

(No Model.)

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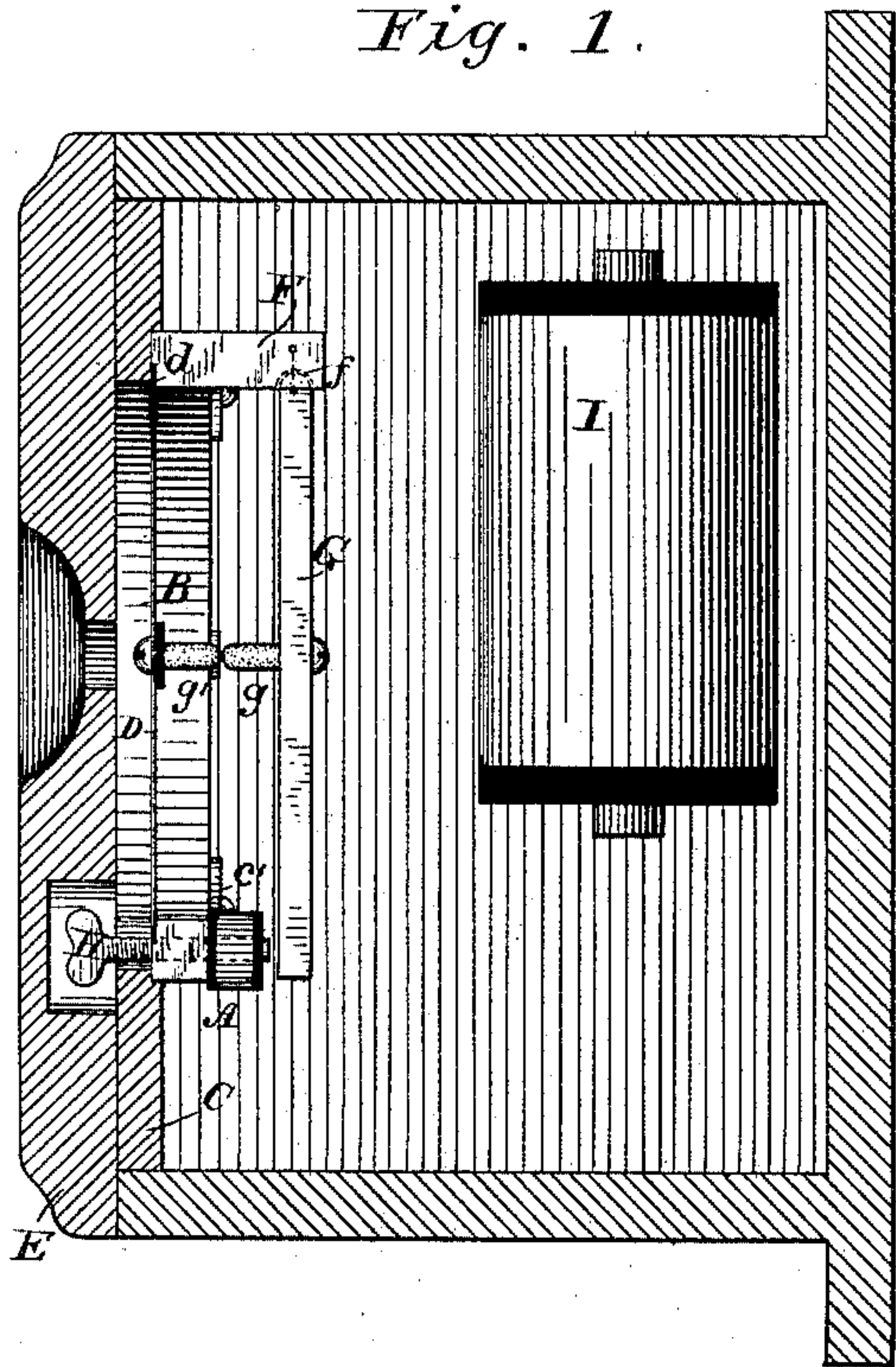
T. J. PERRIN.

