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F. A. MERRICK & J. D. FORRER.

OPERATING MECHANISM FOR MOTOR CONTROLLERS.

(Application filed Feb. 12, 1901.)

(No Model.)

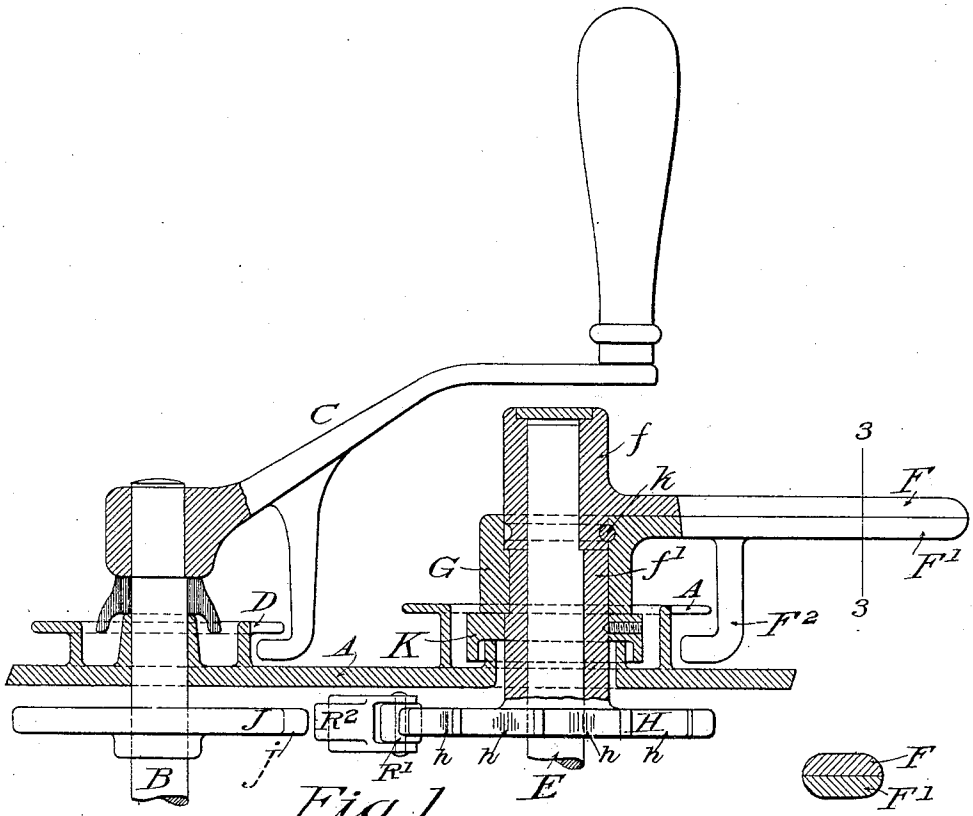


Fig. 1.

Fig. 3.

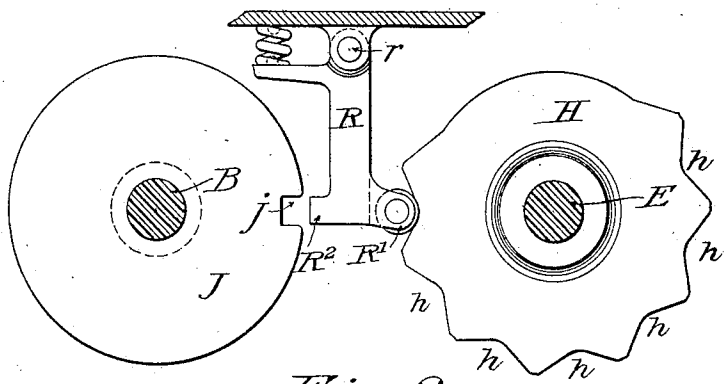


Fig. 2.

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UNITED STATES PATENT OFFICE.

