

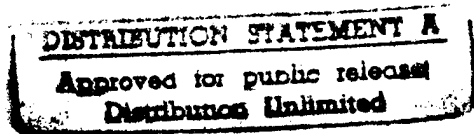
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NOTICE

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1 Navy Case No. 75533

2
3 UNMANNED UNDERSEA WEAPON DEPLOYMENT STRUCTURE
4 WITH CYLINDRICAL PAYLOAD DEPLOYMENT SYSTEM

5
6 STATEMENT OF GOVERNMENT INTEREST

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

11
12 CROSS-REFERENCE TO RELATED APPLICATIONS

13 "Unmanned Undersea Vehicle With Keel-Mounted Payload
14 Deployment System" (Navy Case No. 75532) filed of even date
15 herewith in the name of Christopher F. Hillenbrand.

16 "Unmanned Undersea Vehicle With Erectable Sensor Mast For
17 Obtaining Position and Environmental Vehicle Status" (Navy Case
18 No. 75534) filed of even date herewith in the names of
19 Christopher F. Hillenbrand and Donald T. Gomez.

20 "Unmanned Undersea Vehicle System For Weapon Deployment"
21 (Navy Case No. 75535) filed of even date herewith in the names of
22 Christopher F. Hillenbrand and Donald T. Gomez.

1 "System For Deploying Weapons Carried In An Annular
2 Configuration In A UUV" (Navy Case No. 75536) filed of even date
3 herewith in the names of Christopher F. Hillenbrand and Donald T.
4 Gomez.

5 "Unmanned Undersea Weapon Deployment Structure With
6 Cylindrical Payload Configuration" (Navy Case No. 76115) filed of
7 even date herewith in the name of Christopher F. Hillenbrand.

8 "Unmanned Undersea Vehicle Including Keel-Mounted Payload
9 Deployment Arrangement With Payload Compartment Flooding
10 Arrangement To Maintain Axi-Symmetrical Mass Distribution" (Navy
11 Case No. 76117) filed of even date herewith in the name of
12 Christopher F. Hillenbrand.

13 BACKGROUND OF THE INVENTION

14 (1) Field of the Invention

15 The invention relates generally to the field of nautical
16 weapon delivery systems and more particularly to nautical systems
17 for covertly deploying multiple weapons while eliminating the
18 necessity of having manned ships or submarines present at the
19 deployment site.
20

21 (2) Description of the Prior Art

22 Underwater missiles and torpedoes are currently launched
23 from either the offside of a manned ship or from the torpedo tube
24 of a manned submarine. This current method of deploying
25 underwater weapons requires the actual presence of the ship
26 and/or submarine at the deployment site, thereby posing a number

1 of dangers, including (1) the lives of the people on the ship or
2 submarine, including the equipment itself, are exposed to enemy
3 fire in a danger zone, and (2) ships, as well as submarines in
4 shallow water, are exposed and thereby easily detected by an
5 enemy.

6 Conventional wire-guided torpedoes are available as
7 generally unmanned vehicles, but there are a number of problems
8 in using them as a weapon system platform. A torpedo does not
9 have an arrangement for compensating for buoyancy when a weapon
10 is released from a torpedo shell. Thus, the shock to the torpedo
11 carrier when a weapon is launched will result in an unstable
12 carrier. Also, the torpedo carrier itself is not recoverable,
13 and hence can only be used once.

14 15 SUMMARY OF THE INVENTION

16 It is therefore an object of the invention to provide a new
17 and improved system for undersea weapon deployment.

18 Another object of the invention is to provide such a system
19 which employs an unmanned undersea vehicle to transport the
20 weapon from a mother vessel to a weapon firing site remote from
21 the mother vessel.

22 Still another object to the invention is to provide such a
23 system having a capability to deploy three or more slim envelope
24 dimensioned weapons.

25 In brief summary, the invention provides an unmanned
26 undersea vehicle system comprising a remote-controlled, unmanned

1 undersea vehicle and a mother vehicle interconnected by a
2 communication link. The unmanned undersea vehicle includes a
3 weapon compartment and a control means. Within the weapon
4 compartment are a plurality of weapon deployment devices
5 symmetrically disposed about a central core of axisymmetrical
6 shape and made of positively buoyant material, each weapon
7 deployment device having a weapon canister for carrying a weapon,
8 the weapon deployment devices being pivotable between a
9 retracted, non-deployed position and an extended, deployed
10 position, and configured so that, when in their extended,
11 deployed positions the respective weapon canisters are positioned
12 beyond the vehicle's diameter. Each weapon canister includes end
13 caps at opposing ends which are discharged when the weapon
14 contained therein is fired to allow seawater to enter. The
15 control means controls the deployment of the weapon by expelling
16 the weapon from the weapon compartment and thereafter controls
17 the firing of the weapon. The construction and arrangement of
18 the buoyant central core is chosen to provide a distribution of
19 mass within the vehicle that enhances stability of vehicle motion
20 during deployment and firing of weapons. The mother vehicle
21 generates command information for controlling the control means
22 and receives unmanned undersea vehicle status information from
23 the unmanned undersea vehicle and processes it for use in
24 generating the command information. The communication link
25 interconnects the unmanned undersea vehicle and the mother
26 vehicle to facilitate transfer of command information from the

1 mother vehicle to the unmanned undersea vehicle and to further
2 facilitate transfer of unmanned undersea vehicle status
3 information from the unmanned undersea vehicle to the mother
4 vehicle.
5

6 BRIEF DESCRIPTION OF THE DRAWINGS

7 This invention is pointed out with particularity in the
8 appended claims. The above and further advantages of this
9 invention may be better understood by referring to the following
10 description taken in conjunction with the accompanying drawings,
11 in which:

12 FIG. 1 depicts an unmanned undersea weapon deployment system
13 constructed in accordance with the invention;

14 FIG. 2 depicts, in schematic form, the side elevational view
15 of an unmanned undersea vehicle useful in the system depicted in
16 FIG. 1.;

17 FIG. 3 depicts, in schematic form, the side perspective view
18 of a weapon compartment useful in one embodiment of the unmanned
19 undersea vehicle depicted in FIG. 2;

20 FIG. 4 depicts, in schematic form, the sectional view of the
21 weapon compartment depicted in FIG. 3, taken along the line A-A
22 in FIGS. 2 and 3, with the weapons being situated in a non-
23 deployment condition;

