(12) UK Patent Application (19) GB (11) 2 338 121 (13) A

(43) Date of A Publication 08.12.1999

(21) Application No 9811760.9

(22) Date of Filing 01.06.1998

(51) INT CL[6]
H01R 13/58

(52) UK CL (Edition Q)
H2E EGAX EGBA

(56) Documents Cited
GB 1234520 A EP 0681348 A2 WO 97/05681 A1
WO 86/01042 A1

(58) Field of Search
UK CL (Edition P) H2E EGAU3 EGAU4 EGAX EGBA
INT CL[6] H01R

(71) Applicant(s)
Tenby Industries Limited
(Incorporated in the United Kingdom)
Great King Street North, BIRMINGHAM, B19 2LF,
United Kingdom

(72) Inventor(s)
Barry Boothman

(74) Agent and/or Address for Service
Page White & Farrer
54 Doughty Street, LONDON, WC1N 2LS,
United Kingdom

(54) Abstract Title
A cut-out blank cum cable grip for an electrical connector

(57) An electrical connector 1 has a cut-out for allowing cable entry and in combined with a unitary body, figure 2, for mounting within the connector, the unitary body having both a blank 20,22 for blanking the cut-out and one or more cable grips 30 for gripping a cable passing through the cut-out. In use, when the blank 20, 22 of the unitary device is to be used, figure 5, projections 17, 19 of the unitary cut-out may locate in a recess 4 of the connector 1 and a to mount the blank 20,22. Alternatively, the blank and all but one of the cable grips 30 may be removed from the unitary device and the remaining cable grip located in the recess 4, figure 6; in this case the unitary member may be retained by a screw in screw-hole 5.

