

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in or relating to Plugs for making Connections to Electric Supply Sockets

I, WONG CHOW SAU-FONG, a Chinese citizen, of 30—32 Whitfield Road, Hong Kong, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to plugs for making connections to electric supply sockets so that flexible leads from electrical apparatus such as electric fires, kettles, refrigerators and washing machines may be detachably connected to an electric current supply system.

It is the object of the invention to provide a plug for the purpose set forth in which a switch is incorporated to enable the current supply to the apparatus to be cut off without removing the plug from the socket.

According to the present invention, a plug for connecting a lead from an electrical apparatus to an electric current supply socket, the plug being of the conventional three pin type having the contact pins arranged at the three apices of an isosceles triangle and comprising a hollow body of insulating material from which the contact pins project and an insulating cover closing an open side of the hollow body wherein a switch mechanism arranged to make and break a connection between one of the contact pins and a binding post inside the hollow body for one conductor of the lead is operated by a rocker member projecting outwardly through an opening in the cover, wherein a fixed switch contact is mounted in the body so as to be in electrical contact with said one of the contact pins, a switch frame fixed in the body carrying a movable contact movable by the rocker member into and out of engagement with the fixed contact and the said switch frame being in permanent electrical contact with the said binding post and being included

in the electric current path between the contact pin and the binding post when the switch is closed. Some embodiments of the invention are hereinafter described with reference to the accompanying drawings, in which:—

Figure 1 is a front elevation of one form of plug according to the invention having contact pins of round cross-section;

Figure 2 is a side elevation of the plug shown in Figure 1;

Figure 3 is an elevation similar to Figure 1 with the cover of the plug removed;

Figure 4 is a section on the line 4—4 of Figure 3;

Figure 5 is a section on the line 5—5 of Figure 3;

Figure 6 is a section similar to Figure 4 but showing a modified switch mechanism;

Figure 7 is a rear elevation of another form of plug according to the invention having contact pins of rectangular cross section and including accommodation for a fuse;

Figure 8 is a section on the line 8—8 of Figure 7; and

Figure 9 is a section on the line 9—9 of Figure 7.

Referring to Figures 1 to 4 of the drawings, the plug comprises a body 10 having a flat wall 11 on one side and recessed on the other side to form a cavity which is closed by a cover 12 secured to the body by a screw (not shown) passing through a hole 13 (Figure 3) in the body 10 and entering a screw threaded hole in an internal boss in the cover 12.

Two contact pins 14 and 15 shown in dotted lines in Figures 1 project from the flat wall 11 of the body, and serve to provide connections to the neutral and live sockets of a conventional earthed socket member, and a third contact pin 16 provides an earth connection, the three pins lying at the corners

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of an isosceles triangle with the pin 16 at the apex thereof. The cover 12 has a slot 17 formed in the wall thereof opposite to the flat wall of the base, through which slot projects a rocker member 18 of insulating material serving to operate a switch herein-after described. The contact pins 14 and 16 extend through holes in the wall 11 of the body 10, cross pins 19 passing through them abutting against the inner face of the body wall 11 to prevent the contact pins from becoming detached. The ends of the cross pins 19 lie in grooves 21 in thickened portions of the wall 11 to prevent the contact pins from rotating and to align diametral bores 22 in the said contact pins, shown in dotted lines in Figure 3, with slots 23 in the said thickened portions of the wall 11, to enable conductors to be inserted in the said bores 22 and clamped therein by screws 24.

The third contact pin 15 abuts against the outer face of the wall 11 and is clamped thereagainst by a screw 25 (Figure 4) passing through a switch contact member 26 inside the body and through a hole in the body wall into a co-axial screw-threaded hole in the contact pin 15. The contact member 26, as shown in Figure 4, is substantially Z-shaped and has a rounded pip or projection 27 on the limb thereof which is spaced from and parallel to the wall 11, the said pip 27 facing towards the wall 11.

A metal switch frame 28 comprising two flat side pieces 29 joined together at one end by a bridge-piece 31 is mounted in the switch body 10 by means of a screw 32 passing through the bridge-piece 31 into a screw-threaded hole in an internally thickened portion 33 of the body wall 11. A U-shaped switch arm 34 (Figures 4 and 5), pivoted at 35 in the switch frame 28, has the bend portion of the U extended in a direction normal to its pivot axis and provided with a contact button 36 to co-operate with the contact button 27 on the fixed contact member 26. The rocker 18 is pivotally mounted at 37 in the switch frame 28, and has a projection 38 the end of which moves, when the rocker is moved about its pivot, from one side to the other of the pivot 35 of the switch arm 34. A coiled compression spring 39, extending between the end of the projection 38 and the bend portion of the switch arm 34, thus moves the switch arm 34 to-and-fro with a snap action when the rocker is moved. The bridge piece 31 serves as a stop to locate the switch arm 34 in an 'off' position, shown in Figure 4, the portion of the switch arm which carries the button 36, when the switch arm is moved to the 'on' position, engaging the button 27 on the fixed contact.

Movement of the rocker 18 is limited by inward projections on the side pieces 29 of the switch frame, one of such projections

being shown at 41 in Figure 4. One of the said side pieces 29 carries a binding pin 42.

Figure 6 shows a modified form of switch mechanism embodied in a plug similar to that shown in Figures 1 to 5. Parts shown in Figure 6 which are identical with parts shown in Figures 1 to 5 bear the same reference numerals.

