

PLUG

This invention relates to plugs.

When wiring a conventional plug it is necessary to strip the wires and connect the exposed metal to clamping assemblies set in the plug. Contact is usually achieved by screwing a small screw onto each wire.

This operation can be extremely difficult for those with poor sight and is particularly difficult for the elderly and infirm.

According to the present invention there is provided a plug comprising a base provided with at least one clamping assembly for electrically connecting a wire to a pin, characterized in that said clamping assembly comprises an outer tube having a wire receiving hole, an inner member comprising a roll of metal mounted in said outer tube, a lever extending from said inner member and movable to rotate said inner member with respect to said outer tube, said inner member having a wire receiving gap extending across said roll of metal which, when said lever is moved upwardly from said base is aligned with the wire receiving hole in said outer tube and which, when said lever is pivoted towards said base grips said wire in said clamping assembly, and wherein that edge of said roll which engages said wire when said lever is moved towards said base is sufficiently sharp to penetrate any insulation on said wire as said lever is moved towards said base.

Preferably, said hole in said outer tube comprises a slot and said lever extends through said slot.

Advantageously, said slot subtends an angle of from 100° to 140° and most preferably 120°.

Preferably, said gap is from 2 to 4 mm in circumferential height.

Advantageously, said plug includes a pair of resilient flaps disposed to inhibit an electric cable being

withdrawn from said plug.

Preferably, said plug includes a cover which, when fitted on said base, inhibits wire releasing movement of said lever.

5 Advantageously, said cover is provided with a hole and said base is provided with a piston which is biased into said hole to inhibit separation of said base and said cover.

10 Preferably, said cover is slidably mounted on said base.

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For a better understanding of the present invention reference will now be made, by way of example, to the accompanying drawings, in which:-

Figure 1 is a simplified plan view of a plug in accordance with the invention with its cover removed and with the clamping assemblies open;

Figure 2 is a side view with the cover fitted and with the clamping assemblies closed;

Figure 3 is a section on line III-III of Figure 1, with the electric cable removed for clarity;

Figure 4 is a perspective view of one of the clamp assemblies used in the plug shown in Figures 1 to 3;

Figure 5 is a perspective view of an outer tube forming part of the clamping assembly shown in Figure 4;

Figure 6 is a perspective view of an inner member forming part of the clamping assembly shown in Figure 4;

Figure 7 is a front view of the inner member; and

Figure 8 is a front view of the outer tube.

Referring to Figures 1 to 3 of the drawings, there is shown a plug which is generally identified by reference numeral 1.

The plug 1 comprises a base 2 fitted with a cover 3.

As shown in Figure 1, the base 2 is provided with three clamping assemblies 4, 5 and 6 for securing the ends of the neutral, earth and live wires 7, 8 and 9 of an electric cable 10.

The plug 1 is provided with neutral, earth and live pins 11, 12 and 13. Neutral pin 11 is connected to clamping assembly 4 by a short bar 14. Earth pin 12 is connected directly to clamping assembly 5. Live pin 13 is connected to clamping assembly 6 via a fuse 15.

Each of the clamping assemblies 4, 5 and 6 is substantially identical.

Figures 4 to 8 show clamping assembly 5 which is

directly connected to earth pin 12. The clamping assembly 5 comprises an outer tube 16 which is open at its ends and which accommodates an inner member 19 comprising a roll of metal subtending approximately 240° leaving a small opening 20 approximately 3 mm high.

The inner member 19 is provided with a hole 21 which, when the inner member 19 is fully inserted in the outer tube 16 aligns with a circumferentially extending slot 22 in the outer tube 16. The circumferentially extending slot 22 is about 3 mm wide and subtends an angle of approximately 120°.

As shown in Figure 4, a lever 23 is pressed into hole 21 and soldered in place.

Returning now to the base 2, two resilient flaps 24, 25 converge across the cable inlet 26. Beneath these resilient flaps 24, 25 a hollow passage 27 extends across the plug 1. The hollow passage 27 houses two pistons 28, 29 which are biased apart by a spring 30. The free ends of the pistons 28, 29 extend through holes 31 in the cover 3 to retain the cover 3 in position.

In use, the electric cable 10 is first stripped so the neutral, earth and live wires 8, 9, 10 are the same length. The insulation is then stripped from the last 5 mm of the wires. (This is preferable but not essential.)

The cover 3 is then removed from the base 2 by simultaneously pressing the pistons 28, 29 inwardly and sliding the cover 3 in the direction of arrow A parallel to the base 2 to expose the clamping assemblies 4, 5, 6.

