

MODULAR CABLE TO BOARD POWER CONNECTOR

Background of the Invention

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1. **Field of the Invention:** This invention relates to electrical connectors and more particularly to cable to board power connectors.

2. **Brief Description of Prior Developments:** Cable to board power connectors are known in the art. Such connectors may be adapted to relatively high power uses while other such connectors may be specifically adapted to lower power uses. Other similar connectors may be adapted for signal transmission. The user is required, therefore, to keep a relatively large stock of cable to board connectors for different uses.

There is a need, therefore, for a modular cable to board connector which can be specifically adapted for a particular need.

Summary of the Invention

In the connector of the present invention, a modular cable to board connector is provided in which various configurations can be selected depending on the user's needs.

Each element of this electrical connector comprises a plurality of axial segments positioned in parallel, side by side relation and wherein a transverse passageway extends through said axial segments. A rail is positioned in said transverse passageway, and latching means are used to fix this rail to at least one of said axial segments. The segments may be a high power module, a low power module or a signal module. Guide modules are also provided on each of the opposed ends of the assembly.

Brief Description of the Drawings

The invention is further described with reference to the accompanying drawings in which:

- 5 Fig. 1 is a front view of disassembled segments of a preferred embodiment of a board receptacle of the present invention;
 Fig. 2 is an end view of the segment shown in Fig. 1;
 Fig. 3 is a front view of disassembled segments of a preferred embodiment of a cable plug of the present invention;
10 Fig. 4 is an end view of the disassembled segments shown in Fig. 3;
 Fig. 5 is a front view illustrating the assembly of two segments shown in Fig. 1;
 Fig. 6 is an end view of a partially assembled receptacle as shown in Fig. 1; and
15 Fig. 7 is a top plan view of a receptacle and plug as would result from the assembly of the segments shown in Fig. 1 - 4.

Detailed Description of the Preferred Embodiments

Referring to Fig. 1 - 2, the board receptacle would be comprised, for example, of a guide module 10, a high power module 12, a low power
20 module 14 and a signal module 16. Each of these modules would have locking features as, for example, 18, 20, 22, and 24. As is conventional, the high power module, low power module and signal module would each have contact receiving apertures such as, for example, respectively at apertures 26, 28 and 30.

25 It will be understood that it would be possible to substitute other segments for either the high power module, or the low power module depending on the specific needs of the user. One important consideration

would be power requirements, and the type of power modules and number of power modules might be selected based on such requirements. It will also be understood that a second guide module would ordinarily be positioned to the opposed side of guide module 10 when the receptacle is assembled as will be described hereafter.

Referring to Fig. 3 - 4, the board receptacle would be comprised, for example, of a guide module 32, a high power module 34, a low power module 36 and a signal module 38. Each of these modules would have locking features as, for example, 40, 42, 44 and 46. As is conventional, the high power module, low power module and signal module would each have contacts as is, for example, respectively shown at contacts 48, 50 and 52.

The assembly of the segments as are shown in Fig. 1 - 4 is illustrated in Fig. 5 - 7. From Fig. 5 it will be seen that adjacent segments as, for example, modules 12 and 14 initially slide together in the direction of the arrows. It will be understood that all adjacent segments slide together in a similar way to obtain a structure as, for example, as shown in Fig. 6. From Fig. 2 and 6 it will be seen that the guide module 10 has a recess 54 and the high power module 12, low power module 14 and signal module 16 have respectively slots 56, 58 and 60 which are aligned to produce a passageway shown generally at 62. Referring particularly to Fig. 6, a locking rail 64 is positioned in the passageway 62. In the guide module there is vertical groove 66 which is aligned with a slot 68 in the locking rail. A vertical latch 70 is inserted in these aligned grooves to fix the locking groove to the guide module 10. A similar latch 72 (Fig. 1) serves a similar purpose on the opposed side of the guide module. On the other end of the assembly there is a second guide module 74 which also

has a transverse recess 76 and a vertical groove 78. When a guide module 74 is positioned adjacent signal module 16, a latch 80 would engage groove 78 in the guide module and another groove 82 in the locking rail 64 to fix guide module 74 to the assembly.

