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RAILWAY TRAFFIC CONTROLLING DEVICE.

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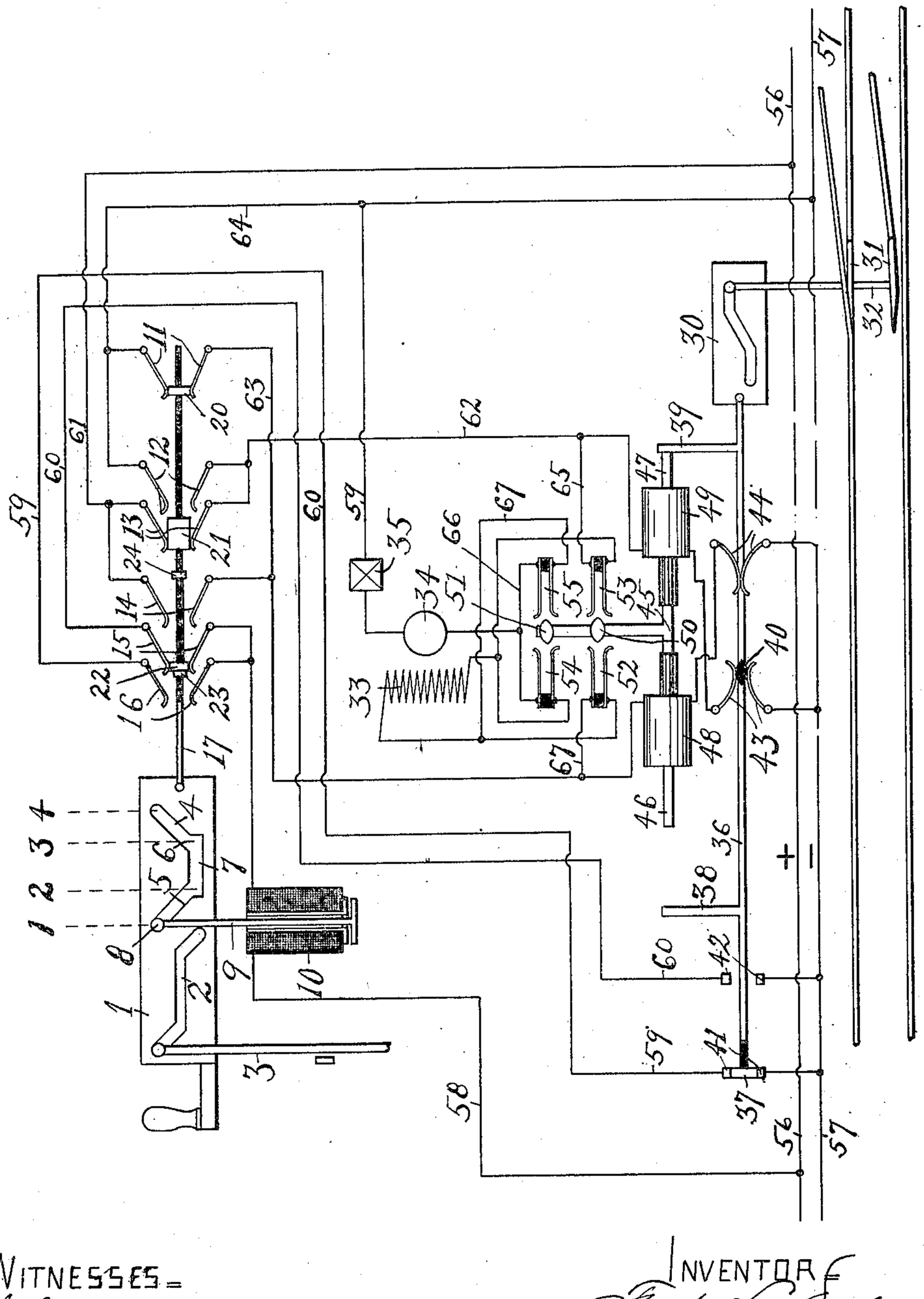
934,895. Patented Sept. 21, 1909.



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UNITED STATES PATENT OFFICE.

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RAILWAY-TRAFFIC-CONTROLLING DEVICE.

934,895. Specification of Letters Patent. Patented Sept. 21, 1909.

Application filed July 21, 1903. Serial No. 166,467.

To all whom it may concern:

Be it known that I, FRANK L. DODGSON, a citizen of the United States, and resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Railway-Traffic-Controlling Devices, of which the following is a specification.

This invention relates to electric apparatus for railway traffic-controlling devices. Its object is to provide an efficient, safe and flexible mechanism.

The drawing is a diagrammatic view of the invention as applied to a railway switch mechanism.

