United States Patent

Sorenson

[15] **3,706,869**

[45] **Dec. 19, 1972**

[54] MULTIPLE WING SWITCH CASE

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[73] Assignee: **Carling Electric, Inc.**, West Hartford, Conn.

[22] Filed: **March 24, 1972**

[21] Appl. No.: **237,725**

[52] **U.S. Cl.** ..... **200/168 C**

[51] **Int. Cl.** **H01h 9/08**

[58] **Field of Search** ..... 200/168 C, 168 B, 168 R; 174/57

[56] **References Cited**

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Primary Examiner—H. O. Jones

Attorney—I. Jordan Kunik

[57] **ABSTRACT**

An electrical switch case, on each opposite end of which is located a set of resilient wings of different dimensions and positioned at different angles, said wings individually and selectively operating in conjunction with a flange on said case to removably secure the latter upon mounting plates of different ranges of thickness.

9 Claims, 12 Drawing Figures

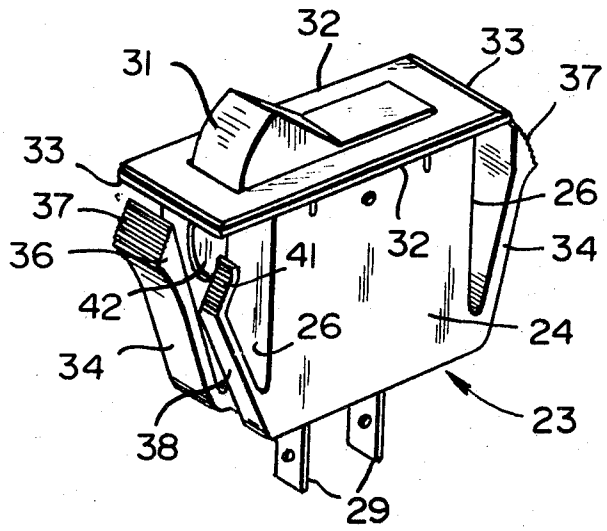


FIG. 2

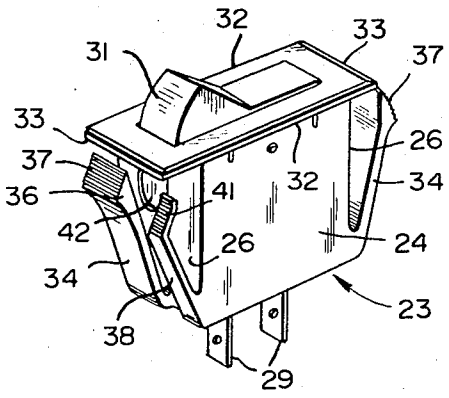
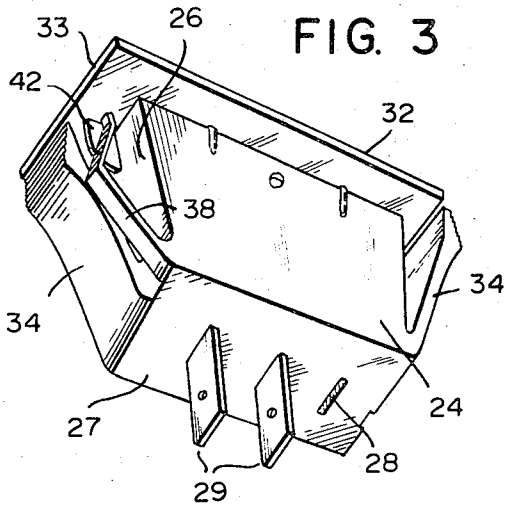


