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.

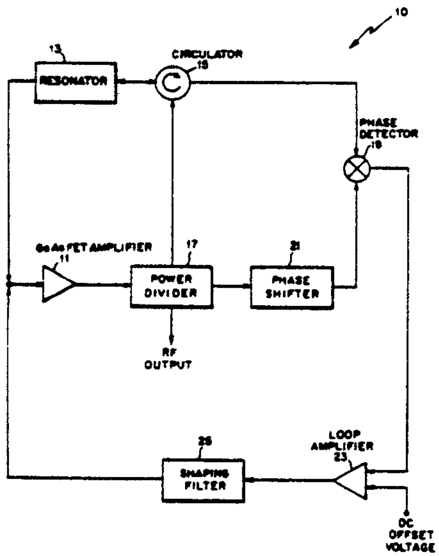
4,555,678 Nov. 26, 1985

Microwave Oscillator

Inventors: Zvi Galani, Richard W. Laton, Raymond C. Waterman, Jr., and Robert DiBiase.
Assignee: Raytheon Company.
Filed: Nov. 21, 1983.

Abstract—An improvement in a microwave oscillator using a GaAs FET as the active element is shown to include a phase detector responsive to a portion of the positive feedback signals applied to a resonator having a high Q and to a portion of the signals out of the GaAs FET, shifted by 90°, to obtain signals to degenerate noise internally formed in the GaAs FET.

2 Claims, 1 Drawing Figure



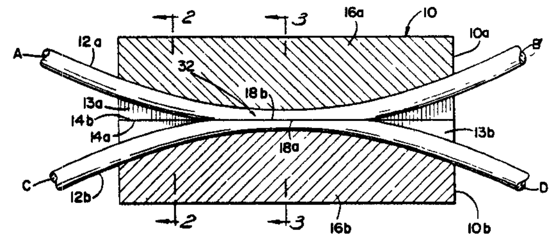
4,556,279 Dec. 3, 1985

Passive Fiber-Optic Multiplexer

Inventors: Herbert J. Shaw and Michel J. F. Digonnet.
Assignee: Board of Trustees of the Leland Stanford Junior University.
Filed: Nov. 9, 1981.

Abstract—A passive, frequency selective, fiber-optic multiplexer, comprises a directional coupler in which a pair of single mode optical fibers are accurately positioned to provide evanescent field coupling, typically by polishing a portion of the cladding from each of said fibers to place the respective cores of said fibers within the evanescent field of light in the other fiber. The coupling efficiency of a coupler constructed in this manner is wavelength-dependent, and provides over-coupling, that is, the capability of transferring light, virtually entirely, back and forth between the fibers within the coupler. The wavelength-dependent nature of the evanescent field coupling permits multiplexing, specifically between a pair of wavelengths, one of which is coupled in its entirety from a first fiber to a second fiber, and the other of which is essentially uncoupled. By increasing the number of total transfers of the light signals between the pair of fibers, the frequency solution of the multiplexer may be optimized for light signals of virtually any frequency separation.

29 Claims, 37 Drawing Figures



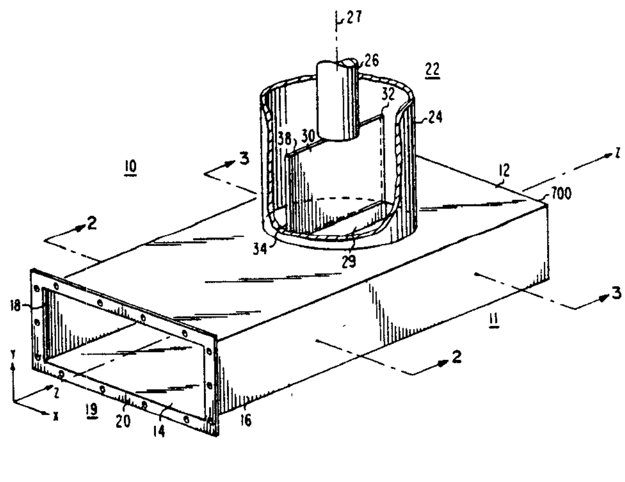
4,556,853 Dec. 3, 1985

Mode-Controlling Waveguide-to-Coax Transition for TV Broadcast System

Inventor: Raymond N. Clark.
Assignee: RCA Corporation.
Filed: Sept. 28, 1984.

Abstract—A coax-fed slotted-cylinder (pylon) antenna for UHF television operation at power of 200 kW and above has a coaxial feed which is large enough to propagate higher TE_{11} mode as well as the desired fundamental TEM mode. The power fed to each slot and, as a consequence, the antenna array factor may be perturbed by the higher modes. It is important to reduce losses in the feed of the higher-power signals from the transmitter or high-power amplifier up the tower to the antenna. For lowest loss, a waveguide is used for the run up the tower. A waveguide-to-coax transition is used for adapting the waveguide to the coaxial antenna feed while suppressing the undesired $TE_{1,1}$ mode. The transition has two short semicircular waveguides opening into the waveguide feed from the transmitter. The semicircular walls of the two waveguides are coupled to the outer conductor of the coax antenna feed. The semicircular waveguides have a common flat wall, the center of one core of which is coupled to the center-conductor of the coax antenna feed.

