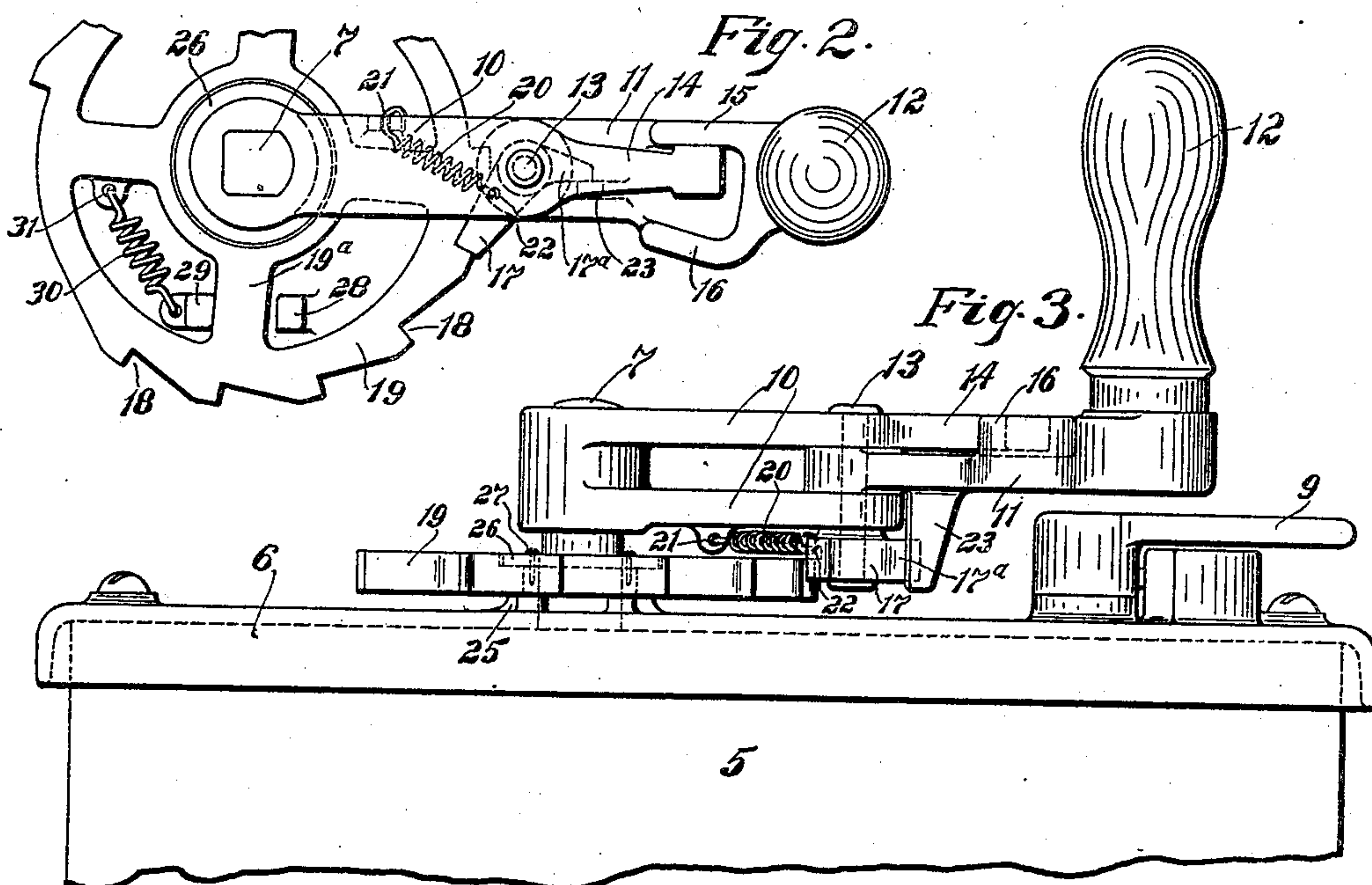
