

Feb. 23, 1965

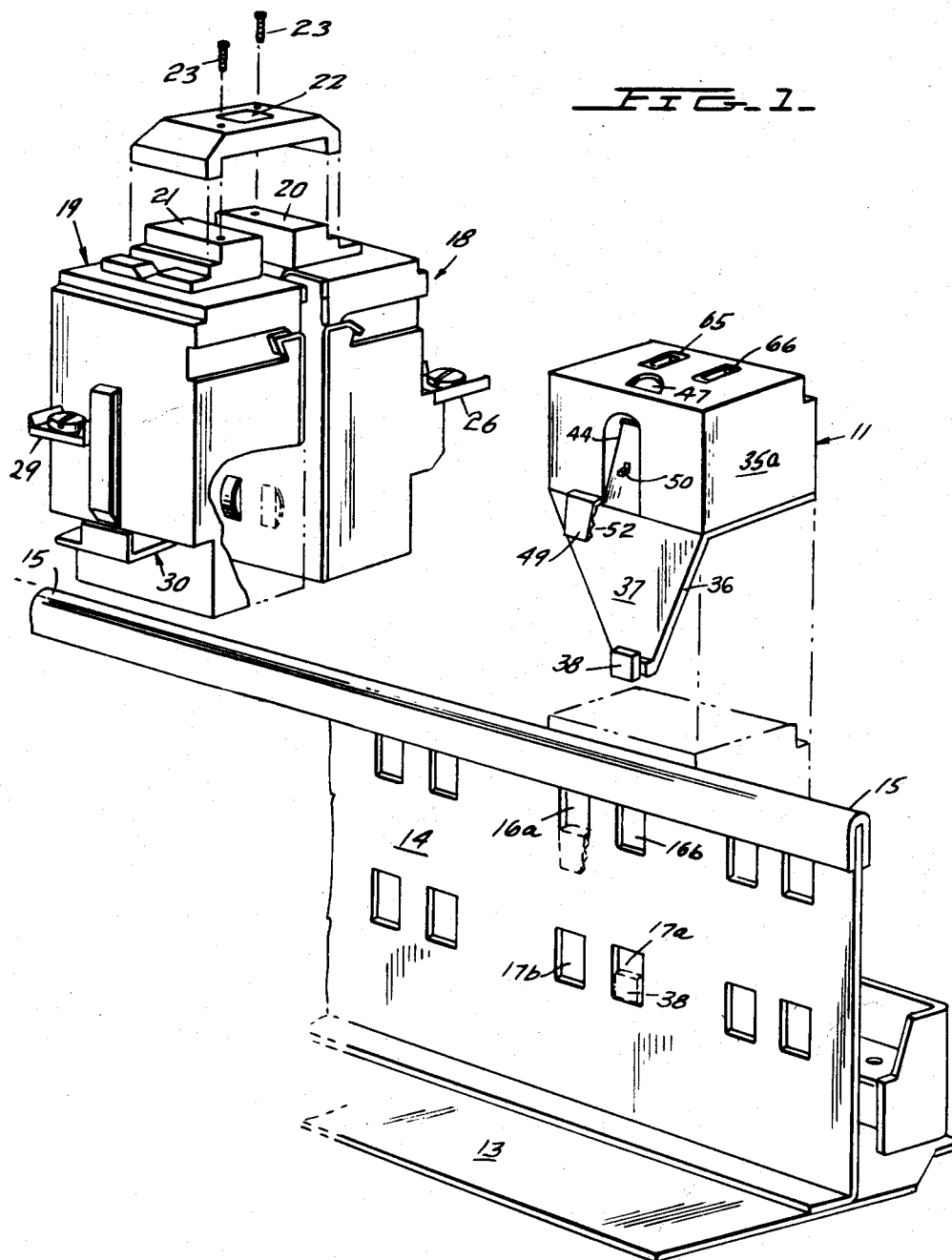
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3,170,744

REMOVABLE GROUNDING RECEPTACLE FOR PANELBOARDS

Filed June 27, 1960

4 Sheets-Sheet 1



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FIG. 2.

