

No. 781,797.

PATENTED FEB. 7, 1905.

A. R. THOLLANDER.  
TELEPHONE RECEIVER.  
APPLICATION FILED OCT. 1, 1904.

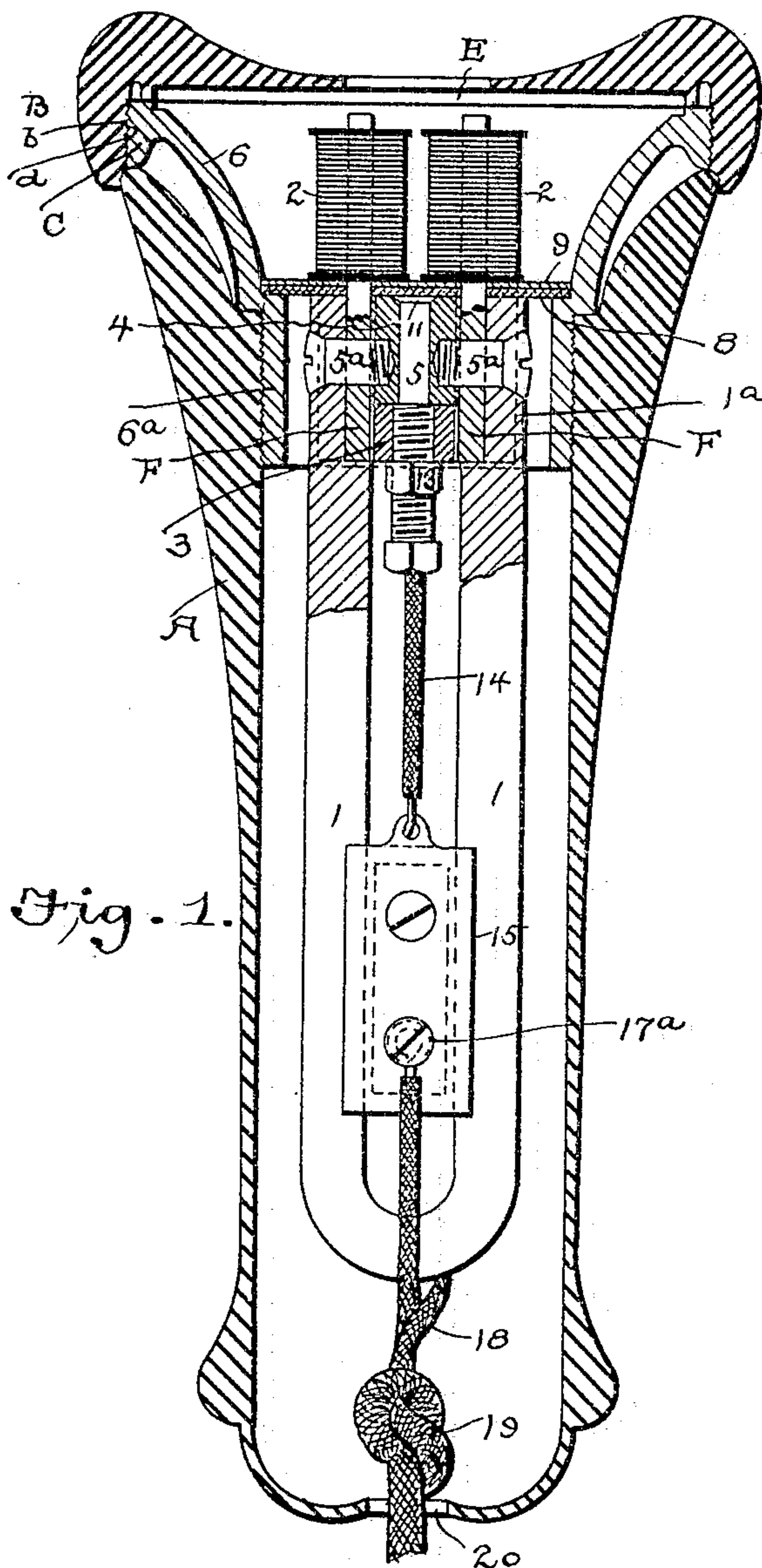


Fig. 1.

