EXEMPLARY CLAIM

1. A self-propelled underwater attack deviation device comprising in combination:
   a cylindrical casing adapted for launching from a submerged submarine,
   a jet propulsion plant within said casing and having
   a discharge nozzle at its downstream end through which passes jet propulsion gaseous discharge,
   said discharge nozzle extending beyond and being of
   smaller cross section than said casing,
   a removable end cap telescoped onto said casing in
   enclosing relation to said discharge nozzle and adapted to be readily removed therefrom by the
gaseous discharge from said nozzle,
   a flexible strip of acoustical reflecting material
   packaged between said nozzle and said end cap and
   having one end secured to said casing,
   said strip being so packaged that it streams behind
   the device upon forward movement of the device
   through the water after removal of said end cap, and
   means responsive to hydrostatic pressure for
   activating said propulsion plant when the device
   is launched under water.

4 Claims, 3 Drawing Figures
ACTIVE TORPEDO DECOY AND SONAR TARGET

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.

The present invention relates to the defense of a submerged submarine and more particularly to an underwater launched decoy for active acoustic homing torpedoes as well as providing a sonar target.

An object of the invention is to provide a combined decoy and sonar target which is compact and relatively inexpensive.

Another object of the invention is the provision of a decoy and target, which, when launched from a submerged vessel, becomes self-propelled and becomes greatly enlarged in acoustic reflecting area.

A further object of the invention is to provide an underwater decoy which, while propelling itself, closely simulates the propeller beat of a slow moving submarine. Other objects, as well as the attendant advantages of the invention will be understood from the following description of the preferred embodiment of the invention when read in connection with the accompanying drawing in which:

FIG. 1 is a sectional view of a decoy before launching;

FIG. 2 is a fragmentary view showing the structure and arrangement of acoustic reflecting streamers after the decoy has been launched; and

FIG. 3 shows the launched decoy with fully extended reflecting streamers as it propels itself through the water.

In accordance with the invention, an assembled decoy of a size suitable for ejection or launching through a submarine signal tube is provided with a jet propulsion system utilizing a gas under pressure and rolls of ribbon-like acoustic reflecting material such as metal foil packaged around the propulsion tube of the decoy and protected against disturbance by a detachable casing which separates itself from the decoy when subjected to the gaseous discharge of the jet propulsion system. Thereafter, forward movement of the decoy results in the metallic foil rolls unwinding and streaming behind the moving decoy to provide a relatively large acoustic target for the attraction of the active acoustic homing torpedo and for the confusion of a sonar operator on an attacking surface vessel. Also in accordance with the invention, the gaseous propulsion system includes a flutter valve constructed to release the propelling gas in periodic bursts so timed as to closely simulate to a passive sonar operator the propeller beat of a slow moving submarine.

The preferred embodiment of the invention shown in the drawing comprises a decoy vehicle 10 of circular cross section having a forward compartment 11 containing gas under pressure, a center compartment 12 separated by a bulkhead 13 from the pressure compartment 11 and by a bulkhead 14 from an aft compartment 15 which later terminates in a discharge mouth or nozzle 16 of reduced cross section. Gas under pressure, e.g., compressed air, carbon dioxide or a high vapor pressure liquid, is introduced into the forward compartment through a check valve 17, a conduit 18 connects the pressure compartment 11 to the center compartment 12 through a cut-off valve 19, having an externally available control handle 20 and a regulator valve 21 controlled by hydrostatic pressure to which it is exposed through a tube 22 opening to the outside of the vehicle 10. The center compartment 12 is in communication with the aft compartment 15 through an orifice 23 in the bulkhead 14 and an alined fluter valve 24 here shown as being a rubber lip-valve similar in construction to a toy novelty noisemaker. However, any relief valve adjusted to "chatter" may be utilized. Gas under pressure passing through the valve 24 discharges through the nozzle 16 to provide jet propulsion for the vehicle 10. In order to promote evenness in cross section in gas flow in the nozzle 16, a gas diffuser 25 which may be a very fine mesh screen is employed between the valve 24 and the nozzle 16. One or more rolls 26 of acoustic reflecting sheet material are arranged laterally adjacent to the nozzle 16 and have their bitter ends suitably secured to the body of the vehicle 10 as by screws 27. The rolls 26 are, preferably, aluminum foil provided with a reinforcing material 28 bonded thereto at their bitter ends and extending longitudinally thereof to prevent severance of the foil and to function as the strain member when the foil is pulled through the water.

The material 28 may be any adhesive tape resistant to elongation such as cloth backed surgical type tape.

