May 2, 1961 D. P. SCHWESTER 2,982,808

INSULATED ELECTRICAL CONNECTORS

Filed Sept. 5, 1958

Fig. 1

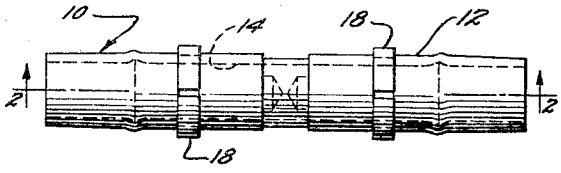


Fig. 5

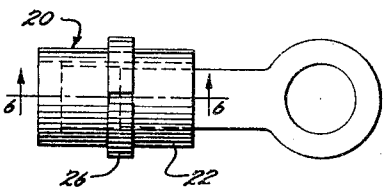


Fig. 2

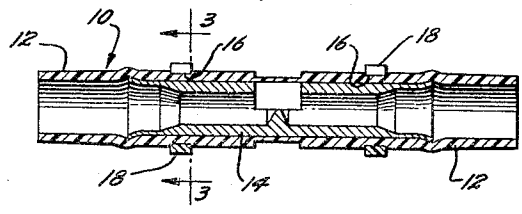


Fig. 6

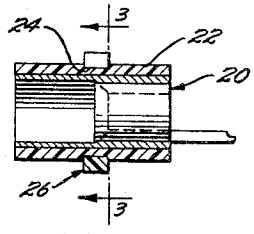


Fig. 3

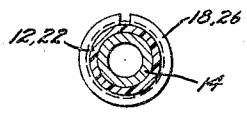


Fig. 4

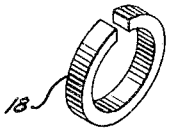


Fig. 9

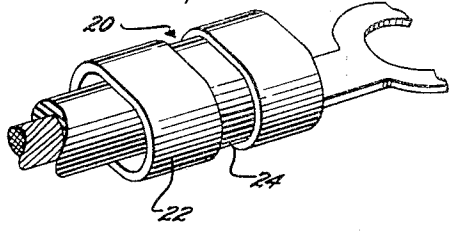


Fig. 7

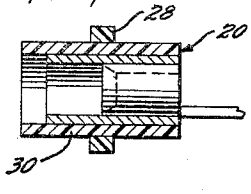


Fig. 8

INVENTOR.
Daniel P. Schwester
BY
John Babis Jr.

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INSULATED ELECTRICAL CONNECTORS

Daniel P. Schwester, East Orange, N.J., assignor to The Thomas & Betts Co., Elizabeth, N.J., a corporation of New Jersey

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5 Claims. (Cl. 174—84)

The invention relates to electrical connectors of the insulated sleeve type which are adapted to be crimped on bare end portions of insulated wire conductors, and more particularly to insulated connectors of the butt-end and/or terminal type, for example, wherein the insulating sleeve includes an annular means for locating a predetermined area of such connectors between the jaws of a crimping tool having corresponding complementary cavities formed therein for receiving the locating means.

More specifically, the invention resides in insulated electrical connectors of the character specified having a separate split ring of hard frangible plastic material mounted thereon in captive relation adapted to indicate areas thereon to be crimped and for locating such areas of the connector with respect to the jaws of a crimping tool provided with corresponding complementary slots or cavities for receiving the frangible plastic ring therein preparatory to performing a crimping operation thereon in which operation the frangible plastic ring is shattered or crushed and thus expended, leaving the crimped connector free of such indicating, locating or positioning means.

Similar insulated sleeve connectors, known heretofore, were provided with an annular locating or positioning flange, as an integral part thereof, at spaced points thereon intermediate its opposite ends. This construction possessed certain disadvantages in that such connectors, in the installation of a large number in parallel relation, were not adapted to be grouped together in closely bundled relation by reason of such integral locating flanges and thus occupied more space. Moreover, such connectors were more expensive to manufacture, required more time to inspect each crimped connector after a large number had been connected to and between the respective ends of two bundles of wire conductors, and were not adapted for a color differential between the annular flanges and the body of the insulation covering on the sleeve connector, whereby to visually distinguish different sizes of such connectors.