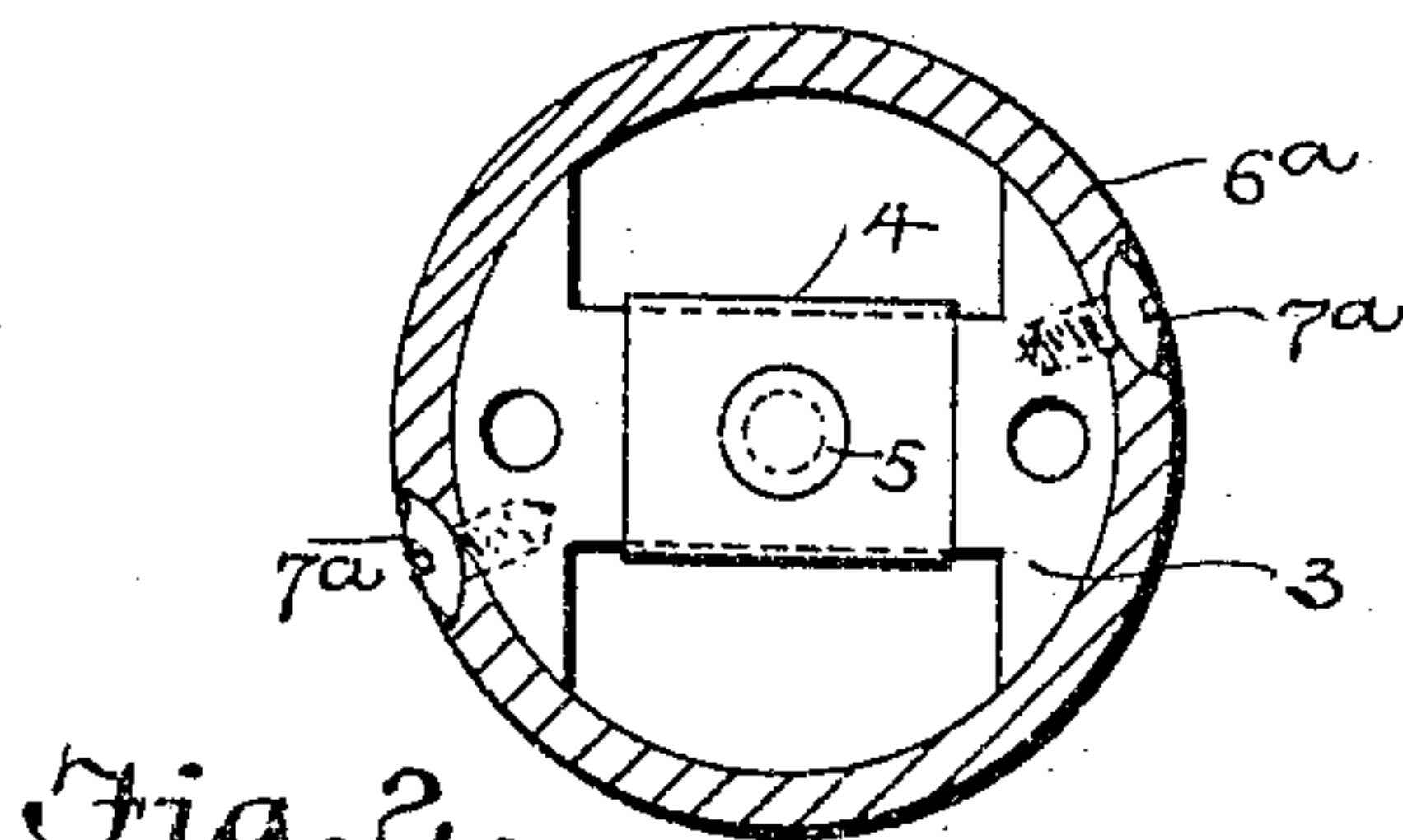


Fig. 2.

