

June 28, 1949.

W. L. TODD ET AL
POLARITY INDICATOR PLUG
Filed Jan. 15, 1945

2,474,407

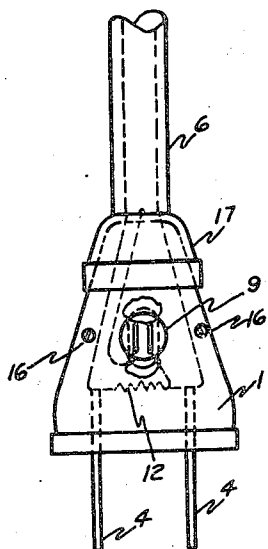


FIG. 1

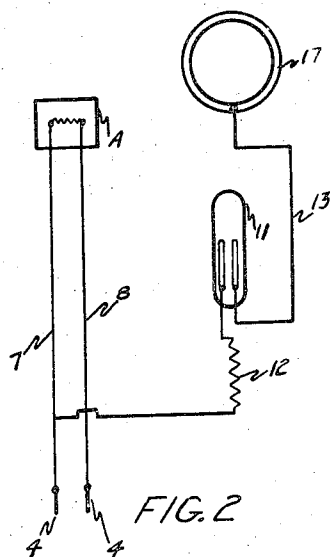


FIG. 2

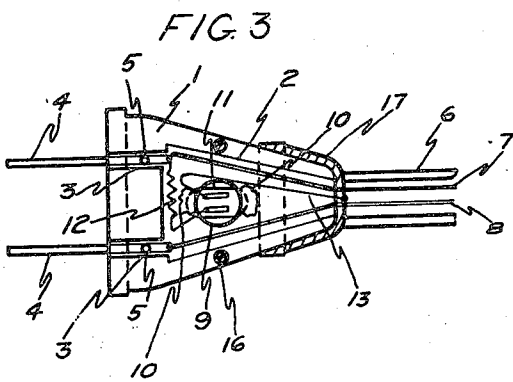


FIG. 3

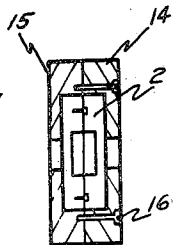


FIG. 5

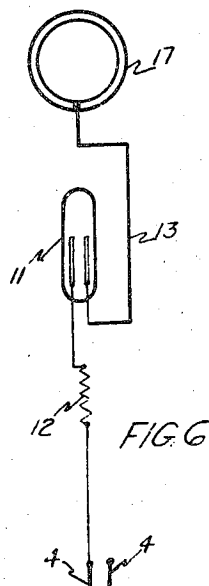


FIG. 6

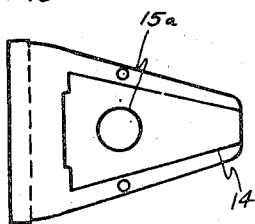


FIG. 4

INVENTOR.
WILLIAM L. TODD
ELBERT E. GREENBERG
BY *Allen & Allen*
Attorneys

UNITED STATES PATENT OFFICE

2,474,407

POLARITY INDICATOR PLUG

William L. Todd, Fort Thomas, Ky., and Elbert E. Greenberg, Cincinnati, Ohio, assignors to The Kelley-Koett Manufacturing Co., Covington, Ky., a corporation of Ohio

Application January 15, 1945, Serial No. 572,886

8 Claims. (Cl. 177-311)

1

For various reasons it may become desirable when connecting up electrically operated devices to current supply receptacles, to connect one of the lead-in wires for the apparatus to the ground wire terminal in the receptacle. Modern wiring practice requires in domestic, public building and factory installations that one wire of each branch circuit be grounded at the electrical inlet box. When an electrically operated device is arranged with a grounded casing and one of the connector wires from an outlet receptacle is to be connected or by short circuit likely to become connected to the casing, it is necessary to avoid short circuit, that a grounded wire be the one so connected up or that is likely to become connected up with the casing. Also where the casing of an apparatus is not itself grounded, but is connected up with other than a grounded input wire, a person standing on a moist floor or touching some grounded pipe or the like, will get a bad shock upon touching the casing.

In various types of electronic equipment, radio devices, input circuits to the electrodes on cathode ray tube devices, and other apparatus, it is often desirable to select the terminal thereof to which a grounded wire should be connected.

Various cumbersome devices have been suggested for determining which of the two terminals of an outlet receptacle is the grounded terminal. Also receptacles and attachment plugs have been marked to indicate the required orientation of the connector plugs in the receptacles.

