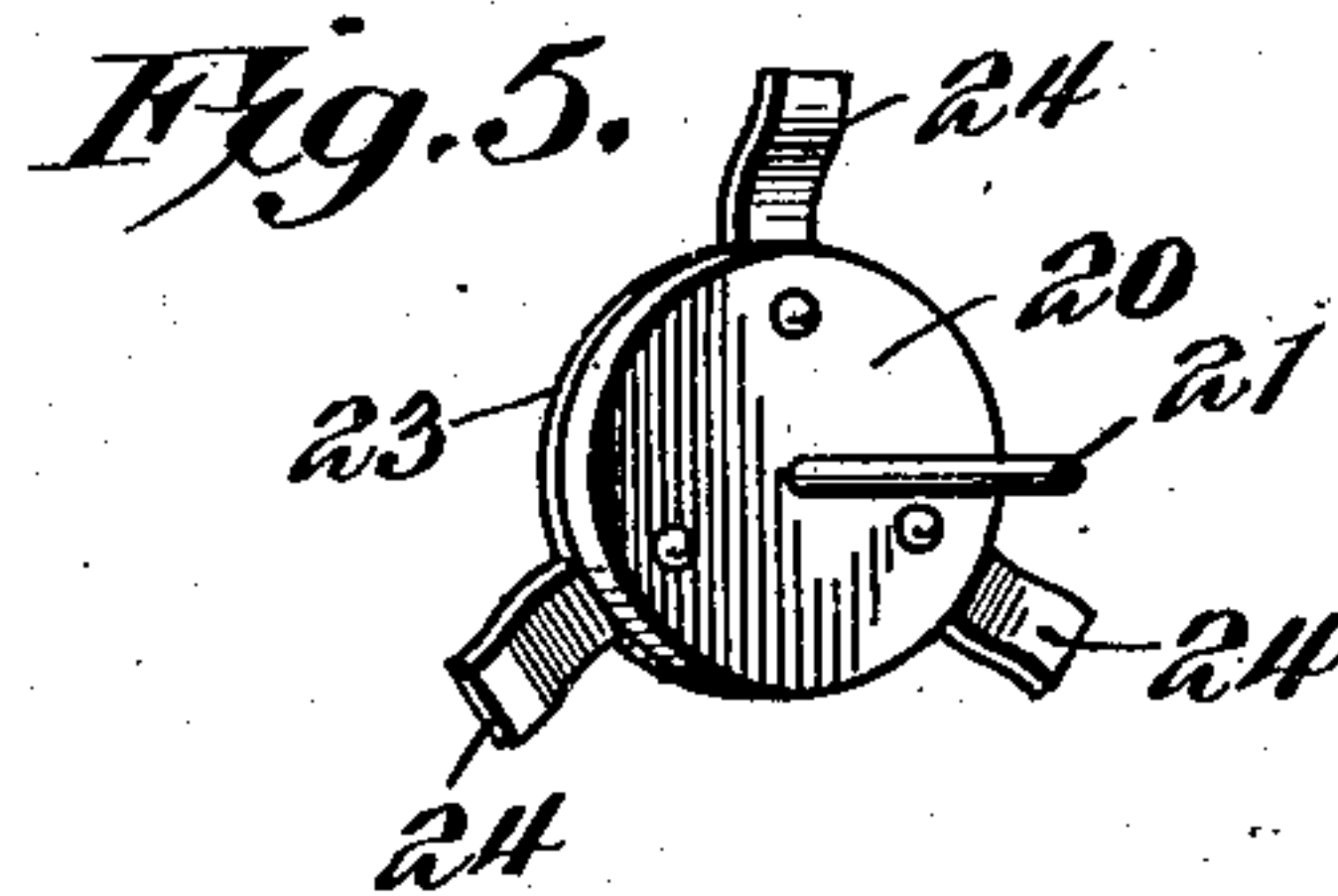