6 Claims, 11 Drawing Figures



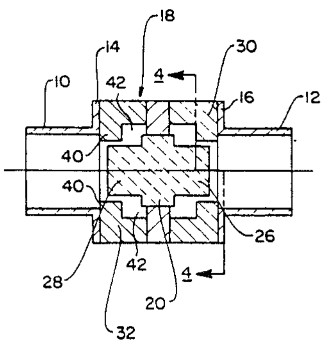
4,556,854 Dec. 3, 1985

Microwave Window and Matching Structure

Inventor: Yukio Hiramatsu.
Assignee: Litton Systems, Inc.
Filed: June 29, 1984.

Abstract—A circular waveguide window between two rectangular waveguides, having increased bandwidth and increased power-handling capability. It uses particular window and an impedance-matching structure whose dimensions are related in a particular way to the dimensions of the rectangular waveguides.

3 Claims, 13 Drawing Figures



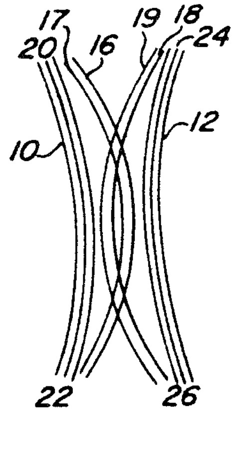
4,556,855 Dec. 3, 1985

RF Components and Networks in Shaped Dielectrics

Inventors: Bing Chiang and Boris Sheleg.
Assignee: The United States of America as represented by the Secretary of the Navy.
Filed: Oct. 31, 1983.

Abstract—A new class of low-cost microwave/millimeter-wave dielectric couplers are disclosed. In one embodiment, the waveguides to be coupled are formed of bundles of dielectric fibers and coupling is achieved by having a certain percentage of the dielectric fibers cross over between the waveguide bundles. In a second embodiment, the waveguides are formed of stacked longitudinal dielectric lamination sheets, and coupling is achieved by crossing over a certain number of the laminate sheets from one waveguide stack to the other waveguide stack.

13 Claims, 13 Drawing Figures



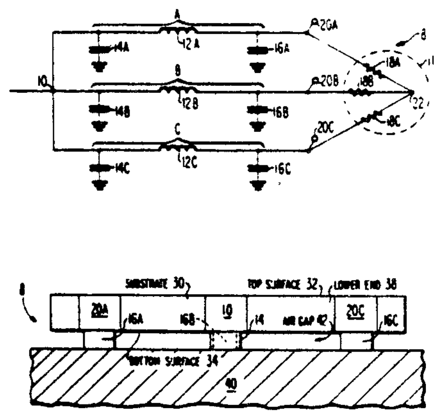
4,556,856 Dec. 3, 1985

Planar, Lumped-Element, Matched N-Way Power Divider

Inventor: Adolph Presser.
Assignee: RCA Corporation.
Filed: Sept. 18, 1984.

Abstract—An N-way, lumped-element, matched, isolated branch power divider in planar form is disclosed. Lumped inductors are disposed on the top surface of a dielectric substrate, an isolation resistor network is disposed on the bottom surface of the substrate, and the substrate is suspended above a ground conductor by lumped-element capacitors. The capacitance values of the capacitors and the inductance values of the inductors are selected to provide between the common terminal and each branch terminal a lumped-element π network transmission line having a phase shift of about 90° at frequencies within an operating range of frequencies.

13 Claims, 9 Drawing Figures



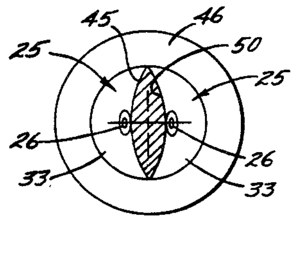
4,557,551 Dec. 10, 1985

Nonlinear Optical Fiber Coupler and a Method of Making Same

Inventor: Richard B. Dyott.
Assignee: Andrew Corporation.
Filed: Sept 28, 1983.

Abstract—A nonlinear waveguide component is formed by a pair of optical fibers disposed in side-by-side relation and defining between them a space of elliptical cross section. A single crystal of electrooptic material is grown *in situ* in the space between the fibers and has major and minor crystal axes coinciding with the major and minor axes of the space.

15 Claims, 9 Drawing Figures



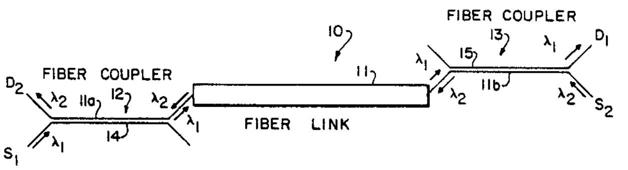
4,557,553 Dec. 10, 1985

Method of Wavelength Multiplexing in Fused Single-Mode Fiber Couplers

Inventor: Matthew N. McLandrich.
Assignee: The United States of America as represented by the Secretary of the Navy.
Filed: Nov 2, 1981.

