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Cain

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[54] **WATER SKI TOWLINE PAY-OUT AND RETRIEVAL APPARATUS**

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

[51] **Int. Cl.** **B65h 75/40**

[58] **Field of Search** ..... 114/235 WS; 242/86.5 R, 242/86.5 A, 86.2, 85, 106; 254/166, 169, 171, 149, 175.7; 294/68; 214/85.1

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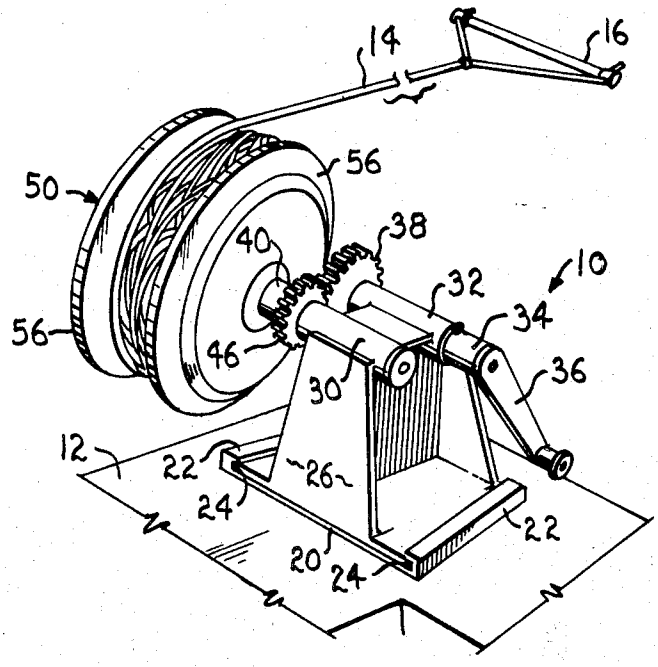
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[57] **ABSTRACT**

Apparatus assembled as a unit which is buoyant in water, rapidly secured and released from a boat, and capable of paying-out or retrieving an unloaded water ski towline. A hook on the hub of the wind spool receives an eyelet in the end of the towline for quick connection and release of the towline from the apparatus. The apparatus may be manually cranked to retrieve the towline into the boat, and has a free-wheel position wherein drag on the towline causes the latter to pay-out upon movement of the boat.

8 Claims, 6 Drawing Figures



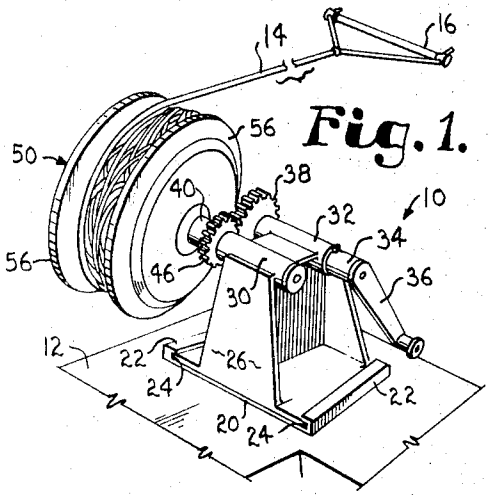


Fig. 1.

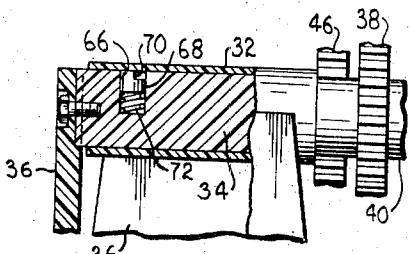


Fig. 5.

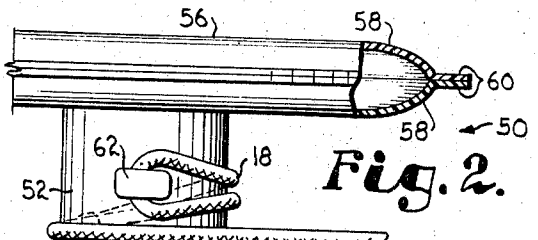


Fig. 2.

