Oct. 22, 1929. R. B. SHANCK 1,732,286

TELEGRAPH SYSTEM

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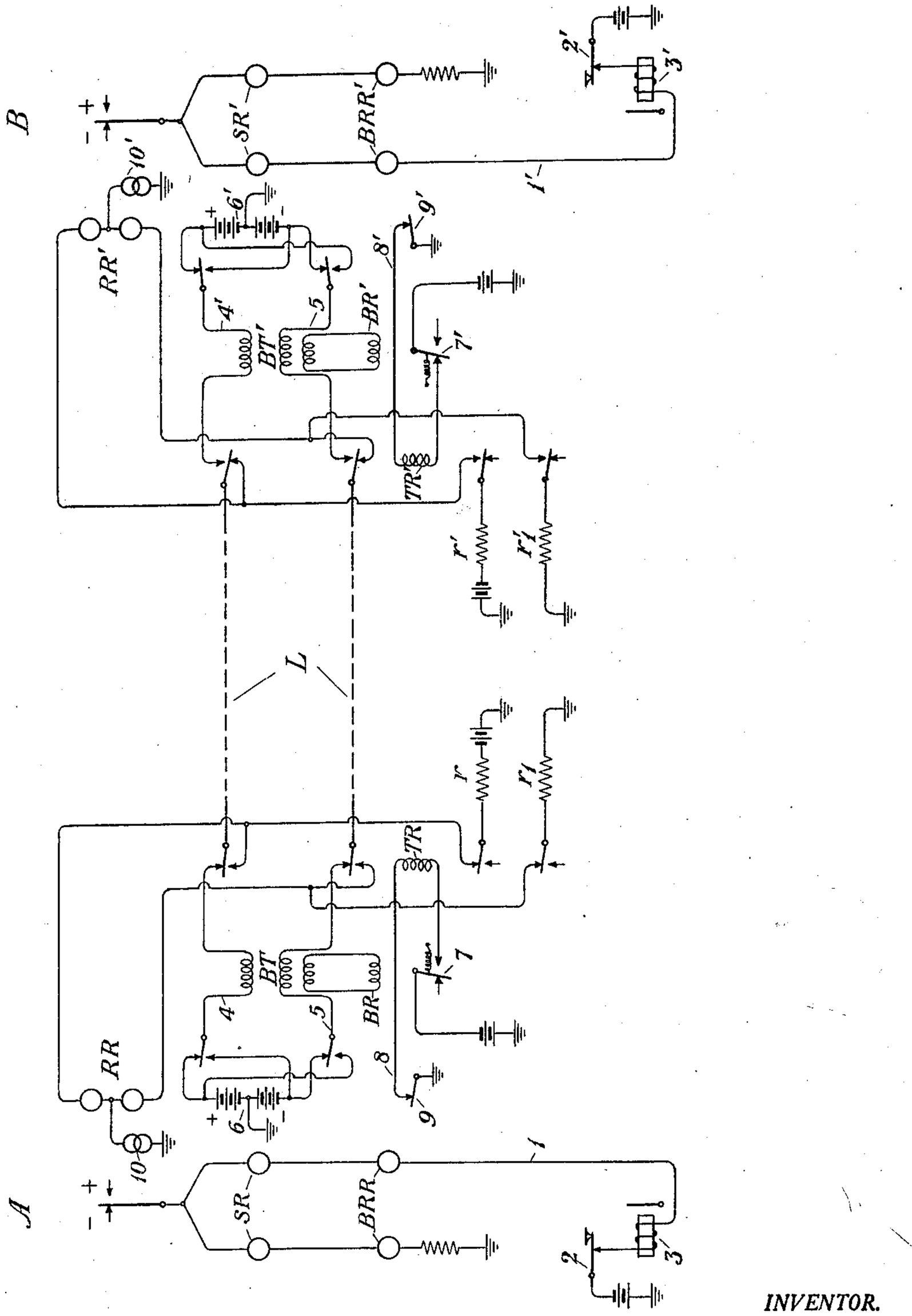

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TELEGRAPH SYSTEM

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This invention relates to telegraph systems and more particularly to improved arrangements for transmitting a "break" signal over such systems.

When telegraph transmission is taking place from one station to another, it is often desirable for the receiving operator to interrupt the sender. This is accomplished usually by the opening of the key at the receiving station and the sending of a "break" signal. This break signal will reverse the direction of transmission and will cut off the sending apparatus at the first station and connect the receiving apparatus to the line thereat. In the arrangements of this invention one of the cardinal features thereof consists in the utilization of alternating current for the transmission of the "break" signal. This use of alternating current in connection with the "break" feature would have the advantage that any material interference due to earth-potential differences could be avoided. Furthermore, if used differentially with a ground return, as in the arrangements of the invention, there will be no appreciable tendency for interference of the alternating current with telegraph transmission. Other features and objects of the invention will appear more fully from the detailed description hereinafter given.

The invention may be more fully understood from the following description together with the accompanying drawing in the figure of which is shown a circuit diagram illustrating a preferred form of the invention.

