(12) UK Patent Application (19) GB (11) 2 280 551 (13) A

(43) Date of A Publication 01.02.1995

(21) Application No 9415275.8

(22) Date of Filing 28.07.1994

(30) Priority Data
(31) 9315588 (32) 28.07.1993 (33) GB

(71) Applicant(s)
On Tat Bakelite Electric Works Limited

(Incorporated in Hong Kong)

33 Hung To Road, Wong's Industrial Building, 5/F, Kwun Tong, Kowloon, Hong Kong

(72) Inventor(s)
Peter Fok

(74) Agent and/or Address for Service
Marks & Clerk
57-60 Lincoln's Inn Fields, LONDON, WC2A 3LS, United Kingdom

(51) INT CL^6
H01R 13/585

(52) UK CL (Edition N)
H2E EGDX

(56) Documents Cited
GB 2269273 A GB 2137432 A

(58) Field of Search
UK CL (Edition M) B5A AT14E AT14P , H2E EGDX EGGD EGGE EGHE EGHX
INT CL^5 B29C 45/26 , H01R
Online databases:WPI

(54) Cable clamp of electrical plug

(57) An electric plug comprises a front cover and a back cover, each having a respective semi-circular recess adapted to be combined to form a circular entrance for receiving therethrough an electric cable. Electrically conductive pins are provided for connecting the electric plug to an electric socket. Deflectable tabs (11) are formed integrally with the back cover and above a plate member of the back cover for being in contact with and to restrain the movement of the electric cable. An aperture (15) is formed adjacent each of the tabs (11) on the plate member of the back cover for allowing, during moulding, a moulding tool to fill the apertures (15) to prevent escape onto the plate member of the moulding material used to make the deflectable tabs (11).