FIG. 3



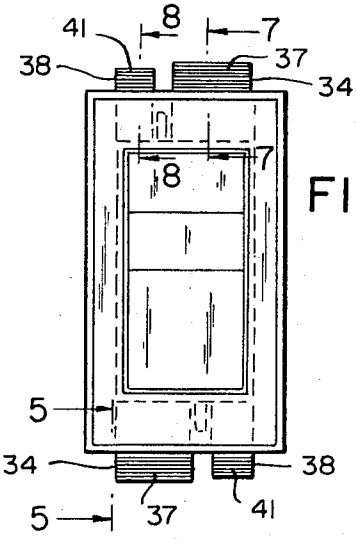


FIG. 4

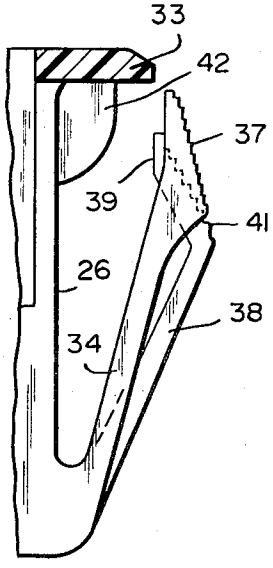


FIG. 5

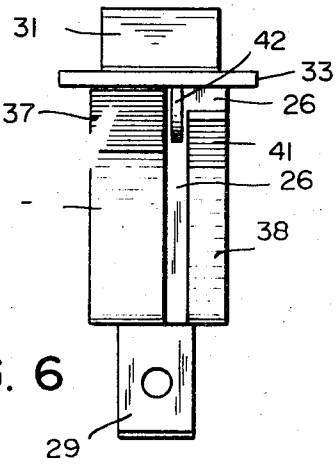


FIG. 6

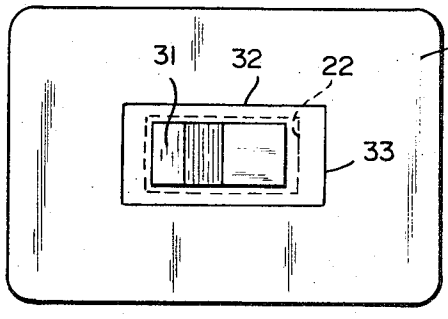


FIG. 1

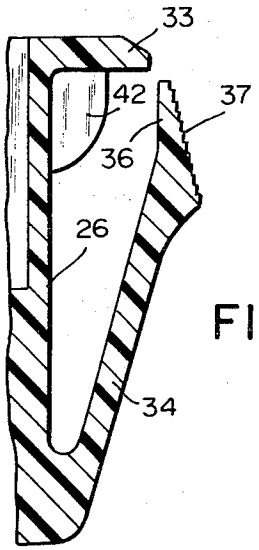


FIG. 7

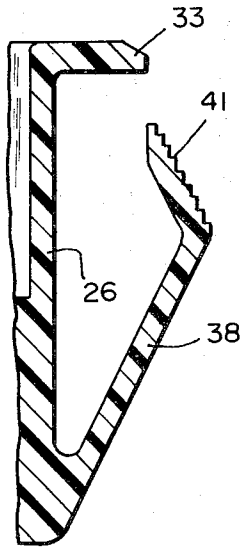


FIG. 8

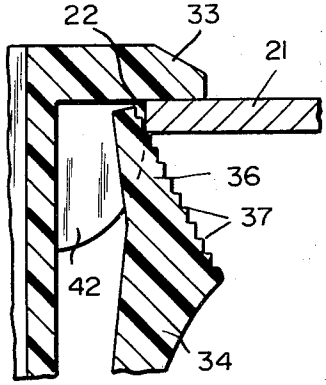


FIG. 9

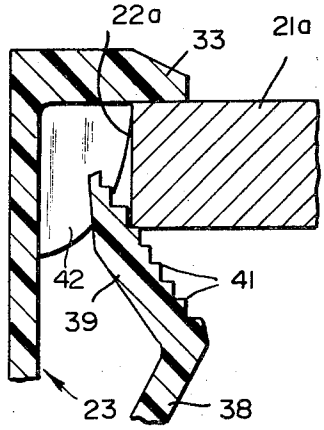


FIG. 10

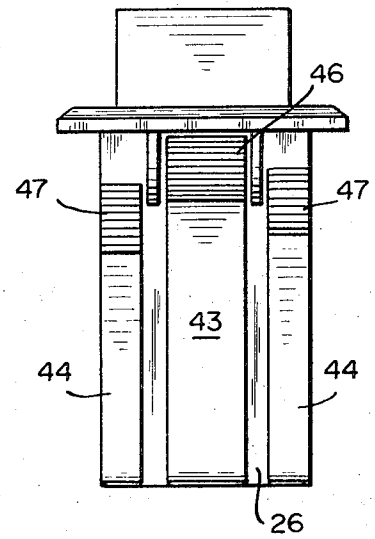


FIG. 12

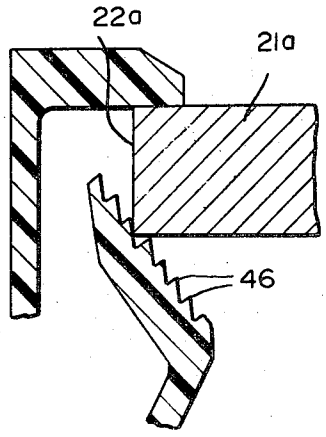


FIG. 11

MULTIPLE WING SWITCH CASE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to means for securing electric switch cases on mounting plates or panels and, more particularly, to multiple pairs of flexible wings on opposite ends of said case wherein one of each pair of wings has the capability of firmly securing the switch case to the mounting panel or plate having a particular range of thickness, while the other of each pair of said wings is capable of firmly securing said case to another mounting plate of a range of thickness different from that of said first mentioned plate.

