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ELECTRICAL CONNECTORS

This invention relates to electrical connectors and in particular to the manufacture of electrical plugs and sockets with covers of impact resistant material.

The majority of electrical socket covers are
5 made of rigid plastics material with the drawback that they are liable to become damaged if subjected to impact, as may occur from time to time, especially if the socket is attached to the end of an extension lead. As a solution to this problem it is known to mould
10 socket covers from rubber or other elastomeric material. However, these sockets have the disadvantage that because the housing material is relatively soft the edges of the socket openings tend to become impaired by plug contact pins as they are repeatedly inserted into and withdrawn
15 from the socket. Furthermore, the sockets are open to abuse since it is possible for pins of the incorrect shape to be forced into the socket openings.

It is also known to make electrical plug covers of rubber to improve resistance to damage by impact
20 forces. The cover of a plug is often relied upon to support the inner ends of the contact pins, but a cover of elastomeric material may not provide adequate resistance to large forces exerted on the ends of the pins and tending to push them back into the plug body,
25 especially if the plug becomes hot.

The present invention seeks to avoid the above drawbacks and as a solution provides a cover member for electrical connectors, made mainly of impact resistant material and including a unitary insert of substantially rigid moulded plastics material to reinforce the cover member in predetermined areas at which contact pins are intended to cooperate with the cover member the insert is a flat frame including one or more bush portions for engagement by respective screws to fix the cover to another body part of the connector so that separate bush inserts are unnecessary. The insert may be an elastomeric or thermoplastics material and may be bonded to the impact resistant material, but in one preferred construction the material is moulded around the preformed insert.

In the case of a socket cover embodying the invention, the cover has a plurality of apertures for the pins of a plug to pass through, and the insert defines these apertures.

In the case of a plug cover, the insert will be arranged to overlies the inner ends of the plug pins when the plug is assembled for the ends of the pins to abut against the insert.

One specific form of socket connector according to the invention comprises a base carrying contacts for cooperation with the pins of an electric plug engaged with the connector, a cover member of impact resistant material secured to the base and provided with a plurality of openings, and insert portions of substantially rigid material carried on the base and located within said openings, said insert portions having apertures therein for receiving the plug pins.

A better understanding of the invention will be had from the following description which is given by way of

example and with reference to the accompanying drawings, in which:-

Figure 1 is a top plan view of a double socket housing made in accordance with the invention;

5 Figure 2 is a section taken along the line X-X in Figure 1;

Figure 3 is a schematic view showing a plug cover embodying the invention;

Figure 4 is an exploded view of the plug cover;

10 Figure 5 is a plan view of a socket connector embodying the invention; and

Figure 6 is an exploded view of the body parts of the socket connection shown in Figure 5, the cover and base being illustrated in section.

The socket housing illustrated in Figures 1 and 2 consists of a main body 1 of elastomeric or thermoplastic material which is moulded in situ over a preformed insert 2 of substantially rigid plastic material. The insert 2 may be made as a unitary injection moulding. It includes two T-shaped parts 3 interconnected by strips 4 and each including portions 5, 6, 7 surrounding and defining the apertures for insertion of the line, neutral and earth pins of an electric plug. As shown the socket is intended for conventional 13 amp plugs, but other pin configurations and shapes are of course possible. The insert portions 5, 6, 7 have chamfered edges to assist in guiding the pins into the apertures, and extend through the full thickness of the cover. The remaining parts of the insert 2 are embedded in the material of the main body 1, except three cylindrical bushes 8 which protrude at the inner surface. These bushes are intended to receive the ends of self tapping screws which secure the cover onto the socket base which carries the socket contacts.

Thus, the insert 2 serves to reinforce the cover around the pin apertures, it provides support for the body 1, and it provides means for securing the cover to the socket base.

If the socket includes a switch mechanism with an actuating member which projects through an opening in the cover, this opening could be reinforced also by the rigid insert, e.g. in a similar manner to the pin apertures. The insert 2 could conveniently incorporate guideways for a shutter mechanism adapted to close the pin apertures when the plug is removed, if required. Other modifications are possible without departing from the invention.

