

June 16, 1953

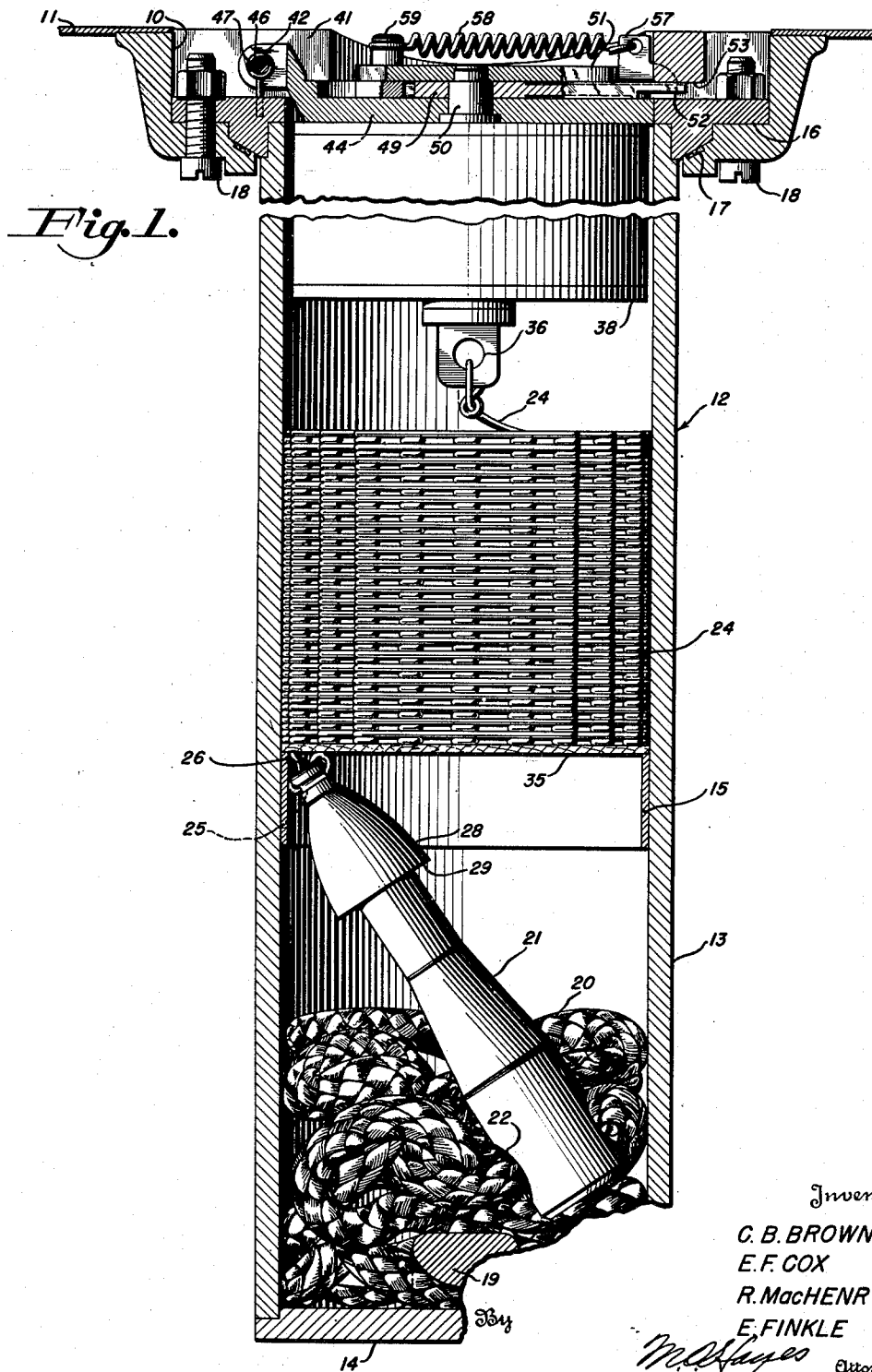
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APPARATUS FOR RECOVERING PRACTICE TORPEDOES

