

July 22, 1947.

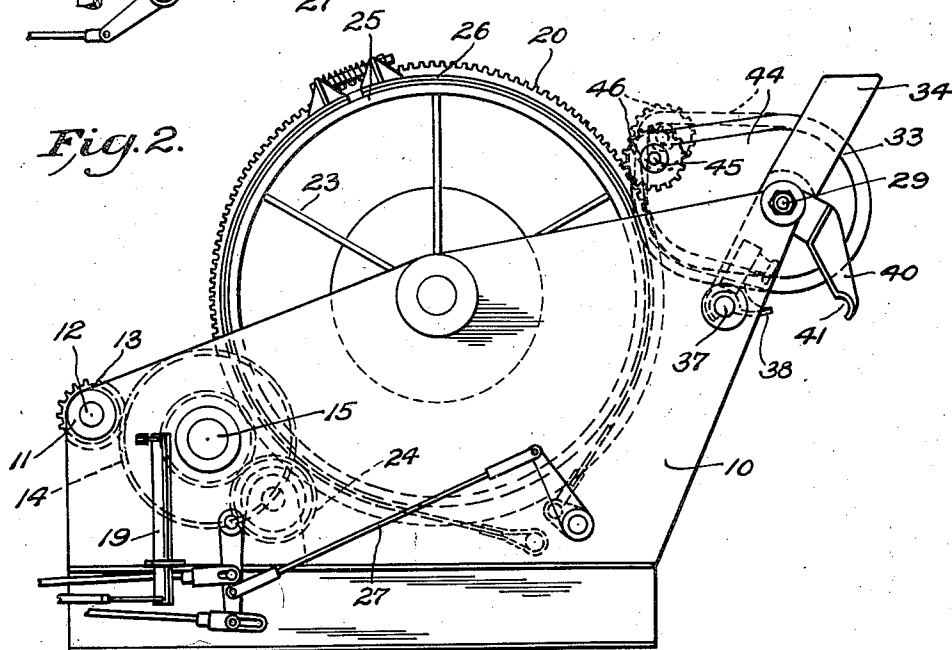
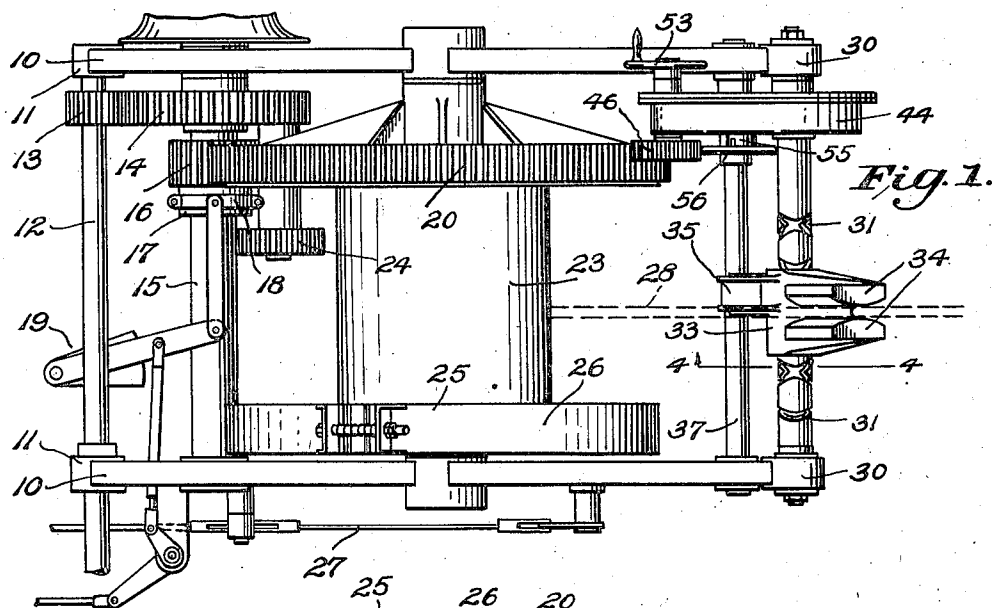
E. BARKER

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SPOOLING MECHANISM FOR CABLE WINCHES

