O. I. STRAUB AND M. WILDRICK.

BOMB OR SUBMARINE MINE.

APPLICATION FILED SEPT. 19, 1918.

1,310,586.

Patented July 22, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

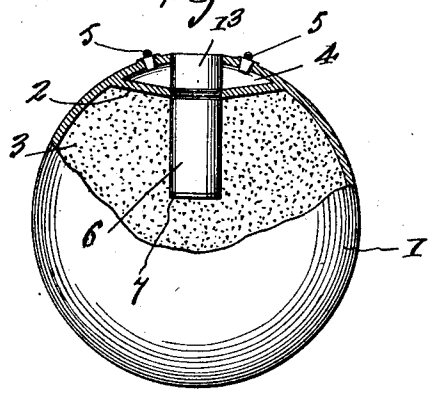


Fig. 5.

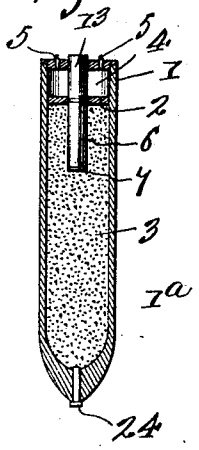


Fig. 2.

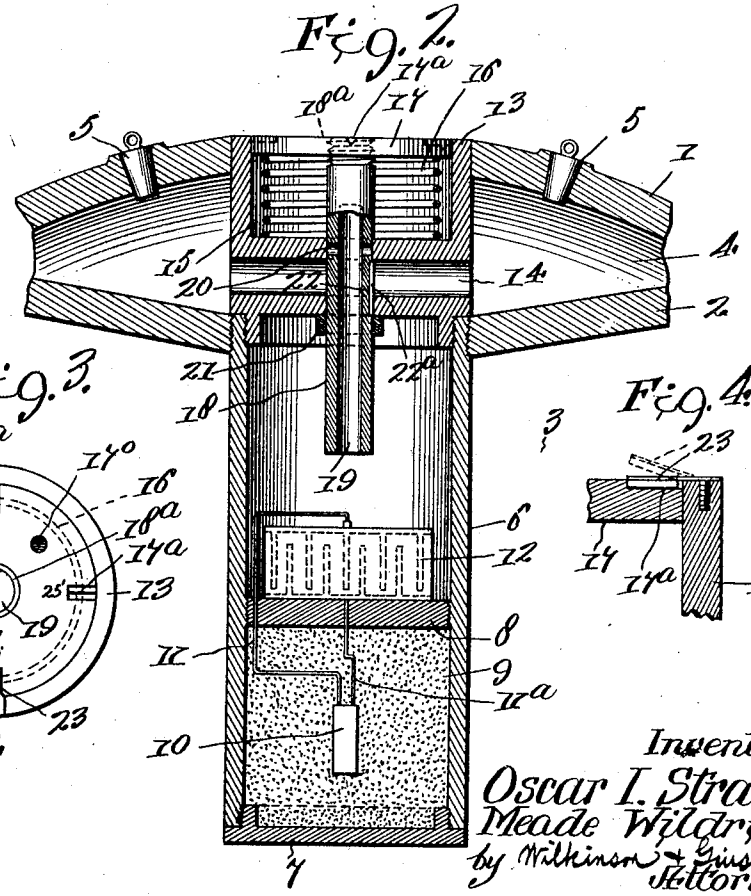


Fig. 3.

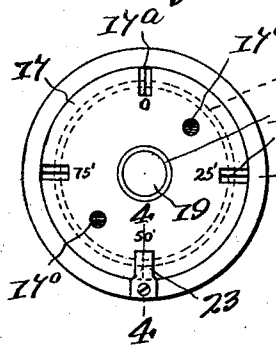


Fig. 4.

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2 SHEETS—SHEET 2.

Fig. 6.

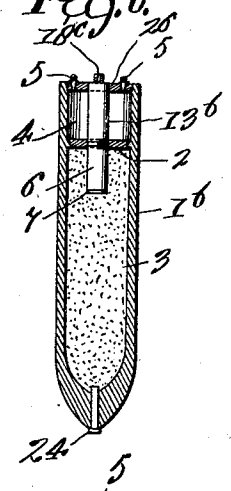


Fig. 9.

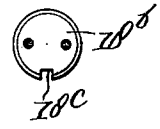


Fig. 8.

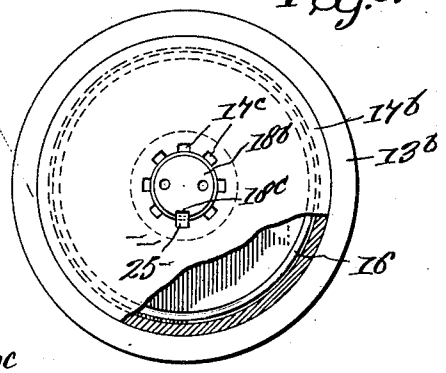


Fig. 7.

