Jan. 30, 1968 J. C. BRUMFIELD 3,366,846

CIRCUIT BREAKER MOUNTING ARRANGEMENT INCLUDING A BASE SUPPORT MEMBER FOR BOLT CONNECTING THE CIRCUIT BREAKER TERMINALS TO AN EXTERNAL CIRCUIT

Filed Oct. 23, 1965 6 Sheets-Sheet 1

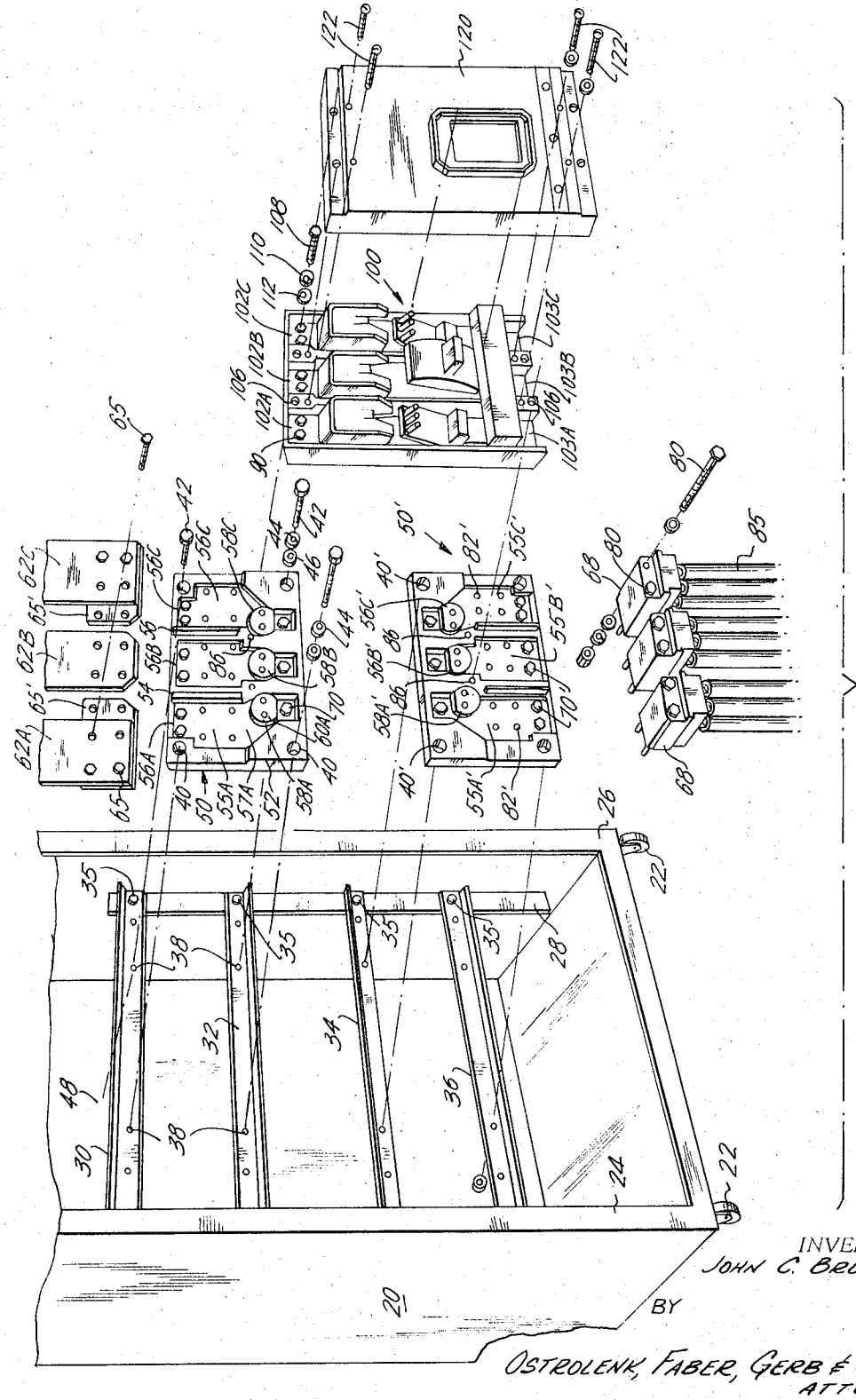


FIG. 1.

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FIG. 2

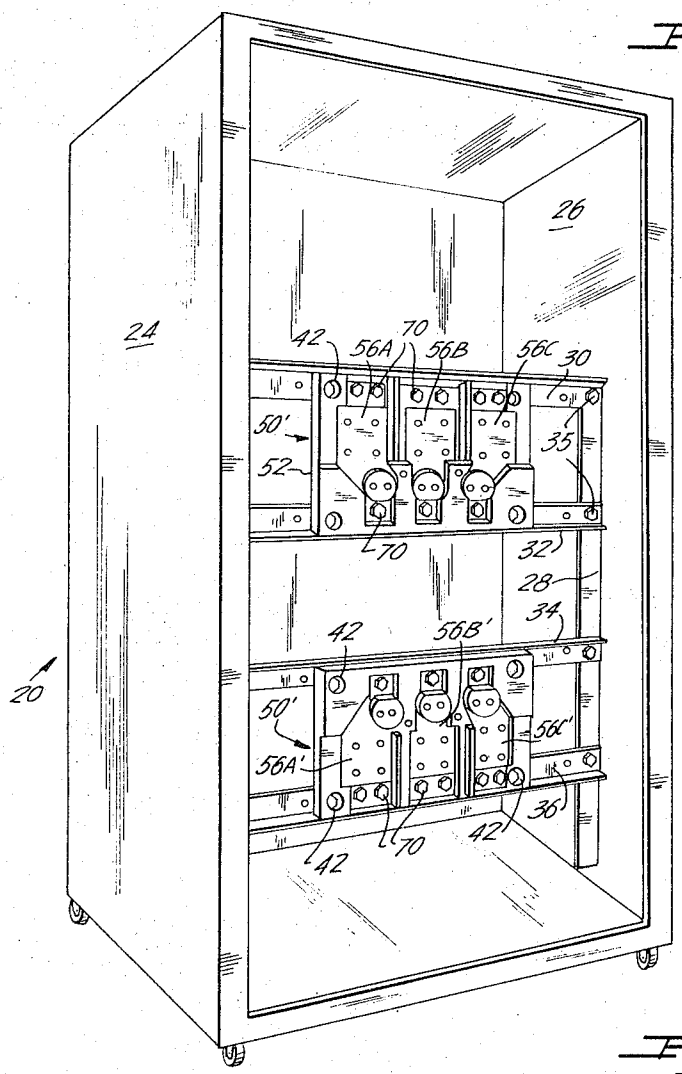
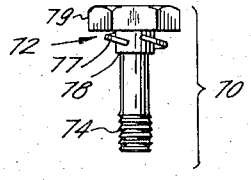


