March 3, 1959 F. C. GOOD 2,875,890

WINDLASS

Filed June 10, 1957 2 Sheets-Sheet 1

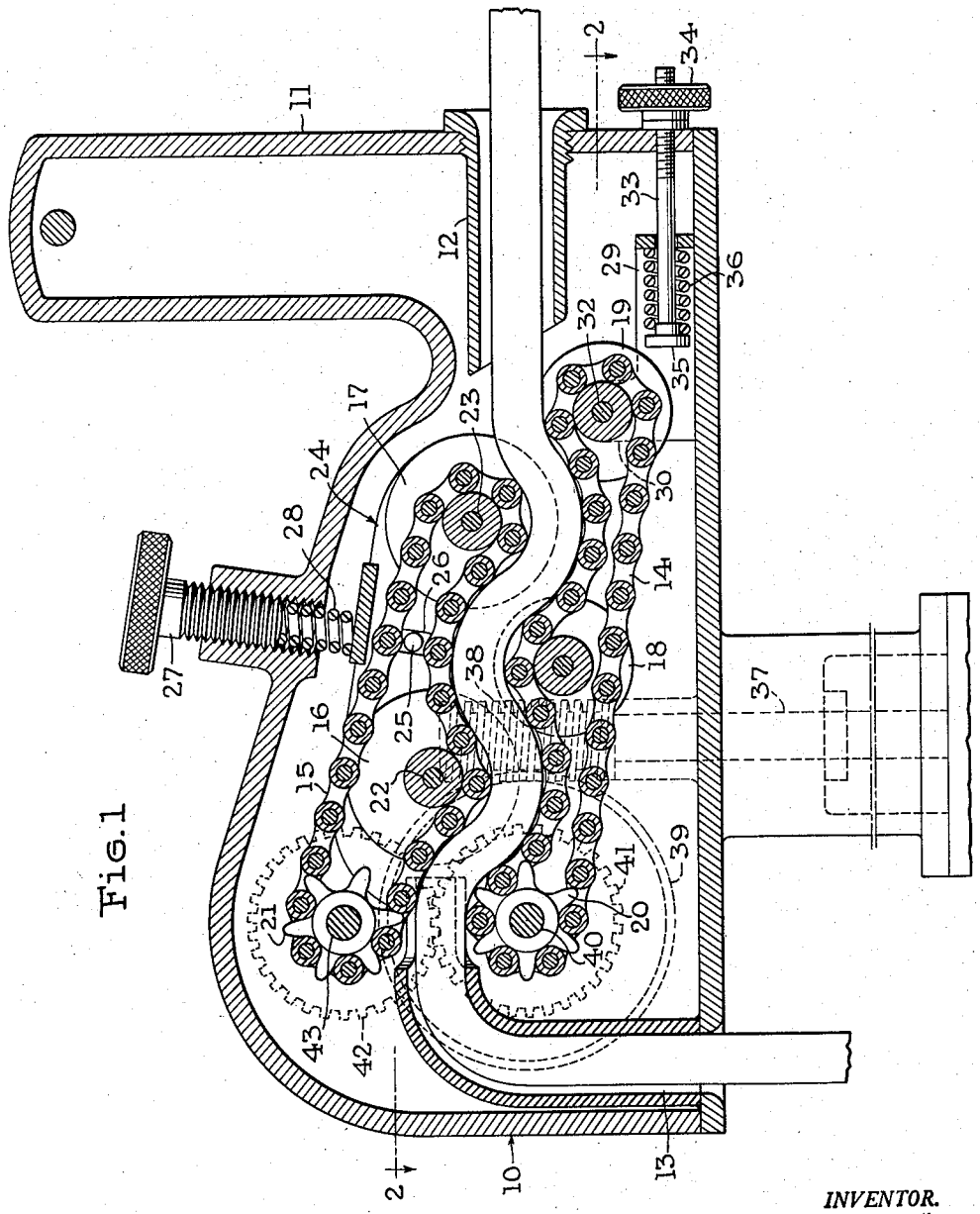

Fig. 1

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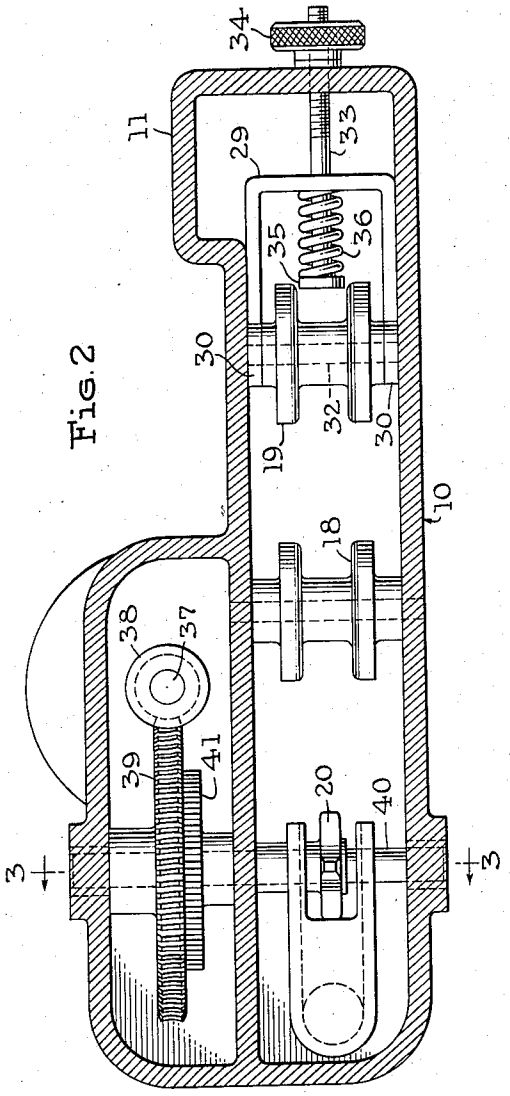

Fig. 2

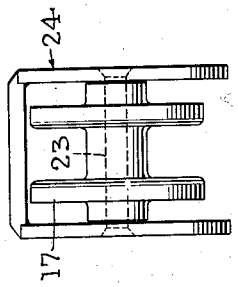

Fig. 5

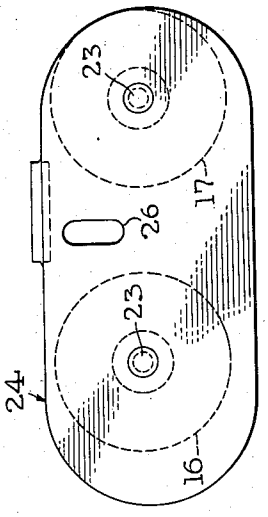

Fig. 4

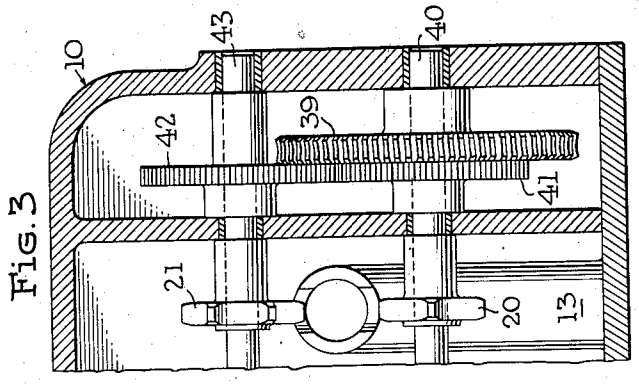

Fig. 3

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2,875,890

Patented Mar. 3, 1959

2,875,890

WINDLASS

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Application June 10, 1957, Serial No. 664,774

1 Claim. (Cl. 203—227)

This invention relates to power driven windlasses, and more particularly to apparatus of this type which is designed primarily for anchor line and/or chain retrieving on boats in the so-called pleasure craft range of sizes.

Most windlasses for nautical use require constant attention during the operation thereof, and thus require that a person be on the deck of a boat where the windlass is located. Again, most windlasses are rather bulky pieces of apparatus, and for these and other reasons, have not enjoyed widespread adoption in pleasure craft circles.

