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Cox, III

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[54] **WATER SKI ROPE REWINDER**

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[52] **U.S. Cl.** ..... **114/235 WS;** 242/86.5 A

[51] **Int. Cl.**[2] **B63B 21/00**

[58] **Field of Search** ..... 114/235 WS; 115/6.1; 242/86.5 A

[56] **References Cited**

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3,098,463	7/1963	Brown	242/86.5 A
3,178,127	4/1965	Andersen	242/86.5 A
3,303,813	2/1967	Colins et al.	114/235 WS

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[57] **ABSTRACT**

Apparatus for automatically moving a water ski tow rope to one side of a boat when slack occurs in the tow rope and for rewinding the rope onto a reel when the skier releases the handle thereof comprising: a davit member, a resilient member attached to the davit member and a fixed bracket in a manner such that the resilient member biases a portion of the davit member to one side of the boat when slack occurs in the tow rope and reduces the jerk transmitted to the skier during initial acceleration and turns.

4 Claims, 6 Drawing Figures

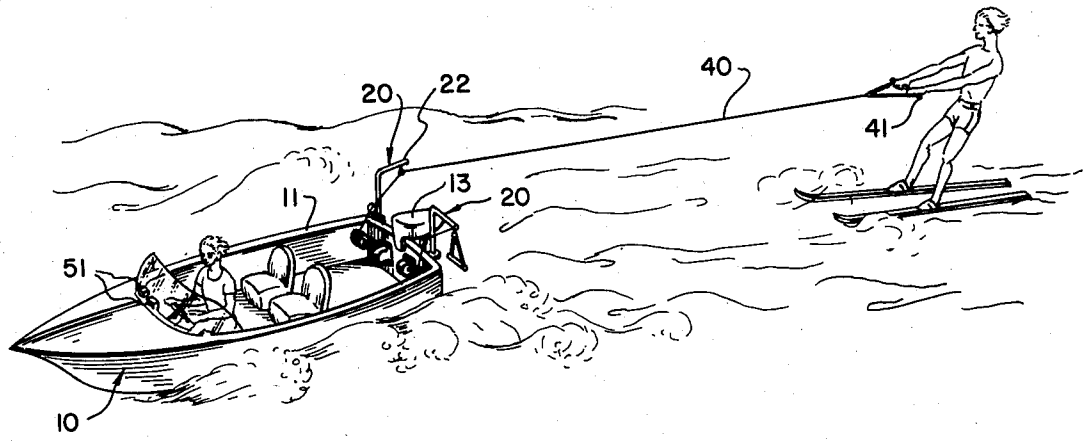


FIG. 1

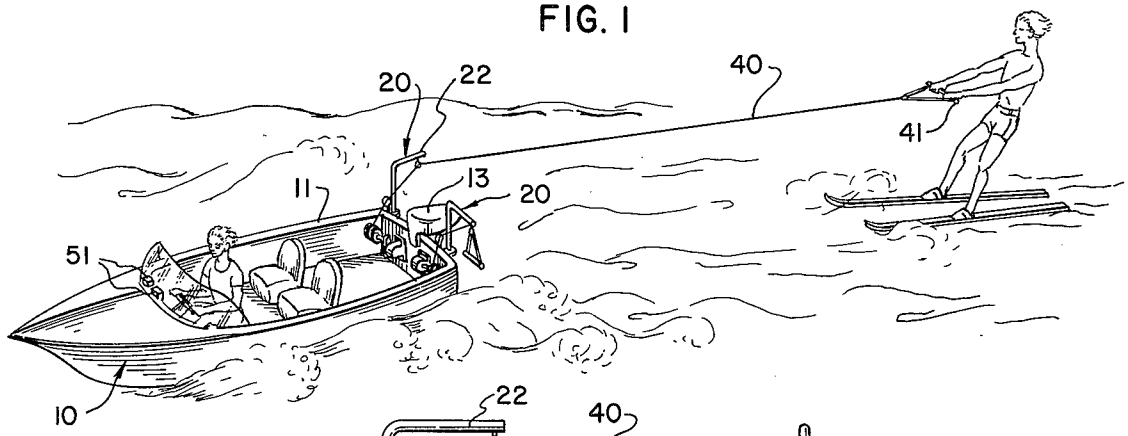


FIG. 2

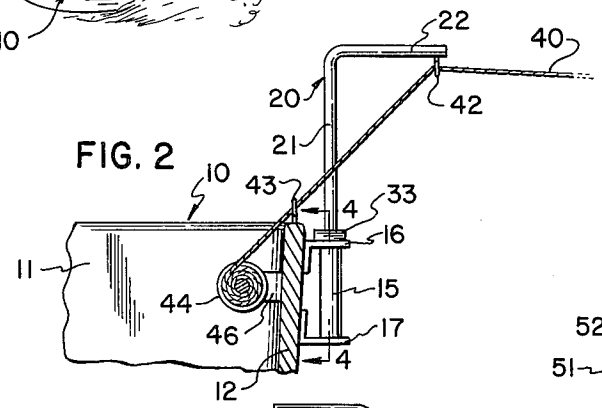


FIG. 3

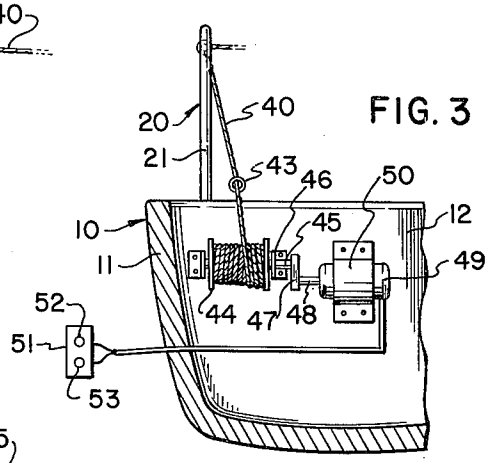
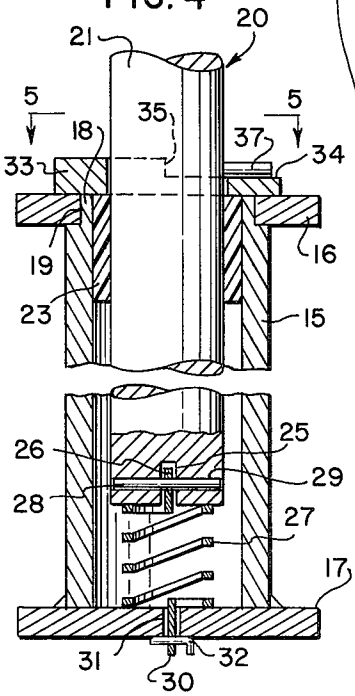


FIG. 4



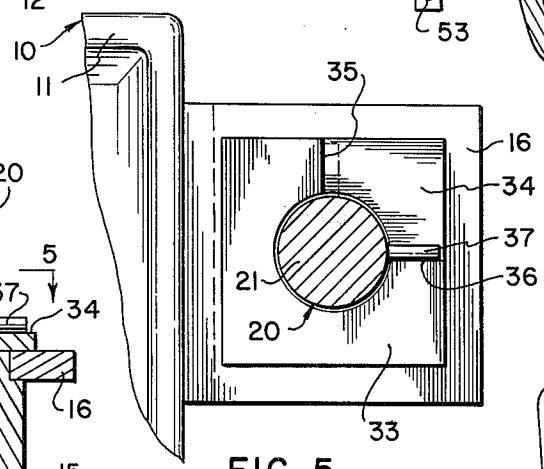
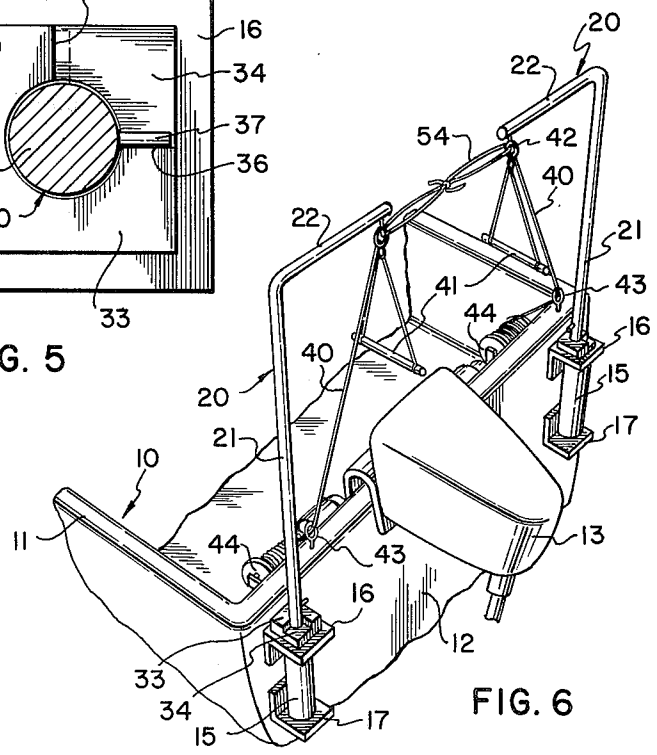


