

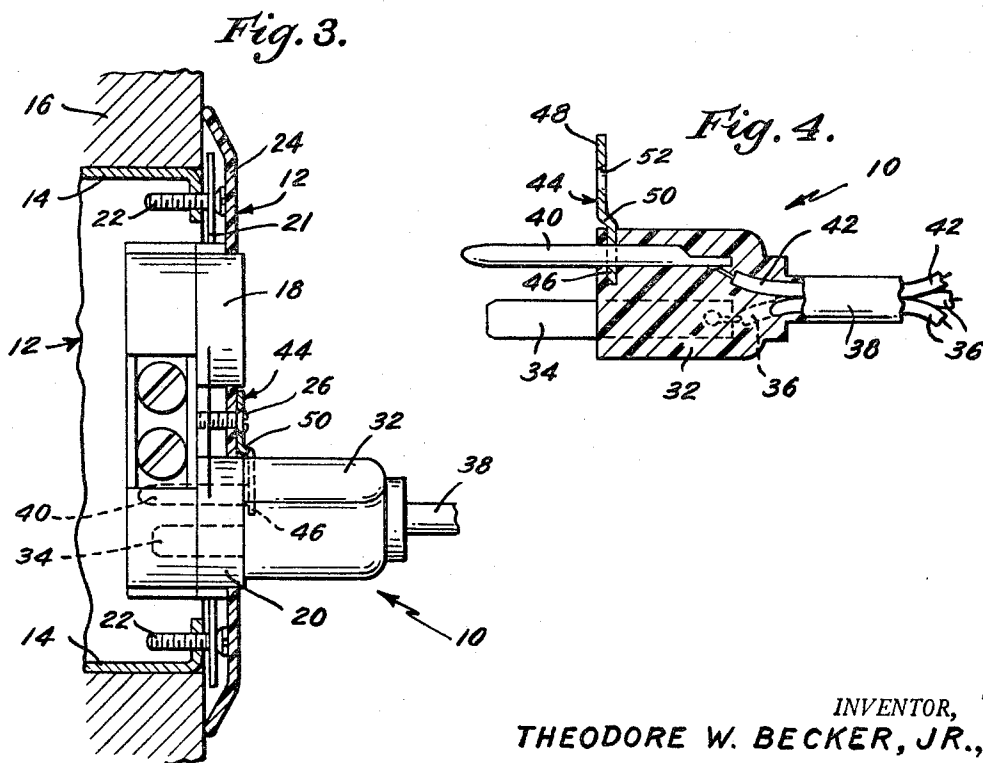
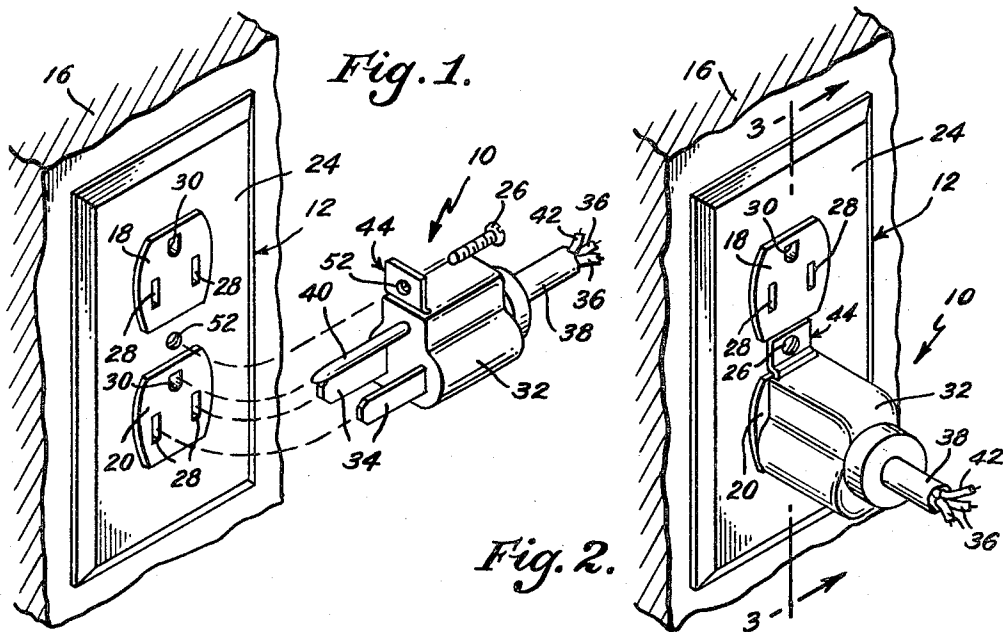
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ELECTRICAL PLUG WITH SAFETY GROUND ELEMENT

