnetic Energy Absorption in Man for Near-Field Exposure Conditions"

I. CHATTERJEE, M. J. HAGMANN, AND O. P. GANDHI

In the above referenced paper,[1] the following corrections should be made.

On page 1236, in Table I, the unit for SAR should be μW/kg rather than W/kg$\times 10^{-6}$.

On page 1236, in Fig. 1, the caption should read: Fig. 1. Whole-body-average SAR (in W/kg for 1 mW/cm^2 incident energy density) for man in free space [3]. *Divide* by 3770 for W/kg with 1 V/m rms incident ***E***-field or (3770$\times$2) for W/kg with 1 V/m peak incident ***E***-field.

On page 1237, in Fig. 3, the ordinate should read SAR (μW/kg).

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[1] I. Chatterjee, M. J. Hagman, and O. P. Ghandi, *IEEE Trans. Microwave Theory Tech.* vol. MTT-29, pp. 1235–1238, Nov. 1981.

The caption should read: Fig. 3. Comparison of exact numerical solutions with those obtained from the empirical equation. Frequency = 77 MHz. Spatial maximum in vertical electric field *= 0.707 V/m rms or 1 V/m peak.* $\Delta_v = 0.5\ \lambda$. The asymptotic line indicates the value of SAR for $\Delta_h = \infty$. We would like to point out that in order to obtain the SAR for the near-field with $\Delta_v = 0.5\ \lambda$ and $\Delta_h = \infty$ at 77 MHz, we have to use a value of far-field SAR read off from Fig. 1 divided by (3770$\times$2). Therefore, from (1)

$$\mathrm{SAR}|_{\text{near-field}} = \frac{0.22/(3770\times 2)}{\left[1+\left(\frac{2.12}{1.95}\right)^2\right]} = 13.4\ \mu\mathrm{W/kg}$$

for a spatial maximum in vertical electric field = 0.707 V/m rms. This is very close to the value indicated by the solid horizontal line in Fig. 3. The agreement is not exact because the values of SAR shown in Fig. 1 were obtained for a homogeneous block model and the numerical results in Fig. 3 are for an inhomogeneous block model.

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.

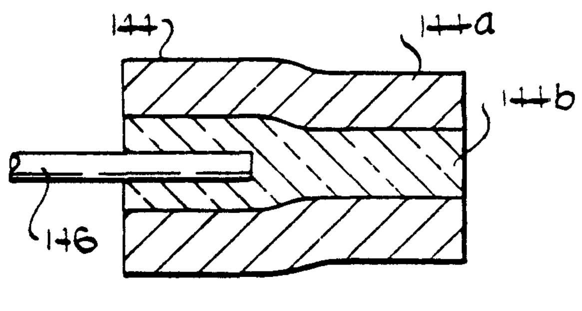
4,290,667 Sep. 22, 1981

Optical Fiber Terminations and Connectors

Inventor: Martin Chown.
Assignee: International Standard Electric Corporation.
Filed: Jun. 30, 1978.

Abstract—A termination for an optical fiber is formed with an integral lens for producing an expanded parallel light beam. A pair of terminations provide an optical coupler for connecting between a corresponding pair of optical fibers.

11 Claims, 20 Drawing Figures



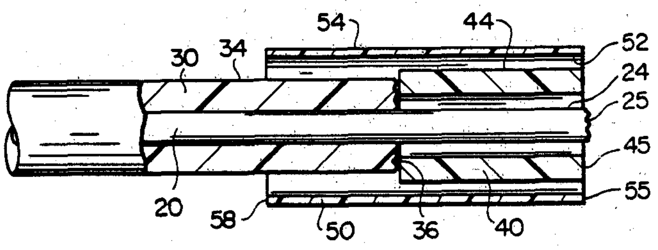
4,290,668 Sep. 22, 1981

Fiber Optic Waveguide Termination and Method of Forming Same

Inventors: Roger H. Ellis; Raymond Clarke.
Assignee: Raychem Corporation.
Filed: Nov. 29, 1978.

