

### [54] CONNECTOR SHROUD AND ASSEMBLY

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339/75 MP, 91 R, 176 M, 176 MP, 184 M

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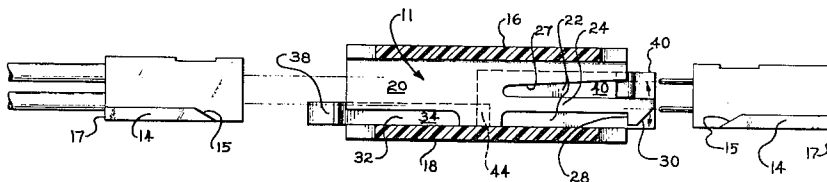
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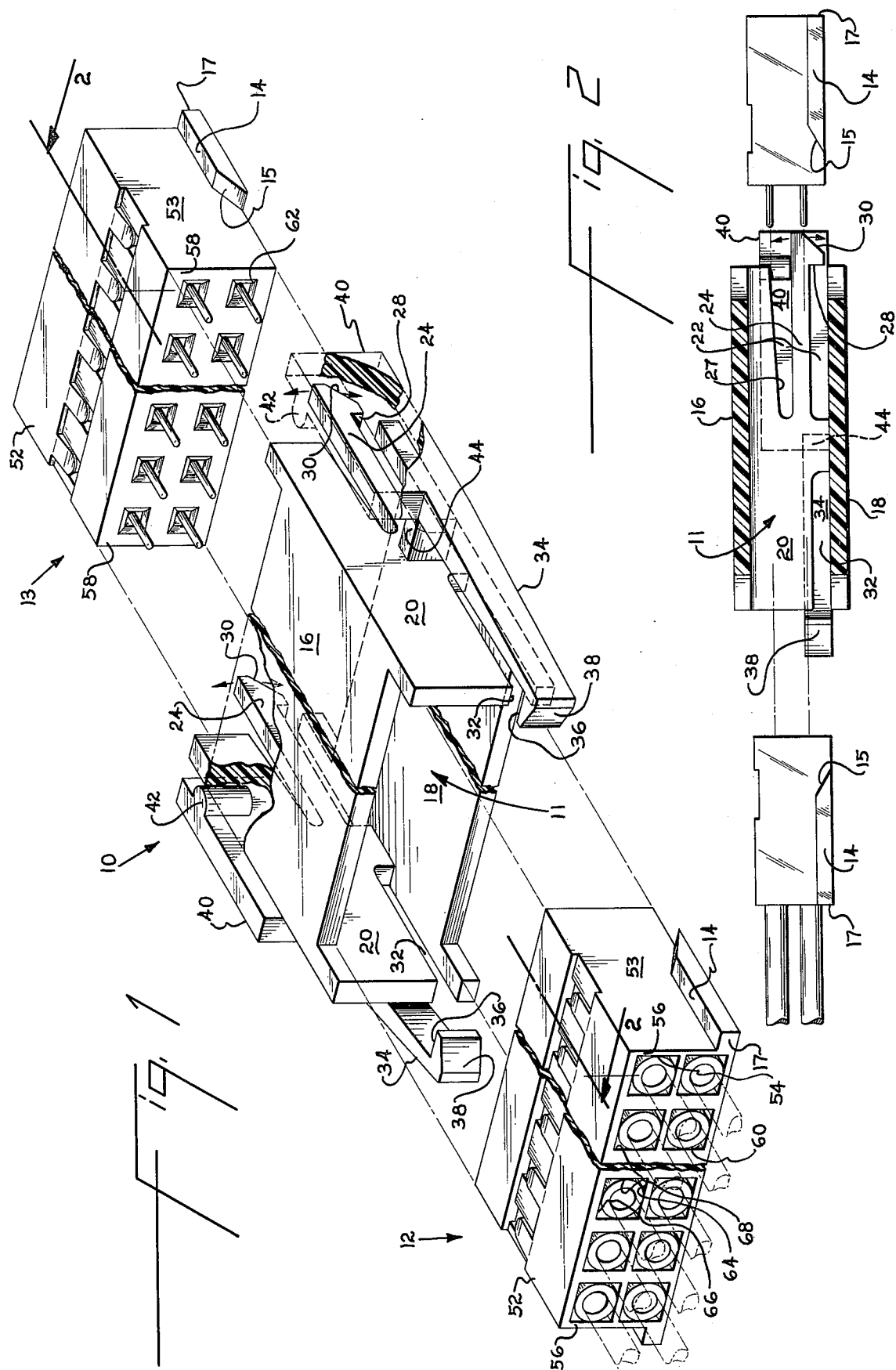
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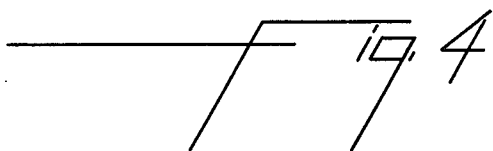
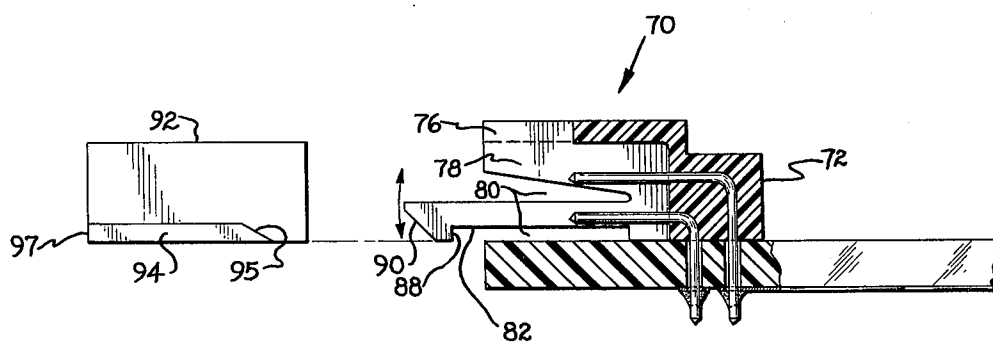
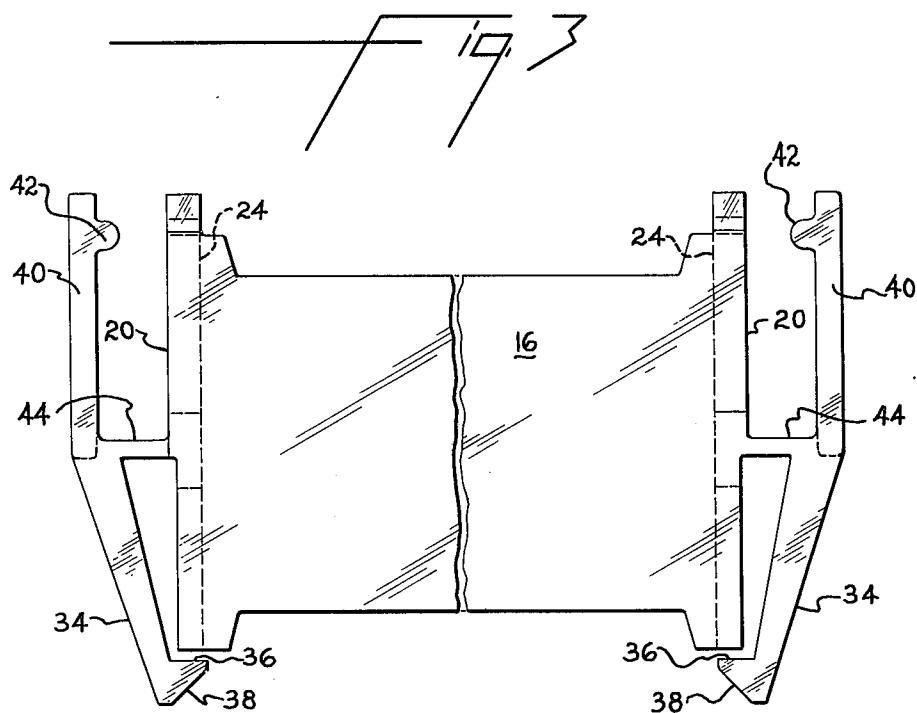
### [57] ABSTRACT

