April 10, 1962 J. B. SKLENAR 3,028,829

WATER SKI ROPE RETRIEVING APPARATUS

Filed May 25, 1959

FIG. 1.

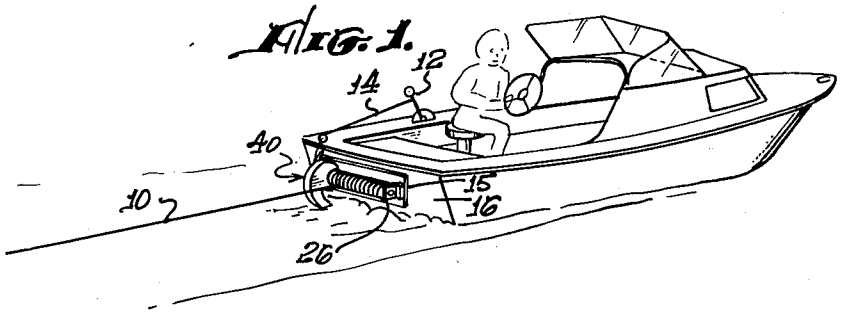


FIG. 2.

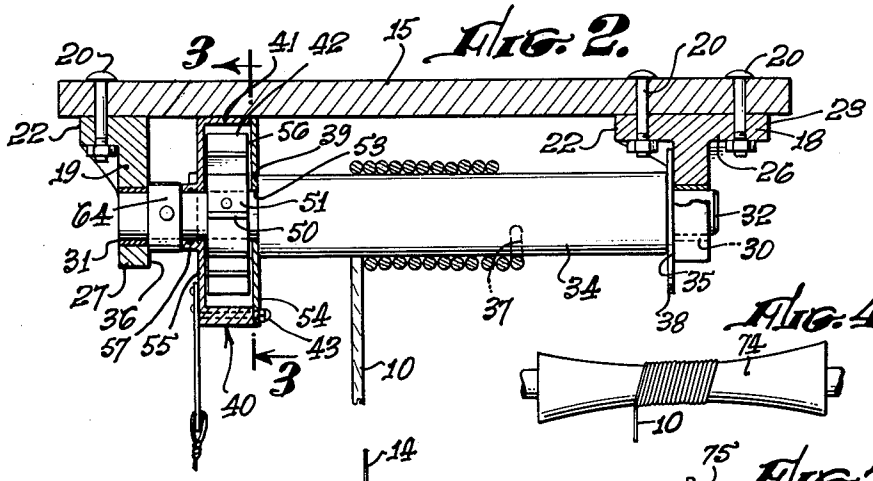


FIG. 4.

FIG. 5.

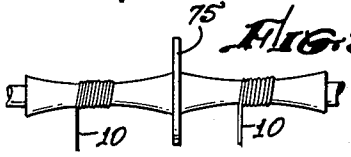


FIG. 6.

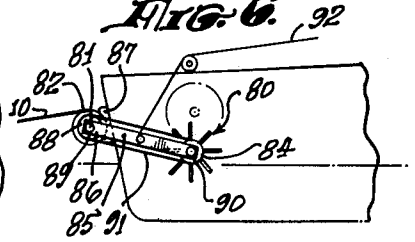
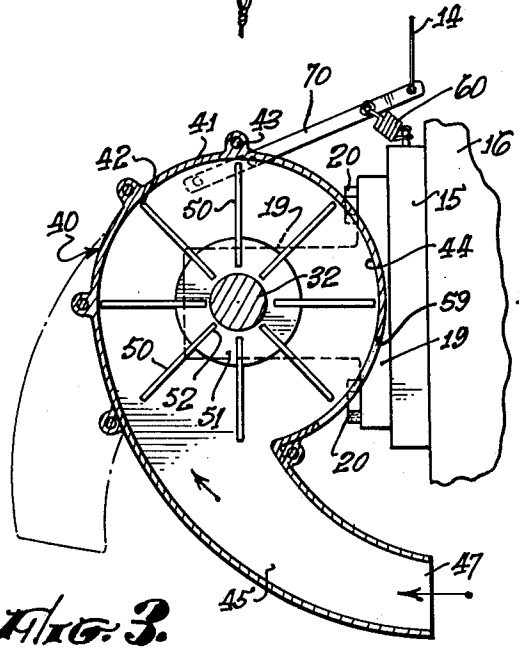


FIG. 3.



