

A WINCH SPOOLER

FIELD OF INVENTION

The present invention relates to a winch and particularly although not solely to
5 a winch for unwinding and winding of a cable, a wire, a rope or the like without
twisting or tangle.

BACKGROUND

Many winches for spooling and despooling of a cable, a wire, a rope or the like
10 (referred to hereinafter as a cable, for simplicity) are known. Commonly used winches
comprise a spool onto which the cable is wound. The cable is either wound on the
spool or is released from the spool when the spool rotates. Unwinding or despooling of
the cable is controlled either manually by rotating or braking the spool or by using
electrical or mechanical means to aid in rotating the spool. In some cases, especially in
15 marine operations, the cable is stiff and the free end of the cable is light. Unwinding
the spool may release or despool the cable proximate the spool whilst the free end of
the cable does not move out. To avoid this problem, the free end of the cable may be
provided with a load or a weight sufficient to provide tension. As the spool unwinds
the cable, the weight or load pulls the cable to ensure the cable remains taut. This
20 permits easy unwinding of the cable reducing the propensity of tangling of the cable
nearest the spool. However, attaching and detaching of the weight to the free end of
the cable is laborious and time consuming, and hence an undesirable step to be taking.

Hence, it is accordingly an object of the present invention to provide a winch
which addresses the abovementioned disadvantages or which will at least provide the
25 public with a useful choice.

BRIEF DESCRIPTION OF THE INVENTION

Accordingly in a first aspect the present invention consists in a winch including
a spool rotatably mounted about an axis of rotation to a fixed structure, said
30 including a spool core presented to receive thereabout a flexible elongate member to

be wound and unwound to and from said spool core, said spool core being terminated by end members disposed at axially separated locations to said spool core and defining with said spool core, a spooling zone where said flexible elongate member is capable of spooled,

5 at least one pressure device including a spooled flexible elongate member contact surface movably disposed relative and radial to said axis of rotation, said contact surface extending in the direction of the axis of rotation and disposed to contact the outer surface of the spooled flexible elongate member.

 Preferably said contact surface extends parallel to the axis of rotation.

10 Preferably said contact surface is biased towards said spooled flexible elongate member by a biasing means.

 Preferably said biasing means is a spring.

 Preferably a plurality of biasing means act to bias said contact surface towards said spooled flexible elongate member.

15 Preferably said flexible elongate member is a cable.

 Preferably said flexible elongate member is a rope.

 Preferably said contact surface is provided by a contact roller which is rotationally supported to rotate about an axis of rotation parallel to said first mentioned axis of rotation.

20 Preferably said contact roller is supported in a rotatable manner by a support means of said pressure device, said support means being fixed relative to said fixed structure.

 Preferably said contact roller is supported in a rotatable manner by a support means of said pressure device, said support means being engaged to said fixed
25 structure.

 Preferably said contact roller is a cylindrical roller of a length so as to fit between the end members of said spool.

 Preferably said contact roller is mounted on an axle biased by a spring from said support means towards said spool.

30 Preferably there are at least two pressure devices disposed about said spool.

Preferably said pressure device(s) are provided to direct said bias towards said spool.

Preferably said bias is directed towards the first mentioned axis of rotation.

Preferably said bias is through said first mentioned axis of rotation.

5 Preferably said bias of at least one of said pressure devices is directed to the advance side of said first mentioned axis of rotation for the unspooling of said flexible elongate member.

Preferably there are at least two pressure devices disposed about said spool each spaced from each other about said spool.

10 Preferably there are at least two pressure devices disposed about said spool equi-spaced about said spool.

This invention may also be said broadly to consist in the parts, elements and features referred to or indicated in the specification of the application, individually or collectively, and any or all combinations of any two or more of said parts, elements or
15 features, and where specific integers are mentioned herein which have known equivalents in the art to which this invention relates, such known equivalents are deemed to be incorporated herein as if individually set forth.

BRIEF DESCRIPTION OF THE DRAWINGS

20 A preferred form of the present invention will now be described with reference to the accompanying drawings in which:-

Figure 1 is a side view of the winch system of the present invention,

Figure 2 is a plan view of the tensioner,

Figure 3 is a side view of the tensioner of Figure 2, and

25 Figure 4 is a plan view of a spool showing the positions of the winch and the tensioner when the cable is wound onto the spool.

