O. I. STRAUB & M. WILDRICK.

AERIAL TORPEDO OR MINE.

APPLICATION FILED APR. 11, 1917.

1,297,273.

Patented Mar. 11, 1919.

3 SHEETS—SHEET 1.

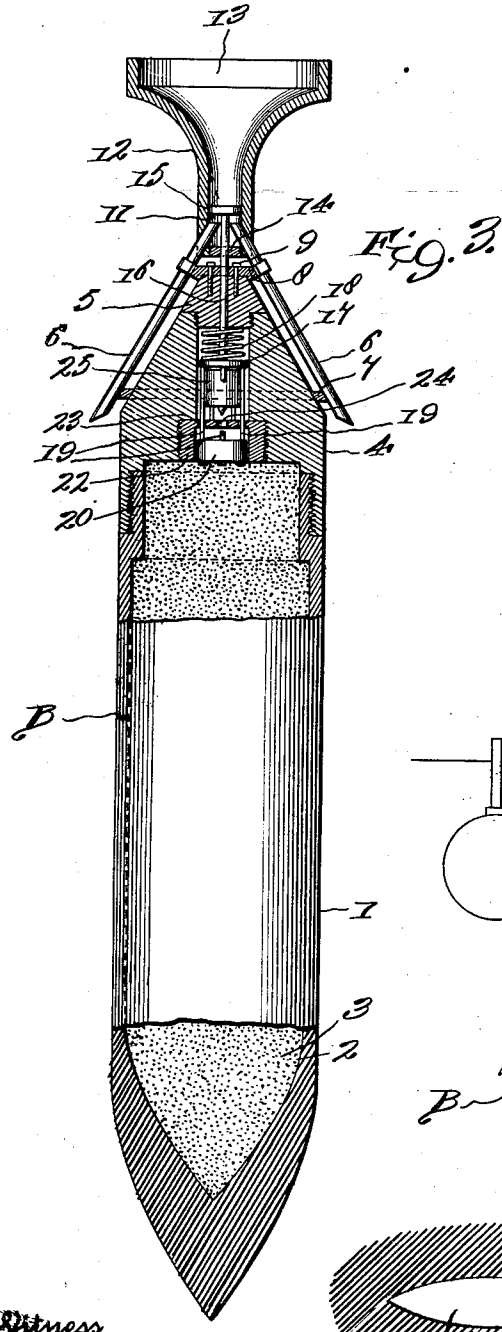


Fig. 3.

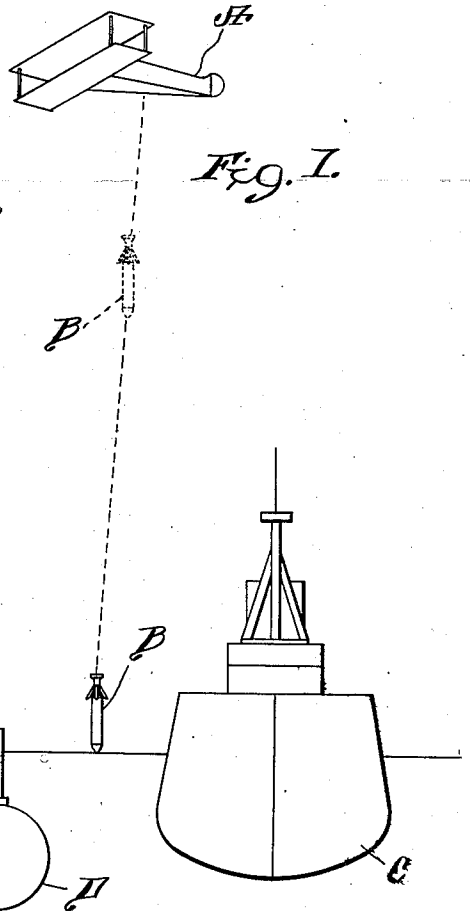


Fig. 1.

