United States Patent [19]

Lingaraju

[11] **3,784,953**

[45] **Jan. 8, 1974**

[54] **GROUNDING CONNECTION FOR ELECTRICAL UNIT**

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[73] Assignee: **Rodale Manufacturing Co., Inc.,** Emmaus, Pa.

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[52] **U.S. Cl.** ..... **339/14 R**

[51] **Int. Cl.** **H01r 3/06**

[58] **Field of Search** 339/14, 132, 133; 174/51, 53

[56] **References Cited**

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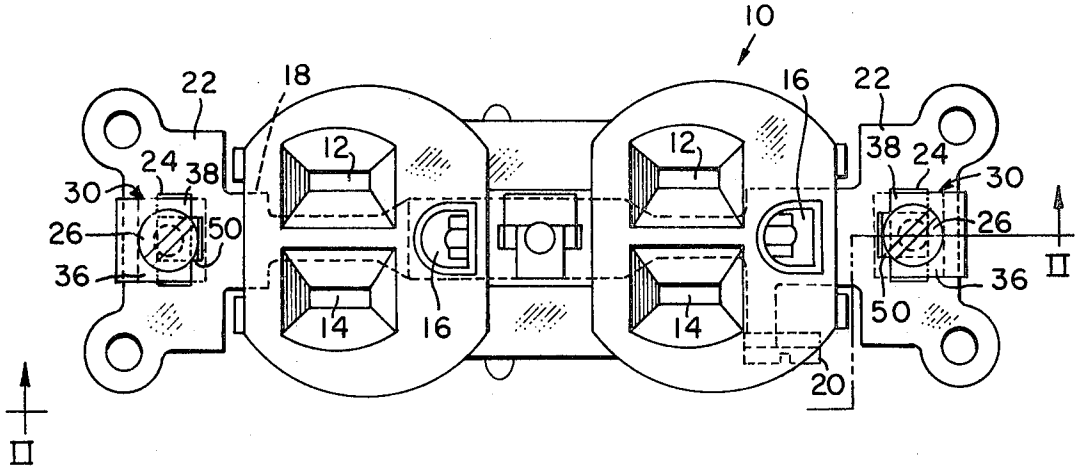
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Primary Examiner—Marvin A. Champion
Assistant Examiner—Robert A. Hafer
Attorney—Louis V. Schiavo

[57] **ABSTRACT**

Clips are carried by an electrical unit in such manner that when the unit is mounted in a flush box a reliable electrical circuit connection between the unit and the flush box is assured.