2. Description of the Prior Art

Various types of mounting means for securing electric switch cases to mounting plates are disclosed in Sorenson, U.S. Pat. No. 3,168,612, issued on Feb. 2, 1965, and in the various reference patents cited by the Examiner during the prosecution of said United States patent.

SUMMARY OF THE INVENTION

The present invention comprises a box-like electric switch case which is molded or otherwise fabricated of a suitable insulating material such as nylon, Bakelite, and the like, said case having on opposite ends thereof pairs or sets of resilient, outwardly extending wings with serrated end portions. Each of the wings in each pair or set at the respective end of the switch case is different in length and angular position from the other wing. On each end of said case, there is one wing that is identical in dimension and angular position with a wing on the opposite end of said case whereby said equal wings, in cooperation with a case flange, engage a mounting plate of a first range of thickness. Another wing of a different length and angular placement is identical with another similar wing on the other end of said case and, as a pair, said other wings likewise cooperating with said flange to removably secure said case to a mounting plate whose range of thickness is different from the first mentioned mounting plate.

The normal outward flexion of the wings when they are urged inwardly in conjunction with the serrations on the ends thereof effectively lock the switch case upon the mounting plate. When it is desired to remove the case from the mounting plate, the resilient wings are urged inwardly whereby the serrations are disengaged from corresponding edges of the mounting plate and the switch case is readily released therefrom.

When the switch case with its multiple sets of different dimensioned and angled wings is inserted through a mounting plate aperture, and the flange of said case abuts the surface of the mounting plate, the switch case becomes secured on said mounting plate by the snap action of the serrations on the resilient wings and the engagement of said serrations with corresponding edges of the mounting plate. The provision of at least two different sets of wings ensures the adaptability of the locking function to mounting plates of different ranges of thicknesses.

These and other novel features and advantages of the present invention will be described and defined in the following specification and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of a typical mounting plate upon which the subject electric switch case is secured;

FIG. 2 is a somewhat enlarged perspective view of one embodiment of the switch case of the present invention;

FIG. 3 is a still further enlarged bottom perspective view of the switch shown in FIG. 2;

FIG. 4 is a top view of the switch case shown in FIGS. 2 and 3, some parts being shown in dotted outline;

FIG. 5 is a greatly enlarged fragmentary view taken on line 5—5 of FIG. 4;

FIG. 6 is a vertical end view of the switch shown in FIG. 4;

FIG. 7 is a greatly enlarged fragmentary view taken on line 7—7 of FIG. 4;

FIG. 8 is a greatly enlarged fragmentary view taken on line 8—8 of FIG. 4;

FIG. 9 is a greatly enlarged fragmentary view of a portion of the switch case shown secured to a mounting plate of comparatively small thickness;

FIG. 10 is a greatly enlarged fragmentary view of a portion of the switch case shown secured to a mounting plate of somewhat greater thickness than in FIG. 9;

FIG. 11 is similar to FIG. 10 and showing an alternative mode of serrating the end portion of the flexible wing; and

FIG. 12 is a vertical end view of another embodiment of the invention herein.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings in detail, the apparatus of the present invention is intended to be secured to a mounting plate 21 or the like which is located on a wall or control panel of an electrical instrument, or the like. Mounting plate 21 usually is a rigid piece of metal, plastic, or the like, the thickness of which may vary as required by conditions of design and function.

Plate 21 has a rectangular aperture 22 (FIG. 1) which removably accommodates a box-like electrical switch case, generally designated 23. See FIGS. 2 to 6. Switch case 23, which has a generally rectangular open top, comprises substantially parallel side walls 24 and substantially parallel end walls 26. Case 23 is molded in unitary form of a suitable insulating material such as nylon, Bakelite, or the like. The bottom of case 23 is enclosed by a floor 27 which may be provided with a plurality of slots 28 through which electrically conductive external terminal elements 29 extend for connection to the switching elements in the interior of the case.

Mounted by suitable means within the open top of case 23 is a pivotable switch button 31 for operating the electrical switching elements in the interior of the case.