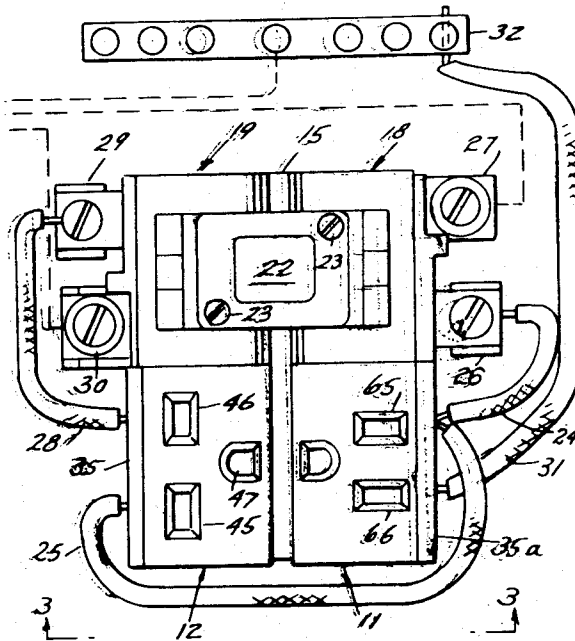


FIG. 7.

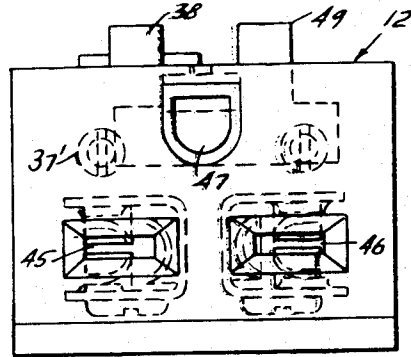


FIG. 6.

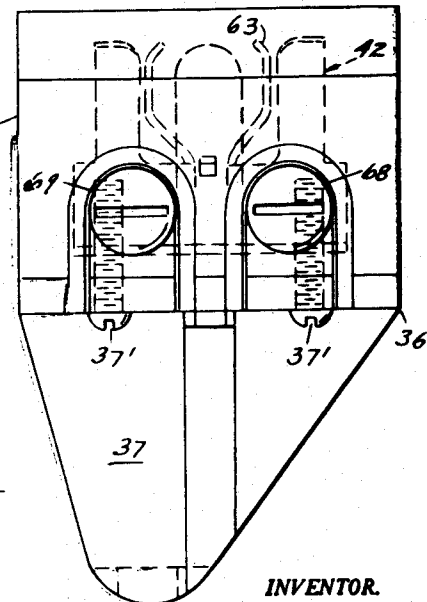
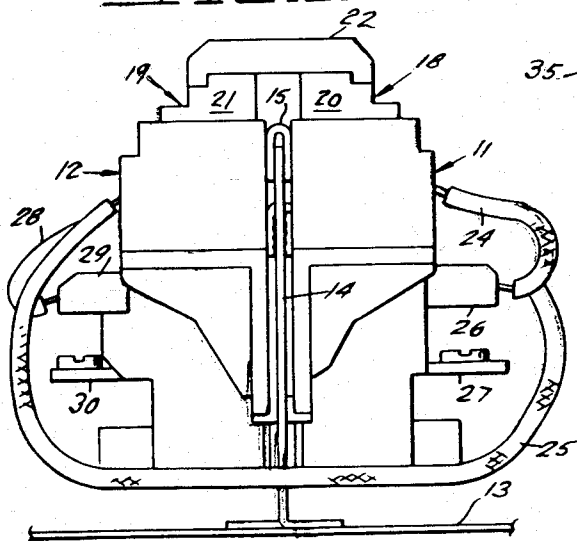


FIG. 3.



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4 Sheets—Sheet 3

FIG. 5.

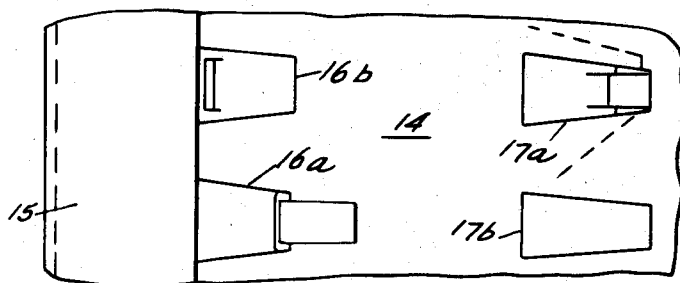


FIG. 4.

