

F. W. JONES.

Shunt for Speaking Telephone Systems.

No. 238,912.

Patented March 15, 1881.

Fig: 1.

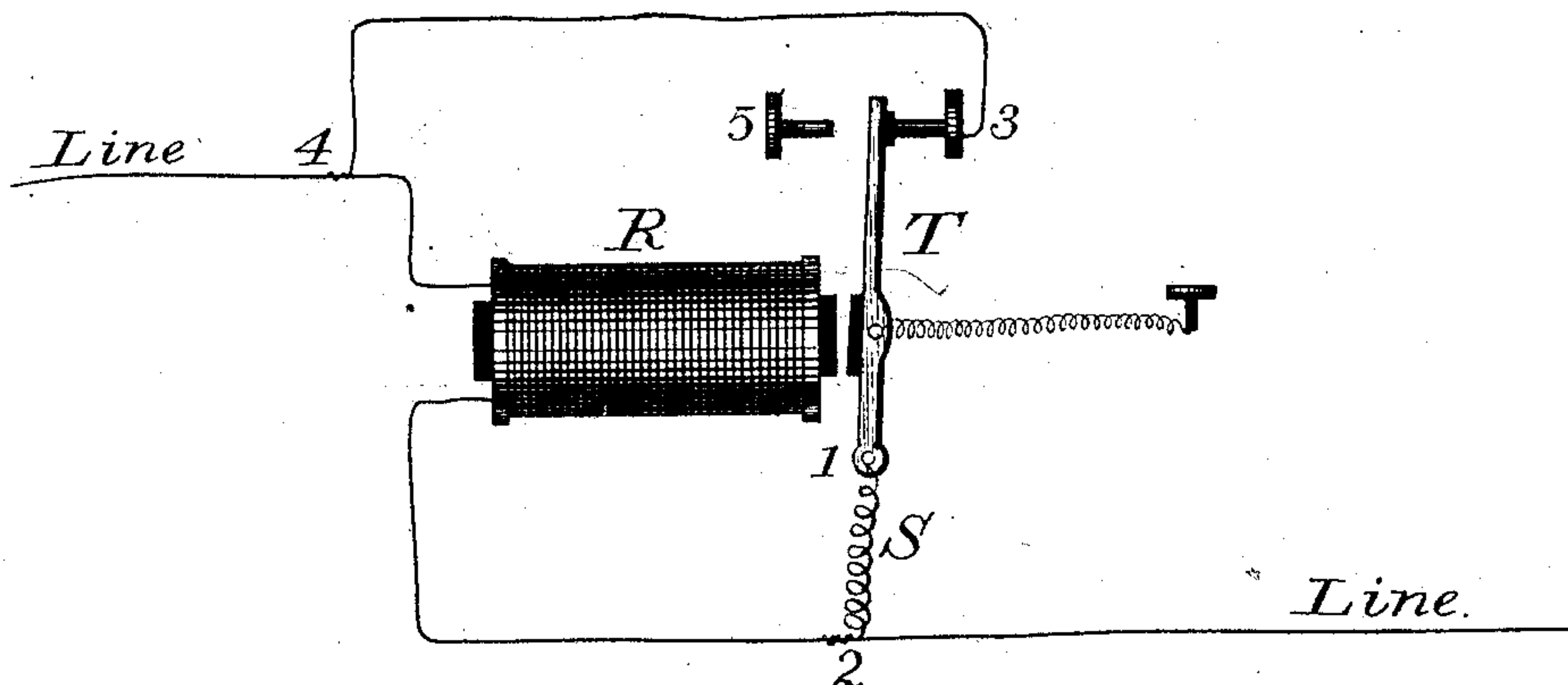
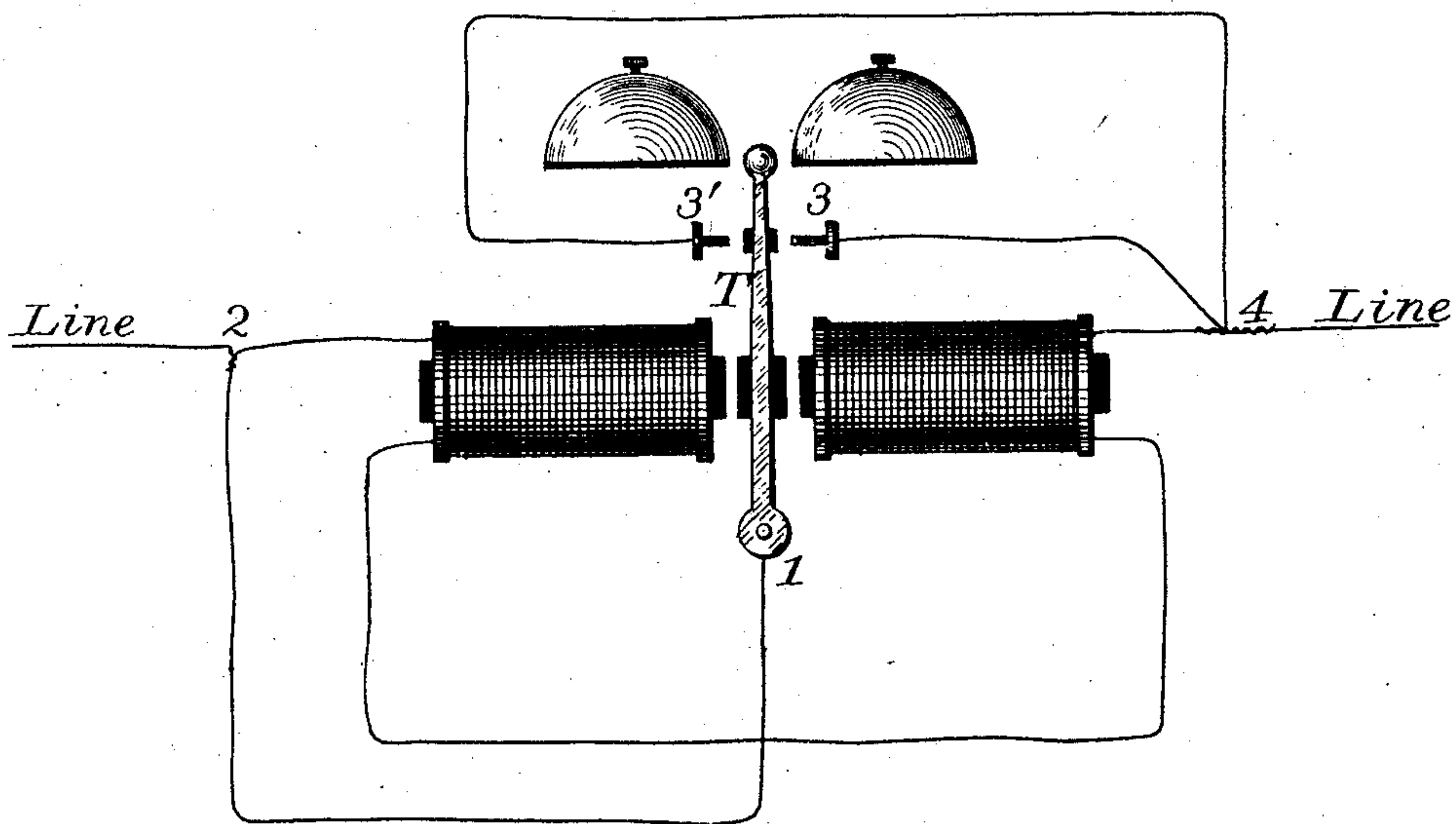


