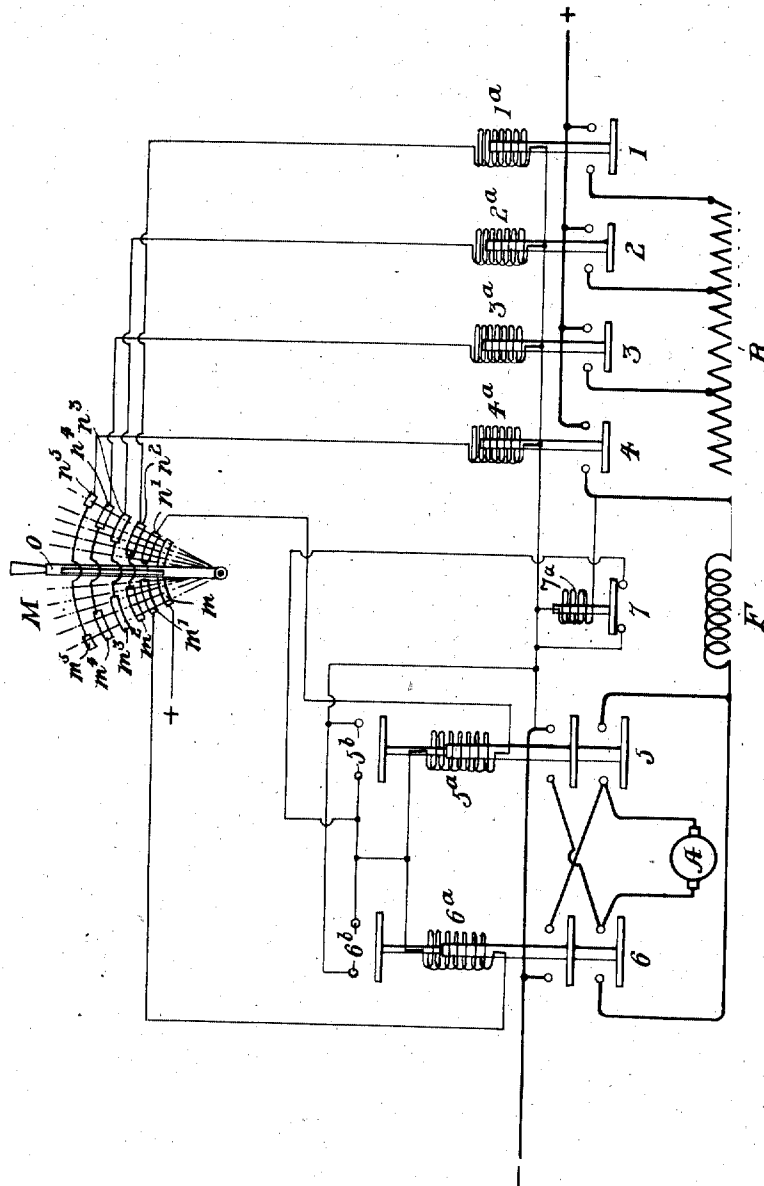


A. C. EASTWOOD.
ELECTRIC CONTROLLER.
APPLICATION FILED SEPT. 24, 1910.

1,008,454.

Patented Nov. 14, 1911.



WITNESSES

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ELECTRIC CONTROLLER.

1,008,454.

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To all whom it may concern:

Be it known that I, ARTHUR C. EASTWOOD, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Electric Controllers, of which the following is a specification.

My invention relates to electric motor controllers of that type in which separately actuated magnetic switches are used to make the proper connections for starting the motor, operate it in different directions, and vary its speed. It sometimes occurs in the operation of such controllers that when the master controller is moved to the off position some one of the resistance cut-out switches may remain closed due to a heavy arc which has been formed at its contacts which welds them together.

One of the objects of my invention is to provide a controller in which it will be impossible to operate the main switch or reverser in case any of the resistance cut-out switches are closed. This may be accomplished in a number of ways, one of which is shown diagrammatically in the accompanying drawing.