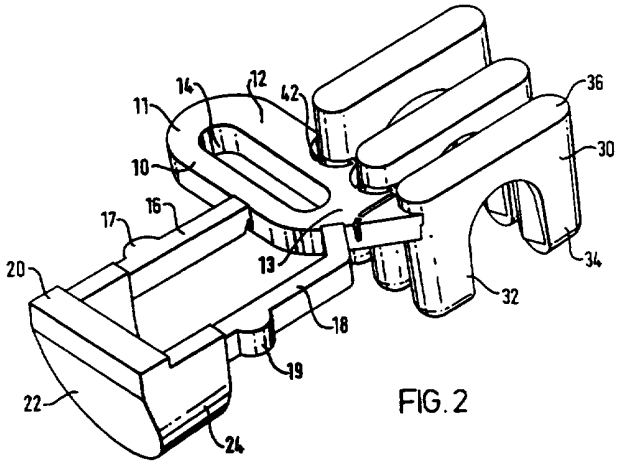

FIG. 2

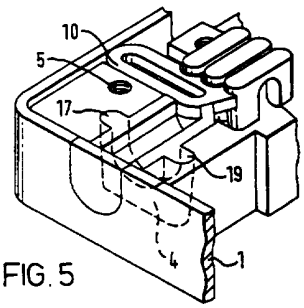

FIG. 5

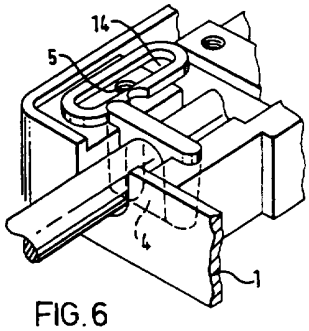

FIG. 6

GB 2 338 121 A

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

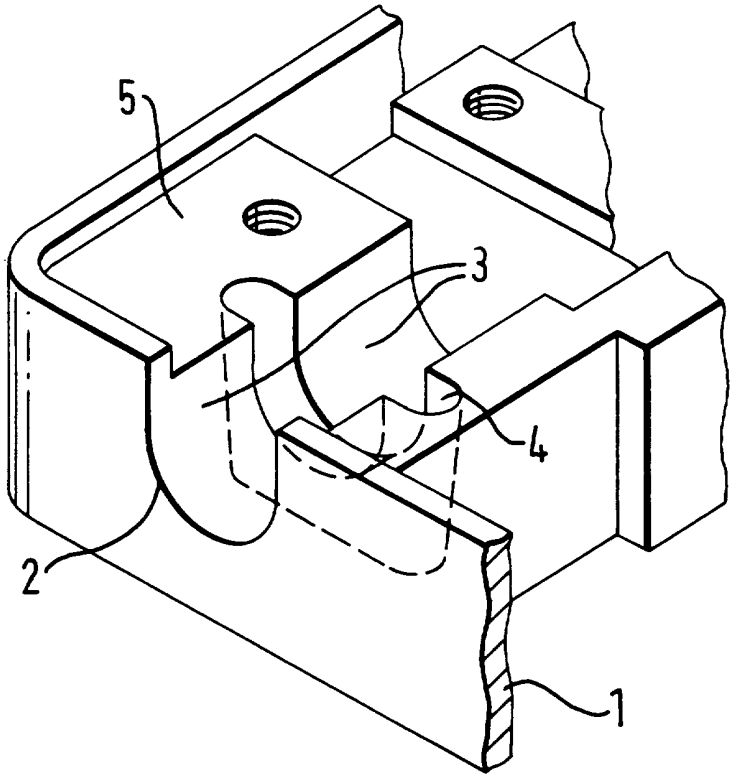

FIG.1

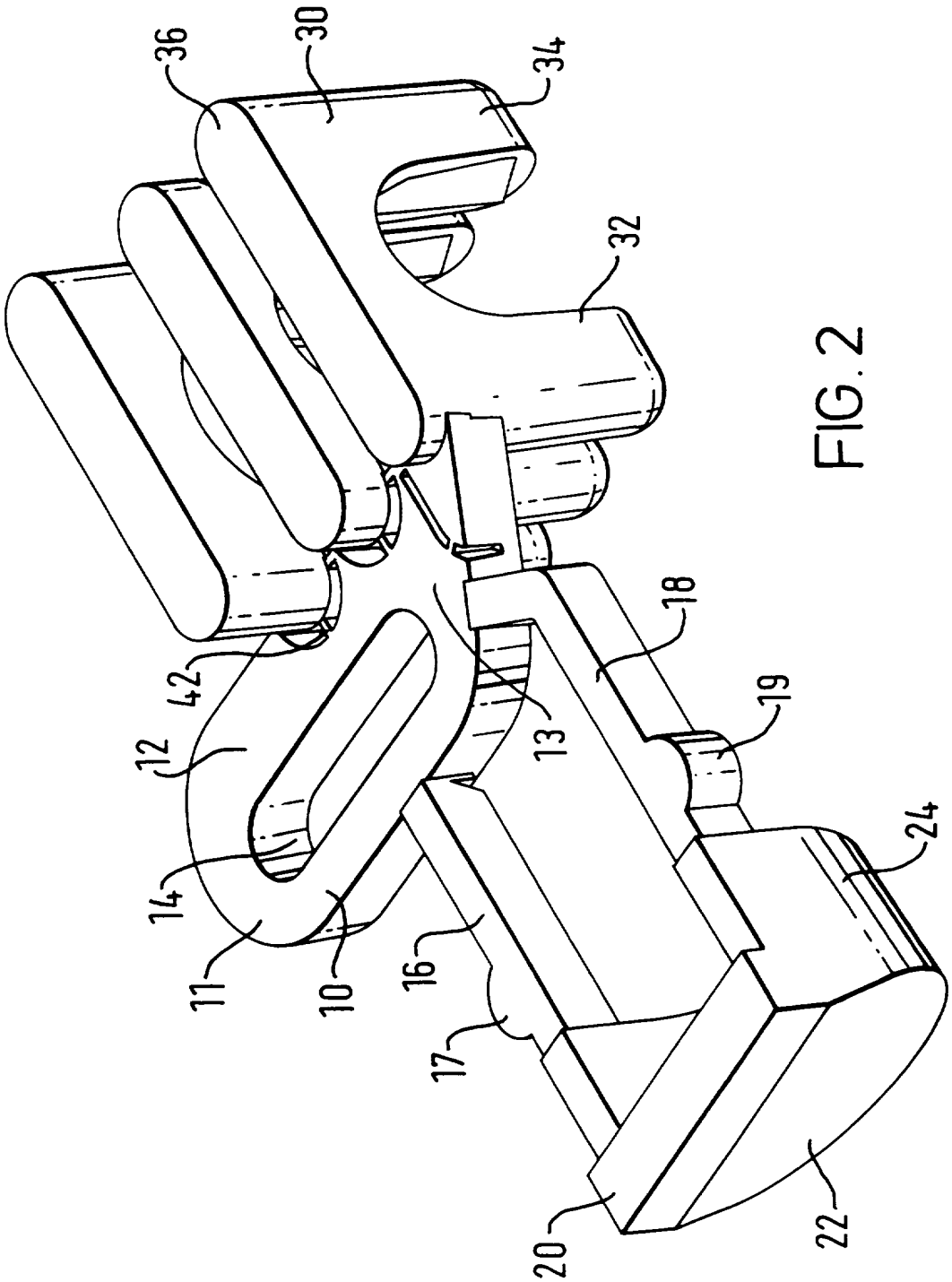

FIG. 2

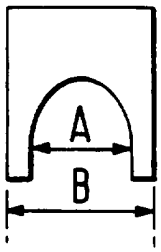

FIG. 3

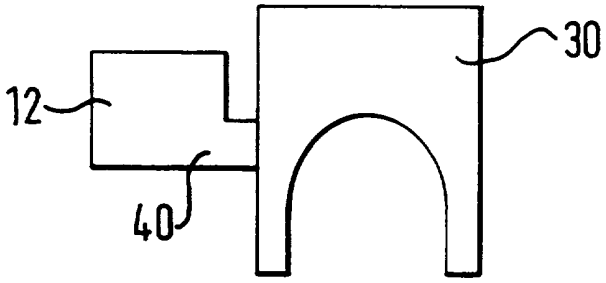

FIG. 4a

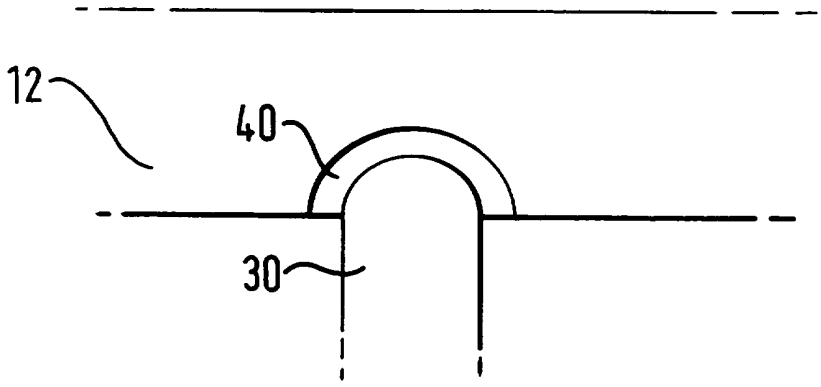

FIG. 4b

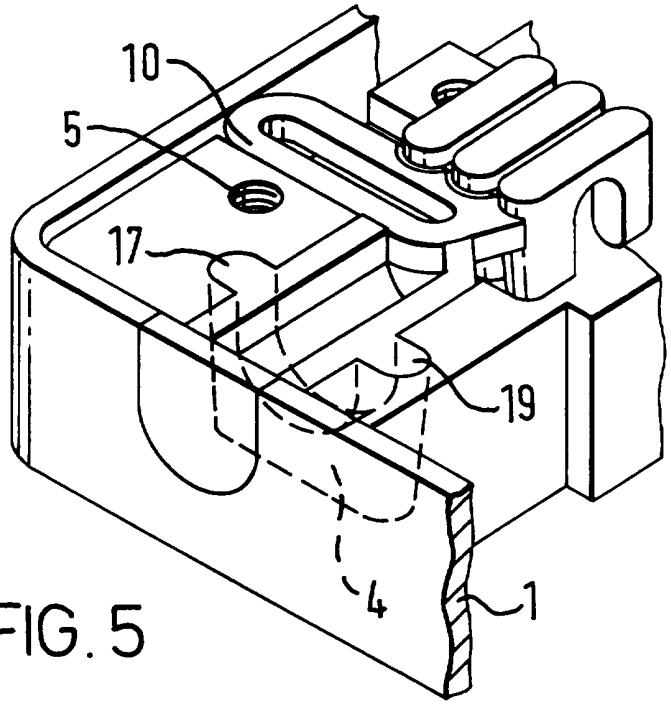

FIG. 5

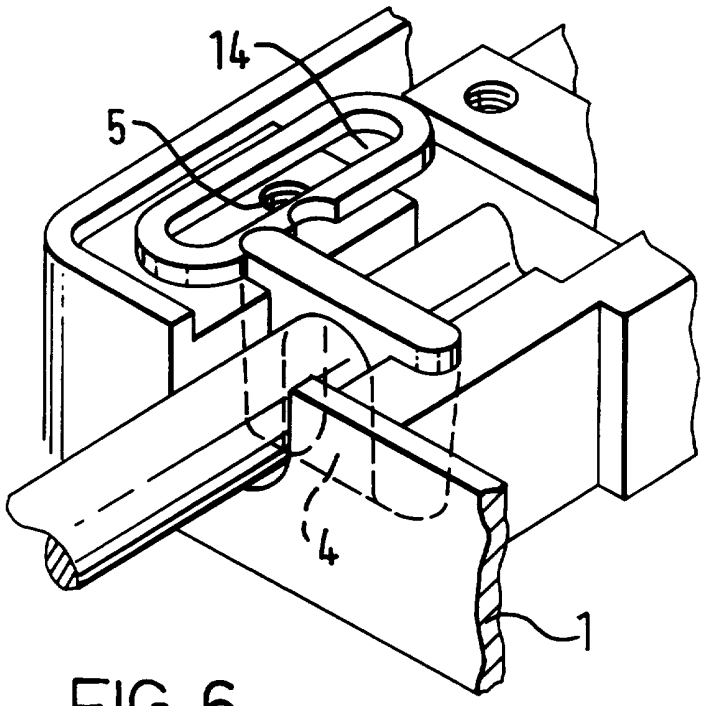

FIG. 6

ELECTRICAL CONNECTOR

The present invention relates to electrical connectors such as sockets and fused connectors and more particularly but not exclusively to such connectors which may be used alternatively as side or rear entry fittings.

Electrical connectors such as switches, sockets, fused connectors and the like are commonly used mounted on a wall or similar surface. One or more electrical cables enter the connector either through a side outer wall of the connector, or from the rear thereof.

