June 26, 1923.

1,460,175

J. A. RAYDER

TORPEDO HEAD

Filed Jan. 16, 1923

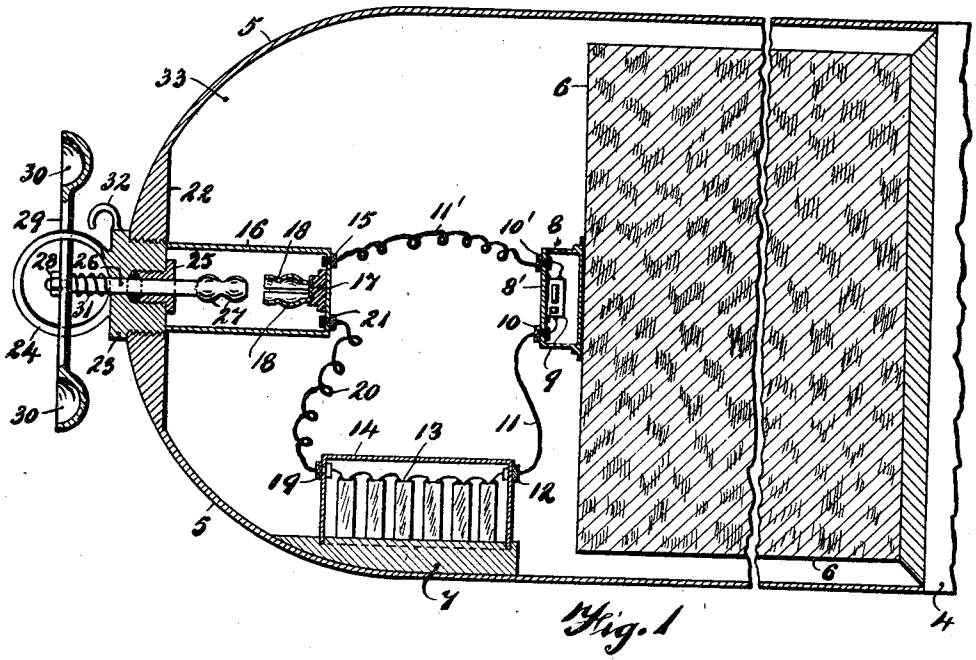

Fig. 1

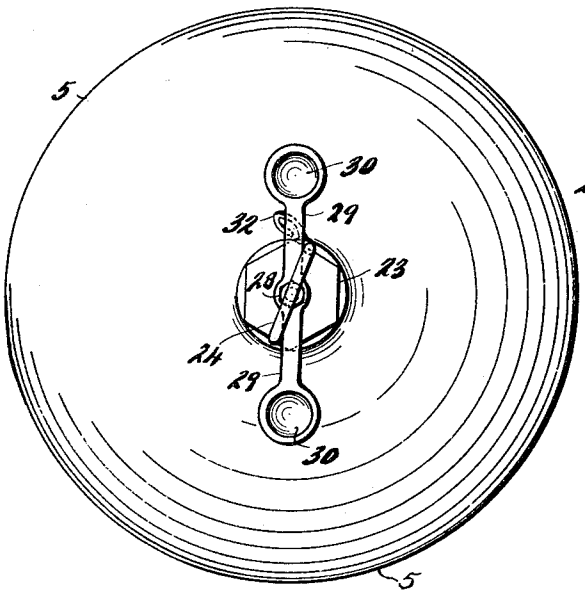

Fig. 2

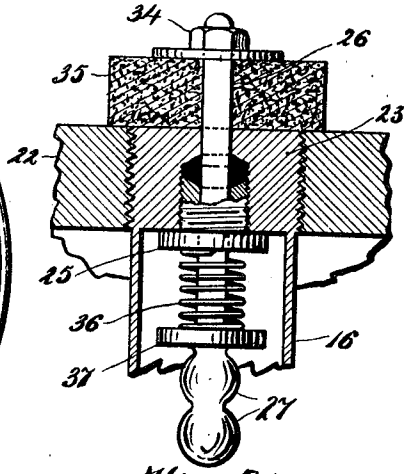

Fig. 3

Joseph A. Rayde
INVENTOR

BY Alfred J. Bratton
ATTORNEY

Patented June 26, 1923. 1,460,175

UNITED STATES PATENT OFFICE.

JOSEPH A. RAYDER, OF PHILADELPHIA, PENNSYLVANIA.

TORPEDO HEAD.

Application filed January 16, 1923. Serial No. 613,025.

To all whom it may concern:

Be it known that I, JOSEPH A. RAYDER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Torpedo Head, of which the following is a specification.

This invention relates to torpedoes and it has more particular reference to the foremost portion or head part thereof in contradistinction to the centre portion or air chamber and the tail which carries the engines, rudders, and propellers besides the apparatus for controlling depth of immersion and direction of course.