# TELEPHONE TRANSMITTER AND RELAY.

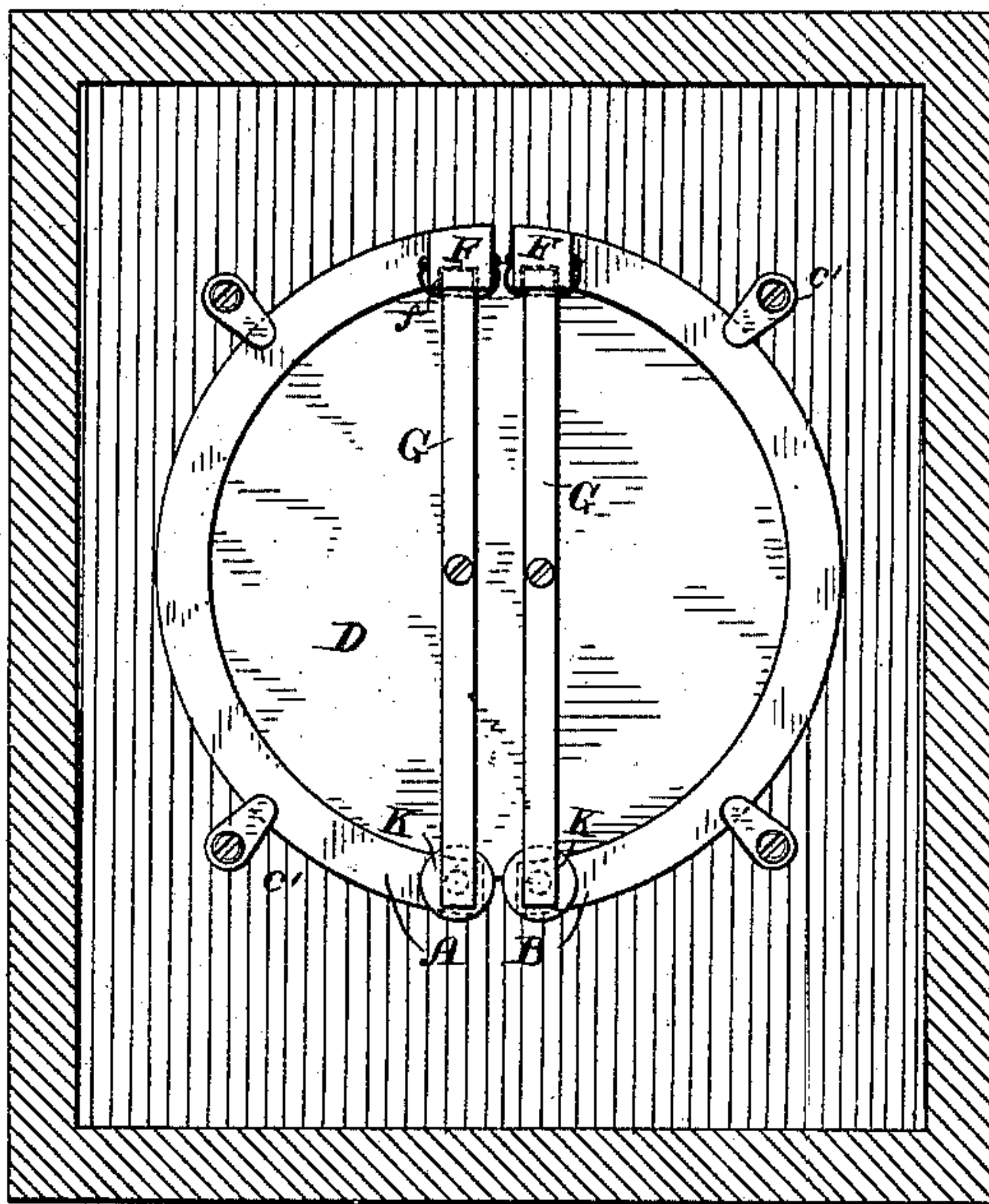
No. 324,727.

Patented Aug. 18, 1885.