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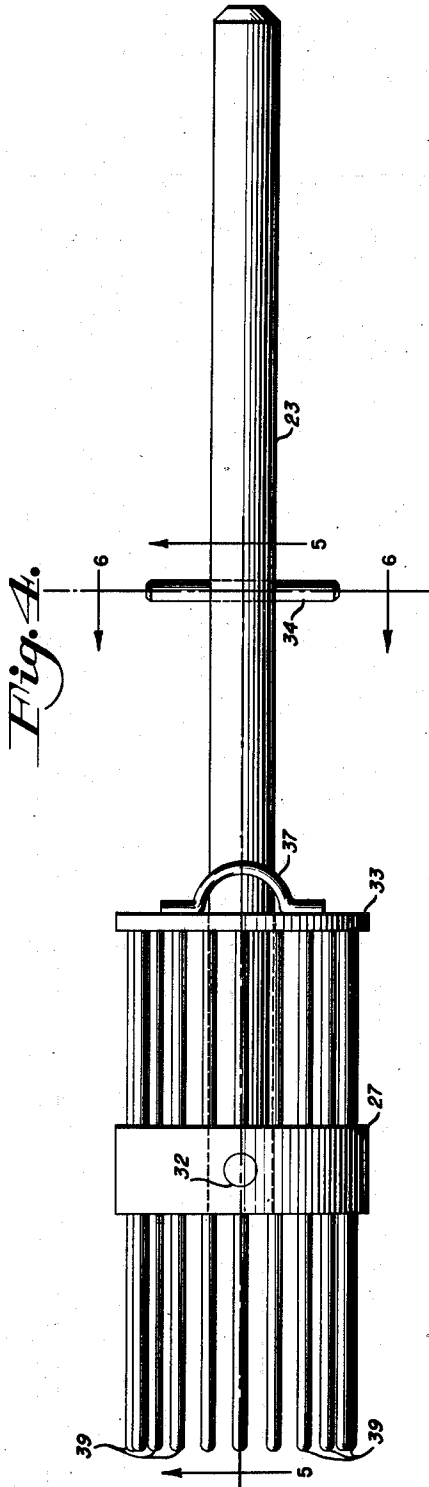
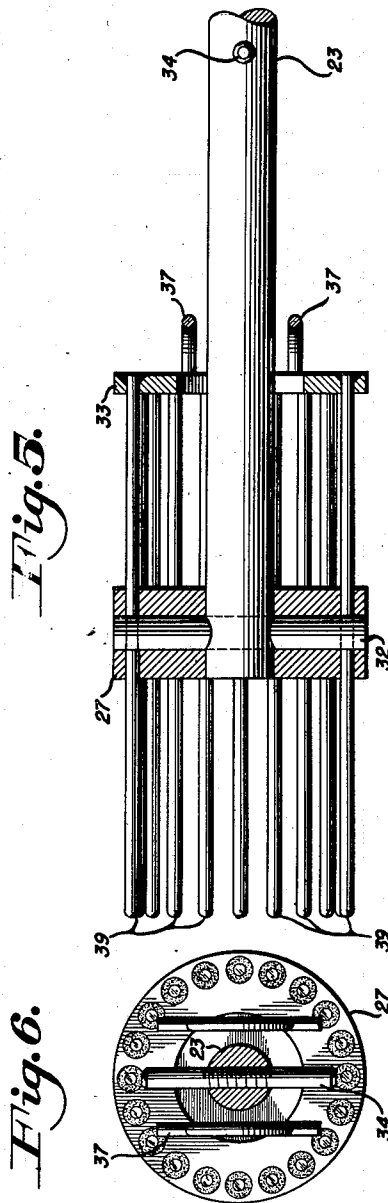
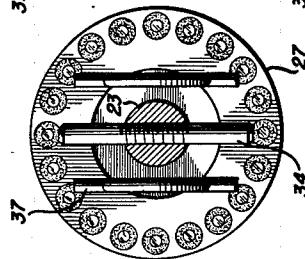


Fig. 6.



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Fig. 7.

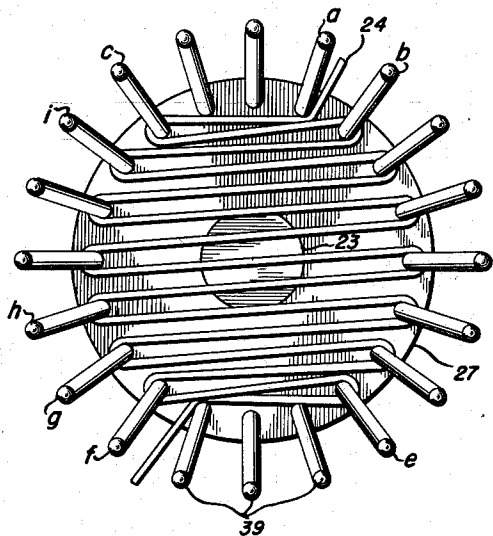


Fig. 8.

