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Winters

[11] **3,751,030**

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[54] **AQUATIC APPARATUS WITH BUOYANCY CONTROL STRUCTURE**

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[51] **Int. Cl.** **B63b 7/06,** A63g 31/00

[58] **Field of Search** ..... 272/1 B; 9/2 A, 2 R; 114/16 R, 16 A, 16 E; 46/94

[56] **References Cited**

UNITED STATES PATENTS

3,491,997	1/1970	Winters	272/1 B
443,991	1/1891	Ellis	272/1 B
3,126,558	3/1964	Nolan et al.	9/2 R

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Assistant Examiner—R. T. Stouffer
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[57] **ABSTRACT**

A floatable-submersible aquatic apparatus including a substantially hollow shell exteriorly configured in the shape of an aquatic animal. The shell is provided with fore and aft ports to permit the free ingress and egress of water through the shell. The interior of the shell is provided with first and second buoyancy control members which are attached longitudinally along first and second lateral surfaces of the shell. Each control member includes a chamber which may be selectively filled with air through a valve. Inside of each chamber is positioned a block of floatable polystyrene material to maintain minimum buoyancy of the apparatus. The aquatic apparatus may also include a snorkel operably connectable through an upper and lower portion thereof.

10 Claims, 4 Drawing Figures

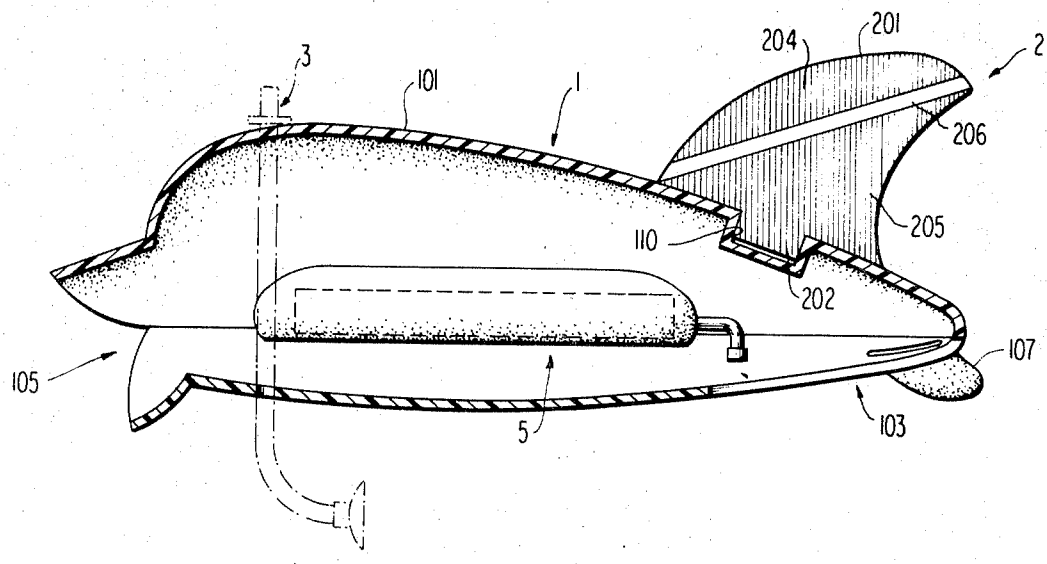


FIG.1

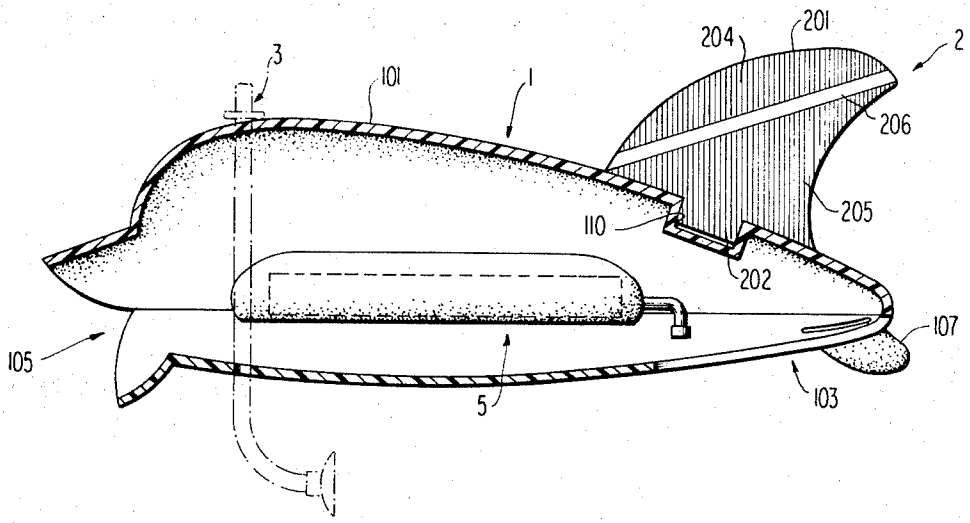
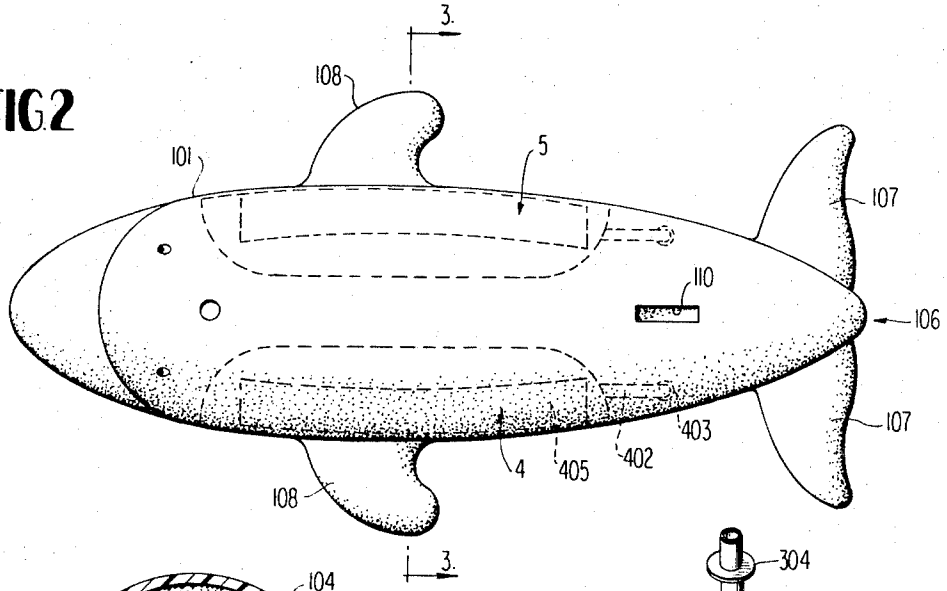


FIG.2



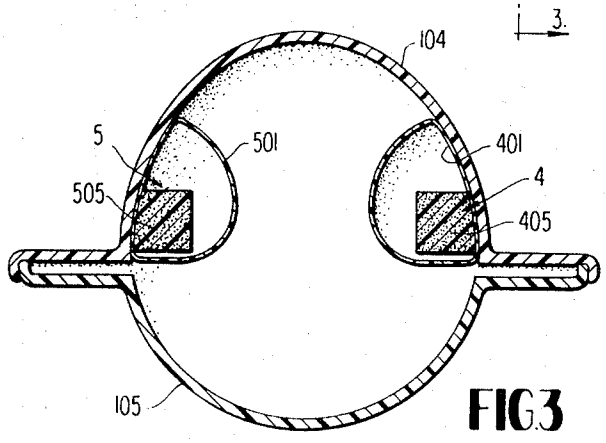


FIG.3

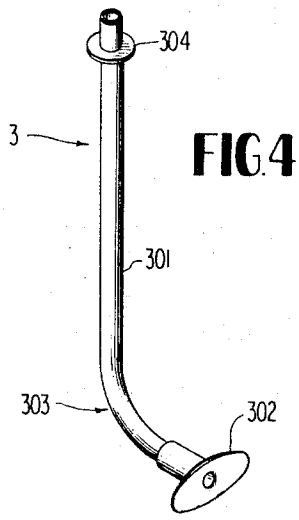


FIG.4

AQUATIC APPARATUS WITH BUOYANCY CONTROL STRUCTURE

RELATED PATENTS

This invention relates to and is an improvement of my invention disclosed and claimed in U.S. Pat. No. 3,491,997 entitled "Swimming Aid Capable of Undergoing Porpoise-Like Leaping Movement."

