

[54] **SHIELDED HIGH VOLTAGE CONNECTOR**
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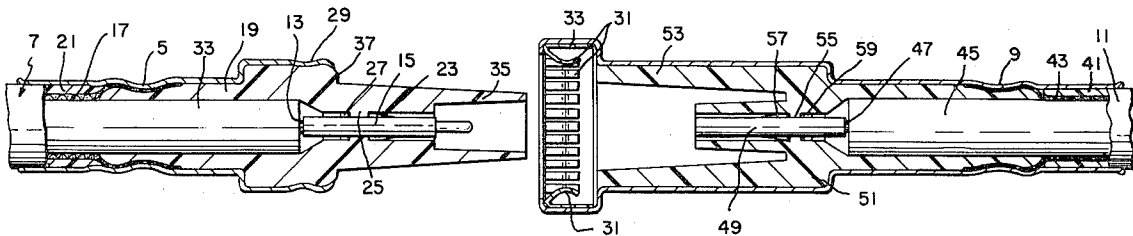
[57] **ABSTRACT**

The disclosure relates to a shielded high voltage connector, primarily for use with high voltage RG cable wherein the connector members can be snapped together, a metal can being positioned over each connector portion to provide a continuous ground connection across the connector portions as well as providing shielding completely around the connection.

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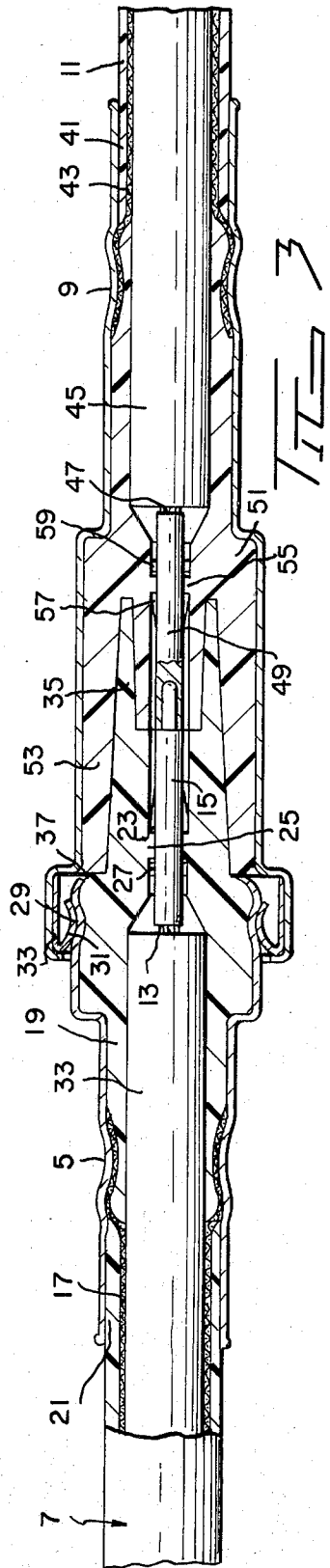
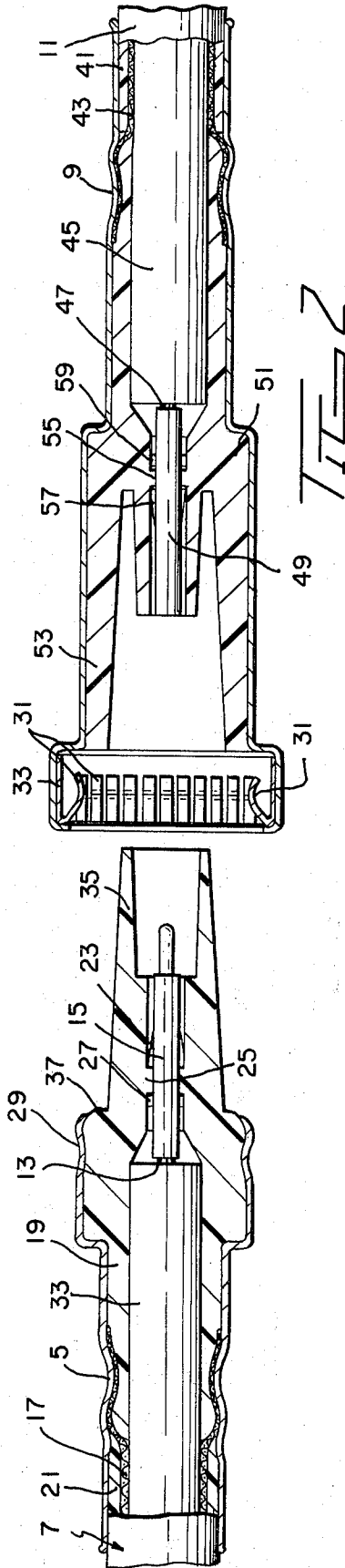
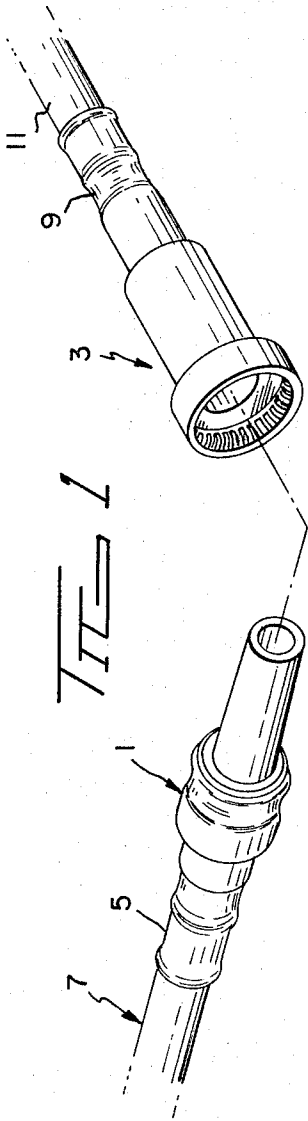
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10 Claims, 3 Drawing Figures