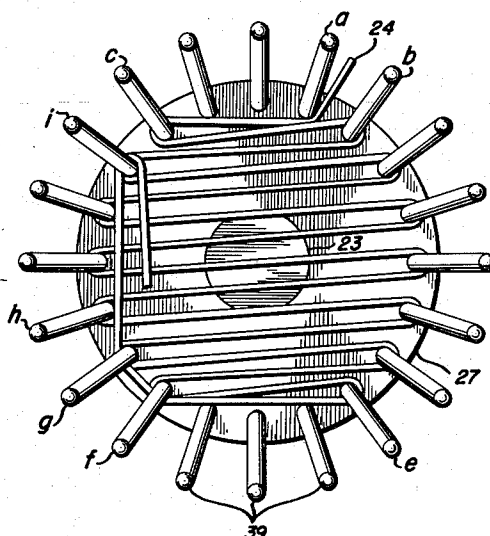
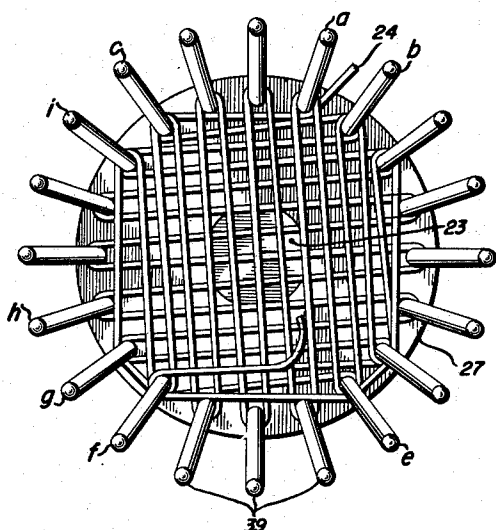


Fig. 9.



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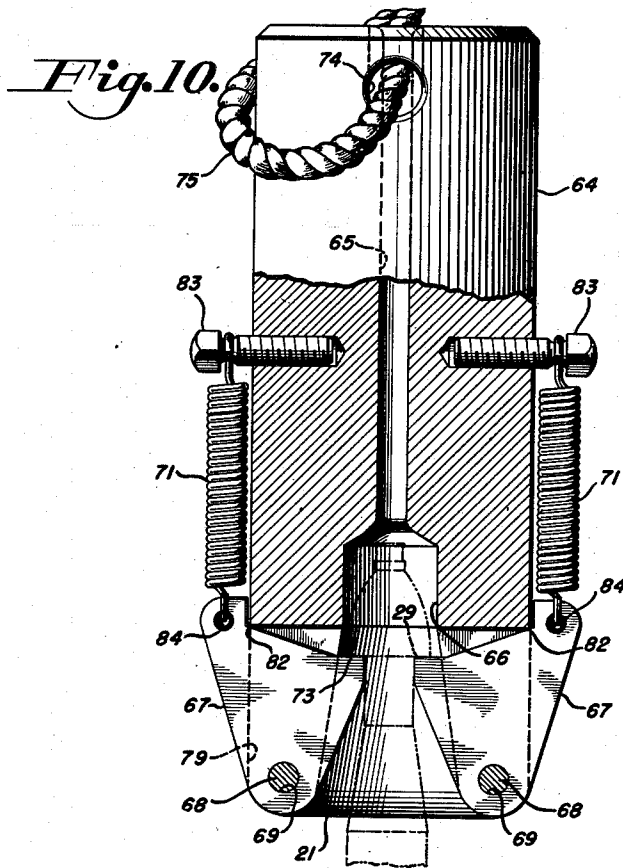
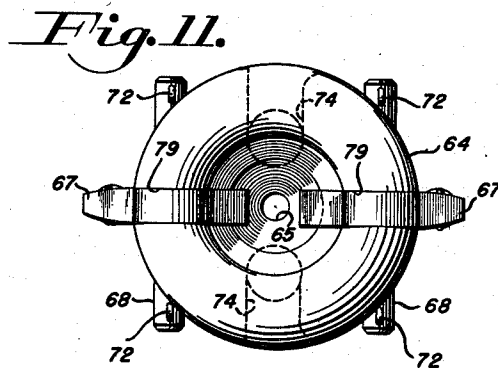
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Fig. 12.

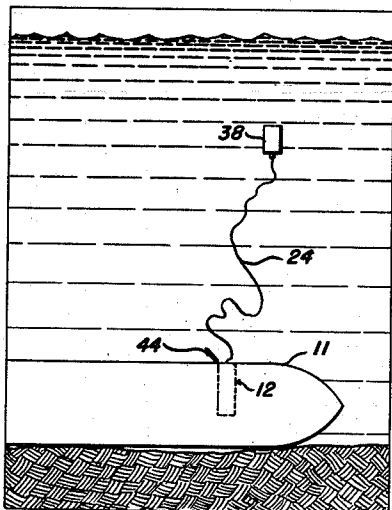


Fig. 13.

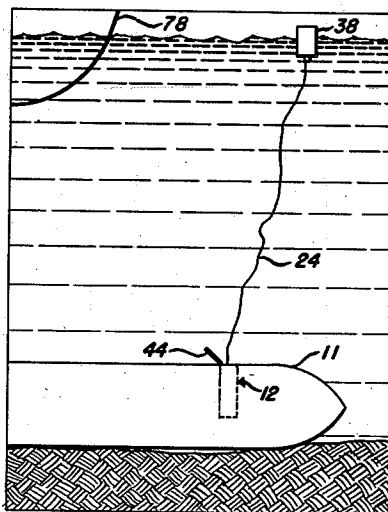


Fig. 14.