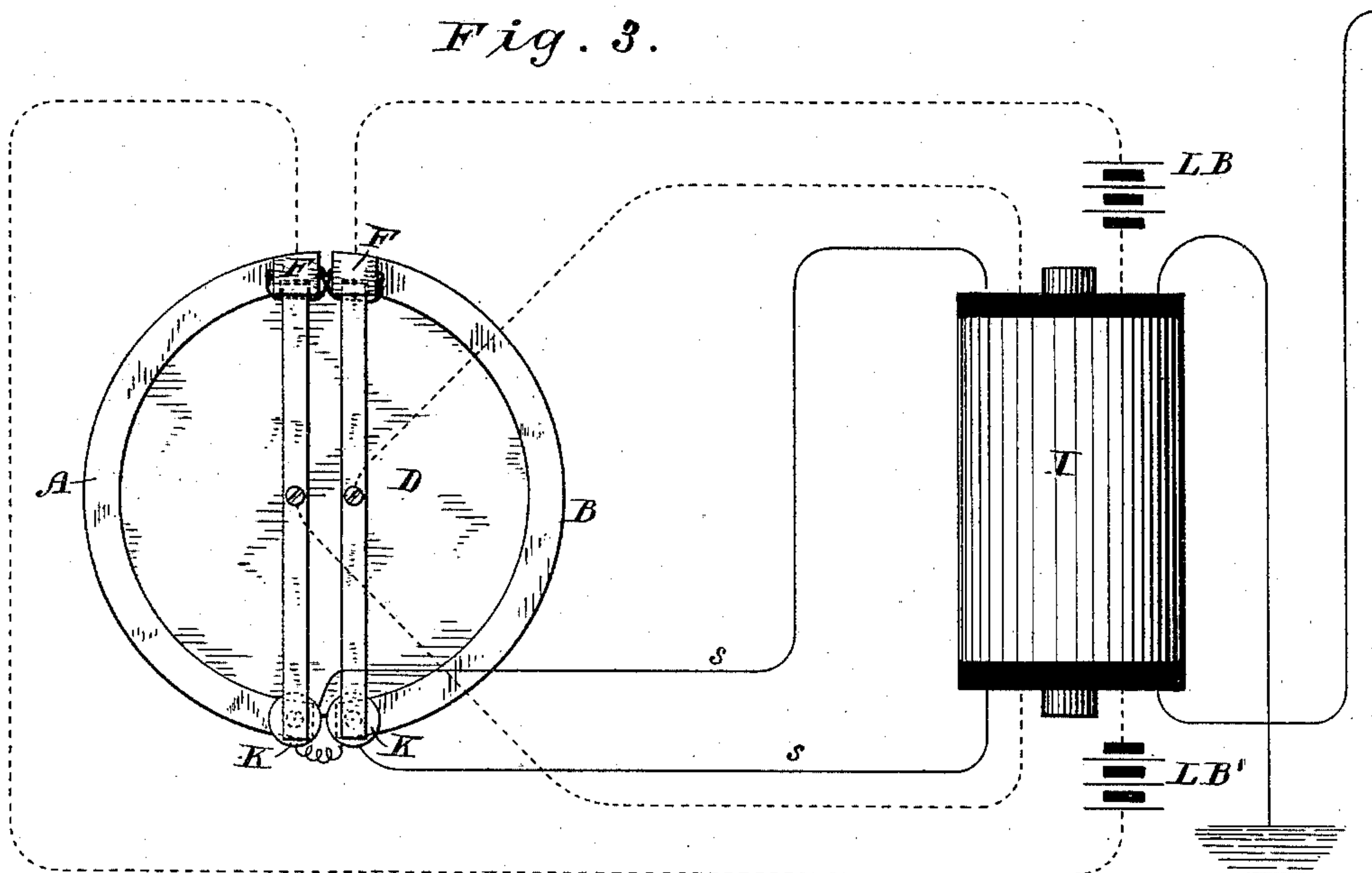
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



WITNESSES

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INVENTOR

*Thomas J. Perrin*

*By his Attorneys*

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(No Model.)

