Feb. 16, 1954 A. DOWRELIO 2,669,427

ANCHOR HOIST

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Fig 1.

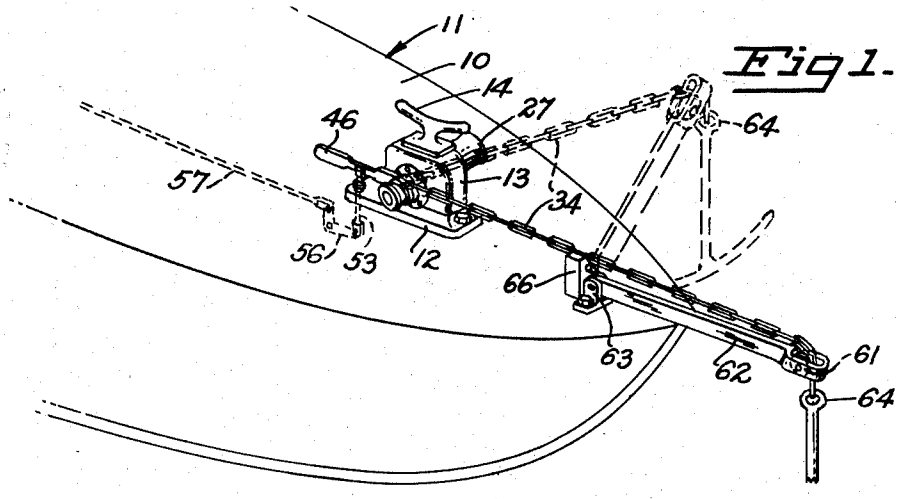


Fig. 2.

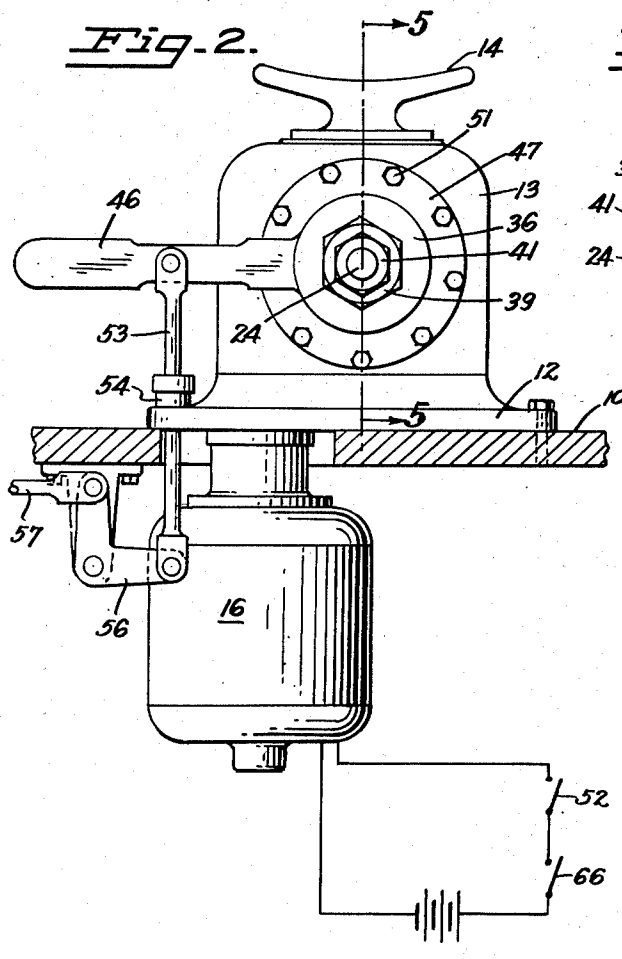
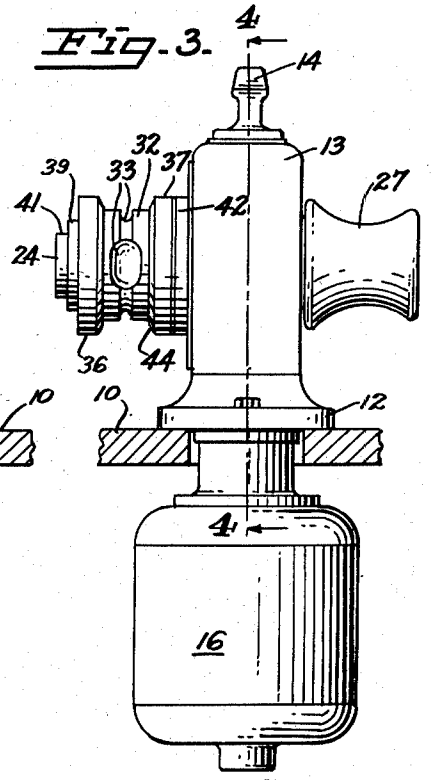


Fig. 3.



