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TORPEDO LOCATOR AND RETRIEVER

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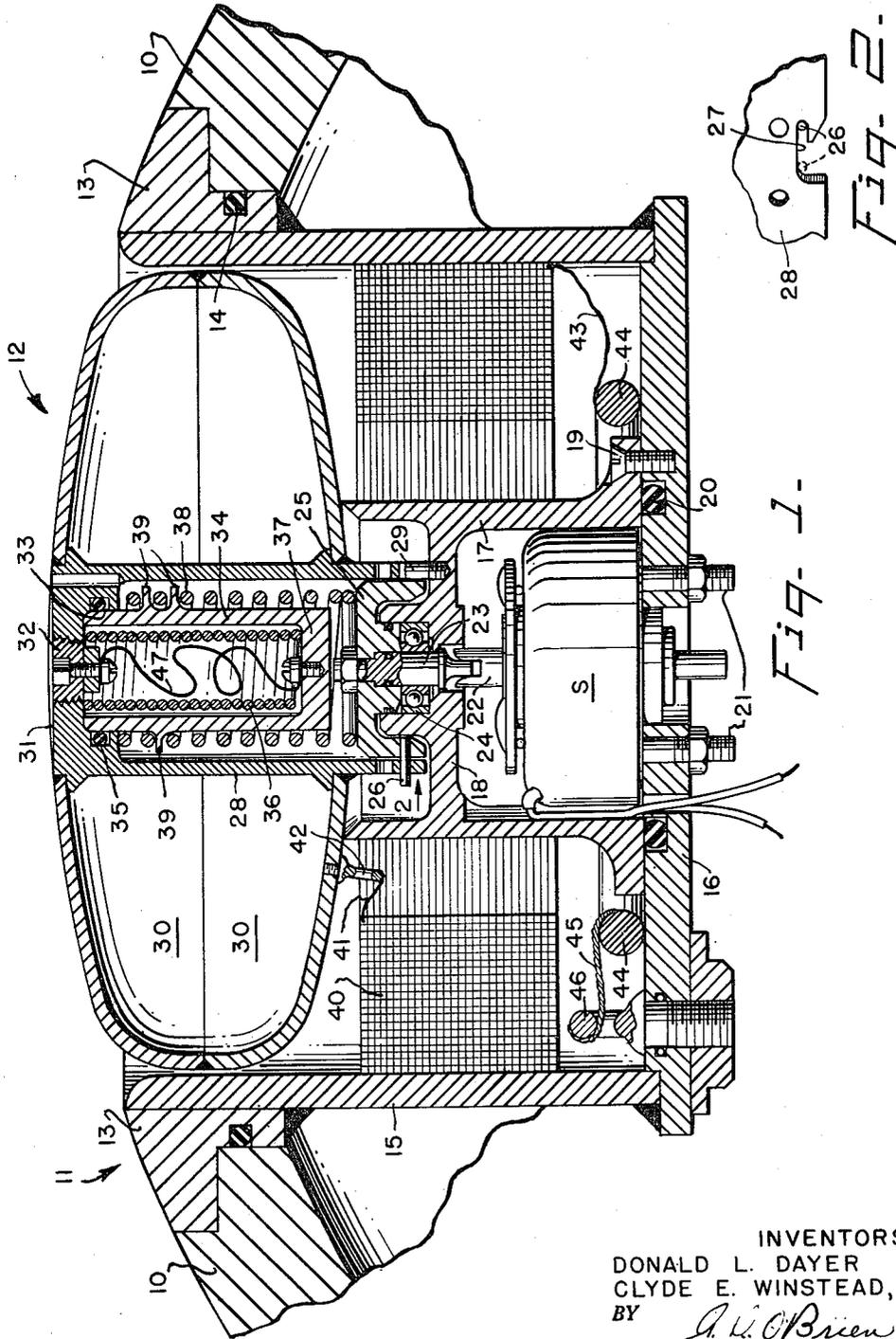


Fig. 1-

Fig. 2-

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TORPEDO LOCATOR AND RETRIEVER

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of the Navy

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8 Claims. (Cl. 9—9)

This invention relates to torpedoes and more particularly to improvements in apparatus for locating and retrieving negatively buoyant torpedoes which have come to rest on the bed of a body of water after an exercise run or the like.

