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PIEZOELECTRIC APPARATUS

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Fig. 1.

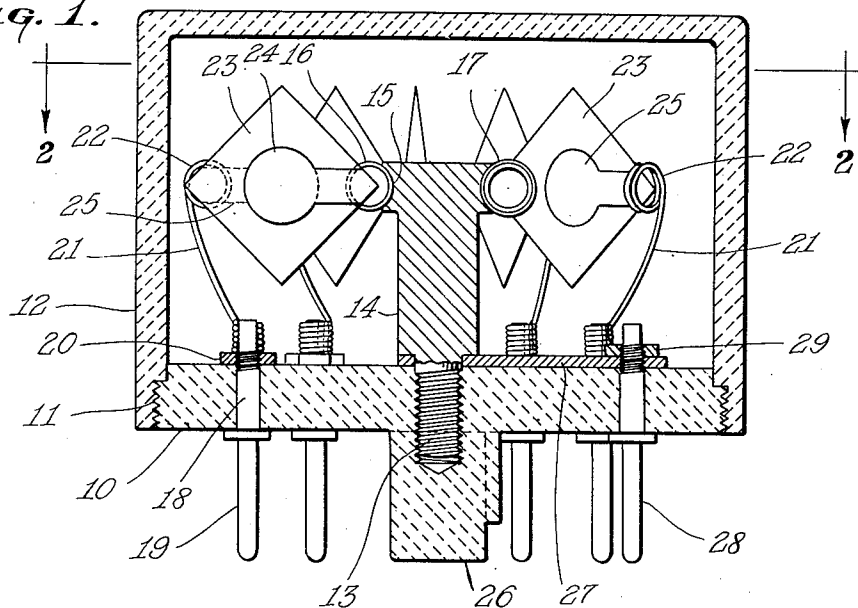
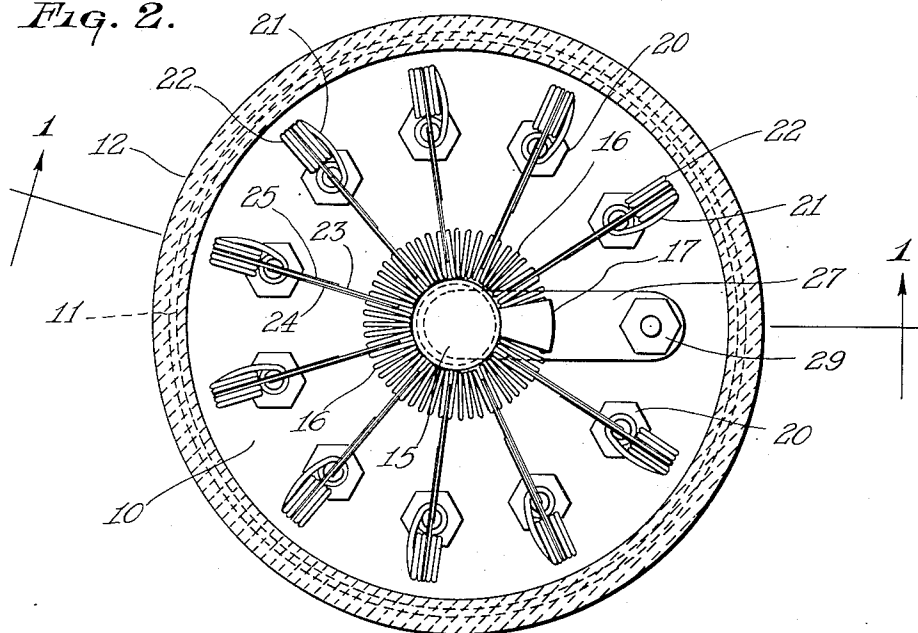


Fig. 2.



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PIEZOELECTRIC APPARATUS

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7 Claims. (Cl. 171-327)

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My invention relates broadly to piezo-electric crystal apparatus and more particularly to a multiple mounting for piezo-electric crystals.

One of the objects of my invention is to provide an insulating container including a multi-pronged base constituting a multiple piezo-electric crystal holder by which piezo-electric crystals may be resiliently mounted radially around a common central holder connection.

Another object of my invention is to provide a multiple piezo-electric crystal element holder by means of which piezo-electric crystals formed with spaced portions acting as surface electrodes extending to diagonally opposite ends may be resiliently mounted radially around a common resilient connection support so as to be collectively related and unrelated in a definite manner to a circuit organization.

Another object of my invention is to provide enclosed multiple piezo-electric crystal element mountings arranged on a multi-pronged pilot insulating base so that piezo-electric crystal elements may be radially held at diagonal ends.

Still another object of my invention is to provide a multiple piezo-electric crystal holder comprising an insulating base within the housing on which a plurality of crystals may be held resiliently at diagonally opposite ends radially about a common support so that mechanical vibration may take place without appreciable restriction.

In the following description names will be given to parts for convenience of expression but the names are intended to be as generic in their application to similar parts as the art will permit.

My invention will be more fully understood from the following specification by reference to the accompanying drawings.

Fig. 1 is a cross-section view taken of the holder of the invention along the line 1—1 of Figure 2.

Fig. 2 is a plan view along the line 2—2 of Fig. 1.

I have developed a multiple piezo-electric crystal holder for the purpose of resiliently mounting crystal elements with spaced surface electrodes in radial relation about a common resilient support so that free mechanical vibration will not be materially restricted.

