Aug. 6, 1940. J. SACHS 2,210,501

ELECTRIC SWITCH

Filed April 13, 1937 2 Sheets-Sheet 1

Fig. 1

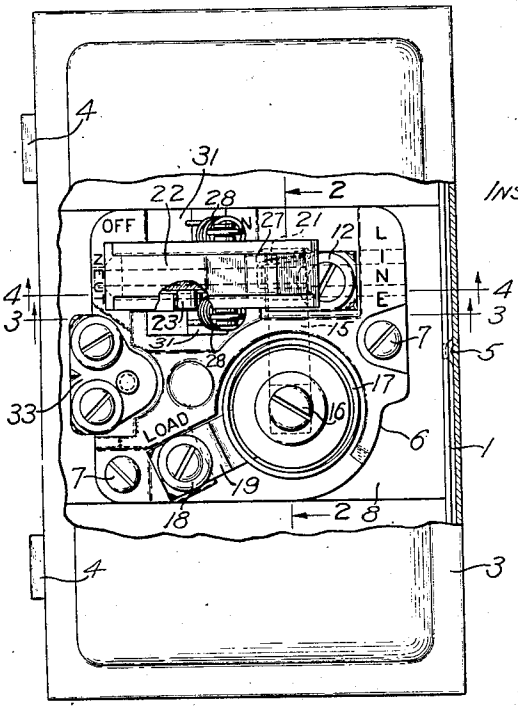


Fig. 2

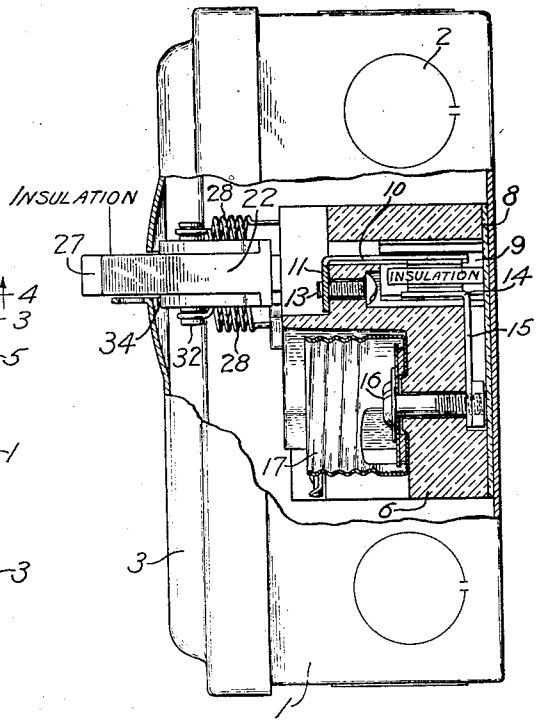


Fig. 3

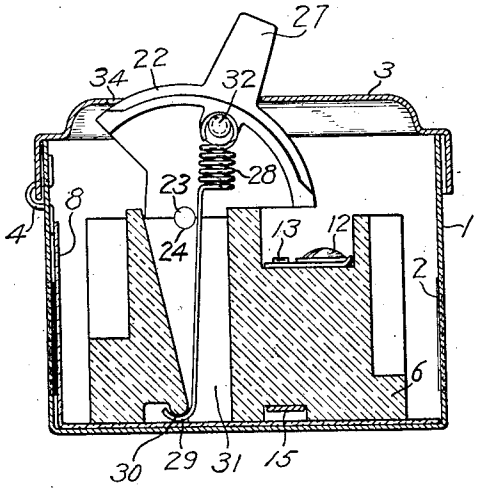
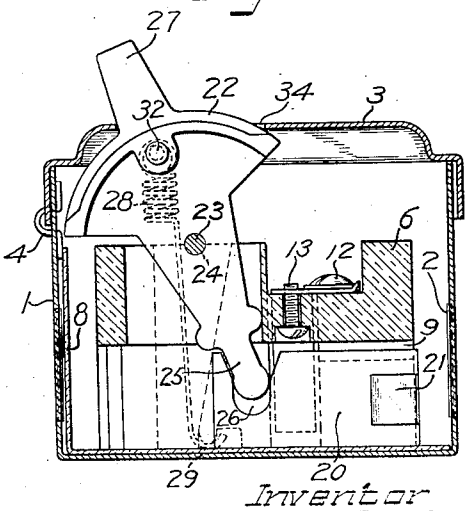


