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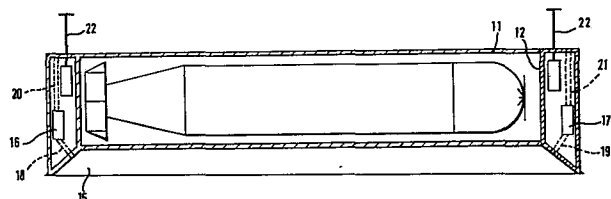
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⑤④ **Underwater weapon systems.**

⑤⑦ An underwater weapon system comprises a container 11 (Figure 1) for a self-propelled weapon with target homing means, the container including pumps 16, 17 having inlets 18, 19 on the underside of the container to pump silt, gravel etc. from underneath the container whereby the container can be buried or partially buried in the sea bed. Reverse operation of the pumps raises the container which is opened automatically, e.g. with a radio control system 22 to release the weapon when the weapon is to be used.



"UNDERWATER WEAPON SYSTEMS"

This invention relates to underwater weapon
5 systems.

According to one aspect of the present invention,
there is provided an underwater weapon system
comprising a self-propelled weapon with target housing
means, a watertight container for the weapon, pump
10 means having an inlet or inlets on the underside of
the container and an outlet or outlets above the under-
side, whereby sand or silt under the container may be
pumped away to cause the container to become buried
in sand or silt on the sea-bed, the pump means being
15 operatively reversible to pump sand or silt underneath
the container for raising the container.

The use of moored mines is well-known. The laying of a minefield, for example to safeguard an area such as the approaches to a harbour, is an expensive operation. Particularly in wartime,
5 the positioning of such mines may be haphazard.

According to another aspect of the present invention, there is provided an underwater weapon ; system comprising a self-propelled weapon with target homing means, and a container for said weapon, said
10 container including pump means having an inlet or inlets on the underside of the container and an outlet or outlets above the underside, said container further having control means for operating said pump means and further control means operative to open
15 the container to permit release of the weapon..

The weapon may typically be a torpedo and may be of conventional construction, for example with an acoustic sensor or other target-detecting device controlling guidance means for guiding the torpedo
20 towards a target. Other forms of self-propelled

weapons suitable for underwater release may be employed.

With the weapon system of the present invention,
the container, with the weapon in it, is put on the sea-
bed and the pump means are operated to pump silt
5 or sand, which covers the majority of the sea bed,
particularly in shallow water, from underneath the
container and to eject it above the base of the container.
Thus the container will bury itself in the sea-bed.
Means may be provided to stop the pump means
10 when the container is buried to a predetermined
depth.

Most self-propelled underwater weapons are of
generally elongate form. The container, in such a case,
is also preferably of elongate form. It may be buried
15 with its axis vertical or in a generally horizontal
position. If it is buried in a vertical position, the
upper end may be left protruding above the sea bed.
More generally however the container may be completely
buried and, when the weapon is to be activated, the
20 container has to be raised by reverse operation of the
pump means.

Activation of the weapon system may be effected by
an external command signal, for example transmitted by

acoustic or electromagnetic signalling to a receiver within the container or it may be effected in response to an output of a target detection sensor within the container. The activation may be in one or more
5 stages, for example the container may be raised to the surface of the sea bed initially and further operation may then be deferred until a sensor detects a target whereupon the container is opened for launching of the weapon.

10 If this weapon system is used defensively, for example for defence against surface vessels or underwater vessels approaching a harbour, control means, operating by electromagnetic or acoustic radiation or by a communication cable may be provided for activating and
15 de-activating the system as required. Particularly if a power supply can be fed to the system, it is readily possible then to bury and raise the container as often as required.

If the weapon system is to be used offensively, for
20 example in the sea near enemy territory, the ability to have the system buried in the sand or silt in the sea bed significantly reduces the possibility of detection of the weapon.

If acoustic or electromagnetic radiation signals are
25 to be received when the container is buried in the sea bed, receiving means may be provided which can be

erected and retracted as required. A programmed intermittent listening with retraction of the receiving sensor, e.g. radio aerial, may be employed to reduce the possibility of detection.

5 By the use of a self-propelled weapon, this weapon system enables action to be taken, for example against surface or underwater craft, over a large area, far larger than is possible with conventional mines. If a number of weapon systems are deployed, they may be
10 linked, for example to a central listening system so as to ensure that the weapon most advantageously sited is employed.

In the foregoing, the use of a weapon such as a torpedo has been referred to more particularly as a
15 means of attack on surface or underwater craft. The weapon however may be any weapon suitable for underwater launching and may, for example, be a ballistic missile. A ballistic missile may be guided, in a known way, in accordance with pre-programmed or pre-received
20 instructions, onto a selected static target defined by its geographical location, or it may have target-detecting sensor means.

Preferably the container or at least the part thereof housing the weapon is constructed to be watertight
25 and pressure-tight. The weapon thus may be stored in a predetermined atmosphere, for example with controlled humidity, and/or in an inert gaseous atmosphere.

