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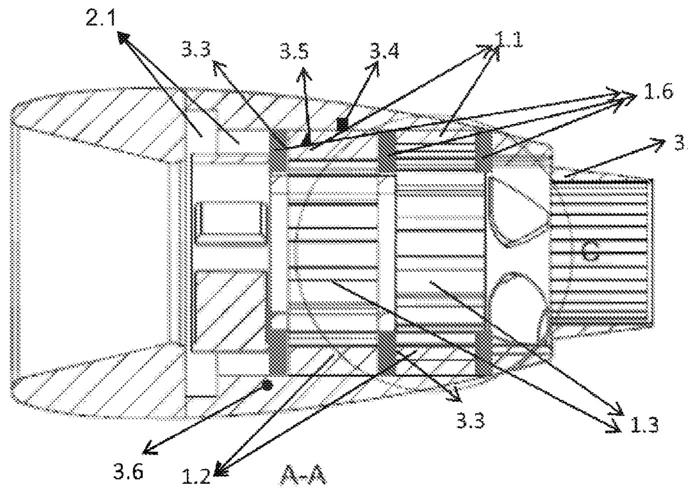

FIGURE 5

(57) Abstract: In summary, the invention is an electric underwater jet engine system designed for vehicles traveling above or below the sea and which contains multiple stator units which are equipped with microprocessors containing relevant algorithms for certain speeds. Naturally, this system can be applied to all marine vehicles intended for civilian or military purposes. Compared to similar electric motors, these engines we have described have high efficiency and are much more powerful while they are small and they consume less energy. The surfaces of the rotor which are affected by the corresponding stator rotate at the hydrodynamic magnetic bearing which is designed for maximum efficiency. In high power motors, the rotor rotates in axial and radial directions, in the hybrid hydrodynamic bearing and magnetic bed, and the rotor and stator do not contact each other. It can also be used as a turbine at times when the engine is not used for propulsion, and the propeller blades rotating by waves or water flow can recharge the batteries. Especially in the case of sailboats, the battery can be recharged using the proposed invention as a turbine.

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ELECTRICAL UNDERWATER JET MOTOR WITH MULTIPLE STATOR FOR SEA VEHICLES

TECHNICAL FIELD

The invention is about an electrical underwater propulsion motor system which is developed for marine vessels, has multiple axial and radial stator, and, in which the direct-drive technology without shaft is used. Outside the motor hub, there are multiple stators and inside the motor, there is the hollow rotor which has no shaft. The rotor and the blades fixed in it form the impeller together. The impeller rotates with no contact to the stator on the hydrodynamic bearings supported by the magnetic bearings. The system pushes the incoming water backward through its nozzle with a high pressure forming a water-jet flow through which a high drive force is obtained.

PREVIOUS TECHNIQUE

A significant portion of the world's oil is used in marine vehicles in marine transportation. If no action is taken, it is predicted that carbon dioxide emission will be higher by 20% than its value today, which will trigger global warming to a significant extent. Given the fact that oil reserves are running out, it is now time to develop alternative environmentally sensitive clean energy systems. Sustainable development in the maritime sector will be driven by the use of electricity, which is a quieter, cleaner and more efficient fuel for marine vehicles.

Superconductivity, as is known, is the ability of some materials to show no electrical resistance above or below certain temperature levels. A wire of superconducting conductor can handle approximately one hundred times the current that its counterpart copper wire can handle which make it possible for electrical motors to generate much higher power with less energy. Today, high-temperature and low-temperature superconducting wire technology has shown a rapid development. Superconductivity is now a serious alternative for electrical motors. It is predicted that potentially higher efficiencies will be obtained from superconducting electrical motors or generators to be developed in the future. Electrical machines operating with superconductor technology are costly but their efficiency is much higher. Costs are expected to decline over the next few years. In addition, the newly developed second generation superconductor wires are thinner and offer new opportunities for industrial designers because they are like a flat band and the designs of such electrical machines are more flexible.

Today, superconducting equipment are being used in MR imaging and wind turbines and they are truly achieving high energy efficiency compared to counterparts. Superconducting wind turbines can achieve several times more energy at the megawatt level compared with the conventional counterparts. It is also clear that similar developments will be observed in electrical motors whose operating mechanisms are not so different. Because superconducting systems have superior features such as high reliability, low maintenance and long life. It is envisaged that high-voltage power transmission lines will be replaced by underground or submarine superconducting transmission lines. Superconducting cables resistant to sea water will probably provide energy transmission from mainland to islands through superconducting energy transmission lines. It is obvious that such corrosion-resistant cables can also be used in electrical marine applications.

It has been reported that the efficiency of very large industrial superconducting motors used in the industry is up to 99%, which significantly reduces energy costs. It is envisaged that today's bulky structure of superconductor technology will be improved over time and less space-consuming and lighter systems will be possible. Propulsion systems used in marine transportation vehicles do not have to be small and light. For this reason, although today electrical motors operating with superconductivity technology can only be used in medium and large segment marine vessels, over time they will be available also for small segment marine vehicles.

In recent years, there have been important developments in the field energy storage which resulted a rapid increase in the use of capacitors with superconducting technology, which are called synchronous capacitors. The developed superconducting magnetic energy storage systems are called super capacitors or ultra capacitors. In these systems, there are briefly three key parts; a superconducting coil, a system that works with helium / nitrogen that cools the environment, and a system that provides power. Thus, electrical motors consuming energy at very high megawatt levels can be fed by giant supercapacitors using superconductor technology. As a result, when high-efficiency electrical marine jet engines using superconducting technology are used, more fuel-efficient, quieter, more environmentally sensitive and less harmful transport will be achieved.

