

(No Model.)

J. C. EICHMEYER.

TELEPHONE RECEIVER.

No. 354,402.

Patented Dec. 14, 1886.

Fig. 1.

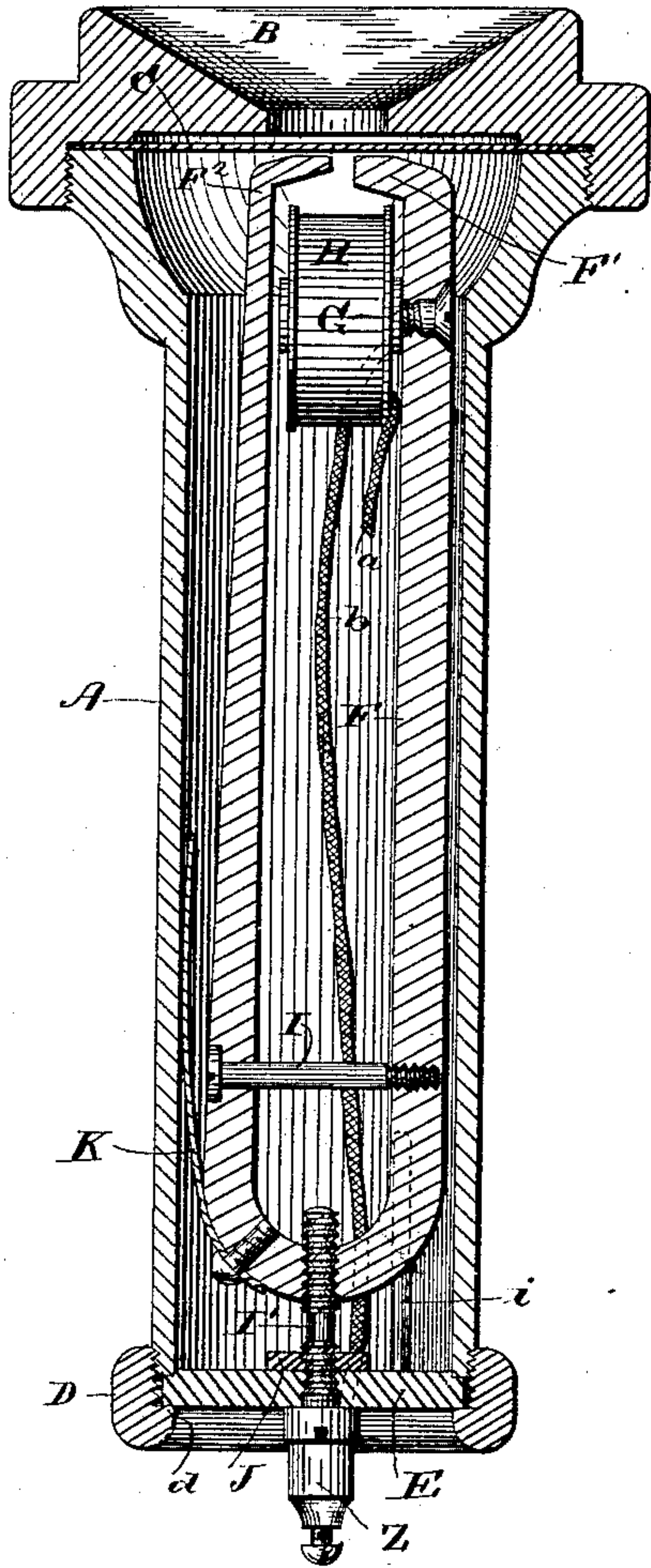
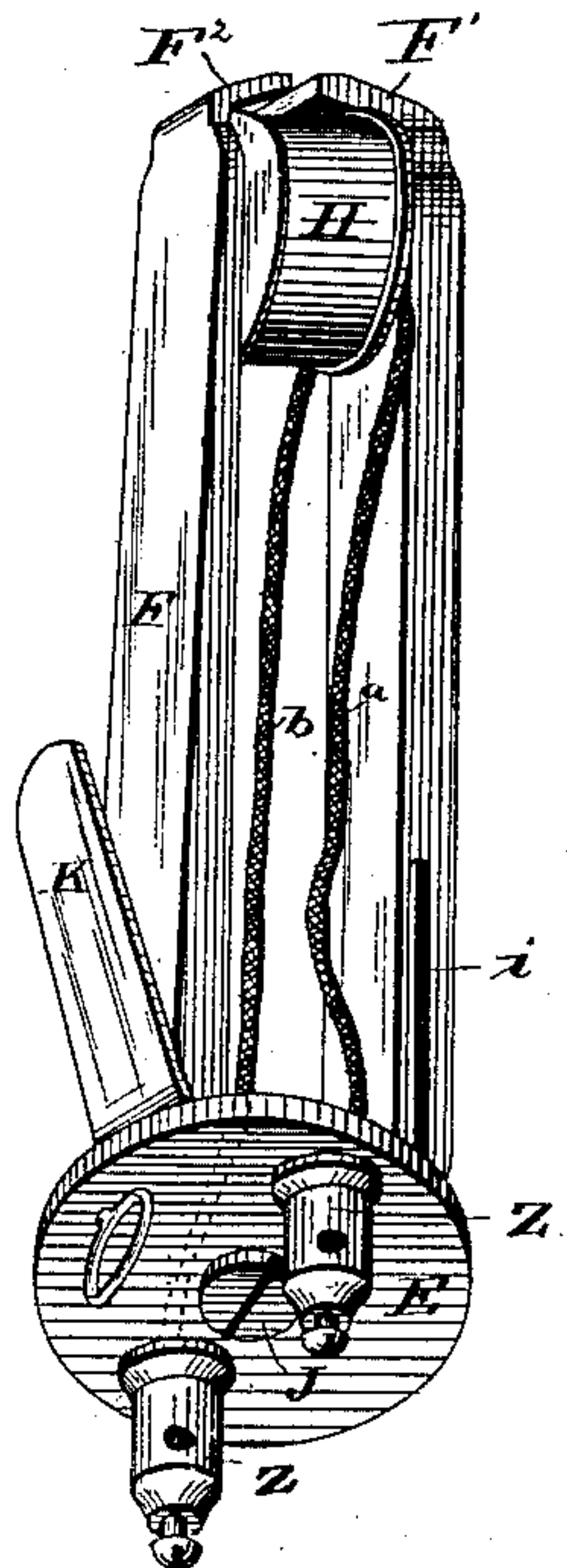


