

(19)



Europäisches Patentamt
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Office européen des brevets



(11)

EP 0 992 047 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

02.01.2003 Bulletin 2003/01

(21) Application number: **98924859.6**

(22) Date of filing: **22.05.1998**

(51) Int Cl.7: **H01H 9/02**

(86) International application number:
PCT/US98/10552

(87) International publication number:
WO 99/000810 (07.01.1999 Gazette 1999/01)

(54) **CIRCUIT BREAKER TERMINAL SHIELD WITH INTEGRAL SECURING**

SCHUTZSCHALTER MIT INTEGRIERTER POLABSCHIRMUNG

BLINDAGE TERMINAL POUR DISJONCTEUR AVEC FIXATION MONOBLOC

(84) Designated Contracting States:
DE FR GB IT

(30) Priority: **30.06.1997 US 884869**
30.06.1997 US 884793

(43) Date of publication of application:
12.04.2000 Bulletin 2000/15

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(56) References cited:
US-A- 4 774 390 **US-A- 5 150 091**

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Description

[0001] The invention described in this application relates to an apparatus, means, system and method for providing a circuit breaker with a circuit breaker terminal shield with integral securing and installation and removal features that may be installed or removed by an operator without using tools. Also, the circuit breaker terminal shield with integral securing and installation and removal features apparatus and means includes an integral circuit breaker installation and removal feature that provides finger holds to assist or otherwise aid a person in either mounting, otherwise installing or removing a circuit breaker on or from its circuit breaker mounting location. The circuit breaker terminal shield with integral securing and installation and removal features apparatus and means further includes an integral terminal shield securing or sealing feature to inhibit unauthorized or unintentional access to the circuit breaker terminals or removal of the circuit breaker, and which may aid in indicating whether there has been unauthorized tampering with the circuit breaker assembly.

[0002] Thus, the invention described herein is believed to provide a relatively elegant, cost effective and reliable apparatus, means, system and method for providing a circuit breaker with a circuit breaker terminal shield apparatus and means, which has an integral circuit breaker installation and removal feature and an integral circuit breaker terminal shield securing or sealing feature, that may be easily installed or removed by an operator without using tools.

Background

[0003] In industrial applications, the input terminal and output terminal areas or ends of circuit breaker assemblies may need to be shielded to better protect persons from unintentionally contacting the circuit breaker terminals. It may also be desirable to provide an integral circuit breaker installation and removal feature that aids or otherwise facilitate the installation or removal of a circuit breaker assembly on or from its mounting location. It may also be desirable to provide an integral circuit breaker terminal shield securing or sealing feature that is believed to aid generally in securing or sealing a circuit breaker to inhibit unauthorized access or tampering and/or to aid in indicating whether there has been unauthorized access or tampering with the circuit breaker terminals.

[0004] US-A-5 150 091 discloses a bus cover for covering the end of a circuit breaker, the bus cover providing predetermined exhaust paths for arc gases. The circuit breaker is provided with shaped openings and the bus cover is provided with baffles having cylindrical shank portions for engaging the openings in the circuit breaker. The bus cover is attached to the ends of the circuit breaker by inserting the baffles into the shaped openings and sliding the bus cover downwardly within the

shaped openings until the cylindrical shank portions engage the openings. The bus cover is then attached to the circuit breaker by means of self-tapping screws.

[0005] US-A-4 774 390 discloses a non-conducting shield for terminals of electrical apparatus. The shield comprises three sides and a cover for covering the terminals. The shield comprises grooves formed in one side thereof which are slid over rails provided in the electrical apparatus and protrusions extending from the side of the apparatus engage a recess in the shield to lock the shield in position on its rails.

Summary Of The Invention

[0006] It is an object of the present invention to overcome the limitations or problems of at least certain of the known approaches.

[0007] In accordance with one aspect of the present invention, there is provided a circuit breaker assembly comprising:- a circuit breaker member; at least one terminal end connected to the circuit breaker member; at least one first projecting end member associated with said at least one terminal end; a second projecting end member associated with said at least one terminal end; at least one end fastening aperture associated with said at least one first projecting end member; a terminal shield main frame member for shielding said at least one terminal end; and at least one first terminal shield fastening member for fastening the first terminal shield main frame member to said at least one first projecting end member; characterised in that the apparatus further comprises a second terminal shield fastening member for fastening the terminal shield main frame member to the second projecting end member, and in that the second projecting end member lies in a plane which is substantially perpendicular to the plane in which said at least one first projecting end member lies.

[0008] It is another object of the present invention to provide a circuit breaker terminal shield apparatus for use with a circuit breaker assembly having at least one circuit breaker terminal, at least one fastening aperture associated with a circuit breaker projecting end member and another circuit breaker projecting end member, the circuit breaker terminal shield apparatus comprising at least one terminal shield main frame member having a first terminal shield fastening member adapted to fasten the terminal shield main frame member to the circuit breaker projecting end member of the circuit breaker assembly, and further having a second terminal shield fastening member adapted to further fasten the terminal shield main frame member to the another circuit breaker projecting end member of the circuit breaker assembly.

[0009] It is yet another object of the present invention to provide a circuit breaker terminal shield means for use with a circuit breaker assembly having at least one circuit breaker terminal, at least one fastening aperture associated with a circuit breaker projecting end member and another circuit breaker projecting end member, the

circuit breaker terminal shield means comprising at least one terminal shield main frame means having a first terminal shield fastening means for fastening the terminal shield main frame means to the circuit breaker projecting end member of the circuit breaker assembly, and further having a second terminal shield fastening means for further fastening the terminal shield main frame means to the another circuit breaker projecting end member of the circuit breaker assembly.

[0010] It is still another object of the present invention to provide a circuit breaker terminal shield system comprising a circuit breaker assembly, where the circuit breaker assembly has at least one circuit breaker terminal, at least one fastening aperture associated with a circuit breaker projecting end member and another circuit breaker projecting end member, at least one terminal shield main frame member having a first terminal shield fastening member adapted to fasten the terminal shield main frame member to the circuit breaker projecting end member of the circuit breaker assembly, and further having a second terminal shield fastening member adapted to further fasten the terminal shield main frame member to the another circuit breaker projecting end member of the circuit breaker assembly.

[0011] It is still yet another object of the present invention to provide a circuit breaker terminal shield system comprising a circuit breaker assembly, where the circuit breaker assembly has at least one circuit breaker terminal, at least one fastening aperture associated with a circuit breaker projecting end member and another circuit breaker projecting end member, at least one terminal shield main frame means having a first terminal shield fastening means for fastening the terminal shield main frame means to the circuit breaker projecting end member of the circuit breaker assembly, and further having a second terminal shield fastening means for further fastening the terminal shield main frame means to the another circuit breaker projecting end member of the circuit breaker assembly.

[0012] It is yet another object of the present invention to provide a method for fastening a circuit breaker terminal shield apparatus to at least one terminal end of a circuit breaker assembly having at least one circuit breaker terminal, at least one fastening aperture associated with a circuit breaker projecting end member and another circuit breaker projecting end member, the method for fastening the circuit breaker terminal shield apparatus comprising the steps of: fastening a first terminal shield fastening member, which is adapted to fasten the terminal shield main frame member, to the circuit breaker projecting end member of the circuit breaker assembly; and fastening a second terminal shield fastening member, which is adapted to further fasten the terminal shield main frame member, to the another circuit breaker projecting end member of the circuit breaker assembly.

