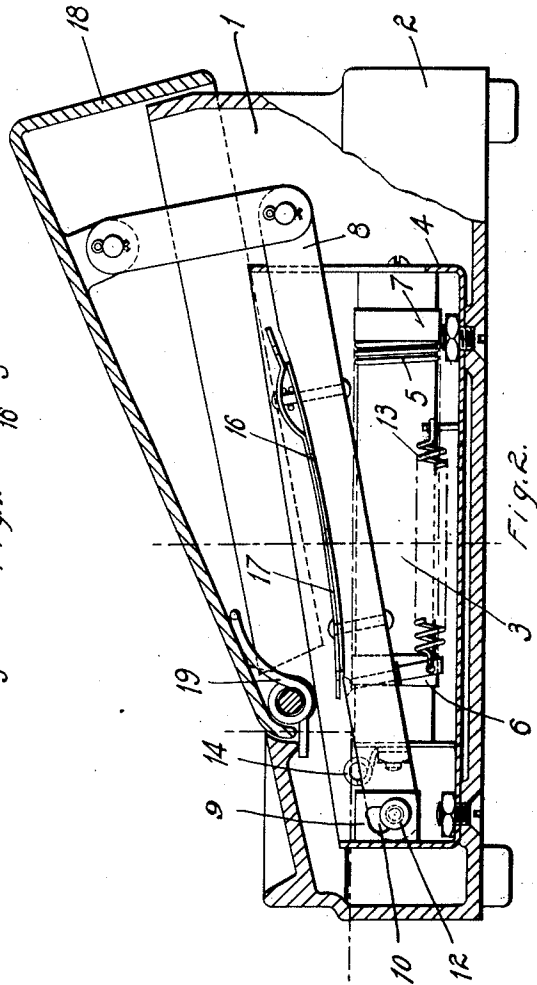
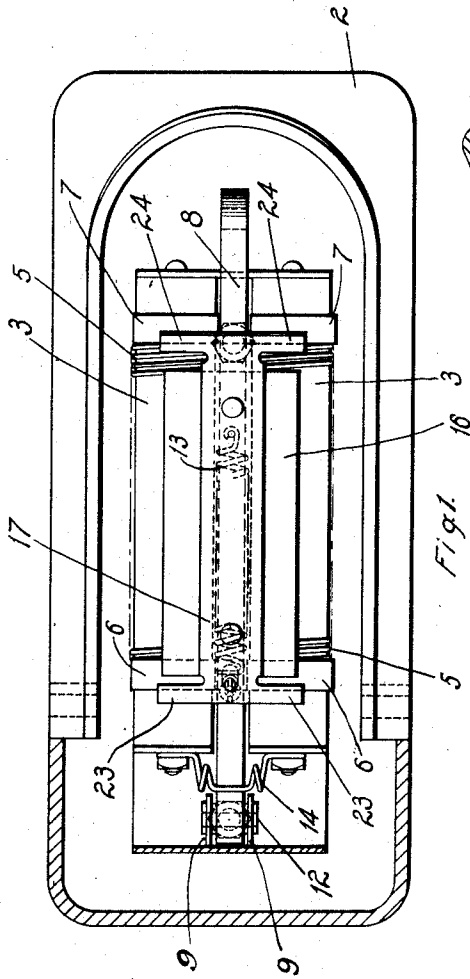


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 CONTROLLER.
 APPLICATION FILED JULY 6, 1915.

1,308,043.

Patented July 1, 1919.
 2 SHEETS—SHEET 1.



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 2 SHEETS—SHEET 2.

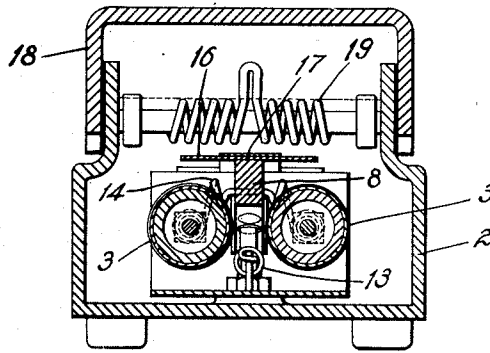


Fig. 3.

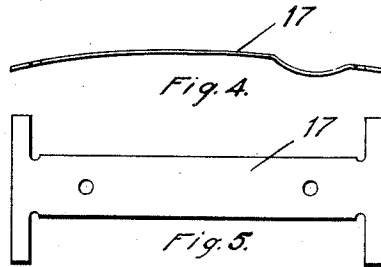


Fig. 4.

