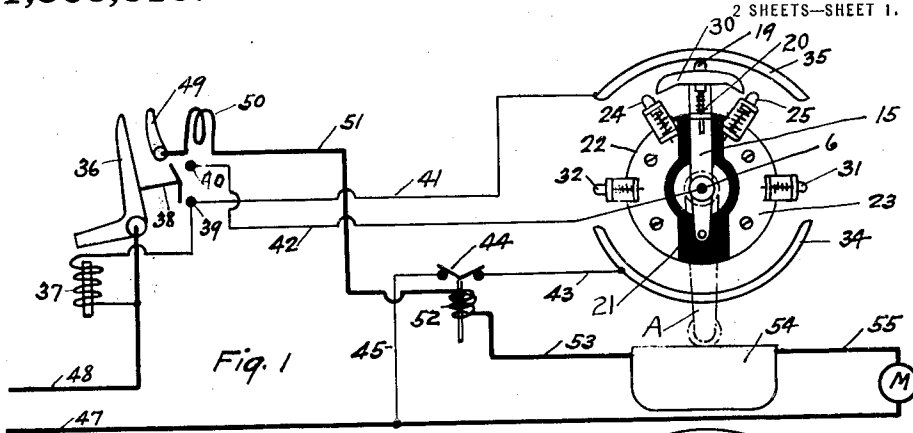
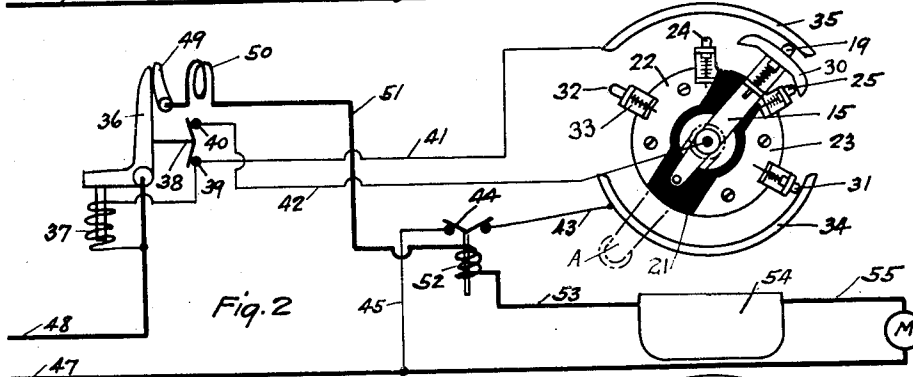
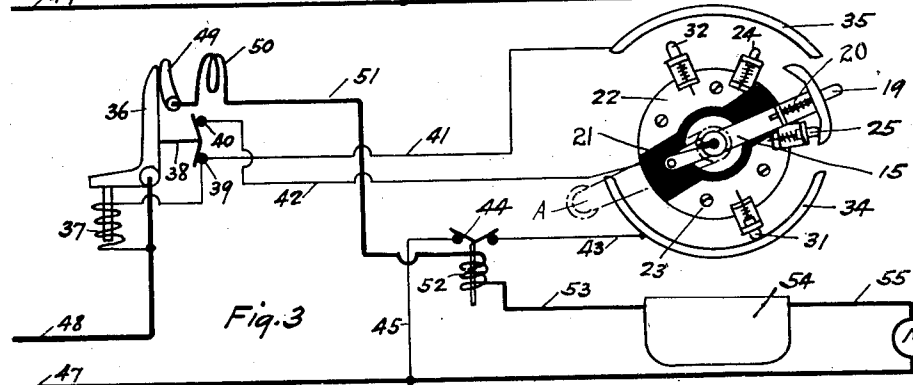


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ATTACHMENT FOR ELECTRICAL CONTROLLERS.
APPLICATION FILED APR. 21, 1919.

1,363,813.

Patented Dec. 28, 1920.

2 SHEETS—SHEET 1.



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INVENTOR.

BY
Edwin P. Corbett
ATTORNEY.

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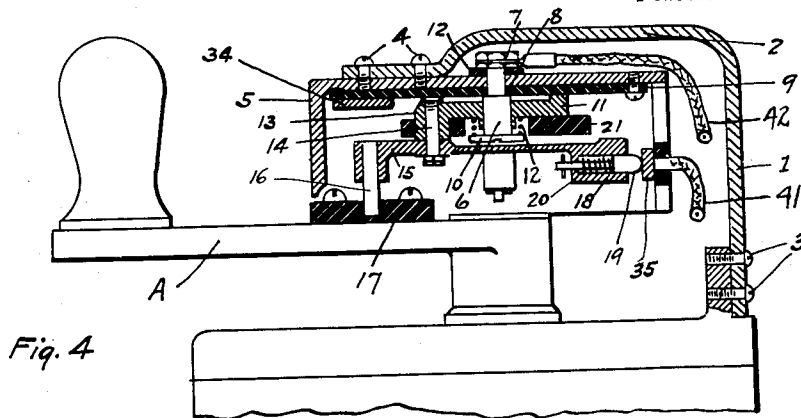


