United States Patent [19]

Guangorena et al.

[11] **3,728,914**

[45] **Apr. 24, 1973**

[54] THREE SPEED DECK WINCH

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[73] Assignee: **Barient Company**, San Carlos, Calif.

[22] Filed: **Dec. 29, 1970**

[21] Appl. No.: **102,293**

[52] **U.S. Cl.** ..... **74/812**, 254/150 R

[51] **Int. Cl.** **F16h 5/72**, B66d 1/24

[58] **Field of Search** ..... 74/812; 254/150 R

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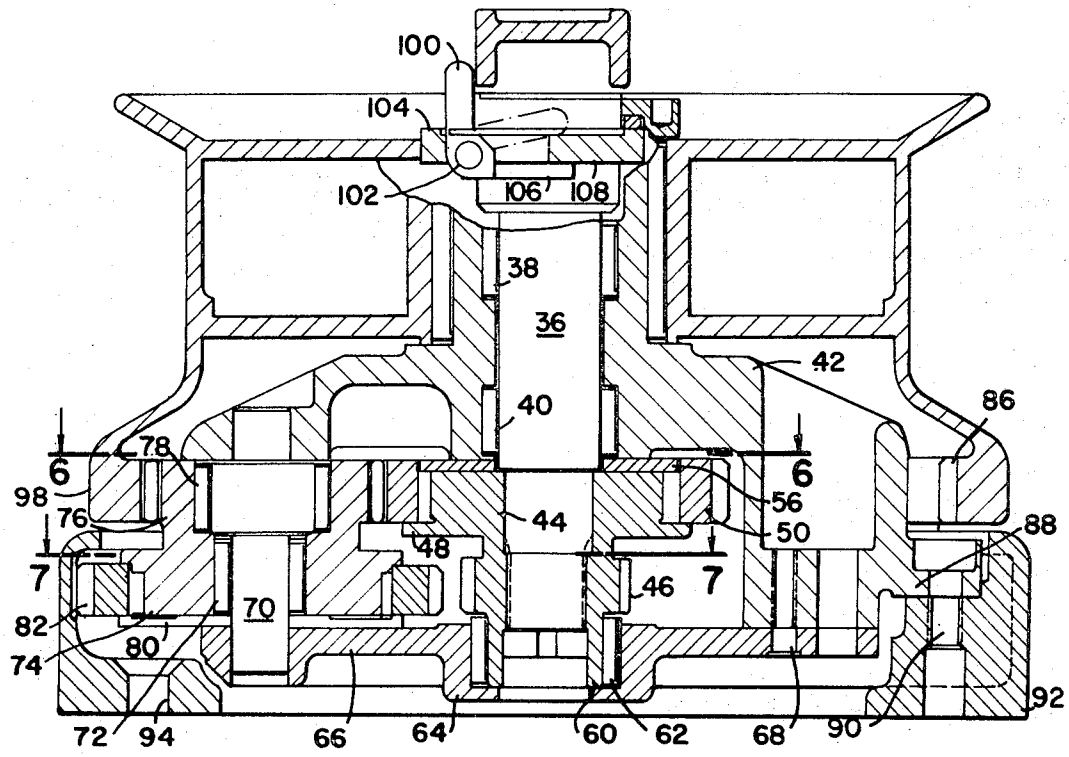
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Primary Examiner—Charles J. Myhre
Assistant Examiner—Thomas C. Perry
Attorney—Owen, Wickersham & Erickson

[57] **ABSTRACT**

A winch particularly adapted for hauling lines on a sailing craft which will provide three wind-up speeds of the drum for one speed applied to a central shaft by a winch handle or a segment wheel attached to the shaft. Internally, the winch has a gear train mechanism including two rachet gears that provide two different drum speeds when the handle or segment wheel is rotated in opposite directions. A first speed is provided by an engaging means on the drum which causes it to be directly driven in one direction while overriding both ratchet gears of the internal gearing. The engaging means is retracted by movement of the handle or segment wheel in the opposite direction which thus drives the drum at a second speed through one ratchet gear of the internal gear mechanism. Another reversal of the handle or segment wheel causes the drum to be driven at a third speed through the other ratchet gear as long as the engaging means remains in its retracted position. The movable element of the engaging means may be situated in the end face of the drum or in the handle.

