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 examing 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.

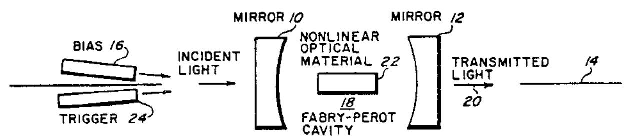
4,558,923 Dec. 17, 1985

Picosecond Bistable Optical Switch Using Two-Photon Transitions

Inventors: Craig A. Hoffman, Jerry R. Meyer, and Filbert Bartoli.
Assignee: The United States of America as represented by the Secretary of the Navy.
Filed: Dec. 22, 1983.

Abstract—A bistable optical switch comprising a Fabry-Perot resonator containing a nonlinear semiconductor medium with a desired band structure and whose susceptibility (refractive index) varies with optical energy density. The Fabry-Perot resonator is biased to a point where two stable transmission states are possible. Switching is accomplished by pumping the nonlinear material with an energy hw in the range $\frac{1}{2}\Delta_g < hw < \Delta_g$, where Δ_g is the bandgap between the upper valence band and the conduction band of the nonlinear material, in order to stimulate a two-photon valence-to-conduction band absorption transition at a non-minimum energy and thereby make possible a one-hw photon virtual transition between the heavy hole and split-off valence bands of the nonlinear material. This virtual transition alters the susceptibility thereby switching the resonator to a different stable transmission state. Switching times on the order of picoseconds are obtained because switching-time is not dependent on the carrier recombination time.

17 Claims, 5 Drawing Figures



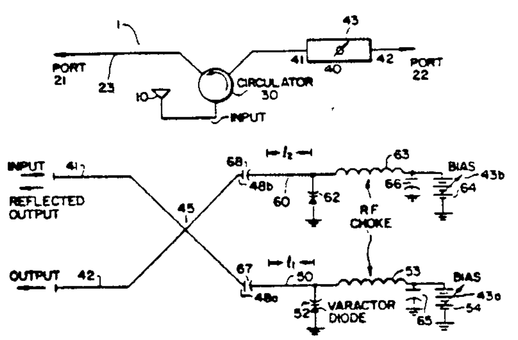
4,559,489 Dec. 17, 1985

Low-Loss Radio Frequency Multiple Port Variable Power Controller

Inventors: David C. Vacanti, John C. Read, and Jimmy S. Takeuchi.
Assignee: The Boeing Company.
Filed: Sep. 30, 1983.

Abstract—A multiport power controller uses remote-controllable variable reactive elements to set the amount of power delivered to the ports.

12 Claims, 5 Drawing Figures



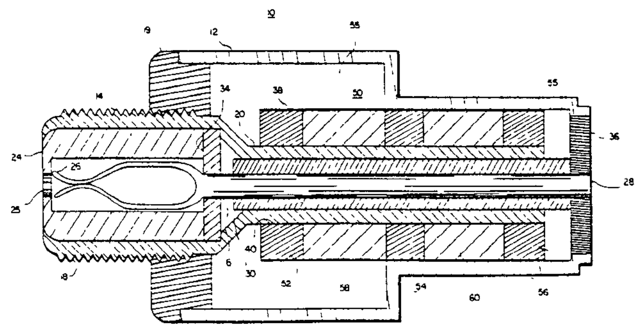
4,559,506 Dec. 17, 1985

Temperature Compensated Coaxial Cable Isolator

Inventor: Raymond G. Capek.
Assignee: Zenith Electronics Corporation.
Filed: Jul. 5, 1984.

Abstract—A coaxial cable isolator includes a stepped diameter tubular outer conductive element and a threaded smaller diameter inner conductive element coaxially aligned therewith to form an interruption. A ceramic structure is positioned in the interruption and includes three ceramic capacitive elements, each having a different temperature coefficient selected to provide a minimum of 3.8 and maximum of 5.0 nanofarads of capacitance over the 0 degree Centigrade to +45 degree Centigrade operating temperature range of the isolator. Two ferrite elements for EMI absorption are sandwiched between the three capacitive elements.

6 Claims, 4 Drawing Figures



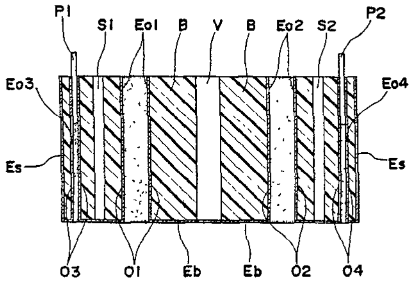
4,559,508 Dec. 17, 1985

Distribution Constant Filter with Suppression of TE11 Resonance Mode

Inventors: Toshio Nishikawa and Tadahiro Yorita.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Feb. 8, 1984.

