

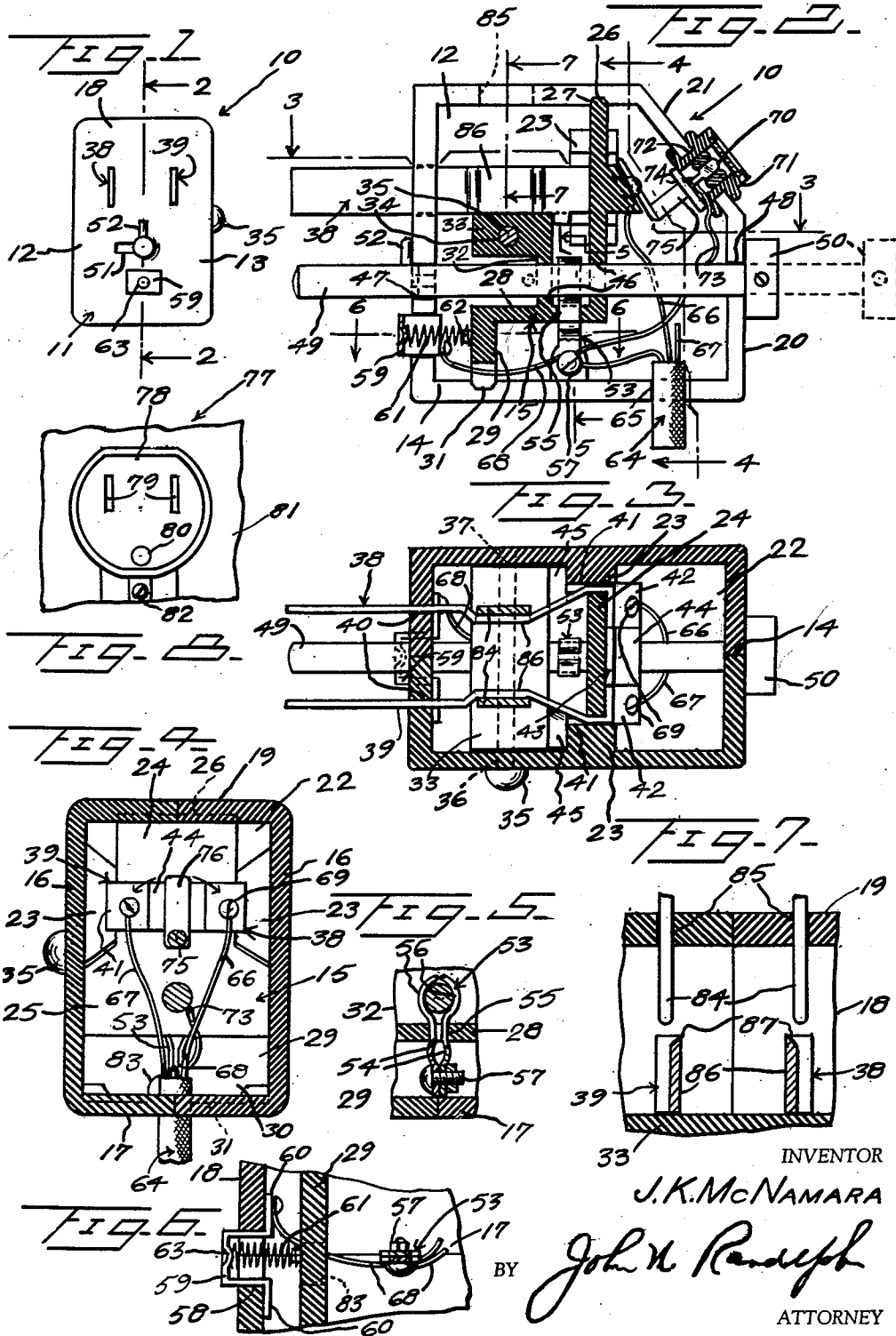
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ELECTRIC PLUG WITH GROUND INDICATING LIGHT

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ELECTRIC PLUG WITH GROUND INDICATING LIGHT

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This invention relates to a novel electric plug adapted to be connected to a conventional three-wire electric cord such as is utilized with electric power tools and other portable electrical devices for grounding the device to protect the user from possible electrocution.

More particularly, it is an aim of the present invention to provide a plug for a three-wire electric cord, having a retractable ground prong connected to the third wire of the electric cord to engage a ground connection of a conventional three-wire electrical outlet or receptacle, or which ground prong can be retracted to enable the plug to be connected to a conventional two-wire electrical receptacle or outlet without utilizing a special two prong adapter plug for this purpose, without cutting off the ground prong or without substituting a two prong plug for the three prong plug.