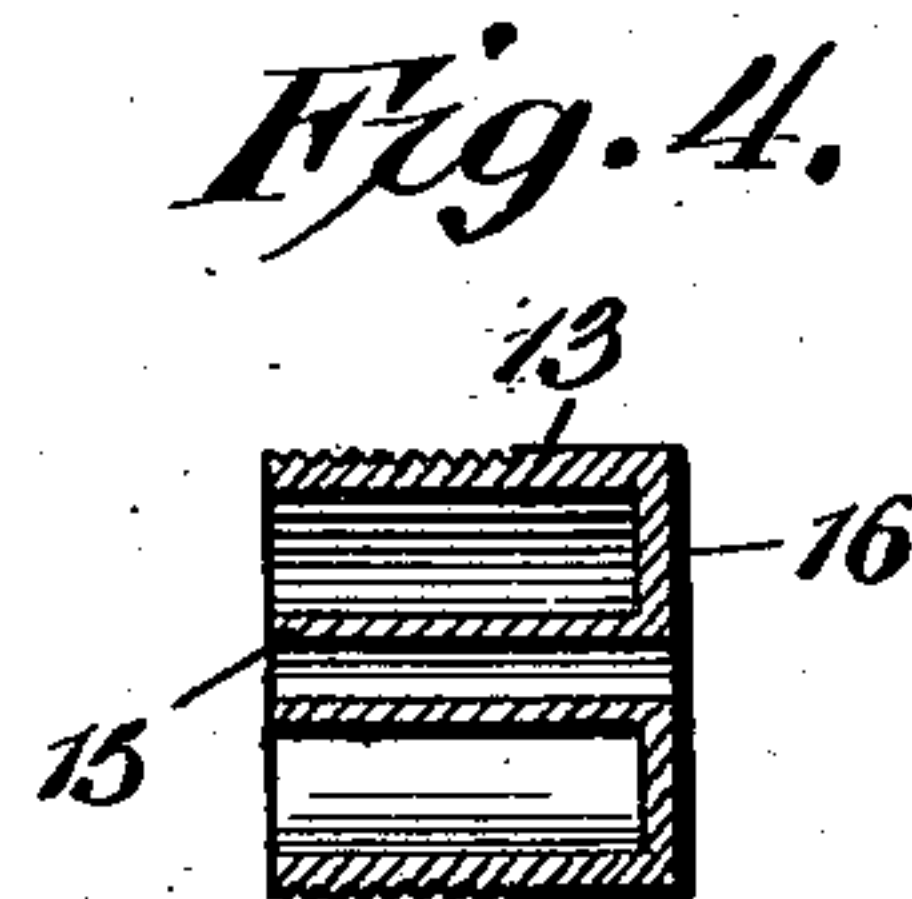
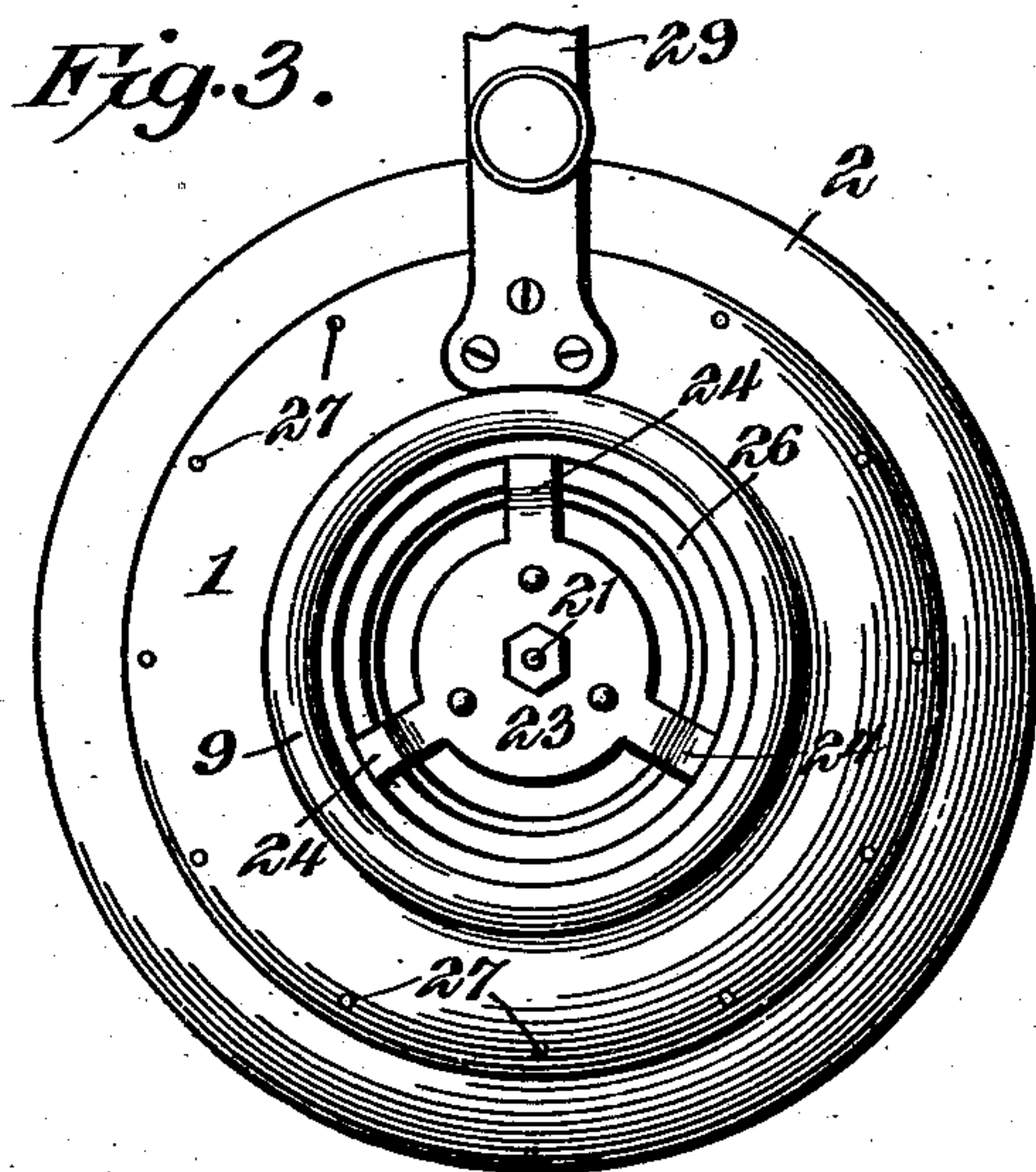
