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INTERCHANGEABLE CONVENIENCE OUTLET RECEPTACLE
WITH GROUNDING INSTRUMENTALITY
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Fig. 1.

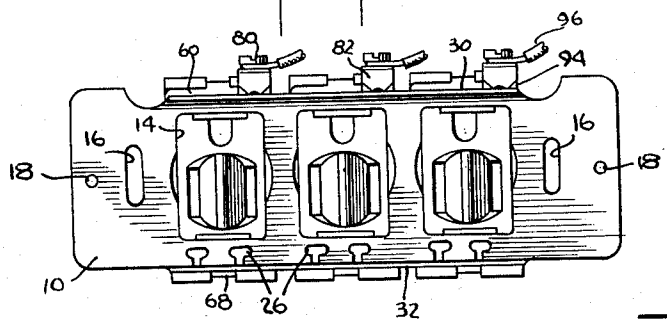
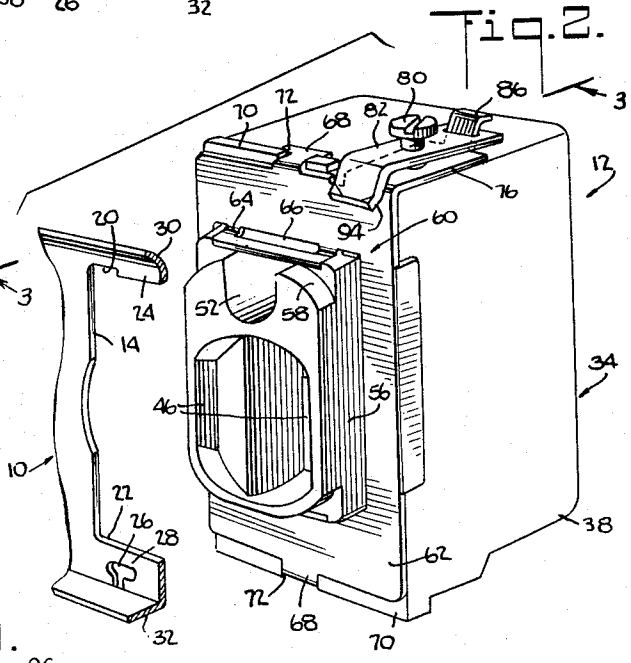


Fig. 2.



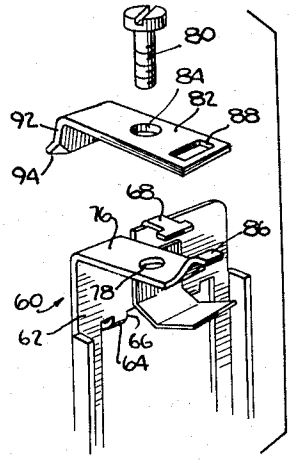


Fig. 4.

Fig. 3.

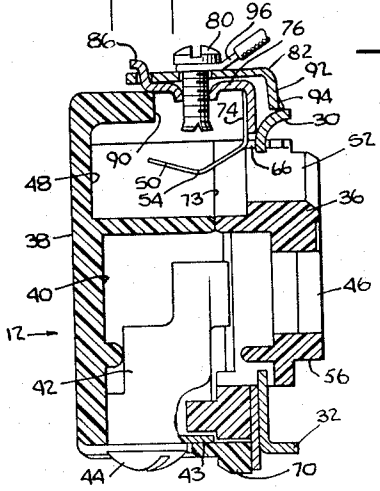
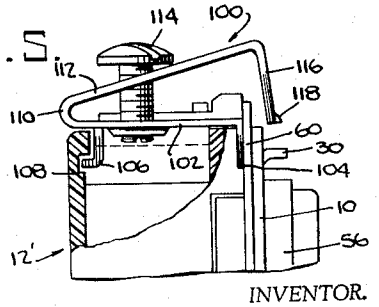


Fig. 5.



