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Li

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(54) **PERSONAL PROPULSION DEVICE**

(76) Inventor: **Raymond Li**, St. John's (CA)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **12/767,216**

(22) Filed: **Apr. 26, 2010**

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US 2010/0200702 A1 Aug. 12, 2010

Related U.S. Application Data

(60) Division of application No. 11/789,552, filed on Apr. 25, 2007, now Pat. No. 7,735,772, which is a continuation of application No. 11/088,330, filed on Mar. 23, 2005, now Pat. No. 7,258,301.

(60) Provisional application No. 60/556,396, filed on Mar. 26, 2004, provisional application No. 60/581,438, filed on Jun. 22, 2004.

(51) **Int. Cl.**
B64C 29/00 (2006.01)
B64C 39/02 (2006.01)

(52) **U.S. Cl.** .... **244/4 A**; 114/315; 440/38

(58) **Field of Classification Search** .... 244/4 A; 114/315; 440/23, 38
See application file for complete search history.

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(57) **ABSTRACT**

The present invention provides a personal propulsion device including a body unit having a center of gravity, where the body unit includes a thrust assembly providing a main conduit in fluid communication with at least two thrust nozzles, with the thrust nozzles being located above the center of gravity of the body unit. The thrust nozzles are independently pivotable about a transverse axis located above the center of gravity, and may be independently controlled by a single common linkage. The present invention may further include a base unit having an engine and a pump, which provides pressurized fluid to the body unit through a delivery conduit in fluid communication with both the base unit and the thrust assembly.

