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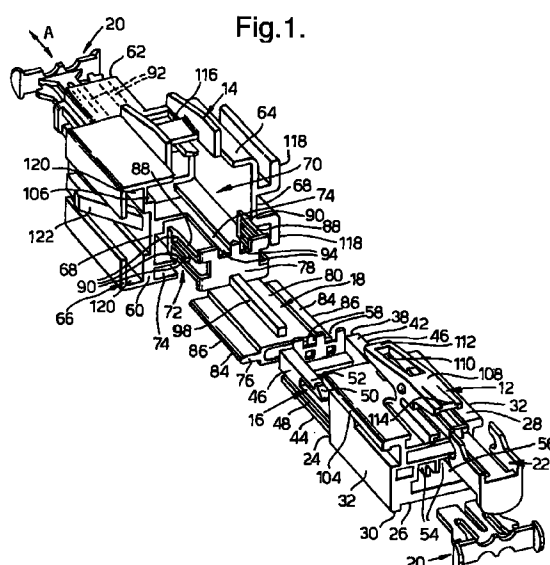
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(54) Two-part electrical connector housing

(57) A housing (10) for a two-part electrical connector comprising a male member (12) having a front face (24) and a lower side (30) with an open-side channel (34) formed in the lower side, extending in an axial direction (A), and opening through the front face; a female member (14) having a bore (70) for receiving the male member on relative movement in the axial direction, the female member having a front face (60) and a lower side (66) with an open-side channel (72) formed in the lower side, extending in the axial direction, and opening through the front face; a first coding member (16) having a front face (38) and a lower side (44), the first coding member being separately formed from the male member and positioned in the channel in the male member with the front faces, and with the lower sides of the male member and the first coding member, being substantially aligned; a second coding member (18) having a front face (76), and an upper side (80), the second coding member being separately formed from the female member and positioned in the channel in the female member with the front faces of the female member and the second coding member being substantially aligned, and with the upper side of the second coding member defining a lower surface of the bore (70) in the female member; wherein the lower side of the first coding member and the upper side of the second coding member have corresponding aligning means (96,98) which align with one another, and engage with one another, on mating of the male and female members. The use of separately formed coding members allows a large number of variants without the need to change the design of the male and female housing members.



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Description

Technical Field

[0001] The present invention relates to a housing for a two-part electrical connector.

Background of the Invention

[0002] When installing, for example, a wiring harness in a motor vehicle, it is essential to ensure that the correct two-part electrical connectors are mated together. One solution to this problem is to make all the female housing members, and corresponding male housing members, different so that one male member will only mate with one female member. This has disadvantages in terms of the number of variants of female and male housing members that have to be produced.

Summary of the Invention

[0003] It is an object of the present invention to overcome this problem.

[0004] A housing in accordance with the present invention for a two-part electrical connector comprises a male member having a front face and a lower side with an open-side channel formed in the lower side of the male member, extending in an axial direction, and opening through the front face of the male member; a female member having a bore for receiving the male member on relative movement in the axial direction, the female member having a front face and a lower side with an open-side channel formed in the lower side of the female member, extending in the axial direction, and opening through the front face of the female member; a first coding member having a front face and a lower side, the first coding member being separately formed from the male member and positioned in the channel in the male member with the front faces of the male member and the first coding member being substantially aligned, and with the lower sides of the male member and the first coding member being substantially aligned; a second coding member having a front face, and an upper side, the second coding member being separately formed from the female member and positioned in the channel in the female member with the front faces of the female member and the second coding member being substantially aligned, and with the upper side of the second coding member defining a lower surface of the bore in the female member; wherein the lower side of the first coding member and the upper side of the second coding member have corresponding aligning means which align with one another, and engage with one another, on mating of the male and female members.

[0005] By moving the relative positions of the aligning means on the separately formed first and second coding members, a large number of variants of two-part

electrical connector can be provided without the need to change the design of the male and female housing members.

Brief Description of the Drawings

[0006] The present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is an exploded view of a housing in accordance with the present invention for a two-part electrical connector;

Figure 2 is a perspective view of the housing of Figure 1 after assembly and mating;

Figure 3 is a front perspective view of the male member of the housing of Figures 1 and 2;

Figure 4 is a perspective view of the first coding member of the housing of Figures 1 and 2; and

Figure 5 is a perspective view of the second coding member of the housing of Figures 1 and 2.

