Nov. 9, 1943. K. PERKINS 2,333,814

RHEOSTATIC MOTOR CONTROLLER

Filed March 11, 1942

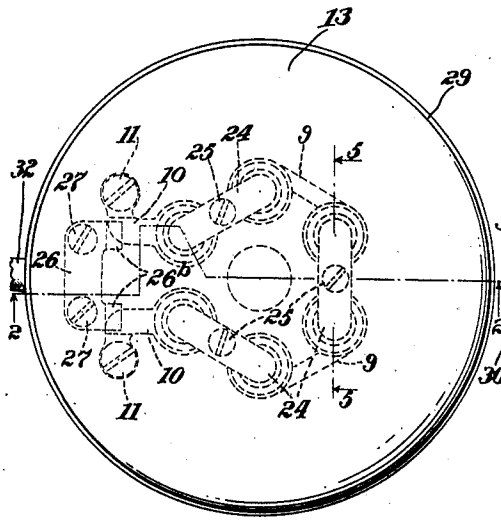


Fig. 1.

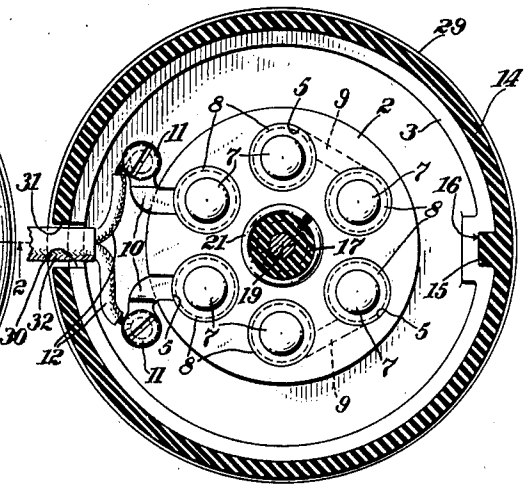


Fig. 3.

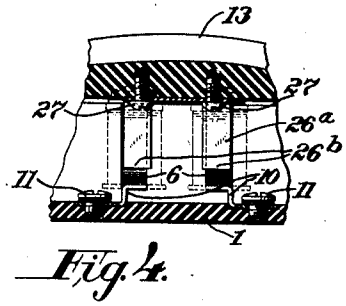


Fig. 4.

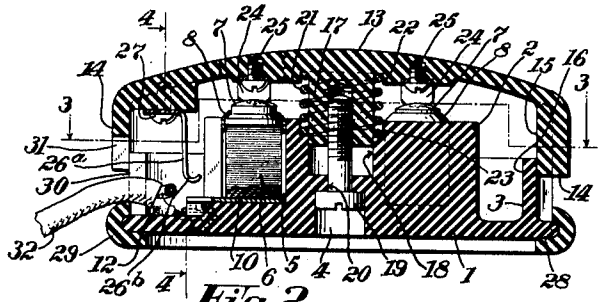


Fig. 2.

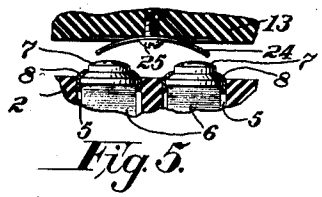


Fig. 5.

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RHEOSTATIC MOTOR CONTROLLER

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9 Claims. (Cl. 201—51)

This invention relates to a rheostatic motor controller and more particularly to that type used to control the speed of motor-driven sewing machines.

A primary object of the present invention is to provide a foot-controller of the compressible carbon pile type having a plurality of resistor units physically arranged and electrically connected so as to result in a symmetrical, compact structure of pleasing external appearance having a simple and rugged operating mechanism comprising few parts.

Another object of this invention is to provide an inexpensive foot-controller comprising two easily molded interfitting parts that may be readily assembled together with a single fastening element.

A still further object of the invention is to provide a rheostatic motor controller which is rendered substantially dust-proof by a telescopic construction which makes it unnecessary to bring an actuator element out through an aperture in the casing.

With the above and other objects in view, as will hereinafter appear, the invention comprises the combinations and arrangements of parts hereinafter set forth and illustrated in the accompanying drawing of a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the accompanying drawing—

Fig. 1 is a plan view of a rheostatic motor controller embodying the invention.

Fig. 2 is a vertical section, partly in elevation, taken on the line 2—2, Fig. 1.