Accordingly, it is an object of the invention to provide an insulated sleeve type splice connector of the character specified which is not subject to the above-noted disadvantages.

A further object of the invention is to provide an insulated sleeve type connector as specified which is provided with frangible locating means adapted to be shattered or expended in a crimping operation thereon.

Another object of the invention is to provide an insulated sleeve type splicing connector having spaced annular locating flanges mounted thereon in captive relation which are automatically eliminated during a crimping operation thereon.

Another object of the invention is to provide an insulated sleeve type splice connector as specified which need not, in the use thereof, be staggered lengthwise relative to a large number of such connectors in order to form a compact bundle thereof in a minimum of space.

Another object of the invention is to provide an insulated sleeve type connector as specified wherein the insulation jacket and an annular locating flange adjacent each end portion thereof consists respectively of a yieldable plastic material of a predetermined color and a hard frangible plastic material of a contrasting color.

With the above and other objects in view, the invention resides in the novel construction, combination and arrangement of parts, the novel features of which are set forth with particularity in the appended claims, the invention itself, however, both as to its organization and method of operation, together with additional objects and advantages thereof, being best understood from the following description of a specific embodiment thereof, when taken in connection with the accompanying drawing, in which:

Fig. 1 is a view in elevation of a butt-end type of insulated electrical connector showing a frangible split ring or collar seated in an annular groove formed about the insulating sleeve of the connector adjacent each opposite end thereof;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a transverse sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a perspective view of a frangible split ring or collar per se;

Fig. 5 is a view in elevation of a terminal type of insulated electrical connector showing a frangible split ring or collar mounted thereon in a manner similar to that shown in Fig. 1;

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 5;

Fig. 7 is a sectional view similar to Fig. 6, showing an endless frangible ring or collar press-fitted on the outer periphery of the insulating sleeve of a terminal connector shown in Fig. 5;

Fig. 8 is a perspective view of an insulated butt-end electrical connector, as in Fig. 1, after the respective end portions thereof have each been crimped on the bare end portion of an insulated wire conductor; and

Fig. 9 is a perspective view of an insulated electrical terminal connector, as in Fig. 5, after the insulated barrel-end portion thereof has been crimped on the bare end portion of an insulated wire conductor.

Referring to the drawing, the invention is illustrated in Figs. 1, 2, 3 and 8 as applied to a butt-end, insulated sleeve type connector **10**, wherein an insulating sleeve **12** of nylon, for example, is telescoped over a ductile metal sleeve **14**, with the opposite ends of the insulating sleeve **12** extending beyond the opposite ends of the metal sleeve **14**, as exemplified in United States Patent Des. 181,392, assigned to the same assignee as in this application.

In accordance with the invention, the insulating sleeve **12** of the butt-end connector **10** is provided with an annular groove **16** of suitable width and a depth of at least five thousandths of an inch, adjacent each end of the connector **10**, for the reception of a split ring or collar **18** of frangible plastic material in each groove. The normal inner diameter of the split ring or collar **18** is substantially equal to the outer diameter of the grooves **16**, whereby the rings or collars **18** are held on the butt-end connector **10**, against relative lateral displacement. The rings **18** are adapted for locating each end portion of the butt-end connector **10**, relative to the jaws of a known form of crimping tool which are suitably slotted to receive one of the rings or collars **18** therein preparatory to performing a crimping operation on the connector **10** in known manner. The depth of the complementary slots formed in the jaws of the crimping tool is such that they will close substantially simultaneously on the outer periphery of the butt-end connector and the outer pe-

riphery of the locating ring or collar **18**, during a crimping operation thereon. The frangible ring **18** is thus subjected to a crimping pressure and expended by reason of the frangible locating ring or collar **18** being crushed, leaving the butt-end connector **10** free of such locating rings after a crimping operation thereon, as illustrated in Fig. 8.

Further in accordance with the invention, the frangible rings or collars **18**, of styrene, for example, are provided in a color differing from that of the nylon insulating sleeve **12**, whereby to provide a definite color contrast therebetween and thus facilitate the visual positioning of an end portion of a butt-end connector **10** relative to and between the slotted jaws of a crimping tool of the pliers type, for example.