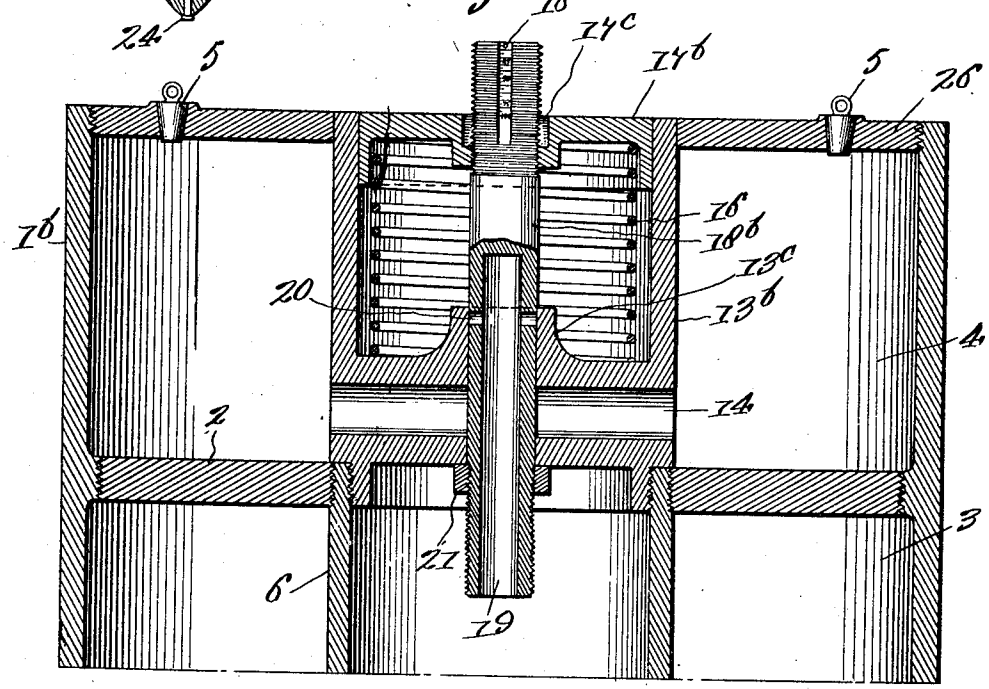
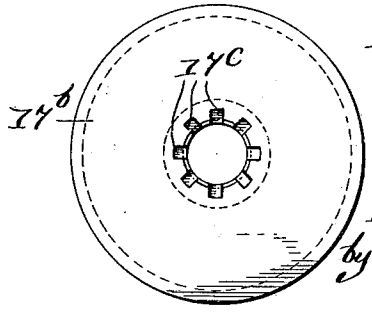


Fig. 11.



Fig. 10.



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UNITED STATES PATENT OFFICE.

OSCAR I. STRAUB AND MEADE WILDRICK, OF THE UNITED STATES ARMY.

BOMB OR SUBMARINE MINE.

1,310,586. Specification of Letters Patent. Patented July 22, 1919.

Application filed September 19, 1918. Serial No. 254,804.

To all whom it may concern:

Be it known that we, OSCAR I. STRAUB and MEADE WILDRICK, of the United States Army, citizens of the United States, stationed at Fort Adams and Fort Monroe, in the counties of Newport and Elizabeth city and States of Rhode Island and Virginia, respectively, have invented certain new and useful Improvements in Bombs or Submarine Mines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our present invention relates to improvements in bombs for submarine mines which are intended to be dropped from the stern of a vessel, or from an aircraft, and which is exploded when the bomb reaches a predetermined depth.

The bomb is intended especially for use against submarines, and is intended to carry a large quantity of high explosives; but it may be used against ships or other vessels, as also against land fortifications.

The invention herein described covers in part subject-matter disclosed in our application, Serial No. 200,533, filed November 6, 1917, and entitled Improvements in bombs or submarine mines.

Our invention will be more fully understood after reference to the accompanying drawings, in which similar parts are indicated by similar reference symbols throughout the several views, and in which:—

Figure 1 represents a complete bomb parts being broken away;

Fig. 2 shows a section through the firing arrangement, the parts being shown on a much larger scale than in Fig. 1;

Fig. 3 is a plan view of the piston, and illustrates the method of adjusting the device to the predetermined depth.

Fig. 4 shows a section along the line 4—4 of Fig. 3, and illustrates the method of locking the piston at the desired position.

Fig. 5 shows an elongated projectile embodying the invention.

Figs. 6 to 11 illustrate modifications in which different means for adjusting the device to operate at a predetermined depth are employed. In these figures:—

Fig. 6 is a central vertical section through the bomb constructed according to our invention, the firing attachment being shown in elevation.

