

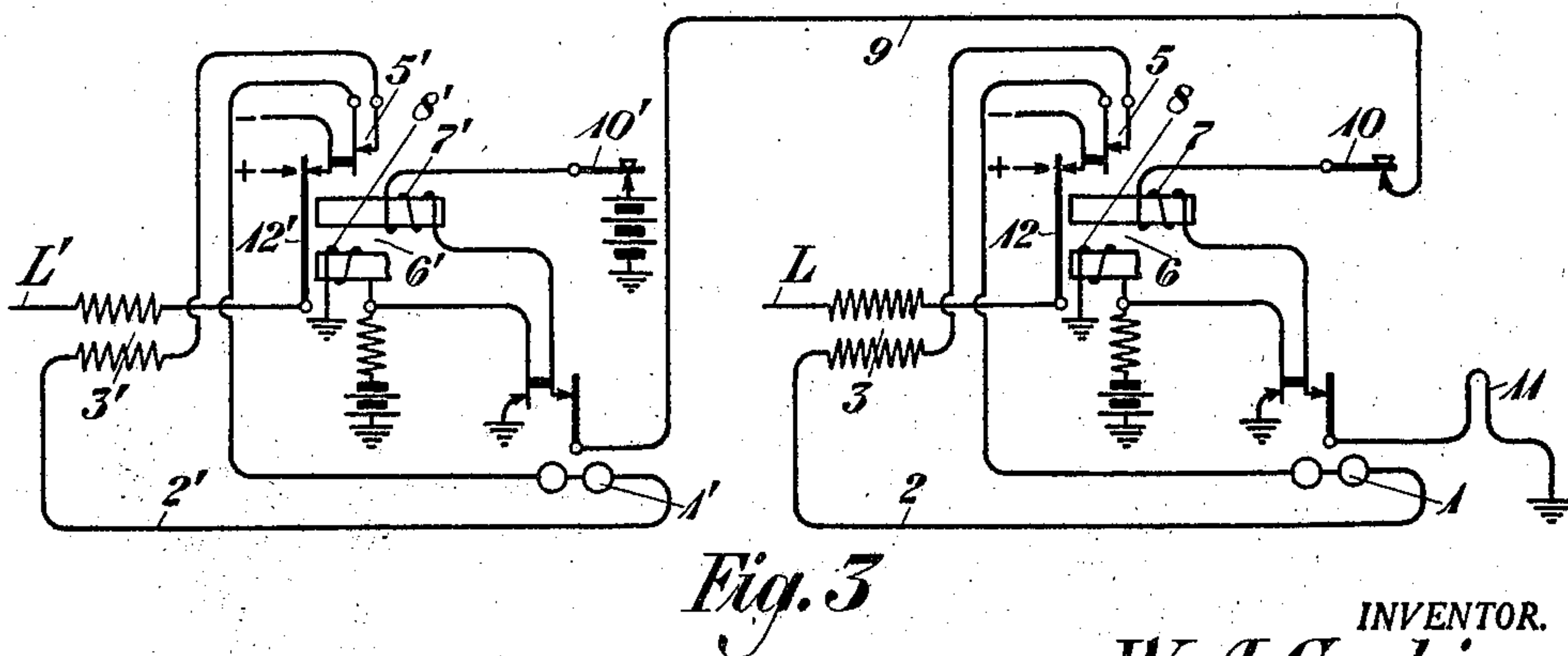
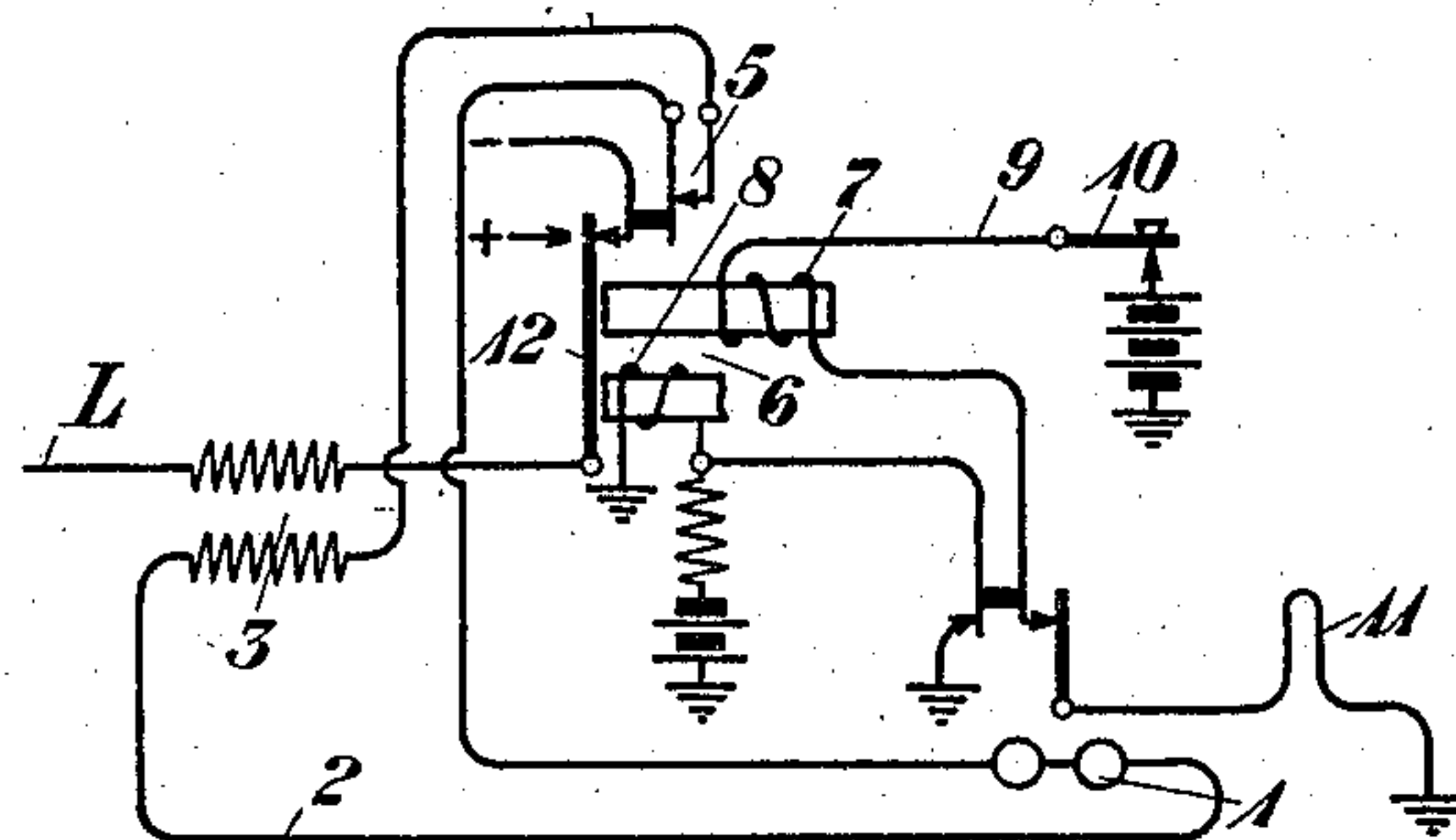
