Oct. 27, 1959 R. T. CASEY 2,910,629

CIRCUIT BREAKER PANELBOARD

Filed March 29, 1956 2 Sheets-Sheet 1

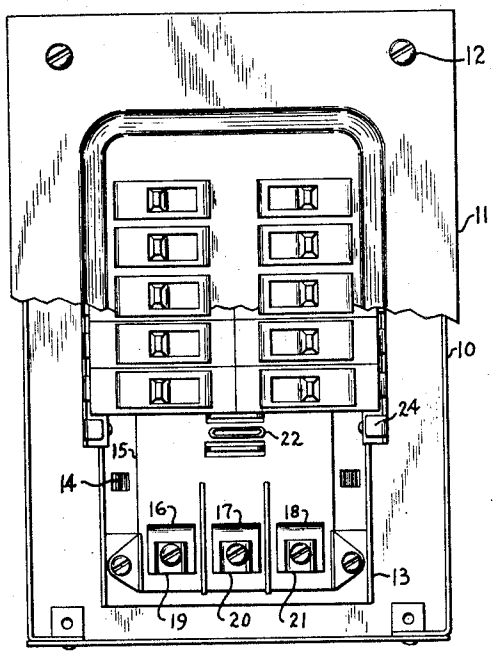


Fig. 1

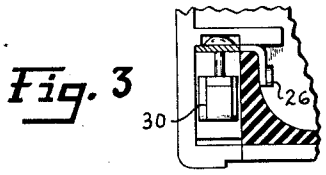


Fig. 3

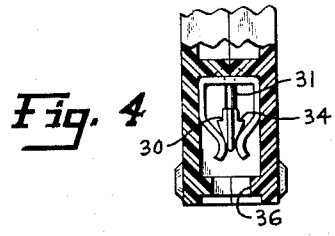


Fig. 4

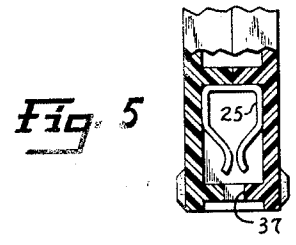


Fig. 5

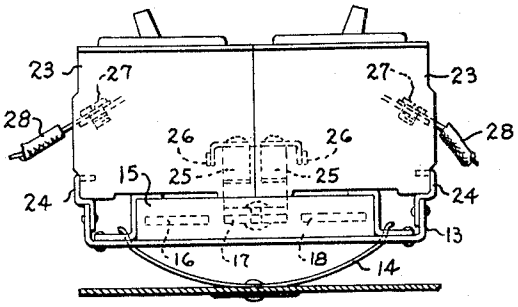


Fig. 2

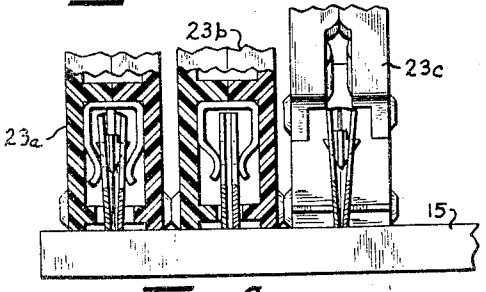


Fig. 6

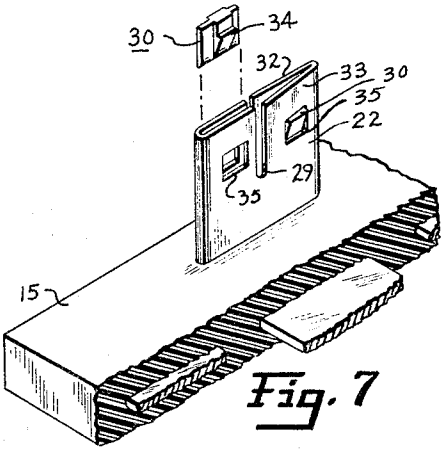


Fig. 7

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CIRCUIT BREAKER PANELBOARD

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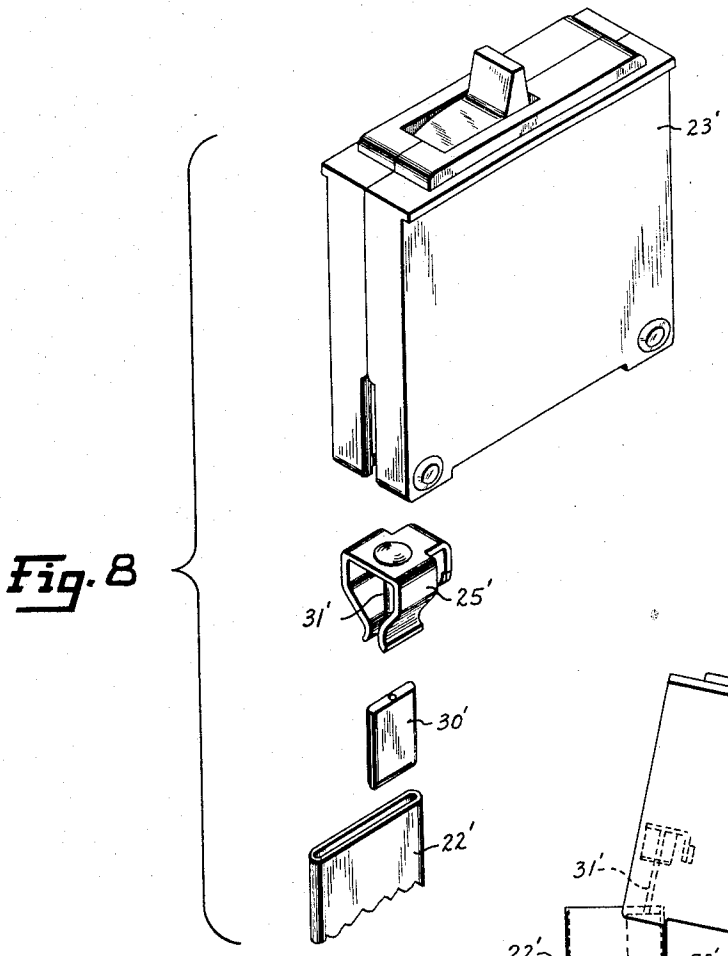


Fig. 8

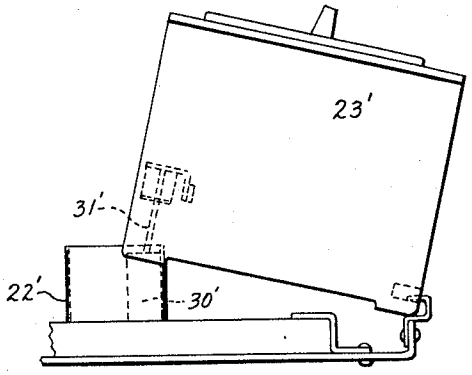


Fig. 9

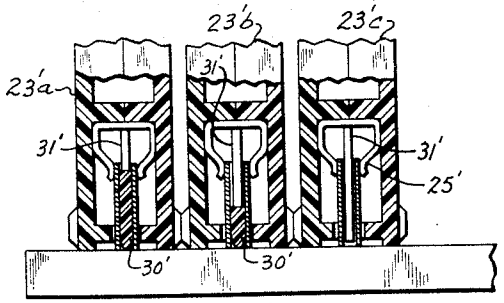


Fig. 10

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CIRCUIT BREAKER PANELBOARD

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Application March 29, 1956, Serial No. 574,851

6 Claims. (Cl. 317—119)

My invention relates to circuit breaker panelboards and load centers and especially to such panelboards and load centers incorporating circuit breakers having at least one terminal thereof adapted to be connected by a plug-in type electrical connection. More specifically, the present invention is concerned with an improvement upon plug-in circuit breaker panelboards of the type disclosed in Patent No. 2,738,446, issued March 13, 1956, to William J. Fleming and assigned to the same assignee as the present invention.

The above application discloses a circuit breaker panelboard having a number of stations or locations, at each of which a circuit breaker may be mounted, electrical contact being made therewith by a plug-in action. Such circuit breakers are made in various ampere ratings, such as 15, 20, 30, and 50 amperes, the selection of a breaker of a given rating being dictated by the requirements of the circuit which it is used to protect.

The installation of such panelboards and the initial selection and installation of the various breakers is, of course, ordinarily carried out by qualified personnel, and also is usually subject to inspection and approval by civil authorities. It is, therefore, quite likely that such initial installation will be properly carried out, with due consideration to the requirements of the various circuits and devices to be protected.

After such initial installation however, the user may alter the installation. For instance, he may find that, because of overloading of the branch circuits, a certain breaker trips or opens repeatedly, and will attempt to replace such breakers with a breaker of higher rating. Such replacement would, of course, defeat the protective function of the breaker, and create a danger of fire. It is, therefore, extremely desirable that such replacement be discouraged, impeded or effectively prevented.

Accordingly, it is an important object of the present invention to provide an electric circuit panelboard of the type referred to, and circuit breakers for use therewith, wherein a circuit breaker of a given ampere rating cannot be mounted and energized at a location where a circuit breaker of lower ampere rating has once been inserted.

