May 31, 1938. L. SCRUGGS 2,119,220

CONTROL SWITCH FOR ELECTRICALLY OPERATED DEVICES

Original Filed June 22, 1935

FIG. 1.

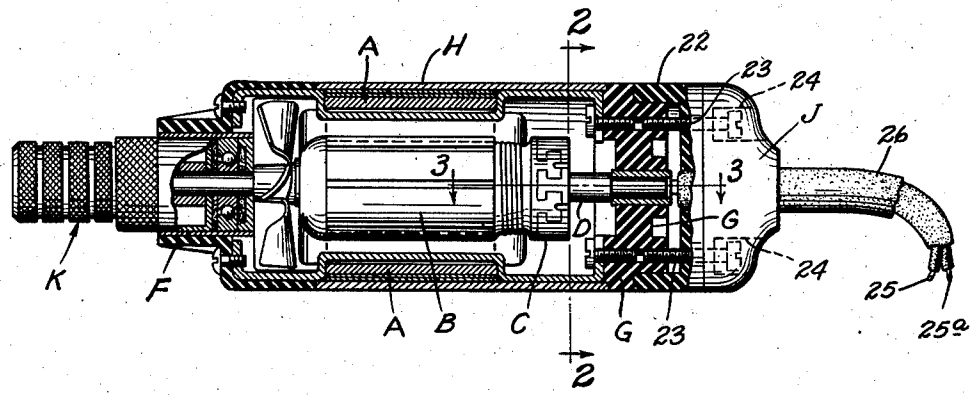


FIG. 2.

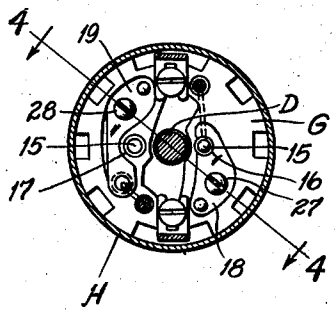


FIG. 3.

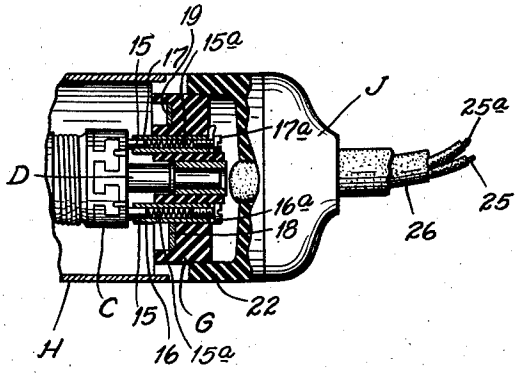
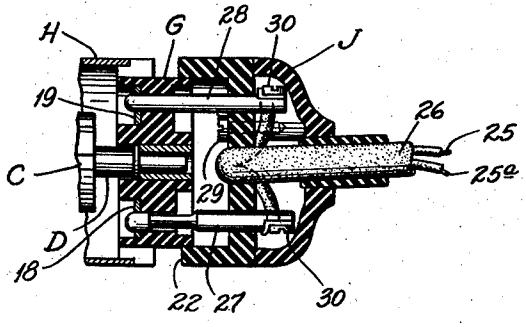


FIG. 4.



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CONTROL SWITCH FOR ELECTRICALLY OPERATED DEVICES

Loyd Scruggs, University City, Mo.

Original application June 22, 1935, Serial No. 27,893. Patent No. 2,082,264, dated June 1, 1937. Divided and this application February 8, 1936, Serial No. 62,875

1 Claim. (Cl. 200—157)

This invention relates to a novel control switch for electrically-operated devices, my present application being a division of my pending application for patent Serial No. 27,893, filed June 22, 1935, now Patent No. 2,082,264, patented June 1, 1937.

The main object of my invention is to provide an inexpensive control switch of rugged construction and simple design, whose actuating member is constructed in the form of a cap piece reciprocatingly mounted on one end of the handle, housing or equivalent part of the electrically-operated device with which the switch is used; thereby enabling said device to be started and stopped simply by pushing said cap piece inwardly or pulling it outwardly.

Another object of my invention is to provide a control switch for an electrically-operated device, that is mounted on or combined with the handle, casing or equivalent part of the device in such a way that if the device should be dropped, or if the handle should be subjected to a sharp blow or shock, the movable member of the switch will move automatically in a direction to cut off the supply of electrical energy to said device.

I have herein illustrated my improved switch as being used for controlling the operation of an electric motor of a device that is intended to be held in the hand of the person who is manipulating a tool or instrument attached to the armature shaft of the motor, but I wish it to be understood that said switch is capable of use with various other types and kinds of electrically-operated devices.

Figure 1 of the drawing is a longitudinal sectional view of a fractional horsepower electric motor equipped with a control switch constructed in accordance with my invention.

Figure 2 is a cross sectional view, taken on the line 2—2 of Figure 1, looking in the direction indicated by the arrows.

Figure 3 is a fragmentary longitudinal sectional view, taken on the line 3—3 of Figure 1; and

Figure 4 is a fragmentary longitudinal sectional view, taken on the line 4—4 of Figure 2.

In the accompanying drawing, which illustrates the preferred form of my invention, A designates the laminated field core of a fractional horsepower electric motor, B designates the armature core, C designates the commutator, D designates the armature shaft, and K designates a chuck that is used for enabling a tool, instrument or appliance to be detachably connected to the armature shaft D. The housing of the motor is made of such shape and dimensions that it virtually constitutes a handle which is adapted to be grasped by one hand of the user, and in the motor herein illustrated, the housing is made up of two end members F and G of insulating material, and a tubular shell H whose end portions overlap said end members. The brushes 15 that co-act with the commutator C are carried by tubular-shaped brush holders 16 and 17 mounted in the rear housing member G in parallel relation to the armature shaft and provided at their outer ends with screws 16a and 17a that serve as abutments for the springs 15a which force the brushes 15 against the commutator. Said brush holders 16 and 17 are attached to brass contact plates 18 and 19, respectively, that are mounted in the rear housing member G and connected in any preferred or suitable way with the field coils.