15 Claims, 6 Drawing Sheets

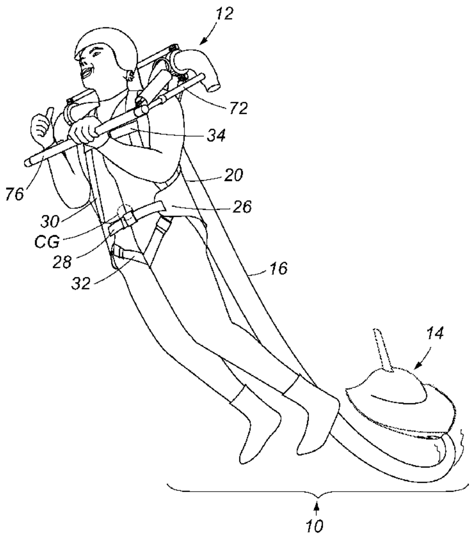

FIG. 1

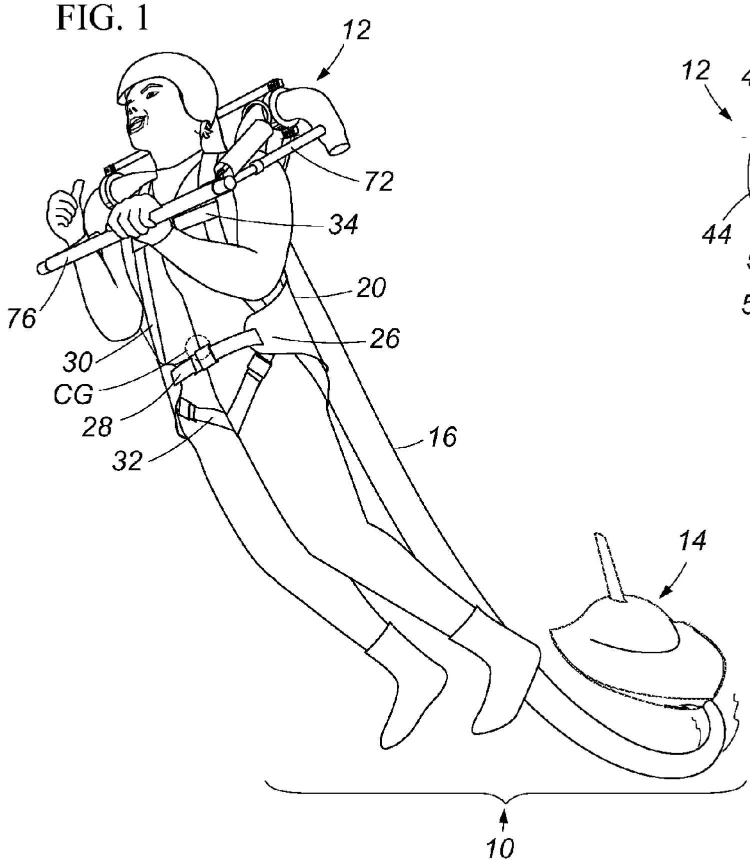

FIG. 2

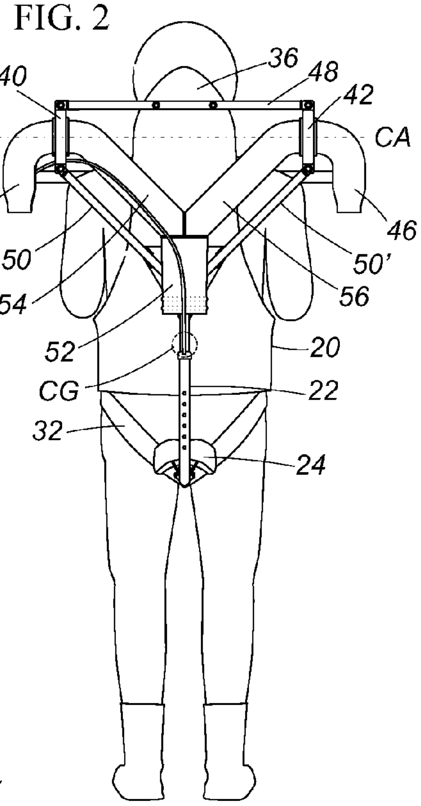

FIG. 3

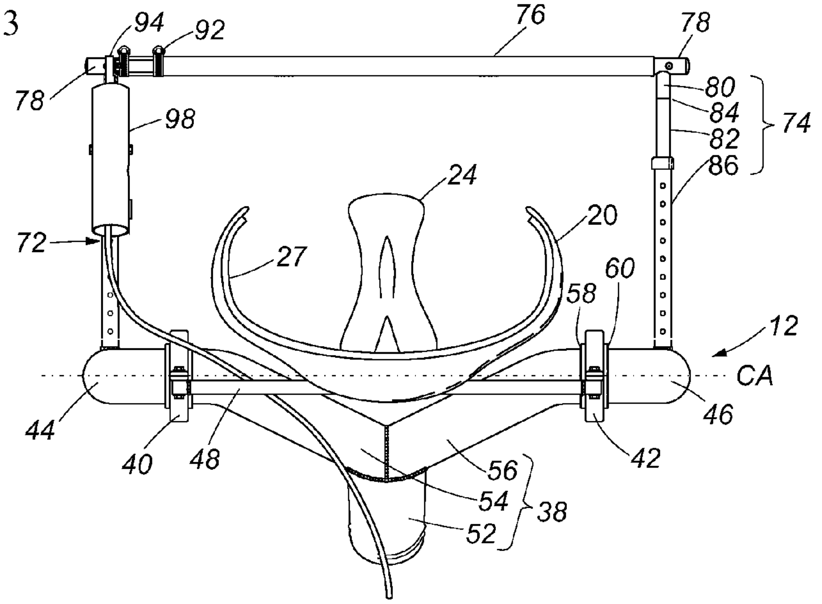

FIG. 4

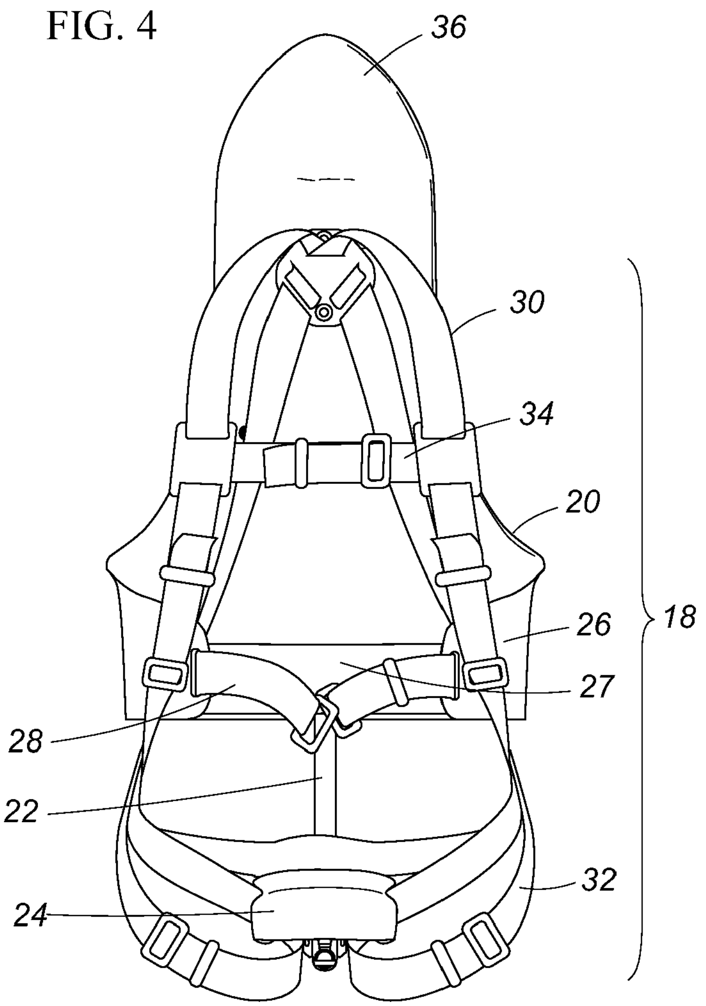
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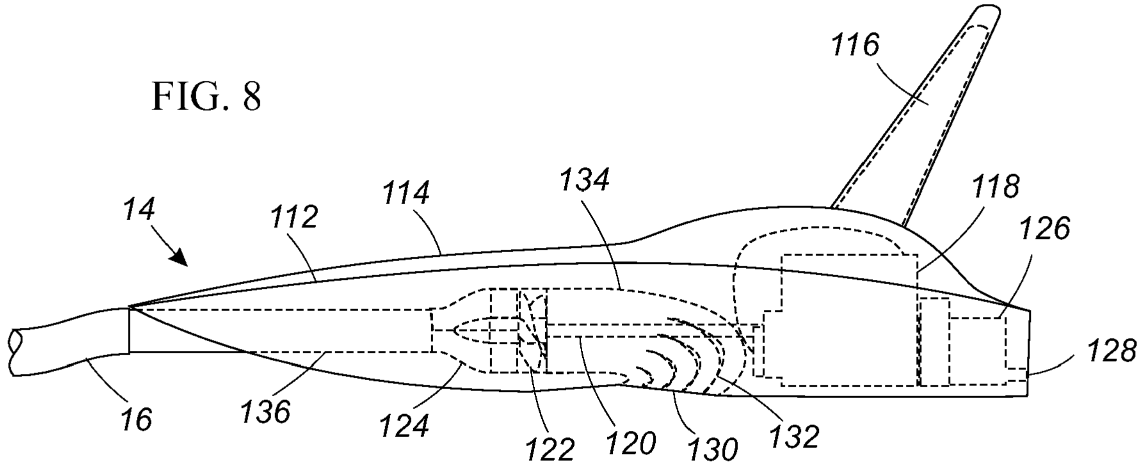
FIG. 8


116
14
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130
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FIG. 5

