WATER SKI TOW LINE RETRIEVE

Fig. 1

Fig. 2

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WATER SKI TOW LINE RETRIEVE
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ABSTRACT OF THE DISCLOSURE

I disclose a tow rope retrieve including a stationary drum mounted with the winding direction transversely of the boat movement. A crank shaft and crank arm rotatably mounted on the drum are provided with means for engaging and winding the tow rope upon the stationary drum. The crank arm is provided with novel means for its retraction when not in use. The stationary drum can be mounted either on the side or transom of the boat, when provided with my novel mounting bracket. In certain applications, a spring loaded drum is secured to the stationary drum and includes a relatively short length of rope that the latter must be heavily constructed and secured to the tow rope. The spring tension of the drum is such that release of the tow rope by the skier automatically retrieves the near end portion of the ski rope to facilitate grasping and winding the tow rope about the stationary drum.

The present invention relates to a water ski tow line retrieve and more particularly to a retrieve including a stationary drum and retractable crank arm.

In the sport of water skiing a rather long tow line having a handle at its outer end is affixed at its nearer end to the boat transom. Boats employed for towing water skiers usually are of the outboard type, and the larger boats may be employed to tow two water skiers simultaneously. In such a case a pair of tow ropes are secured one on either side of the outboard motor to the transom in order to balance the pull loads upon the boat. When a single skier is towed, it is desirable to secure the tow rope to the central portion of the boat transom. Accordingly, an arcuate bar or a short length of rope is secured to either side of the outboard motor and the tow line is movably attached to the intermediate portion thereof so as to remain clear of the outboard motor.

In the latter instance, i.e., in the case of a single water skier, when it is desired to retrieve the rope it is necessary for the boat operator or other individual with the boat to reach aft of the motor in order to secure the nearer end of the tow rope. Aside from the possibility of falling overboard, this operation is awkward and time consuming.

In either situation, i.e., with either a single skier or multiple skiers, it is time- and space-consuming to retrieve and haul the rope by hand into the boat. As a result many types of reels and the like have been employed for retrieving and storing the tow rope or ropes. In most instances the tow rope is permanently secured to the reel with the result that the latter must be heavily constructed to support the pull loads. Even then, the differing directions of pull upon the reel is likely to cause damage thereto. Intermittent contact of the reel flanges with the rope results in dangerous localized wearing of the tow rope.

Examples of this type of rotatable reel, which are usually mounted with their winding directions parallel to boat movement, are disclosed in United States Patents to Rowley 3,006,309; Wittrock 2,998,796; and Weide 2,956,778.

On the other hand, Stewart 3,113,547, discloses the use of a stationary drum wherein the winding direction is transverse of boat movement. In the Stewart retrieve, however, the rotatable crank arm remains permanently attached to the tow rope. The crank and handle are unnecessarily rotated whenever the tow rope is paid out, and the rotating parts cause, in addition to wear, the potentiality of personal injury. Moreover, when the rope is angulated relative to the direction of boat movement, varying degrees of stress are imparted to the crank arm thereby increasing the likelihood of damage thereto and necessitating heavier construction. In addition contact between the tow rope and the crank arm causes localized wearing of the tow rope. Another disadvantage of the Stewart device is that the crank arm must be rotated to pay the tow rope out of the drum. Finally, the Stewart arrangement does not permit balancing of the pull load upon the boat in the event that a single skier is towed.

I overcome these disadvantages of the prior art by providing a stationary drum and a rotatable and retractable crank arm for winding the tow line upon the drum. My novel ski tow retrieve is arranged so that the tow rope can be permanently secured to the boat transom if desired. However, the tow rope is detachably secured to the crank arm and is secured thereto only when it is desired to retrieve the tow rope. When the tow rope is being paid out the crank arm is detached therefrom and retracted so that the tow rope can slip over the edge of the drum flange facing the skier without interference from the crank arm. In furtherance of the latter purpose, the aforementioned drum flange is provided with an arcuate configuration to facilitate paying out the tow rope. At this time the handle of my novel retrieve remains motionless to reduce wear and to obviate the possibility of personal injury through contact with a spinning handle, as in prior retrieves.