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Fig. 4.

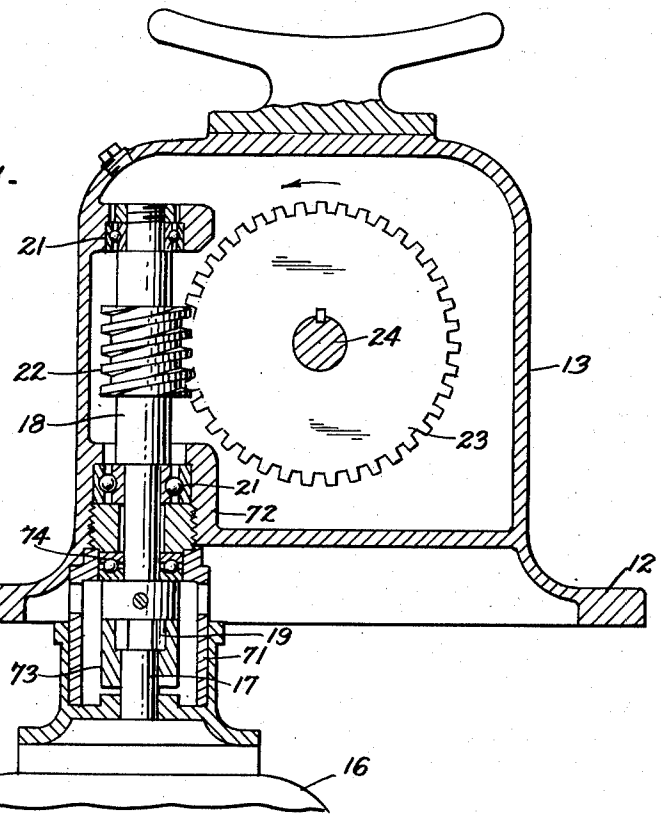
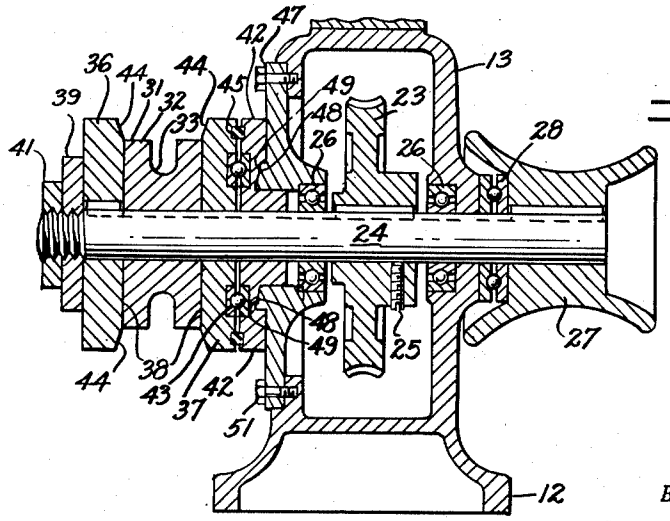


Fig. 5.



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ANCHOR HOIST

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Application May 28, 1951, Serial No. 228,629

2 Claims. (Cl. 254—187)

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This invention relates to new and useful improvements in anchor hoist. More particularly the invention relates to a hoist for a small vessel which is driven by a motor and may be manually controlled to raise the anchor under the accurate control of the operator at a standard or slower speed. The device may also be used to check speed of descent of the anchor.

Another feature of the invention is the provision of a guide through which the anchor chain passes, said guide extending out over the side of the vessel so that the anchor does not mar the sides of the vessel when being raised or lowered. Said guide is pivotally mounted on the deck of the vessel so that the anchor may be swung up over the side when the hoist hauls up the anchor. A limit switch is actuated by the guide when it reaches upper position to stop the hoist motor when the anchor is in storage position.

Still another feature of the invention is the fact that the winding and unwinding of the chain are positively controllable at all times. Preferably the means of controlling the operation of the hoist is located on the hoist itself with an auxiliary control at the wheel house or other convenient location.

The chain is deposited in a locker and stored below deck, thereby eliminating the danger and unsightliness of storage on deck.

Further objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings in which similar characters of reference represent corresponding parts in each of the several views.

Fig. 1 is a perspective view of a vessel with the hoist installed;

Fig. 2 is a side elevation of the hoist;

Fig. 3 is a front elevation of the same;

Fig. 4 is a vertical section taken substantially along the line 4—4 of Fig. 3;

Fig. 5 is a vertical section taken substantially along the line 5—5 of Fig. 2.