In the tower or operating station is the usual interlocking board, having the operating lever 1 provided with an ordinary tappet slot 2, which coöperates with a roller attached to the tappet 3 in the interlocking board. Another slot 4 in the lever has two inclined portions 5 and 6, connected by a horizontal portion 7 having stop faces at its ends. In this slot is a roller 8, connected by the rod 9 to the armature of the indicating magnet 10. Fastened to the frame which carries the lever 1, and suitably insulated therefrom, are three sets of pairs of contact springs as follows: 11 and 12, 13 and 14, 15 and 16. A frame or rod 17 moves with the lever 1 and bears three bridges, 20, 21, and 22, coöperating with said pairs of contact springs. The bridge 22 is carried loosely by the rod 17 and is moved by stops 23 and 24 on said rod, coming in contact with the bridge 22. The stops are so set on the rod 17 that the rod may make two thirds of its stroke before it moves the bridge 22.

At the switch is a suitable electric motor for throwing the switch, as for instance, by reciprocating a motion plate 30, which has in it the usual slot and moves the switch points 31 by means of a suitable rod 32. The motor has a field 33 and an armature 34 for operating a suitable connecting device 35, for communicating the movement of the motor to the motion plate 30. The connecting device 35 may be an electric clutch of any suitable form, whereby, when current is passing through the field, the motion plate is moved, and when no current is passing through the field, the motion plate is disconnected from the motor and remains stationary. Means are provided also whereby the movement of the motion plate makes and breaks suitable contacts for energizing the indicator 10, and for making and breaking operating connections through the motor and safety circuits. In the present instance, a frame or bar 36 carries a bridge 37, two strikers 38 and 39, and an insulated block 40. The bridge 37 makes a circuit through either one of two pairs of contact heads 41 or 42 in the indicator circuit. The insulated block 40 breaks the circuit through either one of two pairs of contact heads or springs 43 and 44. The strikers 38 and 39 act upon a frame 45, which carries the cores 46 and 47 of two solenoids 48 and 49. The frame 45 carries also a pole changer for the field 33 consisting of contact-making blocks 50 and 51, whereby one circuit may be made by the block 50 through either one of two pairs of contact heads or springs 52 53; and another circuit may be made by the ock 51, through either one of two pairs of contact heads or springs 54, 55.

The wiring or circuits are as follows: Preferably there are two main conductors 56, (which will be called the positive common) and 57 (which will be called the negative common). These two mains may be bus bars in the tower or operating station; and current is supplied to them. The negative common is led out to the switch or traffic controlling device. The positive common is preferably wholly in the tower current. A wire 58 leads from the positive common to the indicating magnet 10, and thence to the two pairs of contact springs 15 and 16. From the other side of the contact springs 16 the normal indicating wire 59 leads to the contacts 41 at the switch; and from the other side of the contact springs 15, the reverse indicating wire 60 leads to the contact heads 42 at the switch. From the positive common 56, the common operating wire 61 leads to one side of both pairs of springs 13 and 14. From the other side of the pair of springs 13 extends the normal operating wire 62, which leads to one side of the motor mechanism at the switch and through the solenoid 49 and the contacts 43 to the negative common 57; and from the pair of springs 14 extends the reverse operating wire 63 to the other side of the motor mechanism at the switch, and through the solenoid 48 and the contacts 44 to the nega-

tive common 57. From the negative common 57 a safety circuit wire 64 passes to one side of the pairs of contacts 11 and 12. The other side of the pair of contacts 12 is connected with the wire 62, and the other side of the contacts 11 is connected with the wire 63. A branch 65 from the wire 62 is connected through the contact heads or springs 53, and thence through the contact springs 54, with the common wire 66 connected to one terminal of the armature 34. The wire 63 is connected by a branch 67 through the contact springs or heads 52, and through the contact springs or heads 55 with the common connection 66, above mentioned, to one pole of the armature 35. The other terminal of the armature passes through the connecting device or clutch 35 and thence connects, by the wire 68 with the wire 64. The wires 65 and 67 are connected to the two poles of the motor field 33.

In the normal position of the parts shown in the drawing, the circuit of the field and armature of the motor is open in two places, because the heads 50 and 51 are midway between, and disconnected from, both their pairs of contacts; the solenoid 48 is ready for operation, to shift the frame 45, as soon as the bridge 21 changes from the contacts 13 to the contacts 14; the reverse indicating circuit 60 is broken at the switch, but is made as soon as the switch has made its complete movement; the normal indicating circuit is broken at the operating station, so that both indicating circuits are broken; the reverse operating circuit is broken at the contact 14 at the operating station, and is also connected through the contacts 11 and bridge 20 at the terminals of said circuit with the same pole (negative) of the source of electrical energy. The normal operating circuit is broken at the contacts 43 at the switch.