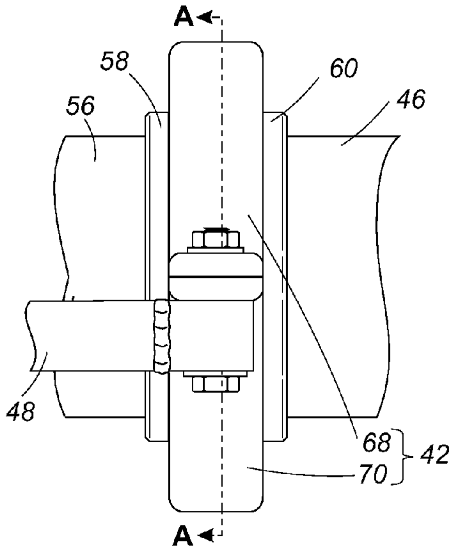


FIG. 6

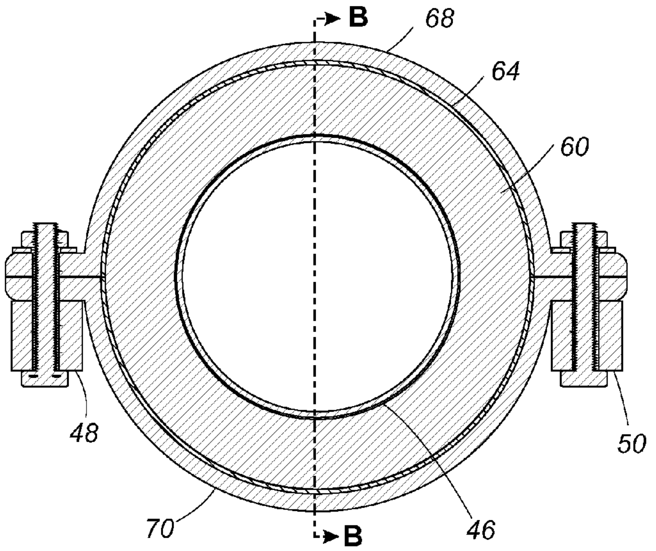


FIG. 7

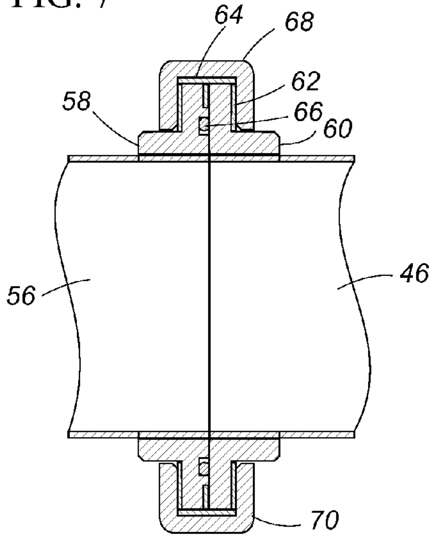


FIG. 9

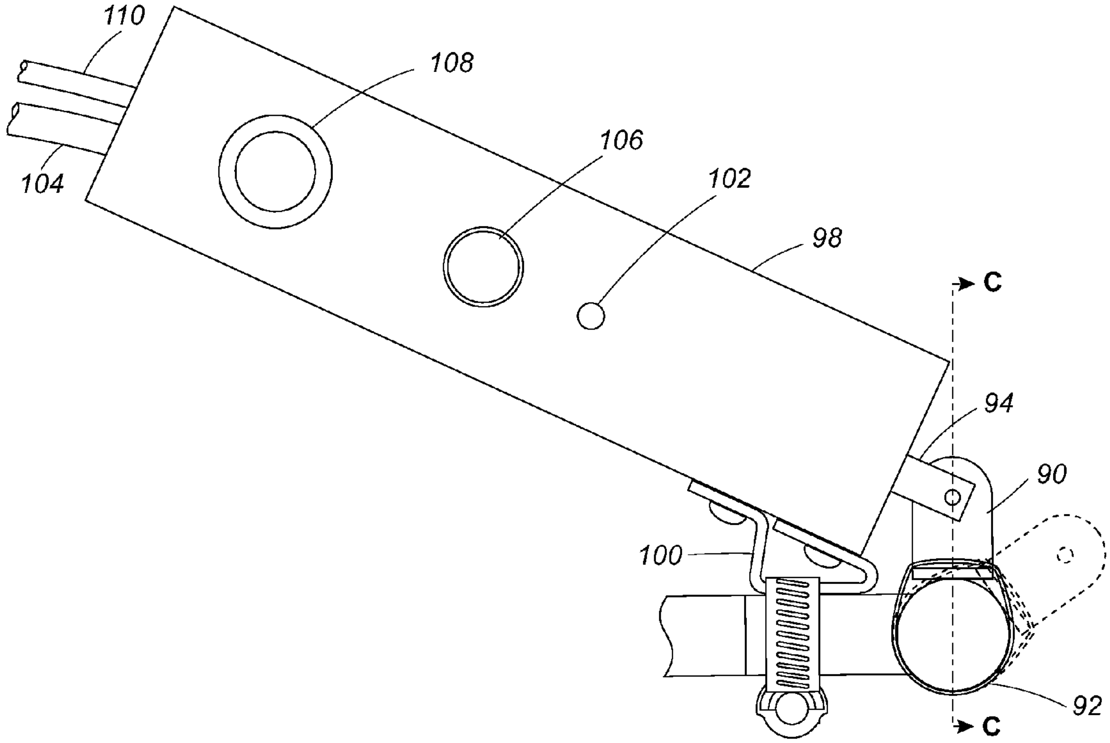


FIG. 10

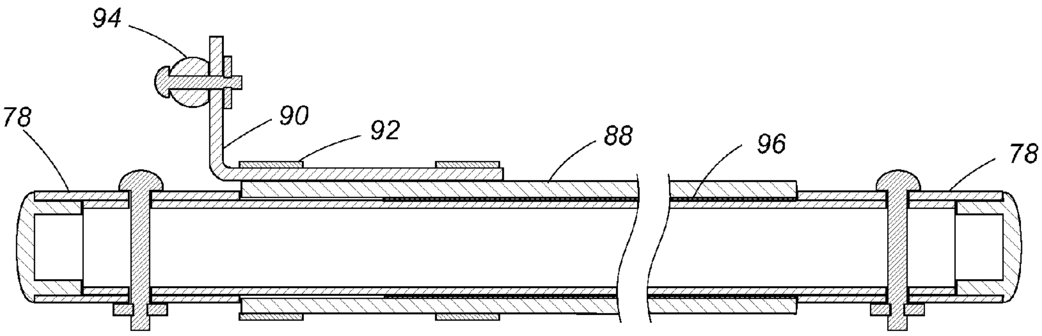


FIG. 11

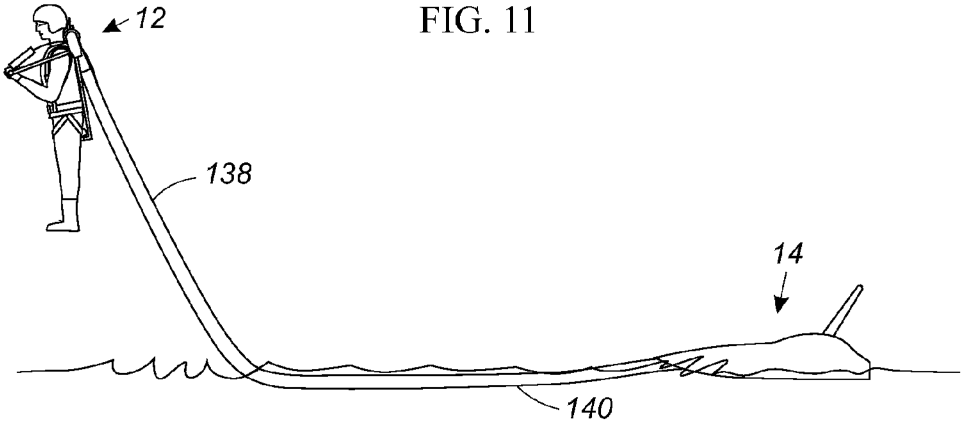