Our invention is directed to providing for an indicator as a part of the usual attachment plug which terminates the two-wire cord or cable for any piece of electrical apparatus. The same principle can be applied to a test plug to be used merely to test a circuit, or a plug screwed into a receptacle in the circuit, so as to find or check as to the ground wire or connection.

In our invention we employ the principle that the human body will receive a small amount of current from a live wire although the body is fully insulated from the ground. Thus in our novel device we insert in some convenient way a tiny or "peanut" neon tube or other glow lamp into or on the body of an otherwise standard receptacle plug and connect the tube through a high resistance or impedance to one terminal of the plug and to an exposed conductor on the outside of the plug, such as a ring on the dielectric body of the plug. In such a construction, if the terminal which is connected to the lamp is a live terminal, the contact of the finger of the

2

person inserting the plug with the conductor will cause the lamp to glow.

Various forms according to our invention at once suggest themselves, and we have selected for illustration and description but one structure, it being understood that the invention inherent therein and in other arrangements on the same principle will be set forth in the claims that follow, to which reference is hereby made.

In the drawings:

Figure 1 is a side elevation of one of our indicator plugs.

Figure 2 is a wiring diagram showing the use of the plug of Figure 1.

Figure 3 is a plan view of one half of the connector plug body.

Figure 4 is a plan view of the other half.

Figure 5 is a cross section through the plug assembly with the electrical connections removed.

Figure 6 is a wiring diagram showing the use of our device as a piece of test equipment.

As a convenient construction our plug can be made of two halves molded from suitable insulation material. The one half will have a body 1 of tapered construction as shown with a facial cavity 2. There will be grooves 3, 3, in this half in which the terminal prongs 4, 4 will be mounted, and if desired held in place by screws 5. A standard cable or cord 6 (indicated diagrammatically) may be used containing two supply wires 7 and 8, which are insulated and will be soldered to the inner ends of the terminal prongs.

The cavity in the casing half is provided with a sight hole 9, and laid into the cavity and held in place across the sight hole by drops of sealing wax 10, is the "peanut" neon tube 11 or other glow lamp. The tube terminals are connected to a high resistance 12 that is soldered to one of the terminal tongues and to a wire 13 which extends out through the narrow end of the cavity. Instead of a high resistance, a condenser can be used, or combination of condenser and resistance, and the term "impedance" is used in this specification to mean any of said arrangements.

The other half of the casing, in this example of our invention, is formed of a matching piece of molded insulation material 14, with a matching cavity 15, in which is a sight hole 15a.

When the connections are set up in the first half of the casing, the other half is set upon it and screws 16 used to connect the two halves together.

A metal cup-shaped ring 17, set over the cable prior to assembly, is then pushed down over the narrow end of the assembly and soldered to the

3

wire 13 from the neon lamp. If this is not desired, the wire 13 may simply be permitted to extend out of the end of the plug and stripped of insulation to be grasped in the finger.

The operation of the device may be explained by the wiring diagram of Fig. 2. If the left hand prong 4 when inserted into the receptacle of a wiring system so that it engages a live or non-grounded terminal, and the ring 17 of the plug is held in the fingers, as is necessary for insertion of the prongs into the receptacle, then current will flow through the impedance 12, and through the lamp, thence to the ring 17 and into the fingers, resulting in the lamp being caused to glow. The two sight holes will permit of the light being observed by the operator and he will know that the desired wire 7 of the input cable will be connected to the proper terminal and that the other wire 8 will be grounded. Naturally the wires 7 and 8 will have been so connected to the apparatus as to apply the grounded wire 8 to the desired part of the apparatus A.

If the device is to be used for testing only, the same arrangement as now described will be employed except that there will be no cable connections.

Referring to Fig. 6, the prongs 4 are inserted into the receptacle to be tested and the ring 17 grasped in the fingers. If the plug is so oriented that the left hand prong is brought into contact with a live terminal, the light will go on. If it is not, the plug is removed and reversed. By marking the side of the left hand prong, say, with a dab of red paint, the grounded terminal and the live or hot terminal of the receptacle can be determined.

The invention is applicable to screw-in plugs, as is obvious. The placing of the lamp on the inside of the plug is not required except for protecting it and makes the glow more readily visible in a bright light. The use of a metal ring as a contact with the fingers, as already noted is not required, since the wire from the lamp can project from the plug and then is grasped by the operator to make the test. Also the wire from the lamp could be connected to an exposed button of metal. None of these suggested modifications will require illustration since no structure problems are involved.

