

(12) UK Patent Application (19) GB (11) 2 057 792 A

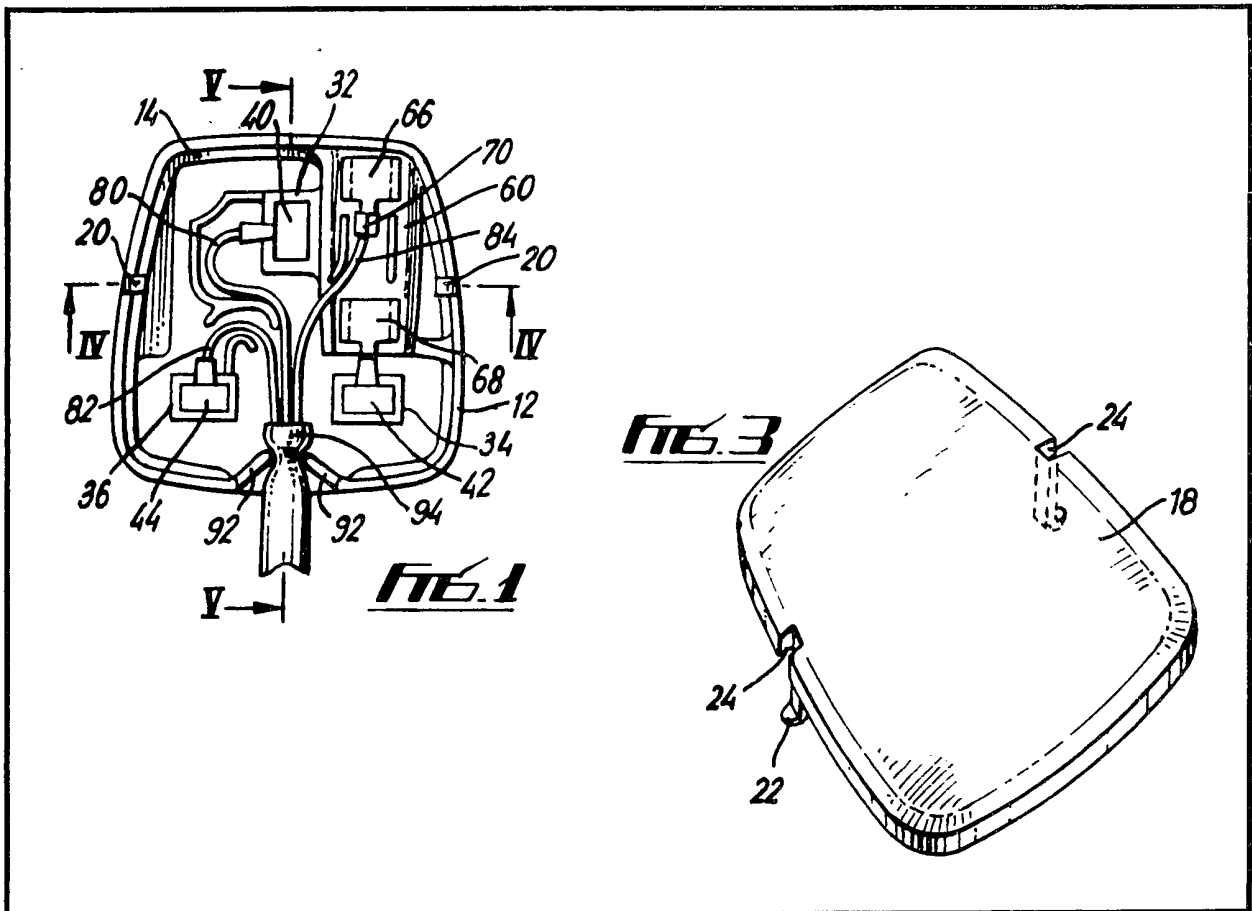
(21) Application No **8026821**
 (22) Date of filing
18 Aug 1980
 (30) Priority data
 (31) **7928836**
 (32) **18 Aug 1979**
 (33) **United Kingdom (GB)**
 (43) Application published
1 Apr 1981
 (51) **INT CL³ H01R 13/40**
13/502
 (52) Domestic classification
H2E 114 DAB DCS
 (56) Documents cited
GB 2003676 A
GB 863386
GB 666607
 (58) Field of search
H2E
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body. The plug is intended to be sold already connected to conductors and is safer than conventional plugs which are wired-up by the user.

