June 17, 1958 G. GASDORF ET AL 2,838,839

MOORING DEVICE

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Fig. 2

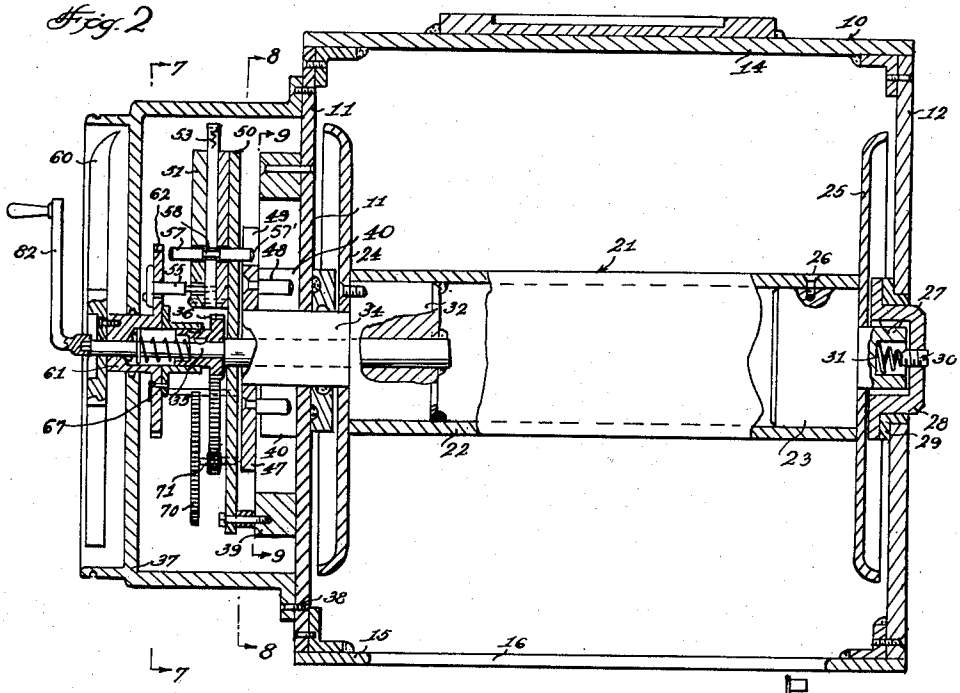


Fig. 5.

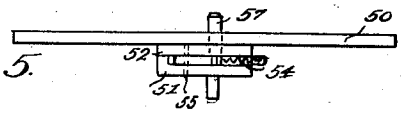


Fig. 4.

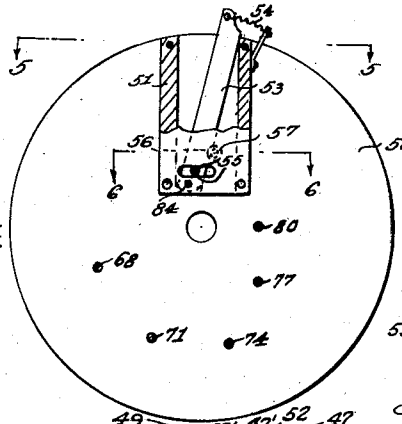


Fig. 6.

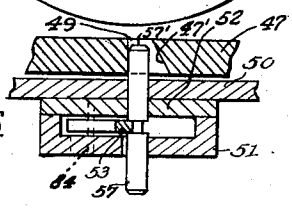


Fig. 3.

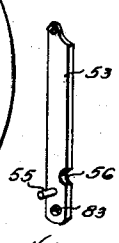
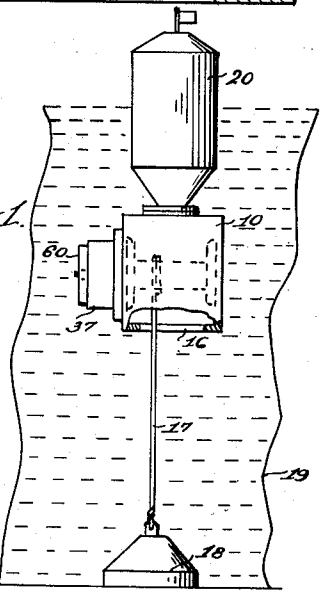


Fig. 1.



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Fig. 7.

