

No. 863,253.

PATENTED AUG. 13, 1907.

W. R. BANKHEAD.
TELEPHONE RECEIVER.
APPLICATION FILED NOV. 17, 1906.

Fig. 1.

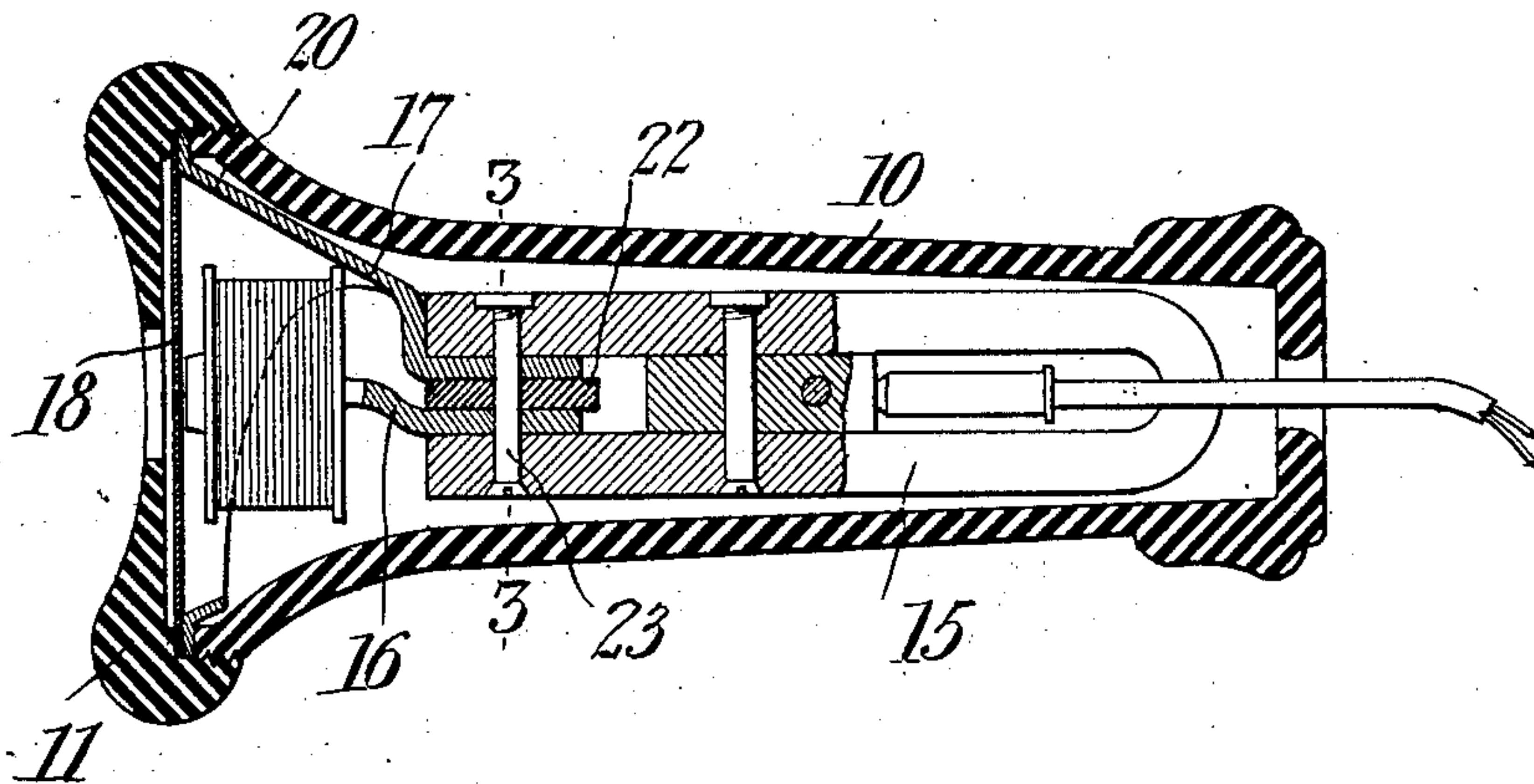


Fig. 2.