Our national patent application TR 2011 09302 (Electrical Jet Motor for Marine Vehicles) focused on the construction of "the rotor integrated with fan blades". Our ongoing work about the invention, for which the scope of intellectual protection is determined by the mentioned patent, revealed new technical problems. These technical problems are; first, none of the conventional electrical motors used in this area uses water jet technology, but uses only the drive force of the fan. Second, there is a problem of low-efficiency in conventional electrical motors used in this field. Third, the stainless steel large diameter bearing which works underwater could break down in a short time due to corrosion and cavitation it is exposed, which, in turn, increases the cost burden. Fourth, additional designs are needed to increase power and efficiency. Fifth, as the fan rotates freely, the water is scattered around by the effect of centrifugal forces which leads to the loss of efficiency for an effective drive force. The sixth is the rapid warm-up of the engine when running underload. Seventh, the design allowing only outboard mounting affects widespread use.

BRIEF DESCRIPTION OF THE INVENTION

The invention is a brushless, synchronous, servo fan motor used for propulsion in marine vehicles and basically operates within principles and mechanism of brushless electric motors. As known, electric motors consist of two coaxial parts which are the fixed stator and the moving rotor. While electric motors operate at 98% efficiency at the optimum speed which they are designed to operate, the efficiency drops considerably when operating at higher or lower speeds and this decrease is shown by the motor performance curve. The sea vehicles are moving at a very wide speed range. For this reason, the low efficiency of electric motors at different speeds (whether under or above the designed speeds) is a serious problem for the mentioned engines considering that these motors are powered by the batteries. Because the inefficient use of the batteries shortens the range that marine vehicles can reach, the preference of electric marine vehicles is negatively impacted. The invention which allows batteries to be used with high efficiency at a wide range of speeds, has multiple axial and radial stators. These stators are optimized to operate at maximum efficiency at different speeds and they are activated by the microprocessor at speeds which they operate with high efficiency. For example, while the propulsion is obtained through a single stator for low speeds, other stators are activated by the microprocessor as the desired speed of the vehicle is increased. The microprocessor processes the data of the sensors through relevant algorithms and it activates and deactivates the corresponding stators to keep the efficiency maximum. Thus, the batteries are used at the highest efficiency (over 90% efficiency) for all speed ranges.

As a result of our studies, new ideas have emerged to solve the technical problems in the known state of the art. Suggestions to solve these problems are as follows: First, instead of merely utilizing the thrust force of the fan blades, an nozzle device which can narrow and expand is attached to the system. This ensures that the water is pressured in the outlet area and a jet stream is generated through nozzle. Second, the problem of efficiency loss occurring at different speeds in conventional electric motors is overcome by using multiple stators. Instead of using laminated silicon sheets in the stator, the design involves an ironless (no silicon sheets), frameless (no frames to place the bobbins), slotless (no slots for bobbins) stator along with the mono-helix, double-helix or triple-helix coil windings. This new design is also suitable for production with superconducting motor components. Thus, the efficiency is high even for large segment marine vessels. In addition, lightweight but durable materials such as carbon fiber are used as intermediate filling and support material in the rotor and stator to make the motor lightweight but durable. The fan blades are also made from lightweight but durable materials like carbon fiber. Third, instead of bearings which are exposed to corrosion and cavitation, a hybrid hydrodynamic pressure bearing surface and a magnetic bearing are used which operate both radial and axial. Hydrodynamic bearing solutions are still widely used in hydro-turbines. Fourth, instead of single stator and single rotor systems, multiple rotor and multiple stator systems are proposed. Thus, efficiency and power are much higher. Also in case of a fault in one of the stator, the engine will continue to run at low power with the other stator(s) and rotor(s) and will not stop. Fifth, the turbulence that occurs in the water passing through the propeller blades is smoothed out in the nozzle or in the diffuser blades before arriving which ensures an effective thrust. Sixth, the blades at the inlet of the engine are designed as a water flow straightener. These blades both smooth the incoming water stream and they provide an additional cooling by forming a large surface. Thus, the system will be able to operate underwater with high efficiency without maintenance for many years. Seventh, for mounting of motor to marine vehicles, an inboard system is developed in addition to outboard system.

1. Electric Underwater Jet Motor
    - 1.1. Stator (radial)
    - 1.2. Rotor
    - 1.3. Pusher impeller
    - 1.4. Magnetic Bearing Components
    - 1.5. Permanent Magnet Bars
    - 1.6. Stator (axial)
    - 1.7. Hydrodynamic Bearing Components
    - 1.8. Motor Protection body
    - 1.9. Motor Connection and Mounting Elements
2. Hydrodynamic jet motor housing
    - 2.1. Hydraulic system that adjusts steering and the diameter and the direction of the nozzle
    - 2.2. flow straightener
    - 2.3. Nozzle (output)
    - 2.4. Diffuser blades
3. Control Unit
    - 3.1. Microprocessor
    - 3.2. Software
    - 3.3. Magnetic Bearing (Distance) Sensors
    - 3.4. Counter, hall effect and speed measurement sensors

3.5. Jirescopic balance sensors
3.6. Heat and humidity sensors
3.7. Pressure measuring sensors
3.8. Voltage and ampere measurement sensors
3.9. Motor drive circuit
3.10. Software algorithms
3.11. Energy management system
3.12. Control Board
3.13. batteries
3.14. Battery charging components

DETAILED DESCRIPTION OF THE INVENTION

The invention is an electric underwater propulsion system which is developed for marine vessels, has multiple axial and radial stator and in which the direct-drive technology without shaft is used. The invention is characterized by the electric underwater jet engine (1), the hydrodynamic jet motor housing (2) and the control unit (3). The electric underwater jet motor (1) comprises at least one radial stator (1.1), at least one rotor (1.2), at least two impeller blades (1.3), magnetic bearing components (1.4), at least one permanent magnet bars (1.5), at least one axial stator (1.6), hydrodynamic bearing components (1.7), motor housing (1.8) and motor connection and mounting elements (1.9). The electric motor consists of a rotor (1.2) carrying the impellers and axial (1.6) and radial (1.1) stators placed in front, behind and around the motor. The stator (1.1) is at the exterior while the rotor (1.2) carrying natural magnet bars is located at the interior. The impeller blades (1.3) are fixed in the rotor (1.2) ring without any shaft and are characterized by having narrow profile at the center while widening through the perimeter. The rotor (1.2) is characterized by its rotation on hydrodynamic bearings (1.7) without axial shaft. The rotor (1.2), together with the magnetic bearing components (1.4), rotate freely on the hydrodynamic bearing components (1.7) in the stator without contacting it.

