May 26, 1936. A. O. ENGBERG ET AL 2,041,748

ELECTRIC CIRCUIT CONTROLLING MECHANISM

Filed June 12, 1931

Fig. 1.

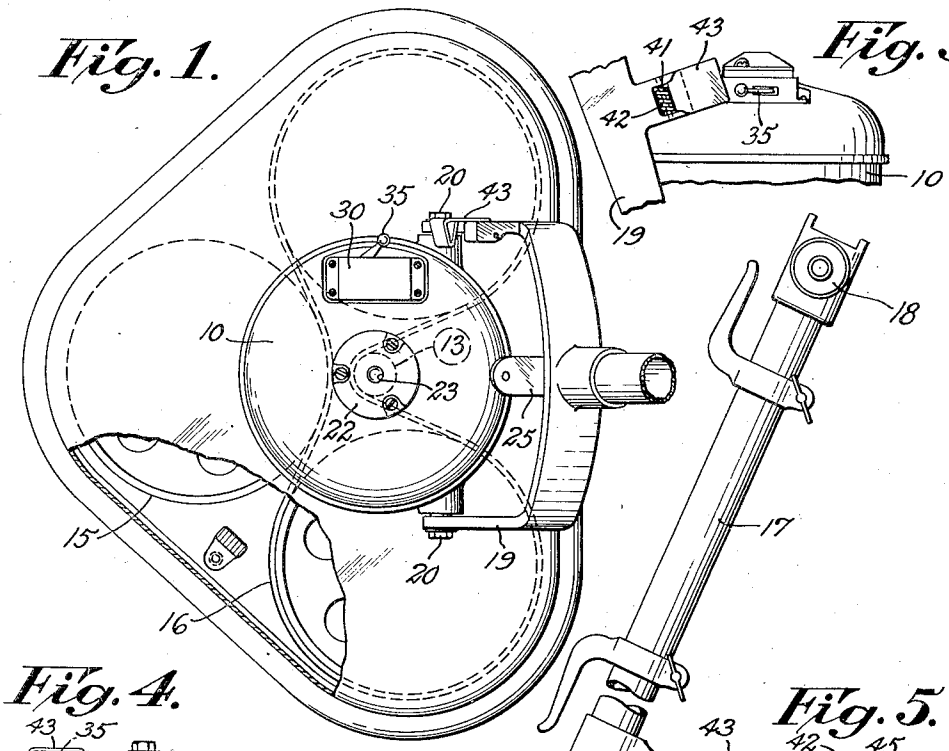


Fig. 3.

Fig. 4.

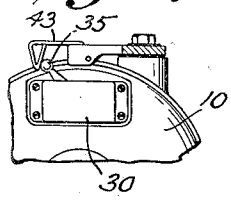


Fig. 5.

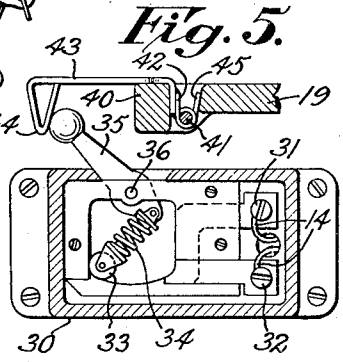
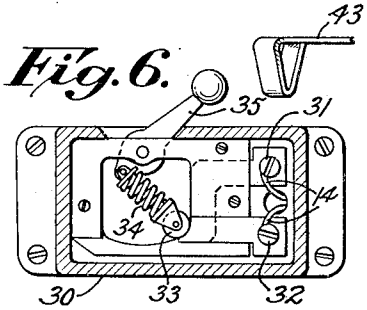


Fig. 2.

Fig. 6.



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Patented May 26, 1936 2,041,748

UNITED STATES PATENT OFFICE

2,041,748

ELECTRIC CIRCUIT CONTROLLING MECHANISM

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Application June 12, 1931, Serial No. 543,868
In Germany June 27, 1927

2 Claims. (Cl. 200—52)

This application is filed to replace our copending application Serial No. 288,190, filed June 25, 1928.

Our invention relates to electric circuit controlling mechanism, and more particularly to such mechanism for use in connection with floor polishers of the type disclosed in copending application Serial No. 286,663, filed June 19, 1928, by A. O. Engberg et al.

