Dec. 25, 1923. 1,478,701

F. DIEHL

CONTROLLER

Original Filed Feb. 10, 1919 2 Sheets-Sheet 1

Fig. 1.

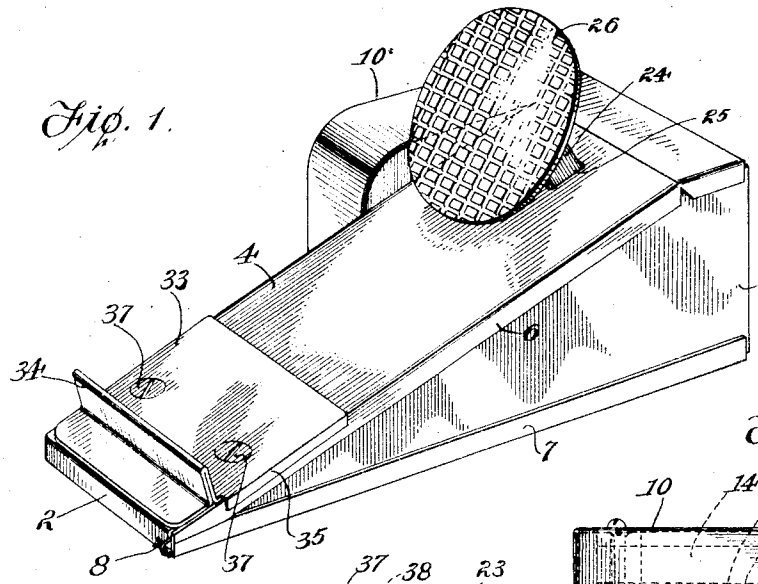


Fig. 2.

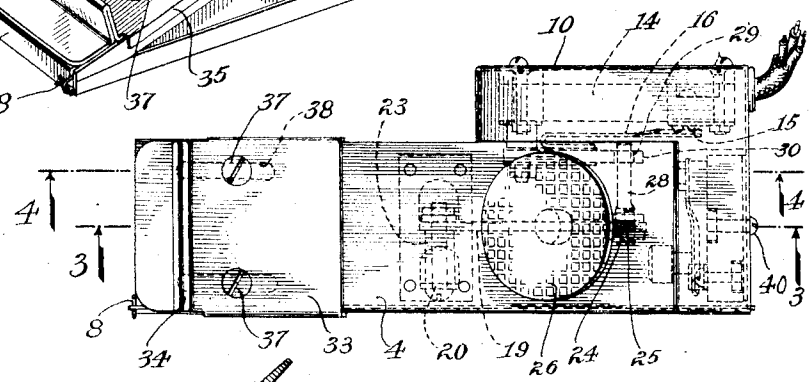


Fig. 3.

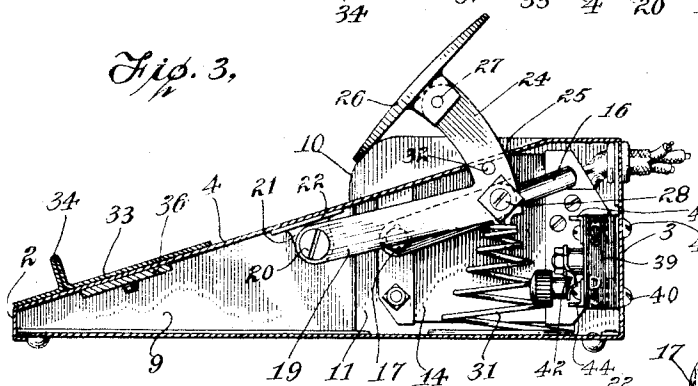
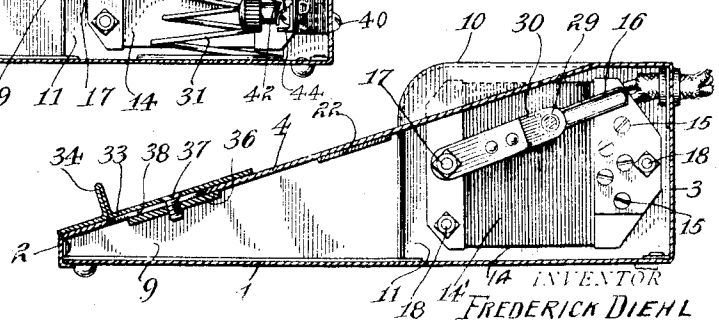


Fig. 4.



