

# Patent Abstracts

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4,613,834

Sept. 23, 1986

## Microwave Slot Line Ring Hybrid Having Arms Which Are HF Coupled to the Slot Line Ring

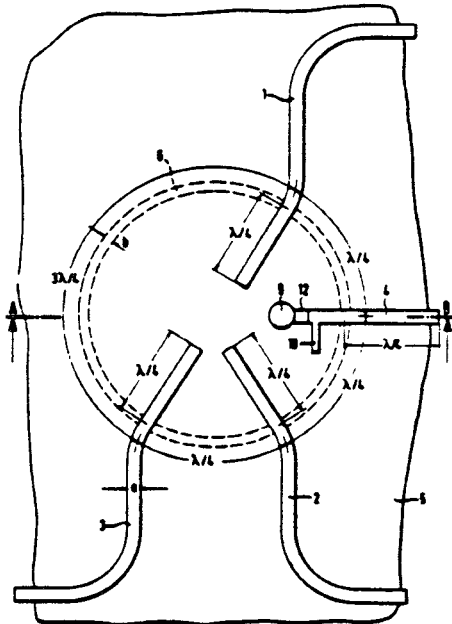
Inventor: Wilfried Heine.

Assignee: Ant Nachrichtentechnik GmbH

Filed: Dec 23, 1983.

**Abstract**—A microwave ring hybrid on a dielectric carrier substrate is provided with connecting arms designed in microstrip technique. The ring of the hybrid comprises a slit line made in a conductive layer on the side of the carrier substrate opposite that on which the strip conductors of the microstrip lines for the connecting arms are disposed.

18 Claims, 6 Drawing Figures



4,613,835

Sept. 23, 1986

## Reflection Phase Shifter

Inventor: Rainer Geissler.

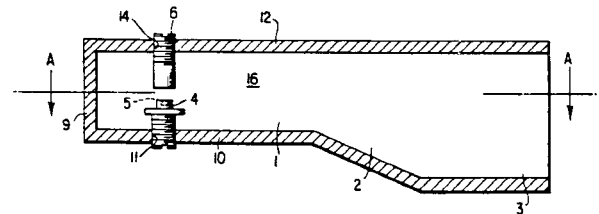
Assignee: ANT Nachrichtentechnik GmbH.

Filed: Apr. 22, 1985.

**Abstract**—A reflection phase shifter connectable to a waveguide for shifting the phase of a high frequency signal received from the waveguide. The phase shifter includes a waveguide section having two pairs of opposite side walls and an end wall forming a short-circuit. The side walls define a cavity and an opening opposite to the end wall for communication with the waveguide. The waveguide section has a broad dimension between one pair of opposite side

walls corresponding to the width dimension of the waveguide and a narrow dimension between the other pair of opposite side walls which is smaller than the height dimension of the waveguide. A switchable semiconductor arrangement, including a switching semiconductor element and a housing for accommodating the switching semiconductor element, is adjustably mounted in a side wall of the waveguide section and penetrates into the said cavity with a controllable penetration depth for tuning said waveguide section for a desired phase angle shift. A tuning pin is mounted in a side wall of the waveguide section so that the tuning pin is disposed opposite the switchable semiconductor arrangement.

6 Claims, 2 Drawing Figures



4,613,836

Sept. 23, 1986

## Device for Switching between Linear and Circular Polarization Using Rotation in an Axis across a Square Waveguide

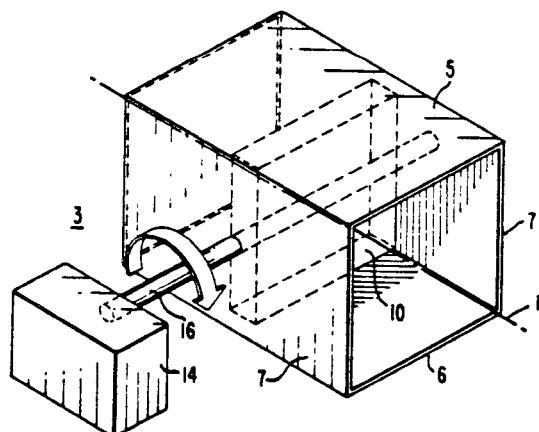
Inventor: Gary E. Evans.

Assignee: Westinghouse Electric Corp.

