(No Model.) 2 Sheets—Sheet 1.

T. J. PERRIN.

SPEAKING TELEPHONE TRANSMITTER.

No. 307,728. Patented Nov. 4, 1884.

Fig. 2.

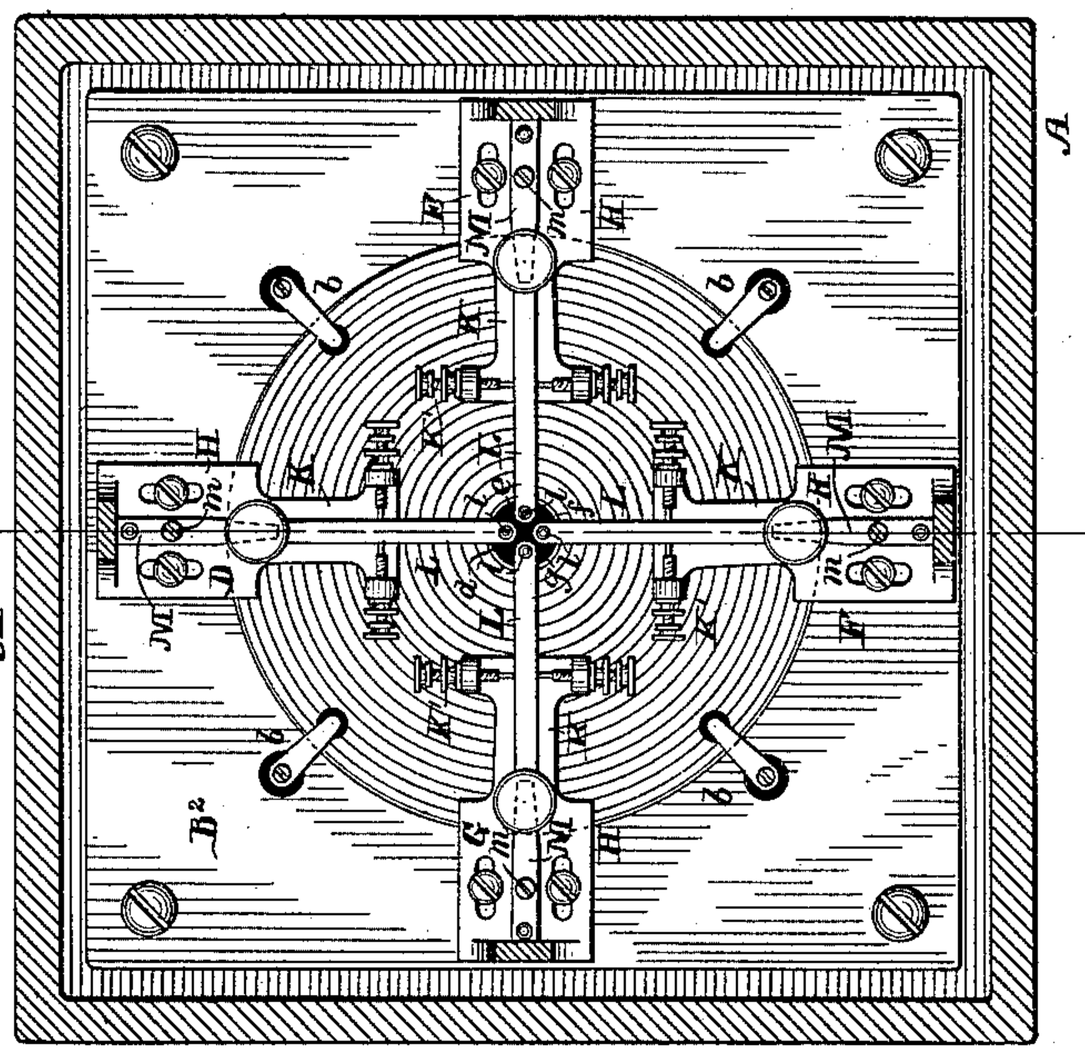
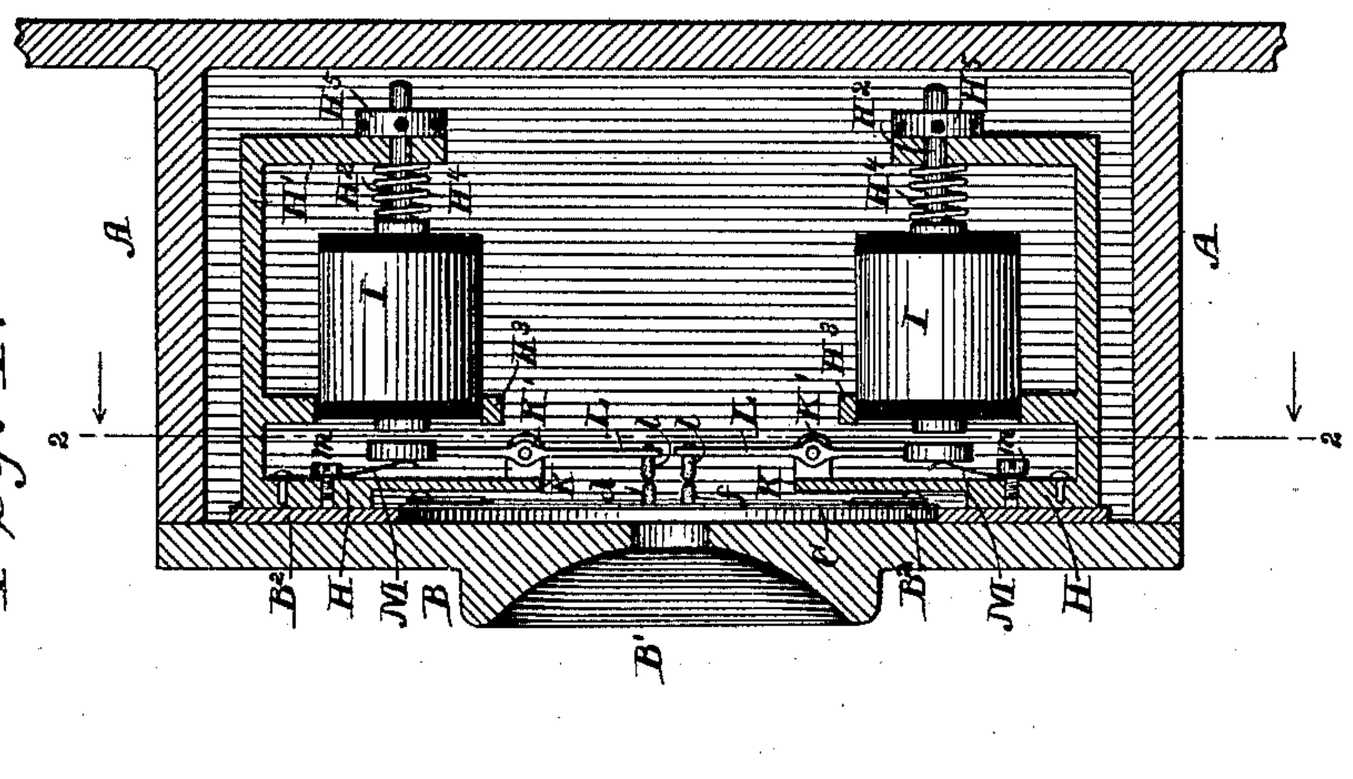