(54) **Non-rewirable electric plug**

(57) A non-rewirable plug has a hollow body (12) accommodating pins (40, 42, 44) which are restrained against axial movement relative to the body, the end of each pin within the body having means for permanently connecting a conductor thereto. The plug body is closed firstly by a shield which rests on the plug body and then by a non-removable cover (18) with projections (22) which engage inside the plug



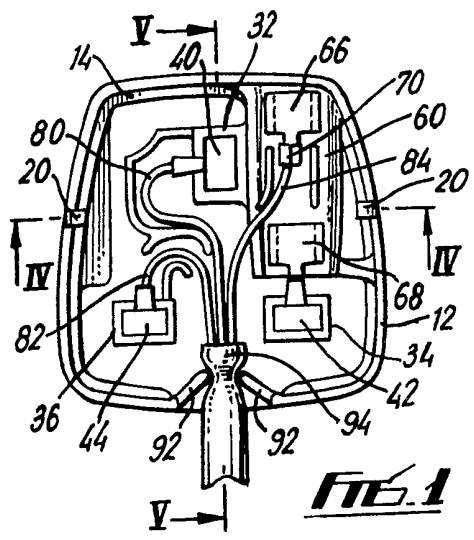


FIG. 1

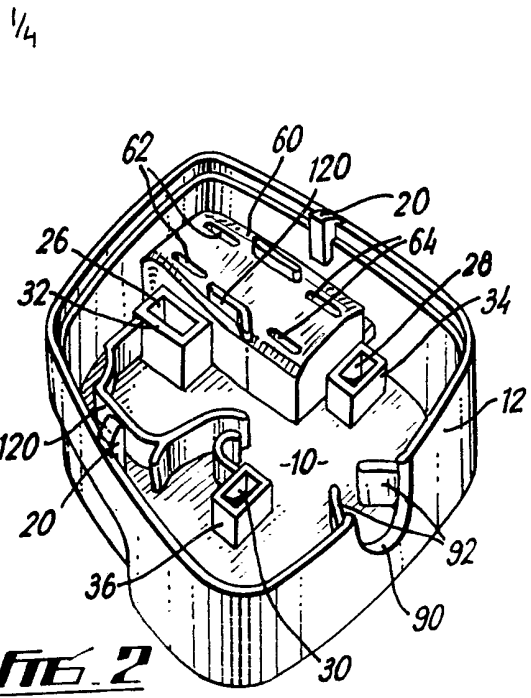


FIG. 2

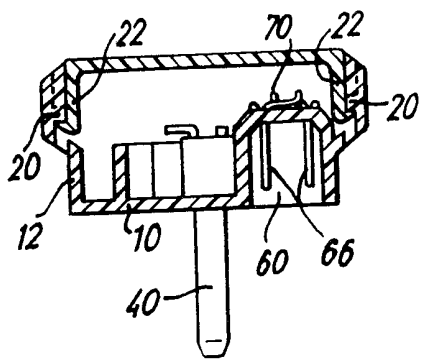


FIG. 4

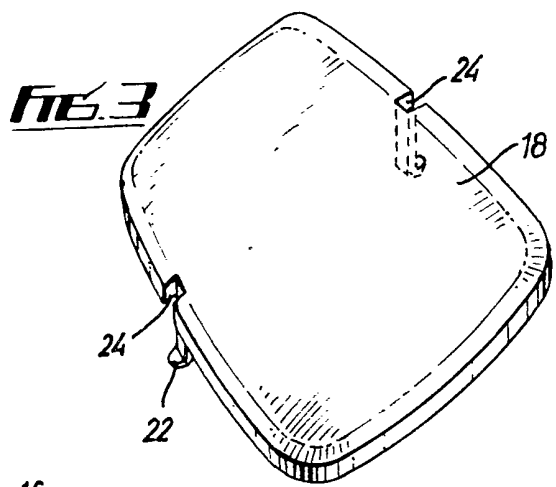


FIG. 3

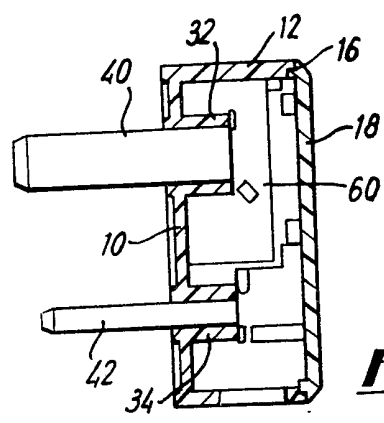


FIG. 5

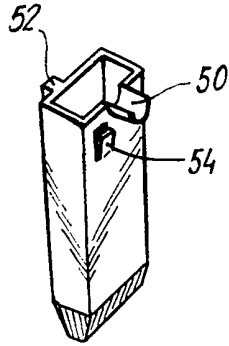


FIG. 6

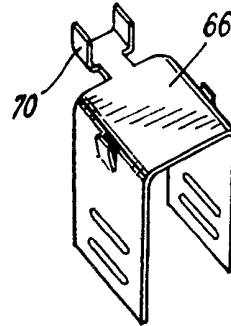


FIG. 7a

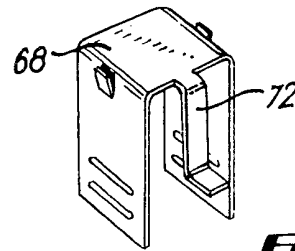


FIG. 7b

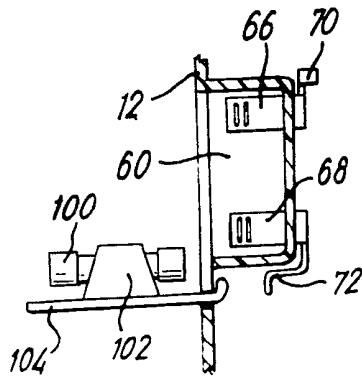


FIG. 8

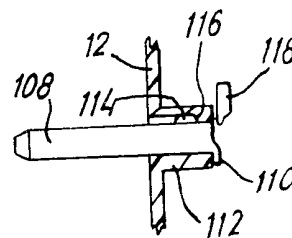


FIG. 9

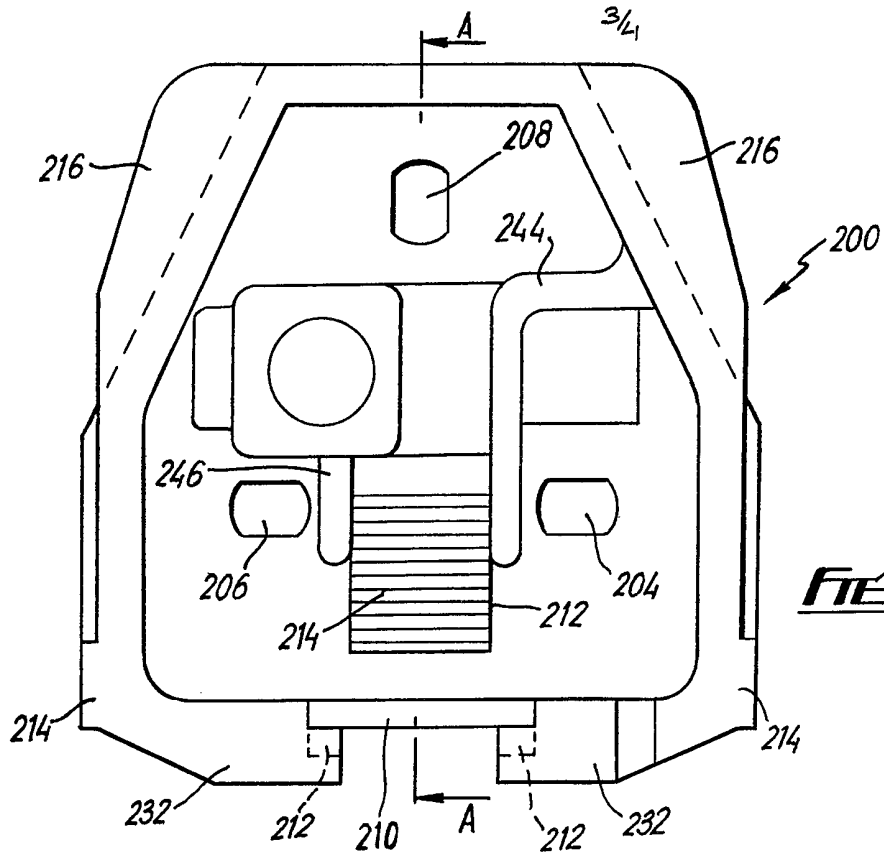


FIG. 10

