

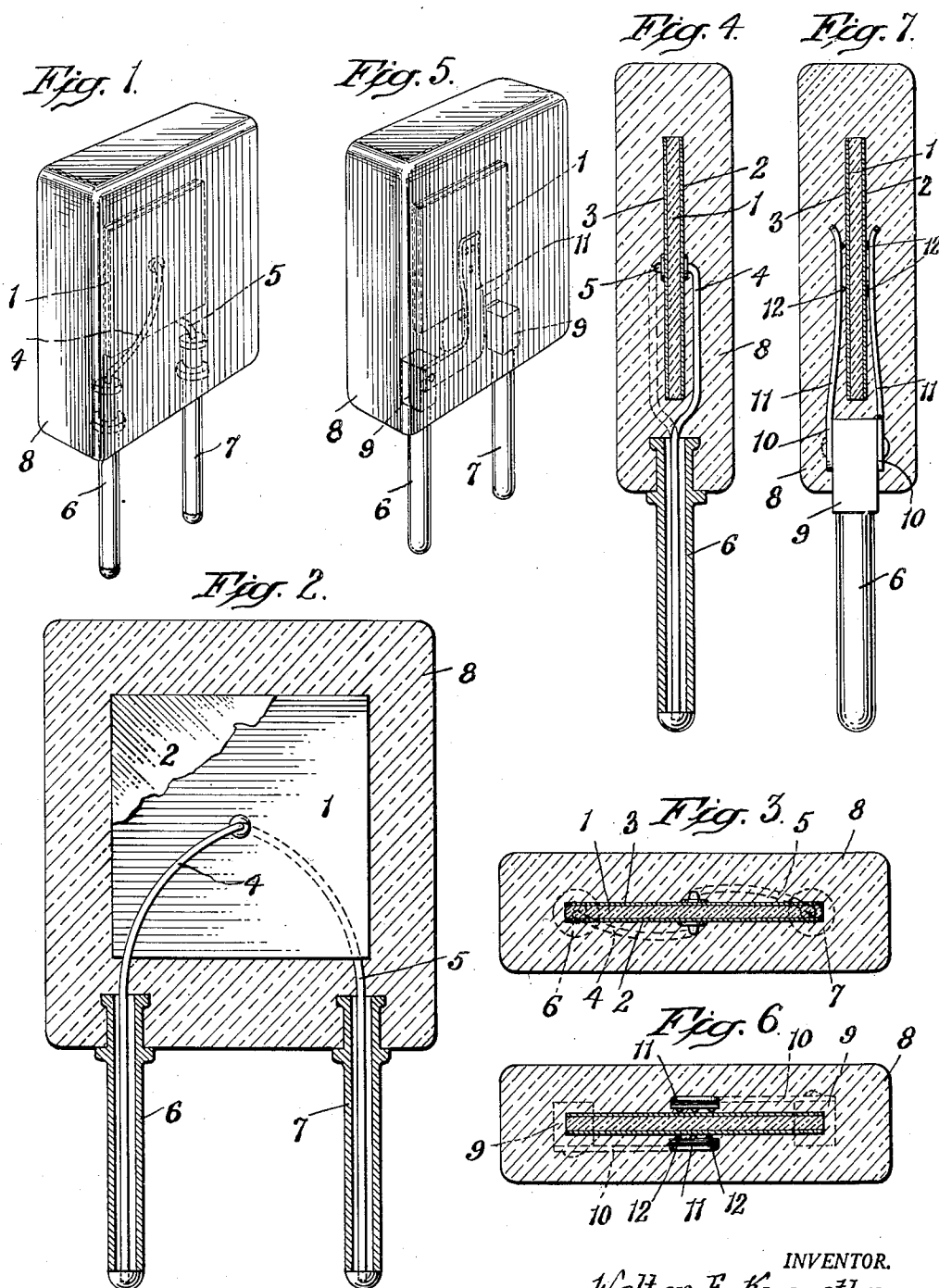
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CRYSTAL

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CRYSTAL

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4 Claims. (Cl. 171—327)

This invention relates to crystals of the character used in radio work, such as crystals of quartz, tourmaline, or other piezo-electric mineral, and one of the objects of the invention is to provide an improved mounting and housing means for crystals of this character.

At the present time, crystals of the character used for radio purposes, are housed in various ways in box-like casings or enclosures on which a removable cover or end-piece is usually secured by means of screws or similar fasteners. The mounting of the wafer-like crystal between electrodes and the structure of the casing itself are such that both the crystal, and its associated elements, are often subjected to the effects of vibration, climatic conditions, dampness and other factors, all of which tend to create deficiencies in operation, raise or lower the natural frequency of the crystal, or render the crystal completely inoperative.

