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COMPRESSIBLE RESISTANCE PILE MOTOR CONTROLLER

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Fig. 1.

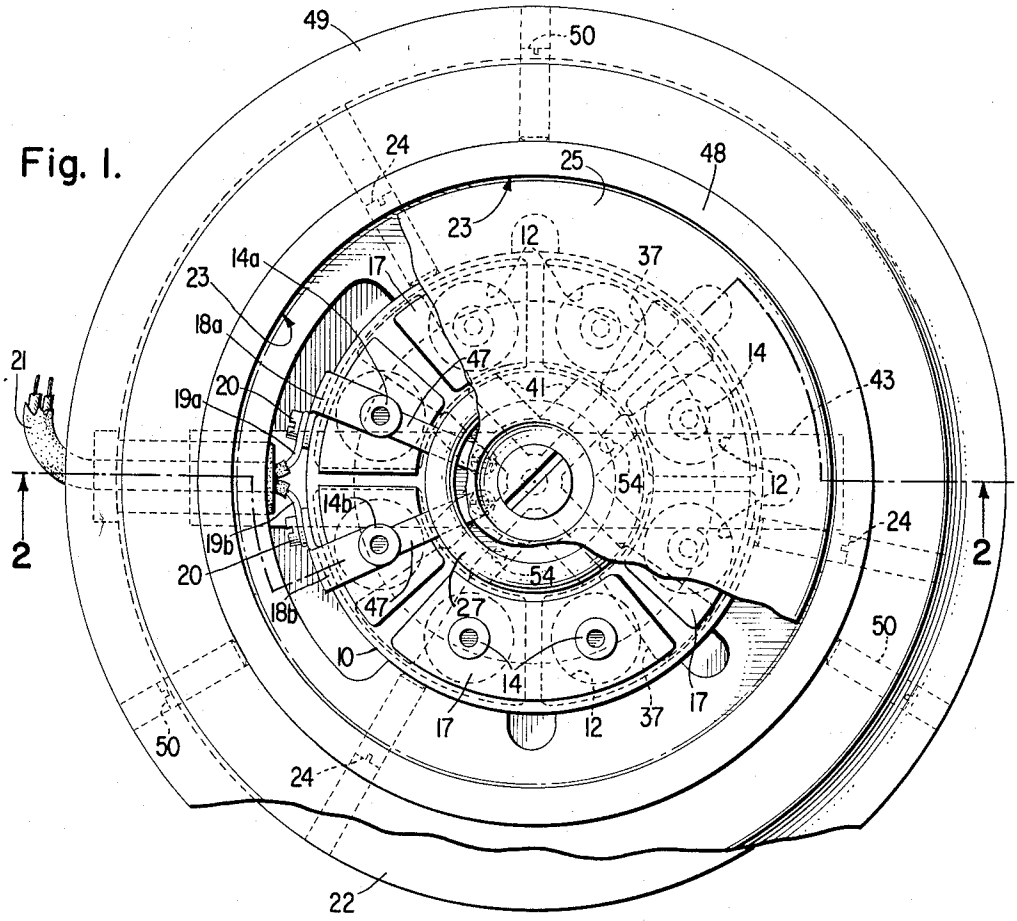


Fig. 2.

