

Sept. 11, 1945.

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2,384,772

SEWING MACHINE MOTOR CONTROLLER

Filed May 26, 1943

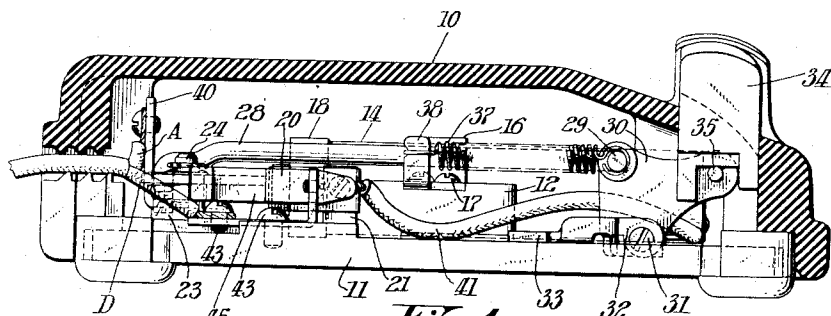


Fig. 1.

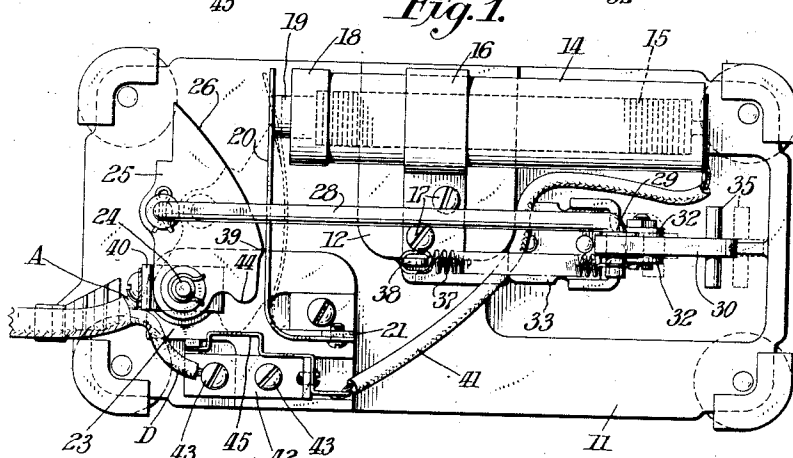


Fig. 2.

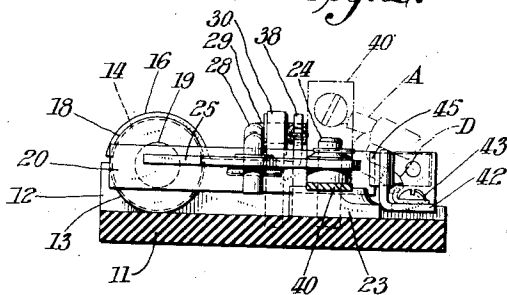


Fig. 3.

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2,384,772

SEWING MACHINE MOTOR CONTROLLER

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Application May 26, 1943, Serial No. 488,551

4 Claims. (Cl. 201—51)

This invention relates to foot operated rheostats or controllers, of the carbon pile type, used to control small motors such as electric sewing machine motors. One of the objects of this invention is to provide a simplified and improved carbon pile controller or rheostat which can be manufactured at low cost, is of compact construction and may be readily manufactured and assembled.

Another object of this invention is to provide an improved manually controlled mechanism for compressing the carbon pile and to arrange the mechanism to effect a gradual and uniform variation in the resistance of the carbon pile over the entire working range of the manually controlled compressing mechanism.

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 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,

Figure 1 is a longitudinal vertical sectional view taken through the rheostat and showing, in side elevation, the operating mechanism and the base on which it is carried.

Fig. 2 is a top plan view of the rheostat with the cover removed.

Fig. 3 is a left end elevation of the rheostat as viewed in Fig. 2.

Referring to the rheostat shown in the drawing, the hollow casing, in which is housed the carbon-pile and the mechanism for compressing it, comprises a hollow top or cover member 10 and a bottom or base member 11, each of which is preferably made of insulating material such as artificial resin, or "Bakelite." The casing is fully shown and described in my prior Patent No. 2,117,257, dated May 10, 1938, to which reference may be had for a more complete and detailed description.

Formed on the upper face of the base 11 is an upstanding substantially rectangularly shaped block 12 formed with a semi-circularly shaped groove 13 (Fig. 3) which receives a rheostat comprising a tubular porcelain body 14 which houses a pile of carbon disks 15. The porcelain tube 14 is adjustably secured in the groove 13 by a sheet-metal strap 16 which has one end overlying the porcelain tube and its other end fixed to the block 12 by the screws 17.

At one end of the tube 14 there is secured a cap 18 through which extends the usual conducting pressure head 19 which is lightly engaged by one end of an L-shaped spring 20, the other end of the spring being secured to an upstanding lug 21 carried by the base 11. A boss 23 is formed on the base 11, and imbedded in the boss and base is a vertically arranged pivot pin 24 on which is pivotally mounted a member 25 having a cam face 26. Actuating mechanism is provided for swinging the member 25 about its pivot 24. This mechanism comprises a pull rod 28 having one of its ends secured to the member 25 and its other end secured at 29 to a three arm lever 30 which is fulcrumed at 31 on the ears 32 of a plate 33 fixed to the base 11. The cover 10 is formed with a rectangular opening or guideway in which is fitted a manually operable push button 34 bifurcated at its lower end to receive the ends of a cross-bar 35 carried by the operating arm of the lever 30. The above described actuating mechanism for the pivoted member 25 is old and well known and is fully disclosed in my prior Patent No. 2,117,257 previously referred to.

