

[54] **ANCHOR WINCH**

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150, 187, 186, 168, 169; 242/54 R

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[57] **ABSTRACT**

A power driven winch for reeling in an anchor line on a storage drum which is locked to prevent rotation when the power is deactivated. The drum is driven through a torsion spring clutch which is adapted to adjustably release frictional, torque transmitting engagement between the drive and the drum to accommodate unreeling of the line at varied rates to govern the speed of the anchor descent.

12 Claims, 2 Drawing Figures

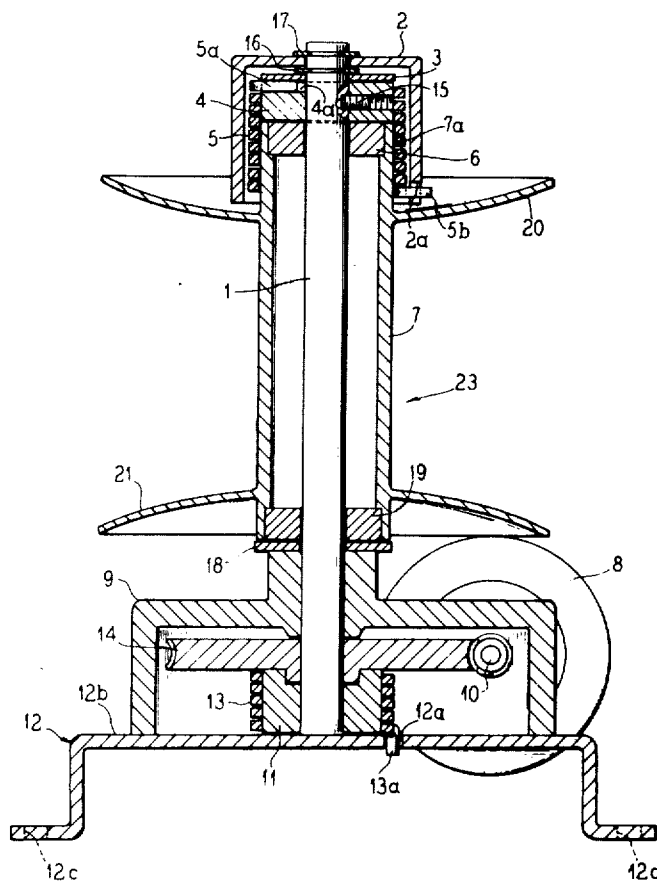


Fig. 1

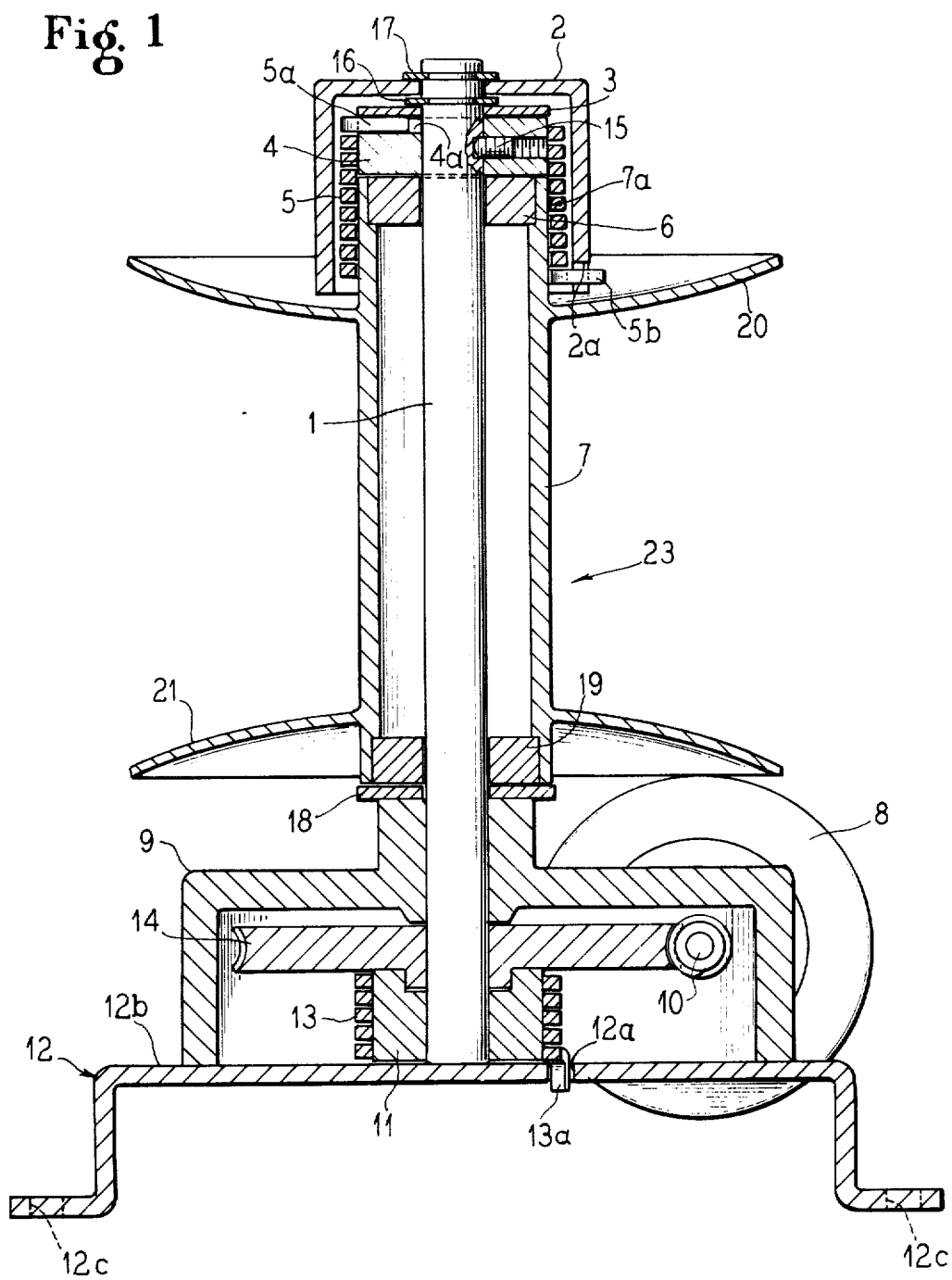
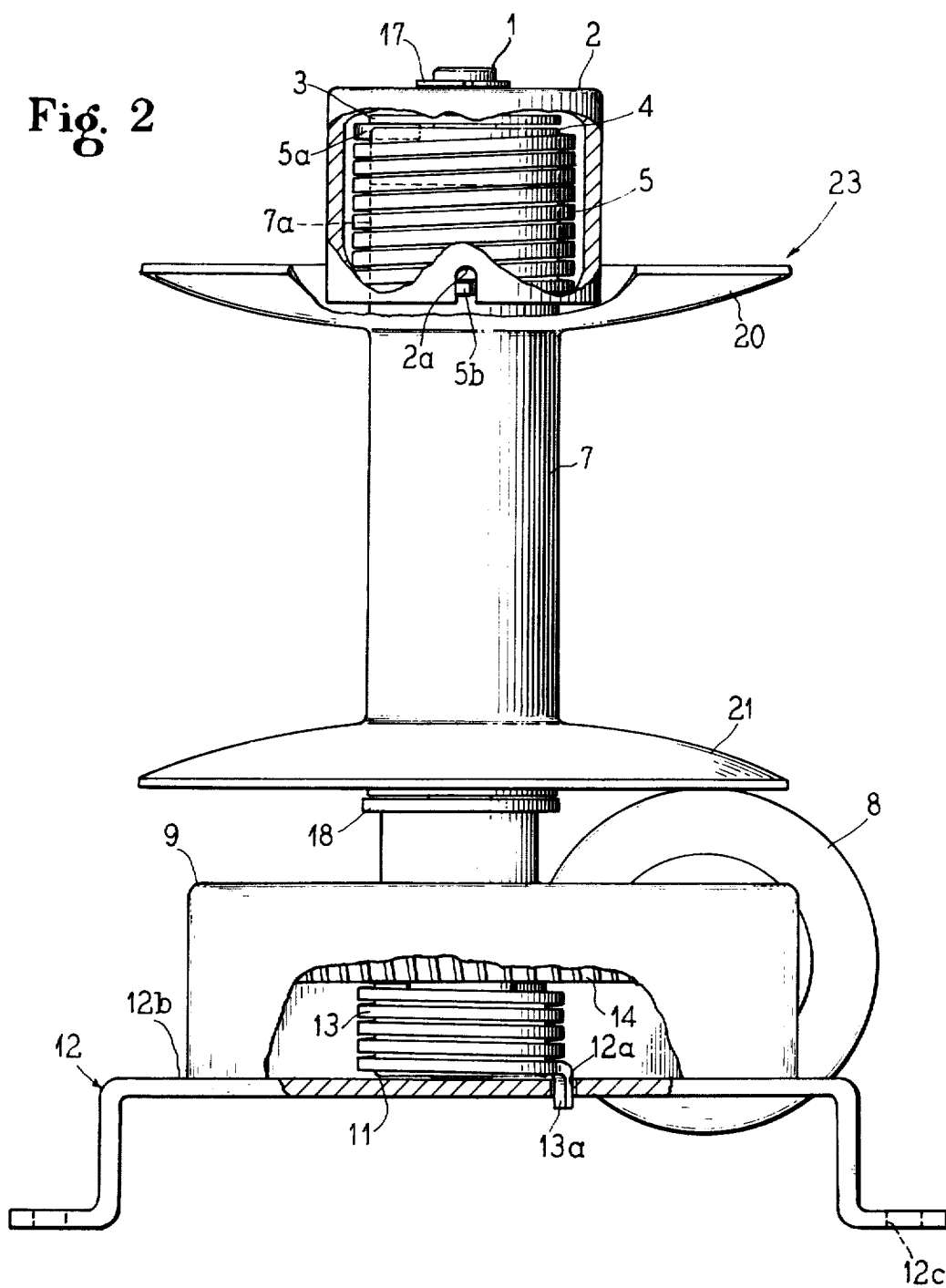