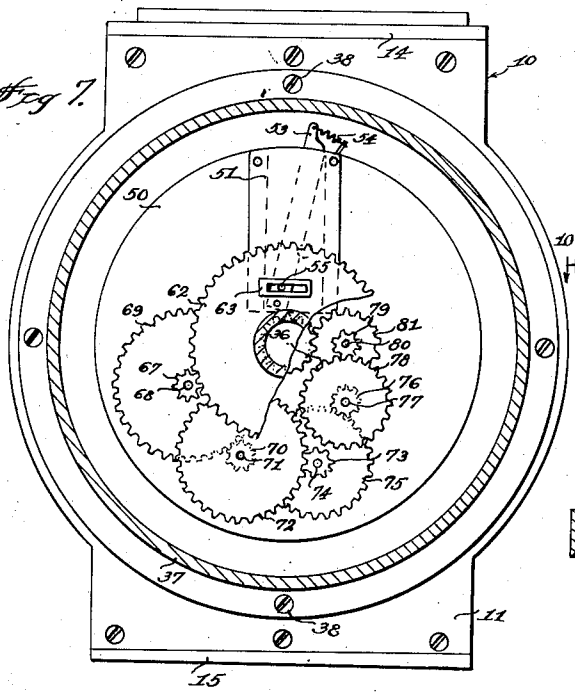


Fig. 9.

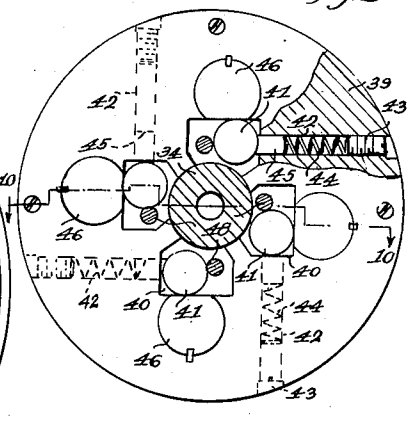


Fig. 10.

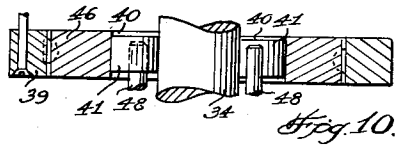


Fig. 8.

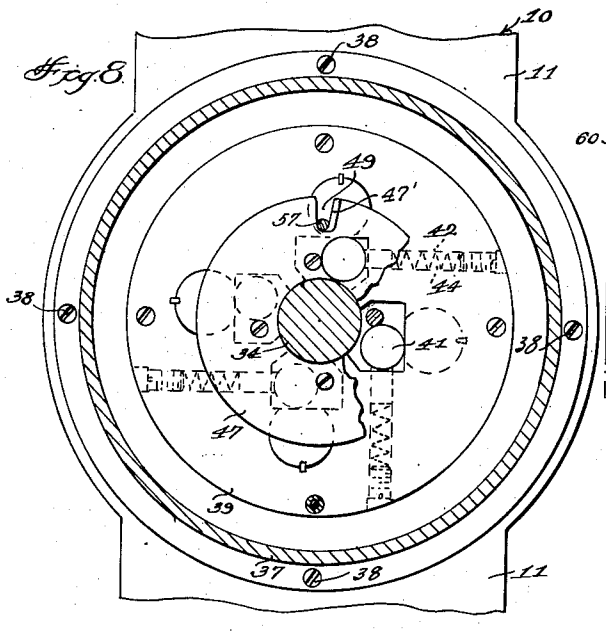
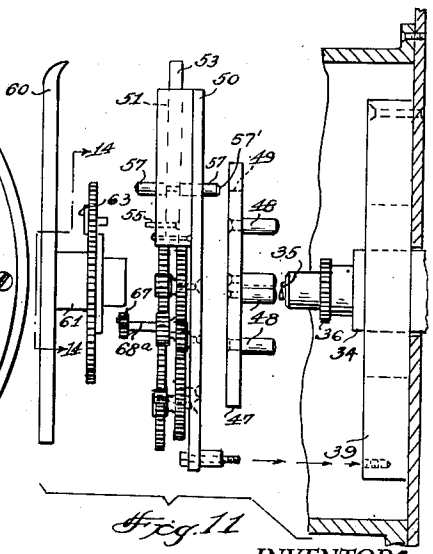


Fig. 11.



