L. STEINBERGER.

TELEPHONE RECEIVER.

APPLICATION FILED JUNE 12, 1919.

1,402,546. Patented Jan. 3, 1922.

Fig. 1.

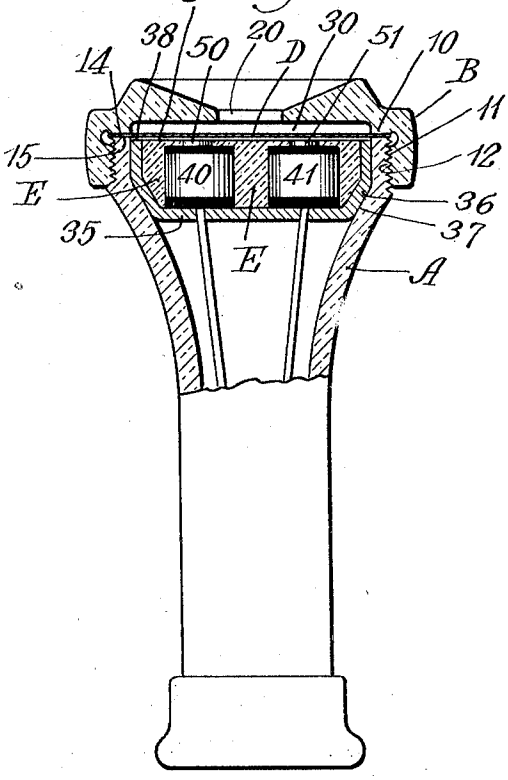


Fig. 2.

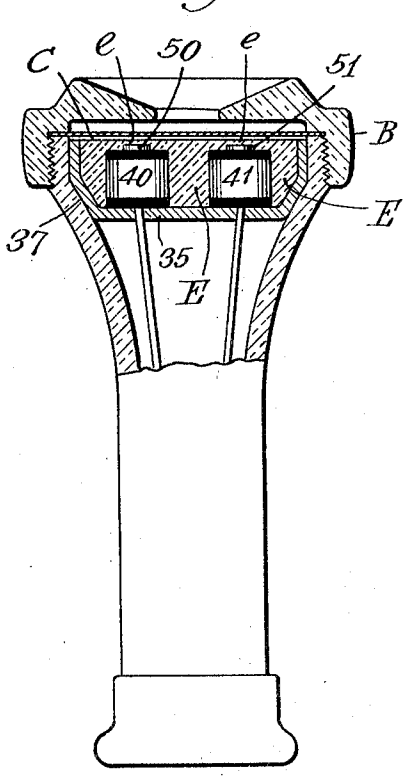


Fig. 3.

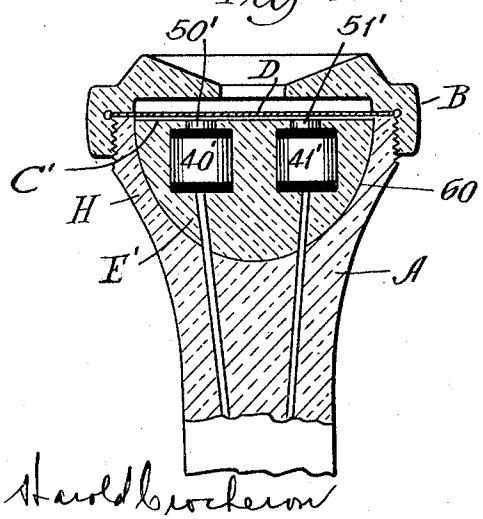
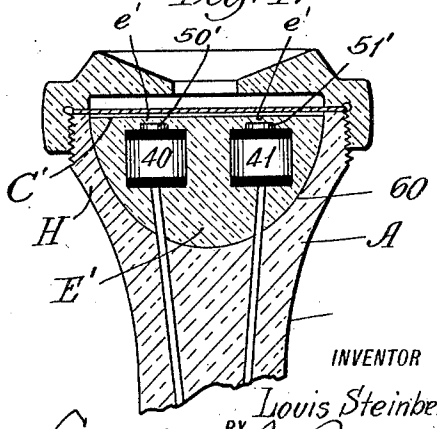


Fig. 4.



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TELEPHONE RECEIVER.

1,402,546. Specification of Letters Patent. Patented Jan. 3, 1922.

Application filed June 12, 1919. Serial No. 303,724.