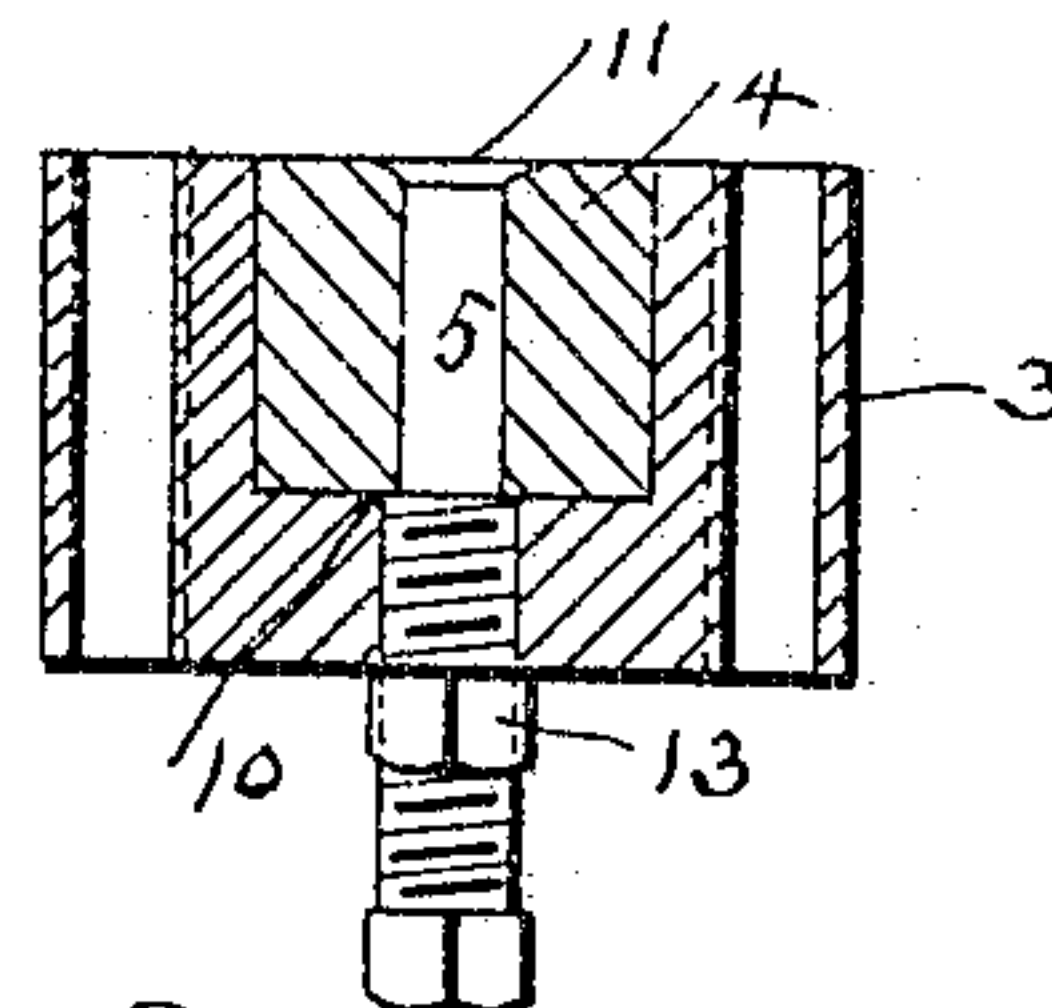


Fig. 3.

