Feb. 8, 1949. V. C. J. PETERSON ET AL 2,461,079

WIRE ROPE SPLICE

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Fig. 1.

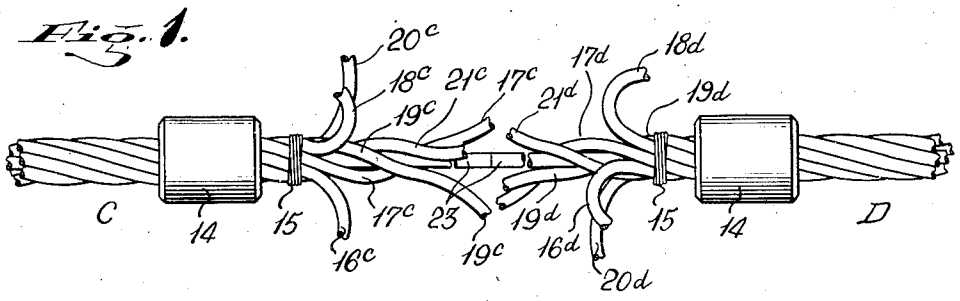


Fig. 2.

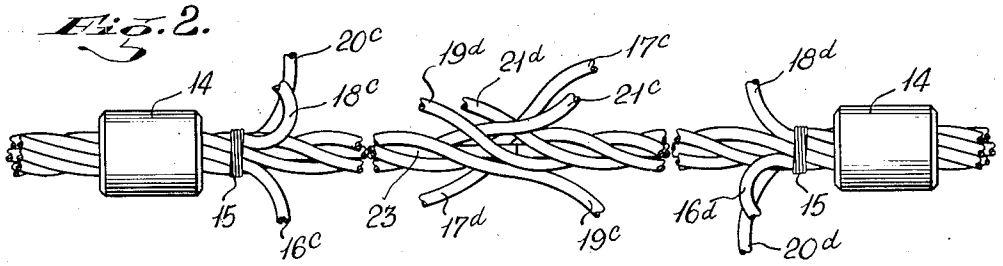


Fig. 3.

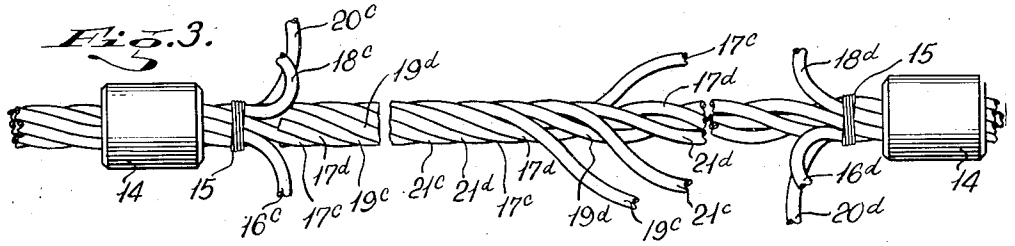
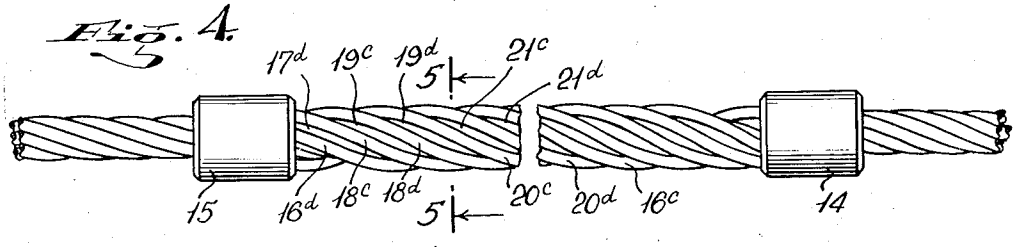


Fig. 4.



