

Sept. 15, 1959

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2,903,716

AUTOMATIC MOORING DEVICE FOR BUOYS

Filed July 9. 1953

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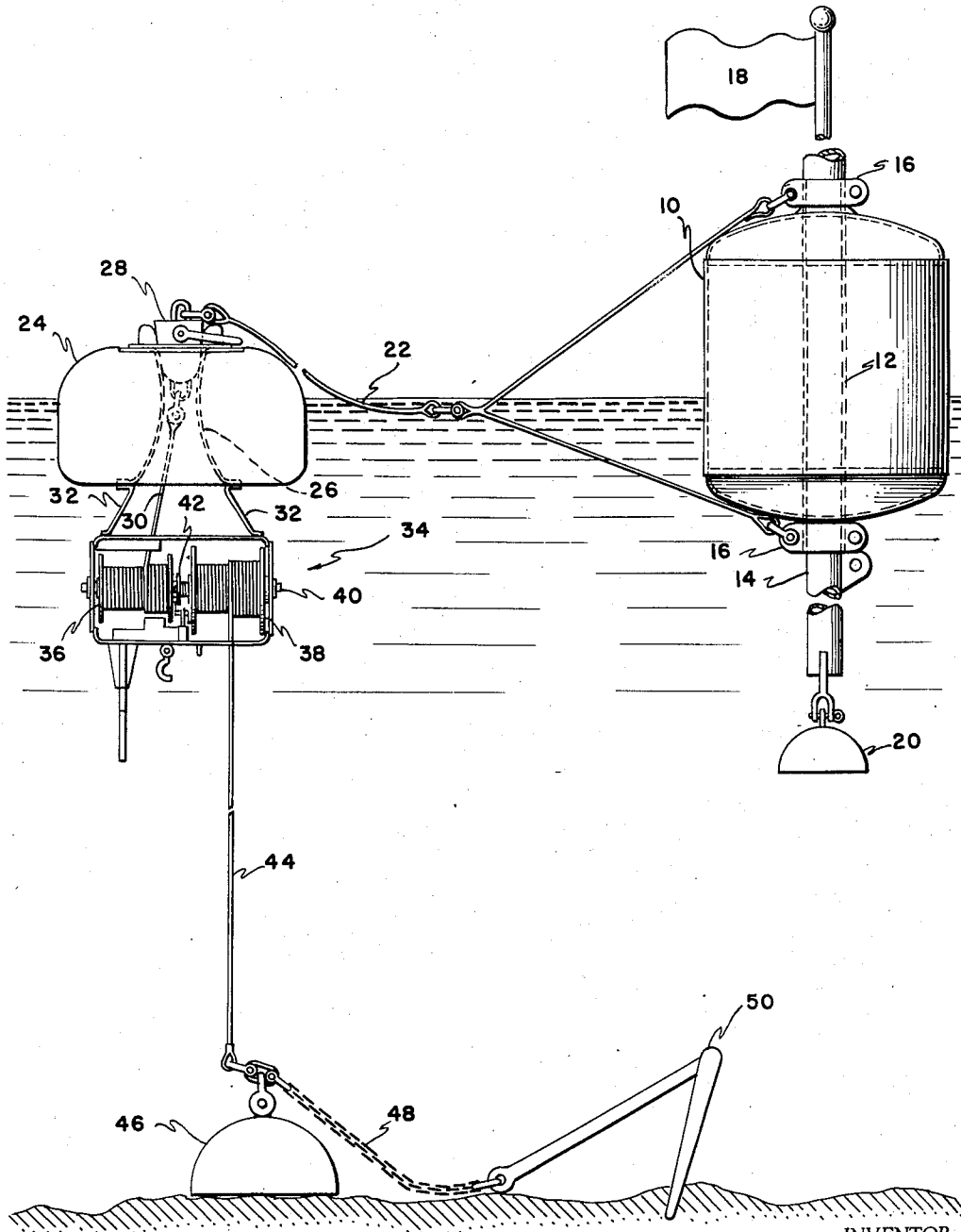