Fig. 2



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ANCHOR WINCH

SUMMARY OF THE INVENTION

This invention relates to Winches in general and more particularly to a Winch with an electrically powered motor, for raising, lowering and locking an anchor or other load, in a desired position. The winch provides a cable storage drum which is driven through suitable gearing by a motor, to reel cable thereon and which is irreversible except for activation of a control release means to accommodate an adjustable rate of cable unreeling.

A feature of this invention is the simple, compact release device for the Winch drum or spool, that permits an easily controlled release rate, from slow to fast, of the anchor rope or cable.

Another feature of this invention is the simple, compact device that locks the rope or cable drum in the desired position and prevents the weight or pull on the rope or cable from unwinding same from the winch drum, unless released by rotation or movement of the release device.

Among the objects are to produce a simple, reliable and compact electrically powered Anchor Winch for small boat use and for other small winch applications.

Another object is to provide a support which may be easily attached and positioned for best results in the boat or on other objects to which it may be attached.

Other objects and advantages will appear in the following specification and the novel features of the invention will be more particularly pointed out in the appended claims.

FIG. 1 is a vertical sectional view of an anchor winch showing details of construction.

FIG. 2 is a side elevational view with certain parts broken away to show more detail of the drum release device.

This invention is intended especially for raising, lowering, and locking in a desired position, an anchor on small boats, but will have other uses as well.