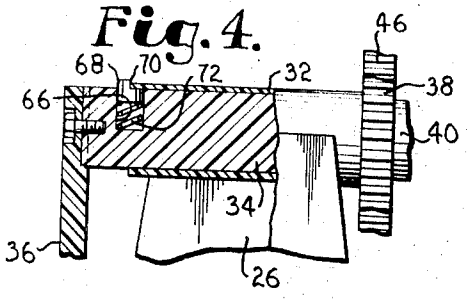


Fig. 4.

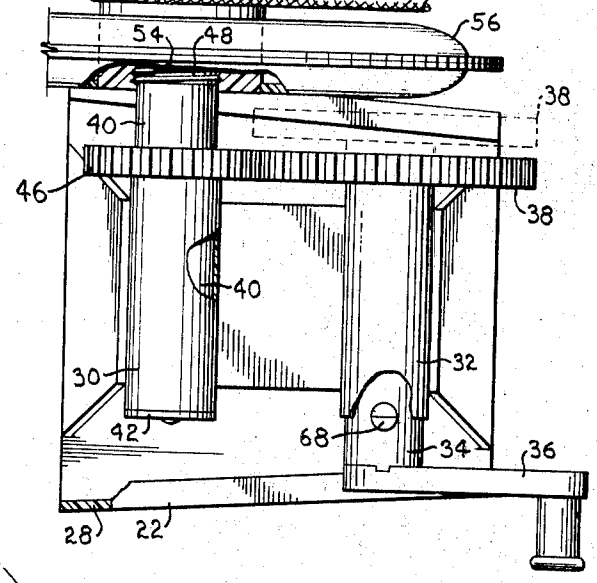


Fig. 3.

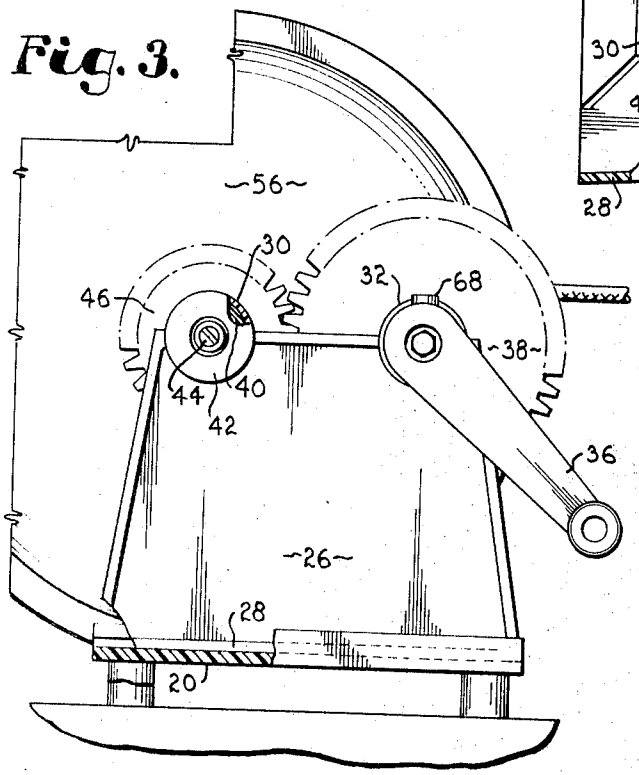
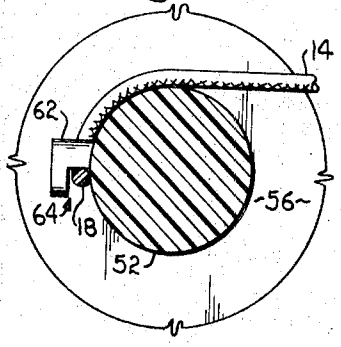


Fig. 6.



WATER SKI TOWLINE PAY-OUT AND RETRIEVAL APPARATUS

BACKGROUND AND SUMMARY OF THE INVENTION

This invention relates to apparatus effecting pay-out and retrieval of an unloaded water skiing towline or like lightweight device.