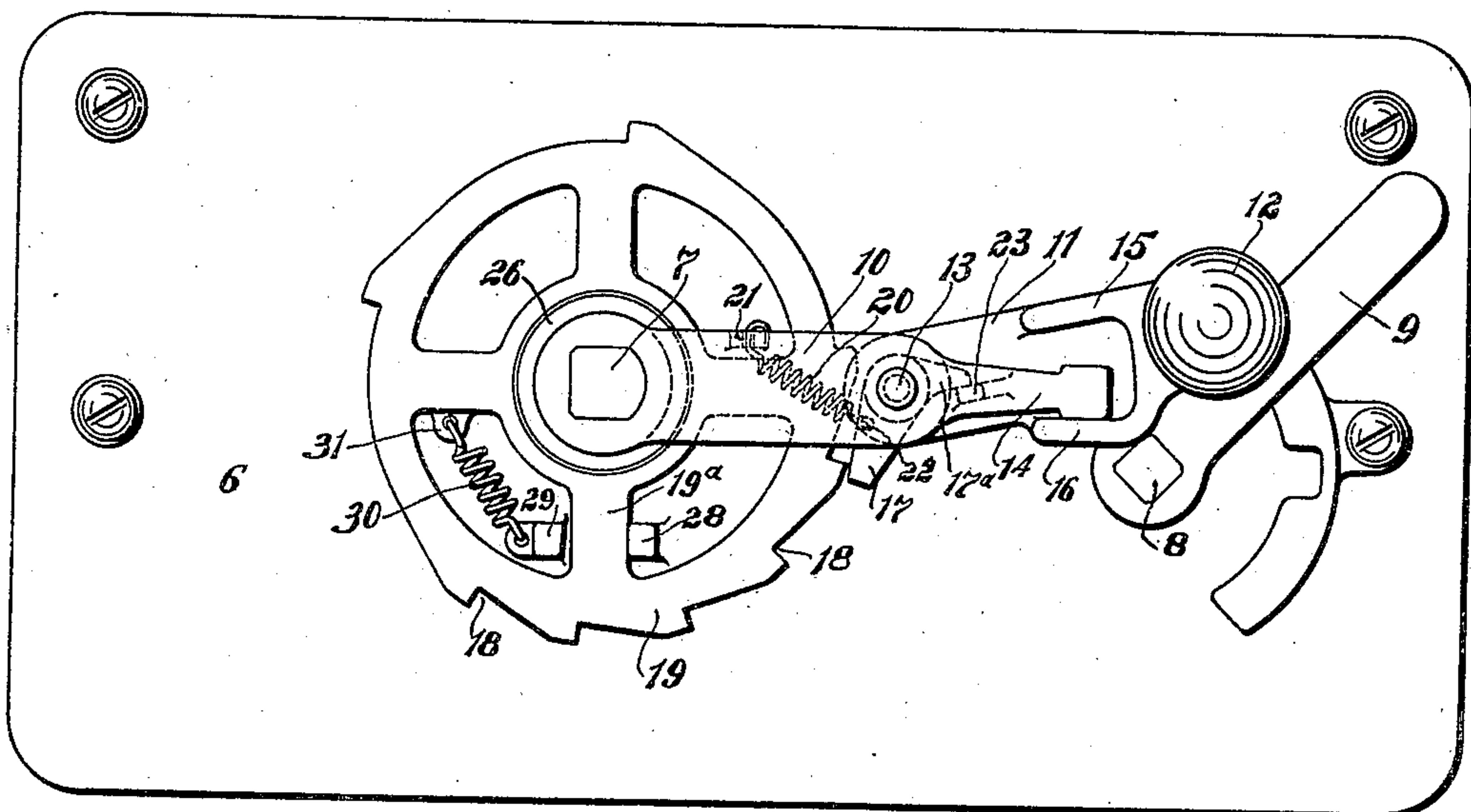


