Sept. 30, 1958 J. F. MONTGOMERY 2,854,200

LEVEL WINDING SPINNER REEL

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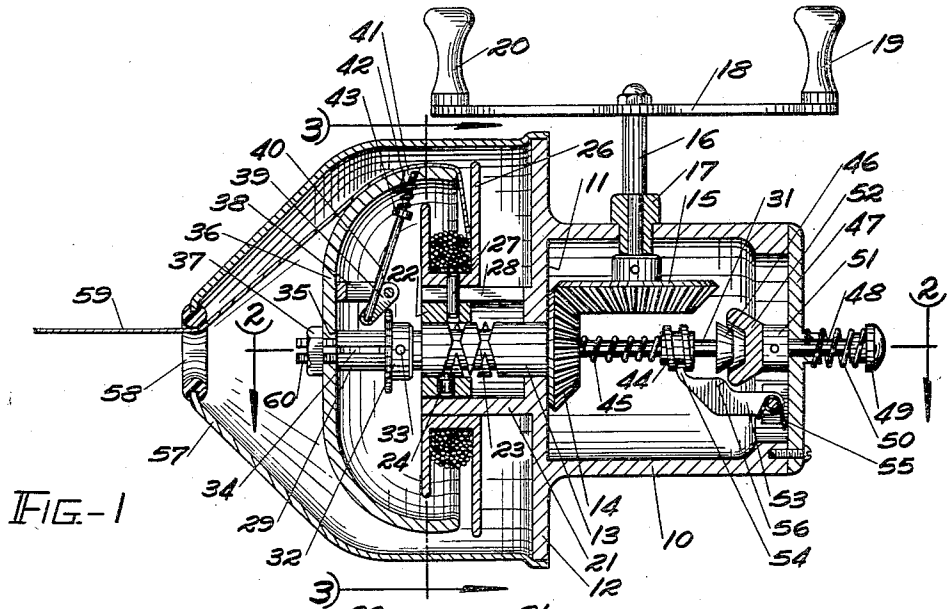


FIG.-1

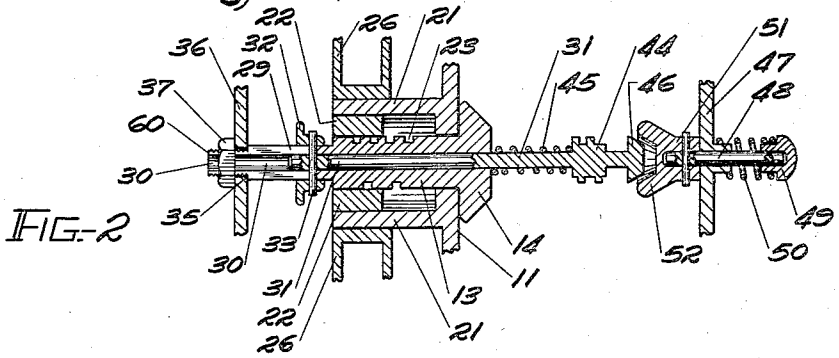


FIG.-2

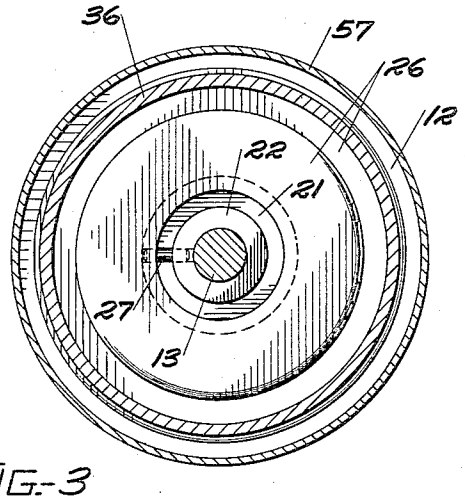


FIG.-3



FIG.-5

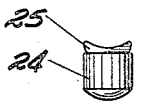


FIG.-4

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LEVEL WINDING SPINNER REEL

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7 Claims. (Cl. 242—84.21)

This invention relates to a spinning type reel which may be employed for casting, trolling, or even still fishing.

Primary objects of the invention are to provide a simple construction with the minimum number of parts rugged in nature, permitting a relatively low cost of production; a positively non-rotating line spool; means for level winding of the line about the spool; a spooling member always in fixed connection with the line winding crank; winding of the line either in a clockwise or anti-clockwise direction, and a line flow, variable braking action without actual pressure against the line itself in a snubbing action.

These and many other objects and advantages of the invention will become apparent to those versed in the art in the following description in one particular form of the invention as illustrated in the accompanying drawing, in which,

Fig. 1 is a view in longitudinal, horizontal, diametrical section through a structure embodying the invention;

Fig. 2 is a view in vertical section on the line 2—2 in Fig. 1;

Fig. 3 is a view in transverse vertical section on the line 3—3 in Fig. 1;

Fig. 4 is a view in side elevation of the finger of the level winding mechanism; and

Fig. 5 is a view in end elevation of the finger.