FIG. 12

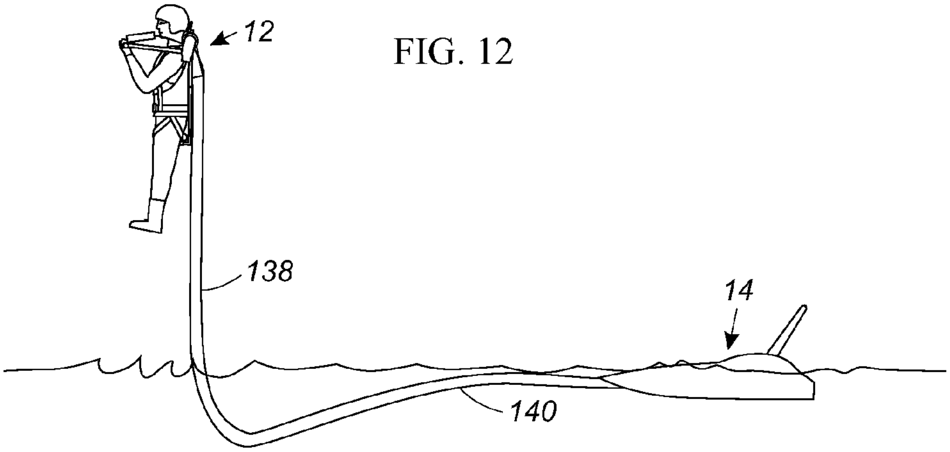


FIG. 13

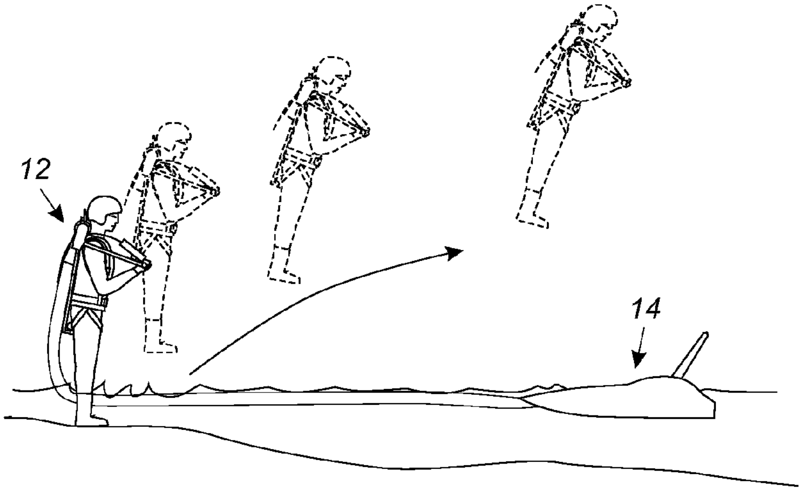


FIG. 14

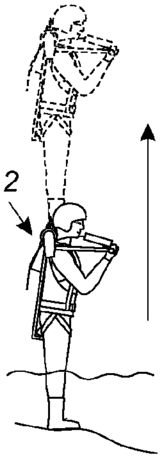


FIG. 15

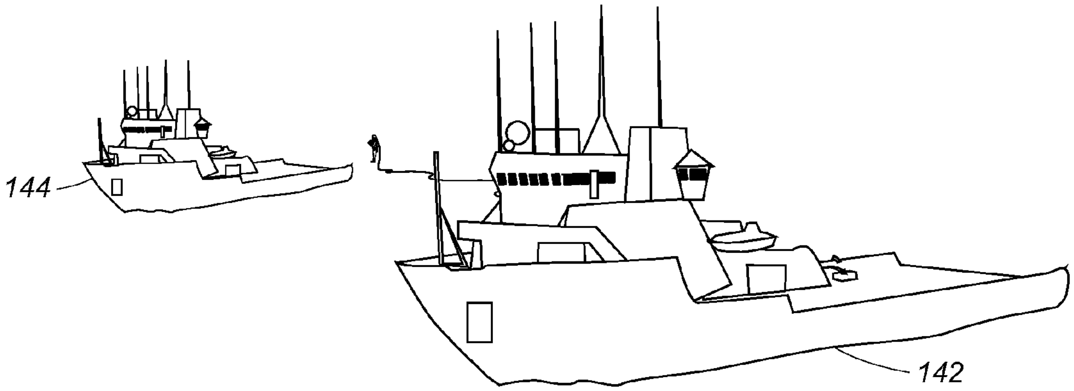


FIG. 16

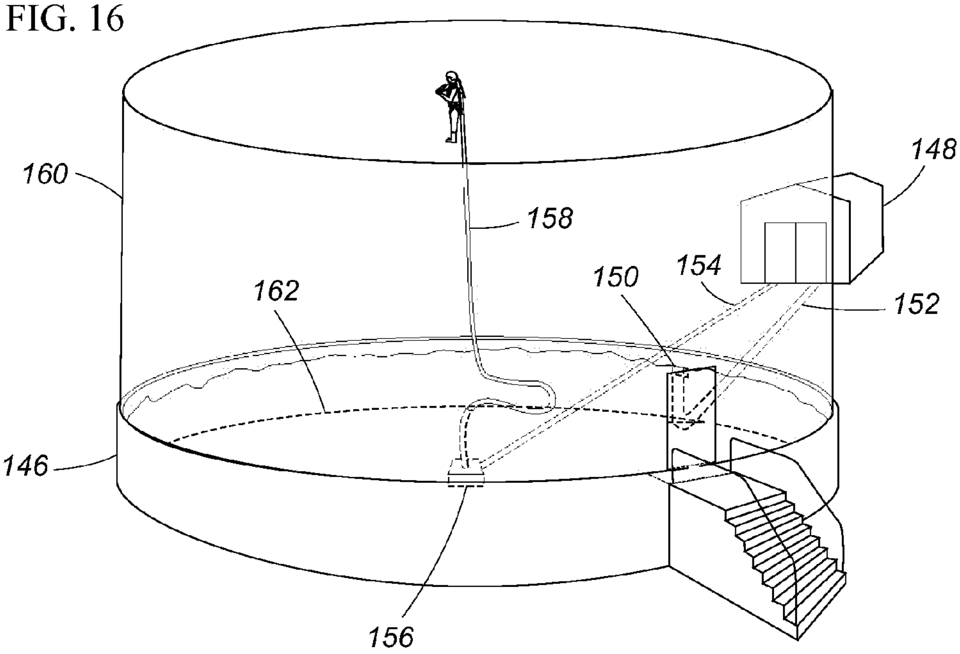
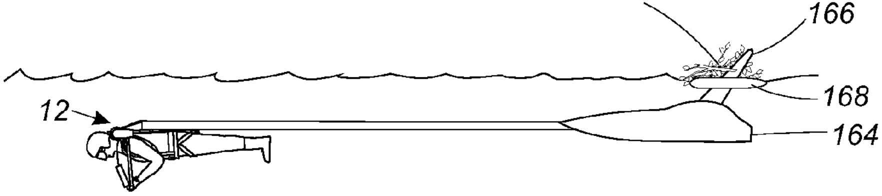


