Nov. 4, 1924. 1,514,546

R. LEE

MOTOR CONTROLLER

Filed Sept. 14, 1923

FIG. 1

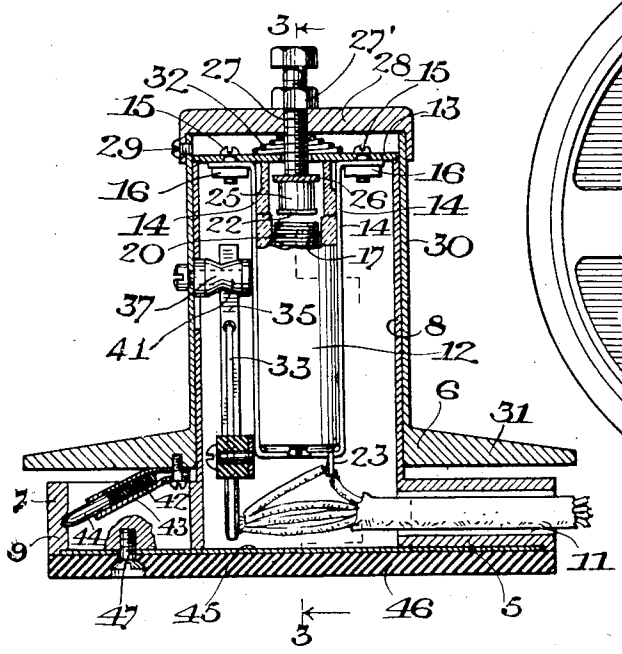


FIG. 2

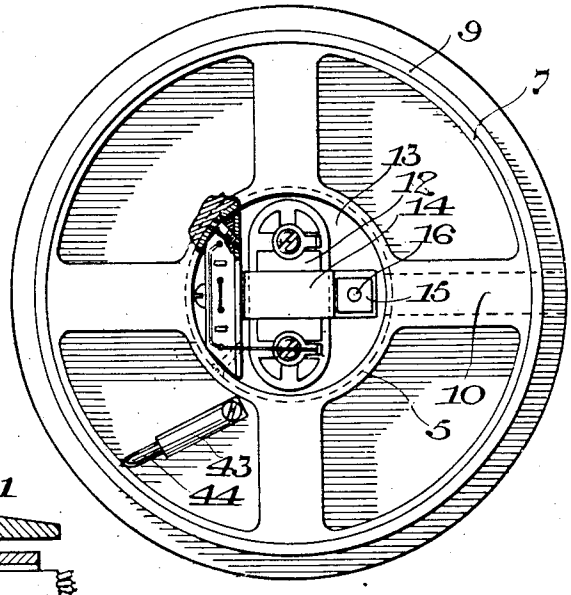


FIG. 3

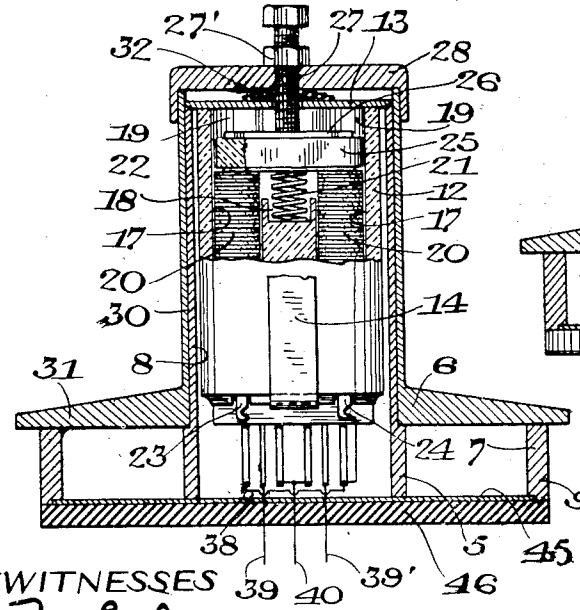
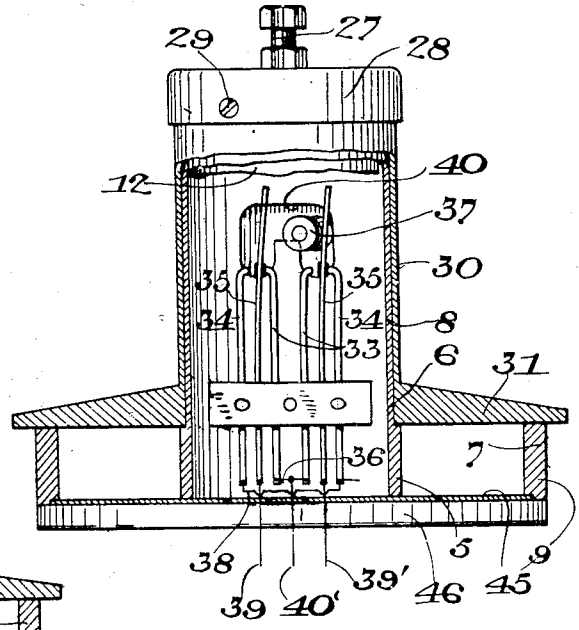


FIG. 4



WITNESSES

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UNITED STATES PATENT OFFICE.