Filed: Nov 12, 1985

**Abstract**—A microwave phase shifting device utilizing the rotation lateral to a longitudinal axis across a square or circular waveguide by a slab of dielectric material to provide a differential phase shift between a linear to circular polarization in a high frequency microwave signal

8 Claims, 14 Drawing Figures



4,613,838

Sept. 23, 1986 4,614,915

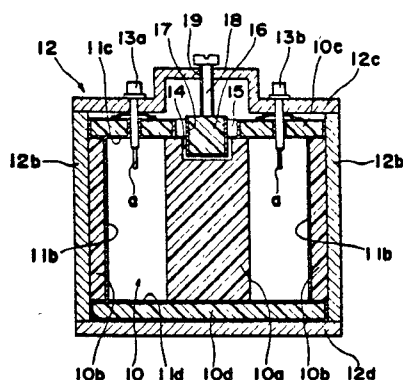
Sept. 30, 1986

## Dielectric Resonator

Inventors: Hidekazu Wada and Ishikawa.  
Assignee: Murata Manufacturing Co., Ltd.  
Filed: Aug. 29, 1985.

**Abstract**—A dielectric resonator employing  $TM_{010}$  mode or its variation mode, and including a cavity resonator and a columnar inner dielectric member accommodated within the cavity resonator a region being formed at an end face of the inner dielectric member so as not to contact the cavity resonator, and a resonant frequency adjusting member being adapted to be movable toward or away from the region, thus adjusting the resonant frequency through variation of a capacitance value in a path passing through the columnar dielectric member, the resonant frequency adjusting member, and the cavity resonator.

15 Claims, 8 Drawing Figures



4,613,839

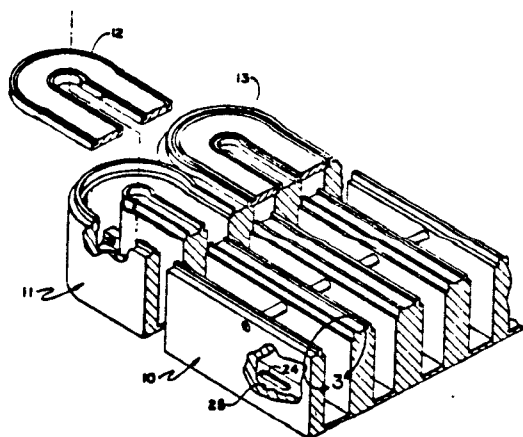
Sept. 23, 1986

## Machined Waveguide

Inventors: John D. Foglesonger and Robert A. Masters.  
Assignee: ITT Corporation.  
Filed: Aug. 9, 1984.

**Abstract**—Machined planar array serpentine and transmission lines. The waveguide is fabricated in two parts. In cross section, one part is U-shaped having two side walls and a bottom wall machined out of one piece of aluminum. A plate rests upon and is arc welded to the upper edges of the side walls to provide a fourth wall.

3 Claims, 5 Drawing Figures

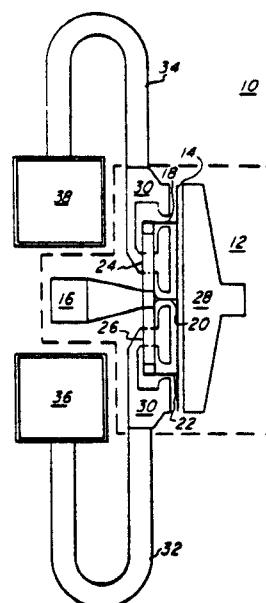


## Monolithic Series Feedback Low-Noise FET Amplifier

Inventors: David D. Heston and Randall E. Lehmann.  
Assignee: Texas Instruments Incorporated.  
Filed: Jan. 14, 1985.

**Abstract**—A monolithic low noise amplifier is provided having at least one stage. Said stage including a field effect transistor (FET) and an inductive series feedback element comprising a transmission line having an end connected to the FET source and an end connected to ground. A load matching network is attached to the FET drain to provide simultaneous noise match and power match.

8 Claims, 4 Drawing Figures



4,614,920

Sept. 30, 1986

## Waveguide Manifold Coupled Multiplexer with Triple Mode Filters

Inventor: Robert S. K. Tong.  
Assignee: Com Dev Ltd.  
Filed: Jan. 11, 1985.

**Abstract**—A multiplexer has a plurality of bandpass filters coupled through E-plane or H-plane T-junctions to a waveguide manifold. Where the multiplexer has four channels and each filter is a six-pole filter, two triple mode cavities make up each filter. Where each filter is a five-pole filter, one triple cavity and one dual mode cavity makes up each filter. Two band edge channel filters are operated to produce an asymmetrical filter function response, thereby causing extra transmission zeros to be created and improving the selectivity of the filter out of the passband. The multiplexer is designed for use



4,616,196

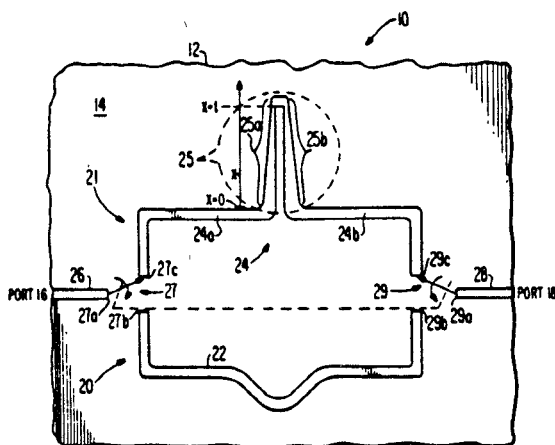
Oct. 7, 1986

### Microwave and Millimeter-Wave Switched-Line-Type Phase Shifter Including Exponential Line Portion

Inventor: Avind K. Sharma.  
Assignee: RCA Corporation.  
Filed: Jan. 28, 1985.