FIG. 17



PERSONAL PROPULSION DEVICE

CROSS-REFERENCE TO RELATED APPLICATION

This application is a Divisional of U.S. Utility patent application Ser. No. 11/789,552, filed Apr. 25, 2007, by Raymond Li, entitled PERSONAL PROPULSION DEVICE, now allowed, which application is a Continuation of U.S. Utility patent application Ser. No. 11/088,330, filed Mar. 23, 2005, by Raymond Li, entitled PERSONAL PROPULSION DEVICE, now U.S. Pat. No. 7,258,301, issued Aug. 21, 2007, which application is related to and claims priority to U.S. Provisional Patent Application Ser. No. 60/556,396, filed Mar. 26, 2004, entitled PERSONAL PROPULSION DEVICE, which application is related to U.S. Provisional Patent Application Ser. No. 60/581,438, filed Jun. 22, 2004, entitled PERSONAL PROPULSION DEVICE, the entirety of which is incorporated herein by reference.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

n/a

FIELD OF THE INVENTION

The present invention relates to powered flight, more specifically, to a personal propulsion device.

BACKGROUND OF THE INVENTION

Personal flight has been an eternal dream and a recent reality. However, unlike birds, human beings have a low power-to-weight ratio, and personal flight has only been accomplished by developing machines using powerful engines and aerodynamic lifting surfaces, such as autogyro aircraft, fixed wing airplanes, and helicopters. Arguably, the closest experience to that of individual, unrestricted flight has been attained through the use of single passenger devices, consisting mainly of a flight pack or similar structure that fits on or around the torso of an individual.

Typically, flight packs include propulsion devices such as propellers, rotor blades, or rockets, which often require a highly flammable fuel in order to generate sufficient thrust for flight. In addition to having a reservoir of volatile fluid attached to the body of a pilot, the close proximity of the propeller, rotor blades, or rocket exhaust to the pilot further poses significant safety risks. Another drawback of such self-contained, single-passenger flight packs is that the pilot must support the entire weight of both the airframe and fuel on his back, which can be highly uncomfortable and places severe limits on operation duration and range. Moreover, the location of thrust forces and the weight distribution of the fuel and accompanying components in such designs increase instability during take-off and for the duration of the flight.

Existing single passenger devices suffer an additional major drawback, in that the fuselage, engine, electrical equipment, fuel, and flight instrumentation are all part of the aircraft. As a result of the added weight of these systems, a significant amount of engine output and fuel is required to generate sufficient thrust to achieve flight. This necessitates larger and heavier engines and, even then, the power-to-weight ratio is often quite low.

As an alternative to employing the combustion of volatile fluids to directly generate thrust, the high-pressurization of non-flammable fluids, such as water, has been proposed to create sufficient thrust in order to achieve flight. While the use of pressurized water may significantly reduce the above-mentioned safety risks, even water-propelled devices still have drawbacks in that the pressurization source must be carried into the air along with the fuselage and accompanying systems, contributing to a low power-to-weight ratio, and requiring larger engines in order to generate sufficient thrust.

It would be desirable to provide a single passenger aircraft that is safe, stable, and achieves a higher power-to-weight ratio than typical single-passenger devices. Moreover, it would be desirable to provide a single passenger aircraft that provides maneuverability, vertical takeoff and landing, as well as practical flight range and duration.

SUMMARY OF THE INVENTION

The present invention provides a personal propulsion device having a body unit, a base unit, and a delivery conduit in fluid communication with both the body unit and the base unit. The body unit may include a thrust assembly having at least two independently pivotable thrust nozzles, as well as a single linkage that accomplishes the pivoting movement. The nozzles are located above a center of gravity for the body unit, which provides inherent stability when the personal propulsion device is in use. The body unit may further include buoyant characteristics, as well as throttle controls and the like.

The base unit can include a wave-piercing hull that encloses an engine and a pump, which provides pressurized fluid to the delivery conduit. The delivery conduit subsequently delivers the pressurized fluid to the body unit, in order to provide sufficient thrust to lift the body unit and an operator into the air.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the present invention, and the attendant advantages and features thereof, will be more readily understood by reference to the following detailed description when considered in conjunction with the accompanying drawings wherein:

FIG. **1** illustrates a personal propulsion device in accordance with the present invention;

FIG. **2** is a rear view of a personal propulsion device in accordance with the present invention;

FIG. **3** is a top view of a personal propulsion device in accordance with the present invention;

FIG. **4** is a front view of a harness system of a personal propulsion device in accordance with the present invention;

FIG. **5** is a top view of a swivel housing of a personal propulsion device in accordance with the present invention;

FIG. **6** is a cross sectional view of the swivel housing at line A-A of FIG. **5**;

FIG. **7** is a cross sectional view of the swivel housing at line B-B of FIG. **6**;

FIG. **8** is a side view of a pump vessel in accordance with the present invention;

FIG. **9** is a side view of an engine control module in accordance with the present invention;

FIG. **10** is a cross sectional view of the cross arm with throttle twist grip at line C-C in FIG. **9**;

FIG. **11** is an illustration of a personal propulsion device in forward flight in accordance with the present invention;

FIG. **12** is an illustration of a personal propulsion device in hover flight in accordance with the present invention;

FIG. **13** is an illustration of a takeoff with forward translation of a personal propulsion device from shallow water in accordance with the present invention;

FIG. **14** is an illustration of a vertical takeoff of a personal propulsion device in accordance with the present invention;

FIG. **15** is an illustration of a method using a personal propulsion device in accordance with the present invention;

FIG. **16** shows a pond or pool-based embodiment of a personal propulsion device in accordance with the present invention; and

FIG. **17** depicts an alternative use of a personal propulsion device in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Now referring to FIGS. **1** through **4**, an exemplary embodiment of the present invention provides a personal propulsion device **10** having a body unit **12**, a base unit **14** capable of providing pressurized fluid flow, and a delivery conduit **16** in fluid communication with both the body unit **12** and the base unit **14**.