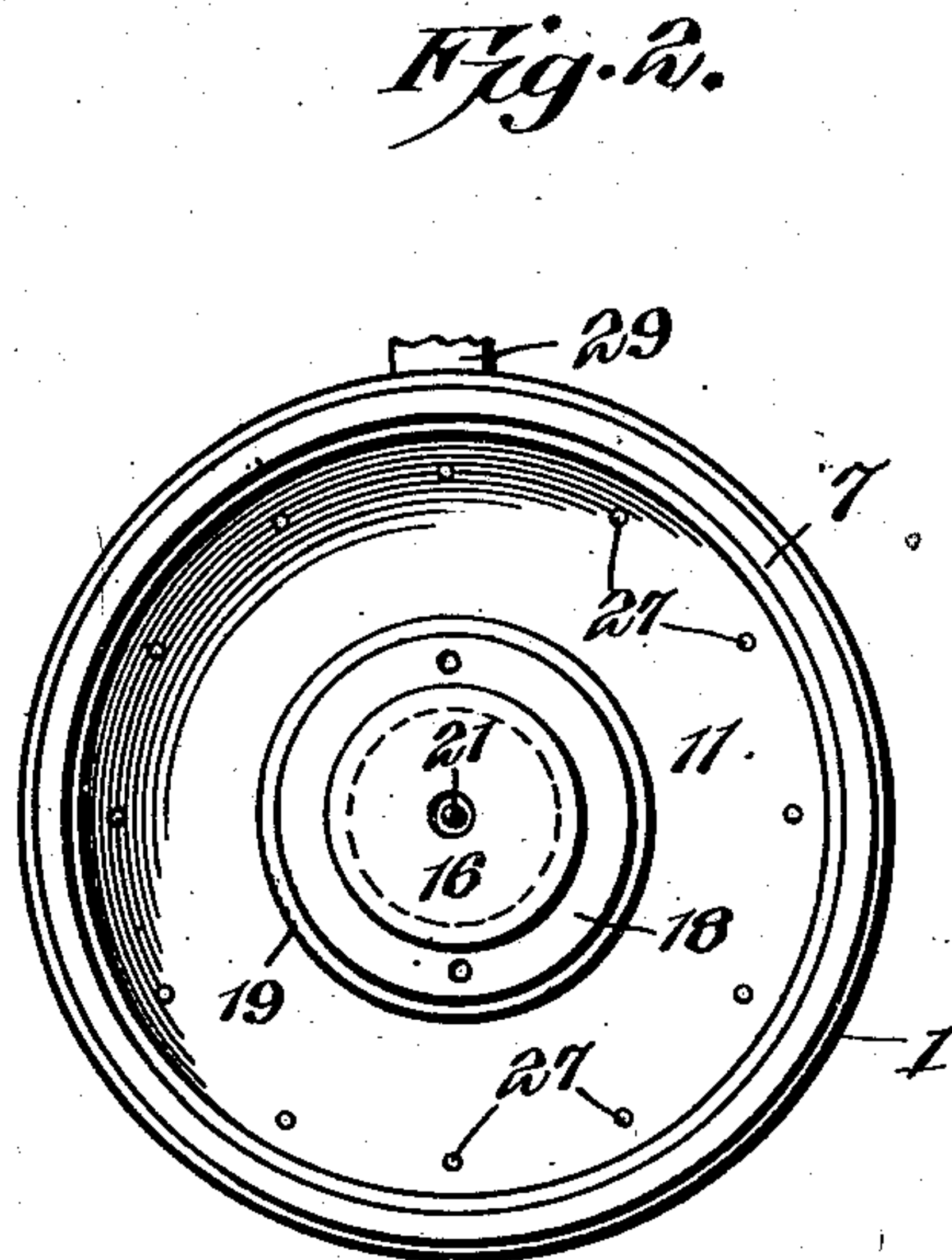