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Fig. 10.

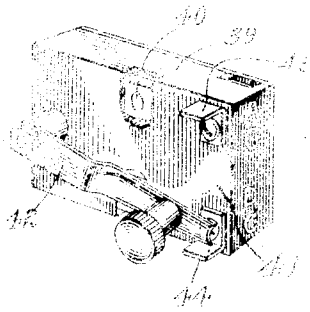


Fig. 5.

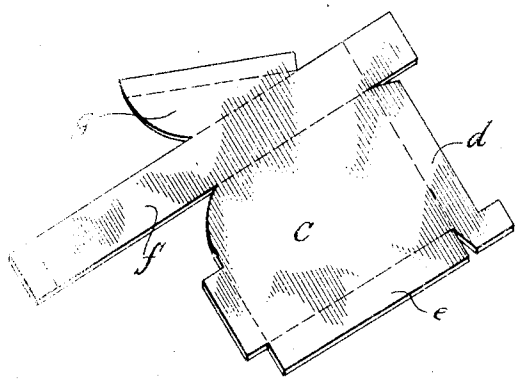


Fig. 6.

Fig. 8.

Fig. 7.

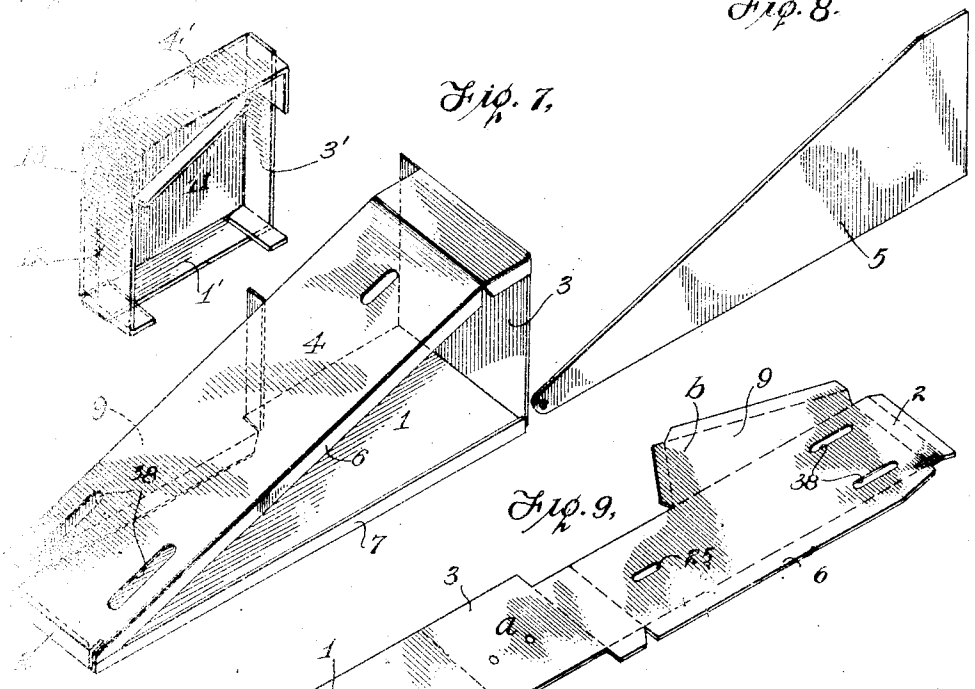


Fig. 9.

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1,478,701

UNITED STATES PATENT OFFICE.

FREDERICK DIEHL, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO DIEHL MANUFACTURING CO., OF ELIZABETH, N. J., A CORPORATION OF NEW JERSEY.

CONTROLLER.

Application filed February 10, 1919, Serial No. 276,085. Renewed May 16, 1923.

To all whom it may concern:

Be it known that I, FREDERICK DIEHL, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented new and useful Improvements in Controllers, of which the following is a specification.

