May 18, 1926. 1,585,022

H. H. C. DUNWOODY

TELEPHONE RECEIVER

Filed Feb. 17, 1923

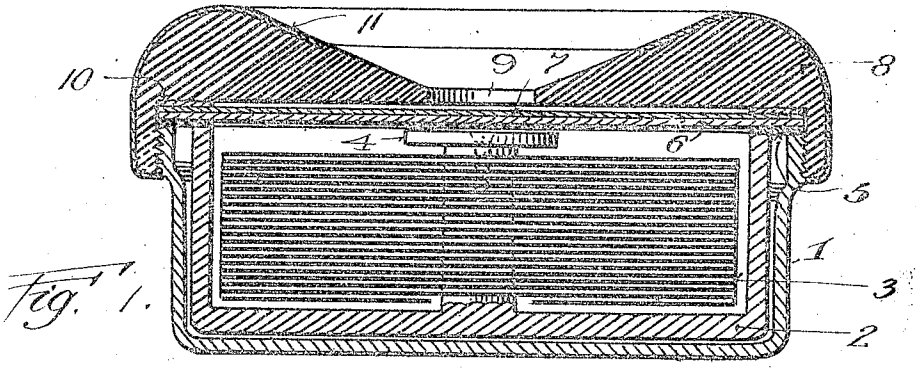


Fig. 1.

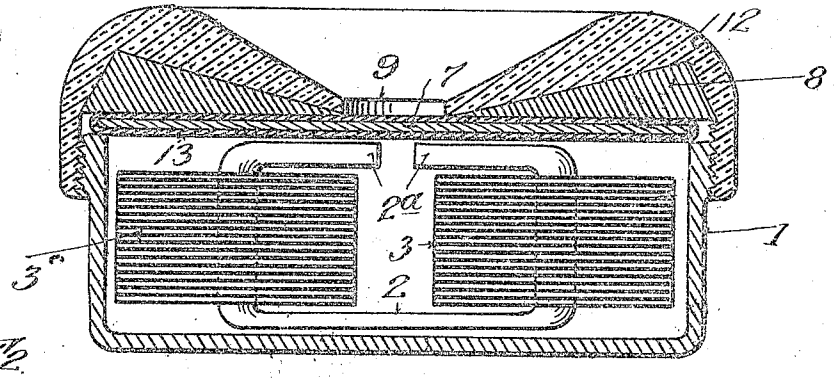


Fig. 2.

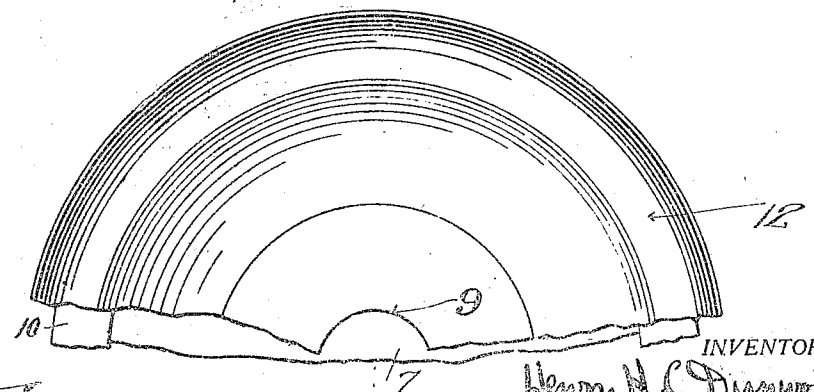


Fig. 3.

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UNITED STATES PATENT OFFICE.

HENRY H. C. DUNWOODY, OF WASHINGTON, DISTRICT OF COLUMBIA.

TELEPHONE RECEIVER.

Application filed February 17, 1923. Serial No. 619,645.

This invention relates to telephone receivers, and has for its primary object the provision of a telephone receiver which is simple in structure, efficient in operation and economical of manufacture..

A further object of the invention is to provide novel features in connection with telephone receivers which may be applied to any type or construction of telephone receiver.

Further objects of the invention will appear more fully hereinafter.

The invention consists substantially in the construction, combination, location and relative arrangement of parts all as will be more fully hereinafter set forth, as shown in the accompanying drawing and finally pointed out in the appended claims.

Referring to the drawing:

Fig. 1 is a view in section of a telephone receiver embodying my invention;

Fig. 2 is a similar view of a slightly modified construction;

Fig. 3 is a top plan view of the same.

The same part is designated by the same reference character wherever it occurs throughout the several views.

It is among the special purposes of my present invention to provide a telephone receiver which is extremely sensitive, and which at the same time is of greatly simplified construction, and completely eliminates the use of springs for returning the diaphragm thereof to its normal position, and further, which permits vibration of the diaphragm by and in accordance with the signal current substantially throughout its area, as distinguished from the telephone receivers heretofore employed wherein the peripheral edge of the diaphragm is held securely in place, and the approximate center thereof vibrated by the signal current.

While I have shown and will now describe my invention as applied to a type of telephone receiver commonly employed in the telephone and telegraph art, and known as an earphone, I wish it to be understood that I do not desire to be limited or restricted in this respect as the invention may be equally applied and adapted for use in connection with any type of telephone receiver. Furthermore, while I have diagrammatically illustrated two types of construction of telephone receivers, I wish it to be understood that I do not desire to be limited or restricted in this respect, as my invention may be applied to telephone receivers of any construction.

