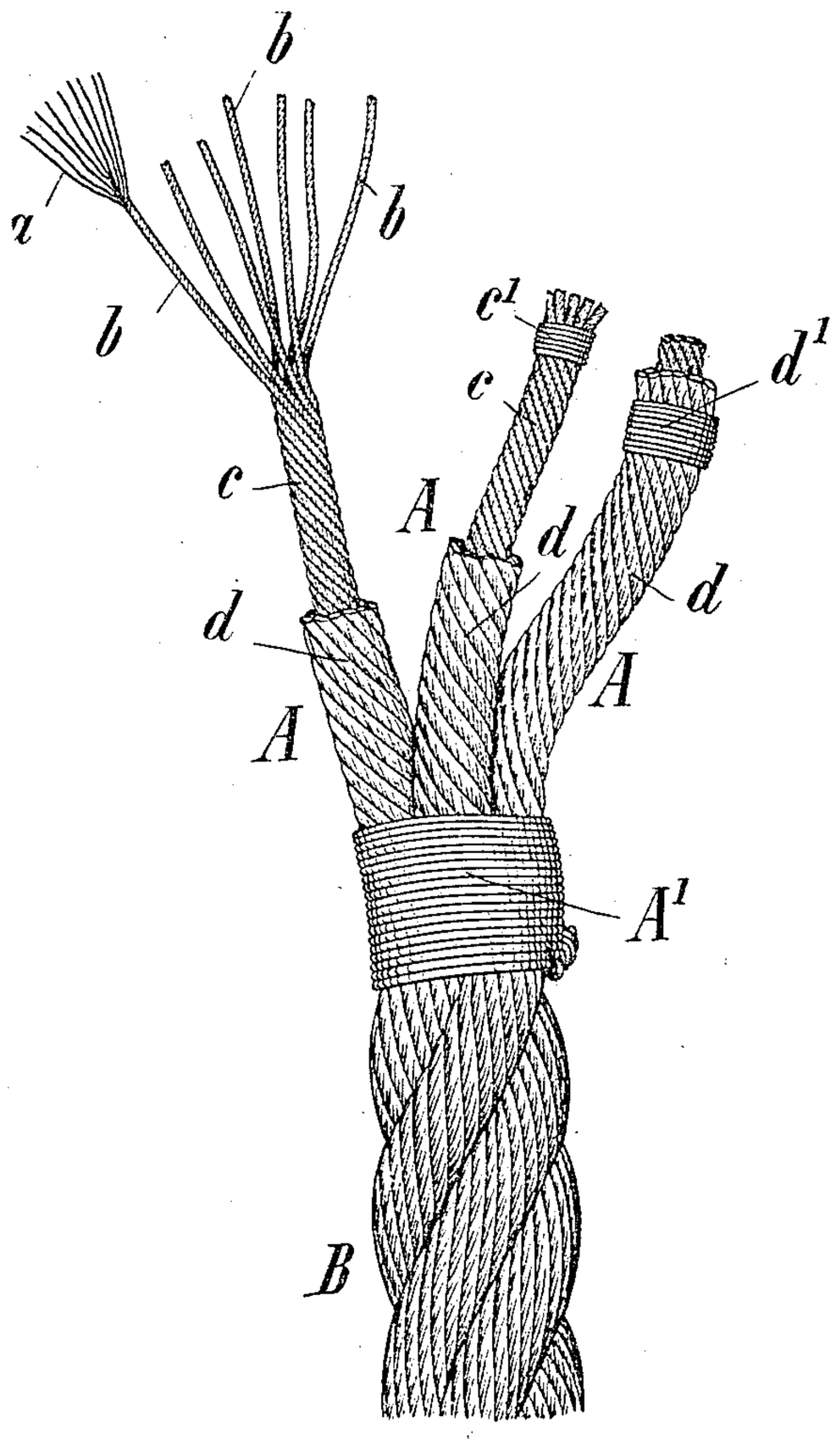
No. 825,748. PATENTED JULY 10, 1906.

C. W. H. MÜHLSTEPHAN, Jr.

HAWSER.

APPLICATION FILED AUG. 7, 1905.



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No. 825,748. Specification of Letters Patent. Patented July 10, 1906.

Application filed August 7, 1905. Serial No. 273,153.

To all whom it may concern:

Be it known that I, CARL WILHELM HEINRICH MÜHLSTEPHAN, Jr., a subject of the German Emperor, and a resident of Magdeburg, Germany, have invented certain new and useful Improvements in Hawsers and the Like, of which the following is a specification.