Fig. 3 is a horizontal section, partly in plan, taken on the line 3—3, Fig. 2.

Fig. 4 is a fragmentary vertical section, partly in elevation, taken substantially on the line 4—4, Fig. 2.

Fig. 5 is a fragmentary vertical section, partly in elevation, taken substantially on the line 5—5, Fig. 1.

Referring more specifically to the drawing, there is shown a motor controller comprising a disk-like base 1 preferably made of molded insulating material and formed with a centrally-disposed upstanding body portion 2 and an upstanding peripheral edge portion 3 as seen best in Fig. 2. Formed within the body portion 2 is a central axial guide-aperture 4 surrounded symmetrically by vertical cylindrical receiving pockets 5 positioned in a regular hexagonal arrangement. Seated within each of said pockets 5 is a stack of carbon disks 6 arranged between the bottom portion of said pockets and a movable contact stud 7 positioned on the top of each stack. A flanged spacer collar 8, pressed within the top of each pocket 5 surrounds each of said studs to center and to retain it within the pocket and to provide a vertical bearing surface for its movement. Electrical bridging conductors 9 are embedded within the body portion 2 and extend between the bottom portions of certain ones of said sockets to make electrical contact with the bottom of the stack of disks therein and to series connect said stacks together in pairs as seen in Fig. 3. Also partially embedded in the body portion 2 of the base 1 are the L-shaped terminal lugs 10, each of which connects at one end with the bottom disk of one of two adjacent stacks and at the other end terminates in a portion which receives a terminal screw 11 for making connection with leads 12, whereby the device may be connected into any desirable external circuit.

An inverted cup-shaped movable pedal member 13, preferably made of molded insulating material, is formed with a downturned peripheral edge portion 14 which is adapted to encompass the complemental upturned edge portion 3 of the base 1 so that said pedal member 13 and said base 1 are partially telescoped in a coaxial position to form together a casing for the controller. A vertically disposed guide-rib 15 formed in the edge portion 14 extends radially inward and is engaged within a complemental slot portion 16 formed in the peripheral edge portion 3 of the base 1 so that said pedal member is constrained to move vertically and coaxially relative to said base 1.

The domed pedal member 13 is formed with a vertically depending central boss member 17 adapted to slide vertically within a portion 18 of the guide aperture 4 in order to maintain the base 1 and the pedal member in coaxial alignment. A headed screw 19, threaded into the central portion of guide boss 17, extends vertically from the lower part of the aperture 4 upward and through a portion 20 of reduced diameter forming a stop shoulder to limit the upward travel of said screw and prevent the complete separation of the base 1 and the pedal member 13. A helical reaction spring 21 embracing the boss member 17 and having its ends received in annular recesses 22 and 23 in the pedal member and base respectively, is provided to balance the operating pressures applied by the foot of the operator and to bias said pedal member to a raised

position when all foot pressure is relieved, as is the case shown in Fig. 2. It is clear that this construction permits adjustment of the maximum axial separation between the base and pedal member to be readily made by direct manipulation of the screw 19 through the aperture 4.

Electrically-conducting bow springs 24 are secured to the inside top wall of the pedal member 13 by screws 25 threaded into said wall and are positioned and arranged so that, when said pedal member is depressed, the springs bear upon and bridge respective pairs of the carbon disk stacks in the base member and thus cooperate with the fixed bridging conductors 9 to connect all of the stacks in series relation, as seen best in Fig. 1. The reaction spring 21 lifts the pedal member 13 high enough, when the foot pressure is removed therefrom, so that the bow-springs 24 leave the surfaces of contact studs 7 and thus open the series circuit through the carbon disk stacks at several points. The bow-springs 24 in association with the contact studs 7 thus provide the make and break contacts and comprise a built-in switch for the controller. See Fig. 5.

An inverted U-shaped conducting member 26, secured to the inside of the top wall of the pedal member 13 by screws 27 is formed with two depending limbs 26^a which carry at their free ends curved terminal portions 26^b adapted to make contact with and short-circuit the terminal lugs 10 when the pedal member 13 is sufficiently depressed, as shown best in Fig. 4. This short-circuit across the terminals of the controller effectively by-passes the resistance afforded by the stacks of carbon disks after they have been compressed sufficiently by downward pressure on the pedal member 13. This provides a position of minimum resistance for the controller.

