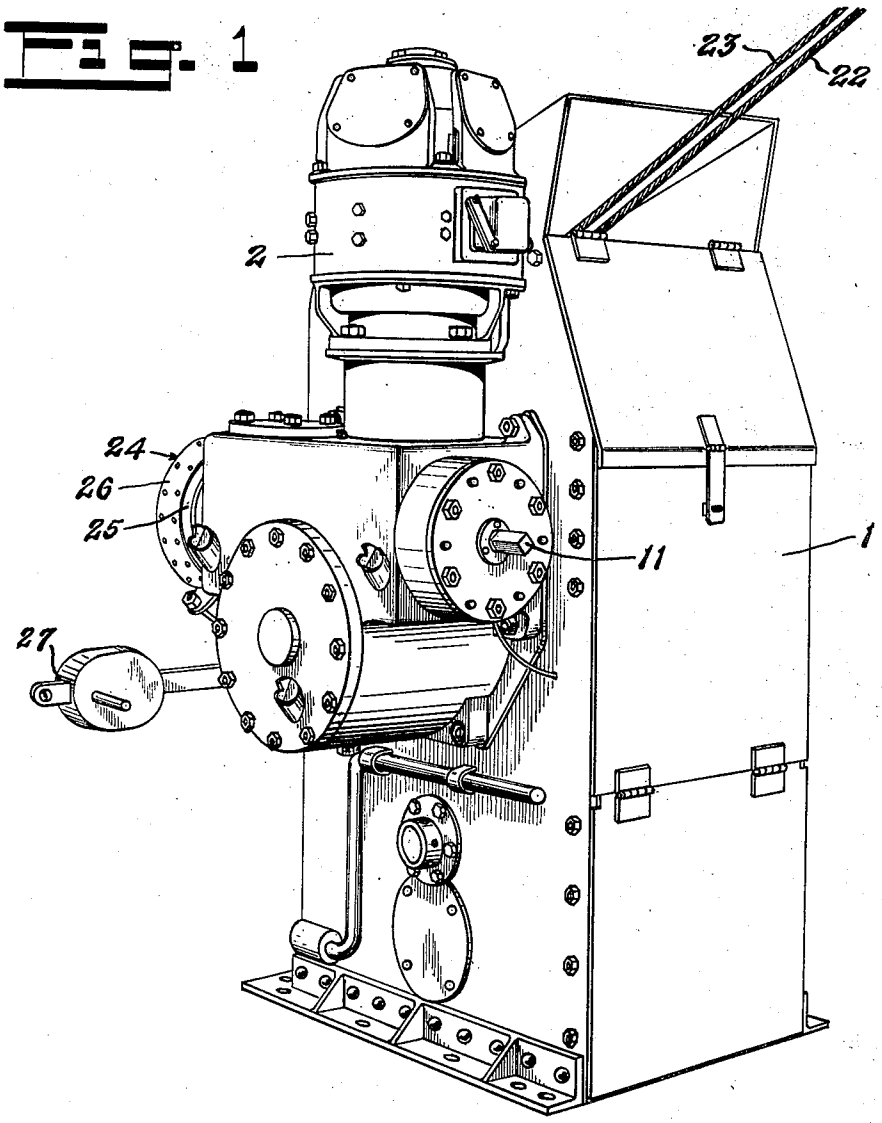
Nov. 19, 1940. C. L. HARKRADER 2,221,835

