April 27, 1926.

1,582,417

H. E. METCALF

LOUD SPEAKING RECEIVER

Filed Jan. 28, 1924

2 Sheets-Sheet 1

Fig. 1.

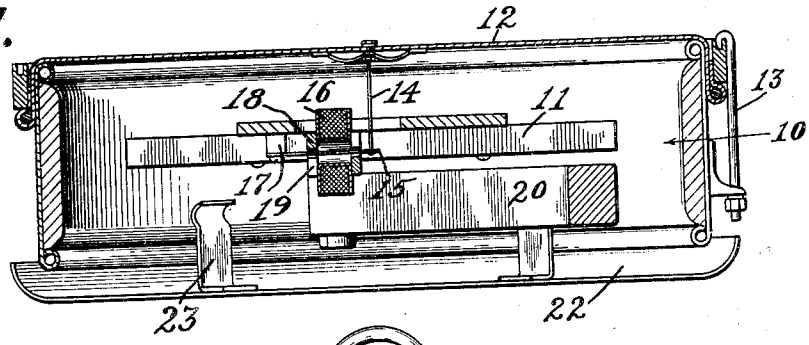
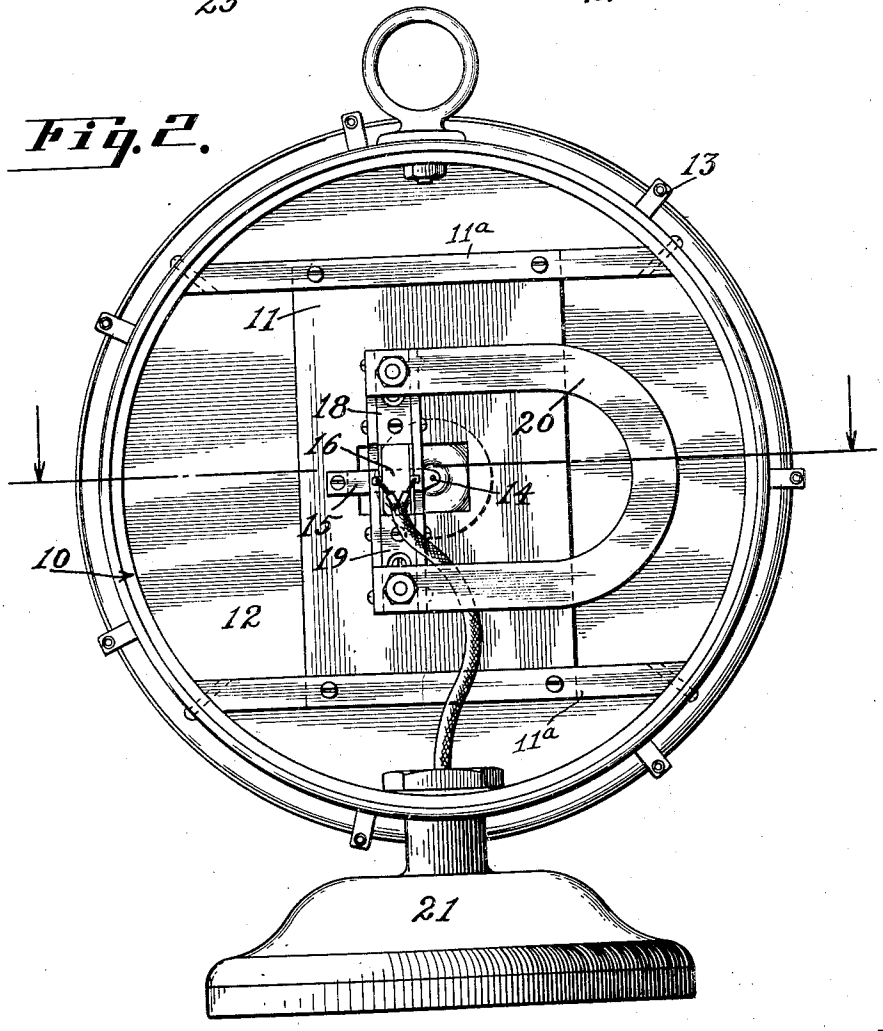


Fig. 2.



Inventor

HERBERT E. METCALF.

By Dewey, Strong, Townsend & Loftus.

Attys.

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2 Sheets-Sheet 2

Fig. 3.

