

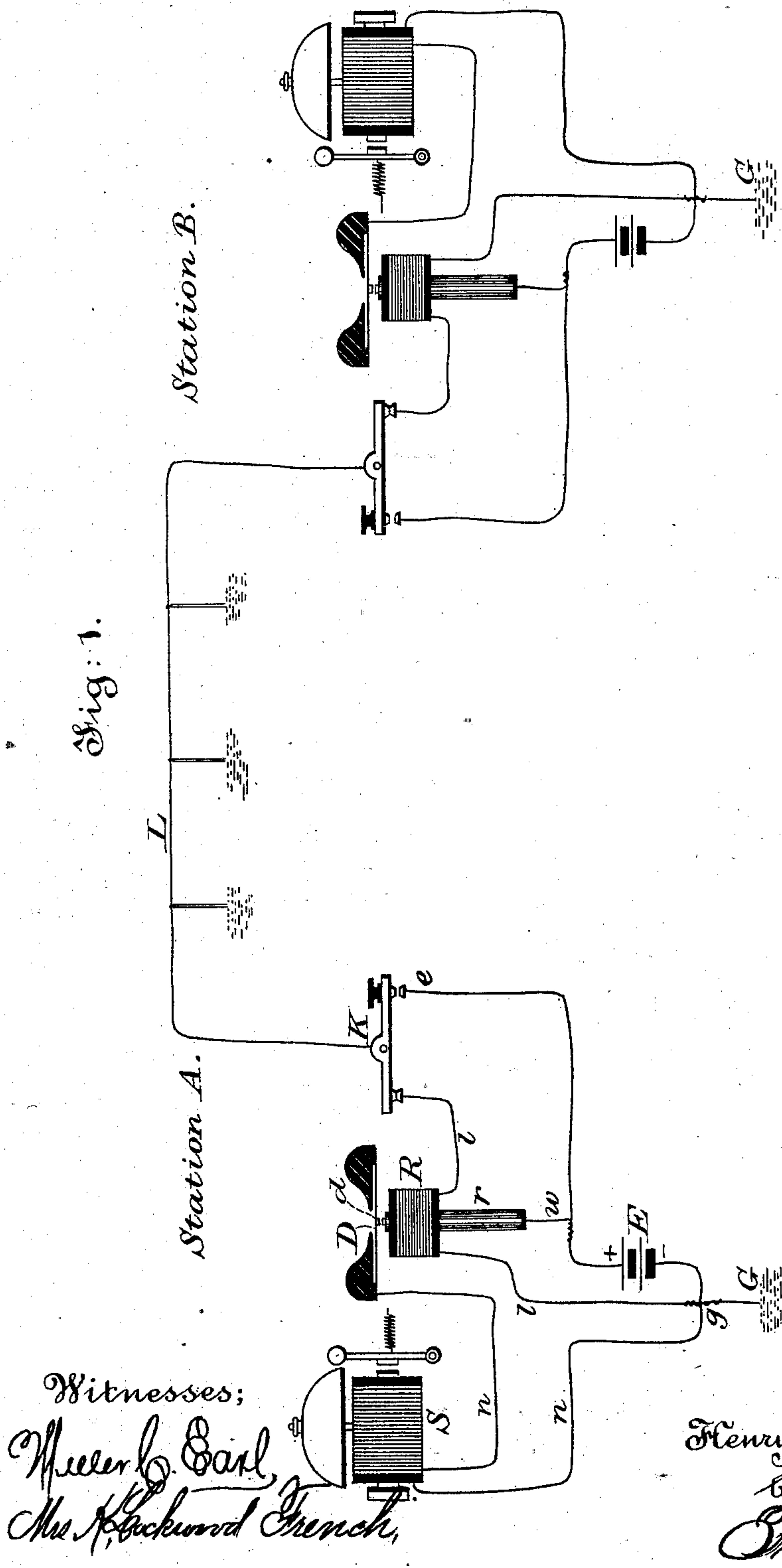
(No Model.)

2 Sheets—Sheet 1.

H. VAN HOEVENBERGH.
Telephone Signaling Apparatus.

No. 239,579

Patented March 29, 1881.



