A. KIMBLE.

MOTOR CONTROLLER.

APPLICATION FILED SEPT. 7, 1909.

942.382. Patented Dec. 7, 1909.

Fig. 2

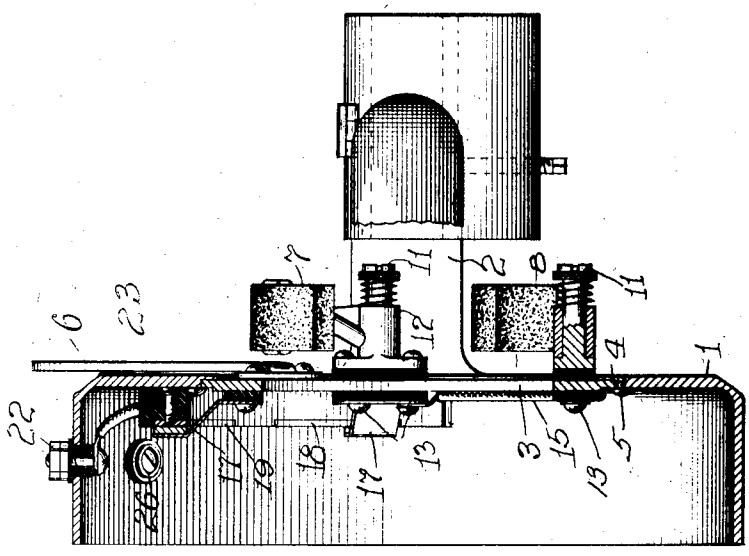
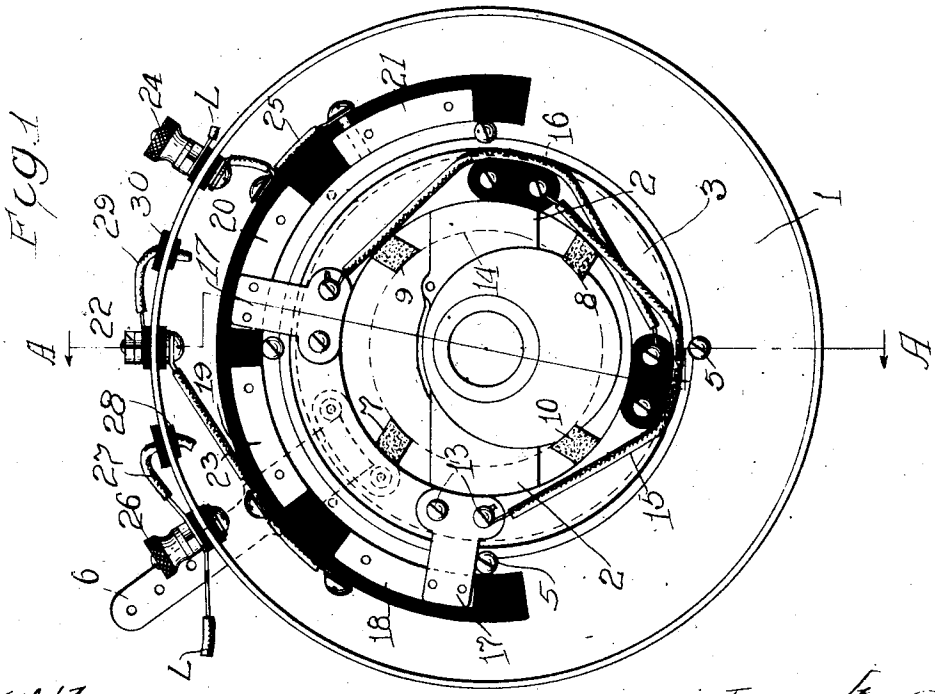


Fig. 1



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UNITED STATES PATENT OFFICE.

AUSTIN KIMBLE, OF CHICAGO, ILLINOIS, ASSIGNOR TO KIMBLE ELECTRIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

MOTOR-CONTROLLER.

942,382. Specification of Letters Patent. Patented Dec. 7, 1909.

Application filed September 7, 1909. Serial No. 516,346.

To all whom it may concern:

Be it known that I, AUSTIN KIMBLE, a citizen of the United States of America, and a resident of Chicago, county of Cook, State of Illinois, have invented certain new and useful Improvements in Motor-Controllers, of which the following is a specification.

The main objects of this invention are to provide an improved controller for starting, stopping, reversing and regulating the speed of a single phase alternating current commutating motor; to provide an improved controller and support adapted to form a part of the motor frame structure; and to provide an improved construction in which all the functions of the controller are performed by one moving structure without connecting links or reversing switches.

A specific construction embodying this invention is illustrated in the accompanying drawings, in which:

Figure 1 is an interior end elevation of the end frame of a motor with the controller assembled thereon. Fig. 2 is a sectional view taken on the line A—A of Fig. 1.