16 Claims, 26 Drawing Figures



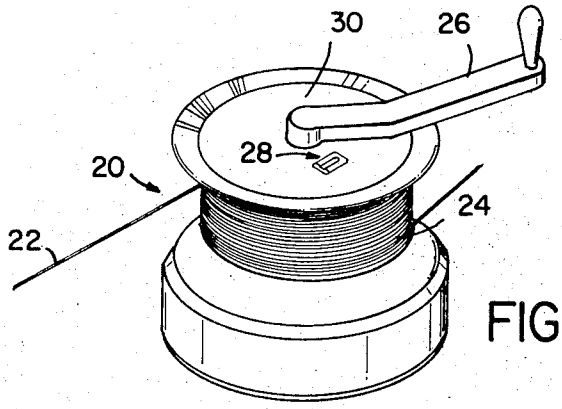


FIG_1

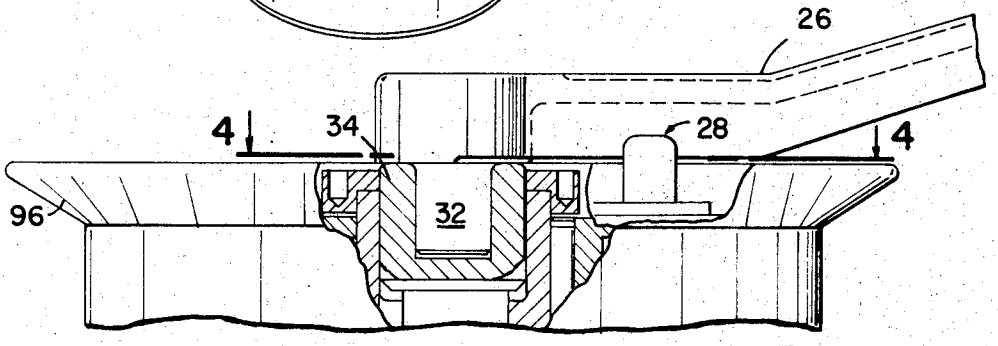


FIG_3

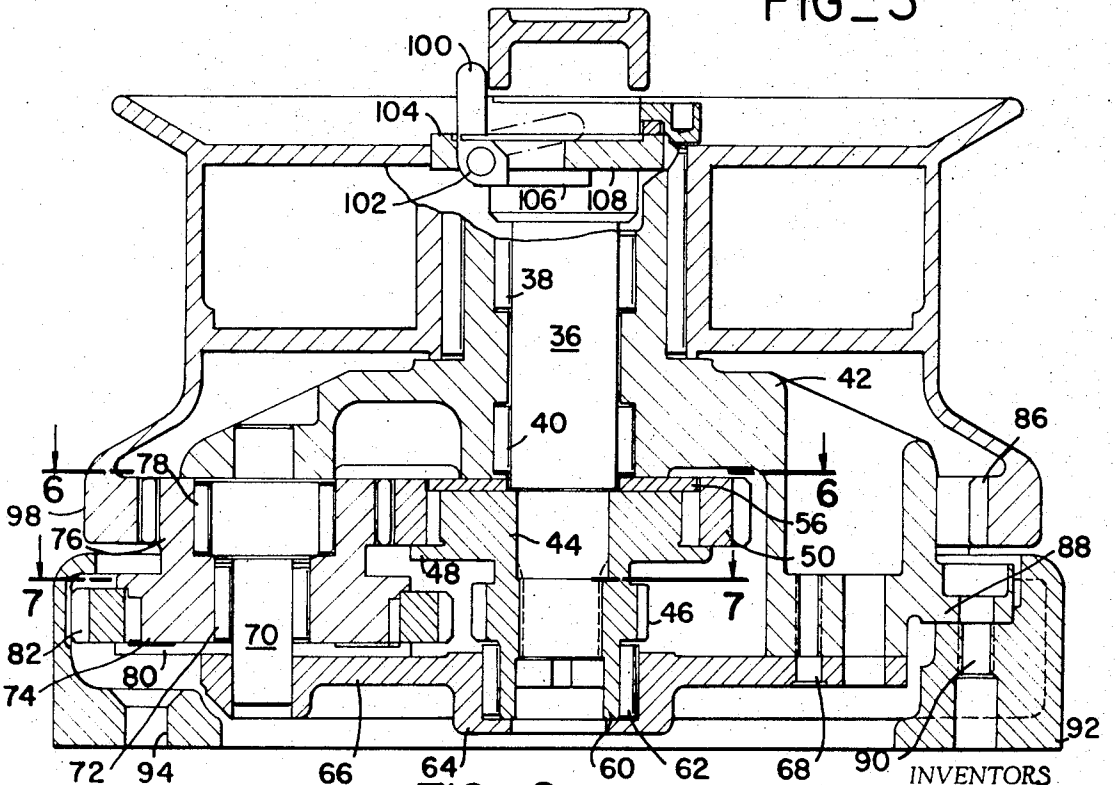


FIG_2

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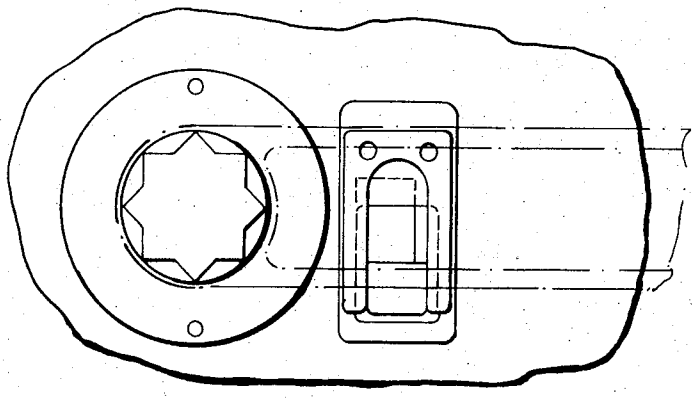


