Nov. 17, 1925. 1,562,252

A. PIHL

TELEPHONE RECEIVER

Filed Aug. 8, 1924 2 Sheets-Sheet 1

Fig. 1.

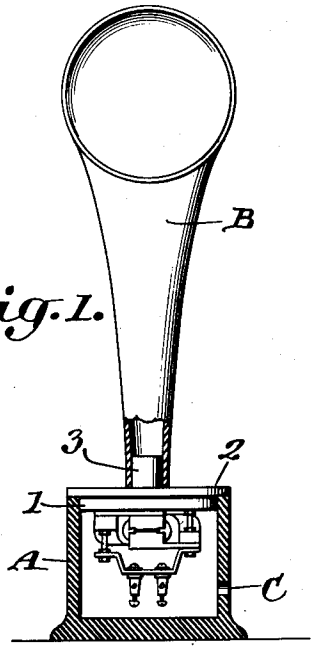


Fig. 2.

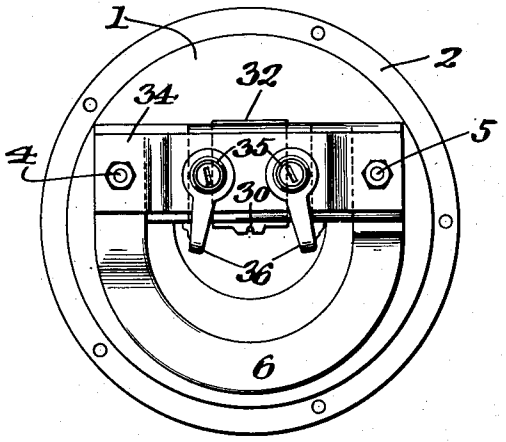
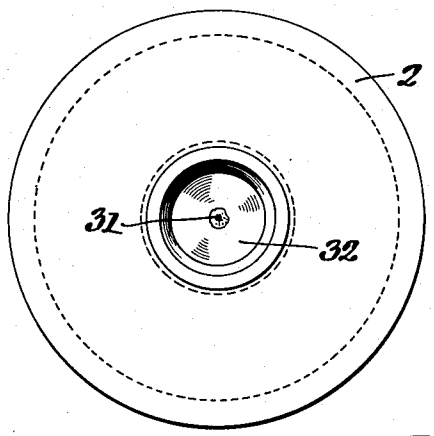


Fig. 3.



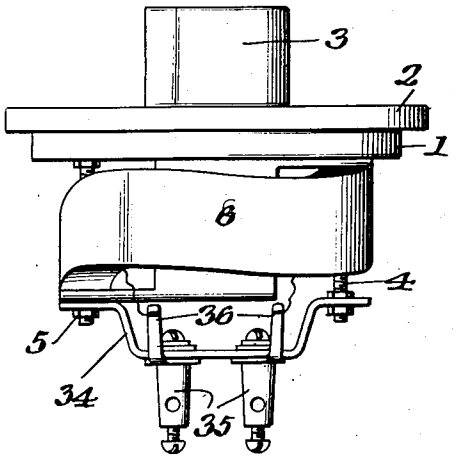


Fig. 4.

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Baldwin & Wright

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TELEPHONE RECEIVER

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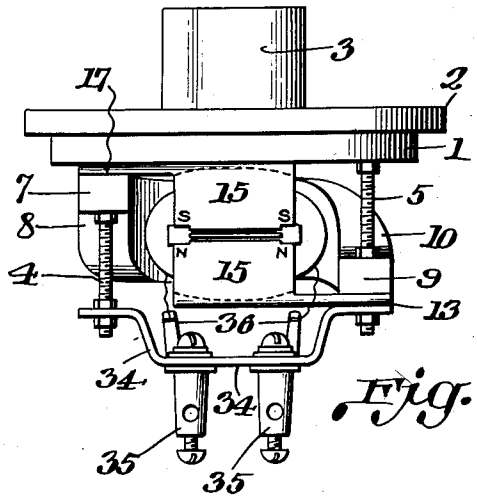


Fig. 5.

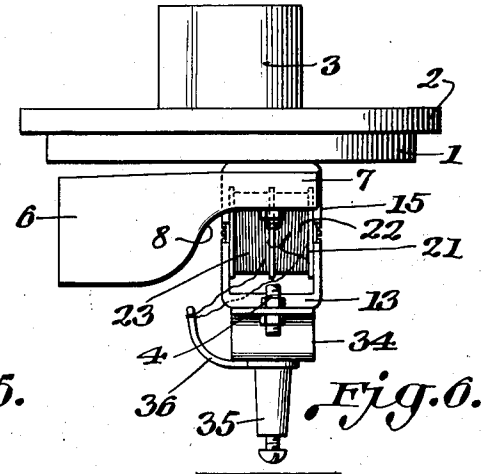
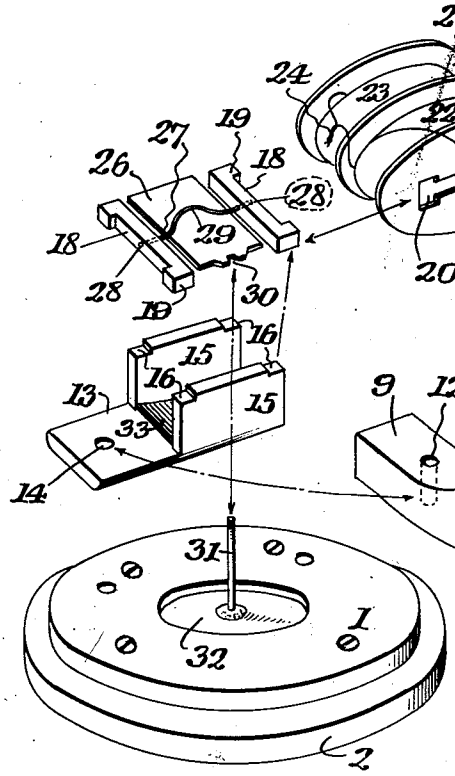