[0013] These and other objects, advantages and features of the present inventions will be readily understood

and appreciated with reference to the detailed description of preferred embodiments discussed below together with the accompanying drawings.

5 Brief Description Of The Drawings

[0014]

Figure 1A is a drawing of an exterior view of one embodiment of one circuit breaker terminal shield of the circuit breaker terminal shield with integral securing and installation and removal features apparatus and means of the present inventions.

Figure 1B is a drawing of an interior view of one embodiment of one circuit breaker terminal shield of the circuit breaker terminal shield with integral securing and installation and removal features apparatus and means of the present inventions.

Figure 2 is a drawing of the apparatus, means and system and method of the present inventions showing one circuit breaker terminal shield and circuit breaker assembly of the circuit breaker terminal shield securing and installation and removal features apparatus, means and system.

Figure 3 is a drawing of the apparatus, means, system and method of the present inventions showing a partial view of one circuit breaker terminal shield of the circuit breaker terminal shield with integral securing and installation and removal features apparatus and means when installed or otherwise mounted on a input terminal end of the circuit breaker assembly.

Figure 4 is a drawing of the apparatus, means, system and method of the present inventions showing a full view of one circuit breaker terminal shield of the circuit breaker terminal shield with integral securing and installation and removal features apparatus and means when installed or otherwise mounted on the input terminal end of the circuit breaker assembly.

Figure 5 is a drawing of the apparatus, means and system of the present inventions showing a full view of one circuit breaker terminal shield of the circuit breaker terminal shield with integral securing and installation and removal features apparatus and means when installed or otherwise mounted on the input terminal end of the circuit breaker assembly, and in which the circuit breaker assembly and circuit breaker terminal shield has been secured or sealed by a terminal shield securing or sealing wire and a terminal shield securing or sealing clamp.

Detailed Description Of Preferred Embodiment

[0015] Referring to Figures 1 to 5, a circuit breaker terminal shield with integral securing and installation and removal features system 1 comprises two circuit breaker terminal shield with integral securing and installation and removal features assemblies or devices 20 (only one of which is shown) and a circuit breaker assembly 90. One circuit breaker terminal shield with integral securing and installation and removal features apparatus, assembly or device 20 is used to shield the input terminals 91a, 91b and 91c of the input terminal end 90a of the circuit breaker assembly 90 and another like assembly is used to shield the output terminals of the output terminal end 90b of the circuit breaker assembly 90. Only one circuit breaker terminal shield with integral securing and installation and removal features assembly 20 is shown since the construction is the same or essentially the same for either the input terminal end 90a or the output terminal end 90b of the circuit breaker assembly 90.

[0016] In the circuit breaker terminal shield with integral securing installation and removal features system 1, the circuit breaker assembly 90, which receives the circuit breaker terminal shield with integral securing installation and removal features assembly 20, comprises an operating or toggle handle or movable actuator 99, which may have at least an ON position, a TRIPPED position and an OFF position, and further comprises circuit breaker upper and lower horizontal projecting end members or portions 97 and 98, respectively, as well as circuit breaker left and right and left center and right center vertical projecting end members or portions 92a, 92b and 93a, 93b, respectively, at both the input and output terminal ends 90a and 90b of the circuit breaker assembly 90. The circuit breaker upper and lower horizontal projecting end members or portions 97 and 98 comprise upper access and retention apertures, holes or openings 97a, 97b and 97c and lower access apertures, holes or openings 98a, 98b and 98c, respectively. The circuit breaker input terminals 91a, 91b and 91c project out from the interior portion of the circuit breaker assembly 90 and into the circuit breaker terminal areas 96a, 96b and 96c, each of the areas being defined by two of the circuit breaker vertical projecting end members 92a, 92b and/or 93a, 93b the lower horizontal projecting end member 98. The circuit breaker left center and right center vertical projecting end members 93a and 93b further comprise slotted dove tail apertures or openings 94a and 94b, which extend the length of the circuit breaker vertical projecting end members 93a and 93b and which are designed to receive securely terminal shield upper dove tail lug members or portions 34a and 34b and lower dove tail lug members or portions 36a and 36b of terminal shield main frame flange members 31a and 31b of a terminal shield main frame member 30, as is discussed further below.

[0017] The circuit breaker assembly 90 may further

comprise push-to-trip buttons, circuit breaker lug openings or apertures and circuit breaker mounting openings or apertures. The circuit breaker assembly 90 may include an electronic trip unit, which may further include energy measurement capabilities. Further, the circuit breaker assembly 90 may be a "single" unit, or in certain arrangements, the circuit breaker assembly 90 may also comprise a separate circuit breaker unit and a corresponding mounting plug-in unit (not shown). In such an arrangement, threaded screws or bolts may be passed through the circuit breaker mounting apertures or openings and received by threaded apertures or openings in the corresponding mounting plug-in unit so as to mount the circuit breaker unit on the mounting plug-in unit. Also, the circuit breaker lug apertures or openings may be used to receive threaded copper studs, which may be plugged into copper tulip contacts that are provided in the mounting plug-in unit. In this way, a current path may be provided through the mounting plug-in unit to the circuit breaker unit.

[0018] With respect to the circuit breaker terminal shield with integral securing and installation and removal features apparatus, assembly or device 20, it comprises a terminal shield main frame member 30 and a terminal shield securing or sealing member 80. Both the terminal shield main frame member 30, which has several fastening, mounting or securing features allowing it to be fastened or mounted to a circuit breaker assembly without requiring the use of tools, and the terminal shield securing or sealing member 80 may be integrally formed or otherwise fashioned from a polycarbonate material known as Lexan 143R or from any other suitably appropriate material for use in shielding and securing or sealing circuit breaker terminals 91 of the circuit breaker assembly 90. Thus, as shown, the circuit breaker terminal shield assembly 20 comprises two formed or molded pieces, namely the terminal shield main frame member 30 and the terminal shield securing or sealing member 80.

[0019] In particular, the terminal shield securing or sealing member 80 comprises a horizontal securing or sealing flange member 81, a vertical securing or sealing flange member 82, which further comprises a securing or sealing wire receiving aperture, hole or opening 82c, and a vent rib snap lug supporting member 83, which further comprises a vent rib snap lug 85 and a vent rib stop member or portion 84. The vent rib stop member or portion 84 is spaced from the vent rib snap lug 85 by the depth or thickness of the vent ribs (as measured from the external face of the vent ribs to the internal face of the vent ribs) so that when the vent rib snap lug 85 is inserted, it cooperates with the vent rib snap lug 85 to inhibit horizontal movement of the terminal shield securing or sealing member 80. The vent rib snap lug 85 has a vent rib snap lug external face 85a that is wider than a vent rib snap lug internal face 85b. Additionally, the vent rib snap lug internal face 85b is displaced from the vertical securing or sealing flange member 82 by an

amount that is about the thickness of upper center vent ribs 62 so that the internal face 82b of securing or sealing flange member 82 is adjacent to or fits firmly with respect to the external face of the upper center vent ribs 62, and is securely fitted since the vent rib snap lug internal face 85b is wider than the dove tail snap lug external face 85a so as to generally inhibit removal of the vent rib snap lug 85 from between upper center vent ribs 62b and 62c. Additionally, when the securing or sealing member 80 is insertedly fitted, the upper edge 82d of the securing or sealing flange member 82 is generally flush with respect to the terminal shield access and retention external face 40a.

