May 8, 1962 T. F. PETERSON 3,032,964

HELICALLY-PREFORMED SPLICES AND METHOD OF SPLICING

Original Filed Sept. 20, 1946



Fig. 1



Fig. 2



Fig. 3

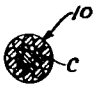


Fig. 4



Fig. 5

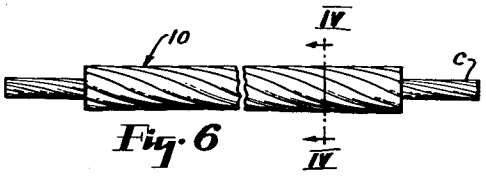


Fig. 6

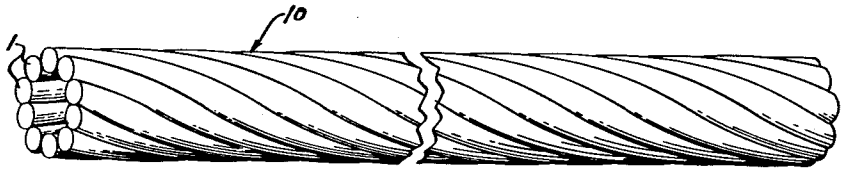


Fig. 7



Fig. 8

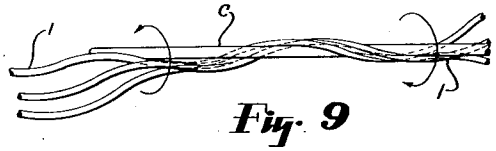


Fig. 9

United States Patent Office

3,032,964

Patented May 8, 1962

3,032,964
HELICALLY-PREFORMED SPLICES AND METHOD OF SPLICING

Thomas F. Peterson, Shaker Heights, Ohio, assignor to Preformed Line Products Company, Cleveland, Ohio, a corporation of Ohio

Original application Sept. 20, 1946, Ser. No. 698,312. Divided and this application Oct. 23, 1959, Ser. No. 848,320

5 Claims. (Cl. 57—145)

This invention is a division of the subject-matter disclosed in my copending application Serial No. 698,312 filed September 20, 1946, for Helically-Preformed Wire Envelope and Methods of Use.

The objects and purposes of the present invention are the provision of a splice or connector for wires, strands, and cables, composed of helically-preformed elements or filamentary bodies of sufficient stiffness to be twisted or intertwined together to form such envelope, and of a pitch to enable the preformed helices to be applied to enclose elongated members of a diameter substantially equal to or greater than the internal diameter of such helices. The limit of elasticity of the helices is not exceeded in the side application thereof.

The primary objects of the invention are, therefore, to provide:

A connector or splice for adjacent ends of wires, ropes, strands, and cables.

An electrical connector or splice for adjacent ends of wires, ropes, strands, and cables.

An electrical connector or splice between the opposed ends of an electrical conductor, of low resistance and low magnetic loss characteristics.

A splice predominately of helical components having straight portions intermediate their ends in registering or nesting relationship to provide a rigid, inflexible support at such portions which is self-retaining.

A device as in the foregoing paragraph in which the lay of the helices at each side of a straight portion is the same or the reverse with respect to each other.

In the drawings—

FIGURES 1 and 2 are side and end views, respectively, of one of the helically-preformed elements characteristic of the present invention;

FIGURE 3 is a tubular body, shown in side elevation, composed of the elements of FIGURE 1; the elements as shown being arranged into two groups or half-sets *a* and *b* axially displaced relative to each other;

FIGURE 4 is a cross-sectional view of a tube similar to that shown in FIGURE 3 illustrated as applied to splice a cable which corresponds to section IV—IV of FIGURE 6;

FIGURES 5 and 6 are side views of the tube or envelope as illustrated in FIGURE 3 applied to cables or the like; the direction of the lay of the envelope of FIGURE 5 being the reverse of lay of the cable, while the direction of lay of that of FIGURE 6 is the same as that of the cable;

FIGURE 7 is a perspective view, shown somewhat enlarged, of a tube or envelope made in accordance with the present invention;

FIGURE 8 is a side elevational view of a modified form of the invention; and

FIGURE 9 is a schematic representation of the side application of a plurality of helically-preformed elements to splice elongated members of wire, cable, etc.

Referring more particularly to the drawings, in which like reference characters refer to like parts throughout, it has been discovered that helically-preformed elements similar to 1 in FIGURE 1 may be preformed to the same

helical pitch and lay out of any suitable material, such as round wire, plastic, or the like, and then be intertwisted together to form a closed envelope **10**, as shown in FIGURE 3, without the necessity of providing any support from within, as has heretofore been the case.

