July 21, 1970 M. J. A. SPOOREN 3,521,224

ELECTRICAL CONNECTOR HAVING A FERRULE PROVIDED WITH OVERLAPPING PORTIONS

Filed July 27, 1967

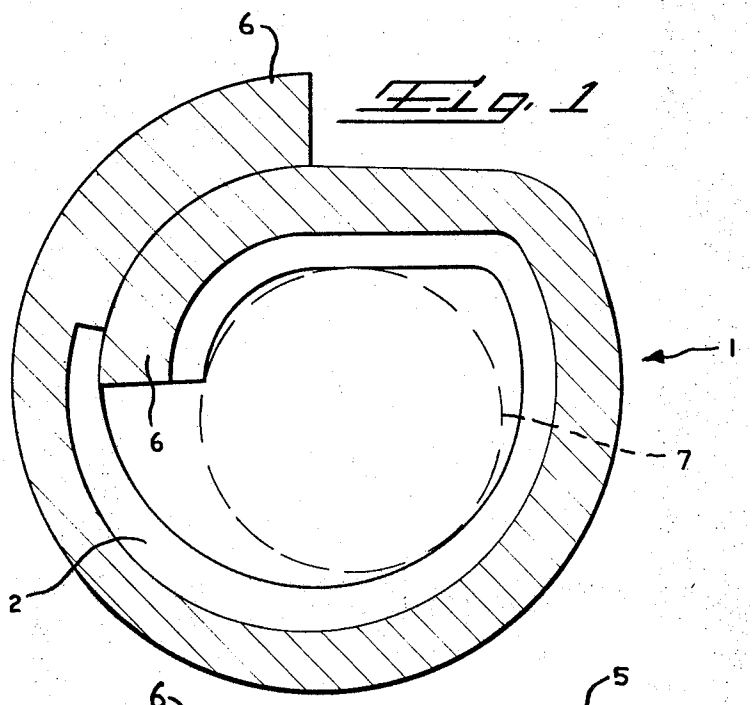

Fig. 1

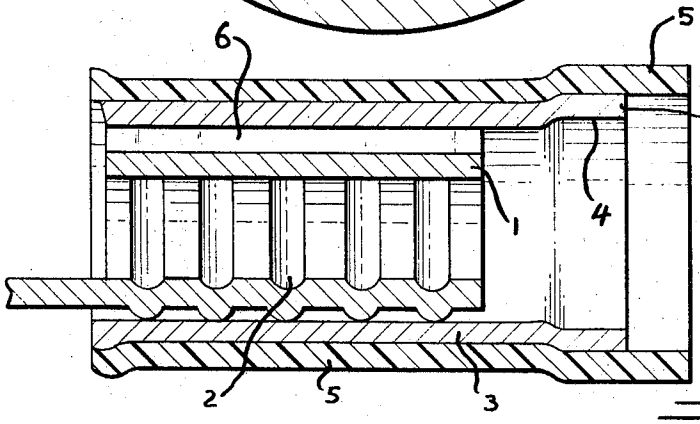

Fig. 2

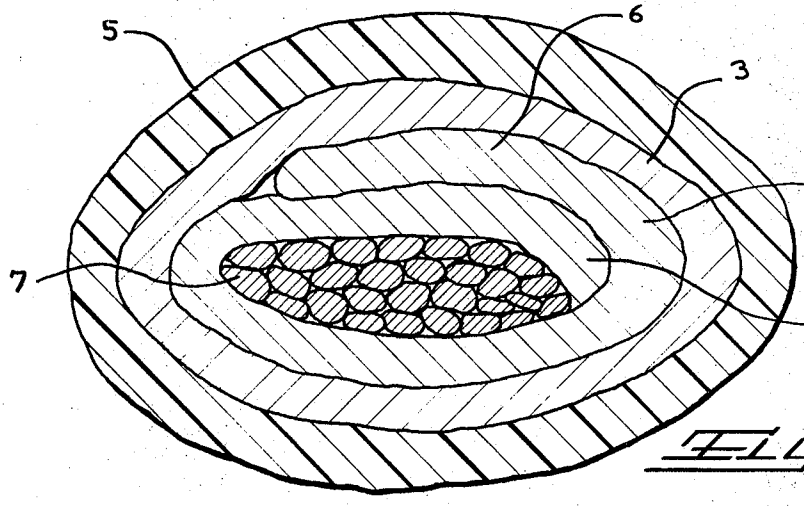

Fig. 3

United States Patent Office 3,521,224 Patented July 21, 1970

3,521,224

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Filed July 27, 1967, Ser. No. 656,497
Claims priority, application Netherlands, July 19, 1966, 6610131
Int. Cl. H01r 11/28
U.S. Cl. 339—276 2 Claims

ABSTRACT OF THE DISCLOSURE

A ferrule of an electrical connector is provided with overlapping portions in an axial direction therealong thereby increasing the tensile strength when crimped onto an electrical wire or the like.