A suitable motor 8 mounted to a gear housing 9 and having a shaft gear 10 drives a gear 14 that is locked to a drum shaft 1, causing rotation of drum shaft 1 when the motor is activated to drive a drum 23 for reeling a cable or rope thereon. A shaft collar 11 is locked, by suitable means, to drum shaft 1 or to gear 14, or to both. A helical coiled torsion spring 13 surrounds shaft collar 11 and having frictional engagement therewith, with one end 13a of spring 13 locked in a fixed position, whereby spring 13 acts as a clutch that permits rotation in a reeling, take-up direction, but prevents rotation in the opposite direction, as determined by helical wrap of the spring 13. This arrangement prevents the unwinding rotation of the drum shaft 1, whenever the motor 8 is deactivated. In some instances the use of self-locking or irreversible worm and worm gear combinations may in themselves provide sufficient resistance to reverse or unreeling rotation of the drum shaft 1 when the motor 8 is deactivated so as to eliminate the requirement of the torsion spring 13. The winch drum 23 includes a drum hub 7, to which suitable end flanges 20, 21 are formed or attached, and is fitted with bearings 6 and 19 at opposite ends for rotational movement about the drum shaft 1 and having a thrust washer 18 interposed between said hub 7 and the housing 9. Drum hub 7 could be a rod of suitable material bored or formed to rotate around shaft 1. Drum hub 7 extends

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through drum flange 20 to form a frictional engaging clutch surface 7a for a torsion spring 5. Drum drive shaft 1 extends through drum hub 7 and has a shaft collar 4 locked to drive shaft 1 by set screws 15, or by other suitable means. An inward formed end 5a of torsion spring 5 is attached to shaft collar 4 by engaging a slot 4a, or by other suitable attachment, in the top outside edge of collar 4. Torsion spring 5 extends down and around shaft collar 4 and also around and over the clutch surface 7a of drum hub 7. A washer 3 held in position by retaining ring or pin 16 holds the end of spring 5 in the slot 4a in collar 4. On the portion nearest drum flange 20, torsion spring 5 has an outward formed end 5b that engages a slot 2a, or is attached by other means, in the lower rim of release cup 2. Release cup 2 has a hole in its top center and is retained in position on shaft 1 by retaining ring or pin 17, or by other suitable means. Release cup 2 extends down and over torsion spring 5 and is easily rotatable. Rotational movement of release cup 2 reduces or releases the frictional grip or hold of spring 5 on the extended clutch surface 7a portion of drum hub 7 and permits release of the drum 23 to pay out an anchor line or other load (not shown). Rate of release, from slow to fast, of the winch line (rope, cable or chain) can be regulated by the amount of rotation or movement of release cup 2 relative to the drum shaft 1 to impart an unwinding twist to the torsion spring 5 and loosen its grip on the clutch surface 7a of the hub 7. With release cup 2 in its normal position, tightly wound spring 5 tightly grips drum hub clutch surface 7a extension and also shaft collar 4 that is locked to drive shaft 1 so that non-slipping rotational power is applied to winch drum 23 when motor 8 is activated. When motor 8 is stopped, the anchor or other winch load is locked in position and prevented from unwinding or pulling down by the one way clutch action of spring 13 and the driving couple of spring 5 between the drum shaft 1 and the drum hub 7. Controlled rate of release is obtained by selective movement of release cup 2 as described above to reduce or disconnect the torque transmitting couple between the torsion spring 5 and the clutch surface 7a.

Another feature of this invention is the mounting arrangement that greatly reduces the strain or load on the bent or formed attached end 5a of torsion spring 5. With spring 5 gripping or locking up on both drum hub extension 7a and also on shaft collar 4 in its normal torque transmitting posture, the load or strain is greatly reduced on the attachment point of spring 5 to shaft collar 4, where failure is most likely to occur and the reliability and load handling ability of the winch is greatly increased.

Another feature of this invention is the formed mounting plate or base 12 that is attached to gear housing 9 to provide a closure wall therefor and retains shaft collar 11. Mounting plate 12 also serves as one of the practical attachment points for the secured end of spring 13 by an downward formed end 13a of spring 13 extending through a hole 12a in mounting plate 12. A portion 12b of mounting plate 12 is extended parallel to motor 8 and formed upward from the base portion to provide a mounting surface for a motor switch and for a motor overload circuit breaker. Holes 12c through the downward and outward formed legs of the mounting plate provide for attachment to a boat or other object on which the winch might be used.

