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P. H. WINTER

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RECEPTACLE GROUNDING DEVICE

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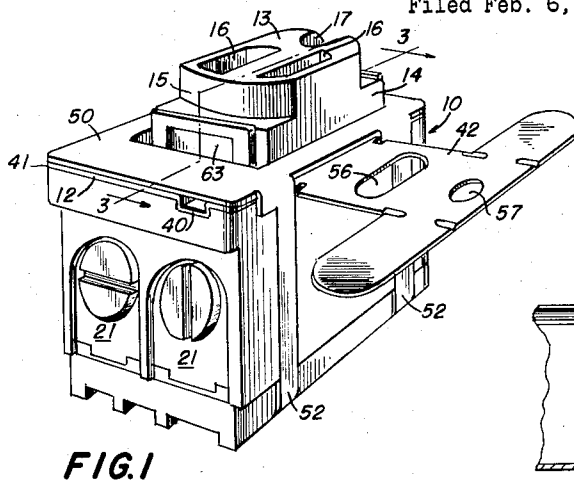


FIG. 1

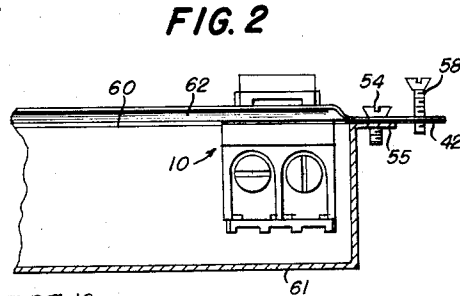


FIG. 2

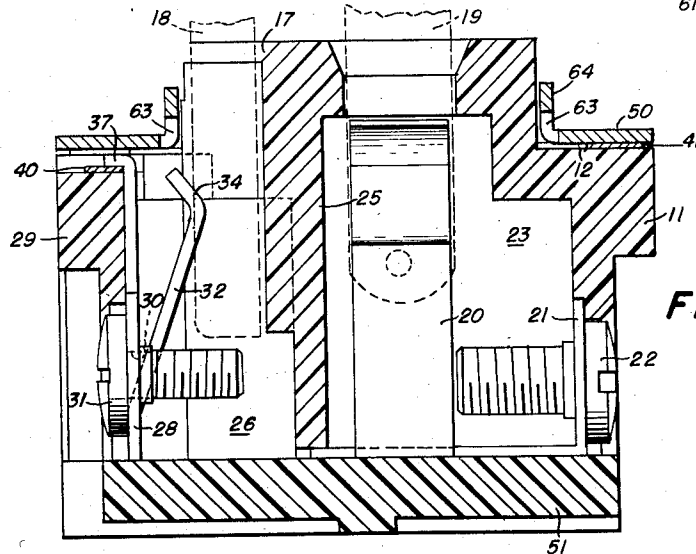


FIG. 3

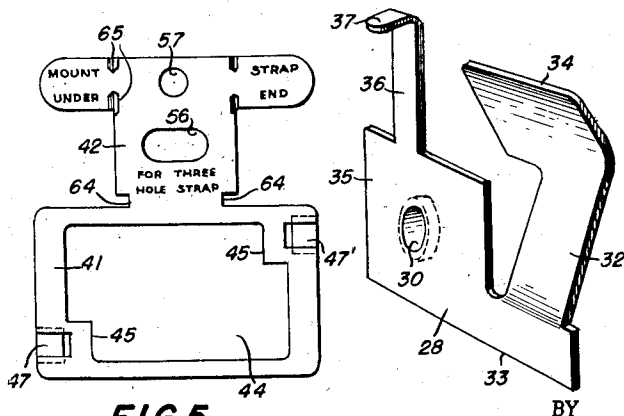


FIG. 5

FIG. 4

INVENTOR
PAUL H. WINTER

BY *Leech and Radue*
ATTORNEYS

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RECEPTACLE GROUNDING DEVICE

Paul H. Winter, Syracuse, N. Y., assignor to Pass & Seymour, Inc., Syracuse, N. Y., a corporation of New York

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8 Claims. (Cl. 174—51)

This invention relates to a receptacle grounding device and more particularly to means for automatically grounding the plug prong grounding contact of an outlet receptacle of the interchangeable type when it is attached to its mounting strap and applied to a conduit box.

