

# Patent Abstracts

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4,622,523

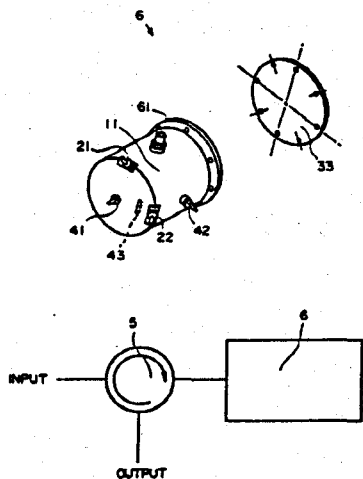
Nov. 11, 1986

## Group Delay Equalizers Using Short-Circuit Triple-Mode Filters

Inventor: Wai-Cheung Tang.  
Assignee: Com Dev Ltd.  
Filed: May 3, 1985.

**Abstract**—A bandpass filter has a plurality of cascade waveguide cavities each resonating in three independent orthogonal modes. The cavities can be cylindrical or have a square cross section. Where the cavities are circular, each cavity resonates in  $TE_{111}$  or  $TE_{010}$  modes simultaneously. Where the cavities have a square cross section, each cavity resonates in  $TE_{011}$  and  $TM_{110}$  modes simultaneously. Between each triple-mode cavity, there is located an iris having an aperture with four separate radial slots that are offset from a center of the iris. The filter is capable of producing an elliptic function response. In a variation of the invention, an all-pass filter has an output that is short-circuited and, when used in conjunction with a circulator, it functions as a group delay equalizer. Previous triple-mode filters are not capable of producing an acceptable result relative to dual-mode filters.

4 Claims, 12 Drawing Figures



4,622,524

Nov. 11, 1986

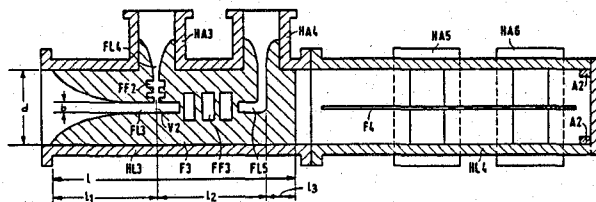
## Dual-Band Polarization Filter Comprising Orthogonally Oriented Fin-Type Conductors

Inventor: Günter Mörz.  
Assignee: ANT Nachrichtentechnik GmbH.  
Filed: Feb. 22, 1985.

**Abstract**—A dual-band polarization filter can be produced at low expense includes two hollow waveguide sections arranged one behind the other. A

fin-type conductor structure is provided in each hollow waveguide section. The fin-type conductor structures produce polarization and frequency band separation of the signals fed into the hollow waveguide sections, these signals being associated with two different frequency bands and two polarization directions.

10 Claims, 2 Drawing Figures



4,622,527

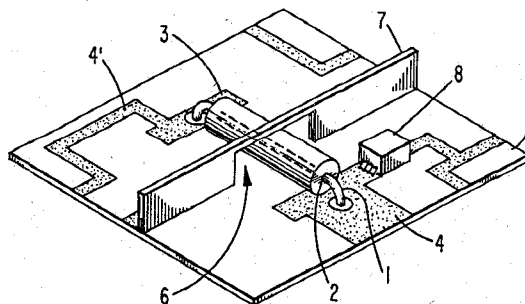
Nov. 11, 1986

## Isolation of RF Signals in a RF Shield Aperture

Inventor: David J. Carlson.  
Assignee: RCA Corporation.  
Filed: June 20, 1985.

**Abstract**—An apparatus is disclosed which presents a high impedance to unwanted RF signals which may be otherwise coupled to jumper wires which traverse the boundary between RF shielded areas. Specifically, a conductor for connecting two circuits separated by a shield wall is surrounded by a ferrite material which is positioned to extend through an aperture of the RF shield.

4 Claims, 3 Drawing Figures



4,622,528

Nov. 11, 1986

### Miniature Microwave Filter Comprising Resonators Constituted by Capacitor-Coupled Rejector Circuits Having Tunable Windows

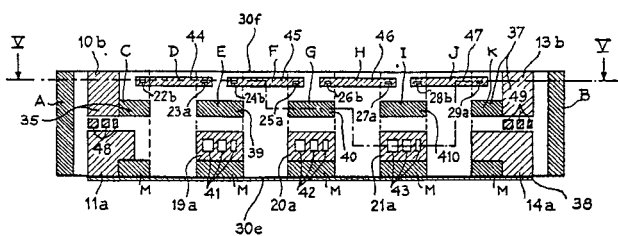
Inventor: Roland Millard.

Assignee: Alcatel Thomson Espace.

Filed: Sept. 11, 1984.