BACKGROUND OF THE INVENTION

This invention relates to a floatable-submersible aquatic apparatus. More particularly the invention relates to a floatable-submersible aquatic apparatus designed to function as a swimming aid, floating article support, surfing aid, etc. Moreover, the invention relates to a floatable-submersible apparatus which may be exteriorly configured in the shape of and which may be suitable to have the operational characteristics of an aquatic animal, such as for example, a porpoise or dolphin, shark, sea turtle, seal and the like.

A variety of buoyant aquatic devices have been previously developed to serve as swimming aids and/or amusement devices. Moreover, some of these previously known devices have been configured in the shape of aquatic animals. Such devices, however, while providing a degree of utility are primarily limited in their operational characteristics to riding devices designed to buoyantly support a person generally above the surface of a body of water. It would be highly desirable to provide an aquatic device which may be utilized in a range of operational modes much broader than the above noted aquatic devices.

More specifically it would be highly desirable to provide a swimming aid capable of operating over a wide range of movements including generally horizontal movement along the surface of a body of water, diving beneath the surface of a body of water, leaping movements in the water, and movement from a horizontal to a substantially vertical orientation within a body of water, much in the way that a porpoise moves from a swimming position to a stationary, nearly vertical posture.

Further, scuba divers have experienced difficulty in certain areas in supporting spare tanks of air, buoyantly supporting a scuba diver's flag to warn of underwater activity, and effectively deterring predatory fish such as for example, sharks. A buoyant device which could deter sharks from entering an area, support articles such as spare air tanks. and effectively support a scuba diver's flag would obviously be of immense value.

Applicant has previously created a device which meets at least some of the foregoing needs. Such a device is described and claimed in applicant's previously noted U.S. Pat. No. 3,491,997. The disclosure of this patent is hereby incorporated by reference as though set forth at length.

Notwithstanding, however, the advantageous utility and structural desirability of applicant's above referred to aquatic device, room for significant functional and structural innovation remains.

In this connection, it would be highly desirable to provide a floatable-submersible aquatic device retaining the operational capability of applicant's prior device while adding a surfing capability thereto. Further, it would be desirable to provide a floatable-submersible aquatic device having a degree of roll stability. Additionally, it would be desirable to provide a floatable-submersible aquatic device suitable to retain the operational capability of applicant's prior device while minimizing manufacturing difficulties and expense.

OBJECTS OF THE INVENTION

It is therefore a general object of the invention to provide an aquatic apparatus which will meet at least some of the desirable characteristics previously described.

It is a particular object of the invention to provide an aquatic device suitable for utilization in a wide range of operational modes.

It is another object of the invention to provide an aquatic device configured in the shape of an aquatic animal capable of utilization in a wide range of operational modes which may be readily and conveniently manufactured.

It is still another object of the invention to provide an aquatic device retaining the operational capability of applicant's previously patented device while adding a surfing capability thereto.

It is a further object of the invention to provide an aquatic device retaining the operational capability of applicant's previously patented device, while adding a degree of roll stability thereto.

It is a still further object of the invention to provide an aquatic apparatus having a minimum buoyancy which may be readily increased.

SUMMARY OF THE INVENTION

A preferred embodiment of the invention suitable to accomplish at least some of the foregoing objects comprises a generally elongate hollow shell exteriorly fashioned in the configuration of an aquatic animal and having a fore and aft port fashioned therein to provide for the free ingress and egress of water through the shell. A first buoyancy control member is connected interiorly and longitudinally along a first lateral interior surface of the shell and a second buoyancy control member is connected interiorly and longitudinally along a second lateral interior surface of the shell oppositely spaced from the first lateral interior surface of the shell.