A shroud is provided for an electrical connector assembly comprising a housing having a generally rectangular cavity, a pair of opposing sides of the cavity having recesses therein, and elongated members extending from the sides longitudinally in each recess, each elongated member having a latch surface on the free end thereof directed inwardly in the recess; and the members being flexible axially within each recess to receive a pair of flange members on opposite sides of a connector block inserted in the shroud and to engage the latch surface on each member with a mating latch surface on each flange member to releasibly secure the connector block in the shroud.

**15 Claims, 4 Drawing Figures**







## CONNECTOR SHROUD AND ASSEMBLY

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The present invention relates to electrical connector assemblies, and particularly relates to housing assemblies for releasibly latching a connector block and a plurality of electrical connectors therein with a plurality of mating electrical connectors.

#### 2. Description of the Prior Art

Electrical connector blocks, housing and assemblies are well-known in the prior art. An electrical connector block suitable for use with the shroud of the present invention, with minor modifications, is described in U.S. Pat. No. 3,781,760. An electrical connector housing having a hood or shroud integrally formed with a connector block for receiving another connector block having a plurality of mating electrical connectors therein is described in U.S. Pat. No. 3,366,729. A three piece separable electrical connector housing assembly, wherein the intermediate housing has a plurality of cavities therein in alignment with a plurality of mating connectors in a pair of connector blocks, is described in U.S. Pat. No. 3,434,098. A housing member for electrical connectors comprising identical parts is described in U.S. Pat. No. 3,497,942.

The shroud and connector block assembly of the present invention is readily distinguished from the prior art assemblies by the elongated members longitudinally disposed in recesses provided in opposing sides of the shroud cavity and the latching surface on the free end of each elongated member.

### SUMMARY OF THE INVENTION

According to the present invention a shroud is provided for an electrical connector assembly comprising a housing having a generally rectangular cavity, a pair of opposing sides of the cavity having recesses therein, and elongated members extending from the sides longitudinally in each recess, each elongated member having a latch surface on the free end thereof, and the members being axially flexible within each recess to receive a pair of flange members on opposite sides of a connector block inserted in the shroud and to engage the latch surface on the free end of each elongated member with a mating latch surface on each flange member and releasibly secure the connector block in the shroud.

In the preferred embodiment of the shroud of the present invention an edge of each recess in the opposing sides of the cavity is inclined with respect to the elongated member and spaced therefrom to provide a stop for the axial flexing of the elongated member during insertion of a connector block in the shroud. The stop edge of the recess prevents over-flexing the elongated member and damaging it.

Preferably, a cam surface is provided on the free end of each member opposite the latching surface and directed outwardly from the recess to engage each flange member on opposing sides of the connector block and facilitate flexing the member axially within the recess when the connector block is inserted in the shroud.

A preferred connector block for use with the shroud of the present invention comprises a generally rectangular body having a plurality of terminal receiving cavities therein for electrical connectors, and a pair of flange members disposed on opposite sides of the body,

each flange member having a surface coplanar with a common surface of the body and a latch surface at one end of the flange member. Preferably, each flange member has a cam surface on a leading edge of the member for engaging the free end of each elongated member of the shroud and flexing each elongated member axially within the recess to receive the connector block, and a latch surface on a trailing end of the flange member for engagement by the latch surface on each elongated member.