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2 Sheets-Sheet 1



Inventor

Eugene Barker

By *H. D. McElwain*

Attorney

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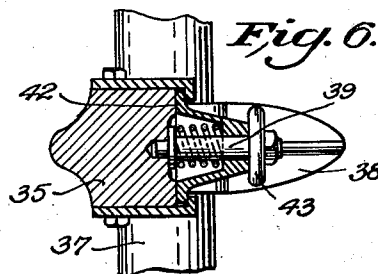
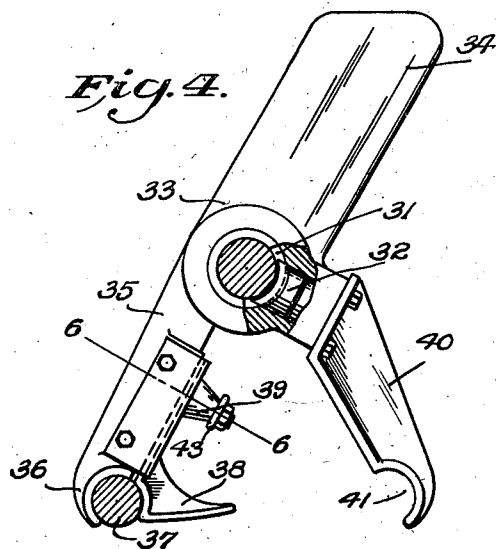
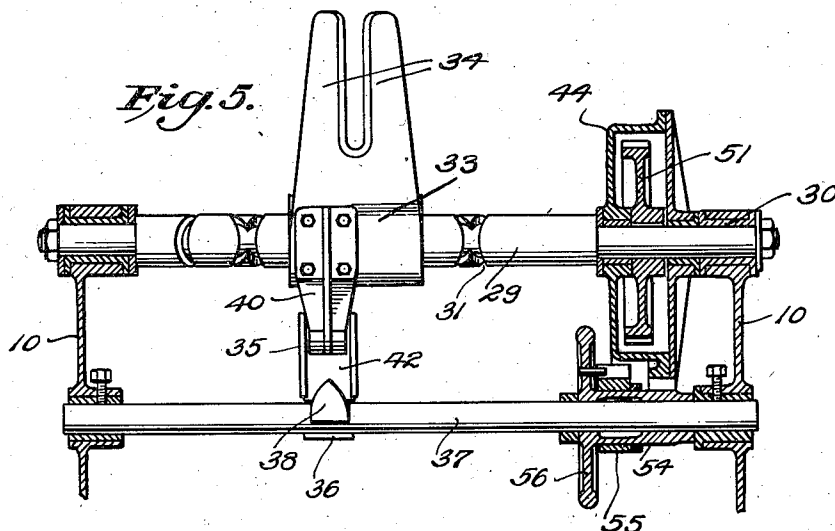
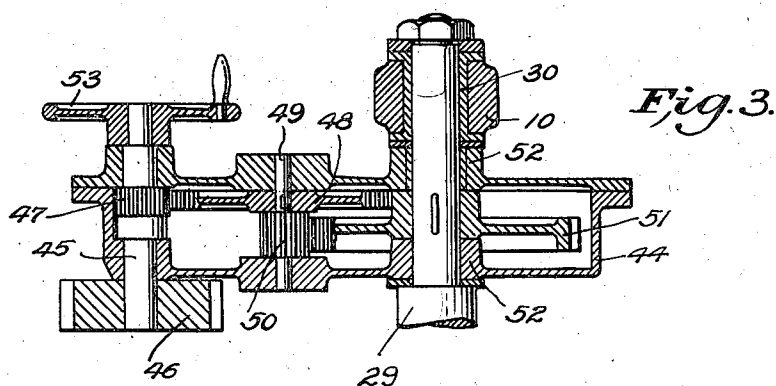
E. BARKER

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SPOOLING MECHANISM FOR CABLE WINCHES

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2 Sheets-Sheet 2



Inventor
Eugene Barker

By *W. S. McQuinn*

Attorney

UNITED STATES PATENT OFFICE

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SPOOLING MECHANISM FOR CABLE WINCHES

Eugene Barker, Columbus, Ohio, assignor to The Jaeger Machine Company, Columbus, Ohio, a corporation of Ohio

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2 Claims. (Cl. 242-158)

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This invention relates to winches and, more particularly, to power driven winches of the heavy duty type employed quite commonly on ships for raising and lowering anchors, towing purposes and various other capacities.

In the operation of such apparatus, it is important that the cable be properly guided as it is being wound about the power driven drum with which it is connected, so that the cable will spool in uniformly even and level windings on the drum.

