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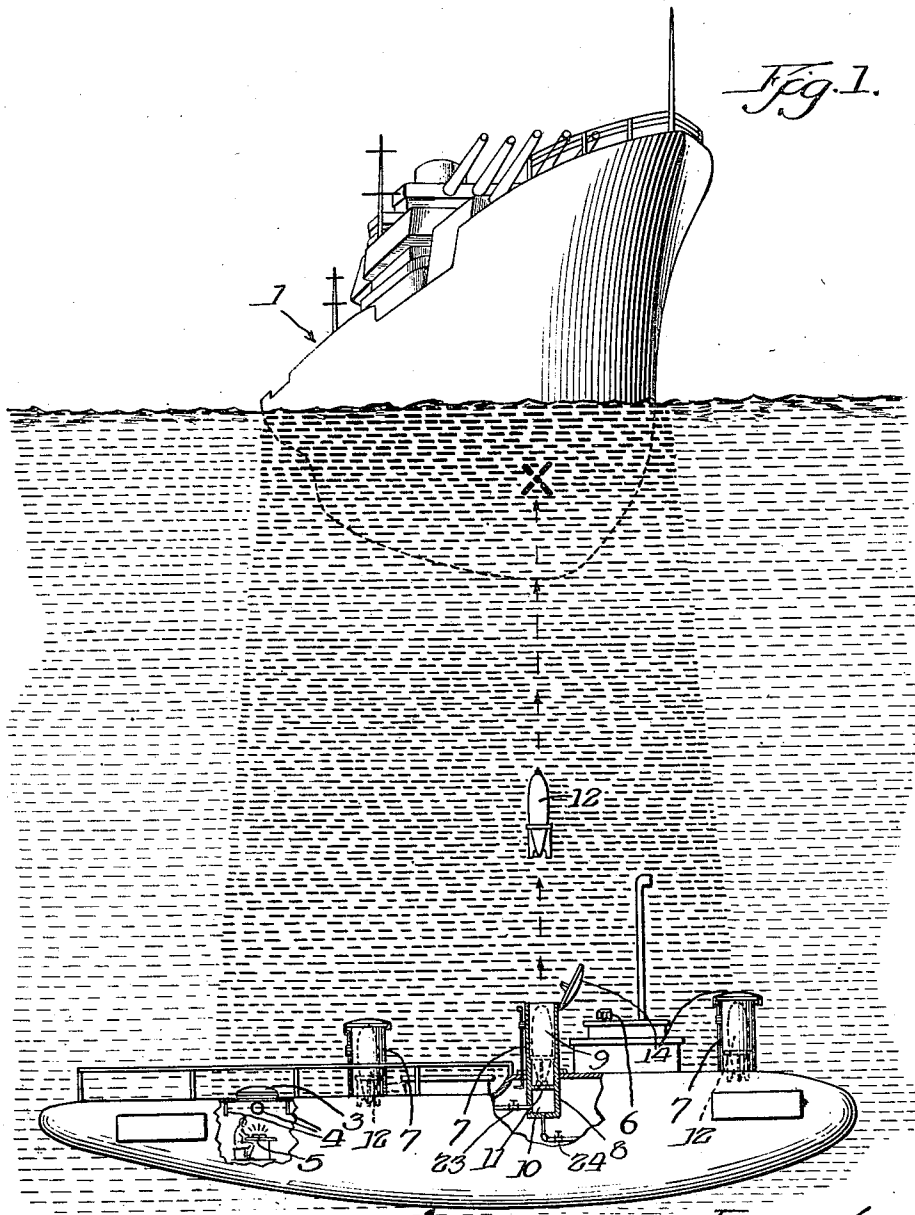
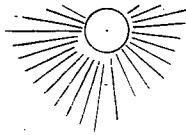
M. C. SCHWAB