Abstract—An apparatus and method of entering and extracting a discrete wavelength of optical data in a single-mode duplex optical data transmission system relies on a selective evanescent field coupling. A continuous single-mode fiber transmits the two wavelengths in opposite directions with respect to each other. A length of a like single-mode fiber is fused to the continuous single-mode fiber such that the product of the fused length and the coupling coefficient of the fiber pairs equals $\pi/2$ at one of the optical frequencies to effect one-hundred-percent evanescent field coupling to and from the continuous fiber. The product of the coupling coefficient and the fused length equals π at the other optical wavelength to effect a zero percent evanescent field coupling. The other wavelength travels the length of the continuous single-mode fiber uninterrupted while the first wavelength is selectively coupled and decoupled from the fiber as desired.

2 Claims, 4 Drawing Figures



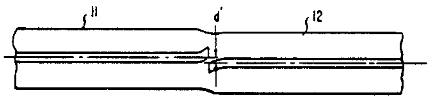
4,557,556 Dec. 10, 1985

Method of Fabricating an Optical Attenuator by Fusion Splicing of Optical Fibers

Inventor: George A. Decker, Jr.
Assignee: AT&T Bell Laboratories.
Filed: Oct. 28, 1983.

Abstract—An advantageous method for fabricating an optical attenuator between the ends of two optical fibers uses the following steps. The axes of the cores of optical fiber ends are misaligned by an offset distance and then one of them is moved along its center axis until the ends of the fibers abut one another Abutted ends of the optical fibers are melted. While the fiber ends are molten, surface tension aligns the axes of the cores of the optical fibers. Finally the abutted ends region of the optical fibers is cooled into a lumped optical attenuator.

7 Claims, 6 Drawing Figures



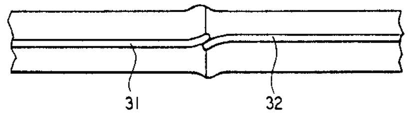
4,557,557 Dec. 10, 1985

Method of Making an Optical Fiber Attenuator Using a Lossy Fusion Splice

Inventors: Robert F. Gleason and John McLay.
Assignee: AT&T Bell Laboratories.
Filed: Oct. 28, 1983.

Abstract—A method for fabricating an optical attenuator includes the following steps. Measuring the magnitude of optical loss imposed on an optical signal transmitted through first and second abutted optical fibers. Aligning the abutted ends of the first and second optical fibers for minimum distributed optical signal loss through both optical fibers, as measured at the far end of the second optical fiber. Heating the abutted ends of the first and second optical fibers into a plastic state. Physically distorting the optical fiber ends until the measured optical signal loss increases by a desired additional lumped optical loss value. Cooling the abutted ends of the first and second optical fibers to form a fusion splice imposing the desired additional lumped optical loss value between the ends of the first and second optical fibers.

2 Claims, 4 Drawing Figures



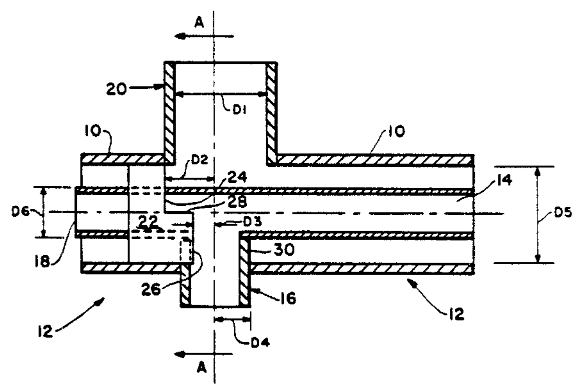
4,558,290 Dec. 10, 1985

Compact Broad-Band Rectangular to Coaxial Waveguide Junction

Inventor: Joseph C. Lee.
Assignee: The United States of America as represented by the Secretary of the Air Force.
Filed: Apr. 11, 1984.

Abstract—A compact waveguide junction for coupling rectangular waveguide of one frequency band to a coaxial waveguide, and a second rectangular waveguide of a second frequency band to the interior of the hollow center conductor of the coaxial waveguide.

11 Claims, 4 Drawing Figures



4,559,490 Dec. 17, 1985

Method for Maintaining Constant Bandwidth Over a Frequency Spectrum in a Dielectric Resonator Filter

Inventors: Mark A. Gannon and Francis R. Yester, Jr.
Assignee: Motorola, Inc.
Filed: Dec. 30, 1983.

Abstract—A method and corresponding apparatus for maintaining constant bandwidth over a frequency spectrum in a microwave, dielectric resonator waveguide filter. Bandwidth is determined by the product of the resonant center frequency and the interresonator coupling coefficient. To maintain constant bandwidth while changing center frequency, the interresonator coupling coefficient must be chosen such that it varies inversely with changes in center frequency. The interresonator coupling coefficient is a function of the physical dimensions of the waveguide and the dielectric resonators, the dielectric constant and the spatial location of the resonators within the waveguide. Once the physical and spatial parameters have been established, the center frequency of the filter may be adjusted by altering the thickness of the resonators without changing the filter bandwidth.

15 Claims, 4 Drawing Figures