The sport of water skiing utilizes a towline attached to the stern of a boat to pull the skier through the water. Serious drawbacks are associated with casting such a towline into the water. For instance, the line often becomes entangled, hazardously requiring the skier to remain motionless in the water while untangling the line. To prevent this, various forms of reels or spools have been utilized to hold the towline and allow pay-out simply by moving the boat, as well as retrieval of the line by rotating the spool and winding the line thereon for storage.

Associated with this type of pay-out and retrieval apparatus are a variety of peculiar problems which have detracted from the feasibility of the various types of devices presently available for effecting pay-out and retrieval of a water skiing towline. For instance, because a sporting boat is used for such a variety of purposes, safety precautions dictate that the apparatus being removed from its prominent, operative location and stowed when water skiing is not contemplated. Attendant with this need or portability is that the apparatus be buoyant to prevent loss upon accidental dropping overboard. Prior apparatus suffered from these and other problems in attempting to construct the entire apparatus so that the skier could be towed directly from the spool of the apparatus.

It is a primary object of the present invention to provide apparatus of the type described which overcomes these drawbacks by being of lightweight structure incapable of withstanding the forces imposed by a towed water skier, thereby enhancing the portability and buoyancy characteristics of the apparatus.

A corollary to the above object is to provide such apparatus that is capable only of holding unloaded water skiing towlines, wherein the towline is quickly and easily released from the apparatus after pay-out to allow the towline to be attached unobtrusively and directly to the boat stern for subsequent towing of the skier or like heavy loads. More particularly, this object is accomplished by providing an open-sided hook on the hub of a wind spool of the apparatus that permits rapid engagement of an eyelet in the end of the towline.

Another object of the invention is to provide pay-out and retrieval apparatus of the type described which has a gear drive facilitating manual operation thereof, the gear drive being disengageable to allow free-wheeling of the spool of the apparatus so that weak drag forces exerted on the floating towline upon boat movement will be sufficient to cause spool rotation and pay-out of the towline.

These and other objects and advantages of the present invention are specifically set forth in or will become apparent from the following detailed description of a preferred embodiment of the invention when read in conjunction with the accompanying drawing, wherein:

FIG. 1 is a perspective view of apparatus constructed in accordance with the principles of the present invention, as mounted to a boat and with a water skiing towline wound thereon;

FIG. 2 is a partial top plan view of the apparatus with portions broken away to reveal details of construction;

FIG. 3 is a partial side elevational view with portions broken away;

FIG. 4 is a fragmentary, partially cross-sectional transverse elevational view of the drive shaft with the latter in its drive position;

FIG. 5 is a view similar to FIG. 4 but with the drive shaft in its free-wheel position; and

FIG. 6 is an enlarged cross-sectional elevational view of the central hub and hook of the spool.

Referring now more particularly to the drawings, pay-out and retrieval apparatus generally denoted by the numeral **10** is mounted to the stern portion **12** of a boat with a water skiing towline **14** attached thereto. The towline has a hand grip **16** at one end thereof, and the opposite end is doubled over into a closed eyelet **18** as best seen in FIG. **2.**

The apparatus includes a flat base **20** firmly mounted as by screws onto the stern **12,** with a pair of laterally extending guide rails **22** at opposite, transversely spaced edges of the base. Rails **22** taper inwardly toward the rear of the boat and define channels **24.** An upstanding support **26** has laterally extending lower edges **28** that can be rapidly and easily inserted and removed from channels **24** through the larger end of base **20** to releasably secure the support **26** to the boat stern. At the upper side of support **26** are a pair of laterally spaced, hollowed, cylindrical collars **30** and **32.**

Rotatably carried in collar **32** is a transversely extending drive shaft **34** which has a manual handle **36** affixed to one end and a gear **38** rigidly secured to or integrally formed on drive shaft **34** at its other end. Rotatably carried in the other collar **30** is a main shaft **40.** An enlarged end cap **42** secured by cap screw **44** (FIG. **3**) to one transverse end of main shaft **40** bears in rotary relationship against the adjacent transverse end of collar **30** and the support **26.** Main shaft **40** also has a gear **46** affixed to a portion thereof outside collar **30** in intermeshing relationship and engagement with the gear **38** to provide gear reduction and accompanying torque increase for rotation of the main shaft in response to manual rotation of the drive shaft by handle **36.**

