

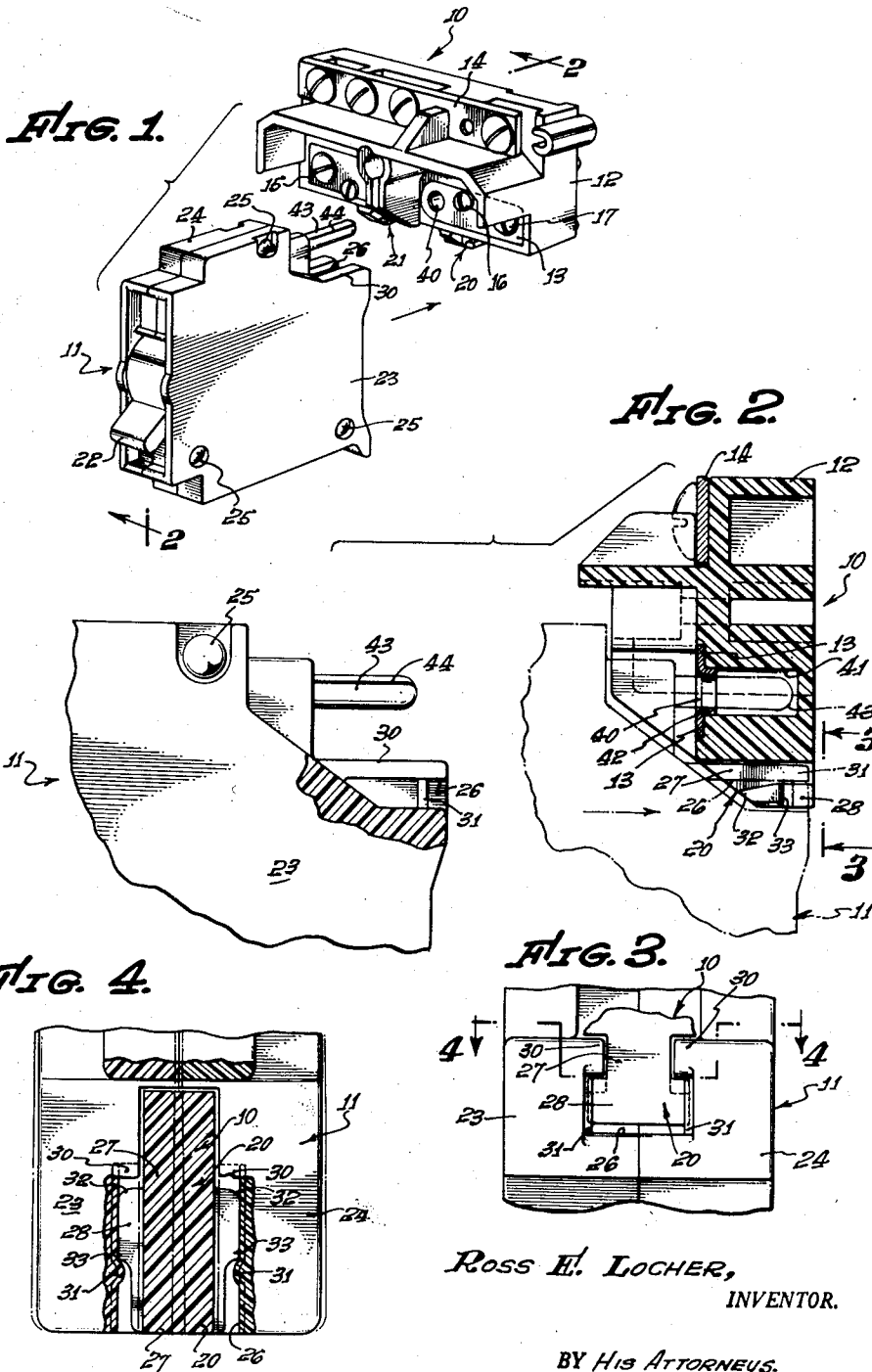
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INTERLOCK MOUNT FOR SWITCH

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2,869,043

INTERLOCK MOUNT FOR SWITCH

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8 Claims. (Cl. 317-119)

This invention relates to means for interlockingly mounting one unit to another, and in particular to interlocking mounts for electrical switch or circuit breaker panel boards and the like.