E. W. STULL.  
 CONTROLLER HANDLE.  
 APPLICATION FILED JUNE 22, 1905.

934,232.

Patented Sept. 14, 1909.

Fig. 1.



Witnesses:

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By

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# UNITED STATES PATENT OFFICE.

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## CONTROLLER-HANDLE.

934,232.

Specification of Letters Patent. Patented Sept. 14, 1909.

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*To all whom it may concern:*

Be it known that I, EMMETT W. STULL, citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Controller-Handles, of which the following is a full, clear, and exact specification.

My present invention relates to improvements in the operating means of electric motor controllers, particularly such as are adapted for use in connection with electric railway equipments.

The object of my invention is to produce a positive step-by-step movement of the controller so as to prevent a too rapid supply of current to the motor or motors controlled thereby; to protect the motor or motors against overload; and to prevent an unnecessary waste of current in starting the motor or motors.

The invention therefore consists of a controller handle carrying a pawl which is adapted to engage a notched member such as a quadrant or circular rack, together with means for causing said pawl to engage one of the notches of said member when the handle is moved forward and for releasing said pawl from said notch when the handle is moved a short distance backward.

The invention further consists of improved details of construction and novel combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

In the accompanying drawings which illustrate the preferred embodiment of my invention, Figure 1 is a top plan view of a controller equipped with my improved controlling handle; Fig. 2 is a plan view of the handle, showing same in a different operative position; and Fig. 3 is a front elevation of the handle and part of the controller casing.

Referring now to the drawings, the controller casing 5 is provided with the cap plate 6 through which projects the upper ends of the main drum shaft 7 and the reversing switch shaft 8. The latter shaft is provided with the customary operating handle 9. The shaft 7, however, is provided with my improved handle for producing a positive step-by-step or notching-up movement of the main drum. This handle is so constructed and arranged that it insures a

gradual cutting out of the external resistance from the motor circuit, so as to permit the motors to speed up to such an extent that the proper counter-electro-motive force is generated thereby before the next step of external resistance is cut out. This arrangement protects the motors against damage due to current overloads, and also effects an economy in the operation of the system by preventing an unnecessary waste of current in starting the motor or motors.

The operating handle for the main drum comprises the bifurcated arm 10 fixed on the end of shaft 7, and the arm 11 movable relative to arm 10 and carrying the knob 12 adapted to be grasped by the operator. The arm 11 is pivoted on the stud 13 carried by the bifurcated arm 10 and is limited in its movements relative to said arm 10 by the projection 14 carried by said arm 10 and playing between the flanges 15 and 16 formed upon the upper part of the arm 11. Pivotaly mounted upon the lower end of stud 13 is a pawl 17 which is adapted to engage the notches 18 in the notched member or circular rack 19, said notches corresponding to the operative positions of the controller. The pawl 17 is normally maintained in engagement with said member 19 by the spring 20, one end of which is attached at 21 to the arm 10 of the operating handle and the other end of which is attached to the pawl at 22. Said pawl has formed thereon the projection 17<sup>a</sup> which lies in the path of the lug 23, carried by the arm 11. This projection and lug constitute the means for releasing the pawl from the notched member when the handle is moved slightly backward or in a counter-clock-wise direction. To prevent the pawl from engaging the same notch from which it has been released when the handle is again moved forward, I preferably make the notched member 19 movable between predetermined limits. Said member is here shown as rotatably mounted concentrically about the shaft 7, being held in place on a bushing 25 by means of the washer 26 fastened to said bushing by screws 27. The notched member is limited in its movements by the arm 19<sup>a</sup> which plays between the lugs 28 and 29 carried by the cap plate 6. The member 19 is normally maintained in the position shown in Fig. 1 with its arm 19<sup>a</sup> against the lug 28, by means of the spring 30 one end of which is fastened to the lug 29 and the other



end of which is fastened to the member 19 at 31.