It is a general object of the present invention to provide a novel receptacle grounding device of the type described.

More specifically it is an object of the invention to provide, in an outlet receptacle of the interchangeable type, a contact for the grounding prong of a plug and a grounding tab engaged thereby and positioned to lie beneath the mounting strap for the receptacle and extend over the mounting ear of a conduit box to which the strap is attached.

An important object of the invention resides in providing the grounding tab with a frame portion adapted to fit between the upper edge of the receptacle housing and the metal cover therefor and using the cover to maintain contact between the frame and a tang on the grounding contact.

Another important object of the invention resides in the universality of the mounting tab frame permitting accommodation to a receptacle for positioning at either end of the mounting strap without affecting the circuit continuity between the frame and the grounding contact tang.

Other and further objects of the invention will be more apparent to those skilled in the art upon a consideration of the following specification and accompanying drawing, wherein is shown a single exemplary embodiment of the invention, with the understanding that such changes may be made therein as fall within the scope of the appended claims without departing from the spirit of the invention.

In said drawing:

Fig. 1 is a perspective view, on an enlarged scale, of an interchangeable receptacle of the grounding type fitted with the grounding tab and other parts of the present invention;

Fig. 2 is a longitudinal section through a conduit box fitted with a receptacle constructed in accordance with the present invention;

Fig. 3 is a longitudinal vertical section, on an enlarged scale, taken on broken line 3—3 of Fig. 1;

Fig. 4 is a perspective view of the ground contact from the receptacle showing the tang which connects it electrically to the frame portion of the grounding tab; and

Fig. 5 is a plan view of the complete grounding tab and the frame.

The increased use of portable electrical appliances, and those not permanently connected into a power circuit, with the attendant dangers of electrical shock to users, has caused a review of the electrical codes in many areas, with a strong trend towards requiring the use of a third wire between the power outlet and the appliance for grounding the frame and casing thereof. Such an arrangement of course necessitates a third blade or prong on the attachment plug and provision in the outlet re-

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ceptacle for contacting this prong and effectively grounding it. Contact is readily made by a third spring in the receptacle and it is highly desirable and extremely important that this be automatically grounded when the receptacle is mounted in a conduit box. Such boxes are grounded either automatically by being connected to rigid or flexible metal conduits or by arrangement in a separate grounding circuit where non-metallic sheathed cables are used in the wiring system, as required by building codes in any areas. With the old style receptacle mounted in a conduit box this grounding is no problem since the grounding prong engagement spring in the receptacle is merely permanently attached by riveting or the like to the fixed mounting strap on the receptacle, and since this strap is screw-fastened to the conduit box grounding is effected automatically. In the more modern and more desirable wiring devices wherein a number of various types are interchangeable in a mounting strap which holds three to the single gang box the problem is not so readily solved, for the mounting strap for the receptacles and other wiring devices while itself secured to the conduit box by screws in many cases engages only the plastic shell of the receptacle which it supports in the box.

In accordance with the present invention means are provided for automatically grounding the third prong contacting spring when the interchangeable receptacle is mounted at either end of a three opening mounting strap.

A reference to the drawings illustrates the arrangement very clearly. In Fig. 1 is seen such a grounding receptacle illustrated generally at 10, housed in a molded plastic shell 11 of generally rectangular shape in plan, elevation and end views, having an outer forward facing flat wall 12 from the center of which projects forwardly a neck 13 shaped at its lower portion generally rectangularly, as seen at 14, to be received in a correspondingly shaped opening arranged transversely in a mounting strap such as seen at 60 in Fig. 2. The outer portion of the neck, as seen at 15, has generally arcuate ends with sides coincident with those of the lower portion thereof. Its shape and depth are such as just to fill the opening in a plastic wall plate (not shown) intended to be used therewith. Extending through the end wall of the neck is provided a pair of elongated, parallel passages 16 appropriately spaced to accept the blades of a conventional parallel bladed attachment plug of standard dimensions. The arrangement, however, also provides an additional opening 17 at one end of the neck to accept a prong, different in transverse section from the plug blades and generally shown at 18 in Fig. 3. Its spacing and relationship to the blades of the plug are by this time standardized.

