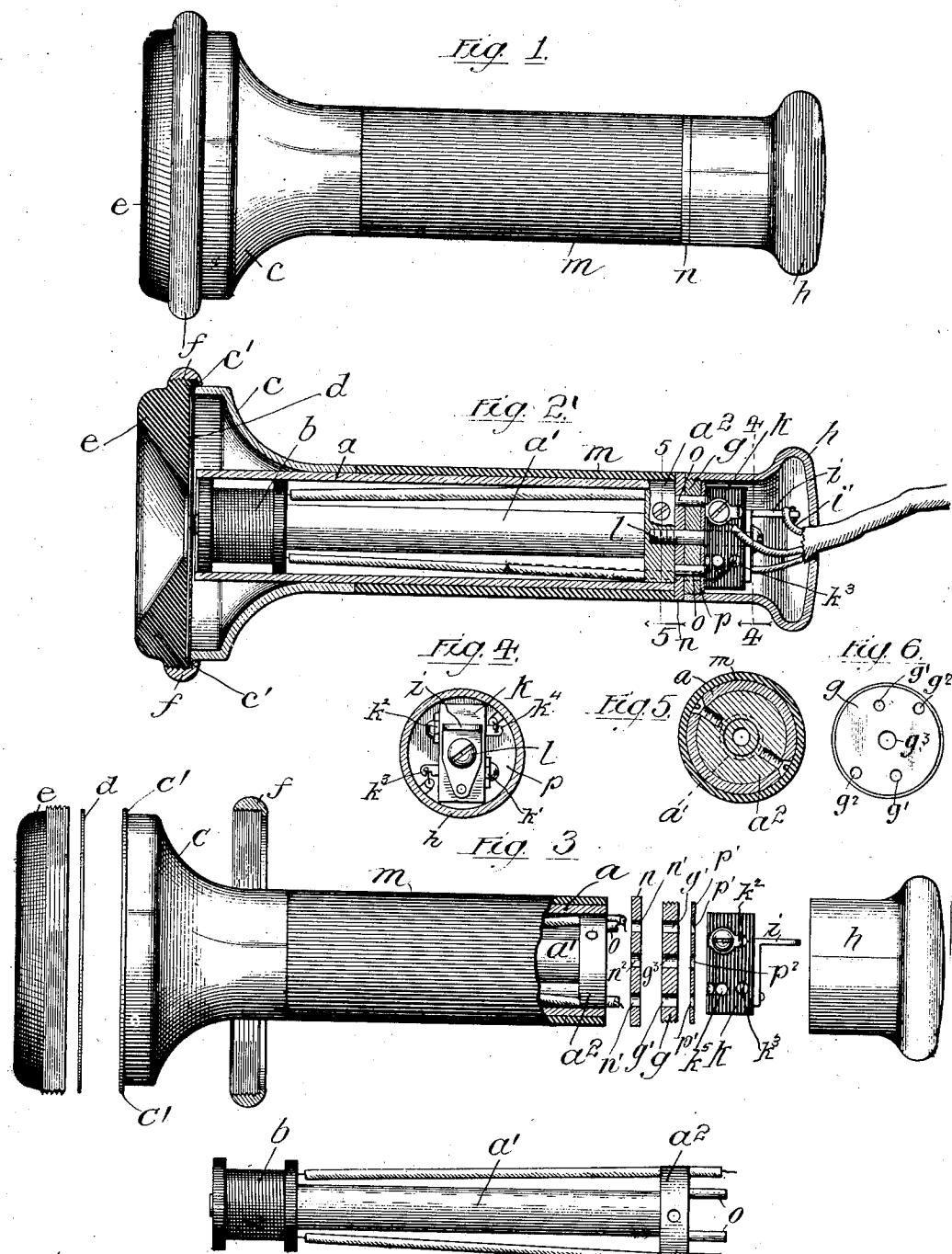


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PATENTED OCT. 16, 1906.

