

March 23, 1937.

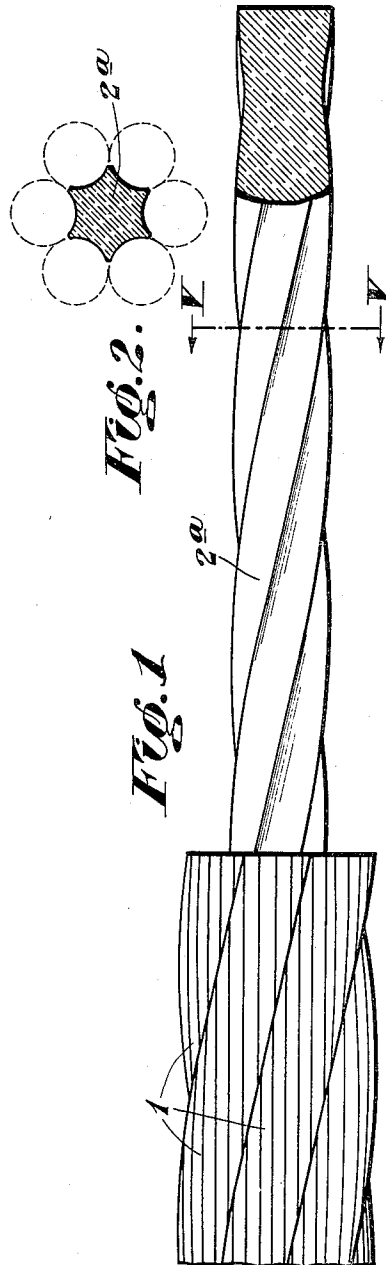
F. C. CARSTARPHEN

2,074,956

WIRE ROPE

Filed Sept. 13, 1935

3 Sheets-Sheet 1



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March 23, 1937.

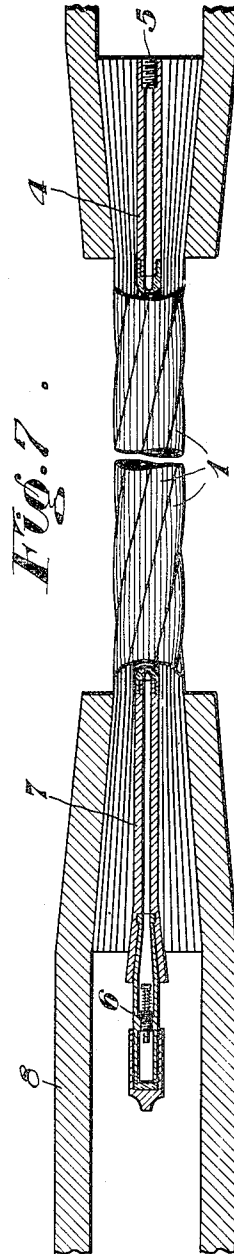
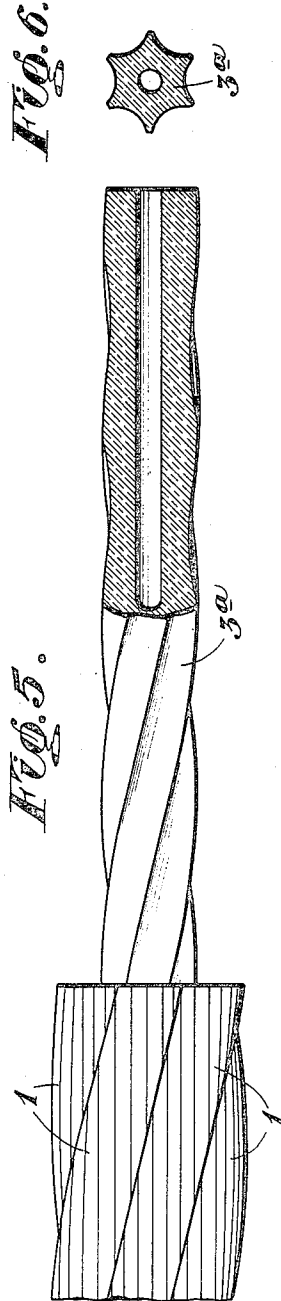
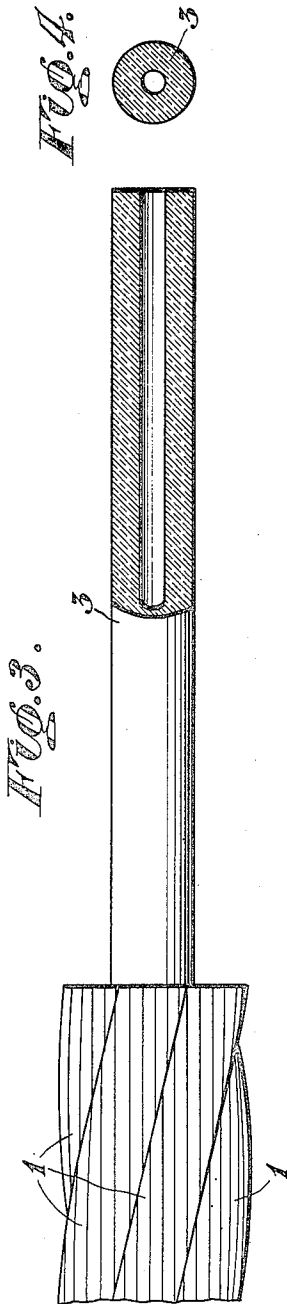
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WIRE ROPE