Still another object of the invention is to provide an electric plug having a secondary means for grounding the third wire of the electric cord when the plug is connected to the two-wire electrical outlet with the ground prong retracted.

Still another object of the invention is to provide an electric plug having means by which grounding of the third wire can be checked.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawing, illustrating a presently preferred embodiment thereof, and wherein:

FIGURE 1 is a front elevational view of the three-way electric plug;

FIGURE 2 is an enlarged central sectional view taken substantially along a plane as indicated by the line 2-2 of FIGURE 1;

FIGURE 3 is a longitudinal sectional view through the plug taken substantially along the line 3-3 of FIGURE 2;

FIGURE 4 is a transverse sectional view of the plug, taken substantially along the line 4-4 of FIGURE 2;

FIGURE 5 is a fragmentary transverse sectional view taken along the line 5-5 of FIGURE 2;

FIGURE 6 is a fragmentary horizontal sectional view taken substantially along a plane as indicated by the line 6-6 of FIGURE 2;

FIGURE 7 is an enlarged fragmentary transverse sectional view taken substantially along a plane as indicated by the line 7-7 of FIGURE 2, and

FIGURE 8 is a fragmentary plan view of a conventional three-wire type electrical receptacle or outlet.

Referring more specifically to the drawing, the three-way electric plug in its entirety is designated generally 10 and includes a casing, designated generally 11, composed of complementary halves 12 and 13 having edges 14 which are disposed in abutting engagement with one another when the casing halves 12 and 13 are assembled together. The assembled casing 11 defines a chamber 22 in which a partition member, designated generally 15, is accommodated. The partition 15 and the casing halves 12 and 13 are formed of electrical insulating material and said parts, particularly the casing halves, may be formed of a transparent insulating material.

The casing 11, composed of the assembled casing halves, includes complementary side walls 16, a bottom wall 17, a front wall 18 which is disposed at a right angle to the walls 16 and 17, a top wall 19, an upright lower rear wall 20 and an inclined upper rear wall 21. The side

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walls 16 are provided with transversely aligned inwardly extending projections 23 between which extends an upright back wall 24 of the partition 15, which back wall has a laterally enlarged lower portion 25 which fits snugly between the side walls 16, below the projections 23, as best seen in FIGURE 4. The top wall 19 has a transversely extending internal groove 26 in which the beveled upper edge 27 of the rear wall 24 seats.

The partition 15 also includes a bottom wall 28 which extends forwardly from the bottom edge of the rear wall portion 25 and which is disposed above and parallel to the bottom 17 and terminates at its forward end in a downturned extension 29 which, like the partition bottom 28, fits snugly between the casing side walls 16. The extension 29 has a bottom portion 30, as best seen in FIGURE 4 which is restricted in width and beveled to engage in an upwardly opening transverse groove 31 of the casing bottom 17.

The partition 15 also includes a transverse upper front wall 32 which extends upwardly from the horizontal bottom wall 28, forwardly of and spaced from the rear wall portion 25 and which terminates at its upper end in an upper front portion 33. The wall 32 and portion 33 fit snugly between the casing side walls 16 and the portion 33 is disposed forwardly of the projections 23. The projection 33 has a bore 34 which extends therethrough to receive a long screw 35 which passes loosely through an opening 36 of one side wall 16 and threadedly engages an opening 37 of the other side wall 16 for securing the casing halves 12 and 13 together and for functioning in combination with the grooves 26 and 31 and the partition parts which engage therein for retaining the partition 15 immovably in the casing chamber 22.

The plug 10 includes two electrical blade-type contacts 38 and 39 which extend through transversely aligned laterally spaced openings 40 of the front wall 18, so that forward portions of the blades 38 and 39 extend forwardly from the casing 11, while rear portions of said blades extend rearwardly into the chamber 22 and have intermediate parts thereof resting upon the partition portion 33. Parts of the rear ends of the blades 38 and 39 extend across inwardly opening notches 41 of the projections 23, past portions of the side edges of the rear wall 24. The blades 38 and 39 have inclined rear terminals 42 which bear upon a downwardly and rearwardly inclined thickened rear portion 43 of the rear wall 24 so that the terminals 42 are disposed at an incline, nearly parallel to the top rear wall 21. The portion 43 includes an intermediate part 44 which is disposed between the terminals 42 and substantially flush therewith. The blades 38 and 39 have extensions 45 which project laterally outward from the bottom edges thereof and which engage between the partition portion 33 and the projections 23 to prevent the blades from sliding forwardly or rearwardly relative to the casing and partition.