Another object of my invention is the provision of an electric circuit breaker panelboard of the type referred to and circuit breakers for use therewith, incorporating blocking means which cannot readily be removed by the user.

A further object of my invention is the provision of such a blocking means which is automatically installed whenever a breaker of a given ampere rating is initially installed.

In carrying out my invention in one form, I provide a panelboard having a number of relatively stationary blade-type contacts and circuit breakers for use therewith having a socket at one portion adapted to receive said blade-type contact in conducting engagement. Each blade-type contact has two spaced-apart wall portions, and certain of the circuit breakers include a spacer member carried by the breaker casing and adapted to enter between the wall portions of the stationary contact, forcing them apart, when the breaker is mounted. The spacer member is moreover adapted to be trapped between such wall portions and remains there even when the breaker is removed. The circuit breakers are provided with apertures through which said blade-type contacts must enter and certain of the circuit breakers have apertures less than the width required to admit a blade-type contact containing one of said spacer members, whereby such breakers cannot be mounted at such location.

My invention will be more fully understood by a reference to the following detailed description and the accompanying drawings in which:

Figure 1 is a front elevation view of a circuit breaker panelboard incorporating my invention, the front cover thereof being partially broken away;

Figure 2 is a side elevation view of a portion of the interior assembly of the panelboard of Figure 1;

Figures 3, 4 and 5 are detailed fragmentary views of the plug-in line contact portion of circuit breakers adapted to be used with the panelboard of Figure 1 in accordance with my invention;

Figure 6 is a view of a portion of a panelboard assembly in accordance with my invention showing particularly the manner in which the plug-in contacts operate;

Figure 7 is a fragmentary perspective view showing particularly one of the relatively stationary contact blades of the panelboard of Figure 1;

Figure 8 is an exploded view in perspective of another embodiment of my invention;

Figure 9 is a fragmentary view showing the operation of the mounting arrangement used in Figure 8;

Figure 10 is a detailed sectional view showing circuit breakers in mounted position and incorporating the blocking element as shown in Figure 8.

Referring first to the embodiment disclosed in Figures 1 through 7, I have shown my invention as incorporated in a circuit breaker panelboard including an outer enclosure **10** having a front cover plate **11** retained thereon by suitable means such as by screws **12** and containing therein a circuit breaker supporting pan **13** resiliently supported therein by arcuate strip springs **14**. The mounting pan **13** serves to support a suitable bus bar assembly including a body of insulating material **15** having embedded therein three elongated generally parallel bus bars **16**, **17**, and **18** having portions thereof projecting from the insulating body at one end and carrying line connecting terminals **19**, **20** and **21** respectively. Each of the bus bars **16**, **17**, **18** has attached thereto along its length one or more blade-type contacts **22**, all of such blade-type contacts being arranged in substantial alignment generally centrally of the insulating body **15** above the central bus bar **17**.

The panelboard further includes a number of electric circuit breakers **23**, the casing of each of which is adapted to make a hook-on type of engagement and mounting on the supporting pan **13** by engagement with retaining hooks **24**. The corner of each of the circuit breakers **23** opposite from the corner engaged under the hooks **24** is provided with a blade-receiving socket in a suitable conforming recess within the insulating casing of the circuit breaker **23** and including a generally U-shaped resilient socket member **25** connected electrically with a relatively stationary contact **26** within the circuit breaker. The opposite end of the circuit breaker **23** is provided with a load terminal **27** adapted to receive a conductor such as **28** leading to a load circuit to be controlled.

Each blade-type contact **22** is preferably formed of a generally tubular material and has a slot **29** extending inwardly from the upper edge thereof dividing the blade into two halves. Each of the circuit breakers **23**, when