Hence two separate electrical connectors have to be made, one with an opening for receiving a cable in a side outer wall and one with a cable receiving opening at the rear.

As two connectors are required to be manufactured which fulfill the same basic purpose, increased costs arise. The need for retailers to stock double the number of items is also a disadvantage.

To allow the choice of cable entry to be made after the purchase of the connector, an aperture for receiving the cable may be formed in the connector, the aperture being visible when the connector is mounted to a surface. A blanking device for the connector aperture, or a break-out wall is then provided.

A further problem associated with this type of known connector is that the cable grip provided within the connector must be arranged to be suitable for use with a number of different sized cables, as commonly used in various differing electrical applications. The presently provided cable grips only achieve this by having a plurality of parts and are required to be manually adjusted to correctly grip the cable. This is both inconvenient for the manufacturer as the large number of parts increases the manufacturing and assembly costs, and also for the consumer who is required to perform the manual adjustment.

An object of the present invention is to overcome at least some of the disadvantages of known electrical connectors by providing the combination of an electrical connector and a unitary structure. The unitary structure may be manufactured in a single moulding process and provides both means for blanking-off an unused aperture in the connector and means for gripping cables of differing dimensions. The unitary structure may be removably secured to the connector at the time of manufacture so that no additional packaging is required.

According to one aspect of the present invention there is provided the combination of an electrical connector, said connector having an outer wall with a cut-out portion therein, and a unitary structure secured thereto and having a body, said body having a portion for blanking said cut-out portion and said structure further having at least one cable gripping means depending from said body.

