

April 21, 1925.

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R. D. PARKER

TELEGRAPHY

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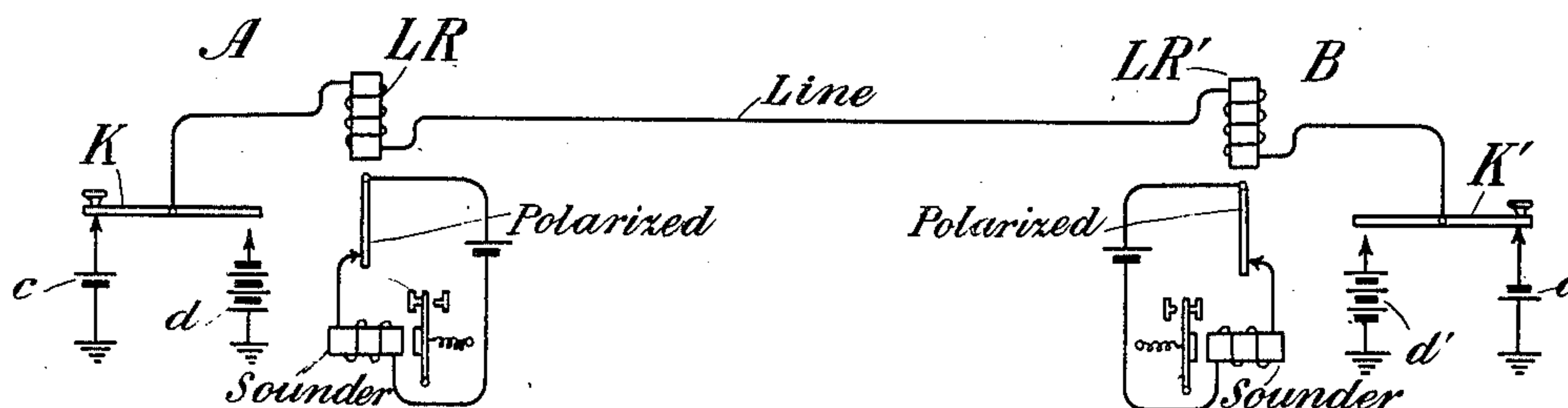