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SHIELDED HIGH VOLTAGE CONNECTOR

This invention relates to shielded high voltage connectors and more particularly, to shielded high voltage connectors which provide a continuous ground connection between connector portions, yet are field installable and snap fastened.

Connectors for high voltage cables particularly of the RG type have been known and used in the prior art. Such connectors have been of high cost and difficult to assemble and install in the field. It is therefore desirable to provide such high voltage shielded connectors which are of reduced cost and yet can be easily installed in the field.

Briefly, the above is accomplished in connection with shielded high voltage cable, particularly of the RG type, by providing plug and receptacle connector portions, the plug portion including a hard insulating body, preferably of plastic over the cable inner insulation, the wire shielding riding over the insulating body. A metal can which is capable of providing electrical shielding is positioned over the insulating body, cable shielding and outer cable insulation and crimped thereon at forward and rear positions. The receptacle is formed in the same manner except for a crimp only at a rear position, the forward end of the receptacle forming a split ring for receiving the forward end of the plug in a snap-on manner to provide the connection.

It is therefore an object of this invention to provide a shielded high voltage electrical connector which is relatively low in cost.

It is a further object of this invention to provide a high voltage shielded connector having a continuous ground connection.

It is a yet further object of this invention to provide a shielded high voltage connector which is readily installable in the field.

The above objects and still further objects of the invention will immediately become apparent to those skilled in the art after consideration of the following preferred embodiment thereof, which is provided by way of example and not by way of limitation, wherein:

FIG. 1 is a pictorial view of a shielded high voltage connector in accordance with the present invention;

FIG. 2 is a cross-sectional view of the shielded high voltage connector of the present invention prior to connection; and

FIG. 3 is a cross-sectional view of the shielded high voltage connector of the present invention after connection.

Referring now to FIG. 1, there is shown the shielded high voltage electrical connector of the present invention which includes a plug portion 1 and a receptacle portion 3. With further reference to FIGS. 2 and 3, the plug portion 1 includes a wire or cable 7 having an outer insulation jacket 21, a braid or shielding 17 thereunder, inner insulation 33 and a wire 13 within the inner insulation. A pin 15 is crimped onto the wire 13 and a rigid plastic plug 19 is positioned over the insulation 33, the braid 17 riding over the top of plug 19. The plug 19 includes a front nose portion 35 and a shoulder 37 at the rear of the nose portion. The nose portion 35 includes an interior hollow region of enlarged cross-section at its forward end into which the pin 15 extends. The hollow portion is then of reduced diameter downstream and includes a ridge 25 onto which fingers 23 on the pin 15 lock to prevent movement of the pin

to the left. The pin 15 also includes a ridge 27 thereon to prevent excessive forward movement of the pin 15. A metal can 5, preferably of brass, is positioned over the plug 19, braid 17 and outer insulation 21 of the wire 7 so that the can extends just over the shoulder 37. The can 5 is then crimped in the region where it contacts the braid 17 and also over the shoulder 37 and immediately behind shoulder 37 at 29. This provides an electrical connection between the braid 17 and can 5, the can portion extending over shoulder 37 being rounded to provide for easy insertion into a mating member and a snap-on connection in the region of crimp depression 29.