THE DRAWINGS

Other objects and advantages of the present invention will become apparent from the following detailed description taken in conjunction with the accompanying drawing wherein:

FIG. 1 is a cross-sectional view of a floatable-submersible aquatic apparatus having the configuration of a porpoise with a water port in the fore and aft portions thereof to permit the free ingress and egress of water longitudinally through the shell.

FIG. 2 is a top view of the aquatic apparatus of FIG. 1 disclosing first and second buoyancy control members positioned interiorly within the shell and along opposite interior surfaces thereof;

FIG. 3 is a cross-sectional view taken along section line 3—3 of FIG. 2; and

FIG. 4 is a snorkel device operably adapted to be positioned through apertures in the upper and lower surfaces of the aquatic device as illustrated in phantom in FIG. 1.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawings and particularly in

FIG. 1 thereof there will be seen a preferred embodiment of the subject invention comprising an aquatic apparatus including a generally closed hollow body means 1 configured externally to resemble the natural shape of a porpoise or dolphin. It should be realized, however, that other aquatic animal configurations may be utilized such as, for example, a shark, sea turtle, a seal or the like. A fin simulation member 2 and a snorkel 3 may be selectively connected to the hollow body means 1 for use in operational modes which will be discussed more fully hereinafter. Left and right buoyancy control chambers 4 and 5 respectively (note FIG. 2) are attached to interior longitudinal surfaces of the hollow body means 1 and serve a multiplicity of functions also to be discussed in detail hereinafter.

The body means 1 includes a generally closed shell 101. The shell 101 is provided with ports 102 and 103 in the fore and aft ends thereof respectively. The ports provide an avenue for the free ingress and egress of water through the shell to effectively keep the aquatic device at a realistic depth in the water and enable water to flow freely through the body without impeding forward movement thereof.

The shell 101 may be formed with an integral tail portion 106, note FIG. 2, including laterally extending flukes 107. The tail flukes serve to support a rider, particularly when the aquatic device is manipulated in a generally erect posture within a body of water. Further, integrally formed with the body shell 101 are a pair of flippers 108. One flipper is fashioned on each lateral surface of the body member and extends generally normally therefrom. The flippers thus positioned serve as hand holds for a person utilizing the device and aesthetically provide the aquatic device with a realistic porpoise appearance.

The body shell 101 may be fabricated from a suitable plastic material such as, for example, polyethylene or acrylonitrile-butadiene-styrene copolymer resin (ABS) so as to have structural integrity. The body shell may be made in one complete part if blow molding or rotational molding techniques are utilized or in two parts comprising, as best illustrated in FIG. 3, a top half 104 and a bottom half 105, if vacuum forming or injection molding techniques are utilized. The two parts may be permanently sealed together if vacuum formed or snapped together if injection molded in order to form a complete body shell 101 in the shape of an aquatic animal.

A dorsal fin 201 may be operably connectable to an upper aft portion of the shell 101. As illustrated in FIG. 1 the outer surface of the dorsal fin 201 is provided with indicia simulating a scuba diver flag. This indicia is provided on both sides of the fin 201 and includes first and second red portions 204 and 205 separated by a diagonal white stripe 206. The dorsal fin 201 is preferably formed with an extension 202. The extension 202 may be generally rectangular in cross-section and is adapted to be received within a compatibly dimensioned recess 110 sunk into the shell 101. The dorsal fin 201 may be operably connected to the shell 101 by an interference fit. If a more rigid connection is desired, a suitable threaded connection, such as a bolt and wing nut combination may be utilized.

Operationally, the dorsal fin 201 is utilized with the snorkel 3 during skin diving operations. The special color design of the fin is a warning signal for crafts to stay clear of the immediate area, thereby protecting someone utilizing the aquatic device and swimming beneath the surface of the body of water.

Turning now to FIG. 4 there will be seen a snorkel 3 including a conduit 301 having attached at a lower end thereof a mouthpiece 302. The conduit 301 is fashioned having a bend 303 therein and is adapted to receive over an upper end thereof a retaining ring 304 which may be held in place by an interference fit.