5 Referring again to Fig. 3 and 4, it will be seen that there is a recess 84 in the guide module 32 and slots 86, 88 and 90 respectively in the high power module 34, low power module 36 and signal module 38 which, when aligned, form a passageway (not shown) for a locking rail (not shown) to enable the entire plug to be assembled with latches (not shown)
10 and another guide module (not shown) in a way similar to that described above.

Referring to Fig. 7, it will be seen that a plug shown generally at numeral 92 will be assembled to engage the receptacle shown generally at numeral 94 which is assembled in the way described above.

15 It will be appreciated that a cable to board connector has been described which may be assembled from modular components which may be high powered module, low powered module or signal module so that the specific needs of the user may be accommodated.

While the present invention has been described in connection
20 with the preferred embodiments of the various figures, it is to be understood that other similar embodiments may be used or modifications and additions may be made to the described embodiment for performing the same function of the present invention without deviating therefrom. Therefore, the present invention should not be limited to any single
25 embodiment, but rather construed in breadth and scope in accordance with the recitation of the appended claims.

**Claims****WHAT IS CLAIMED IS:**

1. An element of an electrical connector comprising:
 - 5 (a) a plurality of axial segments positioned in side by side relation and wherein a transverse passageway extends through said axial segments;
 - (b) a rail positioned in said transverse passageway; and
 - (c) means for fixing said rail to at least one of said axial
10 segments.
2. The element of claim 1 which is a receptacle.
3. The element of claim 1 which is a plug.
15
4. The element of claim 1 wherein at least one of the axial segments is a power module.
5. The element of claim 4 wherein the power module is adapted for
20 higher power requirements.
6. The element of claim 4 wherein the power module is adapted for lower power requirements.
- 25 7. The element of claim 1 wherein at least one of the axial segments is a signal module.



8. The element of claim 1 wherein supporting guide segments are positioned at opposed ends of said element.
9. The element of claim 8 wherein the rail is fixed to said supporting
5 guide segments.
10. The element of claim 9 wherein the means for fixing the rail to at least one of the axial segments is a latch. There is a slot adjacent at least one end of the rail and there is a groove in at least one of the supporting
10 guide segments and said slot and said groove are aligned and said latch passes through said groove and slot to fix the rail to the supporting guide segment.
11. The element of claim 8 wherein at least one of the axial segments is
15 a power module and said power module is interposed between said supporting guide segments.
12. The element of claim 11 wherein a high power module and a low power module are both interposed between said supporting guide
20 segments.
13. The element of claim 12 wherein the selection of number and types of power modules is based on power requirements.
- 25 14. The element of claim 8 wherein at least one of the axial segments is a signal module and said signal module is interposed between said supporting guide segments.



15. The element of claim 8 wherein at least one of the axial segments is a signal module and said signal module is interposed between said supporting guide segments.

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16. The element of claim 15 wherein at least one power module is interposed between said supporting guide segments.

17. The element of claim 16 wherein a high power module and a low
10 power module are both interposed between said supporting guide segments.