Fig. 4

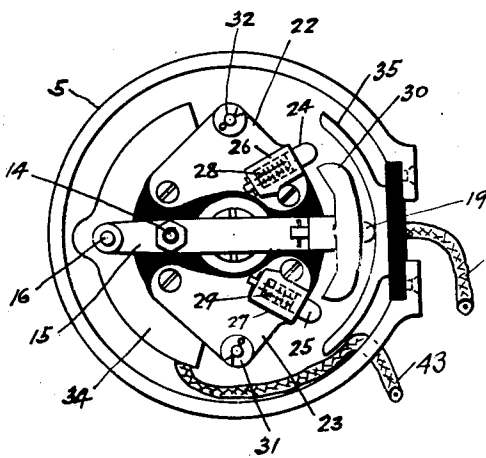


Fig. 5

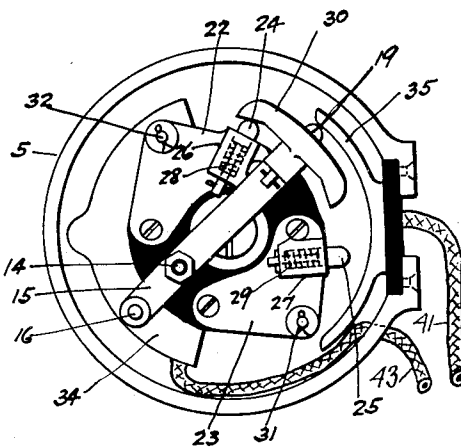


Fig. 6

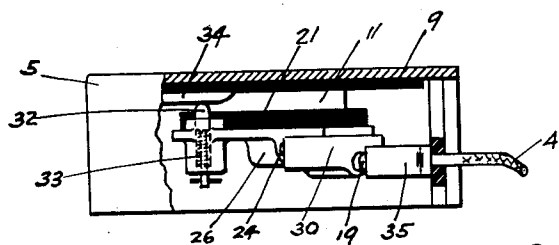


Fig. 7 Estell C. Raney
INVENTOR.

BY
Edwin P. Corbett
ATTORNEY.

UNITED STATES PATENT OFFICE.

ESTELL C. RANEY, OF COLUMBUS, OHIO, ASSIGNOR TO THE AUTOMATIC RECLOSING CIRCUIT BREAKER COMPANY, OF COLUMBUS, OHIO, A CORPORATION OF OHIO.

ATTACHMENT FOR ELECTRICAL CONTROLLERS.

1,363,813.

Specification of Letters Patent.

Patented Dec. 28, 1920.

Application filed April 21, 1919. Serial No. 291,541.

To all whom it may concern:

Be it known that I, ESTELL C. RANEY, a citizen of the United States of America, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Attachments for Electrical Controllers, of which the following is a specification.

My invention relates to an attachment for electrical controllers and is particularly adapted for use in connection with drum controllers, though not necessarily limited thereto. It is especially advantageous in connection with controllers of the "full reversing" type, that is, those controllers which are movable clockwise from neutral to effect rotation of a motor in one direction and movable counter-clockwise from neutral to effect rotation of such motor in the opposite direction. However, it is equally applicable to "separate reversing" controllers wherein reversal is effected by a separate reverse cylinder.

One of the objects of this invention is to provide a novel means which may be readily applied to any controller for making and breaking the current outside of the controller by means of a solenoid switch, so that the drum controller will never be called upon in operation to make or break heavy currents. In handling heavy electrical currents on drum controllers, there is a great difficulty in building a controller with proper facilities for breaking the current without damaging the current fingers or segments. With the arrangement proposed herein the current is broken by means of a magnetically operated switch which is provided with blow-out coils and arc chutes so that arcing is taken care of very effectively by this switch and the controller is relieved from all arcing, thereby increasing its life and making its service much more satisfactory.

A further purpose of this apparatus is to provide such mechanism that, if the controller has been moved to a running position and failure of voltage or overload occurs, my solenoid switch will open and will not reclose until the handle of the controller has been returned to the off position and again brought back to the first running point.

In addition, my apparatus is such that whenever the handle of the controller is

moved toward neutral position in either direction, the solenoid switch will immediately open and breaks the circuits so that the controller will carry no current when being moved toward neutral position. This eliminates the possibility of burning at the various contact points of the controller.

