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ELECTRICAL GROUNDING BRACKET

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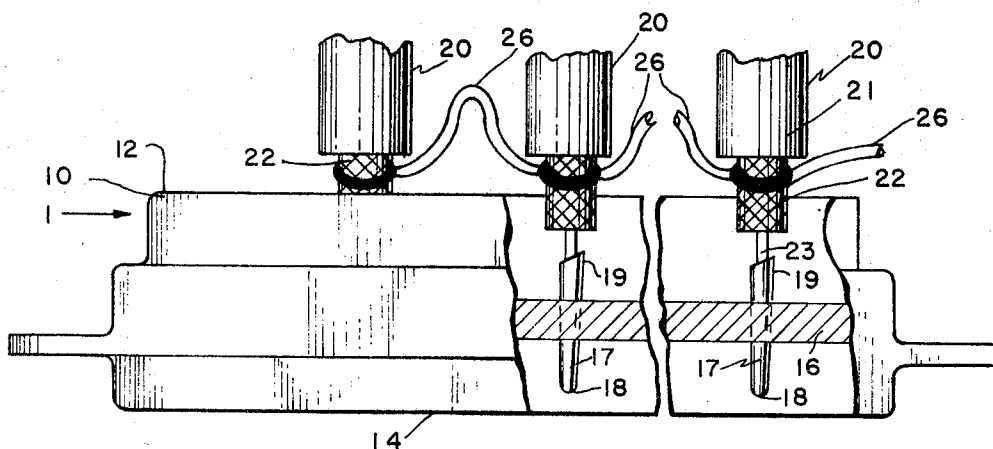
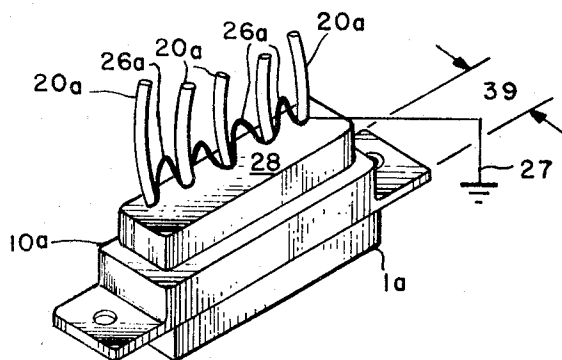


Fig. 1 PRIOR ART



PRIOR ART

Fig. 2

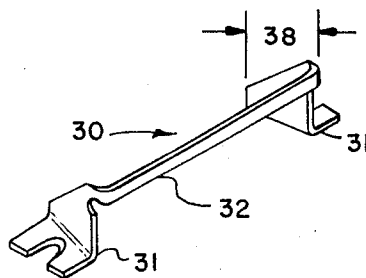


Fig. 3

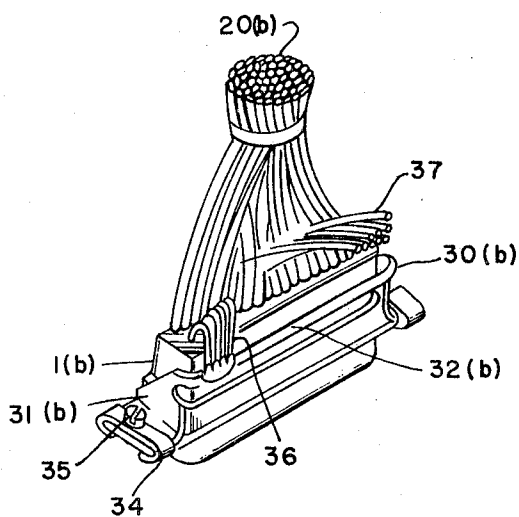


Fig. 4

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ELECTRICAL GROUNDING BRACKET

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7 Claims

ABSTRACT OF THE DISCLOSURE

A bracket for providing low-impedance grounding of the outer shield of multiple shielded wires in a multiple-pin electrical connector.

BACKGROUND OF THE INVENTION

The background of the invention is set forth in two parts.

Field of the invention

The field of art to which the invention pertains is multiple-pin electrical connectors commonly known as micro, miniature, or subminiature connectors.

