March 25, 1969 K. H. PASCOE ET AL 3,435,349

DUO-CRYSTAL MIXER

Filed June 28, 1966

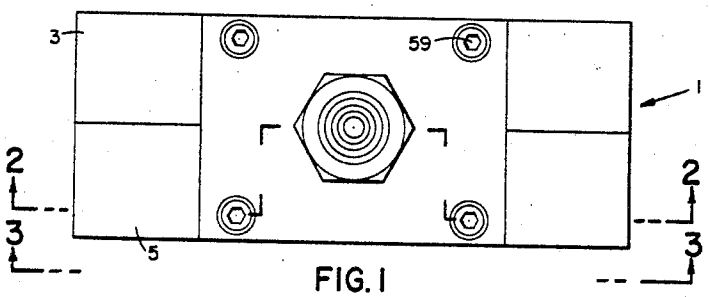


FIG. 1

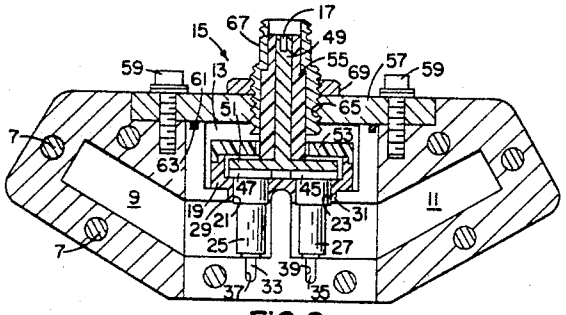


FIG. 2

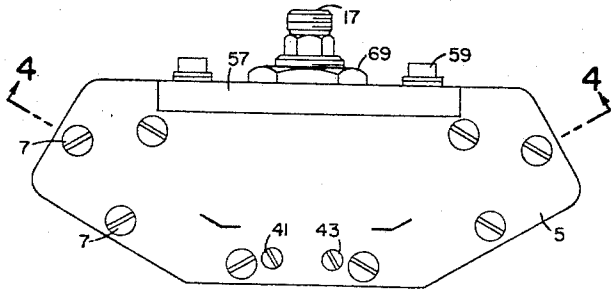


FIG. 3

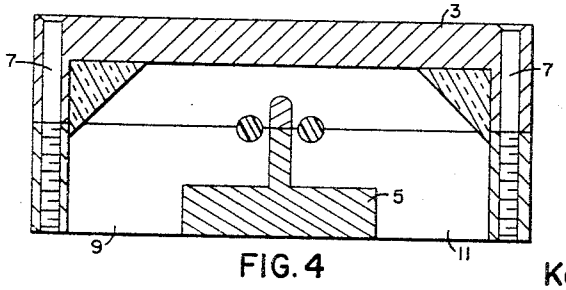


FIG. 4

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United States Patent Office 3,435,349 Patented Mar. 25, 1969

3,435,349

DUO-CRYSTAL MIXER

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Filed June 28, 1966, Ser. No. 562,431
Int. Cl. H04b 1/26; H03k 3/00; H03d 9/02
U.S. Cl. 325—449 6 Claims

ABSTRACT OF THE DISCLOSURE

A duo-crystal mixer microwave assembly that is easily removed from the accompanying waveguide structure, which has two crystal diodes that are easily replaceable, and that increases the reduction of microphonics. The two crystals are held by their flanges by an insulated housing so that each crystal is positioned in an input port of the microwave assembly and the pins of the crystals are grounded to the microwave assembly housing by set screws. An insulated electric lead makes contact with the flanges of both crystals and acts as the output of the assembly.

This invention relates to a duo-crystal mixer microwave assembly with the mixer being utilized to combine signals of a short slot hybrid, rat-race or magic tee.

In duo-crystal mixers, there is a need for a simple duo-crystal assembly unit that can be easily recoved from the waveguide structure by access to only one side of the structure and for a duo-crystal assembly unit that has the diodes thereof grounded in such a manner that microphonics will be reduced in comparison to prior art devices.

With these needs in mind, it is an object of this invention to provide a simple and reliable duo-crystal mixer.

Another object of this invention is to provide a duo-crystal assembly unit that can have the diodes thereof substituted one for another by a simple procedure.

Still another object of this invention is to provide a duo-crystal assembly unit that can be removed and replaced by access to only one side of the structure in which the unit is mounted.

A further object of this invention is to provide a duo-crystal assembly unit in which the diodes are grounded from the tip end rather than the flange end to reduce microphonics.

In accordance with this invention, the duo-crystal mixer includes a microwave coupler housing having two inputs and a duo-crystal assembly unit arranged relative to the inputs for combining the signals at the two inputs into an output.