2,349,009

SUBMARINE

Filed Sept. 18, 1941

2 Sheets-Sheet 1



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Inventor:
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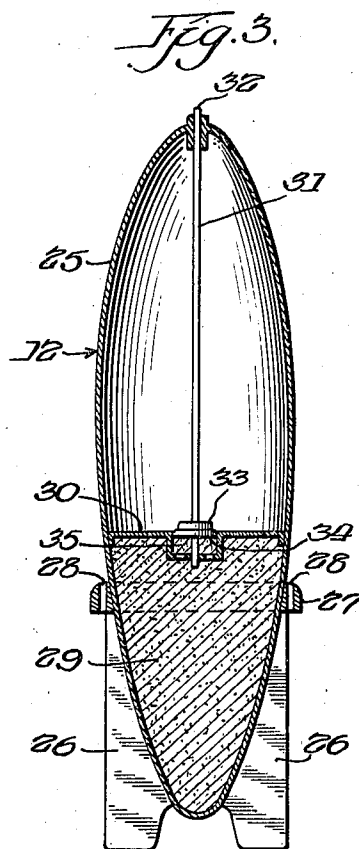
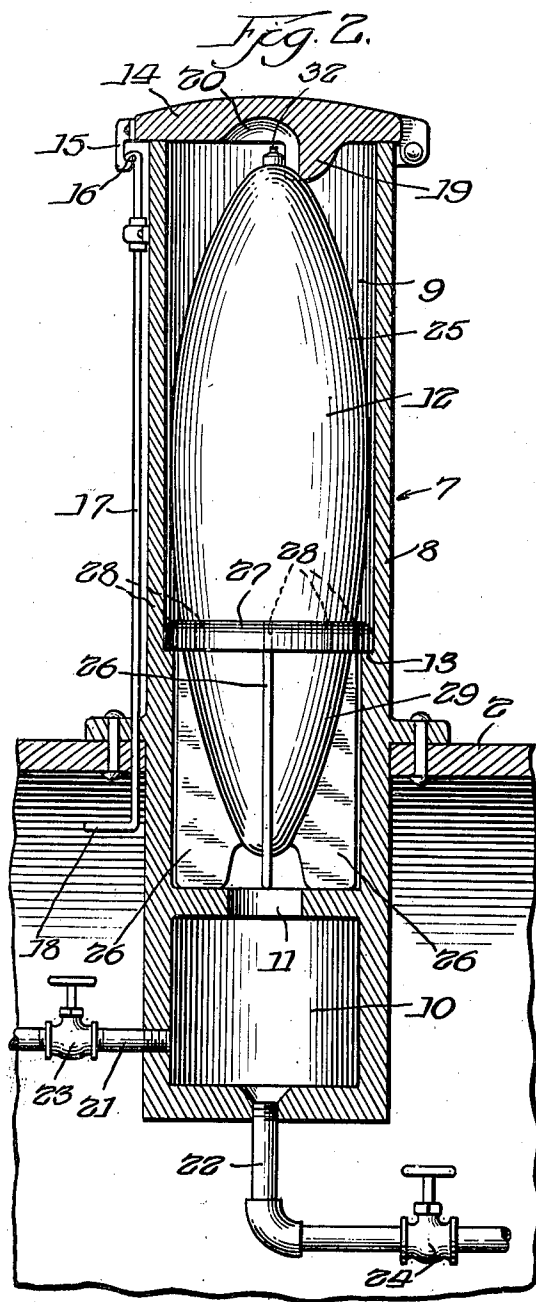
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,349,009

SUBMARINE

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Application September 18, 1941, Serial No. 411,371

5 Claims. (Cl. 114—17)

This invention relates to improvements in submarine craft and more particularly to a submarine provided with torpedo tubes constructed and arranged to fire torpedoes vertically upward, said tubes being charged with a new and improved form of torpedo.

Hitherto submarine craft have attacked enemy shipping by rising to the surface and discharging a torpedo in horizontal position at or near the surface of the water. This procedure subjects the attacking submarine to the risk of detection and counterattack. Furthermore, torpedoes which travel on the surface of the water require expensive propelling means for their operation.

The present invention resides in a submarine craft provided with suitable detecting means whereby said craft may be maneuvered vertically under its target, and further provided with vertically travelling torpedoes and means whereby said torpedoes may be released in vertical position directly under the target. If desired, the submarine may be submerged at any desired depth and may remain motionless with the motors turned off until an enemy craft comes into position directly overhead, whereupon one or more torpedo tubes may be opened so that the torpedoes contained therein rise and strike the enemy craft. Thus it will be apparent that the submarine of the present invention is difficult to detect. Further, its position below the attacked ship shields it from the latter's gun fire.

It is a principal object of the present invention to provide a submarine capable of attacking enemy craft while said submarine is positioned a substantial distance below the surface of the water, whereby the location and course of the attacking submarine may be concealed from the attacked ship and its defending aircraft.

