Sept. 6, 1932. A. MEISSNER 1,875,347

PIEZO ELECTRIC CRYSTAL

Filed May 7, 1927

Fig. 1

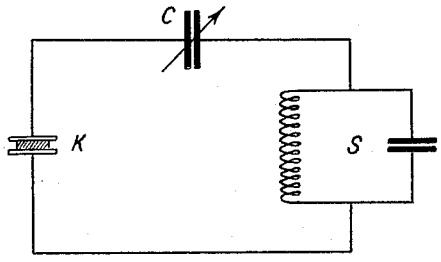
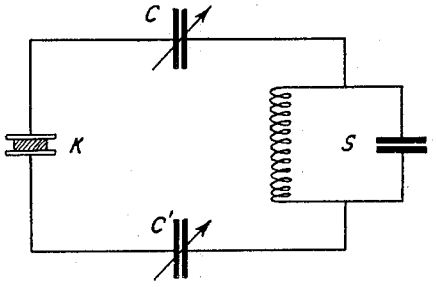


Fig. 2



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PIEZO-ELECTRIC CRYSTAL

Application filed May 7, 1927, Serial No. 189,500, and in Germany June 24, 1926.

This invention relates to a method and means for influencing the maximum potential arising at an excited piezo-electric body.

It is a well known fact that a piezo-electric body, for instance, a quartz crystal of definite size, possesses an exactly definable natural period of oscillation. Such a body constitutes the connection between a mechanically oscillating and an electrically oscillating system since, by virtue of the mechanical vibrations, charges are set up at or across the ends of the body.

It is an object of this invention to provide a method and means whereby, in a circuit comprising a piezo-electric body, maximum potential effects may be caused to arise at the crystal at a frequency differing from the natural mechanical frequency of the body.

If an oscillation circuit being perfectly tuned, or nearly so, with the oscillations of the piezo-electric body, is coupled with such a piezo-electric body, then the resonance frequency of the entire system changes, within certain limits, depending upon the degree of coupling. In other words, maximum potentials will arise at the crystal electrodes not at the mechanical frequency of the crystal, but rather at a frequency slightly departing therefrom. Hence, by variation of the coupling, it is thus possible, within small limits, to change the frequency at which the arrangement shows maximum effects.

A suitable arrangement may consist of capacitive coupling between a crystal and an oscillation circuit, such capacitive coupling, if desired, being effected by connection of the piezo-electric body with the oscillation circuit by way of one or more variable condensers.

In the accompanying drawing,

Figure 1 shows an arrangement utilizing but one condenser for varying the coupling and

Figure 2 shows an arrangement whereby a pair of condensers may be utilized.

In Figure 1 K represents the crystal and S the oscillation circuit which is tuned to the natural frequency of the crystal. C is the variable condenser which serves for adjustment of the coupling. If desired, and as pointed out above, another condenser C' could be inserted, for instance, in the lower lead as shown in Figure 2.

Another way to render the capacitive coupling variable would consist in that the distance between the electrodes on the crystal is made variable so that variation of the coupling is realized. Apart from the quartz crystal just mentioned, also a Rochelle salt plate, for instance, could be used to act as the piezo-electric body.

I claim as my invention:

1. In combination, a piezo electric crystal having a pair of electrodes, a tuned circuit, connections between the circuit and said electrodes, and solely a variable condenser in one of the connections from the tuned circuit to one of the electrodes.

2. In combination, a tuned circuit, a piezo-electric crystal having a pair of electrodes, and connections from the electrodes to the tuned circuit, each connection having solely therein, a condenser.

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