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OPERATING MECHANISM FOR MOTOR-CONTROLLERS.

SPECIFICATION forming part of Letters Patent No. 708,724, dated September 9, 1902.

Application filed February 12, 1901. Serial No. 47,029. (No model.)

To all whom it may concern:

Be it known that we, FRANK A. MERRICK and JOSEPH D. FORRER, of Johnstown, in the county of Cambria and State of Pennsylvania, have invented a new and useful Improvement in Operating Mechanism for Motor-Controllers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

Our invention has relation to operating mechanism for electric-motor controllers, and is designed to provide against the improper operation of the reverse-switch of the controller by making it inconvenient for the motorman to operate said switch unless the regulating-switch is at its off position. Although subject to such inconvenience the reverse-switch may be operated at any time and in all positions of the regulating-switch.

With this object in view our invention consists in a reverse-switch handle composed of two complementary parts or members, both of which must be grasped by the motorman for convenient operation of the switch, although the latter may with inconvenience be operated by one part or member only, in combination with means controlled by the regulating-switch, whereby the other part or member cannot be moved unless the regulating-switch is at its off position.

Our invention also consists in the novel construction and combination of parts, all as hereinafter described, and pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section through the upper portion of a motor-controller of the general type commonly used on electric-railway cars; Fig. 2, a plan view of a portion of the operating mechanism, and Fig. 3 a section on the line 3 3 of Fig. 1.

The letter A designates the top of the controller-casing; B, the shaft for the regulating-switch, and C the removable handle therefor. D is a guard-flange for preventing removal of the said handle except when the latter is at its off position.

E is a shaft of the reversing-switch. The handle for this switch is composed of the two members F F′, which when fitted together in the manner shown form a hand-grasp portion of the same cross-section as that of the handles usually employed on such switches. The upper section F of this handle is squared onto or otherwise engaged with the shaft E by means of a hub portion *f*, and the lower member F′ has a hub or sleeve portion G, which is rotatably engaged with a sleeve *f*′, which is loosely mounted on the said shaft and which carries at its lower end, within the upper portion of the controller-casing, a plate or disk H, having therein a series of peripheral notches *h*, one for each position of the reverse-switch.

R is a pawl-lever pivoted at *r* within the controller-casing and having at its free end an antifriction-roller R′, arranged to engage the notches of the disk H, and also a toe or lug R^2, whose end is adjacent to the path of movement of a disk or plate J, which is rigidly secured to the shaft B. This plate or disk J has a single peripheral notch or recess *j*, which is so disposed that when the regulating-switch is at its off position it will be adjacent to and opposite the said toe or lug R^2.

The lower member F′ of the reverse-switch handle has a depending arm F^2, which engages a guard-flange A′ on the controller-casing to prevent the removal of the handle except when the reverse-switch is at its off position.

K designates a water-guard which is secured to the sleeve *f*′.

For the purpose of connecting the two handle members so that they will be removed from the switch as one piece and at the same time to permit independent movement of the upper member we have shown the two members connected by a pin *k*, which is seated partly in an interior groove of the hub portion of the lower section and partly in an exterior annular groove of the upper section. This pin may, however, be omitted and the sections be made separately removable.

The operation of the device is as follows: When the regulating-switch is at its off position, both members of the reverse-switch handle can be freely rotated together, thereby turning the said switch, by reason of the fact that the toe or lug of the pawl-lever R can move back into engagement with the notch or recess in the plate or disk J. If, however, the regulating-switch has been moved from its off position and occupies any other position in the range of its movement, the pawl cannot be disengaged from the notch of the plate H by reason of the fact that the toe or lug R^2 will impinge against the edge of the plate or disk J. Consequently the lower section of the handle cannot be turned, and in order to operate the reverse-switch under these conditions it will be necessary for the motorman to use only the upper section F of the handle. Owing to the shape of the same and the manner in which the two sections fit together, as shown in Fig. 3, this will be an inconvenient operation and will not be practiced. In case the pin *k* is omitted the reverse-switch may also be operated at any time by raising the upper handle-section a short distance away from the lower one, in which position it can be readily grasped and turned. This, however, is equally as inconvenient as the other method and will not be practiced. Consequently the motorman when he desires to operate the reverse-switch will first move the regulating-switch to its off position and then move the reverse-switch.