FIG. 1

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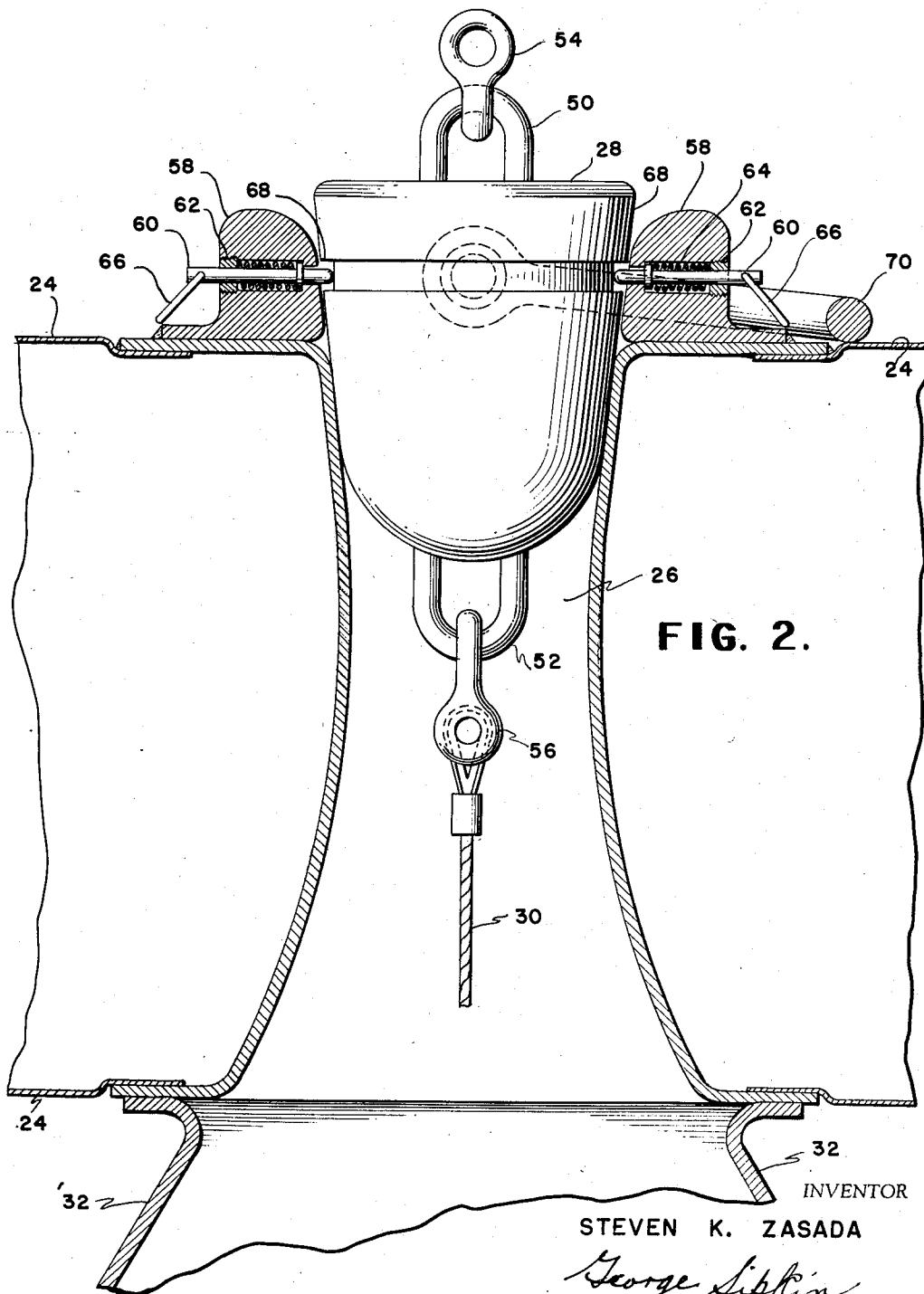
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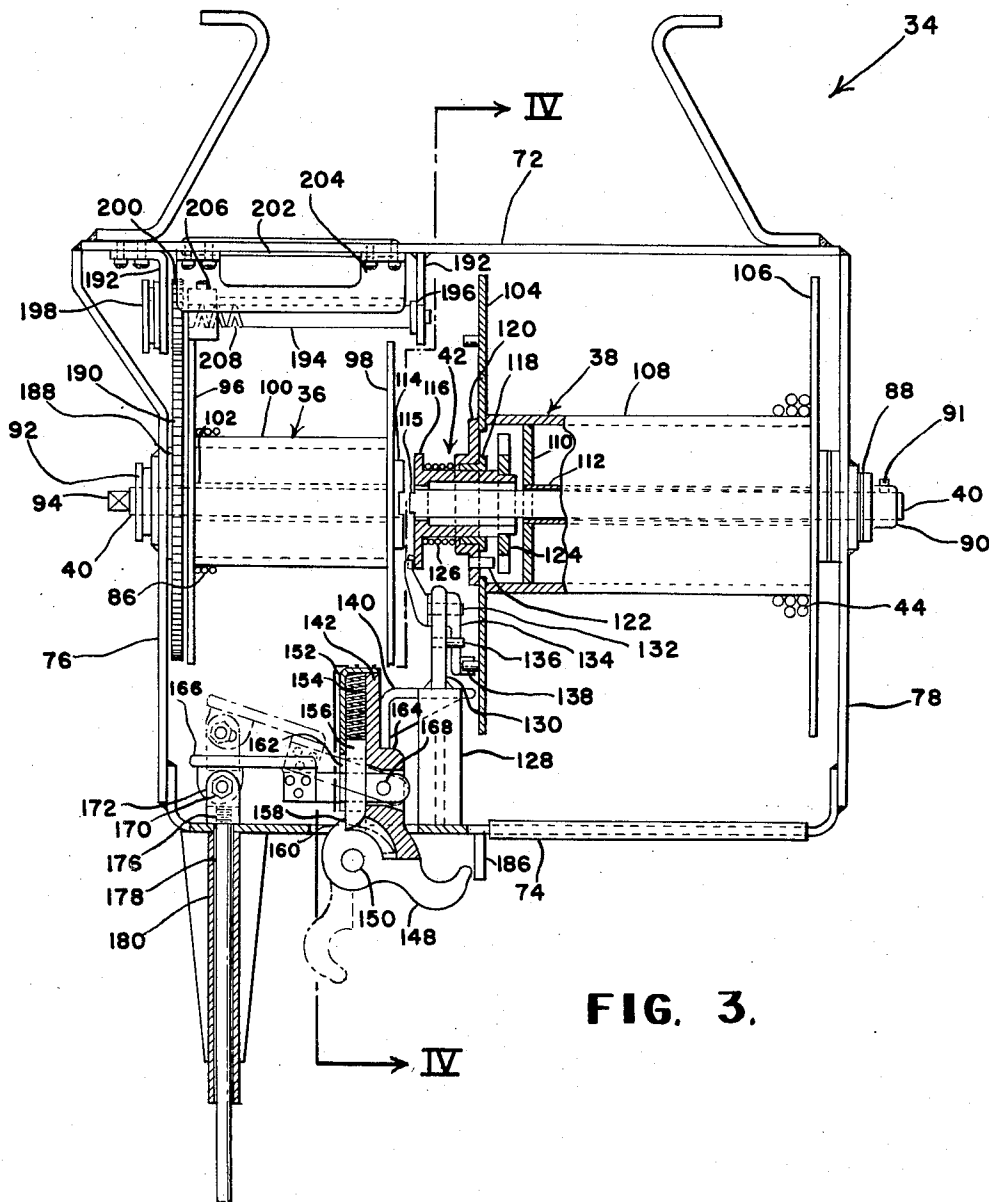
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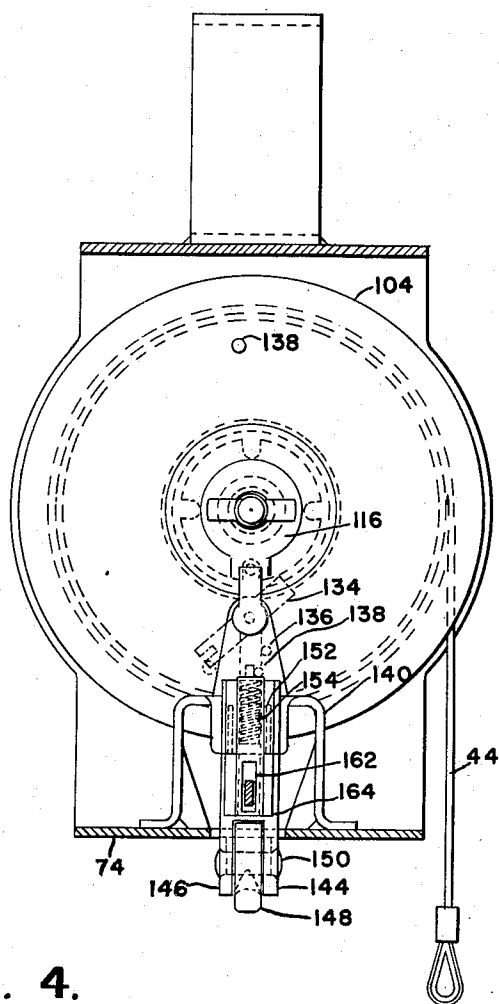


FIG. 4.

