No. 785,180. PATENTED MAR. 21, 1905.

F. C. NEWELL.

BRAKE SWITCH LOCKING DEVICE.

APPLICATION FILED MAR. 29, 1902.

Fig. 2.

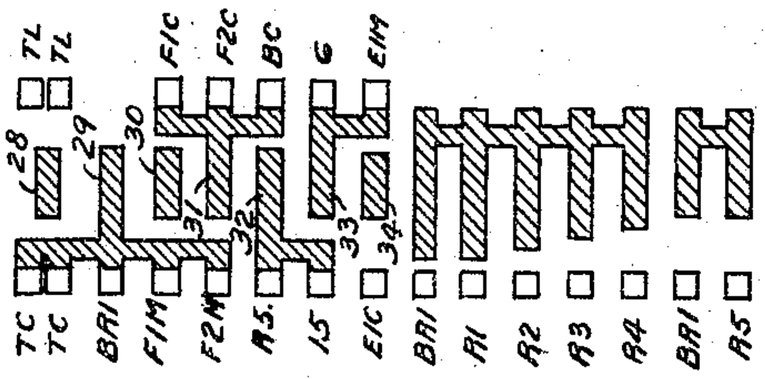

Fig. 1.

WITNESSES:

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Att'y.

No. 785,180. Patented March 21, 1905.

UNITED STATES PATENT OFFICE.

FRANK CLARENCE NEWELL, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE AIR BRAKE COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

BRAKE-SWITCH LOCKING DEVICE.

SPECIFICATION forming part of Letters Patent No. 785,180, dated March 21, 1905.

Application filed March 29, 1902. Serial No. 100,567.

To all whom it may concern:

Be it known that I, FRANK CLARENCE NEWELL, a citizen of the United States, residing in Wilkinsburg, county of Allegheny, State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Brake-Switch Locking Devices, of which improvement the following is a specification.

My invention relates to electric brakes for cars, and has for its object to provide a locking device for the brake-switch which will prevent an improper movement of the said brake-switch, or such a movement as to either make or break the line-circuit when the running-controller is not in its open or "off" position.

In the operation of electrically-propelled cars the supply of current from the line or source of supply to the motors is regulated by the running-controller, and a brake-switch is usually employed which when thrown to "braking" position is adapted to open the line-circuit and to connect up the motors to act as generators in a local brake-circuit. The running-controller is provided with a blow-out magnet for preventing injurious effects of the sparks at its contact-points; but the brake-switch is not usually so equipped, and in order to prevent sparking at the contact-points of the brake-switch it is necessary that said switch be thrown to make or break the line-circuit only when the running-controller is in its open position, at which time no current is flowing through the circuit. If, however, the brake-switch is free to be moved at all times, the motorman may accidentally or in a moment of excitement throw the brake-switch to open or close the line-circuit when the running-controller is not in its open or off position, and thus cause injurious sparking at the brake-switch contact-points.

This invention is devised to prevent the possibility of such improper movement of the brake-switch; and it comprises, broadly, an electrically-actuated locking device for preventing the movement of the brake-switch to open or close the line-circuit when the running-controller is not in its open position.

It also comprises certain novel combinations, all as hereinafter more fully described, and set forth in the claims.

In the accompanying drawings, Figure 1 is a diagram illustrating an application of my invention to an equipment comprising two motors, a running-controller, and a brake-switch, the running-controller being shown in open position and the brake-switch in running position. Fig. 2 is a diagram of the brake-switch, showing the arrangement of the contact-points when the switch is in position for braking.

While my invention is adapted to be used in connection with various forms of running-controllers and brake-switches, I have shown it applied in connection with a well-known form of series-parallel controller C, reversing-switch D, and brake-switch B—such as shown, for instance, in my prior patent, No. 675,667, of June 4, 1901, or in my prior application, Serial No. 15,348, filed May 3, 1900.

The parts which relate directly to my present invention comprise the shunt-circuit S, one end of which is connected to the line between the trolley T or other source of supply, and the brake-switch and the other end is connected to the terminal of the line E′ at the cut-out switch W in the base of the running-controller. In the shunt-circuit is located a solenoid or electromagnet-coil M, having a core or armature L, adapted to be drawn into notches of the locking device by the current passing through the shunt-circuit and to be withdrawn from said notches by means of a spring N when there is no current flowing in the shunt-circuit. The part P in which the notches K K′ are located may be the shaft of the brake-switch or any member connected to move therewith.

I have merely indicated diagrammatically one form of electrically-actuated locking device, since it is obvious that my invention is not limited to any specific form; but covers, broadly, any such locking device adapted to be actuated by the current in the shunt-circuit.

It will not be necessary to describe the course of the current in the motor-circuits,

corresponding with the operation of the motors in running and in braking, as such action is well understood in the art, and therefore only so much of the operation will be referred to as is necessary to show the corresponding action of the current in the shunt-circuit.