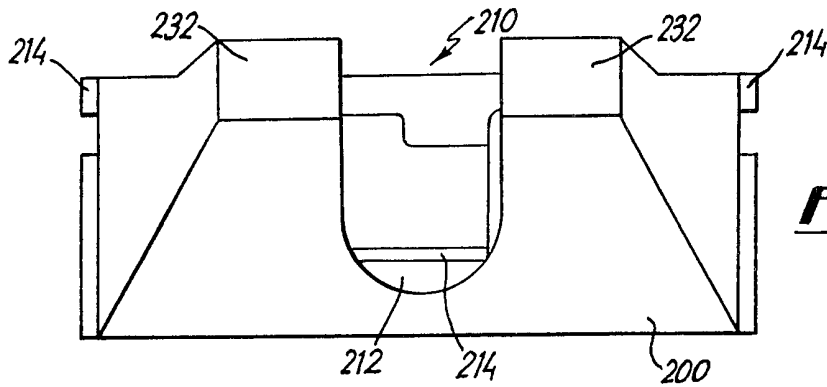


FIG. 11

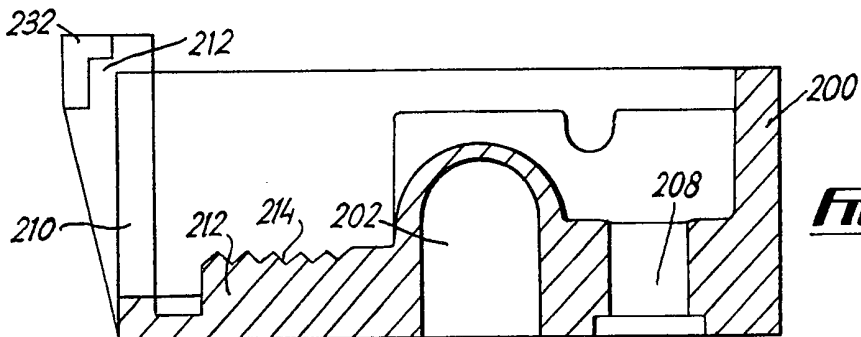


FIG. 12

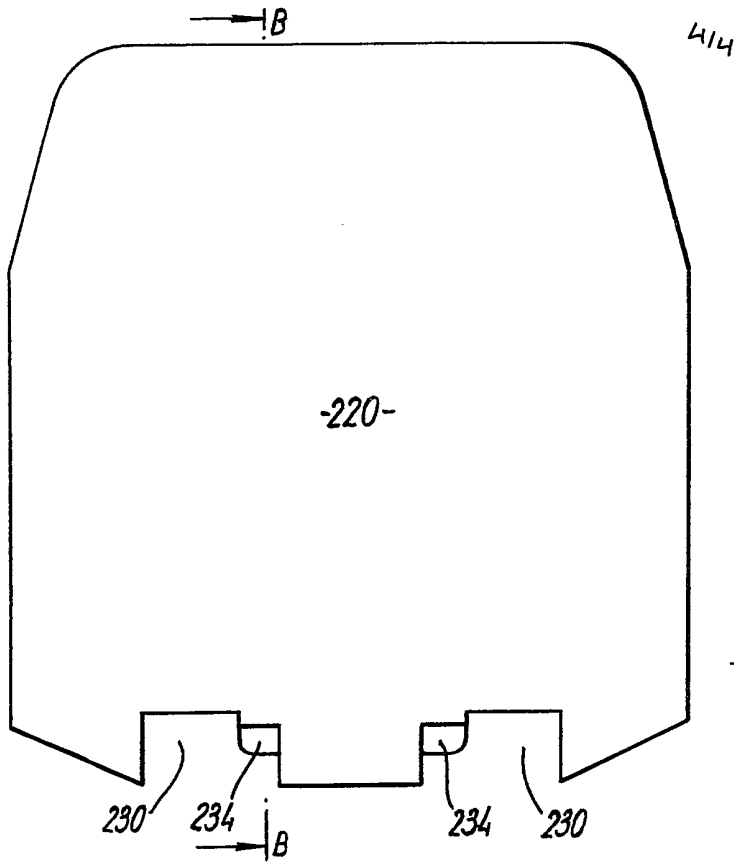


FIG. 13

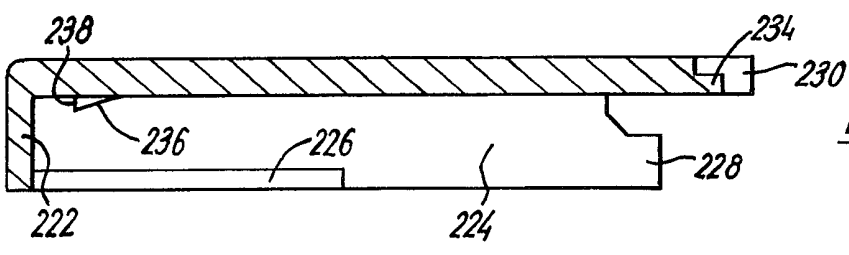


FIG. 14

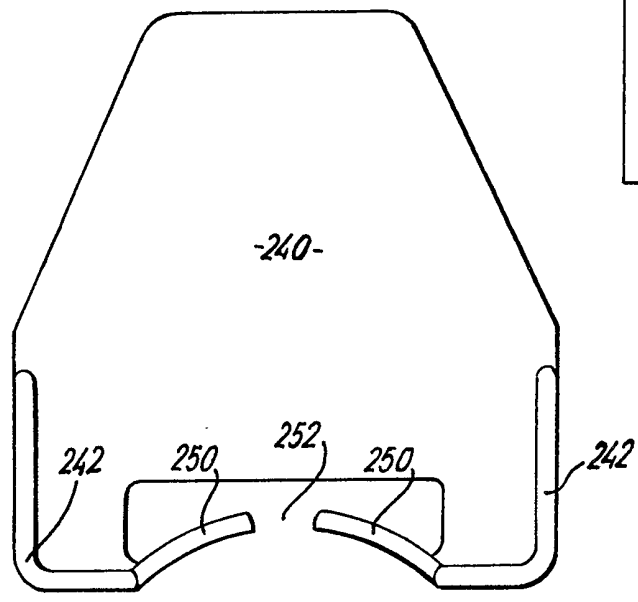


FIG. 15

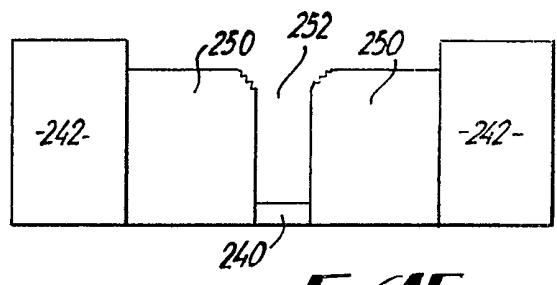


FIG. 16

SPECIFICATION

Non-rewirable electric plug

5 This invention relates to an electric plug and more particularly a non-rewirable electric plug.

A non-rewirable plug is one that is intended to be sold to the public with conductors already secured to the plug terminals. The construction of the plug is such that if the plug is once separated from the conductors it cannot be satisfactorily re-connected again.

10 According to the invention there is provided a non-rewirable plug comprising a hollow body, a plurality of plug pins, each pin extending from the body through a bore formed in the body, and each pin having a projection thereon engageable with the body to locate said pin with one end in