More particularly though not essentially, my invention has reference to torpedoes used for target practice and naval manoeuvers, said torpedoes being of a non-explosive character; that is to say more specifically torpedoes which when discharged from the torpedo tube are destined to make a "hit" and sink without exploding; or, exhaust their energy in a futile course and then sink.

Now the primary object of my invention is to provide a novel form of torpedo head fitted with means whereby when the torpedo makes a hit and sinks—or exhausts its course and sinks—it can be promptly located and salvaged thereby effecting considerable economy.

From a careful study and investigation into the aforesaid matter I have ascertained that there are great possibilities in the recovering of torpedoes during test or practice firing on warships of all types and including submarines. For instance it will be readily seen that the loss of but one or more torpedoes of the type referred to involves a heavy financial wastage not alone in so far as its actual cost is concerned but also in the wastage of considerable time and money in futile attempts at its location and recovery after said torpedo has ceased to function.

Now, I have discovered that by providing a torpedo head embodying an audible signal which will give an alarm of sufficient duration when the torpedo has made a "hit" or spent its course and sunk, said torpedo can be promptly located and salvaged thereby effecting a considerable economy.

Having the foregoing discovery in mind I have aimed at and provided a torpedo head fitted with an audible signal of sufficient power that it can be heard at a distance of five hundred or more yards even when submerged to the extent of twenty fathoms and more.

With the foregoing and other objects in view this invention consists essentially in the novel features of construction, combinations and arrangements of parts constituting the torpedo head hereafter fully described and more specifically defined in the subjoined claims.

In the further disclosure of the invention reference will be had to the accompanying sheet of explanatory drawings, and in which like characters of reference designate the same or corresponding parts in all the views.

Figure 1 is a central longitudinal section through a torpedo head embodying one form of my present invention.

Figure 2 is a plan view of the same; and

Figure 3 is a sectional detail of a slightly modified form of circuit closing device hereinafter more fully described.

Referring more particularly to the drawings the numeral 4 designates a fragmentary part of the centre portion of a torpedo and which usually constitutes the air chamber or reservoir while the numeral 5 generally designates the foremost or head part that ordinarily contains the explosive—usually wet gun cotton—with dry primer and a mechanical igniting arrangement. The aforesaid parts are generally referred to by way of acquainting those having a knowledge of the art with the relation of my invention thereto.

According to my invention and as more particularly referring to torpedoes for test practice I construct the head part 5 in conformity with prevailing designs as a shell or cylinder in which is concentrically secured a collapsible cylinder 6 of cork or other appropriate material, as well as a lead or other suitable ballast block 7 which serves to maintain the torpedo on an even keel. Axially concentric of the forward end of the aforesaid collapsible cylinder 6 I mount a metal covered-in water-tight box 8 in which is secured a high or low frequency buzzer 9. This buzzer 9 may be secured to the forward end and inside of the box 8 by, bolts, screws or their equivalent, or it may be welded thereto. Fitted in the forward end 8′ of the watertight box 8 are a pair of glands or stuffing boxes 10, 10′ through which are passed conduct-

ing wires 11, 11′ respectively, the former of which connects through a gland 12 with one terminal of a multiple-cell battery 13 enclosed in a suitable box 14 mounted on the aforementioned ballast block 7. The other conducting wire 11′ connects through a gland 15 into a water tight cylinder 16 of brass or other suitable material, that houses a fibre or other insulate block 17 on which is mounted a spring "jack" 18 hereinafter more fully explained, said jack having the free end of said conducting wire 11′ suitably attached to one side or blade thereof. Leading from the other terminal of the multiple-cell battery 13 through a gland 19 is a return wire 20 the free end whereof is passed through a second gland 21 into the water-tight cylinder 16 and connected to the spring "jack" 18 in opposed relation to the free end of the conducting wire 11′; or, in other words, to the opposed blade of said "jack." The aforesaid water-tight cylinder 16 is suitably screwed into the reinforced end 22 of the domed forward head part 5 and it is closed in watertight by a removable cap or plug 23 having an integral or attached ring 24 for the purpose of making a line fast thereto after location of the fired or spent torpedo. It is to be here noted that the watertight cylinder 16 is disposed axially concentric and longitudinal of the head part 5. The removable cap or plug 23 is centrally counter bored and fitted with a stuffing box or gland 25 through which passes a rod or plug 26 the inner end 27 whereof is suitably globular shaped for locking engagement in the hereinbefore referred to spring "jack" 18 as later on explained.