Description of the Preferred Embodiment

[0007] Referring to the drawings, the housing 10 in accordance with the present invention, for a two-part electrical connector, comprises a male member 12, a female member 14, a first coding member 16, a second coding member 18, and, optionally, a pair of terminal retaining members 20 and a locking member 22. The members 12-22 of the housing 10 are separately formed, and preferably moulded from plastics material. The male member 12 mates with the female member 14 by relative movement in an axial direction A.

[0008] The male member 12 comprises a front face 24, a rear face 26, an upper side 28, a lower side 30, and side walls 32. An open sided channel 34 is formed in the lower side 30 and extends in the axial direction A to open through the front face 24. An axially extending rib 36 is formed on each side wall 32 within the channel 34.

[0009] The first coding member 16 has a front face 38, a rear face 40, an upper side 42, a lower side 44, and side walls 46. Each side wall 46 of the first coding member 16 has an axially extending groove 48 formed therein. The grooves 48 correspond to the ribs 38 in the channel 34 in the male member 12. Each side wall 46 also includes an upwardly directed tab 50 which is formed on a resilient arm 52 which is integral with the side wall. The first coding member 16 is assembled in the male member 12 by sliding the first coding member through the opening to the channel 34 in the front face 24 of the male member, with the ribs 38 making a sliding fit in the grooves 48. The first coding member 16 is retained in the male member 12 by the tabs 50 making a snap fit with corresponding tabs or openings (not shown) formed in the male member. In the fully assembled position, the front faces 24,38 are substantially

aligned, and the lower sides 30,44 are substantially aligned. The arrangement of the ribs 38 and grooves 48 may be reversed with the ribs formed on the first coding member 16 and the grooves formed in the male member 12.

[0010] The male member 12 has a number of axially extending bores 54 formed therein within each of which a female electrical terminal (not shown) can be positioned. Electric conductor wires (not shown) for the female terminals pass through an aperture 56 in the rear face 26 of the male member 12 which opens into the terminal bores 54. The front face 38 of the first coding member 16 defines a wall (stop means) at the front face 24 of the male member 12 to retain the female terminals in the terminal bores 54. One of the terminal retaining member 20 makes a sliding snap fit in the aperture 56 in the rear face 26 of the male member 12 to define stop means at the rear face to retain the female terminals in the terminal bores 54. The front face 38 of the first coding member 16 has apertures 58 formed therein which align with the terminal bores 54 in the male member 12.

[0011] The female member 14 comprises a front face 60, a rear face 62, an upper side 64, a lower side 66, and side walls 68. An axially extending bore 70 is formed in the female member 14 which opens through the front face 60. An open sided channel 72 is formed in the lower side 66 of the female member 14 and extends in the axial direction A to open through the front face 60. An axially extending groove 74 is formed in each side wall 68 of the female member 14 within the channel 72.

[0012] The second coding member 18 has a front face 76, a rear face 78, an upper side 80, a lower side 82, and side walls 84. Each side wall 84 of the second coding member 18 has an axially extending rib 86 formed therein. The ribs 86 correspond to the grooves 74 in the channel 72 in the female member 14. A pair of rearwardly (axially) extending resilient arms 88 are integral with the rear face 78 of the second coding member 18, with one or more sidewardly directed tabs 90 formed on each arm. The second coding member 18 is assembled in the female member 14 by sliding the second coding member through the opening to the channel 72 in the front face 60 of the female member, with the ribs 86 making a sliding fit in the grooves 74. The second coding member 18 is retained in the female member 14 by the tabs 90 making a snap fit with corresponding tabs or openings (not shown) formed in the female member. In the fully assembled position, the front faces 60,76 are substantially aligned, and the lower sides 66,82 are substantially aligned. When in position in the female member 14, the upper side 80 of the second coding member 18 defines a lower surface for the bore 70 in the female member. The arrangement of the ribs 86 and grooves 74 may be reversed with the grooves formed in the second coding member 18 and the ribs formed on the female member 14.