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MOTOR CONTROLLER.

Application filed September 14, 1923. Serial No. 662,710.

To all whom it may concern:

Be it known that I, ROYAL LEE, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Motor Controllers, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

The invention relates to motor controllers, and more particularly to a foot-operated motor controller for use with dental motors, sewing machine motors and other small motors.

One of the objects of the invention is to provide a foot-operated motor controller in which the reversal of the motor may be easily accomplished.

Another object of the invention is to provide a foot-operated motor controller embodying a carbon pile rheostat.

A further object of the invention is to provide a foot-operated motor controller including a member provided with a flange adapted to be engaged by the foot of the operator to operate the switch.

The invention further consists in the several features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings: Fig. 1 is a vertical sectional view through a device embodying the invention, parts of the rheostat being shown in full; Fig. 2 is a bottom view of the device, with parts broken away and parts shown in section and with the bottom pad removed; Fig. 3 is a detail sectional view taken on the line 3—3 of Fig. 1; Fig. 4 is a view of the device, parts being broken away and parts being shown in section and parts omitted to show the reversing switch mechanism.

The device includes a member 5 forming a casing and support, a variable resistance mechanism including a foot-operated member 6, and reversing switch mechanism associated with said resistance mechanism and said member 6.

The member 5 has a circular base portion 7 and a cylindrical or tubular portion 8 projecting therefrom. The base portion has a central opening alined or forming a continuation of the bore of the tube 8 and a rim portion 9 secured to the spider 10. One of the arms of the spider has an opening 11 extending therethrough through which the conductor cable passes.

The variable resistance mechanism herein shown and constituting the preferred construction is a carbon pile compression rheostat and its actuating means. This rheostat includes a casing 12 of insulating material secured to a plate 13, seated on the top of the tube 8, by means of a metal strip 14, screws 15 and nuts 16. This casing is provided with spaced bores 17, a central recess 18 and a space above said recess and bores, the side walls 19 of which are circular and alined with the bores 17. A pile of carbon disks 20 is disposed in each of the pockets formed by the bores 17 and the curved side walls 19 of the casing 12, and a spring 21 seated in the recess 18 acts upon a metal bridge-piece or switch member 22 to normally hold it out of contact with the top disks 20 of each pile. The lowermost disk of one pile is in contact with a terminal member 23 and that of the other in contact with a terminal member 24. Current may pass from one of these terminals to one set of disks, through the member 22 to the other set of disks and through these disks to the other terminal when said switch member 22 is brought into contact with the piles, and by varying the pressure of said member 22 on the disks the resistance in the motor circuit including these disks will be varied and the operation of the motor thereby controlled.

To apply pressure to the disks through the member 22 a block 25 of insulating material is mounted on the top of the member 22, a metal strip or plate 26 is disposed on top of the block 25 and engaged by an adjustable screw 27 mounted in a cap 28 secured by screws 29 to the upper end of the tubular portion 30 of the member 6, which portion is slidably mounted on the tube 8, the lower end of said member 6 being in the form of an annular flange 31 which is adapted to contact with the base portion 7 of the member 5 and limit its movement and hence the greatest pressure to be applied to the disks. The adjustment of the screw 27 relative to the cap also determines that point in the movement of the member 5 at which pressure is applied to the carbon disks, a lock-nut 27′ being used to hold the screw in adjusted position. A spring 32

is interposed between the plate 13 and the cap 28 and acts to normally hold the member 5 and its cap in upper position in which the spring 21 is free to hold the switch member 22 in its inoperative position. Thus the application of foot-pressure to the flange of the member 6 moves said member downwardly causing a closing of the motor circuit through the contact of member 22 with the carbon piles and then causing a gradually increasing pressure upon the piles which gradually acts to lessen the resistance in the motor circuit until the motor gets up to the highest desirable operating speed, at which time the member 6 is stopped in its movement by contact with the base 7. It will also be understood that the operator may vary his foot-pressure on the member 6 and thereby vary the pressure on the carbon piles, hence the resistance in the motor circuit and hence the speed of the motor to suit the requirements of the work the motor is to do.