24 FIG. 5 depicts, in schematic form, the sectional view of the
25 weapon compartment as depicted in FIG. 4, with the weapons being
26 situated in a deployment condition;

1 FIG. 6 depicts, in schematic form, a detail of a portion of
2 the weapon compartment depicted in FIGS. 3 through 5, which is
3 useful in understanding the weapon deployment operation;

4 FIG. 7 depicts, also in schematic form, the detail of a
5 weapon canister used in the weapon compartment depicted in FIGS.
6 3 through 6, which is useful in understanding the weapon
7 deployment operation;

8 FIG. 8 depicts, in schematic form, the side perspective view
9 of a weapon compartment useful in a second embodiment of the
10 unmanned undersea vehicle depicted in FIG. 2;

11 FIG. 9 depicts, also in schematic form, the sectional view
12 of the weapon compartment depicted in FIG. 8, taken along the
13 line B-B in FIG. 8, with the weapons being situated in a non-
14 deployment condition; and

15 FIG. 10 depicts, also in schematic form, the sectional view
16 of the weapon compartment depicted in FIG. 8, taken along the
17 line B-B in FIG. 8, with the weapons being situated in a
18 deployment condition.

19 20 DESCRIPTION OF THE PREFERRED EMBODIMENT

21 FIG. 1 depicts an unmanned undersea weapon deployment system
22 10 in accordance with the invention. With reference to FIG. 1,
23 the system 10 includes a "mother vehicle" 11 and a unmanned
24 undersea vehicle 12 constructed in accordance with the invention,
25 which are interconnected by a communication link 13 such as an
26 optical fiber. The mother vehicle 11 may be a conventional

1 manned nautical ship (either a surface ship or a submarine), to
2 which may be added (if necessary) mounting means (not separately
3 shown) for holding and releasing the unmanned undersea vehicle
4 into the ocean and for retrieving it from the ocean as described
5 below, and means (also not separately shown) for communicating
6 with the unmanned undersea vehicle to facilitate control of the
7 unmanned undersea vehicle by the mother vehicle as described
8 below.

9 FIG. 2 depicts, in schematic form, the side elevational view
10 of the unmanned undersea vehicle 12 which is useful in the system
11 10 depicted in FIG. 1. With reference to FIG. 2, the unmanned
12 undersea vehicle 12 includes an axi-symmetrical torpedo-shaped
13 outer hull 20 which houses a forward control system compartment
14 21, a weapon system compartment 22 and an aft "control effectors"
15 compartment 23. The central portion of the outer hull 20 is
16 generally cylindrical, with a forward rounded nose (to the left
17 in FIG. 2) and a tapered tail (to the right in FIG. 2).
18 Extending rearwardly of the tail portion is a propeller 30 used
19 to drive the unmanned undersea vehicle 12 selectively in a
20 forward or rearward direction. Extending vertically and
21 horizontally from the tail portion are four fins 31-33. Two of
22 the fins, one identified by reference numerals 30 (shown in FIG.
23 1) on opposing sides of the tail portion extend horizontally
24 therefrom (the second horizontally-extending fin is not shown),
25 and two fins, identified by reference numerals 32 and 33, on
26 opposing sides extend vertically therefrom. The angular

1 orientation of the fins relative to the longitudinal axis of the
2 unmanned undersea vehicle 12 is adjustable to permit steering of
3 the unmanned undersea vehicle horizontally and vertically.

4 The control system compartment 21 includes a number of
5 elements, including local control circuitry 24 for controlling
6 the various elements of the unmanned undersea vehicle 12 in
7 response to commands provided by the mother vehicle 11 (FIG. 1),
8 as well as in response to information as to the unmanned undersea
9 vehicle's external environment as provided by an external sensor
10 25. The local control circuit 24 may include, for example, a
11 conventional auto-pilot and a suitably-programmed digital
12 computer, as well as electrical circuitry for providing control
13 signals to control other components of the unmanned undersea
14 vehicle 12 as described below. The external sensor 25 may
15 comprise, for example, a conventional Doppler sonar device.

16 The aft "control effectors" compartment 23 includes several
17 elements for propelling and steering the unmanned undersea
18 vehicle 12 and, in one embodiment, for connecting the unmanned
19 undersea vehicle to the communication link 13 and for reeling the
20 communication link 13 out as the unmanned undersea vehicle moves
21 away from the mother vehicle 12 and reeling it in as the unmanned
22 undersea vehicle 12 returns towards the mother vehicle 12. In
23 particular, the control effectors compartment 23 includes a motor
24 40 for powering the propeller 30. The motor, in turn, is powered
25 by a battery and motor control circuit 41, which receives motor
26 control information from the local control circuit 24 in the

1 control system compartment 21 over a control link represented by
2 a dashed line 42. The control effectors compartment 23 also
3 includes motors (not shown) for controlling the orientation of
4 the fins 31-33, which are also powered by and under control of
5 the battery and motor control circuit 41. The battery and motor
6 control circuit 41 also provides status information to the local
7 control circuit over the control link 42.

8 In one embodiment, the control effectors compartment 23 also
9 includes a mother vehicle control link 43, which performs the
10 functions of connecting the unmanned undersea vehicle 12 to the
11 communication link and reeling the communication link 13 out and
12 in as the unmanned undersea vehicle 12 moves away from and toward
13 the mother vehicle 11. The mother vehicle control link 43, in
14 turn, provides the command information it receives from the
15 communication link 13 to the local control circuit 24 over an
16 internal communication link represented by dashed line 44. In
17 addition, the local control circuit 24 provides unmanned undersea
18 vehicle status information, including information as to the
19 unmanned undersea vehicle's position and its environment, to the
20 mother vehicle control link 43 over the internal communication
21 link 44, and the mother vehicle control link 44 will transmit
22 that information over the communication link 13 to the mother
23 vehicle 11.