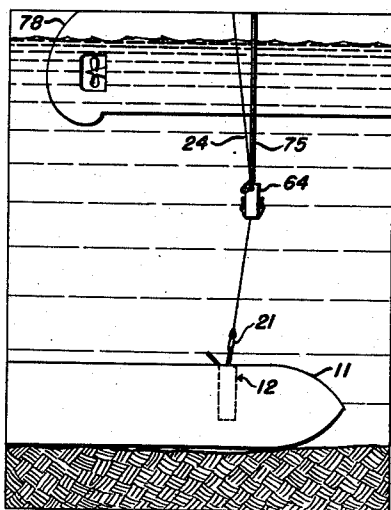
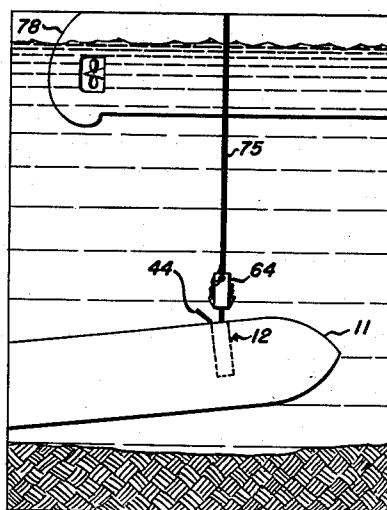


Fig. 15.



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APPARATUS FOR RECOVERING PRACTICE TORPEDOES

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6 Claims. (Cl. 9—9)

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sec. 266)

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This invention relates generally to an apparatus for retrieving practice torpedoes of the "sinker" type and more particularly to apparatus of this character for recovering, without the use of a diver, practice torpedoes which have come to rest on the bed of a body of water at the end of a practice run.

A "sinker" type torpedo may be defined herein as a practice torpedo having negative buoyancy and which sinks to the bed of a body of water at the end of a practice run.

Several devices have been heretofore employed to recover practice torpedoes which have sunk to the bottom but they have not proved to be entirely satisfactory under all conditions of service.

One prior art method employed a stream-lined float which was towed through the water by a hoisting cable attached to the extreme aft end of the torpedo. Frequent failure in the use of this method was caused by twist-breaking of the tow line during the practice run.

Another recovery apparatus heretofore devised for a torpedo employed a float having a length of line attached to the torpedo which was initially enclosed within the handhole of the torpedo by a handhole cover. The cover has a control surface thereon which is so constructed that the kinetic pressure of the water on the control surface during the forward motion of the torpedo would hold the cover in a closed position. When the torpedo came to rest on the bottom at the end of the practice run, the water pressure on the control surface was relieved and the cover would fly open to allow the float to rise to the surface to mark the location of the torpedo to aid a diver in locating the torpedo on the bottom.

In accordance with the present invention, the recovery device retains all of the advantages of the prior recovery devices of this general type and possesses none of the foregoing disadvantages. More specifically, the present invention according to the new and improved recovery apparatus thereof provides an arrangement in which a marker float is released from the torpedo in predetermined time delayed relation to the launching of the torpedo within the water sufficient to release the float therefrom an interval after the torpedo has come to rest on the bed of a body of water. A line, interconnecting the float and torpedo, is employed to guide a latch body thereon to attach the latch body to a latch keeper secured to the torpedo. A hoisting cable secured to the latch body and lowered therewith is employed to raise the torpedo to the surface

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of the water without the use of a diver. According to a corollary feature of the present invention, the foregoing recovery operations are facilitated by the provision of a novel method and apparatus for faking the float line within the handhole of the torpedo.

One of the objects of the present invention is the provision of a new apparatus for recovering a practice torpedo without the use of a diver after the torpedo has sunk to the bed of a body of water at the end of a practice run.

Another object is the provision of a new apparatus for making manifest on the surface of a body of water the location of a practice torpedo which has sunk to the bottom thereof.

Still another object is to provide a new and improved latch for locking the cover of the handhole of a torpedo until after the torpedo has come to rest on the bed of a body of water.

A further object of the present invention is to provide a new apparatus for stowing a long length of a float line in the handhole of a torpedo in such a manner that the line will pay out without becoming fouled as the float attached thereto rises from the torpedo to the surface of the water.

Still another object is the provision of a new and improved latch means which may be employed without the use of a diver to attach a hoisting cable to a torpedo which is resting on the bed of a body of water.

Still a further object is to provide a time delayed latch release means for a torpedo handhole cover which may be operated by a retriever crew within the time interval measured by the release means to lock the cover and thereby render the latch release means ineffective to release the float and line therefrom when the torpedo fails to sink to the bottom at the end of a practice run.

