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2,564,562

MICROPHONE

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Fig. 1

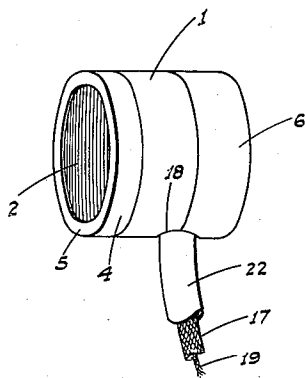


Fig. 2

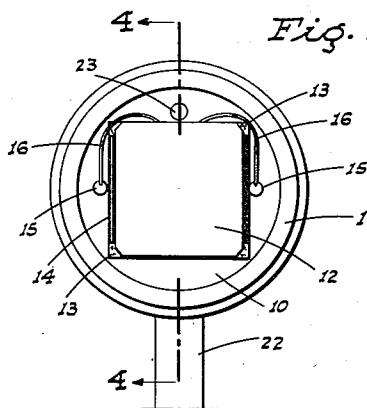


Fig. 3

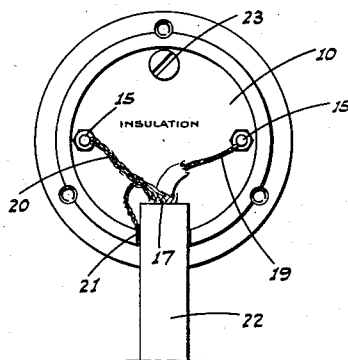
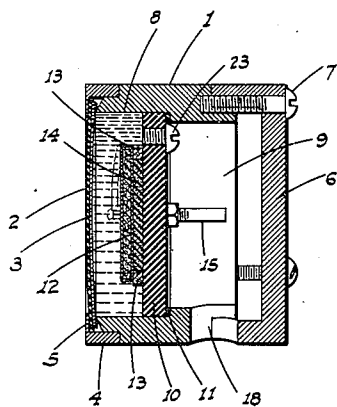


Fig. 4



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MICROPHONE

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2 Claims. (Cl. 171-327)

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This invention relates to, and it is an object to provide, a microphone adapted especially for use as an electronic stethoscope which is much more sensitive to, and effects a better reproduction of, the sound of body organs such as the heart, lungs, etc., than is accomplished by the mechanical type of stethoscope now in common use.

Another object of the invention is to provide a microphone, of the type described, which is small in size, handy and practical to use, and unaffected by humidity, or temperature below 212° F.

A further object of the invention is to provide a microphone which includes a hollow cylindrical body having an enclosed chamber formed in part by an exposed flexible diaphragm and an internal partition in said body, a cushion-mounted pick-up crystal supported in said chamber by the partition, and a dielectric oil filling said chamber, whereby sound impulses imparted to the flexible diaphragm are transmitted through the oil to said crystal.

A further object of the invention is to produce a simple and inexpensive device, and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Figure 1 is a perspective view of the microphone.

Figure 2 is an enlarged front end view of the microphone, with the flexible diaphragm removed.

Figure 3 is an enlarged rear end view, with the back cap removed.

Figure 4 is an enlarged cross section of the microphone on line 4-4 of Fig. 2.

Referring now more particularly to the characters of reference on the drawings, the microphone comprises a relatively small-diameter, hollow cylindrical body 1 initially open at both ends, but normally closed at the front end by a diaphragm 2 of flexible rubber or the like.

The diaphragm 2 is provided with a flexible backing sheet 3 of metal foil. The assembly of the diaphragm and metal foil sheet 3 is held in place against the forward end of the cylindrical body 1 by means of a press fit collar 4 which includes an annular, inwardly extending flange 5

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which engages about the periphery of the diaphragm 2 in compression relation thereto. The rear end of the cylindrical body 1 is normally closed by a removable back cap 6 held in place by circumferentially disposed screws 7.

The hollow cylindrical body 1 is separated into a front chamber 8 and a rear chamber 9 by a circular, dielectric partition or cross wall 10 frictionally seated in said body in abutting relation to an annular shoulder therein; there being a gasket 11 between the peripheral portion of said partition and the shoulder.

A pick-up crystal 12 of flat rectangular form is disposed in the front chamber 8 in adjacent relation to the partition 10, and in spaced facing relation to the diaphragm 2. The crystal 12 is of envelope type, flexible on its forward face, and filled with ammonium di-hydrogen phosphate crystal; the dimension of the crystal in the present embodiment being $\frac{1}{2}$ " x $\frac{1}{2}$ " x 0.25". The crystal 12 is cushioned-mounted on the partition 10 as follows:

Relatively narrow cork strips 13 extend along upper and lower edges of the crystal and are engaged between the latter and said partition 10. Intermediate the cork strips 13 and between the crystal 12 and the partition 10 there is a sponge rubber or cushion pad 14 which substantially matches the crystal in plan between said strips. The crystal, strips 13, and sponge rubber pad 14 are secured together and to the partition 10 by any suitable adhesive.

A pair of terminal posts 15 extend through the partition 10 on opposite sides of the crystal 12, and the leads 16 of said crystal connect, within the front chamber 8, with said posts 15.

A flexible, co-axial or shielded type cable 17 leads into the rear chamber 9 of the body 1 through a bottom opening 18, and within said rear chamber the center wire 19 connects with one of the terminal posts, while the braided shield 20 splits, with one portion connecting to the other terminal post 15, and the remaining portion grounded, as at 21. At the point of entry of the cable 17 into the body 1 said cable is provided with a protective sleeve 22. The front chamber 8 is filled with a dielectric liquid, such as oil; filling of said chamber being accomplished through an opening in the partition 10, which opening is normally closed by a screw plug 23.

When the above described microphone is in use as an electronic stethoscope, it is placed with the diaphragm 2 directly against a person's body adjacent the organ whose sound is to be heard. The cable 17 leads from the microphone to an

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electric amplifier (not shown), which may include a loud speaker or ear phones in a head set, whichever is most convenient.

The sound from the body organ is imparted to the diaphragm 2, and is then transmitted through the oil in the chamber 8 to the crystal 12; response of such crystal causing reproduction of sound through the amplifier to the loud speaker or head set.

The above described microphone is not only simple, efficient, and practical in operation, but it is substantially fool-proof, and is constructed for long life, but unaffected by humidity or temperature changes.

From the foregoing description it will be readily seen that there has been produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful and upon which Letters Patent are desired:

1. In a microphone having a fluid-filled chamber the back wall of which is a dielectric plate, and a piezo-electric crystal unit of substantially rectangular form in the chamber; mounting and

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locating means for the unit comprising a pair of cork strips along opposite edges of the unit and disposed between and adhered to the adjacent faces of the unit and plate, there being a cushion pad in the space between and engaging the plate, unit and strips.

2. A device as in claim 1, with terminal posts projecting through the plate laterally out from the unit, the lead wires of the unit being connected to said posts within the chamber.

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