the body and to prevent axial movement of said pin at least in one direction relative to the bore, means at said one end of each pin for permanently securing a conductor in electrical connection with the pin, said body being closed by a non-removable cover.

25 It is to be understood that reference herein to "permanent securing of a conductor to a pin" is intended to distinguish the connection from the known kind wherein the conductor is clamped to the pin by a screw or other means enabling, and intended to allow, the conductor to be disconnected and reconnected at will. The permanent connection called for by the invention is of the kind which is not intended to be disconnected and reconnected and is preferably effected by welding, crimping or other like fastening. Such a connection is not in all circumstances permanent per se, but can be considered permanent when compared to the aforementioned prior art.

40 It is also to be understood that the term "non-removable" as applied to the cover is intended to distinguish the cover from those of conventional re-wirable plugs where the cover is removably fastened to the plug body, for example by a screw, so that it can be separated from the body and conductors connected, or disconnected, from terminals within the plug body.

50 In one embodiment of the invention the means for connecting a conductor to a pin comprises a metal strip preferably integral with the pin. A conductor can be welded to the strip or the strip can be crimped around the conductor. If desired the conductor can be both crimped and welded.

55 In the case of a fused plug, one input conductor is permanently connected to a terminal which is in direct connection, or which is part of a fuse terminal. The other fuse terminal is permanently connected by a conductor to one pin, generally the live pin. The fuse terminals are arranged to be accessible from outside the body so that the fuse can be changed. Preferably the fuse is located in a

collar provided on a flap hinged to the body.

