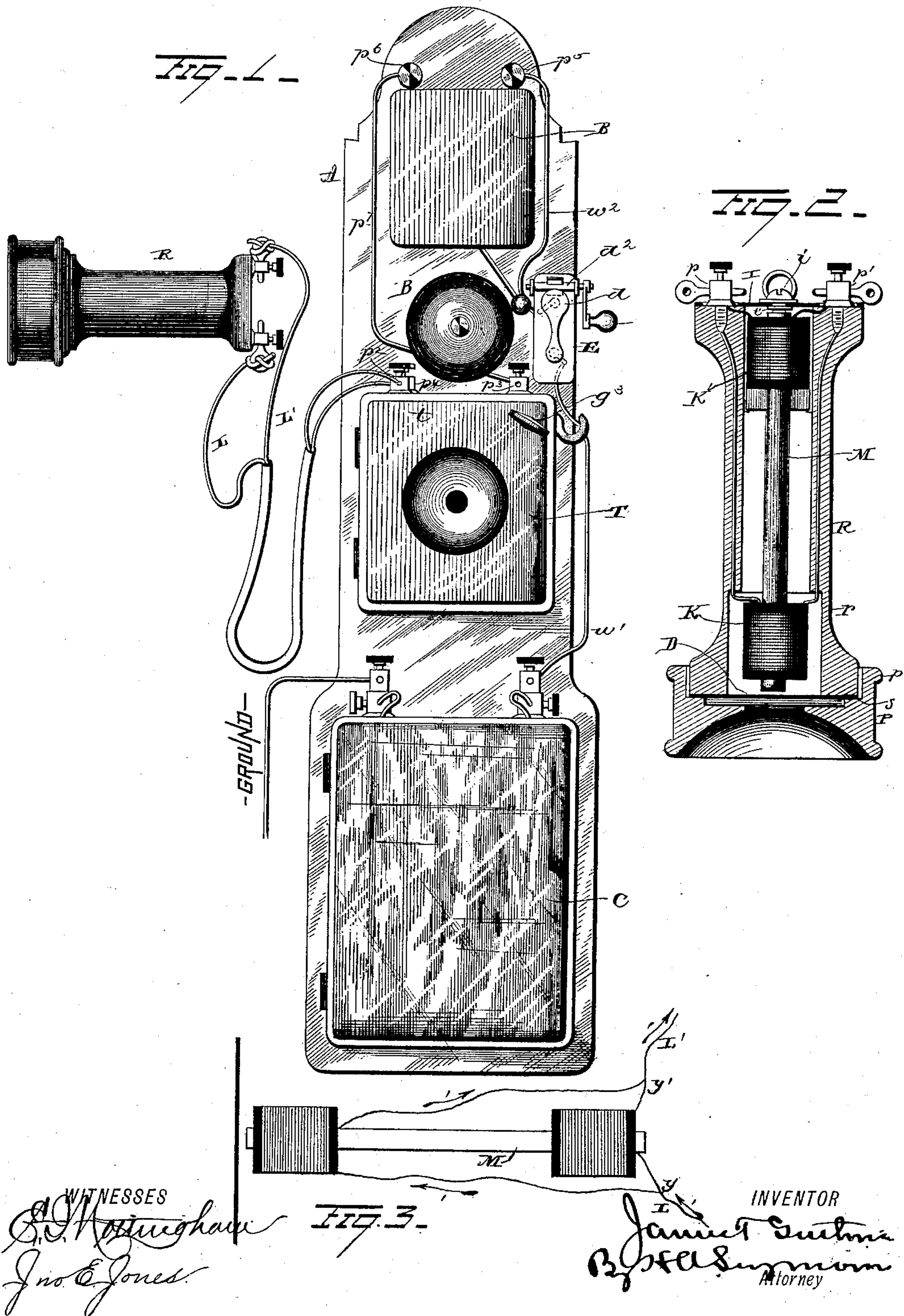


(No Model.)

J. T. GUTHRIE.
TELEPHONE RECEIVER.

No. 341,000.

Patented May 4, 1886.



UNITED STATES PATENT OFFICE.

JAMES T. GUTHRIE, OF LEESBURG, OHIO.

TELEPHONE-RECEIVER.

SPECIFICATION forming part of Letters Patent No. 341,000, dated May 4, 1886.

Application filed November 10, 1885. Serial No. 182,326. (No model.)

To all whom it may concern:

Be it known that I, JAMES T. GUTHRIE, of Leesburg, in the county of Highland and State of Ohio, have invented certain new and useful Improvements in Telephonic Receiving Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improved telephonic receiving apparatus designed especially for use with direct electric currents, or such as are not intermittently reversed. It is, however, capable of being operated by reversed currents, or such as emanate from the secondary coil of an inductorium.

