(No Model.)

T. J. PERRIN.

TELEPHONIC APPARATUS.

No. 347,374. Patented Aug. 17, 1886.

Fig. 1.

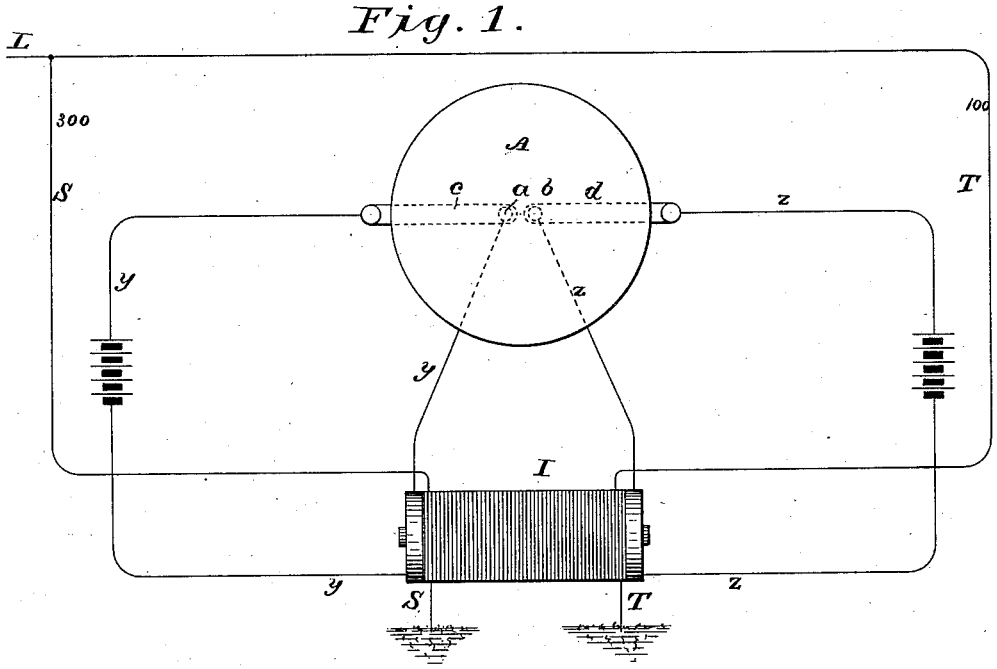


Fig. 2.

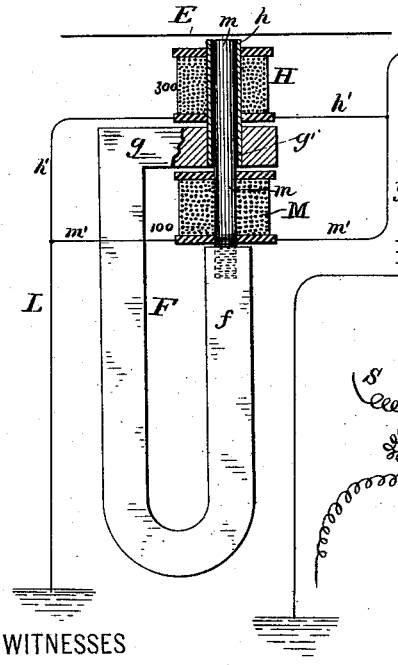


Fig. 3.