Abstract—A soft polymeric clad glass fiber waveguide with an easy to handle, low-loss end termination is disclosed. Each end termination is formed with a pair of telescopically assembled plastic sleeves. The inner sleeve is heat bondable to the glass core and has a refractive index lower than the glass core. It replaces an end portion of the soft rubbery polymeric cladding. The outer sleeve is heat shrinkable and during the termination procedure functions to compress, center and confine the inner sleeve. After termination, it functions to stiffen the fiber end and strain relieve the junction between the soft polymeric cladding and the stiffer inner sleeve. A method for making such a waveguide termination is disclosed. Also disclosed is an environmentally sealed optical waveguide of related construction.

24 Claims, 15 Drawing Figures



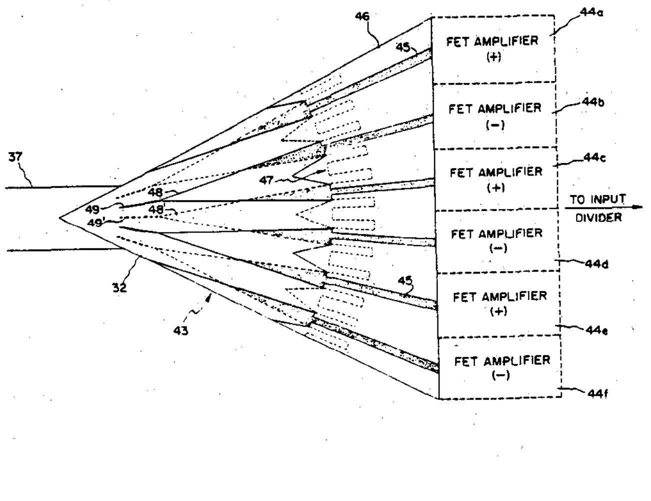
4,291,278 Sep. 22, 1981

Planar Microwave Integrated Circuit Power Combiner

Inventor: John P. Quine.
Assignee: General Electric Company.
Filed: May 12, 1980.

Abstract—A broadband, low loss, microwave integrated circuit power combiner for field effect transistors and other solid state amplifiers has a single metallized MIC substrate contained within a waveguide structure. An array of fin-line transitions from plural microstrip lines to a standard output waveguide can be tapered and placed directly in the waveguide taper region. Undesired higher order modes are absorbed by resistance metallization strips at the tips of the fin-lines or by resistor networks which bridge the microstrip lines.

16 Claims, 9 Drawing Figures



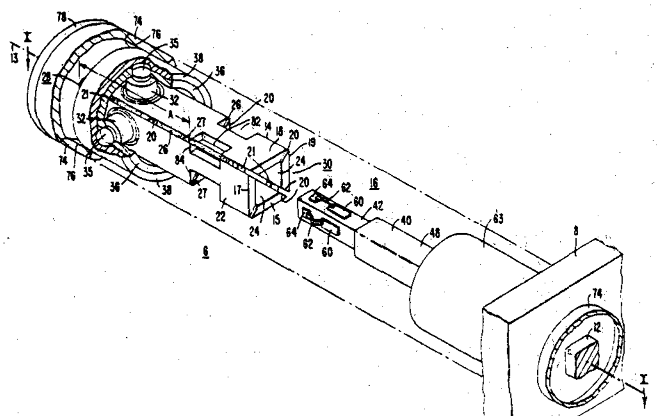
4,291,279 Sep. 22, 1981

Microwave Combiner Assembly

Inventor: Daniel C. Buck.
Assignee: Westinghouse Electric Corp.
Filed: Nov. 16, 1979.

Abstract—A microwave combiner assembly is described incorporating a coaxial transmission line having a plurality of diodes exhibiting negative resistance at high frequency mounted between the center conductor and the outer conductor of the transmission line. Each diode is mounted on a segment forming a portion of the center conductor which are separated by slots containing lossy dielectric. A signal is capacitively coupled from each diode by capacitively coupling each segment to a common center conductor. Each diode is biased by coupling a bias voltage to each segment. The microwave combiner overcomes the problem of mechanically assembling a plurality of diodes in an oscillator or amplifier while attenuating anti-phase currents in the diodes indicative of undesired oscillator modes.