Fig. 1.



WITNESSES

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Baldwin Hopkins & Peyton.

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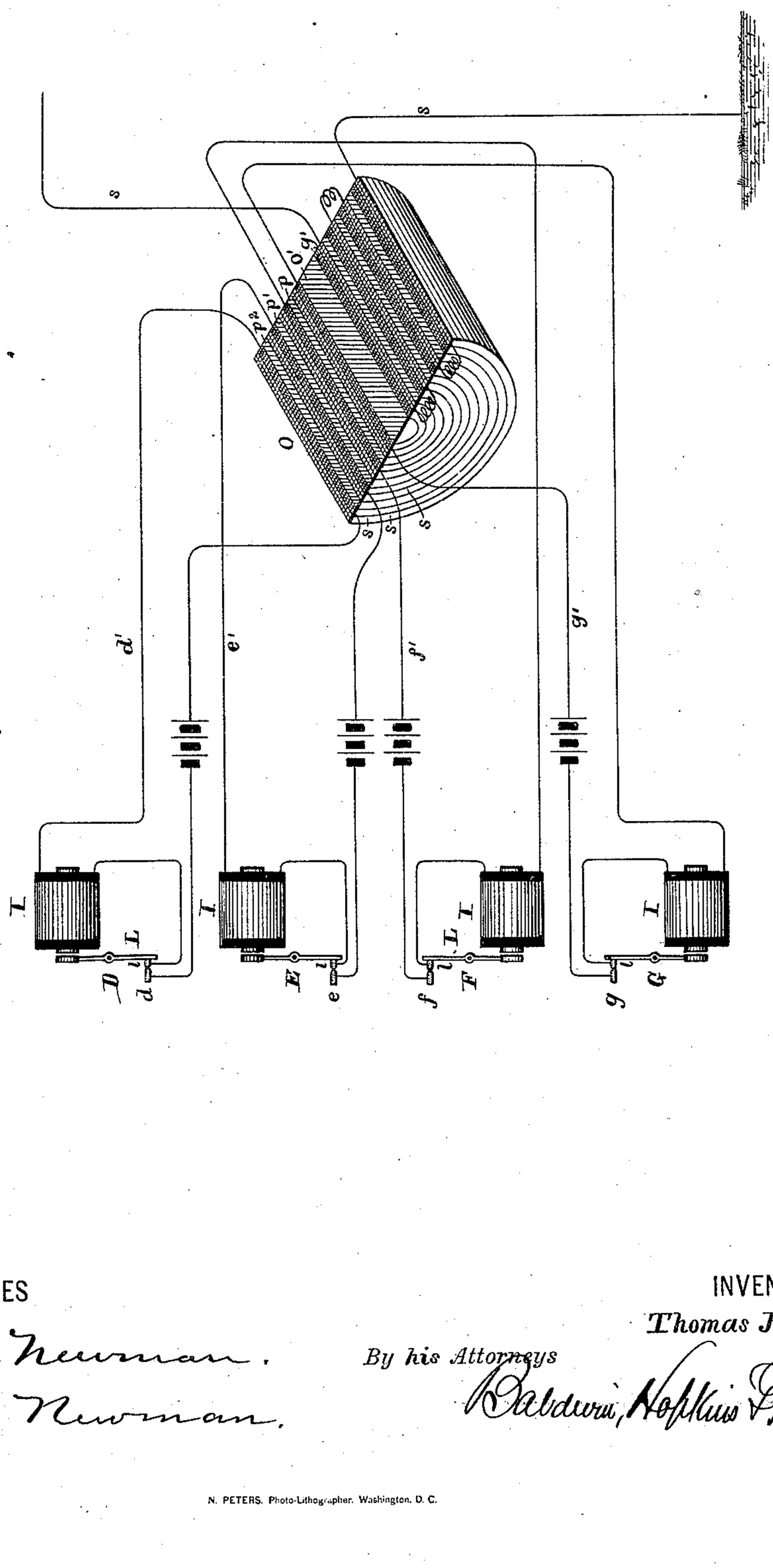
Fig. 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

THOMAS J. PERRIN, OF NEW YORK, N. Y., ASSIGNOR TO THE NATIONAL IMPROVED TELEPHONE COMPANY, OF NEW ORLEANS, LOUISIANA.

SPEAKING-TELEPHONE TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 307,728, dated November 4, 1884.