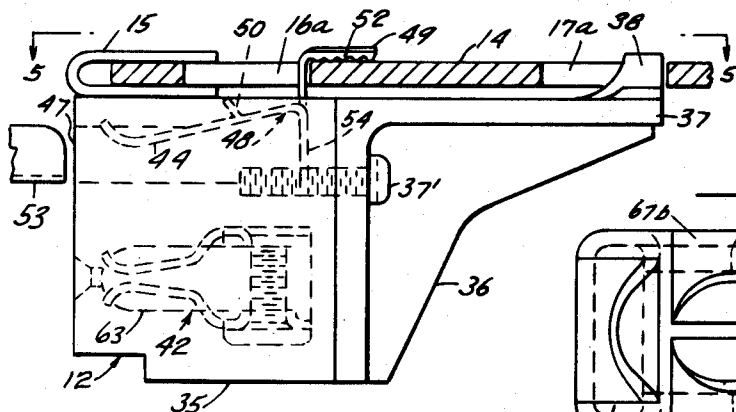


FIG. 8b.

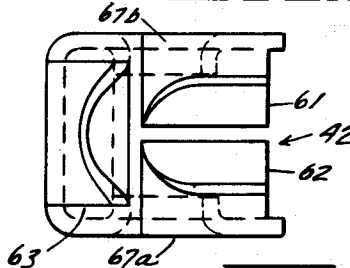


FIG. 8a.

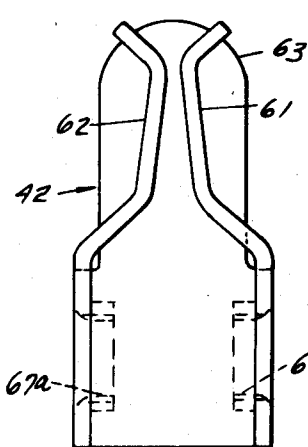
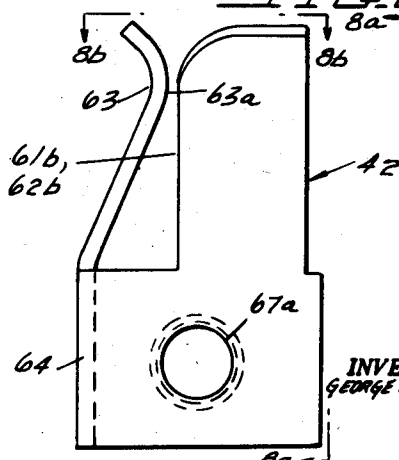


FIG. 8.



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REMOVABLE GROUNDING RECEPTACLE FOR PANELBOARDS

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Filed June 27, 1960, Ser. No. 38,904
10 Claims. (Cl. 339-14)

This invention relates to electrical receptacles for receiving plug caps and more particularly to a receptacle of this type which is constructed to be mounted in a panelboard in the location normally occupied by a circuit breaker.

Heretofore, it has been the practice to provide electrical outlets by running conductors through conduits extending from panelboards to outlet boxes having electrical plug-in receptacles. This requires a considerable expenditure of time and material. Another common practice of providing convenience receptacles is to install them directly on the front cover of a panel. Considerable work is required since the cover must be specially drilled, re-finished and the receptacles installed on the cover. In addition, it is difficult to add more receptacles if such is required.

The instant invention provides a plug-in receptacle which is conveniently mounted in a residential lighting panel especially of the type utilized in basements. Most residential basements are not provided with any wall mounted receptacles. Therefore, in order to plug in an electrical tool for use in the basement, it is necessary to first remove a bulb from a ceiling lamp holder and re-place the bulb with a screw type plug receptacle.

The residential panels of most newer buildings are provided with a number of circuit breaker locations which are not occupied by circuit breakers. It is at one of these unoccupied circuit breaker locations that the receptacle of the instant invention is intended to be installed so that a permanent electrical outlet is always available.

The panel receptacle is preferably a three-wire device. That is, a device having three prong-receiving contacts, two of which are connected to the source of electrical energy and the third of which is connected to equipment ground. The equipment grounding contact is provided with a locking ear which is moved into locking position when the equipment grounding contact is deflected upon engagement by a plug prong. When the locking ear is in locking position it cooperates with a formation on the panelboard rib to which the receptacle is mounted in a manner to prevent dismounting of the receptacle. That is, the receptacle cannot be dismounted from the panelboard while a plug cap is mounted on the receptacle.