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Fig. 12

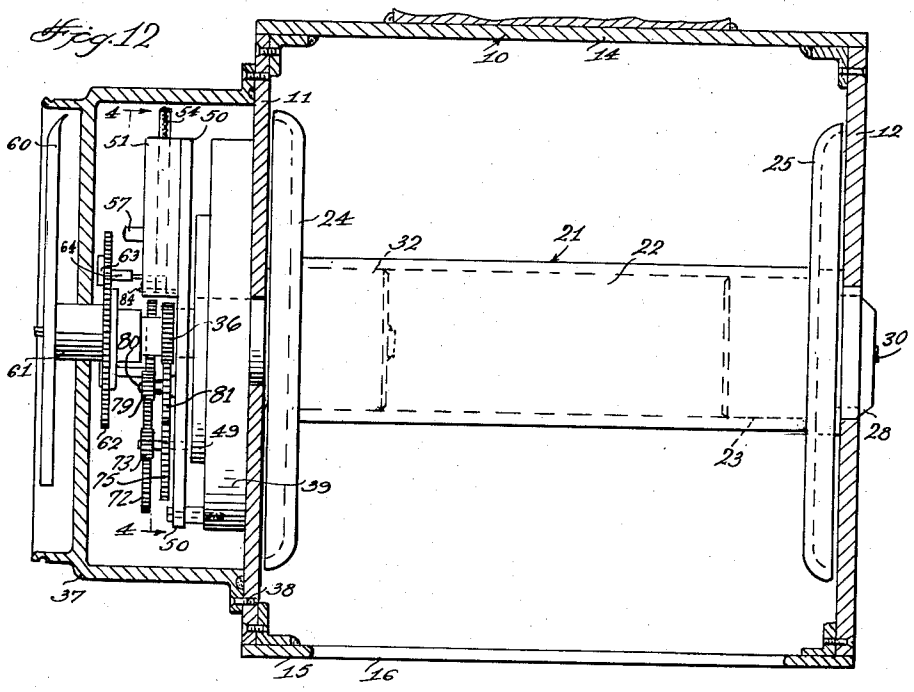
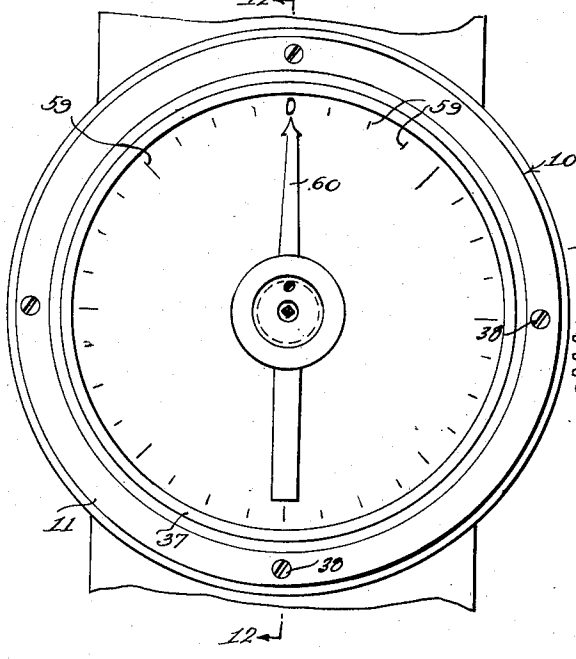


Fig. 13



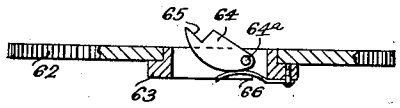


Fig. 15

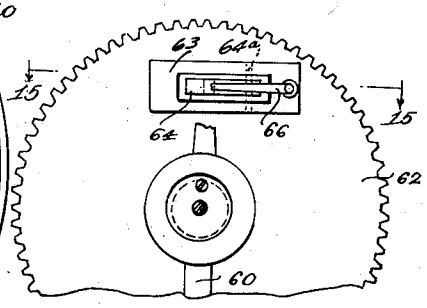


Fig. 14

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2,838,839

MOORING DEVICE

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Application December 22, 1955, Serial No. 554,868

2 Claims. (Cl. 33—136)

This invention relates to a mooring device, and more particularly to a mooring device which is semi-automatic in its operation.

The object of the invention is to provide a semi-automatic mooring device which is adapted to be used for mooring various objects such as buoys, or objects in the air and whereby the device is constructed so that a predetermined amount of cable or line can be automatically played out and then the reel is automatically stopped.

Another object of the invention is to provide a mooring device which is adapted to have a cable or line arranged in engagement therewith, and wherein there is provided a means for controlling the amount of line which is played off of the device, the device being constructed so that when it is used in the water, there will be no entanglement from weeds, debris, or floating objects.