[0020] In particular, the terminal shield main frame member 30 comprises terminal shield main frame access and retention member 40 and terminal shield main frame cover member 50, each of which is integrally associated with or otherwise associated in a suitably appropriate way with respect to one another. As shown in Figures 1A and 1B, the terminal shield main frame access and retention member 40 and terminal shield main frame cover member 50 are formed generally perpendicularly to the planes of one another. The terminal shield main frame member 30 also comprises left flange terminal shield main frame member 30a and right flange terminal shield main frame member 30b, each of which is integrally formed with or otherwise associated in a suitably appropriate way with respect to terminal shield main frame access and retention member 40 and terminal shield main frame cover member 50. As shown in Figure 1B, the terminal shield main frame flange members 30a and 30b are formed generally perpendicularly to the planes of both terminal shield main frame access and retention member 40 and terminal shield main frame cover member 50. Terminal shield main frame flange members 30a and 30b are contoured or shaped to fit firmly or securely with respect to the outside partially curved or non-linear ends or portions along the outer left and right vertical projecting end members or portions 92a and 92b, respectively, of the circuit breaker assembly 90.

[0021] The terminal shield main frame member 30 further comprises left center terminal shield dove tail flange member 31a, right center terminal shield dove tail flange member 31b and terminal shield main frame horizontal structural member 30c, each of which is integrally formed with or otherwise associated in a suitably appropriate way with respect to terminal shield main frame access and retention member 40 and terminal shield main frame cover member 50. As shown in Figure 1B, the left and right center terminal shield dove tail flange members 31a and 31b are formed generally perpendicularly to the planes of both terminal shield main frame access and retention member 40 and terminal shield main frame cover member 50. Left and right center terminal shield dove tail flange members 31a and 31b comprise upper dove tail lug members or portions 34a and 34b and lower dove tail lug members or portions 36a

and 36b, respectively. The upper dove tail lug members or portions 34a and 34b and lower dove tail lug members or portions 36a and 36b are designed to fit securely within slotted dove tail apertures or openings 94a and 94b, which extend the length of the circuit breaker center vertical projecting end members 93a and 93b of the circuit breaker assembly 90, respectively. It is noted that corresponding upper dove tail lug aperture or opening sets 35a and 35b and lower dove tail lug aperture or opening sets 37a and 37b, which are formed in the upper and lower terminal shield access cover portions 51 and 55, respectively, are provided so that the upper dove tail lug members or portions 34a and 34b and lower dove tail lug members or portions 36a and 36b may be integrally formed or molded by introducing molding material through the dove tail lug aperture or opening sets 35a and 35b and lower dove tail lug aperture or opening sets 37a and 37b.

[0022] Terminal shield main frame member 30 also comprises a circuit breaker upper horizontal projecting member fastening or mounting portion 60, which is integrally formed with or otherwise associated in a suitably appropriate way with respect to the upper center outside edge area of terminal shield main frame member 30. In particular, upper left inner edge 66a, upper center inner edge 66b and upper right inner edge 66c of the terminal shield main frame access and retention member 40 define the upper boundaries of a securing or sealing device receiving aperture or opening 65, which is located at the outside center edge area of the terminal shield access and retention external face 40a. Additionally, lower left inner edge 67a, lower center inner edge 67b and lower right inner edge 67c partially define the lower inner boundaries, which are located at the inner portion of the terminal shield main frame structural member 30c. As shown, the lengths of lower inner edges 67a and 67c (which are the same length) are less than the lengths of upper inner edges 66a and 66c (which are also the same length). Finally, vertical left outer edge 68a, vertical right outer edge 68c and lower center outer connecting member or portion 68b define the connecting boundaries between the upper inner boundaries 66 and the lower inner boundaries 67. Also, lower inner edges 67, vertical outer edges 68a, 68c and lower center outer connecting member 68b define the upper securing or sealing device receiving aperture or opening 65. The securing or sealing flange or tab 82 of the securing or sealing member 80 is inserted through the securing or sealing flange or tab receiving aperture or opening 65. Since left and right lower inner edges 67 are shorter than upper inner edges 66, the inner fastening or mounting segment 69b is sloped downwardly from the external face 40a generally in the direction of the lower center connecting member 68b of the terminal shield main frame cover member 50. In this way, the securing or sealing wire 86 may be more easily inserted or passed through the securing or sealing wire aperture, hole or opening 82c since the upper edge 82d of the securing or sealing flange member 82

is generally flush with respect to the terminal shield access and retention external face 40a.

[0023] The circuit breaker fastening or mounting member or portion 60 comprises integrally formed upper center vent ribs 61 and 62. In particular, as shown in Figures 1 to 3, formed integrally with the vent ribs is a movable lower securing or sealing device receiving structural member 64 having a lower securing or sealing device receiving aperture or opening 64e. The lower securing or sealing device receiving aperture or opening 64e is defined by left and right structural segments 64a and 64b and by external and internal structural members 64c and 64d, which are integrally formed or otherwise associated with left and right vent rib triangular projecting members 63a and 63b, which project externally and outwardly from and which are integrally formed or otherwise associated with left and right upper vent ribs 61a and 61b, respectively. Additionally, the upper internal side of the vent ribs 62a, 62b, 62c and 62d comprises a fastening or mounting extension member or portion 62e, which extends generally inwardly in the direction of the circuit breaker movable actuator 99 and which has an upper face 62f that is displaced or separated from an internal face 40b of the terminal shield main frame access and retention member 40 so that a center portion 95 of the circuit breaker upper horizontal projecting member 97 firmly or securely fits within an area 62g defined by the upper face 62f of the fastening or mounting extension member or portion 62e and the terminal shield access and retention internal face 40b. In its normal position, the lower securing or sealing device receiving aperture or opening 64e is vertically aligned with the upper securing or sealing device receiving aperture or opening 65. The securing or sealing vertical flange member or portion 82 may be inserted through the lower and upper securing or sealing device receiving apertures or openings 64e and 65, respectively, until an upper face 81a of the securing or sealing horizontal flange member or portion 81 is seated adjacent to or firmly with respect to a lower face of the lower securing or sealing device receiving structural segments 64a, 64b, 64c and 64d.

[0024] Terminal shield main frame access and retention member 40 also comprises left and right terminal shield main frame retention projecting members or tabs 43a and 43c, which are designed to fit snugly or securely within the upper left and right access and retention apertures, holes or openings 97a and 97c, respectively, which are formed in the circuit breaker upper horizontal projecting end member or portion 97 of the circuit breaker assembly 90. In particular, circuit breaker upper left and right access and retention apertures, holes or openings 97a and 97c receive terminal shield main frame retention projecting members or tabs 43a and 43c, respectively. It is noted that corresponding left and right terminal shield retention molding apertures or openings 33a and 33c, which are formed in the terminal shield main frame member 30, as shown, are provided so that the left and right terminal shield main frame retention

projecting members or tabs 43a and 43c may be integrally formed or molded by introducing molding material through the left and right terminal shield molding apertures or openings 33a and 33c.