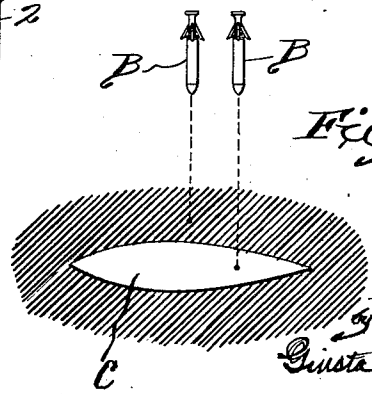


Fig. 2.

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Fig. 4.

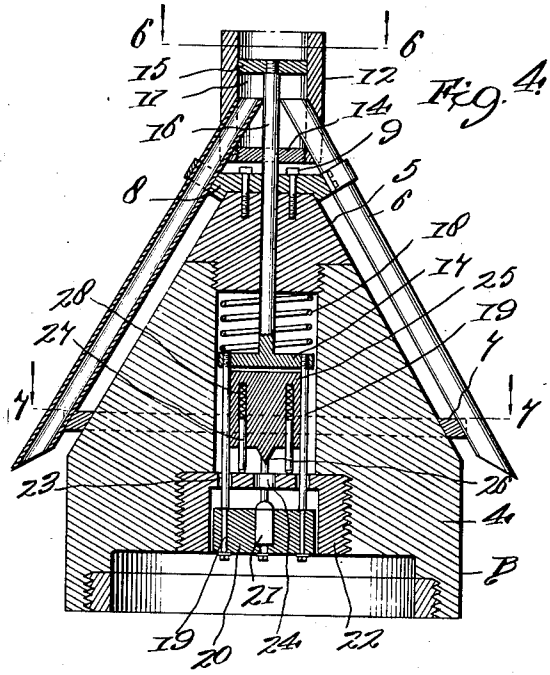


Fig. 6.

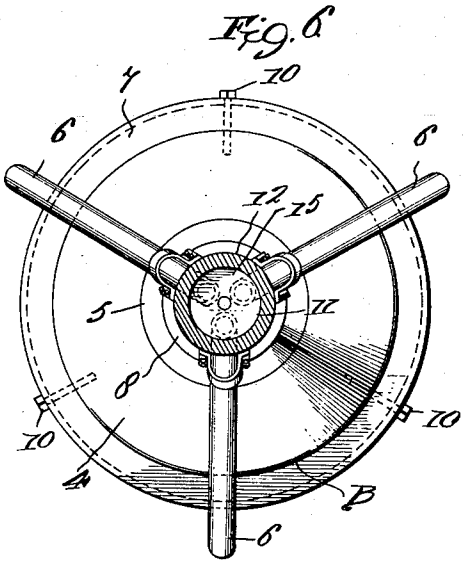


Fig. 5.

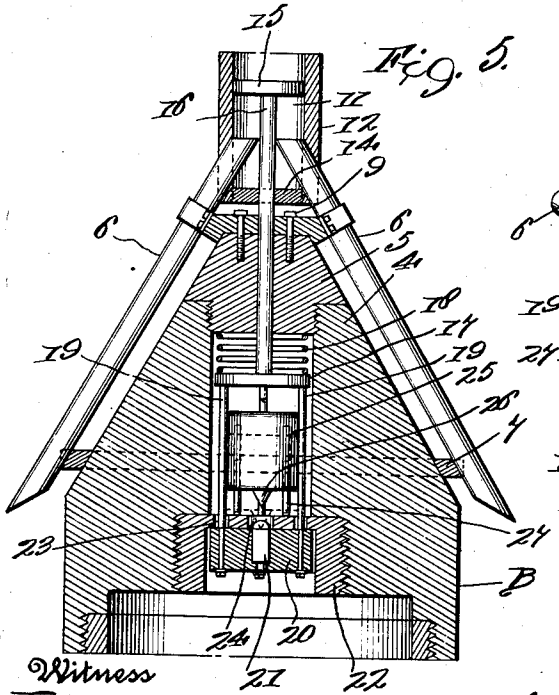
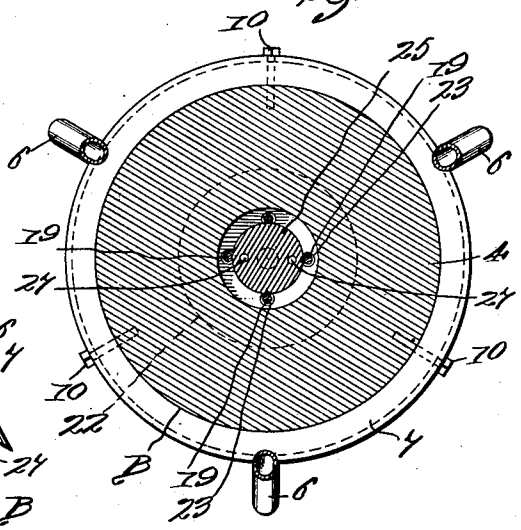