24 In one embodiment, the unmanned undersea vehicle 12 also
25 includes an erectable mast 50, which may be extended in a
26 telescoping manner from the control effectors compartment. The

1 far (upper) end of the mast 50 includes sensor equipment which
2 permits acquisition of certain positioning and environmental
3 information. In particular, the mast 50 includes an optical
4 and/or video camera 51, which may be a CCD device, for obtaining
5 image information as to the vehicle's environment. The camera 51
6 provides the video information to the local control circuit 24,
7 which can process the information and use it locally, and in
8 addition can provide the processed and/or raw video information
9 to the mother vehicle 11. The mother vehicle 11, in turn, can
10 use the information received from the unmanned undersea vehicle
11 12 in determining the commands to be provided to the unmanned
12 undersea vehicle 12.

13 In addition, the mast 50 includes a Geodetic Position System
14 ("GPS") antenna 52. The GPS antenna 52 receives signals from the
15 Geodetic Positioning System maintained by the Federal Government
16 of the United States of America, and provides them to the local
17 control circuit 24 to facilitate determination of the vehicle's
18 location. The Geodetic Positioning System, as is well known,
19 includes a plurality of satellites which revolve around the Earth
20 and transmit signals which a conventional publicly-available GPS
21 receiver can use to identify the location of the receiver in any
22 relevant location on Earth. It will be appreciated that other
23 embodiments may utilize other location positioning systems, such
24 as may be provided by the Federal Government's Loran-C system.
25 In either case, the local control circuit 24 can use the
26 positioning information locally and it can provide the can

1 provide the information to the mother vehicle 11. The mother
2 vehicle 11, in turn, can use the information received from the
3 unmanned undersea vehicle 12 in determining the commands to be
4 provided to the unmanned undersea vehicle 12.

5 As noted above, the unmanned undersea vehicle 12 further
6 includes a weapon compartment 22. The weapon compartment 22
7 stores and deploys weapons, in the form of missiles, under
8 control of the local control circuit 24 operating, in turn, under
9 control of the mother vehicle 11. In one embodiment, which will
10 be described below in connection with FIGS. 3 through 7, the
11 weapon compartment 22 deploys a plurality of weapons axially
12 symmetrically about the unmanned undersea vehicle 12. In a
13 second embodiment, which will be described below in connection
14 with FIGS. 8 through 10, the weapon compartment, identified in
15 those FIGS. by reference numeral 22' deploys the weapons
16 downwardly. In both cases, the weapon compartment can carry a
17 number of missiles and deploy them individually in a plurality of
18 locations. As it deploys the individual weapons, the weapon
19 compartment 22 and 22' maintains axial mass symmetry, which
20 simplifies steering of the vehicle as it is propelled through the
21 ocean, as well as simplifying weapon deployment from multiple
22 positions.

23 FIG. 3 depicts, in schematic form, the side perspective view
24 of weapon compartment 22, and FIG. 4 depicts, in schematic form,
25 the sectional view of the weapon compartment depicted in FIG. 3,
26 taken along the line A-A in FIGS. 2 and 3. Insofar as the

1 invention is presently understood, weapon compartment 22 embodies
2 the preferred mode of invention, with respect to the instant
3 above-entitled invention. In FIGS. 2 and 3, the weapons are
4 shown in retracted, non-deployed condition. FIG. FIG. 5 depicts,
5 in schematic form, the sectional view of the weapon compartment
6 as depicted in FIG. 4, with the weapons being situated in an
7 extended, deployment condition. With reference to those figures,
8 the weapon compartment 22 includes a central core 60, formed of a
9 buoyant material, having a central aperture 61 which extends
10 therethrough from the forward control system compartment 23 to
11 the rear control effectors compartment 24. Core 60 may be formed
12 of any suitable buoyant material, such as a buoyant composite.
13 The forming of core 60 out of a buoyant material contribute
14 significantly to providing a distribution of mass within the
15 vehicle which enhances stability of vehicle motion when weapons
16 are deployed and fired. It also provides a significant reduction
17 of the vehicle weight enabling more weight to be allocated to the
18 vehicles payload, namely weapons. The central aperture 61 is co-
19 axial with the weapon compartment 22 and provides a passageway
20 through which the connections extend between the forward control
21 system compartment 23 and the rear control effectors compartment
22 24.

23 In addition, around the exterior surface of the central core
24 60 is formed a plurality of recesses 63(1) through 63(6)
25 (specifically shown in FIG. 5, and generally identified by
26 reference numeral 63(i)). In each recess 63(i) is mounted a

1 pivotal weapon deployment device 62(1) through 62(6) (generally
2 identified by reference numeral 62(i)). FIGS. 3 and 4 show the
3 weapon deployment devices 62(i) in a retracted, non-deployed
4 position, FIG. 5 shows the weapon deployment devices 62(i) in an
5 extended, deployed position, and FIG. 6 shows a detail of a
6 weapon deployment device 62(1) useful in understanding deployment
7 thereof. Each weapon deployment device 62(i) comprises a weapon
8 canister 64(i) mounted on a pivotable arm 65(i). When retracted,
9 as shown in FIGS. 3 and 4, the weapon deployment canister 64(i)
10 and arm 65(i) fits into the respective recess 63(i). The outer
11 surfaces of the arms 65(i) are contoured to conform to and form
12 the cylindrical outer surface of portion of the hull 20
13 comprising the weapon compartment 22.

14 As noted above, FIG. 5 shows the weapon deployment devices
15 62(i) in their respective deployed positions. As shown in FIG.
16 5, in the deployed positions, the weapon deployment devices 62(i)
17 are pivoted about respective pivot points 66(i) so that the
18 weapon canisters 64(i) are positioned beyond the surface of the
19 hull 20. As shown in FIG. 6, the weapon deployment devices 62(i)
20 are pivoted between the retracted, non-deployed position and the
21 extended, deployed position by respective electrical motors 67(i)
22 through a gear train 68(i). The motors 67(i), in turn, are
23 controlled by the local control circuit 24 (FIG. 1). It will be
24 appreciated that a plurality of motors and associated gear trains
25 may be situated along the length of the weapon compartment 22 to
26 provide for more rapid pivoting of the associated weapon

1 deployment device 62(i) than may be provided by a single
2 motor/gear train.

