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3,411,400

SPLICED LOOP AND METHOD OF FORMATION THEREOF

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2 Sheets-Sheet 1

FIG. 1.

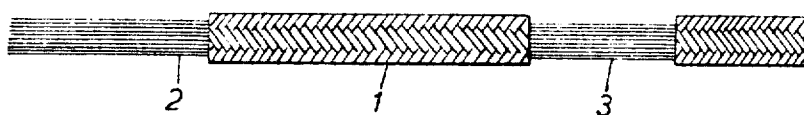


FIG. 2.

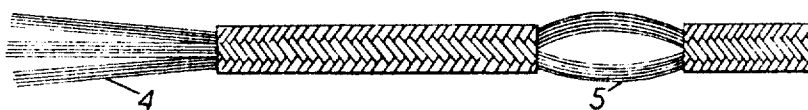
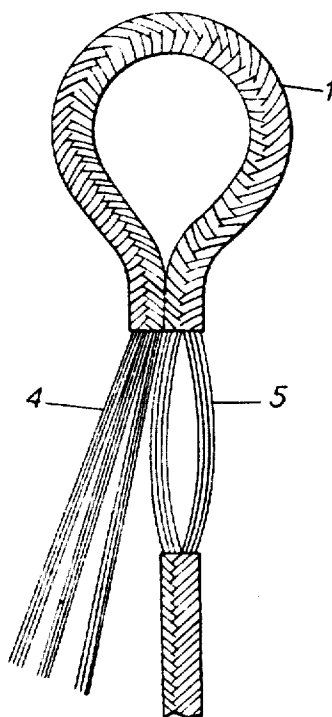


FIG. 3.



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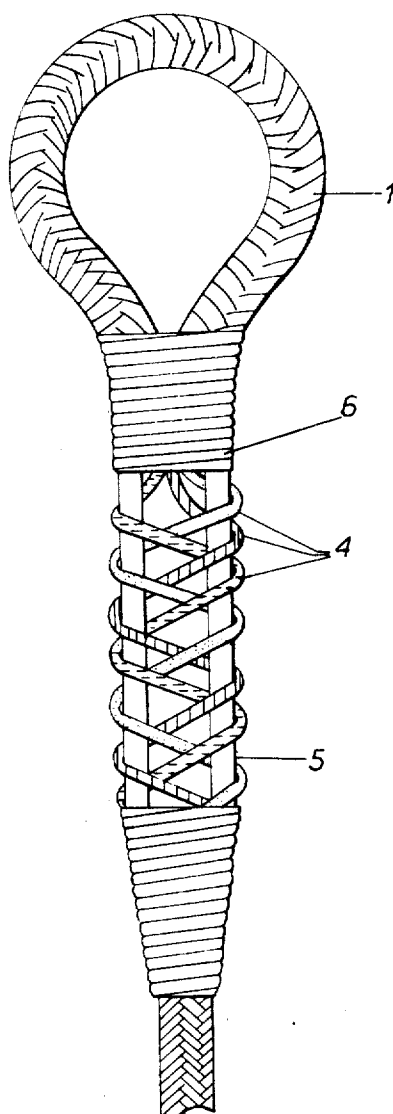
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FIG. 4.



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SPLICED LOOP AND METHOD OF FORMATION THEREOF

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8 Claims. (Cl. 87—8)

ABSTRACT OF THE DISCLOSURE

The invention describes a spliced loop in a textile rope, and method of making such a loop, in which the rope consists of a plurality of parallel textile core filaments covered by an envelope and comprising a first uncovered portion of said rope from which the envelope has been removed adjacent the free end thereof, a second uncovered portion of said rope, from which the envelope has been removed spaced from said first portion, at least two bundles of filaments in said second uncovered portion, and at least two bundles of filaments in said first uncovered portion, braided with said at least two bundles of said second portion.

The present invention relates to a spliced loop formed at the end of a textile rope, and also to a method for the manufacture thereof.

Recently, a rope has been proposed which consists of an assembly of parallel textile filaments, generally of synthetic origin and constituting a core, covered by an envelope, which is for example braided or extruded around the said core. An example of such a rope is described in French Patent specification No. 1,327,110. As compared with conventional stranded or braided textile ropes these ropes are lighter due essentially to the absence of shortening (stranding) and, consequently, by greater strength for equal diameter or weight. Moreover, when in use they stretch only to a small degree and, relatively to stranded ropes, they exhibit above all permanent anti-giratory properties.

Relative to steel cables, apart from the majority of the preceding functional properties, these ropes exhibit a high degree of flexibility and excellent handling qualities.

In a conventional rope or cord, which is stranded or braided in order to produce a terminal splice (also known as a spliced loop), the free end of the rope, the "dead" strand, is unstranded or unbraided as the case may be, and is interlaced with the "live" strand at a distance equal to the developed length of the loop which it is desired to form. This interlacing operation, which is a delicate operation and one which requires a considerable amount of time to effect, is carried out with the aid of a manual apparatus known as a "splicer." Due to the interlacing of the filaments of the "dead" strand with those of the "live" strand, the cabling and stranding torsions maintain the assembly in equilibrium. The spliced loop formed is then self-locking.

The application of this principle to a rope formed by an assembly of parallel filaments is obviously impossible, due to the absence of elementary strands.

According to one aspect of the present invention there is provided a spliced loop in a textile rope in which the rope consists of a plurality of parallel textile core filaments covered by an envelope and comprising a first uncovered portion of said rope from which the envelope has been removed adjacent the free end thereof, a second uncovered portion of said rope, from which the envelope

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has been removed spaced from said first portion, at least two bundles of filaments in said second uncovered portion, and at least two bundles of filaments in said first uncovered portion, braided with said at least two bundles of said second portion.

