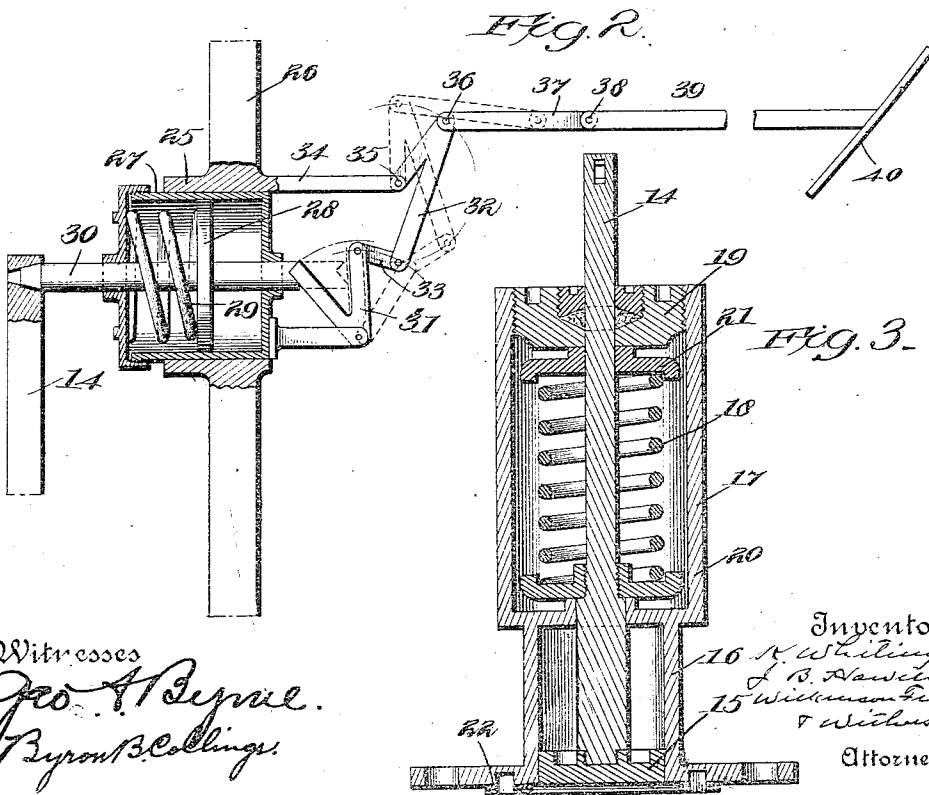
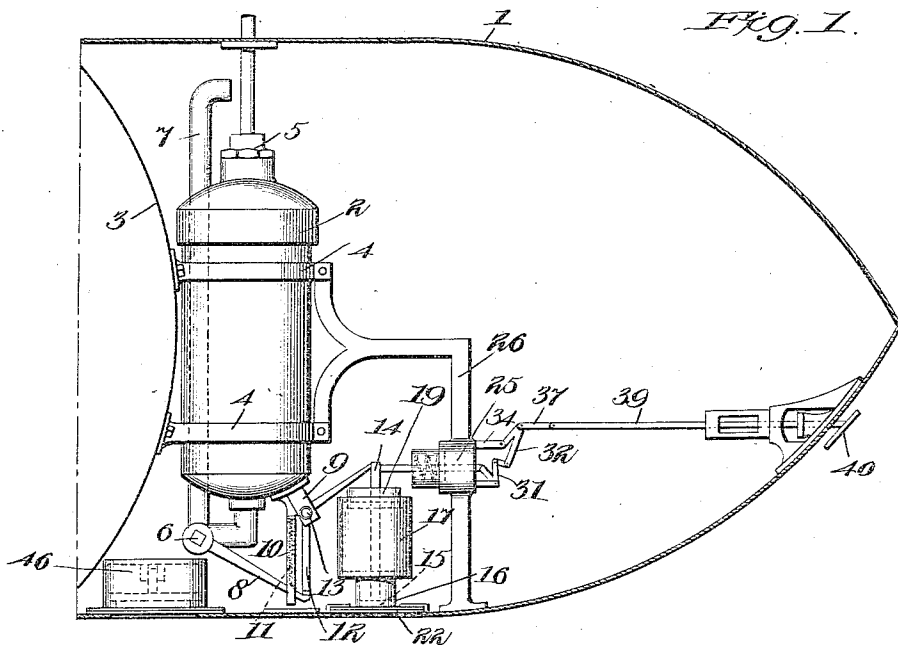


K. WHITING & J. B. HOWELL.  
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 TORPEDOES TO AID IN THE RECOVERY THEREOF AFTER FIRING.  
 APPLICATION FILED JULY 22, 1910. RENEWED OCT. 10, 1911.