Fig. 4



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Filed April 13, 1937 2 Sheets-Sheet 2

Fig. 5

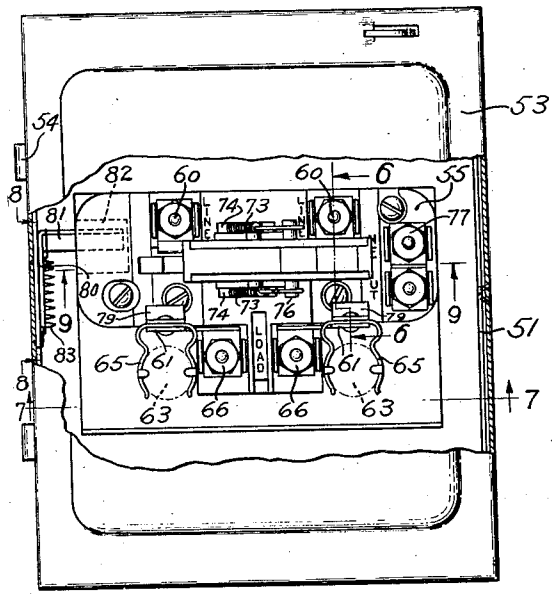


Fig. 6

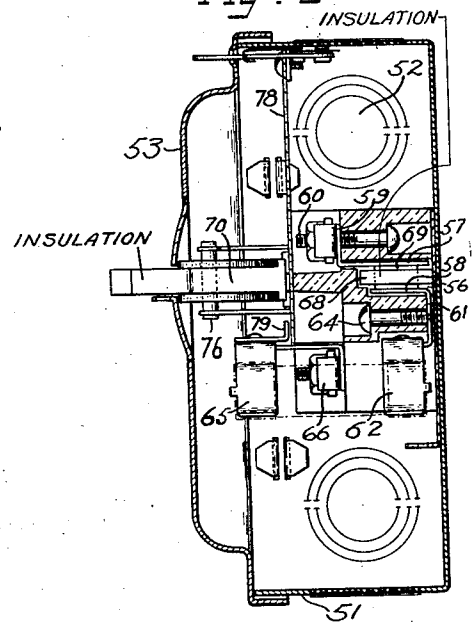


Fig. 7

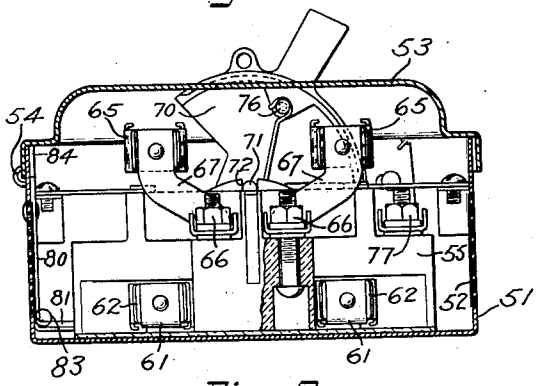


Fig. 8

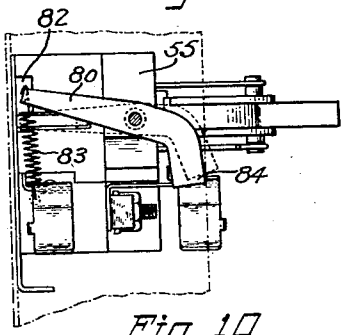
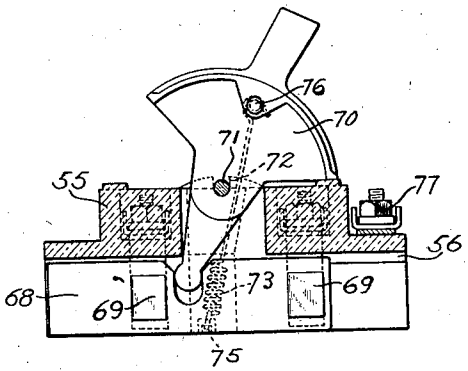
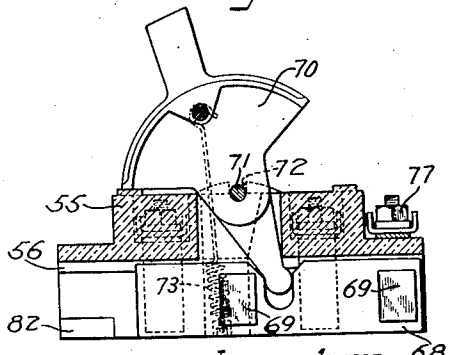


Fig. 10

Fig. 9





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UNITED STATES PATENT OFFICE

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ELECTRIC SWITCH

Joseph Sachs, West Hartford, Conn., assignor to Colt's Patent Fire Arms Manufacturing Company, Hartford, Conn., a corporation of Connecticut

Application April 13, 1937, Serial No. 136,629

4 Claims. (Cl. 200—154)

One object of the invention is to provide a switch having certain novel features of construction of such a nature that the switch may be readily assembled and disassembled.

