Patent Abstracts

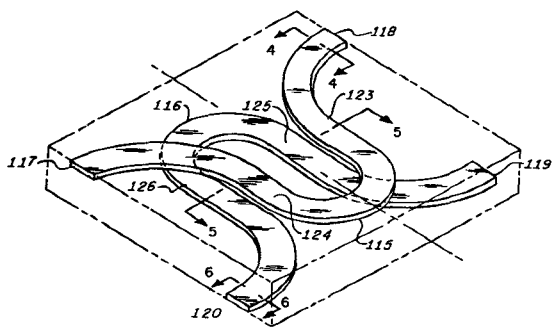
4,375,053 Feb. 22, 1983

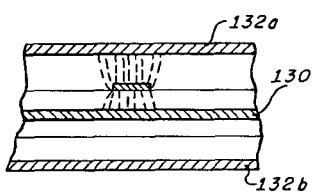
Interlevel Stripline Coupler

Inventors: Raymond D. Viola, Gerard L. Hanley.
Assignee: Sperry Corporation.
Filed: Dec, 29, 1980.

Abstract—Stripline interlevel couplers capable of power splitting signals incident thereto at a given level of a multilevel stripline circuit between a plurality of levels and of coupling such incident signals between levels substantially unattenuated.

7 Claims, 13 Drawing Figures





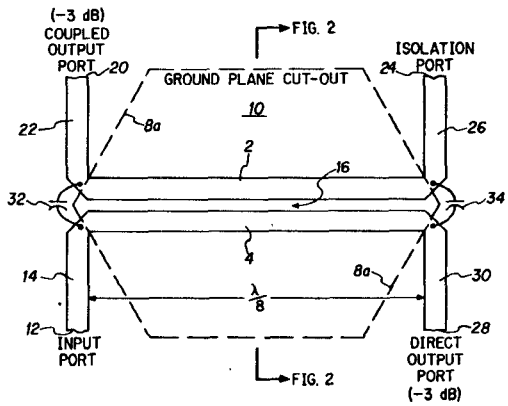
4,375,054 Feb. 22, 1983

Suspended Substrate—3 dB Microwave Quadrature Coupler

Inventor: Anthony M. Pavio.
Assignee: Rockwell International Corporation.
Filed: Feb. 4, 1981.

Abstract—A −3 dB microwave quadrature coupler is provided on a single layer dielectric substrate and employs only two conductor coupling lines and a relatively wide cost efficiently manufacturable coupling gap. The substrate is suspended within a mounting case providing a minimum spacing above and below the substrate. The ground plane is on the bottom of the substrate. Microstrip conductor ports are on the top of the substrate and are connected to a pair of parallel-spaced coplanar conductor lines on top of the substrate juxtaposed a cut-out region of the ground plane therebelow. The coplanar conductor lines are balanced and coupled to each other, not to the ground plane, nor to the mounting case. The coupler is compact, with a reduced length of $\lambda/8$. The coupler is amenable to implementation on inexpensive low dielectric constant substrate material, still with a relatively wide coupling gap.

2 Claims, 2 Drawing Figures



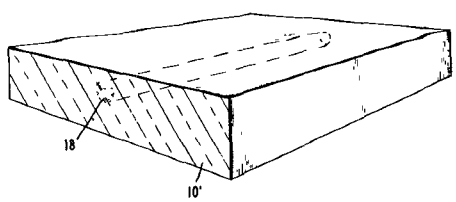
4,375,312 Mar. 1, 1983

Graded Index Waveguide Structure and Process for Forming Same

Inventor: Gregory L. Tangonan.
Assignee: Hughes Aircraft Company.
Filed: Aug. 7, 1980.

Abstract—The specification discloses a process for forming a graded-index waveguide structure by first providing a substrate of a first selected optical material having a chosen index of refraction. Next, a patterned layer of a second optical material is formed on one surface of the substrate or, optionally, within selected cavities formed in the substrate. This second optical material has a refractive index which is larger than the refractive index of the substrate. The patterned layer of the second optical material is formed in a predetermined geometry and to a predetermined thickness. Then, a layer of a third selected optical material is formed on the patterned layer of the second optical material and on the substrate surface to a predetermined thickness. This third optical material has a refractive index which is substantially the same as the refractive index of the substrate. Finally, the substrate with the patterned layer of the second optical material and the layer of the third optical material deposited thereon is heated to an elevated temperature for a period of time sufficient to diffuse the second optical material into the first and third optical materials and to form a graded index waveguide structure.