The plug cover shown in Figures 3 and 4 consists of a main part 10 of elastomeric or thermoplastic

material and an insert 11. The part 10 is moulded in situ over the insert 11 which is preformed from comparatively rigid plastics material, e.g. injection moulded from high melting point polymer. The insert

5 comprises a flat, generally rectangular frame 12, the opposite sides of which are joined by cross webs 13. At their junction the cross webs support an integral boss 14 which forms a bush intended to receive the end of a self tapping screw to secure the cover to the plug

10 body. Supported by the frame 12 are a cup-shaped shroud 15 to receive and support the inner end of the earth pin of the plug, a second cup-shaped shroud 16 to receive and support the inner end of the neutral pin of the plug, an open-sided rectangular shroud 17 to receive and

15 support the inner end of the line pin of the plug, and a pair of opposed lugs 18 which define a fuse holder clip. The insert is moulded in position so that the frame 12 and webs become embedded in the part 10 with the boss 14, shrouds 15-17 and fuse holder 18 projecting

20 into the cavity of the cover.

The shrouds reinforce the cover in the regions where the plug pins are engageable with the cover so that the pins are prevented from being pushed back into the plug even if the plug should become hot.

25 In Figures 5 and 6 there is illustrated a modified socket connector embodying the invention. The socket connector comprises three main body parts namely a cover 20, a base 21 and an insert member 22. The cover is moulded from an impact resistant elastomeric material

30 but includes two internally threaded bushes moulded into bosses 24 on the inside of the cover for cooperation with securing screws (not shown) which are inserted through holes 25 in the base to secure the cover to the base. The base is moulded from comparatively rigid plastics

35 material, e.g. high melting point polymer, and includes

upstanding walls defining recesses, such as at 26, for receiving the socket contact elements which are not shown in the drawing in the interest of clarity. The base includes also an integral formation 27 for receiving a cable gripping element. The insert member 22 is received between the base and cover and is also made of comparatively rigid plastics material which is conveniently the same material as the base. It comprises a T-shaped plate 28 on which are mounted three rectangular insert portions 30,31,32 having respective apertures 33,34,35. These insert portions locate within respective openings 36,37,38 of complementary shape provided in the top wall of the cover. In the illustrated embodiment the apertures 33,34,35 are arranged to receive respective pins of a conventional 13 amp plug, although it will be appreciated that other arrangements are possible, to suit other plug pin configurations. The edges of the insert portions are chamfered to assist in guiding the pins into the socket apertures. The insert member 22 is adapted to be carried on the base 21 and for this purpose is formed with three resilient legs 39 having slots 40 adjacent their free ends for receiving locking projections 42 on the base whereby the insert member has a snap-fit attachment to the base.

In the assembled connector, the plate 28 helps to support the top wall of the cover and the portions which engage in the cover openings reinforce the edges of the pin apertures. However the advantages of an impact resistant cover are still retained.



CLAIMS

1. A cover member for attachment to a base member of an electric plug, the cover member being made mainly of impact resistant material and comprising a unitary insert of substantially rigid plastics material having a flat frame carrying shrouds to receive and support the plug contact pins and a boss to receive a screw for fixing the cover member to the base member, the insert being arranged for abutment by the inner ends of the plug contact pins to reinforce the cover member at the position where the plug contact pins are intended to cooperate with the cover member.
2. A cover member according to claim 1 wherein the insert includes a fuse holder clip.
3. A cover member for attachment to a base member of a socket connector, the cover being made mainly of impact resistant material and including a plurality of apertures for the contact pins of an electric plug to pass through, the cover member comprising a unitary insert of substantially rigid plastics material having a flat frame carrying a boss to receive a screw for attaching the cover member to the base, the insert extending around and defining said apertures to reinforce the cover member.
4. A cover member according to claim 3, wherein the edges of the insert at the outer surface of the cover are chamfered for guiding the pins into the apertures.
5. A cover member according to any one of claims 1 to 4, wherein the unitary insert is at least partially embedded in the impact resistant material.



6. A cover member according to claim 5, wherein the impact resistant material is moulded over the unitary insert.

5 7. A cover member for an electric plug substantially as herein described with reference to figures 3 and 4 of the accompanying drawings.

8. A cover member for an electric socket, substantially as herein described with reference to figures 1 and 10 2 of the accompanying drawings.

9. A socket connector comprising a base carrying contacts for cooperation with the pins of an electric 15 plug engaged with the connector, a cover member of impact resistant material secured to the base and provided with a plurality of openings, and insert portions of substantially rigid material supported on the base and located within said openings, said insert portions having 20 apertures therein for receiving the plug pins.

10. A connector according to claim 9, wherein the insert portions are provided by a unitary insert member.

25 11. A connector according to claim 10, wherein the insert member includes a plate which underlies a wall of the cover including the openings.

12. A connector according to claim 10 or 11, wherein 30 the insert member has a releasable connection to the base.

13. A connector according to claim 12, wherein the insert member is secured to the base by snap-fit connection.



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14. A socket connector substantially as herein described with reference to Figures 5 and 6 of the accompanying drawings.