[0013] The female member 14 has a number of axially extending bores 92 formed therein within each of which

a male electrical terminal (not shown) can be positioned. Electric conductor wires (not shown) for the male terminals pass through an aperture (not shown) in the rear face 62 of the female member 14 which opens into the terminal bores 92, in a similar manner to the arrangement of the aperture 56 and terminal bores 54 in the male member 12. The rear face 78 of the second coding member 18 defines a wall (stop means) to retain the male terminals in the terminal bores 92. The other terminal retaining member 20 makes a sliding snap fit in the aperture in the rear face 62 of the female member 14 to define stop means at the rear face to retain the male terminals in the terminal bores 92. The rear face 78 of the second coding member 18 has apertures 94 formed therein which align with the terminal bores 92 in the female member 14, and through which the male terminals can project into the bore 70 in the female member 14.

[0014] The lower side 44 of the first coding member 16 has an axially extending groove 96 formed therein. The upper side 80 of the second coding member 18 has a corresponding axially extending rib 98 formed thereon. Additionally, or alternatively, the lower side 44 of the first coding member 16 may have an axially extending rib 100 formed thereon, and the upper side 80 of the second coding member 18 may have a corresponding axially extending groove 102 formed therein. Optionally, at least one of the side walls 32 of the male member 12 has an external axially extending rib 104 or groove (not shown) and the corresponding side wall 68 of the female member 14 has a corresponding internal axially extending groove 106 or rib (not shown).

[0015] The upper side 28 of the male member 12 preferably has an integral resilient cantilevered arm 108 which extends in the axial direction A. The arm 108 has a latch tang 110 at the front end 112, and is spaced from the upper side 28 at the rear end 114. The upper side 64 of the female member 14 has an integral shoulder 116 extending in a direction substantially perpendicular to the axial direction A.

[0016] Prior to mating of the male member 12 with the female member 14, the female and male terminals (not shown) are positioned in the respective terminal bores 54, 92 in the male and female members, and the first and second coding members 16, 18 are slid into position in the respective channels 34, 72 until the tabs 50, 90 on the first and second coding members make a snap fit with the male and female members. In order to mate the male member 12 with the female member 14, the male member is moved in the axial direction A relative to the female member into the bore 70 of the female member. During the mating process, the front faces 24, 38 of the male member 12 and the first coding member 16, respectively, enter the bore 70; the rib 98 on the second coding member 18 makes a sliding fit in the corresponding groove 96 in the first coding member 16; the rib 100 on the first coding member 16 makes a sliding fit in the corresponding groove 102 in the second coding

member 18; and the rib 104 on the male member 12 makes a sliding fit in the corresponding groove 106 in the female member 14.

[0017] As the male and female members 12, 14 approach their fully mated position, the portion of the male terminals (not shown) extending into the bore 70 of the female member pass through the apertures 58 in the front face 38 of the first coding member 16 and electrically connect with the female terminals (not shown) in the male member. At the fully mated position of the male and female members 12, 14, the latch tang 110 on the cantilever arm 108 of the male member 12 makes a snap fit with the shoulder 116 on the female member 14. In order to prevent unintentional disconnection of the male member 12 from the female member 14, the locking member 22 can be positioned in the space between the rear end 114 of the cantilever arm 108 and the upper side 28 of the male member 12 after the male and female members have been fully mated.

[0018] The side walls 68 of the female member 14 may include external interconnecting means which allow substantially identical female members 14 to be secured together side-by-side if required. The interconnecting means preferably comprises a pair of axially extending L-shaped arms 118 integrally formed on one side wall 68, and corresponding axially extending U-shaped channels 120 integrally formed on the other side wall which slidably receive the L-shaped arms. A resilient lever 122 integrally formed with said other side wall 68 and positioned between the U-shaped channels 120 may be used to frictionally grip adjacent female members 14.