The other two contacts of the receptacle are of novel identical construction and each includes three blades extending in the same direction. The faces of two of the blades are in opposing relationship to receive a plug prong therebetween while the third blade is oriented at right angles to the other blades so that the face of the third blade opposes the edges of the other two blades and is operatively positioned to receive a plug prong oriented at right angles to the plug prong which would be engaged by the first two recited blades. With this arrangement, through a slight modification of the receptacle housing, the receptacle is constructed to receive either parallel prongs for connection to a 120 volt circuit or aligned prongs for connection to a 240 volt circuit.

Accordingly, a primary object of the instant invention is to provide a novel receptacle adapted to be mounted at a circuit breaker location in a panelboard.

Another object is to provide a novel receptacle construction including means for locking the receptacle in

the panelboard to prevent dismounting therefrom when a plug is inserted in the receptacle.

Still another object is to provide a novel receptacle contact means which is constructed to accept flat-type plug prongs oriented parallel to one another or in alignment with one another.

Still another object is to provide a novel receptacle construction wherein the contacts connected to the power source are identical in construction and positioned to receive flat plug prongs oriented parallel to each other or in alignment with one another.

These as well as other objects of the instant invention shall become readily apparent after reading the following description of the accompanying drawings in which:

FIGURE 1 is an exploded perspective view illustrating the manner in which the receptacle of the instant invention is mountable on a panelboard.

FIGURE 2 is a fragmentary plan view of a panelboard including circuit breaker means and a pair of receptacles constructed in accordance with the teachings of the instant invention.

FIGURE 3 is an end view of the panelboard illustrated in FIGURE 2 looking in the direction of arrows 3-3 of FIGURE 2.

FIGURE 4 is a side elevation of a receptacle mounted to a rib with the rib shown in cross-section.

FIGURE 5 is a fragmentary view of the panelboard mounting rib looking in the direction of arrows 5-5 of FIGURE 4.

FIGURE 6 is a front elevation of the receptacle of FIGURE 4.

FIGURE 7 is a plan view of the receptacle of FIGURE 6.

FIGURE 8 is a plan view of one of the contacts connectable to the power source.

FIGURES 8a and 8b are side elevations of the contact of FIGURE 8 looking in the direction of the respective arrows 8a-8b.

FIGURE 9 is an exploded perspective of the receptacle of FIGURES 4-6.

FIGURE 10 is an electrical schematic of the elements shown in FIGURE 2.

Now referring to the figures, plug cap or panel receptacles 11 and 12 are shown in FIGURES 1-3 as being mounted on a panelboard of the type described in detail in U.S. Patent 2,428,320. This panelboard includes a back plate 13 and a mounting rib 14 extending upwardly from plate 13 at right angles. Rib 14 is provided with a U-shaped cap 15 along the free upper edge thereof. Rib 14 is also provided with two rows of guide apertures defining circuit breaker locations. That is, upper aperture 16a and lower aperture 17a define a circuit breaker location for a device such as receptacle 11 mounted to the right side of rib 14 with respect to FIGURE 2 and upper aperture 16b together with lower aperture 17b defining a circuit breaker location for a device such as receptacle 12 mounted to the left side of rib 14 with respect to FIGURE 2.

As will be hereinafter explained, receptacle 12 is adapted for connection to a 240 volt circuit while receptacle 11 is adapted for connection to a 120 volt circuit. A typical arrangement of circuit breakers and receptacles is illustrated in FIGURE 2. The circuit breakers 18, 19 are of the type described in detail in U.S. Patent 2,385,727. The operating handles 20, 21 of circuit breakers 18, 19, respectively, are connected by screws 23 to tie bar 22 so that manual operation of circuit breakers 18, 19 is simultaneous.

Jumpers 24, 25 connect one of the hot contacts of each receptacle 11 and 12 to the load terminal 26 of circuit breaker 18 whose line terminal 27 is connected to one of the hot wires of an energy source. The other hot contact

of receptacle 12 is connected through jumper 28 to the load terminal 29 of circuit breaker 19 whose line terminal 30 is connected to the other hot wire of the energy source. Jumper 31 connects the other terminal of receptacle 11 to the panelboard neutral bar 32 which is connected to the neutral line of the energy source. The energy source is typically a single phase three-wire 120-240 volt system whereby receptacle 12 provides twice the voltage as receptacle 11.