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3 Sheets-Sheet 2



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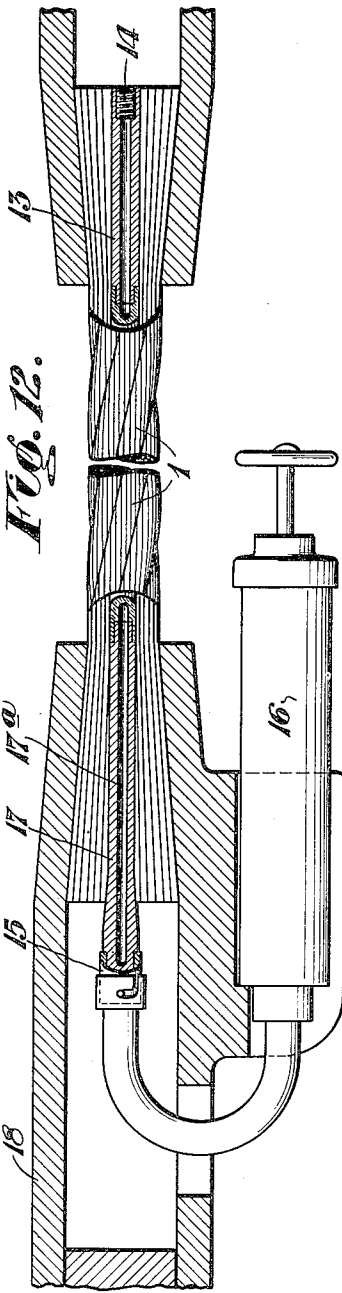
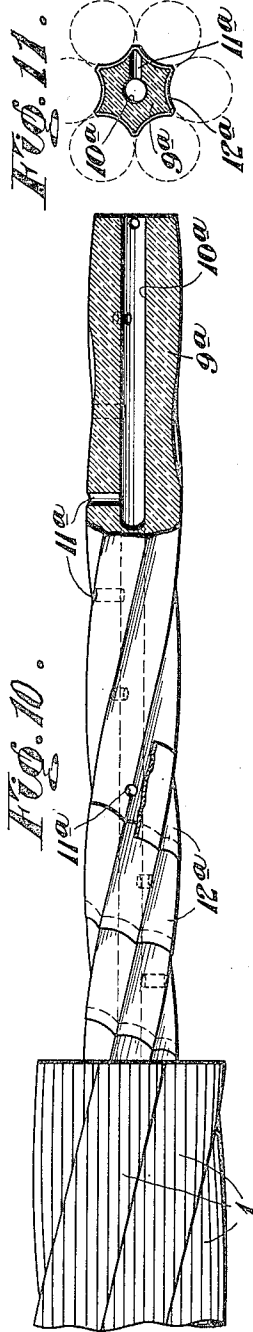
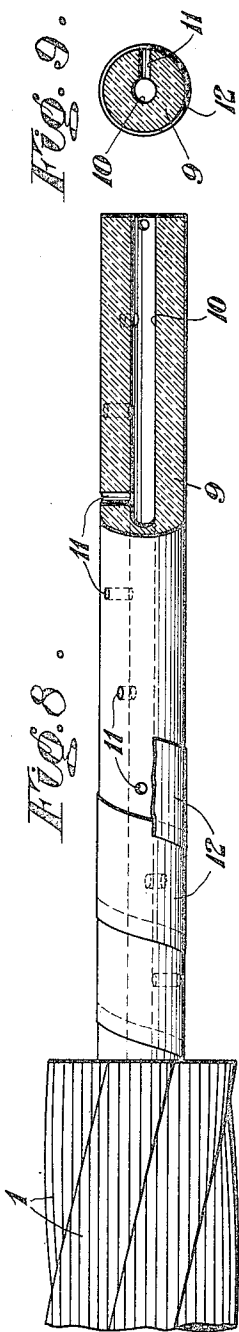
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WIRE ROPE