The objects of my improvement are to enable articulate speech to be communicated by means of electricity over greater distances than heretofore deemed practicable, and to render the spoken messages loud and distinct when received.

With these ends in view my invention consists in a receiving-telephone composed of a suitable trumpet-like case, a metallic diaphragm mounted across the enlarged end of said case, and a permanent magnet arranged within said case to attract the diaphragm, and having a coil of insulated wire mounted on each end, said coils being connected in multiple arc to two common terminals arranged for circuit-connection.

The construction and operation of my new receiving-telephone will be readily understood from the following particular description in connection with the accompanying drawings.

In the drawings, Figure 1 is a front view of a telephone subscriber's-station apparatus comprising my improved receiving-telephone and its adjuncts. Fig. 2 is a diametric section through the case and diaphragm of the receiver, but showing the interior parts in full lines. Fig. 3 is a diagram illustrating the electro-magnetic construction of the receiver.

Referring to Fig. 1, at the top of the back board, A, is mounted an electric bell, B, which is of ordinary construction and need not be here particularly described. T is the transmitter, C the battery-case, and E the circuit-

breaking device for calling purposes. R designates the receiver.

Referring now particularly to Fig. 2, I will first describe the construction of receiver R in detail, and explain the same with reference to Fig. 3. The trumpet-like case *r* is enlarged at both ends, and at one end is provided with an ear-piece, P, which has a flange or lip, *p*, embracing the end of the case snugly, and preferably lined with velvet or similar cloth to give it adherence. At *s* the ear-piece has an annular shoulder, and between this shoulder and the adjacent end of the case is clamped the diaphragm D. Inside of the case is a bar permanent magnet, M, having one pole near the diaphragm and the other pole near the other end of the case. On the diaphragm end of the magnet is a coil, K, of fine insulated wire, and a similar coil, K', is on the other end. The inner terminal of coil K is connected to the outer terminal of coil K', and the inner terminal of the latter is connected to the outer terminal of the former. The double terminals thus formed are connected to the binding-posts *p* and *p'*, respectively, so that the two coils will thus be in multiple-arc connection with wires which may be connected to posts *p p'*. A current passing in the direction of the arrows No. 1, through the wires L and L' to and from the receiver, will divide at the junction *y* of the coil-terminals and reunite at the junction *y'*, a quantity going through each coil in proportion to its resistance. The resistances should be equal. The coils are so wound and arranged upon the magnet that when the current through one coil tends to reinforce the magnet-pole which it surrounds the current through the other coil partially neutralizes the other pole. Now, if a current is used which flows only in one direction, and is simply increased and decreased in strength or varied in response to sound undulations, the current action which strengthens the magnet-pole nearest the diaphragm weakens the other pole, and the magnetic field is shortened and condensed near the diaphragm, and the attraction of the magnet for the diaphragm is much greater than it would be if its field were not so condensed. At the same instant the field is weakened at the opposite pole, there being no necessity for strong attraction or any other magnetic action at such time at that

point. When the current begins to weaken, however, the rear pole begins to gain strength as the front pole loses it, and the magnetic field near the diaphragm becomes weakened by attenuation, resulting from extension and from the loss of the exciting influence of coil K, so that the diaphragm is so much relieved as to make a very free outward half-vibration as the result of its natural resilience. The complete vibrations correspond to variations of current strength, and by means of my improved transmitter, described and claimed in another application, the impulses varied in strength are all caused to flow in the same direction. When the two coils act upon the magnet in opposite directions, there is occasioned a torsional strain which tends to induce in both coils additional currents which react upon the magnet, and thus re-enforce the impulses which come from the transmitter.

On the rear end of the trumpet-like casing is a metal plate, I, through which passes an adjusting-screw, *i*, which screws into the rear end of the bar-magnet, and serves to adjust the same with relation to the diaphragm. The screw has a collar, *i'*, which prevents it from moving longitudinally through the plate.

While I have described my receiver as being especially adapted for operation by non-alternating currents or undulations, it may be also operated by the alternating or reversed currents such as are sent by transmitters using induction-coils.

I do not confine myself to the arrangement of coils as heretofore described, and as shown in my drawings, as they may be so arranged that they will simultaneously strengthen and simultaneously weaken the magnet-poles which they surround, respectively.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a receiving-telephone, the longitudinally-adjustable straight bar-magnet having coils arranged upon its opposite ends, and connected in multiple arc, and arranged to have opposite effects simultaneously, essentially as set forth.

2. The receiving-telephone composed of the trumpet-like casing, the diaphragm, the straight bar-magnet longitudinally adjustable within said casing, and the coils on opposite ends of said magnet and connected in multiple arc, said coils being arranged to have opposite effects simultaneously, essentially as set forth.

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

JAMES T. GUTHRIE.

Witnesses:

W. T. HOVAN,
L. L. SECRIST.