The reversing mechanism includes two sets of switch contacts 33 and 34 and a spring contact 35, each forming a separate switch structure that is connected up in the motor circuit in a well known manner, the contacts 33 being connected together by a conductor 36 and the contacts 34 being connected together by a conductor 38. One of the contacts 34 is connected to one of the terminals of the rheostat, the other terminal of the rheostat being connected to the current supply line. Conductors 39 and 39′ lead to the motor and a conductor 40′ also leads to the motor. When the contact 35 of one switch is held against the contact 34 for that switch the motor will run in one direction and when the contact 35 of the other switch is held against its cooperative contact 34 the motor will run in the opposite direction, as these switches may change the direction of flow of current either through the field or the armature of the motor, as will be fully understood by those skilled in the art.

As means for operating the reversing-switch mechanism, I provide an insulated arm or projection 37 of insulating material secured to the sleeve or tube portion of the member 6 working through a U-shaped slot 40 in the tube 8 and having a conical surface 41 engageable with either of the spring contacts 35 by a horizontal or turning movement of the member 6 adapted to move the contact 35 with which it is engaged against the cooperative contact 34 when in its raised position and adapted to put pressure on said contact 35 as the member 6 is moved downwardly, as shown in Fig. 4, which pressure may flex the contact 34 slightly. By providing a U-shaped slot 40 when the motor circuit is closed by the downward movement of the member 6 said member 6 is locked against rotational movement by the engagement of the projection with the side of either of the vertically disposed portions of said slot, thus preventing any possibility of reversing the motor until the current has been shut off by the upward movement of the member 6 to a position where the member 22 is in inoperative position. The projection 37 also acts as a stop to limit the upward movement of the member 6 relative to the member 5. In order to hold the member 6 in either of its switching positions, I provide a spring 42 in a sleeve or tube 43 pivotally secured to the member 6 and bearing upon a pin 44 having a swivel engagement with the base 7. The reversal of the motor is readily accomplished by the turning of the member 6 by the foot.

A metal plate 45 covers the openwork of the spider and a rubber floor-engaging pad 46 is secured to the base 7 with the plate 45 by screws 47.

I desire it to be understood that this invention is not to be limited to any particular form or arrangement of parts except in so far as such limitations are included in the claims.

What I claim as my invention is:

1. In a motor controller, the combination with a rheostat, of motor-reversing switch mechanism, and a single foot-operated actuator having two movements, one a rotary movement about a vertical axis to control said switch mechanism and the other a vertical movement along said axis to control said rheostat, said actuator having a peripheral foot-engaging portion, whereby such movements are effected by manipulation at any point of said peripheral portion.

2. In a motor controller, the combination of a compressible carbon pile rheostat, a casing therefor, motor-reversing switch mechanism, a foot-operated member vertically slidably mounted on said casing to operate said rheostat and rotatable relative to the casing to operate said switch mechanism.

3. In a motor controller, the combination of a member having a base portion and a tubular portion extending upwardly from said base portion, a compressible carbon pile rheostat within said tubular portion, and a foot-operated member slidably mounted on said tubular portion and adapted to vary the pressure on the resistors of said rheostat, said foot-operated member having an annular foot-engaging flange limited in its movement by engagement with said base portion.

4. In a motor controller, the combination with a casing, motor-reversing switch mechanism within said casing, a foot-operated member, a circuit-closing switch, means for controlling said motor-reversing switch mechanism by rotary movement of said member, and means for preventing rotary movement of said member on the operation of said closing switch by said member.

5. In a motor controller, the combination of a member having a base portion, and an upwardly extending tubular portion, compressible carbon pile resistors and a circuit-closing switch within the casing, a foot-operated member slidably mounted on said casing to move downwardly to close said switch and put pressure on said resistors, a spring for holding said member in an upper position, and a spring for normally holding said switch open, said foot-operated member having an annular foot-engaging flange limited in its movement by engagement with said base portion.

6. In a motor controller, the combination of motor-reversing switch mechanism, a rotatable member for operating said switch mechanism having a foot-engaging flange, and means including a spring to keep said member in either of its positions relative to said switch mechanism.

7. In a motor controller, the combination with a carbon pile rheostat including a circuit closing switch, of motor-reversing switch mechanism, and a single foot-operated actuator having two movements, one a rotary movement about a vertical axis to control said switch mechanism and the other a vertical movement along said axis to control said rheostat, said actuator having an annular foot-engaging flange, whereby such movements are effected by manipulation of any portion of said flange.

In testimony whereof I affix my signature.

ROYAL LEE.