United States Patent

Johnson et al.

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[54] MULTIPLE CONTACT ELECTRICAL CONNECTOR

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[73] Assignee: **Sylvania Electric Products Inc.**

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[52] **U.S. Cl.**.....**339/195 M**, 339/198 R, 339/221 M

[51] **Int. Cl.**.....**H01r 13/50**, H01r 9/08

[58] **Field of Search**.....339/17 R, 17 C, 18 R, 18 B, 339/18 C, 150, 156, 198 R, 198 C, 198 E, 198 K, 221, 275, 276 A, 278 M, 278 T, 195

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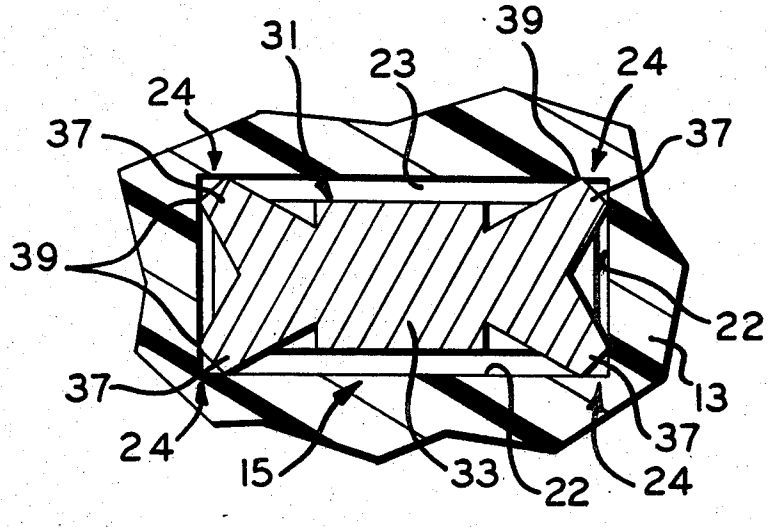
[57] **ABSTRACT**

An electrical connector assembly consisting of a connector block of insulative material having a plurality of connector pins established therein. The pin receiving openings in the block each have a cylindrical shape portion which extends into the block a predetermined distance until it interconnects and aligns with a rectangular shaped portion which extends on through to the opposing surface of the block. The connector pins for this assembly each consist of a cylindrical shaped male end, a centrally located retaining portion, and a rectangular shaped wirewrap end.

