

(No Model.)

E. A. GRISSINGER.
TELEPHONE RECEIVER.

No. 468,246.

Patented Feb. 2, 1892.

Fig. 1.

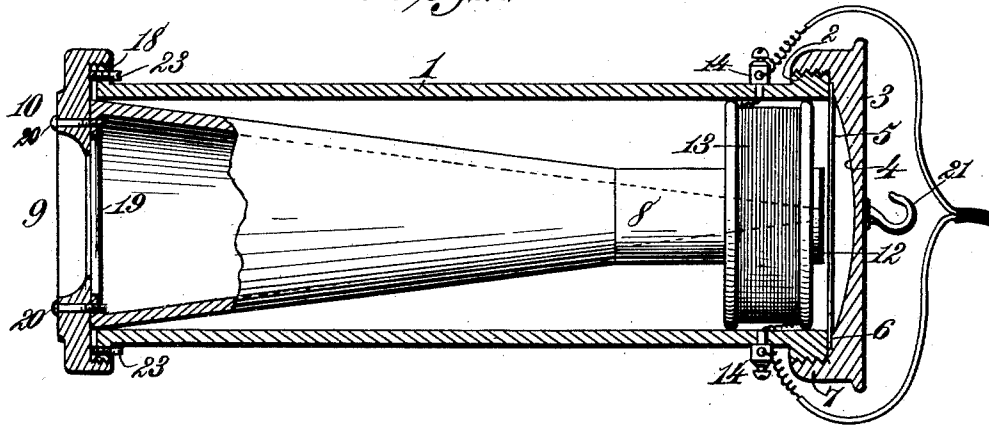


Fig. 2.

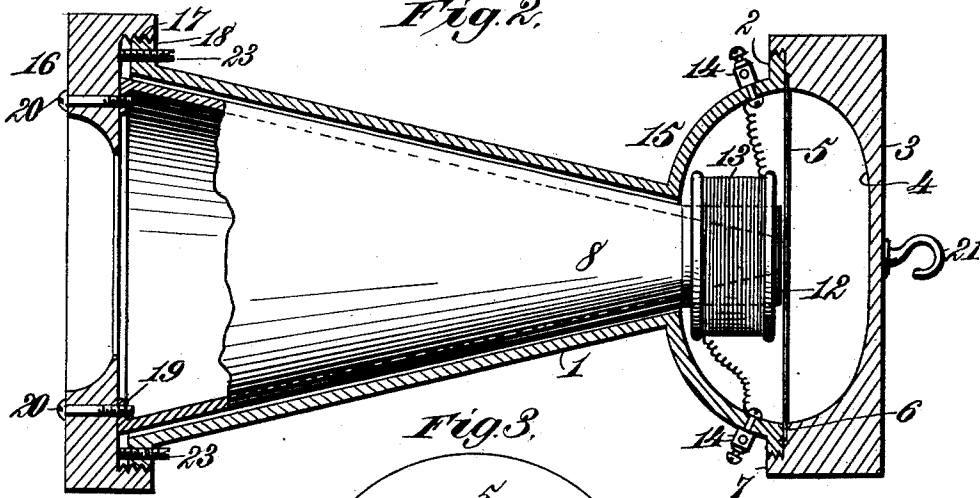


Fig. 3.

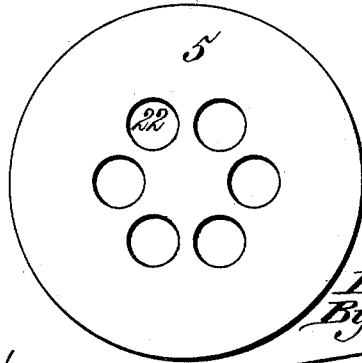
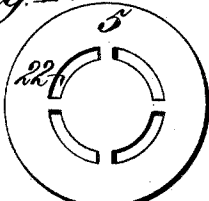


Fig. 4.



Witnesses.

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UNITED STATES PATENT OFFICE.

ELWOOD A. GRISSINGER, OF MECHANICSBURG, PENNSYLVANIA.

TELEPHONE-RECEIVER.

SPECIFICATION forming part of Letters Patent No. 468,246, dated February 2, 1892.

Application filed May 29, 1891. Serial No. 394,529. (No model.)

To all whom it may concern:

Be it known that I, ELWOOD A. GRISSINGER, a citizen of the United States, residing at Mechanicsburg, in the county of Cumberland and State of Pennsylvania, have invented new and useful Improvements in Receivers for Electrical Telephones, of which the following is a specification.

