C. P. EBERSOLE.

CONTROLLER REGULATOR.

APPLICATION FILED OCT. 11, 1906.

980,866.

Patented Jan. 3, 1911.

2 SHEETS—SHEET 1.

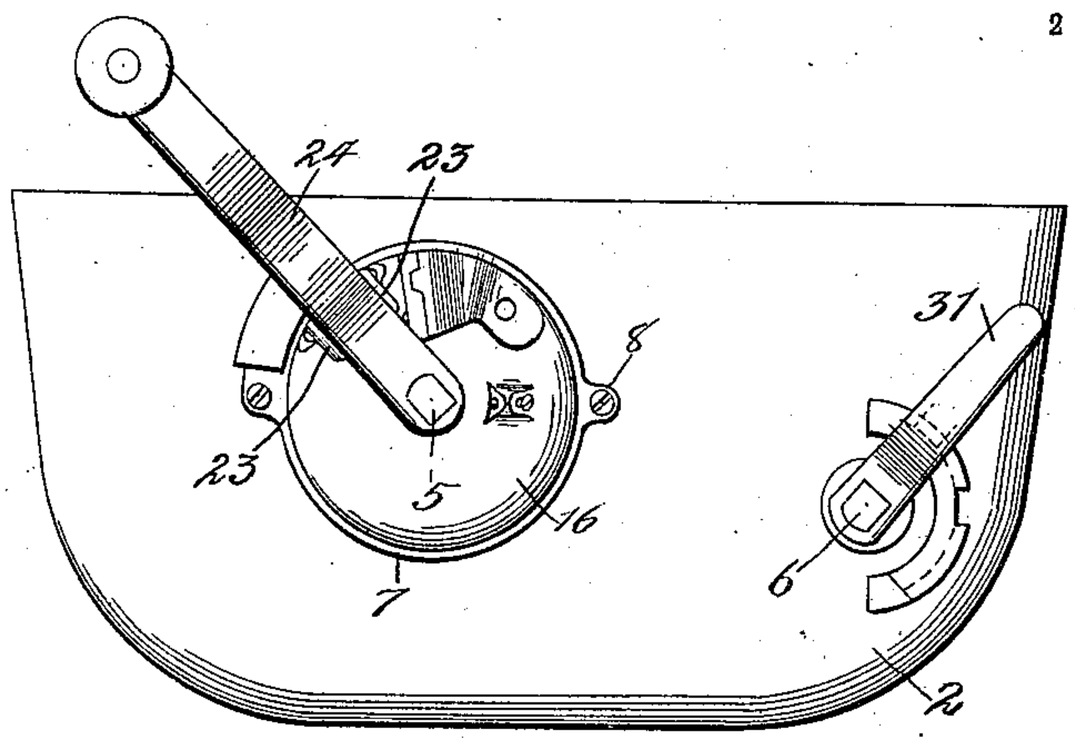

Fig. 1.