The electrical energy used to actuate the motor is controlled by a switch embodying my invention, and constructed in such a manner that it is practically built into the motor, so as to form an integral part of same, the actuating member of said switch being so arranged that it forms a cover or cap piece for the rear end member G of the motor housing. Preferably, the actuating member of said switch is formed by a cap piece J, made of insulating material, and provided with a flange 22 which surrounds a reduced cylindrical portion on the rear end of the housing member G, as shown in Figures 1 and 3, said reduced cylindrical portion being of such length that the cap member J is capable of a slight longitudinal movement relative to the housing member G which supports it.

To close the circuit controlled by the switch, the cap member J is moved outwardly into its "on" position, shown in Figure 3, and to open said circuit, the cap member J is moved longitudinally in the opposite direction into its "off" position, shown in Figure 1. Obviously, the parts of the switch might be arranged so as to cause inward movement of the member J to set the motor in operation, and outward movement of said member to stop the motor. Means is provided for restricting the outward movement of the cap member J, and in the form of my invention herein illustrated, said restricting means is formed by a plurality of screws 23 projecting inwardly through the cap member J and screwed into the rear housing member G, the shanks of said screws being of such length that when the cap member J is moved outwardly, or to the right looking at Figure 1, the inner end walls of counterbores 24 in the cap member J will strike against the heads of the screws 23, and thus cause

said cap member to come to rest in such a position that electrical connection is established between the contact plates 18 and 19 and the wires 25 and 25a of a duplex cord 26 that is attached to the cap member J. The screws 23 are accessible through the counterbores 24 in the cap member J, thereby enabling said cap member to be easily disconnected from the rear housing member G in the event it becomes necessary or desirable to inspect, or remove the brushes 15, the screws 16a and 17a in the brush holders being normally protected and concealed by the cap member J. The particular means employed to establish and interrupt the electrical connection between the contact plates 18 and 19 and the wires of the duplex cord 26, is not important, so far as my broad idea is concerned, but I prefer to provide the actuating member J with a pair of prongs 27 and 28, attached to the wires of the duplex cord 26, and constructed, proportioned or arranged so that they co-operate with the plates 18 and 19 to complete or break the circuit, depending upon the position of the cap member J. In the form of my invention herein illustrated the inner ends of the prongs 27 and 28 project through holes in the contact plates 18 and 19, as shown in Figure 4. One of said prongs is of such cross sectional shape and dimensions that when the cap member J is pushed inwardly into the position shown in Figure 1, the outer surface of said prong will be spaced away from the edge of the hole in the contact plate with which it co-operates, thereby opening the circuit, and when the cap member J is pulled outwardly, as shown in Figure 4, both of the prongs 27 and 28 will bear against the edges of the holes in the contact plates 18 and 19, thereby establishing electrical connection between said plates and the two wires 25 and 25a of the supply circuit. In order to insure a good metallic connection or contact between the plates 18 and 19 and the prongs 27 and 28, said prongs are preferably split or bifurcated so that they will have some resiliency. It is immaterial how the wires of the duplex cord 26 are attached to the prongs 27 and 28, but I prefer to construct the actuating member of the switch in such a manner that the devices used to connect the wires 25 and 25a to the prongs 27 and 28 are housed within the cap member J and are effectively insulated from metallic portions on the outer side of the rear housing member G. To this end I form the cap member J from two pieces of insulating material, detachably connected together by screws 29, as shown in Figure 4, that are accessible after the cap member J has been dismounted from the rear housing member G, and I provide the prongs 27 and 28 with binding screws 30 that are positioned in notches or cut-out portions formed in the outer piece or part of the cap member J, as shown clearly in Figure 4. A control switch of the construction above described contributes greatly to the ease of handling and operating the electrical device with which the switch is used, due to the fact that the actuating member of said switch is formed by a cap piece reciprocatingly mounted on the handle, housing or equivalent part of the electrically-operated device, and hence, can be easily manipulated to start or stop said device simply by moving the cap piece outwardly or pushing it inwardly. Another desirable feature of such a switch is that if the electrically-operated device should be accidentally dropped, or if the rear end portion of the handle of said device should receive a sharp blow or shock, the control member J of the switch will automatically move inwardly, and thus cut off the supply of electrical energy to the device. In addition to the desirable features or characteristics above pointed out, my improved control switch is inexpensive to construct, and it is of sufficiently rugged design to successfully stand up under the rough usage or treatment which it is liable to be subjected to when in service.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

A control switch for an electrically operated device, comprising a stationary part made of insulating material, concealed contact plates carried by said part, a reduced cylindrical portion on said stationary part, a shiftable cap member made of insulating material reciprocatingly mounted on and surrounding the reduced cylindrical portion on said part, combined retaining devices and limiting stops for said cap member threaded into the end of said stationary part and provided with enlarged heads positioned in counter-bored holes formed in the end face of said cap member, prongs on said cap member positioned in holes in said stationary part and adapted to be moved into and out of operative relationship with said contact plates by reciprocating said cap member on the reduced cylindrical portion on said stationary part, a duplex cord whose wires are attached to said prongs on the interior of said cap member, said cap member being composed of two pieces, and a means for detachably connecting together the two pieces of said cap member consisting of screws that are normally concealed from view and which are accessible only after said cap member has been completely disassembled from said stationary part.

LOYD SCRUGGS.