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ELECTRICAL PLUG WITH SAFETY GROUND ELEMENT

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ABSTRACT OF THE DISCLOSURE

An electrical plug for use with a wall receptacle and having a mounting tab incorporated therein for securement to said receptacle to prevent inadvertent removal of the plug from the receptacle, a ground pin being electrically connected to the mounting tab for establishing a safety ground connection when the mounting tab is fastened to the wall receptacle.

The present invention relates to an electrical plug with a safety ground element. More particularly, the present invention relates to an electrical plug of the three-wire type that is adapted to be used in connection with a three-wire receptacle, the plug having a metallic tab joined thereto for connection to the receptacle, thereby preventing inadvertent removal of the plug from the receptacle and further providing an additional ground attachment to the receptacle.

Many electrical plugs and plug receptacles in use today require a ground lead for safety purposes. For this reason, these electrical plugs incorporate a ground lead to which a ground pin is interconnected, the ground pin extending outwardly of the plug in parallel relation to the male prongs thereof. Usually, a corresponding slot that is formed in the receptacle communicates with a ground lead that is fixed in the plug receptacle, the slot being adapted to receive the ground pin therein. In many instances where a ground wire is included in an electrical plug and plug receptacle, an appliance, such as an electric saw, drill or other kind of tool is used, the ground lead being particularly advantageous with tools and appliances because of the safety feature involved. In use of a tool or appliance requiring electrical connection, the tendency is to move the tool to various positions, such movement, however, oftentimes resulting in disconnection of the plug from its plug receptacle. The present invention is adapted to avoid this situation by providing a mounting tab that is formed as part of the plug and that is adapted to be secured to the receptacle through the screw fastener that secures the receptacle face plate in place. Not only does the mounting tab securely mount the electrical plug on the receptacle, but in the present invention the mounting tab is also electrically interconnected to the ground pin. By exposing the outer portion of the mounting tab, the screw fastener that extends therethrough establishes a connection therebetween and the receptacle in which it is fastened. Thus, there is an additional ground from the ground pin of the electrical plug to the receptacle. In the event that the ground lead in the receptacle is faulty and does not establish a connection with ground, the interconnection of the mounting tab, screw fastener and receptacle, after mounting of the electrical plug on the receptacle, provides a ground connection and insures the electrical safety of the worker using the tool.

Accordingly, it is an object of the present invention to provide an electrical plug having a mounting tab formed thereon that is adapted to be fixed on a receptacle for mounting the electrical plug in the receptacle in nonremovable relation.

Another object of the present invention is to provide an electrical plug having a mounting tab joined thereto that cooperates with a receptacle and a screw fastener

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that joins the mounting tab to the receptacle for establishing a ground circuit therebetween.

Still another object is to provide an electrical plug having a ground pin secured therein and on which a mounting tab is mounted, the mounting tab establishing a ground circuit from the ground pin to the receptacle in which the electrical plug is inserted.

Other objects, features and advantages of the invention will become apparent as the description thereof proceeds when considered in connection with the accompanying illustrative drawings.