The base 1 is formed at the peripheral edge with a slight radial flange portion 28. This flange portion has fitted over it an annular cushioning shoe 29 made of rubber or other suitable resilient material, which shoe underlies the base 1 at the periphery and serves as a resilient support for the controller. This support not only provides resistance against the sliding of the unit over any supporting surface on which it may be placed but also helps to prevent the scratching and marring of said surface.

The edge portions 3 and 14 are formed with slots 30 and 31, respectively, to provide exit clearance for the cord 32 containing the leads 12. This clearance provides the only means of access to the interior of the controller for external dirt and dust and may be made very small to exclude substantially all dust infiltration within the controller.

It is clear that, by arranging the stacks 6 such that their axes are vertical, the normal downwardly directed pressure of the foot of the operator may be applied directly to said stacks without redirection and a simple rugged operating mechanism may be employed. The telescoping arrangement between the movable and stationary elements, entirely eliminates the need for the usual operating mechanisms comprising pivots, links and levers. Further, by segregating the total series resistance into a number of individual resistance units represented by the separate stacks, it has been possible to use these stacks as direct supporting elements for the movable pedal member. The symmetrical arrangement of the stacks 6 about the guide aperture 4 assists in holding the pedal member 13 in coaxial alignment with the base 1 by providing a uniformly distributed series of reaction points against which the pedal member bears.

The base and pedal members are of readily moldable shape, and assembly has been reduced to a few simple screw-driver operations by the use of inserts within the molded parts. It is notable that the movable and stationary elements are operatively secured together by the single screw 19.

In operation, when the foot of the operator is pressed down upon the pedal centrally at the top, the guide boss 17 descends slidably within the guide aperture portion 18 in opposition to the pressure exerted by the reaction spring 21. In this descent, the complemental edge portions 3 and 14 of base and pedal respectively are maintained in coaxial slidable telescoped relation and the conducting bow springs 24, secured to the pedal, first make contact with the studs 7 to connect electrically in series relation the pairs of stacks permanently connected in pairs by the embedded conductors 9. Further downward movement of the pedal applies an increasing pressure to the stacks with an attendant decrease in their effective electrical resistance. After a sufficient downward displacement of the pedal is reached, the curved terminal portions 26^b of the conducting member 26 make contact with the terminal lugs 10 to provide a short-circuit around the terminals of the controller. A slight further downward movement of the pedal 13 brings the free end of the boss member 17 to a stop against the shoulder formed by the reduced portion 20 of the aperture 18. This limits the maximum downward position of the controller pedal.

From the foregoing it will be perceived that I have provided an improved and simplified motor controller comprising readily moldable coaxial telescoping parts easily assembled together with few fastening means into a substantially dust-proof casing of pleasing appearance and containing a plurality of vertical-axis stacks of carbon disks distributed horizontally in a regular pattern.

It will be obvious to those skilled in the art that the invention may, without departure from its essential attributes, be embodied in various specific forms other than those shown and described, which latter are to be considered in all respects as illustrative of the invention and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

Having thus set forth the nature of the invention what I claim herein is:

1. A rheostatic motor-controller having a body-member formed with a broad flat base adapted to rest for use upon the floor and a vertical axis cylindrical portion rising from said base and having a plurality of wells, compressible carbon resistance material disposed in said wells, a pedal cap-member movable vertically upon the cylindrical portion of said base, and one or more bow-spring bridging contact members mounted on and within said cap-member in cooperative relation with the compressible resistance material contained in said wells.

2. A rheostatic controller comprising a lower stationary base member formed with a plurality of upright cylindrical receiving pockets distributed horizontally in a regular pattern, stacks of carbon disks retained within said pockets, and an upper inverted cup-shaped pedal member positioned in telescoping relation with the base member and movable relative to said base mem-

ber along a vertical linear axis and spring means mounted directly upon and within said pedal member to electrically connect said stacks in series pairs and to vary the pressure on said stacks.

3. A rheostatic controller comprising a lower upright cylindrical stationary base member having a vertical axis of symmetry and formed with a plurality of generally cylindrical receiving depressions located equidistantly from said axis of symmetry and from each other and having their axes substantially parallel to the axis of said base member, stacks of carbon disks retained within said depressions, and an upper inverted cup-shaped pedal member biased to a raised position and arranged in coaxial telescoping relation with said base member and movable axially downward from said raised position and resilient means carried by said pedal member to electrically connect said stacks in series pairs and to apply increasing pressure on said stacks during the downward movement, said pedal member being constrained to move substantially in an axial direction only.

