

- [54] **EXTERNAL LAUNCHER FOR UNDERWATER WEAPON**
- [75] Inventors: **Everett W. Opdahl**, Lutherville;
Chang-Kyo Kim, Severna Park,
both of Md.
- [73] Assignee: **The United States of America as
represented by the Secretary of the
Navy**, Washington, D.C.
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- [58] Field of Search **114/238, 239, 21 W;
244/3.12, 137 R; 89/1.5 C, 1.81, 1.819, 1.809**

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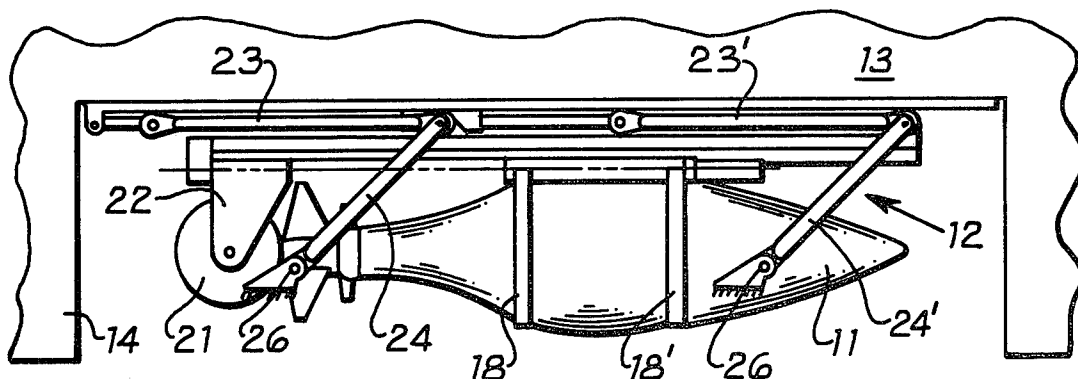
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Primary Examiner—George E. A. Halvosa
Attorney, Agent, or Firm—R. S. Sciascia; Paul S.
Collignon

[57] **ABSTRACT**

A launching device for a weapon carried outside an underwater vehicle. The weapon is protected during travel of the underwater vehicle to prevent damage from floating objects, such as debris. A launching rail is provided to permit the weapon to reach a stabilizing speed prior to release of the weapon and also a reel with wire thereon is provided for weapons which are to be wire-guided.