Referring to the drawing, and particularly to Fig. 1, I have illustrated at 1 the usual casing which encloses the electro-magnet 2, operatively associated with which is diagrammatically illustrated the coil or coils 3. In the form shown the magnet 2 is provided with a button 4 secured to a portion thereof. A ring 5 of some soft resilient material such as rubber is positioned on top of the casing 1, and the magnet 2. A diaphragm 6 of some non-conducting material such as a thin layer of spruce wood, mica, etc., is positioned thereover. A second diaphragm 7 of metal is positioned over the diaphragm 6. In accordance with my invention I provide an ear-piece or cap which consists of a permanent magnet 8, preferably formed in the shape usually employed for the ear-piece or cap, and provided with the central orifice 9, through which the vibratory sound waves set up by the signal current passing through the coil or coils 3 are allowed to pass. If desired, and as shown, a second ring or washer 10 may be interposed between the metallic diaphragm 7 and the permanent magnet 8, which washer or ring is preferably of some resilient material similar to the washer 5.

With the telephone receiver constructed as herein set forth it will be apparent that the permanent magnet 8 will at all times attract the metallic diaphragm 7, and that the metallic diaphragm 7 will be drawn away from the permanent magnet 8 upon the operation of the electromagnet 2, which, as is obvious, is controlled by the voice currents. The permanent magnet at all times draws the diaphragm 7 back to its normal positon, which incidentally is out of contact with the permanent magnet, thereby permitting vibration of substantially the entire area of the diaphragm by and in accordance with signal current with practically no lag. It might, of course, be objectionable to have the permanent magnet 8 in contact with the flash in operation, and, therefore, if desired, an elastic or other form of coating 11 may be placed over a portion of or the entire outer surface of the magnet 8, as shown in Fig. 1.

Referring to Fig. 2, I have shown my invention as applied to the type of telephone

receiver which employs as the core of its electro-magnet a horseshoe magnet 2, the two legs, 2^a, of which are bent to give as large and effective an area as possible so that the effect thereof may be spread over as large an area of the diaphragm as possible.

Two modifications of my invention are shown in Fig. 2, merely as a matter of convenience, and to avoid the necessity of duplication of the drawings. One modification is that a very light non-magnetic material may be employed for the cap as illustrated at 12, and the cap may be provided with a recess therein in which the permanent magnet 8 is placed.

Another modification illustrated in Fig. 2 is that instead of employing two separate diaphragms as in Fig. 1, together with the resilient washers or rings 5 and 10, a single metallic diaphragm 7 may be employed provided with a coating on one or both sides of a resilient material such as rubber. In the form shown the diaphragm consists of the metallic disk 7 encompassed by an elastic 13. The elastic may, if desired, be cut away at one or more portions thereof to enhance the effect of the permanent magnet 8 on the diaphragm 7.

Many other modifications and changes in detail will readily occur to those skilled in the art without departing from the spirit and scope of my invention as defined in the claims, but having now set forth the objects and nature of my invention, and having shown and described structures embodying the principles thereof.

What I claim as new and useful and of my own invention and desire to secure by Letters Patent is:

1. In a telephone receiver, a diaphragm, an electro-magnet positioned on one side thereof, and a permanent magnet positioned on the other side and extending substantially across one surface thereof, and means for preventing said diaphragm from adhering to either of said magnets.

2. In a telephone receiver, a case, a diaphragm carried by said case, an electro-magnet located in said case to actuate said diaphragm, an ear-piece for said case, and a permanent magnet associated with said ear-piece and extending across substantially all of one surface of the diaphragm for influencing said diaphragm in opposition to said electro-magnet, and means for preventing said diaphragm from adhering to either of said magnets.

3. In a telephone receiver, a diaphragm carried by said case, an electro-magnet located in said case to actuate said diaphragm, an ear-piece for said case, and a permanent magnet forming part of said ear-piece for influencing said diaphragm in opposition to said electro-magnet.

4. In a telephone receiver, a case, a diaphragm carried by said case, an electro-magnet located in said case to actuate said diaphragm, an ear-piece for said case, and a permanent magnet forming part of said ear-piece for influencing said diaphragm in opposition to said electro-magnet, and means for preventing said diaphragm from adhering to either of said magnets.

5. In a telephone receiver, a case, a diaphragm carried by said case, an electro-magnet located in said case to actuate said diaphragm, an ear-piece for said case, and a permanent magnet forming part of said ear-piece for influencing said diaphragm in opposition to said electro-magnet, and means to permit free vibration of substantially the entire area of said diaphragm.

6. In a telephone receiver, a diaphragm, an electro-magnet positioned on one side thereof, and a permanent magnet postioned on the other side and extending substantially across one surface thereof, and a non-magnetic covering for said diaphragm.

7. In a telephone receiver, a case, a diaphragm carried by said case, an electro-magnet located in said case to actuate said diaphragm, an ear-piece for said case, and a permanent magnet associated with said ear-piece and extending across substantially all of one surface of the diaphragm for influencing said diaphragm in opposition to said electro-magnet, and a non-magnetic covering for said diaphragm.

8. In a telephone receiver, a case, a diaphragm carried by said case, an electro-magnet located in said case to actuate said diaphragm, an ear-piece for said case, and a permanent magnet forming part of said ear-piece for influencing said diaphragm in opposition to said electro-magnet, and a non-magnetic covering for said diaphragm.

In testimony whereof I have hereunto set my hand on this sixth day of February A. D., 1923.

HENRY H. C. DUNWOODY.