The wall portions 25 and 32 have aligned openings 46 which align with an opening 47 of the front wall 18 and an opening 48 of the rear wall portion 20 to slidably receive a rod 49 which has a knob 50 secured to its rear end and which is disposed behind the rear wall portion 20. The front wall 18 has a notch 51 which opens into the opening 47, through which a pin 52 is slidably movable when said pin, which projects laterally from a part of the rod 49, is disposed to align with the notch 51. When the knob 50 is disposed against the rear wall portion 20 the pin 52 is disposed forwardly of the front wall 18, so that the rod 49 can be turned to move the pin out of alignment with the notch 51 to hold the rod 49 in its full line projected position of FIGURES 2 and 3, with its forward part extending forwardly from the front wall 18. The rod 49 is formed of an electrical conducting material.

A spring clamp 53, composed of two corresponding elongated clamping elements 54, extends through an opening 55 of the bottom portion 28. The strips 54 include outwardly bowed upper clamping portions 56 which are disposed above the bottom portion 28 and between the portions 25 and 32 and which embrace and yieldably grip a part of the rod 49. The lower parts of the elements 54 are secured together by a nut and bolt fastening 57, and said elements are formed of electrical conducting material to provide an electrical connection between the rod 49 and the fastening 57.

The front wall 18 has a rectangular or noncircular opening 58, as best seen in FIGURE 6, below the opening 47. A button 59 of electrical conducting material is slidably disposed in the opening 58 and is prevented from passing outwardly therethrough by outturned flanges 60 which abut the inner side of the wall 18 and which form terminals of a strip from which the button 59 is formed. A spring 61 bears against the button 59 and a part of the forward side of the partition extension 29 for normally holding the button 59 in its projected position of FIGURES 2, 3 and 6. The spring 61 is held in place by a projection 62 which is formed on and projects from the extension 29 and by a projection 63 constituting a dimple in the outer part of the button 59, which projections 62 and 63 engage in the ends of the spring 61.

An end of an electric cord 64 extends into the chamber 22 through an opening 65 of the casing bottom 17, said cord having three exposed wire ends 66, 67 and 68 located within the chamber 22. A binding screw 69 electrically connects the wire 66 to the terminal 42 of the blade 38 and another binding screw 69 connects the wire 67 to the terminal 42 of the blade 39. The third ground wire 68 of the electric cord 64 is connected to the fastening 57 and to one of the flanges 60, as best seen in FIGURES 2 and 6, to thus form a ground connection through the clamp 53 with the rod 49 and also with the button 59. Wire 68 extends through a notch 83 in part 30.

A small glow lamp or neon tube 70 is mounted in a hollow button or casing 71 which is swivelly mounted in an opening 72 of the rear wall 21. At least the outer part of the casing 71 is transparent or translucent so that light rays will be emitted therefrom when the lamp 70 is illuminated. A wire 73 leads from the lamp 70 to the fastening or post 57 and is thereby electrically connected to the wire 68 and a wire 74 connects the lamp 70 electrically to an arm 75 which extends inwardly from the casing 71 and which supports at its inner end an upwardly extending blade 76 of electrical conducting material which is thus connected to the wire 74. The blade 76, as seen in FIGURE 4, normally bears against the inclined surface 44 which is of electrical insulating material.

FIGURE 8 illustrates a part of a conventional electrical receptacle 77 including a conventional three-wire electrical outlet 78 having laterally spaced contact blade receiving slots 79 and a ground prong receiving opening 80. A cover plate 81 of the receptacle 77 is held in place by a screw fastening 82 which is grounded through the frame, not shown, that supports the outlet 78.

Assuming that the other end of the electric cord 64 is connected in a conventional manner to an electric power tool or other portable electric unit, not shown, the plug 10 can be connected to the outlet 78 in a conventional manner so that the blades 38 and 39 will engage in the slots 79 to complete the electric circuit through the wires 66 and 67 to the power tool or other unit, and the prong 49 will engage the opening 80 and be grounded in a conventional manner for grounding the tool or unit, as is conventional.

However, the fact that the tool or unit is grounded can be checked by turning the button or casing 71 to engage the blade 76 with the portion 42 of blade 38. If this

constitutes the positive contact, a circuit will be completed therefrom through the lamp 70, wire 73, clamp 53 and rod 49 to cause the lamp to glow and thereby indicate that the wire 68 is grounded through the rod 49. If the lamp 70 is not energized the casing 71 is oscillated in the other direction to move the blade 76 into engagement with the part 42 of the blade 39 and if this happens to be in engagement with the positive contact of the outlet then the lamp will be energized, as aforementioned. If the lamp 70 is not energized in either of the positions of the blade 76 (electrically connected to one or the other blades 38 or 39), this will indicate that the wire 68 is not grounded through the prong 49 and that the tool or unit to which the cord 64 is connected is not grounded and therefore cannot be safely used. Actually, when the plug 10 is applied as just described, the button 59 will make contact with the screw 82, the head of which will seat in the dimple 63, and as said screw is secured to the grounded frame of the outlet 78, the ground wire 68 will thus be additionally grounded in this manner.