FIG. 5

FIG. 6



WATER SKI ROPE REWINDER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to the pulling of various articles and relates particularly to water ski tow ropes by means of which a skier is towed behind a high speed boat.

2. Description of the Prior Art

In the past, water skiers have used a tow rope with one end anchored to the transom or stern of a motor boat and the opposite end of the rope has had a handle which was held by the skier. Normally it has been necessary for the boat to attain a substantial speed so that the skier could plane across the surface and therefore it has been necessary to mount a relatively large power plant on the boat. At the beginning of the skiing operation, the boat has been maneuvered to a position relatively close to a skier so that the skier could grasp the tow rop handle, after which the boat has moved slowly away from the skier until the tow rope was substantially taut. Thereafter, the power plant of the boat was accelerated rapidly to cause the skier to rise to the surface of the water and be pulled at the same speed that the boat was travelling. When the skier fell or otherwise released the handle, the operator of the boat decelerated so that the ski rope could be recovered by manually pulling the tow rope into the boat. Frequently during this operation the tow rope became entangled with the propellor of the power plant so that not only was the rope severed, but at times the end of the rope became entangled about the propellor shaft and had to be freed before the power plant could again be used.

Some efforts have been made to provide apparatus for moving the ski rope to one side of a propelling boat and to rewind the tow rope onto a reel mounted on the boat. In some instances, such as in Andersen U.S. Pat. No. 3,178,127, the tow rope reel has been operated automatically and the winding in of the rope caused the handle to be moved outwardly to one side of the boat. In other instances, such as the patent to Collins et al. U.S. Pat. No. 3,303,813, the tow rope passed about a pulley located at one side of the boat and the reeling in of the tow rope was controlled by the operator of the boat. However, this type of structure adversely affected the steering of the boat, particularly when a single skier was being towed.

SUMMARY OF THE INVENTION

The present invention is a water ski rope rewinding apparatus in which the rope is mounted on a reel carried by a boat and such reel is operated by a motor under the control of the operator of the boat. The ski rope passes through a fair lead or eye carried by a davit and such davit is mounted in a socket in such a manner that the outer end of the davit normally is disposed outwardly of the boat in a position substantially perpendicular to the longitudinal axis thereof but which can move to a position generally parallel with the longitudinal axis of the boat when a skier is being towed. When the rope becomes slack, the davit automatically returns to its normal position.

It is an object of the invention to provide a water ski tow rope rewinding apparatus including a davit having one end normally disposed outwardly of the boat and generally perpendicular to the longitudinal axis thereof, but which moves to a plane generally parallel with the longitudinal axis of the boat when a skier is being towed.

Another object of the invention is to provide a tow rope rewinding apparatus in which the reel on which the rope is mounted is driven by a motor under the control of the operator of the boat.

A further object of the invention is to provide a tow rope rewinding apparatus including a swingably mounted davit including a resilient operating mechanism which reduces the intensity of the strain applied to the rope during the initial movement of the skier or when slack occurs in the tow rope.

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is a perspective illustrating one application of the invention.

FIG. **2** is a side elevation illustrating the manner in which the mechanism is mounted on a conventional boat.

FIG. **3** is a front elevation of the reel mechanism.

FIG. **4** is an enlarged fragmentary section on the line **4—4** of FIG. **2.**

FIG. **5** is an enlarged section on the line **5—5** of FIG. **4.**

FIG. **6** is a perspective illustrating the apparatus in position for travel.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With continued reference to the drawing, a boat **10** is provided having sides **11** and a stern transom **12** on which a power plant **13,** such as an outboard motor or the like, is mounted for propelling the boat. The boat and the power plant are conventional and such power plant can be either an inboard or an outboard motor which normally drives a propeller (not shown) located below the surface of the water.