Secured on the outer reduced end of the rod or plug 26 by means of a lock nut 28 is a bar 29 the free ends whereof are fashioned as concavo-convex or dished plungers 30, 30, and it is to be noted that the bar 29 is disposed at right angles to the axis of the rod or plug 26. Although I have only shown one bar 29 it will be obvious that it may be replaced by a cruciform or other multiple and radially armed member, the free ends whereof are each provided with dished plungers 30 as above set forth. Intermediate the bar 29 and the outer end of the removable cap or plug 23 I arrange a spiral spring 31 which tends to keep the globular end 27 of the rod or plug 26 from engagement with the "jack" 18. The spring 31 is of just sufficient strength to give a tension that is overcome by the momentum of the torpedo when travelling through the water after firing, and in order to prevent the recoil of said spring when the bar 21 is driven rearwards by said momentum I provide a catch hook 32 for engagement with the bar 29 as later on explained.

It is to be here remarked that the wires 11, 11′ and 20 are heavily armoured with lead so as not to be affected by the oil 33 with which torpedo heads for test and practice firing are invariably filled. I also desire to here point out that the form of torpedo head just described has been specially designed for firing under water inasmuch as the firing of a torpedo equipped with a head as shown more particularly by Figures 1 and 2 of the drawings above water level as from the larger types of war craft such as first class battleships might result in injury to the dished plungers as well as prematurely energizing the high or low frequency buzzer 9. To overcome such possible objectionable features, and in order to adapt my invention for use in connection with torpedoes which are fired at a height above water level I employ the means shown in Figure 3, and from which it will be readily seen that the watertight cylinder 16, removable cap or plug 23, rod or plug 26, and salvaging ring 24 are of the same pattern as hereinbefore described. In this instance, however, the bar 29 and catch hook 32 are omitted while the aforesaid rod or plug 26 is fashioned with a head or nut 34 between which and the outer end of the cap or plug 23, I interpose a soluble salt or calcium washer 35, while a spring 36 is interposed between the stuffing box or gland 25 and a shoulder or collar 37 on said rod or plug 26. Thus it will be readily seen that the soluble salt or calcium washer 35 serves under normal conditions to maintain the globular end 27 and spring "jack" 18 separated but when the torpedo is fired and gets immersed the said washer 35 will dissolve and the spring 36 exerting its force will bring the globular end 27 and "jack" 18 into locking engagement to close a circuit through the high or low frequency buzzer 9 and give the required audible signal whereby the torpedo may be promptly located and salvaged. The aforesaid spring 36 is of sufficient strength when freed by the dissolving of the salt or calcium washer 35 to firmly retain the globular end 27 of the rod or plug 26 between the opposed contact portions of the "jack" 18 whereby the circuit from the battery 13 to the buzzer 9 remains closed until said battery 13 becomes spent or dead.

Having outlined the structure of my novel torpedo head for practice or test fired torpedos I will now briefly describe its operation. Assuming that a torpedo fitted with a head as hereinbefore described is fired from a torpedo tube on board a war craft it will be clearly apparent that as said torpedo travels through the water towards its objective that the momentum of said travel will force the dished plungers 30 rearwards or dissolve the washer 35 with a consequential rearward movement of the rod or plug 26 under the action of the springs 31

or 36. Due to this rearward movement of the rod or plug 26 it will be easily understood by those conversant with the art that the globular end 27 will be forced into the spring "jack" 18 thereby closing a circuit from the battery 13 through the conducting wire 11 to the high or low frequency buzzer 9, conducting wire 11', connected half of the "jack" 18, globular end 27, opposed half of said "jack" 18, and return wire 20 back to the battery 13. Obviously the closure of this circuit will result in the buzzer 9 giving an audible signal, and by the engagement of the bar 29 with the catch hook 32 said alarm will continue to be sounded until the battery 13 is spent or exhausted. On an actual test with an ordinary dry cell battery such as could be conveniently used, said test showed that while operating with a heavy duty six volt buzzer a maximum vibration was given off for twenty-eight hours.

From the foregoing description and an examination of the drawings it will be clearly apparent that by my invention I have provided a simple and inexpensive head for practice torpedoes by the use of which said torpedoes can be promptly located and salvaged with but little trouble and thereby effecting an enormous economy over prevailing wastage in time and labor.

Briefly summarizing: When a practice torpedo has been fired, many things happen in a very short space of time. Some torpedoes make a complete run; others but a part thereof, some fail to travel much farther than a few yards beyond the torpedo tube outlet and then sink. On the other hand some torpedoes make a short run and then dart off in an entirely different course than that intended thereby throwing the observing vessel off its track. Where any of the foregoing conditions arise the range boat, which is usually at hand, must steer in an approximate direction and search for the air bubbles that will be emitted from the air chamber and rise to the water's surface. Even when the water or sea is smooth, this search for air bubbles often extends for hours and in may instances is fruitless. Again when the sea is choppy or rough such a search is hopeless when the torpedo has been fired and sunk without making a hit or completing its run and sunk. Now it will be apparent that where practice torpedoes fitted with my novel form of head are fired they can be promptly located by the usual under water listening apparatus with which range boats are equipped, and the course or point of sinking of said torpedoes followed as long as the audible signal therein contained functions. Thus it will be apparent that my invention is of prime importance for the purposes for which it has been designed, and while I have shown and described practical embodiments thereof, the same are not to be restrictedly construed in that it will be apparent various changes in the details of construction as well as in the relative disposition of the several parts may be evolved without departing from the spirit and scope of my said invention. The right is, therefore, hereby reserved to make such changes and modifications as fairly lie within the scope of the appended claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. The combination with a torpedo for practice firing, of a head containing an audible signal, and means for actuating said signal comprising means operated by the resistance of the water to the motion of the torpedo.

