May 3, 1932. B. O. AUSTIN 1,856,741

SELECTOR SWITCH

Filed Jan. 20, 1930 2 Sheets-Sheet 1

Fig. 1.

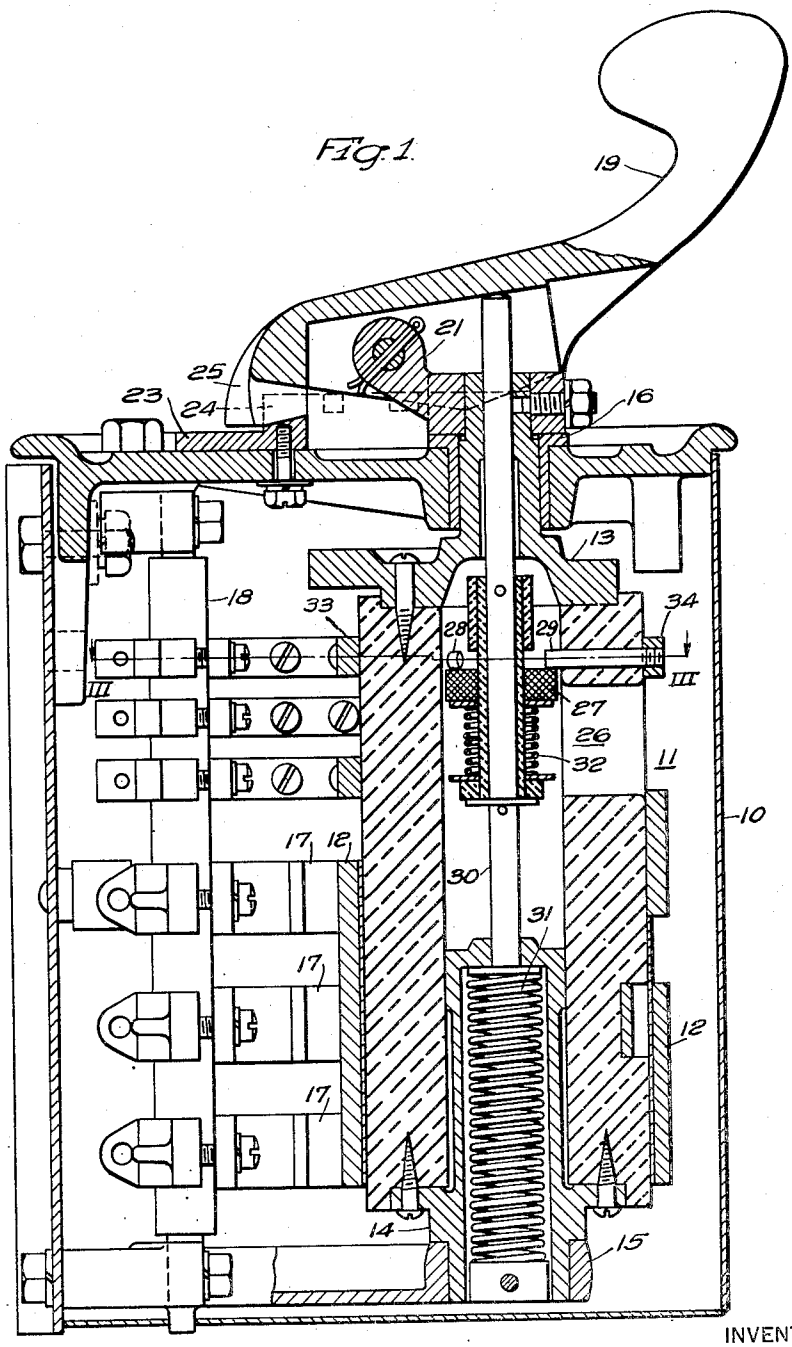

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Fig. 2.