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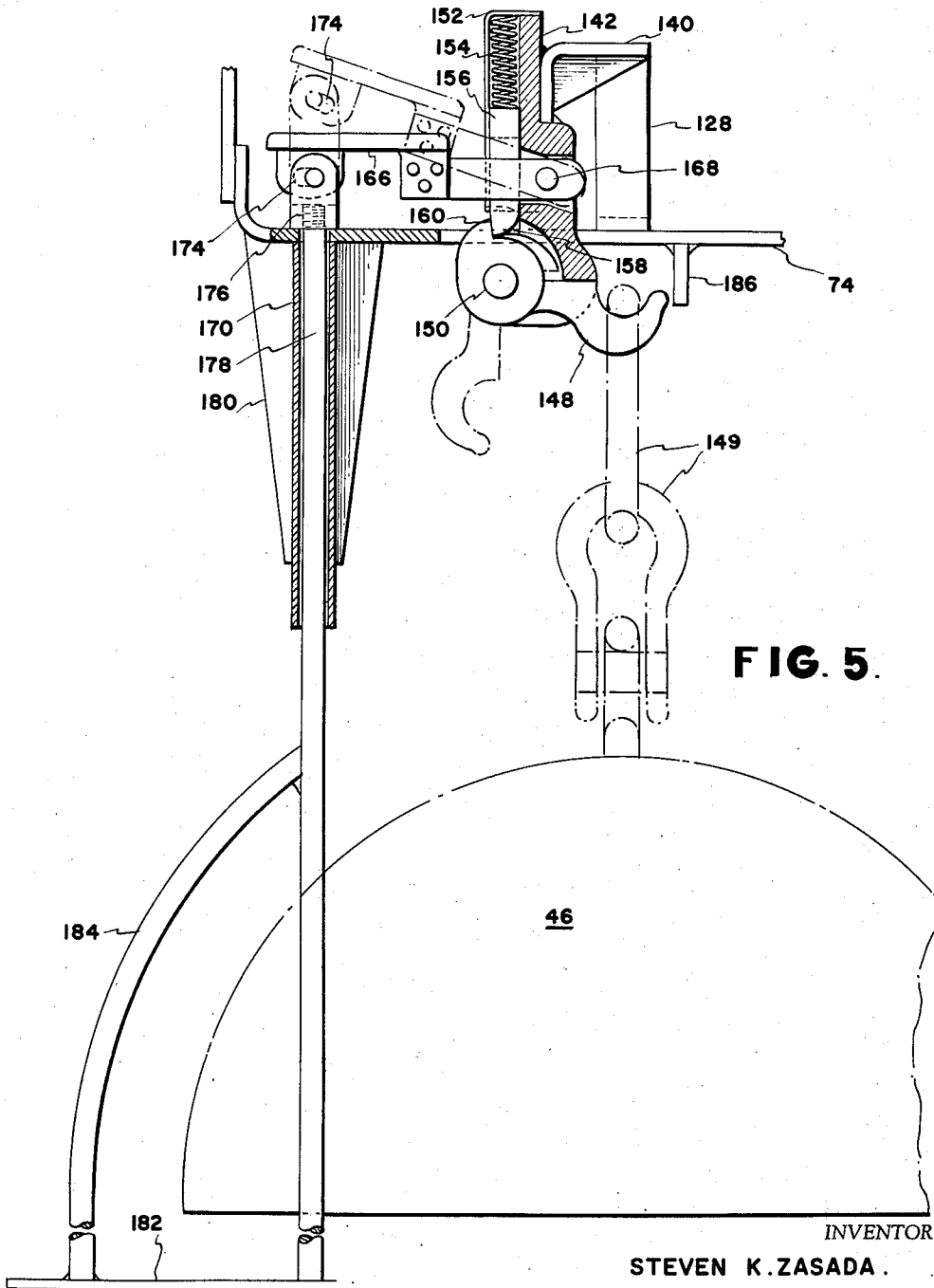
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AUTOMATIC MOORING DEVICE FOR BUOYS

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FIG. 7.