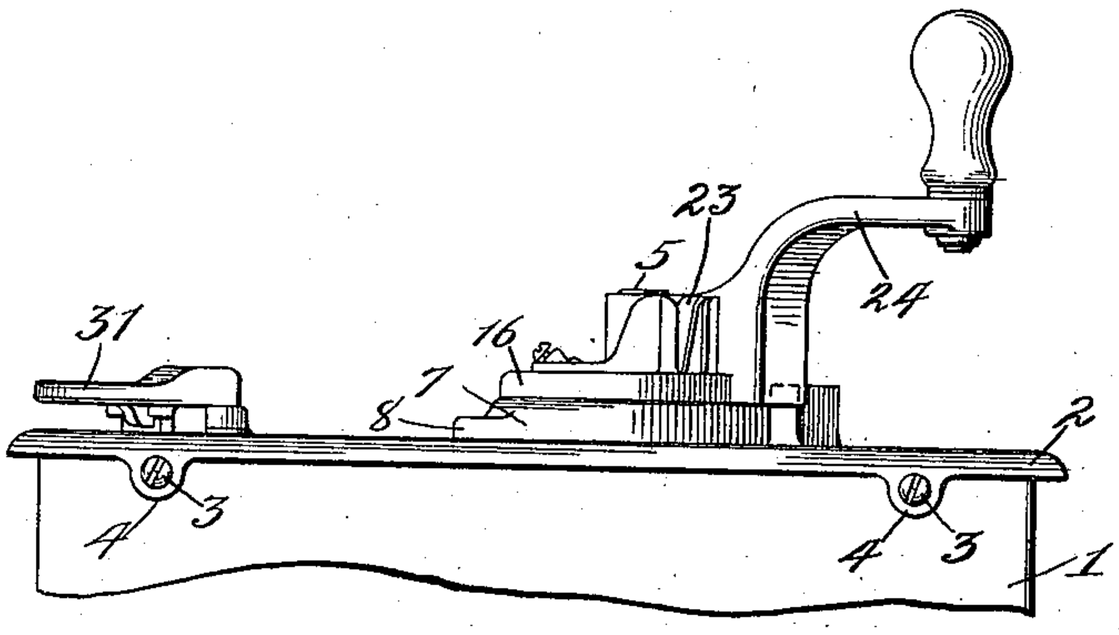

Fig. 2.

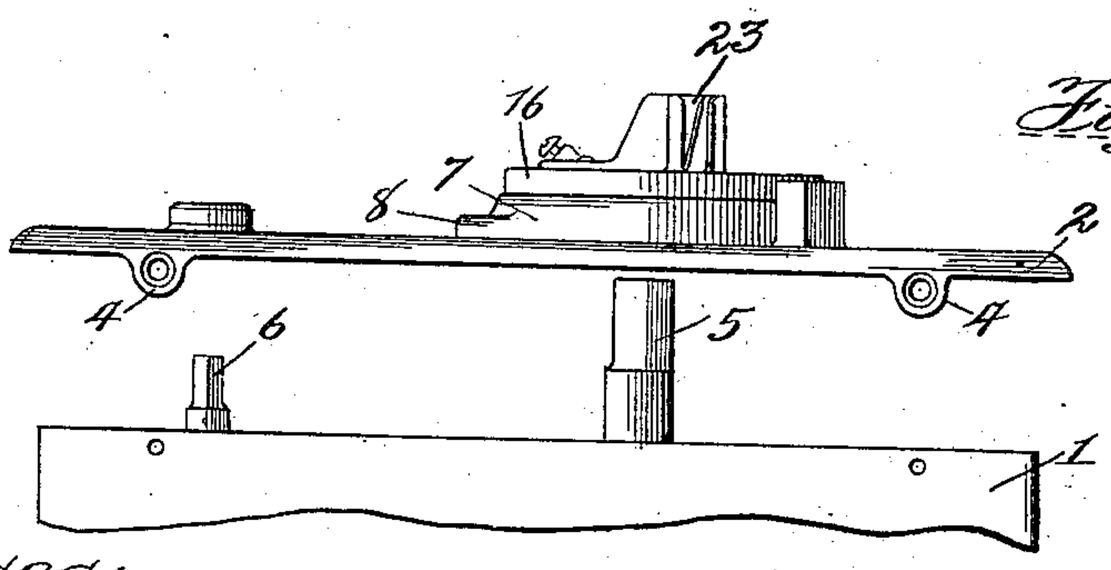

Fig. 3.

