A. J. LOGUIN.

MOTOR CONTROLLER.

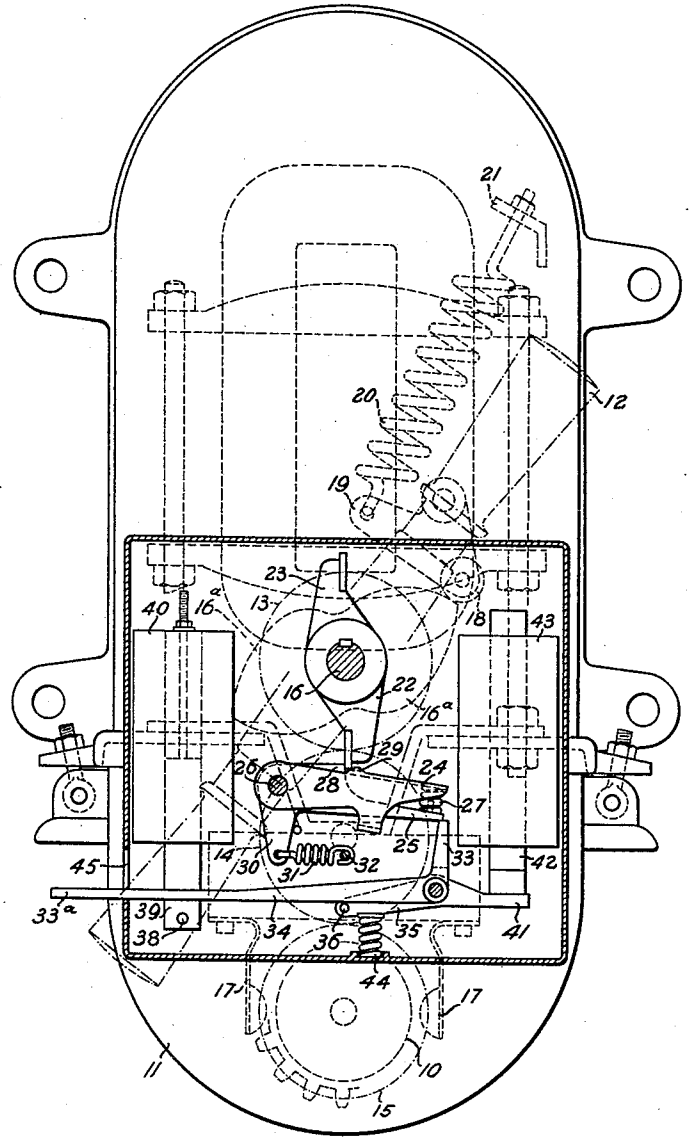
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3 SHEETS—SHEET 1.