In another embodiment of the invention a shield is provided which covers the terminals in the plug body. It is convenient to provide cord gripping means on the shield, the cord gripping means preferably comprising two resilient, preferably, arcuate plates arranged with a gap therebetween of smaller dimensions than the overall width of the conductor to be received therein. The plates preferably extend towards each other and towards the interior of the plug body.

80 A specific embodiment of the invention will now be described by way of example with reference to the accompanying drawings in which:-

Figure 1 is a plan view of a plug with the cover removed;

85 *Figure 2* is a top perspective view of the plug of Fig. 1 with the pins, conductors and fuse terminals removed;

Figure 3 is a top perspective view of a cover;

90 *Figure 4* is a section on the line IV-IV of the plug in Fig. 1, but with the cover in place and the conductors removed;

Figure 5 is a section on the line V-V of the plug in Fig. 1 with the cover in place and the conductors removed;

95 *Figure 6* is a top perspective view of a plug pin;

Figures 7a and 7b show the terminals for a cartridge fuse;

100 *Figure 8* is a section through the part of the plug that receives a fuse;

Figure 9 illustrates in section through part of a plug a different way of mounting a pin;

Figure 10 is a plan view of the interior of the plug body of another embodiment;

105 *Figure 11* is an end elevation of the plug body of Fig. 10;

Figure 12 is a section on the line A-A on Fig. 10;

110 *Figure 13* is a top plan view of a cover for the plug body of Fig. 10;

Figure 14 is a section on the line B-B of Fig. 13;

115 *Figure 15* is an under plan view of a shield; and
Figure 16 is an end elevation of the shield of Fig. 15.

Referring to the drawing the plug comprises a hollow body defined by a base 10 and a wall 12 around the edge of the base. A rebate 14 is provided around the top of the wall which receives a cover 18 for the body. When in place the outer surface of the cover 18 is flush with the top of the wall 12. Two lugs 20 are provided on the inside of the wall on substantially opposite sides thereof. Downwardly projecting clips 22 are formed on the cover at locations corresponding to the lugs 20 on the body. As can be seen in Fig. 4, the cover is held on the body by the clips 22 engaging under the lugs 20. In order to

maintain the cover in its correct location relative to the body, the lugs 20 also extend upwardly from the top of the wall 12. The said upwardly extending portion of the lugs are received in complementary recesses 24 provided in the edge of the cover.

Apparatus 26, 28 and 30 extend through the base of the body. Within the body sleeve 32, 34 and 36 are provided, on the base and in register with the apertures 26, 28 and 30 respectively. Each sleeve and aperture is adapted to receive a flat pin which may be of the kind shown in Fig. 6. For the conventional 13 amp flat pin plug the earth pin 40, i.e. the pin received in aperture 26 and sleeve 32, will be longer than that of the live and neutral pins 42 and 44 respectively, but in other respects the construction can be the same.

Referring to Fig. 6 each pin is preferably of hollow construction but it may be solid or partly solid if desired. The free end of a T-shaped metal strip 50 is fixed to the upper end of the pin. The arms of the strip are deformable and can be crimped around a conductor wire. A stop 52 projects from the upper end of the pin. When the pin is inserted through a sleeve and corresponding aperture during assembly of the plug the stop engages the rim of the sleeve and thus limits the extent by which the pin projects from the base of the plug body. Axial movement of the pin is further restrained by one or more barbs 54, preferably punched out of the pin and directed towards the upper end of the pin. The barbs permit the pin to be inserted through the sleeve for assembly but prevent retraction of the pin by engagement with the inner surface of the sleeve. Each pin is held in place, when the cover is mounted on the base by a projection which extends from the cover and engages the end of the pin. One such projection is shown in Fig. 5 and referenced 16.

In the top right hand corner of the plug (as viewed in Fig. 1) a recess 60 for reception of a fuse is formed in the base, access to the recess being from the exterior of the plug.

Two pairs of slots 62 and 64 are provided in the base of the recess 60. A first U-shaped fuse terminal 66 (Fig. 7a) is located with its limbs extending through slots 62 and into the recess 60. A second U-shaped fuse terminal 68 (Fig. 7b) is similarly disposed with its limbs extending through slots 64. A T-shaped terminal 70, similar to terminal 50, is fixed to the web of fuse terminal 66. A strip conductor 72 is fixed to the web of fuse terminal 68. The fuse terminals 66 and 68 are held in place by projections on the cover similar to projection 16 provided for the pins.

