

T. V. BUCKWALTER.
ELECTRIC CONTROLLER.
APPLICATION FILED JAN. 20, 1909.

933,157.

Patented Sept. 7, 1909.

2 SHEETS—SHEET 1.

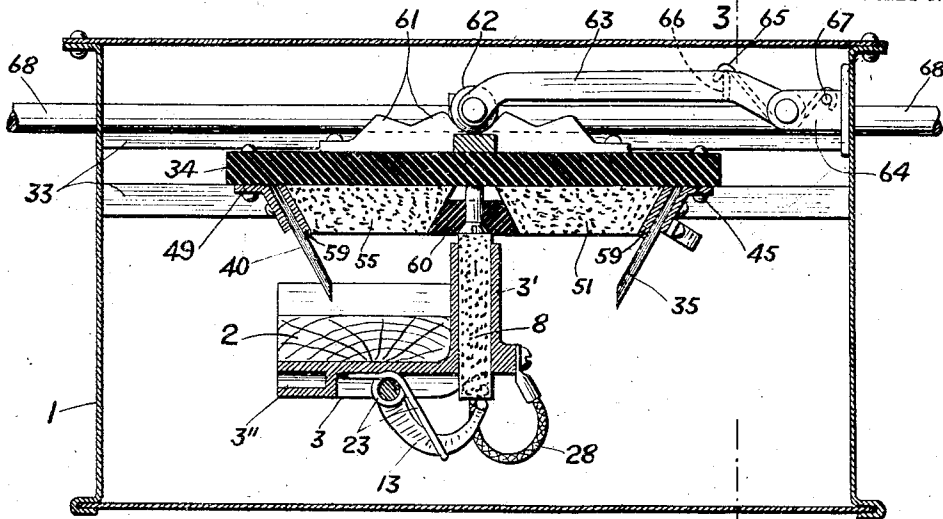


FIG. 1.

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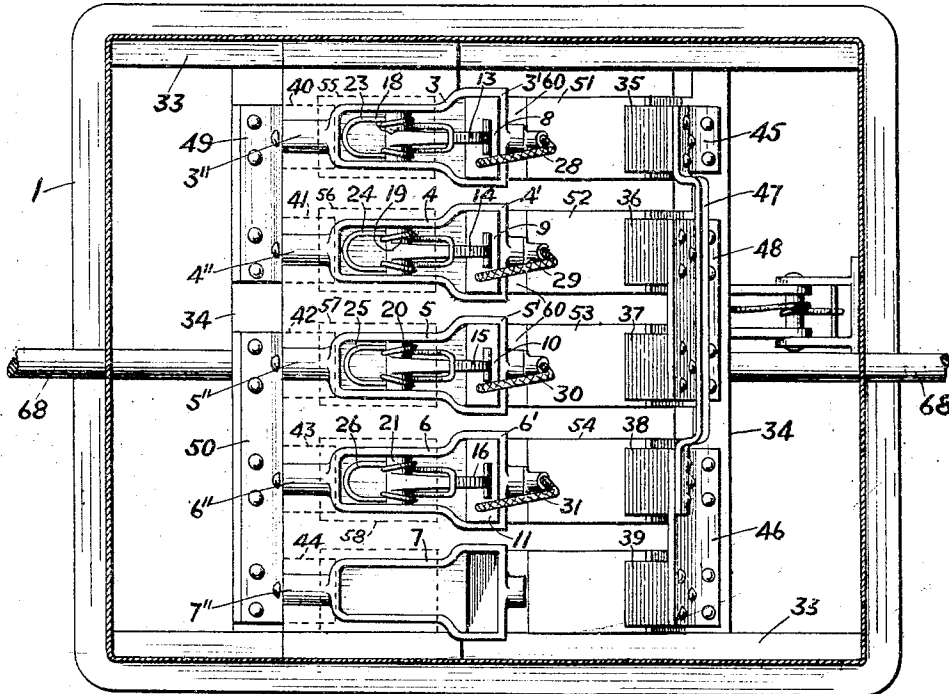


FIG. 2.