FIG_4

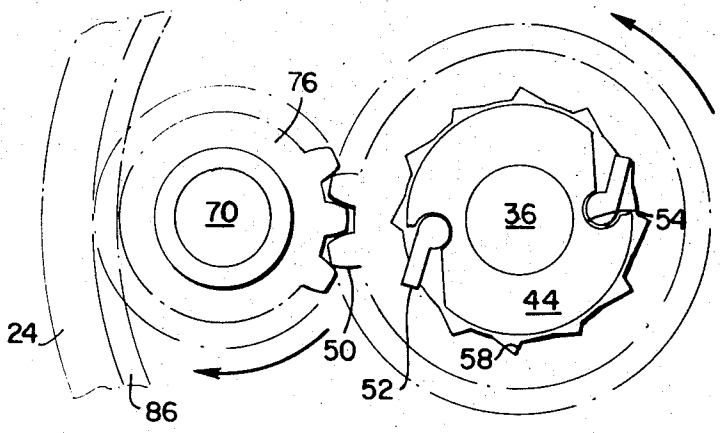


FIG_6

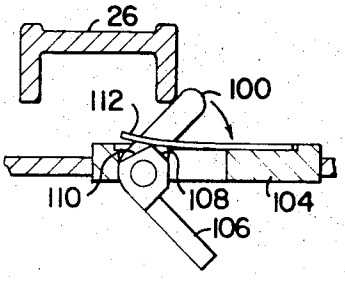


FIG_5

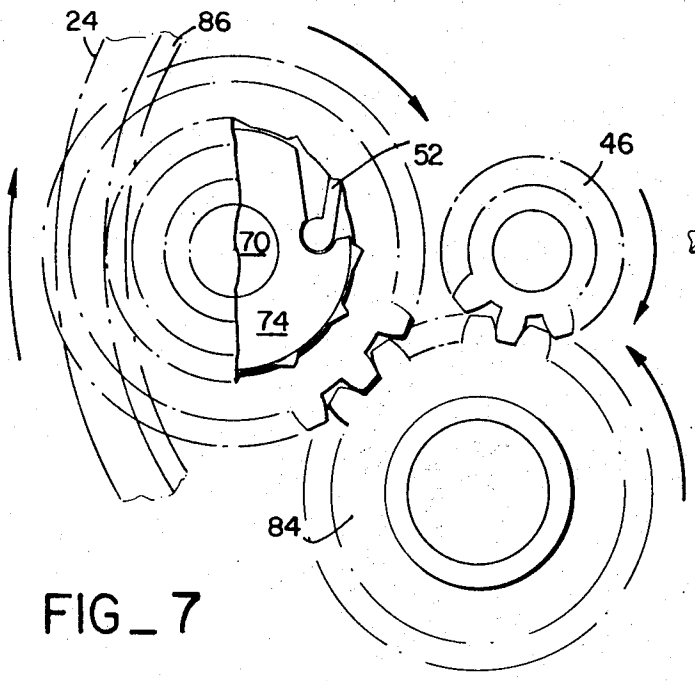


FIG_7

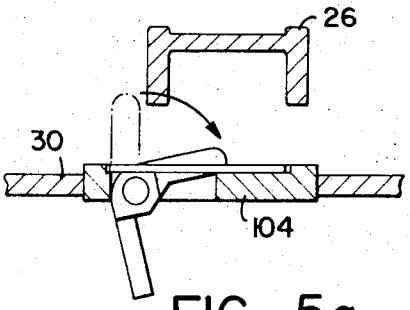


FIG_5a

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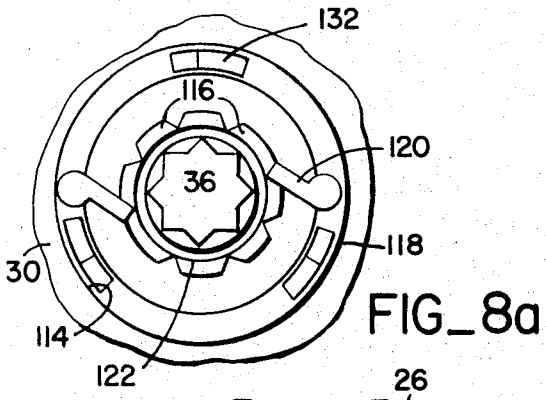


FIG_8a

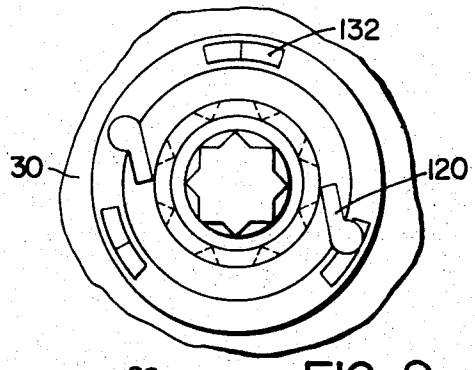


FIG_9a

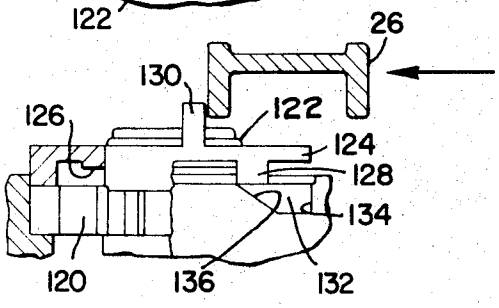


FIG_8

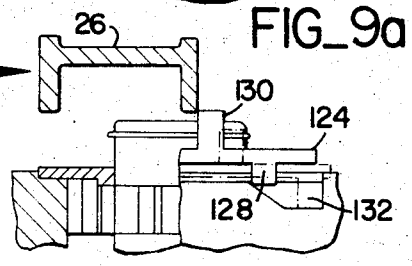


FIG_9

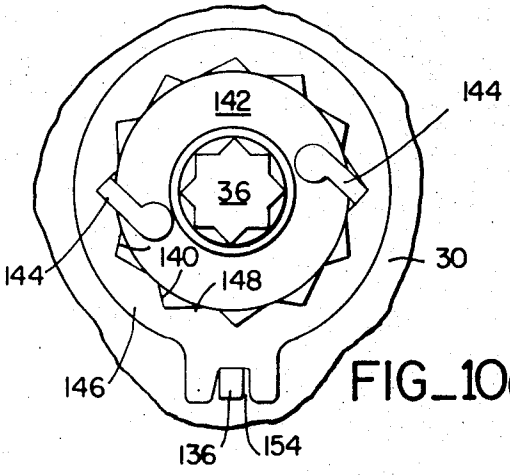


FIG_10a

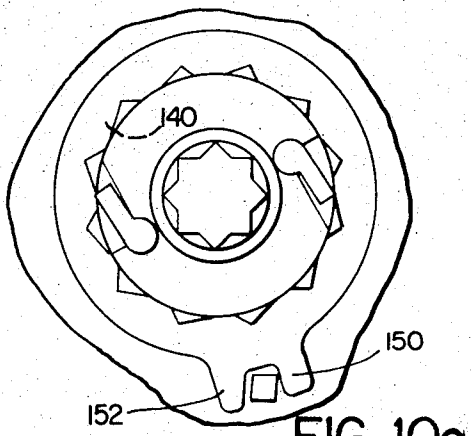


FIG_10c

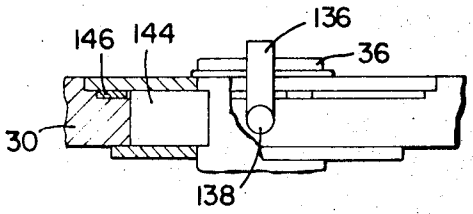


FIG_10

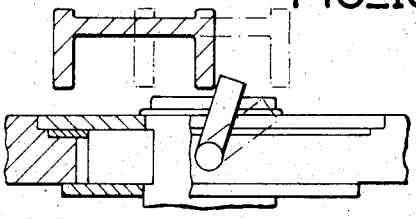


FIG_10b

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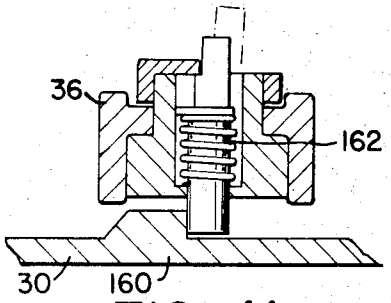