[0025] Also, the upper outer contoured edge 41 of the terminal shield access and retention member 40 is contoured or shaped to fit firmly or securely with respect to the upper outer edge 101 of the circuit breaker face plate 100. In particular, the curved or nonlinear portions 41a, 41b and 41c are contouredly seated adjacent to or firmly with respect to the at least partially curved or contoured upper outer edges 101a, 101b and 101c of the circuit breaker face plate 100, which at least partially conform to or define the circuit breaker access and retention apertures, holes or openings 97a, 97b and 97c. Finally, terminal shield access and retention member 40 comprises terminal shield access apertures, holes or openings 42a, 42b and 42c, which may be used to allow a voltage probe, for example, to access the circuit breaker terminals 91 without having to remove the terminal shield main frame member 30.

[0026] With respect to the terminal shield main frame cover member 50, it comprises upper recessed cover portion or member 51 and lower cover portion or member 55. Upper recessed cover portion or member 51 and lower cover portion or member 55 are connected by a curved or nonlinear cover segment 54. The upper recessed cover portion or member 51 allows a person to more easily grasp the circuit breaker assembly 90 having a terminal shield assembly 20 at both the input terminal end 90a and the output terminal end 90b to facilitate mounting or removal of the circuit breaker assembly 90. Also, terminal shield upper recessed cover portion or member 51 comprises upper recessed vent sections 52a and 52c, all of which are integrally formed with or otherwise associated in a suitably appropriate way with respect to terminal shield main frame cover member 50.

[0027] Additionally, terminal shield lower cover portion or member 55 comprises lower vent sections 56a, 56b and 56c, which further comprise lower vent sections 57a, 57b and 57c and adjacent removable lower vent sections 58a, 58b and 58c, all of which are integrally formed with or otherwise associated in a suitably appropriate way with respect to terminal shield main frame cover member 50. Further, the adjacent removable lower vent sections 58a, 58b and 58c are relatively easily to remove since their left, upper and right sides are integrally connected to the remainder of the terminal shield main frame cover member 50 by only a relatively small amount of molding material on the order of about 0.5mm (two one-hundredths of an inch (0.02 inches)). The removable lower vent sections 58a, 58b and 58c may be removed to connect terminal conductors (not shown) to the circuit breaker terminals 91 if the circuit breaker assembly is not a plug-in unit type circuit breaker assembly. If, however, the circuit breaker assembly 90 is a plug-in type unit having a circuit breaker unit and

a mounting plug-in unit for mounting and receiving the circuit breaker unit, as discussed above, then the lower vent sections 58 need not be removed to connect the terminal conductors since the conductive path is provided by the plug-in arrangement of the plug-in type circuit breaker assembly 90.

[0028] The circuit breaker terminal shield with integral securing and installation and removal features assembly 20 attaches to, is fastened or is otherwise mounted on the circuit breaker assembly 90 in the following way:

[0029] To install a terminal shield main frame member 30, it is first grasped or otherwise taken and positioned directly over the circuit breaker upper horizontal projecting member 97 so that the left center and right center terminal shield dove tail flange members 31a and 31b are vertically aligned with the left center and right center terminal shield slotted dove tail receiving apertures or openings 94a and 94b, respectively. The terminal shield main frame member is then moved downwardly so as to fittedly insert left center and right center terminal shield dove tail flange members 31a and 31b into left center and right center terminal shield slotted dove tail receiving apertures or openings 94a and 94b. In particular, upper and lower left dove tail lug members or portions 33a and 34a and upper and lower right dove tail lug members or portions 33b and 34b are fittedly inserted into left and right dove tail lug receiving apertures or openings 94a and 94b, respectively. The terminal shield main frame member 30 is then slid downwardly until the internal or lower face 40b of the terminal shield access and retention member 40 is seated adjacent to or firmly with respect to an external face 97 of the circuit breaker upper horizontal projecting member. Also, it is noted that as the terminal shield main frame member 30 is slid downwardly, the fastening or mounting extension member or portion 62e will move, as the lower portion of vent ribs 62 bend at their base, laterally outwardly away from the input terminal end 90a of the circuit breaker assembly 90, and will move back to its normal position so as to snappedly fasten to the circuit breaker upper horizontal center portion 95 of the circuit breaker upper horizontal projecting member 97. In this position the curved or nonlinear portions 41a, 41b and 41c are contouredly seated adjacent to or firmly with respect to the at least partially curved contoured upper outer edges 101a, 101b and 101c of the circuit breaker face plate 100, which at least partially conform to or define the access and retention apertures, holes or openings 97a, 97b and 97c. Also, as discussed, terminal shield main frame access and retention member 40 comprises left and right terminal shield main frame retention projecting members or tabs 43a and 43c that will be seated within the upper left and right access and retention apertures, holes or openings 97a and 97c, respectively, which are formed in the circuit breaker upper horizontal projecting end member or portion 97 of the circuit breaker assembly 90. In particular, circuit breaker upper left and right access and retention apertures, holes or openings 97a

and 97c receive terminal shield main frame retention projecting members or tabs 43a and 43c, respectively, so as to inhibit lateral movement of the terminal shield main frame member 30 outwardly away from the input terminal side 90a or outwardly away from the output terminal side 90b under short circuit conditions, for example. Further, as discussed, terminal shield main frame flange members 31a and 31b are shaped to fit firmly or securely with respect to the outside partially curved or non-linear ends or portions along the outer left and right vertical projecting end members or portions 92a and 92b, respectively, of the circuit breaker assembly 90.

[0030] After the terminal shield main frame member 30 has been installed, the terminal shield securing or sealing member 80 is grasped and positioned so that the upper edge 82d of securing or sealing vertical flange member 82 is positioned below or underneath the upper and lower securing or sealing device receiving apertures or openings 65 and 64e. The terminal shield dove tail snap lug 85 is then inserted between two upper center vent ribs 62b and 62c until it snaps in so that its removal is inhibited and dove tail rib stop member 84 cooperates with vent rib snap lug 85 to allow vertical but not horizontal movement or sliding so that terminal shield securing or sealing member 80 may be vertically moved or slid so as to insert the terminal shield securing or sealing vertical flange member 82 through the upper and lower securing or sealing device receiving apertures or openings 65 and 64e until the upper edge 82d of the securing or sealing vertical flange member 82 is generally flush with respect to the terminal shield access and retention external face 40a. Next, the securing or sealing wire 86 may be inserted through the securing or sealing wire receiving aperture or opening 82c, and then the securing or sealing wire 86 may be secured or sealed by the securing or sealing clamp 87. Any other suitably appropriate securing or sealing apparatus or device may, however, be used instead of the securing wire 86 and the securing wire clamp 87.