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WATER SKI ROPE RETRIEVING APPARATUS

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This invention relates to water skiing apparatus, and more particularly to an apparatus to be used in combination with a boat for retrieving a line or rope extending from the boat.

As is well known in the sport of water skiing, the skier is towed behind a power boat by a line or rope extending from the boat, which is of considerable length. When the skier is upset, falls or for any reason releases the tow rope, it must be retrieved by the operator of the boat. Most generally the rope is merely affixed at one end to the boat, and the operator must retrieve it by hand and, if necessary, pay it out by hand when another run is begun with the skier behind the boat.

Accordingly, it is an object of the present invention to provide an apparatus for use in combination with a power boat for retrieving a line or rope extending from the boat.

It is another object of the present invention to provide such a retrieving apparatus which utilizes the forward motion of the boat as a source of power for pulling a line or rope toward the boat.

It is a further object of the present invention to provide such a rope-retrieving apparatus for power boats which can be easily and quickly moved to or from the retrieving position by the operator of the boat.

Yet another object of the present invention is to provide a rope-retrieving apparatus for power boats which quickly and efficiently retrieves a rope extending from the boat together with light objects at the end of the rope.

A still further object of the present invention is to provide a rope-retrieving apparatus particularly useful in water skiing for retrieving the tow rope used by water skiers, which apparatus is simple and economical in construction and is sufficiently rugged to withstand the abusive treatment to which it may be subjected.

The present invention is a rope-retrieving apparatus for use on power driven boats which comprises a reel rotatably mounted at the after end of the boat. The tow rope is affixed at one end to the reel. A water driven rotatable member is affixed to the reel and is adapted to be rotated by the force of moving water when the apparatus is moved to the retrieving position with the boat in forward motion such that the water rotates the member to in turn rotate the reel and wind the rope thereupon.

The novel features which are believed to be characteristic of the present invention both as to its organization and method of operation, together with further objects and advantages thereof, will be better understood from the following description considered in connection with the accompanying drawing in which presently preferred embodiments of the invention are illustrated by way of example. It is to be expressly understood, however, that the drawing is for the purpose of illustration and description only and is not intended as a definition of the limits of the invention.

In the drawings:

FIGURE 1 is a view in perspective of an inboard motor boat having the apparatus of the present invention mounted upon the after end thereof and showing a tow rope extending rearwardly from the boat;

FIGURE 2 is a plan view partly in section of the presently preferred embodiment of the present invention to be mounted upon the transom of the boat of FIGURE 1;

FIGURE 3 is a view in elevation partly in section taken along line 3—3 of FIGURE 2 showing the apparatus in the operating or retrieving position with a phantom indication of the apparatus in the non-operating condition;

FIGURE 4 is a partial view showing an alternative embodiment of the reel used in the apparatus;

FIGURE 5 is a view corresponding to FIGURE 4 showing a second alternative embodiment for use with two tow ropes; and

FIGURE 6 is a partially schematic view of an alternative embodiment of the present invention.

Referring now to the drawings, there is shown in FIGURE 1 a perspective view of an inboard motor boat having the presently preferred embodiment of the apparatus attached upon the transom of the boat with the water skier tow rope **10** extending rearwardly from the retrieving apparatus. The apparatus is shown in FIGURES 1, 2 and 3 in the operating position by which it would be utilized to retrieve the rope **10** when the boat is in forward motion.

As shown in FIGURE 1, the apparatus is moved from an operating or retrieving position to a non-operating position by means of a lever **12** mounted upon the boat at a position which is convenient for the boat operator. By operating the lever **12** from a first to a second position, the apparatus is moved from an operating to a non-operating position, as described hereinafter, through a linkage or cable **14** connected between the operating lever **12** and the apparatus.