During assembly of the plug the earth and neutral leads 80 and 82 are crimped onto the terminals 50 of the earth and neutral pins.

The live lead 84 is crimped onto the terminal 70 of the fuse terminal 66 and the strip

conductor 72 on fuse terminal 68 is crimped onto terminal 50 on the live pin 42.

A cable entry 90 is provided in the wall of the base. Cable restraining means is formed by plates 92 mounted in the base one on either side of the cable entry with their free ends inclined towards each other. During assembly the cable is laid through the plug entry 90 and between the plates 92 with the enlarged portion 94 inwardly of the plates. Any strain applied to the cable from outside the plug is taken by the plates 92 and not by the connection of the conductors to the terminals.

Referring now to Fig. 8 the shank of a cartridge fuse 100 is received in a collar 102 on a plate 104 hinged to the base adjacent the recess 60. By pivoting the plate from the position shown in Fig. 8 the fuse 100 is received in the fuse terminals 66 and 68.

When the plug has been assembled and the conductors fixed to the terminals the cover is clipped in position and if desired, welded and/or screwed to the base. Under normal circumstances, therefore, the plug cannot be rewired.

It will be understood that many modifications can be made to the plug specifically described. For example the pins can be designed for insertion from outside the plug body. The pin 108 shown in Fig. 9 has a stop 110 in the form of a deformable latch. The pin is inserted into the sleeve 112 from outside the base. Latch 110 is then secured over the rim of the sleeve. Terminal 118 is also shown bent over the rim of the sleeve. During assembly the terminal is bent parallel with the pin axis.

The shanks of the pins, particularly the live and neutral pins can, if desired, be externally insulated. If the pins are hollow, insulation can conveniently be provided by deforming the shank of a pin to produce a groove which extends around the pin and which can be filled with a plastics insulating material flush to the undeformed surface of the pin.

Although not illustrated in the drawing the plug can be provided (in a manner known per se) with a neon lamp which is connected so that it is illuminated when the plug is carrying current.

It is preferred that the plug be provided with internal walls referenced 120 in Fig. 2 which form a labyrinth for the conductor wires. The effect of the labyrinth is to make the length of the path of the conductor wires from the cable entry to various terminals substantially the same.

The plates 92 by which the cable is restrained can be modified in many ways. The plates may be integral with the wall 12 and may be non-planar, for example arcuate. The plates may be disposed so that when there is no cable in the plug, they are directed towards one another so that at least the ends of

the plates are co-planar or in parallel planes. If desired stops may be provided which limit movement of the plates inwardly of the aperture 90. In the embodiment shown in the drawings one pair of plates is illustrated. However, two pairs of plates may be provided, one pair being arranged to restrain movement of the cable in one direction and the other pair restraining movement of the cable in the other direction.

Another embodiment of the invention will now be described with reference to Figs. 10 to 16. In this embodiment the plug body 200 is somewhat similar to that of Fig. 1 except that the recess 202 for reception of the fuse (not shown) extends across the plug between the apertures 204, 206 for the live and neutral pins and aperture 208 for the earth pin. The pins and fuse terminals are not shown in the drawings of this embodiment but they may be the same as in the earlier described embodiments or of any other suitable construction.

The end wall of the plug body has an aperture 210 formed therein through which a conductor cable can be led for connection to the terminals within the plug body. Such connection is, in accordance with the invention, permanent and can be formed as described in the other embodiments or by any other suitable means.

Inside the plug body and adjacent aperture 210 a block 212 having a serrated upper surface 214 is provided. The conductor cable is held against the serrated surface by other means as will be described hereinafter.

In raised portions 232 on either side of the top of aperture 210 the plug wall is formed so as to define a channel 212. Flanges 214 project from either side of the top of the plug body at the rearward end thereof (that is at the end containing aperture 210). Flanges 216 project from either side of the top of the plug body at the forward end thereof.

As shown in Figs. 13 and 14 the cover 220 for the body is of substantially complementary shape to the plug body and has depending front and side walls 222 and 224 respectively. An internally directed flange 226 extends from the front wall 222 along the bottom edge of the side wall 224, the side wall itself terminating in a projection 228. The rear edge of the top of the cover is formed with recess 230 which receive the raised portions 232 of the rear wall of the plug body on either side of aperture 210. A small projection 234 is formed in the innermost corner of each recess 230. A wedge-shaped projection 236 defining a forwardly directed shoulder 238 is provided on the under surface of the cover adjacent the front edge thereof but spaced from the front edge by a distance the same as or slightly greater than the thickness of the front wall of the plug body.