9 Claims, 14 Drawing Figures



4,291,286 Sep. 22, 1981

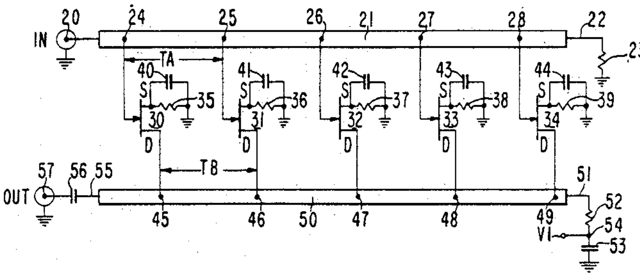
High Bandwidth Transversal Filter

Inventor: Gary L. Wagner.
Assignee: Ford Aerospace & Communications Corporation.
Filed: Dec. 17, 1979.

Abstract—A high bandwidth transversal filter is described having an input impedance matching network, a tapped delay line, a plurality of weighting amplifiers, a distributed summing circuit, and an output impedance matching network. The delay line is implemented with a transmission line. The input impedance of this transversal filter depends on the inductance and capacitance of the transmission line and the capacitance of the inputs of each of the FET's used as weighting amplifiers. The gates of the FET's provide high impedance low loss taps of the delay line. The weighting is accomplished by either varying the drain current of the FET's or by using capacitive voltage dividers to apportion the tapped signals. The resulting weighted signals are applied to a distributed summing circuit which provides both high bandwidth summing and additional delays. This summer is also implemented with a tapped transmission line. The output impedance of this transversal filter depends on the inductance and capacitance of the summing line and the capacitance of the output of each FET. The parameters of the transmission lines constituting the input delay line and the distributed summer can be selected to provide broadband impedance

matching for the input and output of the filter. The FET's thus act as high impedance taps, as weighting amplifiers, and as part of the input and output impedance matching networks.

5 Claims, 8 Drawing Figures



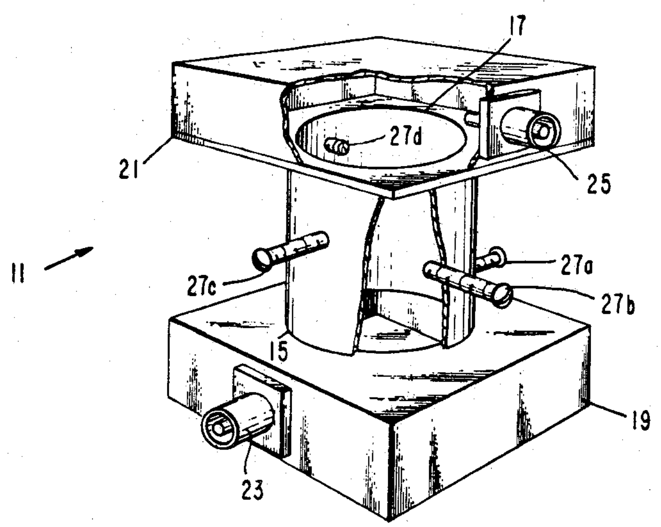
4,291,287 Sep. 22, 1981

Evanescent Mode Filter

Inventors: Frederick A. Young; Edward L. Griffin.
Assignee: Hughes Aircraft Company.
Filed: Dec. 10, 1979.

Abstract—There are herein described evanescent mode filters each of which include a hollow waveguide, wherein a plurality of resonators are disposed, the resonators including loading structures such as tuning screws, for example, wherein at least one of the loading structures is angularly disposed, relative to the axis of the waveguide, with respect to others of the loading structures to reduce the length of the filter and/or to provide internal bridge couplings.