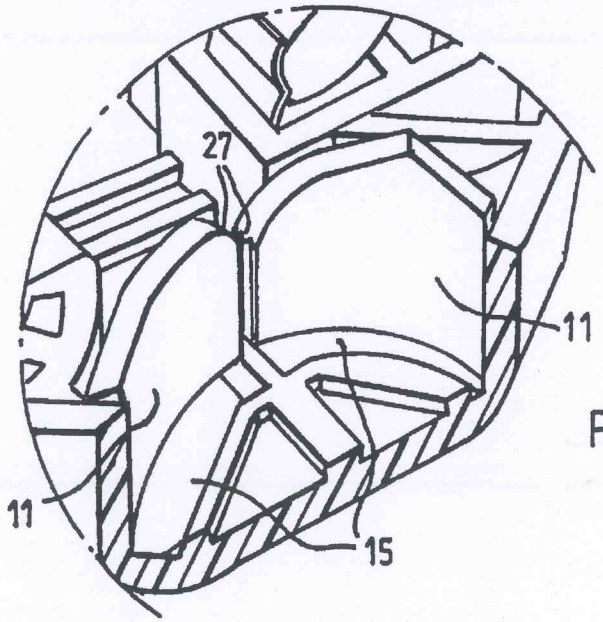


FIG. 4

GB 2 280 551 A

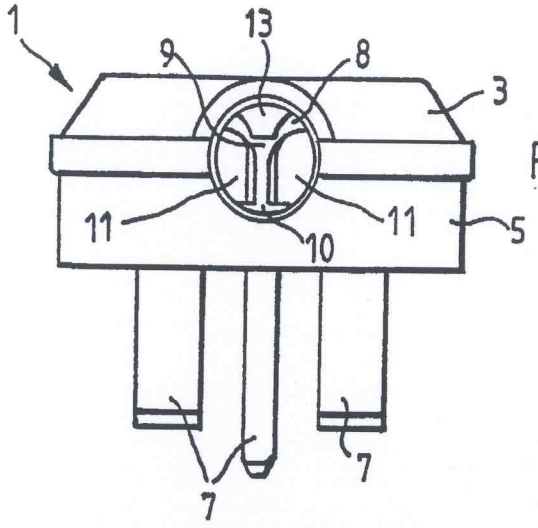


FIG.1

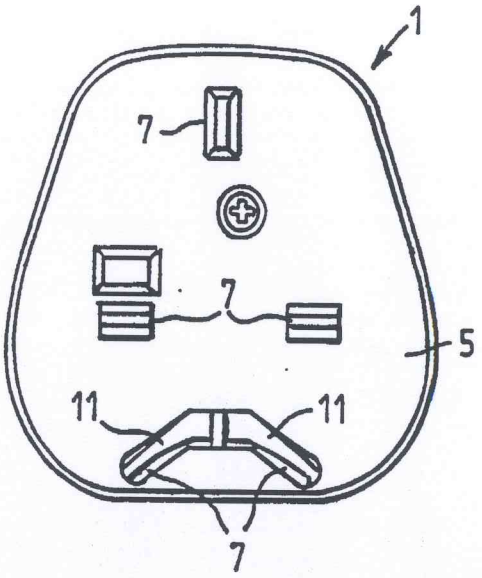
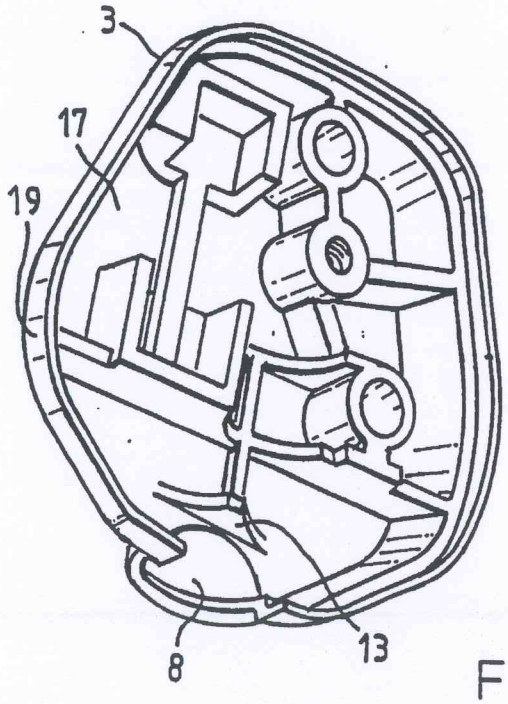