To all whom it may concern:

Be it known that I, LOUIS STEINBERGER, a citizen of the United States, and a resident of the borough of Brooklyn, city and State of New York, have invented certain new and useful Improvements in Telephone Receivers, of which the following is a specification.

This invention relates to the art of telephony and more particularly to the structure of telephone receivers.

The principal object of the invention is to provide a telephone receiver of such structure as to deaden all extraneous sounds which may reach the diaphragm.

Another object is to so construct a telephone receiver that the diaphragm will effect louder and clearer tones of the sounds produced, by reason of the fact that there is provided a continuous and uniform surface, preferably flat, immediately adjacent the inner side of the diaphragm so that the sound waves produced by the diaphragm will re-act upon this adjacent surface.

Another object of the invention is to so construct the receiver that all harmonics will be shut out because of the short action of the overtones.

With these and other objects in view the invention consists in the particular construction and arrangement of parts and their equivalents as will be hereinafter clearly pointed out in the subjoined specification and claims.

Referring to the drawings in which the same reference character indicates the same part in the several views:

Fig. 1 is a vertical view, partly broken away and partly in vertical section of a telephone receiver embodying my invention.

Fig. 2 is another view of a similar form of telephone receiver embodying my invention.

Fig. 3 is a fragmentary view partly in vertical section of still another form of receiver embodying my invention.

Fig. 4 is a view of another form of my invention similar to the forms shown in Figs. 2 and 3.

In each of the figures of the drawing the telephone receiver is of the general structure of receivers ordinarily in use with the sole exception of those portions embodying my improvements, which latter will be hereinafter more particularly described.

Figs. 1 and 2 show a telephone receiver having the shell or body A constructed of the usual insulating material, a cap or ear portion B and diaphragm D, also of the usual construction.

The diaphragm D is secured in place between the body A and the cap B in any approved manner. The means shown consist of the flange portion 10 of the cap which is provided with internal screw-threads 11 engaging with the external screw-threads 12 on the upper part of the main body A of the receiver, the diaphragm D being tightly held at its periphery between the abutting faces 14 and 15 of the body and cap respectively.

The cap B is provided with a central opening 20 and is so constructed that when the respective parts are in place, there will be an air chamber 30 formed between the inner surface of the cap and the upper surface of the diaphragm.

The usual magnets 40 and 41 are provided which are suitably connected in an approved way to the terminals (not shown).

All of the above stated elements are of the approved construction and they are referred to herein in a general way only, so as to make the structure and purpose of my invention clear.

In the upper portion of the form of the body of telephone receiver such as ordinarily used, is a metal cap or saucer 35 which is so formed and constructed that the outer sides 36 thereof will rest on the inner surface 37 of the upper portion of the main body A of the receiver, the upper edge 38 of the cap B extending nearly to but not quite to the upper flat horizontal face 14 of the body portion A of the receiver.

The metal cap or saucer 35 containing the magnetic spools is filled with an insulating material E, preferably rigid or semi-rigid, that is, sufficiently rigid to mold it and sustain its form when placed within the cap and around the magnetic spools, and my invention resides broadly in this construction, and in other specific details to be hereinafter set forth.

As shown in Fig. 1, the insulating material E fills the cap and surrounds the magnetic coils 40 and 41, and reaches up to the level of the upper surface of the magnetic tongues or cores 50 and 51 extending from the spools, or the insulating material may extend nearly to the surface of the horizontal plane of the magnetic tongues so that in both instances the upper faces of the tongues will be ex-

posed and there will be an air space or chamber C of limited capacity formed between the under surface of the diaphragm D and the upper surface of the body of insulating material E.

In the construction shown in Fig. 2, the body of insulating material E placed within the metallic cap or saucer 35 extends upwardly a sufficient distance to completely fill the saucer and yet completely embed the metallic spools 40 and 41 and the magnetic tongues 50 and 51 extending therefrom, thus leaving a thin layer *e* of the insulating material E over the tongues. Of course, care must be exercised not to provide too thick a layer of insulating material over the tongues, but a layer sufficiently thin will not obstruct in any way the operation or effect of the magnetic tongues upon the diaphragm when placed in circuit because the magnetic action will operate through this thin layer of insulating material *e* provided it is sufficiently thin.