An end cap 29 having a slide fit with the main body of the vehicle 10 functions as a protective housing for the foil rolls during stowage and launching of the decoy after which it is pushed rearwardly by exhaust gas from the propulsion nozzle 16 and drops to the bottom.

When the decoy vehicle 10 is to be launched through the signal tube or garbage tube of a submarine the valve knob 20 is turned to open the valve 19. After launching, the water pressure exerted on the valve 21 through the tube 22 opens the valve 21 to permit gas from the compartment 11 to pass into the center compartment 12 and automatically regulates the flow of gas to maintain a constant pressure differential between the gas in the compartment 12 and the external water pressure. This constant pressure differential causes the propelling force to remain substantially constant for different water depths. Gas from the center compartment 12 escapes through the flutter valve 24 in short bursts and after diffusion by the screen 25 is discharged through the tube 16 to propel the vehicle 10 through the water.

The initial exhaust through the tube 16 displaces the end cap 29 and thereafter passage of the vehicle through the water unrolls the foil strips 26 to provide an acoustic target of considerable area as shown in FIG. 3. Preferably, the valve 24 is selected or adjusted to release gas at a rate of about 3 bursts per second so as to closely simulate the propeller beat of a slow moving submarine.

In order that the decoy device of the invention, after use, may not become a hazard to navigation, it may be equipped with an inlet valve held closed by a water soluble material of known type which depending upon its composition will dissolve in water in a relatively short time, say 5 to 10 minutes or longer as desired. Alternatively it is possible to construct the vehicle to have about 1/2 pound negative buoyancy in its exhausted state, i.e., when the pressure in the compartment 11 substantially equals the ambient pressure and the compartment 15 becomes flooded.

It will be apparent from the foregoing that the present invention provides an attack deviation device which is quite simple in construction and is relatively inexpensive. The device in use provides an excellent acoustic target for confusion a sonar operator on a pur-
suing vessel in his effort to locate the true target and such confusion greatly increases the chances of escape by the submarine from a sonar fix. Even after a fix is obtained and the pursuing vessel launches an active acoustic homing torpedo, the echoes returned by the foil strips can cause the torpedo to acquire the device as a target and steer on it for at least one pass with a resulting delaying action which would be invaluable in aiding the submarine successfully to evade. Also, if the operator on the pursuing vessel turned his sonar to listening in an effort to locate the true target, he could again be confused by the propulsion sounds given off by the deviation device.

Submarine officers are understandably reluctant to permit anything to leave their vessel which may identify it as a submarine or fix its position, but these same officers frequently express the desire for a last-resort device for use when they cannot evade a “fix” attained by an attacking surface vessel, since in such a situation, any compromise of the submarine’s position by the use of the decoy of the present invention would be more than offset by the resulting benefits mentioned above.

While for the purpose of disclosing the invention a preferred embodiment thereof has been described in detail, it will be obvious to those skilled in the art that many modifications and variations thereof may be made in view 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.

What is claimed is:

1. A self-propelled underwater attack deviation device comprising in combination
- a cylindrical casing adapted for launching from a submerged submarine,
- a jet propulsion plant within said casing and having a discharge nozzle at its downstream end through which passes jet propulsion gaseous discharge,
- said discharge nozzle extending beyond and being of smaller cross section than said casing,
- a removable end cap telescoped onto said casing in enclosing relation to said discharge nozzle and adapted to be readily removed therefrom by the gaseous discharge from said nozzle,
- a flexible strip of acoustical reflecting material packaged between said nozzle and said end cap and having one end secured to said casting, said strip being so packaged that it streams behind the device upon forward movement of the device through the water after removal of said end cap, and
- means responsive to hydrostatic pressure for activating said propulsion plant when the device is launched under water.

2. An attack deviating device in accordance with claim 1 wherein the jet propulsion plant includes a source of gas under pressure and means including a flutter valve providing fluid communication between said source and said nozzle whereby when the device is self-propelled the gaseous discharge occurs in short bursts to simulate the propeller sound of a slow moving submarine.

3. An underwater deceptive target for sonar and acoustic homing torpedoes comprising:
- a device having propulsion means for propelling said device through the water,
- a plurality of flexible strips of acoustical reflecting material coiled in rolls and carried externally of said device, and
- means securing the free ends of said coiled strips to said device whereby movement of said device through the water causes said strips to uncoil and stream behind the device.

4. The deceptive target of claim 3 wherein said flexible strips are metal foil, and a reinforcing strip of a material resistant to elongating is secured to each of said foil strips along its length.