According to the present invention there is also provided a polarized electrical connector assembly comprising a shroud and a pair of like connector blocks, having a plurality of mating electrical connectors mounted therein. In a preferred connector assembly of the invention, the opposing sides of the cavity additionally have slots for receiving a pair of flanges on opposing side of a like connector block, and a pair of latch arms mounted exteriorly on opposite sides of the housing and inclined with respect to the housing, each latch arm having a latch surface on the free end thereof for releasibly securing the like connector block in the connector assembly. Preferably, each latch arm in integrally formed with a pivotal release lever and a fulcrum integrally connected to the opposite sides of the housing.

Additionally, there is provided a polarized electrical connector assembly comprising a shroud integrally formed with a header block having a plurality of electrical connectors mounted therein and a connector block having a plurality of mating electrical connectors.

The shroud and connector assembly of the present invention provide for accurate alignment of a plurality of electrical connectors with a plurality of mating electrical connectors, polarization of the mating electrical connectors and releasibly latching of the connector blocks in the assembly. Additionally, in the preferred embodiment of the shroud and connector assembly, the shroud provides for protection of male electrical connectors in a connector block. Further, the shroud provides a polarized interconnection of mating electrical connectors using like connector blocks.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective drawing of a preferred embodiment of a shroud and connector assembly of the present invention.

FIG. 2 is an elevation drawing in section taken along line 2—2 of the shroud and connector assembly of FIG. 1.

FIG. 3 is a plan view of the shroud and connector assembly of FIG. 1.

FIG. 4 is an elevation drawing illustrating a header-block including a shroud and connector assembly in accordance with the present invention.

### DESCRIPTION OF THE PREFERRED EMBODIMENT

A preferred embodiment of the shroud and connector assembly of the present invention is described with reference to the attached drawings wherein the same numerals are used throughout to identify the same elements.

With the particular reference to FIGS. 1, 2 and 3, a connector assembly comprising a shroud 10 and connector blocks 12 and 13 housing, respectively, a plurality of mating female and male electrical connectors, is illustrated.

In a preferred embodiment a hollow rectangular cavity 11 is formed of molded plastic, having a top 16, bottom 18 and sides 20. The sides 20 have integrally formed therein recesses 22 and elongated members 24, which are flexible axially within each recess 22 for receiving flanges 14 on opposite sides of connector block 13. A latch surface 28 is provided on the free end of each elongated member 24. Each latch surface 28 is inwardly directed in each recess 22 for receiving the flanges 14 on the connector block 13 and engaging mating latch surfaces 17 on the trailing ends of flanges 14 on block 13. Cam surfaces 30 are integrally formed on the free ends of the flexible members, opposite each latch surface 28, and flex the members axially within each recess 22 upward when engaged by cam surfaces 15 on the leading ends of each flange 14 on inserting of connector block 13 in the shroud. Edge surface 27 of each recess 22 is preferably spaced from and inclined with respect to each elongated member 24 to stop the axial flexing of each member 24 in each recess 22 during insertion of the connector block 13 to prevent overflexing and possible damage to members 24.

When the connector block 13 is fully inserted in shroud 10, the elongated members 24 engage latch surface 28 with the mating latch surfaces 17 on the trailing ends of flange members 14 to lock the block 13 in shroud 10. The flexible elongated members 24 may be readily disengaged by manually flexing them upward to disengage latch surfaces 28 and 17 and the connector block 13 may be withdrawn from the shroud 10.

Slots 32 are provided in the sides 20 of the cavity 11 on the ends opposite recesses 22 for receiving flanges 14 on connector block 12. Quick release latch arms 34 are integrally formed with release levers 40 and integrally connected to exterior sides of the shroud 10 by fulcrum 44. Arms 34 are inclined with respect to sides 20 and have latch surfaces 36 on the free ends thereof and cam surfaces 38 opposite the latch surfaces 36. On insertion of the connector block 12, preferably housing a plurality of female connectors, the cam surfaces 38 engage each flange 14 on the block 12 and flex the latch arms 34 outward about fulcrum 44. Slots 32 receive flanges 14 on the sides of block 12 and provide for polarized mating of the male electrical connectors in block 13 and female connectors in block 12. When connector block 12 is fully inserted the latch arms flex to engage each latch surface 17 of each flange 14 on the connector block 12 and lock the connector block 12 in shroud 10. The latch surfaces 36 secure the block in the shroud 10, and mechanically secure the mating electrical connectors in blocks 12 and 13. Block 12 may be readily disengaged the withdrawn from the shroud assembly by manually pinching the release levers 40 to flex the quick release latch arms 34 about fulcrum 44 and disengage each latch surface 36 from each latch surface 17 on flanges 14 of connector block 12. Stops 42 provides on levers 40 prevent over flexing of arms 34 and damage to fulcrum 44.

