Aug. 15, 1939. R. POPP 2,169,593

COMBINATION TERMINAL AND CONTACT MEMBER FOR AN ELECTRIC SWITCH

Original Filed Aug. 24, 1935

Fig. 1.

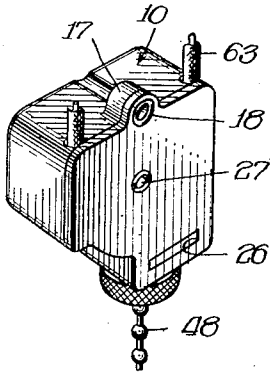


Fig. 2.

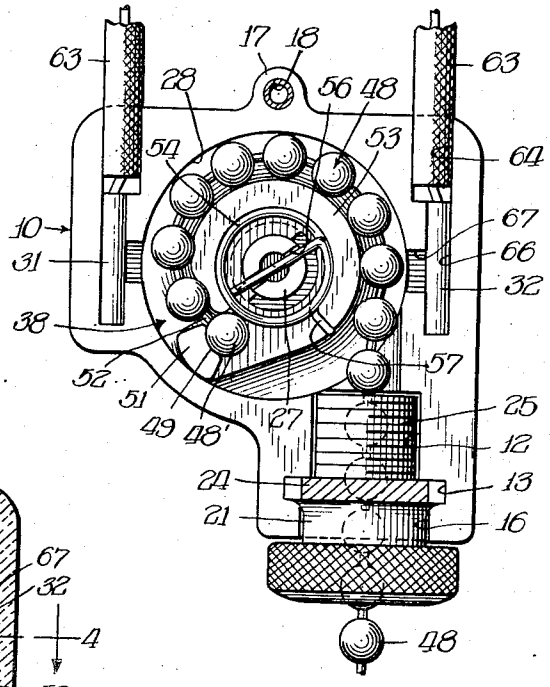


Fig. 3.

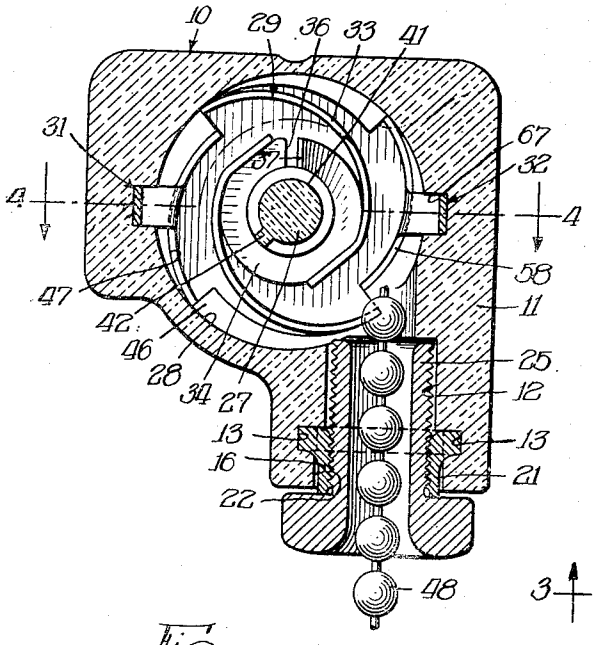


Fig. 4.

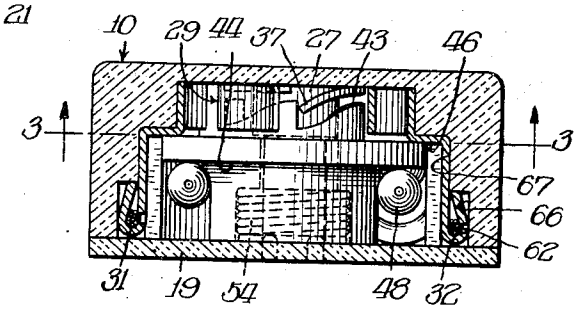
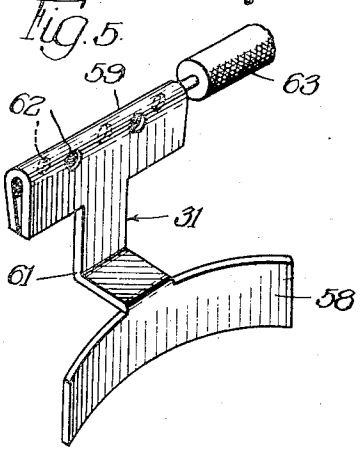


Fig. 5.



