United States Patent

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[54] **WATER SKIING TOW ROPE RETRIEVER**
1 Claim, 4 Drawing Figs.

[52] **U.S. Cl.** **242/107,** 242/86.5, 242/106
[51] **Int. Cl.** **B65h 75/48,** B65h 75/42
[50] **Field of Search** 242/86.5, 86.5A, 100, 106, 107, 107.1, 107.11, 107.2, 107.4, 107.5; 114/235

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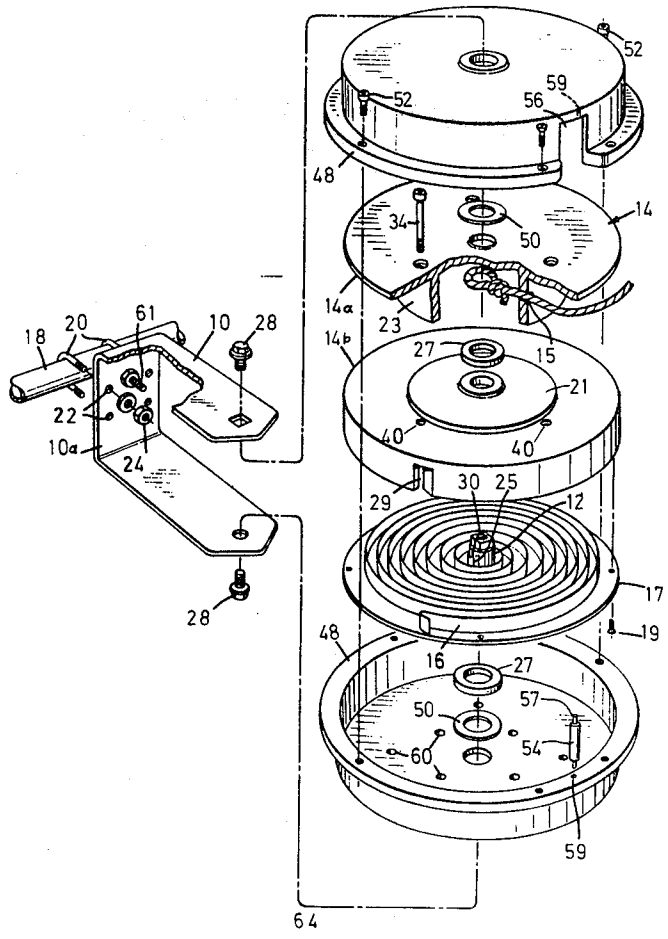
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ABSTRACT: A water ski tow rope retrieving device which is adapted to be fixed to the rear of a tow boat. The device is characterized by a spring biased drum which automatically winds up the tow rope or at least the greater portion of its length when a water skier falls and lets go of the rope. The drum is made in two parts, one for receiving the rope and one for storing a coil spring which biases the drum. In a preferred embodiment, the drum is enclosed within an outer casing.