1,023,907.

Patented Apr. 23, 1912.

2 SHEETS-SHEET 1.



Witnesses  
 Geo. A. Byrne.  
 Byron B. Collings.

Inventor.  
 K. Whiting,  
 J. B. Howell,  
 By William Fisher  
 & Withers.  
 Attorneys.

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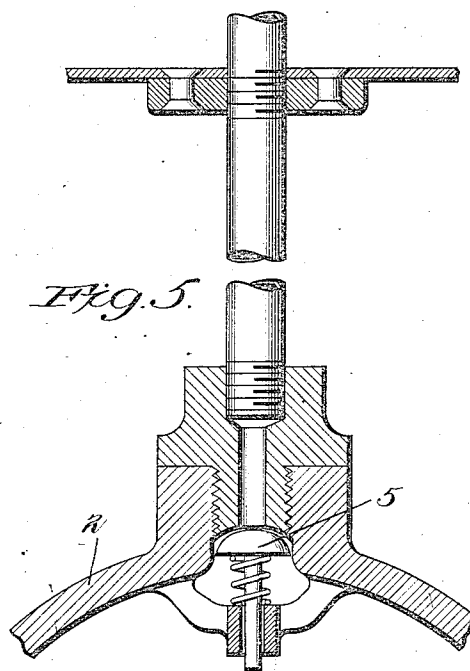
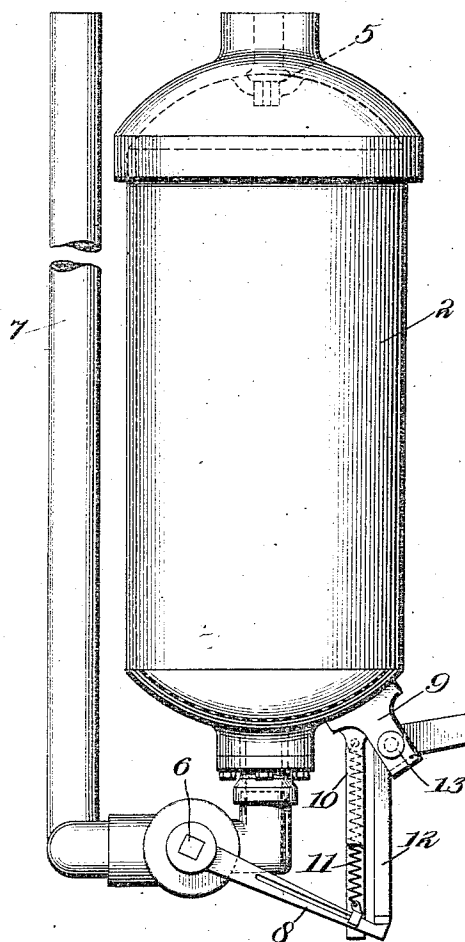
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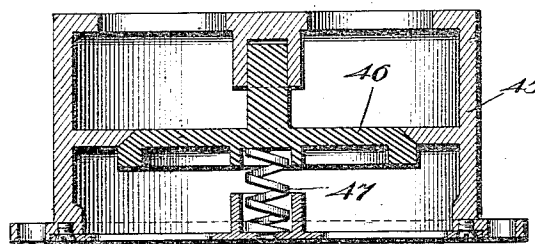
2 SHEETS-SHEET 2.

*Fig. 4.*



*Fig. 5.*

*Fig. 6.*



Witnesses

*Geo. A. Byrne.*  
*Byron B. Collings.*

Inventors

*K. Whiting & J. B. Howell*  
*by Wickham Fish &*  
*Wickham*  
Attorneys

# UNITED STATES PATENT OFFICE.

KENNETH WHITING AND JAMES B. HOWELL, OF THE UNITED STATES NAVY.

MECHANICAL AIR DEVICE FOR EXPELLING WATER OR OTHER LIQUIDS FROM THE HEADS OF TORPEDOES TO AID IN THE RECOVERY THEREOF AFTER FIRING.

1,023,907.

Specification of Letters Patent.

Patented Apr. 23, 1912.

Application filed July 22, 1910, Serial No. 572,270. Renewed October 10, 1911. Serial No. 653,864.

*To all whom it may concern:*

Be it known that we, KENNETH WHITING and JAMES B. HOWELL, both ensigns, United States Navy, and citizens of the United States, have invented certain new and useful Improvements in Mechanical Air Devices for Expelling Water or other Liquids from the Heads of Torpedoes to Aid in the Recovery Thereof After Firing, of which the following is a specification.