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INTERCHANGEABLE CONVENIENCE OUTLET RECEPTACLE WITH GROUNDING INSTRUMENTALITY

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This invention relates to an interchangeable convenience outlet receptacle with a grounding instrumentality. In particular my invention pertains to a conventional interchangeable convenience outlet receptacle incorporating a novel and unique grounding instrumentality.

It is an object of my invention to provide a grounding instrumentality of the character described which is durable and foolproof in operation.

In the accompanying drawings, in which I have shown various possible embodiments of my invention,

FIG. 1 is a front plan view of a three-receptacle mounting strap to which there are coupled three interchangeable convenience outlet receptacles each of which has a grounding instrumentality incorporating the subject of my instant invention;

FIG. 2 is an enlarged perspective exploded view of a portion of the mounting strap and of one of said receptacles together with its grounding instrumentality;

FIG. 3 is an enlarged sectional view taken substantially along the line 3—3 of FIG. 2;

FIG. 4 is an exploded perspective view of the grounding instrumentality and the coupling cap which is employed to connect a receptacle to a mounting strap; and

FIG. 5 is a fragmentary sectional view somewhat similar to FIG. 4 but illustrating a modified form of my invention.

Referring more particularly to FIGS. 1–4 in which I have shown one preferred form of my invention, the reference numeral 10 denotes a conventional elongated mounting strap for interchangeable receptacles 12. The mounting strap is provided with three identical large rectangular openings 14. The mounting strap is fashioned from metal to conduct electricity for the purpose of grounding. It does not have to be an excellent conductor. The usual mounting apertures 16 are provided. In addition, tapped holes 18 are formed for threaded engagement with screws that are adapted to secure an escutcheon plate to the mounting strap.

Each large rectangular opening 14 has one end edge near one longitudinal edge of the strap 10 and its opposite end edge near the other longitudinal edge of such strap. The end edge 20 (see FIG. 2) of each opening 14 is nearer to its associated longitudinal edge of the strap than is the opposite end edge 22.

The end edge 20 of each opening includes a tongue 24 that protrudes into the receptacle receiving large opening 14. The end edge 22 is not provided with any such preformed tongue in its original manufactured condition. However the section of the mounting strap between this end edge 22 and the adjacent longitudinal edge of the strap is formed with perforations 26 elongated in a direction parallel to the end edge 22. It is possible to deform the edge 22 and it is for this purpose that the perforations 26 are provided. A comparatively narrow bridge 28 of metal separates each perforation from said edge. This bridge can be deformed in the plane of and into the large opening 14 by insertion of the tip of a screw driver into a perforation 26 and turning the screw driver to form in the field tongues (not shown) which are registered with and opposite the preformed tongue 24 of each opening on the opposite end edge 20.

Each longitudinal edge of the mounting strap over its central portion wherein the large receptacle receiving openings 14 are provided is formed with an upstanding flange 30, 32. The flange 30 is somewhat shorter and more generously filleted than the opposite flange 32.

As has been mentioned heretofore the grounding strap 10 is adapted to receive in each of its plural large openings 14 a suitable interchangeable receptacle.

Essentially an interchangeable convenience outlet receptacle includes a hollow casing 34 of electrically nonconductive material made in two sections, to wit, a top section 36 and a bottom section 38.

The hollow interior of the casing defined by the two sections 36, 38 includes two chambers 40 shaped to accommodate in each one of them a female power contact 42 having an external portion 43 in which a terminal screw 44 is threaded for engagement with the house wire. Each of these female power contacts is located below and in registry with an access slot 46 in the top section 36.

The casing 34 also includes a third cavity 48 in which there is located a grounding contact 50 which is a thin band of resilient electrically conductive material such, for instance, as Phosphor bronze located beneath an access opening 52 in the top of the casing and in the form of a single blade with a cantilever support at one end this being the end nearest the opening 52 and with a central hump 54 which protrudes into the path of the tip of a grounding prong inserted through the opening 52.

The top portion of the casing is formed with a neck 56 that nicely fits within any one of the large oblong openings 14 in the mounting strap. The upper part or tip of the neck 56 has generously rounded corners 58.

