Nov. 5, 1940. W. Y. CANNON 2,220,208

EAR PHONE

Original Filed Sept. 16, 1935

Fig. 1.

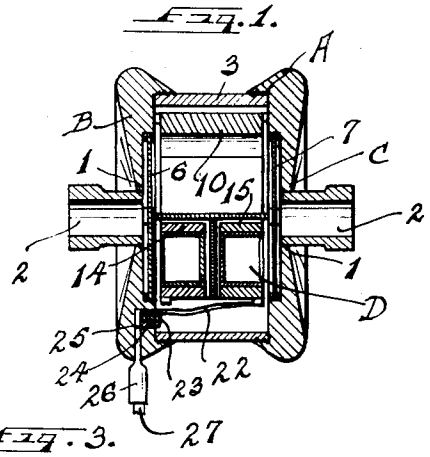


Fig. 2.

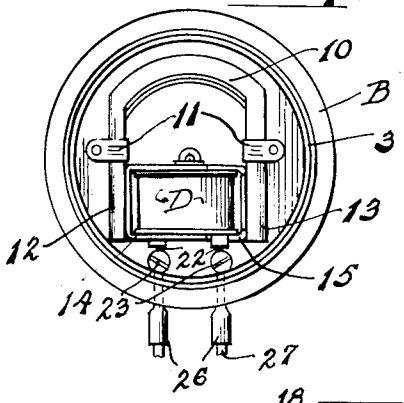


Fig. 3.

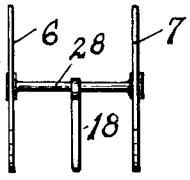


Fig. 5.

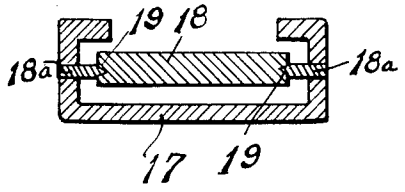


Fig. 6.

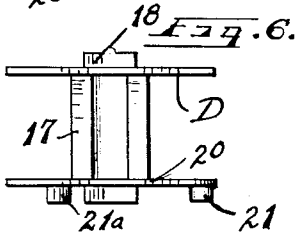


Fig. 7.

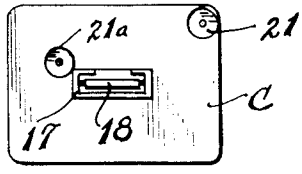


Fig. 4.

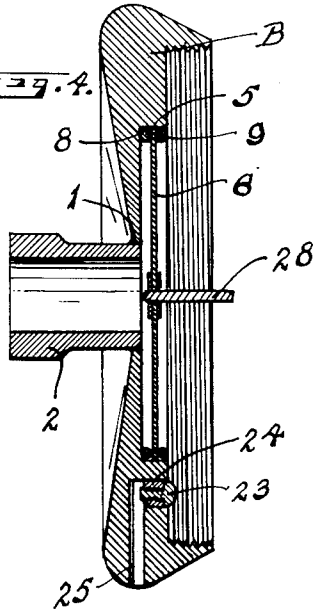
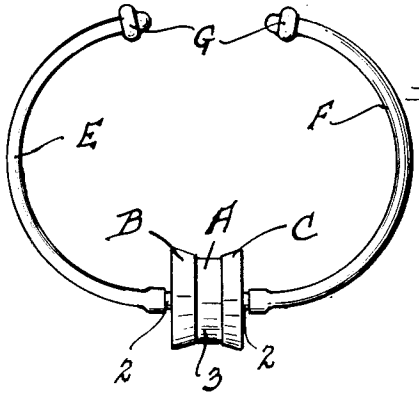


Fig. 8.



Inventor

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By R. M. Thomas Attorney

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UNITED STATES PATENT OFFICE

2,220,208

EAR PHONE

Wilford Y. Cannon, Salt Lake City, Utah

Original application September 16, 1935, Serial No. 40,747. Divided and this application February 22, 1938, Serial No. 191,849

1 Claim. (Cl. 179—116)

My invention relates to sound reproducers and more particularly to the type known as ear phones and has for its object to provide a new and efficient double diaphragm ear phone which will be more efficient, give better voice and sound reproduction and greater selectivity than those now on the open market.

A further object is to provide a new type ear phone which will use light weight rubber or fabric tubes leading to the ears of the user and which will have the reproducing unit mounted to rest upon a table or on the chest of the user, enabling a person to use ear phones in telephony, radio, and telegraphy, also in kindred uses without the heavy phones being carried on the head and weighing so heavy on the ears of the user.