Referring now particularly to FIGURES 2 and 3, the presently preferred embodiment of the apparatus includes a base member **15** which is adapted to be mounted upon the transom **16** or after end of the boat. It can be seen that throughout the figures and the description an inboard motor boat is shown and described, and that if an outboard motor boat is used, the base **15** and the position at which the apparatus is mounted upon the boat must be varied and adapted to the position at which the outboard motor is attached to the boat. Similarly, in use with inboard motor boats the base **15** used to mount the apparatus upon the boat must be so oriented that the motor exhausts or other ports through the transom are clear. It will also be apparent from the following discussion that in some instances the base member can be omitted and the apparatus can be affixed directly to the boat.

Mounted upon the base member **15** are first and second spaced-apart brackets **18** and **19** which are affixed to the base member in a stationary manner by fastening means such as the bolts **20**. The brackets **18** and **19** extend outwardly from the base member **15** and include, in general, an affixing portion **22** and **23** respectively and a bearing arm **26** and **27** respectively. The affixing portions **22** and **23** are of sufficient width to accommodate the fastening bolts **20** and affix the brackets to the base member at each side of the bearing portion. The affixing portions of the brackets also extend above and below the center line of the bearing arm to provide a firm base for fixing the apparatus to the base member by bolts **20** above and below the center line of the apparatus. The bearing arms **26** and **27** respectively of the brackets extend outwardly from the affixing portions and base member a substantial distance, as described more fully hereinafter, and define toward the outward ends thereof aligned bearings **30** and **31** in which a shaft **32** can be rotatably mounted.

Anti-friction bearings of the type well known to the art are mounted within the bearing arm of the brackets to provide relatively free rotation of the shaft **32** therein.

A reel **34** is formed integral with the shaft or is affixed thereto, as shown in FIGURES 2 and 3. The reel extends from a position proximate the inside surface **35** of the first bracket bearing arm **26** to a position spaced a substantial distance from the inside surface **36**

of the second bracket bearing arm 27. Reel 34 is adapted for winding the rope 10, one end of which is affixed thereto at 37 as shown in FIGURE 2. A radially extending washer 38 is positioned between the end of the reel 34 and the inside surface 35 of the bracket 18 in order to provide a low friction contact between the reel and the bracket, and to provide a radially extending flange to retain the rope upon the reel as it is wound.

At the opposite end of reel 34 a substantial space is left between the inner end 39 of the reel and the inside surface 36 of the bracket 19. The space between the inside end 39 and the bracket is sufficient to accommodate the driving member 40. As shown particularly in FIGURES 2 and 3, the driving member for rotating the reel in response to forward motion of the boat includes a housing 41 formed in two halves which are separable along a transverse separation line. The halves of the housing are connected by means of bosses and connecting bolts 43 to form a closed housing which surrounds the shaft 32 and defines by its interior configuration a circular section 44 symmetrical with respect to the shaft and a tangential section 45 which terminates in an opening 47 through which water is admitted to the interior of the housing. Within the circular section 44 of the housing 41 there are positioned a plurality of radially extending blades 50 which are affixed at their inner end to the shaft 32. In the embodiment shown eight such blades are used and are equally circumferentially spaced about the shaft 32. In order to affix the inner ends of the blades 50 for rotation therewith a drum 51 having an outside diameter greater than that of the shaft is affixed to the shaft and the inner ends 52 of the blades are extended into the drum and affixed thereto for strength in mounting.

Thus the shaft 32, the reel 34, the drum 51 and the blades 50 extending radially from the drum are all rotatable as an integral unit. The housing 41, however, is mounted upon the shaft surrounding the blades in such a manner that it is pivotal with respect to the shaft 32, and the shaft 32 is freely rotatable with respect to the housing. That is, an opening 53 is provided in the inside surface 54 of the housing, which opening 53 has a diameter substantially equal to but greater than the outside diameter of the shaft 32 to provide a rotatable bearing contact therewith. At the outer surface 55 of the housing 41 an opening substantially equal to but greater than the diameter of the shaft 32 is provided, and an outwardly extending boss 57 is coextensive with the opening 58 as a rotatable bearing surface.

The distance by which the shaft 32 is spaced outwardly from the base member 15 is a distance sufficient to accommodate the circuit section of the housing such that it is freely rotatable about the shaft 32. Similarly, the width and diameter of the housing are determined such that the outer ends 42 of the blades 50 and the edges 56 thereof are proximate the interior surface of the circular section of the housing. The various optimum dimensions including the length and width of the blades 50 can be determined by one skilled in the art in view of this description.