FIG.2



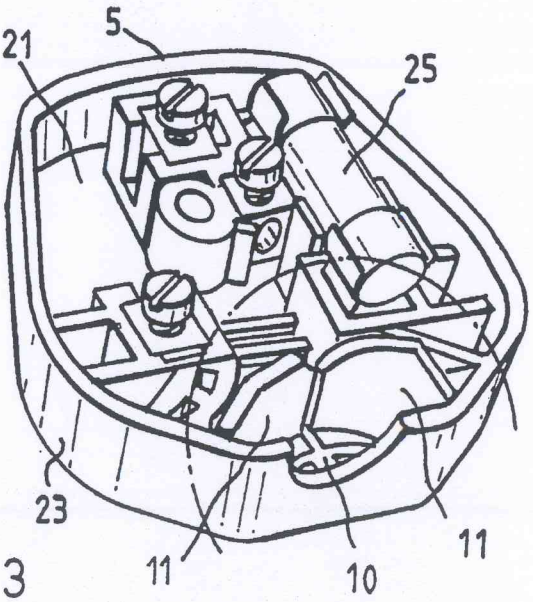


FIG.3

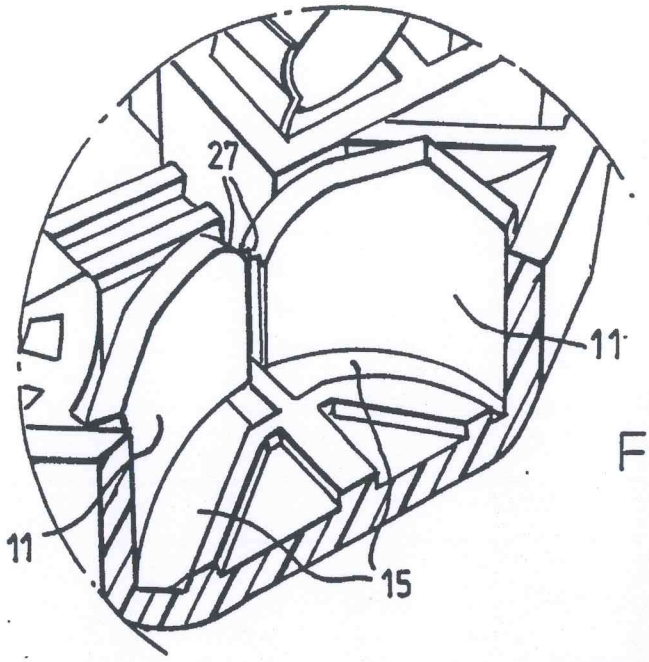


FIG.4

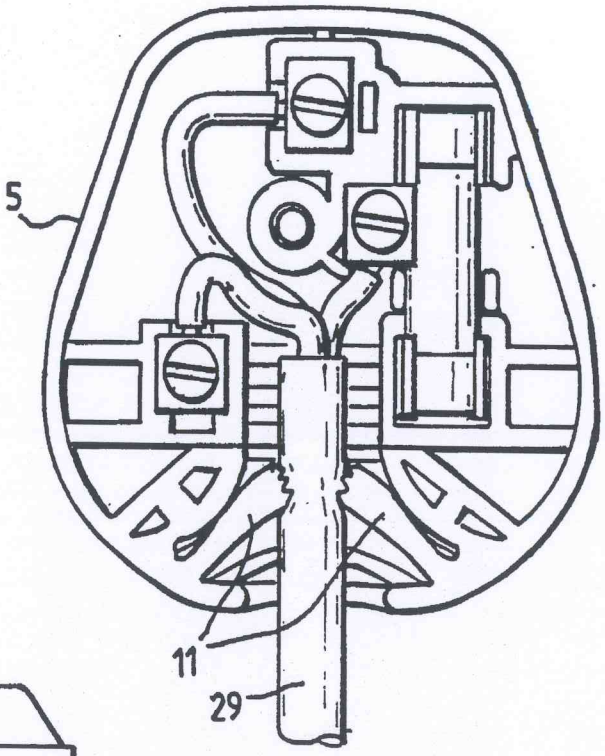


FIG.5

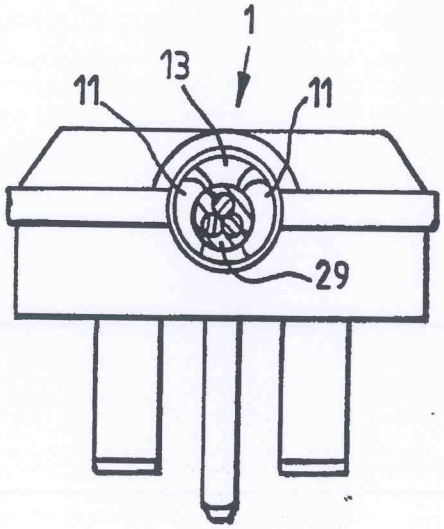


FIG.6

IMPROVEMENTS IN OR RELATING TO ELECTRIC PLUGS

This invention relates to improvements in or relating to electric plugs.

Conventional electric plugs comprise a front cover and a back cover which combine to form a cavity for receiving therein an electric cable. Electric connection members are provided in the electric plugs for electrically connecting the electric cable to an outside electric source. There are also respective openings on the front and back covers which combine to form an entrance for receiving the electric cable therethrough.

Although received in the electric plug and connected to the electric connection members, if the electric cable is pulled in a direction away from the electric plug, the connections between the electric cable and the electric connection members of such conventional electric plugs may be strained or loosened. Ways have therefore been devised to avoid this from happening.

