July 30, 1940. L. C. WOLCOTT 2,209,868

SWITCH

Filed Dec. 9, 1939

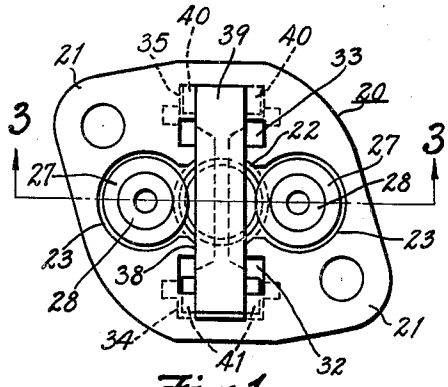


Fig. 1

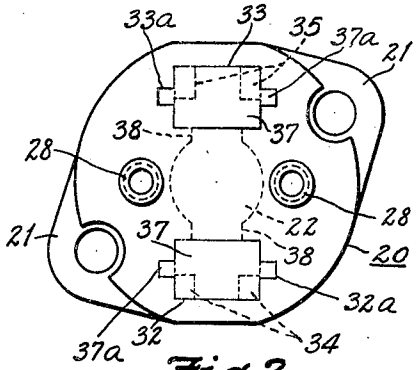


Fig. 2

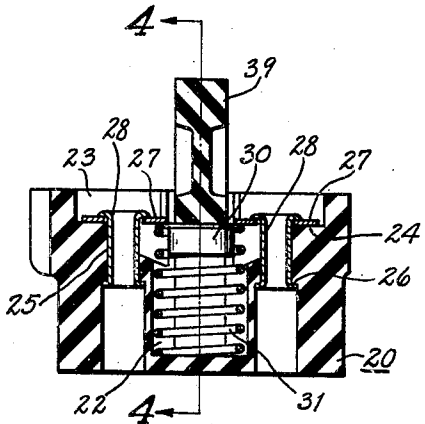


Fig. 3

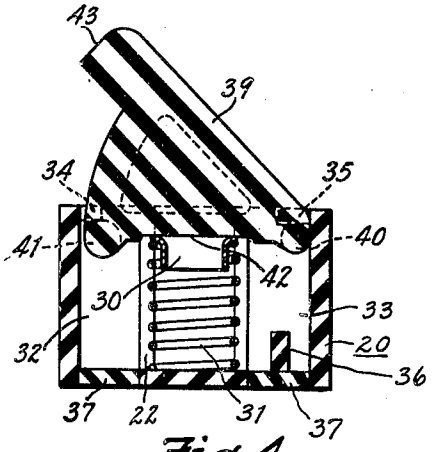


Fig. 4

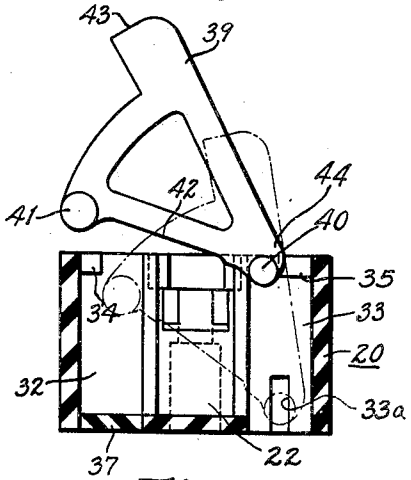


Fig. 5

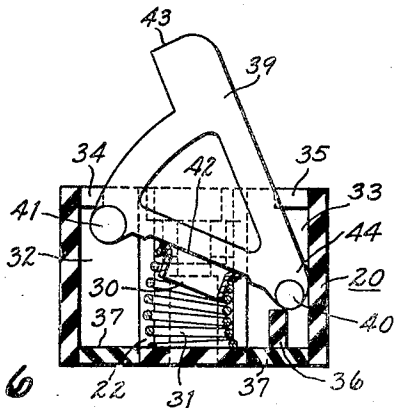


Fig. 6

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SWITCH

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8 Claims. (Cl. 200—54)

This invention relates to electric switches and more particularly to switches adapted to be mounted in a compartment and actuated by a closure member for the compartment.

An object of the present invention is to construct and arrange the parts of the switch in such a manner as to facilitate rapid assembly of a switch actuator with a switch assembly without the use of tools.

More specifically, it is an object to provide a switch sub-assembly including a novel one-piece molded base, stationary and movable contacts and a contact actuating spring, said sub-assembly being self-contained and being so constructed as to permit the assembly of the actuator with the sub-assembly without the use of tools, the parts of the sub-assembly cooperating with the actuator to retain it in assembled relation without the use of any additional parts.

Another object of the invention is to reduce the number of parts and to simplify the structure of the individual parts so as to reduce the cost of production.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing wherein a preferred embodiment of the present invention is clearly shown.