[0019] With the present invention, in order to ensure that the correct male member 12 is mated with the correct female member 14, corresponding first and second coding members 16, 18 are positioned in the male and female members, respectively. By moving the relative positions of the ribs 98, 100 and grooves 96, 102 on the first and second coding members 16, 18, a large number of variants of two-part electrical connector can be provided without the need to change the design of the male and female members 12, 14. This has significant advantages in terms of manufacture. Additionally, the first and second coding members 16, 18 can be designed to provide stop surfaces for retaining the electrical terminals in the male and female members 12, 14. The present invention also lends itself to a modular approach which allows female members 14 to be secured together side-by-side if required. The present invention has particular application in the electrical wiring system in a motor vehicle.

Claims

1. A housing (10) for a two-part electrical connector comprising a male member (12) having a front face (24) and a lower side (30) with an open-side channel (34) formed in the lower side of the male mem-

ber, extending in an axial direction (A), and opening through the front face of the male member; a female member (14) having a bore (70) for receiving the male member on relative movement in the axial direction (A), the female member having a front face (60) and a lower side (66) with an open-side channel (72) formed in the lower side of the female member, extending in the axial direction (A), and opening through the front face of the female member; a first coding member (16) having a front face (38) and a lower side (44), the first coding member being separately formed from the male member and positioned in the channel in the male member with the front faces of the male member and the first coding member being substantially aligned, and with the lower sides of the male member and the first coding member being substantially aligned; a second coding member (18) having a front face (76), and an upper side (80), the second coding member being separately formed from the female member and positioned in the channel in the female member with the front faces of the female member and the second coding member being substantially aligned, and with the upper side of the second coding member defining a lower surface of the bore (70) in the female member; wherein the lower side of the first coding member and the upper side of the second coding member have corresponding aligning means (96, 98) which align with one another, and engage with one another, on mating of the male and female members.

2. A housing as claimed in Claim 1, wherein the first coding member (16) makes a sliding fit in the channel (34) in the male member (12), and/or the second coding member (18) makes a sliding fit in the channel (72) in the female member (14).
3. A housing as claimed in Claim 2, wherein the first coding member (16) has an axially extending groove (48) in each side wall (46) thereof which slidably engages a corresponding axially extending rib (36) on each side wall (32) of the channel (34) in the male member (12), and/or the second coding member (18) has an axially extending rib (86) on each side wall (84) thereof which slidably engages a corresponding axially extending groove (74) in each side wall (68) of the channel (72) in the female member (14).
4. A housing as claimed in any one of Claims 1 to 3, wherein the first coding member (16) has resiliently mounted tabs (50) which make a snap fit with the male member (12) to retain the first coding member in the channel (34) in the male member, and/or the second coding member (18) has resiliently mounted tabs (90) which make a snap fit with the female member (14) to retain the second coding

member in the channel (72) in the female member.

5. A housing as claimed in any one of Claims 1 to 4, wherein the front face (38) of the first coding member (16) defines a stop surface for electrical terminals positioned in the male member (12), and/or the second coding member (18) has a rear face (78) which defines a stop surface for electrical terminals positioned in the female member (14). 5
6. A housing as claimed in Claim 5, wherein the front face (38) of the first coding member (16) has apertures (58) which align with terminal bores (54) in the male member (12) and/or the rear face (78) of the second coding member (18) has apertures (94) which align with terminal bores (92) in the female member (14). 10 15
7. A housing as claimed in any one of Claims 1 to 6, wherein the aligning means comprises an axially extending groove (96) in the lower side (44) of the first coding member (16) and an axially extending rib (98) on the upper side (80) of the second coding member (18). 20 25
8. A housing as claimed in any one of Claims 1 to 6, wherein the aligning means comprises an axially extending rib (100) on the lower side (44) of the first coding member (16) and an axially extending groove (102) in the upper side (80) of the second coding member (18). 30
9. A housing as claimed in any one of Claims 1 to 8, wherein the male member (12) has an axially extending rib (104) on an outer surface thereof which makes a sliding fit in an axially extending groove (106) in the bore (70) in the female member (14). 35
10. A housing as claimed in any one of Claims 1 to 9, wherein an axially extending cantilever arm (108) is integrally formed on an upper side (28) of the male member (12), the arm having a latch tang (110) at a front end (112) thereof; and wherein a shoulder (116) is formed on an upper side (64) of the female member (14), the latch tang making a snap fit with the shoulder on mating of the male and female members. 40 45
11. A housing as claimed in any one of Claims 1 to 10, wherein a locking member (22) is positioned between the cantilever arm (108) and the upper side (28) of the male member (12) after mating of the male and female members (12, 14) to substantially prevent unintentional unlatching of the latch tang (110) from the shoulder (116). 50 55
12. A housing as claimed in any one of Claims 1 to 11,

wherein the female member (14) has interconnecting means (118-122) on a side wall (68) thereof for securing the female member to corresponding interconnecting means on an adjacent female member.