I am aware of Italian Patent No. 490,541 showing a retractable crank arm associated with a stationary drum. The latter prior art device however requires a complicated structure including spring means operable at both the operating and retracted positions, to effect its retractability.

In my ski tow retrieve the crank arm is slidably mounted directly upon the crank shaft and a unique arrangement of stop members on the crank arm and grooves in the crank shaft are employed to determine the operative and retracted positions of the crank arm. The crank arm is maintained in its retracted position by gravity i.e., by the weight of the operating handle of my novel retrieve.

My ski tow retrieve can be mounted either on the forward surface of the boat transom or on the side of the boat, with the latter position being more convenient where the boat has a substantial rear deck, and I provide a two-position clamp arrangement suitable for either mounting position. The tow rope retrieve and its clamp are constructed so that the retrieve is held in the clamp solely by gravity for ready removal from the boat without removing the clamp. Thus, the one or more retrieves can be completely removed from the boat to obviate a specially constructed mooring cover and to permit free use of the boat for purposes other than water ski towing.

It is not necessary to mount my novel ski tow retrieve adjacent the nearer terminus of the tow rope. Thus the retrieve need not be mounted in a position where it may interfere with the movement or operation of the outboard motor as in conventional retrieves. Instead, the retrieve can be mounted forward of the transom, an additional advantage where the boat includes a rear deck.

Where the rear deck is of substantial width or the rope is secured aft of the motor the retrieve is advantageously provided with a spring loaded reel in accordance with another feature of my invention. The reel is permanently
secured to the stationary drum and includes a short length of rope or cord desirably permanently secured to the tow rope adjacent its nearer terminus. The tension of the spring loaded reel is such that the tow rope is straightened out when grasped by the skier but when released the reel automatically retrieves the nearer end portion of the tow rope inboard where it can be wound upon the stationary drum. It will be apparent as this description proceeds that the aforementioned features of my invention can be used jointly or severally depending upon the application of the invention.

I accomplish these desirable results by providing a tow line retrieve for mounting on a boat and the like, said retrieve comprising a relatively stationary drum member, a crank shaft passing centrally and rotatably through said drum member, means coupled to one end of said shaft for rotating said shaft, a crank arm mounted on the other end of said shaft for rotation therewith, said drum having a pair of generally opposed flanges defining a tow line storage area therebetween, a supporting post secured to the outer periphery of one of said flanges, said post having a keying portion adjacent the outward end thereof, and a mounting bracket defining a complementary section for keyingly receiving said keying post portion. I also desirably provide a tow line retrieve for mounting on a boat and the like, said retrieve comprising a relatively stationary drum member, a crank shaft passing centrally and rotatably through said drum member, means coupled to one end of said shaft for rotating said shaft, a crank arm mounted on the other end of said shaft for rotation therewith, said crank arm having a shank portion rotatably and slidably mounted in a slot extending transversely through the adjacent end portion of said shaft, stop member engaging means on said shaft, and a pair of stop members spacedly mounted on said shank for defining retracted and operating positions respectively of said crank arm relative to said shaft and said drum member.

I also desirably provide a similar tow line retrieve wherein said keying post portion and said complementary bracket section are shaped so that said post can be received in said bracket at positions of said post angularly displaced from the radial 90° from another.

I also desirably provide a similar tow line retrieve wherein said crank arm is provided with tow line engaging means, and said stop members are angularly orientated on said shank relative to stop member engaging means on said shaft for positioning said tow line engaging means on a line storage section of said drum at the operative position of said crank arm and for positioning said tow line engaging means closely adjacent said drum at the retracted position of said crank arm.

I also desirably provide a similar tow line retrieve wherein a spring loaded reel is mounted on said retrieve and is provided with a tensioned length of cord the outward or free end of which is secured to the nearer end portion of said tow line.

During the foregoing discussion, various objects, features and advantages of the invention have been set forth. These and other objects, features and advantages of the invention together with structural details thereof will be elaborated upon during the forthcoming description of certain presently preferred embodiments of the invention and presently preferred methods of practicing the same.