It has been common practice to provide torpedoes with some means for marking their positions on the bed of a body of water after they have come to rest so that they may be recovered by divers or grapple devices. Thus, in the U. S. Patent to Smith 1,120,417 an oil reservoir is carried by the torpedo which releases oil when the torpedo reaches its final resting place, the oil rising to the surface to thereby indicate the general area of the torpedo after which a diver descends to locate the torpedo and attach a hoisting cable or the like to it whereby it may be hoisted to the surface of the water. With this type of device, if there is considerable water current, the oil will not rise vertically hence the oil patch on the surface of the water will not be directly over the torpedo thus necessitating a considerable search by a diver. As another solution to the recovery problem torpedoes have been disclosed provided with small buoys which are released when the torpedo came to rest which float to the surface of the water, a line or the like being attached at one end to the buoy and at its other end to a line supply reel or the like carried by the torpedo. This type of device provides a positive marker for the torpedo which enables a diver to follow the line to the torpedo and similarly attach a hoisting cable to the latter. The U. S. patents to Barrett 1,252,877 and Joyce 1,216,132 exemplify this type of device. The limitations on the use of devices of this type is, however, depth of submergence of the torpedo. If it be submerged beyond diving depth recovery cannot be accomplished. To obviate the foregoing disadvantages the U. S. patent to Brown 2,641,780 discloses a device for locating and recovering a submerged torpedo without a diver, this device comprising, generally, the releasable buoy and interconnecting line previously mentioned, and a grapple device which follows the line to the torpedo and attaches itself to the torpedo, the grapple being connected by a cable to hoisting gear on the recovery boat. As will be apparent, this type of device renders possible the recovery of torpedoes submerged at depths beyond diving depths.

This invention relates to apparatus of the general type disclosed by the Brown patent but incorporates certain improvements which further facilitate the recovery of torpedoes.

One of the objects of the invention is to provide a buoy type torpedo marker which incorporates a dye marker which enables a searcher in a boat, helicopter or the like to more readily locate the buoy.

Another object is to provide a simplified and compact device of the foregoing type which may be economically constructed and is highly reliable in operation.

Other objects, advantages and salient features will become more apparent from a consideration of the de-

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scription to follow the appended claims and the accompanying drawing, in which:

Fig. 1 is a transverse cross section through a portion of a torpedo and a central section through the device which constitutes the subject of the invention; and

Fig. 2 is a detail as viewed in the direction of arrow 2, Fig. 1.

Referring to the drawing, hull or shell 10 exemplifies any conventional torpedo provided with a handhold 11. The subject of the invention comprises apparatus 12 disposed within the handhold in any suitable manner to prevent leakage of water into the torpedo. For purpose of illustration, this may comprise a ring 13 sealed to the handhole by an O-ring 14. A cylindrical wall 15 is welded or otherwise secured to the ring, one end of this wall being closed by a base member 16 similarly secured to the cylindrical wall, thus forming a casing for housing the various components to now be described.

A cup shaped circular member 17 having a wall 18 disposed intermediate its opposite open ends is secured to base member 16 by a plurality of angularly spaced screws 19, an O-ring 20 preventing leaking of water into the torpedo. In the space provided by the lower portion of member 17 is disposed a rotary solenoid S of the Ledex type, secured to the base member by bolts 21, the solenoid having a slotted rotary output shaft 22 which engages one end of a shaft 23. Shaft 23 is rotatably supported by a thrust type ball bearing 24 supported by wall 18. To the upper end of shaft 23 is affixed a circular member 25 which carries three equiangularly spaced radially projecting pins 26 which engage corresponding bayonet slots 27, as best shown in Fig. 2, disposed in the lower end of a tubular hub 28. A pin 29, affixed to wall 18, engages a corresponding slot in hub 28 which indexes the hub and prevents rotation of the latter relative to member 17. A pair of identical spun aluminum alloy half members 30 having central apertures are welded to the hub and the peripheral seam between them similarly welded, as shown, these members, the hub and other parts to be described forming a buoy. The upper end of hub 28 is closed by a wall 31 having a removable threaded plug 32 therein, the purpose of which will be subsequently described. The upper end of hub 28 is provided with a bore 33 which slideably receives the upper end of a cylindrical tubular dye pot or container 34, entry of water into the dye pot being prevented by O-ring 35. A compression coil spring 36 is disposed between wall 31 and the lower closed end of the dye pot which urges the dye pot in a direction to separate it from bore 33 to thus permit water to enter the dye pot. A flexible member 37 such as a cord or cable, is connected at one end to plug 32 and at the other end to lower end wall 37 of the dye pot. Sufficient slack is provided in the cord, as shown, to permit separation of the dye pot, as previously described, but to limit the amount of separation so that the dye pot may be recovered with the buoy. A compression coil spring 38 is disposed around the dye pot, one end engaging member 25 and the other end engaging the upper end of hub 28, the spring being secured to the dye pot by a thread 39 which prevents separation of the spring from the dye pot.

An annular supply of nylon cord 40 is disposed within casing 15, this supply being so wound that it feeds off the supply from its inside in successive radial layers. One end 41 of the cord is secured to an eyebolt 42, secured to the buoy, and the other end 43 to a steel ring 44, the latter being secured to the casing and torpedo by a strong cable 45, one end of which is secured to the ring and the other end to eyebolt 46, affixed to base member 16.

In the assembly of the parts, solenoid S is actuated to move pins 26 to the dotted line position as shown in Fig.