The circuit diagram shows a metallic two-way non-duplex polar telegraph system interconnecting the stations A and B. Station A is shown in the sending condition and station B in the receiving condition. At station A there is provided the differential loop circuit 1, which will include a battery, a key 2, sounder 3, a break release relay BRR and a sending relay SR. The sending relay SR will control the application of currents of opposite polarity from the battery 6 to the conductors 4 and 5. Included in conductors 4 and 5 are the primary windings of a break transformer BT. The break transformer BT will have two equal primary windings so arranged as to be series opposed. It will have a third or secondary winding in circuit with a break relay BR. The conductors 4 and 5 may be connected to the line L over the contacts of a transfer relay TR. A receiving relay RR is provided which also may be connected to line L over another set of contacts of the transfer relay. An alternating current generator 10 is connected from ground to the midpoints of the windings of the receiving relay RR. The windings of the receiving relay RR are arranged so as to be parallel opposed. The arrangements at station B are identical with those at station A. Like parts at both stations have been designated with like reference characters with the added designation . . . prime.

The operation of the arrangements of the invention is as follows:

As has been pointed out, stations A and B are shown in condition for sending from A to B. The sending relay SR will send from battery 6 over conductors 4 and 5, through the primary windings of break transformer BT, and over line L to the receiving relay RR′. This will not effect the break relay BR as the primary windings of transformer BT are connected series opposed. These signals will operate relay RR′. Relay RR′ has connected between the midpoints of its windings and ground the alternating current generator 10′. Current from this generator has no effect on receiving relay RR′ as its windings are parallel opposed. However, this current will be transmitted in parallel to ground through both primary windings of break transformer BT and will cause the break relay BR to operate. This will cause the armature 7 of the break relay to attract against the pull of a spring and will hold open the circuit 8 of the transfer relay TR and allow the sending apparatus at station A to be connected to line L. This will be the normal condition for sending from A to B.

When the receiving operator at B "breaks", he opens the loop circuit 1′ and causes the break release relay BR′ to allow its armature 9′ to fall off and open the circuit 8′ of the transfer relay TR′. The transfer relay TR′ thereupon switches off the receiving relay

RR′ and connects the line L to the transmitting apparatus at station B. It will be seen that this removes the alternating current generator 10′ from the line L. Accordingly, the break relay BR at station A will release and allow its armature 7 to fall back and close the circuit 8 of the transfer relay TR. This will operate the transfer relay, which will disconnect the transmitter apparatus from the line L and will connect thereto the receiving relay RR. The operation of the transfer relay TR will open at its third and fourth armatures from the top a holding circuit for the receiving relay RR. It is pointed out that in the leads from these armatures are the resistances r and r_1. These resistances should be so adjusted that when the holding circuit for relay RR is closed a condition of balance through both of its windings will exist so that it will not be operated by the generator 10. It will be seen, that in response to the "break" signal at station B, the above operations have arranged the circuit for transmission in the opposite direction.

While the invention has been disclosed in certain specific arrangements which have been deemed desirable, it is understood that it is capable of embodiment in many and other widely varied forms without departing from the spirit of the invention as defined by the appended claims.

What is claimed is:

1. A telegraph line interconnecting two stations, each of said stations comprising transmitting and receiving apparatus and "breaking" means, and sources of alternating current adapted to be applied to said line at each station for exclusively controlling the operation of the "breaking" means at the distant station.

2. A metallic telegraph circuit interconnecting two stations, a sending circuit at one station adapted to be connected to the sides of said metallic circuit thereat, a transformer having two equal primary windings each serially included in one of the sides of said sending circuit and being arranged serially opposed whereby said transformer will be unaffected by the sending current, a "break" relay controlled by said transformer, a receiving circuit at the other station adapted to be connected to the sides of said metallic circuit thereat, and a source of alternating current at said last mentioned station connected to the sides of said receiving circuit and metallic circuit and sending circuit in parallel for controlling the operation of said "break" relay.

3. A metallic telegraph circuit interconnecting two stations, a transformer at one station having two equal primary windings arranged to be parallel aiding and connected to opposite sides of said metallic circuit when said station is in a sending condition, a "break" relay controlled by said transformer, and means at said distant station when in a receiving condition for applying alternating current over the sides of said metallic circuit and primary windings of said transformer in parallel for controlling said "break" relay.

4. A metallic telegraph circuit interconnecting two stations, a transformer at one station having two primary windings arranged to be parallel aiding and connected to opposite sides of said metallic circuit when said station is in a sending condition, a "break" relay controlled by said transformer, a transfer relay controlled by the release of said break relay for switching said station from a sending to a receiving condition, means at a distant station when in a receiving condition for applying an alternating current over the sides of said metallic circuit and windings of said transformer in parallel for maintaining said "break" relay in an operated condition, and means at said last mentioned station for disconnecting said alternating current from said metallic circuit.

In testimony whereof, I have signed my name to this specification this 16th day of December, 1927.

ROY B. SHANCK.