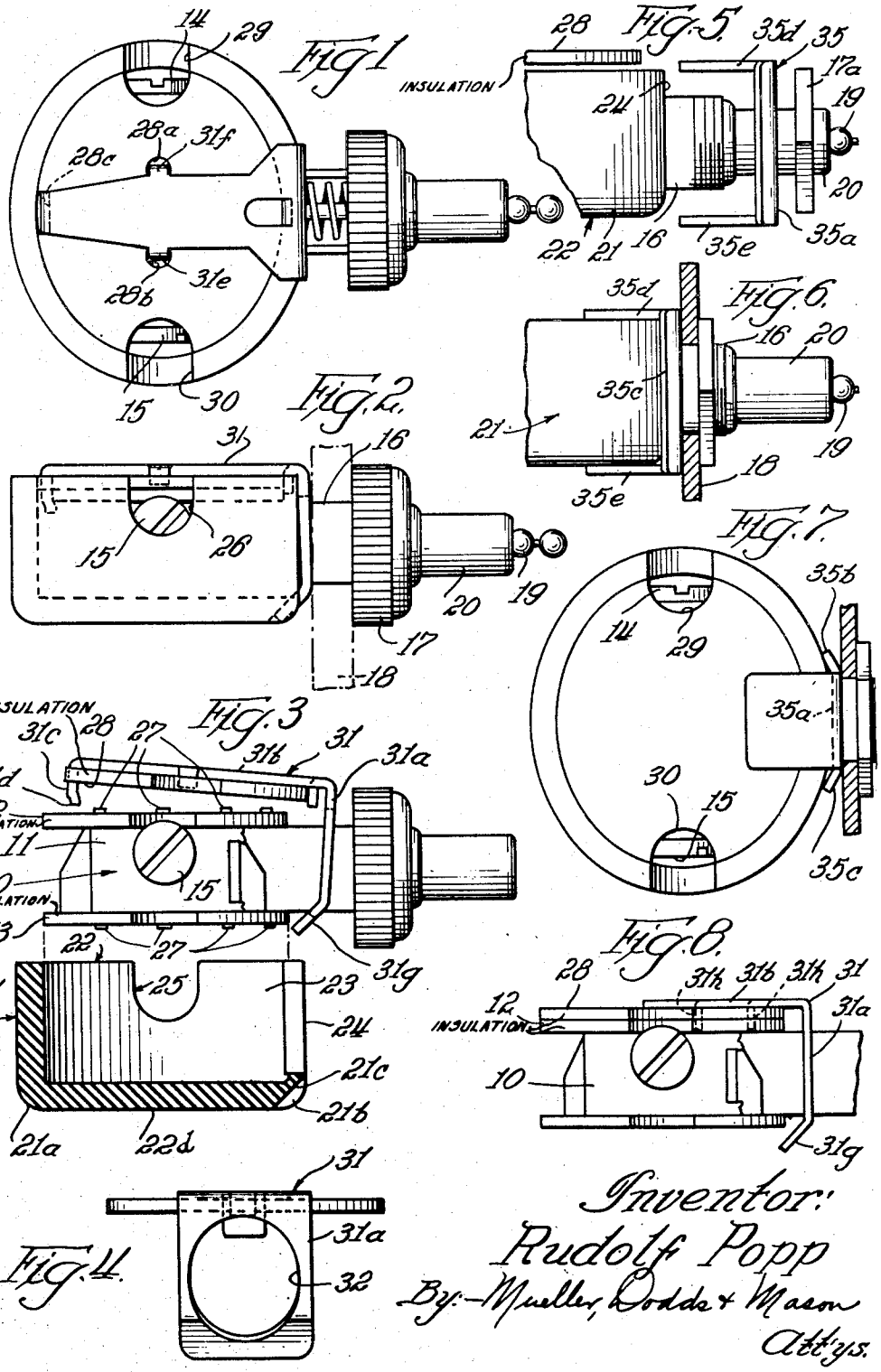
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HOUSING FOR ELECTRICAL SWITCHES

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HOUSING FOR ELECTRICAL SWITCHES

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The present invention relates to electrical switches and more particularly to an improved insulating housing for substantially completely enclosing a preassembled electric switch unit. This application relates to applicant's Patent No. 2,368,679, issued February 6, 1945.