When a swimmer desires to utilize the aquatic device in a skin diving mode of operation, the snorkel 3 may be positioned through an aperture 112 in the lower body surface of shell 101 and an aperture 113 in the upper body surface as illustrated in phantom in FIG. 1. The curved portion of the snorkel 303 abuts against the outer belly surface of the body member 101 and the retainer ring 304 may then be slipped into position to secure the snorkel in an operational mode to be discussed in more detail hereinafter.

Turning again to FIGS. 1–3, there will be seen positioned interiorly of the shell 101 a pair of spaced buoyancy control means 4 and 5, respectively.

Buoyancy control means 4 includes an outer shell structure 401 which may be composed of a flexible vinyl material or a rigid self-supporting plastic as desired. The shell 401 is provided at one end with a conduit 402 having a suitable valve member 403 connected to the free end thereof for admitting air and/or water into the interior of the shell 401 as desired. The shell 401 thus forms a suitable closure for retaining air and/or water to control the buoyancy thereof and the buoyancy of the aquatic device. The outer shell 401 may be attached in a longitudinal posture to a lateral interior surface of the body shell 101 by gluing, heat welding or other fastening techniques as desired.

Connected to the shell 401 is a generally elongated bar 405 composed of a solid floatable material having a specific gravity of less than one. This material may be composed of, for example, cellular polystyrene. The solid floatation bar 405 may be connected to shell 401 as desired by being firmly encased within the shell or loosely floatable within the interior of the shell, or connected thereto by an enclosure exterior of the shell. While the drawings depict the solid floatation bar as being integral end to end, segmented units of solid floatation material are also contemplated.

Laterally spaced from buoyancy control means 4 and connected to the opposite lateral interior surface of the body shell 101 is buoyancy control chamber 5. The buoyancy control chamber 5 is identical with buoyancy control chamber 4 and includes a generally closed exterior shell 501 and connected thereto a solid floatation bar 505.

The solid floatation bars 405 and 505 provide a fixed minimum buoyancy for the aquatic device while the outer shell structures 401 and 501 provide a variable buoyancy capability.

MODE OF OPERATION

Having now described the structure of a preferred embodiment of the subject invention, several modes of operation utilizing the aquatic device within a body of water may be performed.

A person may use the aquatic device in one mode by removing the dorsal fin 2 from its top mounting and laying longitudinally along the top surface of the body, grasping flippers 108. The person thus supported on the aquatic device may produce a porpose-like gener-

ally horizontal swimming movement through the water by kicking his feet. Porpose-like leaping action may be effected by deflating buoyancy control chambers **401** and **501**, shifting the operator's body weight forward and downward and kicking both feet alternately.

The combination of water flowing through fore and aft ports **102** and **103** and the placement of the control buoyancy chambers **4** and **5** on lateral internal surfaces of the aquatic device effectively stabilizes the device against undue lateral roll, while at the same time keeping the device in a realistic looking depth for an aquatic animal swimming on the surface of a body of water.

If desired, an operator may also swim beneath the aquatic device by inserting the snorkel **3** up through the bottom hole **112** and the top hole **113** and securing the upper threaded fastener **305** in place. The snorkel mouthpiece **302** may be firmly held within the rider's mouth and the person may breathe easily and freely while lying face down within the body of water completely submerged beneath the aquatic device.

An amusing whale-like spouting effect may be produced by letting the snorkel mouthpiece **302** drop from the mouth so that water may enter the tube **301** and quickly inserting the snorkel within the operator's mouth and blowing, thus expelling the water from the snorkel tube in a spouting fashion.

To simulate playing catch ball, the buoyancy control chambers **4** and **5** may be inflated and a rider may position himself upon the tail flukes **107** and grasp the flippers **108.** This position will induce the aquatic device to sit upright in the water. Children may then have fun tossing articles into the open mouth or port **102** while the rider rocks back and forth, side to side, helping to catch the article in the mouth. The rider may also dive and catch articles in the mouth of the aquatic device while swimming under water.

While in the position of sitting on the tail flukes a rider may simulate a porpose tail walk. In this connection, backward movement may be achieved by kicking ones feet forward. Completely inflating control buoyancy chamber **4** and **5** will keep the porpoise standing high out of the water, making for an easy backward motion.

