

Nov. 14, 1944.

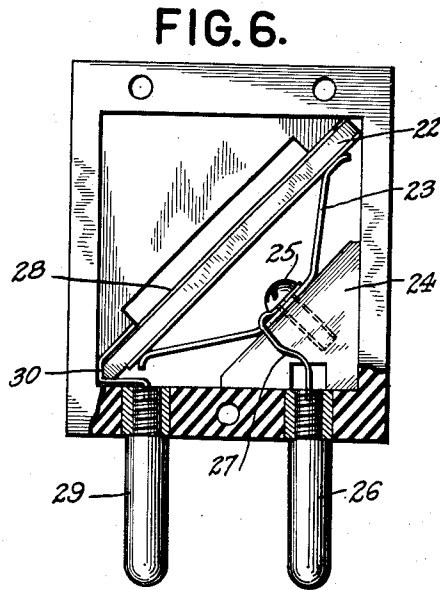
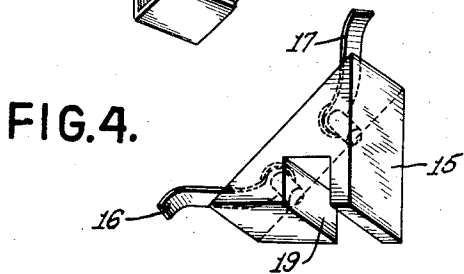
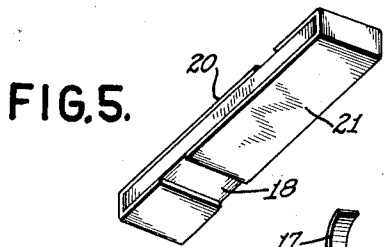
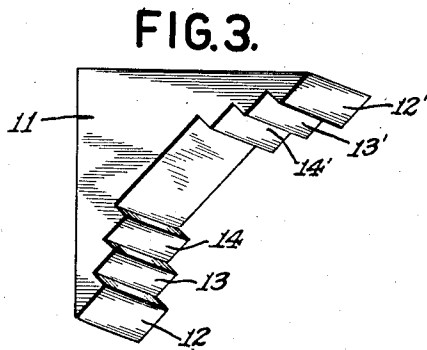
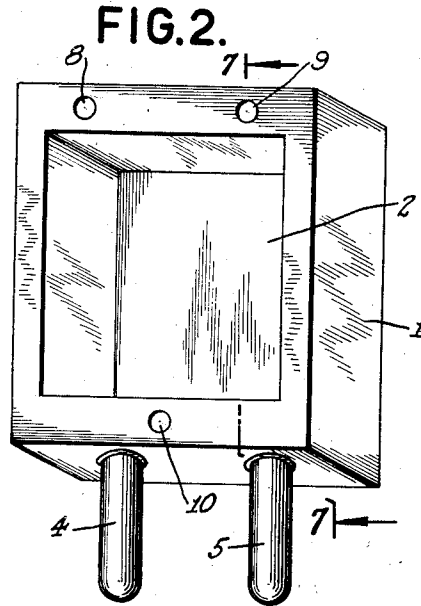
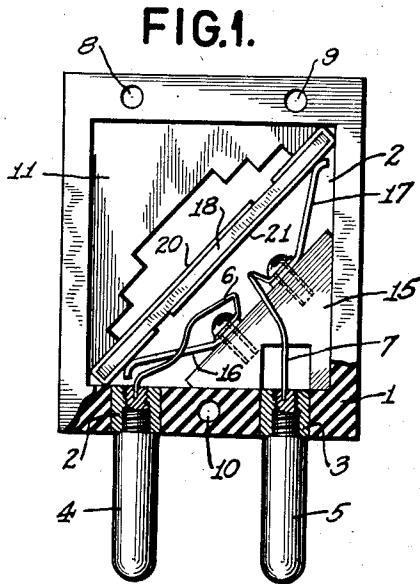
S. A. BOKOVOY

2,362,797

PIEZO CRYSTAL HOLDER

Filed Oct. 15, 1942

2 Sheets-Sheet 1



INVENTOR.
SAMUEL A. BOKOVOY
BY
James H. Curtin
ATTORNEY

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FIG. 7.

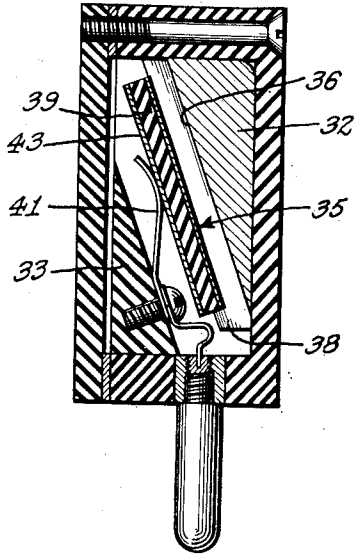


FIG. 8.