3 The procedure used in deploying and firing missiles from the
4 weapon compartment 22 will be described in connection with FIG.
5 7, as well as FIGS. 3 through 6. Initially, the local control
6 circuit 24, under control of the mother vehicle 11, has guided
7 the unmanned undersea vehicle 12 to a position in which a missile
8 is to be deployed and fired. While the unmanned undersea vehicle
9 12 is being propelled to the deployment and firing position, the
10 weapon deployment devices 62(i) will be in the retracted, non-
11 deployed position. After the unmanned undersea vehicle 12
12 arrives at the deployment and firing position, the local control
13 circuit 24, if commanded by the mother vehicle 11 to actually
14 deploy and fire one or more of the weapons, will actuate the
15 motors 67(i) that are associated with all of the weapon
16 deployment devices 62(i) and enable them to pivot the weapon
17 deployment devices 62(i) to the deployed condition. By deploying
18 all of the weapon deployment devices 62(i) symmetrically about
19 the axis of the unmanned undersea vehicle 12, the unmanned
20 undersea vehicle 12 is assured that it will not be forced from
21 the deployment position.

22 After all of the weapon deployment devices 62(i) have been
23 pivoted to the extended, deployed position, missiles contained in
24 one or more of the weapon canisters 64(i) may be fired. The
25 firing process will be described in connection with FIG. 7. With
26 reference to FIG. 7, the weapon canister 64(i) comprises a

1 cylindrical canister body 80(i), a forward end cap 81(i) and a
2 rear end cap 82(i). Prior to firing, the end caps 81(i) and
3 82(i) are affixed to the canister body 80(i) to form a housing
4 for a missile 83(i). When affixed to the canister body 80(i),
5 the end caps 81(i) and 82(i) seal the interior of the canister
6 64(i) from seawater surrounding the canister.

7 When the missile 83(i) inside of the weapon canister 64(i)
8 is fired, air pressure from the combusted gases generated during
9 the firing process builds up inside the canister 64(i), which
10 enables the end caps 81(i) and 82(i) to be blown off the canister
11 body 80(i). When the end caps 81(i) and 82(i) are off the
12 canister 64(i), the missile will thereafter propel itself
13 forward. In addition, seawater from outside of the canister will
14 enter the interior of the canister.

15 After the missile 83(i) has been fired, the local control
16 circuit 24 can actuate the motors 67(i) to enable the weapon
17 deployment devices 62(i) to be pivoted between the extended,
18 deployed position and the retracted, non-deployed position. In
19 that operation, the seawater which entered the canisters 64(i) of
20 the weapon deployment devices 62(i) when the respective missiles
21 therein were fired will remain therein. The seawater in the
22 canisters 64(i) for the fired missiles will help to maintain the
23 symmetry of mass around the longitudinal axis of the unmanned
24 undersea vehicle 12, which, in turn, will simplify controlling
25 the unmanned undersea vehicle 12 as it thereafter propels itself
26 beyond the weapon deployment and firing position.

1 While the unmanned undersea vehicle 12 including weapon
2 compartment 22 has been depicted in FIGS. 3 through 7 as
3 providing six weapon deployment devices 62(i), it will be
4 appreciated that any number of weapon deployment devices 62(i)
5 may be provided in the unmanned undersea vehicle 12.

6 FIG. 8 depicts, in schematic form, the side perspective view
7 of the second embodiment weapon compartment 22'. In the weapon
8 compartment 22', two weapons 90(F) and 90(A) are positioned fore
9 and aft toward the bottom of the weapon compartment 22'. In
10 addition, forward and aft buoyancy tanks 91(F) and 91(A) are
11 provide proximate to and above the correspondingly-indexed
12 weapons 90(F) and 90(A). Positioned between the buoyancy tanks
13 91(F) and 91(A) is a mother vehicle control link 92, which
14 performs the same function as mother vehicle control link 43
15 (FIG. 2); in a unmanned undersea vehicle 12 which incorporates
16 weapon compartment 22', the mother vehicle control link 43 is not
17 present in the aft control effectors compartment 23. Each
18 buoyancy tank 91(F) and 91(A) is provided with a plurality of
19 actuatable valves 93(F) and 93(A) which provide a controllable path
20 to enable seawater exterior of the weapon compartment to flow
21 into the respective buoyancy tank 91(F) and 91(A) during
22 deployment and firing of the respective weapon 90(F) and 90(A) as
23 described below.

24 The operations performed by the unmanned undersea vehicle
25 12, in particular by the weapon compartment 22', in connection
26 with deployment and firing of the weapons 90(F) and 90(A) will be

1 described in connection with FIGS. 9 and 10. FIG. 9 depicts,
2 also in schematic form, the sectional view of the weapon
3 compartment depicted in FIG. 8, taken along the line B-B in FIG.
4 8, with the weapon 90(F) being situated in a non-deployment
5 condition; and FIG. 10 depicts, also in schematic form, the
6 sectional view of the weapon compartment depicted in FIG. 8,
7 taken along the line B-B in FIG. 8, with the weapon 90(A) being
8 situated in a deployment condition.

9 With reference to FIG. 9, weapon compartment 22' is provided
10 with a trap door 94 proximate the weapon 90(F), to facilitate
11 deployment and firing of the weapon. The trap door 94 is curved
12 to provide an arc that, when closed (FIG.9), the trap door 94
13 forms part of the cylindrical hull 20. Initially, the unmanned
14 undersea vehicle 12, in response to commands from the mother
15 vehicle 11 as described above, moves to a position at which it is
16 to deploy and fire a weapon. Thereafter, the local control
17 circuit 24, also in response to commands from the mother vehicle
18 11, enables the trap door 94 to open and the weapon compartment
19 to expel the weapon 90(F) downwardly. (It will be appreciated
20 that weapon 90(A) can also be expelled if both weapons are to be
21 fired contemporaneously.) After the weapon(s) has (have) been
22 expelled to a position completely exterior of the weapon
23 compartment 22', the weapon(s) can be fired. It will be
24 appreciated that, to facilitate complete expulsion of the
25 weapon(s) from the weapon compartment 22', the opening provided
26 by the open trap door 94 will be at least as large as the

1 diameter of the respective weapon. After deployment and firing
2 of the weapon(s) the local control circuit 24 may enable the trap
3 door 94 to close. Similar operations may be performed if only
4 weapon 90(A) is to be deployed and fired.