4 Claims, 4 Drawing Figures



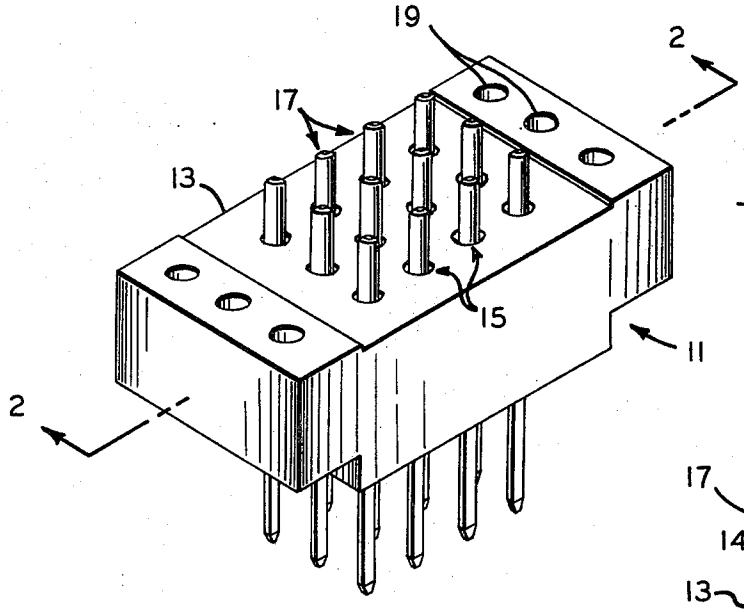


Fig. 1

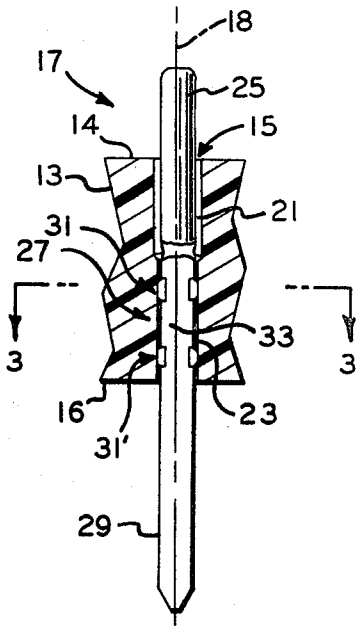


Fig. 2

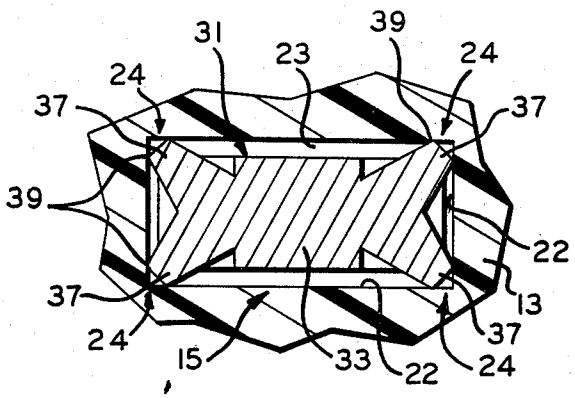


Fig. 3

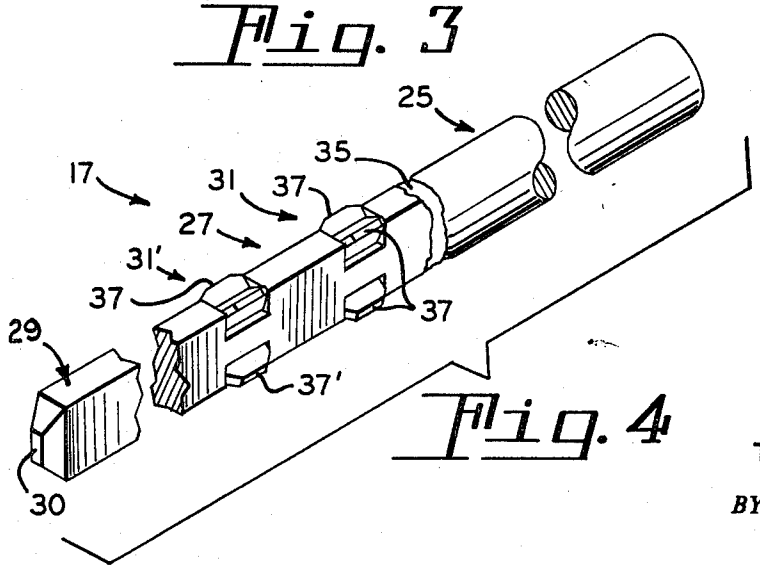


Fig. 4

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MULTIPLE CONTACT ELECTRICAL CONNECTOR

BACKGROUND OF THE INVENTION

This invention relates to electrical connectors and more particularly to multiple contact electrical connectors. The better known connectors of this type consist of a connector block of insulative material having a plurality of connector pins of electrically conductive material located within a corresponding number of pin receiving openings within the block. These openings are usually established according to a designated pattern. To assure ease of repair for this type of connection, it is desirable to design the connector pins so that their removal from the corresponding pin receiving openings is accomplished without difficulty.

Connector pins of the prior art have usually been manufactured of a dual gage strip material which is consequently rolled and formed to the desirable configuration. While this process has resulted in an elaborate pin design, the value of such a design, when compared to the cost for its manufacture, remains questionable. One particular reason for this is that castings which will accept these pins usually require mold designs with intricately shaped core pins for each half of the mold. These core pins in turn, must approach from opposing sides of the casting and meet approximately near the center of the cavity in order that the pin receiving openings conform to the basic configuration of the connector pins.