The radial stator (1.1) and the axial stator (1.6) operate at low voltages as an ironless stator for small and medium segment marine vessels. Each stator sends an electromagnetic effect to the permanent magnets of the rotor which is under the effect of that stator in order to ensure rotation rotate at the speed which is set by the energy management system of its own for the maximum efficiency or at the speed for achieving high speeds. The radial stators (1.1) and the axial stators (1.6) are characterized by having motor windings with specially insulated cables which suited to superconductor technology so that they are used in large size versions of the motor for large and heavy marine vehicles. The stators of the electrical motor, which can be made of various inorganic or organic materials like copper, iron, chromium, aluminum, carbon compounds or superconducting properties, is driven by a drive circuit. The speed of rotation is detected by means of an encoder at any time and is evaluated by the microprocessor. The permanent magnet bars (1.5) are characterized by their shapes that will work compatibly with the hydrodynamic bearing components (1.7). The motor housing (1.8) carries axial radial and conical hydrodynamic bearing components (1.7). The motor connection and mounting elements (1.9) provides the connection of the electric underwater jet motor (1) with the marine vehicle and has sufficient durability. The hydrodynamic bearing components (1.4) are pressure bearing surfaces, characterized by their material of at least one composite material such as carbon fiber, teflon, carbon or graphite.

The hydrodynamic jet motor housing (2) consists of the hydraulic system that adjusts steering, and the diameter and direction of the nozzle (2.1), flow straightener (2.2), nozzle (output) (2.3) and diffuser blades (2.4). The hydraulic system that adjusts steering, and the diameter and direction of the nozzle (2.1), adjusts the output diameter for an optimum water jet according to economical or high-speed options by means of processing data from pressure sensors via the microprocessor and software algorithms. The hydraulic system that adjusts steering, and the diameter and direction of the nozzle (2.1), adjusts the direction and tilt of the electric underwater jet motor (1) according to economical or high-speed options set by the user and it controls the performance and steering by means of processing data from pressure sensors via the microprocessor and software algorithms.

The impeller blades (1.3), the feature is that it is characterized by that it is fixed to the rotor ring (1.2) without any shaft.

This is the impeller blades (1.3), the feature is that it is characterized as containing blade profiles (1.3) which have narrow profile at the center while widening through the perimeter. The rotor (1.2), the feature is that it is characterized as rotating on hydrodynamic bearings without any shaft. The stator (1.1) and the axial stator (1.6), the feature is that it is characterized as to be ironless stator for small and middle segment marine vessels and operating with low voltages. Each stator is working according its own driver which controlled by its energy management system as high efficiency option or high speed option. This is the radial stator (1.1) and the axial stator (1.6), the feature is that it is characterized by having motor windings with specially insulated cables which suited to superconductor technology. The Permanent Magnet Bars (1.5), the feature is that it is characterized by their shapes that will work compatibly with the hydrodynamic bearing components (1.7).The Motor Housing (1.8), the feature is that it is characterized as a part which has Hydrodynamic Bearing Components (1.7) have been attached on it. The Motor Connection and Mounting Elements (1.9), the feature is that it is characterized as a part that provides connection between the electric underwater jet engine and the marine vehicle. The pressure bearing surfaces of the Hydrodynamic Bearing Components (1.7) the feature is that it is characterized by having at least one composite material for each components such as carbon fiber, teflon, carbon and graphite. The Hydrodynamic jet motor housing (2), the feature is that it is characterized as containing the hydraulic system (2.1) which adjust steering positions and the output diameter of the nozzle according the rotation speed for high efficiency option or high speed option. It is also characterized as containing the flow straightener (2.2), Nozzle (2.3), and the Diffuser blades (2.4) This is the Hydraulic system that adjusts steering and the diameter and the direction of the nozzle (2.1), the feature is that it is characterized as adjusting the optimum water jet trust for chosen drive option (efficiency option or high speed option), according the data, software and the algorithm of the microprocessor which are collected by the sensors. (The sensors are collected real time data of input pressure, output pressure, rotating speed). This is the Hydraulic system that adjusts steering and the diameter and the direction of the nozzle (2.1), the feature is that it is characterized as adjusting the optimum water jet and its direction according the data that coming from the control unit and processed by the software together with special algorithms for high efficiency option or high speed option of microprocessor. The Hydraulic system that adjusts steering and the diameter and the direction of the nozzle (2.1), the feature is that it is characterized as adjusting the optimum position for the marine vehicle for different driving option by changing the tilt degree and direction of the water jet motor (1) The max performance for each drive option to be calculated and adjusted according the data that coming from the sensors and processed by the software together with special algorithms for high efficiency option or high speed option of microprocessor. The flow straightener (2.2), the feature is that it is characterized as reducing the turbulence of the fluent at the input of the electrical underwater jet motor and straightener the flow according the right attach angle of the rotor blades. The nozzle (2.3), the feature is that it is characterized by having conical shape for decrease the pressure of the water that inside the motor and increase the velocity of the water jet at the output of the electrical underwater jet motor. The nozzle (2.3) the feature is that it is characterized as contains moving parts for adjusting the output diameter. The diffuser blades (2.4), the feature is that it is characterized as reducing the turbulence of the fluent at the output of the electrical underwater jet motor and straightener the flow after rotor blade to corrected all the flow on axial direction. The Microprocessor (3.1), the feature is that it is characterized as a smart part that decides necessary power with its software and its algorithms, for each coils of the different stator around the rotor for the contactless and stable rotating of the rotor, according the collected real-time data of Gyroscopic balance sensors, Magnetic Bearing (Distance) Sensors. The Control panel (3.12), the feature is that;

- Adjust the working conditions of the water jet motor, according the chosen options (efficiency option or high speed option, cruise control) by the user.

- User can change the direction of the marine vehicle by using the control panel.
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- characterized by being a unit containing functions to make brakes by reversing the propulsive blades in the opposite direction when necessary.