Our invention consists in a mechanical air device to be fitted within the head of a torpedo, and so placed that it will automatically expel the water or other liquid therefrom, when the torpedo sinks below a certain depth through faulty action of its mechanical parts. The water or other liquid thus expelled will give to the torpedo a positive buoyancy, and cause it to rise to the surface of the water where it can be recovered with ease.

The principles governing the action of this device are as follows:—In certain constructions of torpedoes, for every foot below the surface of the water there is a resultant pressure of .49 pounds. Therefore, if a movable piston, placed in a cylinder opened at one end and closed at the other be lowered into the water the piston will be forced into the cylinder, the pressure in pounds per square inch being equal to  $\frac{1}{2}$  of the depth in feet that the cylinder is below the surface of the water. By attaching a rod to this piston the motion is transmitted to objects outside the cylinder, and by placing a spring behind the piston to resist the pressure of the water this action is restricted to any depth, since the piston would not be moved until the pressure of water exceeds that of the spring. The motion of the piston transmitted by the piston rod may be utilized to open a valve connected to a flask containing air under pressure, or in any other suitable manner. By placing such piston and air flask within a receptacle, fitted with a discharge valve, and filled with water, we produce an automatic arrangement which will blow the water out of the receptacle when the air pressure is admitted. If the surface of the piston is exposed to the pressure of the water, and the receptacle described is lowered down into the water, the piston will be forced in when it reaches a depth sufficient to give a pressure

which overcomes the resistance of the spring behind the piston and the air pressure will be admitted from the air flask and the water will be discharged in much the same manner as a boiler discharges steam from a safety valve, then if the receptacle displaces more water than its weight it will have a positive buoyancy and rise to the surface. We accordingly fit a torpedo head with such an arrangement of hydrostatic piston, discharge valve and air flask. The piston is exposed to the pressure of water and protected by a rubber diaphragm, a spring behind the piston is adjustable for any pressure corresponding to any desired depth. If the torpedo sinks below this depth the piston moves inward, the air valve is opened by mechanical means and the water expelled from the head. The torpedo will now rise to the surface, although it had when fully charged for firing a negative buoyancy of about 50 pounds. But the head contained 125 pounds of water, and when this water is expelled the torpedo has a positive buoyancy of 75 pounds.

Referring to the accompanying drawings forming a part of this specification in which like numerals designate like parts in all the views:—Figure 1 is a sectional view showing a water expelling device placed in the head of the torpedo; Fig. 2 is a sectional view of our locking device; Fig. 3 is a sectional view of our pressure regulating device; Fig. 4 is a detail view of the air flask and attached parts; Fig. 5 is a detail view of the valve of said flask; and Fig. 6 is a sectional view of the discharge valve and casing.

1 represents the head of a torpedo in which is located the air flask 2, secured to the bulk head 3 by the clamps 4. 5 represents any suitable charging valve for the flask 2, and 6 represents any suitable valve for controlling the discharge of air from the flask 2 through the pipe 7 into the head 1.

To the valve 6 is secured a trigger lever 8, and to the flask is secured a lug 9 provided with a trigger guide 10 having the spring 11 pressing against said trigger.

To the lug 9 is pivoted at 13 a tripping lever or sear 12, one end of which engages the trigger lever 12, and the other end of which engages the end of the piston rod 14, controlled by the piston 15, working in the

cylinder 16, provided with the enlargement 17 carrying the pressure regulating spring 18, capable of adjustment by means of the stuffing box 19. The piston rod 14 is provided with the abutments 20 and 21 as shown, the latter being loose on the rod, so that the spring 18 controls the piston; and the piston is normally flush with the outer skin of the torpedo head 1 as will be readily understood, and may if desired be covered by a rubber diaphragm 22.

25 is our locking device consisting of a cylinder supported by the standard 26 attached to the clamps 4, in which fits the cylinder 27, having the piston 28, spring 29, and piston rod 30 engaging the sear holding piston rod 14. The piston rod 30 is controlled by a bell crank 31 carried by the cylinder 27; to which is pivoted at one end the bell crank 32 by means of the link 33. The other end of the bell crank 32 is pivoted at 35 to the stud 34 carried by the standard 26, and the middle portion of said bell crank is pivoted at 36 to the link 37, which at 38 is pivoted to the rod 39 carrying the water tripper 40.

45 represents a discharge valve casing containing a valve 46 controlled by a spring 47.