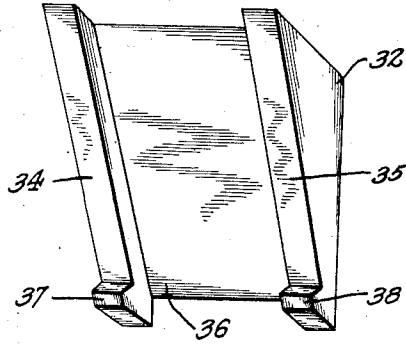


FIG. 10.

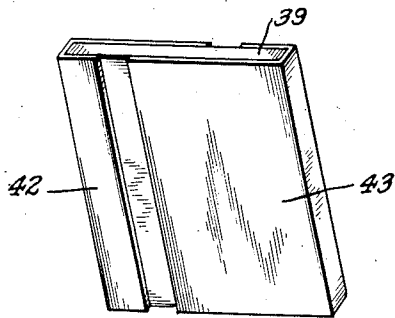
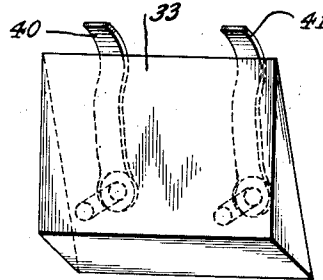


FIG. 9.



INVENTOR.
SAMUEL A. BOKOVOY
BY
James N. Curtin
ATTORNEY

UNITED STATES PATENT OFFICE

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PIEZOCRYSTAL HOLDER

Samuel A. Bokovoy, Verona, N. J., assignor to
Federal Telephone and Radio Corporation, a
corporation of Delaware

Application October 15, 1942, Serial No. 462,129

7 Claims. (Cl. 171—327)

This invention relates to piezoelectric crystal holders, and in particular to a crystal holder made up of a plurality of parts whereby thru a suitable combination of said parts, crystals of various sizes and shapes may be accommodated.

In the prior art it has been the practice to design a crystal holder for each given type and size of crystal. This practice leads to considerable expense inasmuch as the holders are usually made of Isolantite, molded Bakelite or other similar material requiring the use of expensive molding dies or other fabricating equipment. If a crystal holder were used which by reason of its construction could be made to serve as a mounting for any one of a plurality of crystals, it would result in a considerable saving in tooling cost.

It is therefore an object of my invention to devise a crystal holder capable of mounting any one of several different types of crystals.

A further object of my invention is to devise a crystal holder composed of a plurality of simple and relatively inexpensive parts whereby thru a suitable choice and arrangement of parts the holder can be made to accommodate crystals of various types.

Other objects and advantages of my invention will appear as I proceed with the specification and a description of the accompanying drawings wherein

Fig. 1 is a plan view of an assembly of one embodiment of my invention;

Fig. 2 is a view in perspective showing the casing of a crystal holder in which the other parts of the holder and the crystal are assembled;

Figs. 3 and 4 are views in perspective showing parts which may be combined with the casing of Fig. 2 to form the assembly of Fig. 1;

Fig. 5 is a type of piezoelectric crystal suitable for mounting in the holder of my invention;

Fig. 6 is a plane view of an assembly showing a second embodiment of my invention;

Fig. 7 is a cross-sectional view of an assembly showing a third embodiment of my invention;

Figs. 8 and 9 are views in perspective showing parts which may be combined with the casing of Fig. 2 to form the assembly of Fig. 7; and

Fig. 10 is a second type of crystal which may be employed with my invention.

Referring to Fig. 1, the numeral 1 represents the casing shown in Fig. 2. The cavity or hole 2 of the casing is preferably substantially square or slightly rectangular and of a depth which will accommodate the maximum width of crystal of the type shown in Fig. 5. The actual dimensions are best determined from a study of the various

crystal sizes and shapes to be mounted. In one side of the casing two metal inserts 2, and 3, are secured during the molding process. Terminal plugs 4 and 5 are screwed into the inserts 2 and 3, and from small holes in the threaded end of the plugs, flexible leads 6 and 7 are fastened by soldering. Holes 8, 9, and 10 are molded in the casing by which a cover plate and gasket (not shown) may be fastened.

Part 11 of Fig. 1 is shown in perspective in Fig. 3. It is composed of molded Bakelite or other insulating material. Its general shape is that of a right-angled triangle along the hypotenuse of which are a series stepped surfaces, 12 and 12', 13 and 13' and 14 and 14'. Each surface, as for example 13 and 13', is adapted to accommodate a crystal of a certain length. Surface 12 and 12' is for a longer crystal, and surface 14 and 14' is for a shorter crystal than is the surface 13 and 13'.