FIG_11

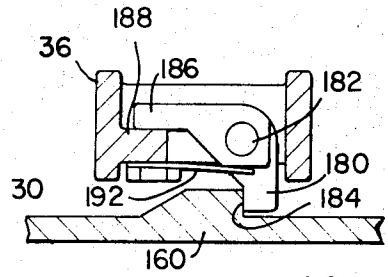


FIG_12

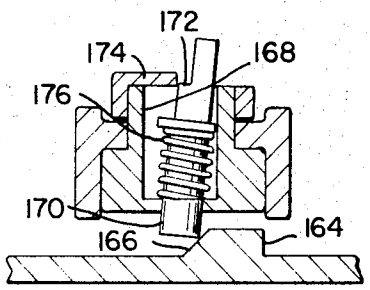


FIG_11a

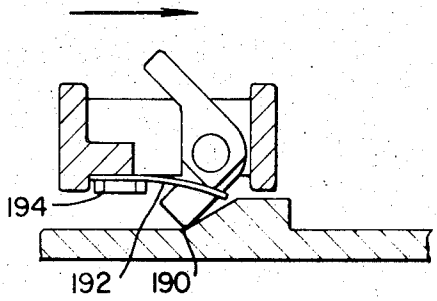


FIG_12a

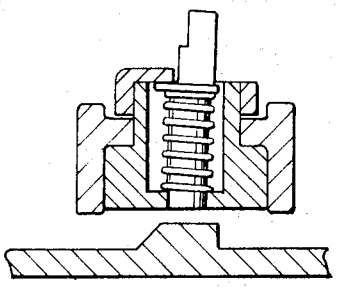


FIG_11b

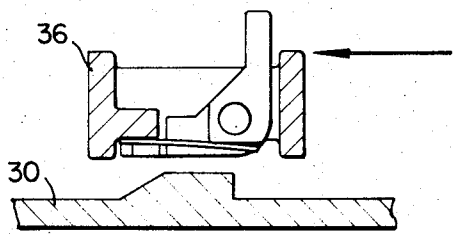


FIG_12b

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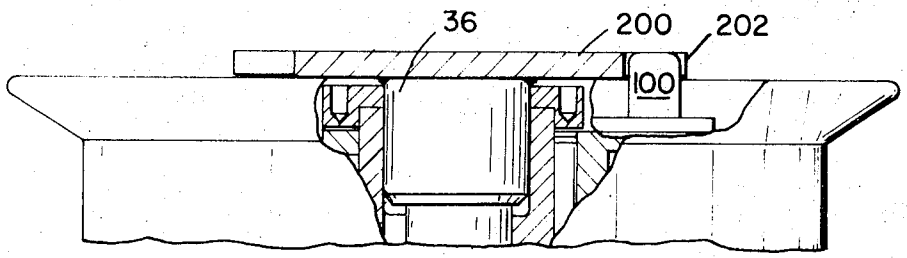


FIG_13

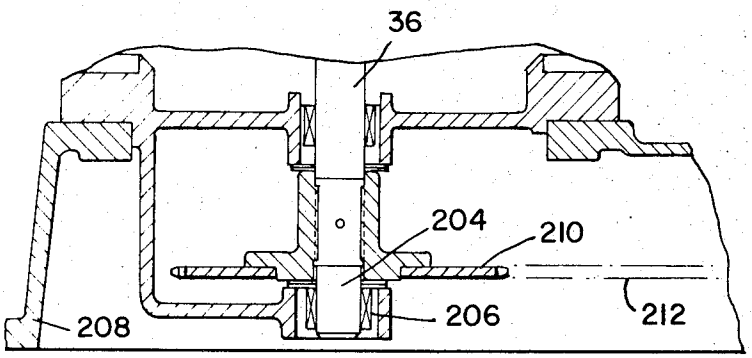


FIG_15

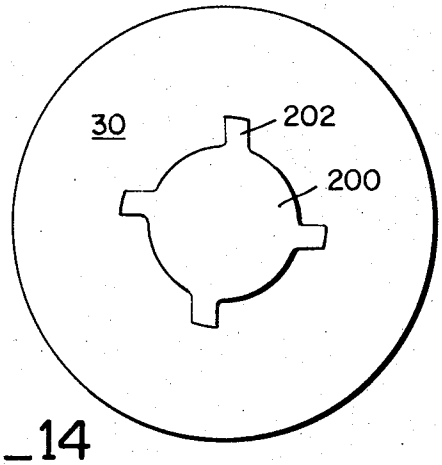


FIG_14

FIG_16

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THREE SPEED DECK WINCH

This invention relates to an improved winch particularly adaptable for installation on sailing boats and other marine craft for providing hauling force to a rope or cable wrapped around the winch drum.

Deck winches on sailing craft are often essential to provide the power necessary to haul or reef sails. Usually, such winches are manually operated by a crank handle to turn a drum around which a line or rope from the sail is passed. Since wind conditions, sizes of sails and other factors can vary considerably in any sailing operation, the wind-up power and speed requirements of the deck winch will also vary accordingly. Heretofore, winches have utilized internal gearing to provide two different gear ratios by movement of the hand crank in opposite directions. A winch with a third gear ratio that would give greater versatility for handling a wider range of conditions was a long felt need in the art prior to the present invention. However, attempts to provide the third gear ratio resulted in complex gearing mechanism such as combinations of complicated gear trains and clutches. Such mechanisms were generally unsatisfactory because they were expensive to manufacture, difficult to maintain, and they lacked the strength and durability required for long and reliable use.

One object of the present invention is to provide an improved deck winch that will provide three different selectable drum speeds by turning the crank at a constant speed.

Another object of the present invention is to provide a three speed deck winch that is relatively simple in construction, yet strong, and therefore durable even under hard, continuous use while also being easy to service and maintain.

Another object of the present invention is to provide a deck winch that will provide three different drum speeds and is particularly well adapted for ease and economy of manufacture.

Another object of the present invention is to provide a deck winch that will provide three different drum speeds and can be operated by either a hand crank on the winch or by a segment wheel on the winch through gearing operated by a remote drive means.

A more specific object of the present invention is to provide a deck winch that will provide three different drum speeds and will shift rapidly from one speed to any of the other two speeds by manipulation of the hand crank or segment wheel.

Yet another object of the present invention is to provide a three speed deck winch wherein one speed is derived by means providing a direct driving engagement between either a hand crank or a segment wheel and the winch drum with an arrangement wherein this means can be actuated and driving engagement can be quickly discontinued by mere reversal of the hand crank or segment wheel.