**Abstract**—The microwave filter comprises resonators constituted by capacitor-coupled rejector circuits. The tuning and coupling capacitors are composed of parallel metal plates supported and separated by the dielectric of a substrate. The surface of at least one plate of each tuning and/or coupling capacitor is provided with windows which can be sealed-off by a metal deposit in order to permit adjustment of each capacitor to its optimum value.

10 Claims, 5 Drawing Figures



4,623,848

Nov. 18, 1986

### Microwave Preamplifier

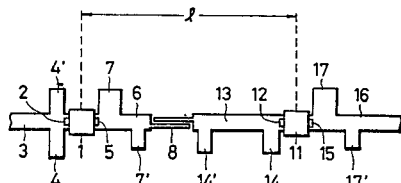
Inventors: Hiroshi Saka and Toshihide Tanaka.

Assignee: Matsushita Electric Industrial Co.

Filed: July 16, 1984.

**Abstract**—An input matching circuit for a first stage amplifying element of a microwave preamplifier comprises at least one capacitive open-ended stub which is located in the vicinity of an input terminal of the first stage amplifying element so that the structure of the input matching circuit is simple. Input impedance of the first stage amplifying element is designed to assume a state of impedance matching for minimum noise, while the distance between the first stage amplifying element and a second stage amplifying element is appropriately determined with an input matching circuit of the second stage amplifying element being appropriately set. With this arrangement input VSWR of the preamplifier is set to a value smaller than an input VSWR of the first amplifying stage, and therefore it is possible to provide a microwave preamplifier which shows satisfactory input VSWR characteristic and noise figure such that the input VSWR of the preamplifier is improved when compared with the input VSWR exhibited on impedance matching for minimum noise while the noise figure is less deteriorated compared to the noise figure exhibited on impedance matching for minimum noise.

18 Claims, 14 Drawing Figures



### Broad-Band High-Power IMPATT Amplifier Circuit

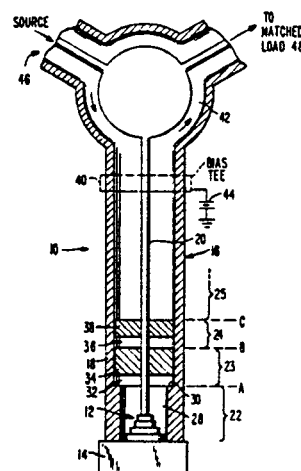
Inventors: G. Conrad Dalman and Charles A. Lee.

Assignee: Cornell Research Foundation, Inc.

Filed: Apr. 2, 1985.

**Abstract**—An IMPATT diode mounted in a double-tuned resonant cavity to exhibit stability by suppressing subharmonic frequencies is disclosed. A fore-shortened quarter wavelength section is connected to the diode to form an equivalent parallel resonant circuit at one end thereof. At the other end of the quarter wavelength section is an odd-quarter wavelength tuning slug which provides a section which exhibits a second, series equivalent resonant circuit. To provide increased stability at subharmonic frequencies, a half-wavelength tuning slug is disposed adjacent to the odd-quarter wavelength section. The half wave tuning slug is virtually transparent at the operating frequency, but is a quarter-wavelength at the first subharmonic, and thus exhibits a high resistance at the subharmonic frequency.

10 Claims, 11 Drawing Figures



4,623,856

Nov. 18, 1986

### Incrementally Tuned RF Filter Having p-i-n Diode Switched Lines

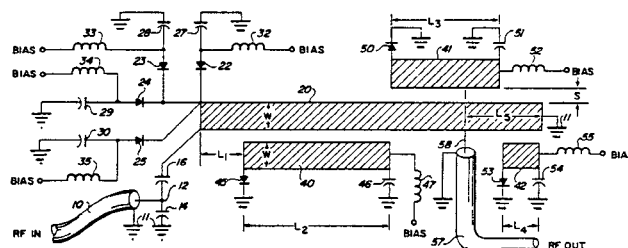
Inventors: Robert H. Bickley and Steven A. Murray.

Assignee: Motorola, Inc.

Filed: June 11, 1984.

**Abstract**—A length of transmission line having a plurality of capacitors and a plurality of shorter lengths of transmission line coupled thereto by p-i-n diodes which are individually operable to connect any combination of capacitors and transmission lines to the basic transmission line for changing the center frequency thereof in incremental steps across a desired band of frequencies.

10 Claims, 9 Drawing Figures



4,623,857

Nov. 18, 1986 4,625,179

Nov. 25, 1986

### Dielectric Resonator Device

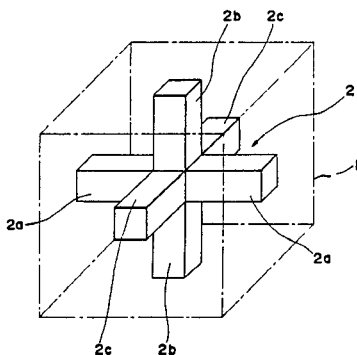
Inventors: Toshio Nishikawa, Youhei Ishikawa, Hidekazu Wada, and Koichi Takehara.