mounted on a blade-type contact 22 as illustrated, occupies approximately one half of the contact as shown. For the purpose of providing a discriminating or blocking action when circuit breakers have been mounted at a given location to prevent the mounting of other circuit breakers at such location, I provide certain of the circuit breakers 23 with a separable blocking element 30 which may be of insulating or metallic material. The blocking element 30 is generally arrow shaped and is trapped within the socket member 25 by contact with the jaws of the socket 25 and with the end of the rivet 31. Preferably, breakers of lower ampere rating are made to contain the blocking element 30. Thus, when a circuit breaker of lower ampere rating is mounted at a given location on the panelboard, as the breaker is rotated about the hook element 24 and the socket member 25 is forced over the half of the blade 22, the blocking element 30 is forced between the side walls 32 and 33 of the blade 22, forcing them apart slightly. Upon full insertion of such a circuit breaker, the blocking element 30 becomes trapped between the walls 32 and 33 by the engagement of its shoulders 34 with the edges of the aperture 35 in the sides of the contact member 22. Thus, although the circuit breaker 23 is subsequently removed, the blocking element 30 remains trapped between the side walls of the blade member and cannot readily be removed. Circuit breakers of lower ampere rating containing such blocking elements as illustrated in Figures 3 and 4 are also preferably provided with a relatively wide entrance way 36 to the socket member 25. Thus, such a circuit breaker may readily be reinserted on a blade containing a blocking element, since the aperture 36 is wide enough to admit the expanded blade member 22. Circuit breakers of higher ampere rating however, such as illustrated in Figure 5, are provided with a relatively narrow opening 37 to the socket member 25. If it is attempted to insert such a circuit breaker at a location where a lower ampere rating circuit breaker has once been mounted, it will be found that the expanded walls of the blade contact member are held too far apart by the blocking member 30 and contact will never be made because the blade contact member will strike the insulating casing and never touch the contact 25. Such a condition is illustrated, for example, in Figure 6.

In Figure 6 I have illustrated the three possible conditions in a panelboard made in accordance with the present invention. Circuit breaker 23*a* represents a low ampere rating breaker mounted at a location where a blocking element 30 has been inserted. Circuit breaker 23*b* represents a circuit breaker of high ampere rating mounted at a location where no blocking element is present. Circuit breaker 23*c* represents the condition which exists when it is attempted to mount a circuit breaker of high ampere rating at a location where a blocking element 30 is in position. It will be observed that because of the slot or cut 29, the presence of a blocking element 30 in one half of the contact blade 22 does not alter the spacing between the walls of the other half.

Referring to Figures 8 through 10, I have shown another embodiment of my invention in which the circuit breaker 23′ contains a socket member 25′, the socket member 25′ containing a rivet 31′ and a filler plug 30′. In this case the contact blade 22′ is not cut but is of flattened tubular construction. When the circuit breaker 23′ is mounted in position on the panelboard, the filler member 30′ is forced into the tubular contact blade 22′ and remains there even when the breaker 23′ is removed being held by frictional engagement between the walls of the blade. For the purpose of providing a discriminating action certain of the circuit breakers 23′ are provided with filler plugs 30′ of differing heights, and also with rivets 31′ of correspondingly different heights.

Figure 10 illustrates the different possible conditions which may exist in a panelboard incorporating this embodiment of my invention. As illustrated, circuit breakers 23′*a* are provided of low ampere rating in which the rivet 31′ is of minimum length and the filler plug 30′ is of maximum length. Accordingly, circuit breakers of medium ampere rating such as 23′*b* are provided with a rivet 31′ of medium length and a filler plug 30′ of shortened length. Circuit breakers of high ampere rating such as 23′*c* are provided with a rivet 31′ of maximum length and no filler plug. Accordingly, when a circuit breaker of low ampere rating such as 23′*a* is mounted at a given breaker location, the maximum length filler plug 30′ will become trapped in the blade 22′ and it will, therefore, be impossible to mount at such location either the circuit breaker 23′*b* of medium ampere rating or the circuit breaker 23′*c* of high ampere rating, since their rivets 31′ will strike the top of the filler plug 30′ to prevent the full entrance of the circuit breaker and contact of the contact jaws 25′ with the sides of the blade 22′ as illustrated in Figure 9.

When a circuit breaker 23′*b* of medium ampere rating is mounted at a given location, the reduced filler plug 30′ will be trapped within the tubular blade 22′. It will thereafter be impossible to mount at such location a circuit breaker such as 23′*c* having a maximum length rivet 31′ since the end of the rivet 31′ would strike the filler plug 30′ before the contact jaws 25′ could engage the sides of the blade member.

It will be observed, however, that it is possible to mount a circuit breaker of low ampere rating such as 23′*a* at a location where a circuit breaker of higher or medium ampere rating such as 23′*b* has once been mounted. This is desirable since a given circuit connected at such location would be adequately protected by such smaller circuit breaker. In a similar manner circuit breakers 23′*a* and 23′*b* may both be mounted at any location where a circuit breaker of maximum ampere rating 23′*c* has once been mounted, since the contact blade 22′ is not permanently modified by such higher ampere rating breaker. This again is desirable because any circuit adequately protected by a larger circuit breaker 23′*c* would be as well or more adequately protected by a smaller ampere rating breaker.

