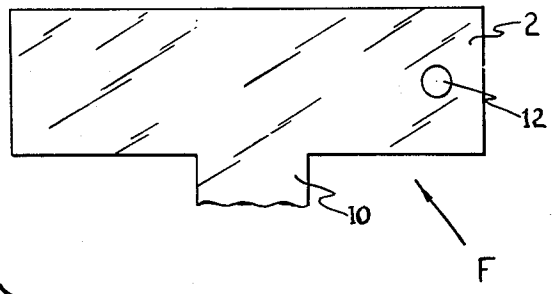
Feb. 5, 1963 H. O. WOOLLEY, JR 3,076,255

ELECTRICAL CONNECTOR AND METHOD OF MAKING THE SAME

Original Filed April 9, 1952

Fig. 1



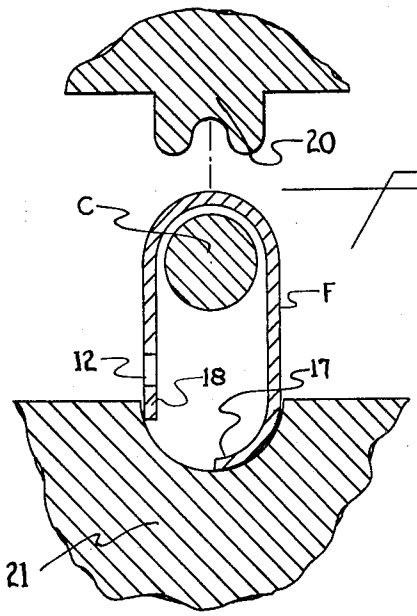
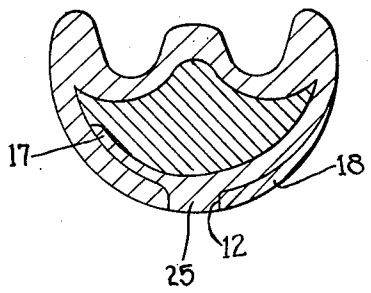


Fig. 2

Fig. 3



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United States Patent Office 3,076,255
Patented Feb. 5, 1963

3,076,255
ELECTRICAL CONNECTOR AND METHOD OF MAKING THE SAME

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Original application Apr. 9, 1952, Ser. No. 281,302, now Patent No. 2,786,192, dated Mar. 19, 1957. Divided and this application Sept. 10, 1956, Ser. No. 608,839
5 Claims. (Cl. 29—155.55)

This application constitutes a division of my copending application No. 281,302, filed April 9, 1952, now Patent No. 2,786,192.

The making of electrical connections by cold forging a ferrule with a wire by a crimping die so that a metal is subjected to cold flow under the die is now well established. It has been obvious that such connections, especially with solid (as distinguished from stranded) wire, have usually called for closed ferrules, i.e., seamless tubing or with edges secured together in the seam so that a lateral stress cannot pull the ferrule open. This is particularly so when designed for heavy duty to withstand heavy mechanical stresses such as encountered in power line applications. For connections which are to be made on the end of a wire this presents no serious problem since seamless ferrules or ferrules made by brazing a butt seam have proven entirely satisfactory. Where, however, the connection is to be made at an intermediate point in a long wire, without severing the wire, such ferrules are useless because it is not feasible to thread them onto the wire.

I have now found that it is possible to make such a connection with satisfactory mechanical strength by overlapping the ends of a ferrule forming portion around the wire in such a manner that when the portion is crimped to the wire the ferrule will be cold forged onto the wire and the overlapping ends will be locked permanently against separation. This is accomplished by the cooperation of a projection on one end mating with a depression on the other end to form a locking means. The projection may be formed during the crimping operation, as will be described subsequently.

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.

In the drawings:

FIGURE 1 shows a portion of a connector blank, adapted to embody the present invention;

FIGURE 2 shows an intermediate step of the operation, showing the connector wrapped around the conductor, prior to the crimping operation; and

FIGURE 3 shows a cross section of the crimped connection in its final form.

The particular die set used in the crimping operation as shown in the drawings is broadly of the type described in the patent to Freedom 2,535,013 but other dies may be employed.

As shown in FIGURE 1 the connector is formed from a sheet or strip of flat stock which is stamped into a ferrule-forming section, generally indicated by the letter "F." This member is the portion of the connector to be joined

to the conductor and a web **10** extends therefrom. The web **10** has a conventional means for joining it to a second conductor, e.g.: any standard connector tongue.

One end of the ferrule-forming portion "F" has at least one opening **12** which, as shown, extends through the thickness of the strip.

The ferrule-forming portion is curled or made into the shape of a U whereby it may be placed around the conductor "C" as shown in FIGURE 2. One end **17** is pre-formed into an arcuate shape at its free end so that it is bent over and/or swedged when it is pushed around the die nest **21** and curled by the upper die **20** during the crimping operation. One end **17** is lifted inward away from the face of the die and thus readily overlaps the other end **18** when the two meet in the bottom of the die. In this position the opening **12** is spaced from the edge of the strip.

During the final stage of the crimping operation, the metal of one overlapping end of the strip is extruded by the crimping pressure into the opening **12**, thus forming a button-like projection **25** functioning as a lock to prevent relaxation of the ferrule. Furthermore the ferrule is securely crimped onto the conductor so that the ferrule is radially deformed onto the conductor and also circumferentially locked thereon by wrapping and crimping so that the hoop stress is locked in the crimped connection.

Changes in construction will occur to those skilled in the art and various apparently different modifications and embodiments may be made without departing from the scope of the invention. The matter set forth in the foregoing description and accompanying drawings is offered by way of illustration only. The actual scope of the invention is intended to be defined in the following claims when viewed in their proper perspective against the prior art.

I claim:

1. An electrically conductive joint between a conductor and a connector comprising a metallic ferrule having a seam formed by overlapping edge portions, a recess extending into the wall in one of the overlapped edge portions adjacent the other edge portion, and said ferrule being crimped onto the conductor to deform the ferrule and conductor throughout their cross-section into interlocking engagement in the area of the recess with part of said other edge portion being deformed into the recess in said one edge portion.

2. The device of claim 1 wherein the recess extends through the wall of the edge portion.

3. The device of claim 1 wherein a plurality of such recesses are provided and the crimped area includes all of the recesses.

4. The method of making an electrical connection which includes the steps of (1) blanking out a strip of conductive metal, (2) forming an opening near one end, (3) wrapping the conductive metal around a conductor with the end having the opening overlapping the opposite end to form a ferrule, and (4) crimping the ferrule onto the conductor in the area of the opening to deform the ferrule and conductor throughout their cross-section into interlocking engagement, whereby the crimping pressure extrudes metal into the opening to effect a lock for preventing the ferrule from unwrapping.

5. The method as set forth in claim 4 wherein the end not having the opening is curled inwardly and then is formed in the shape of a U whereby the ferrule is formed during the crimping operation.

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