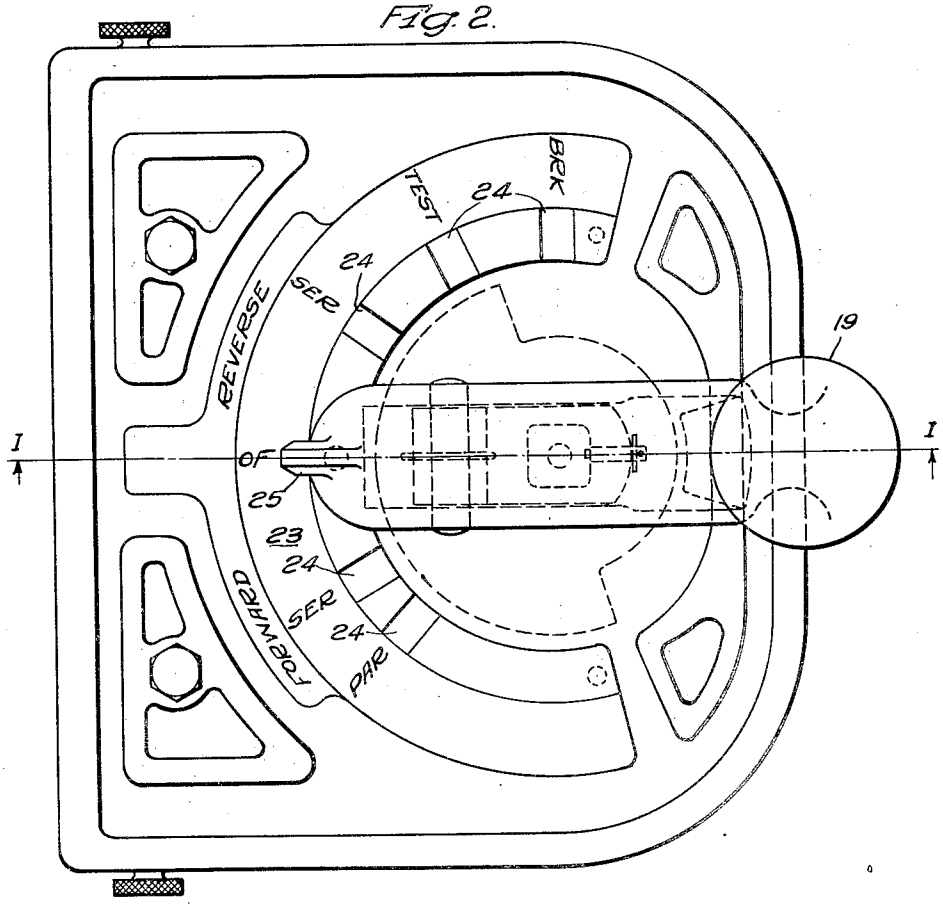
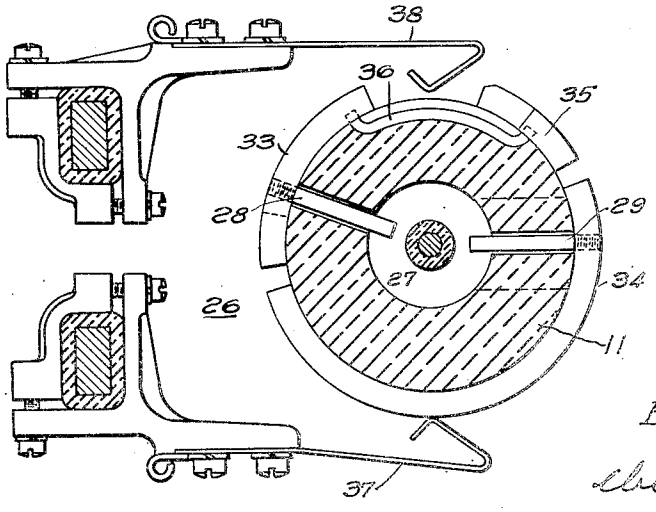


Fig. 3.



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Patented May 3, 1932 1,856,741

UNITED STATES PATENT OFFICE

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SELECTOR SWITCH

Application filed January 20, 1930. Serial No. 421,931.

My invention relates to improvements in control apparatus and more particularly to controllers of the drum type suitable for controlling the operation of the motors of electric vehicles.

The object of my invention, generally stated, is the provision of a controller that shall be simple and efficient in operation and may be economically manufactured.

A more specific object of my invention is to provide for operating the drum of a controller through its different positions, to change circuit connections, without causing arcs between the contact members.

Another object of the invention is to provide for utilizing the movements of the cooperative operating members of a controller to effect an interruption of a circuit through the controller before the drum can be actuated from one position to another.

According to my invention, the controller is so constructed that it is impossible to actuate the drum from one position to another without first disconnecting the source of power, thereby avoiding interruption of the main circuit at the controller contacts and thus preventing burning of these contacts.

For a full understanding of the nature and objects of my invention, reference should be had to the following detailed description, taken in conjunction with the accompanying drawings, in which:

Figure 1 is a view, partially in elevation and partially in section, of a controller constructed in accordance with my invention;

Fig. 2 is a plan view of the controller, showing the indicator plate;

Fig. 3 is a sectional view taken along the lines III—III of Fig. 1 and showing details of construction.