Assignee: Murata Manufacturing Co., Ltd.

Filed: Dec. 23, 1985.

**Abstract**—A dielectric resonator device which includes dielectric resonators constituted by a rectangular cavity shield casing and a composite dielectric structure formed by three dielectric members intersecting at right angles with each other to be combined into one unit and disposed in the rectangular cavity shield casing to provide three resonances by  $TM_{110}$  modes or modified modes thereof which are utilized by the dielectric resonators, and an external coupling device for coupling the dielectric resonators with external circuits.

10 Claims, 22 Drawing Figures



4,623,858

Nov. 18, 1986

### Quick Connect Waveguide Coupler

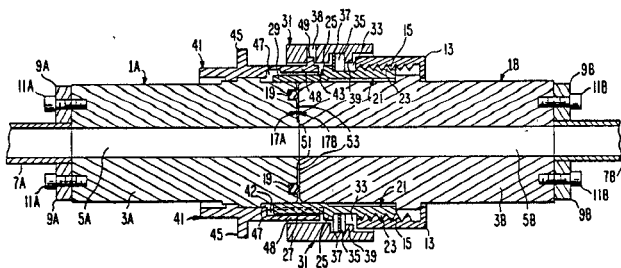
Inventors: Ernest C. Montesanto and Joseph K. Martin.

Assignee: Ford Aerospace & Communications Corporation.

Filed: Jan. 15, 1985.

**Abstract**—A waveguide coupler for quickly, easily, and reliably coupling and decoupling two waveguide sections (1A, 1B). The ends (17A, 17B) of the waveguide sections (1A, 1B) are translationally aligned by means of closely fitting coaxial cylindrical shells (41, 21) surrounding the waveguide ends (17A, 17B, respectively). The ends (17A, 17B) are recessed within the shells (41, 21, respectively). A freely rotatable cylindrical sleeve (31) is axially positioned around one of the waveguide ends (17B) by means of a retaining means (13). Less than one revolution of the sleeve (31) is sufficient to effectuate coupling or decoupling of the waveguide sections (1A, 1B), by means of a set of substantially identical helical grooves (34) within the inner surface of the sleeve (31) engaging pins (49) protruding from one of the shells (41). A wavespring (35) fitting within the inner surface of the coupling sleeve (31) is tensioned to achieve a fixed and preselected unit preload on the coupling surface (51), said preload based upon electromagnetic considerations.

10 Claims, 3 Drawing Figures



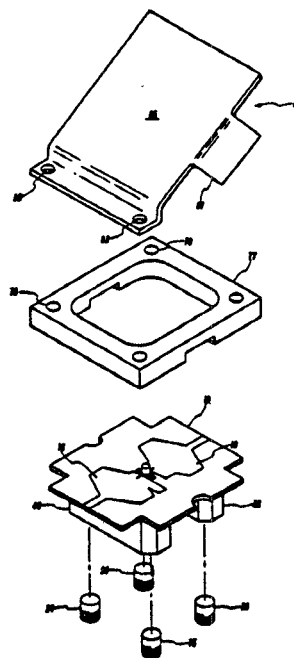
### Space Feedback Apparatus for Field-Effect Transistors

Inventor: Ben R. Hallford.

Assignee: Rockwell International Corporation.

Filed: Oct. 7, 1985.

**Abstract**—Space feedback comprising a shield over the tuning elements of a FET radio frequency amplifier provides positive feedback between the gate and drain terminals to raise the gain of the amplifier above what it would be without the space feedback, while simultaneously lowering the noise figure. Not only is the relative noise lowered, but the absolute amount of noise is lowered.



4,625,182

Nov. 25, 1986

### Optically Triggered Bulk Device Gunn Oscillator

Inventors: Lawrence J. Bovino, Maurice Weiner, and Terence Burke.

Assignee: The United States of America as represented by the Secretary of the Army

Filed: Oct. 28, 1985.

**Abstract**—A high-power solid-state source of microwave and millimeter wave signals is provided by an optically triggered body of bulk semiconductor material selected from the Group III-V compounds including GaAs, Cr.GaAs, and Fe:InP and having a relatively long gap length which is in the order of 0.5 to 10.0 mm as well as having a resistivity which is greater than  $1 \times 10^7$  ohm-cm. The device is further dc biased to a field of between 15 kV/cm and 35 kV/cm. Under such conditions, a very low dc current flows without any oscillatory behavior; however, illumination of the semiconductor body with a fast rising optical pulse having a wavelength suitable for carrier generation causes electrons to be lifted to the conduction band which is accompanied by a rapid reduction of the resistivity. At the same time, the electric field across the gap

