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H. J. HAMMERLY

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CIRCUIT BREAKER PANEL ASSEMBLY WITH DISCRIMINATING MEANS

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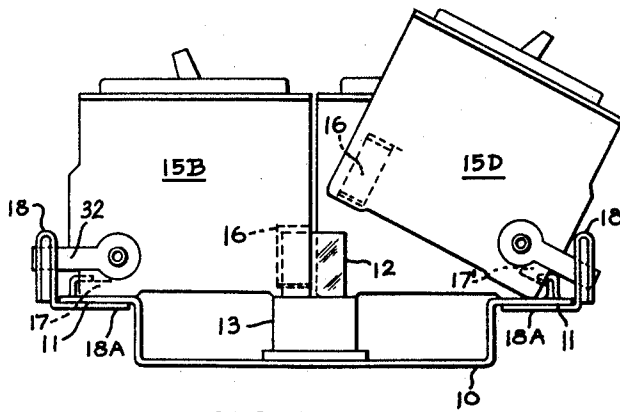


FIG. 1

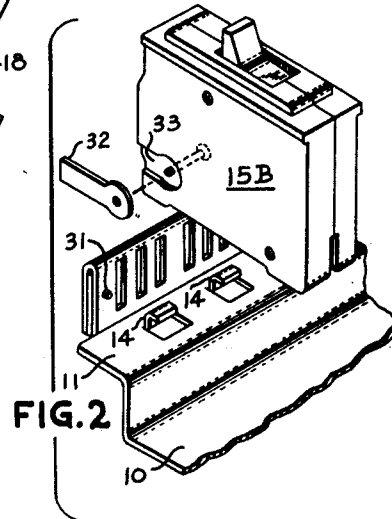


FIG. 2

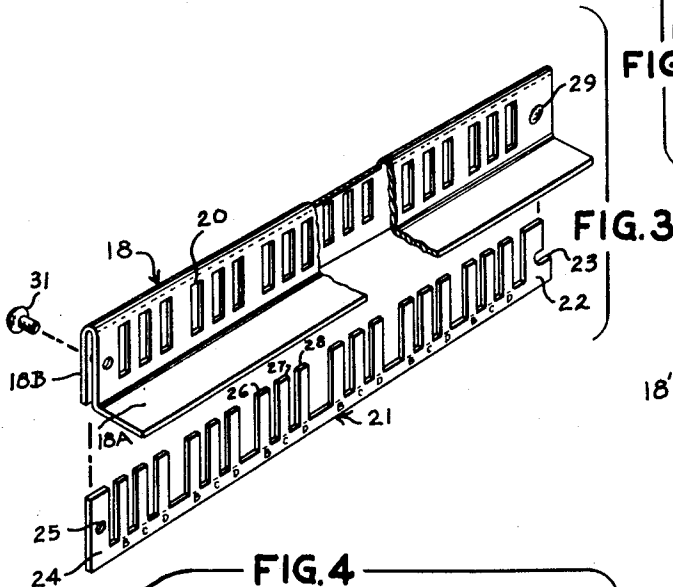


FIG. 3

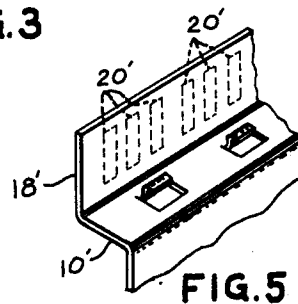
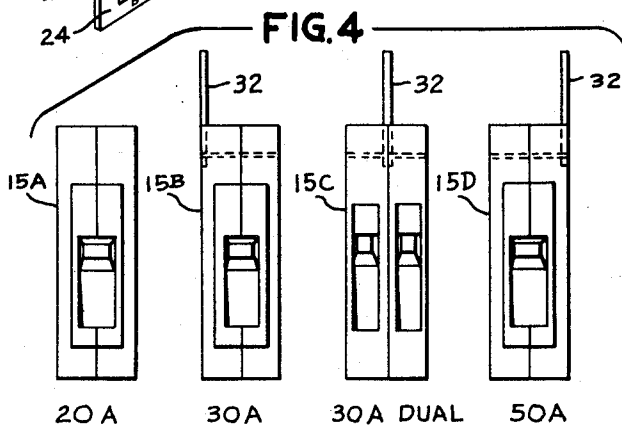


FIG. 4



INVENTOR.
Herman J. Hammerly
BY Robert T. Casey
ATTORNEY

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CIRCUIT BREAKER PANEL ASSEMBLY WITH DISCRIMINATING MEANS

Herman J. Hammerly, Plainville, Conn., assignor to General Electric Company, a corporation of New York
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The present invention relates to electrical control panel assemblies, and more particularly to panel assemblies adapted to receive electric control devices, such as circuit breakers, by plug-in action.