Still other objects, features, advantages and improvements of a torpedo recovery apparatus of the present invention will become apparent from the following description taken in connection with the accompanying drawings of which:

Fig. 1 is a sectional view in elevation of the recovery apparatus of the present invention arranged within the handhole of the torpedo;

Fig. 2 is a plan view of the torpedo handhole cover with certain parts broken away illustrating the various parts of the cover latch when in the position for inserting the time delay pellet therein, this also being the position of the latch to which it is moved in the case of a torpedo which

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is found to be positively buoyant at the end of a practice run;

Fig. 3 is a plan view of the torpedo handhole cover illustrating the position of the various parts of the cover latch as they appear at the time of launching the torpedo on the practice run;

Fig. 4 is a view in elevation of the faking tool for installing the float line in the handhole insert of the torpedo;

Fig. 5 is a sectional view taken along line 5—5 of Fig. 4;

Fig. 6 is a view taken along line 6—6 of Fig. 4;

Figs. 7, 8, and 9 illustrate the preferred method of threading the buoy line on the faking tool;

Fig. 10 is a sectional view in elevation of the latch body engaging the spear;

Fig. 11 is a view of the bottom of the latch body;

Fig. 12 illustrates the marker buoy rising to the surface after the torpedo has come to rest on the bed of a body of water;

Fig. 13 illustrates the retrieving boat about to recover the marker buoy;

Fig. 14 illustrates the latch body being lowered on the buoy line; and

Fig. 15 illustrates the torpedo being raised to the surface of the water.

Referring now to the drawings on which like numerals of reference are employed to designate like parts throughout the several views and more particularly to Fig. 1, there is shown thereon a torpedo 11 having a handhole 10 formed therein which is adapted to receive the handhole insert generally designated by the numeral 12. The handhole insert 12 comprises a tube 13 having a closed bottom portion 14, a flanged portion 16 disposed about the open end of the tube and a tubular collar 15 secured within the wall of the tube. Flange portion 16 is secured within the handhole 10 by screws 18 with a circular gasket 17 arranged between the flange 16 and the torpedo casing to insure a watertight seal therebetween as the screws are tightened.

Hinge pin 42 is fitted within transverse bores provided within the pair of upstanding portions 41 formed on flange 16 with set screws 43 securing the hinge pin to portions 41 as shown. A pair of upstanding portions 45 formed on cover 44 are provided with transverse bores 46 for rotatably mounting the cover on hinge pin 42. Torsion spring 47, sleeved about hinge pin 42 and engaged on one end thereof with the cover and on the other end with flange 16, urges the cover 44 to the open position.

Cover latch 49 is rotatably mounted on latch pin 50 which is pivotally secured to cover 44 and arranged perpendicularly thereto, the cover latch being arranged for limited movement within slotted portion 48 formed in cover 44. Cam plate 51 fixedly secured to latch pin 50 as by swaging the pin to the plate, is limitedly rotatable therewith on the cover, as will hereinafter be more fully described.

Cover latch 49 is provided with a lip 52 which may be rotated into and out of engagement with the keeper slot 53 formed on flange 16. Cover latch 49 is provided with a pellet receiving and engaging surface 54 which together with pellet recess 56 in cover 44 forms a pocket to receive a water soluble pellet 31 therein, the pellet being adapted to dissolve after being submerged in water for a predetermined interval. Tension spring 58, secured at one end to spring eye 57

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formed on cover latch 49, is secured at the other end to stud 59 carried by cam plate 51.

Stud 59 is provided with a cylindrical portion 77 which extends below the cam plate 51 and movable within slotted portion 48 of cover 44 as the cam plate rotates about pivot 50. Hole 60, through cam plate 51, forms an opening to limit the amount of surface of the soluble pellet 31 exposed to the action of the surrounding water when the torpedo sinks to the bottom, the cam plate being in overlying position with respect to the pellet when the torpedo is launched.

Pivotally secured to cover 44 by lock pin 61 is latch lock 62 which is arranged in the path of travel of cylindrical portion 77 and formed with a hooked end 55 which engages lock keeper 63 formed on cover latch 49 when cylindrical portion 77 cams the latch lock 62 to bring end 55 into engagement with lock keeper 63 as cam plate 51 is rotated to the position shown in Fig. 2. As the cam plate 51 is rotated clockwise about latch pin 50, cylindrical portion 77 cams latch lock 62 clockwise about pin 61 to disengage hooked end 55 from lock keeper 63, as shown in Fig. 3.

With soluble pellet 31 disposed within the pellet socket formed by surface 54 and pellet recess 56, lip 52 is held by the pellet in locking engagement with keeper slot 53 against the force of spring 58 when cam plate 51 is rotated to the position shown in Fig. 3, in which position surface 54 of the cover latch bears yieldably against the pellet whereby the cover latch 49 is caused to move to the left in slot 48 under force of spring 58 as the pellet dissolves, thereby to move lip 52 out of engagement with keeper 53 and thus unlock cover 44.