Filed Sept. 13, 1935

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,074,956

WIRE ROPE

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Application September 13, 1935, Serial No. 40,491

16 Claims. (Cl. 117—53)

This invention relates to wire ropes, one of the objects being to construct a wire rope so that an applied load is shared by its various strands more equally than is usual, particularly when the rope is bent around a sheave or subjected to lateral compression. Another object is to construct a wire rope so that the above feature is preserved and, in addition, so that its strands may be easily supplied with a lubricant whereby its flexibility is increased and its service life lengthened. Other objects may be inferred.

Referring to the accompanying drawings:

Figure 1 shows a modification of this example.

Figure 2 is a cross-section from the line V—V in Figure 1.

Figure 3 is a second example of a wire rope constructed in accordance with the present invention.

Figure 4 is an end view of an element in Figure 3.

Figure 5 is a modification of this second example.

Figure 6 is an end view of one of the elements shown by Figure 5.

Figure 7 shows this second example in use.

Figure 8 is a third example of a wire rope constructed in accordance with the present invention.

Figure 9 is an end view of an element shown by Figure 8.

Figure 10 is a modification of this third example.

Figure 11 is an end view of an element shown by Figure 10.

Figure 12 shows this third example in use.

The first example of the wire rope includes strands 1 of intertwisted wires helically laid over a core 2 that is elastic in all directions. This core 2 may be made of an inherently elastic material, such as natural or synthetic rubber or compounds of these, and is of such form that it provides a firm support for the strands 1 without being compressed into and between the interstices of the latter to such an extent as to form what might be termed a substantially unified structure.

It may be said that the strands 1 are actually riding on the rubber core 2, the latter retaining a sufficient amount of its inherent elasticity to permit relative lateral displacement of the strands 1 while continuously urging them towards their proper relative positions.

Another way of describing this rope is by saying that the diameter of the elastic core 2 is

sufficiently small as compared to those of the strands so that it is not compressed by the latter to any material extent. In case the core 2 is made materially larger, it is necessary to compress it greatly in order to close the strands in the making of the rope. Such undue compression robs the core 2 of all or most of its elasticity, even though it may be made of an inherently elastic material.