The body unit **12** includes a body harness system **18** having a torso corset **20**, a seat post **22** and a saddle **24**. The torso corset **20** may have a modified barrel shape, contoured to provide firm support, protection and comfort for the torso, while further transmitting the lifting and gravity forces to an operator. While the torso corset **20** is preferably made of a generally rigid material such as fiberglass-reinforced plastic, the torso corset **20** may include flexible extension flaps **26** that wrap around the waist of an operator. An extension flap cushioning **27** may be attached to the extension flaps **26**, thereby providing a band of foam-like material that cushions and supports the weight of the body unit **12** and the body harness system **18** on the hip bone of an operator. The body harness system **18** can further include a waist strap **28**, shoulder straps **30**, groin straps **32**, and a chest strap **34** to hold an operator in place. Furthermore, a corset extension **36** provides protection for the rear regions of the operator's head and neck. The torso corset **20** and harness system **18** provide rigidity to the body unit **12** for improved stability, provide protection and comfort to the operator, and distribute a substantial amount of the operator's bodyweight over a wide area including the torso, groin and buttocks areas. In addition to promoting stability, the torso corset **20** and the accompanying straps and cushioning can be made from a buoyant material sufficient to keep the body unit **12** and an operator of at least 200 pounds afloat in a body of water for a prolonged period of time.

The seat post **22** and the saddle **24** of the body unit **12** support part of the weight of the operator and, in addition to the rigidity provided by the harness system **18**, further reduce unnecessary movements and oscillations of the lower torso of an operator which can destabilize the body unit **12** during flight. The weight of the operator is distributed over the saddle **24**, the groin straps **32**, as well as over the contact surfaces with the torso corset **20** and the body harness system **18**.

As shown in FIGS. **1-3**, the body unit **12** has a thrust assembly having a supply conduit assembly **38**, left swivel housing **40**, right swivel housing **42**, left thrust nozzle **44**, and right thrust nozzle **46**. Each swivel housing is affixed to or is integral with an upper support arm **48** and a pair of lower support arms **50**, **50'**, with both the upper and lower support arms being affixed to the torso corset **20** in order to transmit lift and propulsion forces. The supply conduit assembly **38** further includes a medially located and vertically disposed main conduit **52** that rises from about mid-back level and branches into a left bifurcation conduit **54** and a right bifurcation conduit **56**. Both bifurcated conduits course upward and forward to terminate in flanges **58**, which are pivotally mounted inside both the left swivel housing **40** and the right swivel housing **42**. The bifurcated conduits are preferably made from 3.00" outside diameter rigid tubing, while the main conduit **52** is preferably made from 4" outside diameter rigid tubing, with the upper end formed to join smoothly with the bifurcated conduits.

The left thrust nozzle **44** and right thrust nozzle **46** are pivotally attached to the swivel housings **40**, **42** with flanges **60** matching the bifurcated conduits' flanges **58**. As shown in FIGS. **5** through **7**, multiple washers **62** made of a low-friction material, and a strip **64** around the perimeter of the flanges, reduce friction between the flanges' contact surfaces inside each swivel housing. An O-ring **66** seated in a groove between the flanges further provides a seal against fluid leaks. The flanges **58**, **60** and washers **62** are housed inside both swivel housings **40**, **42**. The swivel housings **40**, **42** each further include a front housing element **68** and a rear housing element **70**. The swivel housings provide the ability of both the thrust nozzles as well as the main conduit to pivot about a centerline axis "CA" extending through the swivel housings.

Now referring to FIG. **3**, the body unit **12** further includes a port side control arm assembly **72** and a starboard side control arm assembly **74**, both of which are attached to thrust nozzles **44** and **46** respectively. A cross arm **76** connects the control arm assemblies **72**, **74** at their outer ends. Control arm assemblies **72**, **74** each include a cross arm collar **78**, which is affixed to an outer control arm **80**. The outer control arm **80** is further connected to a mid control arm **82**, with an extension spring **84** attached to their inner walls. The mid control arm **82** is connected to an inner control arm **86** with an adjustable telescoping mechanism, and the inner control arm **86** is attached to the front surface of the thrust nozzles **44** and **46**. By moving the cross arm **76** in an up-and-down direction, the operator can deflect both control arm assemblies **72**, **74** together, which in turn deflect the thrust nozzles **44**, **46** together to vary the allocation between lift and propulsion force vectors. The flexible articulation at the extension spring **84** allows the operator to deflect port and starboard thrust nozzles **44**, **46** by different amounts, thus generating yaw control moments. Moreover, this flexibility provides independent control of either nozzle through a single common linkage, i.e., the cross arm **76**. Roll control is not often required in a wingless flight device, but the operator can affect roll control by shifting weight from side-to-side within the body harness system **18**. The static and dynamic friction of the thrust nozzles' swivel mechanism are intended to maintain any set deflection position, in order to allow hands-free hovering and to prevent accidental loss of control should the operator release his grip on the cross arm **76**.

Now referring to FIGS. **9** and **10**, the body unit **12** can include a twist grip control that allows throttle control to be integrated with the cross arm **76**. The twist grip control includes a twist grip **88** extends across a substantial length of the cross arm **76**, in order to allow the pilot to operate the twist grip control with either one or both hands. A crank **90** is affixed to the end of the twist grip **88** by a clamp **92**, and is further pivotally connected to a throttle control master cylinder piston **94**. To facilitate free deflection of the twist grip **88**, a plastic sleeve **96** can be included to reduce the friction between the twist grip and the inner core of the cross arm **76**.