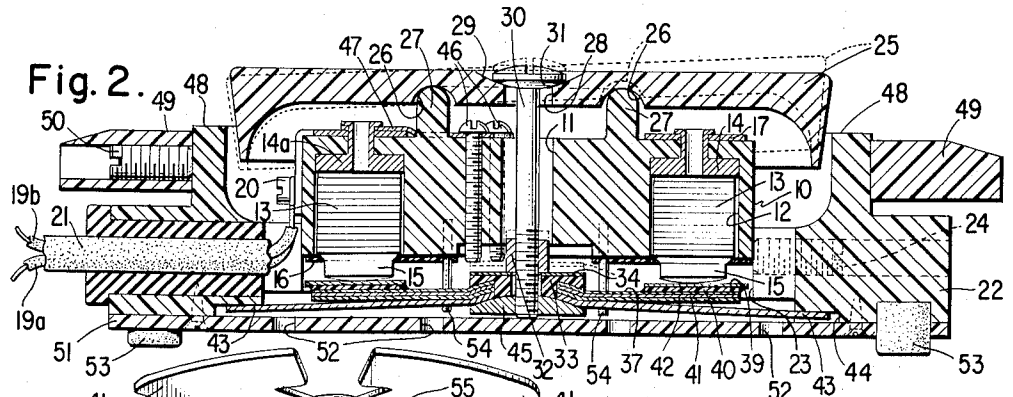
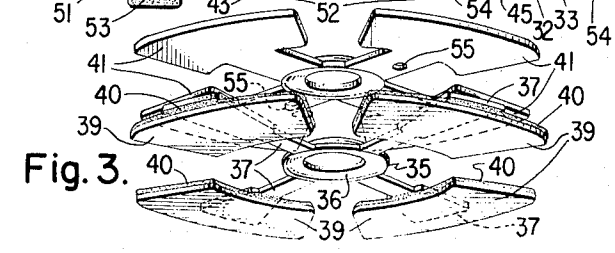


Fig. 3.



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COMPRESSIBLE RESISTANCE PILE MOTOR CONTROLLER

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This invention relates to a compressible resistance pile 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 vertically-positioned short-length piles physically arranged in a circularly symmetrical array and electrically connected in series with means for applying substantially equal pressure simultaneously to said piles in response to the tilting in any radial direction of a disc-like pedal member, thus requiring a minimum amount of prepositioning by the operator.

Another object of this invention is to provide a foot-controller having a substantially frictionless operating mechanism for translating pedal movement into multiple pile pressures.

A still further object of this invention is to provide a foot-controller of minimum overall height having an adjustable reference ring to establish a comfortable foot rest position for the operator.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings 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 drawings,

FIG. 1 is a broken top plan view of a foot-controller embodying the invention.

FIG. 2 is a transverse sectional view taken substantially on line 2—2 of FIG. 1.

FIG. 3 is an exploded view showing perspective details of certain elements of the foot controller embodying the invention.

Referring more specifically to the drawing, there is shown a foot controller comprising a cylindrical body member 10 preferably made of a heat resisting ceramic or molded insulating material. Formed within the body member 10 is an axial aperture 11 surrounded symmetrically by vertical cylindrical receiving pockets 12 positioned in a regular octagonal arrangement. The pockets 12 are open at the bottom to receive in each a stack of carbon discs 13 arranged between a top fixed terminal 14 and a bottom movable contact stud 15.

The studs 15 are retained within the pockets 12 by an annular insulating ring 16 secured to the body member 10 as seen in FIG. 2. Conducting plates 17 connect adjacent pairs of terminals 14 except for terminals 14*a* and 14*b* which are connected to terminals 18*a* and 18*b* respectively. Conductors 19*a* and 19*b* connect by means of screws 20 to the terminals 18*a* and 18*b* and form a cable 21 for connection to external circuits as desired.

A base 22 preferably made of molded insulating material is formed with a central well portion 23 within which is supported the body member 10 fixed in position by means of radial screws 24. A circular disc-like pedal member 25 is formed with an annular groove 26 which engages an upstanding coaxial annular rib portion 27 formed on said body member 10 and extends radially beyond said rib portion so that downward pressure applied to any peripheral region of the pedal member 25 results

in pivoting said pedal about a constant-radius fulcrum, as indicated in the dotted lines of FIG. 2.

The pedal member 25 is formed with an axial aperture 28 having a spherical seat 29 for receiving a screw 30 having a spherical head 31. This permits the screw 30 to be displaced upwards responsively to tilting of the pedal 25 with minimum cocking of the screw. Threaded onto the screw 30 is a guide bushing 32, which slidably fits within the aperture 11. An insulated washer 33 carrying a conducting band 34 and slidable on the screw 30 provides a seat for elements now to be described.

