

[54] ELECTRICAL CONNECTOR SHIELD

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[73] Assignee: International Telephone and Telegraph Corporation, New York, N.Y.

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[52] U.S. Cl.: 339/143 R, 339/258 A

[51] Int. Cl.: H01r 15/06

[58] Field of Search: 49/496; 339/143, 177, 258 A, 339/14, 136; 174/35 GC, 35 MS

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[57]

ABSTRACT

A shielding arrangement for eliminating electromagnetic interference in an electrical connector. A first shell member contains a bore portion on its outer surface and an annular groove adjacent to the bore portion. A conductive shielding member having a section contiguous to the bore portion and a first spring portion adjacent one side of the surface snaps into the groove for removably securing the shield to the shell and a second spring portion adjacent the other side of the section. The second spring portion may be formed at an acute angle with respect to the section and yieldable to provide good electrical contact between the first shell member and a second shell member movable with respect to said first shell member. The first shell member may contain a second annular groove opposite the first annular groove, the shield section at junction of the section and the second spring member being insertable into the second annular groove. Further, the spring members may be formed of finger portions.

2 Claims, 7 Drawing Figures

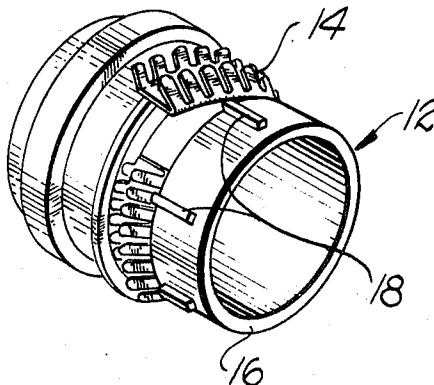


Fig. 1.

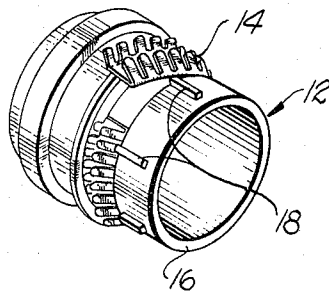


Fig. 2.

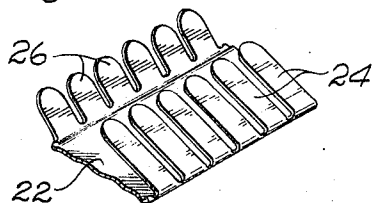


Fig. 6.

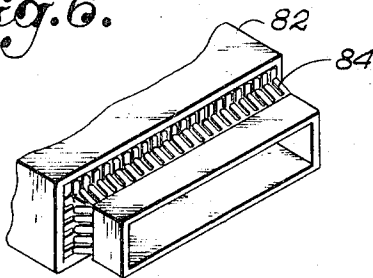


Fig. 7.

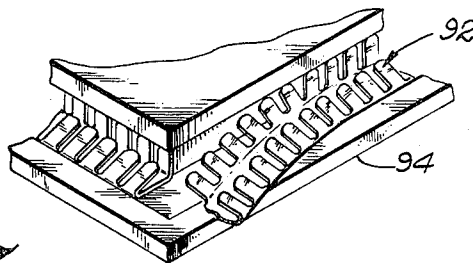


Fig. 3.

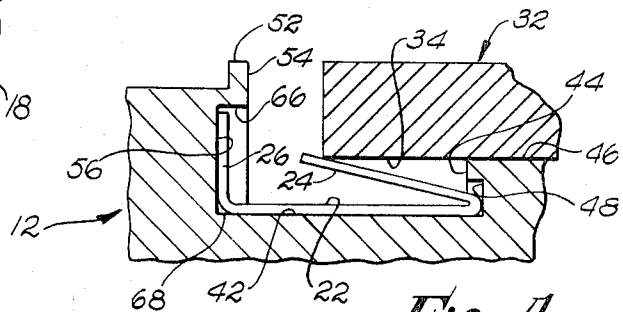
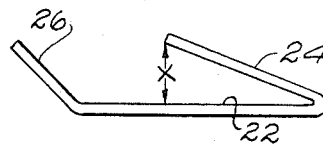


Fig. 4.