One of the objects of the invention is to provide circuit controlling mechanism which will prevent uncontrolled movement of a floor polisher on the floor. A further object of the invention is to provide improved switch mechanism for an electric floor polisher which is simple in construction and operation.

A still further object of the invention is to provide means for starting and stopping the motor of an electric floor polisher and relating the starting and stopping actions to handle positions and movement of the handle, all under control of the handle, and without requiring direct manipulation of the switch by the operator, and without requiring stooping to adjust parts on the motor casing or near the floor.

Further objects and the nature of the invention will become apparent from consideration of the following description taken in connection with the accompanying drawing, forming a part of this specification, which drawing shows one preferred embodiment of the invention.

With reference to the drawing:

Fig. 1 is a top view of a floor polisher embodying the invention;

Fig. 2 is a view of one side of the floor polisher;

Fig. 3 is a partial elevational view of the other side of the floor polisher;

Fig. 4 is a top view of part of the floor polisher showing one position of the parts;

Fig. 5 shows an electric switch and operating mechanism therefor forming part of the floor polisher; and

Fig. 6 shows the same parts as in Fig. 5, but in different position.

The floor polisher comprises a casing 10 enclosing an electric motor 11, which may be of any desired construction. The electric motor is preferably mounted on a vertical shaft 12 on which is mounted a driving pulley 13. The motor is equipped with the usual commutator and carbon brushes 9 to which electricity is conducted by means of the electric wires 14. Below the motor are carrier discs 15. The carrier discs releasably and resiliently retain brush discs 48 which serve both to treat the floor and support the floor polisher. A belt 16 passes around two carrier discs 15, contacting them on one side of the belt, and is in contact, on the other side of the belt, with another carrier disc 15 so that the belt rotates two of the carrier discs in the opposite direction to the third carrier disc. The belt 16 passes in contact with the driving pulley 13 and is driven thereby.

The floor polisher includes a handle 17 having a transverse upper hand grasp portion 18 which is grasped by the operator to guide the floor polisher. The lower part of the handle consists of a fork or yoke 19. The handle is pivoted at 20 to bosses extending laterally from the casing 10. The pivot points 20 are rearward of the axis of the motor, as shown in Figs. 1 and 2.

On the top of the casing 10 is a member 22 having a depression or recess 23 therein. This depression 23 serves to receive a downward projection or knob 24 on a latch lever 25. The latch lever 25 is pivoted at 26 to the handle 17. A spring 27 tends to rotate the latch lever in anticlockwise direction as shown in Fig. 2. The latch lever has a rearwardly extending foot pedal 28. The latch lever rests against the abutment 29 except when the projection 24 is being moved into or out of depression 23.

When projection 24 is in depression 23, the handle is in substantially vertical position. The handle is adapted to swing through an arc including substantially vertical and inclined positions. To move the handle to inclined position, the operator steps on the pedal 28, which raises projection 24 out of depression 23 against the force of spring 27 and the handle can then be moved backwards (to the right as shown in Fig. 2) to inclined position.

Mounted on the top of the casing 10 is a switch 30 for starting and stopping the motor. One of the electric wires 14 is connected to this switch at 31 and 32. The switch is of the known tumbler variety employing snap action. It comprises a contact roller 33 and a snap spring 34. The snap spring 34 acts between abutments pivoted to the roller 33 and the operating arm 35, respectively. As is shown, arm 35 extends outwardly with respect to the casing 10. The operating arm is pivoted at 36. The switch has two positions, an off position shown in Fig. 5, and a closed circuit position shown in Fig. 6.

Extending forwardly from the fork 19 of the handle is a projection or bracket 40. A pivot pin 41 is mounted in this bracket. This pivot pin is arranged substantially parallel to the general ex-

tent of the handle. Surrounding the pivot pin 41 is a spring 42. The spring is attached, as by welding, to a switch throw member 43. This member may be a flat piece of metal bent as shown and having an end projection 44 extending inwardly with respect to the motor casing 10. Spring 42 has an end 45 extending outwardly and abutting against the handle. The spring 42 is under stress and urges member 43 into contact with the outer portion of the projection or bracket 40, as shown in Fig. 5. The spring 42 and the pivot pin 41 serve to provide a resilient mounting for the switch throw member 43.