In the accompanying drawings I have shown certain presently preferred embodiments of the invention and have illustrated certain presently preferred methods of practicing the same, wherein:

FIGURE 1 is a perspective view showing an outboard motor boat with a ski tow line and my novel retrieve mounted thereon;
FIGURE 2 is an enlarged, vertically sectioned view of the retrieve shown in FIGURE 1;
FIGURE 3 is a partial isometric view of the retrieve as shown in FIGURE 5;
FIGURE 4 is a similar view but showing the crank arm of the retrieve in its retracted position; and
FIGURE 5 is a side elevational view showing a modified form of my invention and illustrating in particular the use of the aforementioned spring loaded reel.

Referring now to FIGURES 4–5 of the drawings, boat 10, in this example, is provided with an outboard motor 12 and a single tow line 14. The line 14 is secured to a short length of rope 16 the ends of which are in turn secured to boat transom 18. Thus, a single skier can be towed by the outboard motor boat 10 with balanced pull in avoidance of the motor 12.

In accordance with the invention, a ski tow retrieve including drum 20 is mounted upon the outer or aft surface of the transom 18. The drum 20 is provided with crank arm 22 which is slidably mounted on crank shaft 24 as described in detail below with reference to FIGURES 2–4 of the drawings. The crank shaft 24 desirably extends forwardly through the drum 20 and is mounted for rotation therewith. An operating handle 26 is secured to the forward end of the crank shaft 24 as better shown in FIGURE 2.

In its solid outline position in FIGURE 1 the retrieve is positioned for easier operation by a left-handed person, while a right-handed individual can more easily operate the retrieve in its chain outline position at the side of the boat. Obviously, the retrieve can be mounted adjacent the other end of the transom or on the port side of the boat for easier operation by a right- and left-handed individual respectively. With reference to the side mounting of the retrieve, it will also be apparent that the retrieve can be mounted forward of the position shown in chain outline or either the port or starboard depending upon operator preference.

The drum 20 is mounted by means of post 27 at least to the lower end portion of which is of square cross sectional configuration for keying purposes. In this example, the post 27 is cast integrally with the forward drum flange 28 as also better shown in FIGURE 2. Alternatively the post can be welded to the flange.

As better shown in FIGURE 2 the drum 20 can be fabricated in two parts with the aft flange 44, in this example, being provided with a central disc or web 46. Adjacent its junction with the disc 46 the aft flange 44 is stepped at 43 to accommodate an aft projecting rim 45 of the forward flange 28. The forward flange 28 is secured to the aft flange 44 and disc 46 by a plurality of fingers 47, with three being employed in this example although a different number could be used. The fingers 47 in this example are bolted to the disc 46, either by bolts and nuts 49 as shown or by threading the bolts into suitable tapped apertures (not shown) thereof in the disc 46. Adjacent the abutting surfaces of the forward and aft flanges 45, 44 the flanges are shaped to provide a relatively smooth receptacle or groove 51 for the tow line 14. Alternatively, the drum 20 can be made in one piece as illustrated in FIGURE 5 of the drawings.

The drum 20 is mounted on the boat by means of two-position clump 30 of generally channeled configuration. Eighty portion 32 of the clamp 30 defines a complementary area for keyingly receiving the lower end portion of the post 27. The latter is provided with a slot 34 (FIGURE 2) adjacent the upper limit of the keying configuration of the post, which is engageable with the side or top wall portion of the bracket bight 32 to limit the extent of insertion of the post 27 into the bracket 30.

As denoted by the chain outlines 36 and 38 of the bracket and drum respectively, the various cross sectional configurations of the brackets and the drum post also permit the drum to be mounted with equal facility on the side of the boat. In the latter mounting position, the clamp 38 is turned 90° relative to its transom mounting position, but keyingly receives the keyed post portion in the same manner. The attitude of the stationary drum however remains unchanged. The side mounting position is advan-
tageous on those boats provided with a substantial rear deck as denoted by chain outline 40.