Fig. 1



Witnesses

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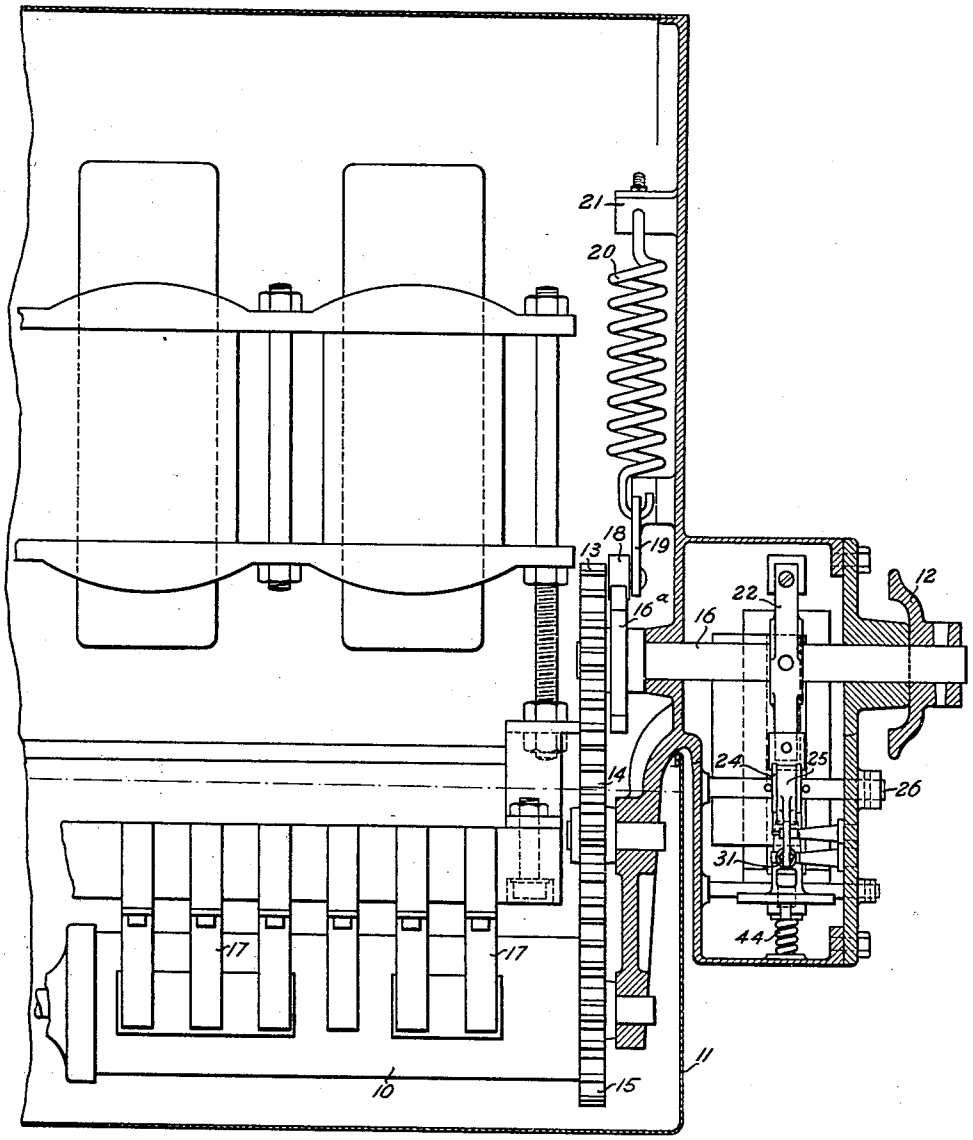
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3 SHEETS-SHEET 2.

Fig. 2



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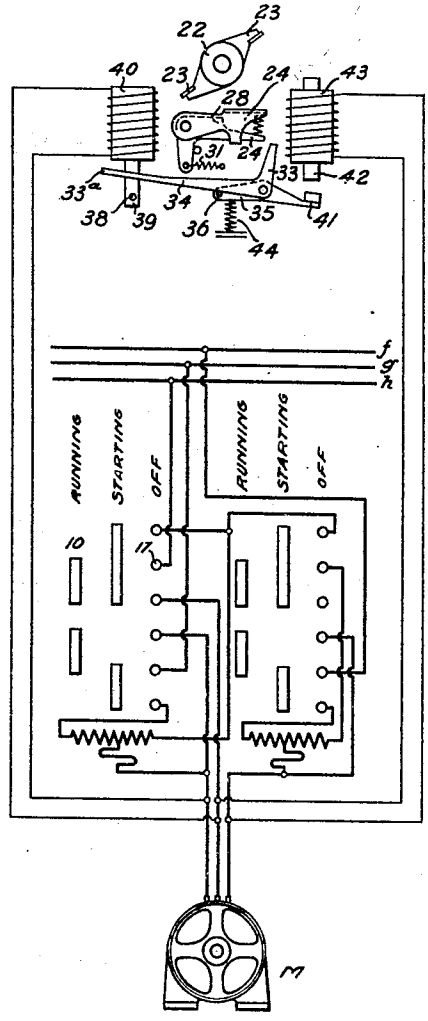
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3 SHEETS—SHEET 3.

Fig. 3



Witnesses

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MOTOR-CONTROLLER.

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Application filed March 27, 1911. Serial No. 617,212.

To all whom it may concern:

Be it known that I, ALEXANDER J. LOGUIN, a subject of the Czar of Russia, residing at West Allis, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Motor-Controllers, of which the following is a full, clear, and exact specification.

This invention relates to controllers for electric motors, and more particularly to protective devices therefor.

In operating starting devices for some types of motors, especially potential starters for induction motors, it is often undesirable that the controller be moved backward from a running position to a starting position. To this end controllers have been designed which move directly from the running position to the off position without passing through the starting positions. Controllers or potential starters have also been designed for preventing the controller from moving backward from an off position directly to a running position, and also for rendering it impossible for the operator to leave the controller in a starting position, arrangements being provided for automatically moving the controller backward to off position if it is released by the operator while it is in a starting position. It may also sometimes be desirable to have means whereby such a controller may be automatically moved forward from running position to off position in case abnormal conditions, such as "no-voltage" or an overload, arise.

It is the object of the present invention to improve controllers embodying the above enumerated desirable means for the various purposes set forth.