In the modification of this example, the strands of intertwisted wires 1 are laid over a core 2^a made of elastic material, the latter being distinguished from the core previously described in that it is formed with helical grooves in its surface into which the strands 1 are fitted. This core is made with just about the right diameter to fill the core space between the strands 1. Therefore, it is normally in an unstressed condition and possesses its full elasticity. It is apparent that the strands are not joined into a unified structure but, instead, actually ride on a rubber roadbed which is not compressed except when the strands leave their normal positions.

The second example of a wire rope constructed in accordance with the present invention includes strands of intertwisted wires 1 helically laid over a hollow core 3 made of elastic material. In the modification of this example a hollow core 3^a having helical grooves formed in its surface is used, the strands 1 being laid in these helical grooves. Except for their hollowness, the cores 3 and 3^a are constructed in the same manner as are the cores 2 and 2^a.

In this second example, the hollow cores 3 or 3^a are filled with a compressed gas. For this purpose, one end of the rope is provided with a hollow metal tube 4 in which a plug 5 is inserted, whereby this end of the rope is closed. The other end of the rope is provided with a valved inlet 6 which includes a rigid non-collapsible shank 7 having a bore communicating with the inside of either the core 3 or 3^a, depending upon which may be used. This shank extends longitudinally into the rope from the exterior of the latter's end, and is of sufficient length to permit the application of a socketing member 8 without danger of the latter closing communication to the inside of the hollow core. The valve in the inlet 6 may be of any construction, such as an ordinary pneumatic tire valve.

The third example of a wire rope constructed in accordance with the present invention includes strands 1 of intertwisted wires laid over a core 9 made of an elastic material and having

an axial bore 10 adapted to receive a lubricant, and radial ducts 11 opening from this bore to its surface at spaced positions registering with the interstices between at least two of the strands 1. This core 9 is covered with tape 12 made of a material tending to retard the extrusion of lubricant through the ducts 11. In the modification of this third example, the features are generally similar to those described above, excepting that the core is preformed with helical grooves in its surface. Since the construction and function of the various elements are otherwise the same, it is not believed necessary to specifically describe them again, similar numbers being used in the views showing this modification excepting that the exponent *a* has been added.

This third example of the invention is further characterized by having its core closed at one end, as by means of a bored shank 13 provided with a plug 14, and by being provided at its other end with a fitting 15 for receiving a fluid or semi-fluid lubricant which may be injected into the bore 10 or 10^a by means of a gun 16. This fitting 15 includes a rigid non-collapsible shank 17 having a bore 17^a communicating with the bore 10 or 10^a of whichever core may be used within the rope. This shank extends longitudinally into the rope from the exterior of the latter's end and is of sufficient length to prevent closing of the bore in the core when a socketing member 18 is used.

The diameter and general form of the cores used in this third example of the invention are generally similar to those of the cores already described. The bore 10 or 10^a should be sufficiently small as compared to the diameters of the cores so that the latter possess a great proportion of the elasticity they would have if solid. It should be noted that in the case of the core shown by Figure 10 the ducts 11^a open into at least one of the ridges between the grooves in the core's surface at spaced positions. In the case of either of the cores shown, these ducts serve to eject lubricant onto the surface of the core whereby the rope strands not only ride on rubber but ride on lubricated rubber, whereby their ability to seek positions where their lengths are equalized is further enhanced. The tape 12 or 12^a is used to prevent too free an extrusion of lubricant from the ducts 11 or 11^a. Furthermore, it functions to aid in the distribution of the lubricant over the entire surfaces of the cores.

As previously mentioned, the elastic material from which all of the cores are made may be of natural or synthetic rubber compound. Preferably, it should be a compound that is resistant to the action of lubricants which are ordinarily used on wire ropes, and other oils which might be encountered when the ropes are subject to service conditions.

Although specific examples of the invention have been disclosed in accordance with the patent statutes, it is not intended to limit their scope exactly thereto, except as defined in the following claims.