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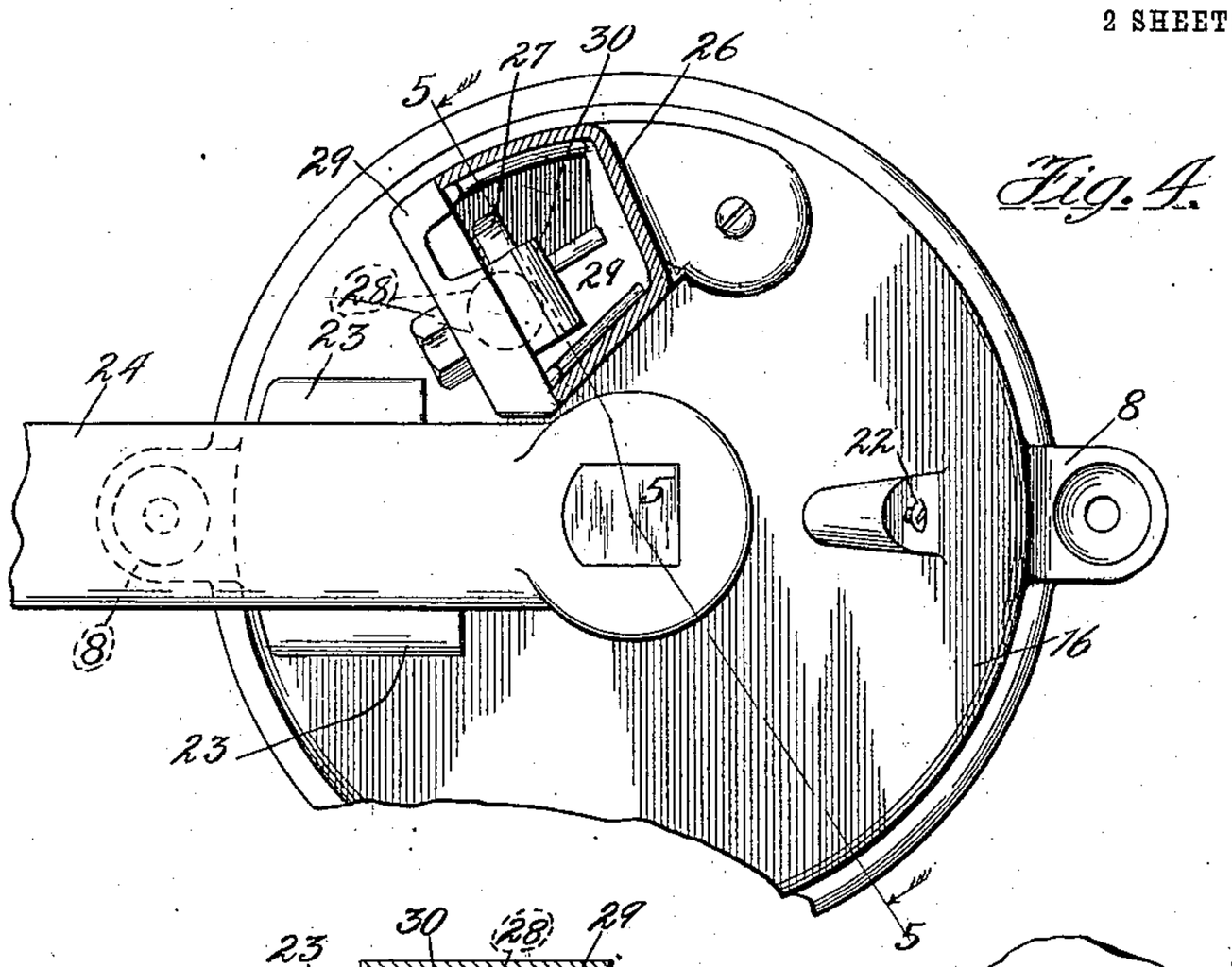


Fig. 4.