The aforesaid and other objects are accomplished by a winch comprised of a drum surrounding a central shaft to which is attached a crank handle. Within the drum the shaft is connected to internal gearing that includes a pair of ratchet gears of different sizes. When the crank is rotated in one direction the first ratchet gear is engaged to drive the drum, and when the crank is rotated in the other direction the first ratchet gear

overrides and the second ratchet gear is engaged and drives the drum at another speed. On the top end of the drum about which the handle rotates is an extendable engaging means which normally is retracted into the drum. When the third winch speed is desired, the engaging means is extended and the handle bears against it as it is rotated in the wind-up direction. This causes a direct coupling of the handle and the winch drum and when these two are rotated simultaneously they override both of the ratchet gears. When the handle (or a segment wheel) is bearing against the extendable means to provide the aforesaid direct drive operation, the shift to another gear ratio is accomplished by reversal of the handle which automatically moves the extendable means into its retracted position and engages one of the ratchet gears in the driving position. The operation and shifting of the winch from one gear to another is thus simple, easy and requires a mere reversal of handle or segment wheel rotation except for the manual extension of the extendable engaging means.

Other objects, advantages and features of the present invention will become apparent from the following detailed description thereof presented in conjunction with the following drawings, in which:

FIG. 1 is a view in perspective of a deck winch embodying the principles of the present invention;

FIG. 2 is an enlarged view in elevation and in section of the winch shown in FIG. 1;

FIG. 3 is an enlarged fragmentary view in elevation and partially in section showing the winch of FIG. 2 rotated 90°;

FIG. 4 is a fragmentary plan view taken along the line 4—4 of FIG. 3;

FIGS. 5 and 5*a* are fragmentary views in section showing the engaging means for the winch of FIGS. 1 – 4 being moved to the retracted position;

FIG. 6 is a fragmentary view in section showing internal gearing for the winch and taken along the lines 6—6 of FIG. 2;

FIG. 7 is a fragmentary view in section taken along the line 7—7 of FIG. 2;

FIG. 8 is a fragmentary view in elevation showing another form of engaging means for providing a direct coupling between the handle and the winch drum in accordance with the present invention;

FIG. 8*a* is a fragmentary plan view of the engaging means of FIG. 8;

FIG. 9 is another fragmentary view in elevation and in section showing the engaging means of FIG. 8 approaching the retracted position;

FIG. 9*a* is a plan view of the engaging means shown in FIG. 9;

FIG. 10 is a view in elevation and in section showing another form of drum-handle engaging means according to the present invention;

FIG. 10*a* is a plan view of the engaging means shown in FIG. 10;

FIGS. 10*b* and 10*c* are views similar to FIGS. 10 and 10*a* showing the same engaging means as it moves toward the retracted position;

FIG. 11 is a view in elevation and in section showing a drum-handle engaging means mounted in the winch handle according to the present invention;

FIGS. 11*a* and 11*b* are views similar to FIG. 11 showing the same engaging means in different operating positions;

FIG. 12 is a view in elevation and in section showing another engaging means installed in the winch handle according to the present invention;

FIGS. 12*a* and 12*b* are views similar to FIG. 12 showing the same engaging means in other operational positions;

FIG. 13 is a fragmentary view in elevation and in section showing our winch using a disc-like driving member in lieu of a handle;

FIG. 14 is a fragmentary top view of the winch in FIG. 13;

FIG. 15 is a fragmentary view in elevation and in section showing the lower portion of the winch of FIG. 13; and

FIG. 16 is a view in elevation showing the winch of FIG. 13 with a remotely operated cranking means.

Referring to the drawing, FIG. 1 shows a deck winch 20 embodying the principles of the present invention as it appears when installed on a sailing boat. In normal use, the line 22 to be hauled is wrapped several times around the winch drum 24 which turns at one of three selected speeds when a handle 26 is manually operated. In one direction of handle movement, as shown, it bears against an engaging means 28 in the upper end face 30 of the drum. As will be seen from the following description this handle engaging member is retractable so that the handle will disengage from it and move relative to the drum to operate gearing housed within it. This internal gearing imparts different speeds to the drum depending on the direction of rotation of the handle.

In FIGS. 2 and 3, the aforesaid gearing and handle engaging member is shown in greater detail. The handle 26 has a head end with a flat sided projection 32 that fits within a similarly shaped socket in an enlarged upper end portion 34 of a main shaft 36 for the winch. This shaft is rotatable and supported by a pair of bearings 38 and 40 seated within an upper internal bearing support 42. At its lower end the shaft is keyed to a pawl carrier 44 which is integral with center pinion 46 directly below it. This pawl carrier has a lower flange 48 which supports a ratchet gear 50, and spaced diametrically apart on its opposite sides are a pair of pivotal spring-loaded pawls 52 that are pivotally seated within cylindrical shaped sockets 54 within the carrier (See FIG. 6). These pawls are retained in place by an annular cap plate 56 that fits around the shaft 36 between the upper surface of the carrier and the bearing support 42. The ratchet gear 50 has gear teeth around its outer periphery and notches 58 spaced apart along an inner surface that are engaged by the pawls 52. These notches are shaped so that rotation of the pawl carrier in one direction will seat the pawls therein and rotate the ratchet gear 50, whereas rotation of the carrier in the opposite direction will override the ratchet gear and not cause it to move.

Below the pawl carrier the center pinion gear 46 has an integral hub portion 60 extending downwardly which is supported in another bearing 62. This bearing is seated in a central boss portion 64 of a lower internal support 66 that is connected to the upper support 42 by a bolt 68 or machine screws. A smaller secondary shaft 70 which is parallel to the central shaft and spaced radially from it, is fixed at its ends in the upper and lower internal support members 42 and 66. Rotatably mounted on this smaller shaft by a bearing 72 is another pawl carrier 74 having pawls 52*a* which is below and integrally connected with a final drive pinion 76 supported by a bearing 78. This pawl carrier is similar in its construction to the other pawl carrier except that its pawl retainer plate 80 is located on the bottom surface of the pawl carrier and bears against the lower internal support member 66. A ratchet gear 82 for the pawl carrier 74 is similar to the ratchet gear 50 and is aligned horizontally with the pinion gear 46 (See FIG. 7). An idler gear 84, also supported on a shaft between the upper and lower internal support members, is meshed with the center pinion gear 46 and the ratchet gear 82 of the pawl carrier 74. The drive pinion 76 above the pawl carrier 74 is meshed with the first ratchet gear 50 as well as a ring gear 86 that extends circumferentially around the inside lower rim of the winch drum 24.