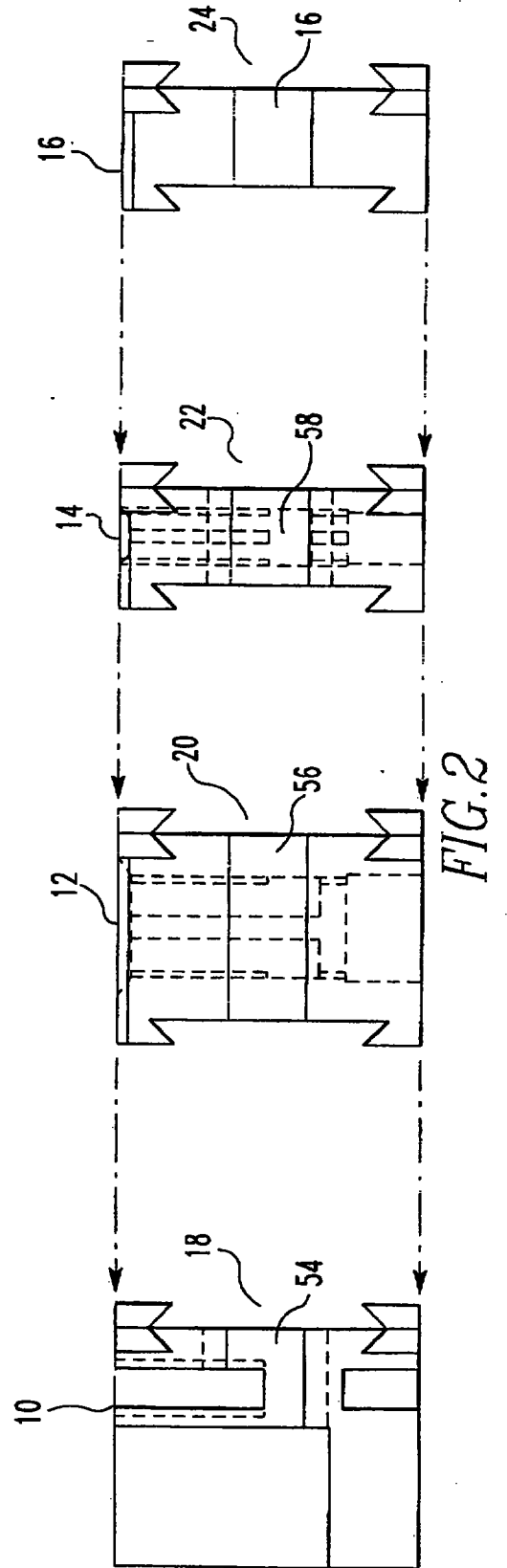
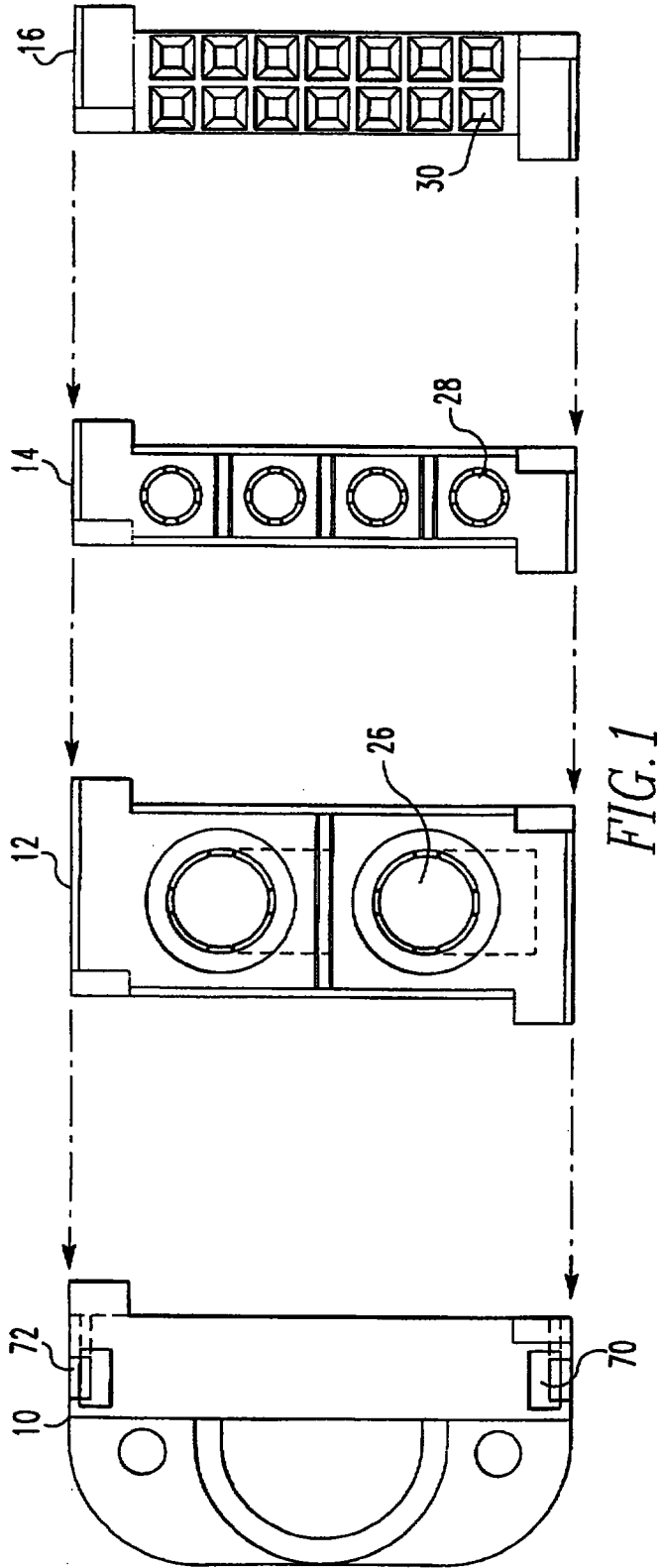
18. The element of claim 1 wherein the transverse passageway is at
least in part formed by aligned slots in at least some of said axial
15 segments.

