Attorney Docket No. 82839
Date: 22 October 2003

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Serial Number 10/600,726
Filing Date 6/23/03
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AN ASSEMBLY OF UNDERWATER BODIES AND LAUNCHER THEREFOR

TO ALL WHOM IT MAY CONCERN:

BE IT KNOWN THAT (1) MICHAEL T. ANSAY, and (2) JOHN R. LITTLE, citizens of the United States of America, employees of the United States Government, and residents of (1) Johnston, County of Providence, State of Rhode Island, and (2) Swansea, County of Bristol, Commonwealth of Massachusetts, have invented certain new and useful improvements entitled as set forth above, of which the following is a specification.

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AN ASSEMBLY OF UNDERWATER BODIES AND LAUNCHER THEREFOR

STATEMENT OF GOVERNMENT INTEREST

The invention described herein may be manufactured and used by or for the Government of the United States of America for Governmental purposes without the payment of any royalties thereon or therefor.

BACKGROUND OF THE INVENTION

(1) Field of the Invention

The invention relates to the launch of bodies from submarines at various depths, and is directed more particularly to the launch of bodies, such as weapons, vehicles, and the like, from locations outside the pressure hulls of submarines.

(2) Description of the Prior Art

The United States Navy has expressed a need to carry greater payloads of weapons/vehicles on submarines and a need to launch weapons/vehicles from modular, external, payload bays. Traditionally, such bodies have been stowed inside submarine torpedo rooms, protected from the pressure and corrosiveness of the ocean environment, and then launched from the submarine torpedo tubes when needed.
Accordingly, there is a need for an assembly for underwater bodies, including an appropriate launcher therefor, which assembly is adapted to be mounted outside a submarine pressure hull, and is operable to separate the underwater bodies from the launcher by force of gravity.

SUMMARY OF THE INVENTION

An object of the invention is, therefore, to provide a launch assembly mounted outside the pressure hull of a submarine, for housing and releasing bodies underwater, and underwater bodies for exiting the launch assembly and dropping downwardly by force of gravity until well clear of the submarine, and thereafter navigating under its own power.

With the above and other objects in view, a feature of the present invention is the provision of an assembly of underwater bodies and a launcher therefor. The assembly is adapted for mounting on a submarine outside the pressure hull. The assembly includes a launcher comprising a housing for enclosing an underwater body, a body support structure within the housing for supporting the body, a pressure regulator system in communication with the housing for imposing a selected pressure on an interior of the housing, a hatch pivotally mounted on the housing, and an actuator for opening the hatch to permit the body to exit the hatch, and for closing the hatch. The assembly further includes an underwater body comprising a self-propelled body adapted to
exit by gravity from the launcher. A release device is disposed on at least one of the launcher and the body for releasing the body from the launcher to permit the exit of the body from the launcher by gravity.

The above and other features of the invention, including various novel details of construction and combinations of parts, will now be more particularly described with reference to the accompanying drawings and pointed out in the claims. It will be understood that the particular assembly embodying the invention is shown by way of illustration only and not as a limitation of the invention. The principles and features of this invention may be employed in various and numerous embodiments without departing from the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Reference is made to the accompanying drawings in which is shown an illustrative embodiment of the invention, from which its novel features and advantages will be apparent, wherein corresponding reference characters indicate corresponding parts throughout the several views of the drawings and wherein:

FIG. 1 is a diagrammatic perspective view of one form of an assembly of underwater bodies and a launcher therefor, illustrative of an embodiment of the invention;

FIG. 2 is a widthwise sectional view of the assembly of FIG. 1;
FIG. 3 is a perspective view of one underwater body released from the launcher of FIGS. 1 and 2; and

FIG. 4 is a perspective view of the underwater body of FIG. 3, after having activated its self-propelling means.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIGS. 1 and 2, it will be seen that the illustrative assembly includes a launcher 10 for retaining and selectively releasing one or more underwater bodies 12.

The launcher 10 preferably is a cylindrically-shaped housing 14 closed at an upper end 16 and open at a lower end 18. A hatch 20 is provided at the lower end 18 and is operable to close the housing lower end 18.

Disposed within the housing 14 is a support framework 22 configured to provide support for the one or more bodies 12. Preferably, the framework 22 is of a substantially rigid construction covered with an elastomeric material. Similarly, the housing 14 is of a substantially rigid material with the interior surface covered with an elastomeric material. The framework 22 loosely holds the underwater bodies 12 inside the housing 14. The elastomeric material cushions the bodies 12 against shock loads and aggressive submarine maneuvers. The framework 22 and underwater bodies occupy most of the housing interior volume. Optionally, the assembly may include rigid
sleeves 23 mounted in the framework 22 and in which the bodies 12 are slidably retained.