This invention relates to a controller for an electric motor.

The controller embodying this invention is particularly adapted for controlling the operation of sewing machine motors, although it may be used for other purposes.

One type of controller which has been extensively used comprises a foot-actuated rheostat adapted to be supported and operated independently of the motor or sewing machine. Such a controller possesses the advantage of being readily movable to any position convenient to the operator and being placed out of the way when not in use.

One of the objects of the present invention is to provide a controller of this general type which is compact, simple, efficient, safe and readily manufactured.

Another object is to provide a controller wherein the casing enclosing the motor-controlling rheostat forms a support for the operator's foot.

Another object is to provide a controller casing which is substantially dustproof and is made of a small number of parts.

Other objects and advantages will appear from the specification and claims.

One embodiment of the invention is illustrated in the accompanying drawings, in which:

Figure 1 is a perspective of a controller embodying the invention;

Figure 2 is a plan view of the controller illustrated in Figure 1, the parts within the casing being shown in dotted lines;

Figure 3 is a longitudinal sectional view taken substantially on the line 3—3 of Figure 2;

Figure 4 is a longitudinal sectional view taken substantially on the line 4—4 of Figure 2;

Figure 5 is a plan view of a blank from which one portion of the casing is made;

Figure 6 is a perspective of a portion of the casing constructed from the blank shown in Figure 5;

Figure 7 is a perspective of the main portion of the casing;

Figure 8 is a perspective of a slide plate which forms a closure for the casing;

Figure 9 is a perspective on a smaller scale of the blank from which is made that portion of the casing illustrated in Figure 7, and

Figure 10 is a perspective of the motor field control switch.

The controller comprises, in general, a rheostat entirely supported by and completely enclosed within a substantially dust and fireproof casing or box which also provides a convenient support or rest for the operator's foot and through which the controlling pedal projects. The casing is preferably made of three pieces of sheet metal which may be readily stamped and bent into the desired shape. Two of the pieces form the permanent sides of the casing and the third forms a removable closure therefor.

The main portion of the box or casing includes a bottom 1, end walls 2 and 3, and a top 4 inclined for the major portion of its length. One side of the casing is closed by a removable slide-plate 5. Vertical flanges 6 and 7 constitute guides and retainers for the slide-plate, which is locked in position by a cotter pin 8. The other side of the casing is permanently closed by a side wall 9 and an auxiliary casing 10. The auxiliary casing constitutes in effect an extension or pocket of the main portion of the casing.

The entire casing is constructed from three sheet metal blanks and may, therefore, be readily and cheaply manufactured. The blank illustrated in Figure 9 comprises a portion *a* generally rectangular in form and a triangular extension *b* projecting from one side thereof. The rectangular portion is bent upon itself at the points indicated by the dotted lines to form the bottom, top and end walls of the main portion of the casing (Figure 7). The triangular extension *b* of the blank forms the side wall 9. Suitable projections are also provided to form the flanges 6 and 7.

The auxiliary casing or pocket 10 is formed from a blank such as illustrated in Figure 5. This blank includes a part *c*, which forms the wall 11 (Figure 6). Projections *d* and *e* form the wall 3′ and bottom

4', respectively. Strip f is bent to form the top 6' and wall 12. The blank is further provided with a portion g which forms a wall 13. This wall is designed to close the space between the top 4' of the auxiliary casing and the inclined portion of the top 4 of the main portion of the casing.

The main and auxiliary portions of the casing are assembled in such manner that the edges of the bottom 1 and wall 3 of the main portion abut the free edges of the bottom 1' and wall 3', respectively, of the auxiliary portion. The free edge of wall 12 is designed to engage the vertical end of wall 9. The drawings clearly show the flanges which are provided for securing the parts together. The parts may be joined in any suitable manner, as by riveting, welding, soldering, etc. The entire casing may be coated with a suitable paint, enamel or lacquer to hide the joints.

