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WIRE ROPES

Filed Nov. 18, 1960

FIG. 1

FIG. 2

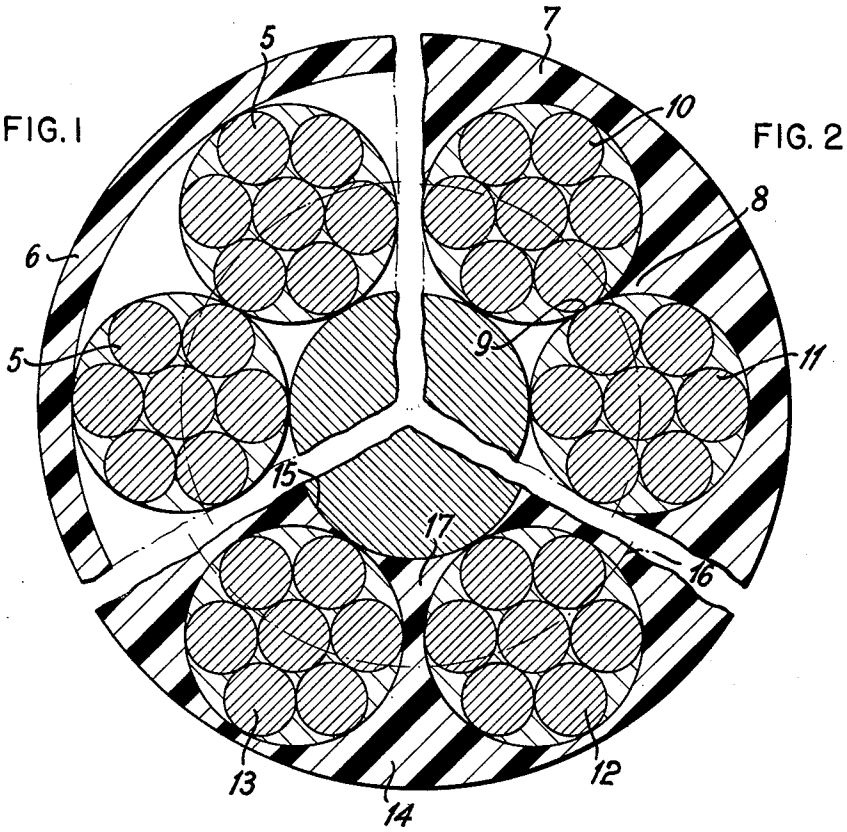

FIG. 3

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WIRE ROPES

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This invention relates to wire ropes having a plastic sheathing.

Wire ropes are sometimes covered with plastic, for example polyamide, in order to protect them against corrosion, chemical influences or the like. This step proves advantageous in cases where the loads on the rope are static, but it is completely unsuccessful when the rope is to perform moving work, i.e. when it travels over pulleys, because experience shows that the plastic sheathing then undergoes a large number of transverse fractures and breaks irregularly in a very short time. In addition, the sheathing has the peculiarity of widening out in the form of a basket and failing to return to its original form.

The invention relates to a wire rope comprising a core surrounded by a layer of wire elements which, in turn, are surrounded by a plastic sheathing. The aforesaid disadvantages are obviated in this rope by virtue of the fact that the elements of the outer layer define narrow gaps between them, and that the plastic sheathing has portions extending through the gaps into the region of the rope core supporting the outer elements, the inwardly extending sheathing portions constituting anchors holding the sheathing on the outer wire elements. Experience shows that with such an arrangement both detachment of the sheathing from the rope and cracks or fractures in the sheathing are absolutely avoided. By virtue of this protection, the rope is not only effectively protected against corrosion, but is also substantially freed from the very troublesome abrasion occurring in moving ropes. Finally, those portions of the plastic sheathing which project between the outer elements prevent lateral contact of the latter, so that no lateral crossover of the wires occurs even under heavy loads.

It is obvious that the plastics employed for the sheathing must be appropriately chosen in regard to hardness, tensile strength, bending strength and the like and must be adapted to the particular purpose of use.