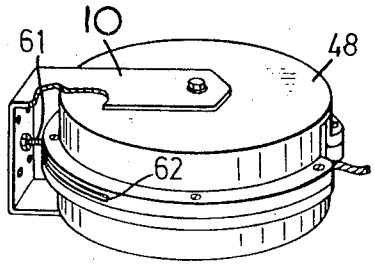


FIG. 4

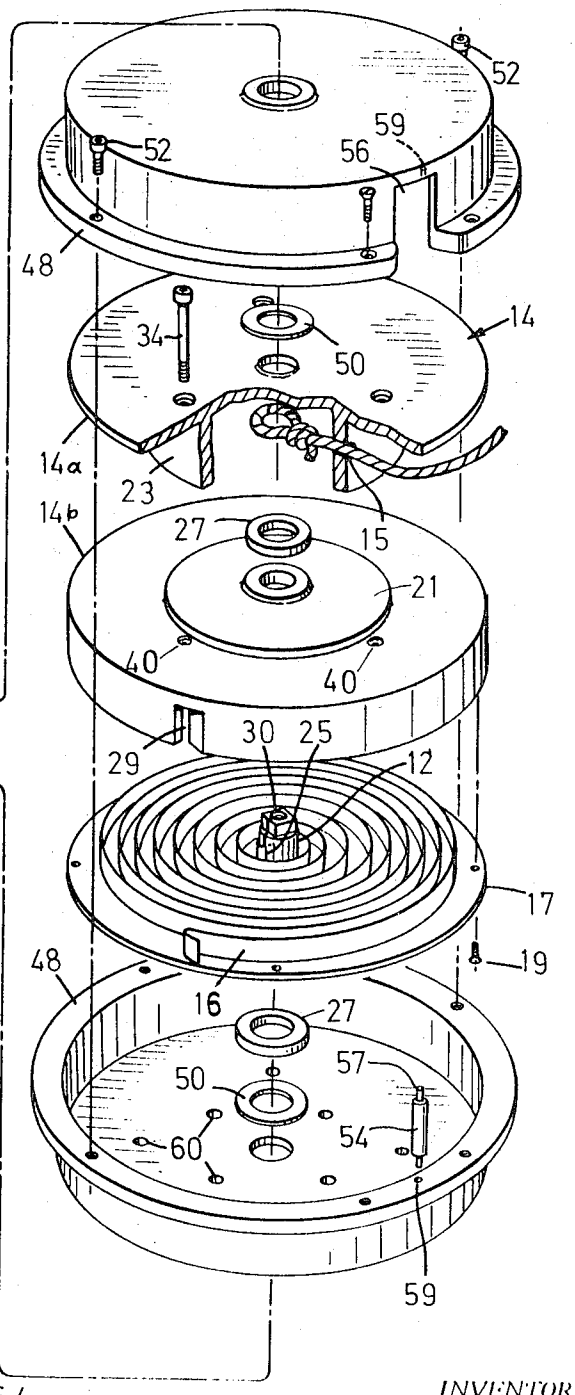


FIG. 1

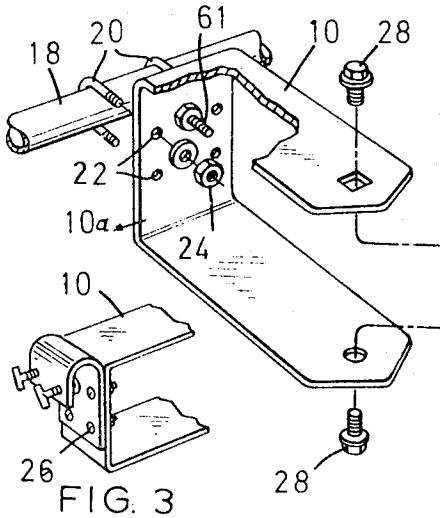


FIG. 3

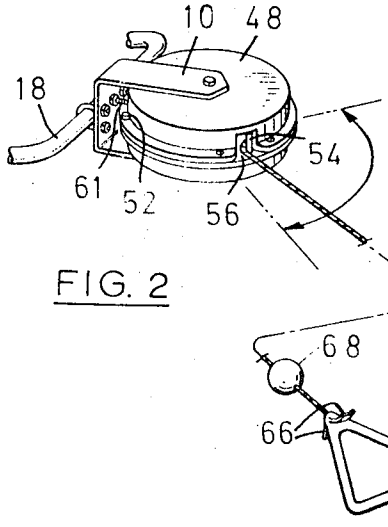


FIG. 2

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WATER SKIING TOW ROPE RETRIEVER

This invention relates to water skiing tow ropes and is particularly concerned with a spring loaded reel for automatically retrieving a tow rope.

As is well known, the sport of water skiing involves the use of a power boat for towing the skier by means of a rope. Heretofore, it has been the usual practice to fix the rope to the rear of the boat, often using a special bracket for holding the rope above the transom, particularly when the boat is driven by an outboard motor.

The common practice of fixing the rope to the boat in the manner mentioned above has several drawbacks. When a skier falls and lets go of the rope, the full length of the rope is dragged through the water. This means that when the operator of the boat wants to circle about in order that the skier may regrip the rope, the boat must be steered through a wide circle as to avoid crossing over the rope as it lies on the surface of the water.

Secondly, as the boat moves through the water with the full length of the rope being dragged behind, there is the danger that the rope might be entangled about another swimmer. Many accidents have occurred in this way as a boat operator does not always have perfect visibility with respect to other swimmers and does not always know the exact path that the rope is taking as it is dragged through the water.

Thirdly, while good water skiing technique dictates the use of a second person in the boat to watch the skier and while this third person often is able to reach over the rear of the boat to drag in the rope hand over hand, this usually requires that the third person stand up which is a bad practice in itself.

In view of the above, it is the object of this invention to provide a spring operated retrieving mechanism for automatically coiling up a water ski tow rope and which is adapted to be fixed to the rear of a water skiing tow boat.

It is a more specific object of the invention to provide a device as above described which is adapted to swing through a horizontal arc as to prevent the rope from binding when the skier moves from side to side across the path of travel of the boat.

It is a further object of the invention to provide a device as previously described which is capable of adjustment to change the preset bias in the spring.