In U.S. Pat. No. 2,654,873 there is described an electrical connector which comprises a tubular electrical ferrule, for example of copper and which has been rolled from an elongate metal blank. The longitudinal edges of the blank form a seam extending longitudinally of the ferrule, these edges being arranged in butt relationship so that the ferrule has an overall smooth outer surface. A sleeve of plastic insulating material surrounds the ferrule, the insulating material being such that the ferrule can be crimped to a wire inserted thereinto by applying crimping pressure to the insulating sleeve. The connector is normally crimped to the wire by the application of a substantially even crimping pressure about the circumference of the insulating sleeve. A seamless copper sleeve is preferably interposed between the ferrule and the insulating sleeve. To form a satisfactory electrical connection with the use of such a connector, it is essential that the sleeve, ferrule and wire sizes should be precisely determined and that crimping should be carried out with a tool having a full stroke mechanism for example as described in U.S. Pat. No. 2,618,993 so that the required crimping pressure is always achieved.

According to the invention, the longitudinal marginal portions of the blank from which the ferrule is formed are arranged in overlapping relationship, so that the wall thickness of the ferrule is doubled over a portion of its circumference for example over about a quarter of its circumference. It has been found that where the ferrule is formed in this way, the connector can be crimped to provide an improved connection between the wire and the connector. The sleeve, the ferrule and the wire sizes and the applied crimping pressure need not however be as accurately predetermined, as in the case of the known connector.

An object of the invention is to provide a ferrule of an electrical connector with means provided thereby for increasing the tensile strength when the ferrule is crimped onto an electrical wire.

Another object is the provision of a ferrule of an electrical connector which is provided with overlapping sections which provides an improved connection between the ferrule and a wire.

A further object is to provide a ferrule of an electrical connector with double wall thickness over a portion of the circumference thereof.

Other objects and attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the drawings in which there is shown and described an illustrative embodiment of the invention; it is to be understood, however, that this embodiment

is not intended to be exhaustive nor limiting of the invention but is given for purposes of illustration in order that others skilled in the art may fully understand the invention and the principles thereof and the manner of applying it in practical use so that they may modify it in various forms, each as may be best suited to the conditions of a particular use.

For a better understanding of the invention, reference will now be made to the accompanying drawings, in which:

FIG. 1 is a cross-sectional view of a ferrule for crimping to an electrical wire;

FIG. 2 is an axial sectional view of an electrical connector, including the ferrule of FIG. 1; and

FIG. 3 is an enlarged cross-sectional view through the connector when crimped to a wire.

Reference will now be made to FIGS. 1 and 2. The connector comprises a crimping ferrule **1** having wire-gripping serrations **2**, a seamless copper sleeve **3** surrounding the ferrule **1** and having a bell mouth **4**, and an outer insulating sleeve **5** surrounding the sleeve **3**, the sleeve **5** being of tough flexible plastic material, for example nylon or polyvinylchloride. The ferrule **1** has been rolled from an elongate sheet metal blank, the longitudinal marginal portions **6** of the blank being arranged in overlapping rleationship, so that the ferrule **1** is of double wall thickness over about a quarter of its circumference.

The connector is intended to be crimped to a multi-stranded or solid insulated electrical wire. An end of the electrically-conductive core **7** of the wire, which is shown diagrammatically in broken lines in FIG. 1, is first stripped of insulation and is inserted into the connector through the bell mouth **4** so that the stripped end of the core lies within the ferrule **1**, the mouth **4** surrounding the terminal part of the insulation. A pair of crimping dies (not shown) are now applied to the connector to exert upon the sleeve **5** a substantially even pressure about the circumference of the sleeve **5**, so that the ferrule **1** is tightly compressed about the core **7** as shown in FIG. 3, the core (which is shown diagrammatically in FIG. 3) being extruded longitudinally under the crimping pressure so that a tight connection is formed between the ferrule **1** and the core. The upper (as seen in FIG. 3) marginal portion **6** is forced against and bedded into the lower (as seen in FIG. 3) marginal portion **6** so that relaxation of the portion of the ferrule **1** which engages the core **7** is restrained, the sleeve **3** also serving to restrain relaxation of the crimped ferrule.

It has been found that the effect of arranging the marginal portions **6** in overlapping relationship as described above is to increase the tensile strength of the connection between the wire and the connector by at least 50% where for example the wire is of 1 $mm.^2$ in cross-section, as compared with the case where the ferrule is of the same outside diameter but does not have overlapping marginal portions.

It will, therefore, be appreciated that the aforementioned and other desirable objects have been achieved; however, it should be emphasized that the particular embodiment of the invention, which is shown and described herein, is intended as merely illustrative and not as restrictive of the invention.

What is claimed is:

1. An electrical connector comprising a tubular ferrule rolled from an elongate sheet metal blank and provided with longitudinal marginal portions extending axially of the ferrule so that the wall thickness of the ferrule is doubled over substantially a quarter of its circumference, a sleeve of plastic material surrounding said ferrule and through which the ferrule can be crimped to

a wire inserted into the ferule, the marginal portions of the ferrule being free to slide with respect to one another circumferentially of the ferrule, and a metal sleeve interposed between said sleeve of plastic material and said ferrule.

2. An electrical connector comprising a tubular ferrule rolled from an elongate sheet metal blank and provided with longitudinal marginal portions extending axially of the ferrule so that the wall thickness of the ferrule is doubled over at least 90° of its circumference, the marginal portions being free for relative sliding movement circumferentially of the ferrule, a sleeve of plastic material surrounding said ferrule and through which the ferrule can be crimped to a wire inserted into the ferrule, a metal sleeve being interposed between the sleeve of plastic material and the ferrule, and serrations being provided on an inside surface of the ferrule.

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RICHARD E. MOORE, Primary Examiner

U.S. Cl. X.R.

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