The Microprocessor (3.1), software (3.2) and Software algorithms (3.10) , the feature is that it is characterized as adjusting different rotation speeds and output diameters together with Software algorithms (3.10) which defined for different options for users. It is also deciding the active and inactive coils and their feeding powers of the stators around the rotor to deliver the highest performance and efficiency according the data which is coming from sensors 3.3. Magnetic Bearing (Distance) Sensors, 3.4. Counter, hall effect and speed measurement sensors, 3.5. gyroscopic balance sensors, 3.6. Heat and humidity sensors, 3.7. Pressure measuring sensors, 3.8. Voltage and ampere measurement sensors. The Magnetic Bearing (Distance) Sensors (3.3) , the feature is that it is characterized as collecting real time distance data between the rotor (1.2) and the stators to the microprocessor (3.1) for providing contactless rotation to the rotor. This is the Gyroscopic balance sensors (3.5) and mentioned in claim 1, the feature is that it is characterized as provide comfortable travel by collected data to reduce the effect of sea currents and wave movements which are the consequences of seasickness on the passengers at sea. This collected real time data being processed by the microprocessor to balanced the vibration of the marine vehicle by generating pulsatile balance flow to reduce vibrations. The gyroscopic balance sensors (3.5), the feature is that it is characterized by being part of helping to ensure the marine vessel's balance. The Pressure measuring sensors (3.7), the feature is that it is characterized as collecting real time data the microprocessor (3.1) for providing high performance. The electrical underwater jet motor (1), the feature is that it is characterized as each of them can be control from the same control panel when using more than one electrical underwater jet motor. The electrical underwater jet motor (1), the feature is that it is characterized as can be recharge of its battery as a generator when it is using with sail boot and driving by the sail. The electrical underwater jet motor (1), the feature is that it is characterized as recharging of its battery as a generator when it is not using for trust a boot and became vertical position on the sea as a unit that generates electricity at the microprocessor control and the rotor rotates at low speed with the raising and lowering of the waves. The electrical underwater jet motor (1), the feature is that it is characterized as when the double rotor (1.2) is used, the directions of rotation of the rotors are opposite to each other.

In summary, the invention is an electric underwater jet engine system designed for vehicles traveling above or below the sea and which contains multiple stator units which are equipped with microprocessors containing relevant algorithms for certain speeds. Naturally, this system can be applied to all marine vehicles intended for civilian or military purposes. Compared to similar electric motors, these engines we have described have high efficiency and are much more powerful while they are small and they consume less energy. The surfaces of the rotor which are affected by the corresponding stator rotate at the hydrodynamic magnetic bearing which is designed for maximum efficiency. In high power motors, the rotor rotates in axial and radial directions, in the hybrid hydrodynamic bearing and magnetic bed, and the rotor and stator do not contact each other. It can also be used as a turbine at times when the engine is not used for propulsion, and the propeller blades rotating by waves or water flow can recharge the batteries. Especially in the case of sailboats, the battery can be recharged using the proposed invention as a turbine.

CLAIMS

1. 1. An electric underwater jet engine comprising a plurality of stator for marine craft, characterized in; at least one rotor (1.2), at least two propellers (1.3), a magnetic bearing (1.4), at least one permanent magnet bars (1.5), at least one stator (1), hydrodynamic jet engine housing (2), and microprocessor (3.1), software (1), which includes parts of the hydrodynamic bearing components (1.7), motor housing (1.8) and motor connectors 3.2), magnetic bed (distance) sensors (3.3), counter and speed measurement sensors (3.4), jirescopic balance sensors (3.5) Heat and humidity sensors (3.6), Pressure measurement sensors (3.7), Voltage and ampere measurement sensors), Motor drive circuitry (3.9), Software algorithms (3.10), Energy management system (3.11), Control panel (3.12), Batteries (3.13), and Battery charging components (3.14).
2. This is the impeller blades (1.3) mentioned in claim 1, the feature is that it is characterized by that it is fixed to the rotor ring (1.2) without any shaft.
3. This is the impeller blades (1.3) mentioned in claim 1, the feature is that it is characterized as containing blade profiles (1.3) which have narrow profile at the center while widening through the perimeter.
4. The rotor (1.2), the feature is that it is characterized as rotating on hydrodynamic bearing components (1.7) without any shaft.
5. The stator (1.1) and the axial stator (1.6) mentioned in claim 1, the feature is that it is characterized as to be ironless stator for small and middle segment marine vessels and operating with low voltages and each stator is working according its own driver which controlled by its energy management system as high efficiency option or high speed option.
6. This is the radial stator (1.1) and the axial stator (1.6) mentioned in Claim 1, the feature is that it is characterized by having motor windings with specially insulated cables which suited to superconductor technology.
7. This is the Permanent Magnet Bars (1.5) mentioned in claim 1, the feature is that it is characterized by their shapes that will work compatibly with the hydrodynamic bearing components (1.7).

8. This is the Motor Housing (1.8) mentioned in claim 1, the feature is that it is characterized as a part which has Hydrodynamic Bearing Components (1.7) have been attached on it.
9. This is the Motor Connection and Mounting Elements (1.9) mentioned in Claim 1, the feature is that it is characterized as a part that provides connection between the electric underwater jet engine and the marine vehicle.
10. This is the pressure bearing surfaces of the Hydrodynamic Bearing Components (1.7) mentioned in Claim 1, the feature is that it is characterized by having at least one composite material for each components such as carbon fiber, teflon, carbon and graphite.
11. This is the Hydrodynamic jet motor housing (2) mentioned in claim 1, the feature is that it is characterized by comprising the hydraulic system (2.1) which adjust steering positions and the output diameter of the nozzle according the rotation speed for high efficiency option or high speed option, the flow straightener (2.2), Nozzle (2.3), and the Diffuser blades (2.4).
12. This is the Hydraulic system that adjusts steering and the diameter and the direction of the nozzle (2.1) mentioned in Claim 11, the feature is that it is characterized as adjusting the optimum water jet trust for chosen drive option, according the data, software and the algorithm of the microprocessor which are collected by the sensors.
13. This is the Hydraulic system that adjusts steering and the diameter and the direction of the nozzle (2.1) mentioned in claim 12, the feature is that it is characterized as adjusting the optimum water jet and its direction according the data that coming from the control unit and processed by the software together with special algorithms for high efficiency option or high speed option of microprocessor.
14. This is the Hydraulic system that adjusts steering and the diameter and the direction of the nozzle (2.1) mentioned in claim 12, the feature is that it is characterized as adjusting the optimum position for the marine vehicle for different driving option by changing the tilt degree and direction of the water jet motor (1) The max performance for each drive option to be calculated and

adjusted according the data that coming from the sensors and processed by the software together with special algorithms for high efficiency option or high speed option of microprocessor.