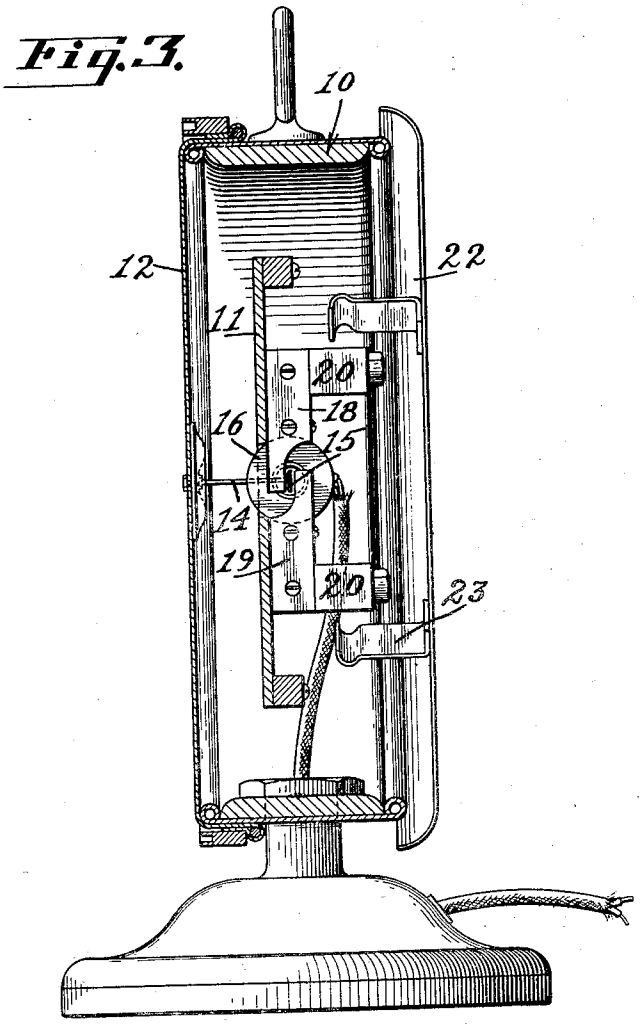
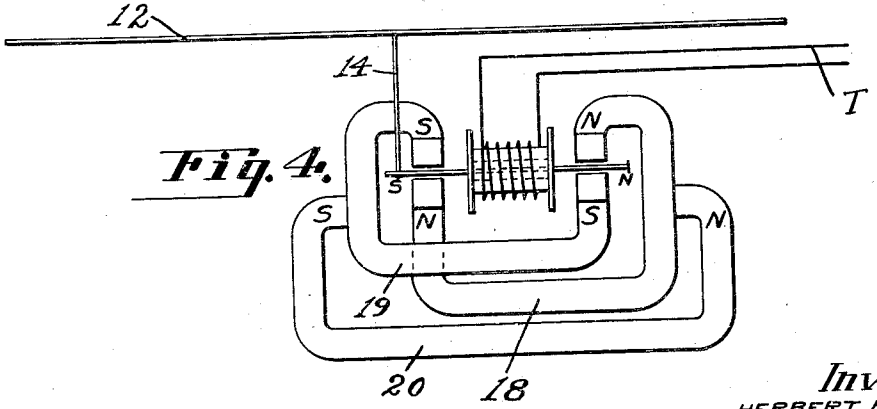


Fig. 4.



Inventor
HERBERT E. METCALF.
By Dewey, Strong, Munsell & Loftis.
Attys.

Patented Apr. 27, 1926. 1,582,417

UNITED STATES PATENT OFFICE.

HERBERT E. METCALF, OF SAN LEANDRO, CALIFORNIA, ASSIGNOR TO THE MAGNAVOX COMPANY, OF OAKLAND, CALIFORNIA, A CORPORATION OF ARIZONA.

LOUD-SPEAKING RECEIVER.

Application filed January 28, 1924. Serial No. 688,907.

To all whom it may concern:

Be it known that I, HERBERT E. METCALF, a citizen of the United States, residing at San Leandro, county of Alameda, and State of California, have invented new and useful Improvements in Loud-Speaking Receivers, of which the following is a specification.

This invention relates to loud speaking receivers, and has for its object to provide a simple and inexpensive receiver and loud speaker particularly suited for the reproduction of telephonic currents in sufficient volume for ordinary home use. A further object is to provide a device of this character which makes it unnecessary to employ the usual horn. The horn not only adds to the expense of a loud speaker, but is unsightly and takes up considerable room.