It is, therefore, the principal object of the present invention to provide a small, compact windlass primarily for use on boats in the pleasure craft range of sizes.

Another object is to provide a windlass which may be operated entirely from the cockpit of the boat without the necessity of going out on deck.

It is a further object of the present invention to provide a windlass which will handle a reasonably wide range of line sizes and which is also useful in handling chain.

Other objects of the present invention will be apparent from a consideration of the following detailed specification, read in conjunction with the attached sheets of drawing, in which:

Fig. 1 is a side elevation with most parts shown in section of a preferred embodiment of the present invention;

Fig. 2 is a section on line 2—2 of Fig. 1;

Fig. 3 is a section on line 3—3 of Fig. 2;

Fig. 4 shows in side elevation the upper roll supporting plate; and,

Fig. 5 is a detailed view of one of the rollers over which the drive chains are entrained.

In general, the objects of the present invention are achieved by providing within a compact housing, suitable for attachment to the deck of a small boat, a pair of opposed, positively driven chains which contact opposite sides of an anchor line. It should be emphasized that there is nothing special about the structure of these chains. They are ordinary sprocket chains, such, for example, as the ones found on a conventional bicycle, but may be of corrosion resistant material. The feature which enables sufficient tractive force to be applied to the line to effect retrieving against the normal weight and pull of an anchor is the fact that each of these chains entrains around a separate set of roller members and the rollers for each chain are staggered with respect to each other. This arrangement causes the line and the chains to follow a substantially sinusoidal path in traveling from one end of the apparatus to the other. Also, the chains may be adjustably biased toward each other.

Referring first to Fig. 1 of the attached drawings, showing a preferred embodiment of this invention, there is provided a compact housing **10** for the various working parts of the windlass. One end of the housing preferably includes a mooring bit **11**. As shown in Fig. 1, the right hand side of this figure would normally be the

bow end, and the left hand side would be the stern end. At the forward or bow end of the housing there is provided an opening into which is inserted a hollow member **12** serving as a hause pipe, and forming an entry port for the anchor line. At the rear of the housing and at the underside thereof, a similar arrangement is provided to define an exit port **13** for the line. In a conventional installation, the exit port would be aligned with an opening in the deck of the boat leading to a line storage or chain locker.

Still referring to Fig. 1, there is therein shown a pair of endless chains **14** and **15** which entrain around separate sets of guide rollers **16, 17, 18** and **19**. In addition to the guide rollers, each chain is also positively driven by means of sprockets **20** and **21**, the drive connections for which will be described hereinafter. Of particular importance in this view, is the staggered relationship between the upper and lower sets of guide rollers. It is apparent from a consideration of Fig. 1, that this staggered relationship between the rollers is such as to cause the line to follow a substantially sinusoidal path in its travel from one end of the windlass to the other.

Referring now to Fig. 5, one of the guide rollers is shown in plan view. The important feature shown in this figure is the depth of the groove in the chain contacting face of the roller. Of course, this could either be a groove turned from cylindrical stock, or the equivalent structure could be made up by welding a pair of disc-like members to a hub. Regardless of the method of manufacture, however, the important consideration is that the roller should preferably receive within its inner boundaries, not only the chain itself, but also at least a portion of the line which is being driven by the chains.

The material from which the rollers are formed is subject to considerable variation. In some cases it has been found advantageous to form these rollers of rubber or other equivalent resilient material to provide a certain amount of "give" to the sides. When thus formed, the windlass is more adaptable to varying line sizes and performs better when the anchor "line" is chain or cable.

Referring again to Fig. 1, it will be seen that the upper pair of guide rollers **16** and **17** are supported on shafts **22** and **23** which extend through opposite sides of a cage-like member **24**. The cage is shown in more detail in Figs. 4 and 5. The cage in turn is supported within the main housing **10** by a pair of pins **25** which extend inwardly from opposite sides of the housing to be received within opposed slotted openings **26** on opposite sides of the cage member. These openings are shown in Figs. 1 and 4. The cage **24** and its pair of guide rolls **16** and **17** are therefore capable of substantial movement within the housing, the limits of which movement are defined by the dimensions of the opposed openings **26** and the pin members **25** which are received therein.

