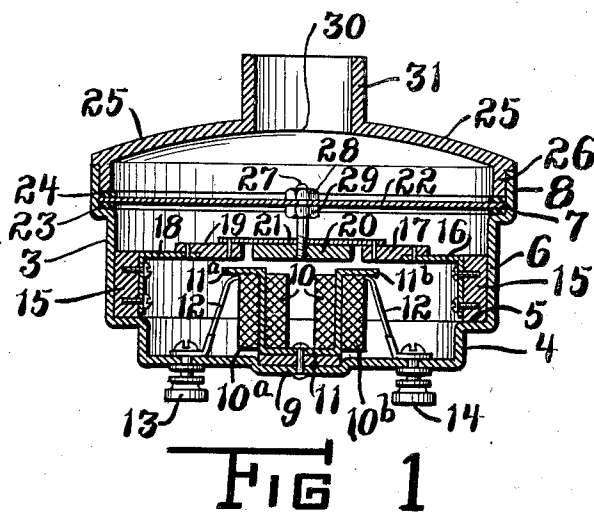
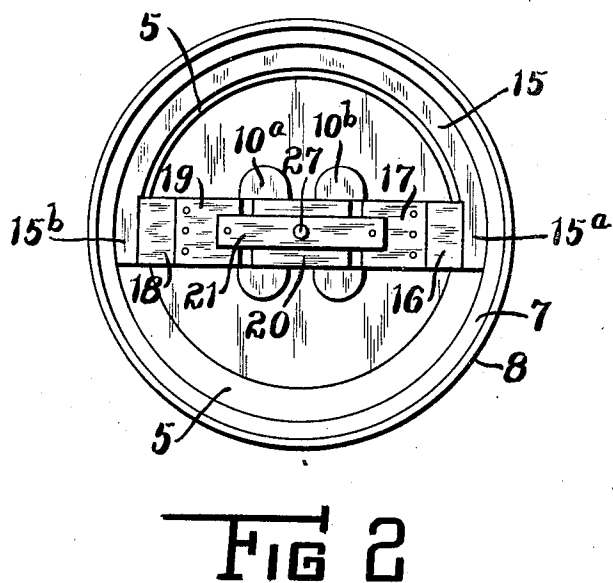


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A. A. DUNCAN
TELEPHONE RECEIVER

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A A DUNCAN
INVENTOR

BY *F. E. Shannon*
ATTORNEY

UNITED STATES PATENT OFFICE

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TELEPHONE RECEIVER

Archibald A. Duncan, Akron, Ohio

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3 Claims. (Cl. 179-114)

This invention relates to improvements in magnetically operated sound reproducing apparatus and while intended for use generally wherever it may be advantageously employed, it is particularly adapted for use in telephone receivers and loud speakers in which connection it will be illustrated in the drawing and hereinafter specifically described.

Objects of the invention are to provide a loud speaking electric receiver of simple construction which may be manufactured at a low cost and which will be efficient in use.

Other objects of the invention are to provide a receiver including a diaphragm having electromagnetic means for vibrating said diaphragm and a permanent magnet for amplifying the force of the electromagnetic means and to provide an improved arrangement of parts whereby the permanent magnet will operate to greatly increase the effect of the electromagnet without in any way distorting or otherwise effecting the normal position of the diaphragm.

Other objects are to provide a sound reproducing device which will include a diaphragm, an electromagnet having an armature operatively connected to the diaphragm and a permanent magnet arranged to permanently maintain the armature in a magnetized condition and thereby provide an armature having polarized ends each positioned in opposite polar relation to the poles of the electromagnet.

The accomplishment of the above and additional objects is attained by the novel construction, combination and arrangement of parts hereinafter described and illustrated in the accompanying drawing wherein there is shown a preferred embodiment of the invention, it being understood that changes and modifications may be made or resort had to substitutions which come within the scope of the claims hereunto appended.

In the drawing:

Figure 1 is a central, vertical, sectional view of a loud speaking unit constructed in accordance with this invention,

Figure 2 is a plan view showing the cover and diaphragm removed.

Proceeding now to a detailed description of the invention with reference to the particular adaptation thereof disclosed in the drawing, the numeral 3 is used generally to denote a casing which is preferably formed of brass or other non-magnetic material. The casing 3 is provided with a relatively small closed end portion

4 which is offset larger to provide an annular shoulder 5 and a relatively larger intermediate portion 6. The wall of the casing is offset larger at the end of the portion 6 to form the annular shoulder and the larger mouth portion 8.

The portion 4 is provided with an end wall 9 and an electromagnet 10 is suitably secured to the central portion thereof. As shown in the drawing, the magnet 10 consists of two coils 10a and 10b wound on a horseshoe core 11. The forks of the core 11 project upwardly in spaced, parallel relation and terminate in outwardly turned horizontal portions 11a and 11b. The end portion 11a forms the positive pole piece of the electromagnet 10 and the end portion 11b the negative pole piece thereof. The ends of the wire 12 forming the coils 10a and 10b terminate in suitable connecting terminals 13 and 14 whereby the same may be operatively interposed in an electric circuit.