In the construction shown, the supporting end frame 1 is in the usual form of the end frame which engages and is bolted to the main frame of a motor. As a part of the end frame, two side brackets 2, 2 project to support the commutator end of the shaft of a motor. Mounted on the end frame, concentric with the axis of the moving parts is an annular ring 3 which is rotatably mounted in the annular seat 4 and being retained therein by the screws 5. The movement of the ring 3 is controlled by a speed regulating and reversing lever 6 which is directly secured to the ring 3. There are also mounted on the ring 3 four symmetrically placed brushes, 7, 8, 9, and 10. The brushes are mounted on studs 11 which are integral with the bracket 12, which is in turn, mounted on, but insulated from the ring 3. The brackets are secured to the ring 3 by means of bolts 13 which are also insulated from the ring 3. The brushes 7, 8, 9, and 10 are shown diagrammatically to engage a commutator which is represented by a dotted circle 14.

The brush 7 is electrically cross connected to the brush 8 by an insulated conductor 15. In a similar manner, an insulated conductor 16 connects the brush 10 with the brush 9. The brush 7 is supported by two bolts 13 which also secure a spring-actuated contact 17 which extends outwardly from the center of the machine. In a similar manner, the brush 9 is directly connected to a similar spring-actuated contact 17. Between the segments 18, 19, 20, and 21 and the end frame is placed insulating material which is made flush with the bearing surfaces of the segments. The metal segments 18 and 19 are electrically connected through the conductor 23 with a short binding post 22 which is mounted on, but insulated from, the end frame 1. In a similar manner, the segments 20 and 21 are electrically connected to a binding post 24 by means of an electrical conductor 25.

The binding post 26 is designed to be connected to the line and to one end of the usual stator windings, the opposite end of the stator windings being connected to the post 22, the other end of the line being connected to the post 24. The four metal contact segments are mounted on the frame, concentrically with respect to the axis of the motor and located so as to be engaged by the spring-actuated contacts 17, 17.

The controller and mounting as shown form the end frame of a stator. One of the line wires L is brought into the post 26 which is connected in the usual way to one end of the stator winding by a wire 27 which passes through the insulating bushing 28. The opposite end of the stator winding 29 is brought out of the frame 1 through the insulating bushing 30 and is connected to the post 22.

In operation, when the speed regulating and reversing lever 6 is in its vertical or middle position, one spring-actuated contact 17 engages the insulating block which is between the metal segments 18 and 19, and the other spring-actuated contact 17 engages the insulating block between the metal segments 20 and 21, which results in an open circuit. When the lever 6 is advanced toward the left, as in Fig. 1, the spring-actuated contacts 17, 17 at the same time engage the metal contacts 18 and 20 respectively. The circuit is then closed from the post 22 to the segment 18, through the metal contact 17, across the usual rotor, through cross-connected brushes to the other spring-actuated contact 17 engaging the metal segment 20 which is connected to the line post 24. In this position the armature will rotate in the direction opposite to the motion of the lever.

As the lever is advanced, the brushes will reach a more advantageous position as regards speed, and the motor will increase in speed until the metal contacts reach the full range of their motion which corresponds to the position of the brushes for greatest torque. When the lever is reversed, the spring-actuated contacts 17, 17 will still engage the metal segments 18 and 20, but the angular position of the brushes will be changed, gradually reducing the speed until the spring actuated contacts 17, 17 again rest upon the flush insulating blocks between the adjacent ends of segments 18 and 19, and 20 and 21 respectively, and open the circuit. This corresponds to the position of the brushes at which there is no tendency of the rotor to turn in either direction.

The type of motor for which the controller which is herein shown and described is particularly designed, is a four-pole, alternating-current commutating motor, of such construction that the speed is controlled by shifting the brushes. The brushes are so located and the electrical connections are such that when the lever 6 is at either limit of its movement the rotor will be driven in the opposite direction at its maximum speed. As the lever is shifted toward its upright or middle position, the shifting of the brushes causes a reduction in the speed of the motor and there is a corresponding reduction in the current, hence when the circuit is opened by the passage of the contact members 17 off from the contact segments and upon the insulated segments between the contact segments, there will be little or no arcing, as the current will have been reduced to its minimum before the contact is broken. Movement of the lever 6 beyond the vertical position carries the contacts 17 into engagement with the other set of contact segments, and causes the motor to run in the reverse direction.

Although but one specific embodiment of this invention is herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted, within the scope of the following claims, without departing from the spirit of this invention.

I claim:—

1. In a motor, the combination of an end cap for the stator frame, a shaft bearing carried by brackets on said cap, a brush holder ring rotatably mounted on said cap concentric with said shaft bearing, brush holders mounted on said ring and adapted to hold brushes in position to bear upon a commutator located between said shaft bearing and said ring, contact members mounted on the inner face of said ring and extending into the space inclosed by said cap, a series of stationary contacts mounted within said cap in position to be successively engaged by said contact members through the rotation of said ring, and means for rotating said ring.

2. In a motor end cap, the combination of an annular disk, flanges integral with said disk for attaching it to a motor frame, a groove in one face of said disk, a ring seated in said groove, removable means for retaining said ring slidably in said groove, brush holders mounted on the outer face of said ring, contact members mounted on the inner face of said ring, and extending into the space inclosed by said cap, a series of stationary contacts mounted within said cap in position to be successively engaged by said contact members through the rotation of said ring, and means for rotating said ring.

Signed at Chicago this 3rd day of Sept. 1909.

AUSTIN KIMBLE.

Witnesses:

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