H. F. ALBRIGHT.
TELEPHONE RECEIVER.
APPLICATION FILED FEB. 5, 1904.



Witnesses:

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Fig. 7.

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HENRY F. ALBRIGHT, OF NEW YORK, N. Y., ASSIGNOR TO WESTERN ELECTRIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

TELEPHONE-RECEIVER.

No. 833,279.

Specification of Letters Patent.

Patented Oct. 16, 1906.

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To all whom it may concern:

Be it known that I, HENRY F. ALBRIGHT, a citizen of the United States, residing at New York, in the county of New York and State 5 of New York, have invented a certain new and useful Improvement in Telephone-Recceivers, of which the following is a full, clear, concise, and exact description.

My invention relates to a telephone-receiver; and its object is to provide an improved receiver which will be cheap to manufacture and extremely efficient.

It has been usual heretofore to make the case of a telephone-receiver of hard rubber, 15 the magnet inside the case being fastened to the rear thereof, the earpiece screwing over the outside of the front of the case to hold the diaphragm in position opposite the polar end of the magnet. This construction has been 20 rather expensive because of the amount of rubber required, and there is the further and more serious objection that changes of temperature will produce different degrees of expansion in the steel magnet and in the hard- 25 rubber case to which the magnet is fastened at the rear and which supports the diaphragm in front, so that the diaphragm is not maintained in a constant and unvarying relation to the magnet-pole.

30 My invention contemplates improvements in structure by which the above-mentioned objections are overcome and a further feature of my invention contemplates an arrangement by which it is made possible and practicable 35 to use a tubular magnet, which is the ideal form of magnet for telephone-receivers, since it will act symmetrically upon the diaphragm.

I will particularly describe the preferred 40 form of my invention by reference to the accompanying drawings, in which—

Figure 1 is a side view of my improved receiver. Fig. 2 is a longitudinal sectional view thereof. Fig. 3 is a view showing the several disassembled parts of the receiver to 45 illustrate how they are put together. Fig. 4 is a view, in partial cross-section, on line 4-4 of Fig. 2. Fig. 5 is a cross-sectional view on line 5-5 of Fig. 2. Fig. 6 is a detail view of the disk to which the rear cap of the receiver is 50 attached; and Fig. 7 is a detail view of the core and magnetizing-helix of the magnet.

The same letters of reference are used to designate the same parts wherever they are shown.

The tubular magnet comprises an outer 55 shell or cylinder *a* and an inner core *a'*, magnetically united with the shell *a* at the rear by means of a disk *a''*. The winding *b* is provided at the front end of the magnet surrounding the core *a'* in the space between 60 said core and the shell or cylinder *a*. Near the front of the magnet a non-magnetic metallic cup *c* is permanently fastened upon the shell *a*, so that the polar ends of the magnet formed by the free ends of said core and shell 65 are concentrically disposed within said cup. The cup *c* is provided with a flange *c'*, upon which the diaphragm *d* rests in operative relation to the concentric poles of the tubular magnet. The core *a'* and shell *a* are preferably permanent magnets, forming, in effect, a permanent horseshoe-magnet which will be 70 strong and less liable to demagnetization, whose action upon the diaphragm will be very symmetrical, and whose condition will be permanent and constant. It will be seen that these poles will act upon the circular diaphragm symmetrically and will therefore 75 make the telephone-receiver more efficient than where two magnet-poles are simply placed side by side behind the diaphragm. The cup *c* being of metal and fastened to the metallic cylinder *a* of the magnet, it will be seen that any variations in temperature will 80 not affect the distance between the magnet-pole and the plane of the diaphragm, which should of course be kept constant in order to 85 secure the best results.

The rubber earpiece *e* fits against the end of the diaphragm and is provided with 90 threads upon its periphery. The earpiece is clamped in position to hold the diaphragm against the flange *c'* of the cup by means of a metal clamping-ring *f*, which has an inner lip or rim at the rear adapted to engage the 95 flange *c'* of the cup and threads upon the forward portion of the interior adapted to screw upon the threaded earpiece *e*. The several parts are thus securely fastened in position by screwing the clamp and earpiece together. It 100 may be mentioned here that this construction is extremely effective to prevent tampering with the receiver, since when the parts are tightly screwed together it is practically impossible for an ordinary person to take them 105 apart.