In electric panel assemblies of the type referred to, control devices, such as electric circuit breakers or fuse blocks, are readily inserted and removed by engaging a portion of the circuit breaker with a portion of the panel, and rotating the circuit breaker about its point of engagement into plug-in type electrical engagement with a stationary contact carried by the panel.

Because of the ease and facility with which such control devices can be inserted and/or removed from such panels, there is a danger that the user or other unauthorized person may remove a properly installed circuit breaker and substitute therefor a circuit breaker of higher rating, for some reason, such as to avoid tripping or repeated opening of the circuit breaker. Such replacement of a circuit breaker, however, removes the basic protective function to be provided to the circuit controlled thereby, creating danger of fire or damage to equipment.

A circuit breaker panel of the type referred to is shown in Patent No. 2,738,446, W. J. Fleming, assigned to the same assignee as the present invention.

It is an object of the present invention to provide an electric control panel assembly including means which may be adjusted or set by the initial installer which means shall (a) permit the installation and removal of a first type of breaker without restriction, and (b) permit the installation of circuit breakers of second, third, and fourth types only at predetermined mounting locations, respectively.

It is a further object of the invention to provide a control panel assembly of the type described which cannot readily be defeated by the user or other unauthorized person.

In accordance with the invention in one form, I provide an electric control panel assembly comprising a base portion having a plurality of breaker mounting locations thereon. At each of the mounting locations, there is provided a means engageable with a portion of a circuit breaker, about which engagement the circuit breaker is then rotated into plug-in type electrical engagement to a fully mounted position. In addition, a plurality of different types of circuit breakers are provided, some of which are provided with a projecting blocking member adjacent the releasably engaged portion of the panel. In addition, the panel is provided with an upstanding barrier adjacent the aforesaid releasably engageable portions, and the barrier normally prevents the installation of any circuit breaker having such a discriminating projection. Means is also provided for selectively removing one or more portions of said barrier to afford clearance for the aforesaid blocking projections of selected circuit breakers.

The invention will be more fully understood from the following detailed description, and its scope will be pointed out in the appended claims.

In the drawings,

FIGURE 1 is an end elevation view of an electric control panel assembly constructed in accordance with the invention;

FIGURE 2 is a perspective view of a portion of the panel assembly of FIGURE 1, the circuit breaker and its keying element being shown in exploded relation;

FIGURE 3 is an exploded perspective view of a portion of the mounting base of the panel assembly of FIGURE 1;

FIGURE 4 is a top or plan view of a group of circuit breakers each of different type, showing the different provisions for the discriminating means, and

FIGURE 5 is a fragmentary perspective view of another embodiment of the invention.

In the drawings, the invention is shown in FIGURE 1 as incorporated in an electric control panel assembly comprising a base assembly including a generally channel shaped supporting pan 10 having a pair of outwardly directed generally planar flanges 11. A plurality of stationary plug-in type contacts in the form of upstanding blades 12 (only one shown) are supported by suitable insulating means, such as by an insulating block 13, on the back wall of the supporting pan 10. The contact blades 12 are adapted to be connected to a suitable power source or sources, by suitable cable-connecting means, not shown. Each of the flanges 11 is provided with a row of mounting hooks 14.

A plurality of electric circuit breakers 15A, 15B, 15C and 15D, are provided, see FIGURE 4. Each of the circuit breakers 15A-15D comprises a generally rectangular insulating casing having a plug-in type socket 16 at one end and a recess 17' defining an integral shelf portion 17 at the other end for receiving a portion of the mounting hooks 14. In use, each of the circuit breakers 15A-15D is mounted on the supporting pan 10 by placing the breaker on the flange 11 so that the hook 14 enters the recess 17', and then rotating the breaker about this engagement with the hook 14 until the socket 16 enters into plug-in engagement with the contact blade 12.

In accordance with the invention, means is provided for restricting the locations at which certain of the circuit breakers 15A-15D can be mounted on the pan 10. For this purpose, a barrier member or strip 18 is provided, rigidly attached to each of the flanges 11. Each barrier strip 18, as shown particularly in FIGURE 3 includes a base portion 18A and an upstanding generally U-shaped portion 18B. The upstanding portion 18B is provided with a series of holes 20 in each of the sides thereof, for a purpose to be described. The barrier strip 18 is attached to the flange 11 by rigidly attaching the base portion 18A to the under side of the flange 11 by suitable means, such for example as by welding.