15. This is the flow straightener (2.2), mentioned in claim 11, the feature is that it is characterized as reducing the turbulence of the fluent at the input of the electrical underwater jet motor and straightener the flow according the right attach angle of the rotor blades.
16. This is the nozzle (2.3), mentioned in claim 11, the feature is that it is characterized by having conical shape for decrease the pressure of the water that inside the motor and increase the velocity of the water jet at the output of the electrical underwater jet motor.
17. This is the nozzle (2.3), mentioned in claim 11, the feature is that it is characterized as contains moving parts for adjusting the output diameter.
18. This is the diffuser blades (2.4), mentioned in claim 11, the feature is that it is characterized as reducing the turbulence of the fluent at the output of the electrical underwater jet motor and straightener the flow after rotor blade to corrected all the flow on axial direction.
19. This is the Microprocessor (3.1) mentioned in claim 1, the feature is that it is characterized as a smart part that decides necessary power with its software and its algorithms, for each coils of the different stator around the rotor for the contactless and stable rotating of the rotor, according the collected real-time data of Gyroscopic balance sensors, Magnetic Bearing (Distance) Sensors.
20. This is the Control panel (3.12), the feature is that;
    - Adjust the working conditions of the water jet motor, according the chosen options (efficiency option or high speed option, cruise control) by the user.
    - User can change the direction of the marine vehicle by using the control panel.
    - characterized by being a unit containing functions to make brakes by reversing the propulsive blades in the opposite direction when necessary.

21. The Microprocessor (3.1), software (3.2) and Software algorithms (3.10) mentioned in claim 1, the feature is that it is characterized as adjusting different rotation speeds and output diameters together with Software algorithms (3.10) which defined for different options for users.
22. The software (3.2) mentioned in claim 1, the feature is that it is characterized as deciding the active and inactive coils and their feding powers of the stators around the rotor to deliver the highest performance and efficiency according the data which is coming from sensors 3.3. Magnetic Bearing (Distance) Sensors, 3.4. Counter, hall effect and speed measurement sensors, 3.5. Jirescopic balance sensors, 3.6. Heat and humidity sensors, 3.7. Pressure measuring sensors, 3.8. Voltage and ampere measurement sensors.
23. This is the Magnetic Bearing (Distance) Sensors (3.3) and mentioned in claim 1, the feature is that it is characterized as collecting real time distance data between the rotor (1.2) and the stators to the microprocessor (3.1) for providing contactless rotation to the rotor.
24. This is the Jirescopic balance sensors (3.5) and mentioned in claim 1, the feature is that it is characterized as provide comfortable travel by collected data to reduace the effect of sea currents and wave movements which are the consequences of seasickness on the passengers at sea.
25. This is the Jirescopic balance sensors (3.5) and mentioned in claim 1, the feature is that it is characterized by being part of helping to ensure the marine vessel's balance.
26. The gyroscopic balance sensor (3.5) according to claim 1, characterized in that: it is characterized by the fact that the software controls all the motors when more than one electric underwater jet engine is connected to the marine vessel.
27. This is the Pressure measuring sensors (3.7) and mentioned in claim 1, the feature is that it is characterized as collecting real time data the microprocessor (3.1) for providing high performance.

28. This is the electrical underwater jet motor (1) and mentioned in claim 1, the feature is that it is characterized as each of them can be control from the same control panel when using more than one electrical underwater jet motor.
29. This is the electrical underwater jet motor (1) and mentioned in claim 1, the feature is that it is characterized as can be recharge of its battery as a generator when it is using with sail boot and driving by the sail.
30. This is the electrical underwater jet motor (1) and mentioned in claim 1, the feature is that it is characterized as recharging of its battery as a generator when it is not using for trust a boot and became vertical position on the sea as a unit that generates electricity at the microprocessor control and the rotor rotates at low speed with the raising and lowering of the waves.
31. This is the electrical underwater jet motor (1) and mentioned in claim 1, the feature is that it is characterized as when the double rotor (1.2) is used, the directions of rotation of the rotors are opposite to each other.