Referring now to FIGS. **3** and **9**, a control housing **98** can be affixed to the outer control arm **80** with an angled bracket **100**. When the twist grip **88** is rotated by the operator, it deflects the crank **90**, which pushes or pulls the throttle control master cylinder piston **94** in a master cylinder (not shown) inside the control housing **98**. The master cylinder movements are transmitted by hydraulic pressure along hydraulic tubing **104** to an engine compartment in the base unit **14**, where it actuates a dual-action throttle actuator piston to move the throttle crank on an engine. As a result, actuation of the twist grip **88** on the body unit **12** is communicated to the base unit **14**, which can result in subsequent modification of the fluid flow provided by the base unit **14**. The throttle control mechanism is intended to maintain any set position in order to maintain flight dynamics should the operator release his grip on the cross arm **76**. The control housing **98** can also include a start/stop electric control **106** and an engine overheat warning buzzer **108**, both of which communicate with the base unit **14** through a multi-lead electric cable **110**. Where necessary, additional gauges or monitors for navigation purposes and for monitoring base unit performance may also be located in the control housing **98**. The hydraulic tubing **104** and multi-lead electric cable **110** may be integrated with the delivery conduit **16** in order to achieve communication with the base unit **14**.

The thrust assembly of the body unit **12** provides lightweight, simple, reliable and stable control for the personal propulsion device **10**. When dry, the body unit **12** exerts little weight on the pilot. Moreover, simple mechanical devices provide the pilot with thrust mechanisms as well as pitch, roll and yaw controls. No engine, transmission, or propeller-type devices are located on the body unit **12**, the absence of which provides simplicity as well as reliability and safety in the operation of the personal propulsion device **10**.

The body unit **12** includes a center of gravity "CG" when in use, where, in an exemplary embodiment of the present invention, the dual thrust nozzles **44** and **46** generate nozzle reaction forces for lift and propulsion at a point well above the center of gravity "CG." By positioning the nozzles above the center of gravity "CG," a significant portion of the forces acting on the body unit, i.e., lift, propulsion, steering, gravity, tension in the delivery conduit, etc., converge normally to the centerline axis "CA" about which the thrust nozzles **44** and **46** and the supply conduit assembly **38** deflect, thereby isolating a substantial amount of the destabilizing forces and moments from the operator. Moreover, as an operator in body unit **12** ascends to greater heights, the weight of fluid moving through the delivery conduit provides greater stability as the weight of the entrained fluid further offsets any destabilizing forces or movements that an operator may experience.

In an exemplary embodiment, as shown in FIG. **8**, the base unit **14** includes a hull **112**, a water-tight deck **114** and a snorkel mast **116** for engine air and ventilation. The engine **118** is located towards the aft portion of the base unit **14**, and powers a drive shaft **120** that rotates an impeller **122** in a pump **124**. The engine **118** inducts air through an air passage in the snorkel mast **116**, and exhaust gases pass through a noise reduction muffler **126** and subsequently exit through an exhaust port **128** located in the stern.

When the engine **118** is in operation, water is inducted through a water intake **130**, past stationary guide vanes **132** that divert the water flow forward through a pump intake channel **134** into the pump **124**, where the impeller **122** transfers energy to the water to increase its speed and pressure. Pressurized water exits through a bow discharge conduit **136**, where the pressurized water flow proceeds into the delivery conduit **16**. The delivery conduit **16** provides the pressurized water flow to the main conduit **52** of the body unit **12**, where the flow is routed to the left and right thrust nozzles **44** and **46**. The engine **118** preferably generates sufficient pressurization of the water exiting the bow discharge conduit **136** such that the fluid mass flow rate at the left and right nozzles of the body unit **12** generate sufficient thrust to lift approximately 200 pounds or more a height of 30 feet for a sustained period of time.

The base unit **14** is intended to be adaptable for a wide variety of applications, and may include variations in form. For example, the base unit **14** may have a wave-piercing hull in order to minimize the possibility of becoming airborne due to large waves. Such activity could interrupt water intake in the base unit **14**, resulting in lost thrust in the body unit **12** and the potential for rapid descent of an operator. A wave-piercing hull would ensure that rather than elevating above a large wave, the base unit **14** would pierce or pass through a portion of a wave, thereby remaining in contact with the water and preventing any interruption of fluid flow to the body unit **12**.

The delivery conduit **16** is preferably a large diameter hose, i.e., four inches or more, having a lightweight polyester jacket and extruded polyurethane lining. This construction provides sufficient tensile strength for towing the base unit **14**, as well as low internal friction, kink resistance, abrasion and chemical resistance, ultraviolet light resistance, high burst strength, and minimal stretching or warping under pressure. In addition to minimizing friction with the pressurized water flow, the delivery conduit also provides additional weight with the entrained water such that flight stability is increased when the personal propulsion device is in operation. Moreover, hydraulic control tubing and control cables may be housed in a flexible protective rubber sheath affixed along a surface of the delivery conduit **16**.

By separating the fuselage, engine, pump, electrical system, cooling system, lubrication system, and fuel system of a typical aircraft and instead supporting these systems independently in the base unit **14** on land or water, a very large percentage of the potential weight of the body unit **12** is eliminated. Instead, power is delivered to the body unit **12** through the delivery conduit **16**, which carries water from the base unit **14** to the body unit **12**. This arrangement allows a relatively small engine to generate sufficient lift and propulsion for the body unit **12**, and enables the personal propulsion device **10** to operate with much higher efficiency, more maneuverability, and longer range and flight duration.

Potential applications for the personal propulsion device **10** include a recreational and rescue vehicle, a ship-based mobile vessel system for duties at sea; a land-based fixed system for amusement rides, demonstrations and training; and a stealth mobile vessel system optimized for low-detection underwater travel for law enforcement and military applications.

Referring now to FIGS. **11** and **12**, an exemplary embodiment includes using the personal propulsion device **10** over water, wherein the base unit **14** is mobile and is towed along by the thrust generated at the body unit **12**. During flight, a section **138** of the delivery conduit **16** is suspended in the air by the lift from the body unit **12**. The remaining portion **140** of the delivery conduit **16** between the suspended section and the base unit **14** floats near the surface of the water through natural buoyancy and hydrodynamic lift. In forward flight, the suspended section **138** of the delivery conduit **16** is slanted due to tension between the forward thrust of the body unit **12** and water resistance on the hull **112** of the base unit **14**. In hover mode, gravity pulls down on the suspended section **138** of the delivery conduit **16** so that it is almost vertical. The weight of entrained water pulls a section **140** of the hose under water, and provides hover stability to the body unit **12** by offsetting a constant airborne mass against a constant lift from nozzle reaction forces.