This invention may be better understood by referring to the drawing forming part of this specification, and in which like numerals are employed to designate corresponding parts throughout the same, and wherein:

FIGURE 1 is an elevational view of a duo-crystal mixer according to this invention;

FIGURE 2 is a sectional view taken along line 2—2 of FIGURE 1;

FIGURE 3 is a view taken along line 3—3 of FIGURE 1; and

FIGURE 4 is a sectional view taken along line 4—4 of FIGURE 3.

Referring now to FIGURE 1, a microwave coupler housing 1 includes halves 3 and 5 that are secured together in a conventional manner such as by bolts 7 (see FIGURE 2). Housing 1 has input ports 9 and 11 (see FIGURE 4) that enter the housing at a common plane and lead to chamber 13 (see FIGURE 2) in one side of the housing. Chamber 13 has a duo-crystal assembly unit 15 mounted therein for receiving the input signals and for producing an output signal at 17.

The duo-crystal assembly unit includes an insulator housing 19 that has bores 21, 23 therein for receiving crystal diodes 25 and 27. Chamber 13 has bores 29, 31 in the base thereof, and crystal diodes 25 and 27 are inserted through bores 29 and 31 to place them in input ports 9 and 11. Pins 33 and 35 are connected to crystal diodes 25 and 27 respectively and mounted in bores 37, 39 of the housing. Set screws 41, 43 (see FIGURE 3) clamp pins 33 and 35 to hold them in place and ground the crystal diodes to the housing. The other end of crystal diodes 25 and 27 have flanges 45 and 47 respectively that are utilized as electrical contacts. Electrical lead 49 has base 51 that is in electrical contact with flanges 45 and 47 to conduct the signal from crystal diodes 25 and 27 to output 17. Insulator cap 53 is pressed over a portion of insulator housing 19, and insulator sleeve 55 is positioned over lead 49 to insulate the lead from the housing. Plate 57 is secured to housing 1 by bolts 59, and O-ring 61 in groove 63 seals plate 57 relative to the housing. Plate 57 has a threaded bore 65 that receives threaded holder contact 67 to clamp base 51 of the lead relative to flanges 45 and 47 of the crystal diodes and provide good electrical contact as well as an additional holding means for crystal diodes 25 and 27. Nut 69 is threaded onto holder contact 67 to clamp the holder contact in place once it has been tightened.

In operation, signals at input ports 9 and 11 are received by crystal diodes 25 and 27 and mixed to produce output signals at output 17.

It is to be understood that the form of this invention, herewith shown and described, is to be taken as a preferred example of the same, and that various changes in the size, shape and arrangement of parts may be resorted to, without departing from the spirit of this invention, or the scope of the subjoined claims.

What is claimed is:

1. A duo-crystal assembly unit including: an insulator housing; a pair of crystals having flanged and pin ends, said crystals being mounted in said housing by the flanged ends of said crystals and said pin ends projecting from said housing and being adapted to be connected to ground; an electrical lead in contact with the flange of each of said crystals and having an output; insulator means around said electrical lead and connected to said insulator housing; and holder means around a portion of said insulator means for clamping said duo-crystal assembly unit relative to a support structure.

2. A duo-crystal assembly unit as set forth in claim 1, wherein said duo-crystal assembly unit is mounted in a microwave coupler housing so as to have the crystals mounted in the coupler housing for receiving input signals at a plurality of inputs to said coupler housing to produce output signals at said output of said electrical lead through said crystals.

3. A duo-crystal assembly unit as set forth in claim 1, wherein said duo-crystal assembly unit is mounted in a chamber of a microwave coupler housing with each crystal of said duo-crystal assembly unit being positioned in an input port to said microwave coupler housings, said crystals each having the pin end received in a bore of said microwave coupler housing with a set screw clamping and grounding the pin end to the microwave coupler housing.

4. A device as set forth in claim 3, wherein said duo-crystal assembly unit is further mounted relative to said microwave coupler housing by said holder means being connected to a plate that forms one wall of said chamber, said holder means and said plate being threaded together

with a lock nut locking said holder means relative to said plate, and clamping means clamping said plate to said microwave coupler housing.

5. A device as set forth in claim 4, wherein an O-ring seal is mounted in said microwave coupler housing around said chamber for sealing between said microwave coupler housing and said plate.

6. A device as set forth in claim 5, wherein said set screws are mounted on one side of said microwave coupler housing and said input ports enter said microwave coupler housing on a side opposite said one side.

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U.S. Cl. X. R.

325—445; 329—116, 160, 205