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOSEPH C. EICHMEYER, OF UTICA, NEW YORK, ASSIGNOR OF NINE-TENTHS
TO FRANK J. CALLANEN, JOSEPH R. SWAN, AND AUGUSTUS H. PALMER,
ALL OF SAME PLACE.

TELEPHONE-RECEIVER.

SPECIFICATION forming part of Letters Patent No. 354,402, dated December 14, 1886.

Application filed March 26, 1886. Serial No. 196,614. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH C. EICHMEYER, of Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Telephone-Receiver; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures and letters of reference marked thereon.

My invention relates to that class of telephone-instruments known as "magneto-receivers;" and it has for its object to improve their construction and operation, so that greater amplitude of vibration will be given the diaphragm, and consequently the words or sounds reproduced will be louder and clearer than those produced by the instruments in common use; and it consists in a certain novel construction, which I will now proceed to describe.

In the drawings, Figure 1 is a longitudinal sectional view of a telephone-receiver constructed in accordance with my invention. Fig. 2 is a perspective view of the magnet and coil removed from the casing and the plate to which they are secured.

Similar letters of reference in the drawings represent the same parts.

The most approved form of instruments of the class to which my invention belongs consists of a straight-bar magnet composed of several pieces of steel secured together and having at one end a common pole-piece, of soft iron, for acting upon the diaphragm, and upon said pole-piece is mounted the coil of fine insulated wire connecting with the main line, and a thin iron diaphragm is employed, placed at right angles to the end of the magnet. Assuming the north pole of the magnet to be that nearest the diaphragm, when a current comes from the line acting upon the magnet tending to strengthen the latter its attraction for the diaphragm will be increased. Then upon a reversal of the current the normal attraction of the bar-magnet will be diminished by the polarization of the core, so that the diaphragm will be acted upon by a force equal to the difference between the magnetization of the permanent magnet and that induced in the core

by the current from line. Now, as the attractive force of the bar-magnet is usually greater than the magnetization produced in the core by the strongest current from line, the diaphragm will be undertension all the time, and its excursions in either direction will be comparatively slight. With the object in view of increasing these excursions I have devised the improved form of receiver hereinafter described, consisting, generally, of an arrangement of magnet and coil whereby upon the receipt of a current from line of one polarity the strength of the magnet and its attraction for the diaphragm will be increased and upon the receipt of a current of opposite polarity the attraction will be reduced very materially, causing a greater variation than is possible by the receivers now in use, all as I will now proceed to describe.

A represents the casing of the instrument, constructed of hard rubber or other suitable material, and B the cap or mouth-piece screwed thereon, and holding in place the diaphragm C at its edges in the usual manner. The rear end of the casing A is screw-threaded on the outside, and upon this end is adapted to be secured the cap or ring D, having a flange, *d*, and between this flange and one end of the casing A is confined a plate, E, of hard rubber or similar material, to which the magnet and the binding-posts connecting with the coil are secured.