In the drawing:

Fig. 1 is a top plan view of the switch embodying the present invention.

Fig. 2 is a bottom plan view of the switch.

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3.

Fig. 5 is a view showing the manner of how the switch actuator is assembled to the switch base.

Fig. 6 is a sectional view illustrating that the actuator for the switch cannot be disassembled from the base when all of the stationary elements of the switch structure are assembled in their proper relation.

Referring to the drawing 20 designates an insulating base preferably molded to the shape illustrated, having integral apertured projections 21 on the top surface thereof to received means for mounting the base upon a suitable support. The base 21 is also formed with a deep central recess 22 opening out upon the top surface and with shallow recesses 23 disposed on opposite sides of the recess 22 to provide platforms 24 that are in the same plane. The platforms 24 have apertures 25 which are counterbored to form shoulders 26. A metal contact 27 rests on each platform 24 and each contact is attached to the base by an eyelet 28 having its shank extending into the aperture and spun over against the shoulder 26 to attach the contact to the base 20. Each contact 27 has a portion extending into the central recess 22 as clearly shown in Fig. 1.

A flanged movable contact 30 is yieldably urged against the contacts 27 by a coil spring 31. One end of the spring 31 rests against the bottom of the recess 22 and the other end of spring bears against the flanged portion of the movable contact 30. It is to be understood that the flanged movable contact 30 could be eliminated if so desired and the spring 30 act as the movable contact. When this is done the spring 31 is made of phosphor bronze or other suitable metal with both ends of the spring closed and ground.

The base 20 is molded with rectangular openings 32 and 33. In this instance these openings are disposed at right angles to the center line of the shallow recesses 23 as viewed in Fig. 1. The upper entrances of the openings 32 and 33 are restricted by lugs 34 and 35 respectively. It will be noted that the lugs 35 restrict the entrance to opening 33 more than the lugs 34 restrict the entrance to the opening 32, see Fig. 1. The lower ends of the openings 32 and 33 are provided with notches 32*a* and 33*a* respectively. It will be noted that the notches 33*a* extend a substantial distance upwardly into the opening 33, see Fig. 5. The notches 33*a* receive a plug 36 which extends across th opening 33. The lower ends of openings 32 and 33 are closed by insulating inserts 37. Each insert is provided with ears 37*a* which are received by the respective notches provided in the openings 32 and 33. It is to be understood that the plug 36 could be formed integral with the insert which would close the opening 33. The inserts 37 are press fitted into the openings 32 and 33 to close same to prevent foreign matter from entering the lower ends of the openings. The base is also molded with a pair of aligned notches 38 equal in width to the distance between the pairs of lugs 34 and 35. The depth of each notch 38 is equal to the depth of the central recess 22. The notches extend from the upper face of the base and form a communication between the openings 32 and 33 and act as a guide for an actuator or lever 39.

The actuator or lever 39 of substantially triangular shape is molded of suitable insulating material. The lever 39 is provided with two pairs

of laterally extending aligned bosses 40 and 41. The pairs of bosses are spaced apart by a portion 42 adapted to rest or engage the movable contact 30 as clearly shown in Figs. 3 and 4. In the present instance the bosses 41 are slightly larger than the bosses 40 and the bosses 40 engage the under side of the lugs 35 while the bosses 41 engage the under side of lugs 34. The bosses 41 cooperate with the lugs 34 to form a stop for the lever in one direction of movement. The lever 39 is provided with an extension 43 which cooperates with the top surface of the base 20 to form a stop for the lever in the opposite direction.

The assembly of the lever 39 to the base will now be described. Referring to Fig. 5, the lever is placed in an abnormal position shown in full lines. It will be noted that inserts 37 are removed from the openings 32 and 33. The end of the lever 39 having the smaller bosses 40 is inserted first into the opening 33 as only the bosses 40 can pass through the restricted space which is between the lugs 35 and the inner wall of the opening 33. The rear end of the lever 39 is lifted upwardly toward the right and then pushed downwardly until the larger lugs 41 pass the restricted space formed by the lugs 34 and the inner wall of the opening 32. When the lugs 41 pass the lower side of the lugs 34 the spring will urge the lever 39 upwardly so that the bosses 40 and 41 will engage their respective lugs as shown in Fig. 4.

When the lever 39 is in the position shown in Fig. 4, the plug 36 and the inserts are then press fitted into their respective openings. The plug 36 limits the downward movement of the lever in the opening 33, thus the lever cannot be accidently disassembled from the base 20. In order to remove the lever 39 from the base the plug 36 and the insert 37 which hold the plugs in the opening 33 must be removed.