The neck 56 is surrounded by a coupling cap 60. This cap is made from sheet steel and has a broad generally plane body 62 which is in face-to-face contact with the top of the casing 34. The coupling cap is formed with a large central aperture through which the neck 56 protrudes.

Said central aperture is formed on the two short sides thereof with outwardly projecting tabs 64 that lie alongside of and extend part way up the neck 56. Each tab 64 is provided with an elongated slot 66 which is shaped and dimensioned to provide a lateral neck socket which will nicely receive a tongue 24.

To mount an interchangeable receptacle in any location on the strap the neck 56 is introduced into an opening 14 from the back of the strap. During the introduction of the neck the preformed tongue 24 first is inserted in a slot 66 (socket) of one of the tabs. The other tab then is swung into the opening 14. Thereupon a tool such as a screw driver is inserted in an adjacent perforation 26 and is twisted to deform the bridge 28 and force the same into the slot (socket) 66 of said other tab, thereby locking the interchangeable receptacle to the mounting strap.

According to normal practice the strap 10 is mounted by its connection through metal screws to a grounded conduit box.

To hold the top and bottom sections 36, 38 of the casing to one another I form each end of the coupling cap with a T-shaped locking tab 68. Each upper end edge of the bottom casing section 38 is formed with a protruding ledge 70 which is interrupted at its center by a downwardly extending groove 72. Each T-shaped tab 68 is aligned with a different groove 72 and the tab is bent over to dispose its shank in the groove 72 with the head of the tab engaging the undersurface of the ledge 70. The body of the coupling cap rests against the flat upper face of the top section surrounding the neck 56. The inside of the bottom section has a shoulder 73 on which the top section is seated. Hence the coupling cap clamps the top section to the bottom section.

The grounding instrumentality comprises a finger 74 which is in one piece with the grounding contact 50 and is disposed at an angle thereto so that with the grounding contact in proper idle position in registry with the access opening 52 for a grounding prong the finger 74 will lie flat against the undersurface of the body 62 of the coupling cap. Said finger is rigidly secured to the undersurface of the coupling cap, the securement being such that these two parts are effectively integrated both electrically and mechanically. For example, the securement may be effected by a rivet or by soldering or brazing, however as indicated in the preferred form of my invention the finger 74 is welded to the coupling cap.

The grounding instrumentality further comprises a flat leg 76 preferably in one piece with the coupling cap and connected to an end edge thereof so that said leg is rigidly secured to the casing 34 by the cap. The leg is at right angles to the plane of the body 62 and extends downwardly along the flat face of an end surface of the casing. Preferably the ledge 70 is cut away to permit the leg 76 to be arranged in face-to-face contact with this end surface of the casing. Since the leg is integral with the coupling cap it too is electrically conductive to a sufficient degree to afford a good grounding path.

Said leg 76 constitutes a "first element." The leg 76 has a tapped opening 78 therein which receives a threaded shank of a metal screw 80 which is a "manipulatable member." The tip of the screw preferably is staked to prevent complete withdrawal of the screw from its opening. A "second element" of the grounding instrumentality constitutes a flat bar 82 which is approximately as wide as the flat leg 76. The bar is made of an electrically conductive metal, e.g. brass. Said bar has an oversize hole 84 therein which freely passes the shank of the screw 80.

Means is included to mount the bar 82 for movement towards and away from the leg 76 and towards and away from the casing 34. Said means conveniently comprises an articulated connection between the leg 76 and the bar 82 adjacent an adjoining set of ends thereof. The articulated connection in effect consists of a hinge or pivot and may be of any desired construction. I have shown in FIGS. 2, 3 and 4 a rather simple and easily fabricated construction for the hinge. It constitutes a toe 86 at the lower, i.e. free, end of the leg 76 which toe is narrower than the leg and is offset outwardly from the leg to terminate in a short tip which is parallel to the leg. Cooperating with the toe and tip is a transversely elongated slot 88 in the rear end of the bar 82. The slot is wide enough and long enough to freely receive the offset toe with the toe passing through the slot and the tip being located beyond the outwardly facing surface of the bar as shown in FIGS. 2 and 3. The bar is threaded onto the toe before the screw 80 is inserted through the hole 84 and threaded into the tapped opening 78. Because the screw 80 is so close to the toe and slot, as long as the screw is in place the bar cannot become separated from the leg, i.e. the toe cannot become disengaged from the slot; and since the screw is staked in place the pivotal connection from bar to toe is as permanent as the staking. It will be apparent that when the screw is backed off the bar can be swung away from the leg and that when the screw is tightened the bar will be forced toward the leg. The end wall of the casing 34 adjacent the grounding cavity 48 is cut away as at 90 (see FIG. 3) to accommodate the shank of the screw 80.