19. An element of an electrical connector comprising a plurality of axial
segment which is restrained to be positioned in parallel side by side
relation wherein at least one of said segments is a power module.

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20. The element of claim 20 wherein at least one of said segments is a
signal module.

1/4



2/4

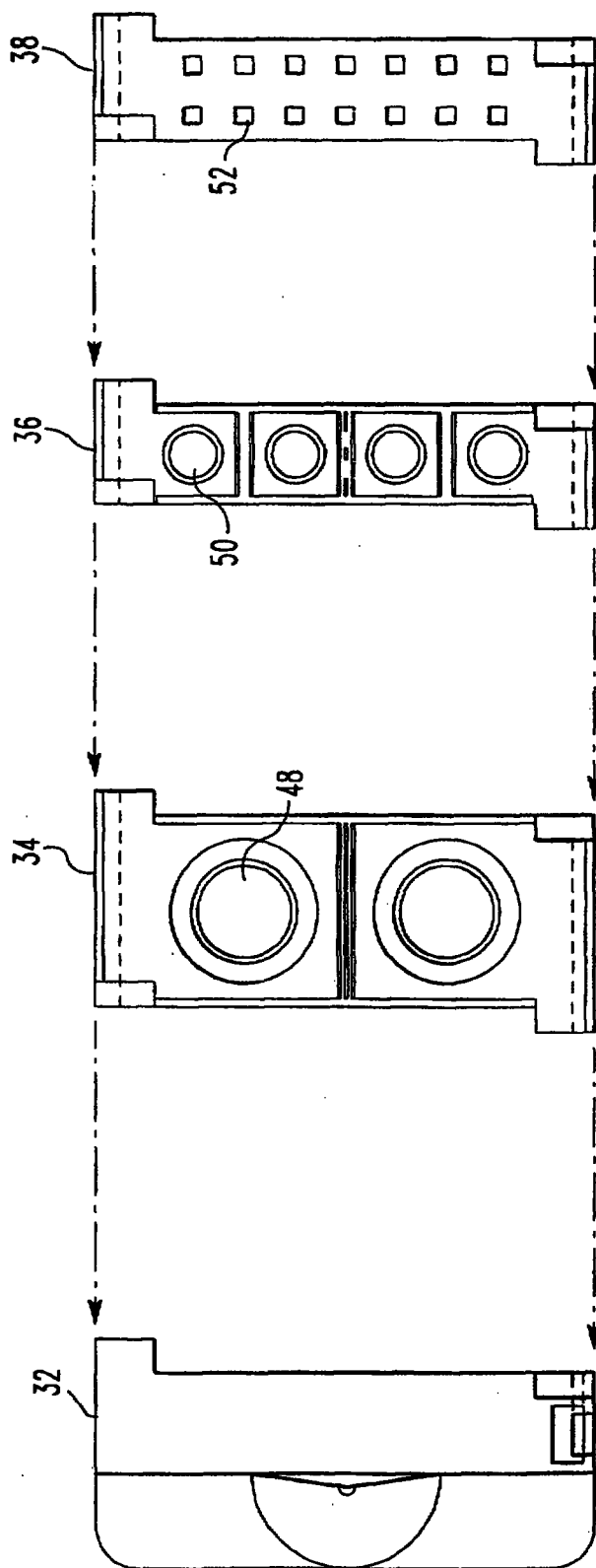