In the one form of the invention as now best known to me, and as illustrated in the drawing, there is a body 10 generally cylindrical in nature, hollow and having an internal end wall 11 from which extends in substantially the same plane an external annular flange 12.

A shaft 13 is revolubly mounted through the wall 11 axially of the body 10, and carries a bevel gear 14 within the body 10. A second bevel gear 15 is fixed to the end of a spindle 16 which extends radially through the outer curved wall of the body 10, supported by a bearing 17, to have the gear 15 in constant mesh with the gear 14 within the body 10. The spindle 16 carries a double ended crank 18 on its outer end in a fixed manner to have the outturned finger grips 19 and 20 secured at respective ends thereof.

A shell 21 extends axially and outwardly from the wall 11, and receives the shaft 13 therethrough. Within the shell 21, there is a sleeve 22 slidingly fitting within the shell, and slidingly receiving the shaft 13 therethrough. The shaft 13 has a crossing right and left hand thread 23 therearound within the shell 21.

The sleeve 22 carries a radially extending pin 24 to be rotatable about an axis extending radially of the sleeve. The pin 24 has an end thread follower 25, Figs. 4 and 5, constantly engaged in the thread 23. This combination of the threaded shaft 13, the surrounding sleeve 22, and the pin 24 is the well known assembly of a level winding apparatus commonly employed in fishing reels.

A line spool 26 is revolubly mounted about the outside of the shell 21, but is held positively against turning around the shell 21 by means of a pin 27 carried by the sleeve 22, extending through a slot 28 longitudinally of the shell

21 and entering the spool 26, Fig. 1. The pin 27 therefore prevents turning of the sleeve 22 about the shaft 13 and also the turning of the spool 26 about the shell 21 so that the sleeve 22 and the spool 26 are confined to longitudinal travel in respect to the shell 21.

The shaft 13 extends axially beyond the shell 21 by a reduced diameter portion 29. The entire shaft 13 and the extension 29 are axially bored to receive slidingly within the bore 30 a rod 31. This rod 31 has a length appearing within the housing body 10 and slidably extends on through into the reduced diameter portion 29. A collar 32 is slidingly carried along the shaft extension 29, and carries a pin 33 which extends diametrically through the extension 29, through a slot 34, and this pin 33 also extends diametrically through an end portion of the rod 31. Thus, the collar 32 may be reciprocated along the shaft extension 29 by axial shifting of the rod 31 through the shaft. The structure in this regard is best shown in Fig. 2.

The shaft extension 29 terminates by a threaded end portion 60, the slot or bifurcation extending through this end portion. There is a shoulder 35 appearing between the end portion 60 and the portion of the shaft extension 29 on which the collar 32 slides.

A spooling member 36 of a bell shape centrally receives the end portion 60 therethrough, and a nut 37 is employed to clamp the member 36 against the shoulder 35 so that the member 36 will be rotatably carried by turning of the shaft 13.

Within the member 36, there is an arm 38 extending inwardly thereof, and on this arm 38 there is a rocking lever 39 pivoted by one end thereto. A spooling finger 40 is rockably connected to the other end of the rocking lever 39, and extends generally radially to have its outer end guided through an opening 41 through the major diameter portion of the member 36. The finger 40 is normally urged to the position shown in Fig. 1 whereby its outer end does not extend beyond the outer surface of the member 36, and this inward urging of the pin 40 is accomplished in any suitable manner, such as by a spring 42 interposed between the inner surface of the member 36 and an abutment 43 on the finger. The rocking lever 39 is in the path of the collar 32 whereby shifting of the collar 32 along the shaft extension 29 will rock the lever 39 outwardly and in turn push the finger 40 to extend beyond the outer surface of the member 36.

The rod 31 extends, as above indicated, axially of the body 10, and carries a short length of a worm 44 in a fixed position thereon spaced from a gear 14. Surrounding the rod 31 between the gear 14 and the worm 44 is a coil spring 45 normally positioning the rod 31 as indicated in Fig. 1. The worm 44 may be made either a separate or an integral part of the rod 31, herein shown, Fig. 2, as being an integral part.

The rod 31 extends on beyond the worm 44 to carry a head 46 of any suitable shape, herein shown as being frusto-conical. This head 46 serves two purposes, namely as a member by which the rod 31 may be pushed axially of the shaft 13, and also as a brake member.