Another object is to provide an improved torpedo tube for ejecting torpedoes in vertical position and directing them vertically upward.

Another object is to provide a submarine adapted to position itself beneath a surface craft by means of the shadow cast by said craft.

Another object is to provide a torpedo tube adapted to support a torpedo therein in vertical position without subjecting the fins or steering mechanism thereof to stress capable of injuring the same.

Another object is to provide a torpedo tube having a safety cover adapted to seal said tube hermetically and so constructed that the torpedo carried within said tube positively cannot be detonated by contact with said cover.

Another object is to provide a torpedo tube

adapted to be charged with air or other gas under pressure to facilitate the opening of said tube and the discharge of the torpedo contained therein.

5 Another object is to provide a vertically travelling torpedo which is propelled upwards by the buoyancy thereof and which does not require a motor or internal propelling machine of any kind.

10 Another object is to provide a torpedo constructed automatically to remain in vertical position.

Another object is to provide a torpedo having a hollow shell portion which is protected against collapse by being filled with gas under pressure approximately equal to that of the sea at the maximum depth at which the torpedo is intended to be used.

15 Yet another object is to provide a torpedo of the character described and so constructed that if it misses its target, it floats as a buoy and can be retrieved.

Another object is to provide a submarine construction of maximum simplicity, sturdiness, effectiveness, dependability, and ease of use.

25 Yet other objects are to provide submarine torpedoes of maximum simplicity, dependability, and effectiveness for the purposes herein described.

30 The foregoing and such other objects, advantages and capabilities as may appear herein or be pointed out as this description proceeds, or as are inherent in the present invention, are illustrated in the accompanying drawings, it being understood, however, that the specific construction illustrated is employed herein purely for purposes of illustration, and that the subject matter of the present invention is adapted to be utilized in a wide variety of modifications.

40 In the drawings:

Figure 1 is a more or less diagrammatic view of my improved submarine attacking an enemy battleship, portions of the hull of the submarine being broken away to show the interior construction thereof.

45 Figure 2 is a central vertical sectional view of the torpedo tube of the present invention, with the torpedo contained therein shown in side elevation.

50 Figure 3 is substantially a central longitudinal sectional view of my improved vertical torpedo.

Like reference characters are used to describe similar parts in the drawings and in the description of the invention which follows:

Referring now more particularly to the draw-

ings, Figure 1 discloses a surface craft 1, which is exemplified by a battleship, but is not limited thereto. The sun is indicated as being substantially overhead. Partially within the shadow cast by said battleship 1 is the submarine 2, which comprises the principal subject matter of the instant invention. The deck of said submarine is provided with a water-tight window 3, which may be plane or in the form of a lens, and which may be constructed of glass, transparent plastic or the like. Suitably positioned with reference to said window is suitable means for detecting variations in light intensity, exemplified by the battery of photo-electric cells 4. Said detecting means 4 is connected to suitable recording and indicating means 5, whereby an operator may determine when the submarine is in the shadow of a surface craft. Alternatively, or in addition, the submarine may be provided with a magnetic or supersonic detector 6 whereby surface craft may be located without reliance upon the shadow thereof.

The submarine is provided with a plurality of vertically disposed torpedo tubes 7, 7, 7, so arranged upon the submarine that torpedoes may be projected vertically therefrom without striking any portion of the submarine.

Figure 2 discloses more fully the construction of the torpedo tube 7. Said torpedo tube comprises a cylindrical barrel 8 suitably fastened to the hull of the submarine 2. The torpedo tube 7 is divided into a torpedo chamber 9 and a pressure chamber 10, said chambers being connected by the passageway 11. Substantially the entire barrel 8 of the torpedo tube may be disposed within the interior of the submarine, or said barrel may project outwardly from the hull of the submarine, as shown.

A torpedo 12 is shown retained within the torpedo chamber 9. Said torpedo chamber is provided with an annular shoulder 13 adapted to engage a portion of the torpedo 12 and serve as a support for the same.

The torpedo tube 8 is provided with a suitable cover 14, which by way of illustration is depicted as being hinged to said torpedo tube 8. Said cover is maintained in hermetically sealed relation to the tube 8 by means of the lock 15 and the latch 16. Said latch is connected by means of the rod 17 to a trigger 18 which may be operated mechanically, automatically or manually to unlatch the cover 14.