Description of prior art

Electronic assemblies often require the use of many electrical data-transmitting wires interlinking the many electronic components of the assembly. The wires serve to transmit data or signals in electrical form from one component to another, or from one assembly to another, and the requirements of the system may necessitate electrical disconnect points for which specialized electrical connectors have been developed, especially in the aerospace industry. The many conductors or wires are usually shielded to isolate the data carried by individual wires from external field sources, such as electrical signals from other data wires, power sources, radar and electronic system clocks.

In cases requiring more than one such wire to be terminated on the pins of a multiple-pin connector, a common prior art means for grounding the shields of each wire has consisted of soldering the ends of a short length of wire, or pigtail, to adjacent conductor shields. One of the shields is connected to ground potential. This forms a single electrical ground path connecting each shield in series. The effect of the many pigtail connections results in an effective alternating current antenna for receiving unwanted external electrical impulses which may be transmitted to one or more of the data-transmitting wires.

Because each of the shields is connected to ground in series with each other shield, the removal of one data-transmitting wire may open the ground path to other shields, necessitating additional wiring rework to reestablish the ground circuit. Similarly the termination of a new data-transmitting wire in the connector requires rework of the series connected ground circuit wires.

SUMMARY

In view of the foregoing factors and conditions characteristic of grounded shield circuitry in a multiple-pin connector, a grounding bracket is provided having a pair of spaced-apart base portions, a member extending therebetween, and means for attaching the base portions to the multiple-pin connector shell whereby separate parallel ground paths may be provided for each shielded wire.

Accordingly, it is an object of the present invention to provide a device for providing low-impedance grounding of the outer shield of multiple shield wires.

It is a further object of the present invention to pro-

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vide low-impedance grounding of shielded wires in a multiple-pin connector.

It is another object of the present invention to provide a device for grounding shielded wires in a multiple-pin connector which permits the addition or deletion of shielded wires without modification of the ground wires.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary elevational view in partial cross section of a multiple-pin connector of a type known to the art;

FIG. 2 is a perspective view of the connector of FIG. 1;

FIG. 3 is a perspective view of an electrical grounding bracket for grounding shielded wires of a multiple-pin connector constructed according to the present invention; and

FIG. 4 is a perspective view of shielded wires terminated in a multiple-pin connector and grounded to the bracket of FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring again to the drawings, and more particularly to FIG. 1, one prior art means of grounding shielded wires terminating in a multiple-pin connector is shown. Connector shell 10 of connector 1 is constructed of electrical conducting material. Shell 10 is generally tubular-shaped having open ends 12, 14, and has internally mounted panel 16 of nonconducting material. Connector pins 17 of conducting material are mounted through panel 16 and axially directed within the connector shell 10. One end 19 of pins 17 is adapted to receive an electrical conductor or wire in soldered contact and the other end 18 of pins 17 is adapted to register in mating relationship with connector pins of another connector (not shown). In this manner, an interface or electrical disconnect point is provided in a wiring system of an electrical assembly. A number of such multiple-pin connectors of varying configurations are commercially available and are widely used in the aerospace industry.

As shown, insulated, shielded data-transmitting wires 20 are terminated on pins 17 of connector 1 by stripping insulation 21 and shielding 22 to expose wire 23 which then may be soldered to end 19 of pin 17. It has been the industrial practice, in order to provide a direct current path from shield 22 of each data-transmitting wire 20 by pigtail conductors 26 to form a continuous ground path interlinking shield 22 of each data-transmitting wire 20 in series and connecting one such pigtail conductor to ground potential.

In miniaturized multiple-pin connectors, the spacing between connector pins becomes so small that the pigtail conductors 26 must be lengthened into a large loop in order to accommodate soldering the ends thereof to the closely spaced adjacent shield portions 26. The series of looped pigtail conductors 26 effectively act as an alternating current antenna when exposed to certain frequencies of electrical energy. Alternating current fields may be generated at nearby power sources, radar, synchronizing systems, or even an adjacent data-transmitting wire terminating in the connector.

FIG. 2 shows, in perspective, a typical multiple-pin connector 1(a) wherein a plurality of data-transmitting wires 20(a) are terminated and the shield of each is connected in series by pigtail conductors 26(a) providing a ground path through conductor 27 to ground potential. The upper interior of shell 10(a) has been filled with a nonconductive material 28 to hermetically seal the stripped portions of data-transmitting wires 20(a) and the soldered connections.