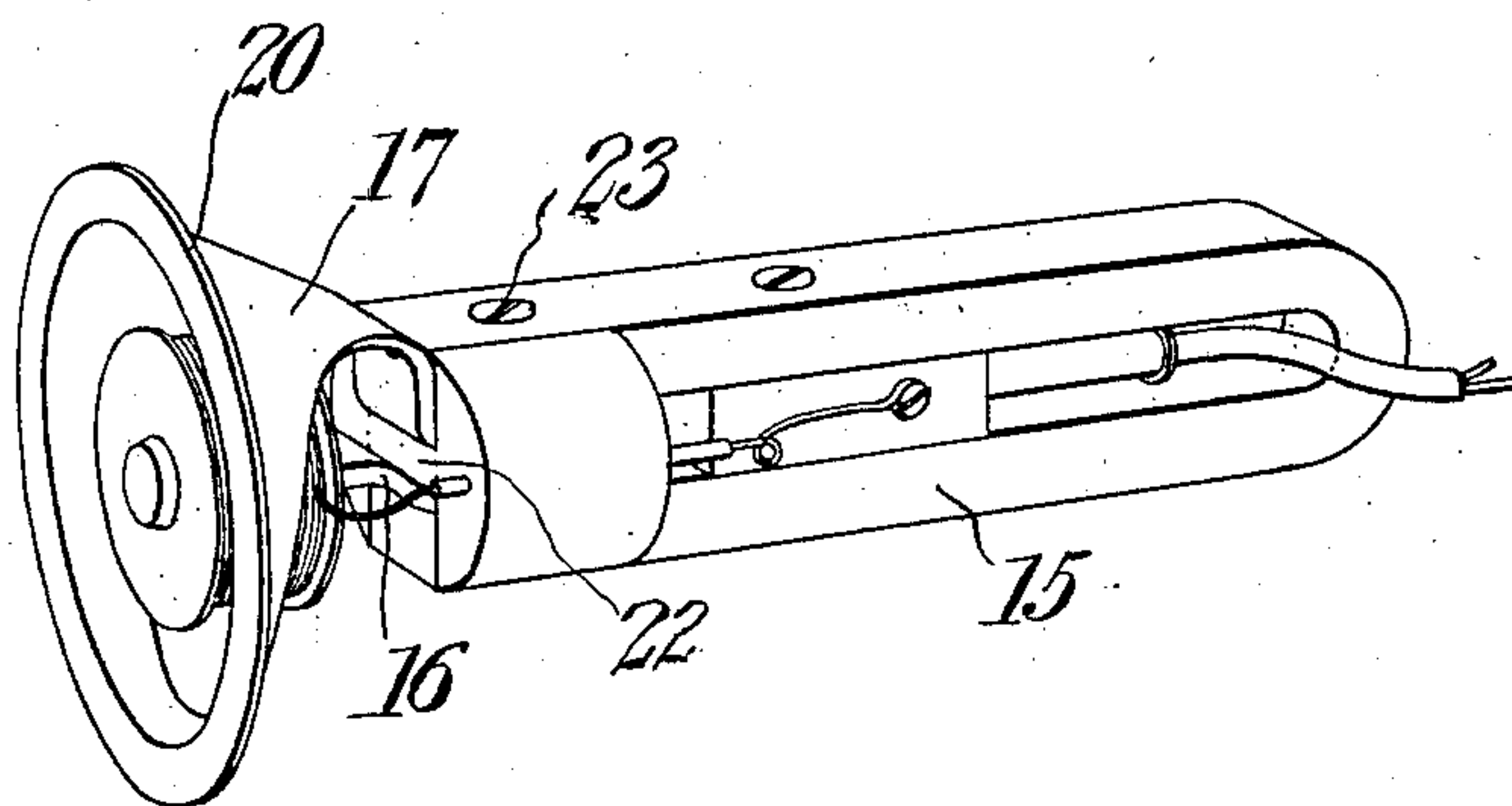
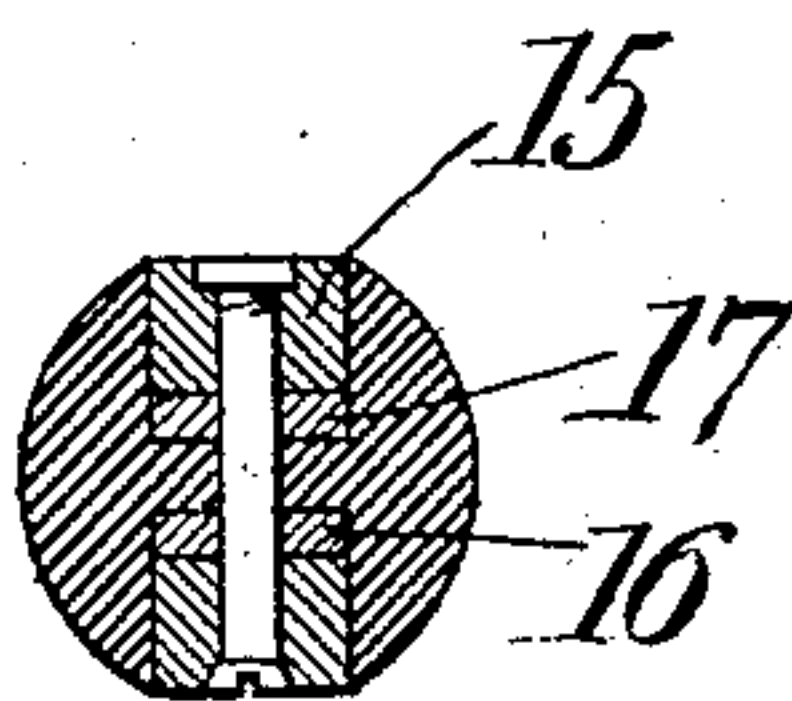