When the boat **10** is used to tow one or more skiers, a socket or sleeve **15** is mounted along a generally vertical axis on the inside or the outside of the transom **12** or on the sides **11** of the boat in any desired manner, as by upper and lower brackets **16** and **17,** respectively. With particular reference to FIG. **4,** the lower end of the sleeve **15** is welded to the lower bracket **17,** while the upper end of such sleeve is provided with a reduced portion **18** received within an opening **19** in the upper bracket **16.** The brackets **16** and **17** are firmly attached to the boat **10** in any desired manner, as by screws or bolts (not shown).

A davit **20** having a generally vertically disposed lower portion **21** and a generally horizontally disposed upper portion **22** is swingably mounted within the sleeve **15.** It is noted that, if desired, the upper portion **22** of the davit could be curved away from the plane of the lower portion. Preferably, a nylon or other waterproof anti-friction bushing **23** is mounted in the upper portion of the sleeve **15** and such bushing has an inner diameter of a size to slidably engage the vertical portion **21** of the davit **20.**

The upper portion **22** of the davit is normally disposed in a position generally perpendicular to the longitudinal axis of the boat and the outer end of such upper portion is located exteriorly of the sides **11** of the boat. In order to swing the davit to its normal position, the lower end of the vertical portion **21** is provided with a slot or groove **25** of a size to receive one end **26** of a torque spring **27.** The end **26** is secured within the slot **25** by a pin **28** extending through an opening **29** in the

vertical portion **21** of the davit. The other end **30** of the torque spring extends through a slot **31** in the lower bracket **17** and such other end is secured by a cotter key or pin **32.** Since the upper portion **22** of the davit **20** can extend to either side of the boat, it is apparent that right and left hand torque springs are provided for causing the davit to turn in the desired direction. A predetermined tension is applied to the torque spring to cause the davit to turn to the outside of the boat when a pulling force on the upper portion of the davit is relieved.

With particular reference to FIGS. **4** and **5,** a stop plate **33** is mounted on the upper bracket **16** and such stop plate has a reduced area **34** connected to the remainder of the stop plate by shoulders **35** and **36.** A stop pin **37** is fixed to the vertical portion **21** of the davit and is adapted to slidably engage the reduced area **34** of the plate **33.** Normally the pin **37** is in alignment with the upper portion **22** of the davit so that when the upper portion extends outwardly of the boat, the pin **37** engages the shoulder **35** and when the upper portion is located in a plane generally parallel with the longitudinal axis of the boat, the pin **37** engages the shoulder **36.**

A tow rope **40** having a handle **41** at one end extends through a fair lead or eye **42** fixed to the outer end of the upper portion **22** of the davit **20** and through a fair lead or eye **43** mounted on the transom **12** to a reel **44** carried by a shaft **45.** Such shaft is journaled in bearings (not shown) carried by brackets **46** which are bolted or otherwise attached to the boat **10.** One end of the shaft **45** is driven by a speed reduction mechanism **47,** the opposite end of which is driven by a shaft **48** of an electric motor **49** mounted on the boat **10** in any desired manner, as by a mounting bracket **50.** The motor **49** can be either reversibly driven or can be driven in one direction only in which case an electrically operated brake (not shown) is provided to prevent rotation of the shaft **48** until desired. The motor **49** is supplied with electrical energy from any conventional source such as a battery (not shown).

With reference to FIGS. **1** and **3,** a control box **51** for each motor **49** is located adjacent to the operator of the boat and such control box has a first switch **52** for energizing the motor in a direction to wind the rope **40** onto the reel **44,** and a second switch **53** for rotating the motor in a reverse direction to unwind the reel **44** or to release the brake mechanism so that the tow rope can be paid out from the reel.

In the operation of the device, the boat **10** is maneuvered to a position adjacent to a skier so that the skier can take hold of the handle **41** of the tow rope at one side of the boat. The operator of the boat then moves the boat forward slowly while operating the switch **53** so that the tow rope unwinds from the reel **44** while the skier remains substantially stationary. When a sufficient length of tow rope has been unwound, the switch **53** is deenergized and the operator of the boat accelerates the power plant **13.** Since the reel **44** can no longer turn, initial movement of the boat causes the davit **20** to rotate substantially 90° so that the upper portion **22** is turned from a generally perpendicular position to a generally longitudinal position while applying additional torque to the spring **27.** The turning of the davit reduces the jerk transmitted to the arms of the skier and makes it easier for the skier to hold onto the handle when the tow rope becomes taut. During the skiing activity, the tow rope normally develops a small amount of slack from time to time caused by the turning of either the boat or the skier, and when this condition occurs the torque spring **27** automatically swings the upper portion of the davit toward a position perpendicular to the longitudinal axis of the boat and maintains a tension on the tow rope. When the slack condition is overcome, the upper portion of the davit again moves to a position generally parallel with the longitudinal axis of the boat and reduces or eliminates any jerk transmitted to the skier.