WINCH

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Fig. 1



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WINCH

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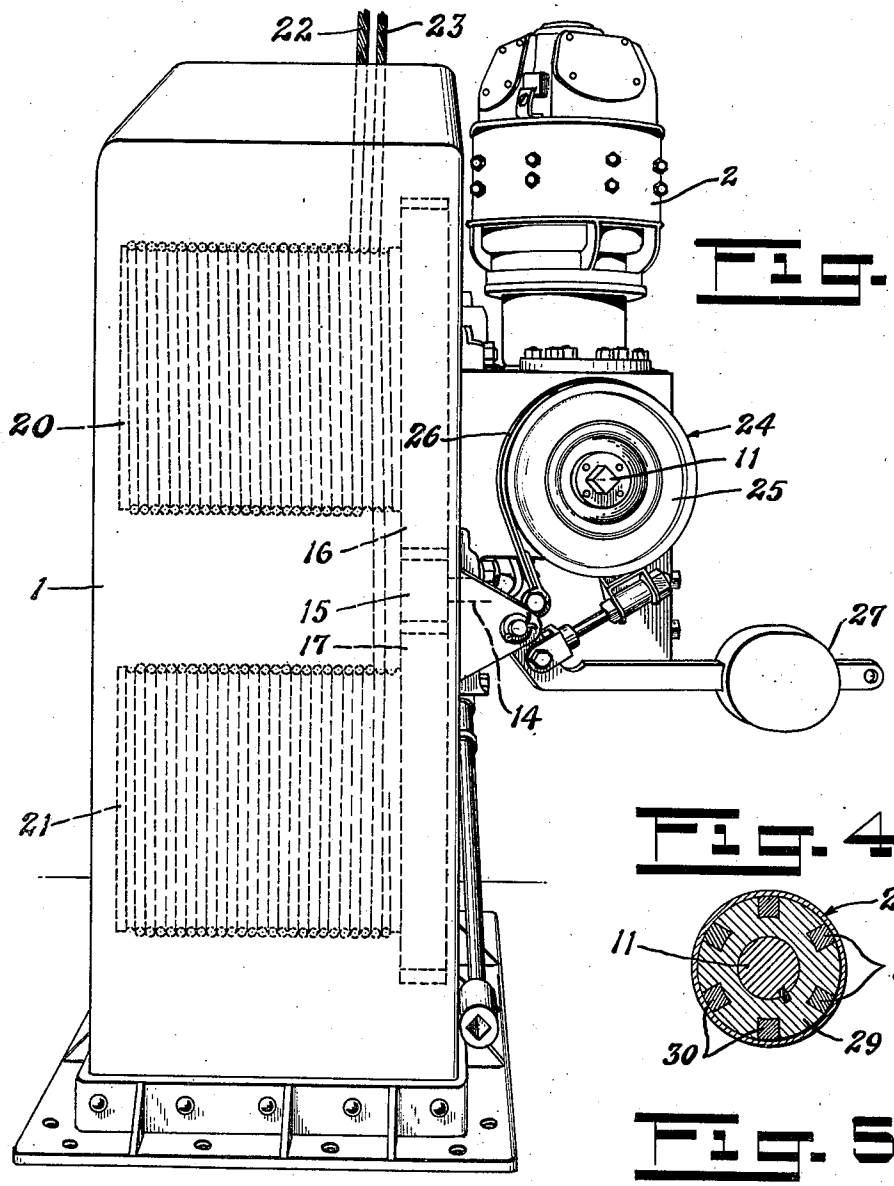
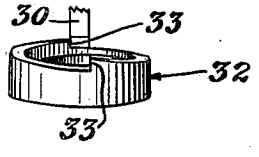