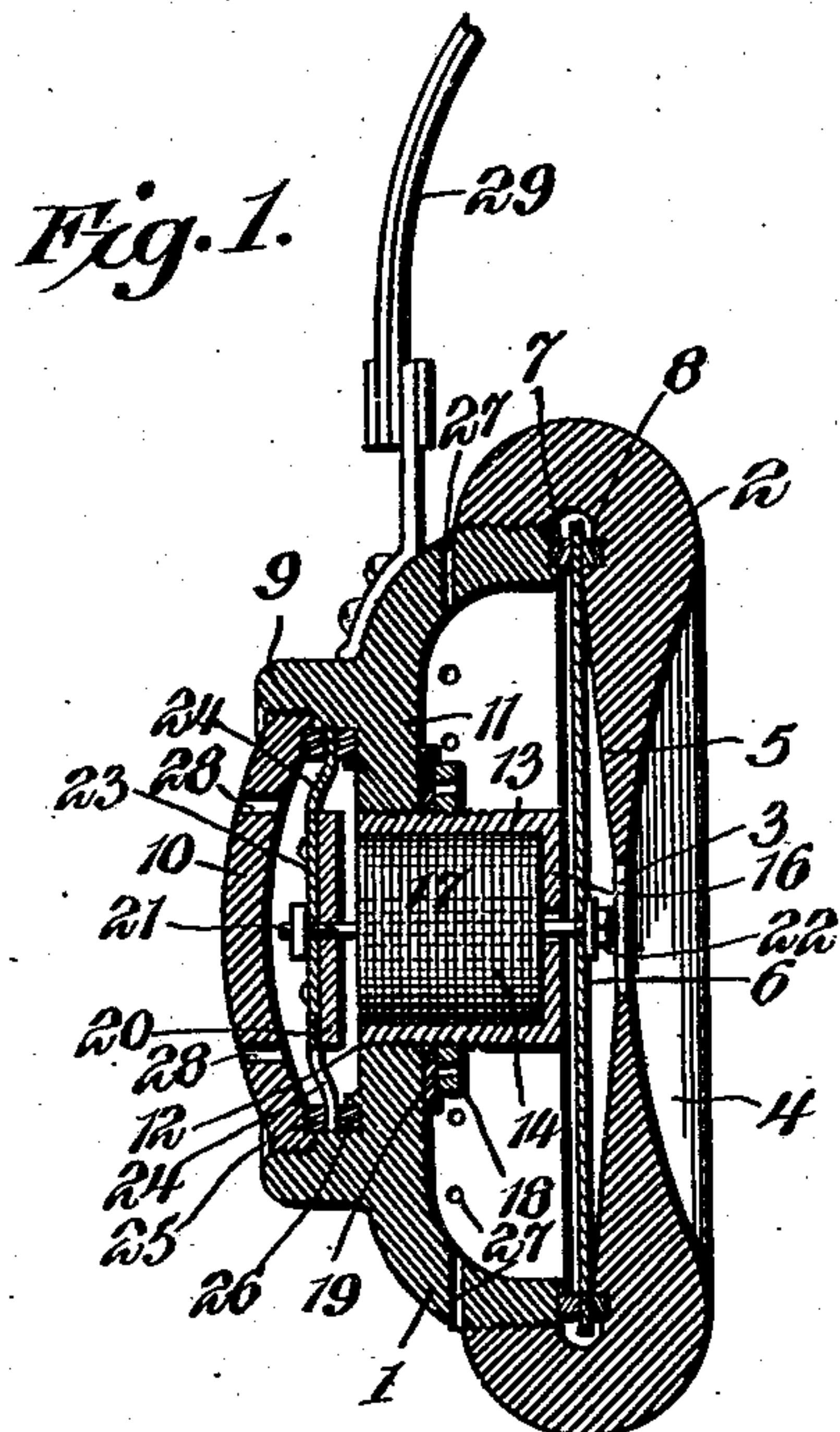