The various novel features of this invention will be described in the following specification and particularly set forth in the appended claims.

The invention is illustrated in the accompanying sheets of drawings, in which—

Figure 1 is an end elevation, partially in section, of a potential starter equipped with my invention; Fig. 2 is a side elevation, parts being in section, of that shown in Fig. 1; and, Fig. 3 shows a diagram of the electrical connections.

The details of the starting controller proper will not be described herein as they form no part of the present invention and are unnecessary to an understanding thereof.

A three-phase induction motor M is here shown and is supplied with current, through a suitable operating drum 10 and contact fingers 17 coöperating therewith, from three-phase mains *f*, *g*, and *h*. The controller drum 10 is designed to make the proper connections for starting an electric motor in any desired manner, the particular drum shown being designed for starting a polyphase induction motor by means of auto-transformer windings. The controller drum 10 which is immersed in oil in the oil tank 11, is moved by the operating handle 12 acting through gear wheels 13, 14, and 15, and a shaft 16. The opposite halves of the controller drum are identical in structure. Each half coöperates in turn with each of the two sets of contact fingers 17 during successive operations of the controller, the sets of contact fingers being on opposite sides of the drum. The normal operation of the drum is continuously in the same direction, which is clockwise in the arrangement shown.

Mounted on the shaft 16 is a cam 16ª which is adapted to be engaged by a roller 18 secured in a spring-pressed lever 19, the spring 20 having its ends connected respectively to the lever 19 and a portion 21 of the controller casing. This arrangement forms a handle returning device which biases the movable member of the controller in one direction when on one side of running position and in another direction when in running position or on the other side thereof. Also mounted upon the shaft 16 is a dog 22 provided with two projecting portions 23 adapted to engage latches 24 and 25 for normally retaining the rotatable member or drum 10 of the controller in running position, as shown in Fig. 1. These coöperating latches 24 and 25 are pivotally mounted upon a common support 26 and are normally biased away from each other by an energy storing member or spring 27 which is located between said latches. One of the latches 25 is provided with a projection 28 against which the dog is pressed when in running position, and due to the engagement between said projection and dog it is impossible, under normal operating conditions, for the dog to be released to permit the con-

troller to move into off position. The other latch 24 is provided with a projection 29 which prevents the dog, when the controller is in running position, to move in a counter-clockwise direction, thus preventing the controller from moving from a running position through a starting position. The latch 25 is provided with an arm 30 to which is secured one end of a spring 31, the other end of which is secured to any convenient portion of stud 32 on the frame. This spring 31 holds the latch in such a manner as to retain, under normal operating conditions, the projection 28 in the path of the dog 22.

When in running position, as shown in Fig. 1, one arm 33 of a tripping member 34 engages and supports the latch 25 assisting the spring 31 in holding the projection 28 against one of the engaging projections of the dog 22. The other arm 33[a] of the tripping member 34 is located in the path of a stud 38 of the core 39 of an overload magnet 40. Another member 35 having a pin 36 which engages the arm 33[a] of the tripping device has an armature portion 41 which is normally held in engagement with the core 42 of a no-voltage magnet 43. The strength of the no-voltage magnet is sufficient, under normal operating conditions, to overcome the action of a spring 44 which acts in opposition to the current in the no-voltage magnet.

As the controller is moved from off position to running position, one of the projections 23 of the dog 22 presses against the upper surface of the latch 24, forcing the co-operating latches 24 and 25 closer together, and storing energy in the spring 27 interposed between said latches. When the controller has been moved into full running position, the dog 22 engages the projection 28, and latch 25 is retained in its locking position under normal operating conditions, with maximum energy being stored in the spring 27. If, when the controller is in this running position, an overload should occur on the circuit, core 39 of the overload magnet will be actuated and the pin 38 forced into contact with the arm 33[a], releasing the tripping member 33. Due to the energy stored in the spring 27, latch 25 will be actuated, drawing the projection 28 out of engagement with the dog 22, thus permitting the movable member of the controller to move forward into off position. If, when the controller is in running position, "no voltage" conditions in the circuit arise, the energy of spring 44 will force the tripping member, which is engaged by the member 35, out of engagement with the latch 25 with the same result. It is therefore seen that the controller can be automatically moved to off position when in running position upon the occurrence of all abnormal conditions on the circuit. The tripping member 33 can also be manually released, thereby permitting the controller to move into off position. This manual operation is effected by making the arm 33[a] long enough so that it will extend through an opening 45 in the casing of the controller.