The underlying idea of the invention is illustrated by way of example in the drawing, in which FIGURES 1, 2 and 3 respectively show three rope cross-sections as compared with the prior art.

It is known to dispose a smooth flexible plastic tube **6** around the outer strands **5** as illustrated in FIGURE 1. Since this tube does not form an integral unit with the rope, it is destroyed in a short time by the work of the rope. This is not changed even if the plastic sheathing **7** is formed with wedge-shaped portions **8** extending substantially as far as the points of contact **9** between the adjacent strands **10, 11** as illustrated in FIGURE 2, since in this case also lifting of the sheathing from the rope cannot be prevented.

In contradistinction thereto, FIGURE 3 illustrates the invention as applied to a stranded spiral rope. The outer strands **12, 13** are here disposed at some distance apart, so that the plastic of the sheathing **14** can penetrate as far as the rope core **15**, and in any case beyond the centre circle **16** of the outer strands. Dovetail-like anchor portions **17** are thereby formed, which unyieldingly anchor the jacket and thus ensure that the rope structure and the sheathing are rigidly held together.

While it is generally sufficient to introduce the plastic between the outer elements of the rope, it would naturally also be possible to cause the material of the sheathing to

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penetrate even more deeply, so that it also reaches between elements of the rope core, for example between the strands of an inner stranded layer.

It is immaterial for the practical application of the invention how the rope to be covered is designed. However, the invention is primarily applicable to stranded spiral ropes in which, as in FIGURE 3, an outer layer of strands is twisted over a core, for example one consisting of an actual core element and an inner layer of strands.

The lateral spacing between the outer elements, which renders possible the penetration of the thermoplastic material can readily be ensured by means known in the rope technique, more especially in the case of rope constructions such as the Seale type in which inner and outer strands lie in a parallel lay, so that the outer strands are embedded in the gaps between adjacent inner strands. If it is desired to direct the plastic also to the inner strands, these will preferably be made, for example, of thicker wires in order to make them more permeable.

The invention at the same time affords an advantageous possibility of providing wire ropes with a colouring for identification purposes by colouring the plastic sheathing in the desired manner. For technical reasons, it may be desirable to effect such colouring, for example in order to determine the age, the extent of the wear and the purpose of use of a rope. Heretofore, this has not been possible because paint becomes entirely or partially detached from the metal of the rope, more especially by abrasion, while the coloured synthetic sheathing according to the invention adheres firmly.

What I claim is:

1. A wire rope comprising, in combination, a rope core, a layer of outer wire elements twisted about, and directly supported on, the core, the outer wire elements being of substantially circular cross section and defining circumferentially spaced and radially extending gaps therebetween, the gaps widening in a radial direction from a narrow center portion, and a plastic sheathing surrounding the layer of outer wire elements, the plastic sheathing having portions extending through the gaps and radially inwardly beyond their narrow portions, the inwardly extending sheathing portions constituting anchors holding the sheathing on the outer wire elements.

2. The wire rope of claim 1, wherein the plastic sheathing is colored.

3. A wire rope comprising, in combination, a rope core, a layer of outer wire elements directly supported on the core, and constituted by wire strands spirally twisted about the core, the outer wire elements being of substantially circular cross section and defining circumferentially spaced and radially extending gaps therebetween, the gaps widening in a radial direction from a narrow center portion, and a plastic sheathing surrounding the layer of outer wire elements, the plastic sheathing having portions extending through the gaps and radially inwardly beyond their narrow portions, the inwardly extending sheathing portions constituting anchors holding the sheathing on the outer wire elements.

4. A wire rope comprising, in combination, a rope core, a layer of outer wire elements twisted about, and directly supported on, the core, the outer wire elements being of substantially circular cross section and defining circumferentially spaced and radially extending gaps therebetween, the gaps widening in a radial direction from a narrow center portion, and a plastic sheathing surrounding the layer of outer wire elements, the plastic sheathing having portions extending through the gaps and radially inwardly beyond their narrow portions, the inwardly ex-

tending sheathing portions constituting anchors of dovetailed cross section and reaching to the rope core.

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