Fig.1.

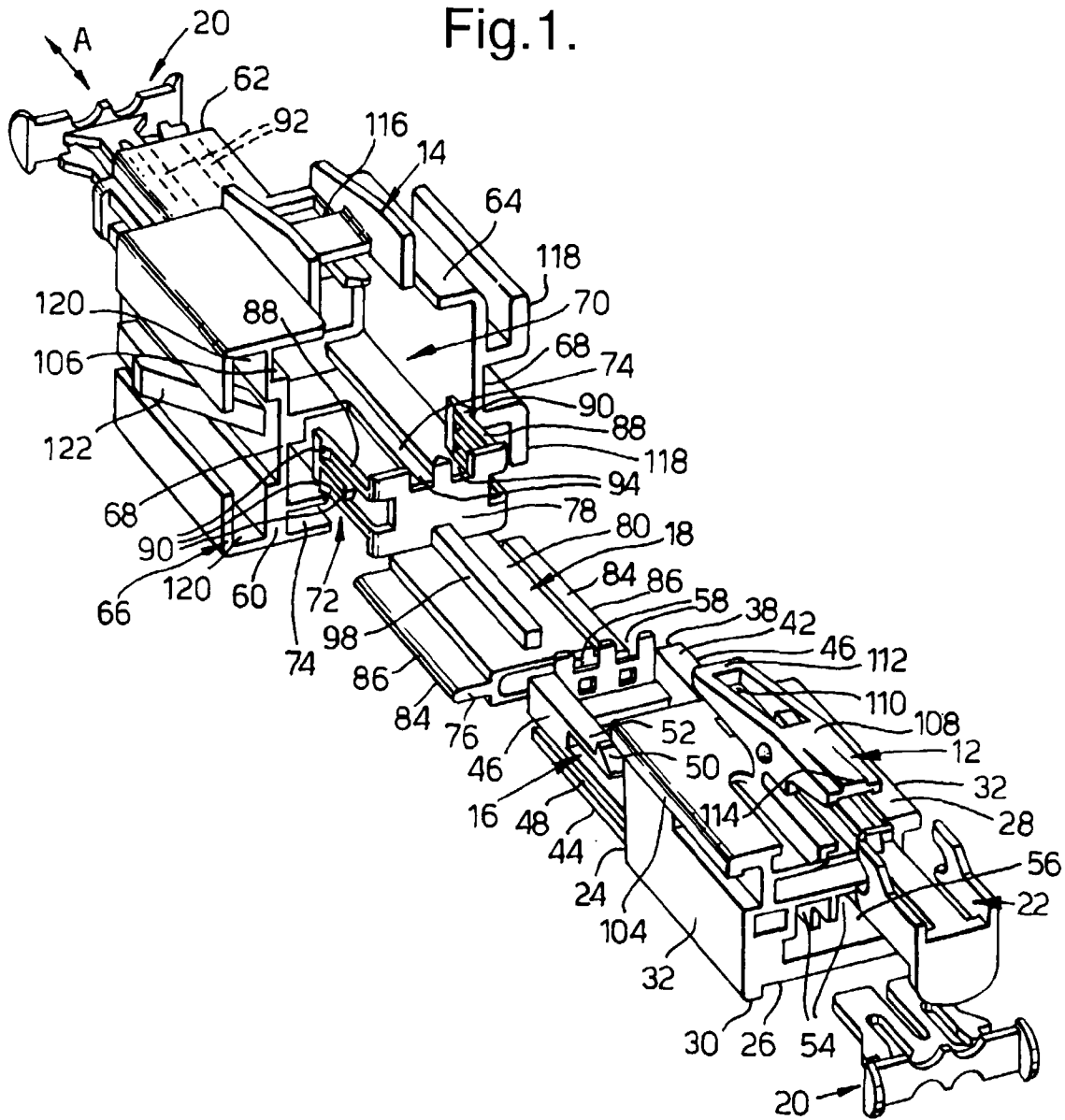


Fig.2.