The above objects are accomplished by a spring operated rope retrieving device comprising a U-shaped bracket having means for fixing the bracket to the rear portion of a power boat, an axle fixed to and extending between the arms of said U-shaped bracket, a drum mounted on said axle for rotation relative thereto, a spiral spring having its inner end fixed to the axle and its outer end fixed to said drum and a tow rope being attached at its inner end to the axle and passing through an aperture in said drum whereby rotation of the drum in a first direction winds the rope on the outside of the drum, said spring being mounted so that the bias of the spring tends to rotate the drum as to wrap the rope around the drum and so that an outward pull on the rope will unwind the rope from the drum against the bias of the spring.

The invention will be more thoroughly understood from the following description of a preferred embodiment thereof as read in conjunction with the accompanying drawings.

In the drawings,

FIG. 1 is an exploded perspective view of a rope retrieving mechanism in accordance with the preferred embodiment of the invention;

FIG. 2 is a perspective view of the mechanism shown in FIG. 1 in its assembled condition;

FIG. 3 is a perspective view of a part of the device shown in FIGS. 1 and 2 and illustrating an alternative arrangement for fixing the device to a boat; and

FIG. 4 is a perspective view of a modified form of outer casing for the device.

Referring to FIG. 1, the chief components of the device of the invention consists of a U-shaped bracket 10, an axle 12, a drum 14 and a spiral spring 16 contained within the drum.

U-shaped bracket 10 is preferably formed of iron or steel as is axle 12. It is these two components which bear the load exerted upon the device by the drag of a water skier. In accordance with the FIG. 1 embodiment of the invention, the web portion 10*a* of the U-shaped bracket is adapted to be fixed to a bar 18 which is commonly carried by a tow boat to hold the rope above the motor. As is well known, this type of bar is considered necessary when the boat is powered by an outboard motor. The particular U-shaped bracket shown in FIG. 1, therefore, adapts the illustrated device for attachment to a boat already having this type of bar installed. Where such a bar is not used, the embodiment illustrated in FIG. 3 might be employed for attaching the device directly to the transom of the boat.

In the case of the FIG. 1 attachment arrangement, a pair of U-bolts 20 having threaded ends are adapted to be passed through holes 22 in the web of the bracket and held in place by means of nuts 24. In the case of the FIG. 3 form of the attaching arrangement, one or two C-clamps similar to those normally fixed to outboard motors are attached to the web of the bracket by nut and bolt assemblies 26.

The axle is held between the other ends of the arms of the U-shaped bracket by a pair of machine bolts 28 received in threaded holes 30 in the ends of the axle. To prevent relative movement between the axle and the bracket, the upper end of the axle is keyed into an appropriately shaped hole in the top arm of the bracket. Adjustment to the preset bias on the spring is accomplished by removing bolts 28 and spreading apart the bracket arms as to free the upper end of the axle, thereby permitting its rotation.

The rope winding drum carried by the axle is preferably a two-piece item so that the spring may be stored in the lower part of the drum, leaving a part of the axle exposed within the upper part of the drum whereby the rope may be attached to the axle without interfering with the spring. Thus, the drum consists of two parts 14*a* and 14*b* which are held together by elongated machine bolts 34. Threaded holes 40 are provided in the lower drum part to receive the lower ends of the bolts 34. The upper part 14*a* carries the rope with the inner end of the latter being passed through aperture 15 and tied loosely to the axle. With this arrangement, full extension of the rope places a direct load upon the axle which is in turn transferred through the U-shaped bracket 10 to the transom of the boat. The lower part 14*b* of the drum carries the spring and essentially consists of a shallow circular dish having a cover plate 17 closing its lower end and held in place by screws 19. The top wall of part 14*b* carries a raised portion 21 which is dimensioned so that the wall 23 of the upper drum part is accurately located.

Axle 12 is provided with an elongated slot 25 extending from its upper end to a point located within the lower drum part 14*b* whereby the inner end of spring 16 may be fixed to the axle. This arrangement provides for dismantlement of the device without removing the spring from the lower drum part. Oil soaked felt washers 27 or suitable alternative means such as O-rings are positioned on the axle on the top and lower surfaces of the lower drum part as to seal the latter against the entrance of water.

Spring 16 is formed of spring steel or other suitable spring material and, as previously mentioned, is fixed at its inner end to the axle by being received in the slot 25 in the axle. At its outer end it is fixed to the drum as by being received in a slot 29 in the outer wall or by other suitable means such as a rivet through the wall. Needless to say, the spring is so arranged that it is in its relaxed position when the rope is wound on the drum so that pulling the rope off the drum winds up the spring.