Fig. 1

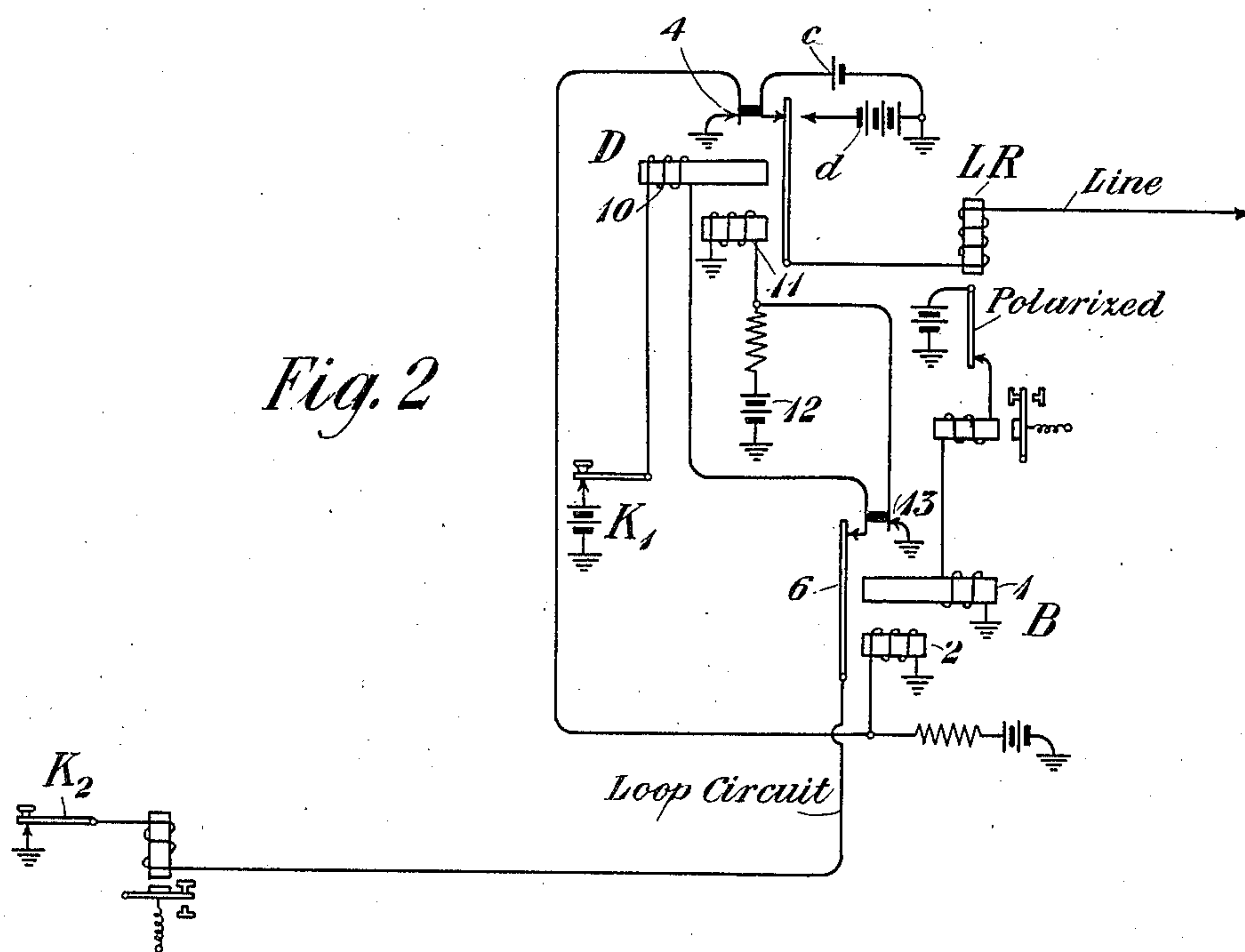


Fig. 2

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UNITED STATES PATENT OFFICE.

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TELEGRAPHY.

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To all whom it may concern:

Be it known that I, RALZEMOND D. PARKER, residing at Brooklyn, in the county of Kings and State of New York, have invented certain Improvements in Telegraphy, of which the following is a specification.

This invention relates to telegraphy, and it is concerned particularly with telegraph systems in which transmission is limited to one direction or the other at a time, which systems are generally designated in the art as "single" telegraph systems.

In the single telegraph systems now in common use the line relays are of the type which is responsive to the presence or absence of line current irrespective of the direction thereof. Systems of this character are troublesome, when used on long lines, due to leakage and capacity. In such instances it is not uncommon to employ a duplex telegraph system modified for one-way operation, the advantage of this system being that it employs relays responsive to the direction of current, as for example, relays with polarized armatures. The duplex systems, however, necessitate the use of balancing artificial lines and other equipment which is expensive to install and troublesome to keep in adjustment.

The object of the present invention is to provide a single telegraph system which employs relays of the type responsive to current reversals, thus securing the operating advantages of these relays for the single systems without the use of balancing artificial lines and similar equipment.

Various other features and objects of the invention will be readily understood from the following description of specific forms of embodiment thereof, having reference to the accompanying drawing in which,

Figure 1 is a circuit diagram showing one form of embodiment of the inventions in simplified form, and

Fig. 2 is a similar diagram showing the apparatus at a terminal station arranged to repeat signals from the main line to a branch loop and vice versa.

Similar reference characters designate similar parts in each of the several views.

In Fig. 1 of the drawing I have shown polarized relays LR and LR' located at stations A and B, the relays being connected with each other by means of a line conductor. Keys K and K' are associated

with the relays and batteries c , d , c' and d' are associated with the keys for causing flow of current over the line circuit. The batteries c and c' have opposite terminals associated with the front contacts of the keys so that these batteries are in conjunction when the keys are in their normal position, and cause the flow of current over the line, this current being of such direction that the polarized relays hold their contacts in their closed positions. The sounders, whose circuits are controlled by these contacts, are therefore normally energized. The batteries d and d' , of higher potential than c and c' , are associated with the back contacts of the keys, the polarity of the back contact battery of each key being opposed to that of the front contact battery of the same key, so that when either key is opened the line circuit current is reversed in direction. The value of the reversed current should preferably be substantially equal to that of the normal current, and since the latter is proportional to the potential of batteries c and c' in conjunction, whereas the former is proportional to that of d and c' or d and c , in opposition, it follows that the potential of the d batteries should be substantially three times that of the c batteries.

The operation of the system will now be readily understood. To send a message to station B, the operator at A opens his key so that battery d causes a reversal of current in the line circuit and the de-energization of the sounders at both stations. He then sends the message in the regular manner by operating his key, a dot or dash being made by the closure of the front contact of the key and a space by the closure of the back contact thereof. Transmission from B to A is similar.

To "break" a message the receiving operator, as B, opens his key so that the back contact battery is associated with the line. If the key at A is closed at this instant, so as to send a marking signal to B, the current in the line is reversed by the battery d' and the sounders are opened at both stations. When the operator at A opens his key the sounders remain open because batteries d and d' are then in conjunction. The operator at A is thus notified by failure of response of the sounder to the operations of the key, that the operator at B is "breaking" his message.

He then closes his key and receives the message from B.