A threaded length **48** (FIG. **2**) on main shaft **40** at an end thereof offset in a transverse direction to one side of support **26,** is received in a central aperture **54** of a hub portion **52** of a spool generally denoted by the numeral **50.** Spool **50** is thereby secured in offset, cantilevered arrangement to support **26.** Spool **50** further includes a pair of transversely spaced side flanges **56** affixed to hub **52** and defining a zone therebetween for receiving towline **14.** Each flange is formed by a pair of facing, dish-shaped sections **58** whose peripheral, flat lips **60** are welded to define a hollowed, sealed, air-filled side flange.

The spool hub **52** is provided with a hook **62** having an open-side **64** disposed to face away from the towline eyelet **18.** Thus, the eyelet **18** can be easily attached to hook **62** in such a relationship that upon counterclockwise rotation of spool **50** as viewed in FIG. **6,** the towline remains in engagement with the hook to thereby wind up upon hub **52.**

Drive shaft **34** has a blind bore **66** adjacent the end thereof upon which handle **36** is secured. Disposed in bore **66** for radial reciprocation relative to drive shaft **34** is stop means which includes a cylindrical detent **68** having a flat, vertical shoulder **70** at an upper end that normally engages a transverse end of collar **32** as shown in FIG. **4.** In this drive disposition of FIG. **4,** detent **68** is in holding engagement with the collar to retain drive shaft **34** in a drive position wherein gears **38** and **46** are in intermeshing engagement. Detent **68** also acts to transmit axial forces imposed on drive shaft **34** to collar **32** and support **26.** A resilient member in the form of a compressible, helical coil spring **72** is disposed in bore **66** and contacts detent **68** to urge the latter radially outwardly toward collar **32.**

Detent **68** may be manually depressed against the urgings of spring **72** to clear the end of collar **32.** The drive shaft **34,** which is carried in collar **32** in a manner permitting transverse shifting therewithin, can then be shifted transversely toward the spool to a free wheel position as shown in FIG. **5.** In its free wheel position, the drive shaft **34** locates its gear **38** out of engagement with the other gear **46,** so that spool **50** and main shaft **46** can rotate freely in response to any external forces exerted on towline **14.**

The spool **50,** drive shaft **34,** main shaft **40,** gears **38** and **46,** and support **26** present a singular portable unit that can be easily detached and secured to the boat and transported as a unit. The components of the unit are formed from lightweight materials, for instance a thermoplastic resin such as high strength polyethelene or polystyrene, so that the entire unit is buoyant in water and easily transported.

In use, this unit can be stowed in the boat until water skiing is contemplated, then rapidly and easily secured in position by inserting edges **28** of the support into channels **24.** The towline **14,** wound up upon hub **52,** is readied for pay-out simply by depressing detent **68** and shifting drive shaft **34** to its FIG. **5** free wheel position. The spring **72** urges detent **68** into frictional engagement with the inner surface of collar **32** to lightly hold the drive shaft in its free wheel position. Placing the hand grip end of the towline into the water where it can be grasped by the water skier, the towline is payed-out simply by accelerating and moving the boat. Weak drag forces on the towline cause it to pay-out as the boat moves. When completely payed-out, the towline eyelet **18** is removed from hook **62** and slipped onto a hook or like mechanism, unobtrusively mounted to the stem of the boat, which is capable of withstanding the strong forces created in pulling the skier through the water.

To retrieve the towline, eyelet **18** is slipped over hook **62,** and drive shaft **34** is pulled back to its FIG. **4** drive position with detent **68** automatically popping out into contact with collar **32.** Cranking of handle **36** in a clockwise direction as viewed in FIG. **3** then causes the towline to wind up upon hub **52.** For storage, the support is slipped out of base **20** and the apparatus moved to a convenient, safe and out-of-the-way location. The flat base **20** alone presents minimal obstruction to activities carried on in the boat to increase safety in boating.