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COMBINATION TERMINAL AND CONTACT MEMBER FOR AN ELECTRIC SWITCH

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Original application August 24, 1935, Serial No. 37,657, now Patent No. 2,124,337, dated July 19, 1938. Divided and this application March 10, 1936, Serial No. 68,029

3 Claims. (Cl. 200—166)

This invention relates in general to electric switches, and more in particular to a combination terminal and stationary contact member for such switches.

The present application is a division of my pending application Serial No. 37,657, filed August 24, 1935, now Patent No. 2,124,337, patented July 19, 1938. The structure of the present application is also more particularly an improvement over the terminal member of Patent No. 1,738,140 issued December 3, 1929, in which I was a co-inventor.

In present day competition in the electric switch art low-priced high quality merchandise is essential to a successful business. However, rigid underwriters' requirements for electric switch performance necessitate safety and ruggedness of design in switches in spite of the low cost merchandising requirements.

It is an object of my invention to provide a simplified, improved, removable terminal member for an electric switch.

A further object is to provide such a member which will positively grip the lead wire for the switch without the use of solder or the like.

A still further object is to provide such a combination terminal and contact member which is adapted particularly for assembly in an insulating frame or housing for the switch mechanism and which said member may be readily assembled in the switch and frictionally retained therein without reliance on the switch cover as is necessary in the prior art switches.

Sturdiness, compactness, ready assembly and removability, are features of my improved combination terminal and stationary contact member, and these features are provided in a member which is inexpensive both from the standpoint of material and labor costs in the manufacture and assembly of the same.

Other objects and features of my invention will be apparent from the following description, taken with the drawing, in which:

Fig. 1 is a perspective view of my assembled switch.

Fig. 2 is an enlarged plan view with the cover of the switch removed.

Fig. 3 is a sectional view along the line 3—3 of Fig. 4, with the actuator of the switch mechanism removed.

Fig. 4 is a cross sectional view along the line 4—4 of Fig. 3.

Fig. 5 is an enlarged perspective view of the combination terminal and contact member of my invention.

In practicing my invention I provide preferably an insulating housing or frame for an electric switch with a removable insulating cover. The switching mechanism is supported in said insulating frame or housing. Removable combination terminal and stationary contact members for said switching mechanism are frictionally retained in cavities in the housing, and each member comprises a relatively soft metal body including a terminal portion adapted to be formed to a substantially U-shape for frictionally gripping a lead wire therein without the use of solder or other like retaining means. Staggered holes are provided on opposite sides of the terminal portion in such a position that the material of the lead wires for the switch proper will bulge slightly into the holes in forming the terminal portion to grip the wire. An offset neck portion is provided from said terminal portion extending to a stationary contact portion for assembly in a position to engage the circuit making and breaking mechanism of the switch. Mounting means are provided in the frame or housing for mounting the switch on a canopy or like electric fixture.

Referring now to the drawing, I provide a one-piece insulating housing 10 of any suitable molded material, but preferably of a material commercially known as "Bakelite", substantially rectangular in shape except for a projecting portion 11 extending from one side at one corner thereof to carry a switch mounting frame or nut therein. The neck or projecting portion 11 comprises a cavity 12 with offset recesses 13 forwardly and at each side thereof and a corresponding open slot at the bottom. The cavity extends forwardly from the recesses to an integral segmental collar 16, shown particularly in Figs. 2 and 3.

A projection 17 at the rear of the housing is apertured to receive a mounting eyelet 18 in an insulating cover 19, as shown in Fig. 1. A mounting frame or nut 21 formed with a forwardly-extending threaded bearing surface 22 is mounted with an ear 24 fitting into a slot 26 in the cover 19, with a corresponding ear fitting in a corresponding slot in the bottom of the housing, and with both ears extending from a vertical flange on the nut. A nipple 25 with a knurled flange at one end, and an elongated threaded outside surface extending rearwardly therefrom is threadably carried in the nut 21. Both the nipple and mounting nut may be inexpensive screw machine parts, or the nut 21 may be formed in an extrusion process.