The housing 14 and closed hatch 20 provide a water tight container which protects the bodies 12 from corrosive seawater and from high sea pressures. The container is adapted to withstand sea pressure at the deepest operating depths of the submarine on which it is mounted. The container normally is maintained at atmospheric pressure with gas, such as air.

Pressurization of the container is effected by a gas or water pressurization system 24, which typically comprises a high-pressure air flask system which may include the submarine main ballast tanks, or a gas generator. Prior to a launch, the pressurization system 24 operates to increase the pressure in the container to substantially equal the outside water pressure. A seal is positioned around lower end 18 of housing 14. By maintaining a slight negative pressure in the container with respect to the environmental pressure, sealing of the hatch 20 against the housing 14 will be maintained.

The hatch 20 is operated by an actuator 26 which, upon equalization of pressure inside and outside the container, causes the hatch 20 to open. Inasmuch as the inside and outside pressures are substantially equal, opening of the hatch 20 is not undertaken against relatively heavy outside pressure. In a preferred embodiment, actuator 26 is a hydraulic actuator that is connected to the submarine's hydraulic system. Control of
actuator 26 is provided by the hydraulic system. A sensor can be positioned on actuator 26 to indicate the position of actuator 26 and hatch 20. Other types of actuators such as pneumatic or electrical actuators can also be used for this purpose.

Inasmuch as the housing 14 is opened at the lower end 18, the pressurized air is confined to the housing, keeping the bodies 12 therein dry and free from contact with seawater.

The housing 14 is provided with a release device 28 which locks the bodies 12 in the housing, and releases a selected body upon receiving a release signal from inside the submarine.

Each of the underwater bodies 12 may be provided with a weight 30 which is releasably attached to the body and jettisoned after launch (FIG. 3). If the body 12 is sufficiently heavy to descend from the housing 14 the weight 30 may be omitted.

In an alternative embodiment, each of the bodies 12 is provided with an individual release mechanism 32 and held thereby, rather than by the release mechanism 28 referred to above.

In operation and in preparation for a launch, the submarine maneuvers into a position sufficiently distant from the ocean bottom to allow a body 12 to drop from the submarine. Using the gas pressurization system 24, the interior of the housing is pressurized so as to have internal pressure substantially equal to external sea pressure. Inasmuch as the bodies 12 and support framework 22 occupy most of the volume of the housing, relatively
little pressurized air is required, at least with a fully loaded
housing. Upon equalization of pressure, the hatch actuator 26
opens the hatch 20. A “firing” signal from the submarine serves
to unlock the release mechanism in use, 28 or 32, which permits a
body 12 to slide out of the framework 22 and into the sea
therebelow, clear of the housing 14.

Upon clearing the housing 14, the weight 30, if used, is
jettisoned and a self-propelling means is started, whereupon the
launched body 12 starts its travel (FIG. 4), in accordance with a
guidance system, to carry out a mission.

The hatch actuator 26 closes the hatch 20 and the gas
pressurization system 24 then draws air from the housing 14 until
the pressure in the housing returns to atmospheric. The
withdrawn air may be exhausted or, preferably, is returned to the
submarine pressurized air system.

There is thus provided a reliable and inexpensive assembly
of weapons and launcher therefor, which assembly is located
outside the pressure hull of the submarine. Use of the assembly
herein described in lieu of the usual torpedo room arrangement
eliminates the need for torpedo tubes, impulse tanks, shutter
doors, inlet cylinders, missile doors, breech doors, and weapon
handling and loading systems. Further, by locating the
underwater bodies external to the submarine pressure hull, the
weight of the bodies is greatly reduced, in view of the buoyant
force difference between air and water. This difference allows
for a smaller and less costly submarine volume to float the
weight of the underwater bodies.

It will be understood that many additional changes in the
details, materials, steps and arrangement of parts, which have
been herein described and illustrated in order to explain the
nature of the invention, may be made by those skilled in the art
within the principles and scope of the invention as expressed in
the appended claims.
AN ASSEMBLY OF UNDERWATER BODIES AND LAUNCHER THEREFOR

ABSTRACT OF THE DISCLOSURE

An assembly of underwater bodies and a launcher therefor. The assembly is adapted for mounting on a submarine outside the pressure hull. The assembly includes a launcher having a housing for enclosing an underwater body, a body support structure within the housing for supporting the body, a pressure regulator system in communication with the housing for imposing a selected pressure on an interior of the housing, a hatch pivotally mounted on the housing, and an actuator for opening the hatch to permit the body to exit the hatch, and for closing the hatch. The underwater body is a self-propelled body adapted to exit by gravity from the launcher. A release device is disposed on the launcher for releasing the body from the launcher to permit the exit of the body from the launcher by gravity.