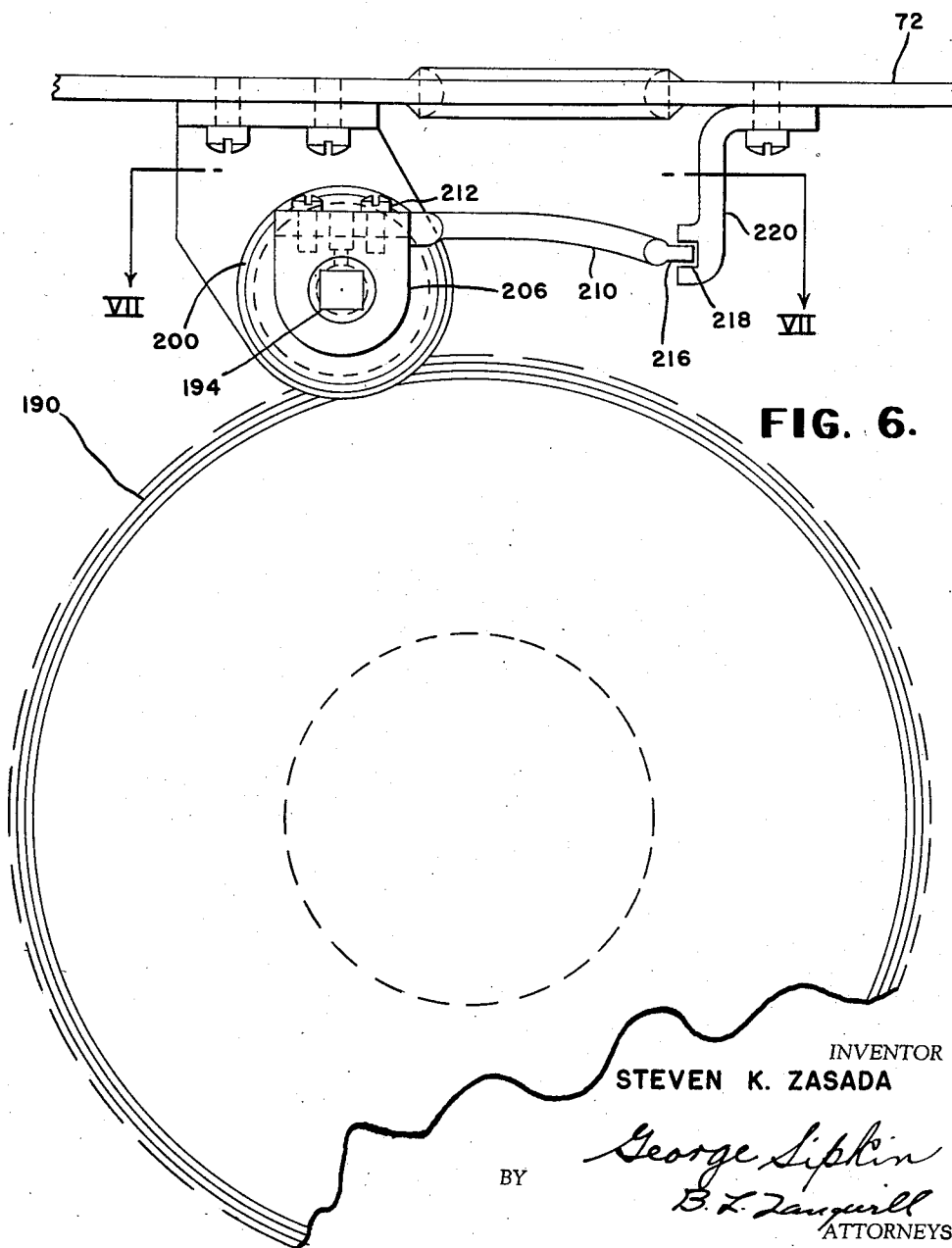
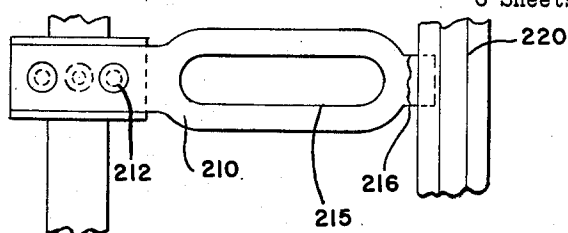


FIG. 6.

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AUTOMATIC MOORING DEVICE FOR BUOYS

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Application July 9, 1953, Serial No. 367,120

26 Claims. (Cl. 9—8)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government of the United States without the payment of any royalties thereon or therefor.

The present invention relates to a mooring device for buoys and more particularly to an automatic mooring device wherein the ratio between scope or length of mooring line to depth of water is maintained constant for all depths, with proper allowance for currents.

The known methods of the prior art for planting buoys involve a procedure wherein the mooring line scope is neither automatically determined nor paid out according to an automatically controlled and pre-set plan. For example, in accordance with prior practice, when a buoy planting is desired or required, the depth of water is first determined by fathometer or chart and the sea current is estimated by observation. With these factors known, the scope of mooring line is determined through empirical practical rules. In order to provide for uncertainties, such as an irregular bottom, ample scope is added as a safety factor to preclude submergence of the buoy subsequent to planting. When a decision as to scope has been made, the mooring line is prepared by shackling together standard lengths of lines or cables, designated by fathoms, and finally attaching thereto the float, chafing chains and anchor. The entire assembly is then planted by dropping the anchor first and allowing the line to pull the buoy and attachments off the deck of the planting ship.

While this method is convenient and reliable in some instances, it is subject to disadvantages, the principal ones of which are inaccurate plants because the launching takes place a considerable time after estimation of water depth, the excessive amount of time required in rigging the estimated length of mooring line, anchors, buoys and the like, and the ever present hazard resulting from lines strewn about the deck and preparation areas.

In order to obviate the above-noted disadvantages, it is an object of the invention to provide a mooring device containing a mooring line and adapted automatically to play out the proper scope of line for planting a buoy.

Another object of the invention is to provide an automatic buoy-mooring device having sufficient mooring line scope whereby the buoy will never be submerged by the force of currents and the buoy will watch at a reasonably close distance to the point of the planting.

A further object of the invention is the provision in a device of the type described of a sounding line extending between the float and anchor which accurately measures the depth and is adapted to be automatically rewound on a reel subsequent to planting of the buoy.

Still another object of the invention is the automatic paying out of a limited scope of mooring line in excess of the depth of water at the location of the plant.

In accordance with the invention, a mooring reel and a sounding reel are provided on which the mooring line and sounding line, respectively, are adapted to be wound and unwound in a correlated manner which automatically provides for an adequate scope of lines for mooring the buoy properly.

An additional object of the invention is the provision of an integrated sounding and mooring line device incorporating a clutch for controlling the correlated operation of the sounding and mooring line reels.

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A further object of the invention is the provision of a spooling device for rewinding the sounding line on the sounding reel after jettisoning the anchor.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description, when considered in connection with the accompanying drawings, in which like reference characters designate like parts throughout the figures thereof and wherein:

Figure 1 is a perspective view of the device showing the apparatus in use in a practical application of the invention;

Figure 2 is an elevation view partly in section showing the float core which comprises an integral part of the apparatus shown in Figure 1;

Figure 3 is an elevation view partly in section showing the depth sounding and mooring reels assembly;

Figure 4 is an elevation view taken on lines 4—4 of Figure 3;

Figure 5 is an elevation view partly in cross-section showing the details of the anchor release mechanism;

Figure 6 is an end view of the level spooling device shown in Figure 2; and

Figure 7 is a plan view taken on lines 7—7 of Figure 6.

Referring now to Figure 1 of the drawings there is shown a dan buoy connected by means of a line to the automatic mooring device of the invention. This buoy, shown as being positioned in a body of water, comprises a buoyant member 20 having a central hollow passageway 12 for receiving a shaft 14 which is adapted to be affixed thereto by means of brackets 16. The shaft 14 extends upwardly from the buoyant member 10 for receiving a pennant 18 which normally is positioned several feet above the surface of the water. Extending downwardly from member 10, the shaft 14 has a weighted member 20 used for the purpose of keeping the member 10 and pennant 18 in a vertical position.