FIG. 5A



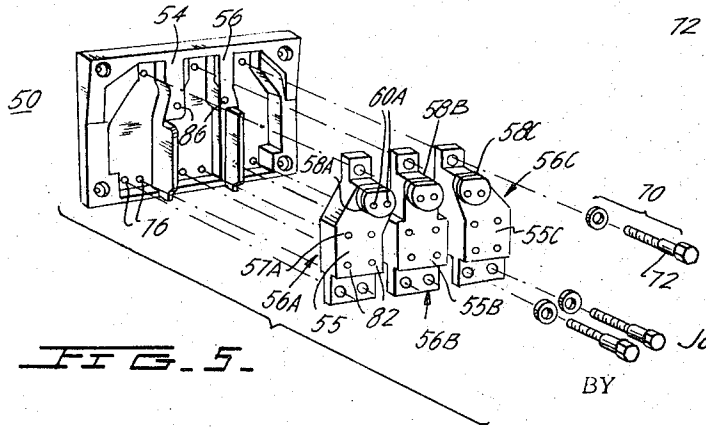


FIG. 5

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FIG. 4.

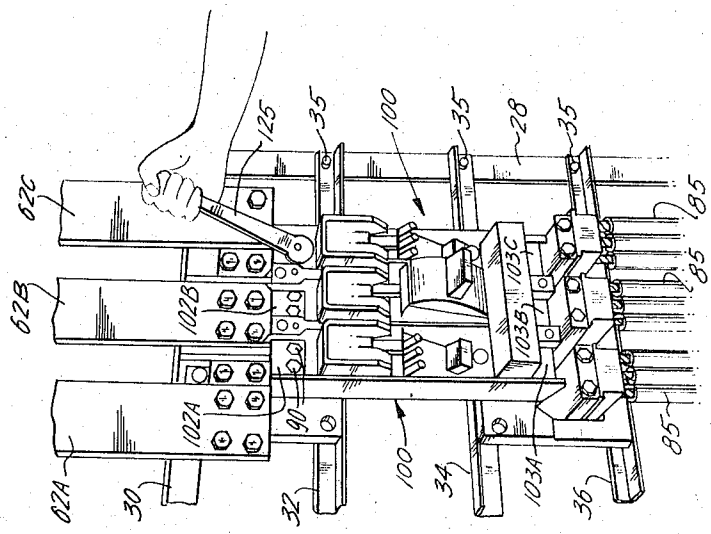
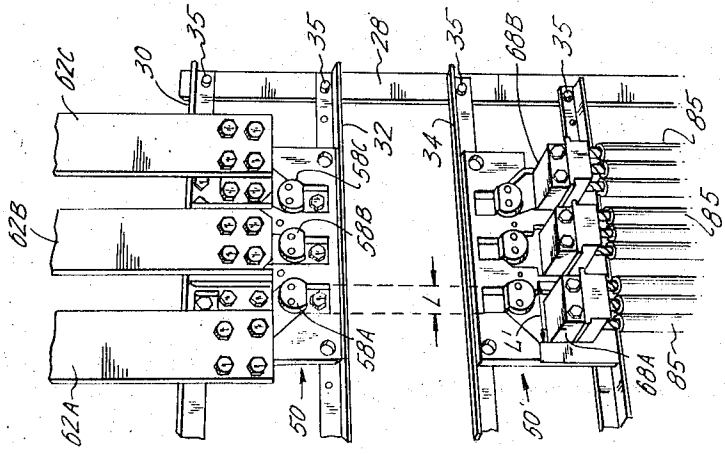


FIG. 3.



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FIG. 6.

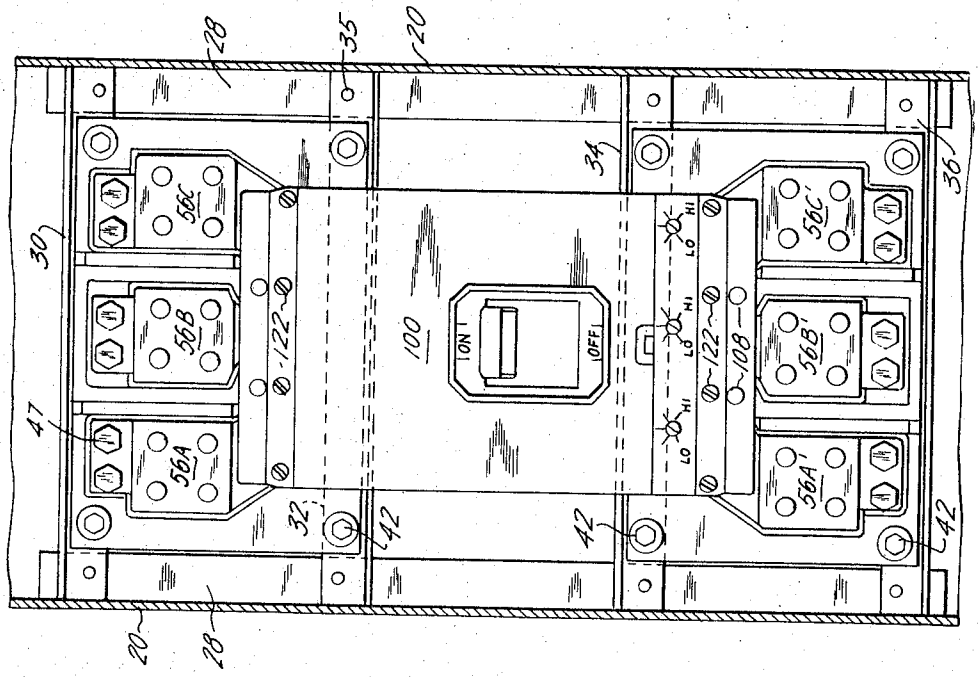
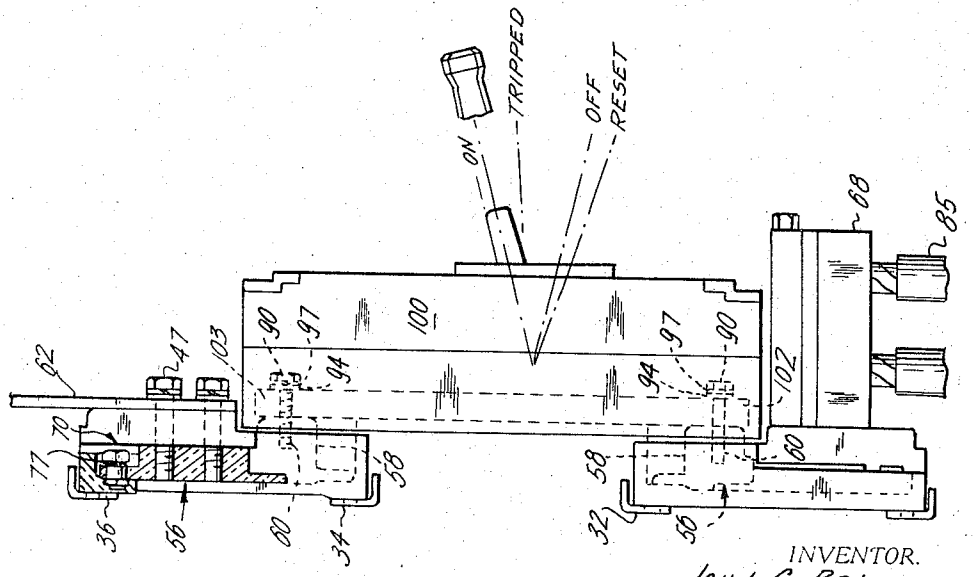