Secured to the bottom portion 14 in any well known manner such, for example, as by welding, brazing, or the like, is an eye 19 for attaching a rope 20 preferably formed of sturdy expansible fabric such as nylon.

Rope 20 is threaded through transverse bore 22 in spear 21 and thence through eye 19, the rope being secured to these parts as by joining the ends of the rope together. The rope has a length sufficient to cause the spear to emerge from the tube 13 when the spear is moved outwardly of the tube. Spear 21 has an additional transverse bore 25 therein through which a buoy line 24 is threaded and secured to the spear as by a knot in the line at 26. Spear 21 is provided with a head 28 forming a shoulder 29 thereon.

A circular wafer 35 rests on the shoulder formed by collar 15 and buoy line 24 is faked thereabove in such a manner that the line will freely pay out without becoming fouled, this preferably being accomplished in the use of the faking tool hereinafter to be described.

The buoy line 24 is of sufficient length to reach from the deepest point on the bed of the practice range to the surface of the water, the free end of the line being secured to eye 36 formed on the base of the buoy 38. The buoy 38 is slidably arranged within tube 13 and normally rests on the faked line 24 when assembled within the tube prior to launching the torpedo. The buoy has been illustrated in Fig. 1, however, as being in abutting engagement with the cover 44 in order to disclose more fully the manner of attachment of line 24 to the buoy.

Referring now more particularly to Figs. 4 to 9, there is shown thereon the faking tool which has been provided for faking line 24 in the afore-

described preferred manner within the tube 13. A cylindrical handle 23 is provided with a stop pin 34 arranged transversely thereon and a plunger 27 secured to the end of the handle by dowel pin 32. A cylindrical metallic collar 33 slidably mounted on handle 23, is provided with a plurality of circumferentially arranged metallic pins 39, preferably 20 in number, which extend from one face of the collar parallel with the handle. The pins 39 are fixedly secured at right angles to this face of collar 33 and a pair of hand grips 37 are secured to the other face of the collar as by soldering the parts thereto. Pins 39 are slidably arranged within suitably arranged parallel bores provided therefor through plunger 27.

To arrange buoy line 24 on the faking tool, the plunger 27 is first moved into engagement with collar 33 and the line is loosely tied to one of the hand grips 37. The line is now loosely brought around the collar to provide sufficient slack to subsequently secure the buoy thereto and passed between any two adjacent pins such as pins *a* and *b* in Fig. 7, thence around a pin *c* spaced three pins from pin *a*, thence back to and around pin *b*, thence back and forth around pins increasingly spaced respectively from pins *b* and *c* until the line passes around a pin *e* which is spaced three pins from pin *f* around which the line was just previously passed, thereby to form the first layer of line subsequently to be faked in the handhole.

In a similar manner, the second layer is applied as indicated in Fig. 8, the looped strands of the line in this case, however, extending at right angles to the strands of the first layer to which end the adjacent pins *g* and *h* are selected to start the second layer from whence the line first is passed to and around pin *i* which is spaced three pins from pin *h*.

Fig. 9 illustrates the completed second layer and illustrates the manner of starting the third layer as at pins *e* and *f* whereby the strands of the third layer are threaded about the pins parallel to the strands of the first layer but wound on the pins from the bottom to the topmost pins as viewed in Fig. 9. In like manner, succeeding layers are wound on the pins at right angles to the layers adjacent thereto until the line has been fully wound on the pins.

The free end of line 24 is now tied to the spear 21 after which the loaded faking tool is inserted within tube 13 on top of wafer 35, plunger 27 and collar 33 being of a diameter to readily admit the faking tool within tube 13. Collar 33 and the pins secured thereto are now pulled rearwardly by hand grips 37 until the collar moves into engagement with stop bar 34, thereby to withdraw the pins from the faked line and leave the line faked within tube 13 as shown in Fig. 1.

The end of the line secured to the hand grip 37 is now untied therefrom and tied to the eye 36 at the bottom of the buoy 38 which thereafter is placed within the tube on top of the faked line.

Cover 44 is now closed and the pellet inserted as disclosed in Fig. 2. The specific manner in which this is accomplished is described as follows. It will be recalled that when the cover 44 is open, the cover latch 49 is urged to the left in slot 48 by spring 58 and cam plate 51 is in the position of Fig. 3 wherein it overlies the pellet pocket. With the parts in the cover open position, the cam plate cannot be moved to the position of Fig. 2 until the cover latch is first moved to the right

in slot 48, in which position of the cover latch the lock keeper 63 therein is in position to receive the hooked end 55 of the latch lock 62.

Thus, upon closing the cover 44, lip 52 is first moved into locking engagement with keeper slot 53 and cam plate 51 thereafter is rotated counterclockwise about pin 50 to the position of Fig. 2 wherein the parts of the cover are locked in position to receive the pellet 31 within the pocket provided therefor by reason of the cover latch being locked in the cover locking position thereof by the coaction between parts 55 and 63. Thus, an arrangement is provided for positively locking the cover without using the washer as during transit or storage of the torpedo, or recovery of a positively-buoyant practice torpedo, as will appear more fully hereinafter.