Referring to the drawings, the controller shown comprises a casing 10 which contains a hollow drum 11. In accordance with standard practice, a plurality of contact segments 12 are mounted on the exterior surface of the drum 11. These contact segments may extend over any portion of the circumference of the drum in order that the desired circuit connections may be obtained when the drum is rotated through predetermined positions.

In order to rotatably mount the drum 11, hollow trunnions 13 and 14 are attached to the opposite ends, as shown. The weight of the drum, when in position in the casing, is supported by a thrust bearing 15 which receives the end of the trunnion 14. A bearing 16 is provided for the upper trunnion 13 and is located in the top of the casing.

As is the usual practice in constructing controllers of this type, a plurality of contact fingers 17 are mounted on a support 18. The contact fingers 17 are disposed to engage the contact segments 12 when the drum 11 stands in or passes through predetermined positions to establish the desired circuit connections.

A handle 19 is provided for rotating the drum 11. Since, in structures of this type, it is desirable to reduce the number of actuating members, provision is made to utilize the handle for performing as many operations as possible. In this instance, in order to utilize the handle to perform other operations, such as actuating a switch, it is so disposed that it may be oscillated in a vertical plane. Instead of mounting the handle directly on the trunnion 13, it is pivotally mounted on a bracket 21 which, in turn, is mounted in a fixed relation to the trunnion 13. Therefore, when the handle 19 is actuated in a horizontal plane, the drum 11 is rotated about its vertical axis and, when oscillated in a vertical plane, a switch is actuated.

The various predetermined positions at which is is desired to stop the drum 11 are marked on an indicator plate 23 which is mounted on top of the casing 10. Slots 24 are provided in the plate 23 to receive a lug 25 provided on the handle 19 and extending laterally over the plate 23. These slots are disposed in an arc of a circle, as shown in Fig. 2, to cooperate with the lug 25 to prevent the handle 19 from being rotated from one position to another without first actuating the handle in a vertical plane to raise the lug out of the slot and serve to retain the drum in the different predetermined positions.

When controllers of this type are used to control the operation of motor vehicles, the

contacts of the controller are required to carry relatively heavy currents. In order to prevent arcing and burning of the controller contacts, an electro-magnetic contactor is connected in the power circuit to interrupt the circuit before the contact members of the controller are disengaged. The electro-magnetic contactor utilized to protect the controller, may be of any well known type and, for that reason, is not illustrated.

The energization of the electro-magnetic contactor may be controlled by any suitable control switch 26 which is mounted inside of the hollow drum 11 to facilitate its actuation by the handle 19. The control switch comprises a disc 27 disposed to bridge two contact members 28 and 29. The disc 27 is supported on a vertical rod 30 which is slidably mounted inside of the hollow trunnions 13 and 14.

As shown in Fig. 1, the rod 30 extends through the trunnion 13 to engage the handle 19. The control switch 26 is normally biased toward the closed position by springs 31 and 32. The action of the spring 31 also causes the rod 30 to exert a pressure against the handle 19 in a vertical direction.

As shown in Fig. 3, the contact members 28 and 29 are connected to contact segments 33 and 34, respectively. The contact segment 33 is connected to a contact segment 35 by a conductor 36. It will be noted that a contact finger 37 will engage the contact segment 34 at all positions of the drum 11, while a contact finger 38 will engage the one or the other of contact segments 33 and 35 at all positions of the drum except the "off" position. Accordingly, there will be a complete circuit through the contact switch 26 when the disc 27 bridges the contact members 28 and 29 except when the drum 11 is in the "off" position.

When the control switch 26 is in its closed position, a circuit is completed through the coil of the electro-magnetic contactor (not shown) which controls the circuit through the main contact members of the controller. When the control switch 26 is open, the electro-magnetic contactor is deenergized and the controller is disconnected from the power source.

The type of controller shown was primarily designed for performing reversing operations. It is suitable for governing the circuit relations in which the motors of an electric vehicle may be connected and also the direction of rotation of the motors. In operating the controller, the desired connections are obtained by rotating the drum 11 from one predetermined position to another. This is accomplished by actuating the handle 19 in a horizontal plane.

As previously described, in order to actuate the handle 19 in a horizontal plane, it is necessary to depress the handle 19, thereby raising the lug 25 out of a slot 24, and then it may be rotated to any desired position to set the drum 11. When the handle 19 is depressed, the vertical rod 30 is projected downwardly, thereby disengaging the disc 27 from the contacts 28 and 29, and the electro-magnetic contactor is actuated to interrupt the circuit through the controller, as previously described. When the handle 19 has been turned to a predetermined position and is released, the spring 31, acting through the rod 30, will force the lug 25 into a slot 24. This action will permit disc 27 to bridge the contacts 28 and 29, and the external contactor will be energized again to close the power circuit.