5 During the deployment and firing operation, as a weapon
6 90(F) or 90(A) is expelled, seawater enters the cavity from which
7 the weapon was expelled. Contemporaneously, to maintain an
8 axially-symmetrical distribution of mass and buoyancy in the
9 weapon compartment 22', the valves 93(F) or 93(A) connected to
10 the respective buoyancy tank 91(F) or 91(A) are also actuated to
11 enable seawater to enter the buoyancy tank. Accordingly, when
12 forward weapon 90(F) is deployed and fired, the forward buoyancy
13 tank 91(F) is filled, and when aft weapon 90(A) is deployed and
14 fired, the aft buoyancy tank 91(A) is filled. The seawater in
15 the buoyancy tanks 91(F) and 91(A) for the fired weapons will
16 help to maintain the symmetry of mass around the longitudinal
17 axis of the unmanned undersea vehicle 12, which, in turn, will
18 simplify controlling the unmanned undersea vehicle 12 as it
19 thereafter propels itself beyond the weapon deployment and firing
20 position.

21 While the unmanned undersea vehicle 12 including weapon
22 compartment 22' has been described as providing two weapons 90(F)
23 and 90(A) and an associated number of buoyancy tanks 91(F) and
24 91(A), it will be appreciated that any number of weapons and
25 associated buoyancy tanks may be provided in the unmanned
26 undersea vehicle 12.

1 The unmanned undersea vehicle 12 provides a number of
2 advantages. In particular, it provides a covert means for
3 deploying multiple underwater missiles and/or torpedoes from a
4 remotely operated and submerged platform. The unmanned undersea
5 vehicle eliminates the necessity of having ships or submarines
6 and their personnel at the deployment site. In addition, it
7 provides a covert means for detecting enemy targets. The
8 unmanned undersea vehicle is particularly useful in mapping and
9 eliminating undersea mine fields. In addition, the unmanned
10 undersea vehicle is relatively economical, since it is easily
11 recoverable; the mother vehicle 11 can, through suitable commands
12 provided to the local control circuit 24, enable the unmanned
13 undersea vehicle to, after the weapons are deployed and fired,
14 propel itself back to the mother vehicle 11 for retrieval. The
15 flooding of the weapon canisters 64(i) in weapon compartment 22,
16 and of the weapon cavity in weapon compartment 22', maintains the
17 stability of the submerged unmanned undersea vehicle during the
18 weapon deployment and launching process.

19 The preceding description has been limited to a specific
20 embodiment of this invention. It will be apparent, however, that
21 variations and modifications may be made to the invention, with
22 the attainment of some or all of the advantages of the invention.
23
24
25

1 Navy Case No. 75533

2
3 UNMANNED UNDERSEA WEAPON DEPLOYMENT STRUCTURE
4 WITH CYLINDRICAL PAYLOAD DEPLOYMENT SYSTEM
5

6 ABSTRACT OF THE DISCLOSURE

7 An unmanned undersea vehicle system includes a remote-
8 controlled, unmanned undersea vehicle and a mother vehicle
9 interconnected by a communication link. The unmanned undersea
10 vehicle includes a weapon compartment and a control means.
11 Within the weapon compartment are a plurality of weapon
12 deployment devices situated about a central core of axisymmetrical
13 shape and made of a positively buoyant material, each weapon
14 deployment device having a weapon canister for carrying a weapon.
15 The weapon deployment devices are pivotable between a retracted
16 position and an extended position. Each weapon canister includes
17 end caps at opposing ends which are discharged when the weapon
18 contained therein is fired to allow seawater to enter. The
19 control means controls the deployment of the weapon by expelling
20 the weapon from the weapon compartment and thereafter controls
21 the firing of the weapon. The buoyancy of the central core of
22 the weapon compartment enhances stability of vehicle motion
23 during deployment and firing of weapons. The mother vehicle
24 generates command information for controlling the control means
25 and receives unmanned undersea vehicle status information from
26 the unmanned undersea vehicle and processes it for use in

1 generating the command information. The communication link
2 interconnects the unmanned undersea vehicle and the mother
3 vehicle to facilitate transfer of command information from the
4 mother vehicle to the unmanned undersea vehicle and to further
5 facilitate transfer of unmanned undersea vehicle status
6 information from the unmanned undersea vehicle to the mother
7 vehicle.