In FIGURES 2-4 the construction of my novel ski tow 18 is shown in detail. The drum 20 includes a pair of flanges 28, 44 defining a tow line storage area therebetween for the line 14. At least the outward portion of the aft flange 44 is tapered rearwardly to facilitate paying out of the line 14. At this time the crank arm 22 is retracted to the position shown in FIGURE 4. The drum 20 further includes central disc 46 and hub 48 by which the crank shaft 24 is rotatably mounted upon and extended through the drum 20.

As better shown in FIGURES 3 and 4 the shank 50 of the crank arm 22 is slidable mounted in a rounded slot 52 therefor which extends transversely through the longitudinal axis of the crank shaft 24. The slot 52 is provided with a narrowed passage 54 opening upon the adjacent enlarged end 55 of the shaft to accommodate the passage of the crank arm pin or stop 56 therethrough. The shank 50 is slidably mounted in the cylindrical slot 52 so that the crank arm can be moved transversely of the crank shaft 24 to its operative and retracted positions. These positions are retained by an operational and retraction stop 56 and 58, respectively, as shown in the figures, etc. The stop 56, 58 can be formed by suitably located swages or other projections upon the side surfaces of the shank 50.

The shaft 24 is rotatably retained upon the drum disc 46 by means of an integrally cast hub 48, the abutment of the enlarged end 55 thereof, and set screw 59 of the operating handle 26 mounted upon the other, reduced end portion of the shaft.

The crank shaft 24 is further provided with stop member engaging means including in this instance, a sleeve groove 60 formed in the enlarged shaft end 55 and extending transversely across the shaft slot 52. The groove 60 is shaped to receive the stops 56, 58 at the respective operative and retracted positions of the crank arm 22. As better shown in FIGURE 3 the stop 56 is formed in the transverse groove 60 at the operative position of the crank arm, while in FIGURE 4 the stop 58 is formed in the transverse groove at the retracted position of the crank arm.

The stop 56 is oriented relative to the crank arm shank such that tow line retaining means or hook 62 of the crank arm is disposed generally over the line storage area between the drum flanges 28, 44 as shown in FIGURES 2 and 3. In this position, the stop 56 is engaged by shaft groove 60 by compressed spring 64 against the turning moment of the crank arm shank 50, which turning moment is induced by tow line tension upon the hook 62. In this example, the compressed spring 64 is retained between the crank shaft 24 and headed end 66 of the crank arm 22.

As better shown in FIGURE 4 the other stop 58 is similarly fitted in the transverse shaft groove 60 at the retracted position of the crank arm 22. In this case however no biasing force is required, other than gravity, as the tow rope is no longer attached to the crank arm 22.

Instead, the weight of the crank arm retaining the stop 58 in the shaft groove 60. The weight of the handle 26 maintains the crank shaft 24 in a rotative position such that the groove 60 is uppermost, as in FIGURE 4 of the drawings.

The stop 58 is angularly displaced about the axis of the crank arm shank 50 relative to the other stop 56 such that 62 is positioned over surface of the aft flange 40, in the retracted position of the crank arm 22. At this position of the hook 62 there is no possibility of interference with the tow line 14 as it is payed out over flange 44 of the drum 20.

In order to move the crank arm shank longitudinally between its operative and retracted positions the pin 56 (which forms the stop for the operative position of the crank arm) is provided with such diameter as to fit readily (when properly aligned) through the slot 52 of the crank shaft 22. In furtherance of this purpose the slot 52 is extended a short distance forward of the shank 50. The pin 56 (for the retraction position) however, is provided with a diameter such that it cannot pass through the slot 52. Thus, the headed end 66 of the shank 50 cannot be projected beyond the drum flange 44 where the headed end would interfere with paying out of the tow line.

