Aug. 15, 1933. P. EHLERT ET AL 1,922,032

CRYSTAL HOLDER OR SETTING

Filed March 1, 1929

Fig. 1

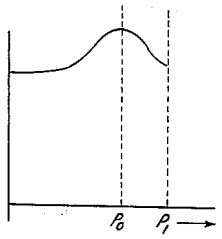


Fig. 2

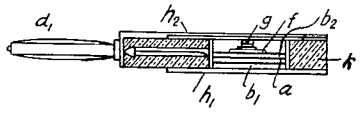


Fig. 3

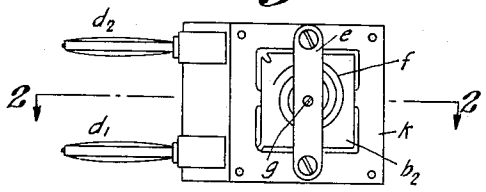
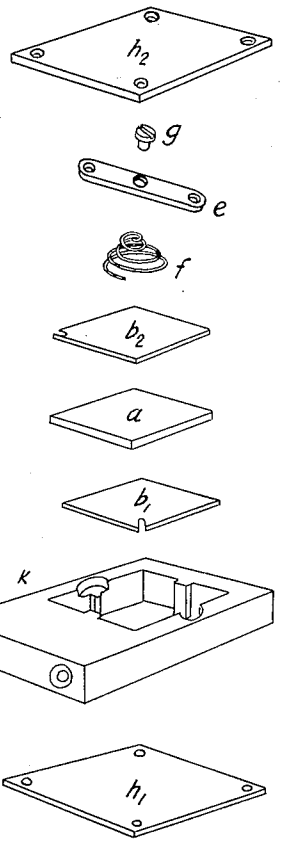


Fig. 4



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CRYSTAL HOLDER OR SETTING

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4 Claims. (Cl. 171—327)

This invention relates to the piezoelectric art and deals more specifically with the production of a piezoelectric crystal holder.

It is known from the prior radio frequency art that crystals may be used for the purpose of keeping the frequency at a constant value and that these will allow to pass all oscillations being of the same frequency as their natural period, while all other frequencies will be blocked.

Crystals of this kind, mostly of lamellar shape, have heretofore been usually interposed between two plate-shaped electrodes, and it has been customary to accommodate them in a convenient boxed-shaped casing provided with connecting terminals, say, pins, the space between the upper electrode and the cover of the casing being filled and packed with some suitable soft substance, for instance, cotton, so as to prevent loosening. Now, it has been found that such crystal elements fail to function always in the same way, and it has been also found, more particularly speaking, that they are subject to variations of operation when their position is changed. For this reason, these crystal elements have also been found rather unreliable when used in non-stationary outfits, for instance, on aircraft, automobiles and the like.

Now, the present invention is based upon the proper appreciation of the fact that the cause underlying the above trouble resides in that the crystals are extremely sensitive in their oscillation performance to the pressure exerted thereon from the electrodes. As a matter of fact, experiments made along this line have demonstrated that the oscillations of the crystals is dependent upon the pressure brought thereon as illustrated in Fig. 1. It will be noted from the graph that the performance initially is gradually improved in proportion as the pressure grows until, in the presence of a certain optimum pressure value P_0 there is reached a more or less pronounced maximum or crest, but that the conditions are much impaired as the pressure is still further increased, so much so that in the presence of a definite pressure P_1 sudden failure to oscillate occurs. For this reason it is of great practical importance to provide ways and means to adjust the optimum pressure.

With this end in view, according to the invention, the crystal setting is so built that the electrodes are held together with the crystal lamella by the agency of an adjustable spring pressure.

The manner in which the present invention is carried out will be more readily understood from the following description taken in connection with the accompanying drawing in which:

Fig. 1 shows graphically the relation of the oscillation of the crystal to the varying pressures exerted thereon;

Fig. 2 is a sectional view taken on line 2—2 of Fig. 3 with the cover plate in place;

Fig. 3 is a plan view of the device with the cover plate removed; and

Fig. 4 is an exploded view of the device shown in Fig. 2.

Referring to the drawing, *a* is the crystal of lamellar form, *b*1 and *b*2 are the lower and the upper electrode, *f* is a spring brought to act upon the electrode *b*2 whose pressure, in the embodiment here shown, is adjusted by the aid of a set screw arranged on the cross piece *e*. The assembly is placed inside an insulating case *k* which is closed at the top and at the bottom by means of cover plates *h*1 and *h*2, respectively. *d*1 and *d*2 denote plugs or pins which are connected by cords with the corresponding electrodes *b*1 and *b*2.

A crystal element of the kind here disclosed is readily adjustable to optimum action; it can be used in any desired position, and can be transported without suffering any damage.

Having thus described our invention, what we claim is:

1. A piezo-electric crystal housing comprising an insulating body member recessed to form a receptacle, an electrode mounted in said body member, a contact member carried by said body and connected to said electrode, a piezo-electric crystal supported by said electrode, a second electrode mounted on said piezo-electric crystal, a second contact member carried by said body and connected to said second named contact member, means for exerting pressure between said electrodes and said piezo-electric crystal comprising a spring mounted to bear on said last named electrode and means for adjusting the compression of said spring.

2. A piezo-electric crystal unit comprising an insulating body member recessed to form a receptacle, an electrode mounted in said body member, a contact member carried by said body and connected to said electrode, a piezo-electric crystal supported by said electrode, a second electrode mounted on said piezo-electric crystal, a second contact member carried by said body and connected to said second named electrode member, and means for exerting pressure between said electrode members and said piezo-electric crystal comprising a support fixed to the open side of said body member, a spiral compression spring mounted between said last named elec-

trode and said support, means for adjusting the compression of said spring, comprising a screw in said support bearing on said spring, and a cover adapted to be fixed to the open side of said body member.

3. A piezo-electric crystal unit comprising an insulating body member recessed to form a receptacle, an electrode mounted in said member, a piezo-electric crystal mounted on said electrode, a second electrode mounted on said piezo-electric crystal, a member fixed to said body member and spaced with respect to said last named electrode, a spiral spring mounted between said member and said electrode, means for adjusting the compression of said spring, and contact members connected with each of said electrodes.

4. A piezo-electric crystal unit comprising an insulating body member recessed to form a receptacle substantially open on two sides, a cover adapted to be fixed to one of the open sides of said body member, an electrode for mounting in said body member adjacent to said cover, a piezo-electric crystal supported by said electrode, a second electrode mounted on said piezo-electric crystal, and means for exerting a pressure between said electrode members and said piezo-electric crystal comprising a support fixed to the other open side of said body member, a spiral compression spring mounted between said last named electrode and said support, means for adjusting the compression of said spring comprising a screw in said support bearing on said spring, a cover adapted to be fixed to said other open side of said body member and means carried by said body member for connecting said electrodes in an electrical circuit.

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