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2 SHEETS—SHEET 2

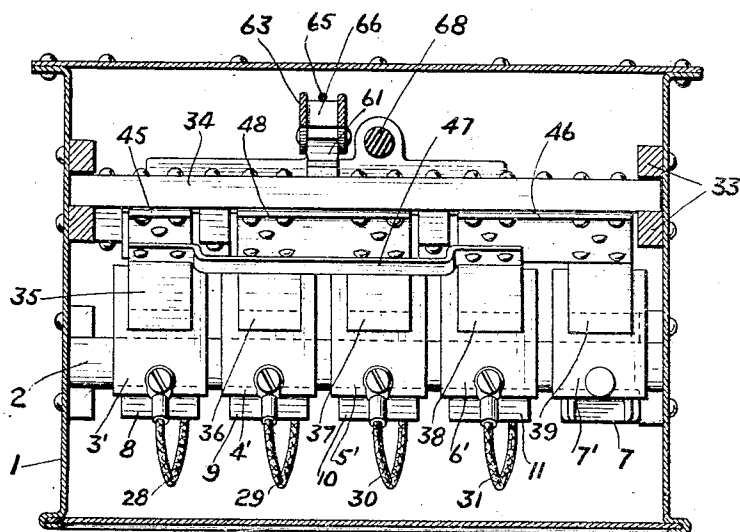


FIG. 3.

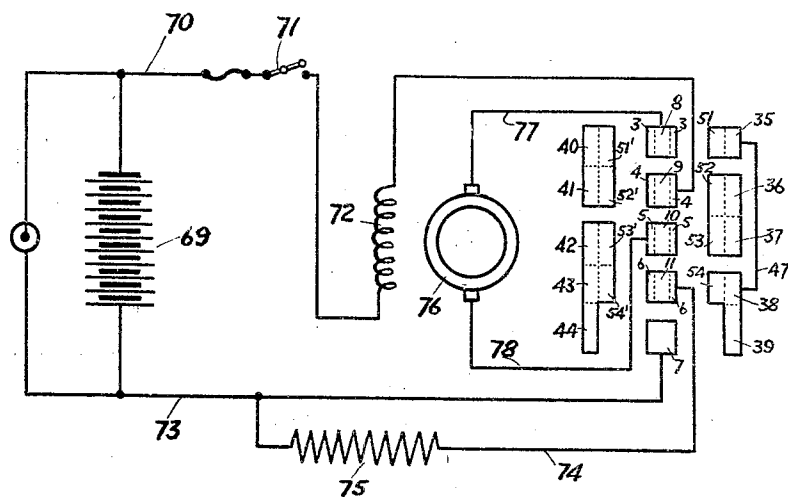


FIG. 4.

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UNITED STATES PATENT OFFICE.

TRACY V. BUCKWALTER, OF ALTOONA, PENNSYLVANIA.

ELECTRIC CONTROLLER.

933,157.

Specification of Letters Patent. Patented Sept. 7, 1909.

Application filed January 20, 1909. Serial No. 473,227.

To all whom it may concern:

Be it known that I, TRACY V. BUCKWALTER, a citizen of the United States, residing in the city of Altoona, county of Blair, and State of Pennsylvania, have invented Improvements in Electric Controllers.

My invention is an electric controller, of the reciprocating type, adapted to be operated from opposite ends of a motor car, vehicle or truck, to effect movement in opposite directions. Its leading object is to provide a simple, inexpensive and efficient controller, of the type specified, having therein means for obstructing high discharges on starting, preventing sparking and protecting the apparatus from shock or injury in throwing on the current.

The characteristic features of my improvements are fully disclosed in the accompanying drawings and the following description thereof.

In the drawings, Figure 1 is a sectional side elevation of a controller embodying my improvements; Fig. 2 is a bottom view thereof; Fig. 3 is a sectional view taken on the lines 3—3 of Fig. 1; and Fig. 4 is a diagrammatic representation of the circuits.