From the foregoing, it will be seen that this invention is one well adapted to attain all the ends and objects herein set forth, together with other advantages which are obvious and which are inherent to the structure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. Buoyant apparatus releasably securable to a boat for effecting pay-out and retrieval of an unloaded water skiing towline or like lightweight device exerting relatively weak drag forces on the apparatus, said apparatus being constructed of lightweight materials and comprising:

a vertically upstanding support having a longitudinal axis along its length, said support is rapidly secured to and disengaged from the boat;

a main shaft extending transversely to said longitudinal axis and rotatably mounted to and carried by said support;

a spool including a central hub attached to said main shaft for rotation therewith and a pair of transversely spaced, sealed flanges affixed to said hub, said hub adapted to receive the towline or like device between said flanges for pay-out and retrieval thereof upon opposite rotation of said main shaft;

a drive shaft rotatably mounted to and carried by said support in laterally spaced, parallel relationship to said main shaft, said drive shaft being transversely shiftable relative to said longitudinal axis of said support while mounted thereto;

intermeshing gears mounted to said main shaft and said drive shaft to effect rotation of said reel upon rotation of said drive shaft;

stop means holdingly engaging said support and said drive shaft for holding the latter in a drive position wherein said gears are intermeshingly engaged, said stop means being movable out of holding engagement with one of said support and said drive shaft to permit transverse shifting of said drive shaft to a free-wheel position wherein said gears are disengaged and said spool is free to rotate in response to weak drag forces imposed on the towline or like device;

said stop means including a detent carried within a corresponding blind bore in said drive shaft, said detent being movable radially outwardly to engage said support and hold said drive shaft in said drive position thereof, said detent acting to transmit axial forces imposed on said drive shaft to said support when in holding engagement with the latter, said detent being movable radially inwardly relative to the drive shaft to disengage said support sufficiently to permit said transverse shifting of the drive shaft toward said free-wheel position; and

said support, main shaft, spool, drive shaft and gears comprising a portable unit rapidly securable to and disengageable from the boat, said unit being buoyant in water.

2. Apparatus as set forth in claim **1,** wherein said stop means further includes a resilient biasing member disposed in said blind bore and contacting said detent to

urge same radially outwardly toward engagement with said support.

3. Apparatus as set forth in claim 2, wherein said detent is in frictional contact with said support when said drive shaft is in said free-wheel position to thereby releasably retain said drive shaft in its free-wheel position.

4. Apparatus as set forth in claim 3, wherein said support includes a first, hollowed, cylindrical collar surrounding a portion of said drive shaft to mount and carry the latter in rotatable relationship to said support, said detent holdingly engaging a transverse end of said first collar when said drive shaft is in its drive position and frictionally contacting an inner surface of said first collar when said drive shaft is in its free-wheel position.

5. Apparatus as set forth in claim 4, wherein said support includes a second, hollowed, cylindrical collar surrounding a portion of said main shaft to mount and carry the latter in rotatable relationship to said support, there being an enlarged end cap secured to a transverse end of said main shaft and bearing against an adjacent transverse end of said second collar to transmit axial forces imposed on said main shaft to said support.

6. Apparatus as set forth in claim 5, wherein is provided a manually operable handle secured to said drive shaft for facilitating manual rotation thereof.

7. Apparatus as set forth in claim 1, wherein said main shaft has a threaded length at an end thereof transversely offset from said support, said hub having a central aperture for threadably receiving said threaded length of said main shaft to secure said spool to said main shaft in transversely offset, cantilevered arrangement to said support.

8. The apparatus as set forth in claim 1 including a base adapted to be firmly mounted to the boat and having laterally extending guide rails at opposite transversely spaced edges thereof defining channels receiving laterally extending lower edges of said support to allow said unit to be rapidly secured to and disengaged from the boat by insertion and removal of said lower edges of the support into said channels.

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