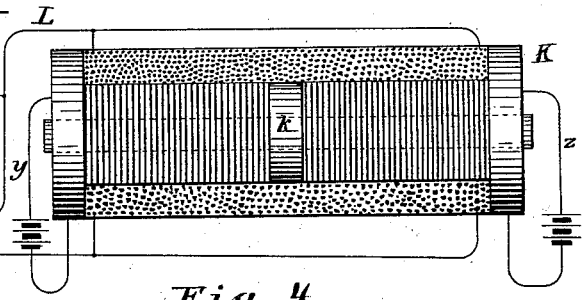
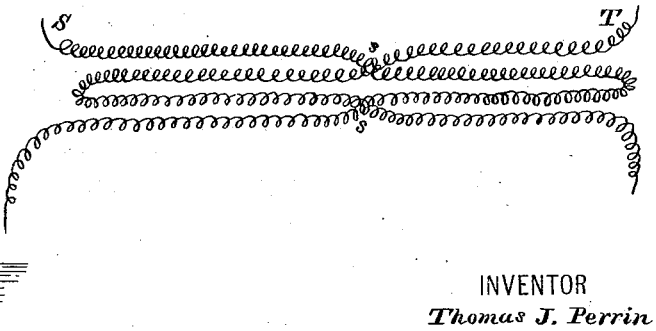


Fig. 4.



WITNESSES

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TELEPHONIC APPARATUS.

SPECIFICATION forming part of Letters Patent No. 347,374, dated August 17, 1886.

Application filed July 25, 1884. Serial No. 138,774. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. PERRIN, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Telephone Systems and Apparatus, of which the following is a specification.

The object of my invention is to provide a system of telephony in which the transmitted vibrations will be reproduced at the receiving-station with such vigor and amplitude of motion of the receiving-diaphragm that the speech or signals will be clear and distinct. To accomplish this object I employ a peculiar arrangement of induction-coil involving more than one primary circuit, and so constructed that currents of different tensions are thrown upon the line to act upon the receiver at a distant station. This receiver is constructed with more than one coil—that is, with a coil for each of said transmitted currents—adapted specially to respond to its particular current and not to the others.

In the accompanying drawings, Figure 1 is a diagrammatic view illustrating the transmitter and the induction-coil and its circuits. Fig. 2 is a view partly diagrammatic, illustrating the construction of the receiving-telephone. Fig. 3 is a view representing the construction of the transmitting induction-coil, and Fig. 4 is a diagram view illustrating the winding of the secondary wires of the induction-coil.

Referring, first, to Fig. 1, A represents a transmitting-diaphragm; *a b*, contacts or electrodes on the diaphragm; *c d*, spring-arms carrying the corresponding contacts or electrodes for the contacts *a b*, as is well understood. The spring-arm *c* and the electrode *a* on the diaphragm are included in a primary battery-circuit, (marked *y*,) which is wound on the induction-coil I, as is presently described. The arm *d* and the contact *b* are included in another primary battery-circuit, *z*, wound in the same manner upon the induction-coil.

The winding is illustrated in Fig. 3, where it will be seen that the spool K of the induction-coil is divided into two sections by a central flange, *k*. The primary circuit *y* is wound on the left-hand section of the spool, and the primary circuit *z* on the right-hand section of the spool. As is well understood, the vibrations of the diaphragm will produce changes of contact which will cause corresponding variations in the primary circuits *y z*, which will act upon the induction coil or coils. The secondary wires S and T are wound over the primaries *y z*, and are both connected with a common main line, L.

The winding of the secondary coils is indicated in Fig. 3, but is shown diagrammatically and clearly in Fig. 4, from which it will be seen that the winding of the wire S is commenced at the left end of the coil, and that of the wire T at the right end of the coil, and that the two wires cross each other midway at the point *s*, and continue to cross each other as they are alternately wound in opposite directions. I prefer this method of winding, as in my opinion it gives the best results.

The windings of the secondary wires S and T in the induction-coil, while of equal resistance, are of different-sized wire or different electrical capacity, so that different inductive effects will be produced. For instance, the winding of circuit S may be of No. 36 wire and that of the other of No. 42. Different inductive effects therefore take place, resulting in currents of different character or tension. The currents thus induced in the secondaries S and T are thrown upon a common main-line wire, L, and are received at the receiving-station upon an apparatus described below.

The Nos. 100 and 300 on the drawings may be taken as arbitrary signs indicating the different characters of the currents generated in the secondary wires.