The invention also provides a method of forming a spliced loop in a textile rope consisting of a plurality of parallel textile core filaments covered by an envelope, such method comprising stripping the envelope from the core adjacent a free end of the rope to provide a first uncovered portion of said core filaments, stripping the envelope from the core at a position spaced from said first uncovered portion to provide a second uncovered portion of said core filaments, collecting the filaments of said first uncovered portion into a first set of at least two bundles of filaments, collecting the filaments of said second uncovered portion into a second set of at least two bundles of filaments, and braiding the bundles of said first set with the bundles of said second set to form said loop.

In practice n "dead" bundles and $n-1$ "live" bundles are formed. This number n is obviously a function of the diameter of the rope and the selection thereof is within the scope of the person skilled in the art. For ropes the diameter of which is of the order of one centimeter, n is generally equal to 3.

In the present description, the expression "stripped" designates the operation which consists of removing from the rope the envelope surrounding the core formed by the assembly of parallel filaments.

In order that the invention may more readily be understood the following description is given, merely by way of example, reference being made to the accompanying drawings, wherein:

FIGURE 1 is a schematic side elevation of a rope having parallel core yarns and a braided covering, illustrating the first stage of forming a loop according to the invention;

FIGURES 2 and 3 are views similar to FIGURE 1 illustrating the second and third stages; and

FIGURE 4 is a further similar view illustrating the final stages of the formation of the loop.

The drawings show substantially the carrying out of the method of the invention. In one particular example, the rope used had as its core $48 \times 10,000$ -denier core elements and $36 \times 30,000$ -denier core elements each formed from continuous polyhexamethylene adipamide filaments assembled without twist and joined together by a latex. This core was enclosed in a braid produced on a machine having 24 spindles fed with a 10,000-denier rove formed from continuous filaments of polyhexamethylene adipamide. The completed rope weighs approximately 315 grams/metre and has a diameter of 20.5 mm.

In forming the loop according to the invention as shown in FIGURE 1, the braid 1 forming the envelope was removed, firstly at the free end of the rope over a length of 60 cm. to form the "dead" strand and secondly over a length 3 of 40 cm., located entirely within the "live" strand of the rope, at a distance from the "dead" strand 2 which was approximately equal to the developed length of the spliced loop which it was desired to produce i.e., in this case 90 cm.

As shown in FIGURE 2, the "dead" strand 2 was divided into three substantially equal bundles 4 and the "live" strand 3 into two also substantially equal bundles 5. After having folded bundles 4 to a position adjacent bundles 5 as shown in FIGURE 3, the three bundles 4 of the "dead" strand were braided, in a conventional manner, on the two bundles 5 of the "live" strand (FIGURE 4), the bundles 4 being passed over the bundles 5 ten times.

In order to improve the appearance of the spliced rope,

the splice may be surrounded by a lacing 6 and/or a vulcanised rubber strip.

In FIGURE 4 the braiding of the bundles 4 and 5 and the lacing are shown symbolically and intentionally deformed, so as to facilitate understanding of the invention.

With the aid of a dynamometer, this rope, retained by the spliced loop, was subjected to a tensile force until rupture occurred under a load of 11.5 metric tons. The fracture took place in the "heart" of the test piece, i.e., in the portion located outside the spliced loop.

The spliced loops produced in accordance with the invention are antigratatory by nature; furthermore, the bundles of the "live" strand remain substantially parallel and the braiding of the bundles of the "dead" strand is balanced. Additionally they are flexible and, in use, notably due to the absence of stranding, these spliced loops exhibit hardly any tendency to stretch. Similarly, under the influence of a tensile force, these loops also have the property of being self-locking.

We claim:

1. A spliced loop in a textile rope comprising in combination:

- (a) a textile rope including a plurality of parallel textile core filaments and an envelope;
- (b) a free end to said textile rope;
- (c) a first uncovered portion of said rope having the envelope removed adjacent said free end;
- (d) a second uncovered portion of said rope spaced from said first uncovered portion and having the envelope removed therefrom;
- (e) at least two bundles of filaments to said second uncovered portion; and
- (f) at least two bundles of filaments to said first uncovered portion, braided with said at least two bundles of said second portion.

2. The spliced loop defined in claim 1, wherein said first uncovered portion includes three bundles of filaments, and said second uncovered portion includes two bundles of filaments.

3. The spliced loop defined in claim 1, wherein said braided bundles are covered with a lacing.

4. The spliced loop defined in claim 1, wherein said

braided bundles are covered with a vulcanised rubber strip.

5. A method of forming a loop in a textile rope, said method comprising the steps of:

- (i) providing a textile rope including a plurality of parallel textile core filaments and an envelope and having a free end;
- (ii) stripping the envelope from the core filaments adjacent the free end to provide a first uncovered portion of said core filaments;
- (iii) stripping the envelope at a location spaced from said first uncovered portion to provide a second uncovered portion of said core filaments;
- (iv) collecting the filaments of said first uncovered portion into a first set of at least two bundles of filaments;
- (v) collecting the filaments of said second uncovered portion into a second set of at least two bundles of filaments; and
- (vi) braiding the bundles of said first set with the bundles of said second set to form said loop.

6. The method defined in claim 5, and including collecting the filaments of said first uncovered portion into three bundles, and collecting the filaments of said second uncovered portion into two bundles.

7. The method defined in claim 5 and including the step of covering the braided bundles with lacing.

8. The method defined in claim 5 and including the step of covering the braided bundles with vulcanised rubber strip.

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