If it is desired to reverse the switch, the lever 1 is moved toward the left, forcing the roller 8 down the slot 5, and permitting the movement of the lever until the stop face at the right hand end of the slot 7 strikes said roller. At this point the lever can move no farther, until the indicator operates, and lifts the roller away from said stop face. In this position the operating circuit is set up from the positive common 56, wire 61, contacts 14, and bridge 21, reverse operating wires 63, solenoid 48, contacts 44 to the negative common 57. This attracts the solenoid core 46 and shifts the frame 45, so that the heads 50 and 51 complete the circuits through the contacts 52 and 54 and then the motor circuit is completed through the wire 67, contacts 52, field 33, wire 65, contacts 54, wire 66, armature 34, connecting device or clutch 35, wire 68 and wire 64, to the negative common 57. This actuates the motor and shifts the switch to its reverse position, thus shifting the striker 38, so that it hits the end of the frame 45 when the switch has been fully shifted, shifts the heads 50 and 51, breaks the circuits through the contacts 32 and 54, and brings the motor to rest. The same movement of the rod 36 shifts the bridge 37, so that at the end of the switch movement the contacts 42 are closed, and the reverse indicating circuit is set up from the negative common 57 through the wire 60, contacts 15, and bridge 22, indicator magnet 10, wire 58 and positive common 56, thus energizing the indicator magnet, raising the rod 9 and roller 8 along the slot 4 and producing an automatic movement of the indicator controller at the operating station by shifting the bridge 22 from the contacts 15 to the contacts 16, the circuit through which latter contacts has been broken at the switch at the contacts 41. The same movement of the frame 36 broke the circuit through the solenoid 48 at the contacts 44, at the end of the switch movement, and made the contact through the contacts 43 for the solenoid 49, but the circuit through said last mentioned solenoid has been broken at the contact 13, and is also through the contacts 12 and bridge 20 connected at both its terminals with the negative common 57, thus assuring security against a cross of the normal operating wire, until the lever is shifted at the operating station. If now it is desired to set the switch to normal, the lever is moved until the stop face at the left hand end of the slot 7 strikes the roller 8, shifts the operating bridge 21 from the contacts 14 to the contacts 13, energizes the solenoid 49, closes the contacts 53 and 55, and sends a current through the field 33 in the opposite direction to which said current flowed for setting the switch to reverse, and causes the rotation of the armature 34 in the opposite direction. The bridge 20 shifts from the contacts 12, but does not in the position just mentioned connect the contacts 11, nor is the bridge 22 moved from the contacts 16.

As soon as the motion plate and switch reach the normal position, the circuit through the solenoid 49 is broken at the contacts 43; and at the end of the switch movement the normal indicating contacts 41 are connected by the movement of the bridge 37. As soon as the switch and motion plate have reached their full normal position, the circuit is broken between the contacts 43; and striker 39 moves the frame 49 so that the heads 50 and 51 take their midway position above mentioned. The normal indicating circuit is made from the negative common 57, through the bridge 37 and contacts 41, wire 59, contacts 16, indicator magnet 10, wire 58, to the positive common 56, thus energizing said indicator magnet, attracting the armature and causing the roller 8 to rise from the stop face last mentioned, and into the slot 5, causing an automatic movement of the lever 1 and its connected parts, shift-

ing the indicator bridge 23 from the contacts 16 to the contacts 15 and completing the movement of the bridge 20 between the contacts 11, thus bringing all the parts to the position in which they were originally found, and completing the cycle of movement of the parts in setting the switch to reverse and replacing it to normal, giving indication of the completed movement of the switch to each position and automatically shifting contacts after the switch has completed the movement. This automatic movement occurs through the action of the indicator magnet 10, which, however, may or may not be used for an indicating purpose, and may be merely an operating means for making and breaking circuits automatically, after and immediately after the switch has completed a movement, either to normal or to reverse. Safety circuits for the reverse operating and normal operating wires are set up through the contacts 11 and 12, and the bridge 20 in connection with the wire 64, by connecting each terminal of the next operating circuit, to the same pole of the source of energy.

It will be noted that when the motor is at rest, the operating current is cut off from both sides of the field but is capable of being applied to the motor for producing a movement of the motor in either direction and at any position of the switch, although it is impossible for the lever to be set in a position not corresponding to the position of the switch. This produces a very flexible mechanism, enabling the operator to set and reset the switch at will, and without going through the complete cycle from the normal position of rest 1°, the reverse operating position 3°, the reverse position of rest 4°, the normal operating position 2°, to the normal position of rest 1° again. The double break of circuits at the motor operating switch or pole changer, prevents stray currents from actuating the motor and prevents any current from flowing back through the motor to either operating wire.

It is obvious that this invention is applicable to other railway traffic controlling devices than switches, such, for example, as signals, railway gates, bridges and bridge locks.

What I claim is:—

The combination of a movable railway traffic controlling device, a motor therefor, a source of electric energy, operating and indicating wires, a controller, means for reversing the connections of said motor for cutting off said motor and for making the indicating circuit from said source of energy comprising an electro-magnetic device in the operating circuit, a pole changing switch moved by said electro-magnetic device, means for cutting off the source of electric energy after indication, and means for causing the breaking of the indicator circuit after said magnet has broken the operating circuit.

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