FIG. 7.



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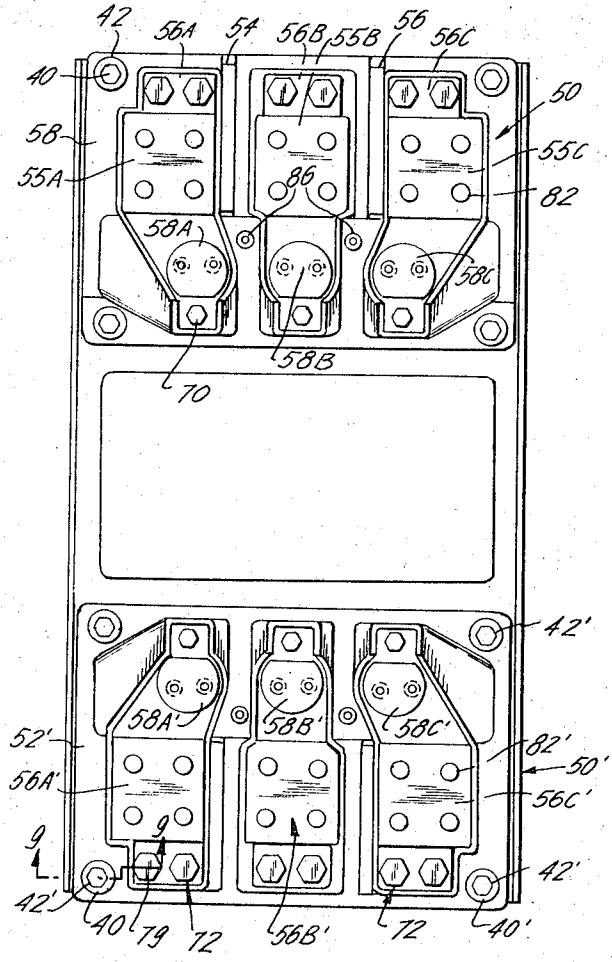
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CIRCUIT BREAKER MOUNTING ARRANGEMENT INCLUDING A BASE SUPPORT MEMBER FOR BOLT CONNECTING THE CIRCUIT BREAKER TERMINALS TO AN EXTERNAL CIRCUIT

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FIG. 8



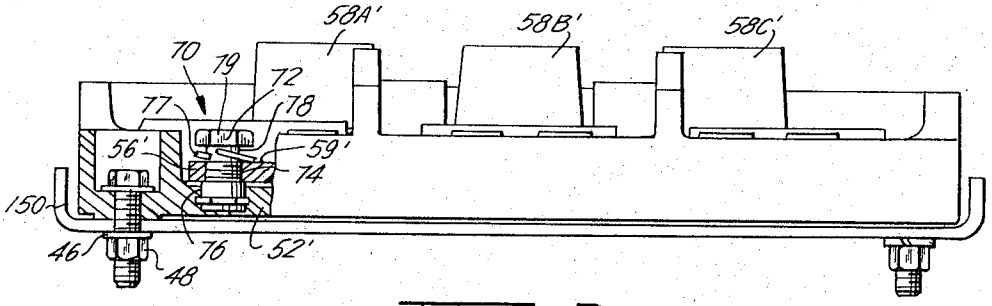


FIG. 9

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FIG. 10.

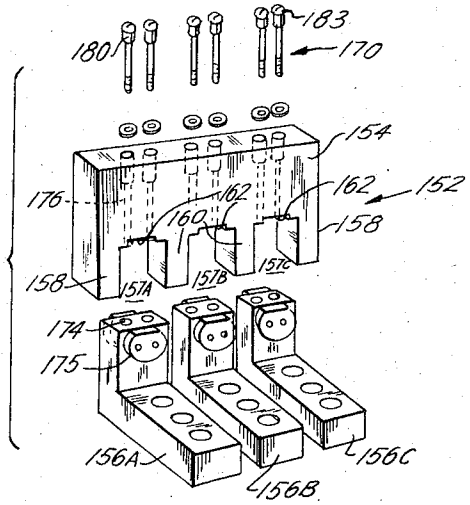


FIG. 11.

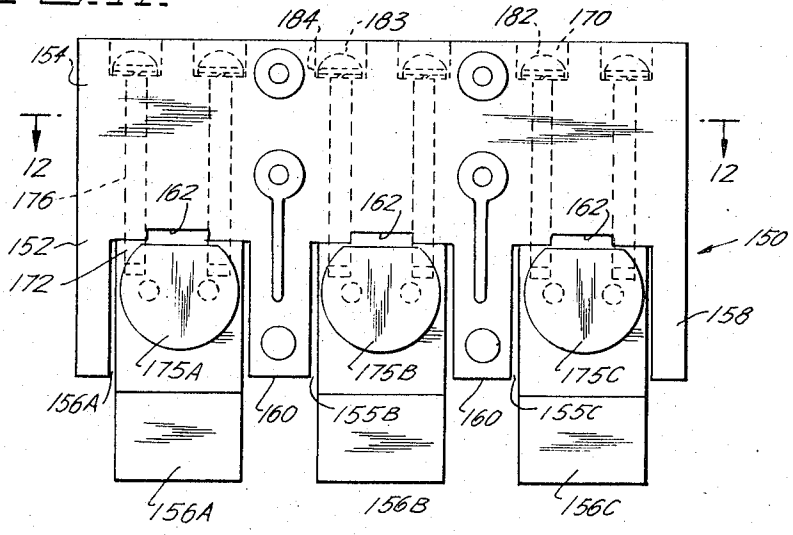
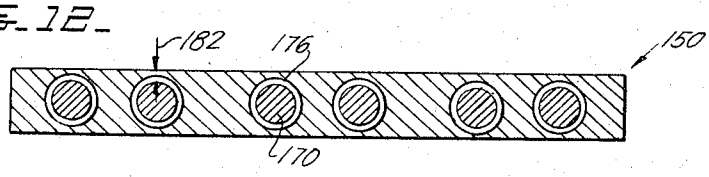


FIG. 12.