Secured to the buoyant member 10, as by means of a float span 22, is the automatic mooring device of this invention. The mooring device generally comprises a float, a depth sounding and mooring reels assembly, an anchor release mechanism and a spooling device for spooling a sounding line onto the sounding reel. The float comprises a float member 24 having a central hollow passageway curved inwardly towards its center for receiving a securing plug 28 in its upper end and providing access for the sounding line 30 extending through the bottom end of the float. Secured to the bottom end of float 24, as by means of brackets 32, is a sounding and mooring reel assembly 34. This assembly comprises a sounding reel 36 and a mooring reel 38, each having a common shaft 40 and being selectively interconnected by means of a clutch 42. A mooring line 44, which is generally made of wire rope, connects the mooring reel 38 with an anchor 46 shown herein as being positioned on the ocean floor. Interconnected with this anchor by means of a chafing chain 48 is a second anchor 50. In the preferred embodiment of the invention, although this can be changed according to different applications, the first anchor is constructed of cast iron or concrete and normally weighs approximately 200 pounds, while the second anchor is of a lightweight type and weighs in the order of approximately 30 pounds.

In general, the operation of the device is as follows. The buoyant member 10 is assembled on the deck of a ship and float span 22 is connected at one end to the buoy and at the other end to securing plug 28. One end of sounding line 30 is secured to the bottom end of securing plug 28 and attached at its other end to sounding reel 36. The mooring line 44 connects the mooring reel

38 with anchor 46 and the two anchors are then joined by means of chafing chain 48. The unit is assembled in this fashion on the deck of the ship.

The clutch is placed in a disengaged position thereby completing the assembling operation on the ship. The complete unit is then launched, the dan buoy assumes a floating condition while the device slowly sinks to the ocean bottom. During descent, the sounding line only pays out. Upon contact with the bottom, the anchors are released, and the float, because of its positive buoyancy, commence to rise toward the surface. Upon initial upward movement, the clutch is made to engage the sounding reel thereby causing both reels to rotate. The sounding line is taken in while the mooring line is paid out in an amount approximately 50% greater than the amount of sounding line as hereinafter described. The device finally reaches the surfaces of the water and since the sounding line is secured to the securing plug 28, the float is automatically oriented with respect to this plug and the plug is drawn into position as clearly shown in Figure 1.

The float and securing plug 28, shown in detail in Figure 2, comprises the float proper 24 having a central hollow passageway 26, the securing plug 28 being affixed in the top end thereof in a locked position. The material or the composition of which the float is made may comprise either balsa wood, plastic or formed sheet steel sheeting. The buoyancy of the float should be ample to raise the combined weight of reels, frame, anchor release and wire rope to the surface of the water. In addition to this positive buoyancy, an additional buoyancy must be provided in order to allow for drag of the wire rope or mooring line which extends between the anchors on the bottom and the mooring reels.

The securing plug 28, affixed in the upper end of the float, has inverted U-shaped members 50 and 52 respectively secured to the upper and lower ends of the securing plug. An anchor shackle 54 is attached to U-shaped member 50 at its upper end and an identical anchor shackle 56 is secured to the bottom U-shaped member 52 and attached to this latter shackle is the depth sounding line 30. Welded or riveted to the top of float 24 and respectively positioned on each side of securing plug 28 are a pair of brackets 58 which are horizontally bored for receiving locking pins 60. The locking pins 60 are held in place by means of tap plugs 62 and a pair of springs 64 which bias the locking pins to an inward or locking position. Hand rings 66 are attached to each of the pins in order to disengage them from the securing plug when this is desirable. As clearly shown in Figure 2, a groove 68 is formed around the periphery of securing plug 28 so that the locking pins may engage this groove when the securing plug is drawn into the position by means of the sounding line when the float rises to the surface of the water. The securing plug 28 is additionally provided with a latching and recovery bail 70 which is used for the purpose of convenience in handling the plug and float after the plug is once secured in an operative position.

Referring now to Figures 3 and 4 of the drawings, the assembly shown therein comprises three major parts; namely, the depth sounding and mooring reels assembly, the anchor release mechanism also shown in Figure 5, and the level spooling device which is also shown in Figures 6 and 7. Each of these three major parts are enclosed within a single framing member comprising top and bottom frames 72 and 74 and frame side plates 76 and 78 respectively.

Making specific reference now to the depth sounding and mooring reels shown in Figures 3 and 4, there is shown a shaft 40 extending horizontally between frame side plates 76 and 78 for supporting sounding reel 36 and mooring reel 38. As aforementioned, clutch 40 is interposed between the reels 36 and 38 for securing the sounding reel to the mooring reel when the float com-

mences upward movement from the ocean floor. In order to obtain the proper amount of mooring line, as indicated above, a definite ratio has been worked out and established between the sounding reel and mooring reel and between the size of sounding and mooring lines respectively wound thereon. The number of turns in each layer are the same for the two reels. In the particular application of this feature in the invention, although it is to be understood that various ratios of reel and wire size fall within the confines of the invention, the sounding line and reel diameters are respectively $\frac{3}{32}$ " and 2.875" while the mooring line and reel diameters are respectively $\frac{5}{32}$ " and 4.0". For an identical number of turns of line per layer and layers per reel, using the above-stated dimensions, a total length of sounding line of 1,013 feet is obtained while total length of mooring line is 1,508 feet. It is evident from the disclosure of these ratios that 50% more mooring line than sounding line is paid out in order to secure proper planting of the buoy. In a typical example of where the depth of water is 100 feet, the sounding reel will pay out 100 feet of line during descent of the apparatus to the ocean bottom. However, during ascent of the apparatus to the surface, the 100 feet of sounding line is taken in while 150 feet of mooring line is simultaneously paid out. This 50% of excess mooring line is directly attributable to the above-described ratios existing between the lines and reels.

Referring more specifically to these parts the shaft 40 is held in position in the frame side plate 78 by means of a pair of friction washers 88 and an adjusting screw 90 which is fixed in place by means of a set screw 91. The other end of shaft 40 is secured in side plate 76 by means of a shaft bearing 92 and a rewind connection member 94 attached to the end of the shaft. The sounding reel 36 comprises a pair of spaced circular plates 96 and 98 interconnected by means of a cylindrical core 100. This sounding reel is locked to shaft 40 by means of a key 102 thereby causing the shaft to turn in unison with the reel for a purpose to be hereinafter described. The mooring reel 38 is similar to the sounding reel except for its larger size, and also comprises a pair of circular spaced plates 104 and 106 interconnected by means of a core 108 which may be made of standard pipe. Within this core is an end plate 110 provided with an internally reamed pipe 112 which provides a free running fit with shaft 40. This mooring reel is considered to float on shaft 40 and is caused to revolve only when the float ascends to the surface of the water.