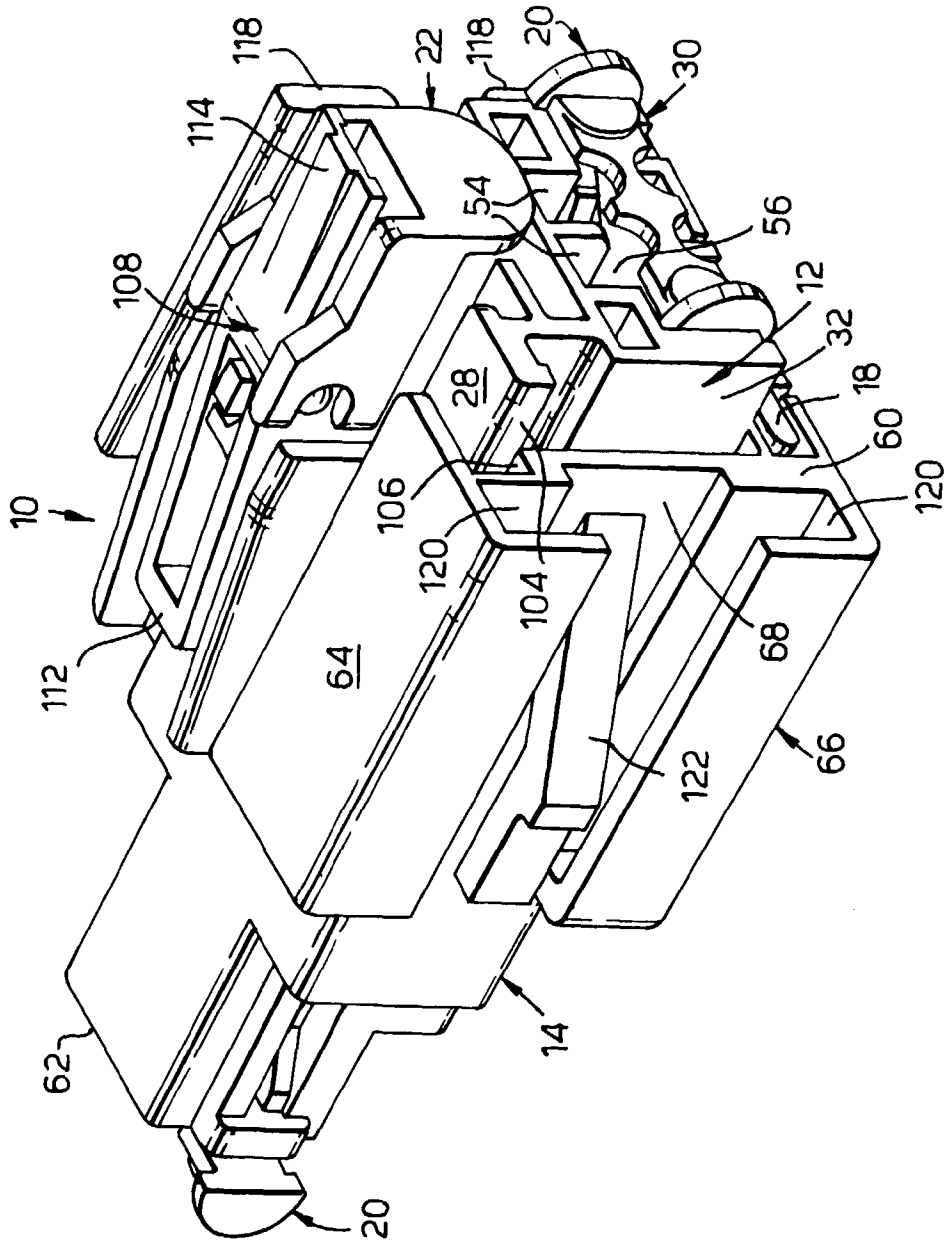


Fig.3.

