

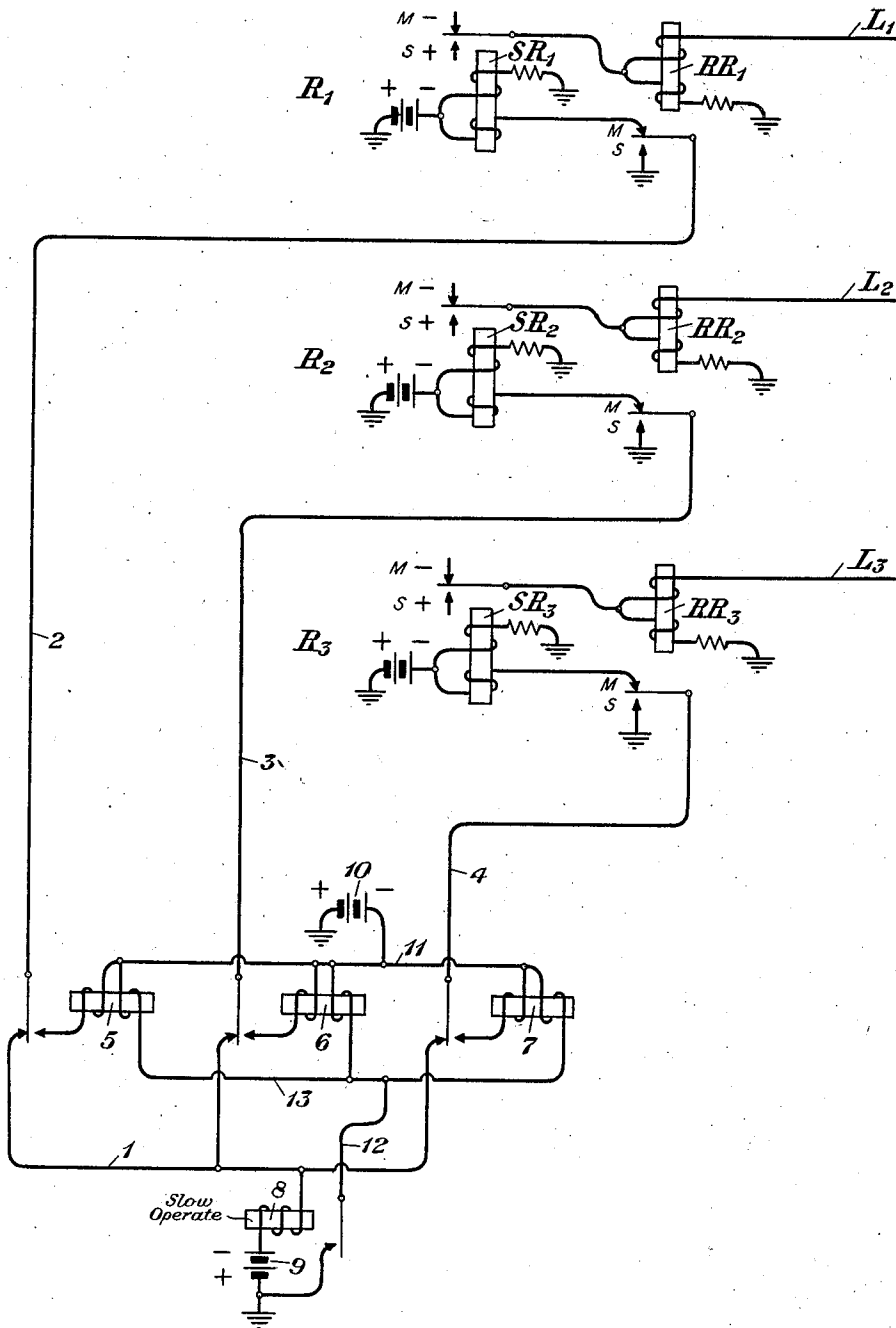
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TELEGRAPH SYSTEM

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TELEGRAPH SYSTEM

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This invention relates to signaling systems and more particularly to improvements in certain types of telegraph systems.

It has been the practice in certain types of telegraph systems to interconnect a plurality of telegraph lines through a well known type of hub circuit. It has been found, that if one of the telegraph lines connected to the hub circuit remains open it might put all of the other lines connected to the hub circuit out of commission and prevent transmission from taking place between said other lines until the first disabled line is repaired. A type of telegraph circuit on which the aforementioned kind of trouble might occur would be a differential duplex system. In accordance with this invention arrangements are provided associated with the hub circuit whereby, if one of the lines connected thereto goes open and remains so for an appreciable period, it will automatically be disconnected from the hub circuit and transmission may take place between the remaining lines connected thereto. This will prevent undue interruption of the service. Other objects and features of the invention will appear more fully from the detailed description of the invention hereinafter given.