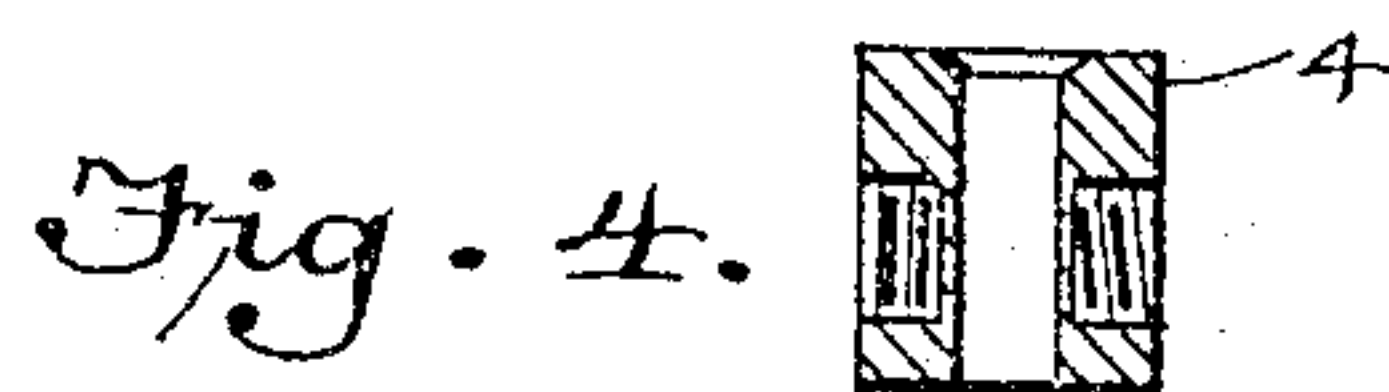


Fig. 4.