The upper internal support member 42 within the drum has a number of lugs 88 that are spaced apart circumferentially around its edge and these are connected by bolts 90 to a base housing 92 for the winch. Other spaced apart holes 94 in a lower flange of this base housing may be utilized to fasten the winch permanently to a boat deck. Outwardly, the drum has more or less a conventional shape with a cylindrical central portion, an outwardly flaring flange 96 around its upper end face 30 and a lower end portion 98 that flares outwardly and supports the internal ring gear 86. Preferably, the drum base housing and handle are all made from some strong corrosive resistant metal such as stainless steel or some other metal that may be plated or coated with a protective finish.

In the embodiment shown in FIGS. 1 to 7, the engaging means 28 comprises a manually operable pawl 100 which is mounted in the upper end face 30 of the drum approximately midway between its outer flange 96 and the handle socket 34. This pawl is pivotally supported on a pin 102 at one end which is journaled in a frame-like member 104 welded to the drum face. Attached to the pawl and extending from its pin connected end at a right angle is an arm 106. When the pawl is in an upright position as shown in FIGS. 2 and 3, the arm 106 bears against the bottom side of a portion 104 of the drum end face, thereby serving as a stop that prevents the pawl from rotating further. Thus, when the handle forces the pawl against stop 104, the handle force is transmitted directly to the drum, whereas when the handle rotates around to engage the pawl from its other side, as seen in FIGS. 5 and 5*a*, the pawl will rotate downwardly to its retracted position which is substantially flush with the drum face 30, thereby allowing the handle to pass over the pawl. Adjacent to the pawl 100 near its pin connected end is a hub portion having a pair of flat surfaces 108 and 110 that meet along an edge. A leaf spring 112 attached at one end to the member 104 is aligned with the surfaces 108 and 110. When the pawl 100 is in the "up" position, this spring lies flat against the surface 108.

In operating the winch 20 with the pawl 100 in its "up" position, the handle 26, rotated in the clockwise direction, as shown in FIG. 2 will bear against it and thereby provide a direct coupling to the drum 24 causing it to turn at the same rate. During this first speed, since the shaft 36 and drum are rotating together, the pawls 52 and 52*a* on both of the carriers 44 and 75

override their respective ratchet gears. Now, when the handle is reversed to the counterclockwise direction, it strikes the rear side of the pawl **100** (FIGS. **5** and **5***a*) causing it to rotate about its pivot pin **102** to the horizontal position which is substantially flush with he end face of the drum. As the pawl rotates, the leaf spring **112** is momentarily deflected upwardly and then lies flush against the cam surface **110** to hold the pawl in its down position. The counterclockwise movement of the handle also causes the shaft **36** to drive the pawl carrier **44** and its pawls **52** thus engage and drive the ratchet gear **50**. This drives the pinion gear **76** which is meshed with the ring gear **86** of the drum **24**, thereby turning the drum at the second speed. At this time, the pawls **52***a* of the carrier **74** are overriding their ratchet gear **82**. When the third speed is desired, the handle is reversed again to the clockwise rotation, but since the pawl **100** is in its downward position, the handle passes over it. The shaft thus turns the center pinion **46** which drives the idler gear **84** that is engaged with the ratchet gear **82**. This rotates the ratchet gear so that the pawls **52***a* engage and drive the carrier **74** as well as the drive pinion **76** which again rotates the drum in the same wind-up direction but at the third speed due to the sizes of the pinion gear **46**, the idler gear **84** and the ratchet gear **82**. Whenever the "first speed" condition is required, the engaging pawl **100** is merely rotated manually to its "up" position as shown in FIGS. **2** and the leaf spring **112** will retain it in that position until the handle direction is reversed.

In the embodiment shown in FIGS. **8** and **9**, an annular recess **114** is formed in the upper end face **30** of the drum around the upper end of the drive shaft **36** which is provided with a series of circumferentially spaced apart and longitudinally extending external notches **116**. Seated within the recess is an annular ring member **118** within which are mounted a pair of pivotal pawls **120**, spaced 180° apart. These pawls are normally urged inwardly into engagement with two of the notches **116** in the shaft. Above the notches on the shaft and retained thereon by an end washer is a smooth cylindrical end portion **122** about which is a slidable annular collar **124** having a downwardly extending lip **126** around its inner edge. Radially outwardly from this inner lip are a series (e.g. three) of circumferentially spaced apart lugs **128** that extend downwardly. The collar also has a single lug member **130** that projects upwardly from its outer edge. In the upper surface of the ring member **118** are a series of similarly spaced apart recesses or detents **132** which are spaced from the shaft **36** the same distance radially as the lugs. Each of these recesses has a vertical wall **134** at one end and a sloped camming surface **136** at its other end. As shown in FIGS. **8** and **8***a*, when direct drive of the drum is desired, collar **124** is manually rotated clockwise so that its downwardly extending lugs **128** move up the sloped surfaces **136** and out of the recesses **132**. This moves the collar lip portion up and allows the pawls **120** to engage the notches **116** in the shaft. Now, as the handle is rotated clockwise, it is directly coupled to the drum. When the second speed is desired, the handle is rotated counterclockwise until it engages the lug member **130** from its opposite side, as shown in FIG. **9**. This rotates the collar **124** relative to the shaft until the downwardly extending lugs **128** register with the recesses **132**. As this occurs, the collar slides downwardly by gravity until the lugs **128** bear against the vertical end walls **134** of the recesses. Also, as the collar moves down, its inner lip **126** comes between the pawls **120** and the shaft notches **116**, thereby disengaging them. When the third speed is desired, the handle is again rotated in the clockwise direction and passes over the lug **130** allowing the collar to remain in its lower position. This drives the drum at the third speed through the internal gearing, as previously described. If the first speed is desired, the collar is merely rotated manually to its "up" position with the lugs **128** out of the recesses **132**. If it is desired to shift directly from the first speed to the third speed the collar can similarly be moved manually to its down position, as shown by the dotted line in FIG. **9**.