Fig. 7.



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3 SHEETS—SHEET 3.

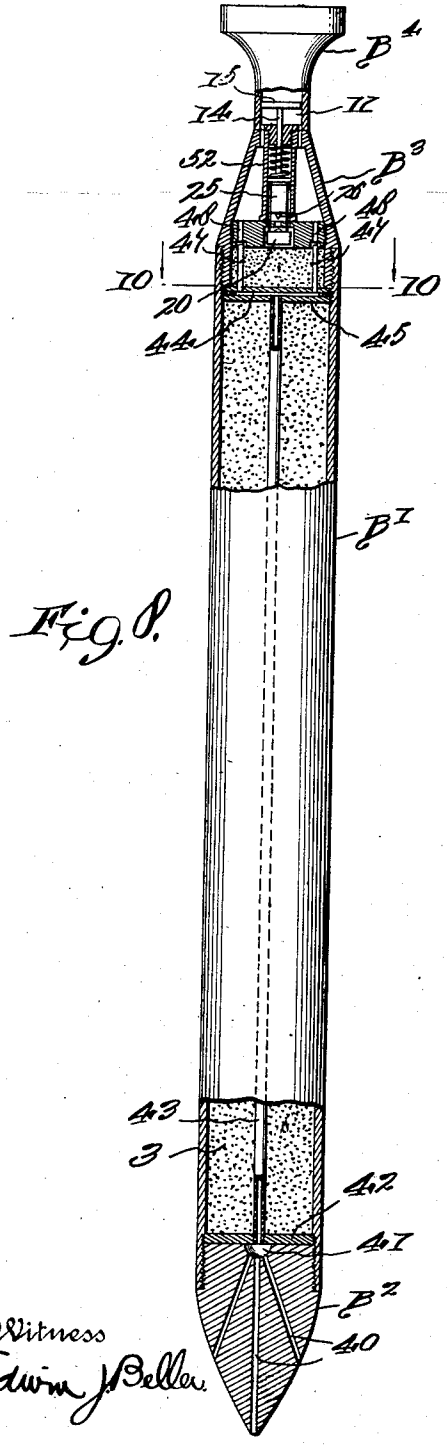


Fig. 8.

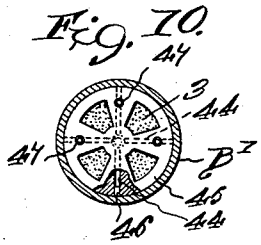


Fig. 10.