Formed integrally at the upper ends of side walls 24 are outwardly extending flanges 32, and formed integrally at the upper ends of end walls 26 are outwardly extending flanges 33. Formed integrally with case 23 and joined at the lower portion of walls 26 thereof is a first set of respective outwardly and upwardly extending wings 34. The width of wings 34 is somewhat

smaller than the width of the respective walls 26. The upper end of each wing 34 terminates in a finger 36 whose outer inwardly sloping surface is provided with a plurality of horizontal serrations 37. Wings 34 extend outwardly and upwardly at an angle from their respective vertical end walls 26 and since they are made of a plastic material, they are somewhat flexible and resilient and can be bent inwardly. The length of aperture 22 in plate 21 is somewhat shorter than the distance between the outer portions of fingers 36 but slightly longer than the distance between the end walls 26. When the bottom of case 23 is urged into and through the aperture 22, wings 34 are caused to flex inwardly by the sliding action against the end edges of aperture 22 until flanges 32 and 33 rest upon the top surface of mounting plate 21. See also FIGS. 7 and 9.

In this position, the bottom edge of mounting plate 21 at aperture 22 is engaged by one of the serrations 37 on finger 36. Since the upper portion of wing 36 is restrained by the edge of the aperture against flexing outwardly to its normally extended position as shown, for example, in FIGS. 2 and 5, the interengagement between said serration and said mounting plate in combination with flange 33 causes case 23 to be secured firmly in position on said mounting plate.

As shown in FIG. 9, when mounting plate 21 is relatively thin, wings 34 suffice to perform their securing function. When, however, a considerably thicker mounting plate 21*a* is used, as shown in FIG. 10, the array of serrations on wings 36 do not extend far enough downwardly to engage the thicker mounting plate since there is a limit to the dimensions of the array of serrations that can be placed upon a particular wing. Accordingly, there is provided on case 23 a second set of wings 38, the lower ends of which are integrally molded with the bottom portion of respective vertical end walls 26, and extend upwardly and outwardly in a manner similar to that of wings 34.

Wings 38 are somewhat shorter than wings 34 and are normally bowed outwardly at a greater angle and to a somewhat greater distance than wings 34. Also, the integrally formed fingers 39 at the upper ends of respective wings 38 have a plurality of serrations 41 whose aggregate slope inclines somewhat more sharply than the slope of serrations 37 on fingers 34. When the thickness of plate 21*a* is such that it is not properly grasped or engaged by serrations 37 on wings 34, serrations 41 on wings 38 come into play to cooperate with the lower edge of the aperture 22*a* of plate 21*a* when flange 33 rests thereon to secure case 23 firmly to said mounting plate.

In the embodiment shown in the Figures of the drawing, respective sets of wings 34 and wings 38 are located at diagonal corners relative to each other so that stability of emplacement of the switch case on the mounting plate is enhanced. Further stability for the firm engagement of the switch case within aperture 22 of plate 21 is provided by a narrow, vertical, arcuate partition 42 which is integrally molded between the respective upper portions of the respective end walls 26 and a bottom surface portion of flange 33. The distance between the upper outer edges of the two bosses 42 beneath flanges 32 is very slightly less than the longitudinal dimension of aperture 22 in plate 21. When case 23 is mounted in position on plate 21, the outer edges of bosses 42 are very close to or abut the respective end walls of aperture 22 to serve as a stabilizing means for the switch case within the mounting plate.

While the widths of respective wings 34 and 38 have been illustrated as having different dimensions, (see FIGS. 2, 3, 4 and 6) it is understood that the relative dimensions of the two pairs of wings may be varied, depending upon the requirements and purposes of the switch case and the particular location in which they are being used.

Although satisfactory symmetry is provided by locating the wide (34) and narrow (38) pairs of wings diagonally at opposite corners, as shown in FIGS. 2, 3, 4 and 6, it may be desired to provide for enhanced symmetry by means of the embodiment shown in FIG. 12 where a wide wing 43 is located centrally of wall 26 and is bounded on both sides by spaced apart narrow wings 44, both the wide and narrow wings being provided with serrated fingers 46 and 47, respectively, comparable to those shown and described in connection with FIGS. 2–10. Partitions 48 may be provided between adjacent wings 46 and 47 in the embodiment of FIG. 12 to perform the same function as provided by partition 42 in the previously described embodiment.

When it is desired to remove the switch from the mounting plate, simultaneous inward pressure is applied at approximately the mid areas of wings 34 and 38, whereby their respective serrations move inwardly out of engagement with an release the inner edges of aperture 22 so that case 23 can be withdrawn freely from mounting plate 21.

While the serrations 37 and 41 of wings 34 and 38 have been illustrated as approximately perpendicular in their step formation, it is understood that said serrations can be made in the form of acute-angled saw teeth 46 as shown in FIG. 11 where said serrations can perform the same securing function against the edge of the aperture within the mounting plate.