From the above it will be observed that when the push button 34 is depressed the lever 30 is caused to move about its fulcrum 31 and thus cause the pull rod 28 to swing the member 25 about its pivot 24 in a clockwise direction as viewed in Fig. 2. In order to return the member 25 to its normal position, and to maintain the parts in the position shown in full lines in Fig. 2 when the button 34 is released, a tension spring 37 is provided, said spring having one of its ends secured to the rod 28 at the point 29 and its other end secured to an upstanding lip 38 struck up from the sheet metal strap 16.

It will be observed in Fig. 2 that the member 25 does not engage the spring 20 when the parts of the actuating mechanism are in their normal or ineffective position. When the button 34 is depressed the initial movements of the member 25 about its pivot causes the slight protuberance 39, formed on the member 25, to engage or contact the spring 20 thereby closing the circuit through the carbon pile.

When the point 39 engages the spring 20 the circuit is as follows: from the lead A to an L-shaped conductor post 40 which embraces the pivot pin 24, through the pivot pin, the member 25, spring 20, conducting pressure head 19, the carbon pile 15, the lead 41 which has one of its ends connected to one end of the pile of carbon disk and its other end connected to an L-shaped

conductor bracket 42 which is fixed to the base 11 by the screws 43, and thence to the lead D.

Further downward movement of the push button 34 causes the member 25 to swing further about its pivot in a clockwise direction and as this movement progresses the cam face 26 moves along the spring and decreases the effective length of the spring until the member 25 reaches the position shown in dotted lines in Fig. 2. When the dotted line position shown in Fig. 2 is reached, the end of the member remote from the pivotal point overlies the conducting pressure head 19 and the maximum pressure is applied to the carbon pile, at this point the protuberance 44 on the member 25 engages a spring 45 carried by the conductor bracket 42 and the carbon pile is shorted out of the circuit. When the protuberance 44 contacts the spring 45 the circuit established is as follows: from the lead A through conductor post 40, pivot pin 24, member 25, spring 45, conductor bracket 42 and thence to the lead D.

From the foregoing it will be observed that during the operation of my improved rheostat the point of contact between the cam edge 26 of the member 25 and the spring 20 moves back and forth longitudinally of the spring 20 thereby increasing or decreasing the effective length of the spring and thus varying the pressure applied to the carbon pile. It is well known in this type of rheostat that the resistance of the carbon pile decreases rapidly when pressure is first applied and that the initial pressures on the pile must be low and applied very gradually. To accomplish this desirable result a low tension spring 20 has been used and the member 25 has been so located and arranged that the spring 20 is initially flexed at a point remote from the pressure head 19 in order to take advantage of the maximum resilience of the spring and thus apply the minimum of pressure to the carbon pile for the initial increments of movement of the member 25. As the movement of the member 25 in a clockwise direction continues the point of application, to the spring 20, of the flexing force applied by the cam 26, travels towards the point of contact of the spring 20 with the carbon pile and, therefore, the pressure exerted by the spring increases a greater amount than would be the case if the point of application of the flexible force remained stationary relative to the spring.

It will be understood that the initial pressure of the spring 20 on the carbon pile can be adjusted by loosening the screws 17 and sliding the carbon pile longitudinally, thus determining the maximum electrical resistance of the carbon pile and the minimum speed of the motor controlled thereby. It will also be understood that the shape of the cam surface 26 may be varied to give the desired characteristics to the controller or rheostat and that the form, construction, and arrangements of the other elements employed are susceptible of material variation. Therefore,

the privilege is reserved of resorting to all such legitimate changes therein as may be fairly embodied within the spirit of the accompanying claims.

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

1. A controller for electric motors comprising a base, a carbon pile resistor secured to said base, and means for applying pressure to said carbon resistor, said means including a flat spring having one of its ends secured to said base and its other end in electrical contact with said carbon pile, a pivoted member having a cam shaped edge, and manually controlled mechanism for swinging said member about its pivot to cause its cam edge to engage the spring intermediate its ends and move along said spring towards the end of the spring which is in contact with the carbon pile.

2. A controller for electric motors comprising a rectangularly shaped base, a carbon pile resistor carried at one side of said base, a flat spring having one of its ends fixed to the other side of the base and extending across said base into contact engagement with the carbon pile resistor, a member pivoted to said base and formed with a cam edge, and mechanism for moving said member about its pivot to cause the cam edge member to engage the spring intermediate its ends and to travel along the spring toward the resistor for the purpose of varying the pressure on the carbon pile resistor.

3. A controller for electric motors comprising a rectangularly shaped base, a carbon pile resistor carried at one side of said base, a flat spring having one of its ends fixed to the other side of the base and extending across said base into engagement with the carbon pile resistor, a member pivoted to said base and formed with a cam edge, said cam edge being normally out of contact with said spring, mechanism for moving said member so that its cam edge engages the spring intermediate the ends of the latter and then rolls over the spring towards the carbon pile resistor.

4. A controller for electric motors comprising a base, a carbon pile resistor carried by said base, a flat spring having one end fixed to said base and its other end in engagement with said carbon pile, said carbon pile being located on one side of said spring, a member located entirely on the other side of said spring and adapted to swing about a vertical pivot, said member having a cam shaped edge, and manually controlled means for swinging said member about its pivot and causing said member to engage and roll over said spring in the longitudinal direction thereof to thereby vary the effective length of said spring for the purpose of varying the pressure on the carbon pile.

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