4. A rheostatic controller comprising a lower stationary base member having a vertical axis of symmetry and formed with more than two embedded column-shaped receiving pockets having their axes substantially parallel to and symmetrically spaced about said vertical axis of symmetry, stacks of carbon disks retained within said pockets, and an upper inverted cup-shaped pedal member carrying resilient current-conducting means and positioned in coaxial telescoping relation with said base member and biased to a raised position with said current-conducting means out of contact with said stacks and movable axially downward to electrically connect the stacks in series pairs and apply increasing pressure to said stacks.

5. A rheostatic controller comprising a generally cylindrical stationary base member with a plurality of generally cylindrical receiving pockets embedded thereing and having axes substantially symmetrically spaced around and parallel to the axis of said base member, stacks of carbon disks retained within said pockets, electrical conductors embedded in said base member to series connect said stacks together in pairs at the bottoms of said pockets, and an inverted cup-shaped pedal member positioned in coaxial telescoping relation with said base member to form therewith a closed casing for the controller, said pedal member carrying resilient current-conductors and being linearly movable in an axial direction to connect and disconnect in series said series pairs of stacks and to vary the pressure on said stacks.

6. A rheostatic controller comprising a stationary base former with a centrally-disposed body portion containing a central axial aperture and a plurality of upright receiving pockets positioned equidistantly from said aperture and from each other, and having a continuous upturned peripheral edge portion, a plurality of compressible resistor units positioned in said receiving pockets, electrical conductors embedded in said base and extending between the bottoms of pairs of adjacent pockets to connect the resistor units positioned therein in series, a movable inverted cup-like pedal member formed with a central guide boss which slides within the axial aperture in said base, and resilient conductor means carried by said pedal member to electrically connect said paired resistor units in series and to increase the pressure thereon responsive to downward movement of the pedal member, said pedal member having a downturned edge portion which vertically overlies the upturned edge portion of said base in movable coaxial telescoping relation therewith.

7. A rheostatic controller comprising a lower stationary base of molded insulating material formed with a centrally-disposed body portion containing upright receiving pockets, and having a continuous upturned peripheral edge portion, a plurality of compressible resistor units positioned in said receiving pockets and series connected in pairs at the bottom by embedded electrical conductors, an upper vertically movable inverted cup-like pedal member having a downturned edge portion which vertically overlies the upturned edge portion of said base in movable coaxial telescoping relation therewith, said pedal member carrying resilient electrical conducting members positioned to connect said pairs of resistor units in series relation and to apply increasing pressure to said units as said pedal member is moved downward.

8. A rheostatic controller comprising a lower stationary generally cylindrical base formed with a centrally-disposed body portion containing a central axial aperture and upright cylindrical receiving pockets, and having a continuous upturned peripheral edge portion, a plurality of compressible resistor units positioned in said receiving pockets and series connected in pairs at the bottom by embedded electrical conductors, an upper movable inverted cup-like pedal member formed with a depending central guide boss which slides within the axial aperture in said base, said pedal member having a downturned edge portion which vertically overlies the upturned edge portion of said base in movable coaxial telescoping relation therewith, said pedal member carrying resilient electrical conducting members arranged to connect said pairs of resistor units in series relation and to apply increasing pressure to said units as said pedal member is moved downward.

9. A rheostatic controller comprising a stationary generally cylindrical base formed with a centrally-disposed body portion containing a central axial aperture and a plurality of upright cylindrical receiving pockets, and having a continuous upturned peripheral edge portion, a plurality of compressible resistor units positioned in said receiving pockets, current-conducting members connecting said resistor units together in pairs at the bottoms of adjacent pockets, a movable inverted cup-like pedal member formed with a central depending guide boss which slides within the axial aperture in said base, said pedal member having a downturned edge portion which vertically overlies the upturned edge portion of said base in movable coaxial telescoping relation therewith, a spring embracing said guide boss and urging said pedal member upward relative to said base, and a single headed screw positioned within said axial aperture and threaded into the pedal member to limit its upward movement, and resilient electrical conducting members carried by said pedal member and arranged to connect said pairs of resistor units in series relation and to apply increasing pressure to said units as said pedal member is moved downward.

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