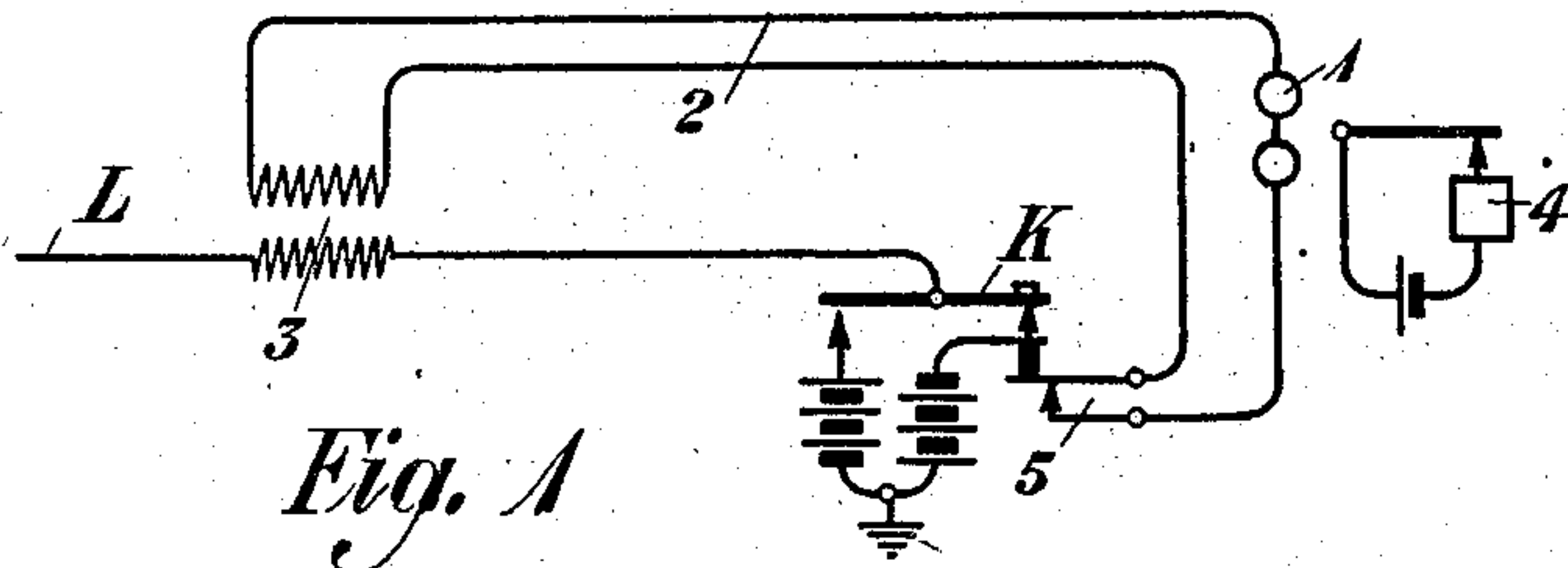
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W. A. CUSHING