My invention relates to improvements in electrical telephones, and the purpose thereof is to provide a receiver wherein the vibrations of the metallic disk or diaphragm produced by the variations in intensity of the magnetizations of the permanent magnet shall produce sound-waves which traverse the receiver in parallelism with its axis and are constantly amplified as they approach the ear, thereby causing an increase in intensity and a marked improvement in the distinctness of the reproduced vibrations.

It is my purpose, also, to provide a receiver for an electric telephone wherein the extremely-minute vibrations of the diaphragm are reflected from a focusing-surface immediately behind, whereby the sound-waves reproduced are all conveyed to the ear and the volume of sound received materially amplified.

My invention also has for its purpose the provision of certain novel features in the construction of the permanent magnet whereby molecular vibration is largely increased and concentrated, together with other improvements in construction and arrangement of parts, all of which will be fully described hereinafter, and then more particularly pointed out and defined in the claims concluding this specification.

To enable others skilled in the art to make, construct, and use my said invention, I will proceed to describe the same in detail, reference being had for such purpose to the accompanying drawings, in which—

Figure 1 is a central longitudinal section of a telephonic receiver constructed substantially in accordance with my invention. Fig. 2 is a similar section showing a slight change in the construction of the exterior shell or handle. Fig. 3 is a detail view showing a modified form of diaphragm. Fig. 4 is a similar view showing a further modification of the diaphragm.

In the said drawings, the reference-numeral 1 denotes the outer shell or handle of the receiver, which is usually of cylindrical form and constructed from any suitable material—such, for example, as hard rubber. At one end of this shell is formed a collar 2, having a male thread, upon which is screwed a cap 3, having an interior concave face 4 concentric with the axis of the shell 1. Between this cap and the end of said shell is arranged the metallic diaphragm 5, its margin being clamped between the two contacting surfaces formed by the face of the collar 2 and a narrow shoulder 6 lying between the concave face of the cap and its threaded flange 7.

Within the shell or handle, and nearly coincident with the length thereof, is arranged a permanent magnet 8, composed of a substantially cone-shaped or conoidal shell of steel permanently magnetized, having its axis substantially coinciding with that of the exterior shell 1. The enlarged end of the metallic shell lies at the open end 9 of the receiver, which is provided with an annulus 10, forming an ear-piece and providing an internal collar for the end of the magnet. At a little distance from its other and smaller end the metallic shell or magnet assumes an exterior cylindrical form, while retaining the conical shape of its interior face. By this construction the end 12 of the magnet adjacent to the diaphragm is gradually thickened, and mounted thereon is the spool 13, containing the fine wire of the induction-coil, the terminals of which pass to binding-posts 14, beyond which they are insulated, united, and connected with the line and with earth in the usual manner.

The flanges of the spool 13 are of such diameter as to fit the interior of the shell or handle and provide a support for the end 12 of the permanent magnet.

I may modify the construction described by making the exterior shell or handle conform more or less closely to the form of the permanent magnet, as shown in Fig. 2. In this modification the induction-coil and the end 12 of the magnet on which it is mounted are inclosed by a spherical segment 15, formed or mounted on the smaller end of the cone-shaped handle. As the end of the permanent magnet is thus deprived of its support by the

flanges of the spool of the induction-coil, I attach its enlarged end to a removable ear-piece 16, which I provide with an interiorly-threaded flange 17, screwing upon a collar 18 on the end of the handle. The end of the magnet is provided with a collar 19, resting against the inner face of the ear-piece, to which it is fastened by screws 20. The magnet is adjusted toward and from the diaphragm by the screw adjustment of the ear-piece 16 upon the handle. In other respects the construction is not materially different from that already described. A hook 21 is usually attached to the cap 3, whereby the receiver is connected to the cut-out on the telephone.

It will be seen that by means of my invention I am enabled to give increased efficiency to the receiver, as all the undulations set up by the vibrations reproduced by the diaphragm are rendered effective by reflection from the concave inner face of the cap and by a concentration or focusing of the same upon the diaphragm. The conical inner surface of the permanent magnet also forms a reflecting and amplifying surface by which the undulations are caused to travel in parallelism with the axis of the shell. Moreover, if the theory of molecular vibration is accepted, it would seem that this form imparts a greatly-increased surface and in a measure directs or concentrates the lines of molecular movement toward the auditory organ. By my construction of the permanent magnet, also, I am able to secure a largely-increased surface for the magnetization by the induction-coil, as well as a greater mass for saturation, and I am able to provide a simple and accurate adjustment for the permanent magnet relatively to the diaphragm. As a result of these features, I obtain a greater volume of reproduction of sound, which is clear and well defined, while the phases of articulate speech are reproduced with increased accuracy.