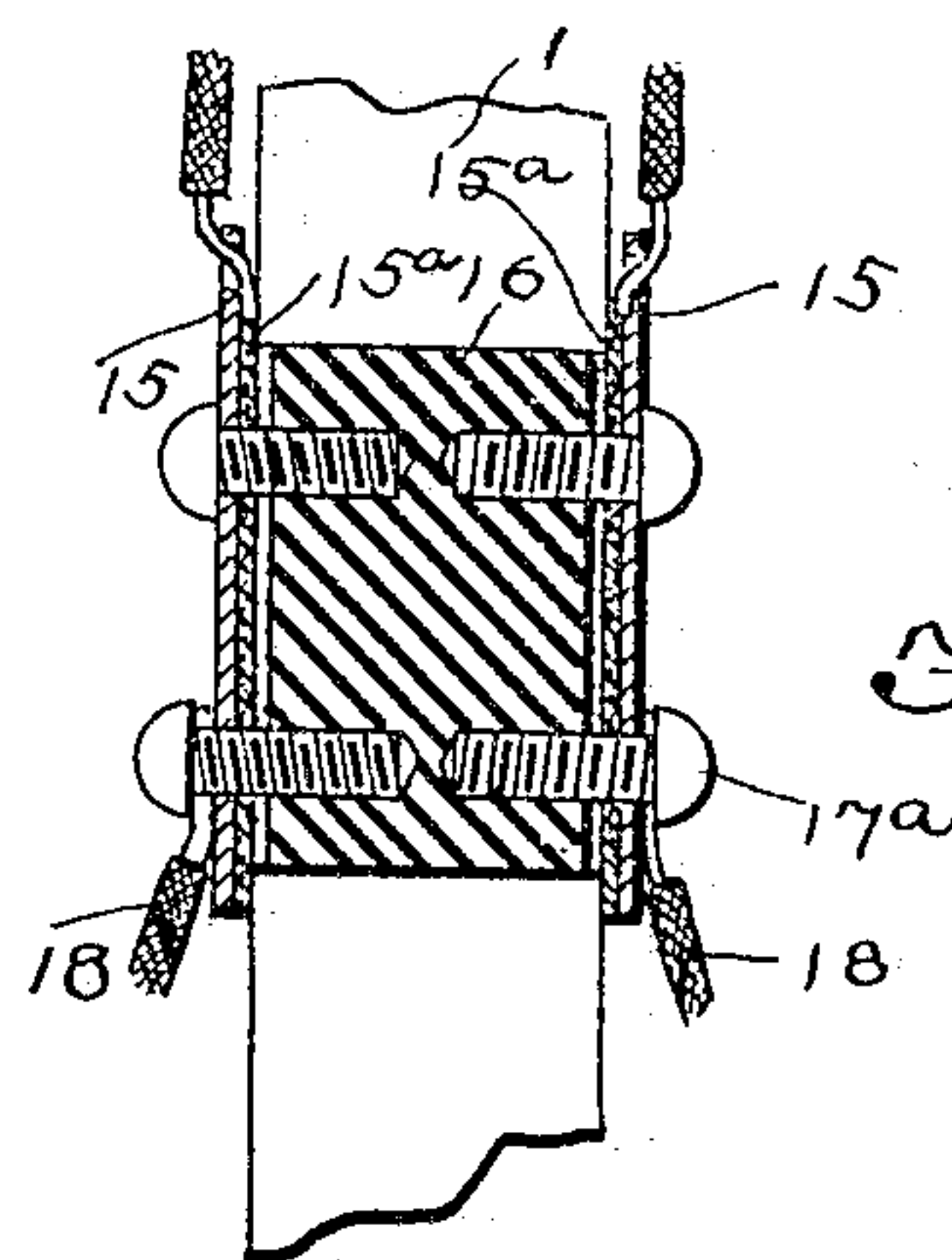


Fig. 5.

Witnesses

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# UNITED STATES PATENT OFFICE.

AXEL R. THOLLANDER, OF CHICAGO, ILLINOIS.

## TELEPHONE-RECEIVER.

SPECIFICATION forming part of Letters Patent No. 781,797, dated February 7, 1905.

Application filed October 1, 1904. Serial No. 226,822.

*To all whom it may concern:*

Be it known that I, AXEL R. THOLLANDER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Telephone-Receivers, of which the following is a specification.

The object of my invention is to provide a telephone-receiver with an air-tight diaphragm-chamber to prevent "surging" of the air in the shell of the receiver and with convenient means to adjust the magnet with respect to the diaphragm.

An improved metal cup or head is also embodied in the invention.

Other objects and advantages will appear from the detailed description following.

The invention is clearly illustrated in the accompanying drawings, in which—

Figure 1 is a central longitudinal section of the receiver complete. Fig. 2 is a detail in plan of the metal bridge and adjusting-block, the tubular portion of the metal cup being indicated in section. Fig. 3 is a vertical central section of the metal bridge and the adjusting-block and screw. Fig. 4 is a central section of the adjusting-block. Fig. 5 is a sectional view of the block for attaching the cords.

Referring specifically to the parts, A represents the body of the casing, preferably made of hard rubber, and B the ear-cap therefor, which screws onto the outside of the metal cup 6 and also fits over the end of the body A.

6 represents the metal cup, which has a flange C taking over the front end of the body A. This flange has external threads *a*, which mesh with the threads *b* on the cap B. Extending across the mouth of the cup between it and the cap is the diaphragm E.

1 represents a single horseshoe-magnet having at the ends cores F, which carry the coils 2. The magnet and cores are supported in place by a metal bridge or block 3, which is milled out on opposite sides to receive and fit between the magnet and its pole-pieces 1<sup>a</sup> and also recessed to receive the adjusting-block 4 and its screws 5, which block fits perfectly in

the recess formed to receive it, as shown in Figs. 2 and 3. The metal bridge 3 is fastened to and within the tubular shank or portion 6<sup>a</sup> of a cup 6 by two sunken screws 7<sup>a</sup>, as shown in Fig. 2. The bridge or block fits perfectly inside said tubular portion 6<sup>a</sup>, which is threaded on the outside and screws into the body A.

The horseshoe-magnet 1 and cores F are fastened to the adjusting-block 4 by two screws 5<sup>a</sup>.