Referring again to Fig. 1, there is shown a means for biasing the cage **24** and its set of rollers toward the lower set of rollers **18** and **19**. While this biasing means could take any one of a number of different forms, a preferred embodiment shown in this figure comprises a knurled head adjusting screw **27**, threaded into an opening in the upper part of the main housing, and a helical spring **28** positioned between the upper surface of the cage **24** and the inner end of the adjusting screw. By this means, different sizes of line may be accommodated and the tension placed on the line is adjustable within reasonable limits. The lower set of rollers **18** and **19** are supported for rotation within the housing and preferably entirely independently of one another. Referring particularly to Figs. 1 and 2, the roller **18** is supported on a shaft which extends through opposed walls of housing **10**. The roller **19**, however, is supported in a small adjustable cage member **29**. This cage rests upon the lower wall of the

main housing and has upstanding arms **30** through which the axle **32** for the roller **19** extends. At the opposite end of the cage, an opening is provided through which extends a bolt member **33**. An opening is also provided in the main housing, through which the bolt **33** also extends to receive a knurled nut **34** on the outside of the main housing. The inner end of the bolt includes a head portion **35**, and a spring **36** is positioned between this head and the inner surface of the cage. It will be obvious that adjustment of the knurled nut serves to resiliently bias the cage in a direction to vary the tension on the lower chain **14**.

For a description of a preferred embodiment of a drive mechanism for the two chains, reference will be made to Figs. 1, 2 and 3. In Fig. 1, there is shown a main power shaft **37** which extends from a point preferably below the deck of the boat through and into the main housing **10** for the windlass.

Fig. 2 is a view taken on the line **2—2** of Fig. 1 and shows the upper end of the drive shaft **37** carrying thereon a worm **38** which meshes with a worm wheel **39** shown in Figs. 2 and 3. The worm wheel is rigidly attached to a shaft **40** extending transversely of the housing and which also carries rigidly attached thereto, the sprocket **20** furnishes the drive for the lower chain. Also rigidly attached to the shaft **40** is a pinion **41**. Pinion **41** meshes with another pinion **42** having the same number of teeth thereon, as shown most clearly in Fig. 3. The upper pinion **42** is carried by a second shaft **43** extending transversely of the main housing, and which also carries the other sprocket **21** which furnishes the drive for the upper chain.

It is believed that the operation of the apparatus herein described will be fairly apparent from the foregoing description. To place the apparatus in operation, it is only necessary to install it preferably on the forward deck of a boat and to thread an anchor line through the inlet port, between the opposed chains, over the guide rollers, and out the outlet port, so that the free end will fall into the line or chain locker. Preferably, the power for operating the windlass is supplied from an electric motor mounted below the deck, the shaft of which is

connected to shaft **37**. The only control necessary, therefore, is a reversing switch controlling the direction of rotation of the motor and which may be located at any convenient point in the cockpit of the boat.

While a preferred embodiment of the present invention has been herein shown and described, applicant claims the benefit of a full range of equivalents within the scope of the appended claim.

I claim:

A windlass for mounting on the forward deck of pleasure craft comprising: a housing; means defining a line entry port at the forward end of said housing; means defining a line exit port on the under side of the rear of said housing; a first pair of guide rollers; a cage rotatably supporting said rollers in fixed spaced relation; means mounting said cage within said housing for limited pivotal and vertical movement therein; a third guide roller supported on an axle extending between opposite sides of said housing, said third roller being positioned horizontally below said first pair of guide rollers; a second cage member; a fourth guide roller rotatably carried by said second cage member, said fourth roller being positioned in staggered horizontal relationship with said first three rollers; means for adjusting the horizontal position of said second cage member; a first sprocket chain entrained around said first pair of guide rollers; a second chain entrained around said third and fourth guide rollers; a pair of sprocket wheels, one for driving each of said chains, said sprocket wheels also being received within said housing; means for positively driving said sprocket wheels; the chain engaging surfaces of each of said guide rollers being grooved to a depth substantially greater than the thickness of said chains.

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