Fig. 3.



WITNESSES:

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WILLIAM ROBERT BANKHEAD, OF BREMERTON, WASHINGTON.

TELEPHONE-RECEIVER.

No. 863,253.

Specification of Letters Patent.

Patented Aug. 13, 1907.

Application filed November 17, 1906. Serial No. 343,925.

To all whom it may concern:

Be it known that I, WILLIAM ROBERT BANKHEAD, a citizen of the United States, residing at Bremerton, in the county of Kitsap and State of Washington, have invented a new and useful Telephone-Receiver, of which the following is a specification.

The principal object of the present invention is to provide a very sensitive receiver for telephony and wireless telegraphy systems.

10 A further object of the invention is to construct a bi-polar receiver in which the ends of the poles are brought very closely together, being nearly in contact, forming a magnetic circuit having a very short air gap.

15 A still further object of the invention is to provide a bi-polar receiver in which the diaphragm forms a part of the magnetic circuit.

20 A still further object of the invention is to provide a novel construction of magnet in which one of the pole pieces is so shaped as to form a seat for the diaphragm and serves further as a means for supporting all of the metallic parts of the receiver within an insulating shell.

25 With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts, hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, 30 size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

35 In the accompanying drawings:—Figure 1 is a sectional elevation of a telephone receiver constructed in accordance with the invention. Fig. 2 is a detail perspective view of the metallic parts of the receiver removed from the shell. Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 1.

40 Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

45 The shell 10 and cap 11 have a threaded connection and are of any desired shape and size, the shell and cap being formed of hard rubber or similar material as usual. Arranged within the shell is a permanent horseshoe magnet 15 having two separate pole piece 16 and 17, the pole piece 16 being flattened at one end where it is connected to one end of the horseshoe magnet, and its opposite end being circular in cross section 50 and forming the core of the usual coil which is connected in any ordinary manner in the telephone or other circuit. This pole piece 16 is slightly offset, so as to bring its extreme end directly opposite the center of the diaphragm 18.

