

[54] **RADIO FREQUENCY FILTER DEVICE**

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[51] Int. Cl. .... **H01r 13/66**

[58] Field of Search .... **333/79, 339/143, 147, 154,**  
**339/156**

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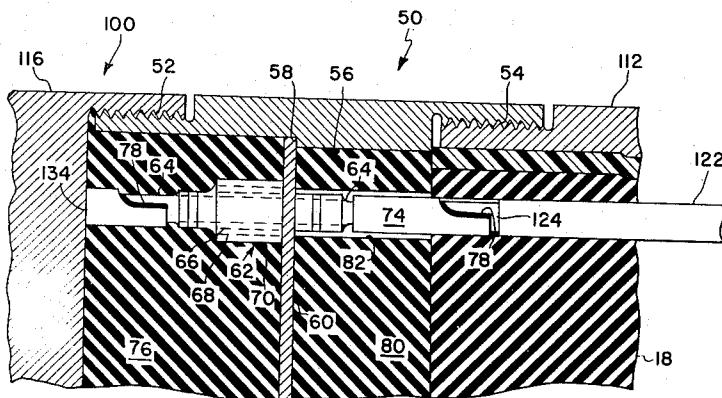
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[57] **ABSTRACT**

An electrical connector utilizing a pin assembly wherein the pin is coated with a dielectric and has a radio frequency energy absorbing sleeve around the dielectric and which is held in place by a solder coating. At the outer end of the radio frequency energy absorbing sleeve the pin grouping is adapted to receive an RF shield.