Although, in the above, the container has been described in combination with a self-propelled weapon, this type of container may be used more generally for the storage of weapons or other equipment. For example
5 it might be used for the storage of weapons, supplies or other equipment for use on submarines, particularly nuclear submarines having long-term underwater capability. This would enable such vessels to be re-supplied without having to come to the surface.

10 The following is a description of one embodiment of the invention, reference being made to the accompanying drawings in which:-

Figure 1 is a diagrammatic side elevation of a weapon system; and

15 Figure 2 is an end elevation with the end plate removed.

Referring to Figure 1 there is shown diagrammatically a self-propelled weapon 10 which, in this case, is a conventional torpedo for underwater travel, the torpedo
20 including a homing means (not shown) for sensing a target and for control of guidance means. This weapon 10 is housed within a pressure-tight chamber 11 which is closed at the forward end by a detachable bulkhead 12.

This particular weapon system is arranged to sit on
25 the sea bed substantially horizontally and to be buried

in the sea bed in a substantially horizontal position. Along the whole length of the bottom of the container is a suction chamber 15. Suction pumps 16, 17 are provided having inlets 18, 19 leading to this suction
5 chamber 15. A plurality of such inlets may be provided if necessary opening into the suction chamber at spaced points along the length thereof. These pumps have outlets 20, 21 respectively on the upper surface of the container.

10 It will be seen that, if the container is put on its base on the sea bed and the pumps are operated, the sand and/or silt on the sea bed will be sucked upwardly from underneath the weapon system via the suction chamber 15 and the pumps 16, 17 and ejected upwardly
15 through the outlets 20, 21. Such operation of the pumps therefore causes the container to bury itself within the sea-bed. Normally the pumps would be operated until the top of the container is approximately at the level of the sea-bed, in other words, the container
20 is substantially completely buried in the sand or silt. Reversal of the pumps, by pumping sand or silt into the region underneath the container will raise the container. If the forward pump 17 is connected to the forward part of the suction chamber 15, operation of the
25 forward pump only would cause the forward end of the container only to be lifted. This may be preferred in some cases for launching a weapon.

In the particular embodiment illustrated, two retractable aerials 22 are shown for reception of communication signals for activating the system. Such activation can be arranged to operate the pumps 16, 17
5 to raise the container or at least the forward end thereof. A sensor (not shown) for detecting the presence of a surface craft or underwater craft is provided in the container. Such a sensor may for example be an acoustic sensor and the container may contain programme
10 means containing the "voice prints" of known target so that any received signals may be analysed and identified and if necessary compared with such voice prints. The listening watch may be continuous or may be intermittent. When a target vessel is detected,
15 the aforementioned forward bulkhead with the forward pumping compartment is removed and the weapon is launched. The weapon, as previously mentioned, is self-propelled and has homing means to guide it towards the target.

CLAIMS:-

1. An underwater weapon system comprising a
self-propelled weapon with target housing means, a
5 watertight container for the weapon, pump means
having an inlet or inlets on the underside of the
container and an outlet or outlets above the under-
side, whereby sand or silt under the container may
be pumped away to cause the container to become
10 buried in sand or silt on the sea-bed, the pump
means being operatively reversible to pump sand or
silt underneath the container for raising the container.

2. An underwater weapon system comprising a
15 self-propelled weapon with target homing means, and
a container for said weapon, said container including
pump means having an inlet or inlets on the underside
of the container and an outlet or outlets above the
underside, said container further having control means
20 for operating said pump means and further control
means operative to open the container to permit
release of the weapon.

3. A weapon system as claimed in claim 2 wherein
25 means are provided to stop the pump means when the

container is buried to a predetermined depth.

4. A weapon system as claimed in either claim 2
or claim 3 wherein said control means are arranged in
5 response to a command signal to operate the pump
means to raise the container to a position for weapon
release.

5. A weapon system as claimed in any of claims
10 2 to 4 wherein means responsive to an external command
signal are provided for activation of the control
means for the weapon system.

6. A weapon system as claimed in claim 5 and
15 having a receiver for receiving an acoustic or
electromagnetic command signal.