The receiver is illustrated in Fig. 2, in which E represents the receiving-diaphragm, and F the receiver horseshoe-magnet. One leg, *f*, of the receiver-magnet is shorter than the other, and the other, *g*, is bent at right angles across the face of the leg *f*, as clearly shown in the drawings. The bent end *g* is bored at *g'*, and a tubular soft-iron core, *h*, is tapped into the hole. This soft-iron tubular core carries a coil, H,

which is placed in a branch, h', of the main line. This coil H is wound of such a resistance as to specially adapt it to receive the current from the secondary wire S at the transmitting-station. A soft-iron pin, m, passes through the tubular core h, but without touching it, and is tapped into the end of the leg f of the horseshoe-magnet, and when in the proper position the face of its end is flush with the outer edge of the tubular core h, as clearly illustrated in the drawings. This pin or core m carries a coil, M, which is included in a branch, m', of the main line. The coil M is of a resistance specially adapted to receive the current from the secondary wire T at the transmitting-station. The two magnetic cores m and h are arranged concentrically, and therefore act centrally upon the receiving-diaphragm. As the coils H and M are constructed so that each coil will take its current sent into the line from its corresponding secondary wire, I obtain a vigor of operation and an amplitude of motion to the transmitting-diaphragm that results in a very marked clearness of the received signals or speech.

The construction of the receiver is novel and advantageous, as thereby the cores of both receiving-coils are caused to act concentrically upon the center of the diaphragm. This, it is considered, is a material improvement in telephonic receivers, and, as above stated, the receiver, in combination with the other features of the system, gives improved results.

I am aware that in other electric systems currents of different tension are thrown upon the line, each of said currents being designed to operate its own independent receiving device. I therefore do not broadly claim such a method of operation.

I am aware of the patents of Watson, No. 251,326 of December 20, 1881, and Gillette, No. 204,024 of May 21, 1878, and do not claim any subject-matter shown therein.

I claim as my invention—

1. The combination of a transmitting diaphragm, independent primary transmitting-circuits, independent secondary coils whose wires have different electrical capacity, in which currents of different tension are induced, a main line, and a receiving-instrument hav- a coil corresponding to each of said secondary coils, and of substantially the same resistance as its corresponding secondary coil.

2. The combination of a receiving-coil, H, its tubular core, a receiving-coil, M, arranged below the coil H, its elongated core which passes upwardly through the tubular core of the coil H, and the diaphragm upon which both cores act, substantially as set forth.

3. The combination of the magnet or supports F, having one end bent at right angles across the face of the other, the tubular soft-iron core carried in said bent ends, its helix, a soft-iron core extending through said tubular core, and secured in the other end of the magnet or support, its helix, and the vibrating diaphragm.

4. The combination of two primary circuit-wires wound in independent coils placed side by side on an induction-coil spool, secondary wires wound over the primaries on said spool alternately in opposite directions, and so as to cross each other at or about the middle of the spool, a main line common to both secondary wires, speech-transmitting devices at one end of the line and speech-receiving devices at the other end of the main line.

5. The combination of an induction-coil having several primary circuits, several secondary coils of different electrical capacity, in which currents of different tension are induced, a transmitting-diaphragm to vary the resistance of the primary circuits, a main line common to said secondary wires, and telephonic receiving devices at the other end of the main line.

6. The combination, substantially as set forth, of independent primary transmitting-circuits, independent secondary coils of different electrical capacity, in which currents of different tension are induced, a main line common to both of said secondary coils, transmitting devices, a receiving-diaphragm, a receiving-coil corresponding to one of the secondary coils included in a branch of the main line, and having a core which acts centrally on the vibrating diaphragm, and another receiving-coil which corresponds with the other secondary coil included in a branch in the main line, and having a core which acts centrally on the vibrating diaphragm.

In testimony whereof I have hereunto subscribed my name.

THOMAS J. PERRIN.

Witnesses:
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NELLIE L. HOLMES.