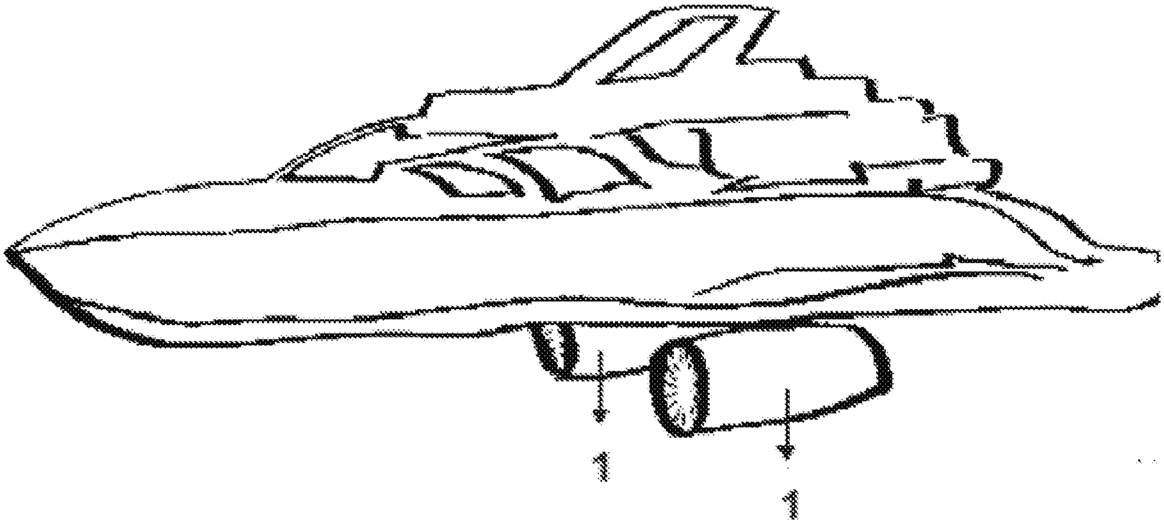


FIGURE 1

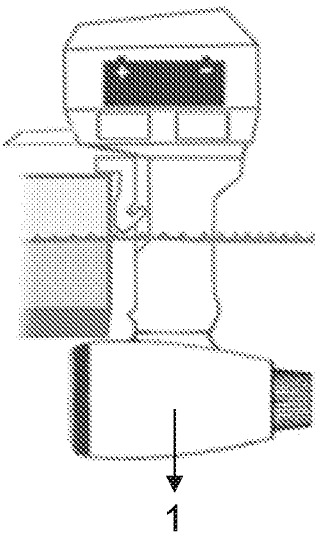


FIGURE 1-A

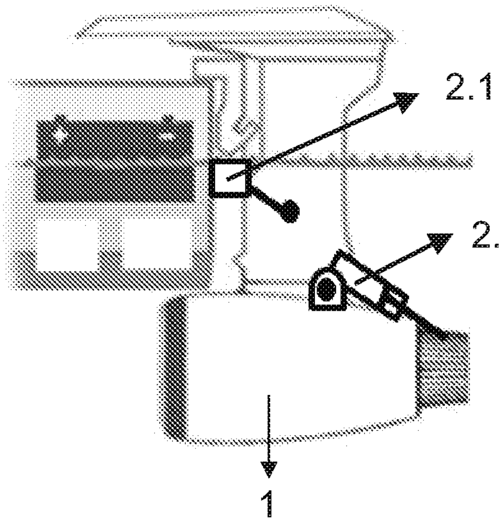


FIGURE 1 - B