From the following specification other objects and advantages will be apparent to those skilled in the art.

In the accompanying drawings I have shown two embodiments of the invention, but it will be understood that the drawings are intended for illustrative purposes only and are not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

In the drawings:

Fig. 1 is a front elevation of a switch embodying certain of the principles of the invention, a portion of the casing being broken away.

Fig. 2 is a side elevation of the switch of Fig. 1 with a portion of the casing broken away to show a sectional view taken on the line 2—2 of Fig. 1.

Figs. 3 and 4 are sectional views taken on the lines 3—3, and 4—4, respectively, of Fig. 1, the switching parts being shown in different positions in the two figures.

Fig. 5 is a front elevation of another switch embodying the principles of the invention, a portion of the casing being broken away.

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 5, the outline of the fuses being shown in dot-dash lines.

Fig. 7 is a sectional view taken on the line 7—7 of Fig. 5, certain portions being broken away to more clearly show the construction.

Fig. 8 is a view taken on the line 8—8 of Fig. 5 with the cover omitted and certain parts indicated in another position in dotted lines.

Fig. 9 is a sectional view of the switch itself taken on the line 9—9 of Fig. 5, with the switching parts in the "on" position.

Fig. 10 is a view similar to Fig. 9 but showing the switching parts in the "off" position.

Referring now to the embodiment shown in Figs. 1 to 4, I have shown a casing which may be of any desired form and may include a box portion 1 having such knockouts 2 as may be desired, and a cover 3 which is preferably hinged to the box portion at 4. A detent 5 is provided for holding the cover in closed position.

The particular switch shown is adapted for use in a two wire system, but the principles of the invention are applicable to switches having a different number of poles.

A base 6 of insulating material is secured in the box by screws 7. A sheet of insulating material 8 may, if desired, be placed between the block and the back of the box. A groove 9 is preferably formed in the rear face of the base 6 and there is positioned adjacent one wall of this groove a switch contact 10 which may include an angularly extending portion 11 to which is secured a line circuit connector 12. A screw 13 serves to secure the contact 12 to the base 6. Another switch contact 14 is provided adjacent the other side wall of the groove 9 and, as shown, it is preferably positioned opposite the contact 10. The contact 14 preferably includes an angular portion 15 which may be secured to the base by a bolt and nut 16 which may also serve as the center contact for a plug type fuse. A screw threaded fuse receiving means 17 is secured to the base and electrically connected to a load circuit connector 18 by a conductor 19.

For cooperating with the switch contacts 10 and 14 I provide a switching member which in the illustrated form comprises a member 20 of insulating material and a U-shaped electrical conductor 21 having the legs of the U positioned on opposite sides of the member 20. The switching member is preferably mounted for rectilinear movement adjacent the rear of the base. When the base has a groove such as shown at 9 formed therein the switching member may be positioned in the groove. In the particular switch illustrated the switch contacts 10 and 14 extend inward from the walls of the groove 9 and therefore also serve to guide the switching member in its movements. The length of the member 20 is less than the length of the groove 9 in which it is positioned, it being apparent that as the switching member is reciprocated in the groove, the legs of the conductor 21 will be moved into and out of engagement with the contacts 10 and 14 to close and open the circuit through the contacts.

A pivoted operating member such as shown at 22 is preferably provided for effecting the reciprocation of the switching member. This operating member may be pivotally mounted on the base 6 by pins 23 which are journaled in a pair of grooves 24 in the front face of the base. A depending portion 25 extends rearward through an aperture in the base into a recess 26 in the member 20, and it is obvious that oscillation of the operating member about its pivotal axis will produce a simultaneous reciprocation of the switching member. The operating member may include a handle 27.