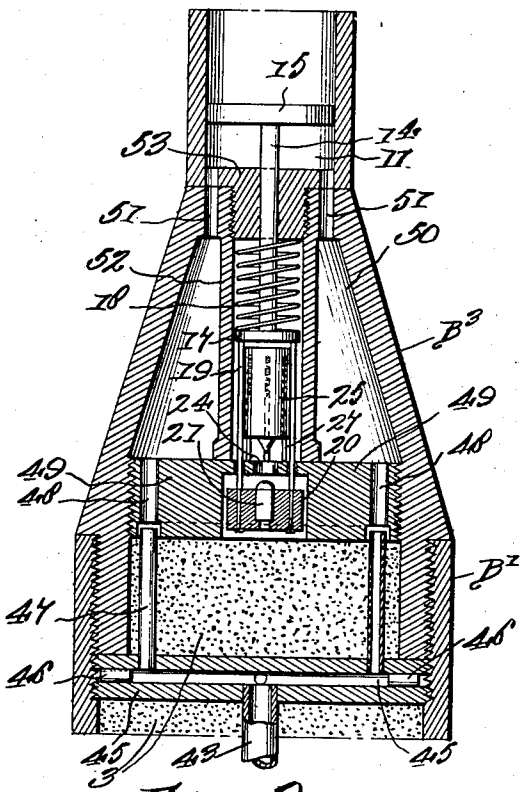


Fig. 9.

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UNITED STATES PATENT OFFICE.

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

AERIAL TORPEDO OR MINE.

1,297,273. Specification of Letters Patent. Patented Mar. 11, 1919.

Application filed April 11, 1917. Serial No. 161,265.

To all whom it may concern:

Be it known that we, OSCAR I. STRAUB and MEADE WILDRICK, both of the United States Army, citizens of the United States, stationed at Fort Howard and Fort Monroe, respectively, in the counties of Baltimore and Elizabeth City, and States of Maryland and Virginia, have invented certain new and useful Improvements in Aerial Torpedoes or 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 invention relates to improvements in projectiles adapted to be dropped from aircraft, whether aeroplanes or dirigibles, and it consists in providing an aerial torpedo or mine, which is capable of carrying a comparatively large charge of high explosive, and which may be safely transported either by rail, boat or aircraft, and in which safety in handling, and more especially safety in launching, is secured.

According to our invention the projectile is intended to be exploded by impact when it strikes the deck of a ship, or any solid target aimed at, but is also exploded under the water. In either case a delayed action fuse is used, which, when the primer is fired on striking the water, will permit the projectile to descend in the water to a predetermined depth, thus securing the desired efficiency of the projectile when it operates as a submarine mine or torpedo.

It is well known that the danger zone of a torpedo or mine of the character described varies, within certain limits, with the depth of the explosion below the surface of the water, and the volume and nature of the explosive used; and that for heavy plated ships, such as battle-ships, this danger zone may be extended twenty yards more or less from the skin of the ship, while for lighter craft, such as torpedo boat destroyers, or submarines, the danger zone under similar conditions may extend as much as fifty yards more or less from the skin of the ship. Therefore, having a sufficient charge of high explosive, and detonating same at a proper distance below the surface of the water, any great accuracy in dropping the torpedo may be dispensed with and the torpedo will be efficacious if it strikes either the target aimed at, or within a reasonable distance of same.

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 shows diagrammatically the torpedo being dropped from an aeroplane, falling in the water between a battleship and a submarine.

Fig. 2 is a diagram showing a plan view of the deck of a vessel and the surrounding danger zone.

Fig. 3 shows on a larger scale the complete aerial torpedo, the nose and tail thereof being shown in section, and the firing arrangement being shown in elevation.

Fig. 4 shows a central longitudinal section on a larger scale through a portion of the tail of the torpedo, the firing attachment being shown in the safety position.

Fig. 5 is a similar view to Fig. 4, but shows the firing mechanism in the firing position.

Fig. 6 shows a section along the line 6—6 of Fig. 4, and looking down; and

Fig. 7 shows a section along the line 7—7 of Fig. 4, and looking down.

Fig. 8 shows a modification in which the air for arming the primer is taken in through the nose of the projectile.

Fig. 9 is an enlarged sectional view of the rear portion of the projectile shown in Fig. 8; and

Fig. 10 shows a section along the line 10—10 of Fig. 8 and looking in the direction of the arrows.

A represents an aeroplane; B, the aerial torpedo; C, a battle-ship; and D, a submarine, all shown diagrammatically in Figs. 1 and 2.

Referring to the details of construction of the aerial torpedo B, as shown in Figs. 3 to 7, 1 represents the main or body portion of the projectile, having a large chamber 2, filled with high explosive 3. Screwed to the rear of this body portion 1 is the base piece 4, closed by the screw plug 5.