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3,366,846

CIRCUIT BREAKER MOUNTING ARRANGEMENT INCLUDING A BASE SUPPORT MEMBER FOR BOLT CONNECTING THE CIRCUIT BREAKER TERMINALS TO AN EXTERNAL CIRCUIT

John C. Brumfield, Philadelphia, Pa., assignor to I-T-E Circuit Breaker Company, Philadelphia, Pa., a corporation of Pennsylvania

Filed Oct. 23, 1965, Ser. No. 503,185
29 Claims. (Cl. 317—119)

ABSTRACT OF THE DISCLOSURE

A mounting arrangement for switching devices, such as multi-pole circuit breakers, is described, which utilizes an intermediate base support member for bolt connecting the terminals of the switching device to the external circuitry, and permits the removal of the switching device without disturbing the external circuit connections thereto.

My invention relates to an improved mounting arrangement for conveniently securing an electrical switching device to a support structure and providing independent means for connecting the terminals thereof to an external circuit.

The installation of electrical switching devices, as for example circuit breakers of the multi-phase variety, requires a support structure, such as an enclosure, for rigidly supporting the circuit breaker and providing convenient access for reception of the line and load connections thereto. In the larger frame size breakers, as for example of the type shown and discussed in copending U.S. patent application entitled "Circuit Breaker Contact Mounting," filed Feb. 5, 1965, Ser. No. 430,549, now U.S. Patent No. 3,268,702 issued Aug. 23, 1966, in the name of Carl E. Gryctko and assigned to the assignee of the instant invention, the weight of the circuit breaker unit is quite substantial, e.g. 50 pounds. Hence a firm, rigid and mechanically secure mounting arrangement is required. In the past such mounting arrangements have generally included individual bracing members of the support structure to which the circuit breaker device is directly attached. After such securement of the circuit breaker device thereto, the external circuit electrical connections are then made directly to the circuit breaker terminals. Should it be necessary to remove the circuit breaker for purposes of unit replacement or contact inspection, it then becomes necessary to also remove the external circuit connections. This is a quite bothersome and tedious operation, requiring excessive use of manpower and shut down of the load for an excessive period of time.

My invention advantageously avoids such a requirement by the provision of a novel mounting block assembly for the reception of the circuit breaker unit. The mounting block assembly includes an insulative base support member. This insulative support member is separated into adjacent compartments, corresponding to the number of poles of the circuit breaker for which it is intended to be used. The support is constructed of suitable material, to electrically isolate the external circuit connection made at the individual compartments while safely dissipating the heat generated under maximum rated conditions. Each of the adjacent sections of the insulative mounting support contains an electrically conductive strap. The electrically conductive strap includes space-separated first and second portions. The first portion is of a suitable configuration to mate with an individual pole terminal of the circuit breaker device, to be mounted thereto, and

the adjacent conductive straps are laterally separated, such that their respective first portions are spaced an amount corresponding to the lateral separation of the circuit breaker terminals. The second portion of the conducting strap is adapted to receive the connections to the external circuit. These may be received directly, as for example the line bus or connecting cables may be directly mounted to such second portion. Alternatively, the cables or similar connections may be made to an intermediate cable connector, which connector is in turn mechanically and electrically connected to such second portion of the individual phase conducting strap.

In mounting a circuit breaker per the novel assembly procedure of my invention, the insulative base support member containing its individual phase conductive straps is first mounted as an integral unit to the enclosure. There may be separate support members at the line and load sides or a single unit adapted to receive both the line and load connections. Naturally, it should be understood that the longitudinal spacing between the line and load support members predeterminedly corresponds to the spacing between the line and load terminals of the circuit breaker device to be received. The individual phase external circuit connections are then completely made to the mounting support member prior to and completely independent of the mounting of the circuit breaker unit thereto. After such external circuit connections are made, the circuit breaker unit is then mounted to and electrically secured to the mounting block. It should thus be recognized that subsequent removal of the circuit breaker device for replacement or contact inspection can be accomplished without interfering with the external circuit connections. This is to be contrasted with the typical prior art arrangements which required the cumbersome and time-consuming necessity of disturbing the electrical external connections before the circuit breaker itself could be removed. Hence, my invention by simplifying the manner in which the circuit breaker is mounted to and removed from the enclosure minimizes the down time for circuit breaker replacement and avoids what had hitherto been a bothersome operation.

As a further novel feature of my invention, the individual conducting straps are resiliently mounted to the insulated base support member in a manner serving to automatically compensate for misalignment between the breaker and support member. This will insure firm contact pressure between the breaker terminals and the individual conducting straps. Specifically, in the mounting of the circuit breaker device to the base support structure, in accordance with my invention, little difficulty will be experienced with respect to lateral misalignment between the respective poles. Such misalignment to the extent that it is usually present may be compensated for and taken up by means of oversized clearance openings in the bolt mountings of the circuit breaker unit to the conducting strap. However, vertical misalignment between the planes of individual conducting straps and the pole terminals can result in poor contact pressure between one or more of the individual pole terminals. This can present considerable difficulties, especially in conjunction with the mounting of the larger frame size breakers, as shown in aforementioned U.S. Patent No. 3,268,702, which are typically rated to carry 1600 amps continuous load at up to 600 volts. Compensation for such vertical misalignment is provided by a resilient, pressure actuated pickup in the mounting of the conducting strap to the insulative support member. As for example, such resilient adjustment means can take the form of a shouldered screw having a split ring lock washer at the shouldered length thereof. Under conditions of exact vertical alignment, the lock washer will be in its relaxed condition, with the force

thereof serving to provide firm securement of the conductive strap to the insulator support member. Should there be vertical misalignment at one or more of the individual conducting straps, the lock washer of that particular conducting strap(s) is compressed a sufficient amount to permit translation of its conducting strap in a direction substantially parallel to the plane of the base support member towards the circuit breaker terminal so as to maintain intimate and firm contact pressure between the circuit breaker pole terminal and the portion of the conducting strap connected thereto.