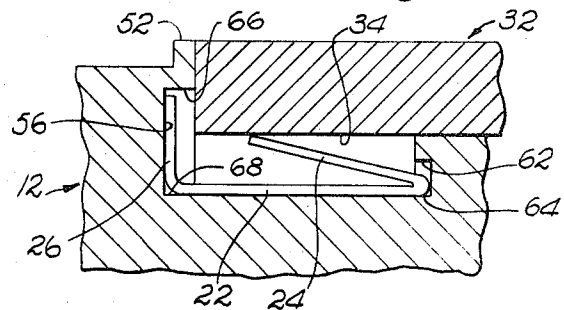


Fig. 5.

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ELECTRICAL CONNECTOR SHIELD

The invention relates in general to shielding devices for eliminating electromagnetic interference in electrical connectors and, more particularly, to an electrical connector having a snap-in electromagnetic shield.

BACKGROUND OF THE INVENTION

The use of shielding in electrical connectors to eliminate unwanted electromagnetic interference from interfering with signals being carried by a coaxial line is well known. Typically, multi-fingered strip contacts normally have to be soldered, crimped or spot welded in place. Alternatively, closed loop preforms for use as shields are expensive and cannot be installed in a recessed single portion of a connector.

In order to overcome the attendant disadvantages of prior art electrical connector shielding members, the present invention provides a shield which can be installed on a connector member with a simple snap-in operation. Moreover, since no bonding or intermediate joining processes are required, fast and simple replacement of the shield is possible.

The advantages of this invention, both as to its construction and mode of operation, will be readily appreciated as the same becomes better understood by references to the following detailed description when considered in connection with the accompanying drawings in which like referenced numerals designate like parts throughout the figures.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 depicts a perspective view of the outer shell of a plug connector with the contact strip shield partially engaged therein.

FIG. 2 illustrates a blown up perspective view of a portion of the contact strip shield shown in FIG. 1.

FIG. 3 shows an edge (end) view of the contact strip shield prior to insertion into the shell of the plug connector.

FIG. 4 depicts the shield shown in FIG. 1 through 3 mounted in the plug connector with a mating receptacle connector shell partially engaged with the plug connector shell.

FIG. 5 illustrates the plug and receptacle connector shells of FIG. 3 fully engaged.

FIG. 6 shows the contact strip shield mounted in a rectangular plug connector shell; and

FIG. 7 illustrates the strip shield mounted in a flat access opening such as a door.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, there is shown in FIG. 1 a plug connector 12 having mounted therein a contact strip shield 14 in accordance with the invention. The plug connector may comprise an outer shell which has contact members (not shown) mounted therein. The front end 16 of the plug connector 12 may be formed of a cylindrical member having a keying arrangement formed of key members 18 formed on its outer surface for mating with a receptacle connector in a fixed orientation.

The strip shield 14 shown in greater detail in FIG. 2 and 3 may be formed of a spring material such as spring steel, beryllium, copper, or phosphor bronze, which is flexible, may be readily stamped, and contains good conductive characteristics. The contact strip shield which is depicted as being utilized to provide a ground connection between the mating plug and receptacle shells is formed of a flat ribbon portion 22 one edge of which contains fingers 24 which are bent at an acute angle with respect to the ribbon portion 22. The fingers 24 are approximately two-thirds as long as the strip itself, although the exact length is not critical. The other edge side of the strip 22 contains a plurality of fingers 26 which are formed in its unstressed shape at an obtuse angle with respect to the strip and extend away therefrom.