The receptacle 3 is formed in substantially the same manner as plug 1. The receptacle 3 includes a cable 11 having an outer insulation jacket 41, a braid or shielding 43 thereunder, inner insulation 45 and a wire 47 within the inner insulation. A receptacle 49 is crimped onto the wire 47 and a rigid plastic plug 51 is positioned over the insulation 45, the braid 43 riding over the top of plug 51. The plug 51 includes a front portion 53 which includes an interior hollow region of enlarged cross-section at its forward end to mate with nose portion 35 and into which the receptacle 49 extends. The hollow portion is then of reduced diameter downstream and includes a ridge 55 onto which fingers 57 on the pin 49 lock to right to prevent movement of the pin to the left. The pin 49 also includes a ridge 59 thereon to prevent excessive forward movement of the pin 15. A metal can 9, preferably of brass, is positioned over the plug 51, braid 43 and outer insulation 41 of the wire 11 so that the can extends beyond the plug 51. The can 9 is then crimped in the region where it contacts the braid 43. The can 9 includes at its front end a split ring 33 with fingers 31 thereon. The fingers 31 extend inwardly so that on mating of plug 1 and receptacle 3 the fingers ride over shoulder 37 and lock by a force friction fit into the groove 29 formed by the crimp. This causes a continuous ground connection from the braid 17 through can 5 and can 9 to the braid 43. This is best shown in FIG. 3.

It can be seen with reference to FIG. 3 that as plug 1 enters receptacle 3, the spring fingers 31 ride over shoulder 37 and are overcompressed as they ride over shoulder 37 and then partially relax into the groove 29 at which point the mating connector halves are properly positioned with respect to each other for proper connection and to provide the continuous ground. Leakage currents are prevented due to the large tracking distance from the pin 15 around the folded cone formed by the members 19 and 51 at their nose portions, the members 19 and 51 providing a clearance fit rather than a pressure seal.

It can be seen that there is provided an electrical connector which is easily assembled in the field, requiring only a crimping tool and wire insulation stripper and cutter and which provides a continuous ground due to use of two interconnected cans which also provide a shielding function at the connection. No soldering or bonding is required.

Though the invention has been described with respect to a specific preferred embodiment thereof many variations and modifications will immediately become apparent to those skilled in the art. It is therefore the intention that the appended claims be interpreted as broadly as possible in view of the prior art to include all such variations and modifications.

What is claimed is:

1. An electrical connector member which comprises, in combination,

- a. a wire having an inner conductor and an outer conductor electrically separated from said inner conductor by insulation and surrounding said inner conductor,
- b. a pin secured to said inner conductor,
- c. a body of rigid electrically insulating material positioned over said insulation, said outer conductor extending over the outer surface of said body, and
- d. a first electrically conducting metal can frictionally secured to said body and crimped to said outer conductor, wherein said body defines a shoulder and a reduced diameter nose forward of said housing, said first can being frictionally secured to said body behind said shoulder and extending over said shoulder.

2. An electrical connector member which comprises, in combination,

- a. a wire having an inner conductor and an outer conductor electrically separated from said inner conductor by insulation and surrounding said inner conductor,
- b. a pin secured to said inner conductor,
- c. a body of rigid electrically insulating material positioned over said insulation, said outer conductor extending over the outer surface of said body, wherein said body is locked to said pin, said pin extending into an aperture defined by said body, and
- d. a first electrically conducting metal can frictionally secured to said body and crimped to said outer conductor, wherein said body defines a shoulder and a reduced diameter nose forward of said housing, said first can being frictionally secured to said body behind said shoulder and extending over said shoulder.