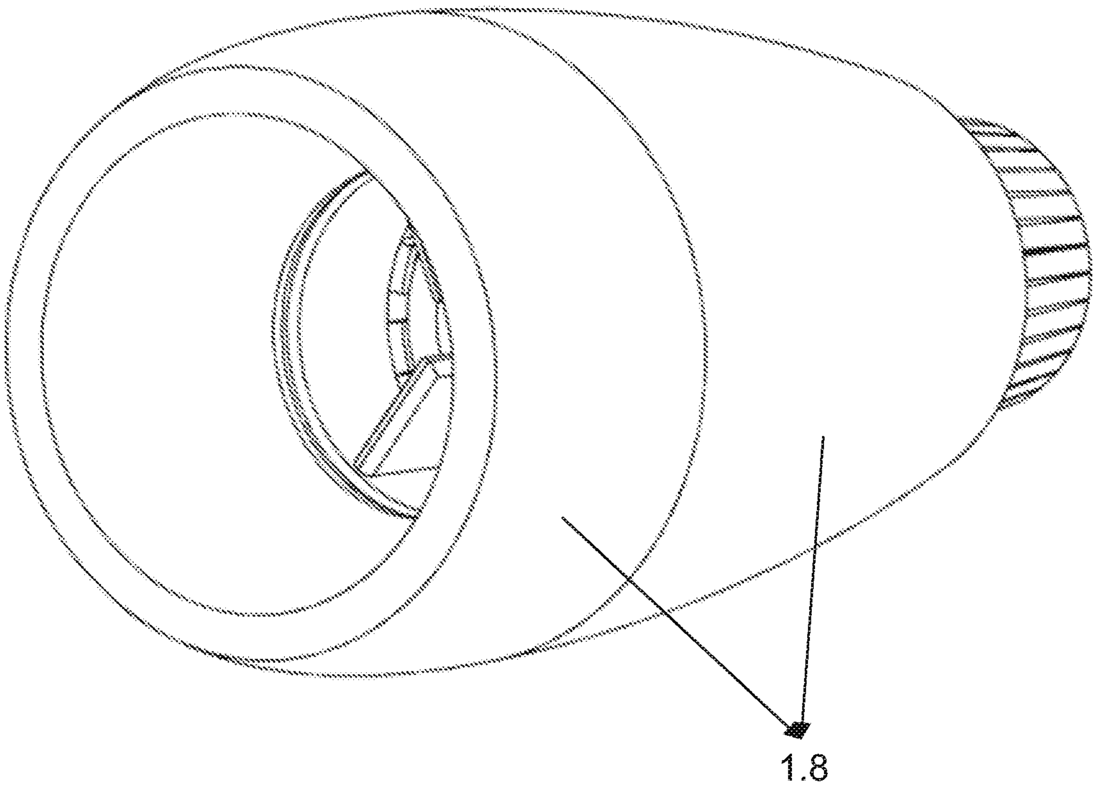


FIGURE 2

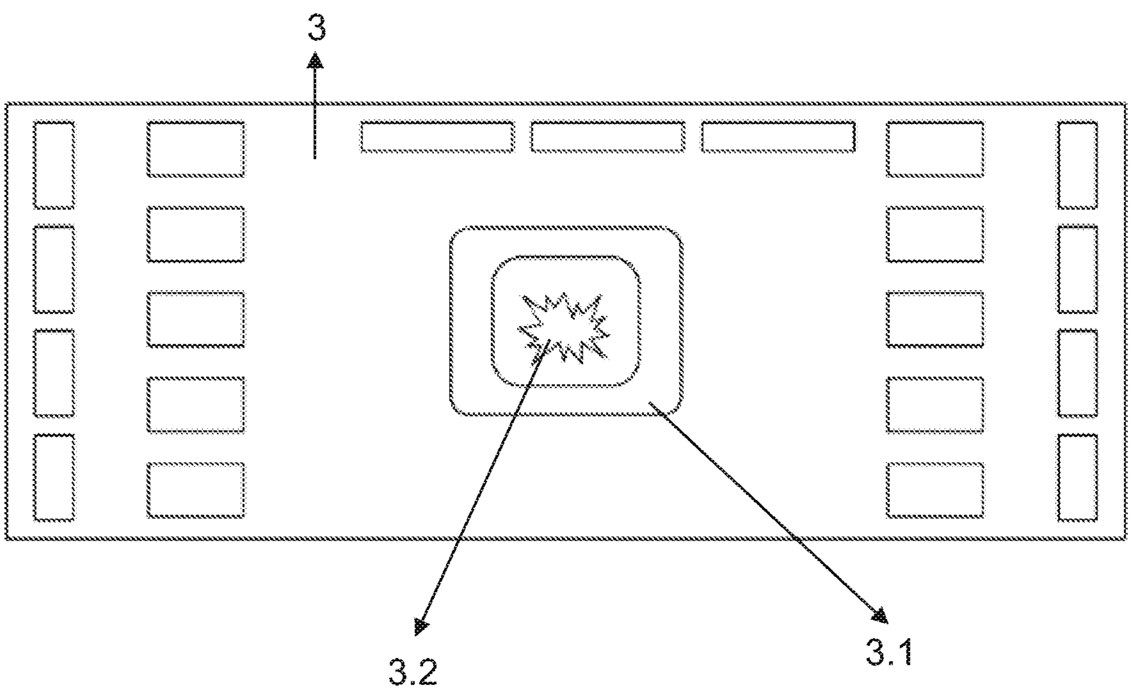


FIGURE 3

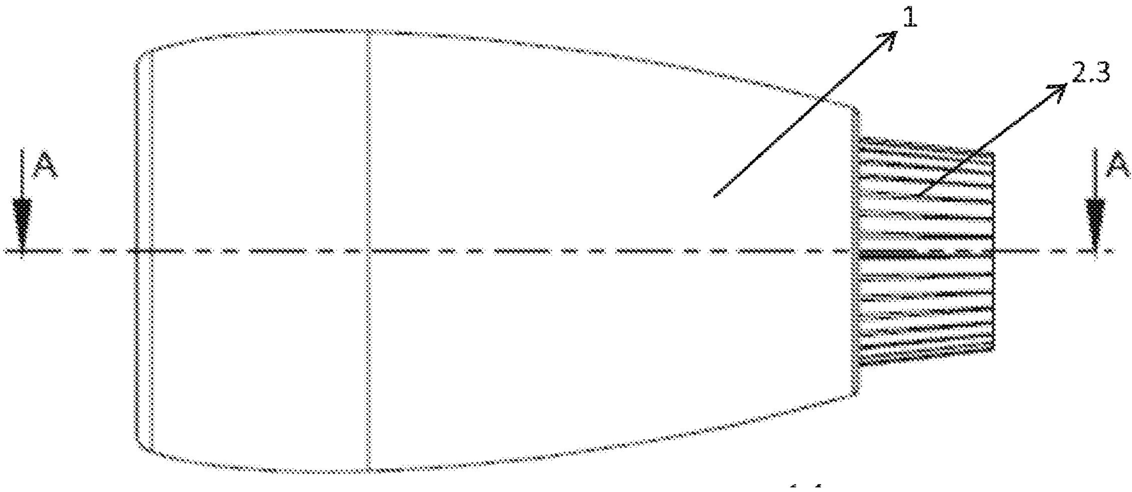


FIGURE 4

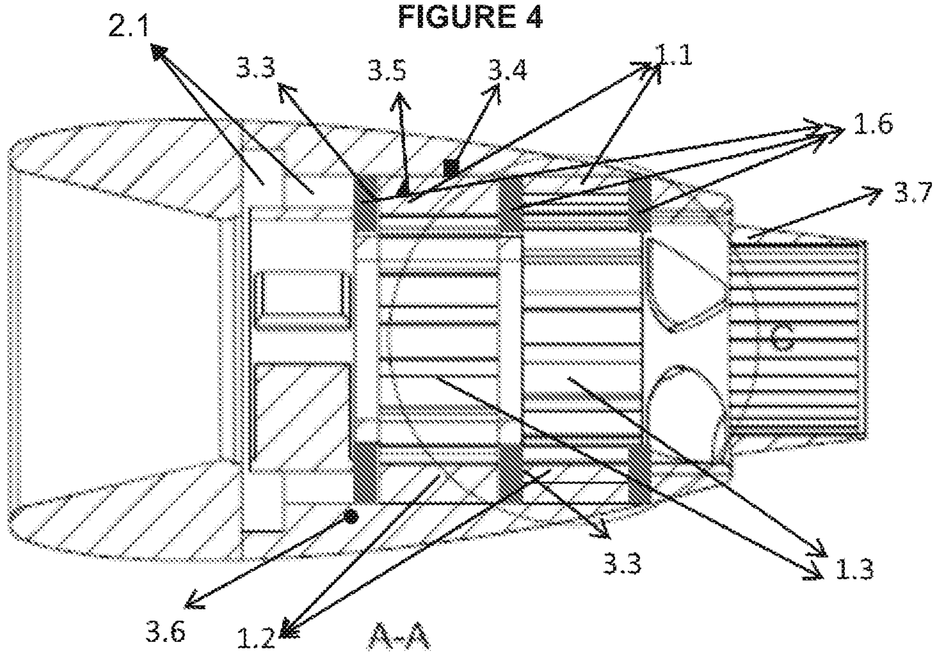