While the invention herein has been described as embodying resilient wings 34 and 38 of different lengths and different angles relative to case 23, it is to be understood that the invention contemplates switch case embodiments wherein additional sets of resilient wings which are set at even greater angles from the end walls of case 23 may also be incorporated therein in order to accommodate panels of greater thickness than those engaged by the longer resilient wings. Accordingly, case 23, with suitable modifications in size, may be made with three or even four or more pairs of resilient wings having progressively shorter lengths and progressively greater angles relative to the end walls of case 23 in order to permit the mounting of said case on various panels having a wide variety of thicknesses. Said additional pairs of resilient wings would also incorporate the inwardly angled array of serrations for engaging the edges of mounting plate apertures.

Although the present invention has been described with reference to particular embodiments and examples, it will be apparent to those skilled in the art that variations and modifications can be substituted therefor without departing from the principles and true spirit of the invention. The abstract given above is for the convenience of technical searchers and is not to be used for interpreting the scope of the invention or claims.

I claim:

1. A switch case in the form of a rectangular box comprising a pair of spaced end walls and a pair of spaced side walls integrally joined to form said case, at least two upwardly and outwardly extending spaced elongated resilient wings on each of said end walls, the respective bottom end portions of said wings being joined at the bottom portions of said respective end walls, a plurality of lateral serrations at the upper ends of said wings, one of said wings in each pair of wings being normally arrayed at a greater angle and being somewhat shorter than the other of said pair of wings.

2. A switch case according to claim 1 wherein the serrations on the shorter of said pair of wings are arrayed at a greater angle relative to said respective end wall than the serrations on the longer of said wings.

3. A switch case according to claim 1 and further comprising an outwardly extending flange at the top of each end wall, the serrations on the longer of each pair of wings cooperating with said flange to secure therebetween a mounting plate of a predetermined range of thickness, the serrations on the shorter of said pair of wings cooperating with said flange to secure therebetween another substitute mounting plate of a predetermined range of thickness greater than that of said first mentioned mounting plate.

4. A switch case according to claim 3 and further comprising a small partition formed between each end wall and its adjacent flange, said partition being located between and spaced apart from said wings.

5. A rectangular switch case adapted to be secured within the rectangular aperture of a mounting plate comprising an outwardly extending flange at the top of said case for abutment against the surface of said mounting plate, at least two resilient wings on opposite ends of said case, the bottom portions of said wings being connected to the bottom portions of the respective end walls of said case and extending outwardly and upwardly toward said flange, one wing of each pair of wings being shorter than the other wing of each pair and extending outwardly at a greater angle than said other wing, the respective shorter and longer wings being identical in dimension and angular displacement, a plurality of lateral serrations on the upper ends of said wings, the serrations on the longer wings cooperating with said flange by snap action to secure therebetween a mounting plate of a first range of thickness, the serrations on the shorter wings cooperating with said flange by snap action to secure therebetween a second mounting plate of a greater range of thickness than said first mounting plate.

6. A switch case according to claim 5 wherein the normal distance between the outermost portions of the respective wings on opposite sides of said case is greater than the longitudinal dimension of said aperture whereby the insertion of said case within said aperture causes the inward flexion of said wings toward the respective adjacent end walls of said case.

7. A switch case according to claim 5 and further comprising a small partition formed between each end wall and said flange, said partition being located between and spaced apart from the adjacent wings.

8. A switch case according to claim 7 wherein the dimension between the outermost opposite edges of the two partitions is slightly less than the longitudinal dimension of said aperture whereby said partitions serve to stabilize the positioning of said case within said aperture when said mounting plate is engaged by a pair of wings on opposite ends of said switch case.

9. A rectangular switch case adapted to be secured within the rectangular aperture of a mounting plate, comprising an outwardly extending flange at the top of said case for abutment against the surface of said mounting plate, a plurality of resilient wings on each of the opposite ends of said case, the bottom portions of said wings being connected to the bottom portions of the respective end walls of said case and extending outwardly and upwardly toward said flange, the wings in each group thereof being of different lengths and arrayed at different angles relative to the respective adjacent end wall, each of said separate wings having a comparable wing of similar dimension and angle on the other end wall of said case, and a plurality of lateral serrations formed on the upper ends of said wings, said serrations engaging the edge of said aperture in cooperation with said flange to secure therebetween a mounting plate, the thickness of said mounting plate determining which of the particular wings on each end wall of said case will perform the securing function for mounting the switch on said plate.

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