Nov. 7, 1933. G. B. SCHEIBELL 1,933,601

PIEZO ELECTRIC CRYSTAL HOLDER

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Fig. 1.

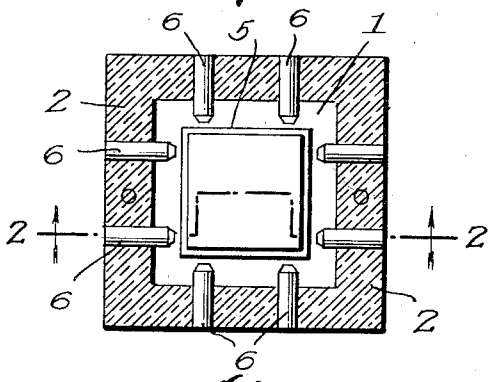


Fig. 2.

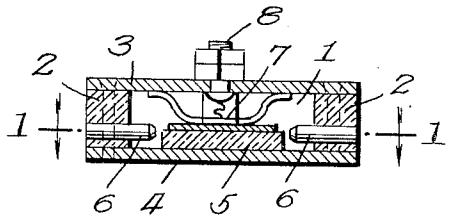


Fig. 3.

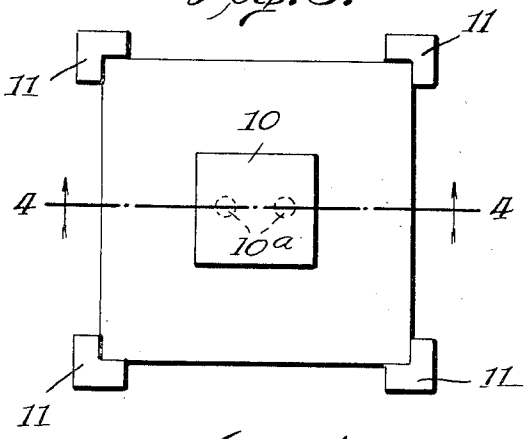


Fig. 4.

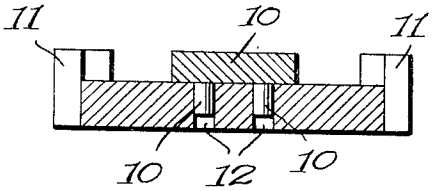


Fig. 5.

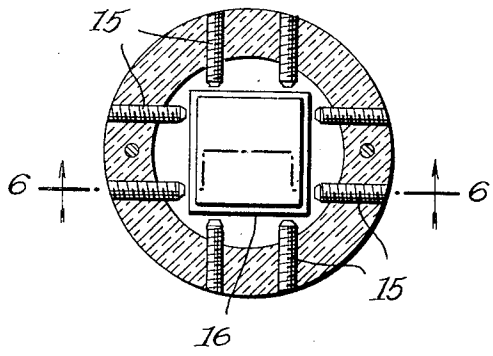


Fig. 6.

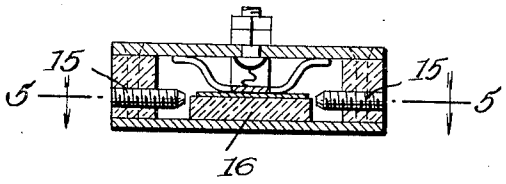
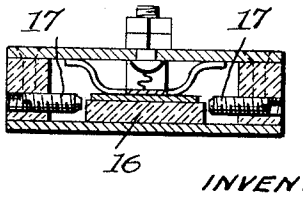


Fig. 7.



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Fig. 8.

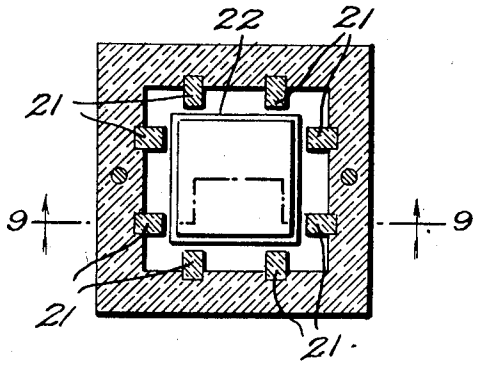


Fig. 11.

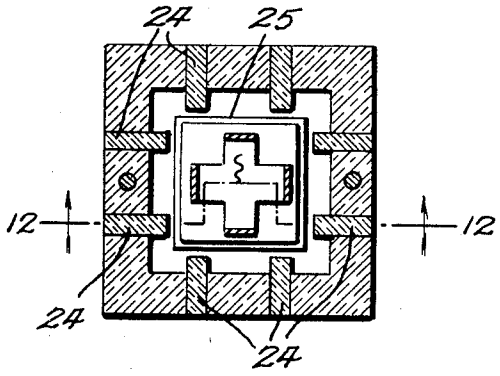


Fig. 9.