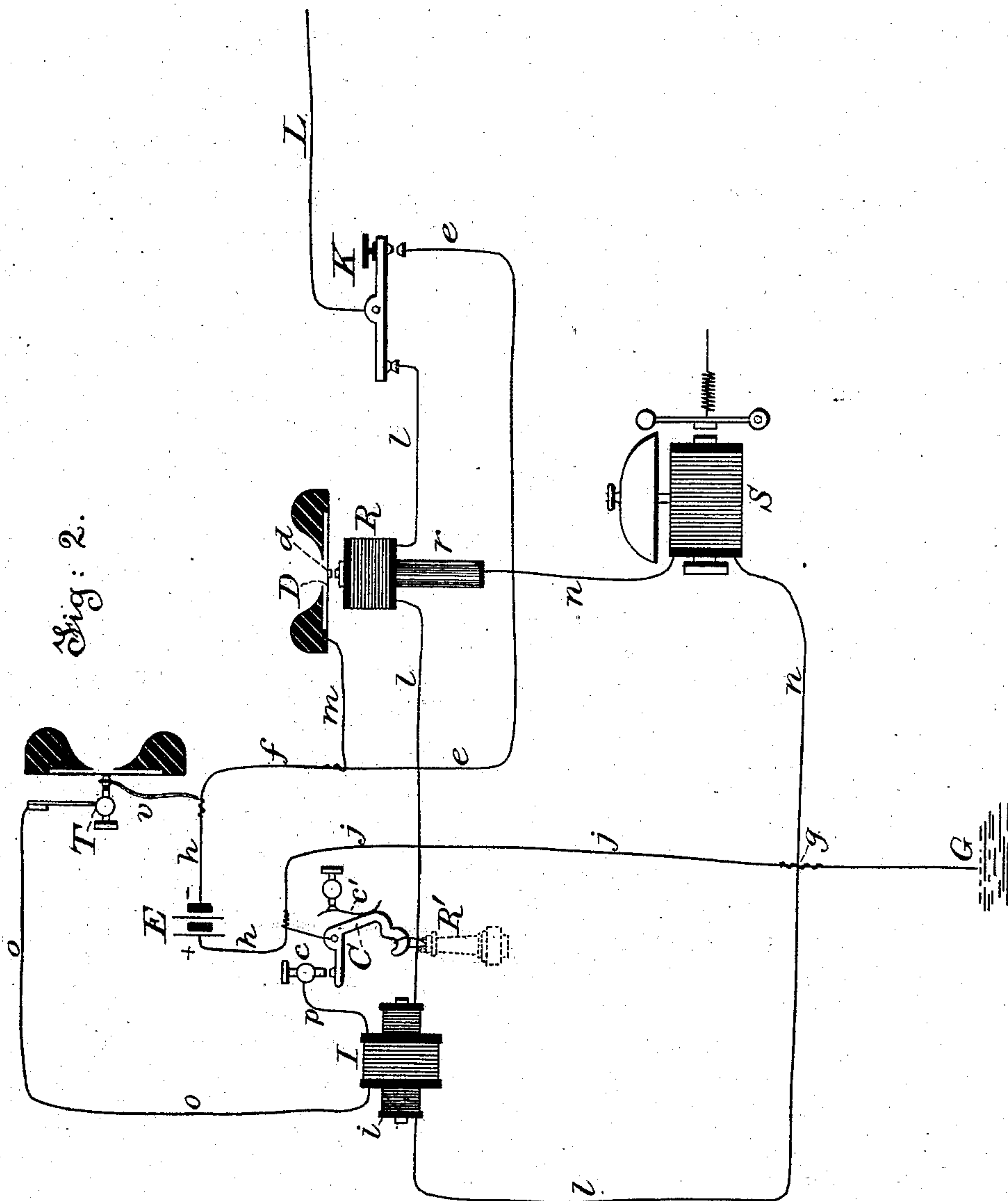
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Witnesses:
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UNITED STATES PATENT OFFICE.

HENRY VAN HOEVENBERGH, OF ELIZABETH, NEW JERSEY.

TELEPHONE SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 239,579, dated March 29, 1881.

Application filed November 29, 1880. (No model.)

To all whom it may concern:

Be it known that I, HENRY VAN HOEVENBERGH, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Telephone Signaling Apparatus, of which the following is a specification.

My invention relates to the construction and arrangement of the apparatus which is employed for the purpose of transmitting calls, alarms, or signals upon telephone-lines, and which is actuated by electric currents transmitted from a suitable battery.

My invention consists, first, in combining with the magnet and diaphragm of the telephonic receiver a contact-point, mounted upon said diaphragm, and adapted to close a local circuit whenever a signaling-current of sufficient strength is caused to traverse the coil of the telephone-magnet, whereby I am enabled to make use of one and the same coil for the purpose of actuating both the telephonic and the signaling apparatus; second, in the combination of a main line, a signaling-key, a battery placed between the working-contact of said key and the earth, a receiving-telephone placed between the resting-contact of said key and the earth, a contact-point placed upon the diaphragm of said telephone and adapted to close a local circuit by means of the attraction exerted by the telephone-magnet under the influence of the signaling-current, and an electro-magnet for actuating the signaling mechanism which is included in said local circuit, whereby I am enabled to operate the signaling apparatus automatically from the telephone-magnet in the main circuit without the necessity of an additional magnet for the purpose, and also to dispense with the special switch heretofore employed for the purpose of connecting the main line to the signaling-instrument and to the telephone-instrument.

In the accompanying drawings, Figure 1 is a diagram representing the arrangement of apparatus and circuits at two terminal stations of a telephone-line embodying my invention. Fig. 2 represents the application of my invention to an apparatus in which a voltaic transmitter distinct from the receiver is employed.

I have shown in Fig. 1 a telephone-line with two terminal stations, respectively designated as station A and station B. As the arrangement of the apparatus and circuits at each of the two stations is precisely the same, a description of one will be sufficient to illustrate my invention.