3. An electrical connector member which comprises, in combination,

- a. a wire having an inner conductor and an outer conductor electrically separated from said inner conductor by insulation and surrounding said inner conductor,
- b. a pin secured to said inner conductor,
- c. a body of rigid electrically insulating material positioned over said insulation, said outer conductor extending over the outer surface of said body, and
- d. a first electrically conducting metal can frictionally secured to said body and over said outer conductor, a mating connector member having the following elements which include
- e. a wire having an inner conductor and an outer conductor electrically separated from said inner conductor by insulation and surrounding said inner conductor,
- f. a receptacle secured to said inner conductor,
- g. a body of rigid electrically insulating material positioned over said insulation, said outer conductor extending over the outer surface of said body, and
- h. a second electrically conducting metal can frictionally secured to said body and over said outer conductor, said second can including at its forward end means for locking with said first can.

4. An electrical connector as set forth in claim 3 wherein said means for locking includes a split ring and plural spring fingers on said split ring.

5. An electrical connector member which comprises, in combination,

- a. a wire having an inner conductor and an outer conductor electrically separated from said inner conductor by insulation and surrounding said inner conductor,
- b. a pin secured to said inner conductor,
- c. a body of rigid electrically insulating material positioned over said insulation, said outer conductor extending over the outer surface of said body, and
- d. a first electrically conducting metal can frictionally secured to said body and over said outer conductor wherein said body is locked to said pin, said pin extending into an aperture defined by said body, a mating connector member having the following elements which include
- e. a wire having an inner conductor and an outer conductor electrically separated from said inner conductor by insulation and surrounding said inner conductor,
- f. a receptacle secured to said inner conductor,
- g. a body of rigid electrically insulating material positioned over said insulation, said outer conductor extending over the outer surface of said body, and
- h. a second electrically conducting metal can frictionally secured to said body and over said outer conductor, said second can including at its forward end means for locking with said first can.

6. An electrical connector as set forth in claim 5 wherein said means for locking includes a split ring and plural spring fingers on said split ring.

7. An electrical connector member which comprises, in combination,

- a. a wire having an inner conductor and an outer conductor electrically separated from said inner conductor by insulation and surrounding said inner conductor,
- b. a pin secured to said inner conductor,
- c. a body of rigid electrically insulating material positioned over said insulation, said outer conductor extending over the outer surface of said body, and
- d. a first electrically conducting metal can frictionally secured to said body and over said outer conductor, wherein said body defines a shoulder and a reduced diameter nose forward of said shoulder, said first can being frictionally secured to said body behind said shoulder and extending over said shoulder, a mating connector member having the following elements which include
- e. a wire having an inner conductor and an outer conductor electrically separated from said inner conductor by insulation and surrounding said inner conductor,
- f. a receptacle secured to said inner conductor,
- g. a body of rigid electrically insulating material positioned over said insulation, said outer conductor extending over the outer surface of said body, and
- h. a second electrically conducting metal can frictionally secured to said body and over said outer conductor, said second can including at its forward end means for locking with said first can.

8. An electrical connector as set forth in claim 7 wherein said means for locking includes a split ring and plural spring fingers on said split ring.

9. An electrical connector member which comprises, in combination,

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- a. a wire having an inner conductor and an outer conductor electrically separated from said inner conductor by insulation and surrounding said inner conductor,
- b. a pin secured to said inner conductor,
- c. a body of rigid electrically insulating material positioned over said insulation, said outer conductor extending over the outer surface of said body, and
- d. a first electrically conducting metal can frictionally secured to said body and over said outer conductor, wherein said body is locked to said pin, said pin extending into an aperture defined by said body, said body defining a shoulder and a reduced diameter nose forward of said shoulder, said first can being frictionally secured to said body behind said shoulder and extending over said shoulder, a mating connector member having the following ele-

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- ments which include
 - e. a wire having an inner conductor and an outer conductor electrically separated from said inner conductor by insulation and surrounding said inner conductor,
 - f. a receptacle secured to said inner conductor,
 - g. a body of rigid electrically insulating material positioned over said insulation, said outer conductor extending over the outer surface of said body, and
 - h. a second electrically conducting metal can frictionally secured to said body and over said outer conductor, said second can including at its forward end means for locking with said first can.
10. An electrical connector as set forth in claim 9 wherein said means for locking includes a split ring and plural spring fingers on said split ring.

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