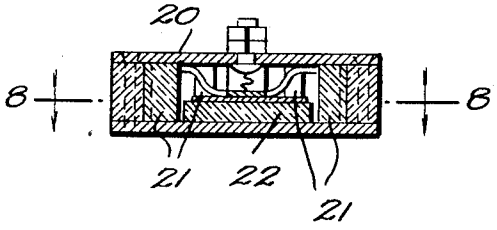


Fig. 12.

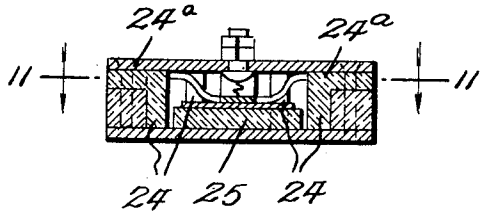


Fig. 10.

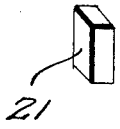
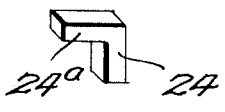


Fig. 13.



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UNITED STATES PATENT OFFICE

1,933,601

PIEZO ELECTRIC CRYSTAL HOLDER

Gordon Brown Scheibell, New York, N. Y., assignor to Radio Corporation of America, New York, N. Y., a corporation of Delaware

Original application June 5, 1929, Serial No. 368,694, and in Canada June 5, 1930. Divided and this application March 27, 1933. Serial No. 662,993

2 Claims. (Cl. 171—327)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

This is a division of my application S. N. 368,694, filed June 5, 1929. My invention relates broadly to apparatus for holding piezo electric crystals. More specifically this invention relates to apparatus for holding piezo electric crystals of various sizes.

An object of this invention is to provide an arrangement for holding piezo electric crystals employed in electrical oscillation generators.

Another object of this invention is to provide an arrangement readily adapted for holding piezo electric crystals of various sizes which are employed in electrical oscillation generators.

Still another object of this invention is to provide a piezo electric crystal holder readily adapted for holding different size piezo electric crystals, in which a plurality of adjustable elements are associated with the walls for defining the space to be occupied by the piezo electric crystal.

Other objects and features of this invention will be apparent to those skilled in the art to which this invention pertains from the following specification and the appended claims.

According to this invention a piezo electric crystal holder is adapted for holding crystals of different sizes by providing elements to the side walls of the holder projecting into the compartment of the holder for defining the space to be occupied by the piezo electric crystal and for preventing the crystal positioned in the compartment from shifting its position.

This invention will be more clearly understood from the following specification and the drawings in which:

Figure 1 is a horizontal sectional view along the line 1—1 of Fig. 2 of an embodiment of the piezo electric crystal holder of this invention; Fig. 2 is a vertical sectional view along the line 2—2 of Fig. 1; Fig. 3 is a top plan view of apparatus employed in adjusting the piezo electric crystal holder illustrated in Figs. 1 and 2; Fig. 4 is a vertical cross-sectional view along the line 4—4 of Fig. 3; Fig. 5 is a horizontal sectional view along the line 5—5 of Fig. 6 of another embodiment of the piezo electric crystal holder of this invention; Fig. 6 is a vertical sectional view along the line 6—6 of 5; Fig. 7 is a vertical sectional view of another modification of this invention; Fig. 8 is a horizontal sectional view along the line 8—8 of Fig. 9 of still another modification of this invention; Fig. 9 is a vertical sectional view along the line 9—9 of Fig. 8; Fig. 10 is a sectional perspective view of the spacer employed in the piezo electric crystal holders illustrated in Figs. 8 and 9; Fig. 11 is a cross-sectional view along the line 11—11 of Fig. 12, illustrating another modified form of this invention; Fig. 12 is a vertical sectional view along the line 12—12 of Fig. 11; and Fig. 13 is a perspective view of the spacer employed in the piezo electric crystal holders illustrated in Figs. 11 and 12.

