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J. E. SMITH

2,034,273

ELECTRICAL CONNECTER PLUG

Filed Sept. 29, 1930

FIG. 1

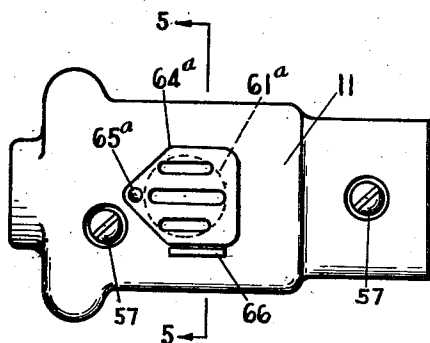


FIG. 2

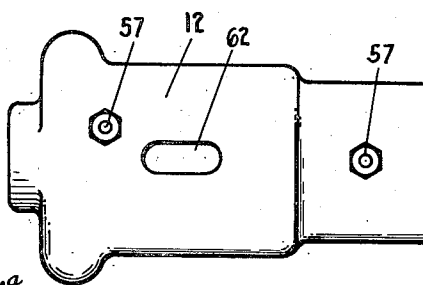


FIG. 3

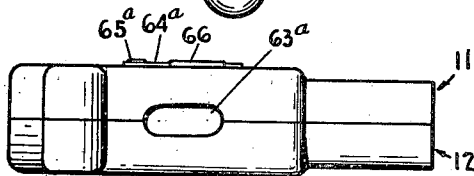


FIG 4

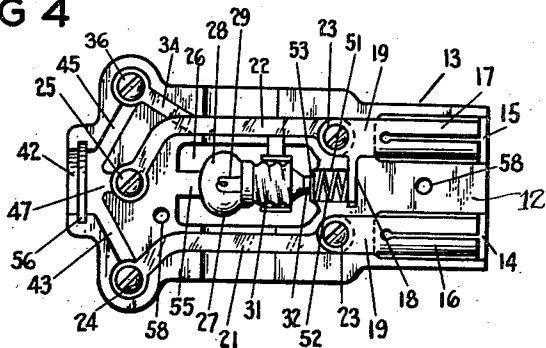


FIG. 5

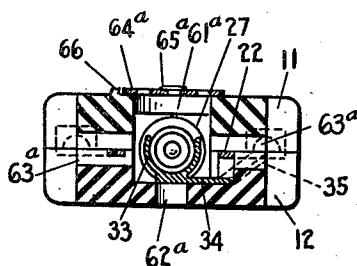


FIG 6

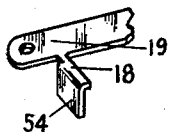
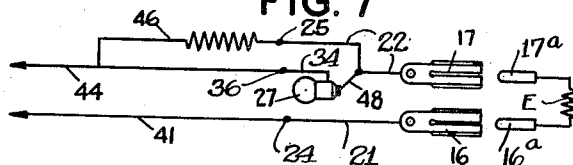


FIG. 7



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2,034,273

ELECTRICAL CONNECTER PLUG

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Application September 29, 1930, Serial No. 484,950

4 Claims. (Cl. 177—311)

My invention relates to electrical connector plugs, and is shown as more particularly applied to that type of plug intended to be detachably connected to electrical appliances.

5 It is one object of my invention to provide in a plug of the above indicated character means for visibly indicating when the circuit from a source of current supply is completed through the electrical element of the appliance. In other words, 10 if the circuit through the appliance element is defective, the indicator will not show a completed circuit.

It is another object of my invention to locate a tell-tale light within the connector plug, but 15 visible therethrough, and to arrange the connections so that a lamp of low voltage can be used.

It is a further object of my invention to provide a connector plug with a tell-tale light located within the plug, the plug being arranged 20 so that the lamp may be readily removed and inserted in the plug without the necessity of taking the plug apart, or disturbing any of the wiring connections to the plug or the lamp.

25 It is a still further object of my invention to provide a plug of the above indicated character with a simple yet rugged wiring arrangement especially adapted for the aforementioned purposes.

30 It is a still further object of my invention to provide a plug having a removable indicator lamp and a guard for said lamp carried by said plug.

It is a still further object of my invention to 35 provide a resistor in circuit with an electric appliance and to connect an indicator lamp across said resistor.

It is a still further object of my present invention to provide an electrical connector plug 40 having a signal of the type shown in my co-pending applications Serial No. 499,701, filed December 3, 1930 and Serial No. 643,620, filed November 21, 1932, the latter of which is a division from the present application.