The cover 14 is provided with a protruding portion 19 adapted, when said cover is in sealing relation with the barrel 8, to contact a torpedo contained in said barrel and to hold said torpedo against displacement or movement within the torpedo tube. The cover 14 may also be provided, if desired, with a recess 20 opposite the detonating point of the torpedo, as a further precaution against accidental contact of the cover 14 with said detonating point.

The pressure chamber 10 is provided with a suitable inlet pipe 21 and a suitable drain pipe or outlet 22. Said pipes are provided with suitable control means, exemplified by the inlet valve 23 and the outlet valve 24.

The construction of the vertical torpedo shown in Figure 2 is further clarified by Figure 3. As will be apparent from said figures, my improved vertical torpedo has an elongated shell 25. Protruding from said shell in the tail portion thereof are the fins 26, 26. Also protruding from said shell and transversely encircling the lower portion thereof is the bearing ring 27, which is in-

tended to engage the shoulder 13 of the torpedo tube 7, and thereby to support the torpedo in said tube. The bearing ring 27 further serves to align the torpedo in vertical position within the torpedo tube 7. Said bearing ring 27 is suitably notched or perforated, as shown at 28, 28 to permit fluid to pass therethrough from the lower part to the upper part of the torpedo tube 7.

The tail portion of the torpedo is charged with explosive 29, and a cover or partition 30 is provided to prevent displacement of said charge 29 within the body of the torpedo. The portion of the torpedo shell above the partition 30 may be empty; that is, it may be totally evacuated, or it may be filled with air or other gas at pressures either less than or greater than atmospheric. If the hollow portion of the shell is filled with compressed air or other gas, the compressed air reservoir thus formed may be connected with a propeller and suitable motive apparatus, so that the compressed gas may be used to propel the torpedo. Alternatively the upper portion of the shell 25 may be filled with a poison gas or liquid having a density less than that of water.

The torpedo is provided with suitable detonating means, herein exemplified by the rod 31. One end of this rod protrudes through the nose of the shell 25 to form the detonating point 32. A piston 33 is fixed to the rod 31 near the other end thereof. When the detonating point 32 strikes an object the impact is transmitted through the rod 31 to the piston 33 which strikes the explosive 29 and detonates the same. If desired, the piston 33 may move in a well 34 forming a part of the partition 30. If desired, the well 34 may contain fulminate 35, a blasting cap or the like, whereby the impact of the plunger 33 more readily will detonate the explosive 29.

Having described the construction of my improved submarine and of the torpedoes used therein, the operation of my invention will now be explained in detail.

One torpedo is placed in each torpedo tube while the submarine is at the naval base. The cover 14 is locked in place before the cruise is begun. Thereafter the torpedo needs no further handling, but is always ready instantly to be placed in action. This elimination of the need for rehandling minimizes the hazard of explosions within the submarine.

When the submarine reaches enemy territory, it is submerged and the photo-electric and supersonic detectors are placed in operation. Compressed air or other gas, or water or other liquid, is pumped into the pressure chamber 10, thence through the passageway 11 into the torpedo chamber 9. The pumping operation is continued until the pressure within the torpedo chamber exceeds the pressure of the sea upon the cover 14.

When the shadow of an enemy craft is registered by the photo-electric apparatus 4, the trigger 18 is operated, thereby releasing the cover 14. Since the pressure within the torpedo tube is greater than the pressure outside, the cover will be thrown open, and the torpedo will be projected vertically upwards, as is illustrated in Figure 1 with reference to the central torpedo tube and torpedo. If desired, the detecting apparatus may be connected with the torpedo discharge apparatus in such manner that the presence of a ship vertically above the submarine will automatically cause one or more torpedoes to be ejected.

Since a substantial portion of the torpedo shell is evacuated, or filled with a material far less

dense than water, the torpedo weighs less than the water it displaces, and therefore will be impelled upwardly by the buoyant force of the displaced water.

Alternatively, a valve may be provided to admit the sea directly into the torpedo tube. Thus the water pressure on the two sides of the cover 14 may be equalized. When the cover is unlatched, the buoyant force of the torpedo will be sufficient to throw said cover open and to discharge said torpedo from its tube 7.