Another important object of my invention is to provide an apparatus having the functions enumerated and yet which is of such form that it may be applied to a controller of either the "full reversing" type or the "separate reversing" type. Not only that but my device is applicable to any controller without altering the parts thereof, even the standard controller handle being suitable for coöperation with my apparatus.

The preferred embodiment of my invention is shown in the accompanying drawings wherein similar characters of reference designate corresponding parts and wherein:

Figure 1 is a diagrammatic illustration showing the parts of my apparatus with a full reversing controller in neutral position.

Fig. 2 is a diagrammatic showing of the position of the parts of my apparatus with the controller moved to the first running position.

Fig. 3 is a diagrammatic showing of the position of the parts of my apparatus with the controller in full running position.

Fig. 4 is a vertical section of the parts of my apparatus which are attached to the controller cover.

Fig. 5 is a bottom plan view of the casing which contains the essential parts of my apparatus, these parts being in the position they assume when the controller is in neutral position as shown in Fig. 1.

Fig. 6 is a view similar to Fig. 5, with the parts of my apparatus in the position they assume when the controller is in first running position as shown in Fig. 2.

Fig. 7 is a detail view illustrating the two sets of contacts in different planes.

In the drawings, my apparatus is shown as comprising an angular supporting member having a vertical arm 1 and a longer horizontal extension 2. The vertical arm is adapted to be attached at its lower end by screws 3 to the stop lug of the controller casing. The horizontal extension 2 is desirably shaped to form a conduit-like supporting member attached by screws 4 to a

cylindrical housing which housing contains most of the mechanical elements of my apparatus.

Within the casing 5 there is a mounted switch structure comprising a central supporting stud 6 secured to the top of the casing by nuts 7 and having at its upper end a reduced formation which results in a shoulder 8. This shoulder 8 bears upwardly against a circular plate 9 of insulating material that practically covers the head of the casing 5.

The stud 6 is provided at its lower end with a head 10 and its main shank supports the sleeve-like hub of a rotatable plate 11, this plate 11 being held against the circular plate 9 by a coil spring 12. At its forward side, the plate 11 is formed with a boss 13 carrying a pivot pin 14.

Upon the pivot pin 14 is mounted a lever 15 having its short arm provided with a depending pin 16 extending into a socket in a plate 17 of insulating material, which plate 17 is secured to the controller handle A for that purpose. The construction is such that movement of the controller handle will swing the lever 15 upon its pivot. Upon the long arm of the lever is a socket 18 for the reception of a contact plunger 19 that is normally pressed outward by a spring 20.

Attached to the under side of the plate 11 is a block of insulating material 21 carrying oppositely disposed contact supporting members 22 and 23, shown best in Figs. 5 and 6. Each contact member has a contact plunger respectively designated 24 and 25 mounted in housings 26 and 27 and normally forced outwardly by coil springs 28 and 29.

The lever 15 is provided with a T-shaped head 30 having cam-like contact surfaces on its inner sides which are designed to cooperate with contact members 24 and 25 in a manner to insure effectual contact and at the same time prevent jarring loose of the lever from either position in which it is making contact. The contacts 24 and 25 and their supporting plates are so mounted that the lever 15 lies in between them and will not contact therewith except when swung to either side.

Extending upwardly from the contact members 22 and 23 are contact plungers 31 and 32, one of these being shown best in Fig. 7. These plungers 31 and 32 are pressed upwardly by springs as indicated at 33.

It should be noted that the contact plungers 31 and 32 are in a plane above that of the contact plunger 19 and are designed to make contact under certain positions of the controller handle with a contact plate 34 mounted upon the circular insulating plate 9. On the other hand, the plunger 19 is in contact with a contact plate 35 when the

controller is in neutral position. It should also be noted by reference to Figs. 1, 2 and 3 that it is only in certain positions of the controller handle that the contact plunger 19 bears against its contact segment 35 at the same time that one of contacts 31 and 32 bears against contact segment 34. The three never make contact at the same time and contacts 31 and 32 never make contact at the same time.

In connection with the apparatus just described, I use a circuit breaker switch 36 which is operable by a solenoid 37 and the movable contact of which carries a supplemental switch 38 designed to bridge contact points 39 and 40. The circuit breaker switch 36 is in the main supply line and the coil of the solenoid 37 is in shunt to the main supply when the controller handle is in running position. Wire 41 connects contact point 39 to contact segment 35 and wire 42 connects contact point 40 to stud 6. Wire 43 connects the segment 34 to wire 47 of the supply line. The wire 43 contains an overload switch 44. Cooperating with switch member 36 is a contact member 49 and a blow-out coil 50. The circuit to the motor from the blow-out coil 50 is through wire 51, overload coil 52, wire 53, controller 54, wire 55 to the motor M.