Means are provided in combination with an operating member for moving the apparatus from the operative to the inoperative position. In the presently preferred embodiment an outwardly extending arm 70 is affixed to the housing and extends radially outward therefrom. The operating linkage or cable 14 is affixed to the arm 70 and to the operating lever 12 described hereinbefore such that movement of the operating lever 12 forward will cause the housing to be pivoted counterclockwise in FIGURES 1 and 3 to the operating or retrieving position. Conversely, a tension spring 60 is mounted between the lever arm 70 and the base to urge the housing in the clockwise direction to a first radial position with respect to the shaft 32 which is the inoperative position shown in phantom in FIGURE 3.

It can be seen that various arrangements can be made for raising and lowering the water inlet 47 from and into the water.

The tangential portion 45 of the housing 41 together with the opening 47 at the end thereof forms a water inlet and path to the coextensive circular section of the housing such that water taken in at the opening 47 is caused to flow through the tangential portion 45 and to impinge upon the radially extending blades 50 to impart a rotational force thereto. An exhaust opening 59 is provided through the housing 41 circumferentially spaced from the tangential inlet such that water flowing into the housing must make a circuit through the housing to the exhaust.

Thus, it can be seen that the apparatus is mounted upon the boat in such a position that the water intake opening 47 will extend below the water line of the boat when it is in the operating position. When the apparatus is in the non-operating position it is pivoted to the position shown in phantom in FIGURE 2 by pushing the operating lever 12 rearward to allow the water opening 47 to raise above the water line.

Accordingly, in operation, in order to retrieve a tow rope 10 which extends outwardly from the boat and the reel 34 of the apparatus, the operator of the boat 12 will pull the operating lever forward, causing the cable 14 to pull upward on the arm 70 until the housing is rotated clockwise a sufficient distance to place the water inlet opening 47 beneath the water line. Forward motion of the boat will then cause water to flow into the opening 47, through the tangential portion 45 of the housing and into the circular section into contact with the radially extending blades 50 in a tangential direction, such that the blades are forced to rotate clockwise in FIGURE 3. Water forced into the housing will push the blades in its path until exhausted through the opening 59. Rotation of the blades 50 thus causes rotation of the shaft 32 and the reel 34. Rotation of the reel in turn causes the rope 10 to be wound upon the reel between the flange 38 and the inside surface 54 of the housing 41. So long as the boat continues its forward motion, the rope will be wound upon the reel by rotation of the blades 50. After the rope has been fully retrieved the operator will release the operating lever 12 to the rearward position thereof to allow the force of the spring 60 to rotate the apparatus counterclockwise a sufficient distance to remove the water inlet 47 from the water. The blades 50 and reel 34 are then no longer caused to rotate and the apparatus is inoperative.

An alternative embodiment of the reel of the apparatus is shown in FIGURE 4. This embodiment is so constructed to cause the rope to be wound from side to side upon the reel as the reel is rotated. That is, the surface of the reel is longitudinally concave such that its diameter at the center is substantially less than the diameter at each end. Accordingly, as the reel 74 is rotated to wind the rope thereupon, the slope of the concave surface causes the rope to be moved from side to side to cause a more uniform winding upon the reel.

Referring now to FIGURE 5, a second alternative embodiment is shown which utilizes two reels similar to that shown and described in FIGURE 4. In this embodiment both reels are again affixed to the shaft 32 for rotation therewith. However, a separating flange 75 is affixed at the mid-point of the reel and the reel is formed with a double concavity to, in effect, provide two concave reels which operate in unison. Thus, two ropes can be retrieved simultaneously by affixing the end of one rope to the reel at one side of the divider 75, while affixing the end of the second rope to the reel in the opposite side of the divider.

In connection with both FIGURES 4 and 5, the remaining construction of the apparatus and its operation are as described hereinbefore.

Referring now to FIGURE 6, a modified form of the

present invention is shown in which the driving member is not contained within a housing and is directly subjected to the force of moving water by placing the radial blades beneath the water line. An indirect drive, such as a belt and pulley arrangement, is used in this embodiment. That is, as shown in FIGURE 6, a reel is again rotatably mounted between brackets at the after end of the boat but the driving member 80 is positioned at a distance removed from the shaft 81 of the reel 82.