SINGLE TRANSMISSION TELEGRAPH SYSTEM

Filed Jan. 27, 1919



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SINGLE-TRANSMISSION TELEGRAPH SYSTEM.

Application filed January 27, 1919. Serial No. 273,370.

To all whom it may concern:

Be it known that I, WILLIAM A. CUSHING, residing at 4053 East 44th St., Newburg Heights Village, in the county of Cuyahoga and State of Ohio, have invented certain Improvements in Single-Transmission Telegraph Systems, of which the following is a specification.

This invention relates to signaling systems and more particularly to arrangements for transmitting and receiving telegraph signals.

One of the principal objects of the invention is to provide a signaling arrangement which may be operated upon a single transmission basis, the signaling arrangement being such that the signals are transmitted by means of a pole changing device and are received in a local circuit inductively related to the line, said local circuit being rendered inoperative when the pole changing device is transmitting signals.

The invention may now be more fully understood from the following description when read in connection with the accompanying drawing, Figures 1, 2 and 3 of which constitute circuit diagrams of three different modifications thereof.

Referring to Figure 1 which illustrates the principle of the invention, a line circuit L is shown, over which signals may be transmitted by the operation of a key K which controls the application of positive and negative battery to the line. A receiving means comprising a polar relay 1 is included in a local circuit 2 inductively related to the line L by means of a transformer 3. The polar relay 1 controls a local circuit including a sounder 4. When the key K is operated in transmitting signals to the line L the circuit 2 of the polar relay 1 is opened at a local contact 5 controlled by the key K so that the transmitted signals do not actuate the polar relay. When the transmitting key at the distant station is opened the direction of the current flowing over the line is changed and an impulse is produced in the circuit 2 which operates the polar relay to open the circuit of the sounder 4. When the distant key is closed an impulse in the reverse direction over the line induces an impulse in the reverse direction in the circuit 2, causing the polar relay 1 to again close the circuit of the sounder 4.