A still further object is to provide an economical reproducing element having inexpensive parts, but giving greater field of reproduction and using two diaphragms mounted to a single armature and giving off sound in both directions from the unit and with this unit, the extra ear phone is eliminated, and its accompanying parts are not used and also the head piece and support of the usual head set is eliminated.

A still further object is to provide a better method of securing the lead in wires to the reproducer providing a unit from which the lead in wires may be pulled out but if they are pulled violently out they will not damage the unit or dislodge or break any of the connecting wires of the voice coil.

A still further object is to provide a double diaphragm phone with spacer between so that by means of tubing connections to the ears, one armature, voice coil, and magnet will serve the purpose of the two now used, with the one unit giving reception to both ears and eliminate much static and outside interference found with double ear phones commonly used in head sets.

A still further object is to provide a new and efficient mounting for the diaphragm giving fuller action and greater sensitivity to the unit.

These objects I accomplish with the device illustrated in the accompanying drawing in which similar numerals and letters of reference indicate like parts throughout the several views and as described in the specification forming a part of this application and pointed out in the appended claim.

This is a division of my former patent application for Sound reproducers, filed Sept. 16, 1935, which was copending at the time this filing was made and which later issued into Patent No. 2,128,398.

In the drawing in which I have shown my device,

Figure 1 is a vertical diametrical section of one of my reproducing units.

Figure 2 is a face view of one of the units with one side removed and with one diaphragm left off to show the interior mounting of the device.

Figure 3 is a view of the double diaphragm and connecting pin.

Figure 4 is an enlarged diametrical section of one side of the device showing the mounting of the diaphragm, both sides in this type being identical.

Figure 5 is a sectional view of the armature and support therefor showing an enlarged view thereof to clearly show the mounting of the armature in the central support.

Figure 6 is a plan view of the voice coil spool.

Figure 7 is an end view of Figure 6.

Figure 8 is a diagrammatic view showing the use of the ear plugs used on the tubing to connect the speaker unit with the ears.

In the drawing I have shown the reproducing unit as A, having end members or caps B and C formed with medial holes 1 therethrough into which hollow stems 2 are secured. The end caps B and C and the hollow stems are alike. The end caps B and C are flanged and the flange is internally threaded to be screwed onto a joining spacer cylinder 3. A step cut is formed on the inner face of each cap and the diaphragms 6 and 7 mounted in these steps being formed preferably of equal diameters, and first an inner ring 8 is placed within the step at the back side thereof and then the diaphragm is placed in the step and outside this another snap spring ring 9 is snapped into place holding the diaphragm mounted therebetween giving a full amount of flexibility to the diaphragm. To the cap B I then secure my horseshoe magnet 10 by suitable clamps or brackets 11 and the ends 12 and 13 of the magnet are provided with pole pieces 14 and 15 respectively. These pole pieces are U-shaped and carry the voice spool and coil D therebetween. The coil D is provided with a core 17 in which the armature 18 is pivotally mounted by inserting pointed pivot pins 18a through the sides of the core 17 with the points of the pins inserted in to conical sockets 19 in the sides of the armature 18. The side 20 of the coil is provided with a cylinder boss 21 near the outer perimeter thereof adjacent one end and a like boss 21a near the core and the wire 22 of the coil is passed through these bosses and secured thereto by suitable means to more securely hold the wires of the coil

from loosening or leakage. The wire 22 is then connected at each free end to screws 23 which screws are inserted into threaded sockets 24. Two sockets 25 are bored into the side of cap B and the plugs 26 of the connecting lead in wires 27 are placed in the socket 25 and the 23 screwed down onto the plugs to make the contact between the voice coil and the lead in wires and with this connection the tension or stress from the lead in wires is eliminated from the coil or coil wire.

In Figure 8 the general assembly of the preferred type of unit A is shown with tubing E and F connecting the two stems 2 with the ear plugs G to transmit the sound to the ear in a manner similar to the stethoscope used by physicians.

Having thus described my invention, I desire to secure by Letters Patent and claim:

In a sound reproducing unit the combination of a cylindrical casing; like shaped cups screwed onto each end of said casing; central hollow stems screwed centrally into said cups said stems having enlarged ends to receive tubing; a step cut in each cup, diaphragms mounted in each step cut and held in place by spacer and retainer rings; a U-shaped magnet mounted to one of said cups; inwardly extended U-shaped pole pieces mounted on each leg of said magnet; a spool mounted between the ends of the pole pieces, a sound coil wound on said spool; a core in said spool; said pole piece being extended inwardly encompassing a portion of said sound coil; an armature mounted in the core by inwardly extended points engaging conical recesses in each edge of the armature; a single pin connected with the armature and extending outwardly in each direction to be engaged medially into said diaphragm; and sound carrying tubes extending from each stem substantially as described.

WILFORD Y. CANNON.