For the purpose of selectively blocking certain of the holes 20 in the barrier strip 18, a key strip 21 is provided, see FIGURE 3. The key strip 21 includes a first end portion 22 having a notch 23 therein, a second end portion 24, having a hole 25 therein, and a plurality of sets of fingers 26, 27, 28. Each group of fingers 26, 27, 28, is positioned adjacent one of the mounting hooks 14 which determine the breaker mounting positions.

The key strip 21 is received between the spaced walls of the upstanding portion 18B of the barrier strip 18, and is supported with respect thereto at one end by a rivet 29 which is received within the notch 23. The end 24 of the key strip 21 is releasably held in place by suitable means such, for example, as by a screw 31. When desired, therefore, the key strip 21 may be removed from the barrier member 18 by removing the screw 31, swinging the key strip downwardly about its engagement with the rivet 29, and then by lengthwise movement, removing it altogether from the barrier strip 18.

For the purpose of cooperating with the key strip and barrier strip in a manner to be described, the circuit breakers 15B, 15C and 15D, are provided with a projecting blocking member 32. The blocking member 32 may be selectively assembled with respect to the basic circuit breaker in one of three selected positions, as shown in FIGURE 4. Thus circuit breaker 15B illustrates a cir-

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cuit breaker provided by mounting the blocking member 32 on one side of the breaker housing, which will be referred to for convenience as the "left" side. Circuit breaker 15C shows the blocking member 32 mounted centrally of the circuit breaker housing. Circuit breaker 15D shows the blocking member 52 mounted on the other or "right" side of the circuit breaker housing. The circuit breaker 15A is left without a blocking member.

As shown in FIGURE 2, the blocking member 32 is mounted on the circuit breaker casing by being received within a generally conforming shallow recess 33 in the side wall of the circuit breaker casing. In the case of the circuit breaker 15C, the blocking member 32 is mounted centrally by being trapped between the cooperating halves of the circuit breaker casing.

When an unmodified key strip 21, as shown in FIGURE 3, is mounted in the barrier member 18, the fingers 26, 27, 28 block the corresponding holes, 20, of the upstanding portion 18B. When all such holes are thus blocked, it is not possible to mount any circuit breaker on the panel except circuit breakers such as 15A, having no blocking member attached thereto. For this reason, circuit breakers having a relatively low rating, such for example 10 to 20 amperes, are preferably made without the blocking member 32.

Circuit breakers having a higher rating, such for example as 30 to 50 amperes, are provided with a blocking member 32 as indicated in the circuit breaker 15B. In order to mount such a circuit breaker to any given location on the panel, it is necessary to remove the corresponding finger 26 (see FIGURE 3) at the desired mounting location. This is done by swinging the key strip 21 out of the U-shaped portion 18B. To facilitate breaking off, the fingers 26, 27, 28 are preferably made frangible, by suitable weakened portions, not shown.

Likewise, when it is desired to utilize a circuit breaker such for example as the dual or two-in-one type as shown in circuit breaker 15C, it is necessary to remove the finger 27, and when it is desired to utilize a breaker of high ampere rating such as 50 amperes, as shown in circuit breaker 15D, it is necessary to remove the blocking finger 28.

Thus by removing predetermined ones of the blocking fingers 26, 27, 28, the electrician installing of a control panel can predetermine what rating or ratings of circuit breakers are permitted to be mounted in the panel at a given location.

In order to render it difficult for an unauthorized person to tamper with the barrier strip or keying means, the key strip 21 is held within the barrier strip 17 by means of a screw 31 directed therein from the side. When the panel assembly is mounted within a metallic enclosure, as is the case as in the usual application, it is not readily possible to insert a screwdriver at right angles to the general plane of the opening of the box 30 as to remove the key strip 21. Thus the key strip 21 is not removable from the barrier strip 18 unless the entire panel assembly including the pan 10, is removed from the box. Unauthorized personnel are hesitant to undertake such a major alteration of the panel assembly, and a substantial deterrent is therefore provided against unauthorized interchange of circuit breakers. If desired, the screw 31 may be a "non-removable" screw, requiring a special tool to loosen it.