Housings for electrical switches are used so extensively at the present time that improvements which result in even a small saving in cost of manufacture amounts to substantial proportions when the housings are made in large quantities. The labor cost involved in assembly of the switches and housings can likewise be large, and savings resulting from greater ease of assembly are extremely important. It is common practice to use metal housings with bodies and covers of snap connected type for electrical switches and more particularly those having preassembled switch units or operating units insertable therein and removable therefrom. However, these metal housings have not been entirely satisfactory because of the difficulties in completely eliminating short circuiting of the switch contacts therethrough, and the consequent necessity for providing insulating liners between the housing and the switch unit positioned therein. The cost of manufacturing the parts for metal housings is thus appreciably increased, not only because of the cost of the insulating liners required, but also by the cost of separate machines required to form the housings and the liners therefor. Also special jigs are usually required in assembling the various parts of the housing. In many instances the insulating liner must be of a special material which not only has satisfactory insulating qualities, but also possesses sufficient resilience to provide for its expanding against the side walls of the metal housing. Since some such insulating materials are readily affected by atmospheric conditions, a separate and special storage place for these parts must be provided. The overhead cost of storage is further increased because of the plurality of parts used in making the housings. It is readily apparent, therefore, that where a metal housing is peculiarly adapted to a particular type or size of switch unit, the cost of storage and inventory for a plurality of switch types will be appreciable.

It is an object of the present invention, therefore, to provide an improved insulating housing for a preassembled electrical switch unit, the parts of which are retained in assembled relationship with the switch unit by a single assembly element.

It is another object of the invention to provide a switch housing structure of the character

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described, all parts of which may be assembled with the switch unit without the use of tools and without requiring complicated manual assembly operations.

It is a further and more specific object of the invention to provide an improved switch housing structure of the character described, wherein the mounting facilities of the switch unit are also utilized to retain the housing parts assembled with the switch unit.

It is still another object of the invention to provide an insulating housing for a preassembled electric switch unit which is rugged in construction, is comprised of a minimum number of parts, and is adapted to have the parts thereof formed by simple machining operations, thereby to achieve economy of manufacture and to facilitate assembly and disassembly of the housing parts with the switch unit.

The invention both as to its organization and method of operation, together with further objects and advantages thereof, will best be understood by reference to the following specification taken in connection with the accompanying drawing, in which:

Fig. 1 is a bottom view in perspective illustrating one embodiment of the present invention;

Fig. 2 is a side view of the structure shown in Fig. 1;

Fig. 3 is a side view, partially in section, illustrating the parts of the structure in disassembled positions;

Fig. 4 is an end view of the assembly element provided in the structure shown in Fig. 1 to retain the housing parts in assembled relationship.

Fig. 5 is a fragmentary side view illustrating a modified embodiment of the invention with the parts partially disassembled;

Fig. 6 is a side view of the structure shown in Fig. 5. with the parts in fully assembled relationship;

Fig. 7 is a bottom view in perspective of the structure shown in Fig. 5; and

Fig. 8 is a side view illustrating a further modification of the invention.

Referring now to the drawings and more particularly to Figs. 1 through 4, the present improved switch housing is there illustrated in its use to enclose a completely preassembled switch unit or mechanism 10 of the well known universal lever type. Briefly, the switch unit 10 is comprised of an insulating body 11 centrally apertured to receive the working parts of the switch mechanism and having side openings which are closed by insulating side plates 12 and 13. Cer-

tain electrically conductive parts of the switch, indicated at 27, are supported by the side plates 12 and 13, with their exposed ends extending outward from the surfaces of the side plates. Terminal screws 14 and 15 threadably received in terminal sleeves embedded in the body 11 are utilized in making circuit connections with the circuit making and breaking contacts of the switch mechanism. Along the side thereof, the switch unit 10 is provided with a mounting element 16 extending outwardly therefrom and threaded along the end thereof to receive mounting means in the form of an internally threaded nut 17 which may be utilized in providing a clamp connection between the switch unit and a supporting member 18. The mounting member 16 is of hollow construction to receive the switch actuating element which is connected to a pull chain 19 through a lever 20. This lever may be tilted in any direction relative to the mounting element 17 to produce "on" and "off" operation of the switch.

In accordance with a particular feature of the present invention, the described switch mounting facilities comprising the mounting element 16 and the nut 17 are arranged to coact with a single resilient assembly element 31 in maintaining the housing parts 21 and 28 assembled with the switch unit 10.