Fig. 2

Fig. 4

Fig. 5



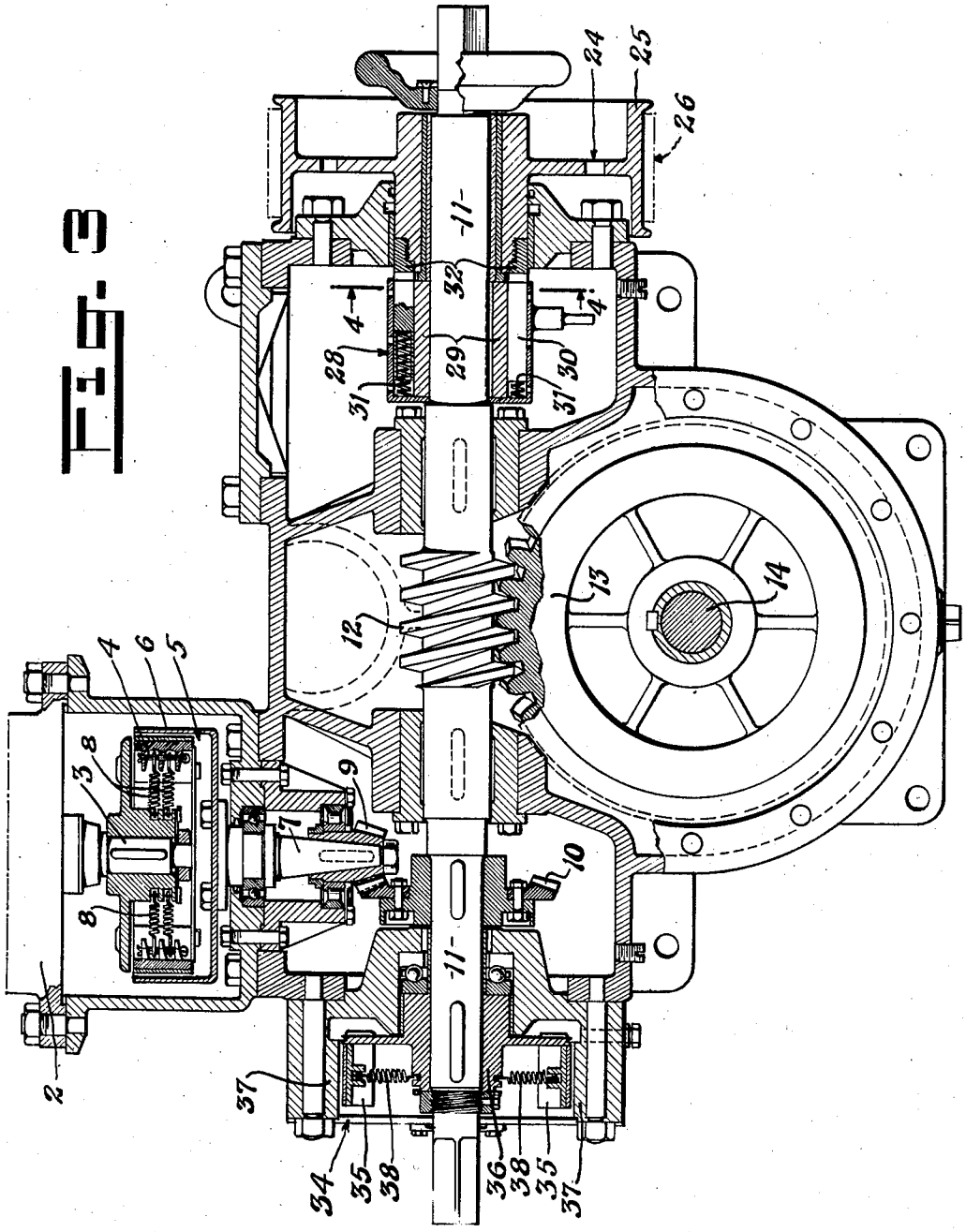
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Fig. 3



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UNITED STATES PATENT OFFICE

2,221,835

WINCH

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Application June 10, 1939, Serial No. 278,381

1 Claim. (Cl. 254—185)

This invention relates to a new and useful improvement in winches, particularly those employed in the highly specialized and exacting duty of raising and lowering life-boats hung on ship's davits. A winch for this purpose must be absolutely dependable, and, because of the almost inevitable failure of power in case of ship-wreck, must provide for the safe lowering of the life-boat independently of the motor. Also, means must be provided to insure that during the raising of the life-boat, it cannot drop in case of failure of power for any reason, or through incorrect or careless operation.