The arrangement also permits simple resilient pressure mounting in predetermined crystal element arrangement so that spaced portions serving as surface electrodes may be resiliently held at diagonal ends of the said crystal elements.

Referring to the drawings as illustrated by Figure 1, there is shown a moulded pilot base member 10 preferably made of polystyrene or other insulating material such as hard rubber, "Bake-

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lite" or the like. The base 10 is threaded at the portion 11 to receive a cover 12 also threaded so as to be screwed on the said base to coact therewith to form an enclosure.

The base 10 is also provided with a threaded recess in the projecting central pilot portion 28 to receive and rigidly support a threaded end portion 13 of a common conductor support 14 so as to centrally position same on the top side of the said base 10. The support 14 is preferably made of silver-plated brass and is provided with an enlarged top portion 15 formed with an annular curved depression for positioning and tensioning a doughnut-shaped coiled spring 16. This spring 16 is preferably made of silver-plated Phosphor-bronze wire with the ends secured to a metal connecting block 17 (see Figure 2).

A plurality of individual support pins 18 provided with pronged portions 19 on one end and threaded on the opposite end are mounted on the base 10 around the support 14 at approximately equal radii and rigidly secured to the said base by the nuts 20.

Silver-plated Phosphor bronze crystal element holder springs 21 coiled at each end are mounted so that similar coiled ends are respectively placed over the threaded portions of the support pins 18. In this event the other coiled end portions 22 will be free with coiled turns approximately in radial alignment with the coil turns of the central coiled spring 16.

Piezo-electric crystal elements 23 with spaced portions 24 and 25 serving as surface electrodes are mounted at diagonally opposite corners between the said radially aligned coil turns of the common spring 16 and the holder spring coiled turns 22. The elements 23 are thus resiliently mounted in radial relation about the common support 14 with the connecting block 17 facing the common pin 28.

A common connecting lug 27 is interposed between the central connecting support 14 and the base 10 before the support 14 is screwed down. The lug 27 is connected to the common pin 28. The pin 28 is secured to the base 10 and the lug 27 by means of the nut 29.

Thus, the crystal elements 23 are respectively connected to the prongs 19 and to the common connector pin 28 when they are forced between the coiled turns of the end portions 22 and the common spring 16.

Having thus described my invention, I claim:
1. Piezo-electric crystal apparatus comprising an insulating base, a central support, a plurality of connector supports and a plurality of piezo-

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electric crystal elements with spaced apart portions acting as surface electrodes, said central support and said connector supports being mounted on said base so that the said elements will be held at spaced electrode corners in radial relation around the said central support.

2. Piezo-electric crystal apparatus comprising in combination an insulating base, a common combined connector and support centrally mounted on said base and provided with radially arranged resilient contactor portions at one end, a plurality of resilient individual connector supports radially mounted on said base around the said central support and piezo-electric crystal elements interposed between the said individual supports and said contactor portions.

3. The combination of a disc-shaped insulating base with a central pilot projection, individual and common supports mounted on said base so that the said individual supports are arranged radially around the said common support and piezo-electric crystal elements formed with spaced apart surface electrodes mounted on said supports at spaced corners thereby to be positioned in radial relation around said common support relative to said pilot projection.

4. The combination of a common conductor support threaded at one end, a closed coil spring mounted on the other end of the said support, a plurality of prong-shaped supports, resilient connector elements respectively mounted on said prong-shaped supports, a common connecting lug, a further prong-shaped support, a plurality of electric crystal elements each including surface electrodes at diagonal corners and a moulded insulating base formed with a central pilot projection portion being formed to receive and to rigidly position said common conductor support, said prong-shaped supports and said lug so that the said crystal elements will be supported by the said resilient connector elements and said spring at said spaced corners in radial formation about said common support relative to said pilot projection.

5. Piezo-electric crystal apparatus including a threaded insulating base, a threaded insulating cover for said base, a spindle-shaped common connector including a plurality of resilient contactor portions at one end and attached to the base at the other end, a plurality of individual resilient contactors positioned on the said base at approximately equal radii about said common connector and a plurality of piezo-electric crystal

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elements, said elements arranged in radial relation in approximately vertical planes around said common connector when secured to said contactors.

6. In a multiple piezo-electric crystal apparatus, a common connecting spindle having an enlarged grooved portion at one end and a threaded portion at the other, a closed coil spring wrapped about the said grooved portion, a plurality of connecting pins threaded at one end and pronged at the other, a common connecting lug, an insulating threaded cover, a disc-shaped insulating base provided with a centrally extending pilot portion and threaded to co-act with the said cover to form an enclosure and to radially position the said pins about the said spindle when mounted on same, a plurality of piezo-electric crystal elements provided with spaced surface electrodes, and a plurality of resilient supports mounted on said pins, said elements respectively interposed between adjacent turns of the said supports and adjacent turns of the said closed coil so as to be resiliently supported at spaced corners.

7. The combination of an insulating base with a central recessed portion on one side and a central pilot projection on the opposite side, a common conductor support having resilient contact portions at one end and rigidly positioned in the said recess at the opposite end, a plurality of individual pronged supports mounted on said base in symmetrical spaced apart relation about the said common support, resilient connector support elements respectively mounted on said individual supports, and a plurality of electric crystal elements each including surface electrodes at diagonal corners supported in radial formation between said resilient supports and the said common support, and terminal means for connecting the said common support to an external circuit.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,321,358	Bokovoy	June 8, 1943
2,392,429	Sykes	Jan. 8, 1946