55 The pole piece 17 is shaped to form an approximately frusto conical shell, but this shell is cut away on one

side, that is, the side toward the leg of the magnet carrying the pole piece 16 as shown, so as to tend to localize the magnetic lines of force, and this shell is provided with an annular flange 20 that forms a seat for the diaphragm 18, and together with the diaphragm is confined between the ear cap and the end of the main shell 10. The tapering or conical portion of this pole piece corresponds approximately in contour to the outer end of the shell 10, and when forced thereinto by 60 screwing on the cap, will form a support for the whole of the metallic parts of the receiver, so that auxiliary fastenings are rendered unnecessary, and the magnet may be readily removed from the shell when necessary by merely unscrewing the cap 11. 70

By making the pole piece 17 of frusto-conical shape not only is it made to conform to the shape of the shell 10 but it also forms a very rigid and stiff support for the magnet, and since this pole piece 17 constitutes the only support for the magnet within the casing, it serves to 75 maintain the diaphragm and the contiguous end of the pole piece 16 in practically constant relation one to the other, so that when once adjusted the free end of the pole piece 16 will always have the same position relative to the diaphragm that it had when initially adjusted. This is due to making the pole piece 17, between the flange or ring 20 and its point of connection with the corresponding leg of the magnet, of such shape as to constitute a stiff or rigid connection. The annular ring or flange 20, it will be observed, is made integral with the frusto-conical portion of the pole piece 17, thus reducing the number of parts and simplifying 85 the manufacture, since this pole piece and flange or ring may be made in one stamping. It will also be observed that the frusto-conical portion extends entirely around the casing and terminates in a lip by which it is connected to the corresponding leg of the magnet. 90

The pole piece 17 has a flattened end for engagement with the end of the horseshoe magnet, and it will be noted that both pole pieces are arranged at the inner adjacent faces of the ends of the horseshoe magnet, and these are held in spaced relation by a block 22 formed of zinc or other diamagnetic material while the parts are held assembled by one or more rivets 23 formed of brass, copper, or other diamagnetic material. 100

As the diaphragm is in contact with the pole piece 17 which constitutes one of the poles of the magnet and is located very close to the end of the opposite pole piece, the magnetic circuit is nearly complete, there being but a very small air gap between the two pole pieces 105 and the receiver being thus rendered extremely sensitive. As the two poles of the magnet are thus brought directly opposite each other at the exact center of the diaphragm where the magnetic pull is most effective, the diaphragm becomes more delicately responsive to voice currents than where the ordinary bi-polar receiver is employed. 110

I claim:—

1. A magneto-electric telephone receiver comprising a permanent horse-shoe magnet with legs of equal length, a pole piece of magnetic material fast on one leg of the magnet and bent or offset to bring its free end into a plane midway between the two legs of the magnet, a receiver coil on said pole piece, a polar extension of the other leg of the magnet made of magnetic material and of frusto-conical shape and cut away on the side adjacent to the other leg of the magnet to localize the magnetic lines of force, an outwardly extending ring or flange formed integral with the base of the said cone-shaped polar extension, a diaphragm in magnetic contact with and supported by the ring or flange, a casing inclosing the magnet and polar extension thereof, and a cap for clamping the diaphragm and the flange of the polar extension to the casing.
2. A magneto-electric telephone receiver comprising a permanent horse-shoe magnet with legs of equal length, a pole piece of magnetic material in contact with the inner face of one leg of the magnet, a receiver coil on said pole

piece, another pole piece of magnetic material of frusto-conical shape having an extension at its smaller end in contact with the inner face of the other leg of the magnet and its outer end formed into an outwardly extending ring or flange integral with the body of the polar extension, a diaphragm in magnetic contact with said ring or flange, a spacing block of diamagnetic material between the contiguous faces of the polar extensions adjacent to the free ends of the legs of the magnet and held thereto by suitable securing means, a casing for the magnetic parts of the telephone receiver, and a cap for the casing clamping the diaphragm and frusto-conical polar extension to the casing.

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

WILLIAM ROBERT BANKHEAD.

Witnesses:

W. A. HOLT,
PAUL MELMER.