9 indicates a metal plate through which the cores F pass and which fits in a seat in the metal cup 6, and 8 is a disk of felt put under the metal plate 9 to prevent the air and dust coming inside the diaphragm-chamber.

The adjusting-block 4 is carried by the adjusting-screw 5, which has a shoulder 10, on which the adjusting-block rests, and is without threads in the block, but is spread at the end, as at 11, to hold the block thereon, without, however, preventing the screw from turning in the block. The screw is threaded in and through the bridge-piece 3 and has a jam-nut 13, whereby it is fixed at adjustment.

As stated, the bridge-piece 3 is fixed in and supported by the tube 6<sup>a</sup> of the cup 6 and is consequently immovable with respect to the casing; but the adjusting-block 4 and the magnet secured thereto are movable and adjustable in the bridge-piece to vary the distance of the poles from the diaphragm. The receiver can easily be adjusted to the point of greatest sensitiveness by simply turning the screw 5 in one direction or the other, thus moving the magnet toward or from the diaphragm, and then can be locked as set by the nut 13. The hard-rubber body A is entirely independent, and its removal does not in the least interfere with the operation of the receiver. After the ear-cap is screwed on the receiver may be adjusted by sound to any degree of sensitiveness, which is much more accurate than by measurement.

The ends of the coils 2 of the electromagnets are connected to insulated wires 14, which are fastened to a metal plate 15, which is securely fastened to a fiber plate 15<sup>a</sup> and to a hard-rubber block 16 by the screws 17<sup>a</sup>, which bind the rubber block tightly to the arms of



the magnet 1. The ends of the wires in the receiver-cords 18 are fastened to the plates 15 by the screws 17<sup>a</sup>. To prevent a sudden pull on the cord from pulling it loose from the screws, a knot is made thereon, as shown at 19, inside the body A, the cord passing out through the opening 20. By making the connection with the rubber block and fiber plate as shown it will prevent the possibility of a shock from an accidental contact, as with exposed binding-posts, and by the construction shown the cords are not liable to become loose or disconnected.

As may be seen, the body of the casing may be removed without disturbing the diaphragm or the adjustment of the magnets.

In assembling the parts the diaphragm is put in position and the ear-cap screwed onto the cup. The magnet being in position, it can be adjusted by sound by placing the receiver to the ear and turning the adjusting-screw 5, and when properly adjusted the screw is fixed by tightening the lock-nut 13. The cords can then be connected up and the body of the casing screwed onto the tubular portion of the cup. The chamber within the cup is practically air-tight and does not have to be opened during adjustment, and the permanency of the adjustment is in no way affected by variation in expansion between the metal and rubber parts.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a telephone-receiver, the combination with a casing and diaphragm, of a magnet, a bridge-piece fixed in the front end of the casing and through which the ends of the magnet extend, and an adjusting-block which is fas-

tened between the ends of the magnet and is adjustably supported on the bridge-piece. 40

2. In a telephone-receiver, the combination with a casing and a diaphragm therein, of a cup within the casing, having a tubular portion screwed into the body of the casing, a bridge-piece fitting and fixed in said tubular portion, a block slidable in the bridge-piece, toward and from the diaphragm, a magnet secured to and carried by the block, and an adjusting-screw between the block and bridge-piece. 50

3. In a telephone-receiver, the combination with a casing and diaphragm, of a cup in the casing, behind the diaphragm, a bridge-piece fixed in the rear portion of the cup, a block slidable in said bridge-piece, a magnet the ends of which are secured to the block, and an adjusting-screw which is tapped through the bridge-piece from the rear and carries the block at its front end. 55

4. In a telephone-receiver, the combination with a casing, diaphragm and magnet, of a bridge-piece fixed in the casing behind the diaphragm and having a recess, a block fitting and movable in said recess and secured to the magnet, and adjusting means engaging the bridge-piece and block, adjustable to move the block with respect to the bridge-piece and vary the distance of the magnet from the diaphragm. 60

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 70

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Witnesses:

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