A further advantageous aspect of our invention relates to the manner in which the connections are made to the external circuit. That is, in using circuit breakers of the larger frame size, for which my invention is particularly well adapted, it is common practice to have a number of cables, of substantial thickness, connected to the circuit breaker terminal. In recent years, the trend towards more compact circuit breaker designs has minimized the lateral spacing between the terminals of adjacent poles to an extent, making the external circuit connections thereto rather difficult. The mounting assembly of my invention avoids this difficulty by tapering the conducting strap outward from the portion where connections are made to the circuit breaker terminals to the portion where connections are made to the external circuit. The portion of the strap receiving the external connection is hence of a considerably greater lateral extent than would be permitted by the spacing between adjacent circuit breaker pole terminals. Such an increased contact area greatly facilitates the reception of the external circuit connections while increasing the creepage distance between the adjacent poles.

In accordance with another advantageous feature of our invention, the individual conductive straps are mounted to hollowed-out regions of the insulative base support. This not only improves the heat dissipating properties thereof, but permits connection of the external circuitry thereto, from either the forward or the rear side of the insulative base support member. Also, the novel connector means of copending U.S. patent application entitled, "Electrical Connector," filed Oct. 23, 1965, Ser. No. 503,320 in the name of J. R. Chamberlain, Jr., may be used in conjunction with the mounting support structure of my invention to provide an extremely versatile arrangement permitting reception of the line and load terminal connections of either side of the enclosure, and advantageously permitting the removal of the circuit breaker device without disturbing these connections.

It is therefore seen that a principal aspect of my invention resides in the provision of improved mounting arrangement for an electrical switching device, such as a circuit breaker, which permits removal of the circuit breaker device in an extremely simplified manner without disturbing the electrical connections thereof to an external circuit.

It is therefore seen that a principal object of my invention resides in an improved circuit breaker mounting arrangement.

A further object of my invention resides in a circuit breaker mounting arrangement which permits removal of the circuit breaker from the forward surface of the mounting enclosure without disturbing the external connections to the circuit breaker device.

Another object of my invention resides in the provision of a novel mounting block for receiving the pole terminals of a circuit breaker, for the electrical inter-connection thereof to an external circuit, and the firm mechanical mounting thereof.

An additional object of my invention relates to such a mounting block having individual pole conductive strap members mounted thereto for each of the circuit breaker pole terminals.

Still an additional object of my invention relates to such a circuit breaker mounting block, wherein the mounting of the individual conductor strap members to the base support member includes a resilient take-up means for adjustably modifying the position of the individual strap members by a sufficient amount to maintain firm electrical contact pressure with the circuit breaker terminals.

Still a further object of my invention is to provide a circuit breaker mounting block having a laterally enlarged portion for receiving the external circuit connections, with such enlarged portion being tapered outward from the circuit breaker terminal locations.

Still another object of my invention is to provide a circuit breaker mounting arrangement wherein all the external circuit connections may be made prior to receipt of the circuit breaker device.

These as well as other objects of my invention will readily become apparent upon a consideration of the following drawings in which:

FIG. 1 is an exploded perspective view showing a typical manner in which the novel mounting arrangement of my invention may be utilized to mount a multi-pole circuit breaker device to its individual enclosure.

FIGS. 2, 3 and 4 are perspective views showing the successive steps for mounting a circuit breaker in accordance with the novel mounting arrangement of my invention, and shown utilizing one form of the mounting support structure. In FIG. 2, the mounting supports themselves are shown mounted to the enclosure at longitudinally spaced positions corresponding to the spacing between the line and load ends of the circuit breaker to be received. In FIG. 3, the external circuit line and load connections are shown having been made thereto, and in FIG. 4, the circuit breaker is then mounted thereto.

FIG. 5 is an exploded perspective view of one form of mounting block structure in accordance with my invention.

FIG. 5A is a front view of the bolt means and resilient lockwasher for securing the individual conductor means to the insulative support member.

FIGS. 6 and 7 are plan and side elevation views, respectively, of the breaker completely mounted to the support structure in accordance with the structural member shown in FIGS. 1–5, with the cross-sectional portion of FIG. 7 showing the manner in which the circuit breaker is, in turn, connected thereto.

FIGS. 8 and 9 are plan and side elevational views of a slightly modified mounting arrangement utilizing the support members of FIG. 5 in conjunction with an individual mounting pan.

FIG. 10 is an exploded perspective view of an alternative form of mounting support structure, constructed in accordance with the novel concepts of my invention.

FIG. 11 is a plan view of the mounting structure shown in FIG. 10.

FIG. 12 is a cross-sectional view along the line 12—12 of FIG. 11 looking in the direction of the arrows and particularly showing the clearance between the mounting bolts and insulative support apertures.

Referring initially to the figures, and particularly FIGS. 1–7, circuit breaker receiving enclosure **20**, which may be supported on casters **22** includes vertically upstanding walls **24**, **26** having longitudinally orientated angle members **28** suitably mounted thereto as by welding. Transversely mounted support angles **30**, **32** **34**, **36** are shown extending therebetween and mounted to the longitudinal angles by appropriate means, such as bolt members **35**. The transverse angle members include spaced apertures **38** predeterminedly located to matingly receive mounting apertures **40** of the mounting block **50**, with mounting block **50** being rigidly secured thereto by the mounting arrangement including bolt member **42**, flat washer **44**, lock washer **46** and nut member **48**. The longitudinal spac-

ing between the support angles **30, 32** naturally corresponds to the spacing between the upper and lower mounting apertures **40** of its respective mounting block base support member **52**. Similarly, the longitudinal spacing between the respective pairs of mounting support members **30, 32**, and **34, 36**, respectively, are appropriately spaced in accordance with the longitudinal spacing of the line and load end terminals of circuit breaker device **100**, which is intended to be installed within enclosure **20**. While a three-pole circuit breaker unit is illustrated in the accompanying descriptions, it should be recognized that the novel concepts of my invention are likewise applicable in conjunction with a single pole device or multi-pole circuit breaker device other than the three-pole variety.

Upper and lower mounting blocks **50, 50'** are of identical construction and the prime numbers will be used throughout to indicate corresponding portions thereof and the ensuing discussion being principally directed to mounting block **50** for the sake of brevity. As shown, mounting assembly **50** is intended to mate with the line end of circuit breaker **100** and mounting assembly **50'** to correspondingly mate with the load end of the circuit breaker device **100**.