When the handle is latched in substantially vertical position, and the projection 24 is in the depression 23, the switch mechanism is in the position shown in Figs. 4 and 5. The outwardly extending operating arm 35 is between the end projection 44 of switch throw member 43 and the projection 40 on fork 18. The switch is now open. If the operator wishes to operate the floor polisher, the foot pedal is depressed and the handle moved backwards toward the position shown in Fig. 2. The projection 44 on member 43 first moves the operating arm 35 in clockwise direction, as seen in Fig. 5. When the switch passes dead center, the operating arm suddenly moves to the position shown in Fig. 6. In order to permit this quick movement, ample space is left between the forward side of projection 40 and the projection 44, as will be clear from Fig. 5. Upon further movement backwards of the handle, member 43 is moved outwardly due to contact thereof with operating arm 35, which then becomes stationary. The outer end of this arm is formed as a ball and this permits the projection 44 to be readily moved outwardly by the contact with arm 35. Member 43, as it is swung outwardly, pivots about pin 41. The spring 42 acts against this tendency and returns the switch throw member 43 to the inner position after it has passed over the switch operating arm 35. When the handle has been moved to the inclined position shown in Fig. 2, the switch is closed as in Fig. 6, and the motor is running.

It is possible, however, to open the switch without moving the handle to vertical position as, for instance, if it should be desired to leave the floor polisher in non-operating position with the handle on the floor. To do this, the handle is moved from the position shown in Fig. 2 toward the vertical position. The projection 44 will first contact operating arm 35 and snap the switch to open position, as shown in Fig. 5. It is not necessary, however, to move the handle so far toward vertical or resting position that the projection 44 passes over the ball formed end of the operating arm 35. The handle can be moved backwards before this is accomplished so that the handle may be down, although the motor circuit is open. Also, if desired, the operating arm 35 may be moved manually, as it is entirely free from member 43 when the handle is in the position shown in Fig. 2 or in a lower position.

The floor polisher is a naturally restless apparatus. It is supported by the brushes 48, which are rotated by the electric motor. If a floor polisher is not held by the handle, it will walk around on the floor of its own accord. If the switch of a floor polisher should be on with the handle in a vertical position, and a cord should be plugged into a wall socket, the floor polisher would start walking and might upset or damage furniture. This disadvantage is prevented by the arrangement herein disclosed, as it is impossible to have the switch on with the handle vertical. When the handle is moved to and latched in vertical position, the switch must be off. This ensures safety of operation.

Furthermore, the switch mechanism is simple. We make use of a standard tumbler switch and merely add a few simple parts to the handle. Furthermore, it is not necessary to stoop to reach down to operate any parts either for control of the electric supply or for latching the handle. And also, the electric cord need not be carried through the handle since it is not necessary to have the switch at the handle. Complete control of the apparatus is afforded, all under control of the handle, and all without necessitating the operator to directly actuate the switch.

It will be understood that variations of structure will fall within the scope of the invention as claimed.

What we claim is:

1. In a switch mechanism of the type wherein an electric switch is mounted on a casing and is provided with an operating arm adapted to be moved to open and close the switch by movement of a handle pivoted on said casing, the combination of a switch throw member adapted to abut said switch operating arm on either side of the latter, means for mounting said member upon said handle in such position as to bring it into abutment with said arm when said handle is moved, and means including a pivot pin carried by said handle and a spring attached to said member and surrounding said pin for yieldingly resisting movement of said member relative to said handle and to said operating arm when in engagement with the latter, whereby said member may successively abut, move, snap over and embrace said operating arm upon movement of said handle.

2. In a switch mechanism of the type wherein an electric switch is mounted on a casing and is provided with an operating arm adapted to be moved to open and close the switch by movement of a handle pivoted on said casing, the combination of a switch throw member mounted on said handle substantially in the plane of movement of the latter, a projection carried by said member and extending substantially at right angles to the direction of movement of the handle, said projection being so mounted and positioned as to abut said switch operating arm on either side of the latter when said handle is moved and to have movement substantially at right angles to the direction of movement of the handle, and means comprising a pivot pin carried by said handle and a spring attached to said member and surrounding said pin for yieldingly resisting movement of said member in a direction transverse to the direction of movement of said handle, whereby said projection may successively abut, move, snap over and embrace said operating arm upon movement of said handle.

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