A further object of the invention is to provide a mooring device which is extremely simple and inexpensive to manufacture.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this application, and in which like numerals are used to designate like parts throughout the same:

Figure 1 is an elevational view illustrating the mooring device of the present invention being used, and with parts broken away and in section.

Figure 2 is an enlarged elevational view of the mooring device, with parts broken away and in section.

Figure 3 is a perspective view of the trip arm.

Figure 4 is an elevational view illustrating the gear stud plate and block, with parts broken away and in section.

Figure 5 is a sectional view taken on the line 5—5 of Figure 4.

Figure 6 is a sectional view taken on the line 6—6 of Figure 4.

Figure 7 is a sectional view taken on the line 7—7 of Figure 2.

Figure 8 is a sectional view taken on the line 8—8 of Figure 2.

Figure 9 is a sectional view taken on the line 9—9 of Figure 2.

Figure 10 is a sectional view taken on the line 10—10 of Figure 9.

Figure 11 is a fragmentary exploded view showing certain of the parts disassembled.

Figure 12 is a sectional view taken on the line 12—12 of Figure 13.

Figure 13 is a front elevational view of the device showing the scale and pointer.

Figure 14 is a sectional view taken on the line 14—14 of Figure 11.

Figure 15 is a sectional view taken on the line 15—15 of Figure 14.

Referring in detail to the drawings, the numeral 10 designates a frame which includes a first and second end wall 11 and 12, and crosspieces 14 and 15 extend between these end walls and are secured thereto. The crosspiece 15 may be provided with an elongated slot 16, whereby a suitable line or cable 17 can be extended through the slot 16. The cable 17 may be connected to an anchor 18 which can be arranged at the bottom of a body of water 19, Figure 1, and a buoy 20 or the like may be secured to the mooring device.

Mounted within the frame 10 is a spool or reel 21 which includes a cylindrical sleeve 22. A bushing 23 is secured within an end of the sleeve 22 in any suitable manner, as for example by means of a set screw 26. Circular flanges or discs 24 and 25 are connected to the ends of the spool 21 so as to maintain the line or cable in place thereon.

There is further provided a braking mechanism for controlling the speed of rotation of the spool 21, and this braking mechanism comprises a reduced diameter portion 27 which extends outwardly from the bushing 23. A cup 28 extends through the end wall 12 of the frame 10, and the cup 28 is adapted to engage a brake surface 29. A set screw 30 is adjustably mounted in the cup 28, and the set screw 30 is arranged in engagement with a coil spring 31, Figure 2. Thus, by rotating the screw 30, the tension on the spring 31 can be varied so that the braking action exerted by the cup 28 can be controlled as desired.

There is further provided a hub 32 which is secured within an end of the sleeve 22 by welding, and extending outwardly from the hub 32 is a shaft or support portion 34 which includes a reduced diameter or stem portion 35. The portions 32, 34, and 35 are of one piece or integral construction. A gear 36 is mounted on the stem portion 35 for a purpose to be later described.

There is further provided a housing 37 which serves to protect the moving parts, and the housing 37 may hold a quantity of oil. The housing 37 may be secured to the end wall 11 of the frame 10 by means of bolts or screws 38. Mounted in the housing 37 is a locking ring 39 and the construction of the ring 39 is shown in detail in Figures 9 and 10. Thus, the ring 39 includes a plurality of cutouts 40 which each have a roller 41 mounted movably therein. These is further provided in the ring 39, a plurality of chambers or compartments 42 which each have a plug 43 arranged in threaded engagement therewith. A coil spring 44 is positioned in each chamber 42, and the coil spring 44 has one end abutting the plug 43, while the other end of the coil spring 44 abuts a movable plunger 45. The ring 39 may be provided with a plurality of inserts 46 which may be made of hardened material whereby there will be a minimum amount of wear on the various parts.

Arranged contiguous to the lock ring 39 is a finger plate 47 which carries a plurality of fingers 48, and the fingers 48 extend into the cutouts 40 in the ring 39. The finger plate 47 is further provided with a notch 49 for a purpose to be later described. Arranged contiguous to the finger plate 47 is a gear stud plate 50, and a block or casing 51 is secured to the gear stud plate 50, there being a spacer member 52 interposed between the block 51 and the plate 50, Figure 6.

Movably mounted in the block 51 is a trip arm 53 which has a coil spring 54 connected thereto, and the arm 53 is mounted on a pin 84, Figure 4. The arm 53 is provided with a notch 56, Figure 3, and the notch 56 is adapted to engage a release pin 57. As shown in Figure 6, the release pin 57 is provided with an intermediate recess 58 so that when the arm 53 has its notch 56 engaging the release pin 57, the pin 57 is locked in place.