According to a further aspect of the present invention there is provided the combination of an electrical connector and a unitary structure, said connector comprising an outer wall having a cut-out portion therein and a correspondingly shaped trough extending into the connector in a direction perpendicular to the outer wall, the trough having a slot formed therein substantially parallel to the wall, and a threaded hole formed in the connector in the same direction as the slot, and wherein said unitary structure comprises a blanking portion of substantially similar shape to the cut-out portion of said outer wall, at least one cable gripping portion and a retaining portion having two parallel elongate members connected to their respective ends by curved members, wherein the or each cable gripping portion is connected to one of the elongate members of the retaining portion, and a connecting member extends between the other longitudinal member and the blanking portion

An embodiment of the present invention will be described in conjunction with the accompanying drawings, wherein:

Figure 1 shows a perspective view of a portion of the electrical connector;

Figure 2 shows a perspective view of the unitary structure;

Figure 3 shows the front elevation of one of the cable gripping members;

Figure 4a shows an enlarged view of the weakened portion of the unitary structure.

Figure 4b shows a further view of the weakened portion shown in Figure 4a.

Figure 5 shows a perspective view of the connector in combination with the unitary structure.

Figure 6 shows a perspective view of the connector in combination with a single cable gripping member.

In the figures like reference numerals refer to like parts.

Figure 1 shows an electrical connector, which could for example be for an electrical socket, a light switch, or any other fitting to which an electrical cable may be connected. The connector has an outer wall 1 and a solid body behind the wall with a U shaped trough extending through the body to form a cut-out portion 2 of the wall. The cut-out portion defines a cable receiving aperture. Perpendicular to the extent of the trough and approximately midway along its length there is a slot 4 having a width greater than that of the trough and a length which extends beyond the base of the trough. When the connector is viewed in plan the slot is rectangular with rounded corners. The slot tapers in width towards the bottom of the slot. A threaded hole 5 is formed in the connector next to the edge of the trough. In the preferred embodiment the hole 5 is offset from the slot 4, although in other embodiments the hole 5 may be positioned in

line with the slot.

Figure 2 shows a moulded plastic unitary structure which is for use with the electrical connector. The unitary structure has a retaining portion and, a blanking portion 20 and at least one cable gripping member 30. The blanking portion depends from a first side of the retaining portion and the cable gripping member from a second side opposite the first. The retaining portion has two substantially parallel elongate members 10,12 connected at their ends by two curved members 11,13 so that an elongate hole 14 is enclosed by the four members. Two connecting members 16,18 extend from a first of the elongate members 10 to the blanking portion 20. At the location where each connecting member is joined to the elongate member the thickness of the connecting member is less than the thickness of the elongate member. Each of the connecting members has a protrusion 17,19 which in the preferred embodiment is semi-circular, extending from the respective sides in opposite directions to each other, for location in the slot. The blanking portion 20 has a wall portion 22 depending from the connecting members 16,18 in a direction perpendicular to the longest dimension of the connecting members and a further portion 24 depending from the surface of the wall portion 22 which is closest to the retaining portion and the connecting members 16,18. The blanking portion 20, connecting members 16,18 and the retaining portion form the body of the unitary structure.

Connected to the second 12 of the two elongate members are three cable gripping members 30. Each cable gripping member 30 has two substantially parallel arms 32,34 depending from a transverse portion 36 to form an arch structure. The free ends of the arms 32,34 extend from the transverse portion 36 in the same direction as the blanking portion 20. Referring to Figure 3, the distance A between the facing surfaces of the two parallel arms 32, 34 is different for each cable gripping member and is related to the diameter of commonly used electrical cables. The distance B between the outer surfaces of the parallel arms of each cable

gripping member is the same for each member. As illustrated in Figures 4a and 4b each cable gripping member 30 is connected to the elongate member 12 by a weakened portion 40 extending to the elongate member 12 and of a thickness less than the thickness of the elongate member. In the preferred embodiment each weakened portion may include one or more webs 42 (see Figure 2).