3 Claims, 7 Drawing Figures



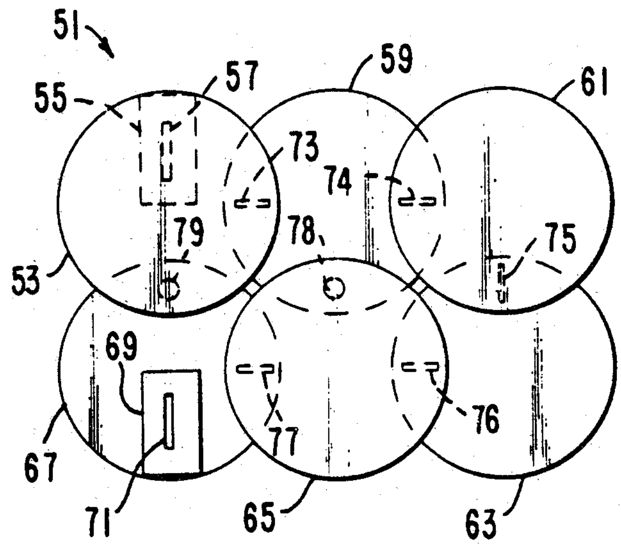
4,291,288 Sep. 22, 1981

Folded End-Coupled General Response Filter

Inventors: Frederick A. Young; Edward L. Griffin; Louis W. Hendrick.
Assignee: Hughes Aircraft Company.
Filed: Dec. 10, 1979.

Abstract—A folded end-coupled general response TE_{011} filter is herein described which achieves all bridge couplings necessary for general bandpass response in a particularly convenient two-tier overlapping structure, where all couplings are made in a single removable iris, and where probe and/or slot couplings are used to achieve coupling of either sign.

4 Claims, 11 Drawing Figures



4,291,289 Sep. 22, 1981

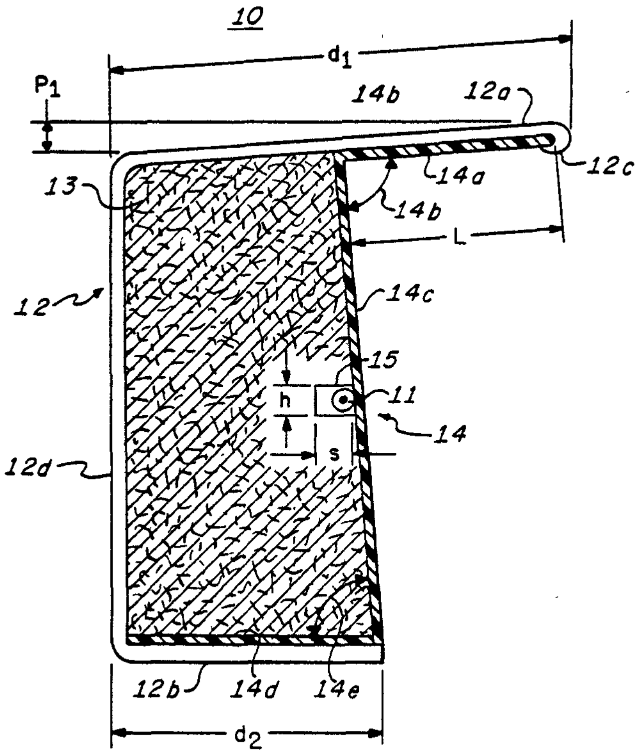
Shielded Surface Wave Transmission Line

Inventors: Basrur R. Rao; Gerald F. Ross; Harry M. Cronson.
Assignee: Sperry Corporation.
Filed: Mar. 17, 1980.

Abstract—A surface wave transmission line enclosed in a dielectric shield and supported within the enclosure at a predetermined distance from the base of the enclosure. The enclosure being constructed such that the surface wave transmission line may be in close proximity to reflecting objects positioned

along the enclosure and at a predetermined distance from a mounting structure.

8 Claims, 7 Drawing Figures



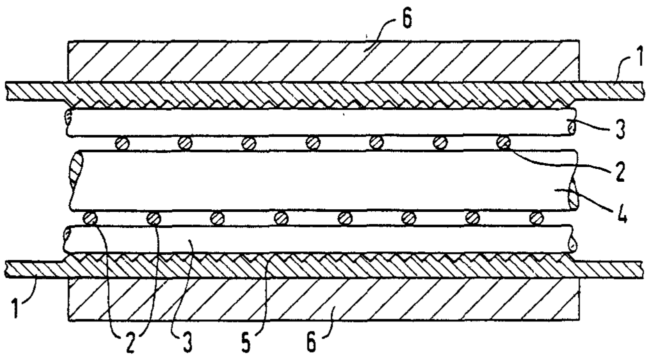
4,292,566 Sep. 29, 1981

Traveling Wave Tube with a Helical Delay Line

Inventors: Hinrich Heynisch; Erwin Huebner; Heinz Barth.
Assignee: Siemens Aktiengesellschaft.
Filed: Aug. 10, 1979.