Another arrangement for achieving the direct drum drive similar to that shown in FIGS. **8** and **9** is shown in FIGS. **10** to **10***c*. Here, a pivotal lug **136** is mounted by a pin **138** at its lower end that is journaled within a recess in the upper end face **30** of the drum located at a radial distance from the device shaft **36**. This lug is thus pivotal between a substantially horizontal position, wherein it is fully within its recess, to a vertical position wherein it extends upwardly from the recess above the drum face. The drum end face has an opening formed with a series of ratchet notches **140** spaced apart around its circumference. Fixed to the drum shaft **36** is a circular ratchet gear **142** having a pair of spring loaded pawls **144** mounted in it and spaced apart 180°. When these pawls are allowed to extend outwardly as the drum shaft is rotated clockwise, as shown in FIG. **10***a*, they will engage the notches **140** and thus drive the drum directly. A generally circular ratchet plate **146** is seated within an annular recess in the drum end face **30** so it can rotate freely with respect to the shaft **36**. This ratchet plate has an inner periphery with a series of notches **148** having the same size, shape and spacing as the notches **140** of the drum face. On the outer surface of this plate are a pair of projections **150** and **152** forming a slot **154**. When the plate **146** is positioned so that the lug **136** is within the slot **154** with the vertical face of the projection **150** bearing against the lug in the upright position, the notches **148** of the plate **146** are synchronized with the notches **140** of the drum face. This allows the pawls **144** to engage the drum directly and drive it at the first speed as a handle **26** within the end of the shaft is turned clockwise. Now, when the handle is turned counterclockwise, as shown in FIG. **10***b*, the projection **152** bears against the lug **136** thereby causing it to pivot downwardly into its retracted position. Simultaneously, the synchronizing plate **146** is rotated so as to remove the pawls **144** from their notches **140** by effectively blocking them. The winch thus operates at its second speed through the internal pinion gear **50**, as previously described. When the handle is again moved in the clockwise direction, it passes over the retracted lug **136** and the rotated synchronizing plate **146** still prevents the pawls from engaging the notches. Thus, the winch now operates at its third speed through the internal ratchet gear **82**. Again, the first speed condition can be set at any time by merely manipulating the pivotal lug to its upright position within the slot **154**, which thus positions the synchronizing plate **146** so that the pawls **144** will engage the notches of the drum end face.

As shown in FIGS. 11 to 11*b*, the first speed condition may also be achieved by means of a stop member 160 that is fixed to the end face 30 of the drum and a retractable engaging member 162 in the handle. The stop member may be a single metal stud spaced radially from the shaft and provided with a vertical surface 164 at one end and a sloped camming surface 166 at its other end. In this arrangement, the engaging member comprises a vertical plunger 162 that is movable within a cylindrical bore 168 within the handle. The plunger has a lower end portion 170 that can extend downwardly below the level of the stop member and thus bear against its vertical end face 164. The upper end of the plunger has a shoulder 172 which will bear against a plunger stop 174 on the handle to hold the plunger in the down position against a coil spring 176 within the bore 168 that normally urges the plunger upward. Thus, when the plunger is in the "down" position of FIG. 11 with its lower end 170 bearing against the stop member 160, the handle 36, rotated in the clockwise direction, will provide the first speed direct drum coupling. When the second speed is desired, the handle is merely reversed to the counterclockwise direction until the lower end of the plunger strikes the rear camming surface 166 of the stop member. This tilts the plunger 162 and pushes its shoulder 172 free of the stop 174 so that the spring 176 can retract it fully away from the stop member. Now, the handle can again be rotated in the clockwise direction to pass over the stud member 160 and achieve the third drum speed through the internal gearing as previously described.

In the embodiment of FIGS. 12 to 12*b* a pivotal pawl 180 is installed in the handle in lieu of the plunger 162. Here, this pawl is pivotal about a pin 182 journaled within the handle and has a surface 184 at one end that bears against the stop member's vertical surface 164 when in the "down" position. In this position, the pawl is prevented from further rotation by engagement of its other end 186 against a horizontal surface 188 within the handle, and when the handle is rotated in a clockwise direction, the direct drum coupling or first speed condition is provided (FIG. 12). Now, when the handle is reversed to the counterclockwise direction, the lower outside end 190 of the pawl 180 engages the sloped rear surface 166 of the stop member 160 and is rotated about its pin 182 to an "up" position. As the handle is turned in this direction, it drives the drum at the second speed through the internal gearing. When the pawl is thus pushed toward its "up" position it is urged and retained in that position by a leaf spring 192 fixed at one end 194 to the underside of the handle. Now, when the handle is turned again in the clockwise direction, as shown in FIG. 12*b*, it passes over the stop member 160 and drives the drum at the third speed through ratchet gear 82. To achieve the first speed condition, the pawl 180 in the handle is merely moved to the down position manually.

While the various embodiments of our invention described above show the winch 20 having a handle 26 connected to the upper end of the central shaft for driving the drum, it may be desirable to operate the winch from a remote station. Thus, as shown in FIG. 13, in lieu of the handle 26, a segment wheel 200 is attached to the upper end of the central shaft 36. This wheel is a flat, disc-like, member and, as seen in FIG. 14, it has circumferentially spaced apart and radially extending dogs or cain portions 202 that will actuate the engaging means 100 (or 130 and 136) in the same manner as the edge of the handle. In a typical installation, the lower end of the central shaft 36, as shown in FIG. 15, is provided with an extension 204 journaled in a bearing 206 that is supported within a housing 208. Fixed to this shaft extension is a sprocket 210 which is connected by a chain 212 to another sprocket 214. The latter sprocket is fixed to the lower end of a vertical shaft 216 housed within a pedestal assembly 218. At its upper end, this latter shaft may be connected through appropriate gearing (not shown) to one or a pair of hand cranks 220. Thus, it is seen that our winch 20 can be operated by drive means directly attached to the winch or a similar drive means located at some convenient location remote from the winch.

To those skilled in the art to which this invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the spirit and scope of the invention. The disclosures and the description herein are purely illustrative and are not intended to be in any sense limiting.