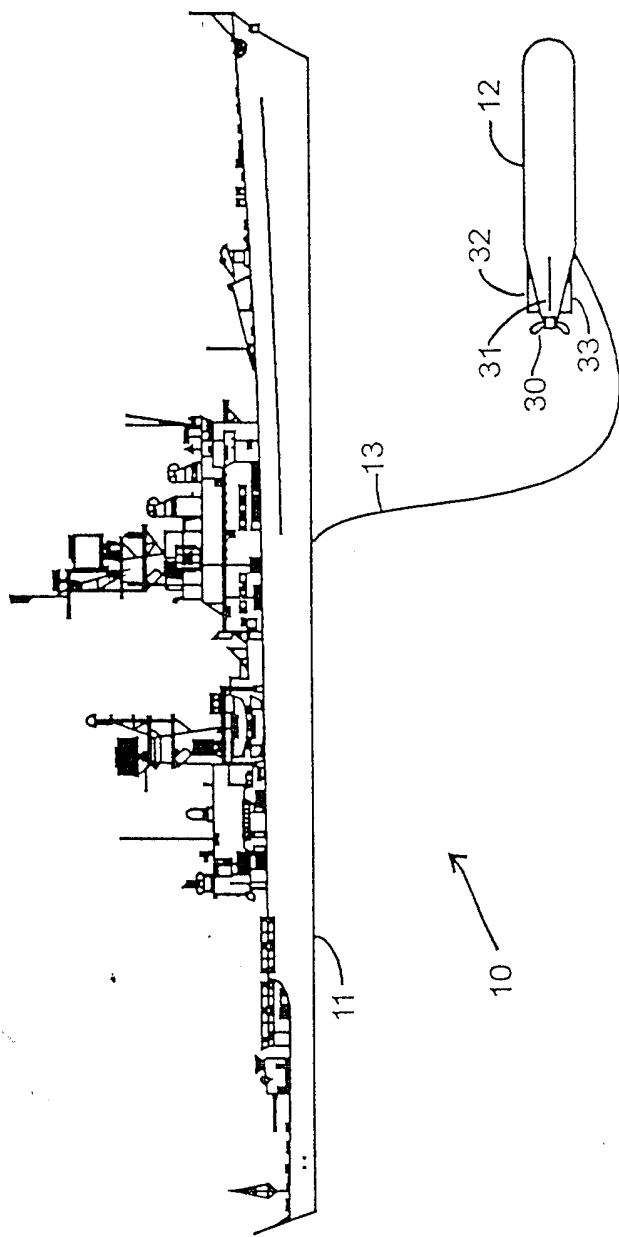
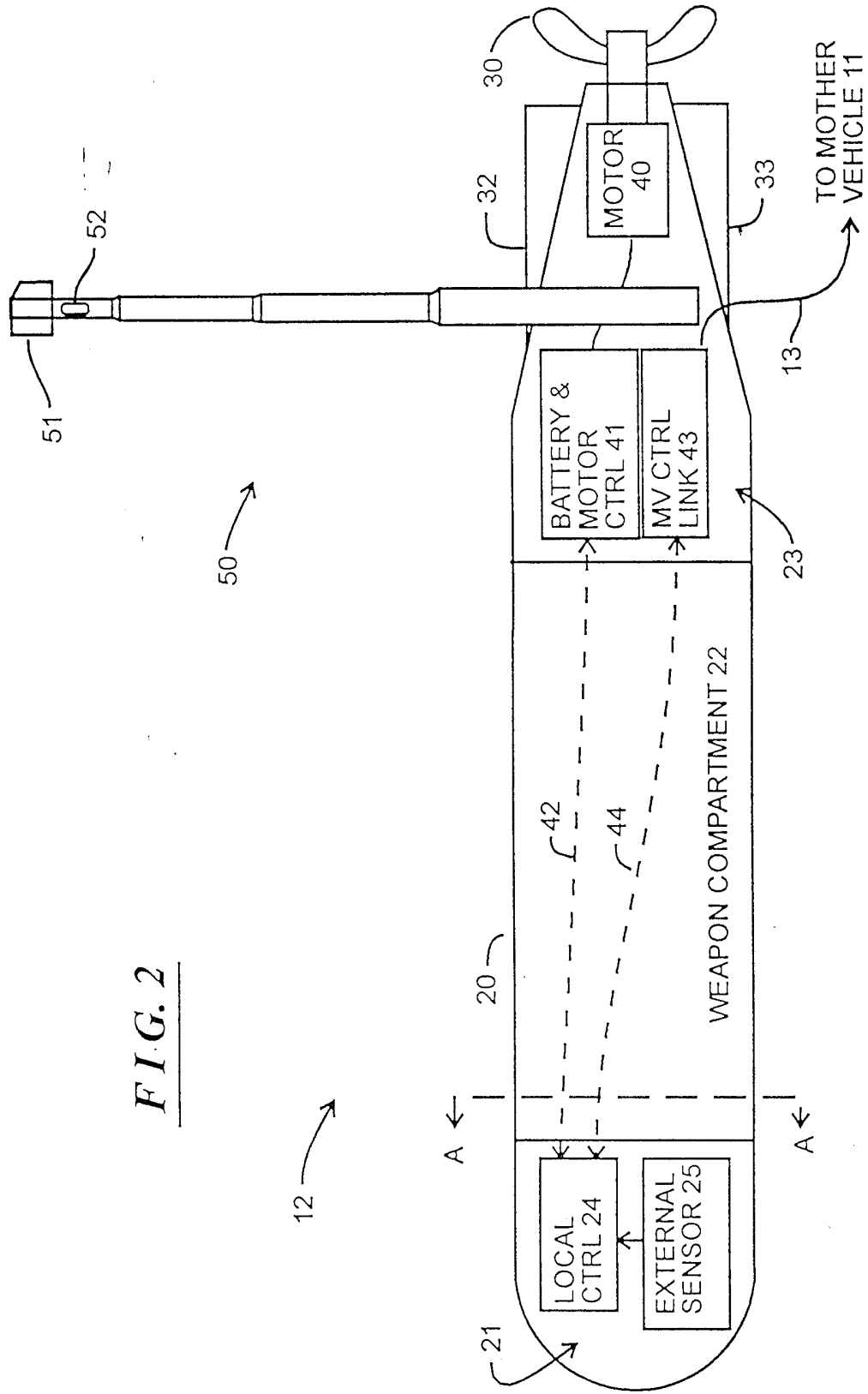