Fig. 5.

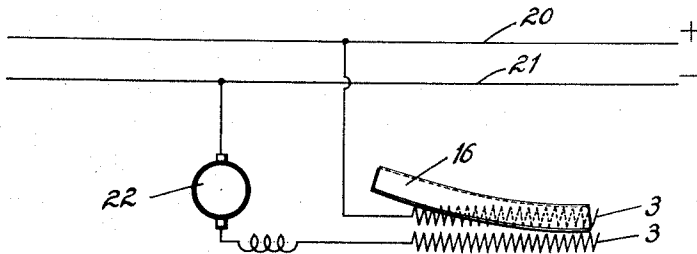


Fig. 6.

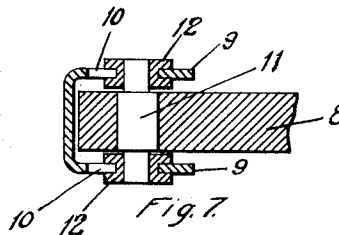


Fig. 7.

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UNITED STATES PATENT OFFICE.

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CONTROLLER.

1,308,043.

Specification of Letters Patent.

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Application filed July 6, 1915. Serial No. 38,158.

To all whom it may concern:

Be it known that I, JOEL R. COOK, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Controllers, of which the following is a specification.

My invention relates to controllers and particularly to such devices as are adapted for use in connection with electric motors of small horsepower.

My invention has for its object to provide a simple and compact arrangement for efficiently controlling the operation of electric motors.

Controllers constructed in accordance with my invention are particularly adapted for use in connection with electric motors that are employed to drive sewing machines and similar mechanisms which are operated more or less intermittently. I provide a pair of resistors of the well known form in which the resistance element is wound upon a cylinder of insulating material. These resistors are connected in series with the motor to be controlled. The resistors are gradually shunted by means of a curved resilient conductor the curvature of which is gradually reduced to effect contact engagement with the resistors and, at the same time, the conductor moved longitudinally to effect a sliding or wiping engagement therewith.

The details of my invention will be described in connection with the accompanying drawings in which Figure 1 is a view, partially in plan and partially in section, of a controller constructed in accordance with my invention, the cover being removed. Fig. 2 is a view, in longitudinal section, of the mechanism of Fig. 1, the cover being in place. Fig. 3 is a view, in transverse section, of the mechanism of Fig. 2. Figs. 4 and 5 are views in elevation and in plan, respectively, of a resilient contact member. Fig. 6 is a diagrammatic view of circuits and apparatus embodying my invention. Fig. 7 is a view, in section, illustrating certain details of the pivotal support for the lever.

Referring particularly to Figs. 1, 2 and 3, a controller 1 comprises a casing 2 of substantially rectangular shape. Two resistor units 3 are rigidly secured to the bottom of the casing by means of a member 4.

Each of the resistor units 3 consists of a resistance element 5, such as, for example, nichrome wire, that is wound upon a cylinder of insulating material and the respective terminals of which are connected to contact members 6 and 7.

A lever 8, which is arranged for vertical movement between the resistors 3, is pivotally supported, at one end, by means of two projecting plates 9 having vertically extending slots 10 of approximately triangular shape. A pin 11, which extends transversely through the end of the lever 8, is provided with reduced end portions upon each of which is mounted a grooved wheel 12. The slots 10 are of such size that the pin 11 and the grooved wheels 12 may be passed through them for convenience in assembling.

A spring 13, which is connected, at one end, to a stationary part, and, at the other end, to the lever 8, exerts force upon the latter to retain the wheels 12 in engagement with the vertical edges of the slots 10 throughout the movements of the lever 8. A spring 14 also tends to retain the pivotal end of the lever 8 in its lowermost position. The lever 8 carries a curved conducting plate 16 and a spring contact member 17 which operate to shunt the resistors in a manner to be described.

The lever 8 is connected to a pivotally mounted cover member 18 which is adapted to be actuated by the foot of the operator. A spiral spring 19 normally maintains the cover 18 and its connected parts in their respective illustrated positions, with the plate 16 and the contact member 17 out of engagement with the contact members 6 and 7 and the resistance element 5.

As shown in Fig. 6, line conductors 20 and 21 supply current to an electric motor 22 which may be operatively connected to any suitable mechanism to be driven. The motor circuit, which is normally open at the resistors 3, is controlled by the contact member 17 and the conducting plate 16.