3 Claims, 8 Drawing Figures



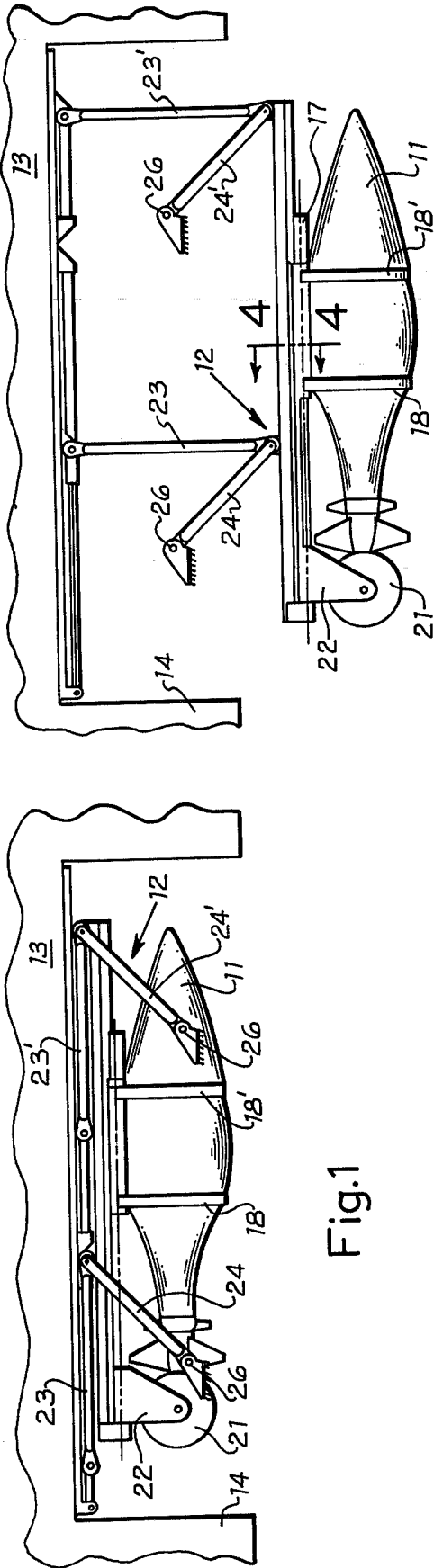


Fig.2

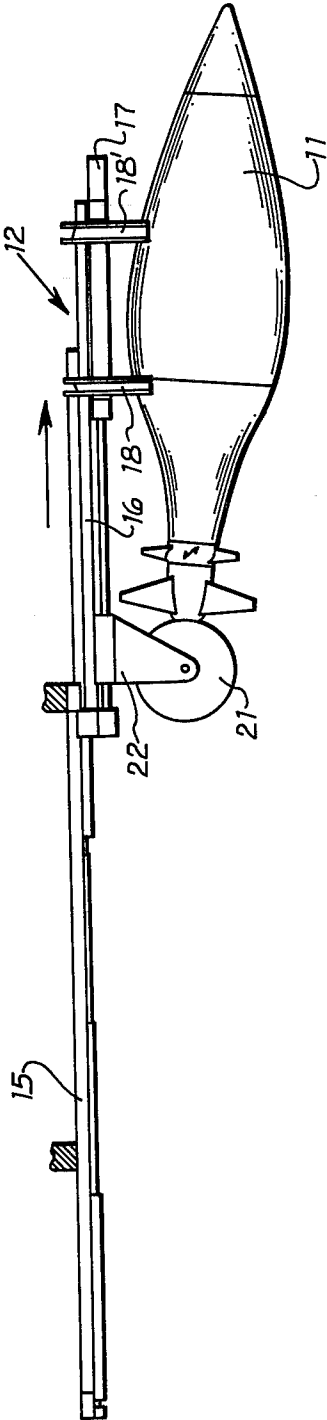


Fig.3

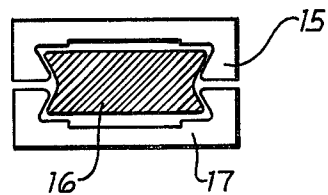


Fig. 4

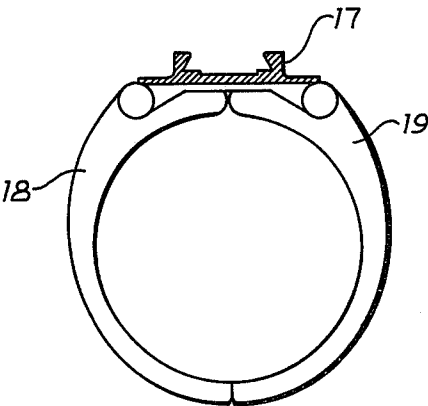


Fig. 5

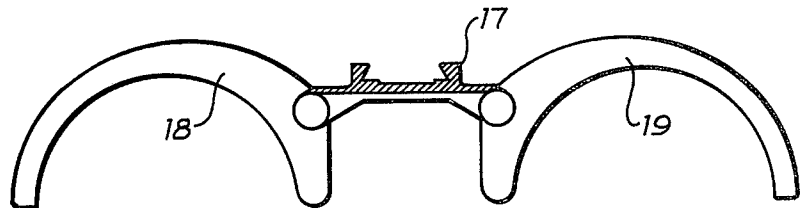
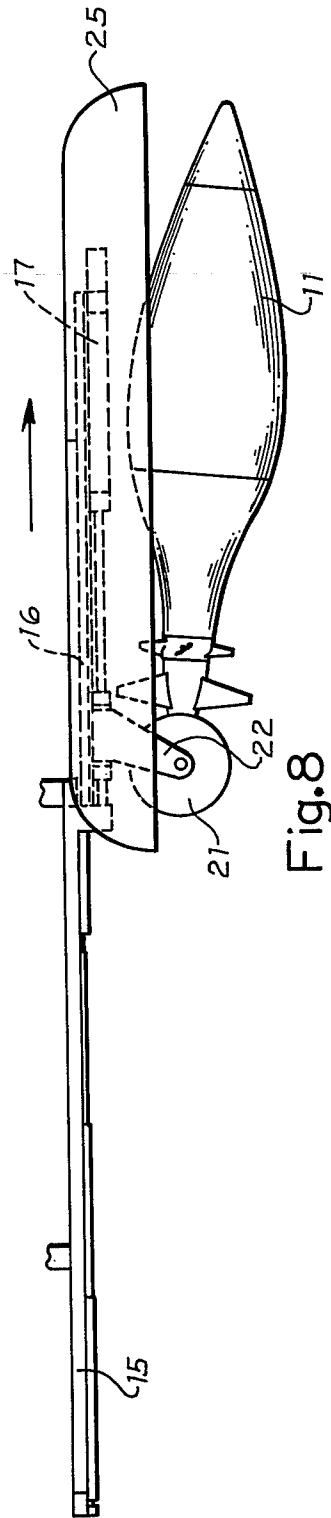
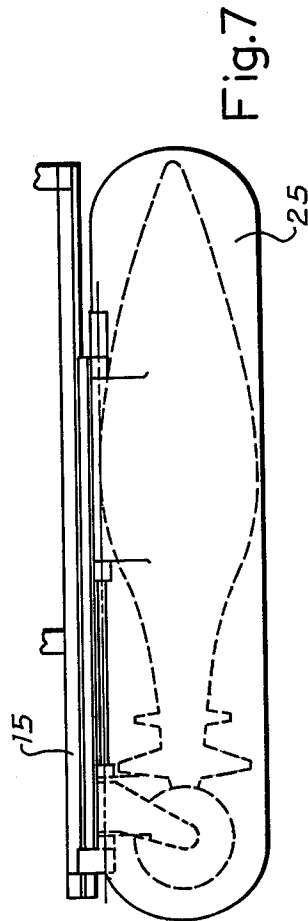