Fig: 2.



Witnesses;
Miller & Co.
Mrs. H. Lockwood French,

Inventor;
Francis W. Jones,
by his Attorney;
Frank L. Pope,

UNITED STATES PATENT OFFICE.

FRANCIS W. JONES, OF CHICAGO, ILLINOIS.

SHUNT FOR SPEAKING-TELEPHONE SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 238,912, dated March 15, 1881.

Application filed August 25, 1879.

To all whom it may concern:

Be it known that I, FRANCIS W. JONES, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Circuits for Telephone-Lines, of which the following is a specification.

My invention relates more particularly to that class of telephone-lines in which the alarm or signaling apparatus is operated by voltaic currents or by magneto-electric pulsations. In operating this class of telephone-lines it is frequently desirable and necessary to place several different stations upon the same circuit, and also, as a matter of economy and convenience, to make use of the same conductor, both for signaling and for conversation, by means of suitable speaking-telephones of well-known construction. A practical difficulty has, however, been found to exist by reason of this organization of apparatus and circuits. The signaling apparatus at each station being actuated by an electro-magnet of the ordinary construction, it is obvious that this electro-magnet must remain at all times in the main circuit, except when the telephone at the same station is in use, so that signals may be received on it at any moment; but it has been found by experience that telephonic vibrations or undulations are checked by being caused to pass through an electro-magnet, or, as it is sometimes expressed, an electro-magnet is more or less opaque to rhythmical vibrations. Consequently, if a number of stations are placed upon the same line, with their several signaling electro-magnets included in the main circuit, the telephonic vibrations which are transmitted to and from between any two stations communicating with each other must necessarily pass through all the electro-magnets in the circuit except their own, and by this means the vibrations are weakened or absorbed to such an extent as to render conversation nearly or quite inaudible.

The object of my invention is to obviate this difficulty by furnishing a path for the telephonic vibrations to pass the station without necessarily going through the coils of the electro-magnet, while at the same time the said electro-magnet is so arranged as to respond

readily to signaling-currents traversing the line.