The body 10 carries an enclosing cap 47. Axially extending through this cap 47 is a plunger 48 axially aligned with the rod 31. This plunger 48 carries an external head 49 and between that head 49 and the cap 47 and surrounding the plunger 48 is a coil spring 50 normally urging the head 49 outwardly from the cap 47. This outward travel of the plunger 48 is limited by a stop 51 on the inside of the cap 47, fixed to the plunger 48. This stop 51 is normally spaced from the head 46, but serves to bear thereagainst when the plunger head 49 is pushed inwardly toward the cap 47. The stop member 51 is provided

with a matching cup inner end 52 to engage frictionally around the head 46. The internal diameter of the cup 52 may be made to be such that the head 46 is engaged before it strikes the bottom of the cup, or the flat end of the head and the flat bottom of the cup 52 may serve as the braking surface between the two members.

A dog 53 is rockably carried within the body 10, herein shown in the one particular form as being pivoted to the cap 47 to extend inwardly therefrom and have a finger 54 engage between the threads of the worm 44, the dog 53 being yieldingly urged theretoward by means of a spring 55. Furthermore, this dog 53 has a portion, herein shown as the shoulder 56 lying in the path of but normally spaced from the rim of the cup 52. Travel inwardly of the body 10 by the cup 52 will disengage the finger 54 from the worm 44.

While not necessary in the overall combination, yet it is advisable to provide a closure cap 57 to protect the spooling member 36, the spool 26, and the level winding mechanism from the elements as well as from sand and mud which are generally encountered in a fishing expedition. This cap 57 is provided with an eyelet 58, and is engaged about the periphery of the flange 12. The line 59 carried about the spool 26 extends upwardly over and around the spooling member 36, and thence downwardly and outwardly through the eyelet 58 to extend along the pole (not shown). It is to be understood that the device described will be mounted on the pole in any suitable or conventional manner, the details of which do not enter into the invention per se.

Operation

Assuming that the spool 26 is empty to begin with, the cap 57 is removed, and the crank 18 is turned to drive the shaft 13 until the spool 26 is brought to its position substantially against the wall 11. This travel of the spool 26 is set up as the shaft 13 turns by the pin or follower finger 24 feeding the sleeve 22 along the shell 21 by the engagement of the portion 25 in the thread 23, in turn sliding the pin 27 along the slot 28 thus carrying the spool 26 along the shell 21 accordingly.

With the spool 26 in that position adjacent the wall 11, the line 59 may be wound around the spool, and then carried therefrom upwardly and around the spooling member 36 and threaded through the eyelet 58, and then the cap 57 is positioned over the flange 12.

Assuming that the fisherman wants to cast, the structure with all of the elements positioned as indicated in Fig. 1 is allowed to remain as shown, and the cast is made whereupon the line 59 is free to travel from the spool 26 around the periphery of the spooling member 36 and out through the eyelet 58. The free running of the line 59 may be stopped by pushing on the button 49 to carry the cup 52 against the head 46 and thus push the rod 31 axially of the shaft 13 and carry the collar 32 against the rocking lever 39 to force the finger 40 outwardly from the periphery of the spooling member 36, and thus have the outer end of the finger 40 to be in the path of the line 59 as it comes around the spooling member. Without holding the crank 18, this will serve as a braking action on the free running of the line 59, since the spooling member 36 with sufficient outward pull on the line 59 will turn, and also cause the gears 14 and 15 to turn, this condition being indicated by the turning of the crank 18. Of course the line 59 may be completely stopped from running out of the reel by holding the crank 18 against turning, and at the same time holding the button 49 in its inward position of travel. Release of the button 49 permits the spring 50 to disengage the cup member 52 from the head 46, and allow the spring 45 to return the rod 31 to its normal position, the dog 53 being released also so that its finger 54 will drop on the worm 44, and as the rod 31 comes back, the finger 54 will find its position between adjacent threads of the worm 44.

To rewind the line 59 on the spool 26, the button 49 is again depressed, to carry the finger 40 outwardly beyond the periphery of the spooling member 36, and the crank 18 is then turned by either one of the members 19 or 20 so that the spooling member 36 is turning and at the same time the line 59 is carried around the spooling member 36 in sliding engagement with the end of the finger 40 so that the line 59 is thus wrapped around the spool 26, at the same time the spool 26 is being reciprocated along the shell 21 by the level winding mechanism. It is to be noted that when the button 49 is sufficiently depressed, that is the cup 52 is urged forcibly against the head 46, enough pressure can be exerted to prevent rotation of the shaft 13 by reason of the pin 33 extending across the shaft extension 29 thus restraining turning of the shaft 13. In this manner, a positive stoppage of the outward travel of the line 59 is set up so that in such a condition, the crank 18 itself does not turn. The line may be paid out as conditions require by releasing somewhat the pressure on the button 49, and then the line again stopped by additional pressure applied against the button 49.