It will be observed that by the use of our invention, as above described, the reverse-switch is at no time locked or prevented from being operated, subject to the inconvenience described, and which is such as to prevent in practice any improper operation. An advantage of leaving the reverse-switch free at all times is that under certain emergency conditions it may be necessary or desirable to move the said switch although the regulating-switch is not at off position. Such a condition would arise, for instance, when for any reason the regulating-switch should become inoperative in such a way that it could not be moved back to its off position. In such an emergency the motorman, if the reverse-switch be free to move, as herein described, can first open the canopy-switch on the car, then reverse his motors and close the canopy-switch, and thus run back to the car-barn for repairs.

We do not wish to limit ourselves to the particular construction, combination, and arrangement of parts which we have herein shown and described, as it is obvious that the details may be changed in various ways without departing from the spirit and scope of our invention as set forth in the following claims.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a controller for electric motors, the combination with a regulating-switch and a reversing-switch, of a handle for the reverse-switch composed of two complementary members, one of which has an operative engagement with the reverse-switch shaft, and the other of which is loose with respect to said shaft, and means controlled by the regulating-switch for preventing movement of the loose member in certain positions of the regulating-switch.

2. In a controller for electric motors, the combination with a regulating-switch and a reversing-switch, of a two-part handle for the reversing-switch, one part of which is operatively engaged with the switch-shaft, and the other of which is loose with respect to said shaft, and means for locking the loose part except when the motor-circuit is opened at the regulating-switch.

3. In a controller for electric motors, a reverse-switch handle composed of two members, one of which is operatively engaged with the reverse-switch shaft, and the other of which is loose with respect to said shaft, and means for locking the loose member under certain circuit conditions.

4. In a controller for electric motors, the combination with a regulating-switch and a reversing-switch, of a handle composed of two complementary members, one of which has a rotative engagement with the shaft of said reversing-switch, a sleeve loosely mounted on said shaft, and with which the other member of said handle has a rotative engagement, and means controlled by the regulating-switch for locking the said sleeve against movement on said shaft unless the regulating-switch is at its open-circuit position.

5. In a controller for electric motors, the combination with a regulating-switch and a reversing-switch, of a handle for the reversing-switch composed of two members, only one of which has an operative engagement with the switch-shaft, and means for locking the other of said members against movement except when the regulating-switch is at its off position.

6. In a controller for electric motors, the combination with a regulating-switch and a reversing-switch, of a handle for the reversing-switch composed of two complementary members, one of which is rotatively engaged with the switch-shaft, a sleeve loosely mounted on said shaft and to which the other handle is rotatably connected, a notched plate or disk carried by said sleeve, a pawl device engaging said plate or disk, and means carried by the regulating-switch for preventing the disengagement of the said pawl device except when the regulating-switch is at its off position.

7. In a controller for electric motors, the combination with a reverse-switch, of a handle therefor composed of two complementary members, one of which is rotatively engaged with the shaft of said switch, a sleeve loosely mounted on said shaft and carrying the other member of said handle, means for locking the

said sleeve unless the motor-circuit has first been opened at the regulating-switch of the controller, and means for preventing removal of the said handle except when the reverse-switch is at its off position.

8. The combination with two related electric switches, of a handle for one of said switches composed of two complementary members, one of which is rotatively engaged with the shaft of that switch, and the other of which is locked to the other switch except when the latter is at its open-circuit position.

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

FRANK A. MERRICK.
JOSEPH D. FORRER.

Witnesses:
CORA G. COX,
H. W. SMITH.