In Figure 2 the invention is shown as applied to a system in which the transmitting and receiving set is located at a main station and controlled from a loop running to a local station. In this form of the invention the reversal of the polarity of the current flow over the line is controlled by a pole changer 6 of a well-known form, said pole changer comprising a main operating magnet 7 and an auxiliary controlling magnet 8. The main operating magnet is included in a local circuit 9, a sending key 10 of which is located at the main station. The local circuit 9 is controlled by the contact of polar receiving relay 1, which is included in a circuit 2 inductively related to the line L by means of the transformer 3, and said circuit 9 includes a loop schematically indicated at 11, extending through keys and sounders at local stations.

Received signals operate the polar relay as described in connection with the arrangement shown in Figure 1 to open and close the local circuit 9 to operate the sounders in the loop circuit. The magnet 7 of the pole changer 6 is deenergized each time the circuit 9 is opened by the polar relay 1, but said relay at the same time that it opens the circuit 9 also removes a short circuit from about the auxiliary controlling magnet 8, which becomes energized and prevents the armature 12 of the pole changer from being retracted.

When the local circuit 9 is opened by means of the key 10 or the key in the loop 11 the magnet 7 of the pole changer 6 is deenergized and the magnet 8 of the pole changer remains short circuited so that the armature 12 of the pole changer is retracted to change the polarity of the current flowing to the line L, thereby transmitting signals to a distant station. The pole changer 6 at the same time that it releases its armature in transmitting signals opens the local circuit of the polar receiving relay 1 at contact 5 so that said receiving circuit is unaffected by transmitted signals.

In Figure 3 a circuit is shown illustrating the manner in which the invention may be applied to a telegraph repeater. In this figure, by operating the key 10 or a key in the loop 11, signals may be transmitted to the line L in exactly the same manner as in Figure 2. Signals transmitted from the line L, however, act inductively through the

transformer 3 to operate the polar relay 1 which opens the loop circuit to actuate the sounders therein without affecting the pole changer 6. The operation of the polar relay 1, in opening the local circuit 9 including the loop 11, results in deenergizing the magnet 7' of the pole changer 6'. Inasmuch as the polar relay 1' is not now operated, the auxiliary magnet 8' remains short circuited so that the pole changer 6' releases its armature to transmit the signal to the line L'. The pole changer 7' in repeating the signal opens the local circuit of the polar relay 1' at contact 5', thereby preventing the repeated signal from actuating the polar relay. Signals arriving from the line L' actuate the polar relay 1' which opens a circuit 9 without affecting the pole changer 6'. The pole changer 6, however, is deenergized and retracts its armature to repeat the signal to the line L, at the same time opening the circuit of polar relay 1 at contact 5.

By means of this invention a simple and effective circuit for single transmission operation is provided, and while the invention has been shown in what is considered its most desirable form it will be obvious that the general principles herein disclosed may be embodied in many other organizations widely different from those illustrated without departing from the spirit of the invention as defined in the following claims.

What is claimed is:

1. In a signaling system, a transmission line, a receiving means inductively related thereto, a pole changer for transmitting signals to said line, indicating means and transmitting means included in a local circuit with said pole changer, said local circuit being under the control of said receiving means, means to prevent said pole changer from being actuated by said receiving means, and means to prevent said receiving means from being actuated when said pole changer is actuated by said transmitting means.

2. In a signaling system, transmission line sections, a repeater interconnecting said sections and comprising two signaling sets, each set including a receiving means inductively associated with a corresponding line section, a pole changer controlled by the receiving means of the opposite set but unaffected by the receiving means of the corresponding set, said pole changers being adapted to repeat to one line section signals inductively received from the other line section, and means to render the receiving means of a set inoperative when the pole changer of that set is repeating signals.

In testimony whereof, I have signed my name to this specification this 17th day of January, 1919.

WILLIAM A. CUSHING.