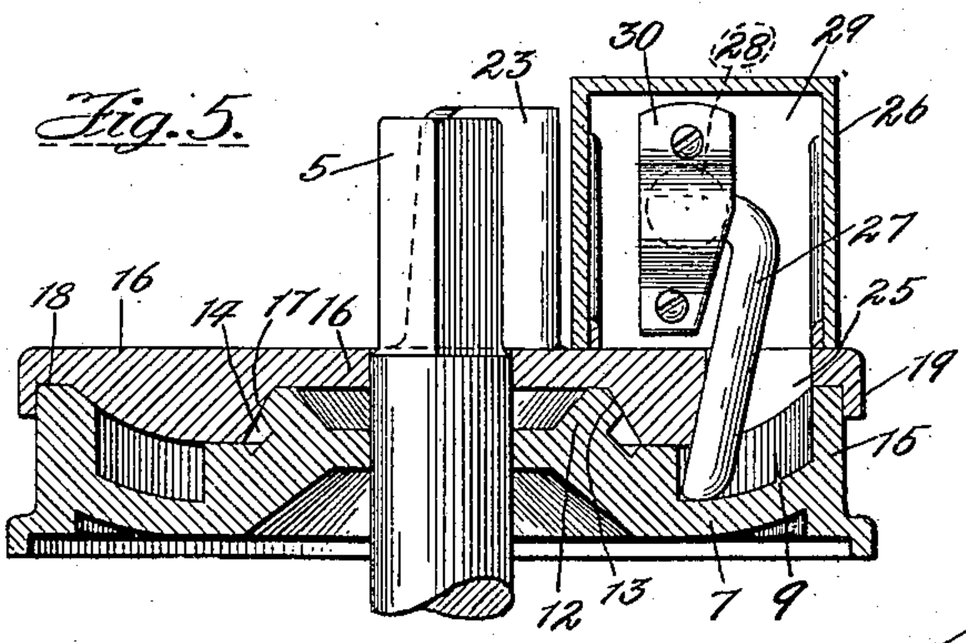


Fig. 5.

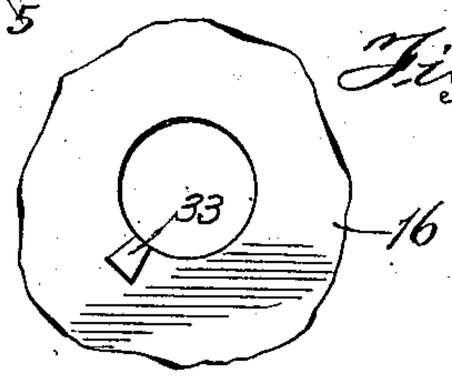


Fig. 8.

Fig. 6.

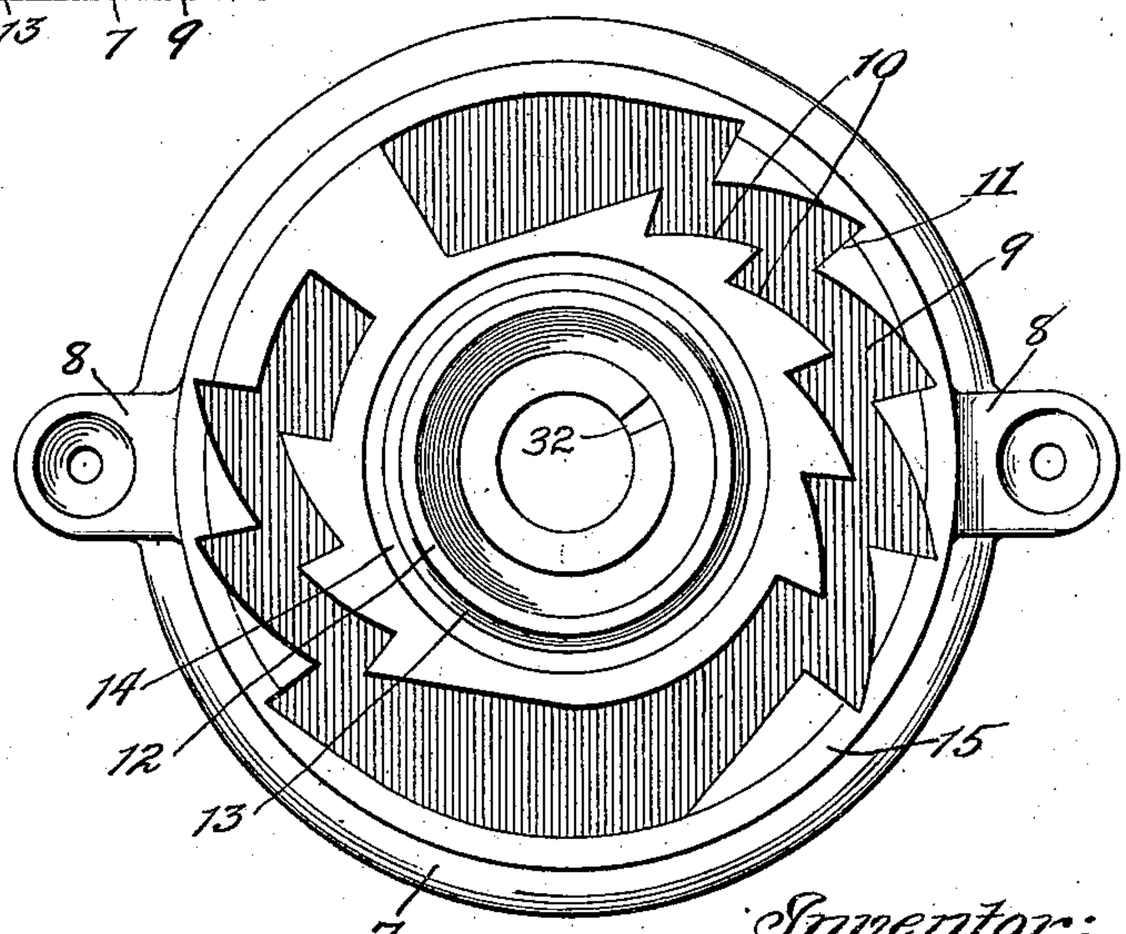
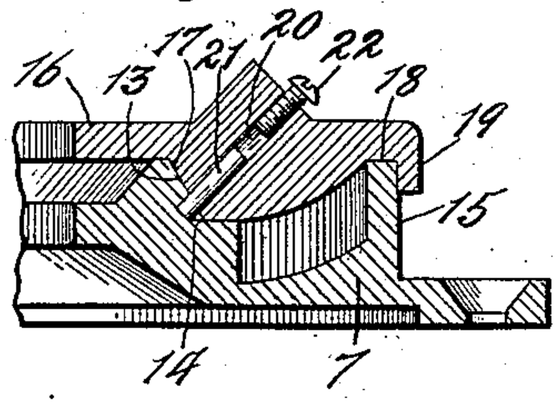