**1 Claims, 2 Drawing Figures**



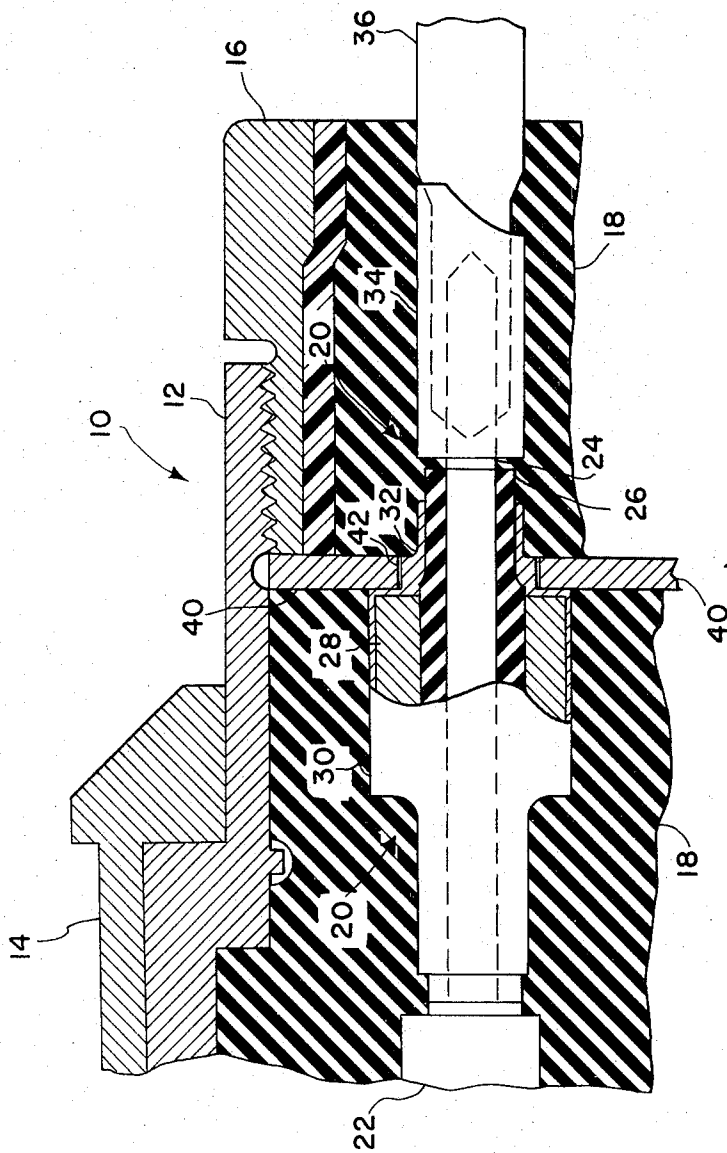


FIG. 1

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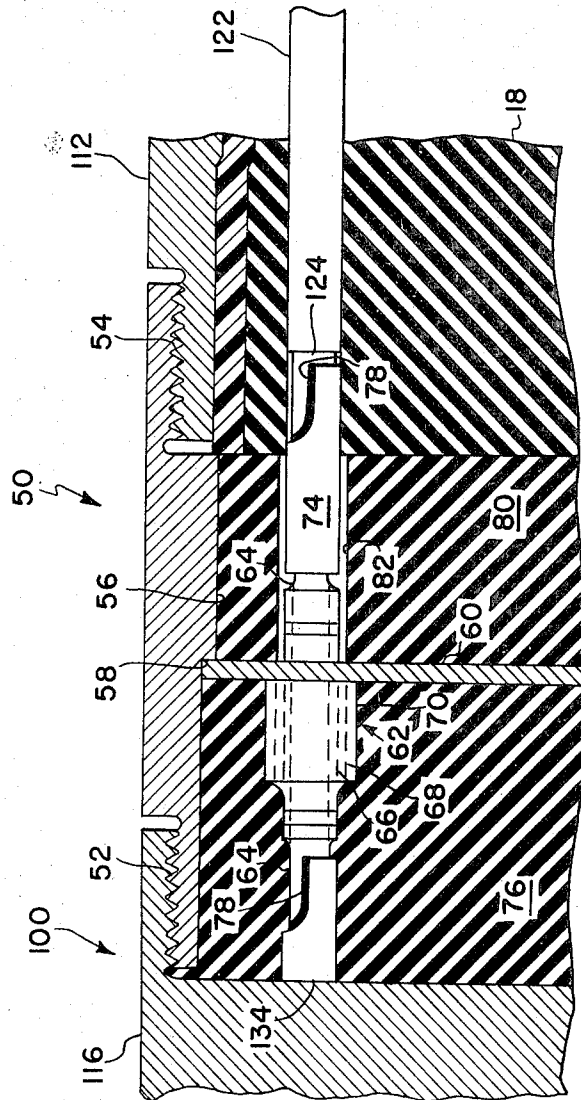


FIG. 2

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## RADIO FREQUENCY FILTER DEVICE

### ORIGIN OF THE DISCLOSURE

The invention described here was made by employees of the United States Government and may be manufactured and used by or for the Government for governmental purposes without the payment of any royalties thereon or therefor.

### BACKGROUND OF THE INVENTION

This invention relates generally to an electrical connector and more particularly to a radio frequency (RF) interference shield for use in systems or components which would require such interference to be blocked out.

The prior art is replete with various devices utilized for blocking or preventing radio frequency interference from entering into an area of component which of necessity must be isolated from such radio frequency interference. Generally, these devices are quite large and of insufficient reliability for the high technological requirements of the space age. The reliability of the previously known devices was reduced substantially by having to utilize numerous components solder joints and complicated construction procedures. Furthermore, these previously known devices had greater space requirements in view of their need to have enlarged parts and additional components that required extra space in the connections.

To overcome the many difficulties of the prior art, the use of a pin assembly having substantial RF interference reduction characteristics that is combined with an RF interference shield to provide a conventional connector device.

It is an object of the instant invention to provide a reliable and compact electrical connector providing radio frequency interference shielding characteristics.

A further object of the instant invention is to provide a radio frequency interference shield device having increased reliability accomplished by decreasing the total number of components, elimination of solder joints and fewer operation in the manufacturing process.

A still further object of the instant invention is to provide a compact RF interference shield in a connector by utilizing the available space in a connector shell to house the filters to eliminate the use of an RF cap and shielding of the cable between the connector and the cap.

Another object of this invention is to provide a connector pin assembly having radio frequency interference shielding characteristics by covering the connector pin with a dielectric surrounded by a sleeve of a radio frequency absorbing material and against which an RF interference shield can be abutted upon connection of the connector components.

A more complete appreciation of the invention and many of the attendant advantages thereof will be readily apparent as the same becomes better understood by reference to the following description when considered in connection with the accompanying drawings wherein:

FIG. 1 shows an overall sectional view of the instant invention; and

FIG. 2 shows a sectional view of a conventional connector modified in accordance with the invention.