The object of the present invention is a cable-laid three-stranded compound hawser without core, each strand being formed of steel wire and hemp threads, (cable-yarn,) the said hawser mainly intended for use as a tow-rope or for other maritime uses. As is known, the hempen ropes and cables hitherto employed for this purpose are now being displaced to an increasing extent by steel-wire ropes and cables, and this for various reasons. In spite of all advantages, however, steel-wire tow-lines present the defect of lack of extension in the direction of their length. To this fact the frequent rupture of even very large tow-lines is attributable.

If one ship is towing another in a rough sea by means of an ordinary steel cable, this latter will of course be subjected to widely-varying strains, as sometimes the cable may be quite slack and at other times strained to the utmost. These strains occurring in towing as a result of winds, waves, steering, or the like, which are usually very sudden and severe, generally result in rupture or snapping of wire cables, because they are unable to stretch sufficiently in the longitudinal direction—that is to say, to take the strain yieldingly, and thereby diminish its effect.

The purpose of the present invention is to obviate the defect referred to, and this object is attained by forming a cable-laid compound tow-line or hawser of steel wire and hemp or other vegetable fibers (yarns) comprising three strands or members and without core, the separate strands of which consist of wire ropes composed of a number of strands which are incased in hempen or other vegetable fibers. Compound ropes of this kind combine the advantages of wire cables with those of hempen cables—that is to say, while they present great strength they are sufficiently yielding or elastic.

The invention is illustrated in the accompanying drawing, a portion of a compound tow-line formed in accordance therewith being shown in elevation. The ends of the members are shown separate and partially freed from the hempen casing, the wire strands and their separate wires being partly unraveled in order to better illustrate the method of manufacture.

As shown by the drawing, which is given by way of example only, a number of separate wires *a* are first of all formed into strands *b* without a hemp core. A number of such strands (seven, for example) are then laid without a hemp core, so as to form massive wire ropes *c*, which are secured from untwisting by means of seizings *c'*. These massive wire ropes *c* are then spirally incased with a layer, or preferably a double layer, of tarred hemp yarn (cable-yarn) *d* to form strands A. Finally three such strands A are formed by circular laying without the use of a core into a compound cable or hawser B. The wire seizing A' (shown upon the cable in the drawing) prevents the untwisting of the cable B. The novel compound cable or hawser B is therefore a three-stranded hawser of long-drawn and spiral-cable lay without a core, and each strand or member A of this hawser B is a massive wire rope *c* of the usual construction with hemp or the like casing *d*, the separate hemp yarns lying in the known arrangement of a single-laid hempen tow-rope—that is to say, spirally around the wire rope. The entire advantage of this compound tow rope or hawser as compared with those of ordinary construction is obtained by the cable-yarn casing *d* of the wire ropes *c* and the absence of the cores. While in ordinary wire ropes the separate strands are laid closely together—that is to say, lie closely in or against each other—so that any extension of the wire rope is practically impossible, the present hawser will extend under heavy strains, because the wire ropes *c* compress the intermediate elastic hemp layers *d*, which thus give lengthwise, so that the hawser as a whole presents a certain elasticity in the direction of its length. A further advantage of the novel hawser is due to the fact that the finer wires *a* of the wire strands *b* and wire ropes *c* are effectively protected by the cable-yarn casing *d* from injury and from the action of the weather and sea-water. In addition to its great strength, however, the flexibility of the novel hawser is also very much greater owing to the arrangement adopted and the combination of wire ropes and hemp yarn.

If a hawser constructed in accordance with

the present invention is used for towing a ship, it will stretch according to the amount and duration of the strain, as the hempen casings which are thereby compressed to a greater or less extent permit of this. Sudden strains are therefore taken up elastically and are correspondingly weakened. If the strain diminishes, the hawser shortens or contracts in consequence of the spiral laying of the wire ropes and the giving of the hemp-yarn casing—that is to say, as a result of the longitudinal elasticity back to its original length.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A three-stranded compound hawser cable laid without core, the separate strands of which are composed of multistranded coreless wire ropes, each strand of said hawser being provided with a hollow-laid sheath of vegetable fibers surrounding the strand, substantially as and for the purpose set forth.

2. A three-stranded compound hawser cable laid without core, composed of three solid-wire ropes laid without a hempen core, each solid-wire rope being composed of a plurality of wire strands laid together without a hempen core, each wire strand being composed of a plurality of wires twisted together, and each of the said three solid-wire ropes being provided with a wrapping of a large number of hempen cable-yarns laid up left handed into a hollow strand around the said solid-wire rope, substantially as and for the purpose set forth.

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