I claim:

1. A wire rope including strands of inter-twisted wires helically laid over a core made of elastic material, said core having preformed helical grooves in its surface into which said strands are fitted.

2. A wire rope including strands of inter-twisted wires helically laid over a rubber core

having preformed helical grooves in its surface into which said strands are fitted and which is of such diameter that it is not compressed by said strands to any great extent.

3. A wire rope including strands of inter-twisted wires helically laid over a hollow core made of elastic material having preformed grooves.

4. A wire rope including strands of inter-twisted wires helically laid over a hollow core made of elastic material, said core being filled with a compressed gas.

5. A wire rope including strands of inter-twisted wires helically laid over a core made of elastic material, said core having an axial bore adapted to receive lubricant and radial ducts opening from said bore to its surface.

6. A wire rope including strands of inter-twisted wires helically laid over a core made of elastic material, said core having an axial bore adapted to receive lubricant and radial ducts opening from said bore to its surface at positions registering with the interstices between at least two of said strands.

7. A wire rope including strands of inter-twisted wires helically laid over a core made of elastic material, said core having an axial bore adapted to receive lubricant and radial ducts opening from said bore to its surface, the latter being covered with a material tending to retard the extrusion of lubricant through said ducts.

8. A wire rope including strands of inter-twisted wires helically laid over a core made of elastic material, said core having an axial bore adapted to receive lubricant and radial ducts opening from said bore to its surface, the latter being covered with tape made of a material tending to retard the extrusion of lubricant through said ducts.

9. A wire rope including strands of inter-twisted wires helically laid over a hollow core made of elastic material, said core being provided with a closure at one end of said rope and with a valved inlet at the other end of said rope.

10. A wire rope including strands of inter-twisted wires helically laid over a hollow core made of elastic material, said core being provided with a closure at one end of said rope and with a valved inlet at the other end of said rope, said inlet including a rigid non-collapsible shank having a bore communicating with the inside of said core and extending longitudinally into said rope from the exterior of the latter's end.

11. A wire rope including strands of inter-twisted wires helically laid over a core made of elastic material and having an axial bore with radial ducts opening therefrom to its surface, said core having its bore closed at one end of said rope and being provided at its other end with a fitting for receiving fluid or semi-fluid lubricant.

12. A wire rope including strands of inter-twisted wires helically laid over a core made of elastic material and having an axial bore with radial ducts opening therefrom to its surface, said core having its bore closed at one end of said rope and being provided at its other end with a fitting for receiving fluid or semi-fluid lubricant, said fitting including a rigid non-collapsible shank having a bore communicating with the bore in said core and extending longitudinally into said rope from the exterior of the latter's end.

13. A wire rope including strands of inter-twisted wires helically laid over a core made of elastic material, said core having an axial bore

adapted to receive lubricant and radial ducts opening from said bore to its surface, said ducts being helically aligned longitudinally along said core.

5 14. A wire rope including strands of inter-
twisted wires helically laid over a core made of
elastic material, said core having an axial bore
adapted to receive lubricant and radial ducts
opening from said bore to its surface, said ducts
10 being helically aligned longitudinally along said
core and the latter being covered with a material
of a character which retards the free flow of lu-
bricant from said ducts and which tends to dis-
tribute it over the entire surface of said core.

15 15. A wire rope including strands of inter-
twisted wires helically laid over a hollow rub-
ber core having helical grooves formed in its sur-

face into which said strands are fitted, and said
core being provided with a closing means at one
end of said rope and with a valved inlet at the
other end of said rope.

16. A wire rope including strands of inter- 5
twisted wires helically laid over a rubber core
having helical grooves formed in its surface into
which said strands are fitted and an axial bore
from which extend radial ducts opening into at
least one of the ridges between said helical 10
grooves at spaced positions, said core being pro-
vided with a closing means at one end of said
rope and with a fitting for receiving lubricant at
the other end of said rope, and being covered with
a material of a character which retards the free 15
flow of lubricant from said ducts.

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