Positioned around shaft 40, and secured to plate 98 of the sounding reel, is a circular plate 114 which is provided with a horizontal groove for receiving male portion 115 of clutch plate 116. When these members are in the engaged position, the reels are locked to one another and, therefore, rotate at the same speed. The clutch plate 116 extends around and longitudinally of the shaft and is enclosed by means of a bushing 118 positioned in a supporting member 120. The supporting member 120 is welded to plate 104 and is provided with a locking pin 122 adapted for mating with aligned openings in plate 124 secured to the outer end of clutch member 116. The spring 126 is positioned between plate 116 and the outer portion of supporting member 120 and normally biases the clutch plate into an engaging position with circular plate 114.

A base 128 is affixed to the inner side of bottom plate 74 for holding a pawl supporting member 130 which is secured to the base by welding. The upper end of this supporting member is provided with a central aperture for receiving a pin 132 which rotatably connects a clutch release pawl 134 therein. The pawl stop pin 136 is also fixed to the pawl supporting member in order to prevent rotation of the clutch release pawl in more than a complete circle. A tripping pin 138 is welded or otherwise secured to plate 104 of the mooring reel for engaging a

protruding portion on the clutch release pawl in order to move this pawl in a direction for disengaging the clutch. When such disengagement occurs spring 126 forces the clutch plate 116 into an engaging position with member 114 on the sounding reel thereby locking the two reels together.

Referring now to Figures 3, 4 and 5, there is shown the anchor release mechanism comprising an angle iron 140 fixed to the top of base 128. Secured to the side of the angle iron 140 is an anchor supporting block 142 which is hollowed out and bifurcated at the bottom forming edges 144 and 146. A hook 148, for supporting the anchors and chafing chain, is positioned within the hollow bifurcated portion and is pivotally connected thereto by means of pin 150. As shown in Figure 3, the hook 148 assumes the position shown in the dotted lines after the anchors and chafing chains have been released from the hook.

Affixed to the side of block 142 is a housing 152 for enclosing the spring 154 which is adapted for biasing a square locking key 156 in a downward direction. The bottom end of locking key 156 is tapered as shown at 158 for engaging an integral upstanding portion 160 of hook 148. Housing 152, locking key 156 and block 142 are each provided with a lateral groove as shown at 162 and 164 for receiving a tripping arm 166. One end of tripping arm 166 is pivoted to block 142 by means of pin 168, passes through the locking key at 164 and is secured at its other end by means of bolts 170 to a connecting member 172. This connecting member is provided with an elliptical groove 174 to provide for sliding movement of the bolts therein and is internally threaded at 176 for receiving the upper end of tripping rod 178 which has a like set of threads for engaging the connecting member. As shown in Figure 5, the tripping rod 178 is positioned within housing 180, and the rod extends downwardly and terminates in a plate 182 located below the main anchor 46. Likewise attached to this plate 182, is a bowed arm 184 which is connected at its upper end to the tripping rod.

The operation of this portion of the apparatus is as follows. When the device strikes the ocean floor, plate 182 and connecting rod 178 are forced upwardly, thereby acting against tripping arm 166 which is likewise forced in an upward direction. Such upward movement of the tripping arm causes the arm to pivot about point 168 and force the square locking key 156 in an upward direction. The locking key is then disengaged from portion 160 on hook 148 and the hook is allowed to pivot about point 150 in a clockwise direction thereby dropping the anchors which have been suspended thereon. It will be noted that a square plate 186 is welded to the underside of bottom plate 74 and in a position adjacent to hook 148. The purpose of this location is to assure that the anchors will not be dislocated from the hooks while the device is in transit.

Referring now to the level spooling device shown in Figures 3, 6 and 7, there is shown a friction disc 188 positioned between frame 76 and reel plate 96. Positioned around the friction disc and secured to reel plate 96 is a spooling gear 190 used for the purpose of transmitting rotary movement from the sounding reel to the spooling device hereinafter described. Subtended from top plate 72 is a pair of plates 192 which have centrally aligned apertures for receiving the ends of a shaft 194. The shaft at one end is adapted to rest in a bearing member 196 secured to plate 182, and at the other end rests in a bushing member 198 which is threadably connected to plate 192. Affixed to the shaft 194 and within frame member 76 is a small gear 200 adapted for meshing with spooling gear 190. An opening 202 is provided in the top plate for the sounding line guide and subtended therefrom is a depending plate 204 used for the purpose of supporting a traveller or slidable member 206. The slid-

able member 206 is positioned on screw shaft 194, the latter being appropriately grooved at 208 thereby providing a track on which the slidable member 206 moves in a forward and reverse direction. In order to provide for guiding and spooling the guiding line on the sounding reel, the slidable member 206 is provided with a horizontal bar 210 which is affixed by means of bolts 212 to the top of the sliding member. The bar 210 is provided with an elliptical groove 215 through which the sounding line is guided and the end 216 of the bar is flat thereby providing for ease of movement in groove 218 cut in a subtending member 220 which is attached to top plate 72. The purpose of this section of the device is to assure proper winding of the sounding line on the sounding reel when the device ascends from the bottom to the surface of the water. When such upward movement occurs, the sounding reel rotates and the spooling gear 190, which by virtue of being securely attached to the reel, also rotates at the same speed as the sounding reel. This gear engages the mating gear 200 on the spooling shaft and causes the spooling shaft to rotate. Such rotation moves the sliding member 206 and it commences to traverse the shaft in a forward and reverse direction, and since the sounding line extends through opening 215 in bar 210, the line will be evenly wound on the sounding reel as the device ascends to the surface of the water.

The operation of the apparatus is as follows: The dan buoy and the depth sounding and mooring reels assembly is prepared on the deck of the ship. At this time the sounding and mooring reels are each provided with lines which are securely wound thereon. The clutch is disengaged and the anchors, chafing line and reels are all attached to the float. The whole unit is then placed in the water, the buoy floats and the mooring reels assembly, which by virtue of the negative buoyancy given thereto by the anchors, immediately starts to sink to the bottom. At this time the sounding reel 36, which has one end of the line connected to the securing plug 28, will cause the sounding line to pay out as the device sinks to the ocean or channel floor. When the device strikes the bottom, the following sequence of events occurs:

The bottom plate 182 and attached tripping rod 178 are caused to move in an upward direction thereby rotating arm 166 about pivot 168. This action forces the square locking key 156 upwardly against the action of spring 154 in order to remove the end 158 of the locking key out of contact with portion 160 on hook 148. The float 24 will be exerting an upward force and this will cause the hook 148 to be pulled downwardly thereby allowing the anchors to slide off the end of hook 148, the hook then assuming the position shown in dotted lines in Figure 3. As the float starts to ascend to the surface of the water, the mooring reel will commence turning because of the dragging effect of the anchors which are connected with the reel by way of the mooring line.