Mounting assembly **50** includes an insulative base support member **52**, formed of an appropriate good insulating material. Insulative support member **52** is separated into three individual poles, laterally spaced compartments as by upstanding wall sections **54, 56**, respectively. Each of the individual phase compartments is centrally hollowed and receives an individual phase conducting strap or connecting means for electrical interconnection between the respective circuit breaker pole terminals and the external circuit. The individual pole connecting means are designated as **56A, 56B** and **56C** at the line side corresponding to the A, B and C phases respectively. Considering one of the connecting means, such as **56–A**, there is a first portion **58A** which freely projects outward from the forward surface of the support assembly **50**. Portion **58A** includes aperture means **60A** adapted to mate with line terminal **102A** of the circuit breaker **100**. Similarly, portions **58B** and **58C** of the other connecting strap means are laterally positioned adjacent each other to mate with line terminals **102B** and **102C** of the adjacent circuit breaker phases.

The individual conducting means such as **56A** are mounted to the insulative base support member **52** by mounting means generally shown as **70** and to be more fully discussed in the following description. The external circuit connections to the individual connecting strap members are made at the regions shown as **55A, 55B** and **55C**, respectively. It is to be noted that these regions are of a considerably greater lateral extent than the terminal region **58A** and are connected thereto by tapered portion **57A**. The external circuit connections may be directly made to portion **55A** as shown by the mounting of line bus **62A, 62B, 62C**, by bolt means **65** and spacer plate **65'**. Alternatively, the external circuit connections may be made via the intermediary of a cable connecting means, such as shown at **68**, and is the subject of copending aforementioned U.S. patent application Serial No. 503,320. Connecting means **68** include bolts **80** which extend into apertures **82** shown in portion **55A'** at the load side for securable connection thereto. The external cable connections, generally shown as **85**, are in turn made directly to intermediary conductor **68**. Insulative support member **52** includes additional mounting apertures **86**, which mate with mounting apertures **106** of the circuit breaker **100** for rigid mounting of the breaker thereto via bolt member **108**, lock washer **110** and flat washer **112**. Circuit breaker device **100** further includes a cover **120** which is placed thereon and by the provision of mounting screws **122**.

Referring now sequentially to FIGS. 2–4, FIG. 2 shows the first step of mounting a circuit breaker utilizing the novel mounting arrangement of the instant invention.

Mounting supports **50, 50'** are mounted, with the provision of the first mounting means, including bolt member **42**, to the transverse support angles **30, 32, 34** and **36** of the enclosure **20**, as shown in FIG. 2. The individual conductive connecting means **56** and **56'** have been previously mounted to their respective insulative base support member **52** and **52'** by a second mounting means **70**. The external circuit connections are then made at portions **55** of the respective individual electrically conductive connecting means **56**. As for example, the line bus **62A, 62B** and **62C** are directly connected to the conducting means of line side mounting support member **50** and the load connecting cables **85** are connected to the intermediary connectors **68** (which is the subject of aforementioned U.S. patent application Serial No. 503,320), which in turn are mounted to the load side mounting support member **50'**. It should, however, be understood that the line and load sides of the enclosure **20** may be reversed, with the line side being at the lower end and the load side at the upper end. As shown in FIG. 3, the connections to the external circuit will then be completely made prior to the circuit breaker **100** being introduced to the mounting arrangement, and hence such external circuit connections are completely independent of the mounting of the circuit breaker to the mounting support. It is to be also noted that the increased lateral area **55** (as shown by L'), relative to the terminal receiving portion **58** of the electrically conductive connecting means (as shown by L), facilitates the reception and connection of such external circuitry connections.

With the external circuitry thus completed, the circuit breaker unit **100** is then mounted such that its individual pole terminals **102** and **103** mate with forwardly extending portions **58** and **58'** respectively, of the individual line and load conducting straps **56, 56'**. A third mounting means, including screw member **90**, flat washer **97**, lock washer **94** is then inserted to securably mount the circuit breaker terminals **102, 103** to tapped apertures **60** of the respective conductive strap portion **58** (see FIG. 9). Screw member **90** is tightened, preferably by an adjustably calibrated torque wrench **125** for providing the proper contact pressure. Additional circuit breaker mounting means **108, 110** and **112** also employed to rigidly mount the circuit breaker to tapped apertures **86** of mounting support assemblies **50, 50'**. Cover **120** of the circuit breaker is then added and maintained by individual bolt members **122**, providing the end result as shown in FIGS. 6 and 7.

Reference is now made to FIGS. 8 and 9, which show a pair of mounting support assemblies **50, 50'** being used in conjunction with a slightly modified enclosure. That is, instead of individual vertical support angles **28** and transverse support angles **30, 32, 34, 36**, as shown in the previously discussed embodiment, a mounting pan **150** is utilized. Mounting pan **150** is appropriately dimensioned such that bolt means **42, 42'** secure the individual mounting assemblies **50, 50'** thereto, with conducting member portions **58A, 58B, 58C** being positioned to matingly receive the circuit breaker line terminals **102A, 102B** and **102C**, and the other set of conducing strap extensions **58A', 58B', 58C'** being positioned to matingly receive circuit breaker load terminals **103A, 103B** and **103C**.

Referring now specifically to FIGS. 5 and 5A and the cross-sectional poles of FIGS. 7 and 9, note that the means for mounting the individual conducting straps, generally shown as **70**, includes a mounting bolt **72** having a forward threaded portion **74**, which mates with threaded insert **76** of the insulative support member **52**, and a shouldered portion **78** intermediate threaded portion **74** and enlarged head portion **79**. A resilient split ring lock washer **77** is interposed between the enlarged head portion **79** of the bolt member **72** and the upper surface **59'** of the conductive connecting strap **56'**. In

its normal relaxed condition the lock washer **77** extends intermediate to the lower portion of head portion **79** and terminal strap surface **59**. However, should there be vertical misalignment between an individual one of the connecting means straps **56'** and associated circuit breaker terminals, this would result in a gap separation between the circuit breaker terminal and the forwardmost surface of strap connecting region **58'**. However, the provision of resilient lock washer **77** permits translation of the individual strap member **56'** in a direction substantially parallel to the forward surface of base support structure **50**, so as to take up the extent of such vertical misalignment and thereby maintain intimate low electrical resistance, securement between the circuit breaker terminals and the mounting means portion **58'**.