In addition to increased manufacturing costs for casting the block to accept these connector pins, ease of repair of the assembled corrector is also reduced by the difficulty this elaborate design creates in removing the pin from the block.

It is, therefore, believed that a multiple contact electrical connector having a connector pin of simple design which promotes ease of removal of the pin from the connector block, as well as facilitating reduced manufacturing costs in production of the blocks to accept these pins, would be an advancement in the art.

OBJECTS AND SUMMARY OF THE INVENTION

Consequently, it is an object of this invention to provide an improved multiple contact electrical connector.

It is a further object of this invention to provide an improved multiple contact electrical connector employing an insulating body having a plurality of connector pins established therein.

It is still a further object of this invention to provide an electrical connector which is simpler to fabricate and can be produced at less cost than those connectors known in the prior art.

In accordance with one aspect of this invention, there is provided a multiple contact electrical connector consisting of an insulating body having a plurality of connector pins of electrically conductive material located therein. These pins, which consist of a cylindrical male end, a centrally located retaining portion, and an elongated wirewrap end, are located within a plurality of corresponding pin receiving openings established in a designated pattern within the insulating body. To provide a means for maintaining the pins in proper alignment within their respective openings, the centrally located retaining portions are each provided with at least two retention portions, these portions having a plurality of protruding flat walled members which mate with the internal walls of the rectangular shaped portion of the pin receiving openings.

For a better understanding of the present invention, together with other and further objects, advantages, and capabilities thereof, reference is made to the following specification and appended claims in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric view of the present invention;

FIG. 2 is a partial elevational view, in section, of the present invention, as taken along the lines 2—2 in FIG. 1;

FIG. 3 is a sectional view taken along the line 3—3 in FIG. 2 showing the relative position of the retention portion of the connector pin as it is positioned within the pin receiving opening; and

FIG. 4 is an isometric view of the connector pin of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

As previously mentioned, there is provided an electrical connector assembly comprising an insulating body having a plurality of pin receiving openings formed therein. Within each of these openings is located a connector pin, this pin having a cylindrical male end, a central retaining portion, and an elongated rectangular wirewrap end. To more fully illustrate the previously described connector, a detailed description of the drawings is provided.

Referring first to FIG. 1, there is shown the assembled multiple contact connector **11**, in accordance with the present invention. Connector **11** comprises an insulating body **13**, a plurality of pin receiving openings **15**, and a corresponding number of connector pins **17**. Holes **19** are provided to assist in aligning the insulating body with a corresponding connector block for a multi-circuit electrical hookup. These holes may also be used to align the insulating body, with contacts intact, to an automatic wiring machine, thereby providing a much faster means for completing the multiple circuit connections.

In FIG. 2 can be seen a partial cross-sectional view of one of the connector pins **17** as it is in position within pin receiving opening **15** in the insulating body **13**. Pin receiving opening **15** consists of a substantially cylindrical shaped portion **21** which extends into the insulating body **13** from upper surface **14** along axis **18** until it interconnects with substantially rectangular shaped portion **23** which, in turn, extends on through to opposing parallel surface **16**. Axis **18**, which is substantially perpendicular to upper surface **14**, as well as lower opposing surface **16**, is common to both cylindrical shaped portion **21** and rectangular shaped portion **23**, and also serves as the axis for connector pin **17**.

Connector pin **17** comprises a substantially cylindrical shaped male end **25**, a centrally located retaining portion **27**, and a substantially rectangular shaped wire-wrap end **29**.

The pin is firmly established within pin receiving opening **15** by the two retention portions **31** and **31'**, respectively. These retention portions are spaced a predetermined distance apart on the rectangular straight member **33** which, in turn, assures proper alignment of the pin along axis **18**.