Fig. 6



EXTERNAL LAUNCHER FOR UNDERWATER WEAPON

BACKGROUND OF THE INVENTION

The present invention relates to a launching device and more particularly to a device for launching a weapon which is carried outside an underwater vehicle.

Most submarines carry their torpedoes and missiles inside the vehicle and, prior to firing or launching, load the weapons into a lockout chamber. From a standpoint of structural simplicity and initial weapon guidance, a cylindrical tube was a natural selection for the lockout chamber. As early type submarines were designed for shallow depths, penetrations in pressure hulls did not present a severe design problem.

The evolution of submarines, along with their weapon systems, has required various changes. Torpedo tubes are now being located somewhat aft of the bow and canted outboard to permit firing past a large sonar dome.

This arrangement, however, has its disadvantages in that hydrodynamic forces acting on the weapon while exiting from the tube tend to rotate the weapon and cause possible hangup or tail damage. In order to minimize this disadvantage, ship speed can be reduced during launch or an impulse launch can be used which will reduce the transitional time period. The reduced launch speed involves an unhappy compromise of operational capability, and the impulse launch results in high noise levels with consequent susceptibility to detection by an enemy.

Weapon performance requirements have increased to the point where the use of existing torpedo tubes impose a severe constraint on weapon design. Due to the diameter and volume of the launch tube, torpedo hydrodynamic shapes cannot be optimized from a performance standpoint. Protruding appendages, such as wings and tails, which may be desirable to optimize performance, are not compatible with the limited tube diameter and the present impulse launch technique. Optimization of the body shape can be accomplished by enlargement of the torpedo tube diameter, however, this makes the hull structural penetration design problem somewhat more difficult, especially as deeper submarine operating depths are considered.

SUMMARY OF THE INVENTION

The present invention relates to a launching device for a weapon carried outside the hull of an underwater vehicle. The weapon is protected from floating objects and, upon launch, the weapon attains a stabilizing speed before it is released. A reel is also provided on the launching mechanism so that the weapon can be wire-guided on its course.

It is therefore a general object of the present invention to provide an external device for carrying a weapon outside the hull of a submarine and having means for launching the weapon.

Other objects, advantages and novel features of the invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a partial side view showing a weapon in a retracted position;

FIG. 2 is a partial side view showing a weapon in a streamed position;

FIG. 3 is a side view showing a weapon being launched;

FIG. 4 is a sectional view taken on line 4—4 of FIG. 2, showing a launching rail arrangement;

FIG. 5 is an end view showing a holding arm in a closed position;

FIG. 6 is an end view showing a holding arm in an opened position;

FIG. 7 is a side view of an encapsulating holding device in a closed position; and

FIG. 8 is a side view of an encapsulating holding device in an opened or launching position.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, there is shown in FIGS. 1 through 3, a weapon 11, such as a torpedo, which is carried by a launching system 12 attached on the outside of a submarine 13. As best shown in FIGS. 1 and 2 of the drawings, in one embodiment of the invention, a well 14 is provided in the hull of submarine 13 and launching system 12 is retractable so that weapon 11 is positioned within the recess 14 until it is desired to launch weapon 11. The positioning of weapon 11 in recess 14 provides protection from floating objects and debris while the submarine is moving. FIG. 2 of the drawings show the launching system 12 in a streamed position, ready for launching.