45 Other and further objects of my invention will be apparent from the following specification taken in conjunction with the accompanying drawing, wherein—

50 Figures 1, 2 and 3 are respectively front, rear and side views of my improved connector plug;

Figure 4 is a plan view of my improved plug, the top half being removed so as to facilitate the illustration;

55 Figure 5 is a longitudinal section taken on the line 5—5 of Fig. 1;

Fig. 6 is a detail of one of the connector clips; and

Fig. 7 is a diagram showing the circuit connections to and in my improved connector plug.

Arrangements heretofore proposed for the use 5 of tell-tale lights on electrical appliances, such as electric irons, percolators, or electric heaters, have merely been indicators that the current had been turned on in the connection cord connected 10 to the appliance. If the heating element in the appliance should be burned out, or the connections to the heating element broken, the light would nevertheless continue to indicate the current being turned on at the wall plug or lamp 15 socket, or in the connection cord. By my proposed arrangement, the lighting of the indicator lamp depends upon the circuit through the electrical appliance. Hence, if the circuit through the appliance is not established or completed there will be no indicator light. Thus, my 20 improved connector plug indicates the true condition of the appliance in the circuit.

At the same time, the indicator lamp must not be connected in series with the circuit through the appliance because then if the lamp should 25 burn out, the appliance could not be used until the lamp was replaced. Accordingly, I propose to energize the indicator lamp through a shunt circuit.

In order to protect the lamp from damage by 30 being in an exposed position, I arrange the lamp within the body of the connector plug. However, it is not practical to use a 110 volt lamp in the connector plug, even if it were practical to get a lamp of such a voltage in the confined area 35 of the body of the plug, for the reason that the heat of the lamp would be so great it would affect the material of which the plug is composed, and perhaps cause other damage to the connections, as well as rendering the plug uncomfortably hot 40 to handle.

Therefore, I propose to use an ordinary flash light bulb requiring but 2 to 3 volts and drawing 45 but 200 milliamperes of current. Such a low wattage lamp will generate practically no heat, and certainly none of a serious character, within the confined space permitted on the interior of a connector plug.

I am enabled to use such a low voltage lamp by connecting the same about a resistor so as to 50 take the drop thereacross, the resistor being in series circuit with the circuit through said appliance. However, it is important that the resistor shall not be confined within the body of the plug for it is apparent that the energy consumed 55

therein would be dissipated in heat and that heat liberated within the body of the plug would be as undesirable as if a 110 volt lamp were used. Accordingly, I propose to arrange the resistor wire outside the plug, as for instance within the connecting cord extending between the wall outlet and my improved connector plug.

Inasmuch as the indicator lamp may burn out and therefore need replacement, I provide an opening in one-half of my improved connector plug through which the concealed lamp may be removed, and a fresh lamp inserted, and over the opening I provide an apertured guard.

Referring now to Figures 1 to 6 of the drawing, my improved plug is formed of two pieces, an upper half 11 and a lower half 12. All of the electrical connections in the plug are located in the lower half of the plug, the connecting strips, etc., being embedded in appropriate grooves or channels. Wherever it is necessary, the upper half 11 has complementary grooves or channels cooperating with those of the lower half to properly enclose the plug and its connections. As this is the usual practice in this art, it is only believed necessary to describe in detail the lower half of the plug, shown in Fig. 4.

At the reduced end 13 of the plug, there are located two channels 14 and 15 terminating in openings at the end of the plug. In these channels are embedded spring clips 16 and 17 respectively. These clips may be of any of the usual and well known constructions adapted to engage the projecting pins 16a and 17a ordinarily constituting the terminals of a heating element E (see Figure 7) of an appliance. However, the clip 17 is provided with an extension 18, the purpose of which will be more fully hereinafter set forth. The channels 14 and 15 are of a considerable depth to accommodate the clips 16 and 17, but the flat, terminal portion 19 of each clip rests in a groove that is only deep enough to accommodate it.

A pair of metal strips 21 and 22 join respectively with the terminals 19 of the spring clips 16 and 17, the screws 23 serving to hold the strips and the terminals in electrical engagement with each other. The screws engage in screw threaded bushings, not shown, which bushings are embedded in the bakelite or other material of which the plug is composed. The connecting strips 21 and 22 rest in appropriate channels or grooves of a shape and size to accommodate the strips; which terminate respectively at terminal screws 24 and 25. It will be noted that the strips 21 and 22 extend longitudinally of the plug adjacent the opposite side edges thereof. Between the channels for these strips is located an enlarged cut out portion or pocket 26 adapted to house an indicator lamp 27.

The indicator lamp 27 comprises a bulb 28, which is shown as rounded, housing a filament 29. Such lamps are ordinarily provided with a screw-threaded metallic shell 31 on the base portion constituting one of the terminals of the filament 29. A terminal 32 on the end of the base constitutes the other terminal for the filament 29, the two terminals 31 and 32 being insulated from each other.