Therefore, it is a general object of the invention to provide in connection with such winches a novel spooling guide for the associated cable, the guide being mounted for sliding movement on a threaded power driven shaft so that, as the drum is rotated to wind the cable thereabout, the guide will travel back and forth in a plane parallel with the cable drum of the winch, guiding the cable as it is being wrapped about the drum so that the same will wind flatly in a level manner on the drum precluding knotting or bunching of the cable during winding and unwinding operations thereof with respect to the drum.

It is another object of the invention to provide a level-winding mechanism for winch cables in which the cable guide is mounted for reciprocating movement on a frame carried rotatable supporting shaft, the latter having continuous intersecting right and left hand threads or grooves adapted for cooperation with the internally threaded shaft-receiving bore of the spooling guide so that, as the shaft is rotated, reciprocating movement back and forth across the face of the cable drum will be provided, thus training the cable so that it will wind flatly on the drum in a uniform manner.

It is another object of the invention to provide a cable spooling guide for winches in which the guide proper is rotatably mounted on a power driven reversely threaded shaft and wherein provision is made for turning the guide between an upright active position adapted for the reception of the associated cable, and a lowered inactive position in which the guide is positioned so that it is out of engagement with said cable and does not contact the same, whereby when the cable is paid out rapidly from the drum, and moves at a high linear rate of speed, as in the lowering of an anchor, the guide of the level winding mechanism will be inactively positioned in order to avoid the development of heat and friction by the contact of the cable line therewith.

A further object of the invention is to provide a winch of the character set forth wherein the threaded or grooved shaft for the spooling guide

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is driven by gearing engageable with the bull gear of the cable drum, the drive gearing for said shaft being retained within a casing mounted for bodily rocking movement about the axis of the groove shaft, whereby through adjustment of said casing, the gear drive to the groove shaft to impart motion thereto may be interrupted at will.

It is a further object to provide the gear drive to the groove shaft with a manually operated control, so that the operating positions of the spooling guide on said shaft may be initially set by a manual operation and thereafter power to rotate the shaft to reciprocate the guide may be supplied by the engagement of the drive gearing with the bull gear of the cable drum.

For a further understanding of the more detailed objects and advantages of the invention, reference is to be had to the following description and the accompanying drawings, wherein:

Fig. 1 is a plan view of a cable winch provided with the level-winding mechanism comprising the present invention;

Fig. 2 is a side elevational view of the winch;

Fig. 3 is a horizontal sectional view disclosing the drive gearing for the grooved shaft of the level winding mechanism;

Fig. 4 is a vertical view taken through the spooling guide on the line 4-4 of Fig. 1;

Fig. 5 is a vertical longitudinal sectional view taken through the spooling guide mechanism;

Fig. 6 is a sectional view taken on the line 6-6 of Fig. 4.

Referring more particularly to the drawings, the numeral 10 designates the parallel frame members of a cable winch. These frame members at one end are provided with bearings 11 for the reception of a power driven shaft 12, power being supplied to the shaft in any suitable manner, usually by the employment of an internal combustion engine, not shown. Rotatable with the shaft 12 is a pinion 13 which meshes with a spur toothed gear 14 fixed to one end of a drum-rotating shaft 15, the latter being suitably journaled for rotation in bearings provided in the frame members 10.

Keyed to the shaft 15 for sliding movement thereon is a shiftable drive pinion 16, the hub 17 of which is annularly grooved for the reception of a yoke 18, and manually operated levers and links 19 are connected with the yoke for the purpose of shifting the operating positions of the pinion 16. In one position the pinion 16 engages with the teeth of a bull gear 20 formed with a cable drum 23. Also, the pinion 16 may be disposed in a neutral position between the gear 20

and the reversing gear 24. In another position, the pinion 16 engages with the teeth of a reversing gear 24 in order that power may be applied to the bull gear to rotate the same in either direction. The cable drum is mounted on a stationary shaft carried by the frame members 10 so that it may rotate freely thereon. Also, the drum is provided with the customary brake wheel 25 with which is engaged a contractible brake band 26 operated by control levers 27, so that braking forces may be applied when desired to the drum to govern its rotation.

The construction thus far described in detail is standard and does not enter directly into the present invention, the latter being concerned principally with improved means for controlling the winding and unwinding of a cable 28 on and from the drum. My improved level-winding mechanism comprises a threaded or grooved shaft 29, which has its ends journaled in bearings 30 carried by the frame members 10. The shaft is formed with continuous spiral grooves 31 of opposite hand which receive a pivoted stud-carried shoe 32 carried by the hub of a spooling guide or follower 33. The upper end of the latter is formed with bifurcated arms 34 so spaced as to receive between them the cable 28 as the latter is wound upon the drum 23.