2 Sheets—Sheet 2.

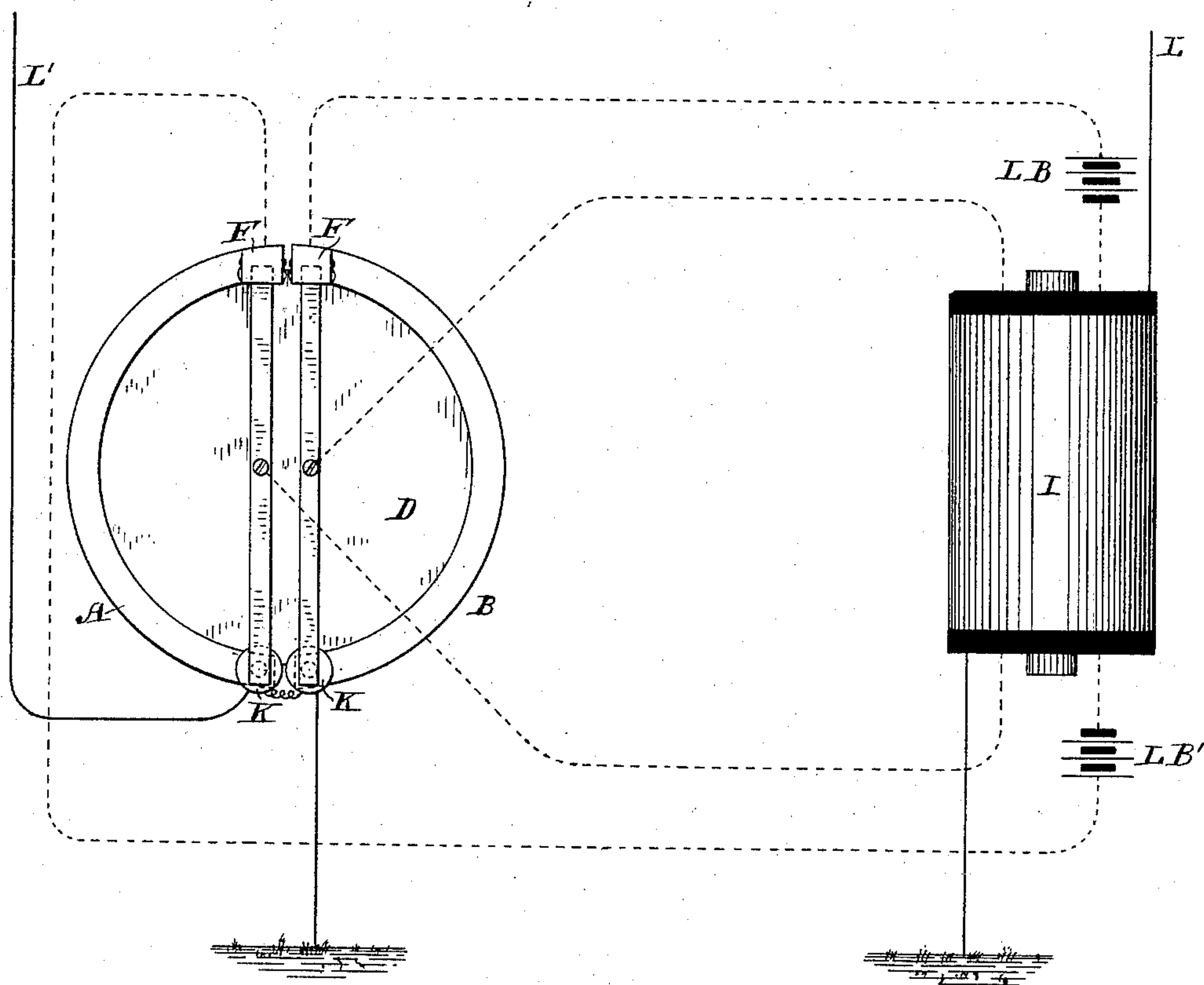
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*Fig. 4.*



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# UNITED STATES PATENT OFFICE.

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

## TELEPHONE TRANSMITTER AND RELAY.

SPECIFICATION forming part of Letters Patent No. 324,727, dated August 18, 1885.

Application filed November 24, 1884. (No model.)

*To all whom it may concern:*

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

The object of my invention is to construct a simple and sensitive transmitter, which may also be used as a relay, and which is so constructed that it will transmit the loudest sounds, as well as the softer ones, without any break or rattle of the instrument.

In the accompanying drawings, Figure 1 is a transverse sectional view of my improved instrument; Fig. 2, a rear view of the diaphragm, showing the electrode-supports. Fig. 3 is a diagram view illustrating the connections and running of the circuits; and Fig. 4 is a diagram view illustrating the arrangement of the instrument as a relay or repeater.

I employ two magnets, preferably permanent magnets, A B, which are bent into half-circles, as clearly shown in Figs. 2 and 3. They are seated in an annular socket, *c*, formed in the front partition or side, C, of the telephone-case, and may be held in place by suitable turn-buttons, *c'*.