The base of the lamp 27 is received in a substantially semi circular spring clip 33 (Fig. 5) which has a metallic strip 34 secured thereto. It will be noted that the strip 34 rests on the bottom of the pocket 26 and passes under the connecting strip 22, where it bridges the pocket 26, entering an inclined groove 35 which leads upwardly from

the bottom of the pocket 26 and terminates at the third terminal screw, 36, that is located at the opposite side edge of the plug from the terminal screw 24.

It will be noted that the connecting strips 21 and 22 bend to the left while connecting strip 34 bends to the right in order to properly space the terminal screws 24, 25 and 36 from each other, and substantially in line with each other adjacent the top edge of the plug.

I propose to use a three wire connecting cord extending from the wall outlet to this connector plug, the cord containing the three wires entering the opening 42 at the end of the plug. The three wires are indicated in Fig. 7, wire 41 being the usual copper wire conductor extending along groove 43 and terminating under the terminal screw 24, thus establishing electrical connection with the connecting strip 21 and spring clip 16. Wire 44 in the connecting cord, likewise a copper conductor, extends along groove 45 and terminates under the terminal screw 36 thus establishing electrical contact with the connecting strip 34 that is connected to one side of the lamp 27.

The third wire of the connecting cord is indicated at 46. This is a resistance wire chosen to have a predetermined ohmic resistance, the IR drop across which corresponds to the voltage required to properly energize the lamp 27. I have found that the flash light lamp requires but 2.2 volts to operate. Usually the connecting cords are six feet in length and by reason of the fact that a resistor of so low a value is required, the amount of heat in the resistor is very small, and there is ample exposed area in a six foot length of cord to dissipate the heat without perceptible warmth in the cord itself.

The wire 46 extends along the central groove 47 and terminates under the terminal screw 25 thus making electrical connection with the connecting strip 22 directly to the clip 17.

The other connection for the lamp 27 is indicated generally in the diagram at 48, and in the plug extends from the terminal 32 of the lamp to the clip 17. In my improved plug this connection is combined with means for holding the lamp in position in the plug as will now be described.

Communicating with the pocket 26 is a cylindrical bore 51 which is made of a size and length sufficient to receive the coiled spring 52. At one end the spring 52 is closed by a plate 53 against which the terminal 32 of the lamp rests when the lamp is in place. At its other end the spring 52 rests against projection 54, which is part of the arm 18 bent at right angles thereto and extending down into the end of bore 51. Thus, the electrical connection is made from the terminal 19 of the clip 17 through the arm 18, the turned down portion 54, spring 52, plate 53, to the terminal 32 of the lamp. This is the connection which is designated generally at 48 in the circuit diagram of Fig. 7.

A projection 55, at the opposite end of the pocket 26, is formed of the material of which the plug is composed and extends into the pocket 26 so as to engage the end of the bulb 28. As the lamp 27 is inserted in place in the plug, it must be pressed home between the projection 55 and the plate 53, and this is sufficient to slightly compress the coiled spring 52. The lamp 27 is held firmly from movement longitudinally of the plug by this arrangement, and it is held from movement sidewise of the plug by the semi-circular spring clip 33.

The connector plug of the above general character is usually provided with a coiled spring guard (not shown herein) about the connecting cord where it enters the plug at the opening 42. The end of this coiled spring is usually secured between the halves 11 and 12 in an annular groove near the opening 42, and I have indicated such a groove at 56. The two halves of the plugs 11 and 12 are held together by two or more screw bolts indicated at 57, these passing through appropriate holes 58, extending through the halves of the plug and located in the parts that are thickest, that is to say, where there are no grooves or cutaway portions.

In order that the light may be seen when illuminated, I provide a hole 61a in the upper half 11 extending out through the front of the plug as indicated in Fig. 1, a hole 62a in the bottom half 12 of the plug, and apertures 63a on opposite sides of the plug. These apertures 61a, 62a and 63a all communicate with the compartment 26 in which the lamp 27 is retained, so that the illumination of the lamp can be seen from all sides of the plug.

In order that the lamp may be removed from the plug without removing the bolts 57, I make the opening 61a in the front of the plug sufficiently large and circular to permit the passage of the lamp 27 therethrough. Over this opening I provide a grill or guard 64a which is riveted to the outside of the upper half 11 of the plug, as indicated at 65a. The riveting is intended to hold the grill or guard 64a in frictional engagement with the surface of the plug 11 so that it may be pushed aside, pivoting on the rivet, to permit the lamp to pass through the opening 61a. A stop 66 is provided on the plug along one edge of the guard 64a, so as to limit its movement in one direction.