Suitable like connector blocks 12 and 13, are similar to connector blocks described in U.S. Pat. No. 3,781,760 and comprise an insulation housing 52 formed of suitable dielectric material such as a moldable plastic. A number of terminal receiving cavities 54 are formed in the body and extend between the sides 56 and 58. Cavity terminal entrances 60 are formed in the sides 56 and contact entrances 62 are formed in sides 58. Each cavity 54 has a bottom wall 64, a top wall 66, and a pair of spaced sides walls 68. Flanged members

14 are integrally formed with or otherwise suitably attached to sides 53 of the housing 52, and are coplanar with a surface of the blocks.

An alternate embodiment of the shroud and connector assembly of the present invention is illustrated in FIG. 4 of the drawings. In this embodiment the shroud 70 is integrally formed with a right angle header block 72 having a plurality of electrical connectors mounted therein. The shroud 70 comprises a top 76 and sides 78 having recesses 80 with elongated members 82 extending from each side 78 longitudinally in each recess. Each elongated member 82 flexes axially within each recess 80 and a base member 86 for receiving flanged members 94 of the connector block 92. A latch surface 88 is integrally formed on the free end of each elongated member 82, and is inwardly directed in each recess 80. A cam surface 90 is provided opposite latch surface 88 for engaging cam surface 95 on flange 94 of the connector block 92 and axially flexing members 82 within each recess 80 when the block is inserted in the shroud 70. Each elongated member 82 engages latch surfaces 88 with the mating latch surfaces 97 on the trailing ends of flanges 94 when block 92 is fully inserted to secure the block in the shroud 70, and mechanically secure the electrical connectors in blocks 92 with the mating connectors in the header block 72. Although this embodiment is illustrated with reference to a right angle header block 72, it is readily apparent shroud 70 is equally useful with a straight through header block. Such header blocks may be readily mounted on a circuit board, as illustrated, or otherwise conventionally mounted to interconnect electrical circuit subassemblies.

While the above description and attached drawings illustrate the preferred embodiments of the shroud and connector assembly of the present invention, it is apparent that other embodiments and modifications are equivalent and will be obvious to one skilled in the art, and the invention is not to be limited except by the appended claims.

I claim:

1. A shroud for an electrical connector assembly comprising a unitary housing having a generally rectangular cavity, a pair of opposing side walls of said cavity having recessed openings therein, and an elongated member extending from each side wall longitudinally in each recessed opening, each elongated member having a latch surface on the free end thereof, each latch surface extending from the member toward a side of the recessed opening, and each member being flexible in axial alignment with each recessed opening and toward a side of said recessed opening to receive a flange member on each side of a connector block inserted in the shroud and to engage the latch surface on each elongated member with a mating latch surface on a trailing end of each flange member and releasably secure the connector block in the shroud.

2. A shroud, as recited in claim 1, said latch surface on each elongated member being inwardly directed in axial alignment with said recessed opening.

3. A shroud, as recited in claim 1, including a longitudinal edge of each recessed opening in said opposing sides being spaced from each member to provide a stop for the axial flexing of each elongated member.

4. A shroud, as recited in claim 2, each elongated member additionally including a cam surface disposed on the free end thereof, opposite said latch surface, outwardly directly from each recessed opening for

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engaging each flange member on the opposite side of the connector block and flexing each elongated member in axial alignment with said recessed opening.