Receptacle 12 comprises a box-like housing 35 having a removable cover in the form of angle bracket 36 secured by screw 37' entered into threaded aperture 38' of housing 35. Housing 35 is provided with three open sided chambers 39-41 within which contacts 42-44, respectively, are disposed in alignment with prong receiving apertures 45-47, respectively, in the top surface of housing 35.

Blade-like grounding contact 44 is part of contact member 48 including hook 49 which is positioned externally of housing 35 at the back thereof and locking ear 50 lanced from blade 44. Connecting portion 51 joins blade 44 to hook 49. Hook 49 is received by mounting rib aperture 16a and as receptacle 12 is moved downwardly hook 49 overlies a portion of mounting rib 14. Hook 49 is provided with stamped teeth 52 which bite into rib 14 so as to provide a good equipment grounding connection therewith.

With a plug cap mounted to receptacle 12 the equipment grounding prong (FIGURE 4) 53 deflects contact blade 44 so that locking ear 50 is projected into rib aperture 16a or at least a sufficient distance toward aperture 16a so that if an attempt is made to dismount receptacle 12 from rib 14 at this time, cap 15 is positioned in the path of locking ear 50 thereby preventing removal of receptacle 12.

Cover bracket 36 includes a leg portion 37 having a projection 38 near the end thereof. Projection 38 extends into rib aperture 17a to cooperate therewith in aligning receptacle 12 in operative position upon rib 14.

The other two contacts 42, 43 are of identical construction being illustrated in detail in FIGURES 8-8b. Contact 42 comprises three blades 61-63 joined together by a U-shaped connecting portion 64. Blades 61 and 62 are somewhat parallel, from portion 64, extend in the same direction and are oriented so that their prong engaging surfaces face one another. Blades 61 and 62 are positioned to receive therebetween one of two aligned cap plug prongs (not shown) which will be received through prong-receiving apertures 45, 46.

The third blade 63 extends in the same direction as the other two blades 61, 62 but is positioned in a plane generally perpendicular thereto. That is, the prong-engaging surface 63a of blade 63 faces the edges 61b, 62b of blades 61, 62. Thus, blade 63 is positioned to be engaged by a parallel cap plug prong of the type which would be inserted through prong-receiving apertures 65, 66 of receptacle 11.

Both arms of U-shaped connecting portion 64 are provided with tapped apertures 67a, 67b. Aperture 67a receives binding post screw 68 while aperture 67b receives binding post screw 69. Thus, it is seen that because two tapped apertures 67a, 67b are provided, both of the contacts 42, 43 which are connected to the hot wires of the power source may be identical construction. Screws 68, 69 are accessible through the open sides of chambers 39, 40.

Receptacles 11 and 12 are of identical construction except for the housings thereof. That is, housing 35a of receptacle 11 is provided with parallel prong-receiving apertures, 65, 66 whereas housing 35 of receptacle 12 is provided with aligned prong-receiving apertures 45, 46. The internal chambers and contacts therein of both housings 35 and 35a are identical.

The different orientation of the prong-receiving apertures provides a convenient keying means. That is, plug caps connected to 120 volt equipment are supplied with

parallel prongs and may be inserted into 120 volt receptacle 11 while these caps cannot be inserted into 240 volt receptacle 12.

In the foregoing, I have described my invention only in connection with preferred embodiments thereof. Many variations and modifications of the principles of my invention within the scope of the description herein are obvious. Accordingly, I prefer to be bound not by the specific disclosure herein but only by the appended claims.

I claim:

1. A plug receptacle mountable on a panelboard at a circuit breaker location thereof, said receptacle comprising a housing having an open back and a cover therefor, a first and a second prong-receiving contact mounted within individual recesses of said housing and retained therein by said cover, prong receiving apertures in the front thereof aligned with said contacts, said housing also having holes in a side thereof through which said contacts are accessible for circuit connections; each of said contacts comprising a pair of blades having opposed faces and a third blade extending in the direction of said pair of blades and whose face is opposite the sides of said pair of blades whereby said contacts may receive flat prongs oriented in a first position as well as at right angles to said first position; a connecting formation electrically connecting said pair of prongs to said third prong, said formation having in opposed surfaces thereof tapped binding post screw receiving apertures; a grounding contact disposed within another recess of said housing and aligned opposite another prong-receiving aperture of said housing; a mounting hook extending from said grounding contact through a first wall of said housing opposite said side of said housing.