At the rear of the tubular magnet a threaded disk *g* is provided, upon which a metal cap

h is adapted to screw. An insulating-block *k*, supporting terminal pieces *k' k²* for the conducting-wires which lead from the winding *b*, is supported upon said disk *g*, the block and disk being fastened to the rear of the magnet by a screw *l*. A bracket *i* may be carried by the insulating-block, to which a tie-cord may be attached in a well-known manner to relieve the conducting-wires from strain. The terminal pieces *k' k²* may be connected with studs *k³ k⁴*, passing through the block, to which the wires leading from the magnet-helix may be attached. The screws which carry the terminal pieces may be inserted in holes drilled through the block, the screw-hole *k⁵* for terminal *k'*, however, alone being shown in the drawings. The cap *h* is provided with a hole through which the flexible conducting-wires may be led to the terminal pieces upon the block *k*.

A hard-rubber shell *m* may be slipped over the cylindrical portion *a* of the tubular magnet before the parts at the rear are assembled. A disk *n* may be interposed between the disks *a²* and *g* to form a seat or abutment for the rubber shell *m* and the cap *h*, and pins *o o* may be carried by the disk *a²*, adapted to pass through the holes *n' n'* in disk *n* and holes *g' g'* in disk *g* into the block *k* to prevent rotation of said parts. Holes *g² g³* are provided in disk *g* for the passage of the conducting-wires leading from the helix to the terminals *k' k²*. An insulating-disk *p* may be interposed between the insulating-block *k* and disk *g* to prevent short-circuiting of the terminals on said disk, said disk being provided with holes *p' p'* for the passage of said pins *o o*. The screw *l* passes through block *k*, perforation *p²* of disk *p*, hole *g³* in disk *g*, hole *n²* in disk *n*, into the rear of the tubular magnet.

I claim—

1. In a telephone-receiver, the combination with a tubular magnet having a magnetizing-helix surrounding the core thereof, of a diaphragm supported before the poles of said magnet, an insulating-block carrying terminals for said helix secured at the rear of said magnet, and a cap secured at the rear of said magnet and inclosing said block and terminals, said cap having a hole therein to admit conductors to said terminals.

2. In a telephone-receiver, the combination with a tubular magnet having a magnetizing-helix surrounding a portion of the core thereof, of a non-magnetic cup flaring outwardly from the outer shell of said magnet, the free ends of said core and shell being concentrically disposed within the cup, a diaphragm supported over said cup in operative relation to said poles, means for clamping an earpiece upon said cup over said diaphragm, an insulating-block secured to the rear of said magnet and having terminals thereon for said helix, and a cap secured between the rear of said magnet and said block and inclosing said

block and terminals, said cap having an opening therein to admit conductors to said terminals.

3. In a telephone-receiver, the combination with a tubular magnet and a magnetizing-helix therefor, of a cup carried by said magnet at the forward end and supporting a diaphragm in operative relation to the magnet-pole, an earpiece and means for clamping the same upon the cup to hold the diaphragm in position, a hard-rubber sleeve fitting over the body of the magnet, a threaded disk of substantially the diameter of the magnet-cylinder fitting upon the rear end of said magnet, an insulating-block having terminal pieces mounted thereon, a screw fastening the insulating-block and threaded disk to the rear end of the magnet-cylinder, and a cap fitting over said insulating-block and screwing upon the threaded disk, said cap having a hole in its end through which flexible conducting-wires may be passed to connect with the terminals upon said block.

4. In a telephone-receiver, the combination with a tubular magnet having a magnetizing-helix surrounding the core thereof, of a diaphragm supported before the poles of said magnet, an insulated block secured at the rear of said magnet, terminals for said helix carried by said block, and a cap inclosing said block and terminals and secured in place between the magnet and insulated block, said cap having a hole therein to admit conductors to said terminals.