A winch having these characteristics is obtained by this invention, one form of which is shown in the accompanying drawings, of which—

Figure 1 is a view in perspective of the winch;

Figure 2 is a side elevation;

Figure 3 is a view, partly in section, of the mechanism of the winch; and

Figures 4 and 5 are detail views of the over-running clutch incorporated in the mechanism.

As shown, the winch consists of a housing 1, on which is mounted a motor 2. To the lower end of shaft 3 of motor 2, is attached the expandible element 4 of a centrifugal clutch 5, the other element of which is a cylindrical drum 6 mounted upon, or attached to, shaft 7 extending below and in alinement with motor shaft 3. Normally, the expandible or braking elements 4 of centrifugal clutch 5 are automatically held in retracted position as shown in Figure 3, out of engagement with drum 6 by springs 8.

On the lower end of shaft 7 is mounted a beveled pinion 9 which meshes with a beveled gear 10 keyed to a horizontal shaft 11. Shaft 11 also carries a worm 12, which meshes with a worm-wheel 13 keyed to a shaft 14. Shaft 14 is also provided with a pinion 15, which meshes with two identical gears 16 and 17 connected, respectively, to identical winding drums 20 and 21, respectively, which are preferably positioned one above the other to save deck space.

When the life-boat is to be raised, motor 2 is started, and when it has gained sufficient speed, shoes 4 of centrifugal clutch 5 will move outwardly to engage drum 6 of the centrifugal clutch, so that the power of the motor is transmitted through the beveled gears 9 and 10 to shaft 11, and from this shaft to the winding drums 20 and 21 through worm 12, worm-wheel 13, shaft 14, pinion 15 and gears 16 and 17. The fall 22 from one of the pair of davits for a life-boat is connected to the end of the usual spirally grooved surface of the upper winding drum 20, and the other fall 23 is similarly connected to the lower winding drum 21, and is given one or more turns around that drum, so that its position on the drum is slightly in advance of that of the other fall upon the upper drum. Therefore, since both drums turn in the same direction at the same speed, the upper drum 20 can be utilized as a guide for fall 23 which passes over it on its way to lower drum 21. In this way both falls can enter the housing through a relatively narrow opening 23a at the top of the housing, or, in other words, at the maximum height down the deck.

Since both winding drums are identical, and since both gears 16 and 17 are also identical and in constant mesh with pinion 15, they can only rotate together, in the same direction and at exactly the same rate of speed, so that both falls will be wound in, or payed out, simultaneously and at exactly the same speed, from which it follows that the life-boat will be positively maintained in a horizontal position.

As a positive safe-guard against the accidental dropping of the life-boat while it is being hoisted, through accidental or other failure of motor 2, a brake 24 is associated with shaft 11. This brake consists of a brake-drum 25 rotatably mounted upon shaft 11 and a surrounding brake-band 26 normally maintained in sufficient engagement with brake-drum 25 to prevent the brake-drum from turning under the load of a life-boat by means of a weighted arm 27. Brake-drum 25 is connected to shaft 11 by an over-running clutch 28 (Figs. 3, 4 and 5), which permits shaft 11 to turn in the winding-in direction independently of brake-drum 25, but not in the other direction. Therefore, while a life-boat is being hoisted, brake 24 may remain fully set at all times without interfering with the hoisting as a positive protection against the accidental dropping of the life-boat.

The over-running clutch between shaft 11 and brake-drum 25 may be of any desired type, that shown having proved entirely satisfactory. The form shown consists of a sleeve 29, keyed to shaft 11 and provided with recesses for the reception of pins 30 spaced 60 degrees apart, which are urged towards the brake-drum 25 by springs 31. The end of the hub of brake-drum 25 adjacent the ends of pins 30 is provided with a ratchet 32 having a pair of teeth 33 spaced apart 180 degrees and so shaped that when shaft 11 is turning in winding-in direction, pins 30 will simply ride over the teeth 33 of ratchet 32 without interfering with the rotation of shaft 11, although brake-drum 25 is stationary, but will prevent the

turning of shaft 11 in the other or paying-out direction, provided brake 24 is set, through the engagement of pins 30 with the teeth 33 of ratchet 32. Thus brake 24 affords positive assurance against accidental dropping of the life-boat at all times while it is being hoisted.