No. 881,712.

PATENTED MAR. 10, 1908.

H. G. PAPE.
TELEPHONE RECEIVER.

APPLICATION FILED JUNE 16, 1904. RENEWED JAN. 25, 1908.



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By

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UNITED STATES PATENT OFFICE.

HERMANN G. PAPE, OF NEW YORK, N. Y.

TELEPHONE-RECEIVER.

No. 881,712.

Specification of Letters Patent.

Patented March 10, 1908.

Application filed June 16, 1904, Serial No. 212,820. Renewed January 25, 1908. Serial No. 412,633.

To all whom it may concern:

Be it known that I, HERMANN G. PAPE, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Telephone-Receiver, of which the following is a specification.

This invention relates to a telephone receiver of that general type which is particularly adapted for use as the ear-piece of an audiphone set, an electrical apparatus including instruments corresponding to the transmitter and receiver of a telephone system and battery connections, all arranged in a manner to facilitate the transmission of speech to persons having defective hearing.

The object of the invention is to produce a simple and inexpensive ear-piece or receiver, the parts of which will be easily accessible for cleaning and repair when necessary, and embodying in its organization a casing and removable front and rear caps, one serving to retain the diaphragm, and the other the mounting of an armature connected to the diaphragm by a connecting rod passed through a novel form of magnet opposed to the armature to actuate the same.

To the accomplishment of the recited objects and others subordinate thereto, all of which will hereinafter more fully appear, the invention resides in that construction and arrangement of parts to be described, illustrated in the accompanying drawings and defined in the claims.

In said drawings—Figure 1 is a sectional view of my receiver. Fig. 2 is a front elevation with the cap and diaphragm removed. Fig. 3 is a rear elevation with the rear cap removed. Fig. 4 is a sectional view of the magnet omitting the coil, and Fig. 5 is a detail perspective view of the armature and its spring spider.

Like numerals indicate corresponding parts throughout the views.

1 indicates a cup-shaped casing of any suitable material, closed at its front side by the front cap 2 screwed thereon and equipped with the usual axial opening 3 and external concavity 4. Opposite the concave inner face 5 of the cap 2 is disposed a diaphragm 6 retained at its periphery between a pair of annular gaskets 7 and 8, for the reception of which the contiguous faces of the casing and cap are formed with annular seats, as shown. From the back of the casing 1 extends an annular flange 9, into which is screwed what

may be termed the rear cap 10, preferably of concavo-convex form. The back wall 11 of the casing proper divides the instrument into front and rear compartments, and is formed with an axial internally threaded opening 12 into which is screwed the externally threaded shell 13 of the cylindrical magnet 14, comprising the shell 13, a hollow axial core 15, an integral head 16 connecting the core and shell at the front end of the magnet, and a coil 17 wound upon the core. This magnet is retained in place by its threaded connection with the wall 11, and by a lock nut 18 screwed upon the shell and bearing against a soft rubber gasket 19 interposed between the nut and the front face of the wall 11.