In FIGURE 5 there is shown a perspective view of a modified form of a barrier member 18'. In this case, the barrier member 18' is an integral part of the supporting pan or tray 10'. In order to provide openings to permit mounting of selected circuit breakers, the barrier portion 18' is provided with frangible or "knockout" sections 20'. Such knockout portions are readily removable by the authorized installing electrician when the panel assembly is out of the enclosing box or enclosure. When the interior assembly is mounted within the box, however, it is extremely difficult, if not impossible, to remove the frangi-

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ble portions 20' because of the difficult accessibility and because of the lack of a firm support for the portion 18'.

It will be observed that a control panel assembly has been provided which can selectively receive a plurality of different types of control devices, and more particularly which can receive a first type of device (such as 15A) without restriction at any mounting location, and which includes means for establishing only predetermined specific mounting locations at which any one of three other types of control devices can be mounted without the possibility of interchanging of the mounting of any of such devices in its mounted position.

It will further be observed that in accordance with the present invention, the installer may, if he desires, remove two or three blocking fingers at a given location. Thus a panel can be provided which, at any given location prevents the mounting of all breakers *above* a predetermined rating, while permitting mounting of all breakers of a predetermined rating or *below*.

The term "circuit breaker" as used in this specification and in the claims, is intended to refer to and comprise any device for making and/or breaking a circuit, including such devices as switches, automatic opening circuit breakers, and fuses.

While the invention has been described in only two specific embodiments, it will be readily apparent that many modifications thereof may be made, and I therefore intend by the appended claims to cover all such modifications as fall within the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. An electric circuit breaker panelboard comprising:
 - (a) a generally planar supporting portion,
 - (b) at least one row of retaining hooks on said supporting portion,
 - (c) an elongated upstanding generally U-shaped barrier strip carried by said supporting portion adjacent said row of hooks, said barrier strip having a pair of closely spaced wall portions, said wall portions having a plurality of aligned holes therein,
 - (d) a keying strip removably carried by said barrier strip and receivable between said closely spaced wall portions, said keying strip including a plurality of fingers each extending between a pair of said aligned holes in said wall portions of said barrier member when said keying strip is in place,
 - (e) a plurality of electric circuit breakers each comprising a generally rectangular insulating casing having a bottom wall and a generally perpendicular end wall, and a retaining lug adjacent the corner of said end wall and bottom wall,
 - (f) at least some of said circuit breakers having a blocking member rigidly attached to the casing thereof and projecting beyond said end wall in a direction generally parallel to said bottom wall,
 - (g) said fingers of said keying strip being readily removable from said strip when said strip is out of said barrier member whereby to leave a corresponding pair of said aligned holes unobstructed to permit the mounting of a circuit breaker at the corresponding mounting location.
2. An electric circuit breaker panelboard comprising:
 - (a) a support member having a generally planar supporting portion,
 - (b) at least one row of retaining hooks on said supporting portion,
 - (c) an elongated upstanding generally U-shaped barrier member carried by said support adjacent said row of hooks, said barrier member having a pair of closely spaced wall portions having a plurality of aligned apertures therein respectively, said apertures being arranged in groups of three each group being positioned adjacent a corresponding one of said hooks,
 - (d) a keying strip carried by said barrier member be-

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tween the spaced wall portions thereof and comprising an elongated strip member having a plurality of blocking fingers extending therefrom, said fingers being arranged in groups of three corresponding to said holes in said barrier member, whereby each of said fingers serves to obstruct passage through a pair of aligned holes in said barrier member when said strip member is in position between said wall portions,

- (e) a plurality of electric circuit breakers, each of said circuit breakers including a generally rectangular insulating casing having a bottom wall and an end wall perpendicular to said bottom wall and a retaining shelf portion adjacent the corner of said end wall and said bottom wall,
- (f) a first one of said circuit breakers including a blocking member rigidly attached to the casing thereof at a first side thereof adjacent said retaining shelf portion and projecting beyond said end wall of said casing in a direction parallel to said bottom wall,
- (g) a second one of said circuit breakers including a blocking member rigidly attached to the casing thereof at a point midway between said walls and projecting outwardly beyond said end wall and parallel to said bottom wall,
- (h) a third one of said circuit breakers including a blocking member rigidly attached to the casing there-

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of at a wall opposite to the wall thereof corresponding to said first wall of said first circuit breaker, said blocking member extending beyond said end wall in a direction parallel to said bottom wall,

- (i) said blocking member of each of said circuit breakers projecting through a corresponding pair of openings in said barrier member when said circuit breaker is mounted on said support with said shelf portion of said casing under one of said retaining hooks,
- (j) said keying strip fingers being readily removable from said strip when said strip is removed from said barrier member,
- (k) releasable restraining means retaining said keying strip within said barrier member.

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