The diaphragm D, which is preferably of some non-magnetic or non-inductive metal, is seated in a depression, *d*, formed in the faces of the magnets A B, adjacent to the door E of the instrument. The upper ends of these magnets are formed with right-angled rearwardly-projecting portions F, which are formed with concave sockets *f* on their under faces. These concaves are formed on the arc of a circle, as clearly shown, and receive the correspondingly-shaped ends of soft-iron swinging arms G G, which are suspended therefrom, being sustained by magnetic attraction. The swinging arms may, however, be permanent magnets, as will be obvious. These arms each carry electrodes *g*, which rest in contact with corresponding opposite insulated electrodes, *g'*, carried by the diaphragm. Each pair of electrodes *g g'* is included in an independent primary circuit of local batteries, LB LB', as clearly indicated in Fig. 3. These primaries are wound alternately in the same induction-

coil I, with independent windings of a continuous secondary line, as indicated in Fig. 3, and as fully set forth in my Patent No. 303,948, granted to me August 19, 1884. Variations of resistance occurring between the electrodes *g g'* will cause variations of the current in the two primary circuits, which act conjointly upon the secondary, which goes to line, as is fully set forth in said patent. The lower end or pole of each magnet A B is provided with an adjustable or screw-pole extension-piece, H, of soft iron, which can be adjusted with reference to the end of the swinging arm G, which hangs opposite to it. Around the end of each adjustable pole-piece H is a coil of wire, K, which is included in the secondary line, as clearly shown in Fig. 3. It will now be obvious that the electrodes *g g'* are maintained in contact under magnetic attraction due to the attraction of the pole-pieces H to act upon the ends of the arms G, and the effect of the pole-pieces will be intensified by the coils K thereon.

By this construction, when the instrument is used as a transmitter, the electrodes are prevented from separating when a more than ordinarily loud sound is uttered in the vicinity of the diaphragm. It will be perceived, however, that the instrument will also be used as a telephonic repeater, as the varying current received over the main line will traverse the coils K and give variations in the attraction of the magnets G G, as is well understood.

When used as a repeater, the main line now shown may be the receiving-line, and it will, instead of passing through the induction-coil, be wound directly on the pole-pieces, and the primary circuit or circuits will be connected to act on another secondary or main line into which the received message is to be repeated. Such an arrangement is shown in Fig. 4, in which L' is the receiving-line wound on the pole-pieces H H, and thence put to earth, and L is the relay-line wound in the induction-coil with the primary wires.

In order to guard against the possibility of the arms G G being displaced or dropping from the magnet-supports F, I pass a wire, *f'*, through an aperture in the end of each arm G, and connect such wire to the pole-piece F of the magnet, as shown in the drawings. This



wire passes loosely through the aperture in the arm, and does not interfere with its swinging motion, but should the arm become displaced on account of any unusual jar the wire will prevent it from falling.

I claim—

1. The combination of the diaphragm, the two bent magnets A B, the swinging arms supported magnetically from the upper poles of the bent magnets, electrodes carried by the diaphragm, and the electrodes carried by the swinging arms.

2. The combination of the diaphragm, the two bent magnets A B, the swinging arms supported magnetically from the upper poles of the bent magnets, the electrodes carried by the diaphragm, the electrodes carried by the swinging arms, and the adjustable pole-pieces in the lower ends of the bent magnets.

3. The combination of the diaphragm, the bent magnets, the swinging arms, the electrodes carried by the swinging arms and by the diaphragm, the adjustable pole-pieces of the bent magnets which act on said swinging arms, the wire coils on said pole-pieces, the secondary line in which said coils are included, and the primary transmitting-circuits.

4. The combination of a diaphragm, magnet-poles arranged in proximity to each other, near the lower edge of the diaphragm, swinging arms supported above the center of the diaphragm and hanging opposite said magnet-poles, electrodes carried on the diaphragm and on the swinging arms, an adjustable pole-

piece in each of said magnet-poles, the coils on the adjustable pole-pieces, the secondary circuit in which said coils are included, and the primary transmitting-circuits.

5. The combination of a diaphragm, a magnet arranged with one pole above the center of the diaphragm and the other pole below it, a swinging arm suspended magnetically from the upper pole of said magnet, an electrode carried on said arm, the opposite electrode on the diaphragm, and an adjustable pole-piece in the lower pole of the magnet.

6. The combination of a diaphragm, a magnet arranged with one pole above the center of the diaphragm and the other pole below it, a swinging arm suspended magnetically from the upper pole of said magnet, an electrode carried on said arm, and the opposite electrode on the diaphragm.

7. The combination of the diaphragm, the magnet arranged with its pole above the center of the diaphragm, the curved socket in the magnet-pole, the swinging arm having a rounded end which fits in said socket, and is thus suspended magnetically, a contact-button carried by said arm, and the corresponding contact-button on the diaphragm.

In testimony whereof I have hereunto subscribed my name.

THOMAS J. PERRIN.

Witnesses:

JNO. R. JUDEN,  
JOHN JUDEN.