As viewed in the longitudinal section of Fig. 3, the plug blades 19 are engaged by contact springs 20 of conventional form, seen at the right end of this figure, and each provided with a terminal plate 21 and terminal screw 22 for connection into the power circuit. These are spaced laterally and housed in a chamber 23 at the right end of shell 11 and separated therefrom by a partition wall 25 is compartment 26 at the other end of the receptacle for housing the grounding elements. As seen in Fig. 4, the grounding device may be referred to as a plate 28 substantially flat and adapted to fit against the outer end wall 29 of the housing. This plate is perforated as at 30 to receive a threaded terminal screw 31 for use in positions where grounding must be by wire attached to the conduit box. A contact spring 32 is formed from the metal of plate 28 and extends at right angles from the straight bottom 33 thereof and has an L-shaped end 34 bent and curved to contact the prong 18, as seen in Fig. 3, when the latter is introduced through the opening 17. The L-shaped portion 34 carries the

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contact spring 32 over to the transverse center of the shell where the grounding prong enters. Extending upwardly from the top of the terminal portion 35 of the grounding plate is an elongated tang 36, the upper end of which is bent over at right angles as at 37 opposite to the direction of bending of the contact spring 32 and so spaced from the bottom of the plate that when the latter rests, as seen in Fig. 3, on the bottom cover of the shell the end 37 rests in a notch 40 at the forward edge of end wall 29.

It now remains to provide means to connect this end of the tang to the conduit box, and this is effected by the combination of a sheet metal frame 41 and integral tab element 42, as seen in plan in Fig. 5. The frame is arranged to have a sufficiently large central opening 44 to loosely fit over the neck of the receptacle and is centered thereon by means of the inturned portions 45 which engage appropriate surfaces on the neck. The frame portion is of external dimensions nearly as large as the flat front face of the receptacle shell and each end is provided with a depressed area 47. These areas are adapted to alternatively fit into the notch 40 in the upper front face and being positioned before the grounding element is assembled one of them is ready to receive the end 37 of the tang therein, as clearly seen in Fig. 3.

In many cases it is desirable where two convenience outlets are arranged, one at either end of the mounting strap, that the orientation of the neck openings is uniform. This requires that the grounding tab on some extend from one side wall and others from the opposite in order that such tab may underlie the mounting strap and fit between it and the lug on the conduit box into which the strap mounting screw enters. It is for this reason that two depressed areas 47 and 47', displaced 180° from each other are shown in Fig. 5, and while not seen in the views, corresponding notches 40 are provided in the two end walls of the receptacle shell so that the strap, no matter in what position mounted, has a depressed area received in each of the notches, and the strap can be rotated 180° in its own plane and still have areas 47 received properly in these notches. Obviously only one of the notches functions to receive the turned down end of the grounding tang 36.

The overall thickness of the turned down end of the grounding tang and that of the material of the frame of the grounding tab is slightly greater than the depth of the notch 40 so that when the securing collar 50 for the receptacle is placed in position it forces the tang end securely into electrical engagement with the metal of the frame which is preferably non-ferrous.

As seen in Fig. 3 the various contact elements of the receptacle are introduced through the open bottom of the shell, fitted in appropriate slots and notches therein and then secured in position and protected by means of insulating bottom plate 51 which has parts interlocking therewith to insure its proper alignment and location on the bottom of the shell. It is held in position by means of straps 52 extending downwardly from collar 50 which surrounds the neck closely and bears over the whole top area of the frame element 41 of the grounding tab. These straps are bent over the bottom of the closure plate and form a rigid assembly of all of the parts heretofore described. This collar element 50 being metal and bearing on the back of the mounting strap 60, provides a fairly effective ground but not nearly so complete a one as the mounting of the tab 42 beneath the strap where the latter is secured by screw 54 to the lug 55 on the box as seen in Fig. 2. An appropriate opening 56 in the tab freely passes screw 54 and a second opening 57 allows passage of screw 58 which secures the face plate in position and is threadedly engaged in the end of the mounting strap 60.