Attached to this screw plug is the tail piece, which comprises a frame composed of a series of pipes 6, open at both ends and preferably secured together by the rings 7 and 8, which are attached to the projectile

by means of the bolts 9 and 10. The rear ends of these pipes 6 open into a cylindrical chamber 11 in the hollow tail 12, which is open at the top as at 13 and closed at the bottom by the plug 14.

Mounted in this chamber is a piston 15, fast to the piston rod 16, the opposite end of which rod carries a head 17 pressed downward by the spring 18. To this head 17, the rods 19 are connected, which rods carry at their lower ends the primer plug 20, carrying the primer 21. This primer plug 20 is normally held in the hollow bushing 22, screwed into the base piece 4. This bushing is provided with perforations 23 for the rods 19, and with a perforation 24 to permit the entrance thereinto of the nose of the primer 21.

The rods 19 serve as guides for the plunger 25, having a firing point 26, which plunger is normally held in the raised position, as shown in Fig. 4, by means of the pins 27, normally pressed downward by the springs 28.

The normal action of the spring 18 is to press the head 17 down and hold the primer 21 in a safety position below the opening 24, while the action of the springs 28 is to hold the plunger 25 in the raised position, all as shown in Fig. 4.

It will be seen that when the parts are in the position shown in Fig. 4, no matter how the projectile may be dropped, either nose down, or tail down, or side-wise, or roughly handled, it will be impossible to have the plunger strike the primer.

When the torpedo is launched, however, as it gathers speed through the air, air under pressure will be forced into the chamber 11, forcing upward the piston 15, and drawing the primer upward into the perforation 24, until the parts assume the position shown in Fig. 5. When the parts are in this position, if the velocity of the projectile is suddenly arrested, as by striking a solid object or even the surface of the water, the plunger will fly downward under its own inertia, compressing the springs 28, causing the firing point 26 to strike the nose of the primer 21. This primer should preferably have a delayed action attachment, such as is well known in the art, whereby there is an appreciable interval between the striking of the primer and the exploding of the projectile. Such an interval should be made long enough for the projectile to travel to a predetermined depth below the surface of the water. Such an interval will also be desirable when the projectile strikes the deck of a ship to permit the projectile to pass down through one or more decks of the ship and into the vitals thereof before exploding.

Thus it will be seen that we provide an aerial torpedo or mine, which is capable of carrying a heavy charge of high explosive, and which is absolutely safe until the projectile has attained a sufficiently high velocity to cause the air pressure generated by such velocity to arm the mechanism.

We have shown the tail piece in the form of a frame which may be carried separately and attached to the projectile when desired; but it will be obvious that the mode of applying the tail piece to the projectile may be varied in a great many ways, and that the means for supplying air pressure to the primer-controlling piston may be greatly varied without departing from the spirit of our invention.

Thus in the modification shown in Figs. 8, 9, and 10, the air is taken in through the nose of the projectile, as will now be described.

Referring to these figures, B' represents an ordinary metal pipe or tube, screw threaded at both ends, having the heavy head B^2 screwed into its forward end and the tail pieces B^3 and B^4 secured to its rear end. The head B^2 is provided with one or more air passages 40, opening downward and connecting with the air chamber 41, beneath the disk 42, above which disk 42 is the charge 3 of suitable high explosive.

Passing through this head B^2, and through the charge of explosive, is the tube 43, which is connected with the air passages 44 in the spider 45 mounted beneath the tail piece B^3. These passages may be conveniently made by boring holes through the spokes of the spider and closing these holes with plugs 46.

Connected to these passages 45 are the pipes 47, which open into passages 48 in the screw plug 49, which closes the lower end of the chamber 50. This chamber 50 is connected with passages 51 to the cylindrical chamber 11, in which the piston 15 is mounted. This piston 15 is provided with a piston rod 14, which projects down through the screw plug 53 screwed in the sleeve 52, which may be integral with or secured to the tail piece B^3. Mounted inside of this sleeve 52 are the head 17, the spring 18, and the rods 19, already fully described with reference to Figs. 1 to 7.