Referring now to the drawings, and particularly to FIG. 1, conventional connector 10 is shown to include a housing or element 12 having lock member or lock ring 14 fitting thereabout for assistance in insuring a rigid connection between the components of connector 10. Cable clamp 16 fits to housing 12 and maintains cables 36 in their proper location. Connector housing 12 has insulated support 18 generally made of rubber or a potting compound for accurately retaining pin assemblies 20.

Filter pin assembly 20 includes pin 22 which is the portion of the filter pin assembly that mates with the mating receptacle that is attached in an integral manner to pin 24 to be utilized in the connection. Pin 24 has dielectric covering 26 completely surrounding and insulating pin 24.

Radio frequency energy absorbing sleeve 28 fits around the central portion of pin 24 and incases a portion of dielectric

covering 26 centrally of pin 24. Metallic radio frequency shielding material provides coating 30 for incasing sleeve 28 as well as dielectric covering 26. Base 32, which is a portion of metallic radio frequency shielding material 30, surrounds the outer end of pin 24 and dielectric coating 26, to provide an accurate abutment for RF interference shield 40. RF shield 40 would be made of a metallic material and provided with accurately positioned openings 42 corresponding to the location and size of pin bases 32. Any number of pins 24, with their corresponding bases 32 for receiving shield 40, can be utilized and it is a matter of design and utility as to the number of pins included in connector 10.

Socket 34 is an integral part of pin 24 and wire 36 is soldered to socket 34.

Referring now to FIG. 2, a housing or adaptor 50 is shown connecting the male and female sections of connector 100 and the cable clamp 112. Adaptor 50 is generally cylindrical in configuration with exterior threads 52 at one end and interior threads 54 at the opposite end. Internal flange 56 provides shoulder 58 for abutment of RF shield 60 which supports filter assembly 62.

Filter assembly 62 includes pins 64 which extend between socket 134 and wire 124 to provide an uninterrupted conductor element. Socket 74 may be utilized on the end of pin 64 adjacent wire 124 to insure a complete connection. It is to be understood also that pin 64 may be rigidly connected to socket 134 and wire 124 rigidly connected to socket 74 by solder 78, or similar adhesion.

Filter assembly 62 is substantially the same as filter assembly 20 in that pin 64 is insulated by dielectric covering 66. A radio frequency energy absorbing sleeve 68 incases covering 66 and pin 64. A conventional metallic radio frequency shielding material provides coating 70 about pin 64, dielectric covering 66 and cable clamp element 112 has wires 124, covered by insulation 122, for mating with socket 134 for receiving pins 64. Insulative support 80 is made of rubber or similar insulating material with a respective number of openings 82 for receiving sockets 74 and wire 124 for proper assembly of connector 100. The assembly is accomplished by cable clamps 112 and 116 to adaptor 50 by threads 52 and 54.

Thus it is seen that the instant invention provides a versatile electrical connector that is simple and compact and is manufactured in such a manner that the number of components is reduced to thereby substantially increase and enhance the reliability of the connector. The compactness of the instant invention is realized because of the use of the available space in conventional connector shells for housing the filter components. Furthermore, a great number of components and elements are eliminated to thereby enhance the reliability and compactness of the instant invention with regard to other shielding systems. It is readily apparent that conventional connectors can be utilized with only a slight modification by inserting filter pin assembly 20, including RF shield 40. The concept can be incorporated into almost any type of connector with the same minimal modifications. The modifications do not detract from the original manufacturing specifications of the connector in any way and permit the sealing properties to be retained, which is an important feature relative to outer space and aircraft applications of the instant invention. Accordingly, it is to be understood that this concept can be applied to production of special connectors or for an adaptor for existing connectors.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. An adapter for fitting between a pair of connectors, which is used for eliminating RF interference in at least one conductor, the connectors having electrically conductive housings surrounding said at least one conductor with the housings having male and female threads to aid in making a connection comprising:

an electrically conductive adapter housing with male threads on one of its ends and with female threads on its other end for mating with the threads on said connectors;

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filter means having outer conductors for making electrical contact with said adapter housing for providing an RF interference shield;  
 a rigid conductive plate with a hole therethrough for each of said filter means supporting said filter means, the size of each hole being such that the outer conductor of the filter means makes electrical contact with said plate;  
 a shoulder around the inside of said adapter housing against

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which said plate abuts and makes electrical contact with said adapter housing; and  
 insulative support material substantially surrounding said filter means on opposite sides of said plate whereby the ends of said filter means can be connected to the conductor ends to connect the adapter in the conductor circuits and with the plate forming an RF shield.

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