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SIGNALING SYSTEM FOR ELECTRIC RAILWAYS.

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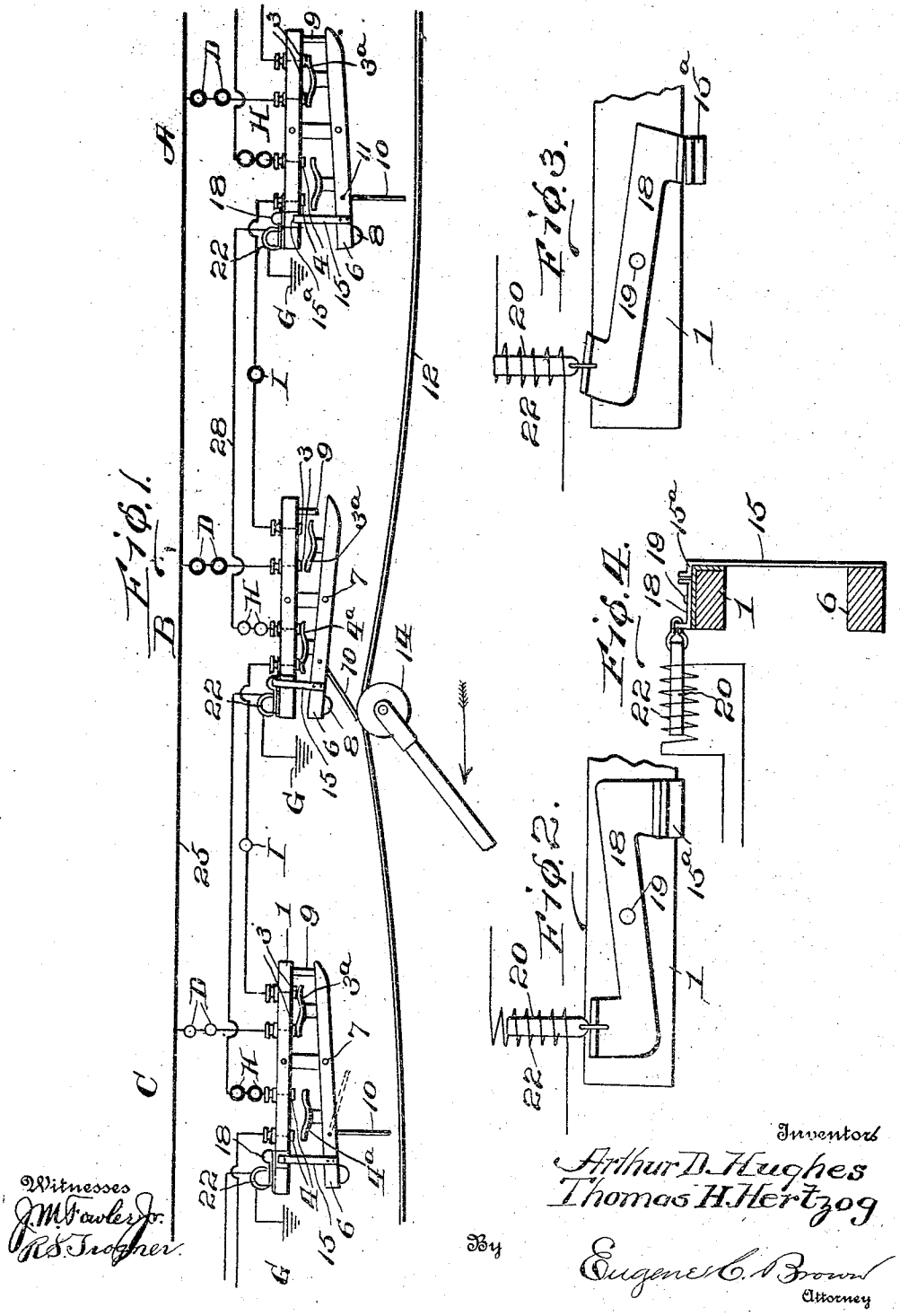
1,098,112. Patented May 26, 1914.



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Application filed July 17, 1912. Serial No. 709,894.

To all whom it may concern:

Be it known that we, ARTHUR D. HUGHES and THOMAS H. HERTZOG, citizens of the United States, residing at Washington, in the county of Washington and State of Pennsylvania, have invented certain new and useful Improvements in Signaling Systems for Electric Railways, of which the following is a specification.

Our invention relates to signaling systems for electric railways employing overhead trolleys and particularly mechanism for throwing lights on or off at the ends of the blocks by the passing of a trolley car. To this end we provide a switch which may light lamps or manipulate a semaphore, at the same time switching on lamps which serve to block the track in the rear of the car.

Our invention provides an arrangement of apparatus which insures the relighting of the signal lamps following the renewal of power after it has been temporarily cut off and mechanism which permits a car to back out of a block without disturbing the signals. These and other objects will appear from the following description, in connection with the accompanying drawings in which—

Figure 1 is a diagram illustrating our signaling system applied to two blocks of a trolley road; and Figs. 2, 3 and 4 are detail views of the detent mechanism for controlling the position of the switch.