With chambers **4** and **5** deflated, the porpoise will stand upright in the water while the rider is sitting on the tail flukes but in a much lower position. This lower position serves to simulate a porpoise or aquatic animal waiting with his mouth open for someone to throw him a fish. Eating of the fish may, of course, be simultated by this invention through disappearance of the object through the mouth **102.**

By completely inflating the control buoyancy chambers **4** and **5** and lying longitudinally along the top of the aquatic apparatus, a person can surf on ocean waves. The waves will flow through the rear or aft aperture **103** and push against the air filled chambers **4** and **5** thereby providing a thrilling and fast ride to the shore.

The particular design of the buoyancy control chambers **4** and **5** inside the aquatic apparatus serves as a significant aid for non-swimmers. In this connection by initially completely inflating the buoyancy chambers a non-swimmer may learn to swim by letting out a small amount of air each day and in this way gaining confidence. It should be noted, however, that even with both buoyancy control chambers **4** and **5** deflated, the solid bars provide the apparatus with sufficient buoyancy to support the weight of the rider. This built-in safety feature adds to the confidence of a non-swimmer and enables one to have fun while learning.

The invention is also a suitable tool for scuba divers in that the device may be effectively utilized as a buoyant equipment support so that spare air tanks and gear may be handy suspended in a submerged posture. Further, a diver may utilize the support apparatus while changing tanks or resting. By attaching a monofilament line to the apparatus and then to a diver's weight belt, a diver can maintain the porpoise following directly over his head on the surface of the body of water. In this connection the fore and aft ports of the aquatic device permits the device to ride easily through the water. When the object of a diver's search is generally located, the diver may then utilize the apparatus as a stationary base of operations by anchoring the device to a rock or other stationary object. If a diver encounters trouble and must drop his weight belt, as is the normal procedure, the device will remain fairly well anchored and the diver may ascend to the surface and hold on to the device until help arrives. The location of a diver may be easily detected in that the large bright red dorsal fin secured to the back of the aquatic device is a readily recognizable signal.

In a further mode of operation, a diver may drive the apparatus under water with or without his equipment attached. In this way, the large aquatic structure serves to ward off predatory fish, such as sharks. Further, the apparatus, because of its hard self-supporting exterior structure may be maneuvered under water to serve as a shield in case of attack from a shark. Additionally, by utilizing the aquatic device as scuba gear, a diver may explore along the surface of a body of water and save his air tanks until reaching an area where tanks would be needed.

While several modes of operation utilizing the subject aquatic apparatus have been described above, those skilled in the art will readily recognize a multiplicity of additional operational modes.

MAJOR ADVANTAGES OF THE INVENTION

A principal advantage of the instant invention resides in the manner in which the hollow body containing an open port in the front and rear cooperates with the buoyancy control chambers to provide a realistic aquatic animal action in response to the manual manipulation of an individual supported by the aquatic apparatus. Other principal advantages include the manner in which the apparatus will enable a person to swim either on the surface of the body of water or submerge and in positions ranging from horizontal to substantially vertical orientation. Further the placement and location of the control buoyancy chambers and openings fore and aft of the aquatic device contributes to the ability of the device to be manipulated in a unique leaping, porpoise-like action.

Another advantage pertains to the manner in which the apparatus provides a buoyant scuba diver flag support in combination with a support which can adequately carry diver's gear, such as spare tanks, cameras, spear guns, etc.

A significant and independent aspect of the subject invention comprises the buoyancy control members, including the combination of a solid floatation bar and a fluid receivable chamber which advantageously provides a minimum fixed buoyancy with add on buoyancy

capability. Moreover, the fore and aft ports in the aquatic device permits forward movement of the apparatus through the water in a generally submerged posture without excessive drag. Additionally, the spaced buoyancy control members provide a degree of roll stability for the aquatic device.

Still further, the subject invention provides a floatable-submersible aquatic apparatus which may be readily and conveniently manufactured.

While the invention has been described with reference to preferred embodiments, it will be appreciated by those skilled in the art that additions, deletions, modifications and substitutions or other changes not specifically described may be made which will fall within the purview of the appended claims.