Abstract—An improved distribution constant type filter provided with a connecting arrangement which includes a through-opening formed in a dielectric block of the filter along a first cavity of a resonance unit at an initial stage, and a connector provided in the through-opening so that one end of the connector is electrically conducted to a conductive layer formed on part of the outer surface of the dielectric block, with the other end of the connector being connected to an external circuit to receive an input signal. The through-opening is preferably small in lateral cross section relative to the first cavity and positioned at a central portion in a widthwise direction of the dielectric block, and thus, coupling magnetic between the resonance unit and the external circuit suppresses a TE11 resonance mode in the filter.

26 Claims, 13 Drawing Figures



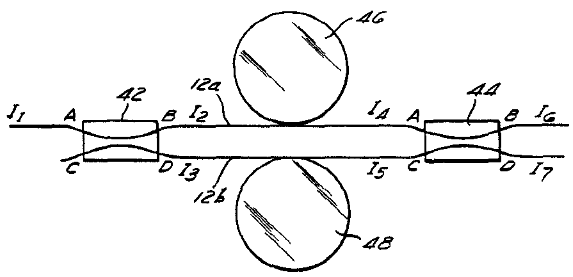
4,560,234 Dec. 24, 1985

Fiber Optic Switchable Coupler

Inventors: Herbert J. Shaw, Ralph A. Bergh, and Michel J. F. Digonnet.
Assignee: Board of Trustees of the Leland Stanford Junior University.
Filed: Aug. 15, 1983.

Abstract—A pair of optical couplers are arranged in series with a pair of outputs from the first optical coupler supplying the pair of inputs to the second optical coupler. At least one of the optical fibers between the first and second couplers is arranged to have a variable length, said variation being at least one-half the wavelength of the light signal utilized within the system. When the light is supplied to one input of the first coupler, this light can be switched selectively to either of the outputs of the second coupler by varying the length of one of the optical fibers between the couplers. Thus, a light signal supplied to either of the inputs of the first coupler can be selectively output at either of the outputs of the second coupler or can be made to alternate between these outputs in accordance with the length of the intervening optical fiber.

17 Claims, 16 Drawing Figures



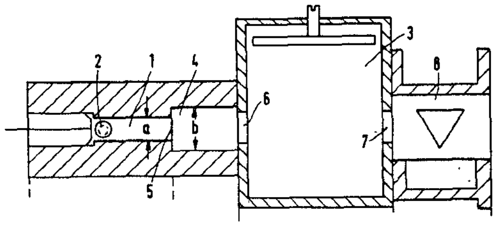
4,560,952 Dec. 24, 1985

Cavity-Stabilized Microwave Oscillator

Inventors: Othmar Tegel, and Hardial S. Gill.
Assignee: ANT Nachrichtentechnik GmbH.
Filed: Feb. 22, 1984.

Abstract—A stabilized microwave oscillator having a selected operating frequency range, composed of a rectangular waveguide dimensioned to have a cutoff frequency above the selected operating frequency range, at least one active semiconductor element and components connected for supplying a direct operating voltage to the element, mounted in the rectangular waveguide, a transmission resonator, and a coupling device coupling the rectangular waveguide to the resonator, the coupling device including a waveguide section having a length of about $\lambda/2$, where λ is the wavelength of the center frequency of the operating frequency range, and dimensioned at least in part to operate as an evanescent mode waveguide and/or a waveguide having a cutoff frequency in the vicinity of the upper end of the selected operating frequency range.

9 Claims, 4 Drawing Figures



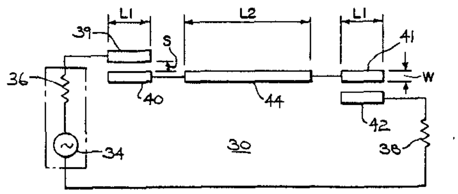
4,560,964 Dec. 24, 1985

Compact Step Tuned Filter

Inventor: Paul. J. Meier.
Assignee: Eaton Corporation.
Filed: Feb. 28, 1985.