F represents the magnet bent into the loop or horseshoe shape shown, and having both of its poles bent over nearly at right angles and with their upper sides in close proximity to the diaphragm, as shown. One of the ends, *F'*, of the magnet is slightly thicker and wider than the other, *F''*, and there is sufficient resiliency in the metal of the reduced end, so that the ends may be made to approach each other slightly. To the leg *F'* of the magnet, just back of the bent end, is secured a short core, G, of soft iron, on which is mounted an ordinary receiver-coil, H, of fine copper wire, connected with the main line. The end of the core G extends nearly across the space between the two legs of the magnet and projects to within about one sixty-fourth of an inch of the

leg F^2 ; but this distance can be regulated to suit varying conditions of current, &c., by means of the screw I , having the flange on its head projecting through the leg F^2 , and adapted to be screwed into the leg F' , so as to draw the two legs together, if desired, or by unscrewing it permit them to separate.

The magnet is secured to the plate by the screw I' , passing through said plate and screwing into the magnet at its lower end, and is adapted to be adjusted toward and from the diaphragm by said screw and held in adjusted position by means of the set-nut j , mounted thereon on the inside of the plate, as shown. In order to prevent the magnet from turning when the screw J is turned, I provide two pins, $i i$, secured to the plate E and projecting on either side of the loop of the magnet. $Z Z$ represent binding-posts secured to the plate E , and to these the coil G is connected by the wires $a b$, as shown.

Secured to one leg of the magnet is a flat metal spring, K , which, when the magnet is within the casing, is adapted to press against the inside of the latter and keep the magnet in position within it and prevent its moving, as will be readily understood; but said spring will not interfere with its withdrawal from the casing when desired.

The operation of the device is as follows: Starting with the idea that the heavier pole of the magnet to which electro-magnet H is secured is a north pole and the light free end a south pole, when a current or impulse comes over the line tending to make the north pole a stronger north the core H will be more strongly magnetized and will draw the lighter leg of the magnet toward it, the distance between them being very slight. When the leg F^2 thus approaches or touches the core, the magnet will be short-circuited, so to speak, acting the same as if a keeper were applied near the end of a horseshoe-magnet, and the attraction the two poles had for the diaphragm will be reduced, allowing the diaphragm to go back to approximately its normal position; but when a current comes over the line, acting upon the core in opposition to the normal magnetization of the magnet and tending to neutralize the attraction of the north pole, F' , both poles of the magnet will attract the diaphragm strongly and cause it to make its maximum excursion toward the magnet. Even if the leg of the magnet is not allowed to touch the core G , the magnetism will be reduced in proportion to the diminution of the distance between them; or the extreme poles of the magnet may be brought into contact, if desired, and the attraction entirely destroyed.

It will be noted that the magnet, coil, and all the operative parts of the instrument, with the exception of the diaphragm, are secured to the plate I , and that the latter is secured in place only by the flange on the ring D , so that by the removal of this ring all the operative

parts can be removed and repaired or adjusted without undoing a number of screws and dismantling the whole of the instrument in order to repair it, as is the case with the instruments now in use.

While I have described but one embodiment of my invention, it is obvious that numerous devices can be devised without departing from the spirit of my invention, and I therefore do not desire to be confined to the devices shown.

I claim as my invention—

1. In a magneto-telephone, the combination, with the diaphragm, of the loop-magnet having both poles in proximity thereto and an electro-magnet for moving the legs of the magnet toward each other, substantially as described.

2. In a magneto-telephone, the combination, with the diaphragm, of the loop-magnet having both poles in proximity thereto and an electro-magnet mounted between the legs of the magnet for drawing them toward each other, substantially as described.

3. In a magneto-telephone, the combination, with the diaphragm, of the loop-magnet having both poles in proximity thereto, the legs of the magnet being separated by spring-pressure, and an electro-magnet mounted between said legs for drawing them toward each other, substantially as described.

4. In a magneto-telephone, the combination, with the diaphragm, of the loop-magnet having both poles in proximity thereto, an electro-magnet between the legs of the magnet, and means for adjusting said legs toward and from each other, substantially as described.

5. In a magneto telephone, the combination, with the diaphragm, of the loop-magnet having both poles in proximity thereto and an electro-magnet mounted upon one leg of the magnet and arranged to draw the legs of the magnet into contact, substantially as described.

6. In a magneto-telephone, the combination, with the diaphragm, of the loop-magnet having both poles in proximity thereto, one leg being slightly heavier than the other, an electro-magnet mounted upon the heavier leg and arranged to draw the lighter toward the heavier leg, substantially as described.

7. The combination, with the magnet, of the plate E , the screw for securing the magnet to the plate and adjusting it relative thereto, and the pins $i i$, for steadying the magnet, substantially as described.

8. In a magneto-telephone, the combination, with the tubular casing, of the plate to which the magnet and coil are secured, the spring secured to the magnet for steadying it within the casing, and means for securing said plate removably to the casing, substantially as described.

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Witnesses:

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