In the accompanying drawings, Figure 1 is a diagram illustrating the application of my improvements to a signaling electro-magnet actuated by voltaic or other electric currents of one polarity. Fig. 2 represents the application of the same to a signaling apparatus operated by alternating positive and negative pulsations, such as are produced by a magneto-electric generator.

Referring to the drawings, R represents an ordinary electro-magnet, which is supposed to be placed at a station upon the telephone-line. This electro-magnet is provided with the usual soft-iron armature and pivoted lever T, which latter may be utilized to actuate the signaling apparatus in any suitable or well-known manner. For example, it may be arranged as a relay to repeat the signals by means of a local battery upon a sounder, a bell, or other like instrument, or a bell-hammer may be attached directly to the lever T, as shown in Fig. 2. The armature-lever T may be provided with the ordinary retracting-spring, as shown in the drawing. The armature-lever T vibrates between two contact-stops, 3 and 5. A shunt or branch circuit is connected with the main line at the point 2, and goes first to the point of the armature-lever at the point 1, through said lever and its rear contact-stop, 3, and thence by a wire to the point 4 on the main line beyond the electro-magnet R. The last-named circuit, from the point 2 to the point 4, constitutes a shunt-circuit passing around the electro-magnet R. In the position of the apparatus represented in Fig. 1 the current of the main line has been cut off at some other station, in order to leave the line clear for the operation of the telephone. Consequently, the electro-magnet R has become demagnetized, and the armature-lever T, being released, is held against the contact-stop 3, thus closing the shunt-circuit around the electro-magnet. Unless the resistance of the helix of the electro-magnet R is very small it is necessary to insert an artificial resistance or rheostat, S, at some point in the shunt-circuit—as, for instance, between the points 1 and 2, as shown in the drawing. In most cases the resistance

of this shunt should be at least equal to that of the helix of the electro-magnet R for giving signals or alarms, although this proportion may be widely departed from without rendering the apparatus inoperative.

If the rheostat is composed of a coil of wire it should be wound with half its convolutions in the reverse direction to the other half, in order to neutralize the effects of self-induction.

The operation of the apparatus is as follows: When the parts are in the position shown in Fig. 1, if a signaling-current is sent through the line it will divide at the point 2, one portion going through the coils of the electro-magnet R to the point 4, and the other portion going through the shunt, by the way of 1 and 3, to the same point 4, thus passing around or avoiding the electro-magnet. The electro-magnet being thus caused to attract its armature, the first movement of the latter interrupts the contact between the lever T and the stop 3 and breaks the shunt-circuit, after which the power of the entire current passes through the coils of the electro-magnet, and a signal is produced by the action of its armature T in the manner hereinbefore described. If, however, a series of rhythmical or telephonic vibrations traverses the same line these will be too weak to affect the armature of the electro-magnet R, which will at the same time tend to obstruct their passage, as before explained; but another available route is open to them by way of the shunt-circuit, which, in this case, remains unbroken, as the rhythmical vibrations are not powerful enough to cause the armature of the electro-magnet to be attracted, so as to break contact at the stop 3. It is obvious, therefore, that these rhythmical or telephonic vibrations may be transmitted past any required number of stations, and that they will, for the most part, pass around the electro-magnets by way of the several shunt-circuits, and that their amplitude will be preserved with little or no diminution.

Fig. 2 shows the application of my invention to a double-acting electro-magnet having

a polarized armature vibrating between fixed contact-stops. In this apparatus, when there is no current upon the main line the armature-lever will remain at rest against the front or the rear contact-point indifferently, its position depending solely upon the polarity of the current last traversing the line, whether positive or negative. In this case the only modification necessary in applying my invention thereto is to connect the point 4 of the main line to both the front and rear contact-stops, 3 and 3', as shown in the drawing.

I do not broadly claim herein the application of a shunt to an electro-magnet for the purpose of conveying telephonic vibrations around said magnet, in combination with a rheostat having its coils wound in opposite directions to neutralize self-induction therein, as these features form the subject-matter of another division of this application. Neither do I claim herein the combination of an electro-magnet, armature, armature-lever, and contact-stops with a main line, a circuit-connection between both the front and back contact-stops and the main line at a point on one side of the electro-magnet, and a circuit-connection between the armature-lever and the main line at a point on the opposite side of the electro-magnet, because I propose to embrace it in a subsequent application.

I claim as my invention—

The combination, substantially as hereinbefore set forth, of an electro-magnet, armature, armature-lever, and contact-stops with a main line in which said electro-magnet is included, a circuit-connection between the back contact-stop and a point in the main line on one side of the electro-magnet, a circuit-connection between the armature-lever and a point on the opposite side of the electro-magnet, and an artificial resistance included in one of said circuit-connections.

FRANCIS W. JONES.

Witnesses:

ANSON S. TEMPLE,
A. C. THOMAS.