Fig. 7.



Witnesses:

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UNITED STATES PATENT OFFICE.

CYRUS P. EBERSOLE, OF KEOKUK, IOWA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO AMERICAN AUTOMOTONEER COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

CONTROLLER-REGULATOR.

980,866. Specification of Letters Patent. **Patented Jan. 3, 1911.**

Application filed October 11, 1906. Serial No. 338,501.

To all whom it may concern:

Be it known that I, CYRUS P. EBERSOLE, a citizen of the United States, residing at Keokuk, in the county of Lee and State of Iowa, have invented new and useful Improvements in Controller-Regulators, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to improvements in controller regulators, such as are used in connection with street car controllers for the purpose of preventing the operator from admitting current to the motors with such suddenness as to injure the same. The construction of devices of this character prior to the present invention has been such that after being placed in position, the top of the controller casing could not be removed, to take out the controller cylinder or for other purposes, without first removing or disassembling the regulator.

It is one of the objects of my invention to obviate this difficulty and to permit of access to the controller through the top of the controller casing without trouble and without displacing the parts of the regulator. To this end I provide a regulator constructed and arranged in such manner that the regulator and the top of the casing may be removed as a unitary structure.

The invention consists of the organization and arrangement of parts hereinafter described and then pointed out in the claims.

Referring to the accompanying drawings, in which an embodiment of the invention is illustrated, Figure 1 is a plan view of the controller casing showing the controller regulator mounted thereon; Fig. 2 is a rear elevation of the upper end of the controller casing with the casing top and regulator in position; Fig. 3 is a view similar to Fig. 2, showing the top of the casing and the regulator removed; Fig. 4 is a plan view of the controller regulator, a part of the top of the same being broken away in order to show certain operative parts thereof; Fig. 5 is a sectional view of the controller regulator taken on line 5—5 of Fig. 4; Fig. 6 is a plan view of the regulator with the top thereof removed; Fig. 7 is a detail view showing one means for preventing the unauthorized removal of the rotatable hood of the regulator; and, Fig. 8 is a partial bottom plan view of the hood.

In the construction illustrated in the accompanying drawings, the casing 1 of the controller is provided with a removable top 2, shown as secured in position by means of suitable screws or bolts 3, which pass through openings in lugs 4 on the top 2 and coinciding openings in the side of the casing 1. The controller shaft 5 and reversing shaft 6 of the controller are arranged to pass freely through suitable openings in the top 2 of the casing and project beyond the same, having the ends thereof squared to detachably receive their respective handles.

