

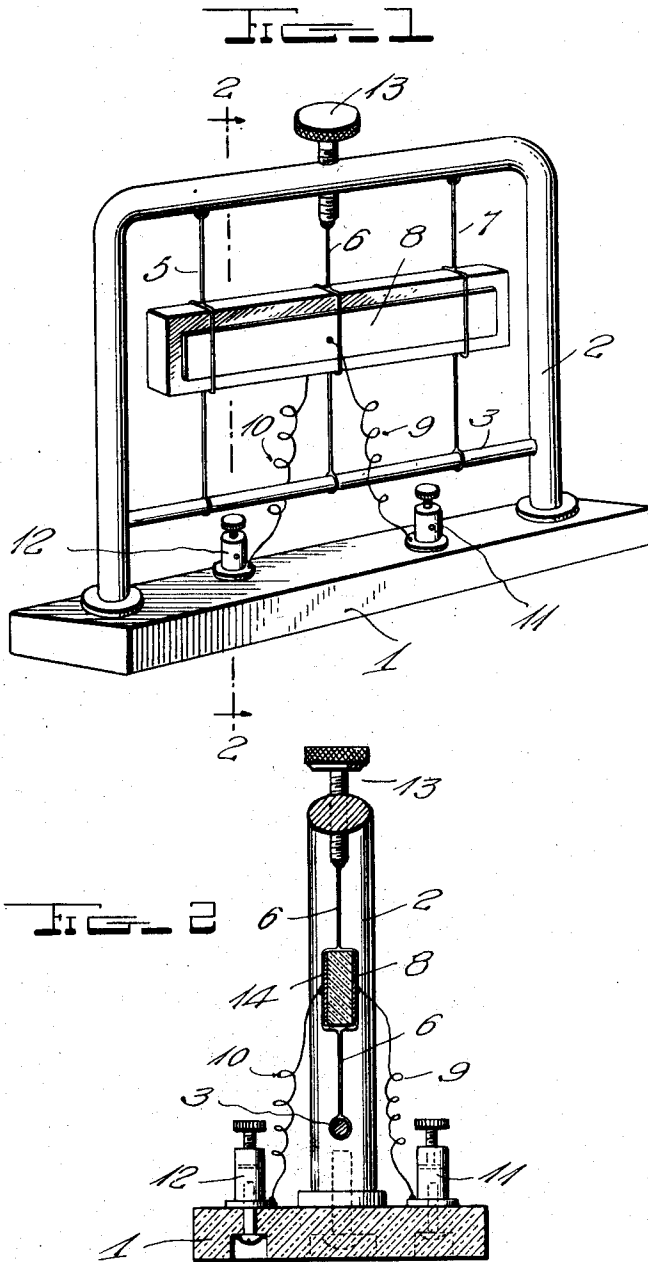
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W. E. BOWER

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ELECTROMECHANICAL VIBRATOR MOUNTING

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INVENTOR.

Ward E. Bower,

BY *Harold J. Doss*
ATTORNEY.

UNITED STATES PATENT OFFICE

WARD E. BOWER, OF WASHINGTON, DISTRICT OF COLUMBIA

ELECTROMECHANICAL VIBRATOR MOUNTING

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This invention relates broadly to electromechanical vibrators in general and more specifically to mountings and holders for electromechanical vibrators.

5 An object of this invention is to provide a mounting for an electromechanical vibrator in which the frictional resistance between the electromechanical vibrator and the electrodes employed for connecting it into circuit is reduced to a minimum.

10 Another object of this invention is to provide a mounting for an electromechanical vibrator in which the area of contact of the electromechanical vibrator and the electrodes employed for connecting it into circuit is substantially constant.

15 Still another object of this invention is to provide a mounting for a mechanically vibratile element in which the element is supported at its nodal point.

20 A further object of this invention is to provide a mounting for a piezo electric element in which substantially no restraining forces act to prevent the element from oscillating at its natural period.

25 A still further object of this invention is to provide a piezo electric element mounting having a relatively low temperature coefficient.

30 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 annexed claims.

35 According to this invention a piezo electric element or other electromechanical vibrator is provided with a mounting in which the frictional resistance to the element's motion between the electrodes is reduced to a minimum by providing coatings, which serve as electrodes, of extremely light material. Greater precision in the operation of the elements is also obtained by suspending the element in its holder at a nodal point.

40 In the drawing, Figure 1 is a perspective view of a preferred embodiment of this invention and Fig. 2 is a cross-sectional view in elevation along the line 2—2 of Fig. 1.