Abstract—A traveling wave tube having a helical delay line has a plurality of dielectric holding rods for supporting the delay line relative to a vacuum envelope. The holding rods are firmly adhered to the delay line and the envelope by means of solid-state reactions.

3 Claims, 1 Drawing Figure



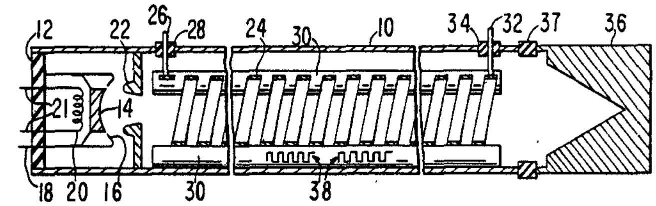
4,292,567 Sep. 29, 1981

In-Band Resonant Loss in TWT's

Inventors: Cliff D. Fritchle; Charles E. Hobrecht; Allan W. Scott.
Assignee: Varian Associates, Inc.
Filed: Nov. 28, 1979.

Abstract—In traveling wave tubes with broad bandwidth, such as an octave or more, the gain varies by many dB across the band One or more lossy circuits inside the tube coupled to the interaction helix-type slow-wave circuit are resonant at frequencies within the operating band. They provide a loss varying with frequency to compensate for the gain variation. The resonant circuits are typically metallized patterns on a dielectric rod which may be a support rod for the interaction circuit. Compared to an external gain equilizer in the drive circuit of the TWT, the internal equalizer is cheaper and provides a better noise figure.

20 Claims, 4 Drawing Figures



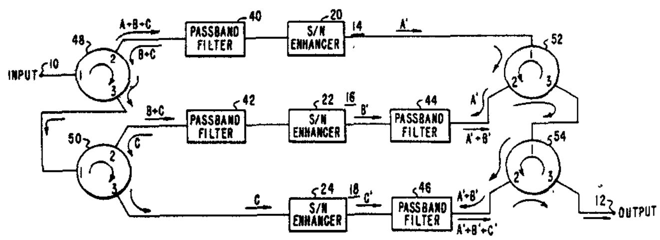
4,292,607 Sep. 29, 1981

Broad-Band Circuit for Microwave S/N Enhancers

Inventors: Harry Goldie; Steven N. Stitzer.
Assignee: Westinghouse Electric Corp.
Filed: Mar. 19, 1980.

Abstract—A microwave circuit network which combines a number of signal-to-noise enhancers of the magnetostatic wave excitation type, utilizing ferrite material, to extend the signal-to-noise enhancement frequency bandwidth beyond that which is offered individually by any one of the enhancers being combined while reducing substantially any signal interaction between the signal-to-noise enhancement operations thereof is disclosed.

5 Claims, 3 Drawing Figures



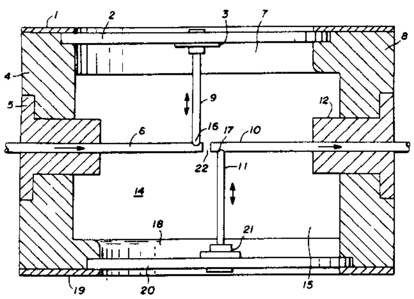
4,293,188 Oct. 6, 1981

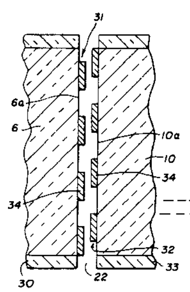
Fiber Optic Small Displacement Sensor

Inventor: Donald H. McMahon.
Assignee: Sperry Corporation.
Filed: Mar 24, 1980.