The invention is also applicable to electrical connectors of the terminal type, as illustrated in Figs. 5, 6, 7 and 9, wherein a terminal connector **20**, having an insulating sleeve **22**, of nylon, for example, telescoped over its wire barrel end portion, is also provided with an annular groove **24**, substantially intermediate the ends thereof for securing a split ring or collar **26** of frangible plastic material thereon, in captive relation, to provide a crimp locating means thereon in the same manner and for the same purpose as described in connection with the preceding drawing figures, whereby the terminal connector **20** is left free of its locating ring or collar **26**, after a crimping operation has been performed thereon, as illustrated in Fig. 9.

Further in accordance with the invention and with particular reference to Fig. 7, the insulating sleeve on either a butt-end electrical connector or a terminal connector of the apertured tongue type, for example, may also be provided with a frangible endless ring or collar **28** by press-fitting the ring on the plain outer periphery of the insulating sleeve **30**, in known manner, whereby to secure the frangible ring **28** intermediate the ends of the insulating sleeve **30**, for locating the connector in a crimping tool for the same purpose and with the same result, as hereinbefore described.

While the invention has been illustrated and described with respect to one embodiment thereof, it is to be expressly understood that various changes and modifications may be made therein without departing from the inventive concept underlying the same. Therefore, the invention is not to be limtied except as is necessitated by the prior art and the scope of the appended claims.

What is claimed is:

1. An insulated sleeve connector comprising a tubular member of ductile metal, a tubular jacket of plastic insulation material telescoped thereon in tight-fitting relation with its opposite end portions extending beyond the opposite ends of said tubular metal member, and a split ring of frangible plastic material mounted on said tubular plastic jacket in captive relation at a point thereon directly over each end portion of said ductile metal member, said split rings being of a different color than said plastic jacket.

2. An electrical connector of the insulated sleeve type comprising a tubular member of ductile conductive metal, a tubular jacket of plastic insulation material telescoped over said ductile metal member in tight-fitting relation with its opposite end portions extending beyond the opposite ends of said tubular metal member, and a ring of frangible plastic material mounted on said tubular plastic jacket in captive relation at a point thereon directly over each end portion of said ductile metal member whereby said plastic rings are removed from said connector in a crimping operation on each end portion thereof.

3. An electrical connector of the insulated sleeve type comprising a tubular member of ductile conductive metal, a tubular jacket of plastic insulation material telescoped over said ductile metal member in tight-fitting relation with its opposite end portions extending equally beyond the opposite ends of said tubular metal member, and a ring of frangible plastic material secured on said tubular plastic jacket against relative endwise movement at a point thereon directly over each end of said ductile metal member whereby said plastic rings are removed from said connector in a crimping operation on each end portion thereof.

4. An electrical connector of the insulated sleeve type comprising a tubular member of ductile conductive metal, a tubular jacket of plastic insulation material telescoped over said ductile metal member in tight-fitting relation with its opposite end portions extending beyond the opposite ends of said tubular metal member, and a ring of frangible plastic material having a rectangular configuration in cross-section and an outer diameter greater than the outer diameter of said tubular plastic jacket mounted on said plastic jacket in captive relation at a point thereon directly over each end portion of said ductile metal member whereby said frangible rings are removed from said connector in a crimping operation on each end portion thereof.

5. In combination, an electrical connector of the insulated sleeve type adapted for connecting a bare end portion of each of a pair of insulated conductors in spaced coaxial relation comprising a tubular member of ductile conductive metal, a tubular jacket of plastic insulation material having an annular rectangular groove therein adjacent each end thereof and telescoped over said metal member in tight-fitting relation with its opposite end portions extending beyond the ends of said metal member, and a split ring of frangible plastic material having a rectangular configuration in cross-section and an outer diameter greater than the outer diameter of said plastic jacket, seated in each of said annular grooves in captive relation, each of said annular grooves in said plastic jacket being located directly over an end portion of said metal member whereby said rings are removed from said connector in a crimping operation on each end portion thereof.

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