[0031] Finally, to remove the circuit breaker terminal shield assembly 20, namely the circuit breaker terminal shield main frame member 30 and the terminal shield securing or sealing member 80, the foregoing method steps or processes are, of course, essentially reversed except as follows. As discussed, as the terminal shield main frame member 30 is slid downwardly, the fastening or mounting extension member or portion 62e will move, as the lower portion of vent ribs 62 bend at their base, laterally or outwardly away from the input terminal end 90a of the circuit breaker assembly 90, and will move back to its normal position so as to snappedly fasten to the circuit breaker upper horizontal center portion 95 of the circuit breaker upper horizontal projecting member 97. To remove the circuit breaker terminal shield main frame member 30, after first having removed the terminal shield securing or sealing member 80, a user needs to grasp the circuit breaker upper horizontal projecting member fastening portion 60 by the left and right vent

rib triangular projecting members 63a and 63b, respectively, and move it laterally or outwardly away from the input terminal end 90a of the circuit breaker assembly 90 so as to unfasten it from the circuit breaker center portion 95. Thereafter, the terminal shield main frame member may be slid upwardly so as to remove the left center and right center terminal shield dove tail flange members 31a and 31b, as well as corresponding upper and lower left dove tail lug members or portions 33a and 34a and upper and lower right dove tail lug members or portions 33b and 34b, from the left center and right center terminal shield slotted dove tail receiving apertures or openings 94a and 94b. Also, of course, left and right terminal shield main frame retention projecting members or tabs 43a and 43c will be unseated or removed from the upper left and right access and retention apertures, holes or openings 97a and 97c, respectively, which are formed in the circuit breaker upper horizontal projecting end member or portion 97 of the circuit breaker assembly 90.

[0032] In the foregoing way, the circuit breaker terminal shield assembly 20, including the terminal shield main frame member 30 and the terminal shield securing or sealing member 80, may be fastened or mounted or removed to or from a circuit breaker assembly so without requiring the use of tools, while also providing the integrated circuit breaker installation and removal feature and the integrated terminal shield securing or sealing feature.

[0033] While the present invention has been described in connection with what are believed to be the practical and preferred embodiments as currently contemplated, it should be understood that the present invention is not limited to the specifically disclosed embodiments. Accordingly, the present invention is intended to cover various modifications and comparable arrangements, methods and structures that are within the scope of the claims.

Claims

1. A circuit breaker assembly (1) comprising:-

a circuit breaker member (90);
 at least one terminal end (90a, 90b) connected to the circuit breaker member (90);
 at least one first projecting end member (93a, 93b) associated with said at least one terminal end (90a, 90b);
 a second projecting end member (97, 98) associated with said at least one terminal end (90a, 90b);
 at least one end fastening aperture (94a, 94b) associated with said at least one first projecting end member (93a, 93b);
 a terminal shield main frame member (30, 40, 50) for shielding said at least one terminal end

(90a, 90b); and

at least one first terminal shield fastening member (34a, 34b, 36a, 36b) for fastening the terminal shield main frame member (30, 40, 50) to said at least one first projecting end member (93a, 93b);

characterised in that the apparatus further comprises a second terminal shield fastening member (80, 81, 82, 82a, 82b, 82c, 82d, 83, 84, 85) for fastening the terminal shield main frame member (30, 40, 50) to the second projecting end member (97, 98), and **in that** the second projecting end member (97, 98) lies in a plane which is substantially perpendicular to the plane in which said at least one first projecting end member (93a, 93b) lies.

2. An assembly according to claim 1, wherein said at least one fastening aperture (94a, 94b) comprises a dove tail aperture, and wherein said at least one first terminal shield fastening member (34a, 34b, 36a, 36b) comprises a dove tail lug member.
3. An assembly according to claim 1 or 2, wherein said second terminal shield fastening member (80, 81, 82, 82a, 82b, 82c, 82d, 83, 84, 85) comprises a movable clip member.
4. An assembly according to any one of the preceding claims, wherein said second terminal shield fastening member (80, 81, 82, 82a, 82b, 82c, 82d, 83, 84, 85) further comprises a securing member (83, 84, 85) for inhibiting access to said at least one terminal end (90a, 90b).
5. An assembly according to claim 4, wherein said second terminal shield fastening member (80, 81, 82, 82a, 82b, 82c, 82d, 83, 84, 85) further comprises a securing or sealing wire (86) for securing the securing member (83, 84, 85) to said terminal shield main frame member (30, 40, 50).
6. An assembly according to claim 5, wherein said second terminal shield fastening member (80, 81, 82, 82a, 82b, 82c, 82d, 83, 84, 85) further comprises a securing or sealing clamp (87) for clamping said securing or sealing wire (86).
7. An assembly according to any one of the preceding claims, wherein said terminal shield main frame member (30, 40, 50) comprises at least one vent section (51, 51a, 51c, 56a, 56b, 56c, 57a, 57b, 57c, 58a, 58b, 58c) for venting the circuit breaker member (90).
8. An assembly according to any one of the preceding claims, wherein said at least one first terminal shield

fastening member (34a, 34b, 36a, 36b) comprises at least one portion of said terminal shield main frame member (30, 40, 50).

Patentansprüche

1. Schutzschalteranordnung (1), die Folgendes umfasst:

ein Schutzschalterglied (90);
mindestens ein Anschlussende (90a, 90b), das mit dem Schutzschalterglied (90) verbunden ist;
mindestens ein erstes vorragendes Endglied (93a, 93b), das dem mindestens einen Anschlussende (90a, 90b) zugeordnet ist;
ein zweites vorragendes Endglied (97, 98), das dem mindestens einen Anschlussende (90a, 90b) zugeordnet ist;
mindestens eine Endbefestigungsöffnung (94a, 94b), die dem mindestens einen ersten vorragenden Endglied (93a, 93b) zugeordnet ist;
ein Anschlussabschirmungs-Haupttrahmenglied (30, 40, 50) zur Abschirmung des mindestens einen Anschlussendes (90a, 90b); und
mindestens ein erstes Anschlussabschirmungs-Befestigungsglied (34a, 34b, 36a, 36b) zur Befestigung des Anschlussabschirmungs-Haupttrahmenglieds (30, 40, 50) an dem mindestens einen ersten vorragenden Endglied (93a, 93b);

dadurch gekennzeichnet, dass die Vorrichtung weiterhin ein zweites Anschlussabschirmungs-Befestigungsglied (80, 81, 82, 82a, 82b, 82c, 82d, 83, 84, 85) zur Befestigung des Anschlussabschirmungs-Haupttrahmenglieds (30, 40, 50) am zweiten vorragenden Endglied (97, 98) umfasst, und dass das zweite vorragende Endglied (97, 98) in einer Ebene liegt, die im Wesentlichen senkrecht zu der Ebene verläuft, in der das mindestens eine erste vorragende Endglied (93a, 93b) liegt.