Fig. 2 illustrates the conduit box 61 with its mounting strap 60, showing only a single receptacle in position at

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the right end thereof. The neck is clearly seen projecting through the mounting strap which has upturned edge flanges 62 for the sake of rigidity.

The several receptacles or other wiring devices are secured in position with their necks projecting through openings in the mounting strap by a cam or like means on the strap engaging in the slots 63 adjacent to or in each end of the lower portion of the neck as seen in Figs. 1 and 3. These shown are formed by punching slots in upturned portions 64 of the closure collar element 50. One form of mounting means for the wiring devices is clearly illustrated in the patent to Despard, No. 2,560,507, granted July 10, 1951, which also shows the outline, in plan, of the mounting strap.

The use of the device of the present invention is believed obvious from the above description, the alternate mountings of the frames and tabs permitting receptacles to be mounted and grounded at each end of a strap and yet have all grounding prong openings similarly oriented. If three outlets are used in a strap the center one can be grounded by the use of a wire from terminal screw 31 to a position beneath the strap surrounding screw 54. If a receptacle such as described above is to be used in the center position tab 42 can be broken off by bending, which is facilitated by the notches 64. Similarly notches 65 permit removal of the plaster ears if not needed.

I claim:

1. In an interchangeable receptacle for mounting in a conduit box by means of a strap spanning the box, in combination, a receptacle shell having a neck extending forwardly from the front wall thereof to pass through said strap and apertured for attachment plug circuit blades and a grounding prong, contact springs in said shell for said blades, a contact element in said shell having a spring for engagement by said prong and a tang extending through said front wall, a grounding plate for said element including, a sheet metal frame on said front wall surrounding said neck and an integral tab extending in the plane of said frame in the direction of and underlying the end of said strap, and means holding said tang in electrical engagement with said frame.

2. The receptacle as defined in claim 1 in which said last mentioned means comprises a metal collar for mounting the receptacle and for holding the parts thereof assembled.

3. The receptacle as defined in claim 1 in which said tang has its end turned over to rest on said frame, said frame being socketed to receive said end, and a second socket in said frame positioned to engage the end upon 180° rotation of the frame, whereby the tab may be arranged to project from either side of the receptacle adapting the latter for use at either end of the strap.

4. The receptacle of claim 1 in which said shell front wall is provided with a depressed area above each end wall of the shell, said frame having a portion depressed to fit in each such area, said areas being so positioned that the frame may be arranged on the neck in either of two positions, said tang having its end turned over and positioned to fit on one of said areas over the frame portion therein.

5. The receptacle of claim 4, in which said means holding the tang in engagement with the frame is a metal collar surrounding said neck and overlying the said frame and said turned over tang end, and straps on said collar secured to said shell.

6. In an interchangeable receptacle for mounting in a conduit box at either end of a strap spanning the box, in combination, a receptacle shell having a flat front wall, a neck projecting forward from the center area of said wall to pass through one of a number of transverse openings in said strap and apertured for attachment plug circuit blades and a grounding prong, the prong aperture being at one end of the neck, contact springs in said shell for said blades, a contact element in said shell having

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a spring for engagement by said prong and a tang extending through said front wall and having an end overlying the same, a grounding tab extending from said front wall in a direction to underlie said strap when the receptacle is mounted therein, and means holding said tab in engagement with said tang end. 5

7. The receptacle of claim 6 wherein said tab is perforated at a position to pass the screw which mounts the strap in the box.

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8. The receptacle of claim 6 in which a metal cover for said front wall is secured to said shell and engages said tang end to hold it in engagement with said tab.

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