Reference is now made to FIGS. 10–12 with respect to an alternative form of my invention. The mounting support structure, generally shown as **150**, includes an insulative base support member **152**, having a main portion **154** and a divided compartmentalized portion including compartments **157A**, **157B** and **157C**, adapted to receive individual phase conducting strap means **156A**, **156B**, **156C**. The individual connecting means **156** are preferably of a generally L-shaped configuration, as is the subject matter of aforementioned U.S. patent application Ser. No. 503,320 so as to increase the versatility and simplicity by which the circuit breaker mounting block may be connected to the external circuitry. The end phase compartments **157A** and **157C** are terminated at their edge extremes by legs **158** and separated from central compartment **157B** by intermediate legs **160**. Cutouts **162** are further provided at each of the individual compartments to increase the electrical creepage distance therebetween. The individual phase conducting straps **156A**, **156B** and **156C** are connected to the insulative support member **152** by elongated screw member **170**, which has a forward threaded end **172**, for threaded engagement with aperture **174** of the connecting member. The main length of screw member **170** extends through a clearance **176**, which is best shown in cross-sectional view **12**, provides a predetermined amount of clearance **182** between the outer circumference of the screw member **170** and the aperture **176**. A shoulder portion **180** is provided adjacent head **183** of bolt member **170**, for receiving a spring-like split ring lock washer member **184**, which serves a function similar to lock washer **77** of previously discussed embodiment, to permit translation of connecting portion **175** of the individual conducting strap in a generally vertical direction so as to compensate for vertical misalignment of the individual circuit breaker terminals, relative to the support member conducting straps.

It is therefore seen that my invention provides an improved support structure for simplifying the mounting of a circuit breaker device thereto, as well as maintaining independence between the external circuit connection and the mounting of the circuit breaker to such support structure.

Although there has been described a preferred embodiment of this novel invention, many variations and modifications will now be apparent to those skilled in the art. Therefore, this invention is to be limited, not by the specific disclosure herein, but only by the appending claims.

The embodiments of the invention in which an exclusive privilege or property is claimed are defined as follows.

I claim:

1. A mounting arrangement for mechanically securing an electrical switching device to a support structure and providing bolted electrical connections from terminals of said switching device to an external circuit, comprising a base support member formed of insulative material, said base support member having opposed first and second surfaces, a first mounting means received by said base support member for securably mounting said base support member to said support structure, such that said first surface is freely accessible to receive said switching device and said second surface juxtaposes said support structure, an individual electrically conductive connecting means carried by said base support member for individually receiving the terminals of said switching device, second mounting means securably mounting said connecting means to predeterminedly spaced locations of said base support member, said connecting means including integrally formed first and second portions, said first portions including a planar contact area freely accessible at said base support member first surface, said planar contact area including first aperture means for receiving a bolted connection to the individual terminals of said switching device and providing firm electrical contact therewith over said planar contact area, said second portions including second aperture means to receive an additional bolt means for connection to an external circuit, third mounting means of the bolted type securably mounting and electrically connecting said connecting means first portions to their individual switching device terminals in a manner independent of the connections of said second portions to said external circuit connecting means, such that the removal of said third mounting means bolts serves to electrically and mechanically detach said switching device from said base support member without disturbing the bolted external circuit connections thereto.

2. A mounting arrangement as set forth in claim **1**, said third mounting means securably mounting and electrically connecting said connecting means first portions to their individual switching device terminals from said first surface of said base support member, said third mounting means including bolts extending through aligned apertures of said switching device terminals and the planar contact area of said first portions.

3. In a mounting arrangement as set forth in claim **2**, at least one of said mounting means including a resilient, pressure-actuable means for compensated movement of the individual connecting means in a direction parallel to the plane of said planar contact area and serving to maintain firm contact pressure between said connecting means and its respective switch device terminal responsive to conditions of vertical misalignment therebetween.

4. In a mounting arrangement as set forth in claim **2**, said connecting means second portion of a considerably greater lateral extent than said first portion, with an intermediate tapered section of said connecting means electrically connecting said first and second portions.

5. In a mounting arrangement as set forth in claim **2**, at least one of said mounting means including a resilient, pressure-actuable means for compensated movement of the individual connecting means in a direction parallel to the plane of said planar contact area and serving to maintain firm contact pressure between said connecting means and its respective switch device terminal responsive to conditions of up to a predetermined extent of vertical misalignment therebetween, said connecting means second portion of a considerably greater lateral extent than said first portion, with an intermediate tapered section of said connecting means electrically connecting said first and second portions.

6. In a mounting arrangement as set forth in claim **2**, at least one of said mounting means associated with each of said individual terminal connecting means including a resilient, pressure-actuable means for permitting individual movement of the connecting means parallel to the plane of said planar contacts are to maintain firm contact pressure between said connecting means and its respective switch device terminal responsive to conditions of vertical misalignment therebetween.

7. In a mounting arrangement as set forth in claim **2**, said second mounting means including a resilient,

pressure-actuable means for adjusting the positioning between said connecting means and said base support member, to maintain firm contact engagement at said third mounting means when subjected to vertical misalignment of up to a predetermined extent between said connecting means and its respective switch device terminal.

8. In a mounting arrangement as set forth in claim 7, said resilient means of said second mounting means including a screw member having a threaded portion for threaded engagement with a tapped opening of said base support member, and a shouldered portion, an expandable member, about said shouldered portion, and abutting a surface of said connecting means, said expandable member in its free state having an axial extent of a first amount, and in its compressed state having an axial extent of a lesser second amount, the difference between said first and second amounts permitting movement of said connecting means by a comparable amount in a direction substantially parallel to said first surface of the base support member.

9. In a mounting arrangement as set forth in claim 8, said expandable member comprising a split-ring, lockwasher interposed between an enlarged head portion of said screw member and the adjacent surface of said connecting means.

10. In a mounting arrangement as set forth in claim 7, said second means including a screw member having a threaded forward end in threaded engagement with a tapped opening of said connecting means, an elongated intermediate length extending through an oversize opening of said base support member, such that said connecting means is mounted at a first terminus of said opening, and an enlarged rear head portion of said screw member is located at the opposite second terminus of said opening, said resilient means including an expandable member about said screw member, and abutting a terminus portion about said mounting block opening.

11. In a mounting arrangement as set forth in claim 10, said expandable member in its free state having an axial extent of a first amount, and in its compressed state having an axial extent of a lesser second amount, the difference between said first and second amounts permitting movement of said connecting means by a comparable amount in a direction substantially parallel to said first surface of the base support member.

12. In a mounting arrangement as set forth in claim 11, said expandable member comprising a split-ring, lockwasher interposed between an enlarged head portion of said screw member and the adjacent surface about said second terminus of the screw member opening.

13. In a mounting arrangement as set forth in claim 2, said means which connects to an external circuit being secured to the second portion of its respective individual connecting means from said first surface of said base support member,

whereby the external circuit connections to said base support member and said switching device avoid access to the second surface of said base support member.

14. In a mounting arrangement as set forth in claim 13, said support structure located within a panelboard, having a rear wall,

said rear wall adjacent said support structure, second surface, all of said external circuit connections located at, and routed through, regions of said panelboard forward of said support structure, thereby minimizing the required clearance between said support structure and said rear wall.