2. Anordnung nach Anspruch 1, bei der die mindestens eine Befestigungsöffnung (94a, 94b) eine Schwalbenschwanzöffnung umfasst und bei der das mindestens eine erste Anschlussabschirmungs-Befestigungsglied (34a, 34b, 36a, 36b) ein Schwalbenschwanz-Ansatzglied umfasst.
3. Anordnung nach Anspruch 1 oder 2, bei der das zweite Anschlussabschirmungs-Befestigungsglied (80, 81, 82, 82a, 82b, 82c, 82d, 83, 84, 85) ein bewegliches Klemmglied umfasst.
4. Anordnung nach einem der vorhergehenden An-

sprüche, bei der das zweite Anschlussabschirmungs-Befestigungsglied (80, 81, 82, 82a, 82b, 82c, 82d, 83, 84, 85) weiterhin ein Befestigungsglied (83, 84, 85) zur Verhinderung von Zugriff auf das mindestens eine Anschlussende (90a, 90b) umfasst.

5. Anordnung nach Anspruch 4, bei der das zweite Anschlussabschirmungs-Befestigungsglied (80, 81, 82, 82a, 82b, 82c, 82d, 83, 84, 85) weiterhin einen Befestigungs- oder Verschlussdraht (86) zur Befestigung des Befestigungsglieds (83, 84, 85) am Anschlussabschirmungs-Haupttrahmenglied (30, 40, 50) umfasst.
6. Anordnung nach Anspruch 5, bei der das zweite Anschlussabschirmungs-Befestigungsglied (80, 81, 82, 82a, 82b, 82c, 82d, 83, 84, 85) weiterhin eine Befestigungs- oder Verschlussklemme (87) zum Festklemmen des Befestigungs- oder Verschlussdrahtes (86) umfasst.
7. Anordnung nach einem der vorhergehenden Ansprüche, bei der das Anschlussabschirmungs-Haupttrahmenglied (30, 40, 50) mindestens einen Lüftungsabschnitt (51, 51a, 51c, 56a, 56b, 56c, 57a, 57b, 57c, 58a, 58b, 58c) zum Lüften des Schutzschalterglieds (90) umfasst.
8. Anordnung nach einem der vorhergehenden Ansprüche, bei der das mindestens eine erste Anschlussabschirmungs-Befestigungsglied (34a, 34b, 36a, 36b) mindestens einen Teil des Anschlussabschirmungs-Haupttrahmenglieds (30, 40, 50) umfasst.

Revendications

1. Assemblage (1) formant disjoncteur comportant :
- un élément (90) formant disjoncteur ;
au moins une extrémité (90a, 90b) de borne connectée à l'élément (90) formant disjoncteur ;
au moins un premier élément (93a, 93b) d'extrémité faisant saillie associé à ladite au moins une extrémité (90a, 90b) de borne ;
un deuxième élément (97, 98) d'extrémité faisant saillie associé à ladite au moins une extrémité (90a, 90b) de borne ;
au moins une ouverture (94a, 94b) de fixation d'extrémité associée audit au moins un premier élément (93a, 93b) d'extrémité faisant saillie ;
un élément (30, 40, 50) formant bâti principal de blindage de borne destiné à blinder ladite au moins une extrémité (90a, 90b) de borne ; et
au moins un élément (34a, 34b, 36a, 36b) de

fixation de blindage de borne destiné à fixer l'élément (30, 40, 50) formant bâti principal de blindage de borne audit au moins un premier élément (93a, 93b) d'extrémité faisant saillie ;

caractérisé en ce que le dispositif comporte en outre un deuxième élément (80, 81, 82, 82a, 82b, 82c, 82d, 83, 84, 85) de fixation de blindage de borne destiné à fixer l'élément (30, 40, 50) formant bâti principal de blindage de borne au deuxième élément (97, 98) d'extrémité faisant saillie, et **en ce que** le deuxième élément (97, 98) d'extrémité faisant saillie se trouve dans un plan qui est sensiblement perpendiculaire au plan dans lequel ledit au moins un premier élément (93a, 93b) d'extrémité faisant saillie se trouve.

2. Assemblage suivant la revendication 1, dans lequel ladite au moins une ouverture (94a, 94b) de fixation comporte une ouverture en queue d'aronde, et dans lequel ledit au moins un premier élément (34a, 34b, 36a, 36b) de fixation de blindage de bande comporte un élément en forme de patte en queue d'aronde. 20
3. Assemblage suivant la revendication 1 ou 2, dans lequel le deuxième élément (80, 81, 82, 82a, 82b, 82c, 82d, 83, 84, 85) de fixation de blindage de borne comporte un élément en forme de pince amovible. 25 30
4. Assemblage suivant l'une quelconque des revendications précédentes, dans lequel le deuxième élément (80, 81, 82, 82a, 82b, 82c, 82d; 83, 84, 85) de fixation de blindage de borne comporte en outre un élément (83, 84, 85) de fixation destiné à empêcher l'accès à ladite au moins une extrémité (90a, 90b) de borne. 35
5. Assemblage suivant la revendication 4, dans lequel le deuxième élément (80, 81, 82, 82a, 82b, 82c, 82d, 83, 84, 85) de fixation de blindage de borne comporte en outre un fil (86) de scellement ou de fixation destiné à fixer l'élément (83, 84, 85) de fixation à l'élément (30, 40, 50) formant bâti principal de blindage de borne. 40 45
6. Assemblage suivant la revendication 5, dans lequel le deuxième élément (80, 81, 82, 82a, 82b, 82c, 82d, 83, 84, 85) de fixation de blindage de borne comporte en outre une pince (87) de scellement ou de fixation destinée à serrer le fil (86) de scellement ou de fixation. 50
7. Assemblage suivant l'une quelconque des revendications précédentes, dans lequel l'élément (30, 40, 50) formant bâti principal de blindage de borne comporte au moins une section (51, 51a, 51c, 56a, 56b, 56c, 57a, 57b, 57c, 58a, 58b, 58c) d'aération 55

destinée à aérer l'élément (90) formant disjoncteur.

8. Assemblage suivant l'une quelconque des revendications précédentes, dans lequel ledit au moins un élément (34a, 34a, 34b, 36a, 36b) de fixation de blindage de borne comporte au moins une partie de l'élément (30, 40, 50) formant bâti principal de blindage de borne.