Abstract—A compact step tuned filter (30, Fig. 6), is provided for passing two or more widely separated microwave frequencies and providing high rejection to signals below the passband, and is particularly useful in miniaturized lightweight airborne step tuned mixers and the like. The filter includes input and output sets (39–40, 41–42) of parallel coupled transmission lines providing lumped element capacitors at the lower frequency and matched transmission lines at the higher frequency, and a central transmission line connected between the input and output sets of coupled lines and providing a resonator between the lumped element capacitors at the lower frequency and a matched transmission line at the higher frequency.

6 Claims, 9 Drawing Figures



4,561,718 Dec. 31, 1985

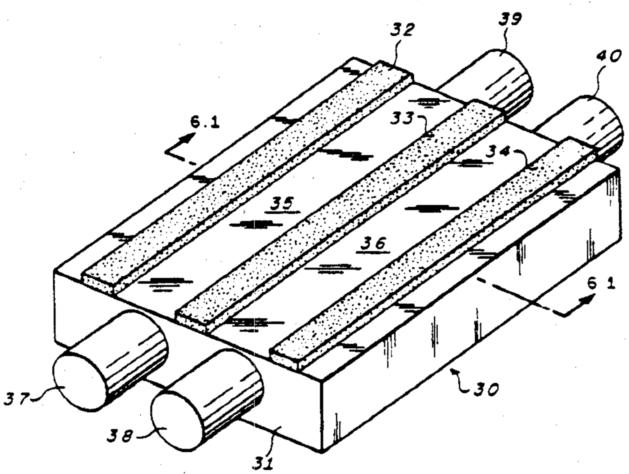
Photoelastic Effect Optical Waveguides

Inventor: Arthur R. Nelson.
Assignee: Sperry Corporation.
Filed: Aug. 22, 1983.

Abstract—An optical waveguide apparatus provides for single-mode and multimode switching or modulation of light wave energy with reduced bias voltages. Optical channels are formed in a crystal substrate by depositing film stripes thereon to cause stress-induced changes in the relative refractive index. Coupling or switching of light waves between the channels is provided by applying a bias which is of reversed polarity at adjacent film stripes, thereby augmenting or diminishing the stress in individual channels. By allowing operation with close spacing of the electrodes and using the enhancement in

refractive index change of the stressed substrate in combination with the applied bias, the required control voltage is substantially reduced.

14 Claims, 6 Drawing Figures



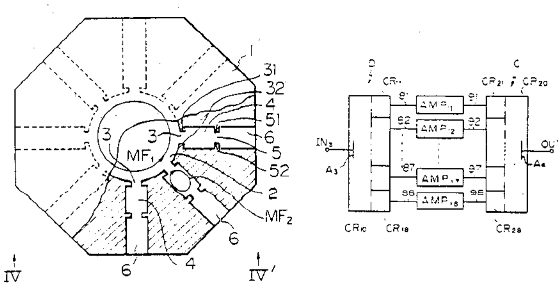
4,562,409 Dec. 31, 1985

Cavity Resonator Coupling-Type Power Distributor/Power Combiner

Inventors: Toshiyuki Saito, Naofumi Okubo, and Yoshiaki Kaneko.
Assignee: Fujitsu Limited.
Filed: Mar. 26, 1984.

Abstract—A cavity resonator coupling-type power distributor/power combiner includes a first cavity resonator operatively resonating with a cylindrical $T_{O,n,O}$ mode, and a plurality of second cavity resonators arranged on the periphery of the first cavity resonator and extending radially and symmetrically with respect to the first cavity resonator. The second cavity resonators each have the same shape and size so that magnetic-field coupling is established between the first cavity resonator and each of the second cavity resonators, for distributing or combining microwave power in a microwave amplifier.

37 Claims, 8 Drawing Figures



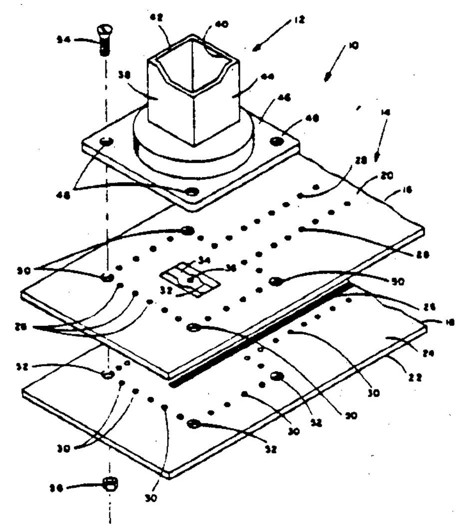
4,562,416 Dec. 31, 1985

Transition from Stripline to Waveguide

Inventor: Darrel F. Sedivec.
Assignee: Sanders Associates, Inc.
Filed: May 31, 1984.