It is evident that there may be many modifications in the precise form and arrangement herein shown and described, and I aim to cover all such modifications which do not involve a departure from the spirit and scope of my invention as set forth in the appended claims.

What I claim as new is:

1. In a controller, a movable switch member, a member movable therewith, a latch adapted to prevent movement of said second mentioned member, and another latch relatively movable to said first latch and tending to render said first latch ineffective to permit movement of said members.

2. In a controller, a movable switch member, a member movable therewith, a latch adapted to prevent movement of said members, a spring-pressed latch separated from the first latch and tending to render said first latch ineffective to permit movement of said members, and means for rendering said second latch effective.

3. In a controller, a movable switch member, a member movable therewith, a latch adapted to prevent movement of said members, and a coöperating relatively movable latch separated from said first latch and tending to render said first latch ineffective, and manually operated means for rendering said second latch effective for releasing said movable members.

4. In a controller, a movable switch member, a member movable therewith, a latch adapted to prevent movement of said members, and a coöperating relatively movable latch separated from said first latch and tending to render said first latch ineffective, and automatically operated means for rendering said second latch effective for releasing said movable members.

5. In a controller, a movable switch member, a member movable therewith, a latch adapted to prevent movement of said members, and a coöperating latch separated from said first latch and tending to render said first latch ineffective, and means responsive to a reduction in voltage below a predetermined value for rendering said second latch effective for releasing said movable members.

6. In a controller, a movable switch member, a member movable therewith, a latch adapted to prevent movement of said members, and a coöperating latch separated from said first latch and tending to render said first latch ineffective, and means responsive to overload for rendering said second latch effective for releasing said movable members.

7. In a controller, a movable switch member, a member movable therewith, a latch adapted to prevent movement of said members, and a coöperating latch separated from said first latch and tending to render said first latch ineffective, and means responsive to abnormal circuit conditions for rendering said second latch effective for releasing said movable members.

8. In a controller, a movable switch member, a supporting member, a latch pivotally mounted on said supporting member and being adapted to normally hold said movable switch member in an operative position, and a second latch also pivotally mounted on said support and being adapted under certain conditions to render said first latch ineffective to permit said switch member to move into another position.

9. In a controller, a movable switch member, a supporting member, a latch pivotally mounted on said supporting member and being adapted to normally hold said movable switch member in an operative position, a second latch also pivotally mounted on said support and being adapted under certain conditions to render said first latch ineffective to permit said switch member to move into another position, and means for rendering said second latch effective.

10. In a controller, a movable member biased backward to off position when in any starting position and when in running position biased forward to off position and being responsive to abnormal conditions in the circuit, means for normally locking the movable member in running position, said means including a plurality of relatively movable latches biased away from each other.

11. In a controller, a movable switch member, a latch adapted to hold said switch member in an operative position, another latch movable independently of and with respect to said first mentioned latch and tending to render said first latch ineffective, and means for rendering said second latch effective to permit said switch member to move into another position.

12. In a controller, contact fingers, a rotatable drum coöperating therewith, a shaft through which motion is given to said drum, a dog mounted on said shaft, a plurality of relatively movable latches normally biased away from each other, one of said latches being engaged by said dog to normally hold said controller in an operative position, and means for releasing said dog.

13. In a controller, a movable member biased in one direction when on one side of running position and in another direction when in running position or on the other side thereof, means including a plurality of latches normally biased away from each other and for locking the movable member of said controller in running position.

14. In a controller, a movable member biased in one direction when on one side of an operative position and in another direction when in said operative position or on the other side thereof, means including a plurality of coöperating latches normally biased away from each other and for locking the movable member of said controller in said operative position.

15. In a controller, contact fingers, a rotatable drum coöperating therewith, a shaft through which motion is transmitted to said drum, a dog mounted on said shaft, a plurality of pivotally mounted coöperating relatively movable members, a spring holding said members apart, one of said members being engaged by said dog to normally hold said drum in an operative position, a tripping member normally engaging one of said coöperating members, and means for releasing said tripping member for releasing said dog.

16. In a controller, a movable member movable from running position to off position without passing through starting position, means including a plurality of coöperating latches normally biased away from each other and for locking the movable member of said controller in running position.

17. In a controller, a movable member movable from running position to off position without passing through starting position, means including a plurality of cooperating latches held apart by a spring for locking the movable member of said controller in running position, and means for tripping said locking means.

Milwaukee, Wis., March 22, 1911.

In testimony whereof I affix my signature, in the presence of two witnesses.

ALEXANDER J. LOGUIN.

Witnesses:

CHAS. L. BYRON,

ROB. E. STOLL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."