In the drawings, L represents the line connecting the two stations, which, upon entering station A, is attached to the lever or axis of the signaling-key K. The key, when in its normal position of rest, as in the figure, makes contact with the wire *l*, which passes through the coil R of a receiving-telephone of the usual construction, and thence, by way of the point *g*, to the earth G. When the key K is depressed it disconnects the line L from the branch wire *l*, and forms a new connection between the line L and the branch wire *e*, which is attached to one pole of a battery, E, whose remaining pole is connected to the point *g*, and consequently with the earth at G.

The receiving-telephone at station A is of the ordinary form, and consists of a coil, R, (hereinbefore mentioned,) which envelopes one of the poles of a permanently-magnetized rod, bar, or core, *r*. In close proximity to the working-pole of the bar *r* is mounted a thin metallic diaphragm, D, which is not normally in contact with the bar *r*. The diaphragm D is mounted within a cone or mouth-piece in a well-known manner.

The principal advantage intended to be secured by my invention is that of rendering the coil of the receiving-telephone available to actuate the signaling apparatus. The introduction into the main circuit of the coil of an additional magnet for this purpose is very objectionable in practice, inasmuch as the latter tends to absorb the telephonic vibrations and thus render the communications indistinct. In order to obviate the necessity of employing an additional magnet, I place a contact-point, *d*, upon the under side of the diaphragm D of the receiving-telephone, which is placed opposite to, but not normally in contact with, a similar point, which is preferably inserted in the end of the magnetic bar *r*. These two contact-points, when pressed together, complete a local circuit, which is preferably derived from the signaling-battery E, as shown in the figure, although

a separate battery may be used, if deemed preferable, under the circumstance of any particular case. An electro-magnet, S, for actuating a signal-bell, or any other well-known or suitable device serving the same purpose, is included in the said local circuit. Thus it will be understood that telephonic currents, as well as signaling-currents, arriving by the wire L from the distant station at B will pass, by the wire *l*, through the coil R of the telephone-receiver directly to the earth at G. The former will merely throw the diaphragm D into the minute vibrations which suffice to produce audible and intelligible sounds in the usual and well-known manner, while, on the contrary, the signaling-currents which proceed from the battery at the distant station are of much greater strength and cause the attractive force of the bar *r* to be so augmented as to powerfully attract the diaphragm D and to bring the contact-point *d* mounted thereupon into electrical connection with the bar *r*, closing the local circuit, which proceeds from battery E by way of wire *w*, bar *r*, diaphragm D, wire *n*, and point *g*, and includes the electro-magnet S of the signaling apparatus. Thus it will be understood that the signaling is effected solely by the action of the coil R, so far as the main circuit is concerned. By the depression of the key K outgoing signals are sent directly to the line L from the battery E, through the wire *e*, without passing through any of the apparatus within the station, which apparatus is, in fact, wholly disconnected from the line during the operation.

In the arrangement shown in Fig. 1 the telephonic receiver is also adapted to be used as a transmitter. The arrangement commonly preferred in practice is that of an independent transmitter, which usually consists of an induction-coil and some suitable device for varying the resistance of the primary circuit of said induction-coil, which is controlled by the vibrations of a diaphragm.

In Fig. 2 the wire *l*, after passing through the coil R of the receiving-telephone, traverses the primary coil *i* of the induction apparatus and then goes to the earth at G, as before.

The variable resistance controlled by a vibrating diaphragm is shown at T, and is con-

nected by the spring *v* and wire *h* with one pole of the battery E, and by the wire O, the primary coil I of the induction apparatus, wire P, stop *c*, switch C, and wire *h*, to the other pole of the battery.

The switch C is represented as an automatic switch of well-known construction, which is operated by the weight of the receiving-telephone, which, when suspended from it, as shown by the dotted lines at R' in the figure, presses the spring *c'* and breaks the contact between the switch and stop *c*, thus disconnecting the transmitter T from the battery when the telephone is not in use, and leaving the battery free to operate the signaling apparatus, when required.

By the use of my invention a convenient and effective signaling apparatus is provided for telephone-lines, in which the necessary changing of the circuits is effected automatically, and which obviates the necessity of additional magnets on the main telephonic circuits.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, with the magnet and diaphragm of a telephonic receiver, of a contact-point mounted upon said diaphragm, and adapted to close a local circuit whenever a signaling-current of sufficient strength traverses the coil of said magnet.

2. The combination, substantially as hereinbefore set forth, of a main line, a signaling-key, a battery placed between the working-contact of said key and the earth, a receiving-telephone, placed between the resting-contact of said key and the earth, a contact-point upon the diaphragm of said telephone, adapted to close a local circuit through the attraction exerted by the telephone-magnet under the influence of a signaling-current, and an electro-magnet for actuating a signaling mechanism included in said local circuit.

In testimony whereof I have hereunto subscribed my name this 23d day of November, A. D. 1880.

HENRY VAN HOEVENBERGH.

Witnesses:

NELSON ZABRISKIE,
MILLER C. EARL.