The shape and size of the wall portion 22 of the blanking portion 20 match those of the cut-out portion 2 of the connector so that when the unitary structure is placed in the trough 3 of the connector the blanking portion 20 fills in the cut-out portion 2. The retaining portion of the unitary structure extends transverse to the trough 3 and to one side of the hole 5 so that one of the elongate members 10 is disposed adjacent to the threaded hole 5 in the connector body. In other embodiments of the present invention the hole 14 of the retaining portion may overlie the threaded hole 5 in the connector body. The cable gripping members lie within the connector beyond the trough.

The unitary structure may be used in combination with the connector in two alternative ways. In the first alternative, illustrated in Figure 5, the unitary structure is placed into the connector as previously described so that the cut-out portion 2 in the outer wall 1 of the connector is blanked-off by the blanking portion 20. In the preferred embodiment the two curved protrusions 17,19 on respective connecting members 16,18 engage the slot 3 so that the blanking portion is located flush with the outer wall 1 of the connector. The unitary structure is secured to the connector by inserting a screw 7 into the threaded hole 5 and tightening the screw so that head of the screw engages with the elongate member which lies adjacent to the threaded hole. Thus a cable may enter the connector via an opening in the rear of the connector which is not visible when the connector is mounted to a surface.

In the second alternative, illustrated in Figure 6, the cable enters the connector through the cut-out portion of the outer

wall and lies in the trough 3. One cable gripping member 30 is selected as matching the cable diameter. The cable gripping members which do not match the diameter of the cable 6 are broken off from the unitary structure at weakened portions 40 and discarded. The blanking portion 20 and connecting members 16,18 are also broken off from the unitary structure at where the connecting members join the first elongate member 19 and are also also discarded. The selected cable gripping member which is still attached to the retaining portion is engaged over the cable 6 and inserted into the slot 4. As the surfaces of the sidewalls of the slot 4 converge towards the bottom of the slot, they engage with the arms of the cable gripping member 30 and urge the arms together to grip the cable. This is explained further in the Applicant's co-pending British application No. 9519201.9. When the cable gripping member 30 is located in the slot 4, the hole 14 of the retaining portion overlies the threaded hole 5 in the connector and the cable gripping member is held securely to the connector by inserting a screw 7 through hole 14 into the threaded hole 5 and tightening the screw so that the thread of the screw engages with the elongate members 10 and 12.

In the preferred embodiment of the present invention the unitary structure is formed from a single moulding process, which may be the process of moulding either thermo-plastic or thermo-set plastics.

The above description relates to one embodiment of the present invention by way of example only and is not intended to exclude any variations which one skilled in the art would easily conceive.

CLAIMS:

1. The combination of an electrical connector, said connector having an outer wall with a cut-out portion therein, and a unitary structure secured thereto and having a body, said body having a portion for blanking said cut-out portion and said structure further having at least one cable gripping means depending from said body.

2. The combination as claimed in claim 1, wherein the or each cable gripping means is connected to said body by a weakened portion.

3. The combination as claimed in claims 1 or 2, wherein said body further comprises a retaining portion for retaining the structure to the connector.

4. The combination as claimed in claim 3, wherein said retaining portion comprises two elongate members joined together at their respective ends to define an aperture therebetween.

5. The combination as claimed in claims 3 or 4, further comprising a screw for securing said retaining portion to said connector.

6. The combination as claimed in any preceding claim, wherein said structure has a plurality of cable gripping means.

7. The combination as claimed in claim 6, wherein each of the cable gripping means is adapted to engage a respective diameter of cable.

8. The combination as claimed in any preceding claim, wherein said cut-out portion defines a cable receiving opening.

9. The combination as claimed in any preceding claim, wherein the connector has surfaces for cooperating with surfaces of the

cable gripping means whereby in use, the cable gripping means are urged to engage a cable.

10. The combination as claimed in any preceding claim wherein said connector has a wall defining a trough therein, said trough extending to said outer-wall to form said cut-out portion.

11. The combination as claimed in any preceding claim, wherein said structure is formed by a moulding process.

12. The combination as claimed in any preceding claim, wherein said cable gripping means comprises two substantially parallel arms depending from a transverse member.