Arranged exteriorly of the housing 37 is a pointer or indicator 60 which is adapted to coact or cooperate with a scale 59 on the outside of the housing 37. Secured to

the pointer 60 is a hub 61, and the hub 61 projects through an end of the housing. Formed integral with the hub 61 or secured thereto is a gear member 62. A collar 63 is connected to the gear member 62, Figure 15, and a dog 64 has a notch 65 arranged therein, there being a spring member 66 arranged in engagement with the dog or trip nose 64.

There is further provided a gear train which includes a gear 67 which is mounted on a shaft 68, and there is further provided a large gear 69 which is mounted on the shaft 68. The gear 69 meshes with a gear 70 which is on a shaft 71, Figure 7, and the shaft 71 drives a larger gear 72. The gear 72 meshes with a gear 73 on a shaft 74, and the shaft 74 drives a larger gear 75. The gear 75 meshes with a small gear 76 on a shaft 77, and the shaft 77 drives a larger gear 78. The gear 78 meshes with a gear 79 on a shaft 80, and there is also mounted on the shaft 80 a larger gear 81 which meshes with the gear 36 on the stem 35.

There is further provided a crank which is indicated by the numeral 82. The arm 53 is provided with an opening 83, Figure 3, and a pivot pin 84 extends through the opening 83 in the arm 53.

From the foregoing, it is apparent that there has been provided a semi-automatic mooring device which will pay out a certain amount of wire, rope or cable and then lock automatically, depending upon where the pointer 6 was manually set on the scale 59. The device will lock automatically on the fly as well as on a dead pull, and it will hold against pull when locked.

The device functions as follows. The wire or cable 17 is wound on the spool 21 in a clockwise direction. Then, the crank 82 is placed on the square on the end of the shaft. The back side of the gear 62 pushes against the release pin 57 which in turn moves the finger plate 47 in a clockwise direction. The fingers 48 on the finger plate 47 contact the rollers 41 and push the rollers in a clockwise direction to move the rollers away from the shaft 34 to thereby free the shaft to permit it to rotate in either direction. The trip arm 53 then falls in the groove 58 on the release pin 57 to thereby prevent the release pin 57 from retracting. Then, the crank 82 is removed.

To set the device for a desired pay out, first the pointer 60 is pushed in and this causes the gear 62 to be disengaged from the gear 67. Then, the pointer 60 is rotated in either direction and set to the desired length of pay out which is marked in feet on the scale 59, and then the pointer 60 is pulled out. This causes the gear 62 to mesh or engage the gear 67. Then, when the spool 21 is rotating in an anti-clockwise direction, as for example when the wire rope 17 is being removed during the regular operation, the gear train shown in Figure 7 rotates the gear 62 to which the pointer 60 is attached. When the amount of wire rope 17 as set on the scale 59 is pulled off, the trip nose 64 which is located inside of the gear 62, moves the trip pin 55, and the trip arm 53 to which the trip pin 55 is attached, so that the release pin 57 is freed. When the release pin 57 retracts, the finger plate 47 rotates in an anti-clockwise direction to thereby allow the locking rollers 41 to wedge between the inserts 46 and the spool shaft 34 to thereby lock the spool.

The locking ring 39 is permanently riveted or otherwise secured to the frame 10 and is leak-proof or liquid tight. The working parts are enclosed in the housing 37 which is filled with oil. Suitable drain and filler plugs may be provided for this housing. The gear 62, pointer 60, and hub 61 are all one unit and move on the stem 35 which is a part of the spool 21.

The brake or drag is arranged at the opposite end of the frame from the pointer 60. Thus, when the screw 30 is rotated in a clockwise direction, pressure is applied against the spring 31, Figure 2, so that the spool 21 creates a friction between the cup 28 and member 29. At the same time, the cup 28 exerts friction against the member 29. The brake cup 28 can move freely lengthwise on the reduced diameter portion 27 and may be kept from rotating by means of two keys.

The present invention can be used where any mooring device is needed as for example for mooring a buoy such as a bouy 20 shown in Figure 1 so that it can be anchored in water. Also, it can be used for mooring floating objects at various places or at given heights in the air. It is advantageous over other mooring devices because it is automatic since it permits a certain amount of wire or cable to automatically pay out over the reel and stop at the set footage. Furthermore, it is completely encased and cannot become entangled by weeds, debris or floating objects.