In the operation of my improved controlling handle, when the knob 12 is grasped by the operator and the handle is moved in a clock-wise direction, the flange 15 is moved into engagement with projection 14 and the movement is transmitted to the shaft 7 through arm 10. During this forward movement the pawl 17 is drawn into one of the notches 18 of member 19 by spring 20, and said member is moved forward against the action of spring 30 until arrested by lug 29. The parts are then in the position shown in Fig. 2, and a further forward movement is prevented until the pawl is released. A slight backward movement of the handle is sufficient to release said pawl. During this slight backward movement the lug 23 engages the projection 17<sup>a</sup> and rotates the pawl on stud 13 against the action of spring 20. Just the instant the pawl is released from said notch the member 19 is moved under the influence of its spring 30 to its initial position as shown in Fig. 1. It will thus be seen that as the handle is again moved forward the pawl 17 is prevented from moving into the notch from which it has just been released and the controller handle will not be arrested until the notch corresponding to the next controller position is reached. The slight backward movement of the controller handle is accomplished without moving the controller drum. The teeth on the notched member 19 are so constructed and arranged that they do not interfere with a free movement of the controller handle backward toward the "off" position. During this backward movement of the controller drum the flange 16 is in positive engagement with the projection 14 on arm 10.

In the appended claims I aim to cover all modifications and changes which do not involve a departure from the spirit of my invention.

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

1. In combination, a controller handle, a pawl carried thereby, a notched member with which said pawl engages, means for causing said pawl to engage one of the notches of said member when the handle is moved forward and for releasing said pawl from said notch when the handle is moved slightly backward, and means for moving said notched member a predetermined distance after the pawl has been released therefrom so as to prevent the pawl from engaging the same notch when the handle is again moved forward.

2. In a controller, a shaft, an operating handle therefor comprising an arm fixed upon said shaft and a second arm pivoted on the arm on said shaft and having a limited

movement relative thereto, a notched member, a pawl carried by said handle, means for moving said pawl into engagement with said member, means carried by the second arm for engaging said pawl and releasing same from said member when the second arm is moved relative to the arm fixed upon said shaft, and means for moving the notched member a predetermined distance after the pawl has been released therefrom to prevent said pawl from engaging the same notch in said member twice in succession.

3. In combination, a controller shaft, a controller handle, a pawl carried by said handle, a notched member rotatably mounted on said shaft, means for limiting the movement of said member, means for causing said pawl to engage one of the notches of said member and move the latter into one limit of its movement when the handle is moved forward, and means for releasing said pawl from said notch.

4. In combination, a controller shaft, a controller handle, a pawl carried by said handle, a notched member rotatably mounted on said shaft, means for limiting the movement of said member, means for causing said pawl to engage one of the notches of said member and move the latter into one limit of its movement when the handle is moved forward, means for releasing said pawl from said notch, and means for returning said member to the other limit of its movement when the pawl is released therefrom, thereby preventing said pawl from engaging the same notch when the handle is again moved forward.

5. In combination, a controller shaft, a controller handle, a pawl carried by said handle, a notched member rotatably mounted on said shaft, means for limiting the movement of said member, means for causing said pawl to engage one of the notches of said member and move the latter into one limit of its movement when the handle is moved forward, means for releasing said pawl from said notch, and a spring for returning said member to the other limit of its movement when the pawl is released therefrom, thereby preventing said pawl from engaging the same notch when the handle is again moved forward.

6. In combination, a controller handle, a pawl carried thereby, a member having a limited movement and arranged to be engaged by the pawl and moved to one of its limits of movement to stop the handle at a predetermined point in the forward movement of the latter, means for disengaging said pawl from said member by a movement of the handle, and means for returning said member to its other limit of movement.

7. In combination, a controller handle, a pawl carried thereby, a member having a



limited movement and biased to one of its limits of movement, said member being arranged to be engaged by the pawl and moved to its other limit of movement to stop the handle at a predetermined point in the movement of the latter, and means for releasing said pawl from said member by a backward movement of the handle.

8. In combination, a controller handle, a pawl carried thereby, a notched member having a limited movement and arranged to be moved to one of its limits of movement by having its notches engaged by the pawl at certain predetermined points in the movement of the handle, means for releasing the pawl from the notches by a movement of the handle, and means for returning said

notched member to its other limit of movement.

9. In combination, a controller handle, a pawl carried thereby, a notched member having a limited movement, said member being arranged to stop the handle at certain predetermined points in its movement by being moved to its other limit of movement through engagement of its notches with the pawl, and means for disengaging the pawl from the notches.

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

EMMETT W. STULL.

Witnesses:

L. LOWENBERG,  
FRED J. KINSEY.