11 Claims, 13 Drawing Figures



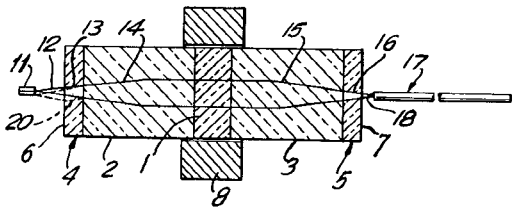
4,375,910 Mar. 8, 1983

Optical Isolator

Inventor: Masafumi Seki.
Assignee: Nippon Electric Co.
Filed: Sep. 25, 1980.

Abstract—An optical isolator of reduced insertion loss and fabrication cost which comprises a nonreciprocal optically active element, such as a Faraday rotator, fot 45° rotation of polarization, a pair of lenses arranged on the opposite sides of the optically active element and a pair of birefringent crystal plates on the outer sides of the respective lenses having their "principal planes" displaced 45° from each other. The light beam passing through the isolator is most constricted at its opposite ends where the birefringent crystal plates are arranged and this minimizes the amount of offset required between any reflected light and the incident light at the entrance end of the isolator to prevent the reflected light from returning to the light source such as a semiconductor laser, thus enabling substantial reduction in thickness of the birefringent crystal plates. The use of two lens elements is effective to reduce the coupling loss of the isolator.

3 Claims, 1 Drawing Figure

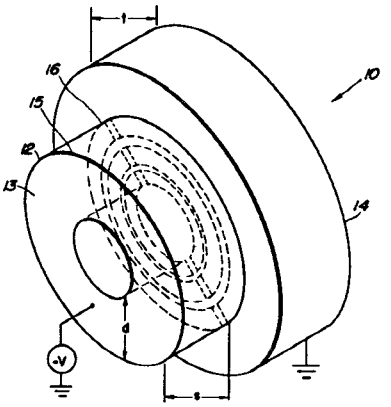


Solid-State Cyclotron Maser

Inventors Achintya K. Ganguly; Kenneth L. Davis; Kwo R. Chu.
Assignee: The United States of America as represented by the Secretary of the Navy.
Filed: Jun. 25, 1980.

Abstract—A solid-state cyclotron maser for generating low power (1 watt or less) signals in the submillimeter frequency range (300–30,000 GHz) includes an accelerating region, a drift region, and a metal grid therebetween. Both regions are formed from semiconductor material, such as indium antimonide, having non-parabolic energy bands. The drift region is a thin disc having metallized outer surfaces, but includes an annular opening in the metal on the front side and a circular opening in the metal on the back side, and is grounded A grid of metal rings is placed on the annular opening of the drift region. The accelerating region is a hollow cylinder having a metallized front surface. It couples to the drift region for covering the annular opening and the grid. A negative-bias voltage is applied to the accelerating region and a magnetic field is applied to the maser at an angle to the axis of the maser. Electrons propagate in spiral trajectories through the accelerating region, grid and drift region. Movement of electrons within the non-parabolic energy bands of the semiconductor material causes changes in the effective mass of the electrons. Phase-bunching of electrons occurs and electrons radiate coherently. Energy is removed from the drift region at the opening on its back side.

10 Claims, 4 Drawing Figures



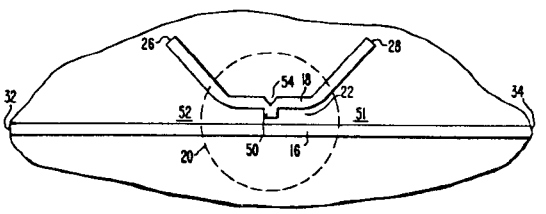
4,376,921 Mar. 15, 1983

Microwave Coupler with High Isolation and High Directivity

Inventors: Lawrence E. Dickens; Paul H. Mountcastle.
Assignee: Westinghouse Electric Corp.
Filed: Apr 28, 1981.

Abstract—A loosely coupled microstrip microwave coupler with high directivity is disclosed. The coupler comprises a ground-plane substrate, a dielectric layer disposed over the substrate, and a section of each of the main and coupled transmission lines disposed on the exposed surface of the dielectric layer adjacently aligned with a predetermined gap therebetween to form a coupling region. The length of the coupling region is substantially less than $\frac{1}{4}$ wavelength of the operating microwave signal. A capacitive-coupling element is disposed within the coupling region across the main and coupled transmission line sections for supplementing the dielectric capacitive coupling of the gap therebetween to increase the directivity of the microwave signal coupling. The capacitive coupling element splits the coupled transmission line section of the coupling region into two branches and is physically adjustable in size to balance the electric and magnetic field microwave coupling components of one of the branches to reduce the microwave power output thereof As a result, the microwave power output of the other of the branches is representative of the microwave signal incident on the main transmission line section substantially.

