

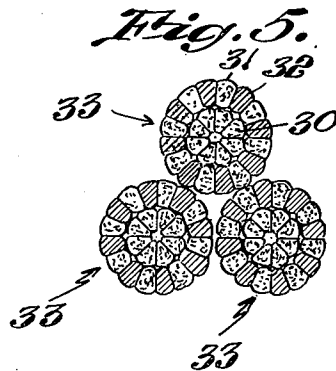
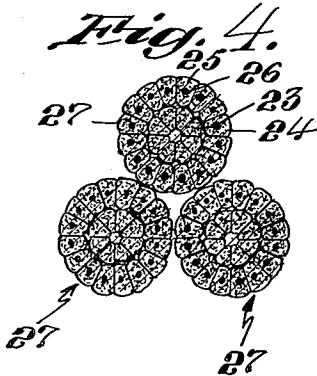
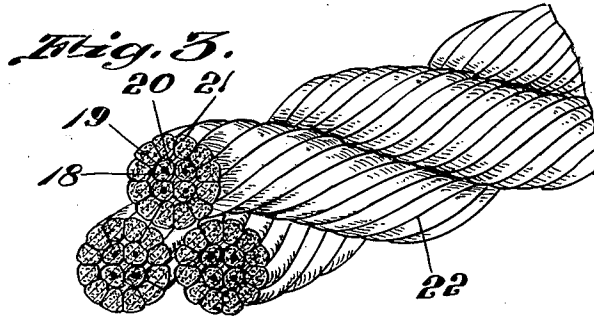
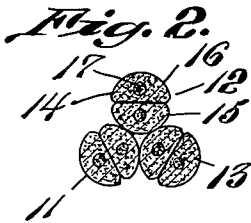
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ROPE COMPOSED OF NATURAL AND SYNTHETIC FIBERS

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ROPE COMPOSED OF NATURAL AND
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This invention relates to rope, particularly that type which is composed of both natural and synthetic fibers.

Although rope has heretofore been made of both natural and synthetic fibers, the bulk of the rope which is in use today is made wholly of natural fibers. These fibers tend to rot due to exposure and when in marine use, such as on lobster pots, are exposed to marine organisms and many times the strength of the rope is such that it is insufficient to pull the lobster pot to the surface and the lobster pot is, accordingly, lost. In other outdoor uses, such as tree climbing and the like, where life is at stake a certain safety factor must be provided in any rope in use and where abrasion has occurred, the rope must be discarded as a safety precaution before much of the rope has been used.

One of the objects in this invention is to strengthen the rope in such a way that the natural fibers take the brunt of the wear to which the rope is subjected but after these fibers become weakened or the tension is so great that there is a slipping of the fibers one on the other beyond the point where the fibers will safely hold together, to then have a reenforcement of the rope become effective so that even though the natural fibers have become weakened the rope is still usable or a safety factor is provided where life or property is at stake.

Another object of this invention is to permit the use of less expensive natural fibers and yet retain in the rope the safety feature of relatively high breaking strength after severe use.

More specifically, an object of the invention is to introduce into a strand of the rope a fiber which will be stronger than the natural fibers and yet one which will be more elastic than the natural fibers which make up the bulk of the rope so that it will not perform its function until the rope stretches beyond its usual safe elasticity, whereupon the stronger fibers will come into play and by taking a share of the load will strengthen the rope at this point so that it regains to a large extent the strength which it had.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a plan view of a short section of the rope showing three strands with a core within these strands;

Figure 2 is a section on line 2—2 of Figure 1;

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Figure 3 is a perspective view showing a modified form of rope;

Figure 4 is a sectional view showing a still different modification; and

Figure 5 is a sectional view showing a still different modified form.