5 Claims, 6 Drawing Figures



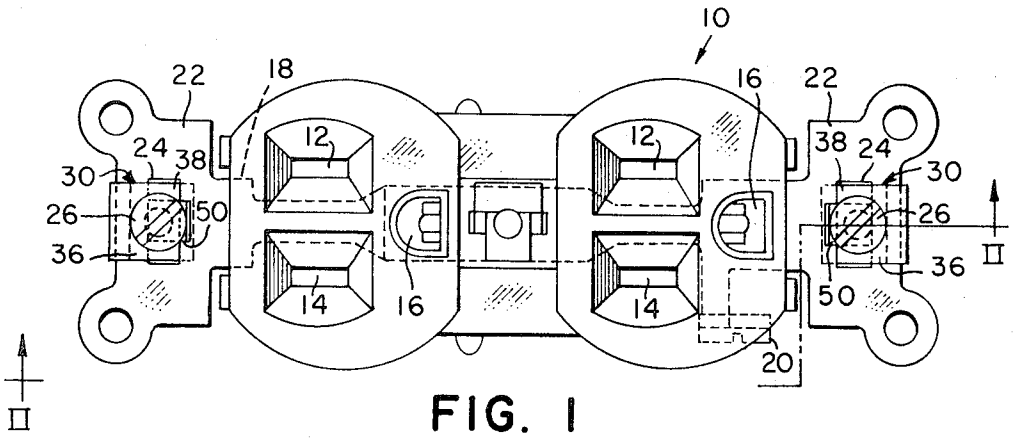


FIG. 1

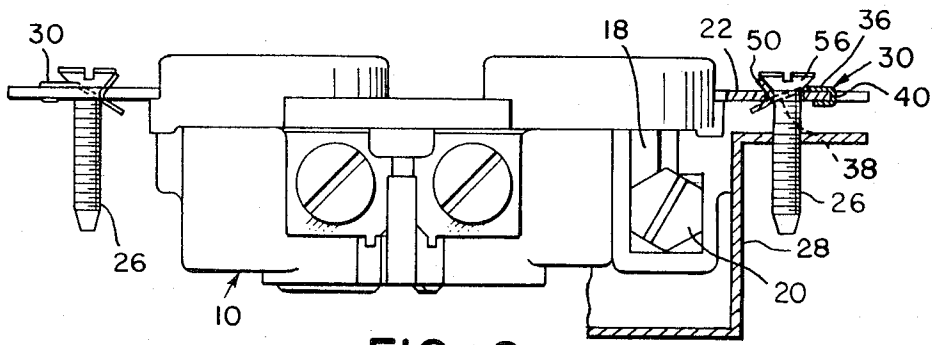


FIG. 2

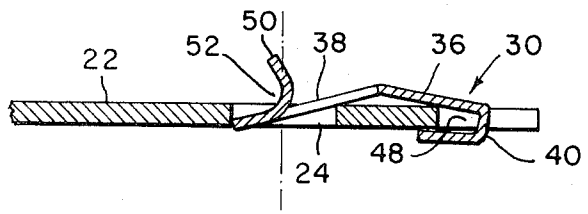


FIG. 5

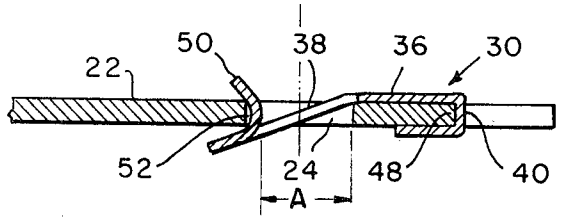


FIG. 6

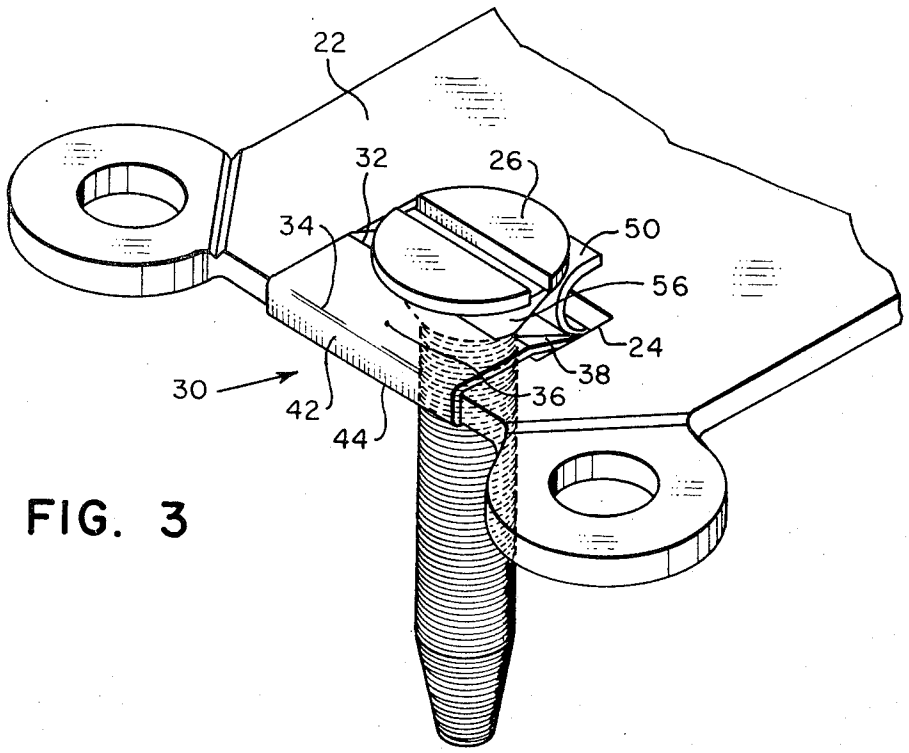


FIG. 3

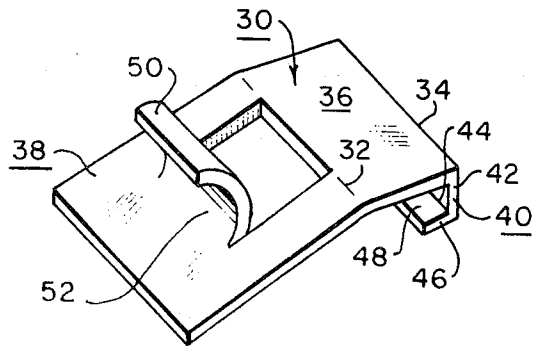


FIG. 4

GROUNDING CONNECTION FOR ELECTRICAL UNIT

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to electrical connections, and more specifically to the provision of a reliable electrical grounding connection between the metal strap or yoke of an ordinary household wall receptacle or switch and the metal flush box in which such a unit is usually mounted.