Abstract—An opto-electronic transducer is provided for converting small displacements into optical intensity or phase variations which may then be converted into varying electric currents A first optical fiber guide is disposed with its end face stationary, for example, while a second optical fiber guide is disposed so that its free end may be laterally displaced from the axis of the first guide in proportion to the parameter to be measured. The sensitivity of the transducer is enhanced through the use of large core, large numerical aperture, multimode optical fibers. The opposed faces of the cooperating fibers are equipped with or are used to illuminate regular arrays of equally spaced opaque, absorptive, or reflective grating systems providing intensity or phase modulation of the propagating light energy in proportion to wave guide deflection.

37 Claims, 19 Drawing Figures





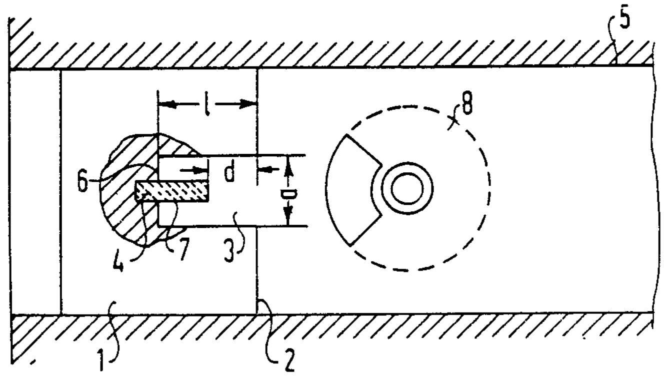
4,293,828 Oct. 6, 1981

Arrangement for Suppressing Interference Waves and Harmonic Waves in Traveling Wave Tubes with a Short Circuiting Slide in the Output Wave Guide

Inventor: Franz Gross.
Assignee: Siemens Aktiengesellschaft
Filed: Feb. 4, 1980.

Abstract—An arrangement for suppressing interference waves and harmonic waves in traveling wave tubes has a short circuit slide in an output wave guide in which the slide has a groove in the form of a $\lambda/4$ or $\lambda/2$ wave guide element in its frontal surface which is the effective short circuit plane. The groove has an attenuation element arranged therein.

10 Claims, 2 Drawing Figures



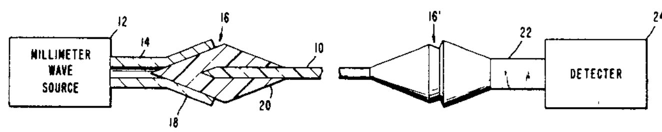
4,293,833 Oct. 6, 1981

Millimeter Wave Transmission Line Using Thallium Bromo-Iodide Fiber

Inventor: Adrian E. Popa.
Assignee: Hughes Aircraft Company.
Filed: Nov. 1, 1979

Abstract—Millimeter wave transmission lines are disclosed for propagating electromagnetic waves of a wavelength ranging from about 10 mm to about 0 4 mm. The transmission lines comprise a fiber of co-crystallized thallium bromo-iodide consisting of from about 40 mole percent to about 46 mole percent thallium bromide and from about 60 mole percent to about 54 mole percent thallium iodide. The fiber may be cladded with a dielectric material having a dielectric constant less than that of the fiber. A number of alternate fiber and cladding cross-sectional configurations are disclosed including circular, square, rectangular, and elliptical.

14 Claims, 10 Drawing Figures



4,293,956 Oct. 6, 1981

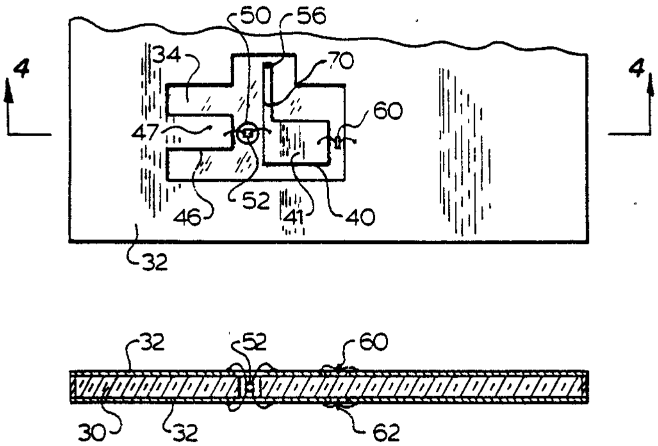
Double-Balanced Mixer

Inventor: John E. Altstatt.
Assignee: California Microwave, Inc.
Filed: Nov. 23, 1979.