In our system, each end of a block is provided with a switch mechanism having a trip-device adapted to be operated by engagement with the trolley wheel, so that the signals are automatically controlled by the passing of the trolley-car from one block section to the next. The switch mechanism comprises a base or supporting-block 1, which may be attached to the insulator bracket from which the trolley wire is suspended, or in any other desirable manner, so that it is in a proper position with respect to the trolley. The block 1 of wood or other suitable insulating material, carries pairs of contacts 3 and 4, upon opposite ends which are adapted to coöperate with spring bridging-plates 3^a and 4^a, carried by the swinging switch-arm 6, pivoted at 7. The arm 6 is eccentrically pivoted and is preferably weighted as at 8, so that the arm will normally assume the position shown at switch-stations A and C, with the right-hand end beaming against the stop 9 and the plate 3^a bridging the contacts 3.

A swinging tripping-arm 10, pivoted at 11, to the switch-arm 6, and preferably made of resilient material, such as spring metal, is arranged to hang over the trolley-wire 12, in a position to be struck by the trolley wheel 14. The arm 10 is permitted to swing through a limited arc, but is permitted to freely swing in the opposite direction until it rests against the bottom of the arm 6. By reason of this arrangement the trolley wheel will lift the arm 6 into the position shown at station B, when traveling in the forward direction, thereby bringing the bridging-plate 4^a into engagement with the contacts 4 and breaking the connection of the plate 3^a with the contacts 3.

In order that the lever arm 6 may be retained in the position shown at station B, after the trolley has moved away, a spring catch arm 15 having a hooked end 15^a attached to the lever arm, and normally bearing against the side of the block 1, is adapted to spring over the top of the block as shown at station B and in the sectional view Fig. 4. For the purpose of releasing the door or catch 15^a and permitting the arm 6 to drop down with the normal position shown at stations A and C, a releasing lever 18, is pivoted at 19 on top of the block 1, having one end adjacent the catch and having the other end connected to the core 20 of a solenoid magnet 22. When the solenoid is deënergized the lever 18 will occupy the position shown in Figs. 2 and 4, permitting the catch to engage and remain upon the top of the block, but when the solenoid is energized the core will swing the lever 18 into the position indicated in Fig. 3, thereby forcing the detent or catch 15^a away from the block and permitting the arm 6 to drop to normal position. The solenoid may be secured in any suitable manner to the supporting block 1.

The electrical circuits by which the switch mechanism controls the signal lamps are clearly indicated in Fig. 1. Each circuit extends over two blocks and includes the distant signal lamps D and rear switch contacts 3 at one station, the forward switch contacts 4 and home signal lamps H, at the adjacent station and the switch releasing device 22 at the next succeeding station. These circuits alternate so that they overlap and form parallel circuits between the stations.

The two bridging plates on the pivoted switch arm at each station control the circuits to the adjacent station alternately. The trolley-wheel having swung the switch-arm 6, at station B, thereby bringing the bridging-plate 4^a into engagement with the contacts 4, the circuit will be closed from the power feeder 25, through the distant signal lamps D, at station C, a block in advance, through the contacts 3, and bridging-plate 3^a, conductor 26, contacts 4 and bridging-plate 4^a at station B, through the home signal lamps H, conductor 28, and solenoid 22 at station A, to ground G. The switch-arm will be maintained in the position shown at B, while the car is traversing the block-section between stations B and C, and consequently the block will be guarded in the rear by the home signal lamps H at station B and in advance by the distant signal lamps D at station C. In case the power should be cut off while the car is at an intermediate point between stations, the signals will be restored as soon as the current is restored and the motorman on the car may know positively that the signal circuit is complete by observing the intermediate signal lamp I. It is, of course, to be understood that each of the lamps may be in duplicate and arranged so that the duplicate lamp will be lighted in case the regular lamp burns out or is broken and as this is a well-known arrangement it is unnecessary to illustrate it. The lamps which are lighted as shown conventionally in light lines while those which are out are shown in heavy lines.

When the car reaches the station C, the trolley swings the switch lever and closes the circuits through the signal lamps of the succeeding block section in the manner previously described, thereby energizing the solenoid 22 at station B, and causing its lever 18 to release the catch 15^a and the switch-arm 6 to drop into the normal position. When the switch-arm at station C was thus swung into raised position by the trolley the circuit through the contacts 3 was broken causing the lights guarding the block section between stations B and C to go out and thereby indicating to a motorman at station B that the block ahead is clear and his car may proceed. If while a car is in block C, a motorman should attempt to pass station B, he will get no signal through the signal lights because the signal circuit is open at 3^a at station C.

The many advantages of our system of block signaling will be appreciated by signal engineers. The system is automatic in operation and the mechanism is exceedingly simple and not liable to get out of order. The contacts controlling the signal circuits are positively maintained while the car is traversing a block and are not dependent upon the current so that they will not be disturbed by a loss of power when it is restored.

We have described in detail the particular arrangement of mechanism illustrated in the drawings for the purpose of disclosing an embodiment of our invention, but it is obvious that various changes may be made therein without departing from the spirit of our invention. The signaling circuits are shown as connected to the power feeder but it is evident that they may be connected to the trolley wire.

We claim:—

An automatic block signaling system for electric railways operating trolley cars, comprising home and distant signal lamps at each station; a switch mechanism at each station having a pivoted member adapted to be swung in one direction by a passing trolley and in the other direction by gravity, a detent to lock said member in the trolley-operated position, and an electro-magnetic releasing device for said detent, signal circuits extending between the stations, each of said circuits including the distant signal at one station, the home signal at the adjacent station and said releasing device of the next succeeding station, said pivoted member having bridging contacts upon each side of its pivot arranged to control alternately one or the other of said circuits between adjacent stations.

In testimony whereof we affix our signatures in presence of two witnesses.

ARTHUR D. HUGHES.
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Witnesses:
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