More specifically, the present improved housing structure comprises a cover 28 and a substantially cup-shaped insulated housing member 21 having an open side 22 for detachably receiving the switch unit 10 therewithin in a position such that the side plate 12 faces toward the open side of the housing member. This housing member is comprised of an end or bottom wall 22*d* for covering the cover plate 13 and is provided along the side or rim wall 23 thereof with an opening in the form of a slot 24 for receiving the mounting element 16 of the switch unit therewithin. The side wall 23 of the housing member 21 is also provided along the rim edges thereof with opposed openings 25 and 26 which register with the terminal screws 15 and 14, respectively, to accommodate the circuit conductors extending to these screws. The insulating cover 28 serves to insulate the exposed ends of the parts 27 which project through the side plate 12, and is provided with indentations for receiving the ends of these conductive parts. It is of the proper configuration to fit snugly within the rim of the housing member 21 and thus lie flat against the side plate 12, and is provided along its opposed edges with slots 29 and 30 which overlie the terminal screws 14 and 15 to accommodate circuit conductors extending directly upward from these screws.

As indicated above the assembly element 31 is provided for the purpose of maintaining the described housing parts 21 and 28 in assembled relationship with the switch unit 10. This element is die formed from resilient metal and is of L-shaped configuration. Along its base portion 31*a*, it is provided with an enlarged opening 32 for receiving the mounting element 16 of the switch unit 10 therewithin. The base portion 31*a* extends in length generally the axial dimension of the switch, that is from the outside face at the top as shown in Fig. 2 to the outside bottom face in that figure. The long portion 31*b* of this member is adapted to extend transversely across the outer surface of the insulating cover 28 to retain the cover in its assembled position flat against the outer surface of the side plate 12. At its extreme end, the element portion terminates in a snap part or leg 31*c* which is adapted to embrace the adjacent edges of the cover 28 and side plate 12 and includes an inturned lip 31*d* adapted to snap beneath the lower edge of the side plate 12 to maintain the desired assembled relationship between this plate and the cover 28. Suitable registering slots 28*c* are provided along the edges of the cover 28 and plate 12 to receive the assembly element leg 31*c* therewithin. Intermediate its ends, the portion 31*b* of the element 31 is also provided with downwardly extending parts 31*e* and 31*f* which are received within openings 28*a* and 28*b* in the cover 28 to assist in maintaining the angular orientation of this cover relative to the housing member 21. At the extreme end of the assembly element base portion 31*a*, an angularly disposed snap part or tongue 31*g* is provided to coact with the housing member 21 in maintaining this housing assembled with the switch unit 10. More specifically, the housing member 21 is provided along its edge 21*a* with a slot 21*b* defining a shoulder 21*c* which extends angularly between the end and side surfaces of the housing member. This shoulder is adapted to be engaged by the angularly extending snap part 31*g* of the element 31 to maintain the housing member assembled upon the switch unit 10.

From the above explanation it will be understood that in order to assemble the housing structure upon the switch unit 10, the cover 28 is first assembled flatwise upon the side plate 12 of the switch unit, following which the mounting element 16 of the unit is inserted through the opening 32 to position the assembly element 31 upon the switch unit. After this operation is completed, and solely by finger manipulation, the leg 31*c* may be tensioned outwardly and forced around the slotted edges 28*c* of the cover 28 and side plate 12 until the lip 31*d* thereof snaps beneath the side plate 12. Thus the element 31 is positioned to hold the cover 28 assembled upon the switch unit 10. Following the described operations, the tongue 31*g* of the assembly element may be manually sprung outward to permit telescoping of the housing member 21 over the switch unit. During such operation the mounting element 16 of the unit is received within the slot 24 and when the operation is completed the end part 31*g* of the assembly element snaps over the shoulder 21*c* to provide a connection which maintains the parts 10 and 21 assembled together. It will, of course, be understood that in installing the switch, appropriate circuit connections are made with the terminal screws 14 and 15 prior to the above-described housing assembly operations. The final operation in installing the switch is that of mounting the same upon a supporting member 18. To this end, the chain 19, lever 20 and mounting element 16 are all projected through a suitable aperture in the supporting member 18, for example, following which the element 17 is threaded onto the mounting element 16. As the element 17 is threaded along the mounting element, it draws the latter element through the aperture in the supporting member 18 and clamps the short portion 31*a* of the assembly element between this member and the adjacent side wall of the housing member 21. As a consequence, the angularly extending tongue 31*g* of the assembly element is locked in engagement with the shoulder 21*c*, positively to prevent disassembly of the housing parts 28 and 21 from the switch unit until the clamping force exerted

upon the base 31*a* of the assembly element is released. Thus it will be apparent that the mounting element 16 and nut 17 serve the purpose of mounting the switch unit 10 upon the member 18 and also coact with the assembly element 31 in holding the housing parts 21 and 28 assembled upon the switch unit.