On the drawing, I have shown a pair of reversing switches 5 and 6 operated, respectively, by the windings 5^a and 6^a and having, respectively, the auxiliary contacts 5^b and 6^b which are open when the switches 5 and 6 are open. A relay 7 having its contacts in the common return from the windings 5^a and 6^a is provided, the winding receiving positive current from the segment *m'* or *n'* on the master switch M whose arm *o* is in contact with the positive segment *m* and may be moved to the left so as to contact successively with the segments *m'* to *m⁵*, or to the right so as to contact successively with the segments *n'* to *n⁵*. The segments *m²* to *m⁵* and the respective segments *n²* to *n⁵* are connected, respectively, to the operating windings 1^a to 4^a of the respective resistance switches 1 to 4. The winding 7^a of the switch or relay 7 is connected to the negative main and to the resistance R, so that, if any of the switches 1 to 4 are closed, the relay winding 7^a is energized and the relay 7 has its contacts open.

If the arm *o* is moved so as to engage the

segment *m'*, current flows from the positive segment *m* through the arm *o*, the segment *m'*, the winding 6^a, and the contacts of the relay 7 to the negative main, this current causing the winding 6^a to close the switch 6. When the arm *o* is moved to the segment *m²*, current flows from the positive segment *m* through the winding 1^a causing the switch 1 to close the motor circuit which is as follows: from the positive main through the switch 1, the resistance R the motor field F, and the armature A to the negative main, causing the armature to rotate in a certain direction. Further movement of the arm *o* step by step to the segments *m³* to *m⁵* successively energizes the windings 2^a to 4^a, causing the switches 2 to 4 to successively close and short-circuit the sections of the resistance in an obvious manner.

If the arm *o* be moved from the off position so as to engage the segments *n'* to *n⁵*, the operation would be the same as that described except that the winding 5^a would be energized, the switch 5 closed, and the armature rotated in the reverse direction.

If, when the arm *o* is moved to its off position, one or more of the switches 1 to 4 remain closed, the switch 5 or 6 will open, but the current from the positive main through the closed switch or switches and the relay winding 7^a would persist, preventing the excitation of the windings 5^a and 6^a when the master switch arm *o* is again operated. It will be impossible to actuate either switch 5 or 6 after one of them has been operated because, as soon as one has operated and the switch 1 has closed, the other is made inoperative by the opening of the contacts of the relay 7.

I claim:

1. A magnetically-operated switch for connecting a main circuit to one side of a source of current supply, an actuating and a maintaining circuit for the switch, and means adapted to open the actuating circuit whenever the main circuit is connected to the other side of the source of supply at any point.

2. A magnetically-operated switch for connecting an electric circuit to one side of a source of current supply, an actuating and a maintaining circuit for the switch, means adapted to open the actuating circuit whenever the main circuit is connected

to the other side of said source of supply at any point, and to close the maintaining circuit when the switch operates.

3. A magnetically-operated switch for closing an electric circuit, an actuating circuit and a maintaining circuit for the switch, one or more other switches for connecting the circuit to a source of supply, and means for opening the actuating circuit of the magnetically-operated switch when any of the said other switches is closed.

4. In a motor control system, a magnetically-operated reverser in circuit therewith, actuating and maintaining circuits for the reverser, a resistance for controlling the motor, one or more switches for connecting the resistance to a source of current supply, and a relay adapted to open the reverser

actuating circuit whenever any of the resistance controlling switches closes.

5. In a motor control system, a magnetically-operated reverser in circuit therewith, actuating and maintaining circuits for the reverser, a resistance for controlling the motor, one or more switches for controlling the resistance, a relay adapted to open the reverser-actuating circuit when any of the resistance controlling switches are closed, and means for closing the reverser maintaining circuit when the reverser operates.

Signed at Cleveland, Ohio, this 19th day of September, A. D. 1910.

ARTHUR C. EASTWOOD.

Witnesses:

J. H. HALL,

H. M. DIEMER.

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