The present invention is intended especially for use on small vessels for hoisting anchors, loading cargo and hauling lines, although it has other uses as will be readily apparent from the following description. The device is preferably installed on the deck 10 of such a vessel 11 near the bow. The base 12 of the hoist is securely fastened to the deck and the casing 13 of the hoist is positioned above said base. A cleat 14 may be mounted on top of casing 13 for general utility purposes. As herein described, below deck is an electric motor 16, although any suitable motor

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may be employed, said motor having a vertical shaft 17 which is coupled to vertical worm shaft 18 by means of a standard coupling 19. Worm shaft 17 is suitably journaled within casing 13, suitable ball bearings 21 serving to mount said worm shaft in vertical alignment. Fixed on worm shaft 17 is worm 22 which meshes with worm wheel 23 mounted within casing 13 on horizontal main drive shaft 24, said wheel 23 being held against axial movement by set screw 25. A considerable speed reduction is accomplished by means of a very high gear ratio, such as, for example, 40 to 1, between worm wheel 23 and worm 22. Further, the shape of the teeth of the two meshing gears is almost square and there is a very slight pitch. Thus worm wheel 23 may be driven from worm 22, and this permits motor 16 to be used as a brake when dropping anchor.

Main drive shaft 24 is mounted horizontally and is supported by ball bearings 26. Said shaft projects out through either end of housing 13. Keyed to one end of shaft 24 exteriorly of housing 13 is a gypsy head 27 of conventional construction, there being a thrust bearing 28 interposed between said gypsy head 27 and housing 13. Gypsy head 27 may be used in the ordinary manner for hauling lines to load cargo, pull the vessel toward a dock or the like.

The opposite end of main drive shaft 24 projects out through the opposite end of housing 13. On said shaft is supported wildcat 31, it being understood that wildcat 31 is not keyed to shaft 24, but is rotatable with respect thereto. The exterior periphery 32 of said wildcat is formed to receive the anchor chain, there being recesses 33 in said periphery for reception of the links of the anchor chain 34 which recesses are alternately flat and on edge, corresponding to the size and arrangement of said links. Thus the anchor chain 34 is in continuous and secure engagement with wildcat 31, and as the same revolves, as hereinafter set forth, chain 34 is wound and unwound.

On opposite sides of the wildcat and keyed to shaft 24 for axially slidable movement are plates 36 and 37 which have annular frictional engagement surfaces 38 engageable with adjacent annular surfaces of wildcat 31. Outer friction plate 36 is held against displacement from shaft 24 by nuts 39 and 41 threaded on the outer end of shaft 24. Inner friction plate 37 is engaged by cam 42 with a thrust bearing 43 interposed between plate 37 and cam 42. Seal 45 fitting within annular grooves in opposed faces of members 37 and 42 protects bearing 43 from damage by water or

other causes. Cam 42 is non-rotatable with respect to shaft 24, but axially slidable with respect thereto. As cam 42 is caused to slide outwardly, it pushes friction plate 37 outwardly and clamps wildcat 31 between plates 36 and 37. Thus as shaft 24 is caused to revolve, wildcat 31 is also caused to revolve. Another feature of the arrangement of the present invention is the fact that wildcat 31 may be caused to revolve at a slower speed than shaft 24 by causing cam 42 to move only partially outwardly, which causes slippage between plates 36 and 37 and wildcat 31. Plates 36 and 37 being of greater diameter than wildcat 31 function as guides for chain 34, insuring against displacement of said chain. For such purpose the corners of plates 36 and 37 are chamfered as indicated by reference numeral 44.

Various means may be employed to shift cam 42 axially relative to shaft 24. A preferred means herein illustrated employs a normally horizontal control handle 46 fixed to said cam, said handle being manually operable to twist cam 42 about shaft 24. Housing cover 47 is provided with an annular external cam surface 48 and cam 42 with an engaging internal annular cam surface 49, said cam surfaces being spiral or helical. Thus as cam 42 is twisted by manual depression of handle 46, the cam surfaces 48 and 49 cause cam 42 to move axially along shaft 24 outwardly from housing 13 thereby accomplishing the clamping action which causes wildcat 31 to turn. When handle 46 is released, cam 42 retracts and plates 36 and 37 move apart, thereby stopping rotation of wildcat 31. Cover 47 is held on housing by screws 51 and may be removed to permit access to the interior of housing 13 for repair and inspection.

When it is desired to drop the anchor, motor 16 is turned off by opening switch 52 located adjacent the hoist and wildcat 31 allowed to turn free. If it is desired to check the speed of the fall of the anchor, handle 46 is depressed, motor 16 acting as a brake, the frictional forces of the various rotating parts serving to slow the descent of the anchor.