The operation of my device is best illustrated in Figs. 1, 2 and 3. In Fig. 1, the full reversing controller is shown in neutral position and it will appear that the solenoid switch is open. Movement of the controller to the position shown in Fig. 2 will result in bringing the plunger contact 31 in contact with its segment 34 while the contact plunger 19 is still in contact with its segment 35. There will result a closed circuit from the supply line 48 through the coil 37 to contact 39, through wire 41, to segment 35 to plunger contact 19, thence through lever 15 and contact member 23 to plunger contact 31, and then through segment 34, through wire 43, overload switch 44 and wire 45 to the supply line 47. As a result, the solenoid coil 37 will lift its core and close the switch 36 and the switch 38 simultaneously. The closing of the switch 38 produces an additional path for current from coil 37 to contact lever 15, as will appear in the following description.

Upon further movement of the controller handle toward the position shown in Fig. 3, plunger contact 19 will pass out of contact with the segment 35 but at this time a circuit is established from supply line 48 through solenoid coil 37, to contact 39, through switch 38 to contact 40 through wire 42, through lever 15 through contact member 23 to contact plunger 31 to segment 34 through wire 43, through overload switch 44, through wire 45 to the supply line 47. Thus, the circuit through the operating coil

of the solenoid switch is not broken by the continued movement of the controller in the same direction and the switch 36 remains closed.

5 It will be understood that the main line circuit extends from supply line 48 through switch 36, complementary switch member 49, through a magnetic blow-out coil 50, through wire 51, through overload coil 52, through wire 53, through controller 54, through wire 55 and then through the motor to supply line 47.

Under these conditions it will be obvious that the switch 36 will remain closed as long as there is no failure of voltage or overload and as long as the controller handle is not moved back toward neutral position. If there is failure of voltage, the coil 37 will be deenergized and the switch 36 will drop open. On the other hand if there is an overload, the switch 44 will be raised and, since the circuit of the coil 37 is thereby opened, the switch 36 will likewise drop open. However, if there is neither failure of voltage nor overload but the controller handle is moved rearwardly toward neutral position, the lever 15 will move away from the contact member 23 and thus break the circuit through the operating coil 37 with the result that the switch 36 will drop open, thereby opening the main current of the controller at a point remote therefrom with the result that the controller will never be called upon to rupture any electrical currents. Whether this opening takes place due to failure of voltage, overload, or return of the controller handle toward neutral position, the switch 36 cannot be reclosed without first returning the controller handle to neutral position, since at the time of opening of the switch 36, the switch 38 is also opened and since to close the switch 36 it is necessary that the plunger contact 19 be in contact with the segment 35 at the same time that the lever 15 is in contact with the contact member 23 and the plunger contact 31 is in contact with the segment 34.

It will be well understood that a similar operation takes place when the controller handle is swung from neutral position in a direction opposite to that just described.

An important aspect of my apparatus resides in the fact that it is so constructed that the operator cannot effect closing of the circuit after it has once been opened, unless he first brings the controller contacts fully into first running position. This is insured because the gap between the segment contacts is of such length that contact cannot be made with segment 34 and with segment 35 without putting the controller fully in first running position. Thus, I have elimi-

nated an ever prevalent danger that will be brought about when the operator moves his controller handle into a partially closed position, when a limited movement of the motor is desired, and then opens the controller again. This results in burning and blistering the ends of the controller segments.

It will be apparent that I have provided a device of extreme simplicity considering the work that it does and one which is not only capable of attachment to a standard type of controller but is capable of such attachment without the necessity of replacing any of the controller parts.

Having thus described my invention, what I claim is:

1. Apparatus for operation with an electrical controller for breaking the circuit outside of the controller comprising spaced contact members, and a lever in between said contacts connected to the controller handle to be swung thereby from one to the other of said contacts, a contact on said lever and a contact on each of said members, a contact segment against which said lever contact is adapted to bear, and a contact segment against which either of said member contacts is adapted to bear, and mechanism whereby the circuit will be closed outside of the controller whenever the lever contact is on its segment, the lever is in contact with such member and proper conditions exist on the line.

2. Apparatus for operation with a controller comprising mechanism inclosed in a casing for mounting upon the controller, and a conduit-like suspending member for holding said casing and protecting a wire running therefrom.

3. Apparatus for operation with an electric controller comprising a lever for attachment to the controller handle in such a manner that it will be swung when the controller handle is swung, and a contact member on either side of said lever with one of which members said lever will make contact when it is swung.

4. Apparatus for operation with an electric controller comprising a lever for attachment to the controller handle in such a manner that it will be swung when the controller handle is swung, a contact on said lever, a segment with which said contact is adapted to coact, contact members with either of which said lever is adapted to contact, contacts on said members in angular relation to said lever contact, and a segment with which said member contacts are adapted to cooperate.

In testimony whereof I hereby affix my signature.

ESTELL C. RANEY,