FIG. 3

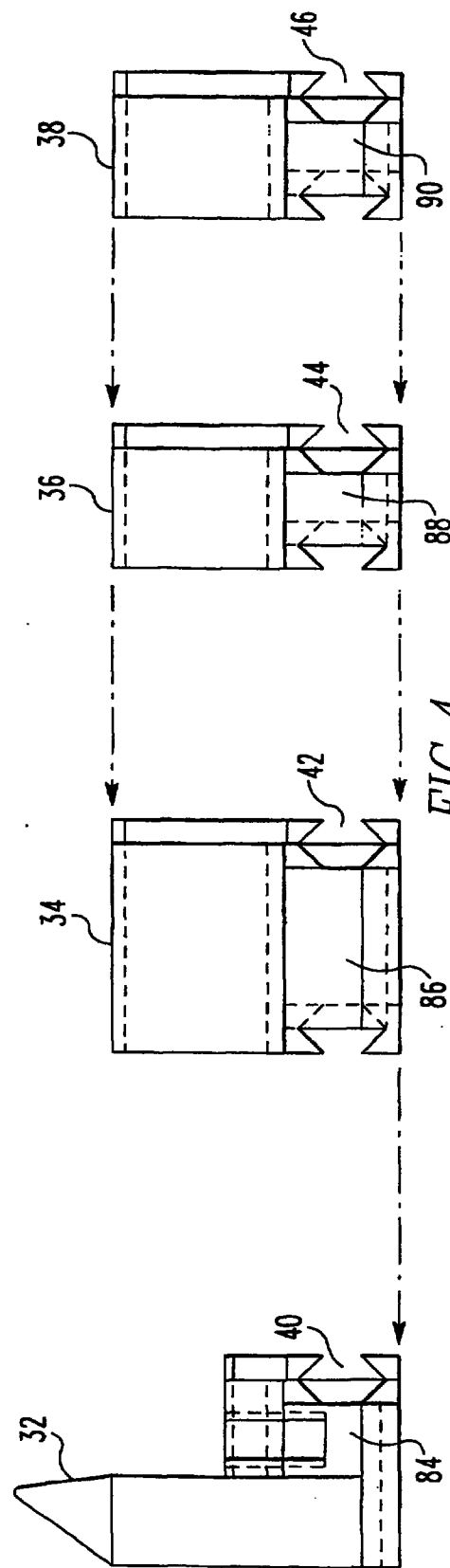
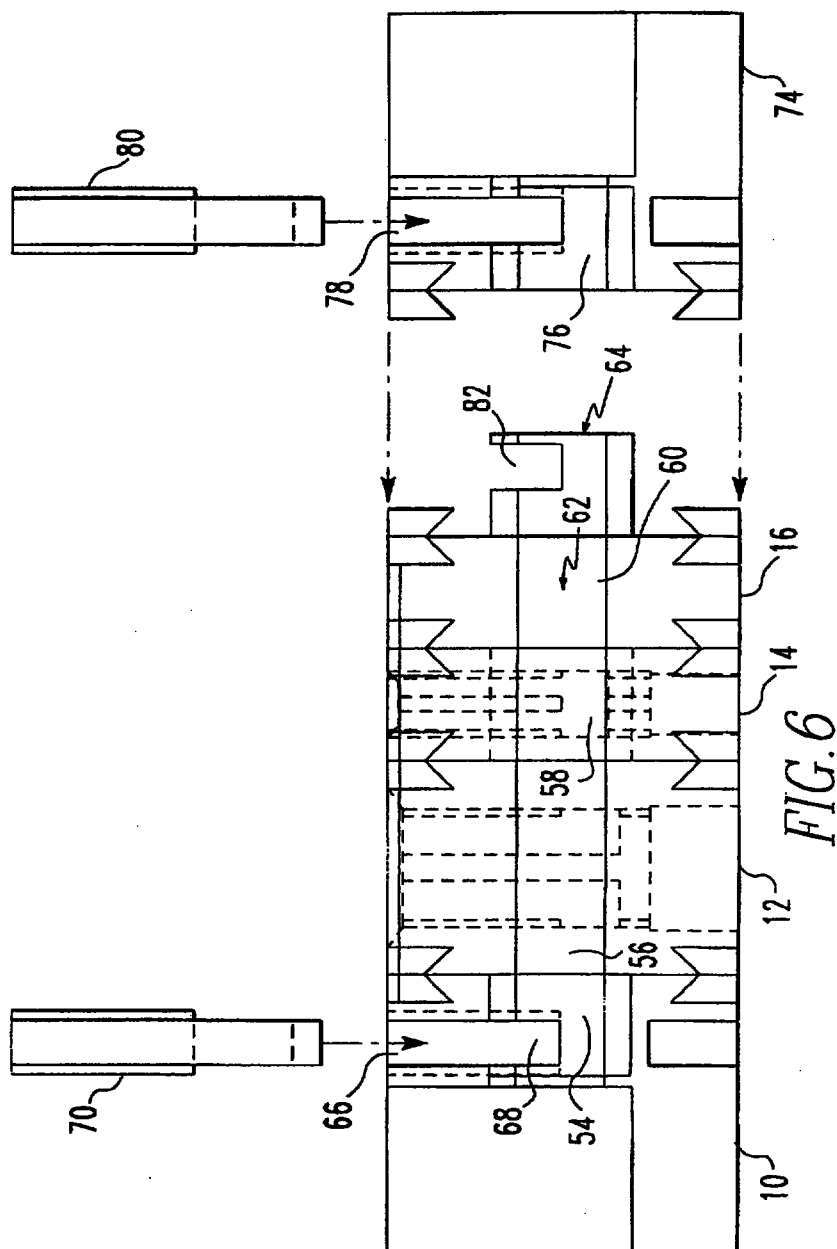
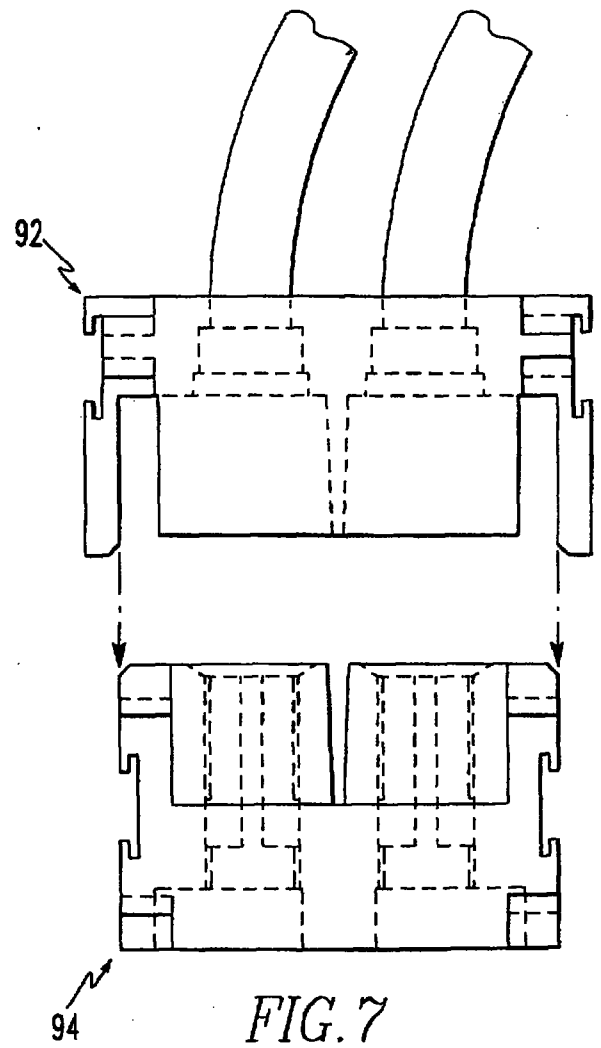
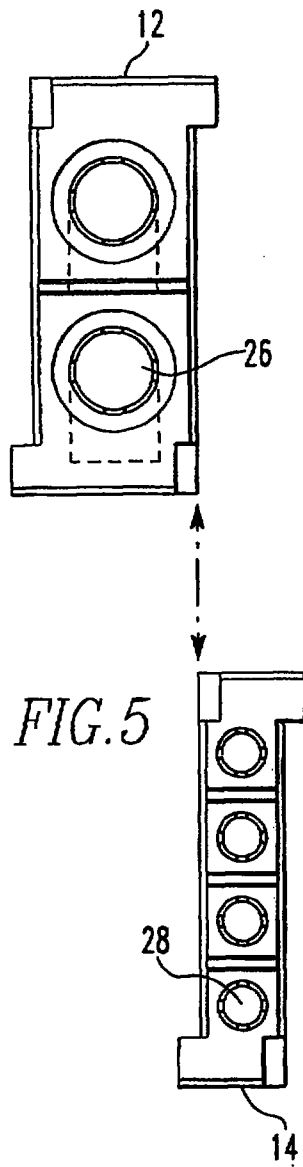