The position of cam 42 may be remotely controlled by attachment of handle 46 to a vertically slidable rod 53 which extends downwardly through a gland 54 in base plate 12 and thence below deck 10, where it is connected to bellcrank 56 and by linkage system 57 leading to the pilot house or other remote position.

Anchor chain 34 may be passed through sheave 61 in the outer end of guide 62 which extends out over the bow of the vessel. Guide 62 is pivotally mounted on pivot 63 to deck 11. Thus the anchor is drawn in by winding chain 34 about wildcat 31 and deposited in a chain locker (not shown) below deck until eye 64 at the top of the anchor engages sheave 61 of guide 62 and causes guide 62 to swing upwardly to assume a position more close to vertical, as shown by broken lines in Fig. 1. Limit switch 66 is positioned on deck and arranged so that when guide 62 is raised to the position shown in dotted lines in Fig. 1 the electric circuit energizing motor 16 is broken.

A connecting housing 71 fixed to motor 16 is screwed into boss 72 in base 12 so as to accurately locate the hoist and motor relative to each other and in proper alignment. Oil seal 73 is provided to retain lubricant within housing 13 and a thrust bearing 74 is provided to protect motor 16 from thrust imparted by worm 22 (see Fig. 4).

In operation, assuming that the anchor is below water, motor 16 is energized by closing push button switch 52, and since guide 62 is in horizontal position, limit switch 66 is closed. Rotation of motor 16 causes rotation of drive shaft 24. So long as handle 46 is in horizontal position, wildcat 31 does not revolve, although gypsy head 27 does revolve and may be employed as desired to wind a line for any desired purpose. When it is desired to raise anchor, handle 46 is manually depressed or depressed by remote control. This causes cam 42 to twist relative shaft 24, which forces cam 42 outward and clamps wildcat 31 between plates 36 and 37 which revolve with shaft 24 and thus turn wildcat 31 at the speed of shaft 24. Anchor chain 34 is hauled in and deposited in the chain locker. If it is desired to revolve wildcat 31 at a slower speed, handle 46 is only partially depressed which permits slippage between plates 36 and 37 and wildcat 31. Raising of the anchor may be interrupted at any time by releasing handle 46. When the anchor is completely raised it swings guide 62 upward and opens limit switch 66 which stops motor 16. It will further be understood that motor 16 may be stopped at any time by opening control switch 52 of the machine. The anchor is secured in upward position by any convenient latching means.

When it is desired to lower the anchor, the latching means holding the anchor in elevated position is released. The anchor thereupon falls, guide 62 returning to horizontal position, and the anchor is swung out so that it does not damage the bow of the vessel. As the anchor descends it falls free since wildcat 31 is loose on shaft 24. If it is desired to check the fall of the anchor, handle 46 may be depressed; since switch 52 is open the gears 22 and 23 and electric motor 16 serve as a brake to slow wildcat 31.

As used in the appended claims, the term "line" includes chains, cables, ropes and the like which may be wound on a winch of the character described.

Although I have described my invention in some detail by way of illustration and example for purpose of clarity of understanding, it is understood that certain changes and modifications may be made therein without departing from the spirit of the invention or scope of the appended claims.

I claim:

1. A hoist for a line comprising a housing, a shaft rotatably mounted in said housing and projecting out through at least one end thereof, a worm wheel in said housing fixed for rotation with said shaft, a driving worm in said housing meshing with said worm wheel, means for rotating said driving worm, the teeth of said worm and worm wheel being substantially square and having slight pitch to enable said worm wheel to be turned by said worm, a stationary annular helical cam on one side of the exterior of said housing, said shaft projecting through and beyond said helical cam, a nut on the outer end of said shaft, a rotatable member loosely mounted on said shaft between said nut and said annular cam, line-engaging means on said rotatable member arranged upon rotation to hoist said line, at least one friction member longitudinally slidable on said shaft and fixed for rotation therewith, cam means engageable with said annular cam to move said cam means longitudinally of said shaft and force said rotatable member and friction member into engagement to cause rotation of said rotatable member, a thrust bearing interposed between said cam means and said friction member, an annular seal surrounding said thrust bearing and sealing against said cam means and said

friction member, and manually operable means to control engagement of said cam means and said annular cam.

2. A hoist according to claim 1 which further comprises a second friction member longitudinally slidable on said shaft and fixed for rotation therewith on the opposite side of said rotatable member from said first-mentioned friction member, said cam means being operable to clamp said rotatable member between said friction members to cause rotation of said rotatable member.

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