In the modified embodiment of the invention illustrated in Figs. 5, 6 and 7 of the drawing, a single U-shaped assembly element 35 is utilized to coact with the mounting facilities of the switch unit in maintaining the cover 28 and the housing member 21 assembled with the switch unit. Specifically, this assembly element comprises a base portion 35*a* having a length equal to the thickness of the housing member 21 and having a centrally disposed opening therethrough for receiving the mounting element 16 of the switch unit. Along the opposite edges thereof, the base portion 35*a* of the assembly element is provided with angularly extending ears 35*b* and 35*c* which are adapted to bear against the side wall of the housing member 21. With this structural arrangement, the leg 35*d* of the assembly element is adapted to overlie the cover 28, thereby to maintain this cover assembled upon the side plate 12 of the switch unit, and the opposite leg 35*e* is adapted to overlie the end wall 22*d* of the housing member 21 to maintain this member assembled upon the switch unit 10. In assembling the housing structure upon the switch unit, this unit is first disposed within the housing member 21 with the mounting element 16 thereof received within the slot 24, following which the cover 28 is positioned upon the side plate 12 within the rim of the housing member. The assembly element 35 may now be telescoped over the switch pull chain 19, operating lever 20 and mounting element 16 to bring the legs 35*d* and 35*e* thereof in the desired overlapping relationship with the cover 28 and the end wall of the housing member 21. The pull chain 19, operating lever 20 and mounting element 16 may now be inserted through the supporting opening in the structural member 18 following which the nut 17*a* may be threaded onto the threads of the mounting element 16 for the purpose of clamping the ears 35*b* and 35*c* tightly against the side wall of the housing member. Thus the switch unit and housing parts are rigidly interlocked against disassembly by the assembly element 35.

The modified embodiment of the invention illustrated in Fig. 8 of the drawing is identical with that shown in Figs. 1 through 4 and described above, except for the arrangement of the facilities for maintaining the cover 28 and the side plate 12 of the switch unit 10 in assembled relationship. Specifically, in the Fig. 8 arrangement the portion 31*b* of the assembly element 31 is provided with downwardly projecting locking ears 31*h* at spaced points therealong which are serrated along their edges for drive fit reception within correspondingly spaced and registering slots formed in the cover 28 and the side plate 12. The serrated locking ears 31*h* may be obtained by a stamping operation performed upon the assembly element 31 before it is die formed into the illustrated configuration. After the drive fit connections are formed between these fingers and the edges of the slots in which they are received, the assembly element 31 forms a permanent part of the switch unit 10. Hence the only detachable part of the assembly is the housing member 21 which may be telescoped over the switch unit by bending the leg 31*a* outwardly in the manner

described above. It is specifically noted, however, that in the Fig. 8 structure, the mounting element 17 in its function to mount the assembly upon a supporting member, also functions to lock the end 31*g* of the assembly element in engagement with the housing member 21.

From the above description, it will be seen that the invention provides a complete insulating housing for a switch unit, the parts of which are retained assembled entirely by means other than securing screws or the like. The parts comprising the housing are easily molded or stamped by the use of simple molds or dies. Further, there are no projections on the casing, so that the parts of the molds may be constructed to be separated from the casings in a straight line motion and the casings can be removed from the molds by a straight line motion. Also, the assembly element for releasably retaining the housing parts in assembled relationship is composed of resilient sheet metal, and is so designed as to be easily formed by a stamping or pressing operation.

While there have been described what are at present considered to be the preferred embodiments of the invention, it will be understood that various modifications may be made therein which are within the true spirit and scope of the invention as defined in the appended claims.