A spider spring 35 made preferably of beryllium copper has a hub 36 with a spherical seat and four radial arms 37. Mechanically secured to but electrically insulated from each of the arms 37 is a conducting plate 39 also preferably made of beryllium copper. This securement may be accomplished by the use of adhesive epoxy resin 40 as shown best in FIG. 3 or by any other suitable means.

The beryllium copper spider spring 35 is backed up by two steel spider springs 41 and 42 which may be of different stiffness to provide a compound spring action. Finally a steel leaf spring 43 having its ends seated in shoulders 44 formed in the base 22 serves as a restoring spring normally to bias the pedal 25 to a non-tilting position, which represents the non-operative position of the foot-controller. All of the above springs have hubs with spherical contours to form a nested series held clamped between the washer 33 and a nut 45 formed with a mating spherical contour and threaded onto the screw 30 as seen in FIG. 2.

It will be understood that the conducting plates 39 form bridging connections for the adjacent pairs of stacks of carbon disks 13 in such a manner that all stacks are connected in series relation with respect to the terminals 18*a* and 18*b*. In the maximum tilted position of the pedal 25 the washer 33 is raised fully so that the conducting band 34 contacts screws 46 and serves to provide a low resistance path across the terminals 18*a* and 18*b* by way of the conducting straps 47. This is the maximum speed position of the controller.

Aligning pins 54 secured to the body member 10 pass through apertures 55 in the steel spider springs 41 and 42 to prevent rotation of the latter out of proper alignment with the studs 15.

The base 22 is formed with an upstanding annular rim 48 which shrouds the pedal member 25 and forms a seat for an adjustable reference ring 49 secured thereto by screws 50. The ring 49 may thus be adjusted with respect to height to establish a comfortable foot rest position as desired. A cover 51 having ventilating apertures 52 is secured to the bottom of the base 22 and resilient feet 53 provide spacing from any supporting surface to insure access of air to the apertures 52.

It will be evident from the above that there is provided according to this invention a foot-controller which has a simple friction-free operating mechanism and which, due to the annular fulcrum structure, makes it unnecessary to preposition the controller with respect to the operator.

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

1. A rheostatic motor-controller of the compressible resistance type comprising a circular symmetrical array of vertical resistance piles, an insulated body member supporting said piles and having an axially apertured portion, a coaxial annular rib formed on said body member, a pedal member fulcrumed on and extending radially beyond said rib, conducting pressure-applying means arranged to connect adjacent pairs of said piles, and tensioned link means operative through said axially apertured portion to connect said pedal member on one side of said body member with said pressure-applying means on the opposite side of said body member, whereby pres-

sure applied to any rim portion of said pedal is transmitted equally to said piles.

2. A rheostatic controller comprising a generally cylindrical stationary base, a cylindrical body member secured to said base, a plurality of receiving pockets formed in said body member and having axes symmetrically spaced around and parallel to the axis of said body member, stacks of compressible resistance discs retained within said pockets, said body member being formed with an axial aperture and a coaxial annular rib portion, a circular disc-like pedal member fulcrumed on and extending radially beyond said rib portion, resilient pressure-applying means arranged to connect adjacent pairs of said stacks and tensioned link means operative through said axial aperture to connect said pedal member with said pressure applying means.

3. Apparatus according to claim 2 in which the stationary base is formed with an upstanding annular rim portion surrounding said pedal member and a reference ring secured to the outer periphery of said rim portion is adjustable in height relative to the pedal member.

4. A rheostatic controller comprising a cylindrical stationary body member having an axial aperture and a coaxial annular rib portion, stacks of resistance discs supported in said body member in a circularly symmetrical array around said central aperture, stationary conducting means for connecting said stacks in adjacent series pairs on one side of said body member, movable conducting means for connecting said stacks in series pairs on the opposite side of said body member, a circular disc-like pedal fulcrumed on and extending radially beyond said annular rib portion and tensioned link means secured to said pedal centrally of said annular rib portion and operative through said axial aperture to effect movement of said movable conducting means to apply pressure equally to said stacks responsively to tilting of said pedal.

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