The lever 23 and the corresponding levers 23a, 23b in clamping assemblies 5 and 6 are then moved to a vertically upwardly extending position as shown in Figure 1. In this position the small opening 20 in the inner member 19 is in alignment with the circumferentially extending slot 22 as shown in Figure 4

relatively small opening approximately 3 mm x 3 mm.

The neutral, earth and live wires 7, 8, 9 are then inserted through the respective small openings and the levers 23, 23a and 23b pivoted towards a horizontal position. As the inner member 19 rotates with respect to the outer tube 16 the wire is trapped between the upper edge 32 of the inner member 19 and the lower edge 33 of the circumferentially extending slot 22.

When all three levers 23, 23a, 23b have been depressed the electric cable 10 is pushed downwardly between the resilient flaps 24, 25 which are displaced forwardly as shown in Figure 1 and inhibit the electric cable 10 being inadvertently withdrawn from the plug 1.

The cover 3 is then slid in the direction of arrow B over the base 2 and pressed towards the base 2 whilst the pistons 28, 29 are held together against the bias of spring 30.

When the holes 31 in the cover 3 come into alignment with the pistons 28, 29 the pistons 28, 29 spring outwardly thereby inhibiting the inadvertent removal of the cover 3. Outward movement of the pistons 28, 29 is restricted by detents 34 on the pistons 28, 29.

The cover 3 bears on the levers 23, 23a, 23b and this serves the dual purpose of ensuring that the wires are gripped tightly and that the levers 23, 23a, 23b do not return to the vertical position and release the wires 7, 8, 9 if the electric cable 10 is pulled.

It should be noted that whilst it is preferable to strip the insulation from the ends of the neutral, earth and live wires 7, 8 and 9 this may not be essential, as the upper edge 32 of the inner member 19 is provided with a relatively sharp edge to penetrate the insulation but not sever the wire below.

If desired the ends 17, 18 of the outer tube 16 may be covered with end caps (not shown). The use of end

caps may be highly desirable in certain circumstances, for example to inhibit the ingress of plastic during manufacture.

5 Whilst the lever 23 preferably extends through the
circumferentially extending slot 22 it will be apprecia-
ted that the inner member 19 could project beyond the
end of the outer tube 16 and the lever be attached to
the projecting portion of the inner member 19. In such
an embodiment the outer tube 16 would not have to be
10 provided with a circumferentially extending slot but
merely a hole. This arrangement would, however, have the
disadvantage that the inner member 19 and the outer tube
16 could separate unless the base was provided with a
suitable retaining wall.

15 It will be noted that the clamping assemblies 4, 5,
6 are approximately equidistant from the cable inlet 26.
This means that the neutral, earth and live wires 7, 8,
9 are all the same length which facilitates preparation
of the wires.

20 It will also be noted that the cover 3 is slidably
mounted on the base 2 and cannot simply be lifted off
the base as with a conventional plug.

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Claims:

1. A plug comprising a base provided with at least one clamping assembly for electrically connecting a wire to a pin, characterized in that said clamping assembly
5 comprises an outer tube having a wire receiving hole, an inner member comprising a roll of metal mounted in said outer tube, a lever extending from said inner member and movable to rotate said inner member with respect to said outer tube, said inner member having a wire receiving
10 gap extending across said roll of metal which, when said lever is moved upwardly from said base is aligned with the wire receiving hole in said outer tube and which, when said lever is pivoted towards said base grips said wire in said clamping assembly, and wherein that edge of
15 said roll which engages said wire when said lever is moved towards said base is sufficiently sharp to penetrate any insulation on said wire as said lever is moved towards said base.
2. A plug as claimed in Claim 1, wherein said hole in
20 said outer tube comprises a slot and said lever extends through said slot.
3. A plug as claimed in Claim 2, wherein said slot subtends an angle of from 100° to 140°.
4. A plug as claimed in Claim 3, wherein said slot
25 extends an angle of 120°.
5. A plug as claimed in any preceding claim, wherein said gap is from 2 to 4 mm in circumferential height.
6. A plug as claimed in any preceding Claim, including
30 a pair of resilient flaps disposed to inhibit an electric cable being withdrawn from said plug.
7. A plug as claimed in any preceding Claim, including a cover which, when fitted on said base, inhibits wire releasing movement of said lever.
8. A plug as claimed in Claim 7, wherein said cover is
35 provided with a hole and said base is provided with a



piston which is biased into said hole to inhibit separation of said base and said cover.

9. A plug as claimed in Claim 7 or 8, wherein said cover is slidably mounted on said base.

5 10. A plug substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

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