If the receptacle includes an outlet having two slots corresponding to the slots 79 but not including the ground prong receiving opening 80, so that such receptacle would correspond identically with the receptacle 77 with the opening 80 omitted, the plug 10 can still be utilized and without an adapter by merely grasping the knob 50 to turn the rod 49 to align the pin 52 with the slot 51 so that the prong can be retracted to its dotted line position of FIGURE 2. The prong 49 will be retained in its retracted position by frictional engagement of the jaws 56 therewith. When the plug 10 is then applied, the wire 68 will still be grounded through the button 59 engaging the screw 82 and the fact that the wire has been grounded can be tested by manipulation of the casing 71 in the aforementioned manner to effect illumination of the lamp 70. The spring 61 permits the button 59 to yield inwardly and to yieldably hold the button in contact with the head of the screw 82 when the plug 10 is applied to a receptacle.

Thus, the plug 10 is adapted for use with either two or three wire electrical outlets and with either type of outlet will effect the grounding of a third ground wire of the electric cord connected to said plug, and will permit testing and visual indication that the third wire is actually grounded.

The plug 10 may also function as a receptacle for another two bladed electric plug, not shown, the blades 84 of which may extend downwardly through slots 85 in the casing top wall 19 to engage inwardly offset portions 86 of the blades 38 and 39, the upper edges of which portions 86 are externally beveled as seen at 87 to guide the blades 84 into engagement with the outer sides of the portions 86 and into yieldable electrical contact with the blades 38 and 39.

Various modifications and changes are contemplated and may be resorted to, without departing from the function or scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. An electric plug including a casing, a pair of spaced blade contacts projecting from said casing and adapted to be electrically connected to two conductor wires of an electric cord leading from the casing for completing an electric circuit through said wires when the blades are received in and electrically connected to an electrical outlet receptacle, a ground contact slidably mounted in and spring urged outwardly of a part of the casing and adapted to be electrically connected to a third ground wire of the electric cord, said ground contact being disposed relative to said blades to engage an electrically grounded part of the receptacle when the blades are electrically connected thereto, and a testing unit supported by said casing including an electrically energized signal electrically connected to said ground contact and a movable contact electrically connected to the signal and se-

lectively engageable with said blades for completing an electric circuit between one of the blades and the ground contact to indicate grounding of the third wire.

2. An electric plug comprising a casing, a pair of spaced blade contacts supported by and projecting from said casing and adapted to be connected to two wires of an electric cord leading from the casing, a rod forming a ground prong mounted in and extending from said casing and adapted to be electrically grounded in an electric receptacle in which said blades are electrically connected, means electrically connected to said ground prong and adapted to be electrically connected to a third ground wire of the electric cord, a testing unit carried by said plug including a light source disposed to be viewed from externally of the casing and electrically connected to said means, a movable electrical contact connected to said light source, and a manually manipulatable part supporting said movable contact and movably supported by said casing for positioning said movable contact in electrical engagement with either of said blade contacts for completing an electric circuit through one of the blade contacts and said ground prong when the plug is electrically connected to the outlet receptacle for energizing the light source for visually indicating that the prong is grounded.

3. An electric plug as in claim 2, means slidably and swivelly mounting said ground prong in the casing, means engaging and cooperating with a part of the casing for retaining the ground prong in a projected operative position, and said first mentioned means including means functioning to frictionally retain the ground prong in a retracted inoperative position.

4. An electric plug as in claim 2, said casing comprising casing halves formed of electrical insulating material defining a chamber when the casing halves are assembled, a partition member of electrical insulating material disposed in said chamber and immovably supported by the assembled casing halves and cooperating therewith for supporting said blades and the ground prong.

5. An electric plug as in claim 4, said first mentioned means including a pair of jaws yieldably embracing a part of said ground prong for frictionally holding the ground prong in a retracted position, and said jaws extending through a part of said partition and being held thereby against movement with the grounded prong.

6. An electric plug as in claim 2, said means including a pair of jaws yieldably embracing a part of said ground prong for frictionally holding the ground prong in a retracted position.

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