Launching system 12 is essentially a double extending rail system consisting of a fixed rail 15, an extending rail 16 and a carriage 17. As shown in FIG. 4 of the drawings, carriage 17 is slidably attached to extending rail 16 and extending rail 16, in turn, is slidably attached to fixed rail 15. If desired, carriage 17 could be propelled in the nature of a catapult, by either mechanical or hydraulic means, or movement of carriage 17 can be accomplished by energizing weapon 11. In either arrangement, the purpose of the double extending rail system is to permit relative movement between weapon 11 and the submarine 13 before the weapon 11 is released from its retainers, thus assuring an accurate launch. Two pair of arcuate-shaped arms are pivotally attached to carriage 17 for holding weapon 11. FIG. 5 of the drawings show one pair of arms, consisting of arms 18 and 19 which are pivotally attached to carriage 17. It can be seen that when arms 18 and 19 are in a closed position, their inner surfaces define a circular area that is only slightly larger than a cross-sectional area of weapon 11 and thus arms 18 and 19 cradle weapon 11 in a snug fashion. When extending rail 16 has been fully extended and carriage 17 has reached the outer end of rail 17, the two pair of arms are opened, as shown in FIG. 6 of the drawings and weapon 11 is released from carriage 17. Arms 18 and 19 can be opened by either mechanical or hydraulic means. For example, arms 18 and 19 can be spring-biased to an open position, and can be latched in a closed position, and triggering of a latch might occur when carriage 17 reaches a predetermined position on extending rail 16.

A wire payout cannister 21 is mounted on the aft end of rail 16 and holds a quantity of wire for use with a wire-guided torpedo. Cannister 21 is rotatably mounted in a U-shaped frame 22 and wire is played-out during travel of the torpedo, with the wire being used to send correction signals for steering the torpedo.

Weapon 11 is carried in recess 14 until the desired time of launch whereupon it is moved to a launch position, as shown in FIG. 2 of the drawing. Various mechanical devices might be employed as the streaming gear. By way of example, a parallelogram type linkage comprised of links 23 and 24 is used to lower launching system 12 into a streamed position. Also a hydraulic system might also be employed to lower and raise the launching system.

Referring now to FIGS. 7 and 8 of the drawings, there is shown an embodiment of the invention for use with a submarine that does not have a recess 14. A torpedo 11 is carried in a cylindrical housing 25 which is split into two halves which are pivotally attached to carriage 16, in a manner similar to the pivoting of arms 18 and 19. Housing 25 serves as a releasing device, upon opening, and also protects weapon 11 from any debris that might be in the path of travel.

OPERATION

The embodiment of the invention shown in FIGS. 1 through 3 of the drawings is used when a recess 14 is provided in a hull of a submarine 14. Immediately prior to launch the streaming gear is activated so that weapon 11 is lowered and is clear of the hull for launching. Forward movement of links 23 causes links 24 to pivot about points 26 and launching system 12 is lowered from recess 14. In the event that weapon 11 is a torpedo, it may be desirable to have carriage 17 propelled by some arrangement of belt drive, as in a catapult arrangement, and weapon 11 is able to reach a stabilizing speed before it is released from carriage 17. In the event that weapon 11 is wire-guided, the control wire connected to weapon 11 is played-out from canister 21.

When the embodiment of the invention shown in FIGS. 7 and 8 of the drawings is used, weapon 11 is in a position to be fired and need not be lowered from

submarine 13. Housing 25 retains weapon 11 in a launch position and protects it from foreign objects that might be floating in the surrounding water. Carriage 17 is propelled and when it nears the end of extending rail 16, housing 25 opens to release weapon 11.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

We claim:

1. A launching device for an underwater weapon carried externally by an undersea vehicle having a recess therein comprising,

a launching system comprised of a first launching rail and a second launching rail slidably and extendably attached to said first launching rail,

means attached to said undersea vehicle for moving said launching system into and out of said recess, and

a carriage slidably attached to said second launching rail having means for releasably retaining said underwater weapon whereby said weapon is released after said second rail is extended relative to said first rail and said carriage moves longitudinally along said second rail.

2. A launching device for an underwater weapon carried externally by an undersea vehicle as set forth in claim 1 wherein said means attached to said undersea vehicle for moving said launching system includes mechanical linkage connected to said first launching rail.

3. A launching device for an underwater weapon carried external to the hull of an undersea vehicle as set forth in claim 1 having a reel attached to said second rail, said reel having a quantity of wire thereon for controlling said weapon after release from said undersea vehicle.

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