The switch frame 28 has side pieces 29 as already described, and a switch-operating rocker 18 actuates a switch arm 34, again as already described. The bend portion of the switch arm 34 has a lateral projection 43 bent up as shown in Figure 6 and carrying a contact button 44. The fixed contact member of the switch is an L shaped piece of metal 45 one limb of which is clamped by the screw 25 between an insulating block 46 and the wall 11 of the body, so that the said contact member 45 is electrically connected to the pin 15, and the other limb of the contact member 45 carries a button 47 against which the button 44 is pressed when the switch is closed.

The plug shown in Figures 1 to 6 is of the type having round contact pins which is commonly used on 15 amp electrical circuits. There will now be described, with reference to Figures 7 to 9, a plug of the flat pin type commonly used on 13 amp circuits of the ring-main type and incorporating a fuse.

Referring to Figures 7 to 9 of the drawings, the plug comprises a body 50, similar to the body 10 of the plug previously described and having the cavity 51 therein closed by a cover (not shown) retained in position by two screws 53. The three contact pins are all of rectangular cross-section, the live contact pin 54 being fitted, as shown in Figure 8, into a recess in the flat face 55 of the body 50 and retained therein by a screw 56 which passes through a flat contact member 57 and holds the said contact member against a flat supporting surface 58 in the plug cavity as well as providing electrical communication between the pin and contact member.

A neutral contact pin 59, and an earth contact pin 61 each pass through apertures in the body 50, these contact pins having enlarged heads at their inner ends which retain them in position relative to the body.

A switch frame 62 similar to that described with reference to Figures 3 to 5, is fixed in the body 50 by a screw 63 and carries a switch arm 64 operated by a rocker 65, these parts also being similar to those described with reference to Figures 3 to 5, and the rocker projecting through a similar slot in the cover.

As shown in Figure 9 of the drawings, the cavity 51 in the plug body does not extend right across the said body, and a second

cavity 66, opening at the flat face 55 of the plug body lies alongside the cavity 51, the cavity 66 being of elongated shape (Figure 7), and terminating at one end adjacent to the contact pin 59. Adjacent the ends of the cavity 66 are provided two clips, one of which is shown at 67 in Figure 9, to receive and make electrical contact with the end caps of a cartridge fuse 68. A cover 69 is provided for the cavity 66, being conveniently retained in position by a loop member 71 on its inner side which embraces the fuse 68. The clip 67 at the end of the cavity 66 adjacent the contact pin 59 is connected, as shown in Figure 9, by a bridging strip 72, to the switch frame 62, the bridging strip 72 being bent to follow the shape of the cavity 51 and being covered by insulating material 73. That clip 67 is held in position by a screw 74 passing through the wall of the cavity 66 into the bridging strip. The other clip 67 is secured in position by a similar screw (not shown), passing through the wall of the cavity 66 and engaging a screw-threaded hole in a binding post 75. Thus between the live contact pin 54 and the binding post 75 there are interposed the switch and the fuse 68, so that an electrical circuit through the plug can be made and broken by operation of the switch, and can be interrupted on overloading by the fuse.

It will be observed that, in all of the illustrated embodiments of the invention, the switch lies to one side of a line passing through the earthed pin and through a point midway between the live and neutral pins. In the embodiment in Figures 7 to 9, the fuse lies on the opposite side of that line.

WHAT I CLAIM IS:—

- 40 1. A plug for connecting a lead from an electrical apparatus to an electric current supply socket, the plug being of the conventional three pin type having the contact pins arranged at the three apices of an isosceles

triangle and comprising a hollow body of insulating material from which the contact pins project and an insulating cover closing an open side of the hollow body wherein a switch mechanism arranged to make and break a connection between one of the contact pins and a binding post inside the hollow body for one conductor of the lead is operated by a rocker member projecting outwardly through an opening in the cover, wherein a fixed switch contact is mounted in the body so as to be in electrical contact with said one of the contact pins, a switch frame fixed in the body carrying a movable contact movable by the rocker member into and out of engagement with the fixed contact and the said switch frame being in permanent electrical contact with the said binding post and being included in the electric current path between the contact pin and the binding post when the switch is closed.

2. A plug according to Claim 1, wherein the said binding post is mounted on the switch frame.

3. A plug according to claim 1, wherein the said binding post is connected to the switch frame through a fuse.

4. A plug according to claim 3, wherein the fuse is mounted in clips one of which is secured to the said binding post and the other of which is connected by a bridge piece to the switch frame.

5. A plug for connecting a lead for an electrical apparatus to an electric current supply socket, substantially as described with reference to Figures 1 to 5, Figure 6, or Figures 7 to 9 of the accompanying drawings.

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1. A plug for connecting a lead from an electrical apparatus to an electric current supply socket, the plug being of the conventional three pin type having the contact pins arranged at the three apices of an isosceles

triangle and comprising a hollow body of insulating material (from which the contact pins project and an insulating cover closing an open side of the hollow body wherein a switch mechanism arranged to make and break a connection between one of the contact pins and a binding post inside the hollow body for one conductor of the lead is operated by a rocker member projecting outwardly through an opening in the cover, wherein a fixed switch contact is mounted in the body so as to be in electrical contact with said one of the contact pins, a switch frame fixed in the body carrying a movable contact movable by the rocker member into and out of engagement with the fixed contact and the said switch frame being in permanent electrical contact with the said binding post and being included in the electric current path between the contact pin and the binding post when the switch is closed.

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5. A plug for connecting a lead for an electrical apparatus to an electric current supply socket, substantially as described with reference to Figures 1 to 5, Figure 6, or Figures 7 to 9 of the accompanying drawings.

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