The pellet 31 is now inserted in the pocket and the cam plate is rotated clockwise to the position of Fig. 3 wherein the latch cover is maintained in cover locking position by the pellet 31 against the opposing force of spring 58. The torpedo is now in readiness for launching thereof on the torpedo range.

After the torpedo is launched and sinks below the surface at the end of the practice run, water enters bore 60 and slowly dissolves pellet 31 after a predetermined interval to free cover latch 49 which concurrently with the dissolving of the pellet is rotated by spring 58 counterclockwise about latch pin 50 to disengage lip 52 from keeper slot 53 thereby to unlock the cover whereby torsion spring 47 moves cover 44 to the open position to allow buoy 38 to float to the surface of the water as shown in Fig. 12, thereby to mark the location of the torpedo on the bed thereof.

The device employed for raising the torpedo to the surface of the water is shown in Figs. 10 and 11 and comprises a hoisting cable 75 having a latch body 64 secured at one end thereof, these parts being carried by the retrieving boat 78 shown in Figs. 13, 14 and 15.

The cylindrical latch body 64 is provided with an axial bore 65 therethrough which terminates in a concentric recess 66 at the bottom end thereof, the recess being adapted to receive the head 23 of the spear 21. A pair of diametrically positioned pawls 67 are rotatably mounted within a pair of slots 79 provided therefor and are rotatably mounted on pawl pins 68 which are secured by cotter pins 72 in a pair of transverse bores 69 through the latch body 64. The pawls 67 are provided with lips 73 disposed within recess 66 and are adapted to grip the shoulder 29 of the spear 21. A pair of diametrically disposed bores 74, each bore extending downwardly through the top and outwardly through the sides of the latch body 64 are provided for receiving the hoisting cable 75 therein which is threaded downwardly through one hole, looped half way around the body and up through the other bore where the cable is clamped together in order to cause the latch body 64 to hang vertically when supported by the hoisting cable.

Each of pawls 67 is provided with a tension spring 71 which urges the pawls into engagement with shoulder 82 by securing one end of each spring 71 to its respective stud 33, the other ends of the springs being secured within bores 34 provided therefor in pawls 67, as shown in Fig. 10.

When the buoy is picked up by the retriever boat, it is removed from line 24 and the latch body 64 is threaded on the line by passing the line through axial bore 65 in the body, the line

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being pulled sufficiently tight to pull spear 21 out of the insert 12 and held taut whereby the latch body is caused to move therealong, as shown in Fig. 14, into engagement with the spear.

The latch body 64 is secured to spear 21 as head 28 moves past lips 73 to cause pawls 67 to rotate outwardly on pins 68 against the force of springs 71 until lips 73 grip shoulder 29 of the spear. With the latch body locked to the spear, a continuous hoisting line comprising cable 15 and rope is provided for hoisting the torpedo from the bottom as shown in Fig. 15.

Should the torpedo complete the practice run with positive buoyancy and before the pellet 31 has dissolved, a member of the retriever boat crew may attach a hoisting cable to the torpedo nose ring and rotate the cam plate 51 counterclockwise about pin 50 to position the cover latch to the handling position as in Fig. 2 thereby to prevent the cover 44 from opening and releasing the float 38.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

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

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. In torpedo recovery apparatus of the character disclosed comprising, a housing for enclosing a marker buoy and having an opening for releasing the buoy therefrom, a cover hingedly supported on said housing for closing said opening, said cover having a face, spring means operatively connecting the cover and housing for urging said cover to open position, a first latch member pivotally supported on said cover about an axis generally perpendicular thereto for pivotal movement thereon parallel to the face thereof, a first coacting latch means mounted on said housing for locking the cover in closed position when the latch member is moved from a cover releasing position to a cover locking position while the cover is in closed position, a second latch member supported on the cover for pivotal movement thereon parallel to the face thereof, said second latch member retaining said first latch member in said cover locking position thereof when the second latch member is moved from a position for releasing the first latch member to a position for locking the first latch member, a plate member supported on said cover for pivotal movement thereon about the pivot axis of said first latch member, coacting cam means mounted on said plate member for engaging and moving the second latch member between said positions thereof for respectively locking and releasing the first latch member as the plate member is pivotally moved between first and second positions thereof, second spring means interconnecting said plate member and said first latch member along a line disposed to one side of said pivot axis of the first latch member when the plate member is in the second position thereof and when the plate member is in the first position thereof interconnecting said plate and first latch members along a line disposed to the other side of said pivot axis whereby the first latch member

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is yieldably urged by said second spring means into said cover locking and releasing positions thereof when the plate member is moved respectively into said first and second positions thereof, and a disintegratable element interposed between said first latch member and the cover when the first latch member is in the cover locking position thereof for preventing movement of the first latch member into the cover releasing position thereof until said element has become disintegrated, said cover and first latch member having complementary recesses formed therein for receiving said element.