DETAILED DESCRIPTION OF THE INVENTION

With reference to Figure 1, a winch 1 of the present invention includes a spool 2
30 for storing a cable 3. The spool 2 is of a type having a drum 4 for storing the cable and

a ridge or end plates 6 at each distal end of the drum. Preferably the drum is cylindrical. Each ridge is preferably a diameter bigger than the diameter of the cylindrical drum 4 such that the space intermediate the two ridges 6 and the cylindrical drum 4 will be sufficient to accommodate the cable 3 when the cable 3 is wound on the cylindrical drum 4. The spool 2 is rotationally driven about axis x-x by an electric or hydraulic motor (not shown) although it is envisaged that the spool 2 can also be operated manually when suited.

The spool 2 is mounted onto a fixed base structure 9 in a manner for rotation about the axis x-x substantially perpendicular to the fixed base structure. The fixed base structure 9 may be a fixed standing panel or a wall. When used in a vessel or a ship, the fixed structure 9 may be a side wall of a cabin. In an alternative form, the spool 2 may be mounted on a standing frame or the like for rotation about the axis x-x substantially parallel to the fixed structure.

As shown in figure 1, situated proximate the spool 2 is at least one pressure device 11. The pressure device 11 comprises a cable contacting member 12 and a mounting 16 having a base 17 and two side walls 18 for accommodating the cable contacting member 12. The cable contacting member 12 is preferably of a cylindrical drum 13 rotatably mounted with the mounting about axis y-y. The cable contacting member 12 is a length that is slightly smaller than the width of the drum 4 of the spool 2 so as to permit the pressure device 11 to be positioned intermediate the two ridges 6 of the spool 2 as shown in figure 4. When the pressure device 11 is in use, a portion of the cable contacting member 12 is in contact with the cable 3 that is wound on the spool. As the spool 2 rotates to wind or unwind the cable 3, the cable contacting member 12 rotates accordingly, on a rotational axis parallel to the axis of rotation of the spool.

The pressure device 11 also includes a plate 19 and at least one elongate bar 20 extending substantially perpendicular from the housing. In the preferred form, two spaced apart elongate bars 21 and 22 are used. The elongate bar having biasing means 23 coiling around a portion of the elongate bar 21 and 22.

The plate includes an aperture for receiving the elongate bar 3. The elongate bar 20 is positioned in a manner where the portion 26 of the elongate bar 20 with the biasing means 23 is disposed on one side of the plate 19 and the portion 27 without the biasing means is disposed on the other side of the plate 19. The distance A between
5 outer major surface 29 of the base 17 of the mounting 12 and the one side 30 of the plate 19 defines a distance A of compression/expansion of the biasing means 23. The constant biasing force from the biasing means 23 of the pressure device 11 against the cable coils causes the cable 3 to be laid flatly so that they are incapable of becoming entangled with one another when the spool 2 rotates to unwind the cable 3. The cable
10 becomes laid onto the spool supported coil of the cable in a side to side manner (save for when the full width of the spool is occupied by cable so that the next level is moved to by the cable).

The elongate bar 20, 21 and 22 is secured to the plate 19 by threaded nuts 33 provided on the outside of the plate 19.

15 The plate 19 also includes at least two apertures each for accommodating an adjustable stud 36. In the preferred form, at least two adjustable studs 36 are provided. The adjustable studs 36 are used for levelling the contacting member 12 on a surface onto which the contacting members are provided. The adjustable studs 36 are secured to the plate 19 by two washers 39, one provided on the one side of the plate 19 and the
20 other on the second side of the plate.

The studs are secured to a base 46.

As can be seen from figure 1, a plurality of pressure devices 11 can be used and preferably, three pressure devices 11 are used.

In the preferred form, a pulley 60 is provided and mounted onto the or a second
25 fixed structure. The second fixed structure may be a ceiling of the cabin or a structure that is built perpendicular to the first fixed structure. The pulley is positioned in a manner for rotation about an axis 90 substantially parallel to the axis of rotation of the spool when in use. In the most preferred form, the pulley is positioned diagonally above the spool.

Referring to figure 1, the winch preferably is also provided with a plurality of cable guides 51 for guiding the cable as it travels. At least two cable guides 51 are provided proximate the spool 2 and at least two 61 are provided proximate the pulley 60. Cable guides 51 stop the cable from jumping off the spool. They extend across the end plates of the spool. Cable guides 61 provide the same feature. One cable guide 63 is provided intermediate the spool 2 and the pulley 60, along a path upon which the cable 3 travels.

