

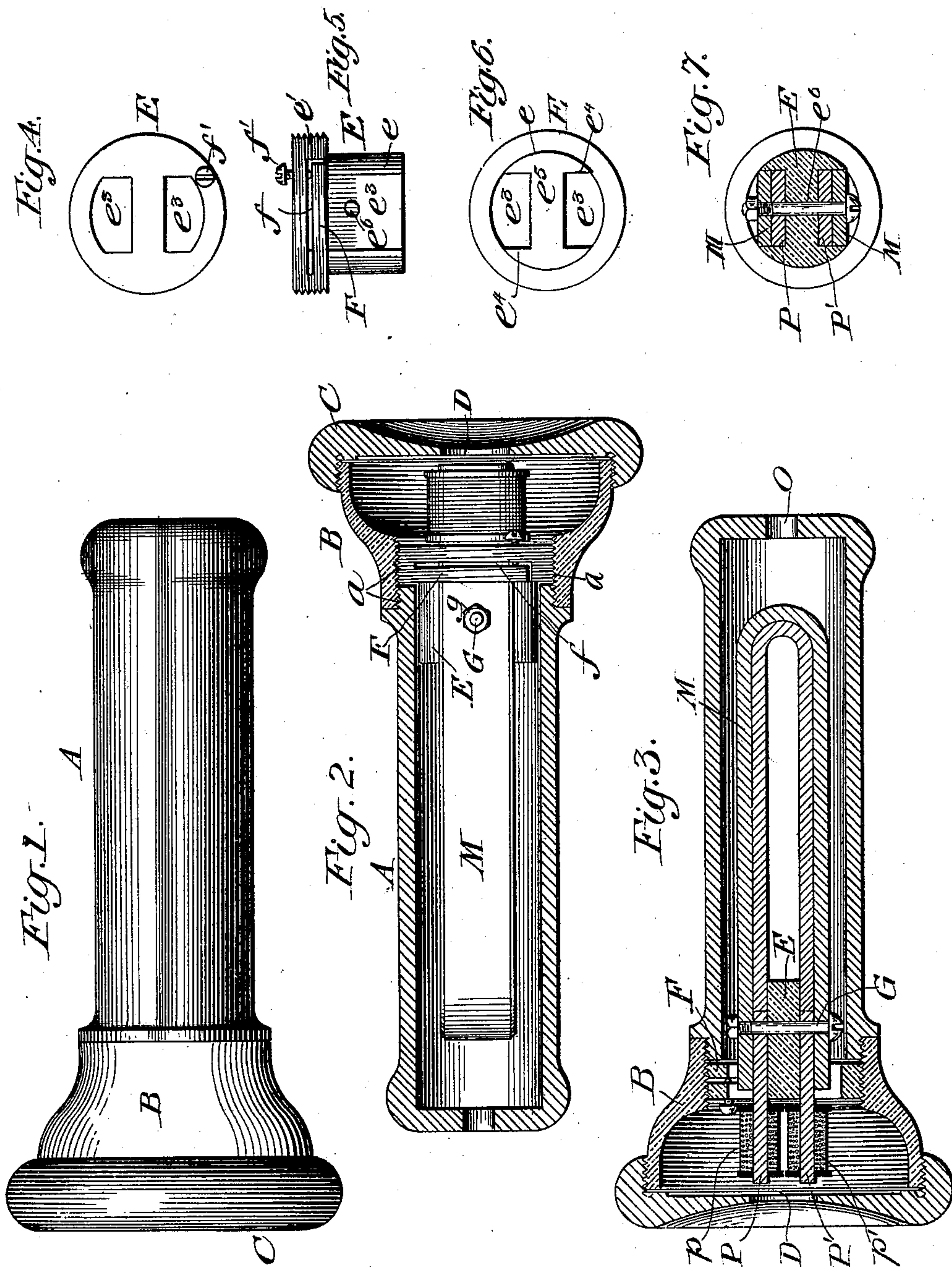
No. 644,206.

Patented Feb. 27, 1900.

A. K. KELLER.
TELEPHONE RECEIVER.

(Application filed Aug. 20, 1898.)

(No Model.)



Witnesses:

D. W. Edlin.

M. B. Cole.

Inventor:

Albert K. Keller.

by Edward E. Clement
att'y.

UNITED STATES PATENT OFFICE.

ALBERT K. KELLER, OF PHILADELPHIA, PENNSYLVANIA.

TELEPHONE-RECEIVER.

SPECIFICATION forming part of Letters Patent No. 644,206, dated February 27, 1900.

Application filed August 20, 1898. Serial No. 689,118. (No model.)

To all whom it may concern:

Be it known that I, ALBERT K. KELLER, a citizen of the United States, residing in the city and county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Telephone-Receivers, of which the following is a specification.

My invention relates to telephone-receivers wherein it is common to use a magnet surrounded by a coil of wire in conjunction with a suitable diaphragm for the purpose of causing changes in current passing through the coil to be translated through the variations in magnetic intensity caused thereby into mechanical vibrations or changes of the diaphragm.

My invention has for its object the general improvement of instruments of this character, whereby an increase in efficiency, a permanent and delicate adjustment, and a compact and economical form may be attained.

I attain my object by providing a cup, preferably of metal, which carries the diaphragm and to which are adjustably secured the magnet or magnets. The connection between the magnets and the cup is by means of a screw-threaded collar on the magnet structure, which works in a similar screw-thread in the cup and is provided with frictional locking means, whereby the adjustment may be made permanent.

My invention is fully described in the following specification and covered in the claims appended thereto and is illustrated in the accompanying drawings, wherein the same letters of reference refer to the same parts throughout.