Some electric plugs provide for a piece of plastic material to be releasably secured, e.g. by screws, to the back cover of the electric plugs, the arrangement being such that the

piece of plastic material is in contact with the surface of the electric cable on the side which faces the cavity of the electric plug. The force exerted by this piece of plastic material upon the electric cable assists in retaining the electric cable in its position despite pulling.

A further improvement to the above electric plugs is to provide for a pair of deflectable tabs in, e.g. the back cover wherein the distance between them in their rest position is smaller than the outside diameter of the electric cable to be received. When the electric cable is pushed through the tabs, the tabs are forced apart, and a reaction force is thus exerted by the tabs upon the outside surface of the electric cable. Such a force ensures that the connections between the electric cable and the electric connection members will not be loosened upon pulling of the electric cable. In such an arrangement, the deflectable tabs normally point slighting towards each other and towards the interior cavity of the back cover. Pulling of the electric cable will therefore increase the force acting upon the electric cable and the electric cable is thus further secured.

The deflectable tabs may be manufactured as separate from

the back cover of the electric plug. If so, the deflectable tabs will have to be inserted into corresponding spaces in the back cover in order to perform their function. Such will increase both the cost of production and the chance of failure in the final products.

The deflectable tabs may alternatively be integrally formed with the back cover, e.g. as discussed in GB 2201306A. While this may alleviate the problems associated with the separate manufacture of the deflectable tabs as discussed above, a wide opening has to be provided for at or near the opening of the back cover, as shown in GB 2201306A. Such an opening will be substantially as wide as the distance between where the respective deflectable tabs meet the side wall of the back cover. There will also be a substantially straight edge at or near the opening of the back cover about which the electric cable may be bent.

With such a large opening, the strength of the back cover and, consequently, the electric plug as a whole is reduced. The fact that the electric cable could be bent about a substantially straight edge at or near the opening of the back cover means that safety is compromised.

It is therefore an object of the present invention to

provide an improved electric plug in which the aforesaid shortcomings are removed or reduced.

According to the present invention, there is provided an electric plug comprising (a) a front cover having a recess at one end; (b) a back cover having a plate member surrounded on one side by a moulded wall member defining a recess for receiving an exposed end of an electric cable and a plurality of electrically conductive pins adapted to electrically connect the electric plug to an electric socket; (c) at least one deflectable securing means integrally formed on the wall member and above the plate member and being adapted in use to be in contact with part of the outer surface of the electric cable thereby to restrain movement thereof characterized in that an aperture is formed in the plate member of the back cover adjacent the or each respective securing means of size substantially equal to or greater than the cross-section of the or each securing means when viewed through the aperture, the arrangement being such that during moulding of the securing means and wall member, a moulding tool is able to fill the or each aperture to prevent escape onto the plate member of moulding material used to make the securing means.

The electric plug may have two deflectable securing means,

each being a deflectable tab.

The recess of the back cover and that of the front cover may respectively assume a substantially semi-circular shape, and may be combined to define a substantially circular entrance for receiving therethrough an electric cable.

The diameter of the entrance may be less than the end-to-end distance of the deflectable tabs.

An embodiment of the invention will now be described in more detail with reference to the accompanying drawings wherein:-

Figure 1 is an end view of the electric plug of the present invention;

Figure 2 is bottom view of the electric plug;

Figure 3 is a view showing the interior of the front cover and the back cover;

Figure 4 is an enlarged view of the partly-circled portion of the electric plug in Figure 3;

Figure 5 is a front view of the back cover of the electric plug with an electric cable received between the securing means and electrically connected to the electric connection members.

Figure 6 is an end view of the electric plug and a cross-sectional view of an electric cable received therein.

Referring to Figure 1, there is shown an electric plug of the present invention generally designated as 1. The electric plug 1 comprises a front cover 3, a back cover 5 and three electrically conductive pins 7. Openings 8 and 10 are provided respectively on the front cover 3 and the back cover 5. The openings 8 and 10 combine to form an entrance 9 for receiving an electric cable. Two deflectable tabs 11 and a protrusion 13, to be discussed later, are also shown.