When the lever 39 is in the position shown in Fig. 4 the lever is secured in its proper assembled relationship with the remainder of the structure, the lugs 40 cooperating with the lugs 35 to form a pivot for the lever and the lugs 34 cooperating with the bosses 41 to form a stop to limit the outward movement of the lever.

The switch is adapted to be mounted on a wall in a refrigerator cabinet and in close proximity to the door. The shank portions of the eyelets 28 are adapted to receive bared ends of insulated wires, not shown, to connect the switch with a source of electrical energy. It will be understood that the bared conductor ends are soldered to the eyelets.

The operation of the switch is as follows: As the door is closed the lever 39 is moved inwardly about its pivot bosses 40 thereby moving the flange contact against the tension of the spring 31, out of engagement with the stationary contacts 27 to open the switch. When the door is opened, the spring 31 urges the contact 30 and the lever 39 outwardly until the contact 30 engages the contacts 27 to close the switch.

When it is desired to disassemble the lever 39 from the base 20 the insert 37 and the plugs 36 are removed from the opening 33, then the lever 39 is moved in a clockwise direction from the position shown in Fig. 4 to the position shown in dot and dash lines in Fig. 5. When the lever 39 is being removed the bosses 41 first cooperate with the lugs 34 to form a pivot for the lever. Upon continued movement of the lever 39 in a clockwise direction a cam portion 44 formed integral with lever will cooperate with the outer wall of the opening 33, to thrust the lever 39 toward a vertical position and cock the spring in a manner shown in Fig. 6. As the lever 39 is moved further into the opening 33 the action of the cam 44 will force the bosses 41 toward the restricted space in the opening 32. When the bosses 41 have moved the required distance the spring 31 will act upon the lever 39 to thrust the bosses through the space between the lugs 34 and the inner wall of the opening 32 and above the top surface of the base 20. When this occurs the bosses 40 on the lever 39 can be easily pulled through the restricted space formed by the lugs 35 and the inner wall of the opening 33.

It will thus be seen that I have provided a simple and compact switch which can be easily assembled or disassembled without the use of tools, which is reliable and efficient in operation, which embodies the advantages of pivoted actuator which requires no screws, pins or other securing means to maintain the actuator in a pivotal relationship with respect to a base which supports the stationary contact which in turn confines the movable contact within the base.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A switch comprising in combination; a sub-assembly including stationary contacts, a yieldable bridging contact normally engaging the stationary contacts and a body which locates the stationary contacts in the same plane and which guide the yieldable contact into engagement with the stationary contacts and which provides a pocket for the yieldable contact; means for securing the stationary contacts to the body, said stationary contacts, when secured, confining the yieldable bridging contact within the body; and a lever having two pairs of laterally extending spaced pins, said pairs of pins being spaced by a portion of the lever which engages the bridging contact, one pair of pins acting as a pivot for the lever and the other pair of pins operating as a stop for the lever.

2. A switch comprising in combination; a sub-assembly including stationary contacts, a movable bridging contact, a spring urging the bridging contact against the stationary contacts and a body which locates the stationary contacts in the same plane and which guides the movable contact into engagement with the stationary contact and which provides a pocket for the spring; means for securing the stationary contacts to the body, said stationary contacts, when secured, confining the bridging contact and the spring within the body; and a lever having two pairs of integral laterally extending spaced bosses, said pairs of bosses being spaced by a portion of the lever which engages the bridging contact, one pair of bosses acting as a pivot for the lever and the other pair of bosses operating as a stop for the lever.

3. A switch comprising in combination; a movable contact actuator comprising a lever having two pairs of laterally extending, aligned pins, said pairs of pins being spaced apart by a portion of the lever adapted to engage a movable contact; a sub-assembly unit comprising stationary contacts, a yieldable bridging contact normally engaging the stationary contacts, and a body which locates the stationary contacts in the same

plane and which guides the yieldable contact into engagement with the stationary contact and which provides a recess for the yieldable contact; means for securing the stationary contacts to the body said stationary contacts, when secured, confining the yieldable contact within the body, said body having pockets respectively for receiving the pairs of pins of said lever, a pair of lugs associated with each pocket for restricting the entrances to said pocket in a manner such that, for all operating positions of the lever said lugs prevent escape of said pins of the lever from said pockets, one pair of lugs serving as a pivot bearing for one pair of pins of the lever, the other pair of pins cooperating with the other pair of lugs to provide a stop for the lever, said lever being movable against the action of the yieldable contact into abnormal position wherein the pairs of spaced pins of the lever can be located respectively in alignment with the entrance portions of said pockets.