As previously mentioned, the rope is tied to the axle and is passed through a hole 15 in the wall of the drum. This is a preferred expedient as it ensures that the load imposed upon the reel by the drag of a water skier will be transferred directly to the axle and to bracket 10. Alternatively, the rope could be fixed to the outside surface of the drum but as the drum is preferably made of a relatively inexpensive and light plastic or

the like, the better arrangement is to fix the rope directly to the axle.

As a further preferred expedient, the drum is enclosed within an outer two-piece casing **48** which also might be formed of plastic as by molding. Fiber washers **50** are positioned around the axle between the inside surfaces of the casing **48** and the top and lower faces of the drum to reduce friction between the drum and the casing. The two parts of the casing are held together by screws **52**. A rotatable guide **54** is used to line one side of an aperture **56** through the casing wall. This is preferably formed of a slick plastic and is carried for rotation on a pin **57** received in socket holes **59**. Holes **60** are formed in the bottom of the casing to allow for drainage.

As will be appreciated from the foregoing, the casing **48** is capable of rotating about the axle. This is a preferred arrangement in order to permit the reel to rotate as the skier moves from side to side relative to the direction of movement of the boat as when slalomming, for example. On the other hand, it is mandatory that the casing not be capable of full rotation as this would cause the rope to jam between the casing and the bracket **10**. Accordingly, a stud **61** is carried by the bracket and is positioned to stand in the path of the heads of the machine screws **52**. The latter are located to allow about 90° rotation of the casing. Alternatively, the casing may be formed with a molded groove **62** such as shown in FIG. **4** and which extends only one quarter of the perimeter of the casing so that the ends of the grooves act as the stop members which engage the stud **61** in lieu of the heads of screws **52**.

The spring is selected and adjusted so that it is capable of winding up the rope with the full length of the rope being dragged through the water even when the boat is moving. On the other hand, the bias of the spring must not be so strong that the drag of a water skier is not sufficient to overcome it as to allow the rope to be fully extended. It will be appreciated, of course, that for special conditions this selection may be varied. A certain amount of adjustment in the spring tension is possible by prewinding or unwinding the spring relative to the bracket **10**.

As a further preferred expedient, the rope handle **64** is provided with a pair of fins **66** which cause the nose of the handle to ride on the top of the water, thereby preventing the nose from diving and causing unusual drag. The rope is also provided with a ball device **68** that engages the rope by friction but which may be moved along the rope to change its position relative to handle **64**. It grips the rope by sufficient friction to prevent it from moving along the rope when it butts up against the casing **48** when the rope is retrieved under spring pressure. On the other hand, the friction between the ball and the rope is not so strong as to prevent manual manipulation of the ball along the rope. The purpose of this ball device is to provide adjustable means for governing the amount of rope that is wound on the drum. Thus, the ball may be positioned to leave a few feet of rope dragging so that when the handle is engaged by the skier, the latter will be positioned a few feet from the boat and away from the prop of the motor. The leaving of a few feet of rope trailing behind the boat does not detract from the chief objects of the invention.

I claim:

1. A water skiing tow rope storage and receiving device comprising: A U-shaped bracket, a shaft fixed to and extending between the arms of said bracket, mounting means for mounting said bracket to the transom of a boat, a moulded plastic housing having a hollow cylindrical chamber formed therein and a rope passage opening outwardly therefrom, said housing being pivotably mounted on said shaft to pivot through an arc of 90° with said rope passage directed outwardly on said bracket, a winding drum consisting of a circular end flange having a diameter to fit in a close fitting sliding relationship within said cylindrical chamber, and a cylindrical drum portion of a substantially smaller diameter secured to and projecting axially from one face of said flange, said flange being rotatably mounted on said shaft, said drum having an inner diameter which is substantially larger than the diameter of said shaft so as to be spaced radially outwardly from said shaft, passage means extending through said drum to permit a tow rope to pass therethrough to be secured to said shaft, said drum being rotatable in said housing and said housing being rotatable on said shaft to permit the through passage of said drum to be aligned with the outlet passage of said housing such that when a rope is fully extended it may extend outwardly from said housing in a straight line through said drum and housing such that all of the towing force is carried by said shaft, a spring housing consisting of a pair of circular sidewalls and a cylindrical outer wall, said spring housing having an outer diameter which is substantially greater than the diameter of said winding drum to fit in the close fitting sliding relationship within said housing, central passage means formed in said spring housing for rotatably mounting said spring housing on said shaft, a spiral spring mounted in said spring housing and having an inner end secured to said shaft and an outer end secured to said spring housing, said winding drum being detachably secured to said spring housing such that the rotational force applied to said spring housing by said spring is transmitted to said drum, one sidewall of said spring housing forming a sidewall of said winding drum.