I claim:

1. A winch for reeling a line comprising:

a mounting base;

a drive means supported on said base;

a drum shaft extending from said base and rotatably driven by

said drive means in a reeling direction;

a restraining means adapted to prevent rotation of said drum

shaft in an unreeling direction when said drive means is deactivated;

a drum means rotatably journaled on said drum shaft and having a hub extending from one end thereof with a circumferentially extending peripheral clutch engaging surface thereon;

a torque transmitting helical coiled torsion spring clutch, having a lesser inside diameter than said hub clutch engaging surface when said torsion spring clutch is in a relaxed condition and having one end thereof fixed to said drum shaft and having a second end frictionally engaging said hub clutch engaging surface to drive said drum in a reeling direction; and

a release means arranged to adjustably release the frictional engagement between the torsion spring clutch and the hub to permit said drum to rotate in an unreeling direction and to provide a varied rate of unreeling of the line.

2. The winch of claim 1 wherein said drum shaft includes an enlarged diameter portion being generally equal in diameter, axially aligned and in juxtaposed relationship to said hub and having a non-disengaging clutch surface thereon.

3. The winch of claim 2 wherein said enlarged diameter portion comprises a driving collar, having a recess at one end thereof to receive said one end of the torsion spring and being of a diameter to frictionally engage said torsion spring.

4. The winch of claim 3 wherein said release means comprises a rotatable member secured to the second end of said torsion spring and being rotatable to adjustably reduce the frictional engagement between the torsion spring and said hub.

5. The winch of claim 4 wherein the rotatable member is cup-shaped with a closed end portion mounted for relative rotatable movement on said drum shaft and having a rim portion keyed to said second end of said torsion spring.

6. The winch of claim 5 wherein the rotatable member further includes a sleeve portion connecting the closed end portion to the rim portion and which extends over and around said torsion spring.

7. The winch of claim 6 wherein the rotatable member sleeve portion comprises a finger grip for rotating said rotatable member.

8. The winch of claim 7 wherein the restraining means comprises a second torsion spring having fric-

tional engagement with said drum shaft and said second torsion spring having one end thereof fixed to prevent rotation with said drum shaft, whereby reeling rotation of said drive shaft releases the restraining frictional engagement therebetween.

9. The winch of claim 8 wherein the drive means includes a gear case, rotatably supporting said drum shaft, an electric motor mounted to said case, and a gearing means interposed between said motor and said drum shaft to rotate said shaft when said motor is activated.

10. The winch of claim 9 wherein said mounting base includes a formed plate providing a closure cover for said gear case and having an aperture therein to secure said one end of said second torsion spring against rotation and further including a supporting surface for motor control components.

11. In a winch construction of the type having a motor drive unit for rotatably driving a take-up reel of the type adapted to take up chain, rope and cable type elongated material, the improvement of

a driven hub on the take-up reel having a circumferentially extending peripheral friction surface,

a driver hub longitudinally adjacent thereto,

a cup-shaped release means having wall portions adapted to be spaced radially outwardly of said friction surface and said driver hub,

a helically coiled torsion spring interposed between said wall portions and said friction surface and being connected in driven relationship with said driver hub,

said spring normally being frictionally engaged with said surface of said driven hub, thereby to rotate the driven hub when the driver hub is rotated,

and an end portion on the opposite end of said torsion spring extending outwardly into mechanical coupling engagement with the wall portions whereby upon rotating the cup-shaped release means to unwind the helical coils of the torsion spring the driving relation with said friction surface may be selectively released to pay out the elongated material.

12. The structure of claim 11 wherein the motor drive unit includes a drive motor operably connected to said driver hub, by means of a drive shaft to rotate said driver hub in a take-up direction, said drive shaft having a driven shaft collar remote from said driver hub with a second helically coiled torsion spring, which is fixed from rotation, frictionally engaged with said driven shaft collar, whereby activating the drive motor unwinds the helical coils of the second torsion spring to release the frictional engagement with said drive shaft driven shaft collar.

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