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2. Plug 32 is removed at this time and by pulling on cord 47 separation of the dye pot from hub 28 is prevented. The hub is then applied into the casing with index pin 29 engaging its corresponding slot. Rotation of the solenoid to move pins 26 to the full time position, as shown in Fig. 2, then locks the buoy against separation from member 25. Cord 47 may now be released since the lower end of dye pot abuts the upper end of shaft 23 thus preventing its separation from the hub under the urge of spring 36. The dye pot is then filled with dye in a dry state, such as powder dye, and the plug replaced.

In the operation of the device solenoid S is energized in any manner well known in the art such as by a time delay switch, a hydrostatic pressure sensing switch or other device which will sense the desired conditions for release of the buoy. Energization of the solenoid moves pins 26 to the dotted line position shown in Fig. 2, which unlocks the buoy from member 25. Spring 38 then forcibly separates the buoy from member 25 and the buoy rises to the surface of the water. When the buoy reaches a position near the surface, preferably at about fifteen feet of submergence, spring 36 overcomes the pressure of the water acting on the lower closed end of the dye pot and separates the dye pot from hub 28 permitting water to enter the dye pot and dissolve the dye, thus producing a dye marker on the surface of the water which may readily be detected. After the buoy is located the nylon line 40 is pulled taut and ring 44 pulled to a position wherein at least a portion of its periphery is disposed in an accessible position outside of casing 15. A grapple device or "go getter" is then attached to line 40 and gravitates along same to the torpedo. When the grapple device reaches the ring its jaws automatically grasp the ring in a manner analogous to that shown by the Brown patent. The grapple is connected to a strong cable extending to hoisting apparatus on the surface recovery boat which cable lifts the torpedo to the surface.

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.

What is claimed is:

1. Apparatus for locating and recovering a torpedo disposed on the bed of a body of water, comprising; a cylindrical casing carried by the shell of the torpedo and extending into the space within the shell, the inner end being closed and the outer end being open, a circular buoy having a central cylindrical hollow hub forming a central space within the buoy and a surrounding annular space for displacing water, a dye container disposed within said central space and sealingly engaging a portion of said hub to prevent entry of water into said container, said container being maintained in engagement with said portion by pressure of water acting on one end of said container, resilient means for urging said container out of engagement with said portion to permit water to enter said container, said resilient means being so proportioned to the pressure of said water that said container is urged out of engagement with said portion when the buoy ascends to a position near the surface of the water, whereby dispersion of the dye in the water is obviated during the major portion of the ascension of the buoy, means for releasing the buoy from said casing, and a

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flexible member adapted to reel off from an annular supply of same carried within said casing, one end of said flexible member being secured to said buoy and the other end to a member disposed within said casing, said last named member being secured to said casing and adapted to be engaged by hoisting apparatus for raising the torpedo to the surface of the water.

2. Apparatus in accordance with claim 1 wherein said last named member comprises a ring normally disposed adjacent the closed end of casing and adapted to be hoisted to a position wherein a portion of its periphery is disposed outside the confines of the shell.

3. Apparatus in accordance with claim 1 wherein the inner end of said hub is provided with a plurality of angularly spaced bayonet slots, a rotary member carried by said casing having corresponding angularly spaced radially projecting pins adapted to engage in said slots, and means for preventing rotation of said hub relative to the casing, the construction and arrangement being such that in one position of said rotary member the buoy is locked thereto and in another position it is unlocked therefrom and free to ascend in the water.

4. Apparatus in accordance with claim 3 including a spring disposed around said dye container, one end engaging said rotary member and the other end engaging a portion of said hub, whereby upon unlocking of the buoy from the rotary member said spring forcibly ejects said buoy from said casing.

5. Apparatus in accordance with claim 4 including means for retaining said spring, said resilient means and said dye container attached to said buoy after said dye container separates from said portion of said hub, whereby the spring, resilient means and dye container may be recovered with the buoy at the surface of the water.

6. Apparatus in accordance with claim 5 including a rotary solenoid having a rotary shaft operatively connected to said rotary member for rotating the latter.

7. A buoy for locating a torpedo disposed on the bed of a body of water, comprising; a pair of identical circular dish-shaped sheet metal members having central circular apertures, the peripheral edges of said members being welded together, a hollow hub extending between the apertures of said members and being welded thereto, forming an annular closed space thereabout adapted to displace water, said hub having a bore in one end, a circular tubular dye container having a closed end and an open end, the open end being disposed in said bore, and a spring disposed within said container for urging said open end out of said bore to thereby permit water to enter the dye container when the urge of the spring exceeds the pressure of the water on the closed end of the container.

8. Apparatus in accordance with claim 7 including a removable plug disposed in the central portion of said hub, a flexible slack member secured at one end to said plug and at its other end to said container, the construction and arrangement being such that when the plug is removed the flexible member may be tensioned to overcome the urge of the spring disposed within the container to prevent unauthorized movement of said open end of the container from said bore during the assembly of the buoy to a portion of torpedo recovery apparatus.

No references cited.