The upper end of the bar is provided with a right angled flange 92, i.e. tip, which extends from the bar toward the mounting strap and the corners of the flange are shaped into projecting points 94 which are adapted to bear against a flange on a longitudinal edge of the mounting strap, the flange 92 being so dimensioned as to force the points 94 against the mounting strap when the screw 80 is fully tightened.

It has been mentioned heretofore that the mounting strap is asymmetrical in that the square flange 32 is spaced further from the associated end edges 22 of the openings 14 than is the rounded flange 30 from the end edges 20. Hence when an interchangeable receptacle is secured to a mounting strap, since the neck is approximately centrally located on the casing 34, one end of the interchangeable receptacle will protrude further from under the mounting strap than will the other end. It is on this further protruding end that the grounding instrumentality, to wit, the leg 76 and the bar 82, is disposed and the tip 92 of the bar is so dimensioned that when the screw 80 is tightened its points 94 will bear against the outer surface of the rounded flange 30. Because the mounting strap is asymmetrical and because the grounding instrumentality is disposed to take this asymmetry into account each interchangeable convenience outlet receptacle which is to be grounded must be so secured to the mounting strap that the grounding instrumentality is located on the narrow side of the strap (the side on which the rounded flange 30 is located). This means that the tab 64 on the coupling cap which tab is closest to the grounding instrumentality should be engaged with the preformed tongue 24 and that the tongue formed by raising the bridges 28 should be caused to enter the slot 66 in the mounting tab 64 remote from the grounding instrumentality.

It will be apparent that when the screw 80 is tightened the points 94 will make a firm and solid contact with the grounded mounting strap thereby to effect a good electric grounding connection between the bar and the mounting strap. A good electric grounding connection also is effected between the bar and the head of the screw 80. Furthermore a good electric grounding connection is effected between the shank of the screw and the leg 76. This leg in turn is in good electric grounding engagement with the grounding contact 50 so that I have formed a good conductive path for grounding purposes from the grounding contact 50 to the mounting strap all that is required being the tightening of the screw 80. It also is to be observed that the bar 82 makes a direct good electric grounding contact with the leg 76 through the toe 86 when this screw 80 is tightened.

Moreover by virtue of the provision of the screw 80 I am able to effect a direct metallic contact to an auxiliary grounding wire 96.

It will be fully appreciated that because the grounding connetction is effected through the points 94 and the flange 30 of the mounting strap such connection can be made with an interchangeable receptacle at any position along the length of the mounting strap and is not limited to any special location of an interchangeable receptacle.

In FIG. 5 I have illustrated an interchangeable receptacle 12' embodying a modified form of my invention which differs from the form first described only by a few minor variations in the grounding instrumentality. In said slightly altered grounding instrumentality the leg and bar of the first described form of my invention are integrated to constitute a single flat strip of metal so that instead of having a two part hinge I alternatively employ a resilient return bend which actually is a spring hinge.

More particularly the grounding instrumentality in FIG. 5 includes a flat strip 100 of sheet metal which preferably is somewhat resilient, e.g. Phosphor bronze. Said strip has a reach 102 which lies against one end surface of the insulated casing of the interchangeable receptacle in essentially the same fashion as the leg 76. However since the strip is not integral with the coupling cap 60 the reach 102 is rigidly secured to the casing by terminating at its upper end in an inturned finger 104 which extends under the coupling cap 60 and is firmly held in place either by welding, brazing or riveting to the coupling cap or simply by being compressed between the coupling cap and the upper face of the bottom section of the casing. For the same purpose the end of the reach opposite from the end having the finger 104 is formed

with an inwardly extending hook 106 the downturned tip of which is disposed within a recess 108 in the bottom wall of the bottom section of the casing. Thus between the finger 104 and the hook 106 the reach 102 is rigidly and firmly held against the adjacent end wall of the casing.