7. A weapon system as claimed in claim 6 and
having a retractable receiving sensor for receiving
20 said command signal.

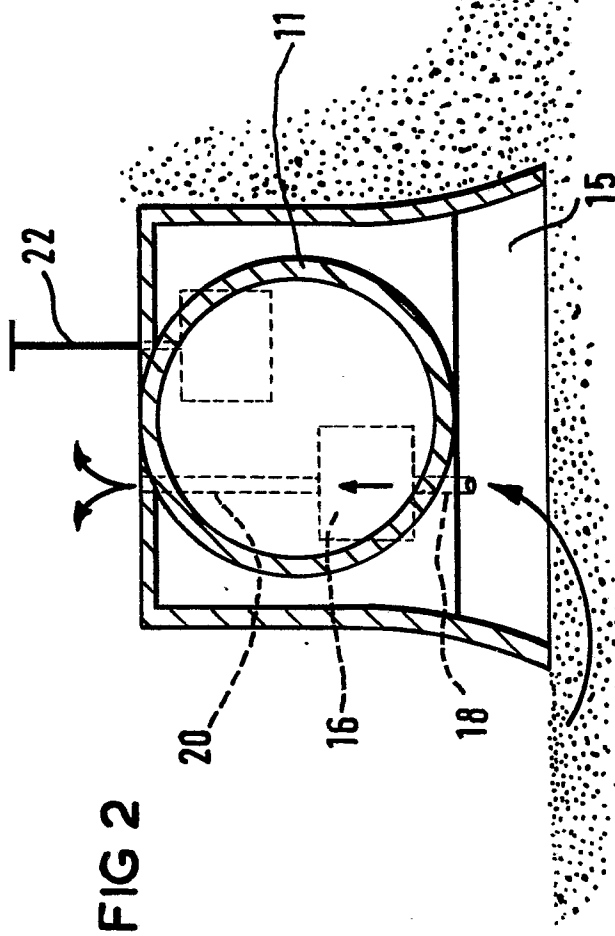
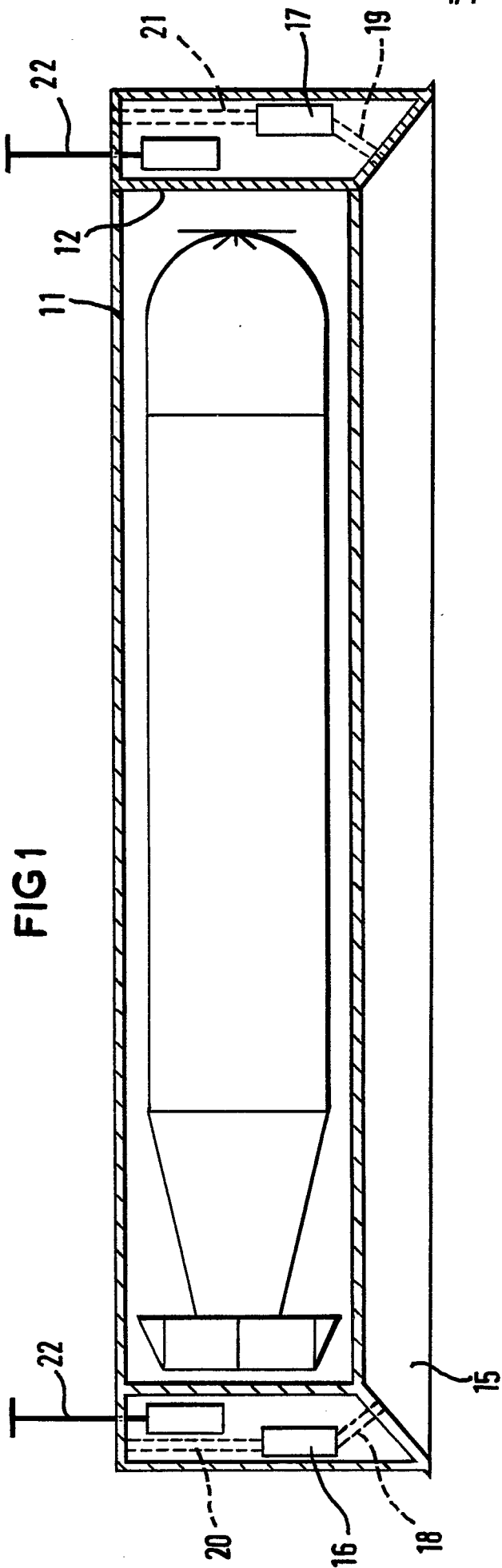
8. A weapon system as claimed in any of the
preceding claims wherein the weapon is a torpedo.

25 9. A weapon system as claimed in any of claims

1 to 8 wherein the weapon is a ballistic missile.

10. A weapon system as claimed in any of the
preceding claims and having a target detection
5 sensor within the container arranged to initiate
launching of the weapon.

11. A weapon system as claimed in any of the
preceding claims wherein the container, or at least
10 the part thereof housing the weapon is watertight
and pressure-tight.





European Patent
Office

EUROPEAN SEARCH REPORT

0053210
Application number
EP 80 30 435

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	<u>US - A - 3 811 379</u> (SONDHEIMER) * The whole patent * -- <u>FR - A - 1 545 658</u> (SUD. AVIATION) * Page 1, right-hand column, paragraph 12; page 2, left-hand column, paragraphs 1-4; figures 1,2 * --	1,2,5, 6,8, 10,11 1,2,9, 11	F 41 F 3/10
A	<u>US - A - 3 193 853</u> (ALEXANDER)		TECHNICAL FIELDS SEARCHED (Int. Cl.)
A	<u>DE - A - 2 032 126</u> (MESSERSCHMITT)		F 42 B
A	<u>US - A - 4 003 291</u> (VASS)		F 41 F
A	<u>US - A - 3 109 370</u> (ELMER)		
A	<u>US - A - 3 038 406</u> (ELMER)		
A	<u>GB - A - 216 905</u> (VICKERS)		

			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			&: member of the same patent family, corresponding document
/ The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
The Hague	28-07-1981	VAN DER FLAS	