The driving member 80 again comprises a plurality of radially extending blades which extend from a hub or drum 84 which is rotatably mounted upon a mounting arm 85. The mounting arm is pivoted at its second end 86 upon the bracket 87 which carries the shaft of the reel 82. A pulley 88 is connected to the shaft 89 and a pulley 90 is affixed to the shaft of the driving member 80. A belt 91 is connected between the two pulleys such that rotation of the driving member 80 causes rotation of the pulley 88 and the reel 82 to retrieve the rope.

Thus, in this embodiment the driving member is mounted upon the arm 85 for pivotal movement and is placed into the operative or retrieving position by lowering the driving member 80 beneath the water line, and is moved from the operative position by pulling the driving member 80 above the water line by means of a cable 92.

Thus, what has been described is a water skiing apparatus which is efficient and economical in construction. The rope retrieving apparatus is particularly useful in retrieving tow lines used in water skiing and can be easily and quickly moved to or from the retrieving position by the operator of a boat.

Although my invention is fully capable of achieving the results and providing the advantages hereinbefore mentioned, it is to be understood that it is merely the presently preferred embodiments thereof, and that I do not mean to be limited to the details of construction above described other than as defined in the appended claims.

What is claimed is:

1. A rope retrieving apparatus for use on boats comprising: a bracket affixed proximate the after end of said boat; a shaft rotatably mounted in said bracket for rotation about an axis fixed with respect to said bracket and substantially transverse to the direction of forward motion of said boat; a water driven member affixed to said shaft for rotation therewith, said water driven member including a plurality of blades extending radially from said shaft; a housing surrounding said blades, said blades and said shaft being rotatable within said housing, a water inlet to said housing for directing moving water into driving contact with said blades, a water outlet from said housing spaced from said inlet in the direction of movement of said blades; and means for pivoting said housing about said shaft from a first position at which said inlet is above the water line of said boat to a second position at which said inlet is forwardly facing beneath the water line of said boat; a reel affixed to said shaft; and a rope affixed at one end thereof to said reel whereby forward movement of said boat causes rotation of said water driven member to cause the rotation of said shaft and reel to wind said rope upon said reel.

2. A rope retrieving apparatus for use on boats comprising: a bracket affixed proximate the after end of said boat; a shaft rotatably mounted in said bracket for rotation about an axis fixed with respect to said bracket and substantially transverse to the direction of forward motion of said boat; a water driven member affixed to said shaft for rotation therewith, said water driven member including a plurality of blades extending radially from said shaft substantially transverse to the direction of forward movement of said boat, a housing surrounding said blades, said blades and said shaft being rotatable within said housing, a water inlet to said housing tangentially oriented with respect to said blades for directing moving water into driving contact with said blades, a water outlet from said housing circumferentially spaced from said inlet in the direction of movement of said blades; a cable affixed to said housing extending from said housing to a position near the operator of the boat whereby a force on said cable pivots said housing about said shaft to the operative position at which said inlet is forwardly facing beneath the water line of said boat; a reel affixed to said shaft; and a rope affixed at one end thereof to said reel whereby forward movement of said boat causes rotation of said water driven member to cause the rotation of said shaft and reel to wind said rope upon said reel.

3. An apparatus adapted to be used by only one operator in retrieving a water skier's tow rope while he concurrently guides a power-driven boat through water in which it floats, comprising: an elongate reel situated rearwardly of said boat, transversely relative thereto and above the waterline thereof; means for rotatably supporting said reel from said boat; a plurality of circumferentially spaced blades affixed to one end portion of said reel, said blades being of such length as to not extend below said waterline; a housing rotatably supported on said reel and extending around said blades, which housing includes a tangential portion having a forwardly disposed open end adapted to be positioned below said waterline when said housing is in a first position and above said waterline when said housing is in a second position; a ski rope affixed to said reel and windable thereon; and means operable by said operator to move said housing to said first position as said boat moves forwardly through said water to permit a portion of said water to flow upwardly through said tangential portion into said housing to rotate said blades and reel and discharge through a port in said housing, which blades and reel cease rotating when said operator moves said housing to said second position.

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