2. A plug receptacle mountable on a panelboard at a circuit breaker location thereof, said receptacle comprising a housing having an open back and a cover therefor, a first and a second prong-receiving contact mounted within individual recesses of said housing and retained therein by said cover, prong-receiving apertures in the front thereof aligned with said contacts, said housing also having holes in a side thereof through which said contacts are accessible for circuit connections; each of said contacts comprising a pair of blades having opposed faces and a third blade extending in the direction of said pair of blades and whose face is opposite the sides of said pair of blades whereby said contacts may receive flat prongs oriented in a first position as well as at right angles to said first position; a connecting formation electrically connecting said pair of prongs to said third prong, said formation having in opposed surfaces thereof tapped binding post screw receiving apertures; a grounding contact disposed within another recess of said housing and aligned opposite another prong-receiving aperture of said housing; a mounting hook extending from said grounding contact through a first wall of said housing opposite said side of said housing; a locking ear projecting from said grounding contact, biased toward unlocking position and movable to locking position through engagement of said grounding contact by a grounding prong of a plug; said ear when in locking position preventing dismounting of said receptacle.

3. A plug receptacle mountable on a panelboard at a circuit breaker location thereof, said receptacle comprising a housing having an open back and a cover therefor, a first and a second prong-receiving contact mounted within individual recesses of said housing and retained therein by said cover, prong-receiving apertures in the front thereof aligned with said contacts, said housing also having holes in a side thereof through which said contacts are accessible for circuit connections; each of said contacts comprising a pair of blades having opposed faces and a third blade extending in the direction of said pair of blades and whose face is opposite the sides of said pair of blades whereby said contacts may receive flat prongs

oriented in a first position as well as at right angles to said first position; a connecting formation electrically connecting said pair of prongs to said third prong, said formation having in opposed surfaces thereof tapped binding post screw-receiving apertures; a grounding contact disposed within another recess of said housing and aligned opposite another prong-receiving aperture of said housing; a mounting hook extending from said grounding contact through a first wall of said housing opposite said side of said housing; a locking ear projecting from said grounding contact, biased toward unlocking position and movable to locking position through engagement of said grounding contact by a grounding prong of a plug; said ear when in locking position preventing dismounting of said receptacle; said hook having integral teeth on the inner surface thereof.

4. A plug receptacle mountable on a panelboard at a circuit breaker location thereof, said receptacle comprising a housing having an open back and a cover therefor, a first and a second prong-receiving contact mounted within individual recesses of said housing and retained therein by said cover, prong-receiving apertures in the front thereof aligned with said contacts, said housing also having holes in a side thereof through which said contacts are accessible for circuit connections; a grounding contact disposed within another recess of said housing and aligned opposite another prong-receiving aperture of said housing; a mounting hook extending from said grounding contact through a first wall of said housing opposite said side of said housing.

5. A plug receptacle mountable on a panelboard at a circuit breaker location thereof, said receptacle comprising a housing having an open back and a cover therefor, a first and a second prong-receiving contact mounted within individual recesses of said housing and retained therein by said cover, prong-receiving apertures in the front thereof aligned with said contacts, said housing also having holes in a side thereof through which said contacts are accessible for circuit connections; a grounding contact disposed within another recess of said housing and aligned opposite another prong-receiving aperture of said housing; a mounting hook extending from said grounding contact through a first wall of said housing opposite said side of said housing; a locking ear projecting from said grounding contact, biased toward unlocking position and movable to locking position through engagement of said grounding contact by a grounding prong of a plug; said ear when in locking position preventing dismounting of said receptacle.

6. A plug receptacle mountable on a panelboard at a circuit breaker location thereof, said receptacle comprising a housing having an open back and a cover therefor, a first and a second prong-receiving contact mounted within individual recesses of said housing and retained therein by said cover, prong-receiving apertures in the front thereof aligned with said contacts, said housing also having holes in a side thereof through which said contacts are accessible for circuit connections; a grounding contact disposed within another recess of said housing and aligned opposite another prong-receiving aperture of said housing; a mounting hook extending from said grounding contact through a first wall of said housing opposite said last recited wall of said housing; said hook having integral teeth on the inner surface thereof.