15. A mounting arrangement for mechanically securing a multi-phase circuit breaker unit to a support structure, and providing bolted electrical connections from terminals thereof to an external circuit, said circuit breaker having longitudinally spaced line and load ends, with laterally adjacent individual pole terminals at each of said ends, said mounting arrangement including first and second insulative base support members for individual securement to the line and load ends respectively of said circuit breaker, said base support members having opposed first and second surfaces, a first mounting means received by said base support members for individually mounting said first and second base support members to said support structure, at longitudinally spaced locations corresponding to the longitudinal spacing between said line and load ends, such that said first surface is freely accessible to receive said circuit breaker and said second surface juxtaposes said support structure, an individual electrically conductive connecting means carried by said base support members for individually receiving the pole terminals of said circuit breaker, at laterally adjacent locations of its respective base member, corresponding to the lateral displacement between adjacent pole terminals of the circuit breaker, second mounting means individually mounting the individual pole connecting means to said base support members at said laterally adjacent locations, said connecting means including integrally formed first and second portions, said first portions including a planar contact area freely accessible at said base support member first surface for receiving the individual pole terminals of said circuit breaker, said planar contact area including first aperture means for receiving a bolted connection to its respective individual circuit breaker terminal to provide firm electrical contact therewith over said planar contact area, said second portions including second aperture means to receive an additional bolted connection to an external circuit, third mounting means of the bolted type for securably mounting and electrically connecting said connecting means first portions to their individual circuit breaker pole terminals from said first surface of said base support member in a manner independent of the connections of said second portions to said external circuit connecting means, such that the removal of said third mounting means bolts serves to electrically and mechanically detach said circuit breaker from said first surface of said base support members without disturbing the external circuit connections thereto.

16. In a mounting arrangement as set forth in claim 15, at least one of said mounting means associated with each of said individual pole connecting means including resilient adjustment means for permitting individual movement of its respective connecting means relative to said base support members in a direction maintaining firm contact pressure between said connecting means and its respective circuit breaker pole terminal responsive to misalignment therebetween.

17. In a mounting arrangement as set forth in claim 16, said resilient adjustment means including means for permitting translation of said connecting means first portion in a direction transverse to said lateral direction.

18. In a mounting arrangement as set forth in claim 15, said connecting means second portion of a considerably greater lateral extent than said first portion, with an intermediate tapered portion of said connecting means electrically connecting said first and second portions.

19. In a mounting arrangement as set forth in claim 15, said resilient adjustment means including means for permitting translation of said connecting means first portion in a direction transverse to said lateral direction, said connecting means second portion of a considerably greater lateral extent than said first portion, with an intermediate tapered section of said connecting means electrically connecting said first and second portions.

20. In a mounting arrangement as set forth in claim 15, said second mounting means including a resilient, pressure-actuable means for adjusting the positioning between said connecting means and said base support members, to maintain firm contact engagement at said third mounting means when subjected to misalignment of up to

a predetermined extent between said connecting means and its respective circuit breaker pole.

21. In a mounting arrangement as set forth in claim 20, said resilient means of said second mounting means including a screw member threaded portion for threaded engagement with a tapped opening of said base support member, and a shouldered portion, an expandable member, about said shouldered portion and abutting a surface of said connecting means, said expandable member in its free state having an axial extent of a first amount, and in its compressed state having an axial extent of a lesser second amount, the difference between said first and second amounts permitting movement of said connecting means first portion by a comparable amount in a direction substantially parallel to said first surface of the base support member.

22. In a mounting arrangement as set forth in claim 21, said expandable member comprising a split-ring lockwasher interposed between an enlarged head portion of said screw member and the adjacent surface of said connecting means.

23. In a mounting arrangement as set forth in claim 20, said second means including a screw member having a threaded forward end in threaded engagement with a tapped opening of said connecting means, an elongated intermediate length extending through an oversize opening of said base support member, such that said connecting means is mounted at a first terminus of said opening, and an enlarged rear head portion of said screw member is located at the opposite second terminus of said opening, said resilient means including an expandable member about said screw member, and abutting a terminus portion about said mounting block opening.

24. In a mounting arrangement as set forth in claim 15,

said means which connects to an external circuit being secured to the second portion of its respective individual connecting means from said first surface of said base support member,

whereby the external circuit connections to said base support member, and said circuit breaker unit avoid access to the second surface of said base support member.

25. In a mounting arrangement as set forth in claim 24,

said support structure located within a panelboard, having a rear wall,

said rear wall adjacent said support structure second surface, all of said external circuit connections located at, and routed through, regions of said panelboard forward of said support structure, thereby minimizing the required clearance between said support structure and said rear wall.

26. A mounting support for mechanically receiving a multi-phase circuit breaker, and providing bolted electrical interconnection between the individual pole terminals thereof and an external circuit, said mounting support including a base support member formed of insulative material, said base support member having opposed first and second surfaces, a first mounting means received by said base support member for securably mounting said base support member to a support structure, an individual

electrically conductive connecting means carried by said base support member for individually receiving the pole terminals of said circuit breaker, at laterally adjacent locations of its respective base support member, corresponding to the lateral displacement between adjacent pole terminals of the circuit breaker, second mounting means received by pole connecting means and said base support member for mounting the individual pole connecting means to said base support member at said laterally adjacent locations, said pole connecting means including integrally formed first and second portions, said first portions freely accessible at said base support member first surface and adapted to receive the individual pole terminals of said circuit breaker, said second portions adapted to receive means connecting to an external circuit, third mounting means of the bolted variety for securably mounting and electrically connecting said pole connecting means first portions to their individual circuit breaker pole terminals from said first surface of said base support member in a manner independent of the connections of said second portions to said external circuit connecting means, such that the bolts of said third mounting means may be removed and said circuit breaker may be electrically and mechanically detached from said first surface of said base support member without disturbing the external circuit connections thereto.

27. In a mounting support as set forth in claim 26, said connecting means second portion of a considerably greater lateral extent than said first portion, with an intermediate tapered section of said connecting means electrically connecting said first and second portions.

28. In a mounting support as set forth in claim 26, said second mounting means including a resilient, pressure-actuable means for adjusting the positioning between said connecting means and said base support member, to maintain firm contact engagement at said third mounting means when subjected to vertical misalignment of up to a predetermined extent between said connecting means and its respective circuit breaker pole.

29. In a mounting support as set forth in claim 28, said resilient means of said second mounting means including a screw member having a threaded portion for threaded engagement with a tapped opening of said base support member, and a shouldered portion, an expandable member, about said shouldered portion and abutting a surface of said connecting means, said expandable member in its free state having an axial extent of a first amount, and in its compressed state having an axial extent of a lesser second amount, the difference between said first and second amounts permitting movement of said connecting means by a comparable amount in a direction substantially parallel to said first surface of the base support member.

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