In accordance with this phase of the inven-

tion, means are provided for effecting a quick action movement of the switching member to at least one of its positions and preferably to both of them. While other means may be used for this purpose, the construction which I now prefer includes tension springs 28. These springs have one end thereof anchored with respect to the base 6, and in the form shown, hooks 29 are provided on the lower ends of the springs for effecting the anchorage as shown at 30. These springs are positioned in slots 31 in the base and have their upper ends secured to projections 32 on the operating member. It is apparent from Figs. 3 and 4 that the longitudinal axes of the springs will move from one side to the other of the pivotal axis of the operating member as the latter is moved to its circuit closing and opening positions, and due to this over center movement a quick action will result.

In the construction shown, the springs 28 serve the additional function of and constitute the sole means for holding the base and operating member in assembled relationship and thereby eliminate the necessity of providing other means for this purpose.

It is apparent that a base, operating member, and switching member made in accordance with the principles of this phase of the invention may be readily assembled and disassembled. Detachable means are preferably provided for preventing rearward movement of the switching member relative to the base 6 and the contacts 10 and 14, and means may be additionally provided for preventing endwise separation of the base and switching member. In the illustrated switch the rear of the casing 1 is detachably connected with the base and functions to prevent rearward movement of the switching member. The width of the casing is such that the side walls thereof constitute means for preventing endwise separation of the base and switching member. As a result of this construction, upon removal of the operating member from the base for any reason, the casing and switch may be freely handled without danger of dropping or losing the switching member, or the switching member may be freely separated from the base and switch contacts if desired by merely removing the base from the casing. It should be understood, however, that the side walls of the casing may, if desired, be spaced sufficiently far apart to permit the endwise removal of the switching member from the base while in the casing upon disengagement of the operating member therefrom.

A solid neutral such as shown at 33 is preferably provided.

The casing cover 3 is suitably slotted at 34 so that the handle 27 may project therethrough and the slot is preferably of such size that when the switch is "on," as shown in Fig. 3, the side of the handle almost engages the right hand end wall of the slot. With this construction any attempt to open the cover 3 while the switch is "on" will effect movement of the switch to "off" position because the just mentioned end wall of the slot 34 will, as it pivots about the hinges 4, push the handle toward "off" position until the latter passes its dead center position whereupon the springs 28 will move it to its full "off" position.

In Figs. 5 through 10 I have shown a switch assembly embodying certain other principles of the invention.

In accordance with the broader aspects of this phase of the invention, any desired form of switch per se may be used, however, for the purposes of this specification, I have illustrated the form of switch which I now consider preferable, and which is in many respects similar to that shown in Figs. 1 through 4.

This assembly includes a box portion 51 having knockouts 52, and a cover 53 which is preferably hinged to the box at 54. Mounted within the box is a base 55 of insulating material which is generally similar to the base 6 shown in the form illustrated in Figs. 1 through 4. The rear face of the base is grooved at 56 and positioned at the opposite sides of this groove are switch contacts 57 and 58. The contacts 57 include angularly related portions 59 through which the bolts 60 extend. The bolts 60 in conjunction with the nuts thereon serve to secure the contacts 57 to the base, and also function as line circuit connectors. The contacts 58 preferably include angular portions 61 to which may be secured clips 62 adapted to hold cartridge type fuses such as shown at 63. The central portion of the contacts 58 may have screw threaded apertures therein with which screws 64 may engage for securing the contacts and associated clips to the base. Fuse clips 65 are secured to the base and electrically connected to load circuit connectors 66 by the conductors 67. The fuse clips 62 and 65 are so mounted on the base that they project from one edge surface thereof so as to receive fuses with their axes extending perpendicularly to the back of the casing with the line side contact ends thereof positioned adjacent the back of the casing.

A rectilinearly movable switching member is provided which comprises a member 68 of insulating material carrying electrical conductors 69 for connecting the switch contacts 57 and 58 to complete circuits therethrough. An operating member 70 having pivots 71 thereon supported in grooves 72 in the front face of the base serves to reciprocate the switching member in a manner similar to that of the form shown in Figs. 1 through 4. Over center tension springs 73 are provided for causing quick action movement of the operating member 70 and for holding the pivots 71 in the grooves 72. The springs 73 are positioned in slots 74 in the base and their opposite ends are secured to the base and the operating member at 75 and 76 respectively. A solid neutral 77 is preferably mounted on the base 55.