In FIGURE 5 of the drawings a modified form of my retrieve 18 is designed to eliminate the necessity of reaching aft of the transom 18 to grasp the tow line 14 for the purpose of initially engaging it with the crank arm 22. The arrangement of FIGURE 5 is particularly advantageous when the tow line 14 is secured aft of the motor 12 as shown in FIGURE 1, or when the two line is connected (not shown) directly to the transom 18 but the boat 10 is provided with an appreciable rear deck 40. In this form of my invention a spring loaded reel 68 is rotatably mounted upon the crank shaft 24, which is provided with a forward extension 70 for this purpose. The reel 68 thus is rotatably retained between the drum disc 46 and the supporting handle 26. A relatively short length of cord 72 is wound upon the spring loaded reel 68. The cord, as indicated by chain outline 72 thereof (FIGURE 1), is secured to the tow line 14 a short distance from its point of securing to the boat 10 or to an intermediate support such as line 16. The rotatable mounting of the reel 68 provides ready accessibility to the cord 72 and its exit 74 from the reel 68, irrespective of the mounting position of the retrieve 18 relative to the tow line 14.

The spring tension of the reel 68 is adjusted by known techniques such that the cord 72 does not interfere with the propeller 13 when the boat 10 is towing a water skier. On the other hand, the spring tension is sufficient to pull the adjacent portion of the tow line inboard when the tow line is released by the skier, so that the boat operator or other person can grasp it for attachment to the crank arm hook 62 and winding about the drum 20. The internal construction of the spring loaded reel 68 is conventional in nature and will not be described in detail.

In the operation of the invention to retrieve the tow line 14 reference is again made to FIGURES 1-4. The nearer end portion of the tow line 14 is brought inboard either manually or by means of the spring loaded reel 68 of FIGURE 5 and the slidable stop 58 of the crank arm 22 as better shown in FIGURE 3. The crank arm is first moved to its operative position by angular displacement and passage of its stop 56 through the crank shaft slot 52 against the action of biasing spring 64. It is then seated in the shaft groove 60 as explained previously. Handle 26 is rotated either manually as shown or by suitable motive means such as an electric motor (not shown) coupled directly to the crank shaft 24. This causes rope 14 to slip through the hooked end of the crank arm 22 and to be wound upon the drum 20.

To aid in the initial laying of the rope 14 in the drum groove 51, means are provided for preventing the rope from slipping over the edge of the forward flange 28 during the first revolution of the crank arm 22. One form of such means includes the provision of a notch 76 through which the rope 14 is passed for grasping by one hand of the operator while he turns the handle 26 with the other. After the crank arm 22 has made one or more revolutions, the biasing spring 64 is applied to winding of the rope is held in place by subsequent windings. A similar notch 78 desirably is provided at a point diametrically opposed from the notch 76 to facilitate use of the retrieve by a lefthanded operator.

When it is desired to pay out the tow line 14 from the stationary drum 20, the crank arm 22 is angularly and longitudinally displaced against the action of the biasing spring 64 to unseat the stop 56 and to orientate the lat-
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7. A tow line retrieve for mounting on a boat and the like, said retrieve comprising a relatively stationary drum member, a crank shaft passing centrally and rotatably through said drum member, means coupled to one end of said shaft for rotating said shaft, a crank arm mounted on the other end of said shaft for rotation therewith, said crank arm having a shank portion rotatably and slidably mounted in a slot extending transversely through the adjacent end portion of said shaft, stop member engaging means on said shaft, and a pair of stop members spacedly mounted on said shank portion for defining retracted and operating positions respectively of said crank arm relative to said shaft and said drum member.

8. The combination according to claim 1 wherein said crank arm is provided with tow line engaging means, and said stop members are angularly orientated on said shank portion relative to stop member engaging means on said shaft for positioning said tow line engaging means adjacent a line storage section of said drum at the operative position of said crank arm and for positioning said tow line engaging means closely adjacent said drum at the retracted position of said crank arm.

9. The combination according to claim 1 wherein a spring loaded reel is mounted on said retrieve and is provided with a tensioned length of cord the outward or free end of which is secured to the nearer end portion of said tow line.

10. The combination according to claim 1 wherein a spring loaded reel is mounted on said retrieve and is provided with a tensioned length of cord, the outward or free end of which is secured to the rear end portion of the tow line.

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