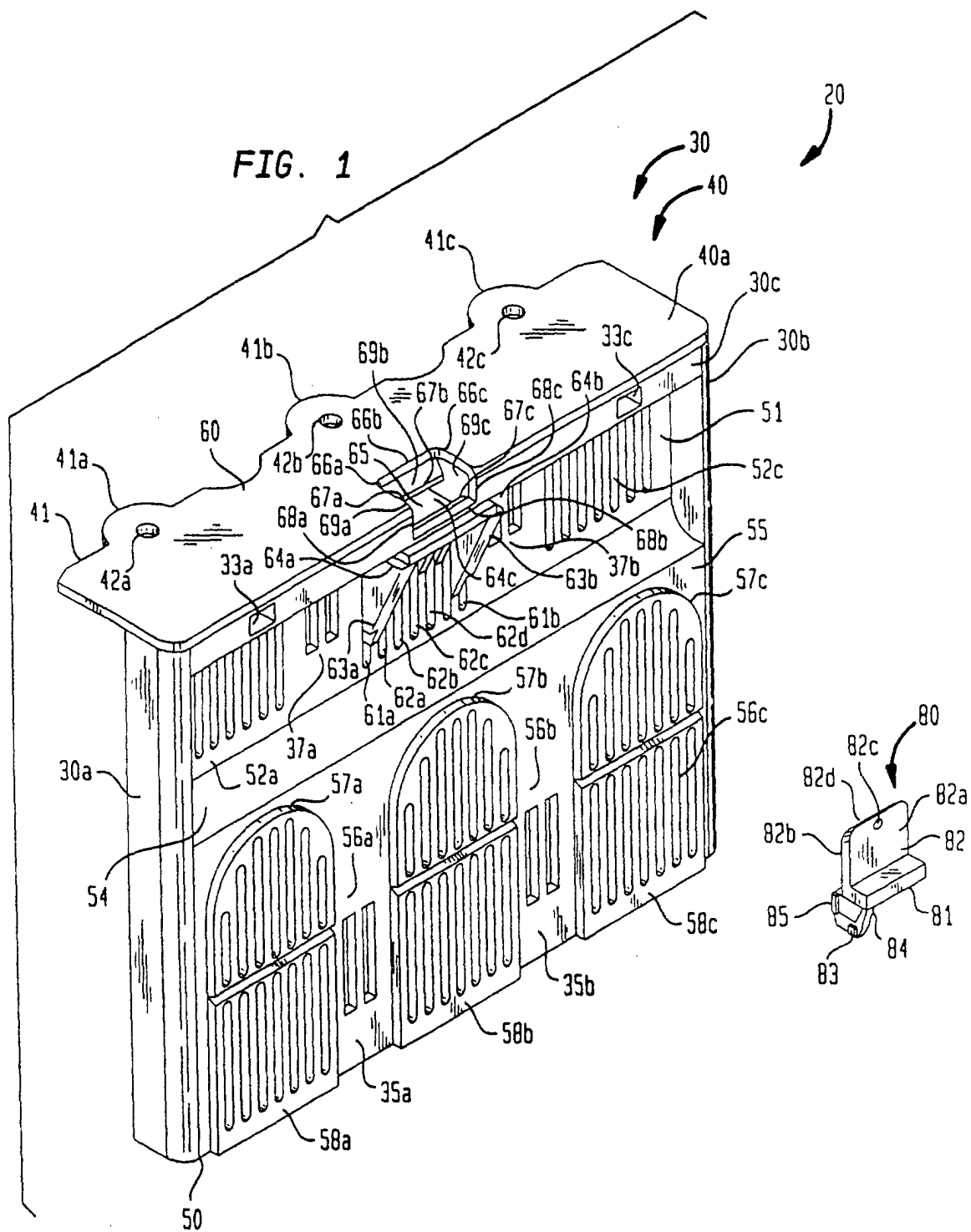
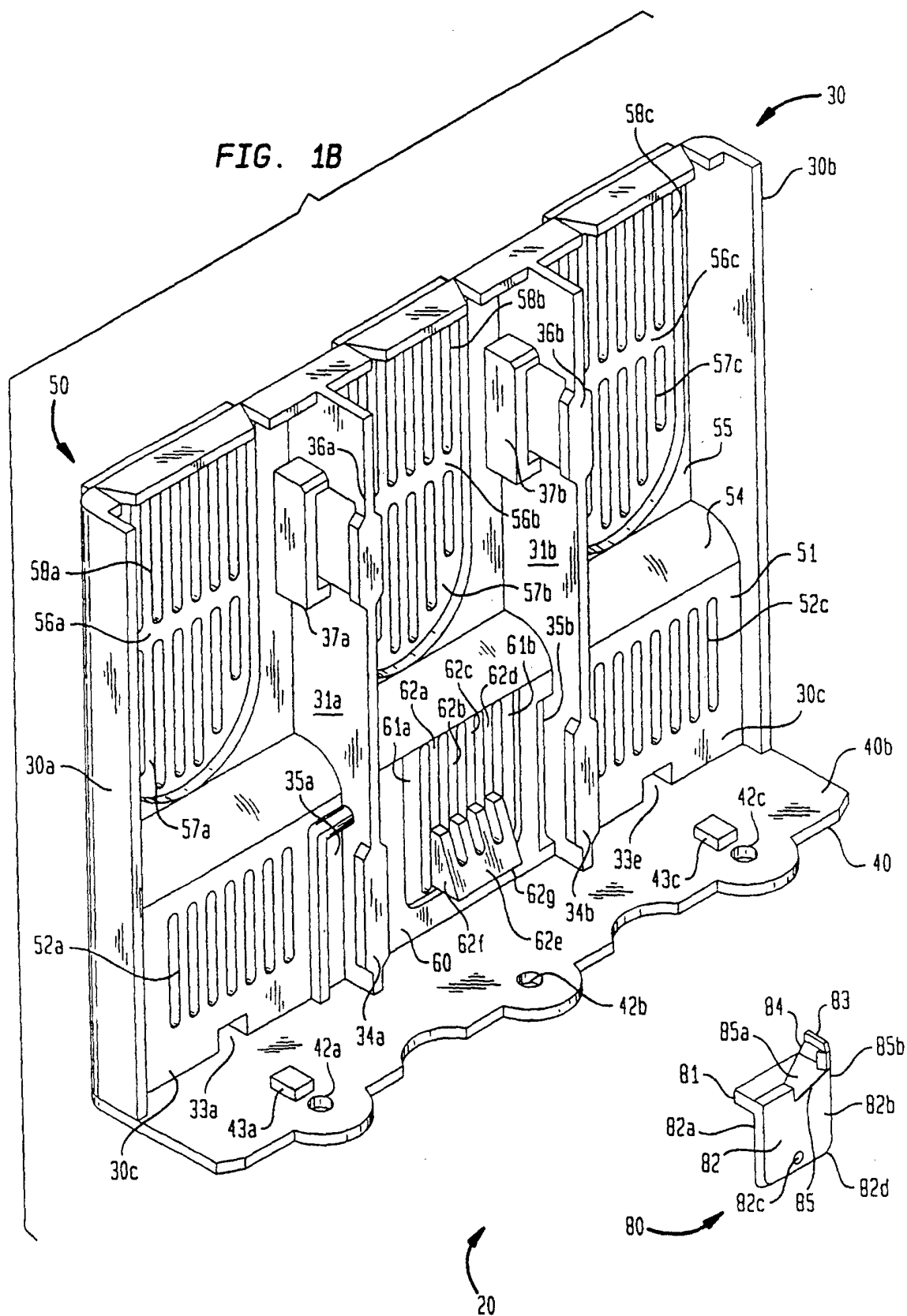