What is claimed is:

1. A submersible aquatic apparatus comprising:
a substantially hollow shell exteriorly formed in the configuration of an aquatic animal,
said shell having ports in the fore and aft portions thereof for the free ingress and egress of water through said shell;
a first buoyancy control member connected to said shell and positioned interiorly thereof longitudinally along a first lateral interior surface of said shell,
said first buoyancy control member including,
flexible impervious wall means,
a filling tube extending into said wall means, and
a valve positioned over a mouth of said filling tube, said first buoyancy control member being selectively operable to receive through said filling tube air to increase the buoyancy of said submersible aquatic apparatus; and
a second buoyancy control member connected to said shell and positioned interiorly thereof longitudinally along a second lateral interior surface of said shell, said second buoyancy control member including,
flexible impervious wall means,
a filling tube extending into said wall means, and
a valve positioned over a mouth of said filling tube, said second buoyancy control member being selectively operable to receive through said filling tube air to increase the buoyancy of said submersible aquatic apparatus; and
said first lateral surface being spaced from and generally opposite to said second lateral surface within the interior of said shell whereby the flexible impervious wall means of the first and second buoyancy control members may be inflated to block the free flow of water through the shell so that water may enter the aft port and push against the first and second buoyancy control members to facilitate surfing capability of the aquatic apparatus.

2. A submersible aquatic apparatus as defined in claim 1 wherein said first and second buoyancy control members each further comprise:
a generally elongated bar composed of a material having a specific gravity of less than 1.

3. A submersible aquatic apparatus comprising:
a substantially hollow shell exteriorly formed in the configuration of an aquatic animal,
said shell having ports in the fore and aft portions thereof for the free ingress and egress of water through said shell;
a first buoyancy control member connected to said shell and positioned interiorly thereof longitudinally along a first lateral interior surface of said shell;
a second buoyancy control member connected to said shell and positioned interiorly thereof longitudinally along a second lateral interior surface of said shell,
said first lateral surface being spaced from and generally opposite to said second lateral surface within the interior of said shell; and
said first and second buoyancy control members each comprising,
a generally elongated bar composed of a material having a specific gravity less than 1, and
a fluid chamber connected to and coextensive with said generally elongated bar.

4. A submersible aquatic apparatus as defined in claim 3 wherein said shell is composed of:
a self-supporting rigid plastic material.

5. A submersible aquatic apparatus as defined in claim 4 wherein said rigid plastic shell is exteriorly configued in the shape of:
a dolphin, having
an integral tail portion including laterally extending flukes positioned at the aft end of said shell operable to support a rider in a sitting posture,and
a pair of integral flippers,
one flipper generally extending normally from a first lateral exterior surface of said shell, and
one flipper extending generally normally from a second lateral exterior surface of said shell, said flippers being operable as hand holds for a rider.

6. A submersible aquatic apparatus as defined in claim 5 and further comprising:
a removable dorsal fin, said fin comprising,
an upstanding fin portion, and
a base portion, said base portion having a generally normally extending protrusion operable to detachably engage with a recess in an upper aft portion of said shell.

7. A submersible aquatic apparatis as defined in claim 4 wherein said shell is fashioned with:
an upper and lower port positioned in general vertical alignment, and
a generally flexible snorkel operably positioned through the upper and lower ports and detachably connected to said shell and having a mouth piece connected to said snorkel in a posture operably beneath said shell.

8. A submersible aquatic apparatus as defined in claim 3 wherein said bar is composed of:
a cellular polystyrene material.

9. A submersible aquatic apparatus as defined in claim 3 wherein said fluid chambers are formed having:
flexible impervious walls;
a filling tube extending into said fluid chamber; and
a valve positioned over a mouth of said filling tube, said fluid chamber being selectively operable to receive through said filling tube air to increase the buoyancy of said submersible aquatic apparatus or water to decrease the buoyancy of said submersible aquatic apparatus.

10. A submersible aquatic apparatus as defined in claim 3 wherein said fluid chambers are formed having:
rigid impervious walls;

a filling tube extending into said fluid chamber; and

a valve positioned over a mouth of said filling tube, said fluid chamber being selectively operable to receive through said filling tube air to increase the buoyancy of said submersible aquatic apparatus or water to decrease the buoyancy of said submersible aquatic apparatus.

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