Abstract—A double-balanced mixer device including a planar substrate selectively plated on both sides to form certain mixer component parts and including a pair of quarter wavelength narrow strips extending from the component parts which form one of the balanced lines, such strips having their

distal ends shorted together to provide an output terminal at which an IF signal may be taken. The quarter wavelength strips provide a low impedance path for IF signals but effectively block RF signals.

6 Claims, 5 Drawing Figures



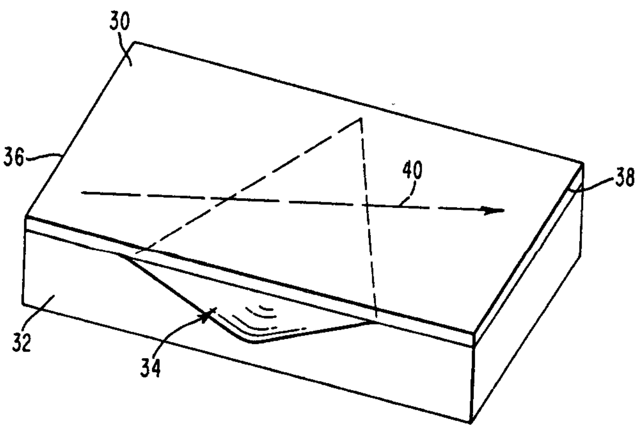
4,294,507 Oct. 13, 1981

Controllably Deformed Elastic Waveguide Elements

Inventor: Mark Johnson.
Assignee: International Business Machines Corporation.
Filed: Jan. 25, 1980.

Abstract—An elastic two dimensionally guiding waveguide is controllably stretched between two or more different configurations, the different configurations being such that wave energy takes different paths through the waveguide at each of the two or more different configurations. The paths are different because wave energy which propagates along and between two parallel boundary surfaces or which follows a surface travels along a geodesic path and the geodesic path can be changed by stretchably deforming the surface shape in a suitable manner. In one embodiment an optically transparent sheet of rubber-like material is stretched into a depression or hole within a substrate using controlled pneumatic forces. Many different active functions may be implemented using this principle, including switching, variable focussing, modulation, scanning and deflection.

41 Claims, 13 Drawing Figures



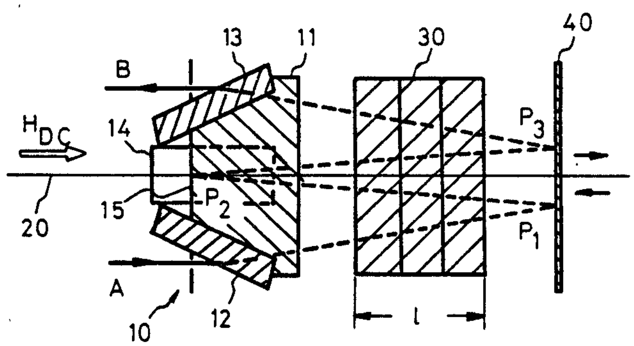
4,294,509 Oct. 13, 1981

Optical Circulators

Inventor: Tsukasa Nagao.
Filed: Dec. 6, 1979.

Abstract—An optical circulator in which a cubic prism for a signal coupler, a lens-like magneto-optic structure, and a reflecting structure are utilized as important constituents acts a role of circulation in optical region. Basic features of the optical circulator are such that a signal light cumulatively effects the Faraday rotation on repeated passages through the magneto-optic structure and therefore a shortened magneto-optic structure will provide sufficient roles in performing a circulator action, and furthermore, such multiple passage of the signal light will introduce useful resonant modes in the magneto-optic structure in order to produce operating modes which can achieve various multiple circulation frequency operations in the optical region. And also the optical circulator has low loss characteristics and broad availability especially in the field of optical communication.