Fig. 6.



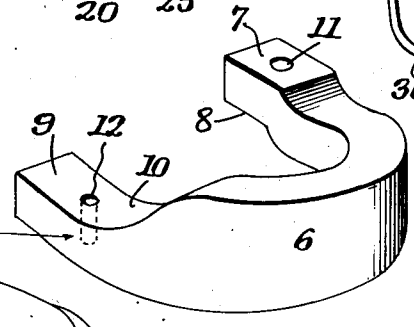


Fig. 7.

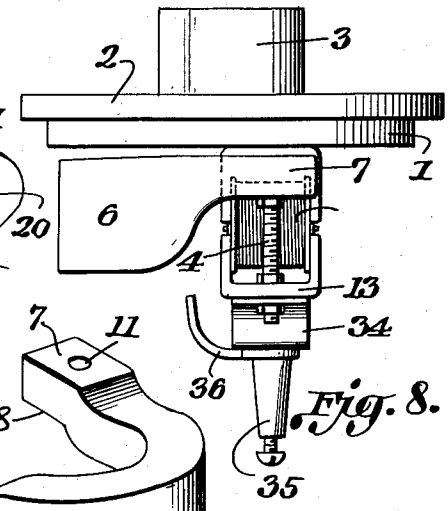


Fig. 8.

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Patented Nov. 17, 1925. 1,562,252

UNITED STATES PATENT OFFICE.

ALBERT PIHL, OF MURRAY, UTAH, ASSIGNOR TO HOLLIDAY RADIO & MANUFACTURING COMPANY, A CORPORATION OF UTAH.

TELEPHONE RECEIVER.

Application filed August 8, 1924. Serial No. 730,939.

To all whom it may concern:

Be it known that I, ALBERT PIHL, a citizen of the United States, and resident of Murray, in the county of Salt Lake and State of Utah, have invented certain new and useful Improvements in Telephone Receivers, of which the following is a specification.

My invention relates to a telephone receiver which is adapted for general use, but especially for wireless telephony. It is illustrated as being of the watch case type and is particularly an improvement upon my prior application Serial No. 596,729, filed Oct. 25, 1922.

An object of the invention is to provide a novel method of mounting the armature which is directly connected to the diaphragm, so that it will be exceedingly sensitive and respond to small current variations.

Another object is to provide a particular form of pole pieces which are employed with a permanent magnet of special form thereby producing a very compact construction but one of great utility.

Other objects of the invention will be apparent from the following detailed description and the appended claims.

In the drawings:

Figure 1 is a side elevation of the receiver inclosed in a case and supporting a loud speaker, the case and a portion of the loud speaker being shown in elevation.

Figure 2 is a bottom plan view.

Figure 3 is a top plan view.

Figure 4 is a side elevation.

Figure 5 is a side elevation from the opposite side.

Figure 6 is a side elevation taken from a point half way between the views of Figures 4 and 5.

Figure 7 is a disassembled view of parts of the receiver.

Figure 8 is a view similar to Figure 6 but showing a modification.

It is to be noted that the receiver can be used in any position, so that the terms top and bottom are merely relative, and have been employed on the assumption that the position shown in Figure 1 is normal.

The receiver as a whole is carried by a ring member 1 attached to the face of a larger ring member 2 provided with a central tubular extension 3. The smaller ring member just fits within the open end of a cylindrical supporting stand A and the larger ring member rests upon the cylindrical member and may be fastened thereto if desired. The tubular extension 3 is designed to support a loud speaker horn as shown in Figure 1. The stand A is provided with an opening C for the introduction of the necessary wires.

Fastened in suitable manner to the ring member 1 as by two long screw threaded bolts 4 and 5 is a permanent magnet 6 which is generally U-shaped in form. However instead of the free ends of this magnet having their pole supporting faces in the same parallel plane as in my prior application above identified, it is skew-shaped, the end 7 being cut away on the under face at 8 and the end 9 being cut away on the upper face at 10, so that the pole supporting faces lie in widely separated planes. The bolts 4 and 5 pass through holes 11 and 12 respectively in the permanent magnet 6 and attach it to the ring member 1.