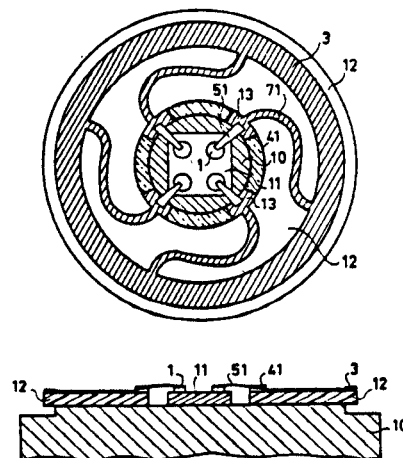
**Abstract**—A switched-line type phase shifter employs a reference, uniform transmission line and a coupled exponential transmission line. The coupled exponential line network provides a different phase shift but provides a phase shift versus frequency characteristic that over a wide frequency band matches the reference line.

5 Claims, 5 Drawing Figures



to permit a reduction in width and in length of the microstrip lines which are folded-back in a curvilinear fashion and placed on the substrate along circular arcs which are concentric with the output element.

14 Claims, 9 Drawing Figures



4,617,531

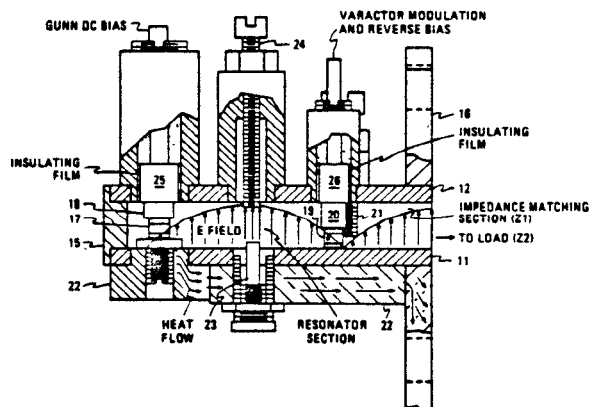
Oct. 14, 1986

### Directly Modulated Microwave Oscillator Having Adjustable Load Coupling

Inventors: Daniel P. Bowlds and Edward B. Foster.  
Assignee: General Electric Company.  
Filed: Sept. 13, 1985.

**Abstract**—A directly modulated microwave source for use in communications equipment is disclosed. The arrangement, fabricated in an open ended waveguide comprises an oscillator section operating in the  $TE_{101}$  mode and an impedance matching section providing adjustable coupling to a load. A suitable active element is a Gunn diode, post mounted in proximity to the closed end of the waveguide for  $H$  field coupling. Modulation in frequency or phase is achieved by a varactor diode, also post mounted, positioned approximately  $2/3$  of the length of the waveguide from the closed end. A vertically adjusted post for the load coupling adjustment, is placed adjacent the varactor post, but nearer the opening. The two adjacent posts define the boundary between sections and provide  $H$  field coupling to the varactor diode. Temperature stabilization means and frequency tuning means are located respectively on the upper and lower surfaces of the waveguide at anti-nodal portions of the oscillator section.

5 Claims, 4 Drawing Figures



4,617,528

Oct. 14, 1986

### Compact Combiner for Use with Semiconductor Devices in the Microwave Frequency Range

Inventors: Alain Bert and Narguise Mamodaly.  
Assignee: Thomson CSF.  
Filed: Sept. 27, 1983.

**Abstract**—A metallic support supports a number of semi-conductor devices surrounded by an annular dielectric substrate which in turn supports a circuit including at least two microstrip lines and a metallic circular output element. The small thickness and high dielectric constant of the substrate are selected

4,617,532

Oct. 14, 1986

## Optically Stabilized Semiconductor Microwave Diodes

Inventors: Wenpeng Chen and Norman E. Byer.

Assignee: Martin Marietta Corporation

Filed: Apr. 30, 1984.

**Abstract**—A semiconductor device is optically phase-locked by utilizing (1) the Burstein shift in differently doped semiconductor layers and injecting light having an energy level lower than the absorption edge of the heavily doped layer in which optical absorption is not desired and higher than the more lightly doped region where it is desired; and (2) the internal photoemission and injecting light having an energy level lower than the band gap of the semiconductor.

3 Claims, 3 Drawing Figures