It should be noted that in some cases I use a diaphragm 5, provided with a group of perforations or openings 22, as shown in Fig. 3, whereby the vibrations reflected from the concave face 4 of the cap may have free passage.

The ear-piece 10 in Fig. 1 is provided with small bolts or screws 20, engaging an internal collar 19 on the large end of the permanent magnet, whereby the latter is rigidly connected to the ear-piece. By screwing the latter farther on or off the permanent magnet may be adjusted relatively to the diaphragm 5, which in this figure and in Fig. 2 is shown as solid or imperforate. In order to lock the parts after the adjustment is effected, a set-screw 23 is tapped through the external collar 18, its end abutting against the ear-piece and holding it fast.

I may use any form of perforation in the diaphragm and any number of such perforations. In Fig. 4 I have shown a modified form of these openings.

Heretofore and prior to my invention telephone-receivers have been used having a per-

manent magnet provided with a long tubular sound-conducting passage communicating at the outer end with a flaring, expanding, or cone-shaped mouth. My invention differs from these in that the sound-conveying passage in the permanent magnet is conical throughout, by which I obtain a marked difference of result.

What I claim is—

1. In a receiver for electric telephones, a permanent magnet having an interior sound-conveying surface of conical form throughout, substantially as described.

2. In a receiver for an electric telephone, the combination, with an outer shell or handle, of a cap having an interior concave surface, a permanent magnet composed of a metallic shell having an interior conical face, its smaller end being thickened gradually by making a portion of the exterior face cylindrical, an induction-coil mounted thereon, and a diaphragm between the thickened end of said magnet and the concave face of the cap, substantially as described.

3. In a receiver for an electric telephone, the combination, with an exterior shell having a cap closing one end and provided with a concave inner face, of a diaphragm between said face and the end of the shell, a permanent magnet composed of a substantially-conical metallic shell open at both ends, and an induction-coil the spool of which fits the end of the outer shell and receives and supports the smaller end of the permanent magnet, substantially as described.

4. In a receiver for an electric telephone, the combination, with a handle, of a cap closing one end and having an inner concave face, a perforated diaphragm between the cap and the end of the handle, a permanent magnet consisting of a cone-shaped metallic shell open at both ends and having its smaller end next the diaphragm gradually thickened, and an induction-coil mounted thereon, substantially as described.

5. In a receiver for an electric telephone, the combination, with a shell or handle having a cap closing one end and a diaphragm between the two, of a permanent magnet consisting of a cone-shaped shell, the large open end having a collar receiving screws or bolts, and an ear-piece screwed upon the open end of the handle, through which screws or bolts are inserted, substantially as described.

6. In a receiver for an electric telephone, the combination, with a shell or handle having a diaphragm at one end, of a permanent magnet consisting of a cone-shaped metallic shell having a collar on its larger end, an ear-piece screwing upon the said end of the handle, screws or bolts passing through said ear-piece and tapped through the collar on the magnet, and a set-screw tapped through an external collar on the handle and abutting against the ear-piece, substantially as described.

7. A receiver for an electric telephone, con-

- sisting of a metallic shell having a substantially-conical sound-conveying opening of uniformly-diminishing diameter from end to end, an induction-coil the spool of which is mounted upon the smaller end of said shell, which is of cylindrical form outwardly, and a diaphragm between a detachable cap and the end of an inclosing shell or handle, substantially as described.
8. In a telephone-receiver, as a permanent magnet, a metallic shell having a sound-opening continuously contracting in diameter from end to end to form a substantially-conical opening, in combination with an induction-coil having its spool mounted upon the smaller end of the shell, which is of cylindrical form outwardly, and an outer or inclosing shell constituting a handle connected at one end to the large end of the permanent magnet and having its other end supported by the spool of the induction-coil, substantially as described.
- In testimony whereof I have hereunto set my hand and affixed my seal in presence of two subscribing witnesses.
- ELWOOD A. GRISSINGER. [I. s.]
- Witnesses:
M. M. DOUGHERTY,
THEO. GRISSINGER.