The operation of our invention is as follows:—The spring 18 is adjusted to be operated at any desired pressure by screwing down the stuffing box 19, the valve trigger 8 is engaged with the toe of the sear or tripper 12, while the other end of the said tripper is engaged with the piston rod 14. This engagement causes the spring 11 to be distended, and therefore to have a tendency to pull the trigger lever 8 upwardly in order to open the valve. The parts now being in the position shown in Fig. 1, the head 1 is attached to the torpedo and placed in the tube for firing. When the torpedo is fired, the tripper 40 is forced inward, and the bell crank lever 31 is so moved as to permit the spring 29 to force the rod 30 out of engagement with the piston rod 14. The sear 12 however, still remains in engagement with the piston rod 14 and therefore still locks the trigger lever 8 which controls the valve 6. Now whenever the torpedo sinks below a depth predetermined by the pressure at which the regulating spring was set, the piston 15 will be forced inwardly and thereby disengage the sear 12 from the piston rod 14. This action will release the trigger lever 8 and permit the spring 11 to move the same inwardly and thereby open the valve 6. The air in the flask 2 now rushes through the pipe 7 and may place an initial pressure as high as 300 pounds to the square inch inside the head 1 of the torpedo. This pressure is previously determined, and is selected of a sufficient amount to cause the water in the torpedo head 1 to force open the discharge valve 46, whereupon the said

water is discharged from the torpedo head. The water from the head being now discharged, the torpedo will rise to the surface and may be recovered.

It will thus be seen that our device provides means for recovering torpedoes whenever through any failure to function properly, they sink to a predetermined depth.

We are aware that prior to our invention hydrostatic pistons have been used for controlling rudders of torpedoes, for registering depths of water, and for other purposes. We are also aware that air under pressure stored in flasks is used for expelling water from tanks of submarine boats, and that relief or discharge valves have been used on tanks or boilers. We therefore do not claim these mechanical movements broadly. Our invention on the other hand resides in the combinations of parts above disclosed for recovering torpedoes.

It is obvious that those skilled in the art may vary the arrangement of parts and details of construction without departing from the spirit of our invention, and therefore we do not wish to be limited to such features except as may be required by the claims.

What we claim is:—

1. In an automobile torpedo provided with a head, the combination of an air flask located in said head and provided with a passage discharging in said head; a valve controlling said passage; a trigger lever controlling said valve; means controlling said trigger lever to retain said valve closed; additional means adapted to be actuated by pressure due to submergence for releasing said first mentioned means; and a discharge valve in said head adapted to permit water to escape therefrom, substantially as described.

2. In an automobile torpedo provided with a head, the combination of an air flask located in said head and provided with a passage discharging in said head; a valve controlling said passage; a trigger lever controlling said valve; a sear coacting with said trigger lever to retain said valve closed; means adapted to be actuated by the pressure due to submergence for controlling said sear, comprising a piston, a piston rod, a spring for actuating said rod and means for adjusting said spring; and a discharge valve in said head whereby the whole is adapted to cause the sudden and complete discharge of water from said head, substantially as described.

3. In a torpedo provided with a head, the combination of an air flask provided with a pipe discharging in said head; a valve controlling said pipe; a trigger lever controlling said valve; means comprising a hydrostatic pressure actuated device controlling said trigger lever; means comprising a water tripping device controlling said pres-

sure device; and a discharge valve adapted to permit water under pressure to escape from said head, substantially as described.

4. In a torpedo provided with a head the combination of an air flask provided with a pipe discharging in said head; a valve controlling said pipe; a trigger lever controlling said valve; a spring for turning said lever and valve; a sear preventing said lever from turning; means comprising a hydrostatic pressure actuated device controlling said sear; means comprising a water tripping device controlling said pressure device; and a discharge valve adapted to permit water under pressure to escape from said head, substantially as described.

5. In a torpedo provided with a head, the combination of an air flask provided with a pipe discharging in said head; a valve controlling said pipe; a trigger lever controlling said valve; a spring for turning said lever and valve; a sear preventing said lever from turning; a hydrostatic pressure controlled device comprising a piston, piston rod, and spring controlling said sear; a locking device controlling said piston rod; a water tripping device comprising a bell crank lever for controlling said locking de-

vice; and a discharge valve in said head adapted to permit water under pressure to escape therefrom, substantially as described.

6. In a torpedo provided with a head, the combination of an air flask located in said head; a pipe discharging into said head and connected to said air flask; a valve controlling said pipe; a trigger lever controlling said valve; a trigger guide for said lever; a spring tending to turn said lever; a sear lever controlling said trigger lever and spring; a piston rod controlling said sear lever; a locking device comprising a piston and spring controlling said piston rod; a bell crank lever controlling said locking device; a reciprocating rod controlling said bell crank; a water tripper controlling said rod; a discharge valve located in said head; and a spring controlling said valve, substantially as described.

In testimony whereof we have signed our names to the specification in the presence of two subscribing witnesses.

K. WHITING.  
J. B. HOWELL.

Witnesses:

H. H. MICHAEL,  
A. W. SEARS.