When the brake-switch is in the position for running, as shown in Fig. 1, with the reversing-switch set forward and the running-controller is moved to any of its series positions, it will be observed that the bars 19^a and 20 will cross-connect the contact-fingers E′ and 15, so that while the main current is flowing to the motors through the usual connections a small current also flows through the shunt-circuit S, wire E′, contact-bars 20 and 19^a on the controller, lead 15, contact-bar 2 on the reversing-switch, lead A^2, through the armature of No. 2 motor, lead A A^2 to contact-bar 1 on the reversing-switch, leads F^2 and F^2 C to contact-bar 31 on the brake-switch, lead F^2 M, and through the field of No. 2 motor to the ground G. It will thus be seen that the current in the shunt-circuit joins that of the main circuit on the lead E′ and flows through the same course therewith to the ground. If the running-controller should be moved to one of its multiple positions, the contact-bars 26 and 27 would cross-connect leads E′ and G, thus giving the shunt-circuit a direct and independent ground connection. It will therefore be seen that when the brake-switch is in running position and the controller is in any position except its open position the shunt-circuit is complete and a sufficient current will flow therethrough to draw the core or latch L into the notch K and prevent the movement of the brake-switch to open the line-circuit.

When the running-controller is in its open position, as indicated in the drawings, the shunt-circuit is broken, so that the solenoid is not energized, and the latch is withdrawn from the notch by means of the spring N, thus leaving the brake-switch free to be moved. If then the brake-switch is thrown to braking position, as shown in Fig. 2, the line-circuit is opened between the leads TL and TC, and the motors are connected up to operate as generators in the local brake-circuit, including the brake magnet-coils H H, while a further movement of the brake-switch may serve to vary the resistance in said brake-circuit, all of which is well understood by those familiar with the art and needs no further explanation. The latch L is now opposite the elongated notch K′, and if the running-controller should accidentally be moved from its open or off position the shunt-circuit would be closed through lead E′, contact-bars 20 and 19^a, lead 15 to contact-bar 32 on the brake-switch, lead R^5, through the resistance to lead BR^1, to contact-bar 29 on the brake-switch, lead F^2 M, and through the field of No. 2 motor to the ground G. It will be noticed that this current joins the braking-current from motor No. 2 on the lead 15 and contact-bar 32 and flows along therewith in the same direction through the field of No. 2 motor. If the running-controller should be accidentally moved to one of its multiple positions, the shunt-circuit would be connected directly to the ground through lead E′ and contact-bars 26 and 27, as before described. It will therefore be seen that if during braking the running-controller be accidentally moved from its open position the shunt-circuit will be completed to ground, thus drawing the latch L into the notch K′ and making it impossible to throw the brake-switch back to running position and close the line-circuit until the running-controller is restored to its open position.

By means of my improvement all injurious sparking at the brake-switch is prevented.

It is of course obvious that other contact-points for the shunt-circuit and operated by the movement of the running-controller could be used in place of those shown, although the latter arrangement is preferable, since it dispenses with the use of any additional contacts or switches and produces a locking device which may be readily applied to any of the ordinary forms of equipment now in use.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a running-controller and a brake-switch, of an electrically-actuated locking device for preventing the movement of the brake-switch from its running position when the controller is not in its open position.

2. The combination with a running-controller and a brake-switch, of an automatic electrically-actuated locking device for preventing the brake-switch from being moved to either make or break the line-circuit when the running-controller is not in its open position.

3. The combination with a running-controller and a brake-switch adapted to make and break the supply-circuit to said controller, of an electrically-actuated locking device, operated by the movement of the running-controller, for preventing the movement of the brake-switch to break the supply-circuit when the controller is not in its open position.

4. The combination with a running-controller and a brake-switch, of an electrically-actuated locking device and means operated by the running-controller when moved to any other than its open position for actuating said device.

5. The combination with a running-controller and a brake-switch adapted to make and break the supply-circuit, of a shunt-circuit around the brake-switch, a locking device actuated by said shunt-circuit, and means operated by the running-controller for making and breaking the shunt-circuit.

6. The combination with a running-controller and a brake-switch, of a shunt-circuit around the brake-switch and electrically connected to one of the contact-fingers of the running-controller, and an electrically-actuated locking device located in the shunt-circuit.

7. The combination with a running-controller and a brake-switch adapted to make and break the supply-circuit to said running-controller, of a circuit independent of the brake-switch, an electrically-actuated locking device located in said independent circuit, and means operated by the running-controller for opening and closing said circuit.

8. The combination with a running-controller and a brake-switch of an electric locking device actuated by current from the line for preventing the movement of the brake-switch from its running position when the running-controller is in one of its live positions.

9. The combination with a running-controller and a brake-switch of a locking device for the brake-switch, electromagnetic means for actuating said lock and means operated by the movement of the running-controller for controlling said electromagnet.

In testimony whereof I have hereunto set my hand.

FRANK CLARENCE NEWELL.

Witnesses:

R. F. EMERY,

JAS. B. MACDONALD.