The present invention contemplates the provision of a crystal, the mounting therefor, and the employment of an enclosing means by which the crystal and its associated parts are permanently enclosed in a dielectric or non-conducting plastic material preferably moulded or otherwise formed about the crystal and its connections, whereby permanence of relationship of the enclosed parts is assured as well as complete and lasting protection from climatic conditions, moisture, vibration and other factors normally injurious or destructive to crystals of conventional construction.

In the accompanying drawing, wherein several embodiments of the invention are shown, Fig. 1 is a perspective view of a crystal and mounting structure, constructed in accordance with the invention; Fig. 2 is a vertical sectional view through the same; Fig. 3 is a transverse sectional view; Fig. 4 is a vertical sectional view, taken at right angles to that of Fig. 2; Fig. 5 is a perspective view of a modified structure; Fig. 6 is a transverse sectional view through the structure of Fig. 5, and Fig. 7 is a vertical sectional view through the structure of Fig. 5.

With reference to the construction shown in Figs. 1 to 4 inclusive, the crystal is indicated at 1, the same being of the conventional flat, wafer-like shape, the thickness of which produces the desired frequency, as is well understood in the radio art. The crystal is of quartz, tourmaline or any other piezo-electric mineral or any other material possessing the piezo-electric phenomena.

At the opposite faces of the crystal 1 are the

electrodes 2 and 3, which may be metallic plates unattached to the crystal and between which the crystal is located, or the electrodes may consist of metallic layers or coatings, such as gold, chrome or other non-corrosive metal, applied in such a manner as to be adherent to the opposite faces of the crystal.

Attached to each of the electrodes, whether the electrodes are separate metallic plates or are metallic coatings as above described, are the lead wires 4 and 5 which extend, and are connected, by soldering or otherwise, to contact pins 6 and 7.

The parts in the relationship illustrated and described, are embedded in a moulded block 8 of hard plastic dielectric or non-conducting material in such a manner that all of said parts, with the exception of projecting portions of the contact pins 6 and 7, are wholly enclosed in and surrounded by the plastic block 8 which forms a one-piece, solid, waterproof and airproof enclosure around the crystal and its connections, thus maintaining the crystal, electrodes and connections in their original relationship and affording maximum protection against moisture, climatic conditions, vibration and other factors which normally greatly affect crystals and mountings of conventional construction.

The hard and solid block of plastic material in which the crystal and its associated parts are contained is easily provided by merely moulding it around the parts, with the result that crystal assemblies constructed as above described may be made speedily, accurately and inexpensively, and the resultant product will maintain its characteristics indefinitely.

While I have herein described the crystal and its assembly as being of a certain structure, it is obvious that it may be varied in many ways. For example, in Figs. 5 to 7 inclusive, the contact pins 6 and 7 are each shown as being provided with a square shank portion 9 embedded in the plastic block 8, and secured to each of the square parts 9 is a metal strip 10 having an integrally formed, resilient off-set finger portion 11, provided with a plurality of projections or points 12. In this construction, the crystal 1, provided with the electrodes 2 and 3, either as separate plates or applied coatings, is placed between the two spring fingers 11, said electrodes being firmly engaged by the projections 12 on the fingers. The crystal 1, electrodes 2 and 3, fingers 11 and strips 10 are all completely embedded in the plastic block 8 which forms a solid, protective covering around them, and from which the contact pins 6 and 7

project for reception in the conventional socket provided for them in the radio apparatus.

The resultant structure as herein described, provides complete protection and enclosure for the crystal and its associated parts, leaving the crystal and parts wholly unaffected by surrounding conditions, climatic or otherwise, thus greatly increasing the effective life of the crystal.

What I claim is:

1. A crystal of the character described comprising, a piece of quartz, tourmaline or other piezo-electric mineral, electrodes in co-operative relation to the piezo-electric mineral, electric contacts connected to the electrodes, the crystal, electrodes and contacts being embedded in a formed or moulded plastic with end portions of the contacts extending through and out of the plastic.

2. A crystal of the character described comprising, a piece of quartz, tourmaline or other piezo-electric mineral, electrodes in co-operative relation to the piezo-electric material and electrical contacts embedded in a formed or moulded plastic material, with one end of each electrical

contact connecting with an electrode and the other end of the electrical contact terminating in a pin extending through and out of the plastic.

3. A crystal of the character described comprising, a piezo-electric mineral in a wafer-like form having its opposite faces provided with a metallic coating, leads in contact with and extending from the metallic-coated faces of the crystal, contact members to which said leads are attached, and a moulded plastic enclosure extending around and completely enclosing the crystal, the leads and portions of the contact members.

4. A crystal construction comprising, a piezo-electric material in wafer-like form having its opposite faces provided with an intimately-attached metallic coating, leads in contact with and extending from the metallic-coated faces of the crystal, the crystal and portions of the leads being embedded in a formed or moulded insulation with parts of the leads extending through and out of the insulation.

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