The two pole pieces may be made identical in form and one of these is shown in Figure 7 at 13. It has a hole 14 registering with the hole 12 in the permanent magnet and the bolt 5 passes therethrough assembling all parts at once. The pole pieces have side flanges 15 the upper edges of which are cut away at their corners at 16 for a purpose hereinafter specified. This pole piece is shown as attached to the under face of the end 9 of the permanent magnet while the other pole piece 17 has its end attached to the upper face of the end 7 of the permanent magnet and lies between the permanent magnet and the ring 1 and is held in position by the bolt 4. The side flanges 15 of the two pole pieces extend toward each other but do not quite meet.

Two pieces 18 having enlarged ends 19 register with the cut outs 16 and bridge the space between the side flanges 15 of the two pole pieces. These pieces lie between the pole pieces as shown in Figure 5. They also extend through openings 20 in three oval discs 21, and form a core for two coils 22 and 23 of very fine wire. These coils are wound in opposite directions and are connected as shown at 24 in Figures 6 and 7. The openings 20 are connected by elongated slots 25 of about the same width as the pieces 18.

In the opening thus formed within the coils and discs is mounted an armature 26. This armature is pivoted by means of a spring 27

having its ends fast at 28 in the pieces 18 and having a bend 29 bearing against the armature. The spring not only serves as a pivot, but exerts enough tension to prevent the armature from rattling. The inner end of the armature 26 has a notch 30, which may be a hole instead, and one end of a link or pin 31 is soldered to the armature at this point and at its outer end to the diaghragm 32. Where the device is used as a loud speaker, the diaphragm fits in a milled groove in the edge of the ring 1 and is held in place by the ring 2. Where the receiver is adapted for head phones, a bronze spring ring may be used to hold the diaphragm in place, said spring ring fitting into the groove in the usual manner.

If desired the bottom of the cup shaped portion of the pole pieces may be made flat or they may be milled out in a curve corresponding to the curve of the coils as shown at 33. This will tend to give a stronger pull on the armature. The ends of the permanent magnet are arranged in a diagonal direction to prevent the magnetic flux from passing directly through the coil and armature. The pole pieces are also fitted tight to the magnet as shown. By winding the coils in opposite directions, the action of one coil on one end of the armature is in opposite direction to the action of the other coil on the opposite end of the armature, and as the armature is pivoted in the middle, both coils tend to move the armature in the same direction, giving a very sensitive receiver.

A bridge member 34 is carried by the bolts 4 and 5 and this supports binding posts 35 of any usual or desired type to which the circuit wires may be detachably connected. Spring terminals 36 are carried by the binding posts and to these the ends of the wires of the coils are connected. When used for head phones, the bridge 34 is omitted and the binding posts suitably mounted on the ring 1 near the bend of the U-shaped permanent magnet. The omission of the bridge piece, ring 2 and extension 3, enables a very compact construction to be obtained for the head phones.

In the modified form of the structure disclosed in Figure 8, a single large coil 37 is employed instead of the two oppositely wound coils. Otherwise the constructions are identical. The double form of coil is also shown in my prior application above identified and there claimed.

Suitable lock nuts as illustrated are carried by the bolts 4 and 5 and enable the parts to be accurately positioned and held.

Slight refinements of structure may be made, and parts of the device used without others, without in any way departing from the spirit of the invention, which is to be regarded as limited only by the scope of the appended claims.

I claim as my invention:

1. A telephone receiver comprising a ring member, a generally U-shaped permanent magnet carried by said ring member and having its ends widely spaced offset to lie in different planes, pole pieces attached to the outer faces of the legs of the magnet and extending inwardly, each of said pole pieces having on its free end sides extending toward the corresponding sides of the opposite pole piece, a coil supported within the sides of the pole pieces, and an armature mounted within said coil.

2. A telephone receiver comprising a ring member, a generally U-shaped permanent magnet carried by said ring member and having its ends diagonally disposed and spaced apart in two planes, pole pieces attached to the ends of the permanent magnet and extending inwardly, a coil inclosed by the free ends of the pole pieces, an armature mounted for pivotal movement within the coil, a diaphragm carried by the ring member, and means connecting the diaphragm and armature.

3. A telephone receiver comprising a ring member, a permanent magnet, pole pieces carried thereby and having inclosing sides extending toward each other, a coil inclosed by said sides, an armature within said coil, and means for pivotally supporting said armature which comprises a bent spring wire attached at its bend to the armature and pivoted at its ends.

4. A telephone receiver comprising a ring member, a permanent magnet, pole pieces carried thereby and having trough shaped free ends with their open sides opposed, a coil supported within the trough shaped ends of the pole pieces, said pole pieces having their outer sides curved to correspond with the curve of the coil.

5. A telephone receiver comprising a ring member, a permanent magnet, pole pieces carried thereby and having trough shaped free ends milled out so that the bottom of the trough is curved, a coil supported within the pole pieces and curved similarly to the bottom of the trough, and an armature mounted within said coil.

In testimony whereof, I have hereunto subscribed my name.

ALBERT PIHL.