The present loud speaker depends upon vibrations imparted to a tightly stretched diaphragm of relatively large size and which is capable of setting in motion sound-waves of considerable volume. This diaphragm is constructed preferably of vegetable or animal fiber, and is capable of reproducing sounds of clear tone which are lacking in the usual metallic vibrations of prior loud speakers. The present device therefore is ideally suited for the reception and reproduction of radio concerts, and being of compact size and neat appearance, lends itself to use in the home.

One form which my invention may assume is exemplified in the following description and illustrated in the accompanying drawings, in which—

Fig. 1 shows a cross-section of a device embodying my invention;

Fig. 2 shows a rear elevation of the same;

Fig. 3 shows a cross-section taken at right angles to the view of Fig. 1;

Fig. 4 shows a diagram illustrating the operation of the receiver.

The device comprises in general a receiver of the type shown in the application of Edwin S. Pridham, Serial Number 596,709, filed October 25, 1922. However, other types of vibrating armature receivers may be employed if desired. Such a receiver is mounted in a drum 10 upon suitable base 11 carried by supporting bars 11ª. One end of the drum is covered with a stretched diaphragm 12, preferably of animal or vegetable fiber. There may also be provided tightening means 13, for tensioning the diaphragm. Connected near the center of the diaphragm is a rod 14, which in turn is secured to one end of a vibrating armature 15. An electro-magnetic coil 16 surrounds the armature and is connected to a telephone circuit T. The armature fits loosely within the coil and is supported at one end upon the frame 11, by means of a screw and block 17.

At opposite sides of the armature are forked pole-pieces 18 and 19, so disposed that their forked ends embrace the coil 16. These pole-pieces are connected at their outer ends to a permanent magnet 20. One arm or fork of each pole-piece is positioned above the armature, while the other arm or fork is positioned below the same. Therefore, considering one end of the armature, there will be a positively charged pole-piece below and a negatively charged pole-piece above; while at the opposite end of the armature that will be a positively charged pole-piece above and a negatively charged pole-piece below.

In the operation of a receiver of this type, the initial current entering the coil 16 will charge one end of the armature positively and the other end negatively. Referring now to the diagram, Fig. 4, it will be seen that the pole-piece 18 will attract the right-hand end of the armature, pulling the same upwardly, while repelling the opposite end of the armature in the same direction. The pole-piece 19 will attract the left-hand end of the armature, pulling the same upwardly, while repelling the right-hand end in the same direction. Thus both ends of the armature are acted upon simultaneously in the same direction, thereby giving greater strength of vibration thereto.

The drum preferably rests in upright position upon a pedestal 21. The rear head of the drum may be covered by any suitable form of screen, but I prefer to cover it with a disc such as indicated at 22, which disc is held removably in place by clips 23, and has its rim spaced from the walls of the drum so as to permit vibrations or sounds set up within the drum to be directed outwardly. The disc as here shown serves the function of a sounding-board, and increases the volume of the loud-speaker.

The diameter of the diaphragm 12 for ordinary purposes is from six to eight

inches, and the movements of the vibrating armature are sufficiently strong to vibrate this relatively large and tightly-stretched diaphragm. The vibrations of this diaphragm create sound-waves of considerable magnitude, and hence, without employing the usual amplifying horn, sound-waves of sufficient volume are produced to enable all those present in a room of moderate size to hear clearly and distinctly. This drum takes the place of the receiver housing and horn now employed in loud-speakers, and is much less expensive. At the same time it is superior for the reproduction of music, since metallic vibrations are not present. Its compact size and neat appearance render it attractive for use in the home.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is—

1. A loud-speaking receiver comprising a base, a drum of relatively large diameter fixed thereon on a horizontal axis, a diaphragm of fibrous material stretched across one head of the drum, supporting bars extending across the interior of the drum, and a receiver of the vibrating armature type supported on said bars within the drum, said receiver having its armature connected with said diaphragm so as to vibrate the latter.

2. A loud-speaking receiver comprising a base, a drum of relatively large diameter fixed thereon on a horizontal axis, a diaphragm of fibrous material stretched across one head of the drum, supporting bars extending across the interior of the drum, a receiver of the vibrating armature type supported on said bars within the drum, said receiver having its armature connected with said diaphragm so as to vibrate the latter, and a cover extending across the opposite head of the drum and removably supported thereon in spaced relation with the drum, so as to permit the escape of sound-waves from the interior of the drum and to provide ready access thereto.

HERBERT E. METCALF.