In an assembled configuration, the cable 3 extends from the spool 2 to over the upper half of the pulley 60 with the free end 71 of the cable 3 disposed away from path upon which the cable travels. The pressure device when in assembled configuration, is positioned as shown in Figure 4. A portion of the cable contacting member 12 of the pressure device 11 is in contact with the cable. In this position, the biasing means 23 is compressed and a bias is created by the biasing means.

In operation, once the motor is actuated, the spool rotates to unwind the cable. As the spool 2 rotates, the cable contacting member 12 of the pressure device 11 rotates accordingly. The constant biasing force from the biasing means 23 causes the pressure device 11 to apply a constant force against the cable 3 that is wound on the spool 2 even as the cable contacting member 12 of the pressure device 11 rotates. This constant force applied by the pressure device 11 to the cable 3 helps to retain the cable 3 in position while the rotational force from the rotation of the spool 2 continues to push the cable 3 out of the spool 2 upon unwinding of the cable 3. This avoids the possibility of having a despool of cable being released around the spool and being tangled or twisted during unwinding or despooling of the cable.

When the cable gradually moves out from the spool, the tension in the biasing means releases to push the cable contacting member 12 towards the next layer of the cable that is still wound on the spool. This action continues until desired cable is dispensed from the spool.

In a preferred form, the drum is of a diameter of 800mm (approximately 14 times of the diameter of the cable).

The cable is of a diameter of 58 mm. Each spring of the pressure device has a spring force of between 7 – 9 N/mm.

CLAIMS

1. A winch including
a spool rotatably mounted about an axis of rotation to a fixed structure, said
5 including a spool core presented to receive thereabout a flexible elongate member to
be wound and unwound to and from said spool core, said spool core being terminated
by end members disposed at axially separated locations to said spool core and defining
with said spool core, a spooling zone where said flexible elongate member is capable
of spooled,
10 at least one pressure device including a spooled flexible elongate member
contact surface movably disposed relative and radial to said axis of rotation, said
contact surface extending in the direction of the axis of rotation and disposed to
contact the outer surface of the spooled flexible elongate member.
2. A winch as claimed in claim 1 wherein said contact surface extends parallel to
15 the axis of rotation.
3. A winch as claimed in claim 1 or 2 wherein said contact surface is biased
towards said spooled flexible elongate member by a biasing means.
4. A winch as claimed in claim 3 wherein said biasing means is a spring.
5. A winch as claimed in claim 3 or 4 wherein a plurality of biasing means act to
20 bias said contact surface towards said spooled flexible elongate member.
6. A winch as claimed in any one of claims 1 to 5 wherein said flexible elongate
member is a cable.
7. A winch as claimed in any one of claims 1 to 5 wherein said flexible elongate
member is a rope.
- 25 8. A winch as claimed in any one of claims 1 to 7 wherein said contact surface is
provided by a contact roller which is rotationally supported to rotate about an axis of
rotation parallel to said first mentioned axis of rotation.
9. A winch as claimed in claim 8 wherein said contact roller is supported in a
rotatable manner by a support means of said pressure device, said support means being
30 fixed relative to said fixed structure.

10. A winch as claimed in claim 8 wherein said contact roller is supported in a rotatable manner by a support means of said pressure device, said support means being engaged to said fixed structure.

11. A winch as claimed in any one of claims 8 to 10 wherein said contact roller is a
5 cylindrical roller of a length so as to fit between the end members of said spool.

12. A winch as claimed in any one of claims 8 to 11 wherein said contact roller is mounted on an axle biased by a spring from said support means towards said spool.

13. A winch as claimed in any one of claims 1 to 12 wherein there are at least two pressure devices disposed about said spool.

10 14. A winch as claimed in any one of claims 1 to 13 wherein said pressure device(s) are provided to direct said bias towards said spool.

15. A winch as claimed in any one of claims 1 to 14 wherein said bias is directed towards the first mentioned axis of rotation.

16. A winch as claimed in any one of claims 1 to 15 wherein said bias is through
15 said first mentioned axis of rotation.

17. A winch as claimed in claim 13 wherein said bias of at least one of said pressure devices is directed to the advance side of said first mentioned axis of rotation for the un spooling of said flexible elongate member.

18. A winch as claimed in any one of claims 1 to 12 wherein there are at least two
20 pressure devices disposed about said spool each spaced from each other about said spool.

19. A winch as claimed in any one of claims 1 to 12 wherein there are at least two pressure devices disposed about said spool equi-spaced about said spool.