In Fig. 2 I have shown the system of my invention arranged to cause the repetition of a message from a main line circuit into a branch loop, and vice versa. The apparatus is shown only for one terminal station, namely A, it being understood that the other station associated with the line is preferably provided with similar apparatus. The transmitting key K of Fig. 1 is replaced in this system by a transmitting relay D, the circuit of which is governed by keys K_1 and K_2 , which are comprised in a loop circuit extending to a branch office or subscriber. Operation of relay D may therefore be effected by the actuation of either key K_1 , which may be at the main station, or key K_2 , which may be at the branch office. The relay D closes its front contact in response to a dot or dash and its back contact in response to a space. Batteries c and d are associated with the contacts of D and serve to cause reversals of current in the line circuit, similarly as in the preceding embodiment. The polarized relay LR governs a sounder which is connected in series with the winding 1 of a relay B. This relay governs the contact 6 which is in series with the loop circuit hereinbefore mentioned and which comprises a sounder at the branch office. Relay B serves, therefore, to open and close contact 6 in response to the operation of relay LR, thus bringing about the repetition of a message from the main line circuit into the loop circuit.

Since relay LR, however, responds not only to incoming signals but also to outgoing ones it is necessary to prevent the response of relay B to the outgoing signals so that relay D and the loop circuit may remain under the control of key K_1 or K_2 . This is accomplished by the provision of a locking winding 2 on relay B, which winding is energized by current from battery 3, provided a shunt for this winding is open at front contact 4 of relay D. The locking winding of relay B is therefore energized when relay D is opened by keys K_1 or K_2 and serves thus to prevent an opening of the local circuit at the contact of relay B when the relay LR reverses its contact due to an outgoing signal.

Means are provided also for preventing the operation of the relay D due to the opening and closing of the loop circuit caused by the repeating relay B. This means comprising the locking winding 11 of relay D, which winding is energized by current from the battery 12, except when the relay B closes its front contact 13, which serves, when closed, to shunt current from the winding 11. Consequently when relay B opens contact 6 in response to an incoming spacing signal, and causes thus the de-

energization of the winding 10 of relay D, winding 11 prevents the opening of the contact of the relay because current now flows through this winding due to the opening of contact 13 of relay B. This arrangement, therefore, serves to prevent the repetition of an incoming message back into the line. The manner in which signals may be transmitted or received by the above-described apparatus will be apparent without further description.

Although only certain specific forms of apparatus and circuits embodying the invention are shown and described herein, it is readily understood that various changes and modifications may be made therein within the scope of the following claims without departing from the spirit and scope of the invention.

What I claim is:

1. In a telegraph system, a line, a plurality of relays associated with the opposite ends thereof and responsive to reversals of current therein, transmitting devices associated with said relays, a source of current associated with each device, said sources being arranged to be in aiding relation in a predetermined like position of said devices, and another unequal source of current of opposite polarity associated with each device and arranged to be in opposition to the first mentioned source at the distant end in other predetermined relative position of said keys.

2. In a "single" telegraph circuit, a line, a polarized relay at each end of the line and responsive to reversals of current therein, a transmitting device associated with each polarized relay, said device having front and back contacts, batteries associated with the front contacts of said devices and arranged to be in conjunction when the said contacts are closed, a second battery for each device associated with the back contact thereof, the said second battery of each device being arranged to oppose the front contact battery of the other device and the relative potentials of said batteries being such that the flow of current in each direction is substantially equal when the first contact of one device is held closed and the contacts of the other device are alternately closed and opened.

3. In a "single" telegraph system, a line, a plurality of polarized relays responsive to reversals of current therein, sources of current and operating means adjacent each end of the line for causing reversals of current therein, and a relay adjacent each end of the line for at times preventing reversals of current in the line in response to actuations of said operating means.

4. In a "single" telegraph system, a plurality of polarized relays, a line for operatively associating the same, unequal bat-

teries adjacent each end of the line and a key to associate said batteries alternatively for causing reversals of magneto-motive force in the relay of the opposite end, said relay being located between said line and said means.

5. In a "single" telegraph system, two polarized relays, a line for associating the same, operating means adjacent each relay for causing responses of both said relays, two other relays controlled respectively by the said polarized relays and respective sounders controlled by these said other relays and means adjacent each polarized relay for rendering the sounder at that end of the line non-responsive to the operating means adjacent thereto.

6. In a "single" telegraph system, a line circuit, a plurality of polarized relays associated with the terminals thereof, two transmitting devices at each end of the line, one adjacent and the other non-adjacent for causing said relays to assume certain pre-determined positions in response to actuation of either of said transmitting devices, and means operable at either transmitting

device for rendering the non-adjacent device ineffective to cause the relay adjacent thereto to assume its pre-determined position.

7. In a telegraph system, a plurality of stations, a line circuit extending therebetween, polarized relays associated with said circuit, sources of current at said stations, having positive and negative potentials, and transmitting devices associated therewith for connecting said sources in aiding relation for one signal and in opposition for another signal.

8. In a telegraph system, a line, two polarized relays in said line, and two opposite alternative grounded batteries of different strength at each end of the line with a corresponding key to make connection to one or the other of them, the batteries of like strength being connected in conjunction for like positions of said keys.

In testimony whereof, I have signed my name to this specification this 19th day of May 1920.

RALZEMOND D. PARKER.