I do not desire to restrict myself to the specific embodiment of my invention herein shown and described since it is evident that it may be changed and modified without departing from the spirit and scope of my invention, as defined in the appended claims.

I claim as my invention:

1. In a controller, in combination, a hollow drum, a control switch mounted inside of the hollow drum, and a handle disposed for movement in a plurality of planes to operate the drum and the control switch independently.

2. In a controller, in combination, a hollow drum, a control switch mounted within the hollow drum, a handle disposed for movement in a plurality of planes to operate the drum and the control switch independently, and means for retaining the handle, when released, in the different predetermined positions to which it may be actuated.

3. In a controller, in combination, a hollow drum, a control switch mounted within the hollow drum, a handle disposed for movement in a plurality of planes to operate the drum and the control switch independently, and means for retaining the handle, when released, in the different predetermined positions to which it may be actuated, said retaining means being disposed to prevent the actuation of the handle in a plane to rotate the drum before it is actuated in another plane to effect the operation of the control switch.

4. In a controller, in combination, a hollow drum, a control switch mounted inside of the hollow drum, a handle disposed for movement in a plurality of planes to operate the drum and the control switch independently, and an indicator plate having slots for retaining the handle when released in different predetermined positions, said slots being disposed to prevent the actuation of the handle in a plane to rotate the drum before it is actuated in another plane to effect the operation of the control switch.

5. In a controller, in combination, a hollow drum, a control switch mounted within the hollow drum, a handle disposed for movement in a plurality of planes to operate the

drum and the control switch independently, and an indicator plate, said handle having a lug disposed to cooperate with slots in the indicator plate to retain the handle in different predetermined positions and to prevent the actuation of the handle in a plane to rotate the drum without first actuating it in another plane to effect the operation of the control switch.

6. In a controller, in combination, a hollow drum, a control switch mounted within the hollow drum, a handle disposed for movement in a plurality of planes to operate the drum and the control switch independently, resilient means for actuating the handle in one plane, and an indicator plate, said handle having a lug disposed to cooperate with slots in the indicator plate to retain the handle in different predetermined positions and to prevent the actuation of the handle in a plane to rotate the drum before it is actuated in another plane to effect the operation of the control switch.

7. In a controller, in combination, a hollow drum having contact segments mounted on its exterior surface, contact fingers disposed to engage said contact segments when the drum is rotated to predetermined positions, a control switch mounted within the hollow drum, and a handle disposed for movement in a plurality of planes to operate the drum and the control switch independently.

8. In a controller, in combination, a hollow drum having contact segments mounted on its exterior surface, contact fingers disposed to engage said contact segments when the drum is rotated to predetermined positions, a control switch mounted inside of the hollow drum to facilitate its operation, and a handle disposed for movement in a plurality of planes to operate the drum and the control switch independently.

9. In a controller, in combination, a hollow drum having contact segments mounted on its exterior surface, contact fingers disposed to engage said contact segments, a control switch mounted inside of the hollow drum, resilient means for biasing the control switch toward its closed position, and a handle disposed for movement in a plurality of planes to operate the drum and the control switch independently.

10. In a controller, in combination, a hollow drum having contact segments mounted on its exterior surface, contact fingers disposed to engage said contact segments, a control switch mounted inside of the hollow drum, resilient means for normally biasing the control switch toward its closed position, said resilient means being mounted inside of the drum, and a handle disposed for movement in a plurality of planes to operate the drum and the control switch independently.

11. In a controller, in combination, a hollow drum having contact segments mounted on its exterior surface, contact fingers disposed to engage said contact segments, a control switch mounted inside of the hollow drum, resilient means for biasing the control switch toward a predetermined position, and a handle disposed for movement in a plurality of planes to operate the drum and the control switch independently.

12. In a controller, in combination, a hollow drum having contact segments mounted on its exterior surface, contact fingers disposed to engage said contact segments, a control switch mounted within the hollow drum, means for biasing the control switch toward a predetermined position, a handle disposed for movement in a horizontal plane to rotate the drum and in a vertical plane to actuate the control switch, and means disposed to prevent the movement of the handle in a plane to rotate the drum before it is actuated in a vertical plane to effect the operation of the control switch.

In testimony whereof, I have hereunto subscribed my name this 14th day of January, 1930.

BASCUM O. AUSTIN.