Since the elements **1** may be assembled to form the envelope **10** by grouping them together coextensively and by twisting them relative to each other until each assumes its respective place in the lay of the envelope, it is obvious that they may be applied to enclosed elongated members having an overall diameter adapted to be enclosed by the envelope without regard to the availability of the ends of such member for threading through the helix. Thus, as shown in FIGURE 9, for wires or cables C already installed, or for brake rods or other motion transmission means already in place, the elements **1** are held adjacent their middles against the member C and their ends are twisted as shown in the arrows until completely in place. The resulting envelope **10** of this invention affords readily available means which may be quickly and economically installed around such cables or rods and fastened in place without disturbing the pre-existent arrangement.

As illustrated in FIGURES 5 and 6, the envelope **10** may be applied to cables or other elongated bodies in the same manner as that described in the preceding paragraph. Where the internal diameter of the envelope **10** is the same or slightly smaller than the external diameter of the cable C, about which it is to be disposed, an effective mechanical gripping action is realized which serves effectively to splice contiguous ends of wires, cables, etc., so as to resist axial displacement thereof. Where the envelope **10** is of electrically conducting material, an effective electrical joint is provided having low magnetic loss characteristics, such as usually characterize prevailing types of electrical splices which must employ extraneous clamps or fastenings from which electrical losses are realized. As exemplified by FIGURES 5 and 6, it is immaterial whether the lay of the envelope **10** agrees with its associated cable C or not. For greater mechanical and electrical contact, however, the lay of the envelope should agree with that of the cable in order that the elements **1** may be accommodated between the strands of the latter so as to afford maximum line contact.

In some cases it is desirable to provide a greater stiffness or rigidity of the envelope than can be had from the entirely helical disposition of its components. This may be achieved by providing registering and complementary straight portions S intermediate the ends of the helically-preformed elements, as shown in FIGURE 8. Where the envelope is serving as a splicing reinforcement for cables, overhead transmission lines, etc., the internal diameter of the helices will be such as tightly to grip the conductor for a substantial distance upon each side of the straight portion S. In other cases, it might be desirable to have the lays of the splicing reinforcement upon opposite sides of the straight portion S reversed to one another so that any one of the component helices may be applied to a cable by holding its ends thereagainst and turning its middle about the conductor until it snaps into place. Sufficient helices to provide a closed envelope may be applied in a similar manner. Thus, in FIGURE 8 is illustrated such an envelope having a central straight portion S and right lay portion **10R** to one side of the straight portion S and left lay portion **10L** to the other side thereof.

In order to increase the holding power of the envelopes **10** when used as splices, a suitable grit or abrasive, such as aluminum oxide, carborundum, etc., usually in a suitable liquid vehicle, may be applied between the envelope and the underlying body.

Furthermore, the cross-sectional configuration of the elements is not critical, although it is less obvious that round sections will serve in the manner described, and since these are usually the most readily available and economic to produce, it is expected that they will have the widest application.

I claim:

1. A mechanical splice for wires, strands, ropes, and the like, comprising a tubular envelope composed of helically-preformed elements of an internal helical diameter sufficient tightly to grip the body to be spliced, and of a pitch and rigidity adapting the elements for application to such body from its side without exceeding the elastic limit of the elements, said elements being of limited length to permit assembly, disassembly and reassembly in relation to each other and in relation to the body to be spliced.

2. An electrical splice for wires, strands, cables, and other filamentary conductors, comprising a tubular envelope composed of helically-preformed conductor elements of an internal helical diameter sufficient tightly to grip the body to be spliced, and of a pitch and rigidity to adapt the conductor elements for application to such body from its side without exceeding the elastic limit of the elements, said elements being of limited length to permit assembly, disassembly and reassembly in relation to each other and in relation to the body to be spliced.

3. A splice for elongated bodies comprising a whole-lay of helically-preformed elements arranged in self-supporting relation to each other, said elements having a non-helical straight portion intermediate their ends arranged in nesting relationship to preserve the integrity of the whole lay.

4. The invention of claim 3, in which the helical lay of said elements to one side of said straight portion is the reverse of the lay of said elements to the other side thereof.

5. The method of splicing cables and the like, which comprises preforming helical elements to an internal helix diameter tightly to grip the cable and to a pitch allowing for the application of said elements to the cable from its side without exceeding their elastic limit, collecting and intertwisting less than a whole-lay of said elements about the cable in substantially coextensive relation to each other, and thereafter intertwisting the remaining elements about said cable to complete the lay.

References Cited in the file of this patent

UNITED STATES PATENTS

337,513	Moxham	Mar. 9, 1886
817,328	Lloyd	Apr. 10, 1906
2,058,234	Johannessen	Oct. 20, 1936
2,230,611	Coffin et al.	Feb. 4, 1941
2,275,019	Peterson	Mar. 3, 1942
2,414,136	Bodendieck	Jan. 14, 1947