When it is desired to replace the lamp 27 in the plug, any instrumentality such as a match may be inserted in the rear aperture 62a to press the bulb 28 upwardly and out through the opening 61a after the grill 64a has been moved out of the way. Here, a person taking hold of the bulb 28 with his fingers can readily extract the same from the plug. A fresh lamp is reinserted through the opening 61a so that the base thereof engages in the clip 33, whereupon a simple pressure upon the lamp 27 with the finger will force the lamp home, the rounded surface of the bulb 28 serving as a cam on the abutment 55 to push the lamp 27 longitudinally in the clip 33 and to cause engagement of the terminal 32 on the lamp with the plate 53. After the lamp is inserted in place, the grill 64a is returned over the opening 61.

By the foregoing, it will be seen that I have provided a construction by which will be accomplished the objects of the invention hereinbefore set forth in a practical manner with a simple arrangement that will be economical to manufacture.

Modifications may be made in the arrangement and location of parts within the spirit and scope of my invention, and such modifications are intended to be covered by the appended claims.

I claim:

1. An electrical connector plug comprising a pair of cooperating parts, a pair of clip terminals mounted between said parts and accessible through one end of said plug, one of said clip terminals having an arm projecting therefrom, terminal screws located adjacent the opposite end of said plug, connecting strips between said

screws and clips, an opening in the plug adjacent the terminal screws, channels in said parts from the opening to at least one of said screws, electrical connecting wires connected to said screws, a pocket in said plug having an opening therefrom to the exterior of said plug, a socket mounted in said pocket, a third terminal screw mounted adjacent the other terminal screws, a connecting strip between the third screw and said socket, a third wire connected to said third screw, an electrical connection projecting from said terminal arm to said pocket, an indicator lamp mounted in said socket and engaging the last mentioned electrical connection, and openings in said plug through which the light of said lamp may be seen.

2. An electrical connector plug comprising a pair of cooperating parts, a pair of clip terminals mounted therebetween and accessible through one end of said plug, one of said clip terminals having an arm projecting therefrom, a pair of terminal screws located adjacent the opposite end of said plug, connecting strips between said screws and clips, an opening in the plug adjacent the terminal screws, channels in said parts from the opening to at least one of said screws, a pair of electrical connecting wires connected to said screws, one of said wires including a resistor, a pocket in said plug having openings therefrom to the exterior of said plug, a socket mounted in said pocket, a third terminal screw mounted adjacent the other terminal screw, a connecting strip between the third screw and said socket, a third wire connected to said third screw and to the said one of said pair of wires including the resistor, appropriate screws in the body of said plug for said wires and connecting strips, a resilient member connected to said terminal arm and projecting into said pocket, an indicator lamp mounted in said socket so as to engage the resilient member and an abutment in said pocket for engaging the lamp to position the same in said pocket.

3. An electrical connector plug and cord set comprising a plug body having first and second appliance engaging prongs at one end thereof and first, second and third terminals at the other end thereof, said first and second terminals being electrically connected with said first and second prongs respectively, a signal light within said plug body and electrically connected in series with said third terminal and said second prong and a three-wire cord having the inner end of one wire thereof connected with said first terminal, the inner end of the second wire thereof connected with said second terminal, the outer ends of said first and second wires being adapted for connection to a source of current supply, the outer end of the third wire thereof being connected with the outer end of the second wire and the inner end of the third wire being connected with said third terminal to thereby shunt a fractional part of the current flowing through an appliance having its heater element connected with said prongs from said second wire so that the shunted current flows through said signal light and the signal light is therefore energized only when said electrical connector plug is electrically associated with such an appliance and the circuit through the appliance is complete, said second wire including a resistance sufficient to cause a voltage drop of sufficient magnitude to cause said signal light to be readily noticeable.

4. An electric connector plug and cord set comprising a plug body having first and second ap-

pliance prong engaging elements at one end thereof, a signal light within said plug body and discernible from the exterior thereof and a three-wire cord having the inner end of one wire of said cord connected directly with one of said prong engaging terminals and having the second and third wires thereof connected together at the outer end of the cord, the inner ends of said second and third wires being connected, the second one through said signal light with the other of said prong engaging terminals and the third one direct with the other prong engaging terminal to thereby shunt a fractional part of the

current flowing through an appliance having its prongs connected with said prong engaging terminals from said third wire so that the shunted current flows through said second wire and said signal light and the signal light is thereby energized only when said electric connector plug is electrically associated with such an appliance and the circuit through the appliance is complete, said third wire including resistance sufficient to cause a voltage drop of enough magnitude to cause said signal light to be readily noticeable.

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