Dec. 28, 1948. D. W. KELLER 2,457,563

CRYSTAL MOUNTING

Filed April 10, 1944

Fig. 1

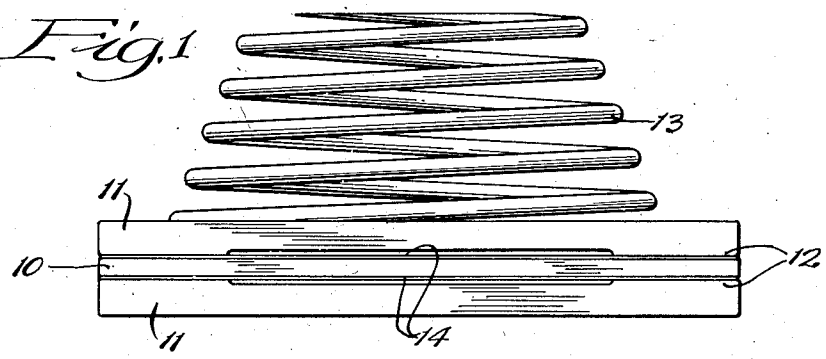
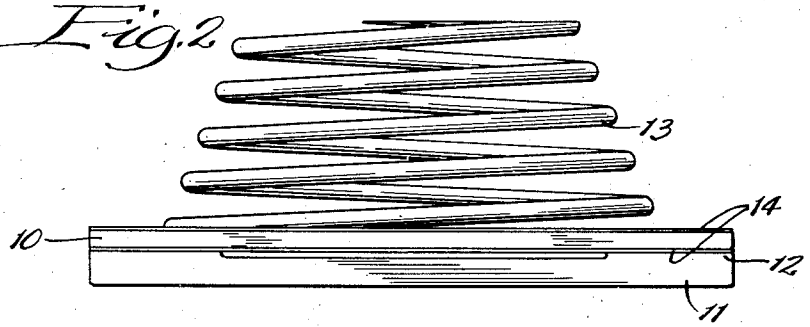


Fig. 2



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CRYSTAL MOUNTING

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3 Claims. (Cl. 171—327)

1

This invention relates to crystal mounting and more particularly to the mounting of electrically active crystals.

It has been customary heretofore to mount crystals between rigid electrodes formed of stainless steel or the like and which are provided with raised corner portions engaging the opposite faces of the crystal. In such mountings the activity of the crystal varies widely under different temperature conditions. It is believed that this variation is due to the different coefficients of expansion of the crystal and electrode material causing the raised portions on the electrodes to engage different portions of the crystal.

It is one of the objects of the present invention to provide a crystal mounting in which the activity of the crystal is substantially constant throughout a wide temperature range.

Another object of the invention is to provide a crystal mounting in which the crystal is engaged through its full face area by thin resilient sheets. With this construction, all points of the crystal surface are subjected to substantially the same pressure and any relative movement between the crystal and the sheets does not produce a change in the points of pressure on the crystal surface.

The above and other objects and advantages of the invention will be more readily apparent from the following description when read in connection with the accompanying drawing, in which:

Figure 1 is an enlarged side elevation of a crystal mounting embodying the invention; and

Figure 2 is a view similar to Figure 1 of an alternative construction.

As shown in Figure 1, a crystal 10 is supported between a pair of electrodes 11 which may be rigid plates of stainless steel or the like. The crystal and electrodes may be generally rectangular and of substantially the same size and the electrodes are provided adjacent their corners with raised portions 12 which are ground or lapped to fit evenly against the crystal surface. In the mounting shown, the lower electrode may be rigidly supported and pressure may be supplied to the upper electrode by a coil spring 13.

According to the present invention thin resilient sheets 14 are mounted between the opposite faces of the crystal and the electrodes to distribute the electrode pressure substantially uniformly over the crystal. The sheets 14 must be thin and flexible enough to follow the crystal surface accurately so that they will engage the crystal surface throughout substantially its full area and yet must be thick enough not to buckle.

2

One preferred material is stainless steel of a thickness between .002 inch and .006 inch. Stainless steel sheets in this thickness have been found to possess the necessary resilience and yet are stiff enough so that they will not buckle when pressure is applied to the electrodes. Other materials which I have found to be satisfactory are phosphor bronze sheets or beryllium copper sheets of a thickness between .003 inch and .016 inch. Various other materials might be selected which would be satisfactory so long as the sheet thickness is such that the sheets are resilient enough to lie firmly against the crystal surface and are stiff enough not to buckle under pressure applied by the raised portions 12 of the electrodes.

With a mounting of this character the sheets 14 lie against the crystal faces throughout the full crystal area and apply pressure to the crystal uniformly over its entire surface. In the event of temperature changes under which the crystal and sheets expand to a different degree, relative movement between the crystal and sheets will not affect the crystal activity. This is due to the fact that each point on the sheet is like each other point so that the contact between the sheets and crystal are the same regardless of their relative position. I have found that with a mounting of this character the crystal activity is substantially uniform through the wide range of temperatures.

In the construction shown in Figure 2, parts corresponding to like parts in Figure 1 are indicated by the same reference numerals. In this construction the upper electrode 11 is omitted and the spring 13 directly engages the upper sheet 14. The portion of the spring engaging the sheet replaces in effect, the raised portions 12 of the upper electrode and the sheet serves to distribute the spring pressure substantially uniformly over the crystal surface. In operation, this construction functions in substantially the same manner as that of Figure 1.

While two embodiments of the invention have been shown and described in detail herein, it is to be understood that these are illustrative only and are not intended as definition of the scope of the invention, reference being had for this purpose to the appended claims.

What is claimed is:

1. A crystal mounting comprising a thin resilient sheet of metal of a thickness between .002" and .016" overlying and in surface contact with the crystal throughout substantially the entire surface of one face of the crystal, and means engaging the sheet and pressing it against the crystal.

2. A crystal mounting comprising a sheet of stainless steel of a thickness between .002" and .006" overlying and in surface contact with one face of the crystal throughout substantially its entire area, and means pressing the sheet against the crystal.

3. In a crystal mounting, a substantially rectangular flat crystal, a pair of rectangular rigid electrodes of substantially the same size as the crystal on the opposite sides thereof, and thin resilient metal sheets of a thickness between .002" and .016" between the crystal and the electrodes, the electrodes having raised portions in their corners engaging the sheets and pressing them against the crystals.

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