Oct. 11, 1960 M. MONASHKIN 2,956,107

INSULATED CABLE CONNECTOR

Filed May 16, 1958

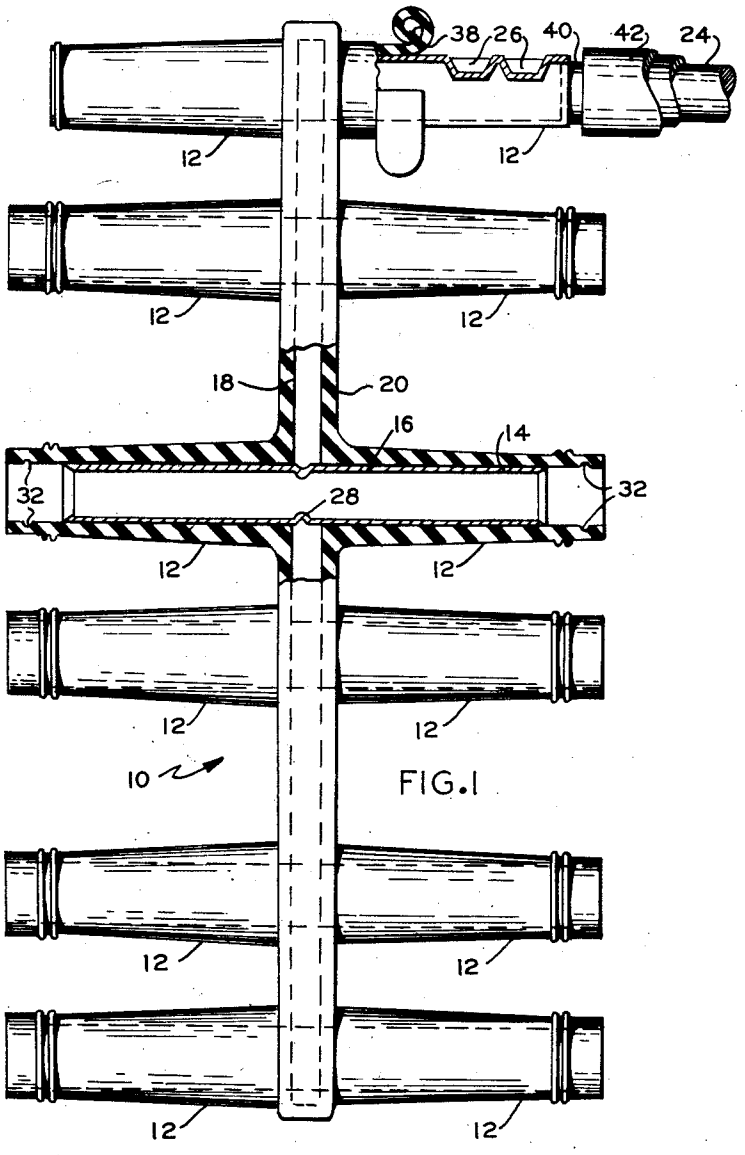


FIG.1

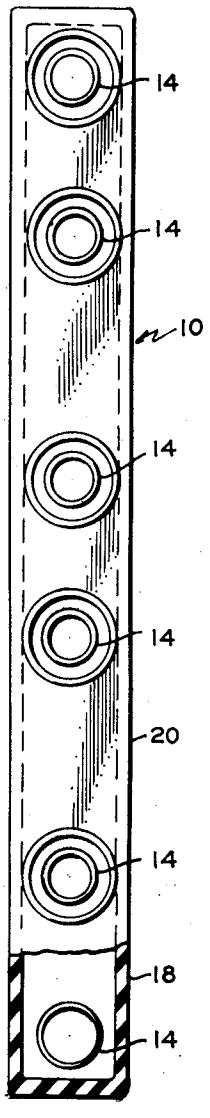


FIG.2

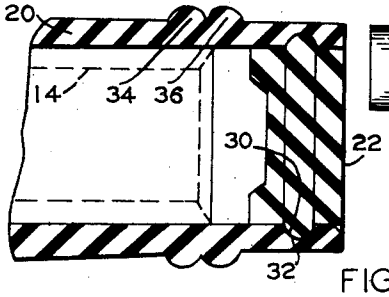


FIG.4

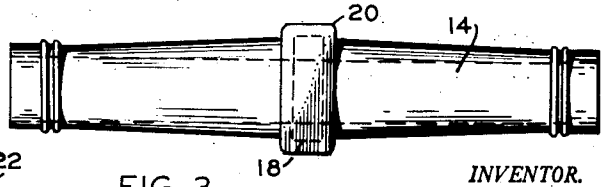


FIG.3

INVENTOR.
MERIL MONASHKIN

BY Ernest Tannick

ATTORNEY

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INSULATED CABLE CONNECTOR

Meril Monashkin, Danbury, Conn., assignor to Burndy Corporation, a corporation of New York

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2 Claims. (Cl. 174—71)

The present invention relates to cable connectors of the type adapted for use with insulated cables and which may have a fully insulated body portion as well as branch portions to which cables may be connected and the resulting junction be completely insulated.

Such connectors are commonly used in underground electrical distribution systems and are usually located in vaults or manholes containing a large number of electrical connectors in a relatively small volume.

One of the principal objects of my invention, therefore, is to reduce the lateral width of the connector over previous types of similar connectors, thereby contributing to a reduction in spacial requirements, with corresponding savings in cost of material. Such a connector would also possess an increased electrical efficiency over the older type of connectors.