In the construction of many types of equipment, and especially in the installation of electrical distribution systems, it is desirable that many components be easily and quickly removable and replaceable by hand and yet not be loosened or ejected by associated vibrations and shocks. Accordingly it is an object of the invention to provide means for mounting one unit to another so that the first unit can be attached by a manual push and detached by a manual pull and so that it will not be loosened by vibration or the shock normally associated with the environment.

A further object of the invention is to provide such a mount which may be used in conjunction with electrical distribution panel boards such as those described in my copending application for Circuit Breaker Panel Board, Serial No. 451,501, filed August 23, 1954, now Patent No. 2,823,339, dated February 11, 1958.

Another object of the invention is to provide an interlock mount in which one unit has a tongue and the second unit has a corresponding slot, the tongue and slot having mating cam surfaces which coact to lock the two units together.

Still another object of the invention is to provide a tongue and a corresponding slot which springs apart to permit insertion of an enlarged portion of the tongue, thereby resiliently locking the tongue in the slot.

An important object of the invention is to provide an interlock mount having a pin on one unit and a corresponding apertured strip on the other unit for aligning the two units, the pin and strip also providing an electrical circuit connecting the two units.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description. However the drawing merely shows and the description merely describes a preferred embodiment of the present invention as applied to an interlock mount for a switch, which is given by way of illustration or example only.

In the drawing:

Fig. 1 is an expanded isometric view illustrating the connection of a switch to a section of a panel board;

Fig. 2 is an enlarged side elevation view shown partially in section along the line 2-2 of Fig. 1, including a phantom view of the switch inserted in the panel board;

Fig. 3 is a view of a portion of Fig. 2 taken along the line 3-3 of Fig. 2; and

Fig. 4 is a partial sectional view along the line 4-4 of Fig. 3, with the expanded position of the switch case shown in phantom.

Referring to the drawing, in Fig. 1 the manner of engaging a pair of units 10, 11 having interlocking mounting means is illustrated. The unit 10 is shown as a sec-

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tion of an electrical panel board which includes a unitary block 12 of dielectric material and electrical conducting strips 13, 14, 15. The strip 13 is attached to the block 12 by a screw 16. A large headed screw 17 is inserted in a threaded opening in the strip 13 and serves to connect an electrical conductor (not shown) to the strip 13. A tongue 20 projects from a face of the block 12 adjacent the face to which the strip 13 is attached. A similar tongue 21 also projects from the block providing means for mounting another unit (not shown). Any number of units similar to the unit 11 may be mounted to the block 12 by providing the desired number of tongues, however this description will be restricted to the details of one tongue 20 for the block 12 and one unit 11.

The unit 11 is shown as an electrical switch or circuit breaker having a lever 22 and being enclosed in a case consisting of two case elements or shells 23, 24 of dielectric material riveted together at three points 25. A slot 26 is provided which receives the tongue 20 when the unit 11 is mounted to the block 12.

It is preferred that the tongue 20 projecting from the face of the block 12 have a narrow portion 27 adjacent the face and a wide portion 28 at the end of the tongue. This type of construction produces a groove along the narrow portion 27 between the wide portion 28 and the face of the block 12, and it is also preferred to construct the tongue to provide similar grooves on both sides thereof. In Fig. 4 the narrow portion 27 is shown in section and the wide portion 28 is shown in elevation. Referring to Fig. 2, it is seen that the grooves between the wide portion 28 and the face of the block 12 are wider at one end than at the other. The wide end of the groove facilitates the entrance of the tongue into the slot.

The slot 26 is designed to mate with the tongue 20 and each case element 23, 24 has a lip 30 partially closing the open end of the slot and corresponding to a groove in the tongue 20. The sides of each lip 30 are shown parallel in Fig. 2; however they could be tapered to mate exactly with the corresponding groove and thereby produce a wedge type of clamping. Rounded protrusions or beads 31 are provided on the opposing walls of the wide portion of the slot 26.

The wide portion 28 of the tongue is not of constant width, part of it being a sliding fit into the slot 26 and part of it being substantially less, as shown in Fig. 4. When the tongue 20 is being inserted into the slot 26 a pair of corners 32 of the wide portion 28 will engage the beads 31. As the tongue is pushed farther into the slot, the sides of the tongue act as cams sliding along the beads 31 and the case elements 23, 24 are spread to the position shown by the phantom lines of Fig. 4. The dotted lines in Fig. 4 indicate the confines of the slot 26 below the lips 30. The case of the unit 11 is of flexible construction and when the widest portion of the tongue has passed the beads 31, the case returns to its normal position, as shown by the solid lines of Fig. 4.