6 Claims, 6 Drawing Figures



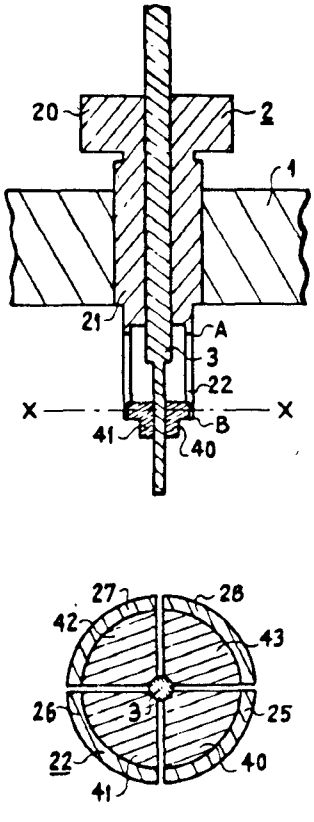
4,376,923 Mar. 15, 1983

Ultra-High Frequency Tuning Device of the Sliding Contact Type

Inventors: Jean C. Curtinot: Xavier Delestre; Jean Fouillet.
Assignee: Thomson-CSF.
Filed: Mar. 4, 1981

Abstract—The tuning device comprises a hollow cylindrical part and a moving rod which penetrates a cavity by passing from one side to the other of the hollow cylindrical member. This cylindrical member is fixed and integral with the cavity. It has an end located within the cavity, the end being longitudinally cut to form n slots (n being an integer greater, than 1) for forming n elastic members, which are covered with an electrolytic silver deposit. Joined silver contacts are welded to the end of the elastic members to provide the contact with the moving rod and prevent poor conduction of surface currents due to wear to the electrolytic deposit at the contacts.

3 Claims, 2 Drawing Figures



4,376,946 Mar. 15, 1983

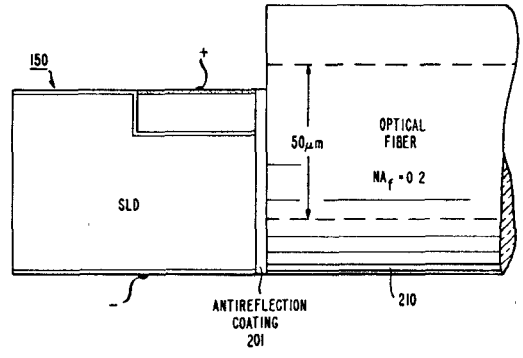
Superluminescent LED with Efficient Coupling to Optical Waveguide

Inventors: Ivan P. Kaminow; Dietrich Marcuse.
Assignee: Bell Telephone Laboratories, Incorporated.
Filed: Nov. 28, 1980.

Abstract—Optical power is coupled into an optical waveguide system such as an optical fiber with maximum efficiency by a superluminescent light-emitting diode having lateral confinement of the light in the junction plane. The waveguide developed in the light-emitting diode is constructed to have an effective numerical aperture equal to the numerical aperture of the optical waveguide, and the refractive index n, the length L and width D of the waveguide in the diode is constructed such that the parameter $nD/2L$ is much less than the numerical aperture. As a result, the inverted population of electrons within the active region are utilized with maximum efficiency to develop rays that are coupled into, and can be guided by, the optical waveguide system.

7 Claims, 3 Drawing Figures

4,377,322 Mar. 22, 1983



Fiber Optic Coupler

Inventors: Richard G. Ransley; William H. Sahm, III.
Assignee: General Electric Company.
Filed: Oct. 27, 1980.

Abstract—A low-cost connector for coupling a fiber optic wave guide with a semiconductor emitter and detector device is described which positions the wave guide and the detector in mutually perpendicular orientation so that the detector device may be directly connected to a printed circuit wiring board with the wave guide exiting the connector parallel to the board. Locating and positioning means with the connector allow a particularly low cost molded semiconductor package to be employed without modification for misaligning of the package halves.

1 Claim, 5 Drawing Figures