Application filed September 18, 1884. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. PERRIN, of the city, county, and State of New York, have invented certain new and useful Improvements in Speaking-Telephone Transmitters, of which the following is a specification.

My invention relates to that class of transmitting-instruments in which the electrical condition of the main line is caused by variations of resistance in a transmitting-circuit, which variations are caused by the vibration of the diaphragm.

The object of the first part of my invention is in a practical and efficient manner to combine in a single instrument the effects of several independent primary transmitting-circuits upon a single main line; and, as collateral to this feature of the invention, the invention consists in certain improvements in structure and organization, which are fully disclosed below.

The object of the next part of my invention is to provide an improved adjustment or control of the contacts or electrodes in that class of instruments in which the pressure of the electrodes against each other is maintained by the attracting force of a magnet, either a permanent or an electro magnet.

The details of this part of my invention are also fully described.

In the accompanying drawings, Figure 1 is a transverse central section through the instrument on the line 1 1 of Fig. 2. Fig. 2 is a section on the line 2 2 of Fig. 1, looking in the direction of the arrow, and Fig. 3 is a diagram view illustrating the circuit-connections and contacts.

A is the case of the telephone, which is provided with a suitable swinging door, B, which is provided with a suitable mouth-piece, B′. On the interior of the door a diaphragm base-plate, B^2, is preferably secured, and the diaphragm C is held in place over the central opening in said plate opposite the mouth-piece by retaining fingers or buttons *b*, in the ordinary way.

Upon the inner face of the plate B^2 are secured four groups of apparatus, D E F G, and upon the center of the diaphragm are secured four insulated contacts, *d e f g*—one for each group of apparatus mentioned. It will be sufficient to describe one group, as the other three are indentical in construction and operation. A bracket or frame, H, is secured upon the plate B^2 by clamping-screws, which pass through elongated slots in the bracket, so as to permit of its adjustment. The end of the bracket farthest from the plate is turned up at right angles, so as to form a standard, H′, through which an extension, H^2, of the core of an electro-magnet, I, passes. The electro-magnet is supported at its front end in a circular socket in a vertical standard or flange, H^3, which rises from the bracket H between its point of attachment with the plate B^2 and its end H′. The core of the electro-magnet is endwise movable within its coil, and is normally thrust forward by a coil-spring, H^4, and its position is regulated by a nut, H^5, on the end of the extension H^2 of the core. An extension, K, of the bracket or frame H projects from its point of attachment with the plate B^2 toward the center of the diaphragm. This extension carries ordinary well-known delicate pivoting devices, K′, which support a pivoted lever, L. One end of this lever carries a contact-button, *l*, which bears against one of the insulated contact-buttons—say *d*—secured on the diaphragm. The opposite end of the lever is somewhat enlarged, and constitutes an armature for the electro-magnet I. The contact-buttons *l* and *d* can be brought into suitable opposite position by the adjustment of the frame H toward or from the center of the diaphragm. In operation, as is hereinafter described, the attraction of the magnet I on the armature-lever L maintains the contact between the buttons *l d*, and the coil of the magnet I is included in a primary transmitting-circuit, of which the pair of buttons *l d* constitute the electrodes.

I will here remark that I am aware that, broadly, the employment of an electro-magnet to maintain contact between the electrodes or buttons of a transmitting-circuit is not new, although the special organization of apparatus and relative arrangement of parts which I have already described are novel, and constitute a very convenient and efficient structure.

The leading feature of this part of my invention consists in elastically controlling the armature-lever L, so that its gravity, if the instrument is not secured upon a perfectly-perpendicular wall, will not tend to throw the armature out of the magnetic field and impair or interrupt the contact between the buttons *l* and *d*, and so that in case of any abnormal disturbance or jar caused by an undue and abnormal action of the diaphragm or otherwise the lever cannot be thrown out of the field of its regulating-magnet and separate the contacts.