27 Claims, 22 Drawing Figures



4,294,514 Oct. 13, 1981

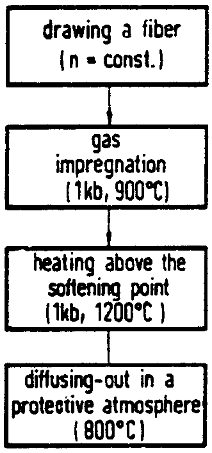
Light-Wave Guides and Method of Producing Same

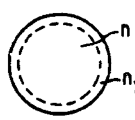
Inventor: Hartmut Schneider.
Assignee: Siemens Aktiengesellschaft.
Filed: Sep. 10, 1979.

Abstract—A light-wave guide fiber is pulled from a uniform fiber-yielding material and the peripheral surface areas (cladding) of such fiber are enriched with a gas soluble in the fiber material at temperatures below the softening temperature of the fiber and at relatively high pressure (for example, via high pressure/high temperature diffusion). The excess pressure resulting in the cladding is equalized by a subsequent temporary heating of the fiber above the softening temperature which causes a change of density in the fiber core.

Thereafter, the gas is diffused out of the cladding at a lower temperature. The resultant fiber exhibits a radially outwardly decreasing refractive index.

5 Claims, 2 Drawing Figures





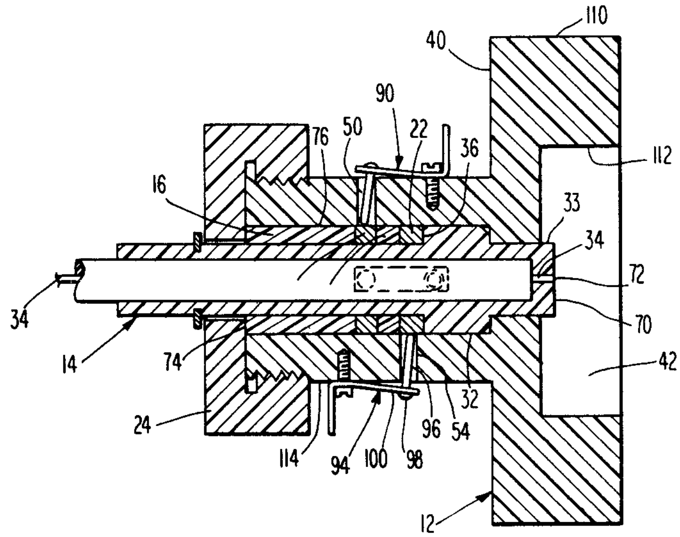
4,295,043 Oct. 13, 1981

Fiber Optic Cable Connector

Inventors: Jules A. Eibner; Franz X. Kanamuller.
Assignee: Sperry Corporation.
Filed: Dec. 13, 1979.

Abstract—The present invention comprises selectively locating electrical shorting rings on the male section of an optical cable connector. The particular locations of the rings chosen is commensurate with the length of the cable and provides a basis for amplifying the signals being transmitted along the optical cable. On the female section of the cable connector there are electrical contact devices which can be shorted by the rings on the male section if such rings are present. There is a selectable amplifier circuit connected to the optical cable and the contact devices, and depending upon which contact devices are shorted the amplifier circuit provides the proper amplification to the optical signals which are being converted into electrical signals.

7 Claims, 9 Drawing Figures



4,295,109 Oct. 13, 1981

Rectangular Waveguide Elbow Bent Across the Narrow Side with Capacitive Loading

Inventor: Eberhard Schuegraf.
Assignee: Siemens Aktiengesellschaft.
Filed: Dec. 10, 1979.

Abstract—A rectangular wave guide H-elbow bent across the narrow side of the wave guide and having its outer corner flattened by a symmetrically angled conducting plane. The present invention provides for the reduction of the reflection factor in such elbow by providing that the relative corner flattening of the wave guide produces a value of x_H/a greater than 0 73 wherein a is the length of the wide side of the wave guide and x_H is the distance from the apex of the wave guide before it is flattened by the conducting plane to the junction of the conducting plane with the narrow side of the wave guide. Furthermore, capacitive loading means of cylindrical form are arranged in the area of the geometrical median w of the bend of the wave guide and being in the form of conductive cylinders 1 and 3 as illustrated in FIGS. 2 and 3.

3 Claims, 5 Drawing Figures