Attention is called to the relationship between the plane of movement of the switching and operating members and the position of the fuse clips, this being such that the fuse clips are adapted to receive the fuses with their longitudinal axes lying in a plane parallel to the plane of movement of the switching and operating members. As a result of positioning these parts in this manner the vertical dimension of the switch and fuse assembly, as viewed in Fig. 5, is relatively small, and consequently in a given size of casing a maximum amount of space is left available for wiring.

If desired, a piece of insulating material 78 may be secured to the casing so as to extend over the line connections, the lower edge being positioned under the members 79. The casing cover 53 is preferably slotted to receive the handle portion of the operating member and the end wall of this slot is adapted to move the operating member to its "off" position when the cover is opened.

While I have illustrated this phase of the invention as it may be applied to a two pole, solid neutral type of switch, it should be understood

that the principles thereof may be utilized in switches having a greater or lesser number of poles.

I have shown, and more particularly in Fig. 8, a cover and switch interlocking means for preventing movement of the switching member to "on" position when the cover is open. Pivoted to the side of the casing is a lever 80 having a portion 81 extending angularly therefrom and which projects into a recess 82 in the base. The lever is biased by a spring 83 to a position in which the portion 81 is in the path of movement of the switching member and when in this position, shown in dotted lines in Fig. 8, it serves to block movement of the switching member to "on" position, that is, to the left as viewed in Fig. 10. When the cover is closed, the end portion 84 of the lever is pushed toward the rear of the casing to cause the portion 81 of the lever to move out of the path of movement of the switching member against the tension of the spring 83.

Certain of the features of the switch assembly shown in Figs. 5 through 10 are disclosed and claimed in my divisional application Serial No. 183,331, filed January 4, 1938, which has matured into Patent No. 2,168,540.

What I claim is:

1. An electric switch comprising in combination, an insulating base, stationary switch contacts, a movable switching member adjacent the rear of the base and adapted to open and close a circuit through said switch contacts, an operating member pivoted on the base for movement about an axis near the front thereof and including a portion projecting rearward into engagement with said switching member whereby oscillation of the operating member serves to move said switching member, spring means secured to the base and operating member for imparting a quick action movement to the operating member, and means having a detachable connection with the base for normally preventing separation of the base and switching member, said switching member being removable from the base upon detachment of said means from the base and without detachment of said spring means.

2. An electric switch comprising in combination, an insulating base having an aperture therethrough from front to rear, stationary switch contacts mounted on the base, a rectilinearly movable switching member adjacent the rear of the base and adapted to open and close a circuit through said switch contacts, an operating member pivoted on the base for movement about an axis near the front thereof and including a portion projecting rearward into the said aperture and into engagement with said switching member whereby oscillation of the operating member serves to reciprocate said switching member, spring means secured to the base and operating member for imparting a quick action movement to the operating member, and means having a detachable connection with the base for normally preventing separation of the base and switching member, said switching member being removable from the base upon detachment of said means from the base and without detachment of said spring means.

3. An electric switch comprising in combination, an insulating base having an aperture therethrough from front to rear, stationary switch contacts, a switching member adjacent the rear of the base and rectilinearly movable to circuit opening and closing positions, an operating member pivoted on the base for movement about an axis near the front thereof, said operating member including a portion projecting rearward into said aperture and into engagement with said switching member whereby oscillation of the operating member serves to reciprocate said switching member, spring means secured to the base and operating member for effecting a quick action movement of the switching member to at least one of its positions and constituting the sole means for holding and the sole means for maintaining said base and operating member in assembled relationship, and means having a detachable connection with the base for normally preventing separation of the base and switching member, said switching member being removable from the base upon detachment of said means from the base and without detachment of said spring means.

4. An electric switch comprising in combination, an insulating base having a groove in the rear face thereof, stationary switch contacts mounted on the base, a switching member positioned in said groove and rectilinearly movable to circuit opening and closing positions, an operating member pivoted on the base for movement about an axis near the front thereof and including a portion projecting rearward into engagement with said switching member whereby oscillation of the operating member serves to reciprocate said switching member, means having a detachable connection with the base for normally preventing separation of the switching member and base, said switching member being freely removable from the base upon detachment of said means from the base, and a spring having one end anchored with respect to the base and the other end secured to the operating member so that the longitudinal axis of the spring moves from one side to the other of the pivotal axis of the operating member as the latter is moved to its circuit closing and opening positions to thereby effect a quick action movement of the operating member to said positions, said spring constituting the sole means for maintaining said base and operating member in assembled relationship.

JOSEPH SACHS.