Mounted in a permanent manner upon the top 2 of the controller casing is the controller regulator. This regulator comprises, in the present instance, a stationary base 7 permanently secured in position upon the top of the casing in any suitable manner, as by means of screws passing through lugs 8 formed thereon. The base 7 has a central opening through which the shaft 5 of the controller may pass. The upper surface of the base 7 has formed therein a zigzag slot or way 9, preferably of the form shown in Fig. 6 and in which the portions 10 form inclined cam surfaces and the portions 11 form stops. These cam surfaces and stops are arranged in any desired manner in order that the proper movement of the controller may take place. An annular projecting hub 12 is also formed on the upper face of the base 7, and is provided with a beveled perimeter 13, in which is formed an annular groove 14, the purpose of which will more fully appear hereinafter. The base is also provided with an outer upstanding flange 15 concentric with the hub, and the zigzag way, in the present embodiment of the invention, is located between said hub and flange, which provide concentric bearings for a hood or head 16, now to be described. The hood 16 is formed with concentric bearing surfaces 17 and 18, which coöperate with the hub and flange bearings on the base 7, and has a depending marginal flange 19 fitting over the flange 15 to aid in maintaining the hood in place. As shown in Fig. 5, the shaft 5 passes through a central opening in the hood, which is loose on

the said shaft. The hood is also provided with an obliquely extending opening 20, in which is arranged a pin 21, which, when in its innermost position, has its end entering the groove 14, the said pin being maintained in its securing position when the parts are in their normal horizontal position by gravity. A screw 22 closes the opening 20 in the head and prevents the withdrawal of the pin 21. The screw 22 is of such a length that there is a space between the top of the pin 21 and the bottom of the screw, which is greater than the depth of the groove 14. When the controller regulator is in normal horizontal position the hood 16 thereof is prevented from being raised and disconnected from the plate, owing to the engagement of the pin with the flange which forms the upper wall of the groove 14. However, in the event that it is desired to separate the two members, by turning the regulator upside down or at an angle, the pin 18 will drop back by gravity in the opening 20 and out of the groove 14, so that the hood may then be readily removed from the base.

Formed integrally with the hood 16 is a pair of upstanding lugs or abutments 23, between which the handle 24 of the controller is arranged to fit, when the hub of the handle is slipped over the top of the shaft 5, thereby operatively connecting the shaft and the hood. The portion of the shaft 5 which projects above the hood 16 is of such shape that the shaft and hood must be in certain relative positions in order that the handle may be engaged with the shaft and enter between the lugs. This is to insure the proper coöperation between the controller and the regulator. In the present instance, the squared upper end of the shaft has one rounded side and the handle socket is correspondingly shaped. Therefore to engage the handle with the hood, the hood must be brought around to starting position, in which position the shaft is left when the handle is removed therefrom, so that the regulator will be in synchronism with the controller.

The hood 16 is provided with an opening 25, over which is located a suitable housing 26 carried by the hood. A dog 27 is mounted in the housing and is preferably angle-shaped, one arm thereof extending laterally and being provided with a ball 28, which seats in a socket formed in part in the inner face of the wall 29 of the housing and in part in a cap plate 30, which may be secured to the wall 29 by suitable screws or rivets. The other arm of the dog depends through the opening 25 into the way 9 so as to coöperate with the cams and stops thereof. By this arrangement a ball and socket mounting is provided for the dog 27, the point of suspension being to one side of the center of gravity of the dog, and the dog is permitted to move or pendulate in transverse directions, its movement backwardly with respect to the forward movement of the hood being limited by engagement with a stop consisting, in the present instance, of the wall 29 of the housing. The housing not only provides a mounting for the dog, but also incloses the dog so that tampering therewith by unauthorized persons is prevented. The handle 24 is, as is common with motor controllers, removable; and the lugs 23 are of such height that the handle cannot be engaged with the shaft, without engaging, when turned, one or the other of the lugs 23, and thereby turning the head or hood. In other words, it is impossible with the arrangement described, for the operator to operatively engage the handle with the controller shaft without bringing the hood into play, while at the same time the handle, when in position, is readily removable. The reversing shaft 6, which also passes freely through the top of the controller casing is provided with the usual removable lever 31.