13. The combination as claimed in any preceding claim, wherein the connector comprises a switch.

14. The combination of an electrical connector and a unitary structure, said connector comprising an outer wall having a cut-out portion therein and a correspondingly shaped trough extending into the connector in a direction perpendicular to the outer wall, the trough having a slot formed therein substantially parallel to the wall portion, and a threaded hole formed in the connector in the same direction as the slot, and wherein said unitary structure comprises a blanking portion of substantially similar shape to the cut-out portion of said outer wall, at least one cable gripping portion and a retaining portion having two parallel elongate members connected to their respective ends by curved members, wherein the or each gripping portion is connected to one of the elongate members of the retaining portion and a connecting member extends between the other elongate member and the blanking portion.

15. The combination of an electrical connector and a unitary structure constructed and arranged substantially as herein described, with reference to, and as illustrated in the accompanying drawings.

Amendments to the claims have been filed as follows

CLAIMS:

1. The combination of an electrical connector, said connector having an outer wall with a cut-out portion therein, and a unitary structure secured thereto and having a body, said body having a portion for blanking said cut-out portion and said unitary structure further having a cable gripping means depending from said body, and separable for engaging a cable passing through said cut-out portion.

2. The combination as claimed in claim 1, wherein the or each cable gripping means is connected to said body by a weakened portion.

3. The combination as claimed in claims 1 or 2, wherein said body further comprises a retaining portion for retaining the structure to the connector.

4. The combination as claimed in claim 3, wherein said retaining portion comprises two elongate members joined together at their respective ends to define an aperture therebetween.

5. The combination as claimed in claims 3 or 4, further comprising a screw for securing said retaining portion to said connector.

6. The combination as claimed in any preceding claim, wherein said structure has a plurality of cable gripping means.

7. The combination as claimed in claim 6, wherein each of the cable gripping means is adapted to engage a respective diameter of cable.

8. The combination as claimed in any preceding claim, wherein said cut-out portion defines a cable receiving opening.

9. The combination as claimed in any preceding claim, wherein the connector has surfaces for cooperating with surfaces of the

cable gripping means whereby in use, the cable gripping means are urged to engage a cable.

10. The combination as claimed in any preceding claim wherein said connector has a wall defining a trough therein, said trough extending to said outer-wall to form said cut-out portion.

11. The combination as claimed in any preceding claim, wherein said structure is formed by a moulding process.

12. The combination as claimed in any preceding claim, wherein said cable gripping means comprises two substantially parallel arms depending from a transverse member.

13. The combination as claimed in any preceding claim, wherein the connector comprises a switch.

14. The combination of an electrical connector and a unitary structure, said connector comprising an outer wall having a cut-out portion therein and a correspondingly shaped trough extending into the connector in a direction perpendicular to the outer wall, the trough having a slot formed therein substantially parallel to the wall portion, and a threaded hole formed in the connector in the same direction as the slot, and wherein said unitary structure comprises a blanking portion of substantially similar shape to the cut-out portion of said outer wall, at least one cable gripping portion and a retaining portion having two parallel elongate members connected to their respective ends by curved members, wherein the or each gripping portion is connected to one of the elongate members of the retaining portion and a connecting member extends between the other elongate member and the blanking portion.

15. The combination of an electrical connector and a unitary structure constructed and arranged substantially as herein described, with reference to, and as illustrated in the accompanying drawings.

The Patent Office

11

Application No: GB 9811760.9
Claims searched: 1 to 15

Examiner: Mr F J Fee
Date of search: 9 November 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): H2E [EGBA, EGAX, EGAU3, EGAU4]

Int Cl (Ed.6): H01R

Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	GB 1234520 A	[I.S.E.C.] elongate members 56´, 66´ joined at end 62 to define an aperture therebetween	1, 3, 4, 8
X`	EP 0681348 A2	[THOMAS & BETTS] clamp 54 supplied unitary to body via latches on latch walls 94, 96, column 5 lines 29 to 32	1, 8, 10, 12
X	WO 97/05681 A1	[GEMPLUS] unitary body 12, 13, cable grip 17, blank plug 18	1, 3, 8, 9, 10
X	WO 86/01042 A1	[AMP] blank plate 35, clamp 45, 25	1, 3, 8, 9, 10

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.