I claim:

1. A three speed deck winch adaptable for sailing boats comprising:

a drum having a cylindrical body and an end face;

a shaft extending through the central axis of said drum;

a driving means attached to said shaft;

internal gearing means and clutch means connected thereto within said drum body and engageable with said shaft for driving said drum at different speeds when said shaft is rotated at the same speed in both its clockwise and counterclockwise directions;

and engaging means for directly interconnecting said driving means and said drum in one position so that rotation of said driving means in a first direction will rotate said drum at the same rate while overriding said internal gear means, said engaging means being movable by said driving means in a second direction opposite to said first direction to a fully retracted and disconnected position that allows said driving means to move over the end face of said drum and thereby operate said internal gearing to turn the drum at a different speed.

2. A deck winch as described in claim 1 wherein said engaging means is movable to the retracted position by rotation of said driving means in the opposite direction to said first direction.

3. A deck winch as described in claim 1 wherein said engaging means is mounted on said end face of said drum.

4. A deck winch as described in claim 1 wherein said driving means comprises a handle fixed to the upper end of said shaft.

5. A deck winch as described in claim 1 wherein said driving means comprises a disc-like member fixed to the upper end of said shaft having circumferentially spaced apart dog portions for contacting said engaging means, and means fixed to the lower end of said shaft for turning it and said disc-like member in either direction.

6. A deck winch as described in claim 4 wherein said engaging means includes movable means mounted in said handle.

7. A deck winch as described in claim 4 wherein said engaging means comprises a pivotal pawl mounted within a recess in said end face of said drum at a radial distance from said shaft and including a first portion movable to an upright position extending into the plane of rotation of said handle from a retracted horizontal position that is below the handle's plane of rotation and stop means for preventing movement of said first portion beyond its upright position.

8. A deck winch as described in claim 7 including a circular member fixed to the upper end of said shaft centrally located within a circular opening in said upper end face of said drum, said opening having a series of circumferentially spaced apart notches, a plurality of spring-loaded pawl members mounted within said circular member and normally urged outwardly to drivingly engage said notches when said shaft and said circular member are rotated in one direction and to override said notches when rotated in the opposite direction, synchronizing means on said drum engageable with said pivotal pawl on said end face of said drum and having means for allowing said spring-loaded pawl members to drivingly engage said notches when in a first position to provide one speed, said synchronizing means being movable relative to said notches to a second position by said pivotal pawl to prevent said spring-loaded pawl members from engaging said notches, thereby causing said drum to rotate at another speed through said internal gearing means.

9. The deck winch as described in claim 8 wherein said synchronizing means comprises a generally annular plate having an opening with notches similar in shape to those of said opening in said drum end face, and a pair of projections on the periphery of said plate for engaging said pivotal pawl.

10. A deck winch as described in claim 1 wherein said engaging means comprises a plurality of pawls pivotally mounted within a circular recess in said drum end face surrounding the upper end of said shaft and engageable with notches in said shaft to thereby drivingly connect it with the drum, collar means around said shaft having an inner lip for preventing engagement with said pawls when in a "down" position, stud means extending below said collar for holding it in an "up" position and a lug member extending upwardly on said collar which is engageable by said handle when said collar is in the "up" position, a series of cavities in said drum end face aligned on a circle below said collar and spaced apart the same distance as said stud means so as to receive them to allow said collar to move into a down position to disengage said pawls.

11. A deck winch as described in claim 1 wherein said engaging means includes a fixed stop member on said drum end face at a radial distance from said shaft, said stop member having an abrupt, substantially vertical face at one end, movable pawl means mounted within said driving means and engageable with said vertical face of said stop member in a down position when the driving means is rotated toward the vertical face, said pawl means being movable to an "up" or retracted position when it engages the other side of said stop member as said driving means is rotated in the opposite direction, and spring means for urging said pawl means to remain in its "up" or "down" position.

12. A deck winch as described in claim 11 wherein said pawl means comprises a movable engaging pin mounted within a recess in said driving means and extendable to a "down" position through an opening to a level below said stop member, said spring means being within said recess and constantly urging said pin member upwardly into a disengaging "up" position, means for holding said pin means in the "down" position when the driving means is rotated in the direction that forces the pin means against the vertical face of said stop member, said pin member being released when said driving means direction is reversed and the low end of said pin member engages the other side of said stop member.

13. A deck winch as described in claim 11 wherein said pawl means is pivotally mounted within said handle, and comprises a first lug member engageable with said stop member, means for holding said first lug member when it bears against the vertical end of said stop member, said spring means being a leaf spring which bears against a portion of said pawl means when it is rotated to the retracted position by engagement with the camming face of said stud member.

14. A three speed deck winch comprising:

a drum having a body with a cylindrical portion and an upper end face and an enlarged portion with a single ring gear;

a shaft extending through the central axis of said drum and pinion means fixed to said shaft within said drum;

a driving means attached to one end of said shaft;

a pair of internal gearing means each including clutch means for interconnecting said pinion means and said ring gear within said drum body so that rotation of said shaft by said driving means in a first direction will cause said drum to rotate at a one speed while rotation in a second direction opposite to said first direction will cause said drum to rotate at a second speed;

and means on said drum end face for selectively engaging said driving means with said drum when the driving means is rotated in said first direction so that said drum will rotate at the same rate as the driving means while overriding said clutch means and internal gearing means within said body, said engaging means being disconnected by rotation of said drive means in a direction opposite to said first direction, thereby allowing said internal gearing to operate at its second speed.

15. The winch as described in claim 14 wherein said means on said drum end face for engaging said driving means comprises:

a circular member fixed to the upper end of said shaft located within a circular opening in said upper end face of said drum, a plurality of spring-loaded pawl members normally urged in one direction to drivingly engage and interconnect said circular member and the drum at the edge of said opening, a movable synchronizing means on said drum end face surrounding said shaft and including means for preventing the driving engagement of said spring-loaded pawl members when in one position and for allowing the engagement of said

pawl members when moved angularly to another position.

16. The winch as described in claim 15 including:

a radially projecting means on said synchronizing means;

a pivotally mounted lug member on said drum end face that is engaged with said radially projecting means while being also movable from a retracted position substantially flush with the surface of said end face to an upright position that projects into the plane of rotation of said driving means, said lug means thereby moving or retaining said synchronizing means in either of its two positions when engaged by said driving means.

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