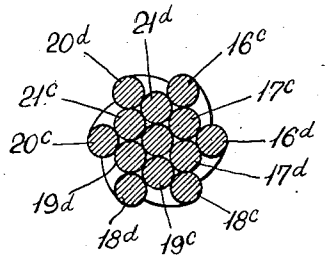


Fig. 5.

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WIRE ROPE SPLICE

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4 Claims. (Cl. 57—142)

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This invention concerns splices, particularly those splices used in making grommets of wire rope which are intended to be used as slings.

A grommet intended to be utilized as a sling can be fabricated in at least three different ways, according to the prior art. Short splices of a well-known kind can be used to join the end of a rope, thus making an endless rope. Another method is to utilize a technique similar to that used in making long or running splices. This is done by winding a single strand around and around a core so that the eventual product is a rope made of a single strand laid around a core so may times as to result in an endless rope with only a single cut strand. Another method of making a grommet is to fasten the ends of a length of wire rope together with clips or other applied fasteners.

All of the above forms of splice have certain disadvantages. Short splices are difficult to make and require a strong and skillful man in the fabrication, and furthermore weaken the rope to a certain extent both at the splice and in the immediate neighboring rope because of the tucking which must be employed to interlace properly the strands. Grommets made with long, or running splices have a disadvantage that sometimes the ends of the cut strands rise to the surface of the rope and form dangerous projections which catch on the hands of those using the grommet. Those slings which are made by winding a single strand around and around an endless central core to eventually form what appears to be endless rope with but a single cut in any of the strands are difficult to make in large size because of the method of stranding employed which requires considerable lifting of a heavy spool or coil to pass the strand around the endless central core. Furthermore unless the strand is preformed, it is extremely difficult to assure that each strand is as tight around the core as the next strand and is carrying its proper share of the load.

Clips and other mechanical fasteners securing the ends of rope together are more or less disliked because of their large size and the projections inherent in them. Furthermore they are notorious for their low efficiency, that is, the tendency they have to permit the rope to pull out of the clip or else cause strains in the rope which cause the rope to break at or in the neighborhood of the clip.

It is, therefore, an object of the present invention to provide a splice which can be used for making endless wire grommets which can be applied by comparatively unskilled workmen without too much physical exertion.

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It is a further object of the present invention to provide a splice which is cheap to produce and can be produced with a minimum expenditure of time.

It is a further object of this invention to produce a splice of reasonable length which is at the same time as strong as the rope which is joined by the splice.

It is a further object of the present invention to provide a splice which can be utilized as the part of the rope subjected to the maximum wear; that is, one which can be used as a grommet splice and which can be applied over the lifting hook when the grommet is to be supported from a hook.

It is a further object of the present invention to provide a splice for making endless grommets which does not require any expensive fittings.

Referring now to the drawings:

Figure 1 is a showing of two ropes prepared for splicing;

Figure 2 is a showing of the ropes of Figure 1 married;

Figure 3 is a showing of a further stage of this splice;

Figure 4 is a showing of a completed splice, and

Figure 5 is a section on line 5—5 of Figure 4.

This splice has been illustrated in conjunction with a six part wire rope. It is to be understood that the splice can be used with any number of parts.

Referring now to Figure 1, two rope ends C and D are shown after preliminary preparation. Ferrules 14 are first slipped on the rope ends and back out of the way. As the ferrules have a considerably larger internal diameter than the rope itself, as will presently appear, this is easily done. After the ferrules 14 are in place, seizings 15 are applied a sufficient distance back from the cut ends to produce a proper splice. The farther back this seizing is, the less tension there will be tending to pull the strands from under the ferrules. Three lays are sufficient for an efficient splice.

Alternate strands 16, 18 and 20 are then unlaid from the core, leaving alternate strands 17, 19 and 21 in place around the core. These strands have all been marked "*c*" and "*d*" to indicate the rope of which each forms a part. A seizing is then placed around the three strands 17, 19 and 21 and the core upon which they lie, at a point midway between the end of the rope and the seizing 15. This seizing has not been shown in the figures for

clarity. The core 23 of each rope is then cut off at this second seizing. After strands 16, 18 and 20 are secured back out of the way, the ropes are married by butting the core ends, and passing strands 17*d*, 19*d*, 21*d* into the spaces between strands 17*c*, 19*c* and 21*c*.