The present invention has been found to be an expedient and inexpensive means of providing a low-impedance

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ground path from the shields of two or more shielded wires in a multiple-pin connector. Bracket 30 of FIG. 3 is initially stamped from aluminum for nonmagnetic requirements and shaped to provide base portions 31, 31 and members 32 extending therebetween. Bracket 30 is plated with nickel for electrical conductivity and subsequently plate with gold to meet corrosive and solderability requirements of space programs.

Turning now to FIG. 4, bracket 30 of FIG. 3 is shown mounted on the typical multiple-pin connector 1 of FIG. 1. A number of insulated shielded data-transmitting wires 20(b) are terminated within connector 1(b) as was typically shown in FIG. 1. The base portions 31(b) of bracket 30(b) are secured to connector 1(b) by clamp 34 and fastener 35 threadably engaging connector 1(b). Pigtail conductors 36, 37, each of which is soldered to the shield of one of the data-transmitting wires 20(b), are shown in the stage of being soldered to member 32(b) of bracket 30(b).

A further feature of the shape of bracket 30 of FIG. 3 is that the dimension 38 does not exceed the dimension 39 of connector 1(a) of FIG. 2. This dimensional correlation permits the addition of bracket 30 without affecting the close grouping of multiple-pin connectors, as at a disconnect panel.

The impedance from the shield of a data-transmitting wire to ground through the grounding bracket has been found to be in the order of magnitude of two milliohms. On the other hand, the impedance of the prior art series connections is necessarily a function of the number of electrical shields which are linked together in the series ground circuit. The principles of the present invention also permit the addition or deletion of a grounded shielded data-transmitting wire without affecting other such wires which terminate in the connector. In the prior art, in order to add or remove a data-transmitting wire at the connector, the ground circuitry of at least one other data-transmitting wire has to be modified because of the series interconnections.

In the instant invention, if additional parallel ground paths are desired, they are provided by assigning one or more of the connector pins as a ground path and connecting same to the grounding bracket.

What is claimed is:

1. An electrical grounding bracket for a multiple-pin connector of the type having a shell, a plurality of connector pins each adapted at one end thereof for attaching a shielded electrical wire and to register at the other end with another plurality of connector pins of another connector, and means for axially supporting the connector pins within the shell in spaced apart relationship, comprising:

an electrical conducting elongated member having a pair of base portions extending from the ends thereof, said member being shaped to generally conform to the contour of a portion of the exterior of the connector shell, said base portions being shaped to seat upon an exterior segment of the connector shell and to support said elongated member juxtaposed said portion of the connector exterior, whereby said bracket may be mounted on the exterior of a multiple pin connector shell and one or more electrical conductor shields may be electrically connected to said bracket.

2. The electrical grounding bracket of claim 1 wherein said member is shaped for closely spaced relationship

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with said one end of the connector pins when said bracket is mounted on the connector, thereby minimizing the electrical impedance between an electrical shield and said member when connected by an electrical conductor.

3. The electrical grounding bracket of claim 2 wherein said pair of base portions each has a first flange adapted for attachment to the connector, said first flange of each base portion being disposed in a common plane, and said pair of base portions each having a second flange joining said first flange to said member, each said second flange upstanding from said first flange whereby said member is supported above the plane of said first flanges.

4. The bracket of claim 2 comprising an integral sheet of metal being formed to define an elongated member having depending end pieces with an outwardly extending lower portion, said lower portion being adapted for attachment to the connector.

5. A combination comprising:

(a) a multiple-pin electrical connector having a tubular shell, a plurality of connector pins, and means for axially mounting the pins in spaced-apart relationship within the shell;

(b) a grounding bracket having a pair of spaced-apart base portions, and a central member extending therebetween, said bracket being shaped to generally conform to an exterior portion of said tubular shell of said connector; and

(c) mounting means for mounting said base portions of said bracket on the exterior of said connector.

6. The combination of claim 5 wherein:

(a) said shell has formed thereon flange portions being designed to receive said base portions of said bracket in surface-to-surface contact relationship, and wherein:

(b) said base portions and said member of said bracket are shaped for supporting said member in closely spaced relationship with said pins for minimizing the distance between said member and said pins.

7. The combination of claim 5 wherein:

(a) the connector shell generally has a lower portion greater in width than the upper portion of the shell; and

(b) said member of said bracket is adapted for being positioned above said lower portion of the connector shell and adjacent said narrow portion of the connector shell whereby the width of the bracket and connector is combination does not exceed the maximum width of the connector shell.

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