The primer plug 20, the primer 21, plunger 25, pins 27 and springs 28 are constructed to operate in the same manner already described with reference to Figs. 1 to 7.

The operation of the modified form of device shown in Figs. 8 to 10 is precisely the same as that shown in Figs. 1 to 7, except that the air is taken in at the nose of the projectile and is carried through air passages back to the cylindrical chamber 11, where it pushes back the piston 15 and moves the primer plug 20 up into the armed position, shown in Fig. 5. At this time,

when the flight of the projectile is suddenly arrested, the inertia of the plunger will cause it to strike the primer with sufficient force to ignite the primer and to explode the explosive charge 3. In a similar manner the air can be taken in anywhere between the nose and the tail.

By the construction shown in Figs. 8 to 10 not only is the air taken in through the nose of the projectile where the air pressure is greatest, but also any abnormal projections from the surface of the projectile are avoided; and moreover, the projectile may be made of very cheap material, such as ordinary iron or steel pipe, into which the head and tail piece are screwed.

What we claim broadly as new is means for automatically controlling the movement of the primer from the safety position to the firing position by means of the air pressure created by the projectile in its flight.

It will be obvious that various modifications might be made in the herein described construction, and in the 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. In a projectile adapted to be dropped from aircraft, the combination with a shell containing high explosive, of firing mechanism comprising a plunger and a percussion primer adapted to explode said high explosive, means for normally holding said firing mechanism in the safety position, and means automatically controlled by the air pressure induced by the flight of the projectile through the air for arming said firing mechanism, said last mentioned means comprising a tail piece provided with an air pressure chamber therein, means for directing compressed air into said chamber as the projectile travels through the air, a piston mounted in said chamber, and means controlled by said piston for moving said primer toward said plunger.

2. In a projectile adapted to be dropped from aircraft, the combination with a shell containing high explosive, of a percussion primer mounted in said shell, a plunger adapted to explode said primer, means for normally holding said plunger and primer apart and in the safety position, and means automatically controlled by the air pressure induced by the flight of the projectile through the air for bringing said primer in the path of said plunger, said last mentioned means comprising a tail piece provided with an air pressure chamber therein, means for directing compressed air into said chamber as the projectile travels through the air, a piston mounted in said chamber, and means controlled by said piston for moving said primer toward said plunger.

3. In a projectile adapted to be dropped from aircraft, the combination with a shell containing high explosive, of firing mechanism comprising a plunger and a percussion primer adapted to explode said high explosive, means for normally holding said plunger and primer apart and in the safety position, and means automatically controlled by the air pressure induced by the flight of the projectile through the air for arming said firing mechanism, said last mentioned means comprising a tail piece provided with an air pressure chamber therein, means for directing compressed air into said chamber as the projectile travels through the air, a spring impressed piston mounted in said chamber and controlled by said air pressure, and means automatically controlled by said piston for moving said primer toward said plunger.

4. In a projectile adapted to be dropped from aircraft, the combination with a shell containing high explosives, a percussion primer mounted in said shell, a plunger adapted to explode said primer, means for normally holding said plunger and primer apart and in the safety position, and a spring impressed piston automatically controlled by the air pressure induced by the flight of the projectile through the air for bringing said primer in the path of said plunger.

5. In a projectile adapted to be dropped from aircraft, the combination with a shell containing high explosive, a percussion primer mounted in said shell, a plunger adapted to explode said primer, means for normally holding said plunger and primer apart and in the safety position, and means automatically controlled by the air pressure induced by the flight of the projectile through the air for bringing said primer in the path of said plunger, said last mentioned means comprising a tail piece provided with an air pressure chamber therein, means for directing compressed air into said chamber as the projectile travels through the air, a spring impressed piston mounted in said chamber and controlled by the air pressure, and means controlled by said piston for moving said primer toward said plunger.

In testimony whereof we affix our signatures.

OSCAR I. STRAUB.
MEADE WILDRICK.