While I have disclosed only two embodiments of my invention, it will be apparent to those skilled in the art 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 my 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 first electrical circuit breaker and means for mounting and making electrical connection to said first circuit breaker, said mounting and connecting means initially being adapted also to receive and connect a second electric circuit breaker selectively, said mounting and connecting means including a relatively stationary contact member, said first electric circuit breaker having a terminal contact thereon adapted to make electrical connection with said relatively stationary contact by a plug-in type of connection, discriminating means carried by said first electric circuit breaker and means operable when said first electric circuit breaker is placed in mounted position to substantially modify said mounting and connecting means whereby said mounting and connecting means is thereafter unsuited to receive said second electrical device, said relatively stationary contact member comprising a generally tubular electrical connector and said discriminating means comprising a member adapted to be forced between the inner walls of said tubular contact member.

2. An electric circuit breaker panelboard comprising a first electric circuit breaker, mounting means for mounting and connecting said first electric circuit breaker, said mounting and connecting means including a relatively sta-

tionary contact having two closely spaced wall portions, said electric circuit breaker having a contact member adapted to make contact with said relatively stationary contact, said circuit breaker contact member being located between insulating wall portions of said circuit breaker and being accessible for connection through an opening between said wall portions, and discriminating means carried by said first electric circuit breaker comprising a discrete blocking element adapted to be forced between the said spaced apart walls of said relatively stationary contact member and to force said walls apart and to become permanently lodged between said walls, whereby the spacing between said walls then is rendered too great to allow entry of said relatively stationary contact member between the insulating wall portions of said second electric circuit breaker.

3. An electric circuit breaker panelboard comprising a plurality of relatively stationary contacts, a plurality of electric circuit breakers adapted to be mounted on said panelboard, each of said circuit breakers having a terminal contact adapted to make electrical contact with said relatively stationary contacts by a plug-in type of engagement, said relatively stationary contact having two closely spaced wall portions, at least one of said electric circuit breakers having discriminating means comprising a discrete blocking member adapted to become lodged between the said closely spaced wall portions of said relatively stationary contact member, and to remain between said wall portions forcing said wall portions farther apart than in their initial condition, at least one other of said circuit breakers being adapted to be mounted on said relatively stationary contact in its initial condition, said other circuit breaker having an insulating casing having an aperture therein, and a plug-in type electric contact within said casing accessible for contact with said stationary contact only through said aperture, said aperture being of insufficient size to admit said stationary contact member when said blocking member is lodged between the walls thereof, whereby the mounting of said second circuit breaker on said relatively stationary contact after said first electric circuit breaker has been mounted on said contact is substantially prevented.

4. An electric circuit breaker panelboard as set forth in claim 3 wherein said stationary contacts each comprise a flattened tubular member having a slot extending therein from one end thereof to divide said member into two generally U-shaped portions.

5. An electric circuit breaker panelboard comprising a support, a relatively stationary contact mounted on said support, a generally hook-shaped retaining member mounted on said support in spaced relation to said stationary contact, an electric circuit breaker having an insulating casing, a retaining lug on said insulating casing at one end thereof adapted to coact with said retaining means, a plug-in type terminal carried by said circuit breaker adjacent the other end of said casing, said retaining lug being adapted to coact with said retaining means on said support

to facilitate the pivotal movement of said circuit breaker about said retaining means and into plugged-in electrical engagement with said stationary contact, and interfering means carried by said circuit breaker and disposed and arranged to become non-removably held with respect to said support upon such pivotal mounting of said circuit breaker, said circuit breaker being separable from said interfering element whereby said circuit breaker may be removed from said support following its mounting thereon while said interfering element remains stationary with respect to said support, said interfering element being held on said support at a location to prevent the mounting thereon of a circuit breaker which has mounting provisions different from said first circuit breaker and which is mountable on said support in the absence of such interfering means.

6. An electric circuit breaker panelboard comprising a support, a relatively stationary contact mounted on said support, a generally hook-shaped retaining element mounted on said support in spaced relation to said stationary contact, an electric circuit breaker having a generally rectangular insulating casing, a lug portion carried by said insulating casing at one end thereof, a plug-in type electrical connector carried by said casing adjacent the other end of said insulating casing, said mounting lug being adapted to coact with said retaining hook to facilitate the pivotal movement of said circuit breaker about said retaining means to move said plug-in type contact into plug-in electrical engagement with said stationary contact, interfering means carried by said circuit breaker, means carried by said support for non-releasably engaging said interfering means, said circuit breaker being separable from said element whereby said interfeirng element remains interlocked with said support upon removal of said circuit breaker to prevent the mounting at such location of a circuit breaker having mounting facilities different from said first circuit breaker but mountable on said support in the absence of said interfering element.

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