It will be seen that as the shaft 29 rotates, the guide or follower 33, through the formation of the grooves and the shoe 32, will advance back and forth longitudinally on said shaft, registering the arms 34 thereof with different portions of the cable-receiving regions of the drum 23. The rotational speed of the shaft 29 is proportioned to that of said drum so that when the drum and shaft are simultaneously rotated, the guide or follower 33 will reciprocate to properly control the winding of the cable on said drum, causing the cable to wind in a flat or level manner and preclude bunching or knotting of the cable as so often occurs with prior types of winches.

The cable guide or follower 33 may be moved between a substantially upright active position in which the cable passes between the arms 34, and a relatively lowered or inactive position in which the arms 34 are removed from registration with the cable. Such an inactive position is sometimes desired in winch operation, particularly under conditions in which the cable is paid out rapidly from the drum, as when the pinion 16 is in a neutral position and the brake on the drum 23 released. Such an operation takes place in such winches when an anchor is dropped. Under these conditions, the linear speed of the cable is so high that if it were to rub or frictionally engage the sides of the follower arms undue frictional heat would be created detrimental to the cable.

To maintain the guide or follower in its upright position, the same below its hub is formed with a downwardly directed integral extension 35 which terminates in a hub-shaped lip 36, the latter being formed for engagement with a stationary shaft 37 carried by the frame members 10 and arranged below and in parallel relationship with the shaft 29. Also, the extension 35 carries a movable curved jaw 38 which is adapted for engagement with the shaft 37 and cooperates with the extension lip 36 to normally retain the follower against oscillation on the shaft 29. However, when it is desired to lower the guide or follower 33, the jaw is moved upwardly by releasing the spring actuated lock 39 so that the jaw 38 will

clear the shaft 37, thus permitting the follower to rock to its lowered position. Such rocking movement to its lowered position of the follower is limited, however, by the provision of an arm 40 which at its upper end may be fastened to the hub of the follower and will have its lower end recessed as at 41 for engagement with the shaft 37 when the follower has been lowered to the desired extent.

The jaw 38 is formed with a shank 42, which is slidably received in a guiding recess provided in the extension 35. The lock 39, which is carried by the shank 42, comprises a spring pressed pin which is receivable within an opening formed in the extension 35. The outer end of the lock is formed with a manipulating head 43 which may be manually grasped to pull the locking pin outwardly from the openings in the extension 35, thus allowing sliding adjustment of the jaw 38 and its shank 42.

In order to apply power to rotate the groove shaft 29 at an R. P. M. bearing a definite ratio with that of the drum 23, there is mounted on one end of the shaft 29 an oscillatory gear casing 44. At one end the gear casing 44 has journaled therein a shaft 45 which, in turn, carries at one end a spur pinion 46 adapted to be thrown into and out of engagement with the teeth of the drum gear 20 when the casing 44 is rocked. Internally, the shaft 45 is equipped with a pinion 47 which meshes with an intermediate or idler gear 48, the latter being fixed to a cross shaft 49 having its ends journaled in bearings supported by the walls of the casing 44. The shaft 49 also carries for rotation therewith a pinion 50, the latter meshing with an enlarged gear 51 secured to one end of the groove shaft 29. The side walls of the casing 44 are provided with bearings 52 so that the casing may be received by and mounted for rocking movement on the shaft 29. Thus when the gear casing is lowered so that the pinion 46 meshes with the teeth of the gear 20, rotating power is applied to the shaft 29 and the gearing ratio is such as to cause the cable guide or follower 33 to move linearly along the shaft 29 at a predetermined rate of travel, whereby to cause the cable to wind levelly on the drum.

The shaft 45 may be provided at the outer end thereof with a hand wheel 53 so that when the casing 44 is elevated to remove the pinion 46 from meshing engagement with the gear 20, the rotation of said hand wheel will impart rotary movement to the shaft 29, causing the guide or follower 33 to assume a desired position of registration with the drum 23, so that the guide or follower will be properly aligned with the cable windings on the drum when the follower is operated by power derived from the bull gear 20. To raise and lower the casing 44, there may be mounted on the stationary shaft 37 of the frame 10 a sleeve 54 carrying an eccentric 55 which contacts the under part of the casing 44. The sleeve 54 may be formed with a hand wheel 56 which, when manually oscillated, rocks the eccentric to effect either raising or lowering movement of the gear casing 44 and its associated pinion 46.