I claim:

1. A housing for a preassembled electrical switch unit of the type having a side plate at one side thereof and a mounting element extending therefrom adapted for use in mounting a switch included in such unit on a supporting member, said housing comprising an insulating housing member having an open side for detachably receiving said switch unit therewithin with said side plate facing toward said open side and having a side opening for receiving said mounting element, said housing member also having a recess in the edge thereof below said side opening which provides a shoulder extending angularly between the end and side surfaces thereof, an insulating cover lying flat against said plate, an assembly element having a base portion extending generally the length of the axial dimension of the switch and having an opening for receiving said mounting element and provided with one end portion extending transversely across the outer surface of said cover and terminating in a part which resiliently embraces the edges of said cover and switch unit side plate to maintain the same in assembled relationship, said assembly element being provided at its opposite end with an angularly extending portion engageable with said shoulder to maintain said housing member and unit in assembled relationship, and mounting means cooperable with said mounting element for mounting the switch upon a supporting member and for holding said assembly element in a position incident to the mounting of the switch wherein said angularly extending portion engages said shoulder.

2. A housing for a preassembled electrical switch unit of the type having a side plate at one side thereof and a mounting element extending therefrom adapted for use in mounting a switch included in such unit on a supporting member, said housing comprising an insulating housing member having an open side for detachably receiving said switch unit therewithin with said side plate facing toward said open side and said housing member having a side opening for receiving said mounting element, an insulating cover lying flat against said plate, a U-shaped

assembly element having an opening in its base portion for receiving said mounting element, and having legs which respectively overlie the outer surface of said cover and a wall of said housing member opposite to said cover to telescopically maintain said cover, said housing member and said unit in assembled but demountable relationship, and mounting means cooperable with said mounting element for mounting said unit upon a supporting member and for holding said assembly element in a position wherein said legs respectively overlie the wall of said housing member and said cover.

3. In an electric switch device including a preassembled switch mechanism having a mounting element projecting therefrom, an insulating housing for said device including a housing member with an open side for the removable reception of said preassembled switch mechanism therein and a closed side opposite said open side, an assembly element having an opening in one portion thereof for the insertion of the mounting element therethrough and having oppositely disposed portions extending away from said one portion at least one of which is adapted to overlie a substantial portion of one of said sides of said housing to retain the switch device in assembled relationship, and a mounting member securable upon said mounting element and cooperable to retain said assembly element in such engaged position incident to the mounting of said switch device upon a supporting member.

4. In an electric switch device as defined in claim 3 said assembly element having as one of said oppositely disposed portions, a leg extending substantially across said housing at the initially open side of the housing member and having as the other one of said oppositely disposed portions, a tongue removably engaging the outside of the housing member at the closed side.

5. In an electric switch device as defined in claim 3 said oppositely disposed portions of said assembly element comprising legs integral with said one portion thereof and extending substantially at right angles thereto to removably engage in a telescopical relation corresponding outside portions of the housing.

6. In an electric switch device as defined in claim 3 said assembly element including as one of said oppositely disposed portions a leg extending over said housing at the initially open side of the housing member and having ear projections thereon extending into the housing for gripping engagement and including as the other one of said oppositely disposed portions a tongue removably engaging the outside of the housing member at the closed side.

7. A housing for a preassembled electrical switch unit of the type having a mounting element extending therefrom adapted for use in mounting a switch included in such unit on a supporting member, said housing comprising an insulating housing member having an open side for detachably receiving said switch unit therewithin and being provided with a side wall having an opening for receiving said mounting element, an assembly element having an opening for receiving said mounting element and having a portion adapted to extend over a substantial portion of the open side of said housing to maintain said housing member and unit in assembled relationship, and mounting means cooperable with said mounting element for mounting said unit upon a supporting member and for thereby holding said assembly element in a position wherein said assembly element portion restrains said housing member and unit against disassembly.

8. A housing for a preassembled electrical switch unit of the type having a side plate and a mounting element extending therefrom adapted for use in mounting a switch included in such unit on a supporting member, said housing comprising an insulating housing member having an open side for detachably receiving said switch unit therewithin with said side plate facing toward said open side and having a side opening for receiving said mounting element, an insulating cover lying against said plate, an assembly element having a base portion extending substantially the length of the axial dimension of said housing member and having an opening for receiving said mounting element, said assembly element including end portions at least one of which is adapted to overlie a substantial portion of said insulating cover and the other of which is adapted to engage a portion of said housing member to maintain said housing member and unit in assembled but demountable relationship, and mounting means cooperable with said mounting element for mounting said unit upon a supporting member and for thereby holding said end portions of said assembly element in coacting relationship with said insulating cover and housing member.

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