Another object of my invention is to permit additional flexibility of the commoning bus bar during installation and rack while maintaining the integrity of the connector insulation.

One of the features of my invention is the use of a bus bar disposed in optimum orientation to provide for structural rigidity while permitting bendability during installation and use and having a plurality of bores therethrough. A plurality of open-ended tubes extend through the bores and are secured to the commoning bus and are used for connection to electrical conductors. Surrounding this structure is an insulating body made of a flexible material such as rubber or neoprene.

These and other objects and features of the invention will become more apparent by reference to the following description taken in conjunction with the accompanying drawing, in which:

Fig. 1 is a plan view of one embodiment of the electrical connector of my invention shown partly in section;

Fig. 2 is a side view of the same, also shown partly in section;

Fig. 3 is an end view of the same; and

Fig. 4 is a cross-sectional view in elevation of the end of one of the outlet arms enlarged to more clearly show detail.

Referring more in detail to the drawing, there is illustrated therein a multiple connector **10** in accordance with the principles of my invention which is seen to comprise twelve outlets **12** formed by six tubes **14**, each of which is disposed in a bore **16** formed in the bus bar body **18**. An insulating cover **20** is illustrated molded about the connector and preferably sealed at the outlets by a plug **22** in a manner hereinafter explained. It is, of course, apparent that the connector of my invention may utilize any number of tubes **14** to provide the desired number of outlets **12**.

An insulated electrical cable **24** may be connected to the outlet **12** by means of crimping as, for example, by the indentations **26**. For crimping the tubes **14** should be made of a suitable malleable metal. Of course, any type of connection to an inserted member may be used in place of the crimping.

The bus bar **18** is preferably made of minimum thickness flat stock commensurate with the strength and current carrying capacity desired such as for example: soft copper. The bores **16** are formed through the bar **18** and the tubes **14** inserted therein and fixed thereto by brazing or upsetting or by other suitable means. A stop **28** may be formed in the tube **14** by an indenting operation prior to the tube's insertion in the bores **16**, or the conductors may be allowed to abut each other.

The pre-shaped plugs **22** are inserted in the open end of the insulation **20** which covers the tubes **14** and may be cemented or otherwise sealed therein. A peripheral bead **30** fits into seat **32** of the insulation. Plug **22** is removed from the end of the insulation when an electrical connection is desired to be made by severing the rubber insulation between the peripherally formed beads **34** and **36** positioned on the insulation adjacent the outlets.

For convenience, the connector shown in Fig. 1 has plugs provided in ten of its twelve outlets. The remaining two outlets are not provided with plugs to assist in the making of the first set of connections. It, of course, being assumed that at least two outlets will be used when the connector is first put into service.

As shown in the upper right of Fig. 1, after the plugs **22** are removed, the end **38** of the insulation covering **20** extending over each tube **14** is rolled up to expose sufficient tube area for crimping. The bared end **40** of the cable **24** is thereafter inserted into the tube **14**, until it reaches the stop **28**. The indentations **26** are formed and the insulation covering **38** unrolled to cover the crimped connections. Suitable resealing means such as electrical tape not shown is employed to seal the connector insulation to the cable insulation **42**.

It has been found desirable to provide additional spacing between pairs of tubes **14** in order to provide clearance for a crimping tool to have access to each of the arms **12** for making a connection. If additional space is needed for clearance between adjacent arms **12**, the bus bar **18** may be bent to spread these adjacent arms and provide additional clearance for the crimping tool. After the connection has been made, the bar **18** may then be strained for connections to be made on the other side to the other arm. When providing a flexible insulation **20**, the integrity of the insulation is maintained during the bending of the bus bar.

The connector of our invention provides the minimum in line clearance for a multiple electrical connector with in-line connections such as are formed at the outlets of each metal tube **14**. Thus it is not necessary to provide space between the adjacent ends of electrical cables for the connector body as hitherto deemed necessary. Consequently, there is a substantial saving in the volumetric requirements in an underground vault or manhole where conditions are usually crowded.

There are also direct savings in the materials used. Moreover, the current may pass directly from the tube enclosing one cable to the in-line adjacent cable resulting in an increase in the electrical joint efficiency.

The multiple connector of my invention may be made in as many pairs of in-line connections and is found desirable.

I have thus described my invention, but I desire it understood that it is not confined to the particular form or use shown and described, the same being merely illustrative, and that the invention may be carried out in other ways without departing from the spirit of my invention, and, therefore, I claim broadly the right to employ all equivalent instrumentalities coming within the scope of the appended claims, and by means of which, objects of my invention are attained and new results accomplished, as it is obvious that the particular em-

bodiments herein shown and described are only some of the many that can be employed to attain these objects and accomplish these results.

I claim:

1. A multiple connector comprising a body having a plurality of bores extending entirely through said body between the largest surfaces thereof; a plurality of tubes each extending through one of said bores and having open ends extending from said body on both sides thereof; means for securing said tubes to said body and means for making connections between the ends of said tubes and members inserted in said tubes.

2. An electrical connection comprising a body having a plurality of bores extending entirely therethrough between the largest surfaces thereof; a plurality of tubes extending through said bores and having open ends extending from said body on both sides thereof; a plurality of electrical cables each coupled to one end of one of said tubes and a layer of flexible insulation surrounding said body and tubes.

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