In the drawings which illustrate the best mode presently contemplated for carrying out the present invention:

FIG. 1 is an exploded perspective view of the present invention showing the electrical plug and the relation thereof with respect to the receptacle in which it is adapted to be inserted;

FIG. 2 is a perspective view showing the electrical plug of the present invention as it is mounted in the receptacle;

FIG. 3 is a sectional view taken along lines 3-3 in FIG. 2; and

FIG. 4 is a sectional view of the electrical plug showing the interconnection of the mounting tab and the ground pin therein.

Referring now to the drawing and particularly to FIGS. 1 and 2, an electrical plug is generally indicated at 10 and, as shown, is adapted to be mounted in a wall receptacle generally indicated at 12. The wall receptacle 12 is conventional in construction and includes a box 14 mounted in a wall 16, the receptacle including a duplex type of socket construction that is defined by sockets 18 and 20 that are mounted in a frame 21. Suitable terminals are electrically interconnected to the slots formed in the sockets 18 and 20, and screw fasteners 22 mount the frame 21 of the duplex socket construction on the box 14 of the receptacle. Further, in accordance with conventional constructions, a face plate 24 is fixed to the frame 21 of the receptacle by means of a mounting screw 26. As shown in FIGS. 1 and 2, the outlet sockets 18 and 20 are of the three-wire type and are formed with slots 28 that are adapted to receive the prongs of the electrical plug 10 as will be described. A round-shaped opening 30 is also provided in each of the sockets and defines a ground connection for interconnecting a ground lead of each socket to a ground pin of the electrical plug 10, as will also be described.

Referring now to FIG. 4, the electrical plug 10 is shown in detail and includes a body portion 32 that is preferably molded of a suitable plastic material in a convenient shape and configuration. Molded in the body portion 32 are male blades or prongs 34 that extend forwardly of the body portion 32 for insertion into the socket slots 28 of the receptacle 12. The blades 34 are electrically interconnected to conductor leads 36 in the conventional manner, the conductor leads 36 being encased in a cable 38 with which the plug 10 is integrally formed. Also molded in the body portion 32 of the electrical plug is a cylindrically shaped ground pin 40 having a tapered outer end and to the inner end of which a ground lead 42 is interconnected. The ground pin 40 is adapted to be inserted into the ground opening 30 of the outlet sockets for establishing a ground circuit between the electrical plug 10 and the receptacle 12.

On many occasions, it is necessary to maintain the electrical plug 10 in positive connection in the receptacle 12 such as, for example, when the electrical plug 10 is employed in conjunction with a power tool or appliance. In normal use of the tool or appliance, unless some provision is made for securing the electrical plug 10 in place, the tendency is to withdraw it when an outward force is applied to the cable 38. This oftentimes occurs when the user of the tool or appliance moves from one location

to another and causes the cable 38 to be extended to its full length. In order to prevent the electrical plug 10 from being inadvertently withdrawn from the receptacle 12, a mounting tab generally indicated at 44 is provided and includes an inner portion 46 and an outer portion 48 that is offset with respect to the inner portion 46 through an intermediate portion 50. The mounting tab 44 is formed of a metallic material that is electrically conducting, and the inner portion 46 is provided with an opening for receiving the ground pin 40 therein. The mounting tab 44 is thus positively mounted directly on the ground pin 40. As seen in FIG. 4, the inner portion 46 of the mounting tab 44 is spaced from the forward end of the body portion 32. However, in order to properly mount the plug 10 in place, the forward face of the outer portion 48 of the mounting tab 44 must be located in generally coplanar relation with respect to the outer end of the body portion 32. For this purpose, the offset intermediate portion 50 is provided and locates the forward face of the outer portion 48 such that it is disposed in generally coplanar relation with respect to the outer end of the body portion. By locating the mounting tab in this manner, the outer portion 48 thereof will be positioned in flush relation with the face plate 24 when the plug 10 is secured in place. Also formed in the outer portion 48 of the mounting tab 44 is a countersunk opening 52 that is adapted to receive the fastening screw 26 that normally locates the mounting plate 24 of the receptacle 12 in position.