Since the center of gravity of the torpedo is in the tail portion thereof, the torpedo cannot turn over in the water, but will remain in upright vertical position. For this reason, the fins 26, 26 may be dispensed with, if desired.

Since the torpedo need contain no moving parts, neither its presence nor its path is easy of detection.

When the torpedo strikes its target, the detonating point 32 will be driven rearwardly and will cause the plunger 33 to detonate the explosive 29, thus sinking the enemy craft. If the upper portion of the torpedo is filled with a poison gas, a smoke or fog producing substance, or the like, the movements of the enemy crew will be impeded and the prospect of escape will further be diminished.

Should the torpedo fail to strike its target, it will remain at the surface in vertical position with a substantial part of the torpedo protruding above water like a buoy. These floating torpedoes act line surface mines, and in attempting to escape from the field of action, enemy craft may strike these floating torpedoes and thus be destroyed.

When the coast is clear after the encounter, the submarine may rise and retrieve the unexploded torpedoes, which may be used again.

Once a torpedo tube has been opened, the cover thereof normally will be allowed to remain open until the submarine comes to the surface, when the torpedo tube may again be closed. If desired, however, suitable means (not shown) for closing a torpedo tube under water may be provided. Thereafter the sea water contained in the empty torpedo tubes may be drained off through the drain pipe 22.

It will be apparent to those skilled in the art that my improved torpedoes may be constructed of a variety of materials. If necessary, the shell 25 need not be made of metal, a suitable plastic or the like being employed.

Thus it will be seen that I have fully disclosed a new type of submarine capable of attacking surface craft from great depths, and provided with a new type of torpedo adapted to be propelled vertically to its mark.

While I have described various details of particular embodiments of my invention, for purposes of clarity in exposition, it will be apparent to those skilled in the arts of warfare and navigation that a wide range of modifications and variations therefrom may be made without departing from the scope of my invention.

I claim:

1. A submarine comprising a body portion, means for propelling said body portion, means for detecting watercraft, and at least one torpedo

tube, said torpedo tube being arranged to retain a torpedo therein in vertical position when said submarine is in horizontal position, said torpedo tube comprising a torpedo chamber, an annular shoulder in said chamber for supporting said torpedo, a cover for hermetically sealing said torpedo tube, said cover being provided with a protruding portion adapted to contact said torpedo and hold it in place, the region of said cover opposite the detonating point of said torpedo being recessed to prevent contact of said detonating point with said cover, lock means for maintaining said cover in sealing relation with said torpedo chamber, control means for releasing said cover, a pressure chamber, a pass connecting said pressure chamber with said torpedo chamber, a valve-controlled pressure inlet, and a valve-controlled outlet for relieving the pressure in said torpedo tube.

2. In a submarine, a torpedo tube comprising a container adapted to support a torpedo with the longitudinal axis thereof substantially perpendicular to the longitudinal axis of said submarine, a cover for sealing said container, safety means to prevent said cover from contacting the detonating point of said torpedo, lock means for maintaining said cover in sealing relation with said container, control means for unlocking said cover, controllable means for increasing the pressure within said container until it exceeds the pressure of the sea thereupon, and a valve-controlled outlet for relieving the pressure within said container.

3. A submarine torpedo comprising a shell, a perforated bearing ring encircling said shell and adapted to engage a ledge for supporting said torpedo, fins on the tail region of said shell for controlling the course of said torpedo, explosive in the tail portion of said shell, a partition for maintaining said explosive in said tail portion, a detonating point protruding from the nose of said shell, a rod for transmitting impact from said detonating point to said explosive, and a detonating charge explodable by said impact to detonate said explosive.

4. A submarine torpedo adapted to travel vertically through the water, comprising a shell, steering means on the tail region of said shell, explosive in the tail portion of said shell, a partition for maintaining said explosive in said tail portion, the interior of said shell above said partition being filled with air, a detonating point protruding from the nose of said shell, and means connecting said detonating point with said explosive, whereby impact with said detonating point will detonate said explosive.

5. A submarine torpedo weighing less than the water it displaces and adapted to be propelled by its own buoyancy, comprising a hollow shell, steering means on the tail region of said shell, explosive in the tail portion of said shell, a partition for maintaining said explosive in said tail portion, the interior of said shell above said partition being filled with gas, detonating means on the nose of said shell, and means transmitting impact from said detonating means to said explosive for exploding the same.

MARTIN C. SCHWAB.