The magnet 14 is designed, when a circuit is closed through the coil, to vibrate the diaphragm, not by the immediate attraction thereof, but by operating an armature 20 located in the rear compartment of the instrument, and connected to the diaphragm through the medium of a connecting rod 21 passed through the hollow core 15 of the magnet, and through axial openings in the armature and diaphragm respectively. The connection of the rod 21 with the diaphragm is effected by means of a nut 22 screwed upon the front end of the rod, and readily accessible either through the axial opening 3 in the front cap or by simply unscrewing the cap from the casing. The rear end of the rod 21 is screwed through the armature 20, which is a small disk of metal, as shown in Fig. 5, and is also passed through a spring metal spider 23 constituting an armature spring riveted or otherwise secured to the armature.

The radial legs 24 of the spider 23 are deflected, as shown in Fig. 1, and are retained at their outer ends between a pair of annular soft rubber gaskets 25 and 26 held in place by the cap 10, which latter, and the back wall 11 of the casing, are formed with seats for their reception, as shown. To prevent compression in either compartment of the instrument casing due to the vibration of the diaphragm or armature as the case may be, the annular wall of the front compartment is formed with openings 27 and the cap is pierced by a plurality of openings 28. Thereceiver or ear-piece thus constructed is preferably equipped with the usual head-piece 29, and is wired in any approved manner.

It will be seen that the detachable front and rear caps of the casing serve respectively to retain the diaphragm and the armature

mounting in place, and that by merely unscrewing these caps all the interior parts are rendered easily accessible for the purpose of cleaning, repairing or replacing the same.

5 Furthermore, by adjusting these caps, the gaskets retaining the outer edges of the diaphragm and armature spring respectively, are more or less compressed to effect the more or less rigid retention of the spring and
10 armature and to regulate the tension thereof within certain limits. Attention is also directed to the fact that by the adjustment of the nut 22, the distance between the magnet and its armature may be varied.

15 It will of course be understood that the undulations of the current induced in the circuit through the magnet by the sounds uttered in proximity to the transmitter. (which is the audiphone receiver) will vary
20 the attractive power of the magnet and cause the movement of the armature 20 which, by reason of the intermediate connection, will vibrate the diaphragm to reproduce the sounds. Of course the magnet
25 may be polarized if desired.

It is thought that from the foregoing the construction of my telephone receiver and audiphone ear-piece will be comprehended; but while the present embodiment of the invention appears at this time to be preferable,
30 I wish to be understood as reserving the right to effect such changes, modifications and variations of the illustrated structure as may come fairly within the scope of the protection prayed.
35

What I claim is:—

1. In a receiver, the combination with a casing having front and rear caps, an armature, a diaphragm and a magnet housed
40 within the casing, an armature spring supporting the armature and having a plurality of ends retained by the rear cap of the casing, said armature having connection with the diaphragm, and said armature spring being ad-
45 justable by the rear cap.

2. In a receiver, the combination with a casing divided to form front and rear compartments, of an armature in one compartment, a diaphragm in the other compartment,
50 a magnet having an inclosing shell screwed into the dividing wall of the casing, and a connection passed through the magnet between the armature and the diaphragm.

3. In a receiver, the combination with a
55 casing divided to form front and rear compartments closed by detachable front and rear caps, of a diaphragm and an armature located in the respective compartments and retained in place by the caps, an intermediate magnet mounted in the dividing wall of
60 the casing, and a connection between the armature and the diaphragm, said connection serving as a means for regulating and adjusting the tension of the diaphragm and
65 armature spring.