Fig. 7 shows a central vertical section through the upper part of the device shown in Fig. 6, parts being shown on a much larger scale.

Fig. 8 is a plan view of the piston, stem and cap piece, parts being broken away.

Fig. 9 is a detail showing the upper end of the adjustable stem.

Fig. 10 is a detail showing the outer face of the piston; and

Fig. 11 is a detail showing the lock to prevent the stem from turning in the piston when set.

Referring first to the construction shown in Figs. 1 to 4, 1 represents a shell of spherical or other desired form, and provided with a partition 2 separating the interior of the shell into two chambers. The chamber 3 is filled with the high explosive, and the chamber 4 is provided with one or more openings closed by the safety plugs or stoppers 5.

A tube 6 projects into the chamber 3, and the bottom of this tube is closed with a screw cap 7, spaced above which is a partition 8 forming a chamber 9 in the tube, which chamber contains the detonating charge and the electric primer 10. This primer has its terminals 11 and 11ª connected to the opposite plates of an electric battery 12 which is normally dry and inert, but which is energized when a sufficient amount of water has been supplied to it.

Screwed into the upper end of the tube 6 is the cap piece 13 which is transversely perforated, as at 14, and is provided with a cylindrical chamber 15, in which chamber is mounted the spring 16 normally held under compression by the piston 17, screwed on the screw threads 18ª of the stem 18, which stem is provided with a set collar 21 normally held by the spring 16 in engagement with the under side of the cap piece 13. This stem is hollow, as at 19, and is transversely perforated, as at 20, the perforated portion being normally closed by the abutting portion of the cap piece 13, as shown in Fig. 2; but when this piston is pressed down, as by the pressure of the water as the bomb descends in the water, the passage 20 will register with the passage 14. If the stoppers 5 be

removed before launching the bomb; when the bomb descends through the water and reaches the predetermined depth, the piston and stem will be forced inward by the pressure of the water, and water will flow from the chamber 4 through the passages 14, 20 and 19 and will energize the electric battery 12, igniting the primer 10 and firing the bomb.

Thus it will be seen that the electric primer is automatically fired only when a sufficient quantity of water has flowed in to energize the battery.

The depth at which the influx of water would begin would depend relatively upon the area of the piston 17, and the resistance to compression of the spring 16.

In order to provide means for adjusting the bomb, so that it will function at any predetermined depth, we provide a suitable adjusting arrangement such, for instance, as shown in Figs. 2, 3 and 4, in which the piston 17 is screwed on the screw-threads 18^a of the stem and holds the spring 16 under compression. By making these screw-threads 18^a quite coarse, a single turn of the piston on the stem will materially alter the compression of the spring 16; but obviously more than one turn may be taken if it is desired to secure further compression of the spring.

For the purpose of turning the piston, we provide spanner sockets 17°, and the upper face of the piston may be graduated, as indicated. This face of the piston is shown as provided with a series of V-shaped notches 17^a, adapted to engage the spring catch 23 carried by the cap piece 13. This spring catch 23 will yield when sufficient pressure is applied to turn the piston, and this catch will snap into one of the V-shaped grooves and hold the piston in place when it has been turned the desired distance.

To prevent the stem from turning with the piston, we provide a key-way 22 to engage a spline 22^a.

In the structure shown in Fig. 5, the firing attachment is carried in an elongated projectile 1^a, whose nose is shown as provided with a percussion fuse 24, preferably of the delayed action type, which fuse is exploded on striking any solid object, such as the deck of a ship, land fortifications, or the like.

In the modifications shown in Figs. 6 to 11, the elongated projectile 1^b is separated by the partition plate 2 into a chamber 3 for the explosive, and a water chamber 4, which is closed by the screw cap 26, which cap is provided with openings normally closed by the plugs or stoppers 5.

The piston 17^b is supported on the spring 16, but preferably without holding the spring under material compression, and the stem 18^b is provided with fine screw-threads engaging the piston. The said piston is slotted, as at 18^c, and this slot is graduated to correspond to the depth at which the bomb is to be exploded.

The cap piece 13^b is provided with transverse openings 14, and has a cylindrical socket 13^c to mask the perforations 20 in the hollow stem.

The collar 21 is screwed on the lower end of the stem 19 so as to prevent the parts from dropping out.

Pressure of the water acting on the piston will compress the spring 16 and when the predetermined depth has been reached, the perforations 20 will register with the passage 14, and if the water is allowed to flow into the chamber 4 some of this water will flow through the passage 14 and the passages 20 in the hollow stem 18^b, and will energize the electric battery as with the former device already described in relation to Fig. 2.