The tripping pin 138 on plate 104 of mooring reel 38 then engages clutch release pawl 134 moving it out of contact with clutch member 116. The clutch is disengaged and spring 126 urges member 116 into engagement with member 114 on sounding reel 36. At this time the mooring reel 38 and sounding reel 36 are tied together and therefore rotate at the same speed. The mooring reel pays out line while the sounding reel takes in line as the device ascends to the surface of the water. Simultaneous with this occurrence of events, the spooling gear 190 will rotate because of its direct connection with sounding reel 36, and engage its mating gear 200 on the spooling shaft 194. The sounding reel line extends through opening 215 and is attached to securing plug 28 on the surface of the water. The sliding member 206 is caused to rotate on the machine grooves 208 of the spooling shaft thereby winding the sounding line on sounding reel 36 in a set predetermined manner.

When the float reaches the surface of the water, the

securing plug 28 is automatically drawn into the central hollow portion of float 24 and is locked in a secure position by means of locking pins 60, each oppositely positioned on each side of the securing plug. When the securing plug 28 is locked in position, the planting of the buoy has been completed.

It will be understood that the above description and accompanying drawings comprehend only the general and preferred embodiment of my invention, and that various changes in construction proportion and arrangement of parts may be made within the scope of the appended claims without sacrificing any of the advantages of this invention.

What is claimed is:

1. An automatic mooring device for positioning a float on the surface and an anchor on the bottom of a body of water comprising, a float, a frame attached to said float, a sounding reel and a mooring reel on said frame, an anchor, means detachably securing said anchor to said frame, anchor releasing mechanism connected with said anchor securing means, releasable engaging means between said sounding reel and said mooring reel for connecting said reels with one another upon movement of one of said reels whereby rotary movement of said one reel causes predetermined rotary movement of the other reel, a sounding line connected at one end to a plug adjacent the surface of said body of water and at its other end to said sounding reel which pays out when said device sinks to the bottom, a mooring line connected at one end to said anchor and at the other end to said mooring reel, and a spooling device for winding said sounding line on said sounding reel, whereby upon release of said anchor, said float rises to the surface and simultaneously takes in sounding line while paying out mooring line.

2. An automatic mooring device for positioning a float on the surface and an anchor on the bottom of a body of water comprising, a float comprising a frame, a sounding reel connected to said frame, a sounding line on said sounding reel adapted to pay out while said device sinks to the bottom, a mooring reel on said frame, an anchor detachably secured to said frame, a mooring line connected at one end to said anchor and at the other end to said mooring reel, releasable engaging means positioned between said sounding reel and said mooring reel, actuating means on one of said reels moving said engaging means for connecting said reels together for unitary rotary movement, and anchor releasing means on said frame for releasing said anchor when said device strikes the bottom of said body of water, whereby said anchor is released from said frame thereby causing said float to rise and pay out said mooring line while winding said sounding line on said sounding reel.

3. In a mooring system for planting buoys comprising a buoy, a float, float span means having a first end thereof attached to the buoy and a second end thereof having means thereon releasably connected to the float for releasably connecting said buoy with said float, a frame attached to said float, a sounding reel and a mooring reel on said frame, a clutch mounted adjacent said reels for connecting said reels together for unitary rotary movement, means for actuating said clutch, an anchor detachably secured to said frame, an anchor releasing mechanism associated with said anchor, a sounding line having one end thereof connected to the said means on the second end of the float span and the opposite end thereof connected to the sounding reel, the one end of the sounding line being releasably connected to the float through the said means on the second end of the float span, a mooring line connected at one end to said anchor and at the other end to said mooring reel, and a spooling device on said frame for guiding said sounding line on said sounding reel.

4. the combination according to claim 3 wherein said sounding reel and said mooring reel are positioned on a

shaft common to said reel for unitary rotary movement of the reels when the clutch is engaged.

5. The combination according to claim 3 wherein said clutch is positioned between said sounding and mooring reels and is connected to one of said reels.

6. The combination according to claim 3 wherein said clutch encompasses a shaft common to said reels, means connecting said clutch to one of said reels, and clutch release means in contact with said clutch operative to move said clutch into engagement with the other of said reels.

7. The combination according to claim 3 wherein said clutch encompasses a shaft common to said reels, means connecting said clutch to said mooring reel, clutch release means on said frame for releasing said clutch, a locking pin on said mooring reel, an end plate on said clutch having means for engagement by said pin, whereby upon release of said clutch by said clutch release means, said locking pin engages said end plate thereby causing said clutch to rotate with said mooring reel.

8. The combination according to claim 3 wherein said clutch encompasses a supporting shaft common to said reels, means positioning said clutch between said reels, and clutch release means operative to connect said reels to each other, said clutch release means comprising a plate having an aperture formed therein, a clutch release pawl rotatably mounted in said aperture, a first arm on said pawl for contacting said clutch, a second arm on said pawl contacting a pawl stop pin on said plate for limiting rotation of said clutch release pawl, and a tripping pin on one of said reels positioned for engagement by said second arm, whereby movement of said one of said reels causes said tripping pin to engage said second arm thereby rotating said clutch release pawl out of contact with said clutch.

9. In a mooring device for planting a buoy in a body of water comprising, a float, a central hollow opening formed by the inner walls of said float, a frame suspended from said float, an anchor detachably secured to said frame, an anchor release mechanism surmounting said anchor, a shaft mounted on said frame, a sounding reel and a mooring reel positioned on said shaft, a clutch encompassing said shaft and positioned between said reels, means securing said clutch to said mooring reel, a protruding member on the forward portion of said clutch, a grooved plate on said sounding reel for receiving said protruding member, clutch release means mounted on said frame for releasing said clutch thereby allowing said protruding member to engage said groove for unitary rotary movement of the reels, a mooring line connected at one end to said anchor and at the other end to said mooring reel, a plug in said float, and a sounding line connected at one end to said plug and at the other end to said sounding reel.