FIG. 1B



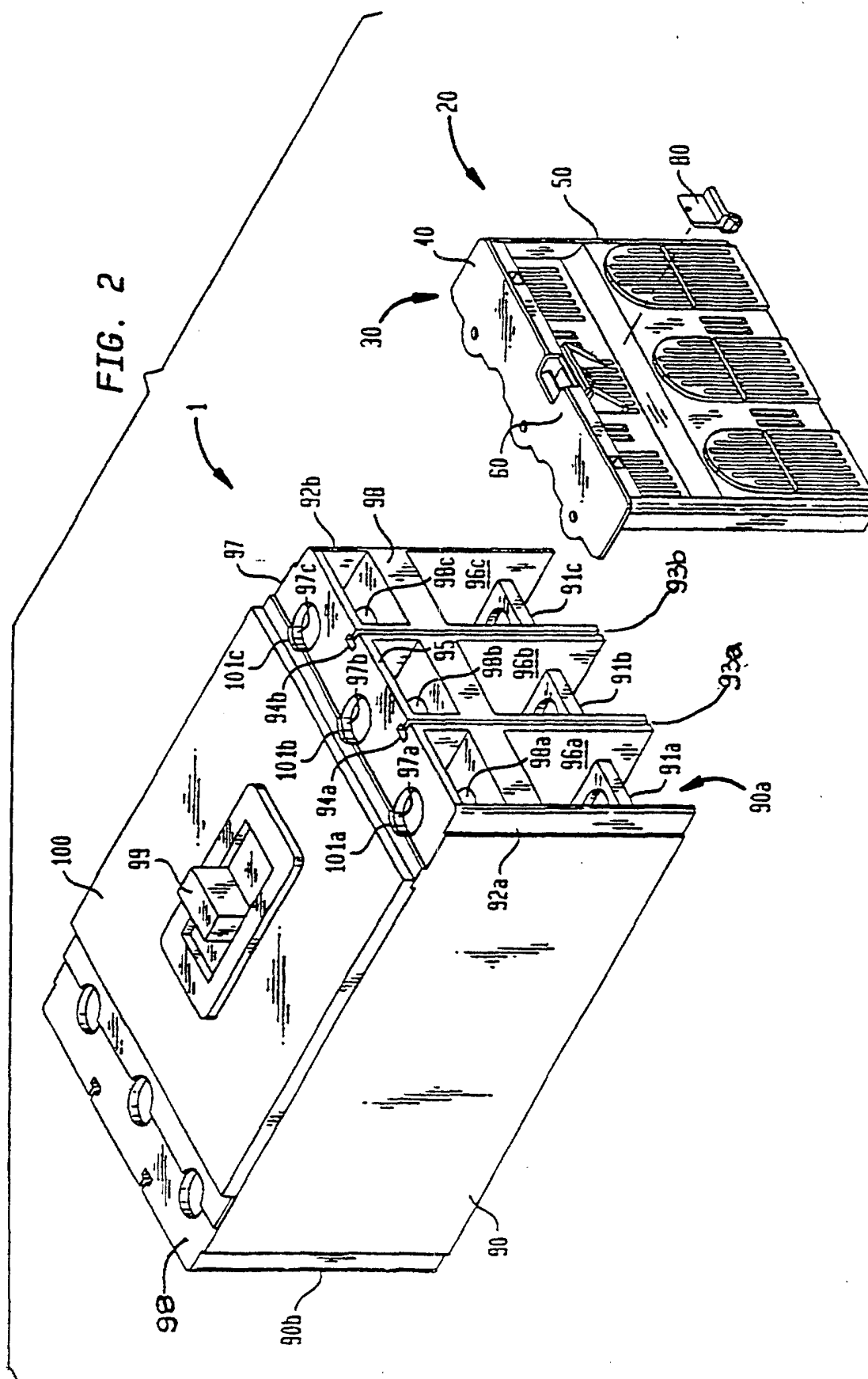


FIG. 3

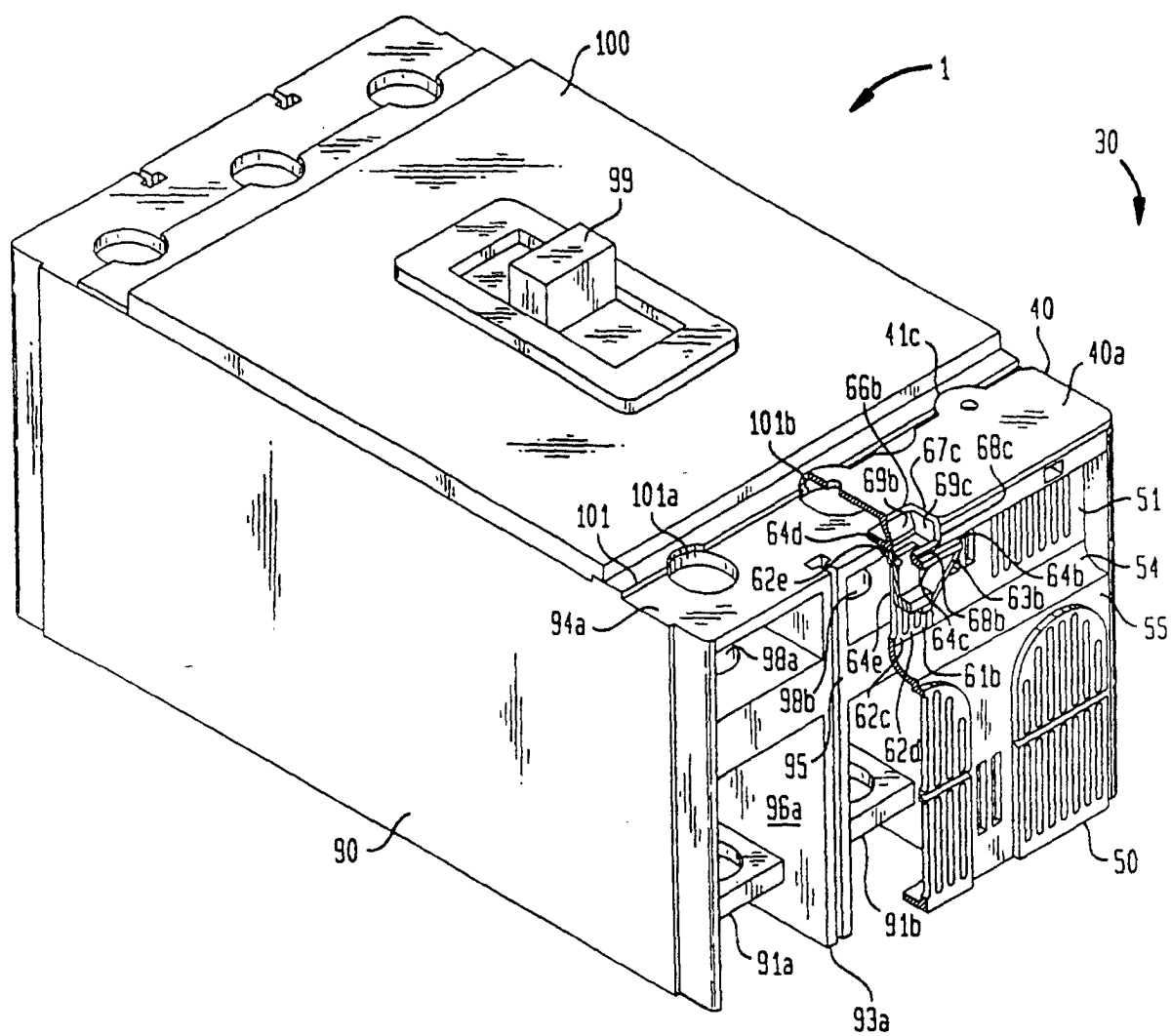


FIG. 4