In order to positively lock the stem relative to the piston, we provide a series of notches 17^c, one of which will tend to register with the slots 18^c in the stem, and if the key 25 is inserted, as shown in Fig. 8, the piston and stem will be relatively locked against turning on each other.

We have shown in Fig. 7 a scale running from zero to one hundred, so that if the stem be set at zero the piston will be pressed down and the bomb will explode shortly after reaching the surface of the water. By screwing up the stem to say 100, the spring 16 will have to be materially compressed, and the bomb will not operate until a depth of say 100 feet has been reached.

It will be obvious that the stem may be set for any intermediate depth.

It will be seen that in all of the modifications if the safety stoppers 5 are kept tightly closed no water can flow in, and the apparatus is absolutely safe.

It will be obvious that various changes might be made in the herein described apparatus, and in the construction, combination and arrangement of parts, which could be used without departing from the spirit of our invention.

Having thus described our invention what we claim and desire to secure by Letters Patent of the United States is:—

1. The combination with a bomb containing high explosive, of a tube carrying a detonating charge mounted in said bomb, a normally inactive electric battery adapted to be rendered active by the addition of water and an electric circuit containing an electric primer for igniting said detonating charge mounted in said tube, and a pressure controlled piston, with means controlled thereby for admitting water to said battery when the bomb reaches a prede-

termined depth thereby completing said electric circuit and generating a current, substantially as described.

2. The combination with a bomb containing high explosive, of a tube carrying a detonating charge mounted in said bomb, a normally inactive electric battery adapted to be rendered active by the addition of water and an electric circuit containing an electric primer for igniting said detonating charge, mounted in said tube, and means for admitting water to said battery when the bomb reaches a predetermined depth thereby completing said electric circuit and generating a current, said means for admitting water comprising a spring impressed piston provided with a hollow piston rod, with a water passage therethrough normally closed when said piston is in the forward position, but opened when the piston is pressed backward against the action of said spring by the pressure of the water on said piston when the bomb is immersed to the predetermined depth, substantially as described.

3. The combination with a bomb containing high explosive and provided with a water chamber and means for normally excluding water therefrom, of a tube carrying a detonating charge mounted in said bomb, and provided with a water inlet in the side thereof opening outwardly into said water chamber, a normally inactive electric battery adapted to be rendered active by the addition of water and an electric circuit containing an electric primer for igniting said detonating charge, mounted in said tube, and a spring impressed piston provided with a hollow piston rod, with a water passage therethrough normally closed when said piston is in the forward position, but connected to said water inlet when said piston is pressed inward under the pressure of the water, when the bomb is immersed to the predetermined depth, substantially as described.

4. The combination with a bomb containing high explosive, of a tube carrying a detonating charge mounted in said bomb, a normally inactive electric battery adapted to be rendered active by the addition of water and an electric circuit containing an electric primer for igniting said detonating charge mounted in said tube, a piston, and a spring normally pressing said piston outward, and means controlled by said piston for admitting water to said battery when the bomb reaches a predetermined depth thereby completing said electric circuit and generating a current, substantially as described.

5. The combination with a bomb containing high explosive, of a tube carrying a detonating charge mounted in said bomb, a normally inactive electric battery adapted to be rendered active by the addition of water and an electric circuit containing an electric primer for igniting said detonating charge mounted in said tube, a piston, and a spring normally pressing said piston outward, means for varying the compression of said spring, and means controlled by said piston for admitting water to said battery when the bomb reaches a predetermined depth thereby completing said electric circuit and generating a current, substantially as described.

6. The combination with a bomb containing high explosive, of a tube carrying a detonating charge mounted in said bomb, a normally inactive electric battery adapted to be rendered active by the addition of water and an electric circuit containing an electric primer for igniting said detonating charge, mounted in said tube, and means for admitting water to said battery when the bomb reaches a predetermined depth thereby completing said electric circuit and generating a current, said means for admitting water comprising a spring impressed piston provided with a hollow piston rod, with a water passage therethrough normally closed when said piston is in the forward position, but opened when the piston is pressed backward against the action of said spring by the pressure of the water on said piston when the bomb is immersed to the predetermined depth, with means for varying the compression of said spring, substantially as described.

7. The combination with a bomb containing high explosive and provided with a water chamber and means for normally excluding water therefrom, of a tube carrying a detonating charge mounted in said bomb, and provided with a water inlet in the side thereof opening outwardly into said water chamber, a normally inactive electric battery adapted to be rendered active by the addition of water and an electric circuit containing an electric primer for igniting said detonating charge, mounted in said tube, and a spring impressed piston provided with a hollow piston rod, with a water passage therethrough normally closed when said piston is in the forward position, but connected to said water inlet when said piston is pressed inward under the pressure of the water, when the bomb is immersed to the predetermined depth, with means for varying the compression of said spring, substantially as described.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."