10. The combination according to claim 9 wherein said plug comprises a groove formed in the outer peripheral portion of said plug, locking means on said float for engaging said groove when said plug is fixed in the central opening in said float, and means on said plug adapted for connection to a buoy.

11. The combination according to claim 10 wherein said locking means comprises a plurality of locking pins, and spring means biasing said locking pins into a groove engaging position.

12. An automatic mooring device for planting a buoy in a body of water comprising, a float, a frame attached to said float, an anchor, mounting means detachably securing said anchor to said frame, a sounding reel, a mooring reel, a sounding line of predetermined diameter on said sounding reel adapted to be payed out as said device sinks, a mooring line of predetermined diameter wound on said mooring reel according to a preset plan, a spooling device on said frame for rewinding said sounding line according to a preset plan and engaging means on one of said reels operative to lock said reels to each

other so that said sounding line and said mooring line are respectively rewound and paid out according to said preset plans when said float rises to the surface of the water thereby providing an excess of mooring line for said float.

13. A mooring device for planting a buoy in a body of water comprising, a float, a frame attached to said float, a sounding reel and a mooring reel, a sounding line connected at one end to said sounding reel and at the other end to a plug adapted for securement in said float, shaft means supporting said reels on said frame, means releasably connecting said reels one to the other for unitary rotary movement with said shaft, an anchor, an anchor release mechanism detachably securing said anchor to said frame, tripping means connected with said mechanism for releasing said anchor, said tripping means comprising a tripping arm, means connecting said tripping arm with said anchor release mechanism, a foot plate adapted for positioning beneath said anchor, a tripping rod connected at one end to said foot plate and at the other end to said tripping arm, and a mooring line attached at one end to said mooring reel and at the other end to said anchor, whereby when said device strikes the bottom of said body of water, said foot plate moves said tripping arm thereby actuating said release mechanism for releasing said anchor.

14. The combination according to claim 13 wherein said anchor release mechanism comprises a bifurcated member, a hook for said anchor, pin means rotatably securing said hook in said member, and locking means fixed to said member for holding said hook in an anchor supporting position.

15. The combination according to claim 14 wherein said hook is provided with an upstanding protruding member, and said locking means comprises a spring biased locking key for engaging said protruding member, whereby said hook is maintained in an anchor supporting position.

16. The combination according to claim 13 wherein said anchor release mechanism comprises a bifurcated member, a hook rotatably mounted in said member, locking means including a tapered locking key attached to said member for holding said hook in an anchor supporting position, and means on said member pivotally supporting and extending said tripping arm through said apertured locking key.

17. A mooring device for planting a buoy in a body of water comprising, a float, a frame attached to said float, a sounding reel and a mooring reel, a shaft on said frame, means mounting said reels on said shaft, means releasably connecting said reels one to the other for unitary rotary movement with said shaft, an anchor, an anchor release mechanism detachably securing said anchor to said frame, a sounding line connected at one end to said reel and adapted for connection at its other end to a plug which plug is releasably connected to the float, a mooring line connected at one end to said mooring reel and at its other end to said anchor, and a spooling device on said frame operative by rotary movement of the sounding reel for winding said sounding line on said sounding reel according to a preset plan.

18. The combination according to claim 17 wherein said spooling device comprises motion transmitting means attached to said sounding reel, a movable member positioned adjacent said sounding reel for spooling said line on said reel, and means interconnecting said motion transmitting means with said movable member.

19. The combination according to claim 17 wherein a first gear is attached to said sounding reel, a second gear in mesh with said first gear, and movable means connected with second gear for spooling said sounding line on said sounding reel.

20. The combination according to claim 17 wherein said spooling device comprises motion transmitting means on said sounding reel, a threaded shaft secured on said

frame, a movable member mounted for translatory movement on said shaft, sounding line guiding means on said movable member, and means connecting said motion transmitting means with said movable member, whereby rotation of said sounding reel causes said motion transmitting means to move said movable member for spooling said sounding line on said sounding reel.

21. A mooring device for planting a buoy in a body of water comprising, a buoy, a float, a float span connecting the buoy to the float, a frame attached to the float, a shaft mounted on the frame, a sounding reel mounted on the shaft, a sounding line connected at one end to the sounding reel and releasably connected at its other end to the float, an anchor, anchor support and release mechanism detachably securing the anchor to the frame, means operative by descent of the frame for actuating the anchor release mechanism, a mooring reel mounted on said shaft, a mooring line connected at one end to the mooring reel and at its opposite end to the anchor, clutch mechanism releasably connecting the mooring reel to the sounding reel for independent rotary movement of the sounding reel during descent thereof and for unitary rotation of such reels during ascent thereof, said float, said anchor and said reels being so proportioned and so constructed and arranged that during planting with the anchor attached to the frame the float is submerged by the weight of the anchor whereupon the sounding line is paid out from the sounding reel, whereas upon release of the anchor from the frame the float rises to the surface of the body of water carrying the frame therewith and in so doing pays out mooring line from the mooring reel and reels in sounding line on the sounding reel.

22. A mooring device as set forth in claim 21 wherein the sounding reel and the mooring reel are so proportioned that during ascent of the float to the surface of the body of water a greater length of mooring line is paid out by the mooring reel than sounding line taken in by the sounding reel.

23. A mooring device as set forth in claim 21 wherein the clutch between the sounding and mooring reels is actuated by initial rotary movement of the mooring reel during ascent of the float toward the surface of the body of water for connecting such reels for unitary rotary movement during such ascent.

24. A mooring device as set forth in claim 21 wherein the sounding reel is locked to the shaft for rotation therewith, wherein the mooring reel is mounted on the shaft for movement relative thereto, and wherein the clutch mechanism includes means separating the two reels during descent thereof for rotary movement of the sounding reel relative to the mooring reel and means actuated by initial ascent of the float for connecting the two reels for unitary rotary movement.

25. A mooring device as set forth in claim 21 which includes a spooling device attached to the frame and having means thereon operated by rewinding rotation of the sounding reel during ascent thereof for guiding the sounding line onto such reel in a predetermined order.

26. A mooring device as set forth in claim 21 wherein the anchor release mechanism includes a hook pivotally connected to the frame for securing the anchor thereto, a detent on the hook and a spring biased key for contacting the detent, and wherein the actuating mechanism includes a tripping rod attached to the frame and having one end thereof extending below the anchor during ascent thereof and adapted to contact the floor under the body of water and means on the opposite end of the rod for moving the spring biased key out of contact with the detent to thereby release the anchor.

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