When the skier falls or otherwise releases the handle of the tow rope **40,** the operator of the boat energizes switch **52** to operate the motor **49** and cause the reel **44** to rotate in a direction to wind the tow rope **40** onto the reel. Simultaneously the operator of the boat circles back to the skier so that the skier can either climb into the boat or can again take hold of the handle **41** after which the tow rope is paid out and the skier continues skiing.

With reference to FIG. **6,** when the boat is being transported over land and along public roadways, it is necessary to move the upper portion **22** of each of the davits inwardly of the sides **11** of the boat so that the davit and the handle of the tow rope will not strike objects along the way. In order to move the upper portion inwardly, the vertical portion **21** of the davit is raised slightly against the tension of the torque spring **27** so that the pin **37** is disposed on top of the stop plate **33,** after which the davit is rotated substantially 180° and the upper portions extend toward each other. In this position, a rope or other connecting member **54** is attached to the upper portions **22** of each of the davits to maintain the davits in facing relationship.

Certain conventional boats are provided with an aft deck located rearwardly of the well deck or passenger compartment and in this event, the reel **44** and motor **49** can be mounted on such aft deck or within the well deck structure including under the aft deck.

I claim:

1. Apparatus for mounting a water ski tow rope on a boat having a longitudinal axis comprising a davit having an elongated substantially straight first portion and a second portion disposed out of the plane of said first portion, bracket means for swingably mounting the first portion of said davit on the boat along a generally vertical axis, a resilient member having one portion attached to the first portion of said davit and another portion attached to a fixed structure to urge the second portion of said davit toward a position outwardly of the boat and generally normal to the longitudinal axis thereof, first stop means carried by said bracket means, second stop means mounted on said davit and cooperating with said first stop means to permit limited swinging movement of said davit relative to said bracket means, and a water ski tow rope connected to the second portion of said davit, whereby a pulling force applied to said tow rope by a skier swings said second portion of the davit to a position substantially parallel with the longitudinal axis of the boat against the force exerted by said resilient member to reduce the jerk transmitted to the skier and said resilient member returns said second portion of the davit to an outwardly extending position when the tow rope is released by the skier.

2. The structure of claim **1** including reel means rotatably mounted on the boat, means for driving said reel means in at least one direction, said driving means being selectively controlled by the operator of the boat,

and the end of said tow rope remote from said skier being wound on said reel means, whereby the operator of the boat can wind the tow rope on the reel when the tow rope is released by the skier.

3. The structure of claim **1** in which said bracket means includes a hollow sleeve for receiving the first portion of said davit and said resilient member includes a torque spring mounted within said hollow sleeve.

4. Apparatus for mounting a water ski tow rope on a boat having a longitudinal axis comprising a davit having an elongated first portion disposed along a substantially vertical axis and a second portion disposed out of the plane of said first portion, said first portion terminating in an inner end and said second portion terminating in an outer end, bracket means mounted on said boat, said bracket means including a hollow sleeve disposed along a generally vertical axis, the first portion of said davit being swingably received within said sleeve and extending substantially therethrough, the inner end of said first portion being spaced from the lower end of said sleeve, a torque spring having one end attached to the inner end of said first portion of the davit and the other end attached to a fixed structure for swinging said davit in one direction, first stop means carried by said sleeve, second stop means mounted on said davit and cooperating with said first stop means to permit limited swinging movement of said davit relative to said sleeve, said torque spring normally urging the second portion of said davit toward a position outwardly of and generally normal to the longitudinal axis of the boat, and a water ski tow rope connected to said outer end of said davit, whereby a pulling force applied to said tow rope by a skier swings said second portion of the davit to a position substantially parallel with the longitudinal axis of the boat to increase the force of said torque spring and to reduce the jerk transmitted to the skier and said torque spring returns said second portion of the davit to an outwardly extending position when the tow rope is released by the skier.

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