FIG. **13** illustrates a takeoff of the body unit **12** with forward translation. Shallow water may be preferred for performing most takeoffs and landings, although takeoffs from deep water, shores, dock structures or from aboard another vessel are equally possible. Upon deploying the base unit **14** on the water and starting the engine **118**, the operator increases the throttle and as lift is felt, he trims the thrust nozzle angles to provide maximum lift and minimal forward propulsion. After takeoff, the pilot continues to increase throttle and at the same time deflect the thrust nozzles rearwards to initiate forward flight. Forward thrust may also be enhanced kinesthetically by pitching the upper torso forward. When in forward flight, the base unit **14** is passively propelled by tension originating from the body unit **12** through the delivery conduit **16** and is slowed down rapidly from water resistance as tension in the delivery conduit **16** is reduced or changes direction. Although not illustrated, alternative embodiments may incorporate active propulsion for the base unit **14** in both forward and reverse directions, in response to flight control commands initiated by the operator on the body unit **12**.

Now referring to FIG. **14**, in order to hover with the personal propulsion device **10**, the operator increases the throttle and at the same time trims the thrust nozzle angles for maximum lift and neutral horizontal propulsion, and continues increasing the throttle until the desired altitude has been reached.

As shown in FIG. **15**, the personal propulsion device may be used as a ship-based means for transporting personnel or cargo from one ship to another. In such an embodiment, a large multi-purpose pump on a supply or rescue vessel **142** supplies the power for lift and propulsion through the delivery conduit **16**, which may have an increased diameter for this particular application, to the body unit **12** as previously described. Repair and maintenance work can be performed on the vessel, and human and cargo payloads can be transferred between the supply ship **142** and another vessel **144**, even in relatively rough sea conditions where other methods of transfer may be too dangerous.

Now referring to FIG. **16**, an alternative embodiment of use for the personal propulsion device **10** providing a land-based application. In this alternative embodiment, a pond or pool **146** provides a safe and restricted access area for operation. A powerful pump preferably located in a pump house **148** draws in water from near the surface of the pond or pool through a skimmer **150** and a supply duct **152** (shown in this embodiment as buried underground). The water is then pumped through a conduit **154** (also shown in this embodiment as buried underground) to a base **156** at the bottom of the center of the pond or pool **146**, then subsequently through a hose **158** to the body unit **12**. In this particular embodiment, the water flow at the thrust nozzles may be controlled by a flow regulating device located in a main conduit of the body unit **12**. An exterior enclosure **160** may be included to restrict the flight area, and a submerged safety net **162** can provide a safe base for takeoffs and landings. This pond or pool-based embodiment can be installed anywhere with access to a water supply, and hence can be deployed in high traffic amusement parks, next to major traffic arterials, and in gathering areas where a natural body of water is not available. This embodiment is especially useful for marketing, demonstrations, training, pilot certification, and as a paid admission amusement ride.

In yet another embodiment of the present invention an operator can use the personal propulsion device **10** for travel in both air and water. As shown in FIG. **17**, an alternative embodiment of the present invention provides for low-detection travel under water. Assisted by an underwater breathing apparatus or snorkel equipment, the operator can travel underwater for long distances with water jet propulsion from a ballasted base unit **164**. A snorkel mast **166** is fitted with ports and passages for engine air intake and exhaust, and a floatation chamber **168** operates to keep the snorkel ports above the waterline when the base unit **164** is under tow. Camouflage material **170** such as an artificial waterfowl or floating debris may be affixed to the snorkel tower **166** to disguise the tower and the wakes generated when traveling. This embodiment may be favorably employed in military and law enforcement applications where both stealth and airborne mobility are important for approaching floating or near shore targets.

It will be appreciated by persons skilled in the art that the present invention is not limited to what has been particularly shown and described herein above. In addition, unless mention was made above to the contrary, it should be noted that all of the accompanying drawings are not to scale. A variety of modifications and variations are possible in light of the above teachings without departing from the scope and spirit of the invention, which is limited only by the following claims.

What is claimed is:

1. A method of operating a personal propulsion device, comprising:

providing a personal propulsion device having a body unit with a thrust assembly; a delivery conduit in fluid communication with the thrust assembly; and a base unit in fluid communication with the delivery conduit;

positioning the base unit in fluid communication with water; and

delivering pressurized water to the thrust assembly to elevate the body unit for flight.

2. The method according to claim **1**, wherein the base unit delivers water to the body unit through the delivery conduit.

3. The method according to claim **1**, wherein during flight the personal propulsion device moves the base unit within the water.

4. The method according to claim **1**, wherein the delivery of water to the personal propulsion device is sufficient to lift 200 pounds a height of 30 feet for a sustained period of time.

5. The method according to claim **1**, further comprising moving the base unit within the water.

6. The method according to claim **5**, wherein the delivery of pressurized water to the thrust assembly enables the body unit to move the base unit.

7. The method according to claim **6**, wherein during delivery of pressurized water, the body unit is independently movable about the base unit.

8. The method according to claim **1**, wherein the base unit is at least partially submerged in the water.

9. The method according to claim **8**, wherein the base unit remains at least partially submerged in the water while the body unit is elevated above the water.

10. The method according to claim **1**, further comprising adjusting the delivery of pressurized water to the thrust assembly in order to achieve a desired elevation of the body unit.

11. The method according to claim **1**, wherein the thrust assembly includes at least two pivotable thrust nozzles.

12. The method according to claim **11**, further comprising manipulating the at least two nozzles to move the body unit in a desired direction.

13. The method according to claim **1**, wherein during delivery of pressurized water the body unit is independently movable about the base unit.

14. The method according to claim **1**, wherein the body unit defines a wave-piercing hull.

15. A method of operating a personal propulsion device, comprising:

providing a personal propulsion device having a body unit with a thrust assembly; a delivery conduit in fluid communication with the thrust assembly; and a base unit in fluid communication with the delivery conduit;

positioning the base unit in fluid communication with water;

delivering pressurized water to the thrust assembly to elevate the body unit, wherein during delivery of pressurized water, the body unity is independently movable about the base unit; and

adjusting the delivery of pressurized water to the thrust assembly in order to achieve a desired flight elevation of the body unit.

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