FIG. 4

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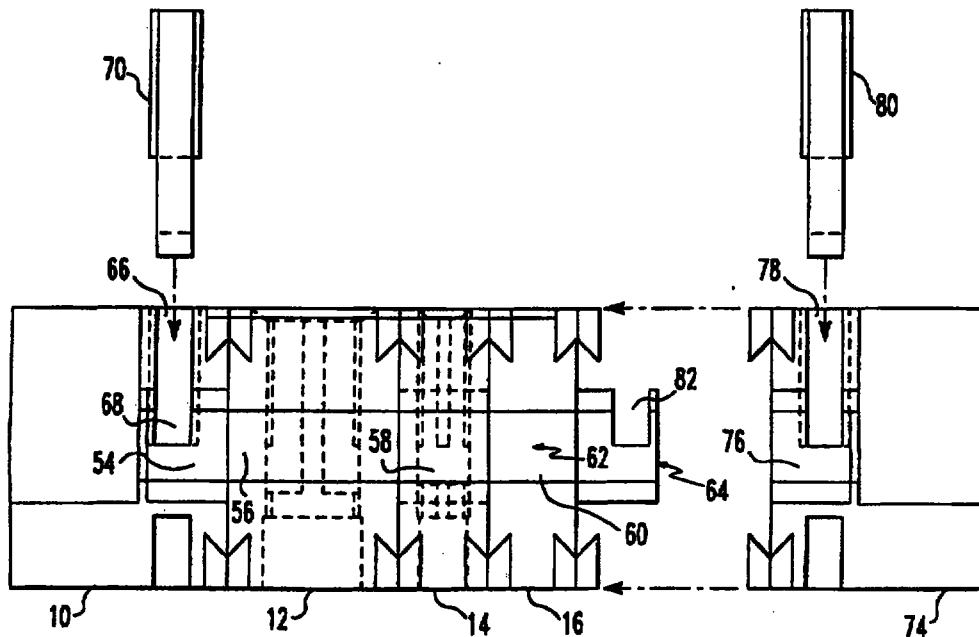
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(21) International Application Number: PCT/US97/01787 (22) International Filing Date: 31 January 1997 (31.01.97) (30) Priority Data: 60/011,073 2 February 1996 (02.02.96) US (71) Applicant (for all designated States except US): BERG TECHNOLOGY, INC. [US/US]; One East First Street, Reno, NV 89501 (US). (72) Inventors; and (75) Inventors/Applicants (for US only): PENDLETON, Christopher, S. [US/US]; 120 Briar Patch Drive, Carlisle, PA 17013 (US). DOUTRICH, Ray, C. [US/US]; 750 Whitman Road, Lebanon, PA 17042 (US). STONER, Stuart [US/US]; 559 Fishing Creek Road, Lewisberry, PA 17339 (US). (74) Agents: LONG, Daniel, J. et al.; 825 Old Trail Road, Etters, PA 17319 (US).		(81) Designated States: CN, JP, KR, SG, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>

(54) Title: MODULAR CABLE TO BOARD POWER CONNECTOR**(57) Abstract**

An element of an electrical connector in which a plurality of axial segments (10, 12, 14, 16) are positioned in side by side relation. A transverse passageway (62) extends through the axial segments and a rail (64) is positioned in the transverse passageway to link the segments together. A latch (70) is fixed within an end segment to lock the rail in place. The segments may be power modules or signal modules. The number and type of power modules used may be selected based on specific power requirements.