In the mounting of the electrical plug 10 in electrical communication with the receptacle 12, the plug 10 is inserted in the outlet socket 20 in the usual manner. The blades or prongs 34 are thus received in the slots 28, and the ground pin 40 is received in the ground opening 30. Prior to insertion of the blades 34 and ground pin 40 in position, the fastening screw 26 is removed from the threaded opening formed in the frame 21, and the outer portion 48 of the mounting tab 44 is then positioned such that the opening 52 therein is located in alignment with the openings formed in the face plate 24 and in the frame 21. The fastening element 26 is then inserted through the opening 52 and tightened within the threaded opening formed in the frame 21. The electrical plug 10 is then securely mounted in position on the receptacle and cannot be removed therefrom except upon removal of the fastening screw 26. As seen in FIG. 3, the forward face of the outer portion 48 is located in flush engagement with the outer surface of the face plate 24 and thus provides for a secure positioning of the electrical plug 10 in flush engagement with the outlet socket in which it is inserted.

In addition to establishing a ground circuit from the ground pin 40 through the ground slot 30 and the ground connection to which it is connected when the plug 10 is mounted in the receptacle 12, a further ground circuit is established by connection of the mounting tab 44 in place on the receptacle 12. Thus, a ground circuit is completed through the ground lead 42, ground pin 40, mounting tab 44, fastening screw 26, and the metallic portion of the frame 21 on which the fastening screw 26 is secured. It is seen, therefore, that the locating of the mounting tab 44 in place provides for an additional ground circuit that acts as a safety feature for the user of a tool or appliance to which the electrical plug is interconnected. In this connection, if the ground circuit in the receptacle 12 is faulty for any reason, or if the exterior projecting portion of the ground pin 40 is removed, mutilated or deformed in any way, the alternate ground circuit from the interior portion of the ground pin 40 through the mounting tab 44 and fastening screw 26 insures that the user of the appliance or tool to which the electrical plug

10 is connected is suitably protected from electrical hazard.

While there is shown and described herein certain specific structure embodying the invention, it will be manifest to those skilled in the art that various modifications and rearrangements of the parts may be made without departing from the spirit and scope of the underlying inventive concept and that the same is not limited to the particular forms herein shown and described except insofar as indicated by the scope of the appended claims.

What is claimed is:

1. In an electrical plug that is adapted to be electrically connected with an outlet socket of a receptacle, a body portion formed of an insulating material, male conductor prongs mounted in said body portion and extending outwardly thereof for engagement in slots in said outlet socket, said conductor prongs being electrically interconnected to conductor leads in said body portion, a mounting tab formed of electrically conducting material mounted in said body portion and extending radially outwardly thereof, a ground pin mounted in said body portion and extending outwardly therefrom for being receivable in a ground slot formed in said outlet socket, said ground pin being permanently connected to said mounting tab in electrical engagement therewith, and electrical conducting means engaging said mounting tab and being connected to said receptacle for fixing said mounting tab to said receptacle so as to prevent inadvertent removal therefrom, said plug thereby being positively mounted on said receptacle and the ground connection thereon being electrically interconnected to said mounting tab, engaging means and receptacle.

2. In an electrical plug as set forth in claim 1, said insulating material of said body portion being plastic and said mounting tab being molded within said body portion, wherein a portion of said tab is embedded in said body portion in permanent electrical engagement with said ground pin, and the remaining exposed portion of said tab is located outwardly of said body portion in the position of use.

3. In an electrical plug as set forth in claim 2, said electrical conducting engaging means being defined by a threaded fastener that extends through an opening formed in said mounting tab for engagement with said receptacle wherein a ground circuit is established through said receptacle, fastener, mounting tab, ground pin and ground connection.

4. In an electrical plug as set forth in claim 3, said mounting tab including an inner portion that is fixed in said body portion and an outer portion that extends radially outwardly of said body portion, said outer portion being offset with respect to said inner portion so as to be located in coplanar relation with respect to the outer end of said body portion from which the prongs and ground pin extend, thereby providing for flush engagement of said outer portion of the mounting tab when it is secured to said receptacle by said threaded fastener.

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