2. Description of the Prior Art

U. S. letters Pat. No. 3,432, 793, issued to W. A. Muska et al., Mar. 11, 1969, recognizes that the electrical grounding connections between an electrical unit, such as is usually mounted in a wall, for example, an ordinary household wall receptacle or switch, and the metal flush box in which the unit is usually mounted are the most likely places for resistance to be introduced in the grounding path, and said patent teaches achieving low resistance electrical contact between the yoke of the electrical unit and the flush box by employing connections each comprising a clip welded to the yoke.

SUMMARY OF THE INVENTION

An object of the present invention is to provide low resistance electrical contact between the yoke of such an electrical unit and the flush box in which it is mounted by employing connections each comprising a clip which is quick detachably associated with the yoke.

Another object of the present invention is to provide such a clip which is simple in design, inexpensive to fabricate and economical to use and put into practice.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of a duplex plug receptacle provided with clips constructed in accordance with the present invention;

FIG. 2 is a side view and fragmentary longitudinal section taken on lines II—II in FIG. 1, showing one end of the receptacle mounted in the flush box;

FIG. 3 is an enlarged perspective view showing one end of the receptacle mounting yoke;

FIG. 4 is an enlarged perspective view of a clip constructed in accordance with the present invention;

FIG. 5 is a section showing one end of the receptacle mounting yoke and the clip of the present invention in the process of being assembled; and

FIG. 6 is similar to FIG. 5, but shows the end of the receptacle mounting yoke and the clip of the present invention fully assembled.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The following description is directed to the specific embodiments of the invention disclosed in the drawings. It is not addressed to the scope of the invention, which may be practiced in a variety of forms.

Referring to the embodiment of FIGS. 1 to 6, the invention will now be described as it is applied to an ordinary duplex plug receptacle, but it will be understood that the invention is not limited to such use and can be used effectively with other wall units, such as switches. The receptacle, designated 10, contains three sockets in each half for mating with corresponding prongs of an electrical plug which is at the end of a three wire cable

attached to some electrical equipment in the well known fashion. Two of the sockets, designated 12 and 14, are in the circuit path for providing energizing current to the equipment while the third socket, designated 16, provides a precautionary grounding path. The receptacle 10 has the usual rigid metal mounting strap or yoke 18 bearing a grounding terminal 20. The sockets 16 in the receptacle are electrically connected by means not shown to the yoke. The yoke has the usual mounting ears 22, which contain elongated slots 24 through which mounting screws 26 extend to attach the receptacle 10 to a metal flush box 28. The flush box, usually located in the wall, ordinarily is electrically grounded so that it provides convenient means for completing the ground path. Various electrical codes and specifications require that the ground current path must have a very low resistance so that in the event a short should occur to ground one of the voltage lines, a large enough current is drawn instantaneously to blow the protective fuse or the like. Furthermore, to elminate the possibily of a fire starting in the event of a short of this nature, it is also required that no sparking or arcing shall occur. It can be appreciated that because the yoke 18 is made of relatively heavy metal and is solidly connected to the grounding terminal 20, it introduces negligible resistance in the grounding circuit. The similarly heavy construction of the metal flush box makes the same hold true for it. Therefore, the most likely place for resistance to be introduced in the grounding path is in making the connection between the yoke and the flush box. The present invention achieves the low resistance electrical contact between the yoke 18 and the flush box 28 by providing electrical connections each comprising a clip, designated 30, which is quick detachably associated with the yoke.

Referring particularly to FIG. 4, the clip 30 constructed in accordance with the present invention preferably is made of a resilient strip of light gauge sheet metal having a suitably low electrical resistance. Transversely extending bends respectively along the lines 32 and 34 separate an intermediate part 36 of the clip from a tail part 38 at one end of the clip and a hooked part 40 at the opposite end of the clip. The part 40 extends downwardly from the bend 34, as at 42, and then is transversely bent along the line 44 and extended back under the intermediate part 36, as at 46, to form a hook with a bight 48. The part 38 extends downwardly and away from the bend 32 at an angle of approximately thirty degrees to the plane of the intermediate part 36. A tab 50 struck out of the part 38 is turned upwardly therefrom and formed into a hook with a bight 52 presenting in the same direction as the bight 48 of the other hook.