In Fig. 1 of the drawings, reference numeral 1 designates a piezo electric crystal holder having side walls 2 of insulating material, such as phenol condensation products, hard rubber or the like, a top 3 and a bottom 4. The top and bottom of the piezo electric crystal holder embodied in this invention are also of insulating material except in cases where the bottom is employed as a contacting plate for the piezo electric crystal, when the bottom is made of conducting material, such as brass, copper or the like. The piezo electric crystal 5 is centrally disposed within the holder 1. A plurality of pins 6 are forced into holes provided in the side walls 2. A contact plate 7 is positioned upon the upper surface of the crystal 5, as illustrated in Fig. 2 of the drawings. A connection is provided between the contact plate 7 and the binding post or terminal 8.

The manner in which the pins 6 are adjusted to the proper positions is more clearly illustrated in Figs. 3 and 4 of the drawings.

In Fig. 3 of the drawings, which is a top plan view of the device employed for adjusting the pins 6 of the piezo electric crystal holder 1, constructed in accordance with this invention, the reference numeral 9 designates a flat plate, which is preferably of metallic material and which is provided with angularly shaped corner members 11 and a centrally disposed plate 10 which is also preferably of metallic material. A pair of extending members 10*a*, illustrated in Fig. 4, which is a cross-sectional view along the line 4—4 of Fig. 3, are formed upon a surface of the plate 10. The members 10*a* engage in openings 12 provided to the plate 9 and serve to retain the plate 10 in fixed relation with respect to the plate 9. In adjusting the positions of the pins 6 the body portion 2 of the holder 1 is placed upon the plate 9 so that the cavity inside of the body portion is disposed symmetrically around the plate 10. The pins 6 are then adjusted so that they define a polygonal area somewhat larger than the area of the piezo electric crystal with which the holder is to be used. Different sizes of plates 10 are employed for adjusting the crystal holder to crystals having different areas.

A modified form of this invention is illustrated in Figs. 5 and 6 wherein the pins 15 positioned

in the body portion 13 of the crystal holder 14, which is circular in shape, are threaded to permit easy and accurate adjustment of the space within the holder to be occupied by the crystal 16. The threaded pins 15 may be cut off flush with the outer faces of the body 13 of the holder 14 after the proper adjustments are made or they may be in the form of screws 17 as illustrated in Fig. 7 so that the space to be occupied by the crystal is readily adjustable.

According to the form of this invention illustrated in Figs. 8 and 9, spacers 21 are tightly fitted into grooves cut into the inner surfaces of the body portion 19 of the crystal holder 20. A detail view of one of the spacers 21 is illustrated in Fig. 10. These spacers may be made of insulating materials, such as phenol condensation products wax impregnated dried wood or the like. Various forms of spacers may be employed in accordance with this invention and where it is more convenient to provide grooves to the upper surfaces of the body portion 22 of the crystal holder 25, illustrated in Figs. 11 and 12, L-shaped spacers 24, which are illustrated in detail in Fig. 13 may be employed. The position of the L-shaped spacers 24 may be adjusted readily with respect to the inner walls of the body portion 22 by adjusting the position of the horizontal portion 24*a* in the groove. The size of the horizontal portion 24*a* of the spacer 24 is made such that the spacers will fit tightly into the grooves. Different sizes of spacers 21, illustrated in Fig. 10, and spacers 24 may be used where it is desired to employ the holders for different sizes of piezo electric crystals.

It is apparent that various modifications in the details of this invention may be made without departing from the spirit and scope thereof and that, therefore, I do not desire to limit this invention to the exact details set forth in the foregoing specification except in so far as these details may be defined by the appended claims.

The invention herein described may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. In a universal piezo electric crystal holder, a piezo electric crystal, a frame member surrounding said crystal and having a plurality of grooves cut in faces thereof, a plurality of spacers adapted to fit respectively into said grooves and projecting into the interior of said frame member in juxtaposition with said crystal, said frame member and spacers being of insulating material, a metallic base member carrying said crystal and constituting an electrode therefor, and an upper electrode carried by the upper face of said crystal, whereby said crystal is held in position laterally but not tightly against said spacers.

2. A piezo electric crystal holder comprising, an insulating frame structure in the form of a hollow square providing a crystal holding chamber and having a plurality of channels disposed in one side thereof, a metallic plate mounted on said frame to close one side of said chamber, a piezo-electric crystal plate mounted directly upon said metallic plate and within said chamber, said crystal plate having the lateral size thereof smaller than the inside of said hollow square, a plurality of L-shaped insulating spacing members each having one part thereof fitted into one of said channels of said frame but flush with the top of said frame, and the other part thereof extending into the inside of said hollow square intermediate said crystal plate and said frame member whereby said spacing members position said crystal within said frame for proper vibration, and a second metallic plate mounted adjacent said frame member in contact with said spacing members and forming a complete seal for said crystal chamber.

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