In the embodiment of the improvements represented in the drawings, a frame or casing 1 supports a cross piece 2, of insulating material, which carries metal conductors in the form of shoes 3, 4, 5, 6, and 7. In sockets 3', 4', 5', and 6' of the respective shoes 3, 4, 5, and 6 are carbon blocks 8, 9, 10 and 11 which are supported and pressed upward by arms 13, 14, 15 and 16. These arms are pivoted to the respective shoes by pintles 18, 19, 20 and 21 and pressed up by coiled springs 23, 24, 25 and 26 each having terminals engaging the corresponding arm and shoe. Conductors 28, 29, 30 and 31 are fixed to respective shoes and the carbons to secure their electrical connection. The respective shoes are provided with sockets, as 3'', 4'', 5'', 6'', and 7'', for connecting a conductor therewith.

The frame or casing supports guides 33 for controlling the movements of an insulating sliding member 34 which is adapted for reciprocation transversely with respect to the part 2. Two sets of metal conducting brushes or fingers 35, 36, 37, 38 and 39, and 40, 41, 42, 43, and 44 are fixed to the sliding member 34 and arranged in pairs so that the members of each pair are inclined inwardly and adapted to be brought alter-

nately into contact with a corresponding shoe, the brushes moving transversely to the surfaces of the shoes upon which they impinge. The finger 35 is secured to the member 34 by the metal angle 45, the fingers 38 and 39 are secured to the part 34 by the metal angle 46, and these parts are electrically connected by the conductor 47. The fingers 36 and 37 are secured to the part 34 and electrically connected by the metal angle 48. The fingers 40 and 41 are secured to the part 34 and electrically connected by the metal angle 49. The fingers 42, 43 and 44 are secured to the part 34 and electrically connected by the metal angle 50.

The two sets of carbon plates 51, 52, 53 and 54, and 55, 56, 57, and 58, having the forms of wedge frustums, are secured to the part 34 by inclined conducting plates 59 clamped on the inner parts of the respective brushes or fingers and wedge shaped insulating members 60 secured to the part 34, a pair of such carbon plates being held in the plane of each of the carbon blocks held by the shoes.

A rack 61 is secured to the part 34 and a roller 62 on an arm 63 engages therewith. The arm is adapted to rock on a hinge connection 64 of the frame 1 and is held down by a spring 65, the latter having its terminals connected with the bearings 66 and 67 on the members 63 and 64.

An operating rod 68 is fixed to the commutator having the body 34 and extends in opposite directions therefrom.

As shown in the diagrammatic view represented in Fig. 4, a battery 69 is connected by the conductor 70, through the switch 71 and the motor field 72, with the shoe or contact 4, electrically connected with the carbon contact 9, and by the conductor 73 with the shoe or contact 7. A conductor 74, containing the resistance 75, is tapped onto the conductor 73 and the shoe or contact 6 electrically connected with the carbon contact 11. The motor armature 76 is connected by the conductor 77 with the shoe or contact 3 electrically connected with the carbon contact 8, and by the conductor 78 with the shoe or contact 5 electrically connected with the carbon contact 10. With the switch 71 closed, when the commutator is moved so that the carbon contacts 51, 52, 53 and 54 strike the respective carbon contacts 8, 9, 10 and 11, current from the battery flows through conductor 70, field 72, contacts 9,

52, 53 and 10, conductor 78, armature 76, conductor 77, contacts 8, 51 and 35, conductor 47, contacts 38, 54, 11 and 6, conductor 74, resistance 75 and conductor 73 to the battery, producing the first speed. When the commutator is moved farther, so that the contacts 35, 36, 37, 38 and 39 engage the respective contacts 3, 4, 5, 6, and 7, current from the battery flows through the conductor 70, field 72, contacts 4, 36, 37 and 5, conductor 78, armature 76, conductor 77, contacts 3 and 35, conductor 47, contacts 38, 39 and 7, and conductor 73, cutting out the resistance and throwing in the shunt circuit to produce the second speed.