The pocket 10 of the casing provides a housing for any appropriate type of resistance unit. That shown in the drawings is in the form of a rheostat such as is fully described in my Patent No. 1,369,407, granted February 22, 1921. This rheostat comprises, in general, a non-conducting support 14 for a suitable resistor 14', a plurality of contacts 15 electrically connected with corresponding sections of the resistor, and a contact arm 16 pivoted to support 14 and movable over the contacts. The arrangement is such that by swinging the arm about its pivot 17 any number of the resistor sections may be included in or excluded from the motor circuits. The rheostat is secured to the wall 11 of the casing by any convenient means, such as bolts 18.

The mechanism for actuating the rheostat arm includes a lever 19 mounted to swing in a plane substantially parallel with the plane of movement of arm 16. This lever is mounted upon a pivot 20 carried by a pair of depending ears 21 of a bracket 22. Bracket 22 is secured to the under side of the top of the casing. A spacing sleeve 23 may be employed to maintain the lever in proper position on the pivot. The free end of lever 19 carries a pedal, which comprises a curved arm 24 extending therefrom through an opening 25 in the top of the casing and a foot-plate 26. Foot-plate 26 is pivotally secured to arm 24 by a pin 27, to provide a better fit against the operator's foot.

A pin 28 rigidly carried by lever 19 projects through an aperture 29 in an arm 30. Arm 30 is made of any suitable insulating material and forms a part of the rheostat arm 16. In this manner, lever 19 is operatively connected with, but insulated from, the arm 16.

A spring, preferably in the form of a conical spring 31, yieldingly maintains lever 19, and, consequently, the rheostat arm, in raised position. A pin 32 may be provided to limit the upward movement of the lever. In order to maintain the spring in proper position, its upper end may be secured to lever 19 by a cotter pin or other suitable means.

When used for controlling sewing machine motors, the controller is ordinarily placed upon the floor beneath or near the sewing machine. The rheostat is electrically connected with the motor. The foot of the operator is positioned upon the controller so that the heel rests upon the inclined top thereof and the foot-plate 26 engages beneath the ball of the foot. By slight pressure of the ball of the foot the pedal may be depressed and the effective resistance of the rheostat varied accordingly.

In order to properly position the foot upon the controller, an adjustable heel-plate may be provided. In the present instance, the heel-plate comprises a plate 33 having a transversely-extending flange 34 for engagement with the heel of the operator. The plate is also provided with downturned guiding flanges 35. The plate is adjustably secured to the top 4 of the casing by means of a clamping plate 36. Screws 37, passing through adjusting slots 38 in the top of the casing, connect the clamping plate with the heel-plate.

In some instances it may be found desirable to operate the same motor on either alternating or direct current and to change the excitation of the field when such a change in source is made. The excitation may be changed by varying the number of active turns in the field winding. To accomplish this result a switch unit 39 may be secured to the wall 3 within the casing by any suitable means such as screws 40. This unit comprises a non-conducting base 41 to which is pivoted a switch arm 42. Arm 42 may be moved to engage either of two fixed contacts 43 and 44 which are connected to different points in the field winding. The field circuit is completed through arm 42 so that when the arm engages on contact 43 a different number of turns are traversed by the field current than when the arm engages contact 44. The field excitation control switch is thus located in a safe but accessible place where it may be operated when desired but where the chance of inadvertent or accidental operation is reduced.

In assembling the controller, the sheet-metal blanks forming the casing are first punched, bent into the required shape, fastened together and painted or otherwise finished, as desired. Then the resistance unit, including contact arm 16 and lever 30, is placed within pocket 10 and bolted in position. Next the arm 19 is placed within the casing, the extension 24 is inserted through

opening 25, and the arm is secured in place by pivot 20. The switch unit 39 is then secured to the casing and conical spring 31 is placed beneath arm 19, the slide 5 is inserted, and the foot-plate is pinned to extension 24.

The controller is thus assembled by bringing together and placing certain units and may be easily taken apart for the repair or replacement of any of the parts. The contacts and operating mechanism are readily accessible for inspection and cleaning upon the removal of the enclosing plate. The contacts are protected against the accumulation of dust and lint which might otherwise collect on the rheostat and interfere with its proper operation and create a dangerous fire hazard from the sparks and arcs which may occur when the rheostat arm is moved to vary the resistance. The entire structure is compact, rigid and strong, presents a neat appearance, and may come into contact with the material being worked upon or the operator's clothing without danger.