Now there is an automatic line winding-in action without touching the button 49. This action is set up through travel of the worm 44 along the dog finger 54. In this action, turning of the crank 18 in a line winding direction, causes the shaft 13 to turn and also turns the rod 31 causing the rod 31 to travel longitudinally of the shaft 13 and advance the collar 32 to extend the finger 40 into line engagement by reason of the screwthread action between the worm 44 and the finger 54. This longitudinal travel of the rod 31 ceases when the finger 54 drops back of the worm 44, between it and the head 46. The finger thus retains the rod 31 in the "line winding" position until released by pushing on the button 49 lifting the dog 53 to allow the spring 45 to shift the rod 31 back and bring the worm 44 into the path of the finger 54 which, upon release of the button 49 will allow the finger to drop into the worm thread and normally hold the rod 31 against longitudinal travel, until the crank 18 is again turned or the button 49 pushed.

While I have herein shown and described my invention in the one best form as now known to me, the description has been made in reference to simplest possible form in respect to bearings and the like, it being understood of course that suitable anti-friction bearings may be employed particularly for the shaft 13 where it extends through the wall 11, and other changes may be made all without departing from the spirit of the invention and I therefore do not desire to be limited to that precise form beyond the limitations which may be imposed by the following claims.

I claim:

1. A fishing reel comprising a body; a hollow cylindrical member extending from the body; a shaft rotatably extending from the body and axially through said member; means carried by the body for rotating said shaft; crossing right and left hand threads around said shaft within said member; a sleeve about said shaft within said member; a pin carried by the sleeve extending into the paths of said threads; a spool carried on said member; said member being slotted longitudinally along one side thereof; a pin interconnecting said sleeve and said spool through said slot setting up a reciprocating travel of said spool while holding the spool against rotation about the member; said shaft being fixed against longitudinal travel; a spooling member fixed to and rotatable with said shaft beyond said cylindrical member; a finger reciprocably carried by said spooling member to have an end portion extendible beyond and retractible from the periphery of the spooling member; a rod slidably extending longitudinally into said shaft and by an end portion extending into said body; a collar about said slidable shaft; said rod adapted to shift said collar along the shaft and shift said finger into its extended position; and means adjacent the

end of said rod within said body adapted to shift said rod to shift said finger.

2. The structure of claim 1 in which said rod is rotatively connected with said shaft, and braking means resisting shaft rotation interposed between said rod and said rod shifting means.

3. A fishing reel comprising a shaft; means for driving the shaft; a line spool mounted concentrically of the shaft; rectilinear spool drive means reciprocating the spool longitudinally of the shaft, said spool being held against revolving about the shaft; a line spooling member fixed on said shaft adjacent said spool; a line engaging finger carried by said member extendible beyond and retractible from the periphery of the member; a rod slidably carried within and longitudinally of and rotatably driven by said shaft; a slide member about said shaft; means interconnecting the slide member through said shaft with said rod; means interposed between said slide member and said finger setting up travel of the finger actuated by travel of said slide member; a brake member for resisting rotation of the rod and shaft at the end of and normally removed from said shaft; and means shifting said brake member into braking action.

4. The structure of claim 3 in which there is a latch member normally retaining said rod in a finger extended position; said latch means being released by travel of said brake member toward said rod.

5. The structure of claim 3 in which there is spring means urging said rod into a finger retracted position; threaded latch means adapted to extend said finger; said latch means comprising a worm about said rod and a dog yieldingly urged against said worm causing said rod upon its rotation to advance said finger to extended position, the worm threads terminating in respect to said dog when said finger is in said extended position; said dog being moved from the path of said worm by said shifting of said brake member.

6. A fishing reel comprising a body; a shaft revolubly carried by the body; means driving said shaft; a spool carried by the body longitudinally shiftable thereof; means reciprocating said spool and maintaining it against rotation relative to said body; a spooling member fixed on said shaft axially of and adjacent to said spool; a rod reciprocably extending through said shaft; means revolubly interconnecting the rod and the shaft; a finger reciprocable through said spooling member to projected and retracted position and biased to a retracted position within the member; means actuated by travel of said rod toward said member urging said finger outwardly of the member; means biasing said rod to a finger retracted position; an abutment on said rod; a dog in the path of the abutment normally biased theretoward to drop behind the abutment when said rod is shifted to said finger projected position; a plunger axially aligned with said rod normally removed from and shiftable into braking contact with said rod and adapted to shift said rod to finger projected position; said dog being also in the path of said plunger to be moved out of the path of said abutment by the shifting of said plunger.

7. The structure of claim 6 in which said abutment has a threaded portion extending therearound and said dog entering said threaded portion upon a line rewind rotation of said shaft, rotation of the shaft turning said rod to advance the rod by means of said dog-to-thread engagement to extend said finger from said member.

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