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N. C. HARRISON

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WIRE ROPE

Filed March 23, 1921

Fig. 1.

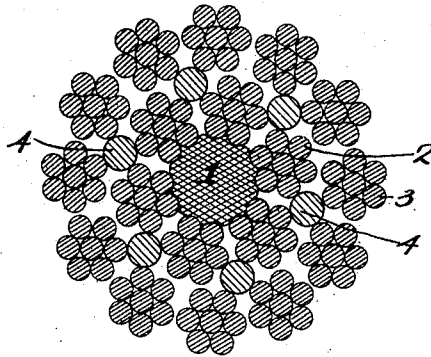


Fig. 2.

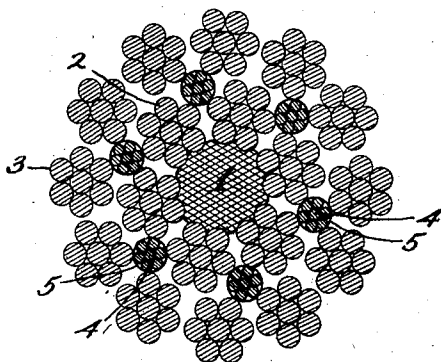


Fig. 3.



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WIRE ROPE.

Application filed March 23, 1921. Serial No. 454,721.

To all whom it may concern:

Be it known that I, NOBLE C. HARRISON, a citizen of the United States, residing at Trenton, county of Mercer, and State of New Jersey, have invented certain new and useful Improvements in Wire Rope, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 This invention has for its object to provide an improved wire rope composed of a plurality of series of strands of helically wound wire, said rope exhibiting the characteristics of great flexibility, strength and durability.

This invention consists in a novel construction of wire rope as will be hereinafter described and then more particularly pointed out.

20 Referring to the accompanying drawings which illustrate embodiments of the invention:

Figure 1 is a cross-section on an enlarged scale of a wire rope embodying the invention.

Figure 2 illustrates a modified construction of rope embodying the invention.

Figure 3 is a detail view illustrating a modified form of the spacer or bearer employed in carrying the invention into effect.

30 In the particular construction shown, the wire rope comprises the usual core 1 which may consist of wire, hemp, fiber, or other material. A series of wire strands 2 are helically wound around this core, as is usual in such constructions. In the particular rope selected to illustrate the invention, there are six of these strands 2 thus helically wound around the core. Surrounding the strands 2 which constitute the inner series of strands, is an outer series of strands marked 3. In what are regarded as the best constructions embodying the invention, the strands of the outer series will be about the same diameter as those of the inner series and there will be twice as many strands in the outer series as there are in the inner series. Further, in what are regarded as the best constructions, the lay of the inner series of strands will be the same as that of the outer series and the pitch will also be the same.

Flexibility in a wire rope is highly desirable, it being understood that the term "flexibility" as here employed means the ca-

capacity of the rope to operate over sheaves without causing excessive bending stresses in the wires of the strands which compose the rope. The ideal rope is one that can operate over small sheaves without causing excessive bending strains in the wires of the outer strands. Now, if the outside strands are free to move or slip as the rope bends over a sheave, the bending stresses in the wires of those strands are reduced. As the rope bends over the sheave, the strand on top must stretch due to the curvature of the sheave and beyond this stretching point the strand must compress or shorten. The construction should be such that the strand which thus compresses and shortens should slip or move with respect to the other strands to equalize this tendency of the strand to stretch and compress. In the usual constructions of wire rope where the strands are in direct contact with each other, the slip or movement of the strand is either prevented, due to the roughness of the contiguous strands with which it is in contact, or if movement occurs, there is friction between the strands which tends to rapidly wear the strands. Under such circumstances, there is also a tendency to "nicking" which, of course, shortens the effective life of the rope.

According to the present invention, bearer spacers are so introduced into the rope as to facilitate the slip of the strands above referred to during the bending and at the same time eliminate or greatly reduce the friction due to the relative movement of the strands. These spacers or bearers should have a smooth, hard surface and should be arranged between the contiguous surfaces of the strands of the outer and inner series. In the particular construction shown in Fig. 1, these spacers consist of wires 4, these wires being arranged in the valleys between the wire strands of the inner series. Where the rope, as in the construction shown, has a series of outer strands of the same diameter as the inner strands and twice in number, each spacer will be in contact with two of the strands of each series.

For rope about, say, an inch to an inch and a half in diameter, spacers consisting of a single wire are regarded as satisfactory, the wire being preferably hard wire. In large ropes or cables, the spacers may consist of strands of wires 4', but to get the best re-

sults, these strands should be so formed that the friction between their outer surfaces and the surfaces of the outer and inner series of strands which form the rope will be less than the friction between the strands themselves. Where such spacer strands are employed, it will be found advantageous to cover them with a metallic covering so as to give it a smooth exterior. A strand of the character referred to is illustrated in Fig. 3, the coating being indicated at 5.

Practical experience has shown that owing to free movement of the strands under tension made possible by the introduction of the bearers or spacers, the efficiency of the rope is greatly improved and a higher percentage of aggregate wire strength is secured, with the result that the rope is more durable and stronger. Further, due to the free movement of the strands under tension on the spacers, the tendency of the rope to rotate is greatly decreased. The bearers preferably being of such character as to carry part of the load, the effective metal area of the rope is increased.

What is claimed is:

1. A wire rope comprising an inner series and an outer series of strands of helically wound wire, and a series of bearers arranged between contiguous surfaces of the strands of the outer and inner series, said bearers being laid up in the valleys between the strands of the inner series, whereby flexibility of the rope is increased and the friction due to relative movement of the strands during bending is reduced.

2. A wire rope comprising an inner and an outer series of helically wound wire strands, the outer series comprising twice as

many strands as the inner series and a series of bearers arranged between the series and lying in the valleys between the strands of the inner series, each bearer being in contact with two strands of each series.

3. A wire rope comprising an inner and outer series of helically wound wire strands and a series of bearers laid up in the valleys between the strands of the inner series, said bearers having a smooth surface as compared with the surface of the strands arranged between the contiguous surfaces of the strands of the outer and inner series.

4. A wire rope comprising an inner series and outer series of helically wound wire strands, the outer series comprising twice as many strands as the inner series, and a series of bearers having a smooth surface as compared with the surface of the strands and lying in the valleys between the strands of the inner series, each bearer being in contact with two strands of each series.

5. A wire rope comprising an inner and an outer series of helically wound wire strands, and a series of bearers consisting of smooth, hard wire arranged between contiguous surfaces of the strands of each series.

6. A wire rope comprising an inner and an outer series of helically wound wire strands, and a series of bearers consisting of smooth, hard wire arranged between contiguous surfaces of the strands of each series, said wire being in contact with two strands of each series.

In testimony whereof, I have hereunto set my hand.

NOBLE C. HARRISON.