In view of the foregoing, it is believed that the operation of my improved level-winding mechanism for winches will be largely obvious. Such operation, however, may be summarized by stating that when the cable is to be wound about the drum 23, as for instance in the raising of a ship anchor, power is applied to the shaft 12 from any suitable source to rotate the pinion shaft 15, the pinion 16 on said shaft being operated by the

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lever mechanism 19 so that said pinion is engaged with the teeth of the gear 20, thus causing the rotation of the drum 23. Also, the gear casing 44 is lowered so that the pinion 46 thereof will be in engagement with the teeth of the gear 20, thus transferring rotary motion to the groove shaft 29 through the meshing gears provided in the casing 44. With the drive gearing so engaged, the cable guide or follower 33 moves at a controlled rate of linear travel back and forth on the shaft 29 and in parallel relation to the face of the drum 23, controlling or guiding the cable so that it winds uniformly in flat coils from one side of the drum to the other. When the winding operation has been completed, the brake mechanism of the drum may be applied to arrest undesired rotation and the pinion 16 moved to a neutral position, discontinuing application of power to the drum.

In an operation in which the cable is paid out rapidly from the drum, with the drum turning freely on its supporting shaft, as in the lowering of a ship's anchor, the extension 35 of the cable guide or follower is disengaged from the stationary shaft 37 by the operation of the movable jaw 38, and the said guide or follower is allowed to swing to its relatively lowered or inactive position in which it is held by the engagement of the arm 40 thereof with the shaft 37. Also, the gear casing 44 is rocked so that its spur pinion 36 is disengaged from the drum gear 20. When the brake 26 is released, the cable will pay out rapidly, although the rotational speed of the drum may be governed, when necessary, by the use of its brake mechanism. Under such conditions of high linear speed of the cable, the guide or follower 33 is removed from contact therewith, thus preventing injury to the cable as a result of frictional engagement and resulting heat caused by possible rubbing of the same against the sides of the follower arms 34.

I claim:

1. Cable winding and unwinding mechanism comprising a frame, a cable drum rotatably supported by said frame, a power rotated driving gear for said drum, a shaft journaled for rotation in said frame in spaced parallel relation with respect to said drum, said shaft being formed with continuous intersecting helical grooves of opposite hand, a cable-guiding follower having an element engaged with said grooves to produce sliding movement of said follower first in one direction and then the other upon unidirectional rotation of said shaft, a gear casing loosely

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mounted on said shaft for turning movement about its longitudinal axis, a gear train in said casing meshing with a gear on said shaft for rotating the latter, a drive pinion for said gear train operable upon rocking movement of said casing to be brought into and out of engagement with the teeth of the drum drive gear, manually operated eccentric means supported by said frame for rocking said gear casing about the axis of said shaft, and manually operated means for imparting motion to said gear train and said shaft independently of the drive gear of said drum.

2. Cable winding and unwinding mechanism comprising a frame, a cable drum rotatably supported by said frame, a power rotated driving gear for said drum, a shaft journaled for rotation in said frame in spaced parallel relation with respect to said drum, said shaft being formed with continuous intersecting helical grooves of opposite hand, a cable-guiding follower positioned on said shaft and having an element engaged with said grooves to provide sliding movement of said follower first in one direction and then the other upon unidirectional movement of said shaft, a second shaft journaled in said frame below said grooved shaft, a depending extension on said follower having a semicircular socket in the lower end thereof arranged to receive said second shaft, a movable jaw carried by said extension and cooperative with said second shaft for maintaining said follower against rotation on said grooved shaft, a gear train rockably supported by said grooved shaft and movable into and out of engagement with the driving gear for said drum, and a foot member carried by said follower and spaced from said extension for limiting the extent of oscillation of said follower and gear train by engagement with said second-named shaft.

EUGENE BARKER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,250,985	Benson	July 29, 1941
1,740,222	Broadwell et al.	Dec. 17, 1929
1,736,674	Smith	Nov. 19, 1929
1,663,801	Kautzky	Mar. 27, 1928
1,432,988	Erickson	Oct. 24, 1922
645,630	Schultz	Mar. 20, 1900
484,358	Flohr	Oct. 11, 1892
27,305	Palmer	Feb. 28, 1860