2. The combination with a torpedo for practice firing, of a head containing an audible signal, means for actuating said signal comprising means operated by the resistance of the water to the motion of the torpedo, and means for holding said actuating means in operative position.

3. The combination with a torpedo head, of an audible signal therein, an electric circuit including electric responsive means for actuating said signal, and means for closing said circuit to actuate the signal comprising means responsive to the resistance of the water to the motion of the torpedo.

4. A head for torpedoes of the type hereinbefore described including a cylindric casing, a ballast block in said casing, a collapsible cylinder longitudinally concentric within the casing, a fluid proof box centrally secured on the forward end of the collapsible cylinder and containing a buzzer, a multiple-cell battery mounted on the aforesaid ballast block, a longitudinally disposed watertight cylinder centrally supported within the forward end of the torpedo head, opposed contact members within the watertight cylinder connected in circuit with the aforesaid battery and buzzer, and means for closing a circuit through the opposed contact members by the resistance to the motion of the torpedo when fired whereby the buzzer is energized.

5. A head for torpedoes of the type hereinbefore described including a cylindric casing, a ballast block in said casing, a collapsible cylinder longitudinally concentric within the casing, a fluid proof box housing a buzzer centrally secured on the forward end of said collapsible cylinder, an enclosed multiple-cell battery mounted on the aforesaid ballast block, a longitudinally disposed watertight cylinder centrally supported within the forward end of the torpedo head, opposed contact members on an insulate base at the rear end within the watertight cylin-

der, armoured wires connecting said contact members with the aforesaid battery and buzzer, and means for closing a circuit through the opposed contact members by the resistance to the motion of the torpedo when fired whereby the buzzer is energized.

6. A head for torpedoes of the type hereinbefore described including a cylindric casing, a ballast block in said casing, a collapsible cylinder longitudinally concentric within the casing, a fluid proof box housing a buzzer centrally secured on the forward end of the said collapsible cylinder, an enclosed multiple-cell battery mounted on the aforesaid ballast block, a longitudinally disposed watertight cylinder centrally supported within the forward end of the torpedo head, opposed contact members on an insulate base at the rear end within the watertight cylinder, armoured wires connecting said contact members with the aforesaid battery and buzzer, a removable plug for closing the watertight cylinder and having a salvaging ring at its outer end, a spring influenced rod concentrically movable through said removable plug and having a globular end for engagement between the aforesaid opposed contact members, a bar at right angles to and mounted on the outer end of the spring influenced rod, said bar having its ends fashioned as dished plunger cups, and means for locking the bar to the torpedo head when forced rearward by the resistance to the motion of the torpedo when fired whereby the buzzer is energized.

7. A head for torpedoes of the type hereinbefore described including a cylindric casing, a ballast block in said casing, a collapsible cylinder longitudinally concentric within the casing, a fluid proof box housing a buzzer centrally secured on the forward end of said collapsible cylinder, an enclosed multiple-cell battery mounted on the aforesaid ballast block, a longitudinally disposed watertight cylinder centrally supported within the forward end of the torpedo head, opposed contact members on an insulate base at the rear end within the watertight cylinder, armoured wires connecting said contact members with the aforesaid battery and buzzer, a removable plug closing in the watertight cylinder and having a salvaging ring at the outer end, a spring influenced rod concentrically movable through said removable plug and having its inner end fashioned for frictional engagement between the aforesaid opposed contact members, means for maintaining a watertight joint about the aforesaid rod, a bar at right angles to and mounted on the outer end of the spring influenced rod, said bar having its ends fashioned as dished plunger cups and a catch for locking the bar to the torpedo head when forced rearwards by the resistance to the motion of the torpedo when fired whereby the buzzer is energized.

8. The combination with a torpedo head, of an audible signal therein, an electric circuit including electric responsive means for actuating the signal, and means for closing said circuit to actuate the signal comprising means responsive to the resistance of the water to the motion of the torpedo, and means for holding said circuit closing means in operative position until released.

In testimony whereof I affix my signature this 11th day of January, 1923.

JOSEPH A. RAYDER.