The lower end of the reach 102, i.e. the end remote from the finger 104, is provided with an integral return bend 110 which connects said reach 102 to a second reach 112 that corresponds to the bar 82. The bend 110 is resilient and biases the reach 112 to an idle position spaced from the reach 102.

A screw 114 has its shank passing through an oversized opening in the reach 112 and threaded into a tapped opening in the reach 102 so that tightening the screw swings the reach 112 towards the reach 102. The tip of the screw preferably is staked to prevent removal of said screw. The upper, i.e. free, tip of the reach 112 has an angular flange 116 which is similar to the flange 92 and is oriented to extend toward the flange 30 of the mounting strap 10. Said flange 116 has points 118 similar to the points 94 and for the same purpose. The operation of the grounding instrumentality shown in FIG. 5 is identical to that shown in FIGS. 1–4 and therefore will not be described.

Having thus described my invention I claim as new and desire to secure by Letters Patent,

1. A grounding instrumentality for an interchangeable convenience outlet receptacle of the type adapted to be coupled to a metallic mounting strap and which interchangeable receptacle has an electrically non-conductive hollow casing with twin power contacts therein for detachable engagement with the twin power prongs of an appliance plug that has a third prong for grounding: said grounding instrumentality comprising a grounding contact located within the casing in position to be engaged by the third prong when the plug is coupled to the receptacle, a first electrically conductive element electrically and physically functionally integral with the grounding contact, means to secure said first element rigidly to said casing, a second electrically conductive element, means mounting said second element adjacent said first element and for movement toward and away from said first element and said casing, said first element and second element being functionally electrically integral with one another, and a manipulatable member interconnecting said elements and arranged upon manipulative movement of said member to force said second element to move toward said first element or allow said second element to move away from said first element, said second element having a portion thereof so disposed that as the second element is moved toward the first element upon manipulative movement of said member said

portion firmly contacts a part of the mounting strap whereby to effect a solid grounding connection to the mounting strap which connection runs through the second element and first element to the grounding contact.

2. A grounding instrumentality as set forth in claim 1 wherein the means mounting the second element adjacent the first element and for movement toward and away from the first element and the casing is a hinge.

3. A grounding instrumentality as set forth in claim 2 wherein the hinge is a spring hinge.

4. A grounding instrumentality as set forth in claim 2 wherein the hinge is a pivot joint.

5. A grounding instrumentality as set forth in claim 2 wherein the manipulatable member is a screw.

6. A grounding instrumentality as set forth in claim 1 wherein the two elements are physically different parts.

7. A grounding instrumentality as set forth in claim 1 wherein the two elements are physically integral.

8. A grounding instrumentality as set forth in claim 1 wherein the second element is captively mounted.

9. A grounding instrumentality as set forth in claim 1 wherein the manipulatable member is a screw.

10. A grounding instrumentality as set forth in claim 1 wherein a coupling cap rigidly connected to the casing couples the casing to the mounting strap and wherein the first element is rigidly secured to said cap.

11. A grounding instrumentality as set forth in claim 10 wherein the grounding contact is physically and electrically secured to the coupling cap and wherein the coupling cap is electrically conductive.

12. A grounding instrumentality as set forth in claim 10 wherein the first element is in one piece with the coupling cap.

13. A grounding instrumentality as set forth in claim 10 wherein the first element includes a portion caught between the coupling cap and the casing.

14. A grounding instrumentality as set forth in claim 1 wherein the second element has an angled tip which bears against the mounting strap when the manipulatable member is moved to move the second element toward the first element.

15. A grounding instrumentality as set forth in claim 14 wherein the angled tip has a point directed toward the mounting strap.

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