When withdrawing the tongue from the slot a pair of corners 33 bear against the beads 31. In order to remove the tongue it is necessary to apply a force sufficient to again spread the sides of the slot. The flexible case of the unit 11 may be designed to maintain the slot rigid until an extraction force greater than a predetermined amount is applied. Thus it is seen that the two units are interlockingly mounted by a means which will withstand a predetermined amount of vibration and shock without loosening.

The conducting strip 13 has an aperture 40 which is positioned over an opening 41 in the block 12. In its preferred form a flange 42 having a smooth inner surface is provided around the aperture 40. A pin 43 of electrical

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conducting material is attached to the unit 11 and positioned so that the pin will enter the aperture 40 when the switch 11 is being engaged with the panel board 10. A section of the pin 43 perpendicular to its longitudinal axis is of the same shape as the aperture 40, but is slightly larger, and in the embodiment illustrated they are circular. A longitudinal slot 44 in the pin 43 allows the pin to be compressed when it is inserted into the aperture 40 and provides for a tight sliding contact between the pin 43 and the flange 42. The pin and flange combination serves a dual purpose in the invention. They maintain proper alignment between the switch and the panel board, and they provide an electrical circuit between the switch and the panel board.

It is to be noted that when the unit 11 is moved into interlocking engagement with a unit 10, the pin 43 contacts the conducting strip 13 in the vicinity of the aperture 40 prior to the sliding engagement of the tongue 20 with the slot 26. Thus in the construction illustrated the pin 43 and aperture 40 may be easily aligned without interference that might otherwise exist due to misalignment of the tongue and groove. When the pin 43 is urged into the opening 41 in the block 12 the tongue and groove thereafter co-operate to effect a proper alignment of the units 10 and 11 and when the unit 11 is urged fully toward the unit 10 the interlock thereof is effected as heretofore described. The sequential engagement of components facilitates an ease of integration of the units that otherwise would not be possible if the engagements occurred simultaneously. Of course, the sequential engagements could be reversed by shortening the pin 43, which may be desirable and convenient in particular circumstances.

Various changes, modifications and substitutions may be made in the embodiment described above without departing from the teachings of the invention. For example, it is not essential that the tongue have two grooves and the slot have two lips. The interlock mount will operate with one groove and lip and one bead and mating cam surface. Furthermore it is not necessary that the tongue have a wide portion 23 forming the groove. The cam surface extending from the tongue between the corners 32, 33 will perform the function of the wide portion 23. Also it should be understood that the practice of the invention is not restricted to electrical components and hence the conducting strip 13 is not essential. The opening 41 may be utilized for the function of the aperture 40 when the aligning pin feature of the invention is desired in a non-electrical embodiment.

I claim as my invention:

1. In an interlock mount for a switch or the like, the combination of: a panel board having an opening in a first face thereof, and a tongue projecting from a second face of said panel board adjoining said first face; a cam surface extending from a side of said tongue and in a plane substantially parallel to the longitudinal axis of said opening at one corner thereof, said case including a control on one face remote from said one corner; a case having a flexible portion; a slot in said corner of said case adapted to receive said tongue; a bead extending from a side of said slot, said bead being positioned to slidably engage said cam surface while said tongue is being inserted into said slot, said cam surface and bead being shaped so that at a point before said tongue is completely inserted into said slot the engagement of said bead and said cam surface flexes said flexible portion and temporarily widens said slot permitting the passage of said bead along said cam surface; and a pin projecting from said corner of said case and positioned to enter said opening when inserting said tongue into said slot, said first face of said panel board and said one face of said case lying in approximately parallel planes when said tongue and said pin engage said slot and said opening respectively, said case moving along a straight line perpendicular to said planes.

2. An interlock mount as defined in claim 1, in which

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said tongue has a pair of cam surfaces extending from opposite sides thereof and in the same plane, said slot having a pair of beads extending from opposite sides thereof.

3. An interlock mount as defined in claim 1 including an electrical conducting strip mounted to said panel board, said strip having an aperture overlying said opening in said panel board, and in which said pin is an electrical conductor, the engagement of said pin and said strip making an electrical circuit between said panel board and said case.