The rope which is the subject of this invention is formed generally in the same manner that a rope of all natural fibers is formed, but I lay in with the natural fibers either as a core about which the natural fibers may be twisted or as a group of fibers twisted with the natural fibers, stronger fibers which are synthetic fibers which will be handled in the same manner as the natural fibers so far as twisting and processing of the rope is concerned but these synthetic fibers will have a greater elasticity than the twisted natural fibers so that as tension is applied upon the rope the natural fibers will take the brunt of the strain which is applied to the rope and will serve to support the tension which is applied to the rope until they become so weakened either by rot, abrasion, cuts, or exposure to mild acids that the tension will cause a parting of the natural fibers at the point of such damage to the fibers and as this elongation occurs, the limit of elasticity of the synthetic fibers will be reached and these synthetic fibers will begin to support the strain or tension which is applied to the rope so that even after the rope starts to elongate due to damage, it is reenforced at the damaged point by synthetic fibers before it has become dangerously weakened, and thus the rope is capable of operating in its intended manner to support the tension applied throughout an added period. The stronger fibers which at present are synthetic fibers which are utilized are of a character to resist the action of the elements which tend to weaken the natural fibers and thus are not subjected to this weakening action.

With reference to the drawings, 10 designates generally a rope formed of a plurality of strands 11, 12 and 13 which are similarly formed and each strand comprises two threads 14 and 15 which have natural fibers 16 twisted about a core of the stronger or synthetic fibers 17.

The natural fibers may be manila or sisal, while the core will be of a stronger material having greater elasticity than the natural fibers such as synthetic fibers, more specifically one of the polyamides of the continuous filament type such, for example, as nylon or a copolymer of vinyl chloride or vinyl acetate. These synthetic fibers while somewhat more expensive than the natural fibers are not weakened by rot or mild acids or

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certain other elements to which the rope may be subjected. As shown in Figure 2, the natural fibers 16 are spun about the synthetic fibers 17 as a core and then the threads 15 and 16 so formed are twisted together to form one of the strands which is in turn twisted to form the rope 10. The natural fibers are twisted to an extent so that they will normally take the load as the core 17 being somewhat elastic will stretch. However, as soon as the fibers partially part, then the core will have reached the limit of its small elasticity and will take a full share of the load and will strengthen the rope at this point.

In Figure 3 I have illustrated four parallel threads 18 formed the same as the threads 14 or 15 with a synthetic core 19 and natural fibers 20 twisted about the core, these four threads serving as a core for threads of natural fibers 21 to be twisted about them to form strands 22, three of which are twisted together as shown in Figure 3.

In Figure 4 there is illustrated eight natural fiber threads 23 forming a core, while threads 24 having natural fibers 25 twisted about a synthetic fiber core 26 are twisted about the eight threads 23 as a core, the whole forming a strand 27, three of which such strands 27 are twisted together to form the rope.

In Figure 5 a still different form is provided where there is a core of eight threads of natural fiber 30 surrounded by twisted threads 31 of natural fibers and 32 of synthetic fibers, the whole forming a strand 33 and three of such strands 33 are twisted together to form the rope.

In each of these instances the synthetic fiber has a modulus of elasticity sufficient so that the natural fibers will be subjected to the tension placed upon the rope first, and while the synthetic fibers will partly support this load, their elasticity is much greater than the other fibers and, therefore, they do not support it as do the natural fibers until the point has been reached where the load causes partial parting of the nat-

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ural fibers or rope elongation, possibly due to a weakening or damage of the natural fibers, whereupon the limit of elasticity of the synthetic fibers will then soon be reached and these synthetic fibers being stronger than the natural fibers will assume their share of the load and will support a tension on the rope so as to again provide a rope which will be of a desired strength as a safety factor for saving property or life.

I claim:

1. In a rope, a plurality of at least three strands laid together with each strand comprising at least two yarns twisted together, said strands being formed of natural and synthetic fibers twisted together, said natural fibers predominating and said synthetic fibers being of greater elasticity than the natural fibers in an amount to take strain only after partial parting of the natural fibers to a predetermined point whereby to strengthen the strand after the synthetic fibers begin to bear load.

2. In a rope as in claim 1 wherein the synthetic fibers are of a greater tensile strength than the natural fibers.

3. In a rope as in claim 1 wherein the synthetic fibers are encased by the natural fibers.

4. In a rope as in claim 1 wherein synthetic fibers form a core about which the natural fibers are twisted.

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