FIG. 1

FIG. 2



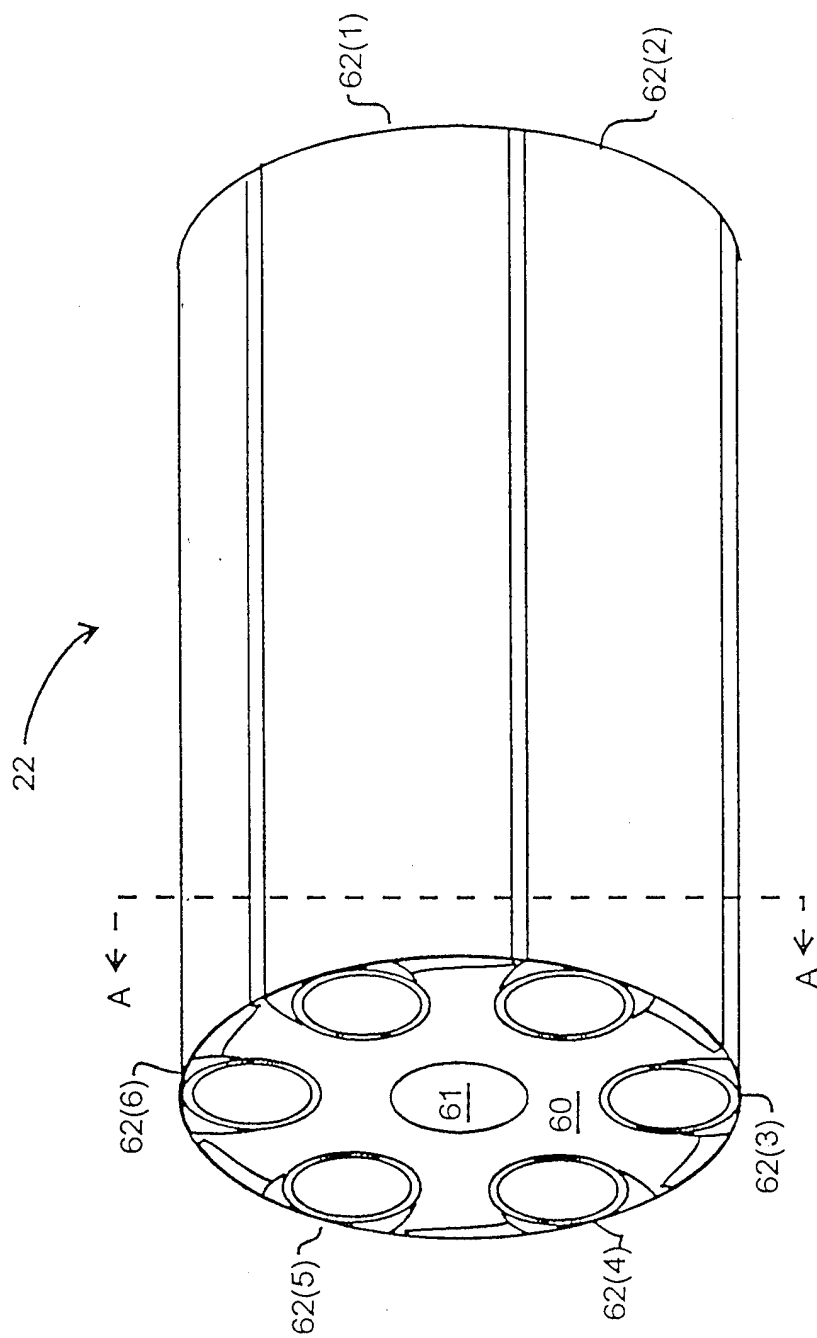


FIG. 3

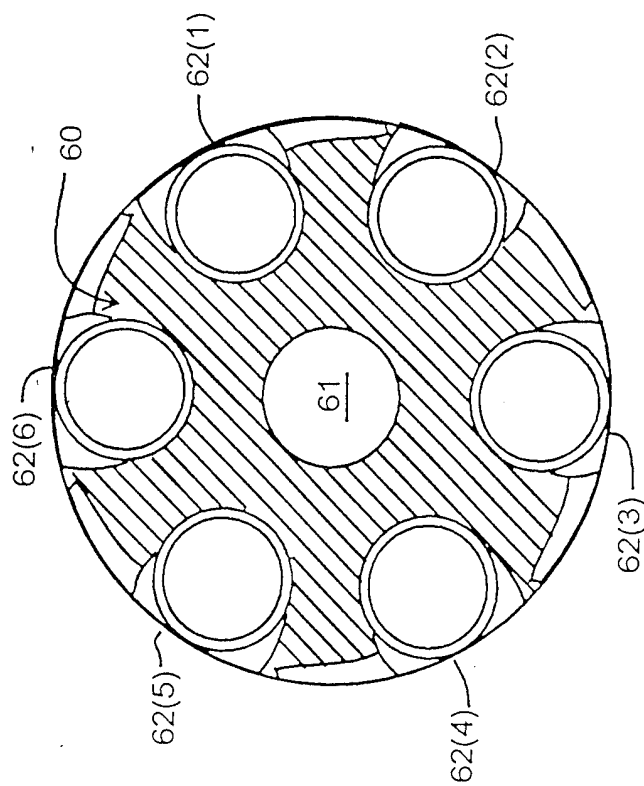


FIG. 4