Referring particularly to FIG. 5, a mounting ear 22 of the yoke 18 and a clip 30 are shown in a preliminary stage of assembly. It will be understood that the width of the clip is slightly less than the length of the slot 24 in the mounting ear so that the tail part 38 of the clip may be inserted into the slot. Now referring particularly to FIG. 6, the mounting ear 22 of the yoke 18 and the clip 30 are shown fully assembled. It will be understood that the distance from the closed end of the bight 48 and the closed end of the bight 52 is slightly less than the distance from the edge of the mounting ear accommodated by the bight 48 and the edge of the slot 24 accommodated by the bight 52 so that in this fully assembled condition of the mounting ear and the clip,

the intermediate part **36** and the hooked part **40** of the clip fit closely about the associated edge of the mounting ear, and the tail part **38** of the clip extends downwardly through and across the slot **24,** with the tab **50** extending back up through the slot and hooking about the associated edge thereof.

Referring particularly to FIGS. **2** and **6,** the gap A between the outer edge of the slot **24** and the back of the tab **50** is for receiving the screw **26.** The fit of the screw in the gap A is a tight one. Thus the clip is urged to the left, as a consequence of which the hook **40** is brought into close embracing relation to the outer edge of the mounting ear, and the tab **50** is sprung slightly and preferably wedged tight against the inner edge of the slot. The head of the screw is provided with a tapered undersurface **56,** and when the screw is threaded home, this tapered surface engages the back of the tab, as shown. In the absence of the screw **26,** the clip **30** is quick detachably associated with the mounting ear **22.** It should be noted that the opening in the tail part **38** provided by striking out the tab **50** is of a length (crosswise of the tab) which permits manipulation of the screw **26** as need be to align it with the threaded mounting hole in the flush box.

The electrical circuit path from the yoke **18** to the flush box **28** is through the tab **50** and the screw **26.** In this connection, note the line contact between the tapered undersurface of the screw head and the tab **50.** As long as the screw is threaded into the flange of the flush box and held fast between the tab **50** and the outer edge of the slot **24** with the tapered undersurface of the screw head and the back of the tab **50** in line contact, an independent grounding connection is maintained between the receptacle and the flush box.

In view of the foregoing, it will be apparent that the receptacle is provided with a grounding connection in such manner that no additional hardware is required except for that which is ordinarily needed to attach the unit to its mounting flush box and to connect it into the circuit that it serves. Furthermore, the mounting screws which are ordinarily packaged with the unit are retained in their usual position without the need of additional washers or the like which have been used heretofore. In addition, the grounding circuit is automatically completed when the wall unit is mounted in its flush box so that it cannot be overlooked by the mechanic when the unit is installed.

While in accordance with the provisions of the patent statutes, I have illustrated and described the best form or embodiment of my invention now known to me, it will be apparent to those skilled in the art that changes may be made in the form of the device described without departing from the spirit and scope of the invention. For example, as shown and described, each ear **22** of the yoke **18** is provided with a clip **30,** but it is only necessary to provide one of the ears **22** with a clip **30.**

I claim:

1. The combination comprising

A. an electrical unit provided with an elongated metal mounting yoke having an opening proximate one end thereof,

B. means for attaching said unit to a metal flush box and simultaneously making low resistance electrical contact between said yoke and box including

1. a clip extending lengthwise of said yoke across and through said opening and having one end portion hooked about the terminal portion of said yoke,

2. means on the portion of said clip extending across and through said opening hooked about the edge of said opening remote from the terminal portion of said yoke, and

3. a screw projected through the opening in said yoke and a registering opening in said clip, the portion of said clip hooked about the edge of said opening remote from the terminal portion of said yoke being flexed by said screw, and being operative thereby to hold said screw fast against the edge of said opening proximate the terminal portion of said yoke.

2. The combination according to claim **1** wherein the clip consists of a strip of light gauge sheet metal having a low electrical resistance.

3. The combination according to claim **2** wherein the means hooked about the edge of the opening remote from the terminal portion of the yoke is a tab struck out of the portion of the strip of sheet metal extending across and through said opening.

4. The combination according to claim **3** wherein the screw is tapered under head and the shank thereof extends through the opening in the strip of sheet metal resulting from said tab being struck therefrom, and said tab extends back up through the opening in the yoke and outwardly from said screw in line contact with said tapered undersurface.

5. The combination according to claim **4** wherein the edge of the opening in the strip of sheet metal remote from the tab is at least as remote from said tab as the corresponding edge of the opening in the yoke.

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