The numeral 15 denotes a permanent horseshoe magnet which is positioned on the shoulder 5 and extends around approximately one-half of the circumference of the casing 3. The positive end of the magnet 15 is provided with a spring bracket 16 which is suitably secured to the inner side thereof and terminates in a horizontal portion which is positioned with the medial line thereof disposed along the diameter of the casing passing over the pole pieces 11a and 11b. A relatively thicker soft iron pole piece 17 is secured to the inwardly projecting portion of the bracket 16 to extend in the same general direction. The pole piece 17 extends over the outer portion of the pole piece 11b and is disposed in operative spaced relation thereto.

The negative end portion 15b is provided with a similar bracket 18 which is suitably secured to the inner face thereof with the longitudinal portion of the bracket 18 positioned with the medial line thereof disposed on the same diameter of the casing as the bracket 16. The numeral 19 denotes a negative iron pole piece which is similar to the positive pole piece 17 and is secured to the inwardly projecting end of the spring bracket 18 to extend in the same general direction with the inner end thereof projecting over the outer portion of the pole piece 11a in operative spaced relation thereto.

The numeral 20 denotes an armature of soft iron which is positioned between the pole pieces 17 and 19 with the ends thereof in operative, spaced relation thereto. The numeral 21 denotes a thin brass spring which is secured to the

pole pieces 17 and 19 and to the armature 20 to secure the same in an operative position. The spring brackets 16 and 18 are composed of magnetically conductive material and the said brackets and the brass strip 21 support the armature 20 so that it may be freely vibrated when subjected to the intermittent attraction of the magnet 10.

The numeral 22 denotes a diaphragm which is preferably composed of mica, but which may be formed of any suitable material. The marginal portions of the diaphragm 22 are supported on the shoulder 7 between the gaskets 23 and 24. A closure member 25 having a cylindrical flange is fitted in the mouth portion 8 with the axial end thereof in forced contact with the gasket 24 thus firmly securing the diaphragm 22 in an operative position in the casing 3.

The numeral 29 denotes a connecting member which is threaded or otherwise secured to the armature 20 with the upper end thereof extending through the central portion of the diaphragm 22.

The connecting member 27 is secured to the diaphragm 22 by the nuts 28 and 29 which are operated to firmly secure the members 27 in place without normally distorting the diaphragm 22. The closure member is provided with a suitable opening 30 which may be provided with a suitable nipple 31.

In operation, the terminals 13 and 14 are operatively connected in a telephone circuit. When subjected to the action of an intermittent current the magnet 10 will be energized attracting the pole piece 20 and operatively vibrating the diaphragm 22.

It will be seen that the pole piece 11a is positive, the pole piece 19 negative and the pole piece 11b negative and the pole piece 17 positive; the attraction of the electromagnet 10 will be greatly amplified resulting in a louder, clearer reproduction of sound.

It will also be seen that use of opposite polarization to intensify the action of a permanent magnet has been accomplished without substantial distortion of the diaphragm 22 when the electromagnet is not in operation thus providing an amplified receiver which will operate to reproduce sound without distortion.

Having thus illustrated my invention and described the same in detail, what I claim as new and desire to secure by Letters Patent is:—

1. In a telephone receiver, an electromagnet having a horseshoe core terminating at each end thereof in laterally projecting pole pieces, a soft iron armature positioned in spaced operative relation to said pole pieces, a permanent magnet having a spring bracket on each end thereof, a soft iron pole piece on each bracket, said armature mounted with its ends in close, spaced relation to and in the lateral plane of the pole pieces of said permanent magnet, each pole piece of said permanent magnet being positioned in close spaced relation to the pole piece at the opposite pole of the electromagnet, a diaphragm and member operatively connecting the armature to the diaphragm.

2. In a telephone receiver, an electromagnet having opposite poles presented in the same direction and having oppositely projecting flat pole pieces, a soft iron armature positioned in spaced operative relation to said pole pieces; a permanent horseshoe magnet, a spring extension on each end thereof, a soft iron pole piece on the end of each extension, said armature mounted in spaced relation between said soft iron pole pieces, a thin strip of magnetically non-conductive material connecting said armature to the soft iron pole pieces, a diaphragm and means operatively connecting said armature to said diaphragm.

3. In a telephone receiver, an electromagnet having opposite poles presented in the same direction and having oppositely projecting flat pole pieces, a soft iron armature positioned in spaced, operative relation to said pole pieces; a permanent horseshoe magnet, a spring extension on each end thereof, a soft iron pole piece on the end of each extension, said armature mounted in spaced relation between said soft iron pole pieces, a thin strip of magnetically non-conductive material connecting said armature to the soft iron pole pieces, each flat pole piece of each electromagnet projecting in spaced relation under the soft iron pole piece on the opposite pole of said permanent magnet, a diaphragm and means operatively connecting said armature to said diaphragm.

ARCHIBALD A. DUNCAN.