As to the switch mechanism, this rotates on a post 27 integral with the housing 10 and extending upwardly in the center of an enlarged cavity 28 within said housing. The switch mechanism comprises a one-piece bridging contact member 29 formed preferably from a phosphor bronze spring material and is mounted to rotate on the floor of the cavity 28 between a pair of stationary contacts 31 and 32, as will hereinafter be explained. The bridging contact member includes a pair of resilient contacting blades 33 oppositely disposed and standing upwardly from a center ring portion 34. The ring is split transversely at one side, as at 36, with an upturned tongue 37 to act as a pawl.

A one-piece actuating member or actuator 38 is provided for operating the bridging contact member 29.

The actuator 38 is preferably molded, and from insulating material. From the standpoint of cost of the mold and ease of handling the molded article, it is important to have vertical, straight side walls and no portions projecting outwardly from the body. These requirements are satisfied in the actuator with a center core for fitting over the post 27, and an annular collar 41 integral with the post at the base thereof. A stop or key 42 on the post limits the movement of the actuator. The bottom portion of the actuator is provided with a plurality of longitudinally projecting ratchet teeth 43 for successively engaging the tongue 37 of the bridging contact member.

An annular flange 44 of the same diameter as the cavity 28 of the housing is provided on the actuator to ride on the ledge 46 at the bottom of the cavity formed in providing alternate ledges and ratchet tooth-like recesses 47 for the bridging contact member and stationary contacts, as will be hereinafter described. The upper face of the flange is adapted to carry a pull chain 48, with the first link 48' lying in a depression 49, and retained therein by the integral stud 51 forming a narrow slit 52. In order that the chain may lay more regularly around the wall 53 of the core of the actuator, slight depressions are formed therein adjacent the slit 52, as shown in Fig. 2.

A coiled retrieving spring 54 is carried loosely in the actuator and around the post 27. One end is turned inwardly and projects into a slot 56 across the top of the center post. The other end of the spring is turned outwardly and engages against a shoulder 57 of a comparatively wide recess in the wall 53 of the actuator. The spring is given approximately one half turn to tension it before the inwardly-extending end is pressed into the slot 56.

As to the stationary contact members, it has been customary in the art to provide a combination contact and terminal, with a screw post threaded into a terminal strip. The terminal portion is also formed to carry a conductor with the latter soldered therein. Both constructions are expensive in material and in labor, in the original and final assembly thereof. I provide a very simple, yet effective, combination contact and terminal in the members 31 and 32 formed in one piece from a relatively soft metal plate. Both members are alike, except that they are mounted oppositely in the housing, and for convenience I will simply describe member 31, as illustrated in Fig. 5.

This member is stamped out with an arcuated contact blade 58 connected with a terminal portion 59 through a constricted neck portion 61. In stamping the terminal portion, a plurality of holes 62 are stamped out, to subsequently lie on opposite legs or walls of the terminal, and staggered longitudinally so that preferably no two holes will lie opposite one another. The holes are stamped in such a manner that the usual burr which results from the stamping will lie on the outside of the formed terminal. The member 31 is finally formed so that the terminal portion is doubled over, as shown in Fig. 5, to pinch the uncovered end of a conductor 63 and positively retain the same by frictional engagement between the walls and the wire, and also by virtue of the fact that, when the walls are pinched together, the wire is forced slightly into the holes 62. In the commercial embodiment of my invention, this construction has acted to positively retain the wire without any additional holding means, such as soldering, as has always been necessary in the prior art.

The members 31 and 32 with the conductors 63 fastened therein are mounted in corresponding recesses in opposite sides of the housing, as shown particularly in Figs. 3 and 4. This mounting is also shown in Fig. 2 with the insulation of the conductors 63 lying in channels 64 opening into cavities 66 rectangular in shape and slightly deeper than the depth of the portion 59. The channels 64 are long enough so that the insulation on the wire extends into the housing far enough so that it will not pull out and leave the wire bare. A channel 67 is also provided, opening into the cavity 28 of the housing on each side thereof to carry the neck portion 61. The contact blades 58 each abut a ratchet tooth in the bottom of the cavity 28, as shown in Fig. 3, and engage against a shoulder of a recess 47 to hold the blade rigidly in position. The members 31 and 32 are retained in the housing as a result of the frictional engagement of the outer faces of the terminal portions 59 with the walls of the mounting cavities 66. There is a slight resiliency in the metal which cooperates in this action, and more important, a cutting frictional engagement exists between the sharp burr on the holes 62 and the walls of the cavity. This obviates the necessity of relying on the cover 19 to retain the members in the housing, as is the case in some prior art switches. This is a marked advantage in view of the fact that the covers sometimes warp slightly at their outer edge to bend away from the upper face of the wall of the housing.