In instruments not constructed according to my present invention, when the armature is so thrown out of the field and the contacts separated, the armature swinging upon its pivot is liable to vibrate and rebound one or more times from the diaphragm before settling into a normal working condition. This seriously mars the operation of the instrument and injures the contact-surfaces. To carry out this branch of my invention I prefer to employ the peculiar devices illustrated in the drawings, or devices substantially similar to them, although other ways of accomplishing the same result may doubtless be devised. A delicate plate-spring, M, is secured upon the base of the bracket or frame H, so that it can be brought to bear upon the armature-lever and tend to move it toward the pole of the magnet. The spring is adjusted by means of a screw, *m*. The required adjustment of the contacts and of the spring M can readily be obtained by adjusting the core of the magnet to or from the armature-lever until the force of attraction brings the buttons *l d* into proper contact. The spring M is also adjusted so as barely to touch very gently the armature-lever. When thus adjusted, any tendency of the armature to move out of the field of its magnet is prevented, and any sudden jar or shock to the instrument will not cause the separation of the electrodes. As the diaphragm is caused to vibrate by sounds uttered into the mouth-piece, variations of contact occur between the buttons *l d*, which are in the transmitting-circuit, and cause, by means of an induction-coil, the proper electrical condition on the main line, as is well understood. The magnet I, the coil of which is included in this primary transmitting-circuit, acts upon the lever L proportionately to the variations of current in its coil, and produces a perfect condition of contact between the buttons, as is well understood.

All of the apparatus may readily be reached for adjustment by swinging open the door of the instrument, on the interior of which all the parts are carried.

The construction and operation, as before remarked, of the four groups of apparatus D E F G are precisely similar. So far, however, as the feature of my invention already described is concerned, but one pair of contacts and one primary circuit need only be employed. In adjusting the instrument one primary circuit only is closed, and the instrument is then brought into proper adjustment for transmission. This circuit is then opened and another circuit is closed and similarly adjusted, and so on.

In telephoning long distances and under unfavorable conditions the ordinary primary circuit, equipped with the ordinary transmitting-battery, does not produce a sufficient electro-motive force in the secondary of the induction-coil, and there are certain objections to increasing the amount of battery-power in the primary circuit of the induction-coil.

In the organization shown the four pairs of contact-buttons *ld le lf lg* are each included in an independent primary circuit, and all four of these primary circuits act upon a common secondary, which goes to line. I am aware, however, that broadly, in a transmitting-telephone, the use of more than one primary circuit to act upon a single secondary is old, and my invention does not contemplate such broad ground.

In the diagram view, Fig. 3, the magnets I and the four pairs of contacts *ld le lf lg* and their separate primary circuits *d′ e′ f′ g′* are clearly shown. Instead of four separate induction-coils, however, I employ a single compound induction-coil, O, which is wound in the following manner: Upon the core O′ is first wound a layer of the primary circuit *g′*, and over that is wound a layer of the continuous secondary circuit *s*. I now prefer to cover this layer of the secondary coil with paper, and slip over it a tubular soft-iron sheath or cover, *p*. Over this tube is now wound a layer of the primary circuit *f′*, and over this a second layer of the continuous secondary circuit *s*. Over this layer a coating of paper is preferably placed, and a second iron tube, *p′*, is preferably slipped over it. A layer of the third primary circuit, *e′*, is now wound on the tube *p′*, and over that a third layer of the continuous secondary circuit *s* is wound. A covering of paper is passed over this coil, and a third iron tube, p^2, is slipped over it; and on this last tube the fourth primary circuit, *d′*, is wound, and over it the last winding of the continuous secondary circuit *s*. As the transmitting-diaphragm, therefore, vibrates in response to sound-waves which strike upon it, corresponding variations in resistance in the four independent primary transmitting-circuits are simultaneously produced, and these variations in resistance simultaneously act upon the single secondary line.

I have shown four primary circuits. It is not essential, however, so far as this feature of my invention is concerned, whether four only be employed or whether as many as four be employed; and in Letters Patent No. 303,948, granted to me August 19, 1884, I have shown an organization in which but two primaries wound into a compound induction-coil in exactly the same manner as herein illustrated and described are employed.