In operation, as the handle 24 is turned in a clockwise direction, the dog 27, held by gravity against one of the cams 10, is forced outwardly by said cam and into engagement with the succeeding stop 11, checking the movement of the handle. By slightly relieving the pressure on the handle, the dog will by gravity disengage from the said stop and swing inwardly against the next cam surface, by which it will be moved outwardly again, upon the forward movement of the handle, into engagement with the next stop. The dog is thus successively thrust into engagement with the stops 11 by the cams 10, as the handle of the controller is moved forward. The handle can be turned in a counter-clockwise direction without check or retardation as the dog, having a ball and socket mounting, is free to ride over the stops and cams, without interfering with the movement of the hood. In the forward movement, however, the dog is prevented from rearward movement by the wall 29 of the housing. When it is desired to obtain access to the controller casing, to permit of the removal of the controller cylinder or for other purposes, it is only necessary to remove the screws or bolts 3 securing the top 2 on the casing, detach the controller handle 24 and reversing lever 31 from their respective shafts and then lift the top upwardly to clear the shafts 5 and 6. The removal of the controller casing top and regulator as a unit is thereby permitted, this being due to the fact that while the regulator is secured to the top of the casing no part thereof is fixed to the controller shaft. Owing to the lugs 23, the handle, when attached to the controller shaft, con-

nects the shaft and the hood of the regulator, and by reason of the shape of the upper end of the shaft and the complementarily-shaped handle socket, it is necessary to bring the hood 7 back to starting position, in the event that it has been moved out of such position, in order to enter the handle between the lugs, thereby insuring synchronism of the controller and regulator. It sometimes happens, in placing the handle upon the shaft 5, that the handle is not pushed down sufficiently far for the projection formed thereon to engage the stop lug formed on the casing to prevent the handle from being turned past the full off position. Under these circumstances, a careless operator might, in turning the handle to the off position, turn the same slightly past that point and thereby throw the controller into the full on position again. I have avoided this contingency in my present form of device, by providing upon the projecting hub 12 a stop 32 which is arranged to be engaged by a stop 33 carried on the hood 16 when the handle of the controller is moved to the full off position, and thereby prevent a further movement of the handle.

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

1. In a controller, the combination with a casing for the controller having a removable top to permit access to the controller, of a controller regulator comprising a stationary and a movable member mounted on and secured to said top and arranged to be removed intact therewith.

2. In a controller, a casing for the controller and a combined controller casing top and controller regulator adapted for simultaneous removal, said regulator comprising a stationary and a movable member, said top being removably mounted on the casing.

3. In a controller, the combination with a controller casing having a removable top, of a controller regulator having a stationary member and a movable member connected together and mounted upon and arranged to be removed intact with said top, said movable member being freely mounted with respect to the controller shaft and arranged to be moved with the controller shaft by the engagement of the controller handle with said movable member.

4. In a controller, the combination with the controller casing having a removable top, of a controller regulator comprising a base fixed to the top, a rotatable hood on the base, a series of cams and stops on the base, a depending dog mounted on the hood and coöperating with the cams and stops to intermittently arrest the movement of the controller shaft during movement thereof in one direction, means for securing the hood on the base without interfering with the rotation of the hood, and a removable handle for operatively connecting the hood and controller shaft, the said top, base and hood having alined apertures through which the shaft passes freely, whereby the said top and regulator may be removed from the casing as a unit.

5. The combination with a removable top for a controller casing, of a base and hood mounted upon and secured to said top so as to be removable therewith, abutments on said hood, and a detachable handle fitting on the controller-shaft and detachably engaging said abutments, whereby by removing the handle the casing top and regulator may be detached from the controller casing as a unit.

6. In a controller, the combination with the controller casing, of a unitary controller casing top and controller regulator removably mounted on the casing, said regulator comprising a base and a rotatable hood, a series of cams and stops on the base, and a depending dog carried by the hood and cooperating with the cams and stops to compel intermittent movement of the controller shaft during movement thereof in one direction while permitting uninterrupted movement thereof in the opposite direction, and lugs on the hood with which the controller handle engages when on the shaft to connect the shaft and hood.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

CYRUS P. EBERSOLE.

Witnesses:
A. W. Cox,
W. B. Wilson.