The plug body is closed by sliding the cover over the body such that the flanges 226 on the cover engage under flanges 216 on the body. As the cover closes the body projections 228 engage under flanges 214 and projections 234 are received in channels 212. Finally the wedge 236 drops down behind the inside of the front wall of the plug and the cover is then non-removably held on the body. Further securement of the cover to the body, as by welding, can be carried out if desired but is not necessary.

Before closing the body with the cover it is, of course, necessary to make the connections to the terminals in the plug body. In addition a shield can be located in the plug body as will be described with reference to Figs. 15 and 16. The shield comprises a flat member 240 of insulating material, dimensioned so as to fit inside the area defined by the walls of the plug body. The shield is made slightly smaller so as to leave space at the front of the assembly for the wedge to engage behind the front wall of the plug body.

A wall 242 extends around each rear corner of the shield so as to support the shield at the top of the plug body. Further support for the shield is provided by walls within the plug body such as are referenced 244 and 246. Further support for the shield can be provided by projections (not illustrated) which depend therefrom towards the tops of the pins thereby holding the pins in place as well.

At the rear of the shield arcuate, resilient plates 250 extend one from each wall 242. The plates extend generally forwardly and towards each other and define a gap 252 therebetween which is arranged to be smaller than the dimensions of the conductor to be led into the plug body. In use, once the connections have been made, the shield is placed over the open top of the plug body and urged downwardly so that the conductor is engaged between the adjacent edges of the plates 250. At the same time the conductor is urged down onto the serrations 214 on the block 212. The conductor is thus gripped and any tension applied thereto is resisted by the plates 250.

In addition to providing a support for the cord grip the shield also provides extra safety against stray wires becoming accessible and also against the unlikely eventuality of the cover being removed.

In the embodiment described the arrangement of the aperture 210 in the plug body permits, if desired, a grommet to be fitted around the conductor at that part where the conductor passes into the plug.

CLAIMS

1. A non-rewirable plug comprising a hollow body, a plurality of plug pins, each pin extending from the body through a bore formed in the body, and each pin having a

projection thereon engageable with the body to locate said pin with one end in the body and to prevent axial movement of said pin at least in one direction relative to the bore,

5 means at said one end of each pin for permanently securing a conductor in electrical connection with the pin, said body being closed by a non-removable cover.

10 2. A plug as claimed in Claim 1, wherein means are provided for preventing axial movement of one or more pins in the opposite direction.

15 3. A plug as claimed in Claim 1 or Claim 2, wherein the means for connecting a conductor to a pin comprises a metal strip on the pin.

4. A plug as claimed in Claim 3, wherein the strip is integral with the pin.

20 5. A plug as claimed in any preceding claim wherein fuse terminals are provided which are accessible from outside the plug body.

25 6. A plug as claimed in Claim 5, wherein the fuse terminals are provided in a recess in the plug body.

7. A plug as claimed in Claim 6, wherein a cover is provided for closing said recess.

30 8. A plug as claimed in Claim 7, wherein fuse carrying means are provided on the fuse recess cover.

9. A plug as claimed in any preceding claim wherein means are provided on the cover for engagement inside the plug body.

35 10. A plug as claimed in any preceding claim, wherein the cover is welded to the plug body.

40 11. A plug as claimed in any preceding claim wherein channel means are provided on the cover or plug body said channel means being adapted to receive a part of the plug body or cover.

45 12. A plug as claimed in Claim 11, wherein the cover is adapted to be mounted on the plug body by relative sliding movement.

50 13. A plug as claimed in any preceding claim, wherein a shield is located in the body, said shield substantially closing the plug body.

14. A plug as claimed in any preceding claim wherein a cord grip is provided.

15. A plug as claimed in Claim 14, wherein the cord grip is fixed to the shield.

55 16. A plug as claimed in Claim 14 or 15, wherein the cord grip comprises two arcuate resilient plates which extend towards each other, and generally away from the direction in which a conductor is led into the plug body.

60 17. A non-rewirable plug substantially as described herein with reference to Figs. 1 to 8, Figs. 1 to 8 as modified by Fig. 9, or Figs. 10 to 16 of the accompanying drawings.