Part 15 of Fig. 1 is shown in perspective in Fig. 4. Two spring terminals 16 and 17 are screwed or otherwise fastened to part 15 and serve the purpose of holding the crystal 18 against one of the surfaces of part 11 and of also making electrical contacts with the crystal electrodes. The slot 19 is to give clearance to the flexible lead 7 which is soldered to the spring terminal 17. Flexible lead 6 is soldered to spring terminal 16.

The piezoelectric crystal 18 is of the type in which electrodes 20 and 21 are plated on its opposed surfaces. Each electrode extends around an end of the crystal and for a short distance along its opposite face as shown in Fig. 5. This permits electrical contact to be made to both electrodes from either side of the crystal as shown in Fig. 1.

Fig. 6 illustrates another embodiment of my invention wherein the additional parts employed for mounting the crystal within the casing 1 are of a slightly different form. The crystal 22, shown in Fig. 6 is also of the type wherein the electrodes are plated on the opposed surfaces of the crystal but as distinguished from the crystal of Fig. 5 the electrodes do not extend around the ends thereof. The two-armed spring contact 23 shown in Fig. 6 is held in position on the block 24 by the screw 25. Electrical contact between the spring 23 and terminal 26 is made by flexible lead 27. In order to make an electrical connection between the electrode 28 on the far side of the crystal and the terminal 29 a flat strip of metal 31 is bent around the end of the crystal as shown in Fig. 6.

Fig. 7 shows a sectional view of a third embodi-

ment of my invention and one wherein the crystal is considerably larger than the one in Fig. 5 although of the same general type in so far as the plating of the electrodes is concerned. Fig. 7 is a section taken thru 7—7 of Fig. 2 after assembly. Parts 32 and 33 of Fig. 7 are shown in perspective in Figs. 8 and 9 respectively. Referring to Fig. 8, the part 32 is wedge shaped with slightly raised portions 34 and 35 extending along the edges of the inclined surface 36. The projections 37 and 38 act as stops for locating the crystal 39 as shown in Fig. 7 and the raised portions 34 and 35 elevate the central portion of the crystal to permit free vibration.

In Fig. 9 the part 33 serves as a member to mount the spring terminals 40 and 41. These springs secure the crystal in positions on part 32 and also make electrical contact with the crystal electrodes 42 and 43. As in Figs. 1 to 6 suitable flexible connections are made between the screws 44, 45 and the plug terminals of the crystal holder.

In the above description I have illustrated several embodiments of my invention whereby with a single casing and a selection from a plurality of relative simple and inexpensive parts, a complete crystal holder may be assembled for mounting any one of several different types and shapes of crystals. For one skilled in the art it would be possible to devise combinations other than those shown and it is intended that my invention not be limited except in accordance with the following claims.

What is claimed is:

1. A holder for a piezoelectric crystal comprising a casing, two substantially triangular inserts within said casing, one of said inserts having a plurality of surfaces for supporting a crystal, the other of said inserts having means for holding said crystal against one of said plurality of surfaces.

2. A holder for a piezoelectric crystal comprising a casing, two insulating inserts within said casing, one of said inserts being wedge

shaped, having one surface thereof inclined with respect to one of the sides of said casing, and adapted to support said crystal, the other of said inserts having means for holding said crystal against said inclined surface of said wedge shaped insert.

3. A holder for a piezoelectric crystal comprising a rectilinear casing an insulating insert within said casing having a surface inclined to one of the sides of said casing and contact-making means for holding a crystal against said inclined surface.

4. A holder for a piezoelectric crystal comprising a casing, an insulating insert within said casing having a plurality of stepped surfaces for accommodating any one of a plurality of differently dimensioned crystals, and contact making means for holding a crystal against any of said stepped surfaces.

5. A holder for a piezoelectric crystal comprising a casing, a pair of insulating inserts within said casing having opposite parallel surfaces, and spring contact means mounted on one of said surfaces for holding a crystal against the other of said surfaces.

6. A holder for a piezoelectric crystal of the type having plated electrodes comprising a casing, two wedge shaped insulating inserts within said casing, one of inserts mounting a two-armed spring for holding a crystal against the other of said inserts.

7. A holder for a piezo-electric crystal, including a casing, a pair of insulating inserts within said casing, one of said inserts having substantially the form of a right-angled triangle and being formed so as to present a series of stepped surfaces along the hypotenuse thereof, the other of said inserts being wedge-shaped, said holder also including means supported by said wedge-shaped insert and serving to hold a crystal against at least a portion of said hypotenuse of said triangular formed insert.

SAMUEL A. BOKOVOY.