4. In a receiver, the combination with a casing, of a diaphragm, an armature, an intermediate magnet, a connection between the armature and the diaphragm, an armature spring, and detachable caps for the casing,
70 one of said caps serving as retaining means for the diaphragm, and the other cap serving to retain the armature spring and also as a means for regulating the distance between the armature and the pole pieces of the magnet.
75

5. In a receiver, the combination with a casing, of a magnet therein, a diaphragm, a pair of rubber gaskets between which the periphery of the diaphragm is interposed, a detachable front cap retaining the gaskets in
80 place, an armature opposed to one end of the magnet and connected with the diaphragm, an armature spring for urging the armature in one direction, a pair of rubber gaskets between which the ends of the armature spring
85 are interposed, and a rear cap retaining the last named gaskets in place.

6. In a receiver, the combination with a casing divided to form front and rear compartments closed by detachable front and
90 rear caps, of a diaphragm and an armature located in the respective compartments, and a magnet adjustably mounted in the dividing wall of the casing between the armature and the diaphragm.
95

7. In a receiver, the combination with a casing, of a diaphragm, armature, and magnet housed therein, said casing having a rear cap which serves to retain the armature in place, said cap serving also as a means for
100 regulating the distance between the magnet and armature.

8. In a receiver, the combination with a casing having a dividing wall separating front and rear compartments of different
105 diameters, front and rear caps having threaded connection with the casing, a diaphragm and an armature spring retained in place by the caps, an armature carried by the armature spring, an electro-magnet screwed into the dividing wall of the casing, and a rod connecting the armature and diaphragm and passed through the magnet.

9. In a receiver, the combination with a casing having a dividing wall and detachable
110 front and rear caps, a diaphragm and an armature mounted in the casing at opposite sides of the dividing wall, a connection between the diaphragm and the armature, and an electro-magnet having a hollow core for the reception of said connection and also having a surrounding shell screwed into the
115 dividing wall of the casing and adjustable toward and from the armature.

10. In a receiver, the combination with a
120 casing having front and rear caps, an armature, a diaphragm and a magnet housed within the casing, and a spring spider supporting the armature and retained by the rear cap of the casing.
125

11. In a receiver, the combination with a casing having a dividing wall and front and rear caps, an armature and a diaphragm mounted at opposite sides of the dividing wall, an electro-magnet having a surrounding shell screwed into the dividing wall, a lock-nut carried by said shell, and a yielding gasket interposed between the lock-nut and the dividing wall of the casing.

12. In a receiver, the combination with a casing divided to form front and rear compartments and having detachable front and rear caps; of an armature and a diaphragm retained in place by said caps, an electro-magnet interposed between the armature and diaphragm and mounted in the dividing wall of the casing, the rear cap and that portion of the casing surrounding the front compartment being respectively provided with a series of apertures to prevent compression in the front and rear compartments of the casing.

13. In a receiver, the combination with a casing having front and rear compartments, of an armature, a diaphragm and an iron-clad magnet housed within the casing, and a connection between the armature and the diaphragm, said connection serving as a means for regulating the tension of the armature spring and also for regulating the distance between the armature and the poles of the magnet.

14. In a receiver, the combination with a casing having front and rear caps, a diaphragm and a magnet housed within the casing, an armature, a spring spider supporting the armature, and means for varying the distance between the magnet and the armature.

15. In a receiver, the combination with a casing, of an iron-clad magnet, means for adjusting the magnet, a diaphragm, an armature, an armature spring, means for varying the tension of the armature spring, and means for varying the tension of the diaphragm.

16. In a receiver, the combination with a casing, of an iron-clad magnet adjustably secured therein, a diaphragm and an armature mounted beyond the opposite ends of the magnet and independently adjustable, and a connection between the diaphragm and the armature.

17. In a receiver, the combination with a casing, of a diaphragm secured at its outer edge to the casing, a bipolar magnet, an armature upon which the magnet exerts a bipolar action, supporting means permitting the armature to maintain a substantially parallel relation with the adjacent end of the magnet during the movement of the armature, and a connection between the armature and the diaphragm.

18. In a receiver, the combination with a casing, of a magnet, a diaphragm and an armature, said magnet being concentric with the diaphragm and exerting a bi-polar action upon the armature, a flexible spider supporting the armature, and independent means for adjusting the armature, magnet and diaphragm.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

HERMANN G. PAPE.

Witnesses:

M. J. H. FERRIS,
E. J. HIGGINS.