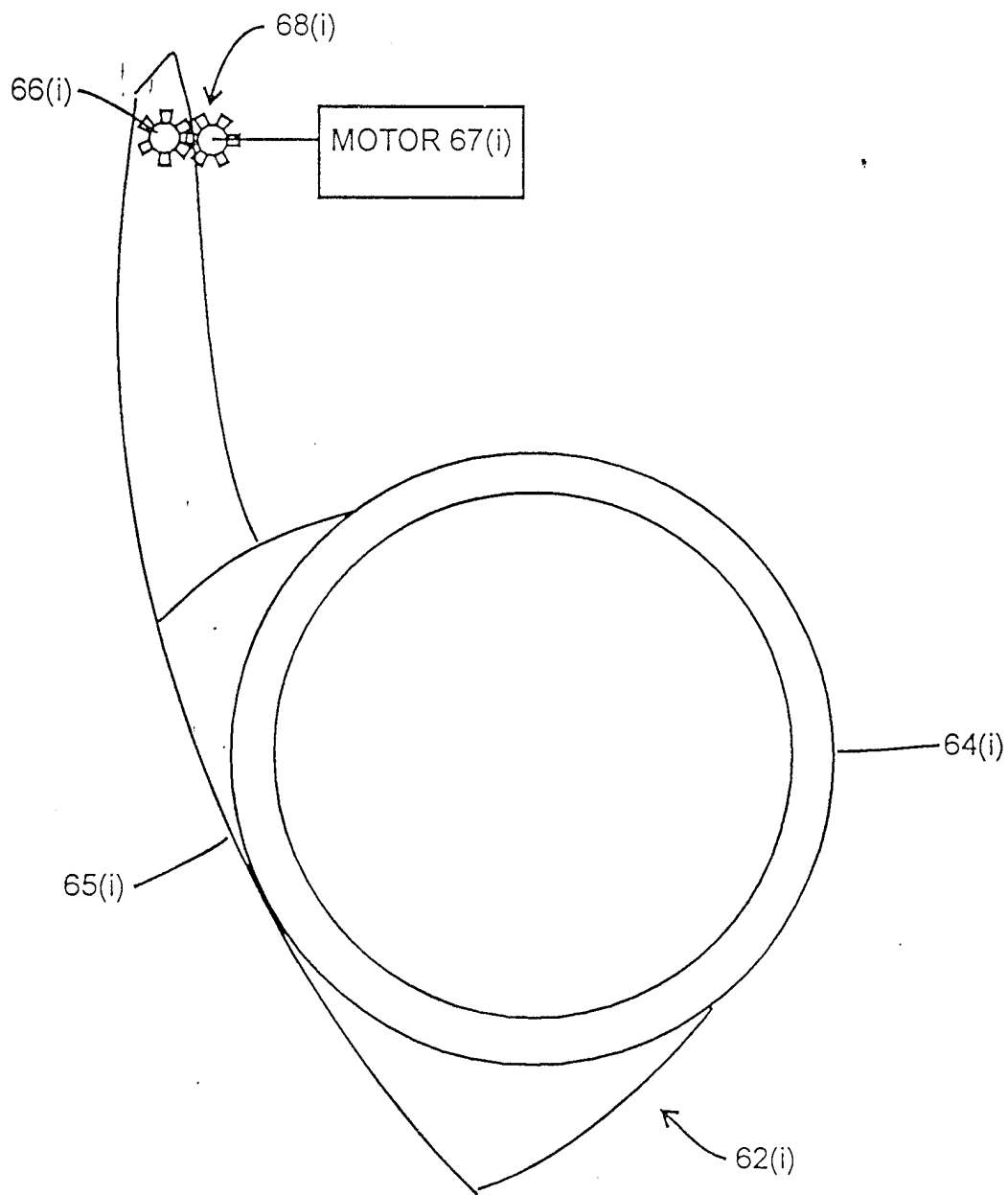


FIG. 6

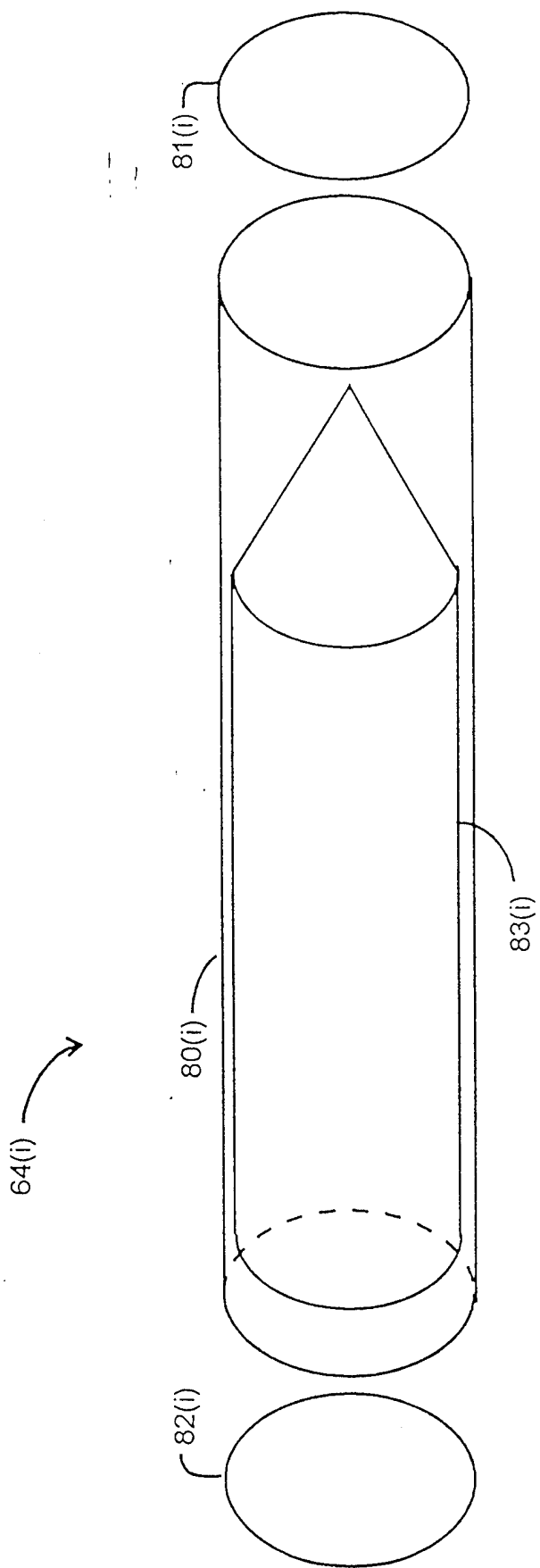


FIG. 7

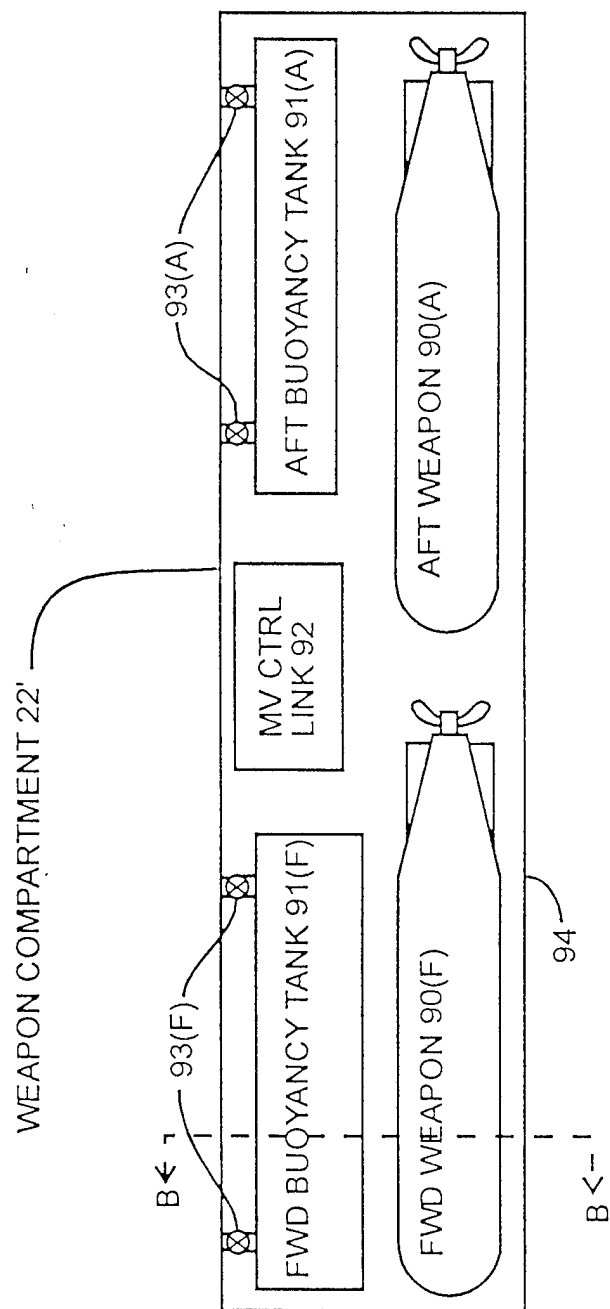


FIG. 8