Referring now to FIG. 4, there is depicted a cross sectional view of a portion of a plug connector 12 as well as a portion of the shell of a receptacle connector 32 having an inner surface

34. The plug connector 12 contains an annular groove portion 42 along its outer surface. The groove 42 is approximately as long as the width of the ribbon portion 22 of the contact strip shield. The front end of the groove terminates in a rearwardly facing shoulder 44, the outer surface of the shoulder being adjacent to the outer surface 46 of the front portion of the plug 16. Formed in the shoulder 44 is an annular groove 48 which defines the area between the shoulder 44 and the bore 42. An outwardly extending flange 52 contains a forward facing shoulder 54 and defines the rear end of the groove 42. Formed in the shoulder 54 is an annular groove 56, which faces forwardly and has a height which is approximately the length of the fingers 26 of the contact strip shield and a depth approximately twice as thick as the thickness of each of the fingers 26. The inner surface of the grooves 48 and 56 adjacent the groove 42 actually form a continuation of the groove surface.

In the position shown in FIG. 3, the distance X between the end of the fingers 24 remote from the portion 22 to the portion 22 is greater than the distance between the of groove 42 and the outer surface 46. The contact strip shield 22 is inserted with its bottom surface contiguous to the surface of groove 42 with the junction of the fingers 24 and portion 22 being inserted into the groove 48 intermediate the top wall 62 and bottom wall 64 which define concentric cylinders. Then the fingers 26 are inserted into the groove 56 with the resultant bending of the fingers 26 so that they are almost at approximately right angles to the portion 22. The free end of the fingers 26 abut the top wall 66 of annular groove 56 and the junction of the fingers 26 and portion 22 abut the bottom wall 68. The walls 66 and 68 also define concentric cylinders with the surfaces 64 and 68 being continuation of surface groove 42. The ends of the shield 14 at the portion 22 may abut each other when mounted or a slight overlap is permissible. It should be further noted that the groove 48 could be eliminated and the shield retained only by use of the groove 56.

As shown in FIG. 4, the receptacle shell 32 is slid over the surface 46 until the front end thereof abuts the fingers 24 causing the fingers 24 to bend inwardly with the tips thereof abutting the inner surface 34 of the receptacle shell 32, thus making a good contact between the plug and the receptacle shell. Further, the shell may be further mated until its front surface abuts shoulder 54 as shown in FIG. 5.

In the embodiment shown in FIG. 6 a plug connector 82 has mounted therein a contact strip 84 which is similar in shape to the contact strip 14 of FIGS. 1 through 5. However, due to the rectangular shape of the connector, pre-bent forms may be made in the strip in order for the strip shield to more readily fit into the rectangular connector shell. Operationally, however, the devices are the same.

In FIG. 7, the shield 92 is mounted on a flat surface 94 such as a door to an equipment access screen room where shielding is required for preventing leakage of electromagnetic interference from equipment utilized in the room as well as preventing electromagnetic interference from entering the room.

What is claimed is:

1. A shielding arrangement for eliminating electromagnetic interference in an electrical connector comprising:

a shell member having a longitudinally extending axis and having a groove on its outer surface defined by a first surface concentric with the axis of said shell member and a second and third surface, one end of said second and third surfaces extending normally and outwardly from said first surface at opposite ends thereof, respectively, and projections extending from the other ends of said second and third surfaces towards each other and concentrically with said first surface; and

a conductive shielding member comprising a first section position adjacent said first surface, a second section extending from one end of said first section and being positioned adjacent said second surface and held by the adjacent projection, and a third section having one end posi-

tioned against said third surface and extending from the other end of said first section at an acute angle toward said second section.

2. A shielding arrangement in accordance with claim 1 wherein said third section extends beyond said portion extending from said third surface, and further comprising a second shell member mated with said shell member, with said third section deflected inwardly toward said first surface.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,678,445

Dated July 18, 1972

Inventor(s) Salvatore T. Brancaleone

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In Claim 1 , Line 72 --

Change: [position] to positioned

Signed and sealed this 2nd day of January 1973.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents