Oct. 15, 1957 C. A. BALL, JR 2,810,030

ELECTRIC SWITCHES

Filed Feb. 2, 1955

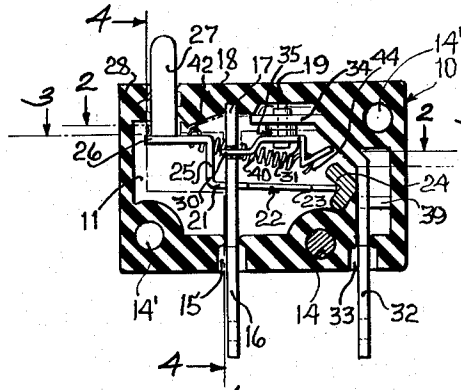


Fig. 1.

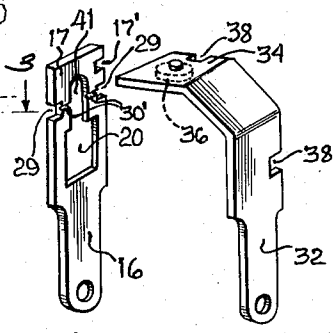


Fig. 5.

Fig. 6.

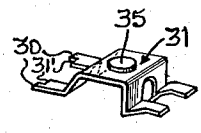


Fig. 7.

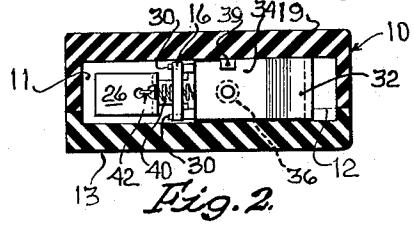


Fig. 2.

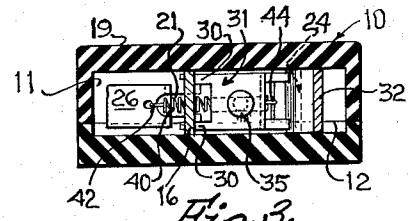


Fig. 3.

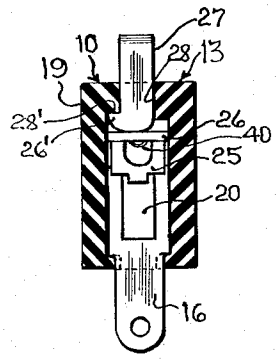


Fig. 4.

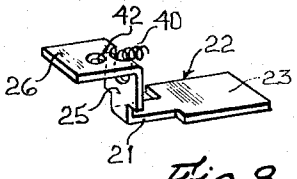


Fig. 8.

INVENTOR.
CHARLES A. BALL JR.
BY Clarence E. Ahrendt
HIS ATTORNEY.

United States Patent Office 2,810,030 Patented Oct. 15, 1957

2,810,030

ELECTRIC SWITCHES

Charles A. Ball, Jr., Highland Park, Ill., assignor to Cherry Electrical Products Corporation, Highland Park, Ill., a corporation of Illinois

Application February 2, 1955, Serial No. 485,719

2 Claims. (Cl. 200—67)

This invention relates to electric switches and an object of the invention is to provide a switch of the character hereinafter described which will be a simplified improvement over electric switches heretofore in use.

Another and equally important object of the invention is to provide in an electric switch an actuator having an overthrow movement such as eliminates the necessity of precision in construction of the parts of the switch actuated by the actuator, and one in which there is no lost movement in the actuator during its overthrow movement in either direction.

Yet another and equally important object of the invention is the provision in an electric switch of an arrangement which results in maintaining a high contact pressure between the confronting contact members of the switch, while requiring but a low operating force to effect disengagement of such contact members.

Another and equally important object of the invention is to provide an electric switch of the type hereinafter described which will be relatively simple in construction, comprising a minimum number of parts, thereby permitting assembly with the minimum labor, resulting in an economically manufactured switch.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings showing the preferred form of construction, and in which:

Fig. 1 is a vertical sectional detail view of the switch embodying my invention;

Fig. 2 is a sectional detail view taken substantially on line 2—2 of Fig. 1;

Fig. 3 is a sectional detail view taken substantially on line 3—3 of Fig. 1;

Fig. 4 is a sectional detail view taken substantially on line 4—4 of Fig. 1;

Fig. 5 is a perspective view of a terminal post embodied in the invention;

Fig. 6 is a perspective view of another terminal post embodied in the invention;

Fig. 7 is a perspective view of the switch blade embodied in the invention;

Fig. 8 is a perspective view of the actuator embodied in the invention.

The several objects of this invention are accomplished by a simplified preferred form of construction shown in the accompanying drawings, in which 10 indicates a body of suitable non-conductive material having a cavity 11 opening from one side 12 thereof and normally closed by a wall 13 secured to the body by a suitable rivet 14 or the like. The body 10 is provided with suitable openings 14' for the passage of mounting screws (not shown) or the like.

Communicating with the cavity 11 is an opening 15 through which projects a terminal post or plate 16, the

upper end 17 of which snugly engages in a notch 18 formed in the wall 19 of the body 10.

A notch 17' is formed in one edge of the post 16 to receive a lateral projection on the side wall of the body 10 whereby to support the post 16 within the body and to prevent its displacement therefrom. The post 16 is of conductive material and includes within that portion thereof confined in the cavity 11, an opening 20, which movably receives a reduced portion 21 of an actuator 22. This actuator is of substantially rigid material and has one end portion 23 thereof pivotally engaged in a seat 24 formed as an integral part of the body 10 within the cavity 11. The free end of the actuator 22 is located on the side of the post 17 opposite the seat 24 and includes an angled portion 25 terminating into a lateral extension 26 extending in the direction of the length of the actuator, as best shown in Figs. 1 and 8. This extended end portion 26 is adapted to be engaged by a push button 27 or the like slidably arranged in an opening 28 formed in the wall 19 opposite the end of the extended portion 26 of the actuator. The push button 27 is provided with an enlargement on one side thereof to provide a shoulder 26' which engages a rib 28' provided at one side of the opening 28, thus to limit outward movement of the button 27.

The post 16 adjacent its upper end portion is provided with opposite notches 29 into which engage the fingers 30 of a switch blade 31 whereby to provide a pivotal connection between the blade 31 and the post 16. A substantially V-shaped supporting seat 30' is formed in the post 16 for the edges 31' of the fingers 30.

A second terminal post 32 projects through an opening 33 formed in the body 10 and has an angled end portion 34 which extends substantially parallel and in spaced relation with the adjacent portion of the actuator 22. As shown in Fig. 1, the switch blade 31 extends between the end portion 34 of the post 32 and the actuator 22. This switch blade 31 intermediate its end portions carries a contact 35 adapted to have engagement with a confronting contact 36 carried by the end 34 of the post 32. The post 32 has notches 38 formed in one edge portion thereof for engagement with lugs 39 provided by the body 10, whereby the post 32 is maintained in its position shown in Fig. 1.

To complete the invention, I provide a tension spring 40, which extends through an opening 41 formed in the post 16 and has one end portion 42 conneted to the free end portion of the actuator 22 and an opposite end portion 44 connected to the free end portion of the switch blade 31. As will be noted in Fig. 1, these connections between the spring 40 and the actuator 22 and switch blade 31 are reversely positioned with respect to the post 16. Likewise, it will be noted that the free end of the actuator 22 and the free end of the switch blade 21 are reversely positioned with respect to the post 16.

While I have specified the element 27 as a push button, it is clear that the means for actuating the actuator 22 may be any approved means.

The switch blade 31 as is the actuator 22 is formed of relatively rigid material and they have their points of pivotal support reversely positioned with respect to each other to minimize the distance of travel of the actuator to effect quick contact separation. When pressure is applied to the actuator it will pivot upon its seat 24. Upon such movement of the actuator 22, the spring 40 will be tensioned. As the tensioned spring passes across the point of pivotal connection between the switch blade 31 and the post 16, it exerts a pull on the plate 31 resulting in a pivotal movement thereof in snap-like action, disengaging the contact 35 from the contact 36. When pressure is removed from the actuator 22,

the spring 40 will return the parts to their original starting positions as shown in Fig. 1.

By the foregoing construction, I have provided an electric switch in which there is a substantial overthrow of the actuator after separation of the contacts. Such an arrangement eliminates the necessity of precision in construction of parts while maintaining a high contact pressure between the contacts. Only a minimum actuating force is required for moving the actuator to pivot the switch blade to a position separating the confronting contacts.

The foregoing construction also results in an electric switch in which there is no lost movement in the movement of the actuator for actuating the switch blade.

The switch comprises relatively few parts, thereby permitting assembly with a minimum degree of labor, resulting in an economically manufactured switch.

The foregoing construction, while shown in the drawings as being embodied in a single pole switch, may be utilized in a double-pole single-throw switch without departing from the invention.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

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

1. A switch of the class described comprising a body of non-conductive material provided with a cavity opening from one side thereof and providing a transversely extending seat formed integrally with the body and within the cavity, a substantially rigid actuator of elongated formation and having one end portion pivotally mounted in the seat and an offset free end portion at the opposite end thereof to provide an extension extending in the general length of the actuator, a push button carried by the body and engaging said extension, a first terminal post carried by the body and projecting into the cavity at a point opposite and in spaced relation with respect to the seat and provided with spaced notches in opposite long edge portions thereof, a switch blade having at one end portion spaced parallelly extending fingers pivotally mounted in said notches and a free end portion extending laterally from said post in the direction of the length of the actuator and opposite to the free end portion thereof, an elongated coil spring having one end portion fixed to the free end portion of said actuator and an opposite end portion fixed to the free end portion of the switch blade, and a second terminal post carried by the body in parallel spaced relation to the first terminal post and extending into the cavity and having at its interior end portion an angled end portion disposed substantially parallel and in spaced relation with respect to the actuator and carrying a stationary contact member in the path of and engageable by the free end portion of the switch blade.

2. A switch of the class described comprising a body of non-conductive material provided with a cavity opening from one side thereof, a pair of terminal posts arranged in parallel relation with respect to each other and extending into the cavity, one of said posts having notches formed in opposite long edge portions thereof, a switch blade having a free end portion and having an opposite end portion provided with a pair of spaced laterally extending fingers pivotally engaging in said notches and extending laterally from said one of said posts and between said posts, the other of said posts having an angled extension disposed in parallel relation with respect to the switch blade and having a stationary contact member adapted for engagement with the switch blade, a contact member carried by the switch blade intermediate its end portions for engagement with said stationary contact member, said body having a transverse seat formed integral therewith and within the cavity in spaced relation with respect to said one post, a susbtantially rigid actuator arranged in said cavity in substantially parallel relation with respect to said switch blade and having one end portion pivotally mounted in said seat and an opposite free end portion bent to provide an extension thereof extending in the direction of the length of the actuator, a push button movably mounted in an opening provided by the body and engaging said extension, and an elongated coil spring having one end portion connected to said extension and an opposite end portion connected to the free end portion of the switch blade.

References Cited in the file of this patent

UNITED STATES PATENTS

2,079,282	Du Bois	May 4, 1937
2,328,154	Lennholm	Aug. 31, 1943
2,486,033	Kaminkey	Oct. 25, 1949
2,487,374	Rich et al.	Nov. 8, 1949
2,533,743	Sharp	Dec. 12, 1950
2,647,179	Martin	July 28, 1953