FIG. 3 shows, in cross-section, the position of the retention portion **31** as it is within the substantially rectangular shaped portion **23** of pin receiving opening **15**. Portion **31** comprises a plurality of protruding flat-walled members **37** which extend from rectangular straight member **33** into the corresponding corners **24** of substantially rectangular shaped portion **23** of opening **15**. As can be seen in FIG. 3, these flat-walled members **37** extend to the corners at a prescribed angle in order that each of their two leading edges **39** contact the internal walls **22** at approximately equal distances from the corner **24**. This will assure a steady, reliable fit between the connector pin **17** and the insulating body **13**.

In FIG. 4 can be seen an isometric view of one of the connector pins **17**. Substantially cylindrical shaped male end **25** is joined to centrally located retaining portion **27** at jointure **35**. Although other alternatives are possible, welding is the preferred method of making this connection. Protruding flat-walled members **37** and **37'** of retention portions **31** and **31'** respectively, are more clearly shown in this view. Substantially rectangular shaped wirewrap end **29** has an angled nose portion **30** which is formed in such a manner so as to more readily accept the wire terminal ends to which it will be joined.

While there have been shown and described what are presently considered the preferred embodiments of this invention, it is obvious to those skilled in the art that various

changes and modifications may be made therein without departing from the scope of the invention as defined by the following claims.

We claim:

1. An electrical connector assembly comprising:

an insulating body having a plurality of pin receiving openings located therein and positioned on a first surface of said insulating body, each of said pin receiving openings having a common axis substantially perpendicular to said first surface of said body, a substantially cylindrical receiving portion extending a predetermined distance into said insulating body along said common axis, and a substantially rectangular receiving portion extending a predetermined distance into said insulating body substantially perpendicular to a second surface of said insulating body, said second surface opposing and substantially parallel to said first surface, whereby each of said rectangular receiving portions interconnect and align with each of said cylindrical receiving portions thereby sharing said common axis; and

a plurality of connector pins of electrically conductive material established within said pin receiving openings of said insulating body, each of said connector pins having a horizontal axis, said horizontal axis being coaxial with said common axis of said pin receiving openings, a substantially cylindrical shaped male end, a centrally located retaining portion, and a substantially rectangular shaped wirewrap end, said centrally located retaining portion comprising a rectangular straight member having at least two retention portions, each of said retention portions having a plurality of protruding flat-walled members extending from each edge of said rectangular straight member into corresponding corners of said substantially rectangular receiving portions, each of said flat-walled members having two outstanding edges, each of said outstanding edges contacting an internal wall of said substantially rectangular receiving portions of said pin receiving openings at substantially equal distances from said corresponding corners of said openings, thereby providing an eight point restricting contact.

2. The electrical connector assembly according to claim 1 in which each of said substantially cylindrical shaped male ends of said connector pins is joined to each of said centrally located retaining portions of said connector pins by welding.

3. The electrical connector assembly according to claim 1 in which said retention portions of said centrally located retaining portions of said connector pins are spaced a predetermined distance apart along said rectangular straight member, thereby substantially preventing movement of said connector pins transverse to said horizontal axis of said pins when said pins are established within said pin receiving openings of said insulating body.

4. A connector pin of electrically conductive material for insertion into a pin receiving opening located within an insulating body, said pin receiving opening having a substantially rectangular receiving portion, said connector pin comprising:

a substantially cylindrical shaped male end, a centrally located retaining portion, and a substantially rectangular shaped wirewrap end, said centrally located retaining portion comprising a rectangular straight member having at least two retention portions, each of said retention portions having a plurality of protruding flat-walled members extending from each edge of said rectangular straight member into corresponding corners of said substantially rectangular receiving portions, each of said flat-walled members having two outstanding edges, each of said outstanding edges contacting an internal wall of said substantially rectangular receiving portions of said pin receiving openings at substantially equal distances from said corresponding corners of said openings, thereby providing an eight point restricting contact.

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