The embodiment of the invention illustrated and described is susceptible of many modifications without departing from the spirit thereof or the sacrificing of its advantages.

What I claim is:

1. A controller comprising a casing formed of two pieces of sheet metal bent and secured together to form a box and a third piece of metal constituting a removable closure for the box, a rheostat enclosed within and supported by said casing, and a pedal extending into said casing and cooperating with said rheostat.

2. A motor controller comprising a substantially dust- and fireproof casing for supporting the operator's foot, a rheostat supported by and within said casing, a pedal carried by said casing and extending through a wall thereof to operate said rheostat, and an adjustable heel-plate carried by said casing to facilitate the positioning and supporting of the operator's foot relative to the pedal.

3. A motor controller comprising a casing having a main foot-supporting portion formed of one piece of sheet metal and a removable closure and a pocket formed of another piece of sheet metal; an adjustable resistance unit supported by and within the casing pocket, and a pedal unit supported by and within the main portion of the casing and having an arm cooperating with the resistance unit and a foot-plate located outside of the casing.

4. A motor controller comprising a sheet metal casing for supporting the operator's foot, a resistance unit mounted within said casing, contacts for said unit, an arm movable in a vertical plane for engaging said contacts to vary the resistance, a pedal above and extending through a restricted opening in the top of said casing for operating said arm, and a spring for yieldingly maintaining said arm and pedal in normal position.

5. A motor controller comprising a rheostat having a resistance, contacts and resistance-controlling arm, a sheet metal casing for enclosing and supporting said rheostat and supporting the operator's foot, a pedal pivotally carried by said casing for operating said rheostat, a spring for yieldingly maintaining the pedal and rheostat arm in normal position, and a heel-plate mounted upon said casing.

6. A motor controller comprising a rheostat having a resistance, contacts and resistance controlling arm, a sheet metal casing for enclosing and supporting said rheostat and supporting the operator's foot, a pedal extending through the top of said casing and pivotally carried thereby for operating said rheostat, and resilient means for maintaining the pedal and rheostat arm in normal position.

7. A motor controller comprising a substantially fire and dust proof casing having an inclined top structurally integral therewith and means thereon adapted to support the heel, a pedal having an arm pivoted to the underside of the top and extending through a restricted opening in the top, a rheostat having a movable arm mounted within the casing, and means connecting the rheostat arm and the pedal.

8. A motor controller adapted to be operated by the foot, comprising a substantially fire and dust proof casing having an inclined top, a foot pedal having an arm extending through an opening in the top, means within the casing for supporting said arm, resilient means cooperating with the pedal to hold the same in a raised position, a rheostat mounted within the casing and having an arm movable in a vertical plane, and means connecting said arm and pedal.

9. A motor controller adapted to be operated by the foot, comprising a substantially fire and dust proof casing having a top adapted to support the foot, a pedal including a curved arm extending through the top of and pivotally mounted within the casing, a foot plate mounted on the projecting end of said pedal arm, a spring cooperating with the pedal, a rheostat mounted in the casing and having a sliding contact, and means connecting said contact and said pedal.

10. A motor controller adapted to be operated by the foot, comprising a casing, an adjustable heel support on the casing, a rheostat mounted within the casing and having a sliding contact, and a spring pressed pedal pivotally mounted within the casing and extending through an opening in the top thereof and operatively connected with said contact.

11. A motor controller adapted to be operated by the foot comprising a substantially fire and dust proof casing having an inclined top, a rheostat mounted in the casing and having a contact slidable in a substantially vertical plane, a spring pressed pedal pivotally mounted within the casing, means connecting the pedal and the contact, said pedal having a portion extending through the top of the casing, and a foot plate mounted on the projecting portion.

12. In a motor speed controller, the combination with a casing including a removable side wall, of a circuit controlling element detachably mounted as a unit within said casing and including a movable contactor, a pedal-lever pivoted at one end to said casing within said side wall, the opposite end of said lever terminating in a foot-piece accessible exteriorly of said casing and an operative connection between said lever and contactor.

In witness whereof, I have hereunto subscribed my name.

FREDERICK DIEHL.