To start the motor, the operator presses the cover member 18 downwardly and the lever 8 is actuated about its point of pivotal support to effect the engagement of projecting portions 23 of the contact member 17 with the contact members 6 that are con-

nected to the terminals of the corresponding resistors. The motor circuit is then completed through the resistors 3 in series. Further movement of the lever 8 causes its pivotally supported end to be actuated upwardly about the projections 23 as a fulcrum.

At the same time, the spring 13 causes the lever 8 to move longitudinally, and the projections 23 have, therefore, a sliding engagement with the contact members 6. This operation causes the surfaces of the coating contact members to be kept free from the products of corrosion caused by the arcs incident to the closing and opening of the motor circuit. Further movement of the lever 8 in a downward direction decreases the curvature of the contact plate 16 to effect contact engagement thereof with the upper surfaces of the resistors 3 to gradually shunt the coils of the resistance element 5. The curvature of the contact member 17 is correspondingly decreased to permit contact engagement thereof with the contact plate 16.

The longitudinal movement of the lever 8 and the contact members carried by it continues substantially throughout the operation of the controller. When the lever 8 is at the end of its path of movement, projections 24 of the contact member 17 engage contact members 7 to completely shunt the resistors 3 and projections 23 are disengaged from the contact members 6. The motor, which has been gradually accelerated by the removal of resistance from its circuit, then operates at its normal speed.

To stop the motor, the operator decreases the pressure applied to the cover 18 and the spring 19 returns the latter and the lever 8 to their respective inoperative positions. The projections 24 are first disengaged from the contact members 7 and the contact plate 16 is gradually permitted to resume its curved shape and thereby gradually insert resistance in the motor circuit. The circuit is broken by the separation of the projections 23 from the contact members 6. The return of the lever 8 to its illustrated position insures that the wiping contact of the coating members occurs during the return of the several parts to their respective inoperative positions.

It will be noted that I provide a simple and efficient means for controlling the circuit of an electric motor whereby the motor is gradually accelerated to its normal speed and is brought to rest by the gradual increase of resistance in its circuit. This result is accomplished by means of a controlling device having the novel arrangement of parts and operating characteristics above set forth.

I claim as my invention:

1. In a controller, the combination with a

wound resistor, and a plate member for gradually shunting turns of said resistor, of means for effecting simultaneous lateral and longitudinal movements of said member.

2. In a controller, the combination with a wound resistor and a resilient plate member for gradually shunting turns of said resistor, of means for effecting simultaneous lateral and longitudinal movements of said resilient member.

3. In a controller, the combination with a resistor, and a curved flexible plate of conducting material for coating therewith, of means for causing said plate to conform to the surface of said resistor and, at the same time, to have a sliding engagement therewith.

4. In a controller, the combination with a resistor, and a curved resilient member for coating therewith, of means for causing said member to gradually engage said resistor; and, at the same time, to have a wiping contact therewith, said means comprising a pivotally mounted lever.

5. In a controller, the combination with a resistor, and a curved resilient member for coating therewith, of means for causing said member to gradually engage said resistor and, at the same time, to have a wiping contact therewith, said means comprising a pivotally mounted lever for carrying said member.

6. In a controller, the combination with a resistor, and a member for coating therewith mounted on a lever having a floating pivotal support, and a spring tending to actuate said lever longitudinally.

7. In a controller, the combination with a resistor, and a member for coating therewith mounted on a lever having a floating pivotal support, means tending to actuate said lever longitudinally, and means for yieldingly retaining said lever and said member in an inoperative position.

8. In a controller, the combination with a spirally-wound resistor and a resilient member for coating therewith, of means for simultaneously actuating said member longitudinally and causing it to shunt a varying number of turns of said resistor, said means comprising a pivotally-mounted lever and a spring for normally retaining said lever and said member in an inoperative position.

9. In a controller, the combination of a resistor, a resilient conducting member for coating therewith, and a pivotally and slidably mounted lever connected to said member.

10. In a controller, the combination with a resistor, and a flexible conducting strip, of means for simultaneously actuating said strip longitudinally and causing it to progressively shunt said resistor, said means comprising a loosely pivoted lever carrying

the strip, and means for actuating the lever and connected parts to cause sliding engagement of the strip with the resistor.

11. In a controller, the combination with
5 a resistor, and a curved flexible conducting member of substantially the same length as said resistor and disposed adjacent thereto,

of means for exerting a lateral pressure on said flexible member to cause it to gradually shunt said resistor.

10

In testimony whereof, I have hereunto subscribed my name this 29th day of June 1915.

JOEL R. COOK.