By reason of the construction just described and illustrated in Figs. 1 and 2, it will be observed that the block or body of insulating material E is separate from and may be lifted out of the metallic cap or saucer 35 when desired. Care must be taken, however, that no air spaces are left between the insulating material E and the surfaces of the cap or saucer against which the material E lies.

The constructions shown in Figs. 3 and 4 differ from those shown in Figs. 1 and 2 in this respect. In the construction of Figs. 3 and 4, I provide a structure substantially like that shown in my Patent No. 847,842, granted March 19. 1907, in which the body portion A of the telephone receiver is made up of a moldable insulating material such as electrose, and it may be provided with a metallic covering such as shown in the above mentioned patent, or it may be made entirely of a solid piece of insulating material as aforesaid.

The diaphragm D and the cap B are secured to the main body of insulating material forming the telephone receiver by the same means and in the same way as described with respect to the structure shown in Figs. 1 and 2.

A depression or cavity 60 is provided in the upper portion of the insulating material H forming the main body of the telephone receiver, as shown in my prior patent just above referred to, and in this cavity or depression 60 I embed the magnetic coils 40′ and 41′ and the magnetic tongues 50′ and 51′, either to the surface of the latter as shown in Fig. 3, so that the tongues are exposed, or completely embed the coils and tongues to a point just above the surface of the tongues, leaving a thin layer *e′* of insulating material thereon, as shown in Fig. 4, similar respectively, to the structures shown in Figs. 1 and 2.

In Figs. 3 and 4 the body of insulating material E′ which is contained in the cavity 60 of the main portion of the body of insulating material is not capable of ready detachment from the main body of the telephone receiver, as it is in the case of the construction illustrated in Figs. 1 and 2, but in other respects the function and construction is the same, thus forming an air chamber C′ between the inner side of the diaphragm and the upper surface of the main body of insulating material E′ in the cavity 60.

By means of this additional body of insulating material in all the forms shown surrounding the coils and tongues of the magnetic spools, I am enabled to attain several important functions, namely, to deaden all extraneous sounds which may reach the diaphragm; to cause the diaphragm to produce louder and clearer tones due to the fact that the produced sound waves will react upon the flat uniform surface afforded by the insulating material which is situated just below the under side of the diaphragm.

By means of this construction, as heretofore stated, all harmonics will be shut out because of the short action afforded the overtones.

This invention is particularly useful in the telephone installations now required for airplane work.

The insulating materials used may be of any suitable kind, and I have found that the insulating material known in the art as electrose is very desirable for this purpose, both in forming the main bodies and caps of the receiver, and also in forming the blocks E and E′ as above described.

As changes of construction could be made within the scope of my invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

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

1. A telephone receiver including a body portion, a diaphragm, magnets for vibrating said diaphragm, and means for securing the diaphragm to the body portion, the said body portion having a chamber adjacent to the diaphragm which has a smooth uninterrupted surface substantially parallel to the surface of said diaphragm against which the sound waves produced by the diaphragm react.

2. A telephone receiver including a body portion, a diaphragm, magnets for vibrating said diaphragm, and means for securing the diaphragm to the body portion, a member secured to said body portion for supporting

said magnets and for providing a smooth uninterrupted surface substantially parallel to said diaphragm against which the sound waves produced thereby react.

3. A telephone receiver including a body portion, a diaphragm, magnets for vibrating said diaphragm, means for securing the diaphragm to the body portion, and a detachable shell secured to said body portion, a mass of insulating material embedding said magnets in said shell, the insulating material forming a solid mass entirely filling said shell and having a perfectly smooth surface opposite said diaphragm which is not interrupted by projections or openings.

4. A telephone receiver having a portion thereof formed to provide a continuous uniform surface without projections or openings adjacent to the inner side of the diaphragm against which the sound waves produced by said diaphragm react.

5. A telephone receiver having a detachable unit arranged to be secured adjacent to the inner side of the diaphragm to provide a continuous uniform surface without projections or openings against which the sound waves produced by the diaphragm react.

6. A telephone receiver having a body with a cavity formed therein, and a detachable barrier in said cavity adjacent the inner side of the diaphragm to exclude the harmonics which are normally set up in said cavity, said barrier having a smooth continuous outer surface.

In witness whereof, I have hereunto set my hand at the borough of Manhattan, city and State of New York, this 6 day of June, 1919.

LOUIS STEINBERGER.

In presence of—
ISABEL R. FLETCHER.