In assembling the switch, the members 31 and 32 are placed in their respective cavities. The bridging contact member 29 is slipped over the post 27 to the position shown in Fig. 3. The actuator 38 is dropped into position and the retrieving spring 54 assembled as previously described. After this is accomplished, the chain 48 is mounted on the actuator and threaded through the nipple 25 in the usual manner. The mounting nut 21 is assembled in the neck of the housing to carry the nipple 25, and the cover is placed on the housing as shown in Fig. 1. As may be noted from this figure, the post 27 with the slot 56 extends upwardly flush with the top face of the cover. In this manner the end of the spring is securely retained in the slot by means of the cover. The ears 24 on the flange of the mounting nut, together with the lower edge of the eyelet 18, are upset to rigidly retain the cover in position.

The switch is positive in operation with the chain moving the actuator 38, limited in its move-

ment by the key or stud 42, to in turn operate the bridging contact member 29. The ratchet teeth 43 of the actuator successively engage the tongue or pawl 37 of the bridging contact member. The nipple 25 may be readily removed and then threaded into the mounting nut 21 to quickly and firmly mount the switch as desired.

This mounting combination, as may be understood from a consideration of the drawing, is readily adapted to rather widely different mounting positions. With the somewhat elongated threaded portion on the nipple 25, and the threaded neck of the nut 21 extending to the mouth of the housing, the switch may be rigidly mounted on a wide or thick board, wall, or fixture, for it is necessary that only a few threads of the nipple be threaded into the nut. On the other hand, the nipple threads into the nut 21 so far that a paper may be firmly gripped between the knurled collar of the nipple and the mouth of the nut as shown in Figs. 2 and 3, thereby mounting the switch on the thinnest possible material. This construction has a further advantage in that with the knurled head of the mounting nipple 25 bearing against the mouth of the nut 21 rather than against the housing, any pressure may be applied to tighten the nipple without danger of the nut being pulled from the housing. This construction eliminates the necessity of a large number of different sized mounting elements, facilitates mounting, and thereby reduces installation costs in material and labor.

Although I have described and illustrated my invention in its preferred embodiment, it is understood that I am not limited thereby, but limit the invention only by the scope of the appended claims.

I claim:

1. In an electric switch, a molded housing of insulating material having a switch mechanism carrying cavity therein, with a relatively thick side wall on at least one side of said cavity, a recess in said wall extending longitudinally thereof, with vertical side walls in said recess, a terminal member for said recess comprising a body portion having a plurality of holes punched therein, with a burr on one side and around each hole, with said body portion formed to fold over a wire conductor to frictionally retain said wire therein, and said terminal member adapted to be removably mounted in said recess with the burrs on said body portion engaging the vertical side walls thereof, and means on said terminal member for making electrical connection with switch mechanism in said housing cavity, said holes being staggered whereby the wire is squeezed into the holes as the body portion is folded over.

2. In an electrical switch, a housing formed of insulating material having a switch mechanism receiving cavity therein and having a recess at the side of said cavity and communicating therewith through a narrow slot, and a combination terminal and stationary contact member carried in said housing and including a contact portion within said cavity and a terminal portion within said recess connected together by a conducting web engaging said slot adjacent to both said terminal and contact portions to secure them firmly in place and said terminal portion being substantially elongated and fitting snugly in said recess whereby it is prevented from twisting therein with said terminal portion having a plurality of burred holes therein adapted for receiving pressed out portions of a wire carried in said terminal portion, and with the burrs at said holes frictionally engaging a wall of said recess to assist in retaining said terminal portion in said recess.

3. In an electrical switch, a housing formed of insulating material having a switch mechanism receiving cavity therein and having a recess at the side of said cavity and communicating therewith, and a combination terminal and stationary contact member carried in said housing and including a contact portion within said cavity, and a terminal portion within said recess connected together, said terminal portion being doubled about a wire, having burred holes in one side thereof and having solid portions on the other side opposite the holes pressing the wire into the holes, and said terminal portion with the wire therein fitting the recess tightly and with the burrs at the holes engaging the wall of said recess and interacting therewith to substantially prevent movement of the terminal portion in the recess.

RUDOLF POPP.