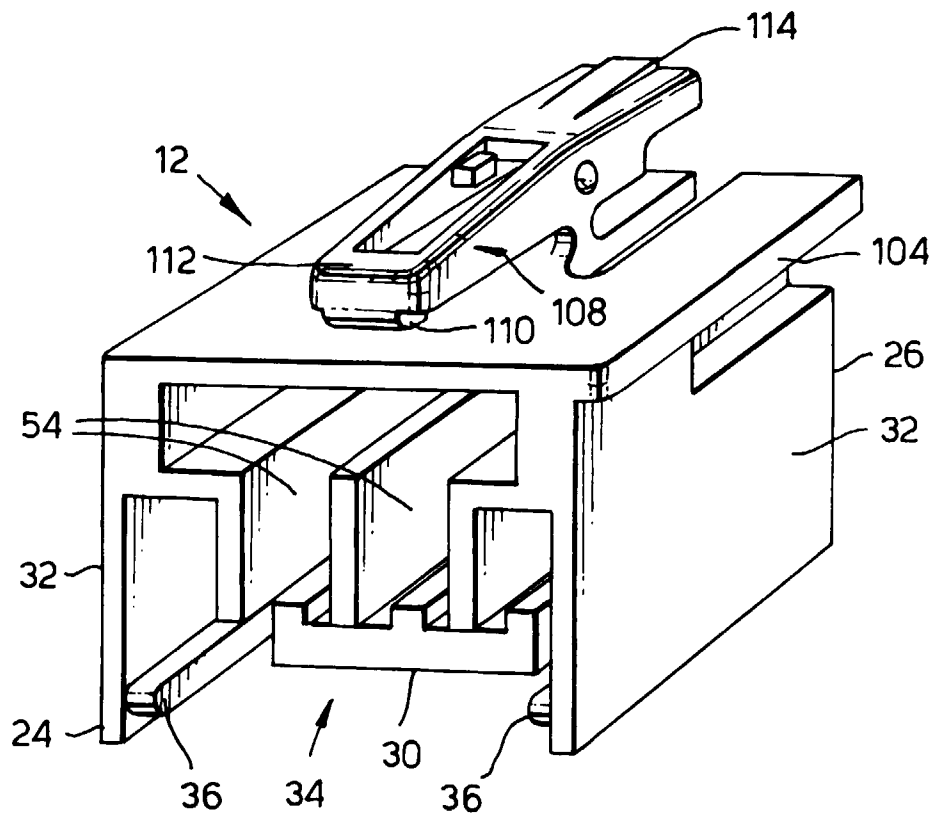


Fig.4.

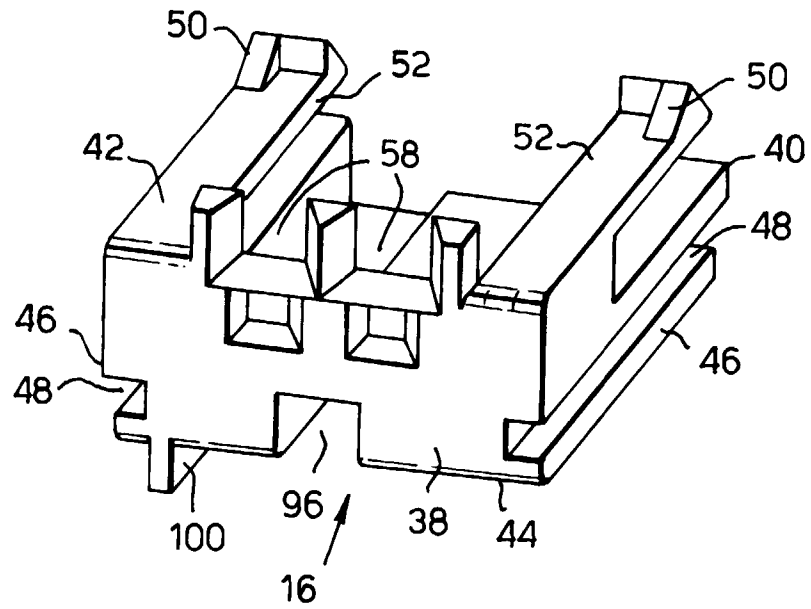


Fig.5.