If one has one of the plugs with prong connections, as illustrated, and a threaded socket-type of receptacle to test, then a screw body plug with prong terminals will first be inserted in the threaded socket, whereupon the receptacle can be tested. We provide a screw body plug to go with a prong equipped indicator in which the screw body is externally marked to show the prong terminal that is connected to the shell of the plug.

The position of the lamp and the impedance are interchangeable with respect to connection to prongs or the conductor contact, so long as the impedance is connected in series. Furthermore, the use of the impedance is a safety factor, since under entirely dry conditions, insufficient current would pass into the body of an ungrounded observer to burn out the glow lamp.

Finally, a plug with but one terminal used as a finder for an electrical live wire can be used. Also, in multiple connection plugs with three or more terminals, more than one terminal can be provided with a lamp and an external button as a conductor to be contacted.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

4

1. A polarity indicator plug for electric outlet receptacles comprising a casing, prongs projecting from the casing for insertion into the sockets of the receptacle, a glow type lamp housed in the casing, said casing having at least one aperture through which it may be viewed, an impedance in the casing connected in series with the lamp, a conductive element exposed on the casing, said element, the lamp and the impedance being connected in series with one of the prongs.

2. A polarity indicator plug for electric outlet receptacles comprising a casing, prongs projecting from the casing for insertion into the sockets of the receptacle, a glow type lamp housed in the casing, said casing having at least one aperture through which it may be viewed, an impedance in the casing connected in series with the lamp, a conductive element exposed on the casing, said element, the lamp and the impedance being connected in series with one of the prongs, said conductive element being a ring embracing the casing.

3. A polarity indicator plug for electric outlet receptacles comprising a casing, prongs projecting from the casing for insertion into the sockets of the receptacle, a glow type lamp housed in the casing, said casing having at least one aperture through which it may be viewed, an impedance in the casing connected in series with the lamp, a conductive element exposed on the casing, said element, the lamp and the impedance being connected in series with one of the prongs, in combination with a cable including conductor wires, said wires connected to the prongs.

4. A polarity indicator plug for electric outlet receptacles comprising a casing, prongs projecting from the casing for insertion into the sockets of the receptacle, a glow type lamp housed in the casing, said casing having at least one aperture through which it may be viewed, an impedance in the casing connected in series with the lamp, a conductive element exposed on the casing, said element, the lamp and the impedance being connected in series with one of the prongs, said casing being formed of two matching parts secured together, each having a facial cavity in it, the lamp being housed between the two parts.

5. A polarity indicator plug for electric outlet receptacles comprising a casing, prongs projecting from the casing for insertion into the sockets of the receptacle, a glow type lamp housed in the casing, said casing having at least one aperture through which it may be viewed, an impedance in the casing connected in series with the lamp, a conductive element exposed on the casing, said element, the lamp and the impedance being connected in series with one of the prongs, said casing being formed of two matching parts secured together, each having a facial cavity in it, the lamp being housed between the two parts and the conductive element being a cup-shaped ring engaging the assembly of matching parts.

6. A polarity indicator plug for electric outlet receptacles comprising a casing, prongs projecting from the casing for insertion into the sockets of the receptacle, a glow type lamp housed in the casing, said casing having at least one aperture through which it may be viewed, an impedance in the casing connected in series with the lamp, a conductive element exposed on the casing, said element, the lamp and the impedance being connected in series with one of the prongs, said casing being formed of two matching parts secured together, each having a facial cavity in it, the lamp being housed between the

two parts and the conductive element being a cup-shaped ring engaging the assembly of matching parts, in combination with a cable including insulated conductor wires entering the said casing through the ring, and secured one to each terminal.

7. In combination, an electrically operated device comprising a casing, and having terminals, and a polarity indicating plug for connecting said device to an electric receptacle, said plug having prongs for insertion in said receptacle, and comprising a housing containing a glow type lamp, and an impedance and having an exposed conductive element, said lamp, impedance and element being connected in series with one of said prongs and one terminal of said device, the other prong being connected to the other terminal of said device.

8. The combination of claim 7 in which said other prong is also grounded electrically to the casing of said device.

WILLIAM L. TODD.

ELBERT E. GREENBERG.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,285,840	Thomas	Nov. 26, 1918
1,835,882	Krippner	Dec. 8, 1931
1,971,899	Buttolph	Aug. 28, 1934
2,023,916	Dante	Dec. 10, 1935
2,034,273	Smith	Mar. 17, 1936
2,112,137	Brach	Mar. 22, 1938
2,213,973	Woodring	Sept. 10, 1940
2,316,163	Hignutt	Apr. 13, 1943
2,116,448	O'Brien et al.	May 3, 1938