Figure 2 shows the bottom view of the electric plug 1 with the back cover 5, pins 7 and tabs 11. There are also shown apertures 15 on the back cover 5, one underneath each of the two respective tabs 11.

Figure 3 shows the interior of the front cover 3 and the back cover 5. The front cover 3 comprises a plate 17 and

a wall 19 and an opening 8 on the wall 19. The protrusion 13 extends from the interior of the plate 17 of the front cover 3. Figure 3 also shows the interior of the back cover 5 which comprises a plate member 21, a wall member 23 and a fuse 25, with an opening 10 on the wall member 23. There is provided in the back cover 5 two deflectable tabs 11 formed integrally with the back cover 5, for receiving therebetween the electric cable. The tabs 11 are integrally connected at their respective end to the wall member 23 and face each other and towards the interior cavity of the back cover 5.

Figure 4 shows an enlarged view of the partly-circled portion in Figure 3. In particular, there are provided apertures 15 on the back cover 5 underneath each tab 11 which, in production, facilities the integral formation of the tabs 11. Teeth members 27 are formed on the sides of the tabs 11 for contacting and gripping the electric cable. The existence of the apertures 15 also avoids the necessity of providing for an opening, which is at least as wide as the width of the two tabs 11, on the wall member 23. The existence of such a wide opening in the wall member 23 would greatly reduce the strength of the back cover 5 and consequently, the electric plug 1 so that when the electric cable is forced through the deflectable tabs 11, the back

cover 5 may be bent or broken.

Figure 5 shows the back cover 5 of the electric plug 1 with an electric cable 29 received therein and electrically connected to the pins 7. It can be seen that the tabs 11 have been forced apart from their rest positions.

Figure 6 shows an end view of the electric plug 1 with a cross-section of the electric cable 29 received therein. It can be seen that, apart from being in contact with the tabs 11, the electric cable 29 is also in contact with the protrusion 13. Such an arrangement ensures that the electric cable 29 is gripped and retained in its position and avoids the connections between the electric cable 29 and the pins 7 being loosened if the electric cable 29 is pulled away from the electric plug 1.

It should be understood that the above only illustrates an embodiment of the present invention and various modifications of changes could be made to the present invention without departing from the general inventive idea.

CLAIMS

1. An electric plug comprising:-

(a) a front cover having a recess at one end;

(b) a back cover having a plate member surrounded on one side by a moulded wall member defining a recess for receiving an exposed end of an electric cable and a plurality of electrically conductive pins adapted to electrically connect the electric plug to an electric socket;

(c) at least one deflectable securing means integrally formed on the wall member and above the plate member and being adapted in use to be in contact with part of the outer surface of the electric cable thereby to restrain movement thereof;

CHARACTERIZED IN THAT an aperture is formed in the plate member of the back cover adjacent the or each respective securing means of size substantially equal to or greater than the cross-section of the or each securing means when viewed through the aperture, the

arrangement being such that during moulding of the securing means and wall member, a moulding tool is able to fill the or each aperture to prevent escape onto the plate member of moulding material used to make the securing means.

2. An electric plug according to Claim 1 further characterized in having two deflectable securing means.

3. An electric plug according to any of the above claims further characterized in that the or each deflectable securing means is a deflectable tab.

4. An electric plug according to any of the preceding claims further characterized in that the recess of the back cover and that of the front cover respectively assumes a substantially semi-circular shape.

5. An electric plug according to Claim 4 further characterized in that the recess of the back cover and that of the front cover are adapted to be combined to define a substantially circular entrance for receiving therethrough an electric cable.

6. An electric plug according to Claim 5 further characterized in that the diameter of the entrance is less than the end-to-end distance of the deflectable tabs.

7. An electric plug substantially as hereinbefore described with reference to the accompanying drawings.