Abstract—A waveguide-to-stripline transition includes a stripline portion (14) that fits over an opening in one end of waveguide (12). The stripline portion has a cavity defined by an upper ground-plane conductor (20), a lower ground-plane conductor (22), and a rectangular arrangement of plated-through holes (28) that electrically connect the upper ground-plane conductor (20) to the lower ground-plane conductor (22). The upper ground-plane conductor (20) is etched to provide an aperture (32) with a conductive crosspiece (34) extending longitudinally across it. A plated-through hole (36) connects the crosspiece (34) to the center conductor (26) to provide a T-shaped feed element in the cavity. As compared with prior-art waveguide-to-stripline transitions, this transition is mechanically stronger and has higher power-handling capability.

3 Claims, 1 Drawing Figure



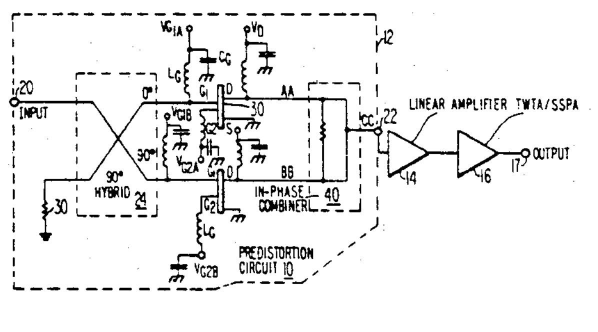
4,564,816 Jan. 14, 1986

Predistortion Circuit

Inventors: Mahesh Kumar and James C. Whartenby.
Assignee: RCA Corporation.
Filed: May 9, 1984.

Abstract—A predistortion circuit for use with a solid-state power amplifier or traveling wave tube amplifier which exhibits phase and amplitude nonlinearities. The predistortion circuit, which produces gain and phase distortion complementary to that of the associated power amplifier, comprises a hybrid circuit for splitting the input signal into two output signals at respective output terminals, the signals having a relative phase difference of 90°, a pair of dual gate FET's or other active nonlinear devices, each connected to a different one of the two output terminals and a combiner for combining in-phase the outputs of the nonlinear devices. Bias on the nonlinear devices is adjusted to effect, in the predistortion circuit, nonlinearities complementary to those of the power amplifier.

11 Claims, 9 Drawing Figures



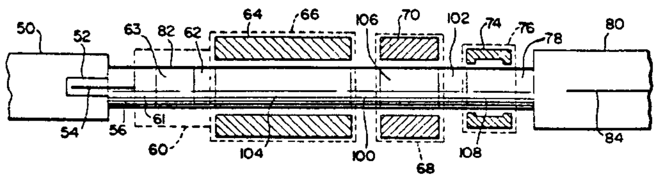
4,564,824 Jan. 14, 1986

Adjustable-Phase-Power Divider Apparatus

Inventor: Charles R. Boyd, Jr.
Assignee: Microwave Applications Group.
Filed: Mar. 30, 1984.

Abstract—A phase-shifter apparatus which imposes a desired phase shift on an electromagnetic wave traveling through a waveguide, and divides the power in an output waveguide into two parts. The phase shifter apparatus includes a quarter-wave plate for changing the polarizations of the linearly polarized wave to a circularly polarized wave, a rod of ferromagnetic material with a magnetic field for imposing a desired phase shift on the circularly polarized wave traveling through the rod, a quarter-wave plate for converting the circularly polarized wave to a linearly polarized wave, and a septum polarizer in the output wave guide for dividing the power. The output waveguide has the power divided between two ports, and independent phase shifts are imposed on the electromagnetic waves of each port.

21 Claims, 3 Drawing Figures



4,564,826 Jan. 14, 1986

Multiple Mitered Circular Waveguide Bend

Inventors: Hans J. Wiesenfarth, and Geza Dienes.
Assignee: Andrew Corporation.
Filed: Apr. 6, 1984.

Abstract—A device for providing a low VSWR match at a bend between two straight circular waveguides has an odd number of at least three circular waveguide sections of approximately equal length along their axes mitered at both of their ends, the length chosen to be an odd multiple of a quarter guide wavelength at the desired operating frequency, and the waveguide sections being mitered so that the device is symmetrical about the bisecting plane of the bend. The ratios of the angles between the adjacent waveguide sections around the bend are approximately binomial coefficients in order to obtain a maximally flat passband.

8 Claims, 4 Drawing Figures