5. A shroud, as recited in claim 1, each elongated member and side wall of said housing being of substantially uniform thickness material.

6. A shroud, as recited in claim 1, wherein said shroud is integrally formed with a header block having a plurality of electrical connectors disposed therein.

7. A shroud, as recited in claim 6, wherein said electrical connectors are male terminals.

8. A shroud for an electrical connector assembly comprising a unitary housing having a generally rectangular cavity, a pair of opposing side walls of said cavity having recessed openings therein, and an elongated member extending from each side wall longitudinally in each recessed opening, each elongated member having a latch surface on the free end thereof, and each member being flexible in axial alignment with each recessed opening to receive a flange member on each side of a first connector block inserted in the shroud and to engage the latch surface on each elongated member with a mating latch surface on a trailing end of each flange member and releasably secure the first connector block in the shroud, a slotted opening in each opposing side wall of said housing at the end opposite said recessed opening for receiving a flange member on each side of a second like connector block, and a pair of latch arms mounted on opposite sides of said housing, each latch arm having a latch surface on the free end thereof for releasably securing said second connector block in said connector assembly.

9. A shroud, as recited in claim 8, said latch surface on each elongated member being inwardly directed in axial alignment with said recessed opening.

10. A shroud, as recited in claim 8, wherein a longitudinal edge of each recessed opening in said opposing sides is spaced from each member to provide a stop for the axial flexing of each elongated member.

11. A shroud, as recited in claim 8, wherein each latch arm additionally comprises a pivotal release lever for disengaging each latch surface and removing said second connector block.

12. A polarized electrical connector assembly comprising a shroud and a pair of like electrical connector blocks having a plurality of mating electrical connectors mounted therein, each connector block comprising a generally rectangular body having a plurality of terminal receiving cavities therein for electrical connectors, and a pair of flange members disposed on opposite sides of the body, each flange member having a surface coplanar with a surface of the body and a latch surface; said shroud comprising a unitary housing having a generally rectangular cavity, a pair of opposing side walls of said cavity having recessed openings

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therein, an elongated member extending from each side wall longitudinally in each recessed opening, each elongated member having a latch surface on the free end thereof, inwardly directed in axial alignment with said recessed opening, said member being flexible in axial alignment with each recessed opening to receive each flange member on opposite sides of the first connector block inserted in the shroud and to engage the latch surface on each elongated member with a mating latch surface on each flange member and releasably secure the first connector block in the shroud, a slotted opening in each opposing side wall of said housing at each end opposite said recessed opening for receiving each flange member on opposite sides of a second like connector block inserted in the shroud, and a pair of latch arms disposed on opposite sides of said housing, each latch arm having a latch surface on the free end thereof for releasably securing the second connector block in said connector assembly.

13. A connector assembly, as recited in claim 1, wherein said electrical connectors in said first connector block are male terminals and said mating electrical connectors in said second connector block are female terminals.

14. A polarized electrical connector assembly comprising a header block having a plurality of electrical connectors disposed therein, a shroud integrally formed with said header block, an electrical connector block having a plurality of mating electrical connectors mounted therein, said connector block comprising a generally rectangular body having a plurality of terminal-receiving cavities therein for electrical connectors, a pair of flange members disposed on opposite sides of the body, each flange member having a surface coplanar with a surface of the body and a latch surface; said shroud comprising a unitary housing having a generally rectangular cavity, a pair of opposing side walls of said cavity having recessed openings therein, and an elongated member extending from each side wall longitudinally in each recessed opening, each elongated member having a latch surface on the free end thereof, each latch surface extending from the member toward a side of said recess opening, each member being flexible in axial alignment with said recessed opening and toward a side of the recessed opening to receive each flange member on opposite sides of said connector block inserted in the shroud and to engage the latch surface on each elongated member with the latch surface on each flange member and releasably secure the connector block in the connector assembly.

15. A connector assembly, as recited in claim 1, wherein the electrical connectors in said header block are male terminals and the mating electrical connectors in said connector block are female terminals.

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