4. An electric switch comprising in combination a base having a recess opening to the upper surface thereof, said base also having a pair of notches extending radially from the marginal wall of the recess; stationary contacts supported by the base and located in substantially the same plane on the base; a movable bridging member; resilient means disposed between the bottom wall of the recess and the bridging member to bring said bridging member into engagement with the stationary contacts; means for securing the stationary contacts to the base, said stationary contacts, when secured, confining the bridging member and the resilient means within the recess; an actuator having a portion adapted to engage the movable bridging member, said portion having a sliding fit within the notches, said actuator having two pairs of laterally extending bosses and spaced apart by the bridging member engaging portion of the actuator; and two pairs of lugs supported by the base, one pair of lugs providing a stop for the actuator and the other pair of lugs forming a pivot for the actuator.

5. In an electric switch in combination; a molded insulating base having a recess formed therein and opening to the upper surface thereof, said base having through openings on opposite sides of the recess, said openings being restricted at one end thereof to provide spaced lugs, said body also having a pair of aligned notches equal in width and depth formed in the upper surface thereof and respectively leading from the openings to the recess; stationary contacts located in substantially the same plane carried by the base; a movable bridging contact and a spring located within the recess which urges the movable contact into engagement with the stationary contacts, said stationary contacts, when secured, confining the movable contact and the spring within the recess; a lever having a sliding fit with the aligned notches and having a portion adapted to engage the movable contacts; laterally extending bosses at each two ends of the lever and respectively engaging the under side of the lugs to prevent escape of the lever in all operating positions of the lever, the bosses at one end serving as a pivot bearing for one end of the lever, the other bosses of the lever cooperating with the lugs of the body to provide a stop for the lever, said lever being movable against the action of the spring into an abnormal position wherein the bosses at each end of the lever can be located respectively in alignment with the unrestricted portions of the openings in order to remove the lever from the body.

6. An electric switch comprising, a sub-assembly unit including stationary contacts; a yieldable bridging member normally engaging the stationary contacts; a body which locates the stationary contacts in the same plane and which provides a recess extending throughout the major portion of the depth for the yieldable bridging member, said stationary contacts confining the bridging member within the recess, said body having a pocket on each side of the recess and communicating with the recess, said body supporting lugs restricting the entrance of each pocket; and a lever having a pair of laterally extending abutments, said abutments being spaced by a portion of the lever adapted to engage the yieldable bridging member, said bridging member biasing the lever so that lugs in one pocket serve as a pivot bearing for one abutment to the lever, the lugs of the other pocket cooperating with the other abutment to provide a stop for the lever, said lever being movable against the action of the bridging member into an abnormal position wherein the abutment against the stop can be made free of the stop to remove the lever from the body.

7. An electric switch comprising in combination; a molded insulating base, said base having a central recess opening to the upper surface thereof, said base having through openings on opposite sides of the recess, said openings having restrictions on each side thereof on upper surface of the base to provide spaced lugs, said base also having a pair of aligned notches equal in width to the spaced lugs and in depth to the recess adapted to afford communication between the openings and the recess; stationary contacts supported by the base and located in substantially the same plane on the base; a movable bridging member; a coiled spring interposed between the bottom wall of the recess and the bridging member to bias normally the bridging member into engagement with the stationary contacts, means for securing the stationary contacts to the base, said stationary contacts, when secured, confining the movable contact and the spring within the recess; an actuating lever having a sliding fit between the spaced lugs in the openings and the aligned notches, said actuator having two pairs of laterally extending bosses, said bosses being spaced apart by a portion of the actuator adapted to engage the movable bridging member, said bosses cooperating with the lugs in the respective openings to prevent escape of the actuator in all operating positions, the lugs in one opening serving as a pivot bearing for one pair of bosses of the actuator, the lugs in the other opening cooperating with the other pair of bosses of the actuator to provide a stop for the actuator, said lever being movable into an abnormal position to cock the spring wherein the bosses can be located respectively in the openings to permit removal of the actuator from the base.

8. An electric switch comprising, a sub-assembly unit including stationary contacts, a yieldable bridging member normally engaging the stationary contacts, a body which locates the stationary contacts in the same plane and which provides a recess extending throughout a major portion of the depth for the yieldable bridging member, said stationary contacts confining the bridging member within the recess, said body having a pocket on each side of the recess and

communicating with the recess; means restricting the entrances to said pockets; and a lever having a pair of laterally extending abutments, said abutments being spaced by a portion of the lever adapted to engage the yieldable bridging member, said bridging member biasing the lever so that the restricting means in one pocket serves as a pivot bearing for one pair of abutments of the lever, the other restricting means in the other pocket cooperating with the other pair of abutments to provide a stop for the lever, said lever being movable against the action of the bridging member into an abnormal position wherein the abutments against the restricting stop means can be made free of the stop to remove the lever from the body.

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