To produce the first speed in the reverse direction the contacts 51', 52', 53' and 54' are moved into engagement with the contacts 8, 9, 10 and 11, when current flows from the battery through the conductor 70, field 72, contacts 9, 52', 51' and 8, conductor 77, armature 76, conductor 78, contacts 10, 53', 54' and 11, conductor 74, resistance 75, and conductor 73, to the battery. To produce the second speed in the reverse direction, the commutator is moved so that contacts 40, 41, 42, 43 and 44 engage the contacts 3, 4, 5, 6, and 7, when current flows from the battery through the conductor 70, field 72, contacts 4, 41, 40 and 3, conductor 77, armature 76, conductor 78, contacts 5, 42, 43, 44 and 7 and conductor 73 to the battery. The several contacts are thus so disposed that in moving the commutator to throw on the current, to operate the motor in each direction, the carbons first engage, in sliding contact, and thereafter the metal contacts engage, and in moving the commutator to throw off the current the metal contacts first separate and thereafter the carbons.

The operations of this mechanism are such that satisfactory engagements are obtained between the contacts, arcing is avoided and injuries to the apparatus are obviated.

Having described my invention, I claim:

1. In an electric controller, a set of metal contacts, a set of carbon contacts electrically connected with said metal contacts, and a reciprocating commutator comprising two sets of metal contacts adapted to engage alternately with said metal contacts first named, said commutator having two sets of carbon contacts adapted to engage alternately with said carbon contacts first named.

2. In an electric controller, a commutator having two electrically separated contact fingers and two electrically separated carbon contacts, each of said carbon contacts being electrically connected with one of said contact fingers, in combination with a contact piece with which said fingers are adapted to engage alternately, and electrically connected with said contact piece a carbon contact with which said carbon con-

tacts first named are adapted to engage alternately.

3. In an electric controller, a fixed member, carried by said fixed member a set of metal contacts having sockets therein, and movable in said sockets a set of carbon contacts, in combination with a reciprocating commutator having two sets of electrically separated carbon contacts adapted to be moved alternately into engagement with said carbon contacts first named, and two sets of metal contacts electrically connected respectively with said second named sets of carbon contacts and adapted to be moved alternately into engagement with said metal contacts first named.

4. In an electric controller, a reciprocating part of insulating material, a pair of carbons, means for engaging said carbons to said reciprocating part, brushes fixed to said reciprocating part and electrically connected with the respective carbons, a fixed part, a rack and a spring pressed engaging device connecting said reciprocating and fixed parts.

5. In an electric controller, a fixed member, fixed to said member a set of conducting shoes containing sockets, movable in said sockets a set of carbons electrically connected therewith, spring pressed devices engaging the respective carbons, a reciprocating member, two sets of electrically separated carbons fixed to said reciprocating member and adapted to make contact with said set of carbons first named, and two sets of conducting fingers fixed to said reciprocating member and respectively connected electrically with said sets of carbons fixed to said reciprocating member, said conducting fingers being adapted for making contact alternately with said shoes.

6. In an electric controller, a supporting member, a metal contact supported by said member, a carbon contact electrically connected with said metal contact and supported thereby, a second supporting member adapted to reciprocate relatively to said supporting member first named, a carbon contact fixed to said second supporting member and adapted to slide upon said first named carbon contact, and fixed to said second supporting member a metal contact adapted to impinge upon said first named metal contact, said second named metal contact moving transversely to the surface of said first named metal contact engaging therewith.

7. In an electric controller, a supporting member, a metal contact supported by said member, a carbon contact electrically connected with said metal contact, a second supporting member adapted to reciprocate relatively to said supporting member first named, a carbon contact fixed to said second supporting member and adapted to slide upon said first named carbon contact without en-

gaging said first named metal contact, and
fixed to said second supporting member a
metal contact adapted to impinge upon said
first named metal contact without engaging
5 said first named carbon contact, said second
named metal contact moving transversely to
the surface of said first named metal contact
engaging therewith.

In witness whereof I have hereunto set
my name this 16th day of January, 1909, in 10
the presence of the subscribing witnesses.

TRACY V. BUCKWALTER.

Witnesses:

ROBERT JAMES EARLEY,
JOS. G. DENNY, JR.