45 Referring to the drawing in detail, the ref-

erence numeral 1 indicates a base of insulating material. This base may be made of any insulating material, such as phenol condensation products, dried wood impregnated with shellacs, waxes or rosins, hard rubber or vitreous materials such as quartz and glass. A U-shaped supporting member 2 is positioned upon the base 1. This member may be made of either insulating material, such as fused quartz, glass, hard rubber or similar substances or it may be made of metals such as aluminum, copper or bronze, suitable for electrical apparatus. A cross member 3 is attached to the extremities of the U-shaped member 2. The piezo electric element 4 is supported by flexible cords 5, 6 and 7 which are attached to the members 2 and 3. These cords are preferably of silk although other materials such as wax impregnated cotton may be used. The member 3 may be dispensed with and the cords 5, 6 and 7 attached directly to the base member 1. The cord 6 is attached to a screw 13 which is provided in the member 2 for maintaining this cord under a certain degree of tension. The cords 5 and 7 are not subjected to as great a tension as is applied to the cord 6 since these cords are employed to prevent the piezo electric element from turning. Various methods of attaching the cords to the piezo electric element may be employed. For example the cords may be tied around the element or they may be held upon the element by means of cements, such as silicate of sodium or potassium.

55 The cord 6 is positioned at the nodal point of the first mode of vibration of the piezo electric element. This cord may therefore be maintained taut with substantially no interference to the free oscillation of the element. The cords 5 and 7 are usually not maintained under tension and consequently introduce no oscillation restraining forces of appreciable magnitude upon the element. The piezo electric element 4 is provided with coatings 8 and 14 to which conductors 9 and 10 are connected. The conductors 9 and 10 are either soldered or cemented to the coatings 8 and 14, respectively. Binding posts 11 and 12 are

serve as terminals for the conductors 9 and 10, respectively, whereby the element 4 is connected into circuit. Coatings 8 and 14 may consist of gold leaf cemented to the surface of the piezo electric element with cements such as shellac, sodium or potassium silicate or similar materials. Metals such as platinum may be sputtered against the surface of the piezo electric crystal and serve as very serviceable and permanent coatings, especially where piezo electric crystal elements of extreme accuracy and precision are required.

While I have described my invention in one of its preferred embodiments, I desire it to be understood that modifications may be made and that I intend no limitations upon the invention other than those imposed by the scope of the annexed claims.

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

1. In a piezo electric crystal unit, a piezo electric crystal, electrodes in contact with said crystal, a frame member, a taut flexible member attached to said frame member and to said crystal substantially at its fundamental nodal point, and other flexible members attached to said frame member and embracing said crystal and its electrodes on opposite sides of its nodal point and maintained under substantially less tension than said taut flexible member.

2. In a piezo electric crystal unit, a piezo electric crystal, electrodes in contact with said crystal, a frame member, a taut flexible member attached to said frame member and to said crystal substantially at its fundamental nodal point, and other flexible members attached to said frame member and embracing said crystal and its electrodes on opposite sides of its nodal point and maintained under substantially no tension.

3. In a piezo electric crystal unit, a piezo electric crystal, electrodes in contact with said crystal, a frame member, a taut flexible member attached to said frame member and to said crystal substantially at its fundamental nodal point, other flexible members attached to said frame member and embracing said crystal and its electrodes on opposite sides of its nodal point and maintained under substantially less tension than said taut flexible member, and means for adjusting the tension of said taut flexible member.

4. In a piezo electric crystal unit, a piezo electric crystal having metallic films deposited on opposite faces thereof, a frame member, a taut flexible member attached to said frame member and to said crystal substantially at its fundamental nodal point, other flexible members attached to said frame member and embracing said crystal and its electrodes on opposite sides of its nodal point and maintained under substantially less ten-

sion than said taut flexible member, said flexible members being mounted for embracing and supporting in contiguous relation said crystal and said metallic films thereon deposited.

5. In a piezo electric crystal unit, a piezo electric crystal, electrodes closely adjacent to opposite faces of said crystal, a frame member, a flexible member attached to said frame member and to said crystal substantially at its fundamental nodal point, other flexible members attached to said frame member and embracing said crystal and its electrodes on opposite sides of its nodal point and maintained under substantially less tension than said taut flexible member, said flexible members being mounted for binding together and jointly supporting said crystal and said electrodes.

WARD E. BOWER.