The device of the present invention functions as follows. The wire rope is spooled on the spool 21 by means of a crank 82 which rotates in a clockwise direction. An anchor or weight is attached to the end of the rope 17 and bouy or float is attached to the top plate 14. When the device is launched in water, the anchor 18 travels downward to thereby rotate the spool 21 in an anti-clockwise direction. The drive gear 36, being on the same shaft as the spool 21, rotates the gear train which consists of the gears 79, 81, 78, 76, 75, 73, 72, 70, 69, 67, and 62. Lesser amount of gears may be used if the length of rope is of less length. The gear 79 is fastened to the gear 81 and runs free on the stud 80 which is fastened to the gear stud plate 50. The gear 81 meshes with the drive gear 36. The gear 76 is fastened to the gear 78 and they rotate on the gear stud 77 which is fastened to the gear stud plate 50. The gear 78 meshes with the gear 79. The gear 73 is fastened to the gear 75 and these rotate on the gear stud 74 which is fastened to the gear stud plate 50. The gear 75 meshes with the gear 76. The gear 70 is fastened to the gear 72 and these gears rotate on the stud 71 which is fastened to the plate 50. The gear 72 meshes with the gear 73.

The gear 67 is fastened to the gear 69 by means of a bushing 68A to permit the gear 62 to disengage in the space between the gear 67 and the gear 69, and these gears rotate on the gear stud 68 which is fastened to the gear stud plate 50.

The gear 62 is fastened to the gear hub 61 which rotates on the shaft extension and drives gear hub 35, if the gear 62 is in the space between the gears 67 and 69. The gear 62 has a pocket on one side in which is positioned the trip nose retainer 63. The trip nose 64 pivots on pin 64A and is spring loaded by means of the spring 66. When the device is paying out rope, the gear 62 meshes with the gear 67 and rotates in an anti-clockwise direction.

When the length of a desired payout is almost reached, the trip nose 64 pushes against the pin 55 which is fastened to the trip lever 53 and which pivots on the fulcrum pin 84 and the trip lever 53 moves out of recess in shot pin 57. This thereby frees the shot pin to move ahead which in turn lets the finger plate 47 rotate in an anti-clockwise direction and the beveled portion 47' adjacent the notch 49 engages the tapered end 57' of the pin 57 and moves the pin 57 away from the plate 47. This permits the locking rollers 41 to wedge between the anvils 46 and the shaft 34 to thereby lock the spool to prevent further payout.

The pointer 60 is fastened to the gear hub 61 to which the gear 62 is also attached. Pushing the pointer in disengages the gear 62 from the gear 67 to make it possible to rotate the pointer in any direction. For example if a payout of 200 feet is desired, the pointer is pushed in, rotated to the 200 foot marking on the housing and pulled out. When the rope pays out, the pointer will rotate in an anti-clockwise direction and the device will function as previously described.

We claim:

1. In a device of the character described, a frame including a first and second end wall arranged in spaced

parallel relation with respect to each other, crosspieces extending between said walls and secured thereto, and one of said crosspieces being provided with a slot for the projection therethrough of a cable a spool rotatably arranged in said frame and including a cylindrical sleeve, circular flanges arranged contiguous to the ends of said spool, a housing arranged exteriorly of said frame and connected to an end wall thereof, said housing having scale markings thereon, a hub secured within an end of said sleeve, a shaft extending outwardly from said hub, a stem of reduced diameter extending outwardly from said shaft, a crank extending through said housing and engaging said stem, a locking ring secured to the outer surface of said frame and having said shaft extending therethrough, there being a plurality of cutouts in said locking ring, there being chambers in said locking ring, spring pressed plungers arranged in said chambers, rollers arranged in said cutouts for engagement by said plungers and shaft, a finger plate arranged contiguous to the outer surface of said locking ring, fingers extending from said plate and projecting into said cutouts, there being a notch in the outer portion of said finger plate, a gear stud plate arranged contiguous to said finger plate, a block secured to said gear stud plate, a trip mechanism arranged in engagement with said block, a hub mounted in an end of said housing and having a pointer connected thereto, and a gear train for selectively connecting said last named hub to said shaft.

2. The structure as defined in claim 1, and further including a braking mechanism arranged in engagement with one end of said spool.

References Cited in the file of this patent

UNITED STATES PATENTS

2,089,031	MacDonald	Aug. 3, 1937
2,355,381	Lear	Aug. 8, 1944