7. In combination a mounting rib extending perpendicular to the surface upon which it is mounted, said rib including a plurality of first means each defining a circuit breaker location, a plug receptacle mounted at a first of said locations; said receptacle comprising a housing having an open back and a cover therefor, a first and a second prong-receiving contact mounted within individual recesses of said housing and retained therein by said cover, prong-receiving apertures in the front thereof aligned with said contacts, said housing also

having holes in a side thereof through which said contacts are accessible for circuit connections; a mounting hook extending from said housing beyond a first wall thereof in operative engagement with said mounting rib for securing said receptacle thereto; a grounding contact disposed within another recess of said housing and aligned opposite another prong-receiving aperture, a locking ear projecting from said housing beyond said first wall, means biasing said ear to unlocking position, said ear being operatively connected to said grounding contact whereby said ear is moved to locking position through engagement of said grounding contact by a grounding contact of a plug.

8. In combination a mounting rib extending perpendicular on the surface upon which it is mounted, said rib including a plurality of first means each defining a circuit breaker location, a plug receptacle mounted at a first of said locations; said receptacle comprising a housing having an open back and a cover therefor, a first and a second prong-receiving contact mounted within individual recesses of said housing and retained therein by said cover, prong-receiving apertures in the front thereof aligned with said contacts, said housing also having holes in a side thereof through which said contacts are accessible for circuit connections; a mounting hook extending from said housing beyond a first wall thereof in operative engagement with said mounting rib for securing said receptacle thereto; a grounding contact disposed within another recess of said housing and aligned opposite another prong-receiving aperture, a locking ear projecting from said housing beyond said first wall, means biasing said ear to unlocking position, said ear being operatively connected to said grounding contact whereby said ear is moved to locking position through engagement of said grounding contact by a grounding contact of a plug; means carried by said rib operatively positioned to cooperate with said ear when in locking position to prevent dismounting of said receptacle from said rib.

9. In combination a mounting rib extending perpendicular to the surface upon which it is mounted, said rib including a plurality of first means each defining a circuit breaker location, a plug receptacle mounted at a first of said locations; said receptacle comprising a housing having an open back and a cover therefor, a first and a second prong-receiving contact mounted within individual recesses of said housing and retained therein by said cover, prong-receiving apertures in the front thereof aligned with said contacts, said housing also having holes in a side thereof through which said contacts are accessible for circuit connections; a mounting hook extending from said housing beyond a first wall thereof in operative engagement with said mounting rib for securing said receptacle thereto; a grounding contact disposed within another recess of said housing and aligned opposite another prong-receiving aperture, a locking ear projecting from said housing beyond said first wall, means biasing said ear to unlocking position, said ear being operatively connected to said grounding contact whereby said ear is moved to locking position through engagement of said grounding contact by a grounding contact of a plug; means carried by said rib operatively positioned to cooperate with said ear when in locking position to prevent dismounting of said receptacle from said rib; a mounting bracket extending from said cover substantially parallel to said rib.

10. In combination a mounting rib extending perpendicular to the surface upon which it is mounted, said rib including a plurality of first means each defining a circuit breaker location, a plug receptacle comprising a housing having an open back and a cover therefor, a first and a second prong-receiving contact mounted within individual recesses of said housing and retained therein by said cover, prong-receiving apertures in the front

thereof aligned with said contacts, said housing also having holes in a side thereof through which said contacts are accessible for circuit connections; a mounting hook extending from said housing beyond a first wall thereof in operative engagement with said mounting rib for securing said receptacle thereto; a grounding contact disposed within another recess of said housing and aligned opposite another prong-receiving aperture, a locking ear projecting from said housing beyond said first wall, means biasing said ear to unlocking position, said ear being operatively connected to said grounding contact whereby said ear is moved to locking position through engagement of said grounding contact by a grounding contact of a plug; means carried by said rib operatively positioned to cooperate with said ear when in locking position to prevent dismounting of said receptacle from said rib; a mounting bracket extending from said cover substantially parallel to said rib, said mounting bracket having a formation cooperating with means carried by said rib to accurately position said receptacle at said location.

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