The seizing (not shown) is then removed, and strands 17, 19 and 21 are laid around the core of the opposite rope end in the grooves resulting from the removal of strands 16, 18 and 20.

In Figures 3, the strands 17*d*, 19*d* and 21*d* have been shown as laid up in this manner, while strands 17*c*, 19*c* and 21*c* are ready for this operation. After strands 17*c*, 19*c* and 21*c* are laid in place, the structure superficially resembles a running splice with the normally cut strands still in place.

The strands 16, 18 and 20 are then laid around the inner rope, following the valleys thereof. This is a simple matter, especially if preformed rope is used, as the helical configuration of the strands tends to cause them to follow the valleys of the rope underneath.

The ferrules 15 are then slipped over the regions including the cut strand ends, and swaged or otherwise compressed in place.

The splice depends for its efficiency not only upon the presence of the ferrules, which need not be long enough or tight enough to transmit the entire load from strand to strand, but also depends upon the friction developed between the interior and exterior strands. In fact, it is possible, by utilizing a long enough splice, to dispense with ferrules and use seizing to hold the ends of the overlying strands in place. However, the shown splice is far superior because of its neat appearance.

In addition to the friction between adjacent strands on the interior rope, which acts as in an ordinary running splice, the action between the overlying strands and the interior rope tends to hold the splice together very materially. This is because any tension separating the ferrules causes the outer strands to grip the inner rope, with a sort of snubbing action. Consequently, a great deal of tension is transmitted between the exterior and interior layers of the splice, lessening the stress on the ferrules.

Although this splice has been described in connection with an even number of strands, it is to be understood that it is perfectly feasible to utilize an odd number of strands. For instance, a seven-strand splice would have four strands of one rope and three of the other in the inner laid rope, and three strands of the first-mentioned rope in the outer layer together with four strands of the other, and will be just as efficient and, when completed, similar in appearance to the six strand splice specifically described.

It is to be understood that the described method of making a splice is illustrative of the invention and that it is possible to deviate from the description somewhat and still remain within the scope of the appended claims.

We claim:

1. A splice for two rope ends comprising a laid inner portion of the same diameter as the rope ends and composed partly of strands of one rope end and partly of strands of the other rope end, an outer portion composed of strands lying in the valleys of the inner portion, said outer portion composed partly of strands of one rope end and partly of strands of the other rope end, and means forcing the outer strands into the valleys for part of their length.

2. A splice for two rope ends comprising a laid inner portion of the same diameter as the rope ends and composed partly of strands of one rope end and partly of strands of the other rope end, an outer portion composed of strands lying in the valleys of the inner portion, said outer portion composed partly of strands of one rope end and partly of strands of the other rope end, the strands of one rope end terminating in substantially a common region spaced from the like region of termination of the strands of the other rope end, and sleeves surrounding the outer section in said regions, said sleeves compressing the outer strands into the valleys of the inner portion.

3. A splice for two rope ends comprising a laid inner portion of the same diameter as the rope ends, said laid portion comprising strands of both rope ends extending the length of the splice, an outer portion composed of strands lying in the valleys of the inner portion, said outer portion comprising strands of both rope ends extending the length of the splice, and a ring at each end of the splice pressing the strands of the outer portion into the valleys of the inner portion.

4. A splice for two rope ends comprising a laid inner portion of the same diameter as the rope ends, said laid portion comprising strands of both rope ends extending the length of the splice, the strands of one rope end alternating with the strands of the other rope end, an outer portion composed of strands lying in the valleys of the inner portion, said outer portion comprising strands of both rope ends extending the length of the splice, the strands of one rope end alternating with the strands of the other rope end, and a ring at each end of the splice pressing the strands of the outer portion into the valleys of the inner portion.

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