Whenever the motor is idle it is disconnected from the winch through the automatic operation of centrifugal clutch 5, so that the lowering of the life-boat is effected by simply releasing brake 24 to the desired degree by manually lifting weighted arm 27. This permits shaft 11 to turn in the lowering away direction under the control of brake 24. Consequently, the winding drums 20 and 21 will pay-out the falls at the rate determined by the degree to which brake 24 is released. Thus, the speed of lowering the life-boat is controllable by the manual manipulation of brake 24 through arm 27.

Since the manual manipulation of brake 24 injects another possibility of accident through human fallibility, a further safe-guard against too rapid lowering away is provided in the form of another centrifugal clutch 34, which may conveniently be associated with the end of shaft 11 opposed to brake 24. This clutch may be similar to centrifugal clutch 5, which serves as a means for connecting the motor to the winch and may be of any desired type. As shown, it consists essentially of brake-shoes 35, expandibly mounted upon a hub 36 keyed to shaft 11 and engageable, when expanded, with a cylindrical brake-drum 37 affixed to winch housing 1. Expandible shoes 35 of centrifugal clutch 34 are normally held out of engagement with brake-drum 37 by springs 38 so that centrifugal clutch 34 will not interfere with the winding in or lowering away of the falls unless the speed of rotation of shaft 11 exceeds the predetermined amount. However, if the boat is lowered too rapidly, through accident or the mishandling of hand-brake 24, centrifugal clutch 34 will operate to slow down the speed of rotation of shaft 11, and, consequently, the speed of lowering away of the life-boat, to the predetermined rate.

All parts of this winch may obviously be of very sturdy construction so that, barring breakage of the falls themselves, it is impossible for any untoward accident to befall the life-boat when being hoisted or lowered. Also complete and very delicate control over the life-boat is maintained, particularly of lowering, through the combined agencies of the overrunning clutch 28, manually-operated brake 24, and centrifugal clutch 34. In an emergency, life-boats may be safely lowered even by comparatively inexperienced persons, by means of this winch. Also, as shown in Figures 1 and 2, the winch is very compact, requires a minimum of deck space and may be very thoroughly protected from the weather, the only opening being that at the top of the housing through which the falls pass en route from the davits to the winding drums.

It will be understood that the winch described above may be modified in many respects without exceeding the scope of this invention.

I claim:

A ship winch for raising and lowering life boats, which includes two identical winding drums, one above the other, each of which is adapted to wind in or pay out a fall of a life boat davit, said upper drum also constituting a sheave or guide for a fall in its passage from the davit to the lower drum, a shaft, gearing between said shaft and said drums for turning said drums in the same direction simultaneously and at identical speeds, an electric motor for turning said drums in winding-in direction through said gearing, said motor normally being operatively disconnected from said drums a centrifugal clutch between said motor and said shaft for automatically connecting them so as to turn said shaft and said drums in winding-in direction when said motor exceeds a predetermined speed and to maintain said operative connection until the speed of said motor falls below said predetermined speed, a brake-drum loosely mounted on said shaft, a brake-band normally engaging said brake drum to prevent rotation thereof, an overrunning clutch, one element of which is fixed to said brake-drum and the other element to said shaft and so arranged as to permit rotation of said shaft in the other direction when said brake is set, said brake-band being manually releasable from said brake-drum to any desired degree for controlling the rate of rotation of said shaft in paying out direction when said motor is inoperative and a centrifugal brake associated with said shaft for automatically limiting the speed of rotation of said shaft in paying out direction to a predetermined speed independently of said other brake.

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