Referring to the drawings, Figure 1 is a side view of my improved receiver. Fig. 2 is a similar view thereof with the external parts in section. Fig. 3 is a longitudinal section of all the parts of the instrument, and Figs. 4 to 7 are detail views.

Referring to the drawings, A is a hard-rubber shell of substantially cylindrical shape and attached at its forward end by screw-threads *a* to a cup B, which is preferably of metal.

C is a hard-rubber cap, between which and the cup aforesaid is clamped the diaphragm D.

The cup B has a wide bell-mouth for the support of the diaphragm and is contracted in an ogee curve and internally screw-threaded at its smaller end for the reception of the shell A. A block E, of brass or other non-magnetic material, is provided, shaped as shown in Figs. 4, 5, and 6. Fig. 4 is a face view of this block, while Figs. 5 and 6 are side and rear views, respectively. At its forward end the block is made cylindrical and is provided with screw-threads adapted to register with the thread *a* on cup B. This cylindrical portion is lettered *e*, and the screw-threads are lettered *e'*. For the greater portion of its length the block is reduced in diameter, as shown in Fig. 5, and it is provided on opposite sides with channels *e³*, which are cut through and through from one end to the other on opposite sides, leaving a central web *e⁵* and upstanding shoulders *e⁴*. Through the middle of the web a plain hole is drilled for a purpose presently to be stated. The screw-threaded cylindrical portion *e* of the block is provided with a portion or portions F, overlying the channels *e* and separated throughout their length from the body of the block by saw-cuts *f*. Each portion F, while it carries a portion of the screw-threads and serves its function as a part of the cylinder, is in effect a spring-tongue secured at one end only and adapted to be moved at the other end through the agency of a set-screw *f'*, serving when thus moved as a locking means to prevent further movements of the screw-threads *e'* and *a* relatively to each other. In other words, the portion F is adapted to be spread by the screw *f'* to jam the screw-threads. The magnet M, which for the sake of description I have assumed to be of the bipolar type, has its polar extremities inserted into the channels *e³ e³*, as shown in Figs. 3 to 7. The usual soft-iron pole-pieces P P' are also inserted into the channels of the block, so as to underlie a portion of the magnet-pole, and a bolt G, provided with a nut *g*, is inserted from side to side of the whole, passing through the extremities of the magnet, through the iron pole-pieces, and through the hole *e⁶* in the web *e⁵* of the block, and thus clamping the magnet, the block, and the pole-pieces all together.

The operation of the parts thus described

and the method of assembling the same are as follows: The cup B is first taken, and the magnet and its attached parts having been assembled, as described, the cylindrical portion *e* of the block E is screwed into the reduced portion of the cup from the rear until by means of a suitable gage the pole-pieces are ascertained to be in a position where they will exert their maximum effect upon the diaphragm, when the set-screw *f'* is given one or two turns. This suffices to cause the tongue F to spring off slightly, so that its screw-threads and those of the main portion of the cylinder bind with a considerable degree of friction upon the threads *a* of the cup. I have found in practice that a very slight lateral displacement of the tongue F is sufficient absolutely to lock the block E from turning within the cup except upon the use of powerful instruments.

In Figs. 2 and 3 I have shown that the conducting-cord containing the circuit-wires leading to the coils *p* and *p'* may enter through an orifice O in the shell. Obviously, however, the electrical connections may be accomplished in a variety of ways.

A receiver constructed in accordance with the principles of this invention has many advantages. Changes of temperature do not affect its adjustment, for the expansion and contraction of the cup B is approximately equal to that of the pole-pieces P P'. As the diaphragm is supported on the former, the position of the latter with relation thereto therefore remains practically unchanged through a wide range of temperature. Again, as all the operative parts are carried upon the cup the rubber shell E may be damaged and even broken entirely off without impairing the efficiency of the instrument.

I wish it to be understood that I do not limit myself to any particular form of magnet or magnet-winding. Obviously the adjusting and locking ring *e* may be attached to any form of magnet, and, moreover, the cup B need not be separate from the shell A, but may be of rubber or other material and formed integral therewith. The screw *f'* may be inserted from the rear as well as the front, and the tongue F may be duplicated without departing from the invention.

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

1. In a telephone-receiver the combination of the following instrumentalities: a shell, a diaphragm, and a cap; a non-magnetic metal block supported within the shell near the diaphragm, and cut away upon opposite sides; a compound horseshoe-magnet composed of two closely-fitted members, one having its poles extended beyond the other, the extremities of both lying within the recesses formed by cutting away the block; soft-iron pole-pieces also lying within said recesses between the longer member of the magnet and the block and fitting snugly against the shorter member of the magnet, the outer ends of said pole-pieces approaching the diaphragm and carrying coils; and a single through-bolt securing the members of the magnet and the pole-pieces to each other and to the block in a single structure, substantially as described.

2. In a telephone-receiver a metal cup carrying the diaphragm over its mouth and having its neck internally screw-threaded, as at *a*, a recessed cylindrical block having an enlarged head or annulus threaded to fit the cup, a compound horseshoe-magnet having long outer members and short inner members with the extremities of both lying in the recesses in the block, iron pole-pieces partly lying within the recesses, fitting snugly within the longer magnet members and in contact with the shorter members, and thence extending into the cup, coils upon said pole-pieces within the cup, a single bolt passing through the block, the longer magnet-poles, and the pole-pieces, to fasten them together, a set-screw tapped into the annulus of the block with its head lying within the cup, and a shell covering the magnets and screw-threaded exteriorly at one end to fit the screw-threads in the neck of the cup, substantially as described.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, this 15th day of August, A. D. 1898.

ALBERT K. KELLER.

Witnesses:

ROBERT OSBORNE, Jr.,
WM. D. GHARKY.