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

In the drawing are shown a plurality of telegraph lines L_1 , L_2 and L_3 terminating at the telegraph repeaters R_1 , R_2 and R_3 . These are interconnected through a well known form of hub circuit 1. While only three lines have been shown interconnected by the hub circuit it is obvious that other lines could also be interconnected thereby. The telegraph repeater R_1 would have a receiving relay RR_1 and a sending relay SR_1 . The telegraph repeater R_2 would have a receiving relay RR_2 and a sending relay SR_2 and the telegraph repeater R_3 would similarly have a receiving relay RR_3 and a sending relay SR_3 . With the arrangements as shown, namely when a marking signal is on line L_1 , equal negative batteries connected to each of the sending relays SR_1 , SR_2 and SR_3 will be connected to each end of the hub circuit and no current will flow thereover. This type of circuit is called an inverse neutral hub circuit. If a spacing signal is now received from line L_1 relay RR_1 will release and its armature will be connected over its spacing contact to ground. This ground will be applied over conductor 2 to the conductor 1 of the hub

circuit and thence over conductors 3 and 4 to the negative batteries connected to the windings of sending relays SR_2 and SR_3 and will cause them to operate to send a spacing signal out over lines L_2 and L_3 . The next marking signal to come in over line L_1 will cause relays SR_2 and SR_3 to return to the marking position. If one of the lines, such for example as L_1 , became open and remained so relay RR_1 would move to spacing and ground would be permanently applied to its spacing contact and a continuous spacing signal would be sent out over lines L_2 and L_3 . This would prevent transmission between lines L_2 and L_3 and put them out of service as long as line L_1 remained open.

As heretofore pointed out the arrangements of the invention provide additional apparatus in connection with the hub circuit whereby if one of the lines, such as L_1 , becomes and remains open it may automatically be disconnected from the hub circuit and service continued between the other lines, such as L_2 and L_3 , connected to the hub circuit. This apparatus comprises a relay 8 which is connected to the hub circuit and hence is common to all of the lines. This relay is adjusted to be slow operative and hence will not operate on the ordinary spacing signal but will operate if any one of the lines remains open for an appreciable period. A series of relays 5, 6 and 7, one for each line, is also provided to disconnect a disabled line from the hub circuit.

The operation of the arrangements of the invention is as follows. Relay 8 is normally unoperated because battery 9 in circuit therewith has its negative pole connected to the hub circuit. As the batteries connected to sending relays SR_1 , SR_2 and SR_3 have their negative poles connected to the hub circuit the voltage of these batteries, which is the same as that of battery 9, will oppose that of battery 9 and no current will flow in the hub circuit. If one of the lines, such as L_1 , now becomes open, ground will be applied from the spacing contact of receiving relay RR_1 , to conductors 2 and 1, winding of relay 8 to battery 9 and ground. If line L_1 remains open for an appreciable length of time the slow operate relay 8 will operate. This will apply ground over the contact and armature of relay 8, conductor 12, conductor 13, right hand windings of relays 5, 6 and 7, conductor 11 to battery 10 and ground. This will operate relays 5, 6 and 7. As ground is connected to conductor 2 relay 5 will immediately lock up over a circuit completed over its armature and contact and left hand winding and thence over conductor 11 to

battery 10. Relays 6 and 7 will not lock up as ground is not applied to conductors 3 and 4. To these conductors there is applied a voltage from the batteries connected to sending relays SR₂ and SR₃ which is opposed to that of battery 10. When relay 5 is operated the previously traced circuit for relay 8 is open and relay 8 releases. This opens the previously traced circuits for relays 6 and 7 and as they did not lock up they will release. The locking up of relay 5 keeps repeater R₁ disconnected from the hub circuit and removes the ground applied to the hub circuit by the opening of line L₁. The release of relays 6 and 7 reconnects repeaters R₂ and R₃ to the hub circuit. Transmission may now be resumed between lines L₂ and L₃. After the line L₁ has been repaired and the open removed, relay RR₁ will operate. This will disconnect the ground from conductor 2 and open the previously traced locking circuit for relay 5 and its release will now reconnect line L₁ to the hub circuit. The arrangements of the invention would operate in substantially a similar manner if either of lines L₂ or L₃ remained open for an appreciable length of time.

While the invention has been disclosed as embodied in certain specific forms which are 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 system comprising a plurality

of lines terminating at repeaters, a hub circuit for interconnecting said lines, a slow operate relay operated if one of said lines is disabled for an appreciable length of time, means controlled by the operation of said relay for automatically disconnecting said disabled line from said hub circuit and allowing transmission between the remaining lines to take place over said hub circuit.

2. A telegraph system comprising a plurality of lines terminating at repeaters, a hub circuit for interconnecting said lines, a slow operate relay connected to said hub circuit adjusted to be operated if one of said lines is disabled for an appreciable length of time, a series of relays each individual to a line, means controlled by the operation of said slow operate relay for operating all of said series of relays, means controlled by each of said series of relays for disconnecting its individual line from said hub circuit and releasing said slow release relay, and means for locking up the relay in said series which is individual to the line disabled.

3. A telegraph system comprising a plurality of lines terminating at repeaters, a hub circuit for interconnecting said lines, a slow operate relay connected to said hub circuit and adjusted to operate if one of said lines is disabled for an appreciable length of time, and means controlled by said relay for automatically momentarily disconnecting all of said lines from said hub circuit and causing the disconnection of said disabled line to be permanent.

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