While the details of construction herein illustrated and described are those deemed by me best adapted for the adjustment of the parts and the accurate transmission of articulate speech, they may of course be largely varied without departing from the principles of my invention.

I am aware that it is old to maintain the electrodes of a transmitting-telephone in contact by means of an electro-magnet included in the primary transmitting-circuit, which acts on a pivoted arm carrying one of said electrodes, and I do not claim such organization, broadly.

No claim is made herein, broadly, to the induction-coil shown and described, as that constitutes the subject-matter of another application to be filed by me. Nor is any claim made herein, broadly, to the combination of a transmitting-diaphragm, two or more contact-buttons mounted on or controlled by said diaphragm, a corresponding electrode or button for each insulated electrode on the diaphragm, and an independent primary transmitting-circuit for each pair of said electrodes, as such subjects-matter are claimed in my original application, No. 121,419, filed February 20, 1884, of which this case is a division.

I claim as my invention—

1. The combination, substantially as set forth, of a transmitting-diaphragm, the electrodes of a transmitting-circuit, between which variations of contact are caused by the vibrations of the diaphragm, a lever or electrode-support which maintains the electrodes in contact, a magnet acting upon said lever to maintain contact between the electrodes, and a spring or yielding controlling device which bears on said lever and tends normally to prevent it from leaving the field of its magnet.

2. The combination, substantially as set forth, of a diaphragm, a transmitting-circuit, the electrodes or contacts of said circuit, between which variations of pressure are caused by the vibrations of the diaphragm, a lever or electrode-support which maintains the electrodes in contact, an electro-magnet the helix of which is included in said primary circuit, and a spring or yielding device which bears on said lever and tends to prevent the lever from leaving the field of its magnet.

3. The combination, substantially as set forth, of a diaphragm, a transmitting-circuit, the contacts or electrodes of said circuit, between which variations of pressure are caused by the vibrations of the diaphragm, a lever or electrode-support which maintains the electrodes in contact, a magnet acting upon said lever to maintain contact between said electrodes, means for adjusting the magnet to or from said support, a spring or yielding device which bears on said lever and keeps it in the field of its magnet, and means for adjusting said spring device.

4. The combination, substantially as set forth, of the casing, the swinging door, the bracket or frame H, secured upon the inner face of the door, the pivoted armature or lever mounted in said frame, the contacts or buttons, one secured on the diaphragm and the other on the armature-lever, the magnet mounted in said frame or bracket, and means for adjusting it relatively to the armature-lever.

5. The combination, substantially as set forth, of the casing, the swinging door, the diaphragm mounted in the door, a frame or bracket, H, secured upon the inner face of the door, a pivoted arm or lever mounted in said bracket, the contacts or electrodes, carried one by said lever and the other by the diaphragm, and means for adjusting the frame readily to or from the center of the diaphragm.

6. The combination, substantially as set forth, of a transmitting-diaphragm, two or more independent primary circuits, their electrodes, and a compound induction-coil, wound first with one primary circuit, then with a portion of the secondary line, then with another primary circuit, and then with another portion of the secondary line, and so on, substantially as described.

7. The combination, substantially as set forth, of a transmitting-diaphragm, two or more independent primary circuits, their electrodes, and a compound induction-coil formed as follows: first, of a core on which one primary wire is wound, over which primary a layer of the continuous secondary wire is wound, then of a tubular iron sheath or cover on which is wound the second primary circuit and a second layer of the continuous secondary line, and so on.

8. The combination, substantially as set forth, of a transmitting-diaphragm, two or more independent insulated electrodes controlled by said diaphragm, a corresponding contact or button for each of said electrodes, an independent primary circuit for each pair of said electrodes, and a single secondary line on which all of the primary circuits act.

In testimony whereof I have hereunto subscribed my name.

THOMAS J. PERRIN

Witnesses:
JNO. R. JUDEN,
JOHN JUDEN.