2. In a torpedo recovery apparatus comprising, a housing adapted to be secured to a torpedo, a cover hinged to said housing, said cover having a face, first spring means operatively connected to the cover and the housing for urging said cover to the open position, a latch member pivoted to said cover about an axis generally perpendicular thereto for rotative movement in a plane parallel to the face of said cover, a keeper on said housing adapted to be engaged by said latch to retain the cover in the closed position, a recess within the face of said cover adjacent an edge of said latch member when said latch member is in engagement with said keeper, a soluble pellet received by said recess and in abutting relation with the edge of said latch member to retain said latch member in engagement with said keeper, a plate pivotally mounted on said cover, and second spring means interconnecting said plate with said latch, said plate adapted to be pivoted to a position wherein said second spring means urges said latch member to a disengaged position with said keeper whereby upon immersion of the apparatus said soluble pellet dissolves and said second spring means rotates said latch member to a disengaged position with respect to the keeper and said first spring means opens said cover.

3. In a torpedo recovery apparatus comprising, a housing adapted to be secured to a torpedo, a cover hinged to said housing, first spring means operatively interconnecting the cover and the housing for urging said cover to the open position, a keeper on said housing, latch means pivotally mounted on said cover about an axis generally perpendicular thereto and adapted to engage said keeper to retain said cover in a closed position, a soluble pellet disposed on said cover in abutting relation with an edge of said latch means to retain said latch means in engagement with said keeper, a plate provided with an aperture pivoted to said cover, second spring means interconnecting said plate with said latch means, said plate adapted to be pivoted to a position wherein said second spring means urges said latch means to a disengaged position with respect to said keeper and said aperture overlies said soluble pellet whereby upon immersion of the apparatus said aperture admits water to the soluble pellet and upon dissolution thereof said second spring means pivots said latch member to a disengaged position with respect to the keeper and said first spring means opens said cover.

4. In a torpedo recovery apparatus, a housing adapted to be secured to a torpedo, a cover hinged to said housing, first spring means operatively interconnecting the cover and the housing for urging said cover to the open position, a keeper on said housing, first latch means pivoted to said cover about an axis generally perpendicular thereto, said first latch means being adapted to

rotate in a plane parallel to a face of the cover and engaging said keeper to retain said cover in a closed position, a recess within the face of said cover adjacent an edge of said first latch means when said latch means is in engagement with said keeper, a soluble pellet disposed within said recess and adapted to abut the edge of said first latch means, second latch means pivoted to said cover engaging said first latch means to retain said first latch means in a cover locking position, a plate pivoted to said cover, said plate being provided with a stud, said stud abutting said second latch means, second spring means interconnecting said first latch means and said plate, said plate adapted to be pivoted to a position wherein said second spring means urges said first latch means to a disengaged position and said stud pivots said second latch means thereby releasing the second latch means from engagement with said first latch means whereby upon immersion of the apparatus said soluble pellet dissolves and said second spring means causes said first latch member to rotate to a disengaged position with respect to the keeper and said first spring means opens said cover.

5. In a torpedo recovery apparatus, a housing having a cover hinged thereto, first spring means interposed between said cover and said housing for urging said cover to the open position, a latch, means pivotally connecting said latch to the cover about an axis generally perpendicular thereto for rotation in a plane parallel to a face of said cover, a keeper on said housing, said latch member engaging said keeper to retain said cover in a closed position, a recess in the face of said cover adjacent an edge of said latch when the latch is in a locking position, a soluble pellet adapted to be disposed within said recess in abutting relation with the edge of said latch whereby the pellet retains the latch in engagement with the keeper, and second spring means operatively interconnected between said latch and said cover urging said latch to a disengaged position with respect to said keeper whereby upon immersion of the apparatus said soluble pellet dissolves and said second spring means releases said latch from engagement with

the keeper and said first spring means opens said cover.

6. In a torpedo recovery apparatus, a housing, a cover hinged to said housing, first spring means associated with the cover urging said cover to the open position, a latch member, means pivoting said latch member to said cover about an axis generally perpendicular thereto for rotative movement in a plane parallel to a face of said cover, a keeper on said housing adapted to be engaged by said latch to retain the cover in a closed position, a soluble pellet mounted on said cover in abutting relation with an edge of said latch member when said latch member is in engagement with said keeper whereby the pellet retains the latch member in engagement with the keeper, and second spring means secured to said latch member for urging said latch member to a disengaged position with respect to said keeper whereby upon immersion of the apparatus the soluble pellet dissolves and said second spring means releases said latch member from engagement with said keeper and said first spring means opens said cover.

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