4. In an interlock mount for a switch or the like, the combination of: a panel board having an opening in a first face thereof, and a tongue projecting from a second face of said panel board adjoining said first face, said tongue having a narrow portion adjacent said second face and a wide portion spaced from said second face by said narrow portion, thereby forming a groove between said second face and said wide portion, said groove lying in a plane substantially parallel to the longitudinal axis of said opening; a cam surface formed along a side of said wide portion; a case having a flexible portion at one corner thereof, said case including a control on one face remote from said one corner; a slot in said corner of said case adapted to slidably receive said tongue, said slot having a narrow segment at its open end mating with said groove; a bead extending from a side of said slot, said bead being positioned to slidably engage said cam surface while said tongue is being inserted into said slot, said cam surface and bead being shaped so that at a point before said tongue is completely inserted into said slot the engagement of said bead and said cam surface flexes said flexible portion and temporarily widens said slot permitting the passage of said bead along said cam surface; and a pin projecting from said corner of said case and positioned to enter said opening when inserting said tongue into said slot, said first face of said panel board and said one face of said case lying in approximately parallel planes when said tongue and said pin engage said slot and said opening, respectively, said case moving along a straight line perpendicular to said planes.

5. An interlock mount as defined in claim 4, in which said groove is wider at one end, thereby facilitating engagement of said tongue and said slot.

6. In an interlock mount for a switch or the like, the combination of: a panel board; a tongue projecting from one face of said panel board; a cam surface extending from a side of said tongue; a flexible case having two case elements fastened together so that said case elements may be temporarily separated; a slot in said flexible case adapted to slidably receive said tongue, said slot being formed of adjacent notches in each of said case elements; and a bead extending from a side of said slot, said bead being positioned to slidably engage said cam surface while said tongue is being inserted into said slot, said cam surface and bead being shaped so that at a point before said tongue is completely inserted into said slot the engagement of said bead and said cam surface separates said case elements and temporarily widens said slot permitting the passage of said bead along said cam surface.

7. In an interlock mount for a switch or the like, the combination of: a panel board having an opening in a first face thereof and a tongue projecting from a second face adjoining said first face, said tongue having a narrow portion adjacent said second face and a wide portion at the end thereof, thereby forming two parallel grooves between said second face and said wide portion; two cam surfaces formed along opposing sides of said wide portion; an electrical conducting strip mounted to said panel board, said strip having an aperture overlying said opening in said panel board; a case having a flexible portion at one corner thereof, said case including a control on one face remote from said one corner; a slot in said corner of said case adapted to slidably receive said

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tongue, said case having two lip portions protruding into said slot at its open end and mating with said grooves; two beads extending from opposing sides of said slot, said beads being positioned to slidably engage respectively said cam surfaces while said tongue is being inserted into said slot, said engaging pairs of cam surfaces and beads being shaped so that at a point before said tongue is completely inserted into said slot the engagement of said beads and said cam surfaces flexes said flexible portion and temporarily widens said slot permitting the complete insertion of said tongue into said slot; an pin projecting from said corner of said case and positioned to enter said aperture and said opening when inserting said tongue into said slot, said first face of said panel board and said one face of said case lying in approximately parallel planes when said tongue and said pin engage said slot and said aperture respectively, said case moving along a straight line perpendicular to said planes.

8. A case for an interlocking switch mount comprising two shells and means for rigidly joining said shells together at a plurality of locations, said joined shells form-

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ing an enclosed volume adapted to contain a switch mechanism, said shells having corresponding recesses therein positioned remote from any of said plurality of joining means, with said recesses forming a slot when said shells are joined together, said slot having a generally T-shaped cross section and an open end and side for slidably receiving a member, and a bead extending into and partially obstructing said slot, said bead being spaced from said open end of said slot for engaging the member after entry and spreading said shells apart.

References Cited in the file of this patent

UNITED STATES PATENTS

15	468,086	Lillard	Feb. 2, 1892
	2,113,792	Ladd	Apr. 12, 1938
	2,283,889	Gilbert	May 19, 1942
	2,351,942	Dyer et al.	June 20, 1944
	2,463,826	Thacker	Mar. 8, 1949
20	2,647,225	Cole et al.	July 28, 1953

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,869,043

January 13, 1959

Ross E. Locher

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, lines 55 and 56, strike out "at one corner thereof, said case including a control on one face remote from said one corner" and insert the same before the semicolon, in line 57, same column; column 5, line 11, for "an" read -- and --.

Signed and sealed this 5th day of May 1959.

(SEAL)

Attest:

KARL H. AXLINE

Attesting Officer

ROBERT C. WATSON
Commissioner of Patents

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