5. In a telephone-receiver, the combination with a tubular magnet and a magnetizing-helix surrounding the core thereof, of a diaphragm supported before the poles of said magnet, an insulating-block secured to the rear of said magnet, having terminals thereon for said helix, a disk interposed between said block and magnet, and a cap fitting over said block and adapted to be secured to said disk, said cap having a hole therein to admit conductors to said terminals.

6. In a telephone-receiver, the combination with a tubular magnet, of a cup secured to the shell of said magnet and flaring outwardly therefrom, the shell being concentrically disposed within the cup, a diaphragm supported by said cup opposite the poles of said magnet, an earpiece, means for clamping said earpiece upon said cup over said diaphragm, an insulating-block secured to the rear of said tubular magnet and carrying terminals for said helix, a disk secured between said block and magnet, and a cap fitting over said block and adapted to be secured to said disk, said cap having a hole therein to admit conductors to said terminals.

7. In a telephone-receiver, the combination with a tubular magnet having a magnetizing-helix surrounding the core thereof, of a diaphragm supported before the poles of said magnet, an insulating-block at the rear of

said magnet having terminals thereon for said helix, pins connecting the rear of said magnet with said block, a fastening member passing through said block into the rear of said magnet, and a cap secured at the rear of said magnet and inclosing said block, said cap having an opening therein to admit conductors to said terminals.

8. In a telephone-receiver, the combination with a tubular magnet having a magnetizing-helix surrounding the core thereof, of a diaphragm supported before the poles of said magnet, an insulating-block at the rear of said magnet and having terminals thereon for said helix, a disk interposed between said block and magnet, pins secured to the rear of said magnet and passing through said disk into the insulating-block, a screw passing through said block and disk into the rear of said magnet, and a metal cap fitting over said block and secured to said disk, said cap having a hole therein to admit conductors to said terminals.

9. In a telephone-receiver, the combination with a central magnet, core, of a magnetizing-helix surrounding a portion thereof, a tubular shell of magnetic material inclosing said core and helix and united with said core at the rear to form a tubular return pole-piece, a non-magnetic metal cup united with the shell and flaring outwardly therefrom, the end of said shell being concentrically disposed within the cup, a diaphragm resting upon the edge of the cup in operative relation to the ends of said core and return pole-piece, an earpiece fitting over the diaphragm having threads upon its periphery, an internally-threaded clamping-ring engaging the edge of the cup, said clamping-ring being adapted to receive the earpiece, which screws into the same, thereby clamping the diaphragm between the earpiece and the

edge of the cup, an insulating-block secured to the rear of said tubular magnet and carrying terminals for said helix, and a cap secured between said magnet and block and inclosing said block and terminals, said cap having a hole therein to admit conductors to said terminals.

10. In a telephone-receiver, the combination with a tubular magnet having a magnetizing-helix surrounding a portion of the core thereof, of a diaphragm supported before the poles of said magnet, an insulating-shell fitting over said magnet, an insulating-block carrying terminals for said helix mounted at the rear of said magnet, and a metal cap secured at the rear of said magnet and inclosing said block, said cap being secured in place between said block and magnet.

11. In a telephone-receiver, the combination with a tubular magnet having a magnetizing-helix surrounding a portion of the core thereof, of a non-magnetic metal cup united with the outer shell of said magnet, the free ends of said core and shell being concentrically disposed within the cup, a diaphragm clamped upon the edge of said cup, an insulating-sleeve fitting upon the shell of said magnet and abutting against the rear of said cup, an insulated block carrying terminals for said helix supported at the rear of said magnet, a metal cap secured between said magnet and block and inclosing said block and terminals, and conductors leading through an opening in said cap to said terminals.

In witness whereof I hereunto subscribe my name this 25th day of November, A. D. 1903.

HENRY F. ALBRIGHT.

Witnesses:

J. W. BAUCKER,
W. L. COURSEN.