FIGURE 5

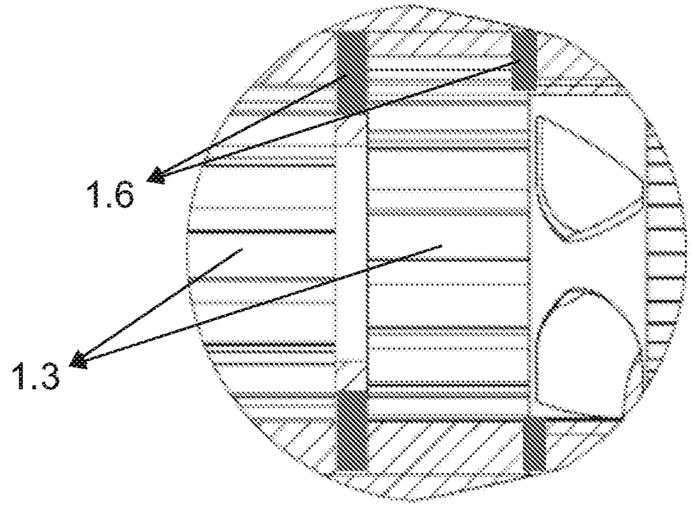


FIGURE 6

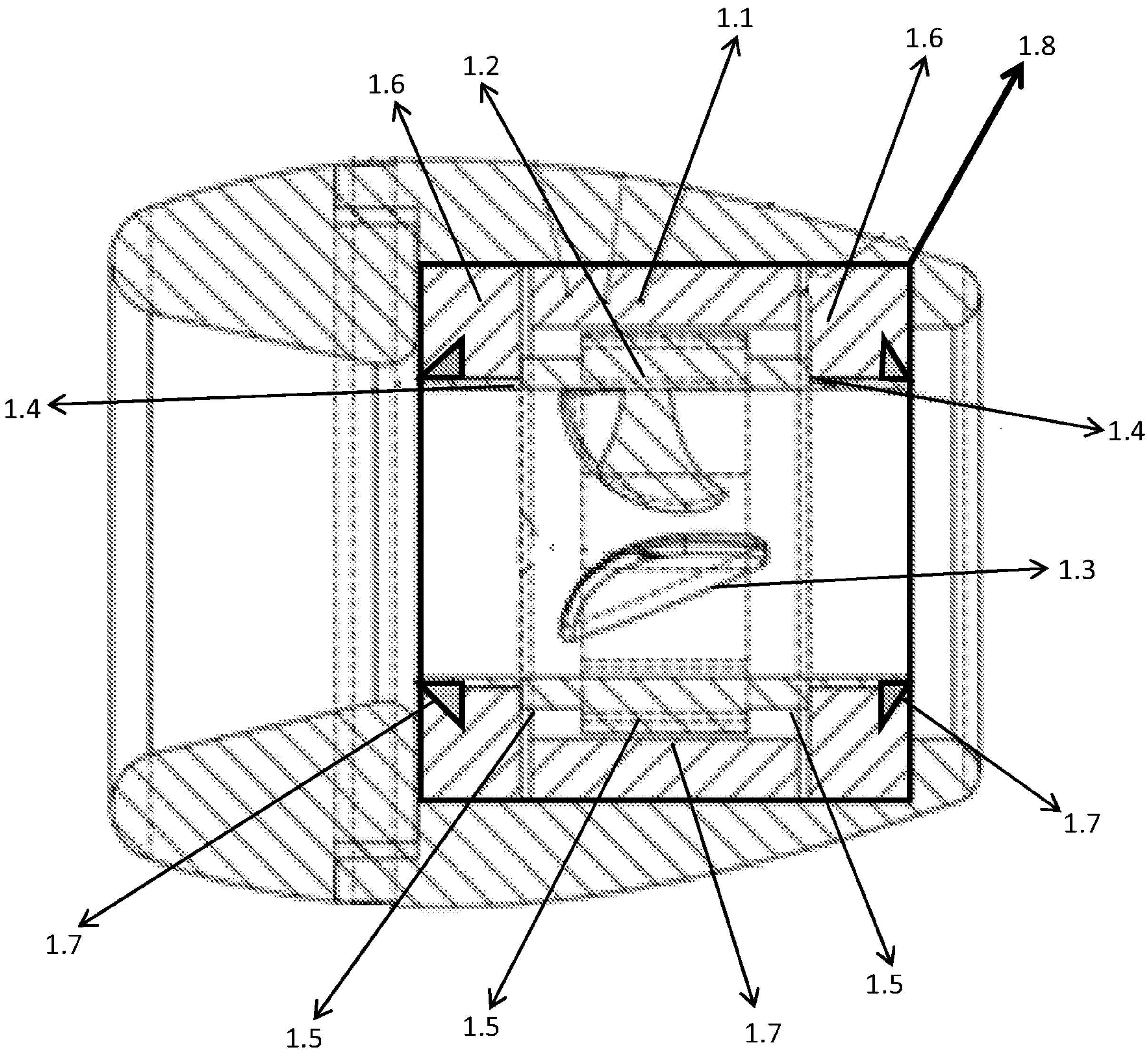


FIGURE 7

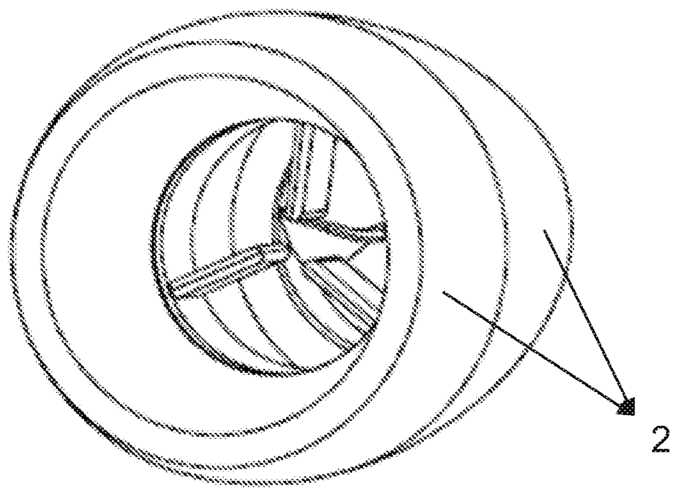


FIGURE 8

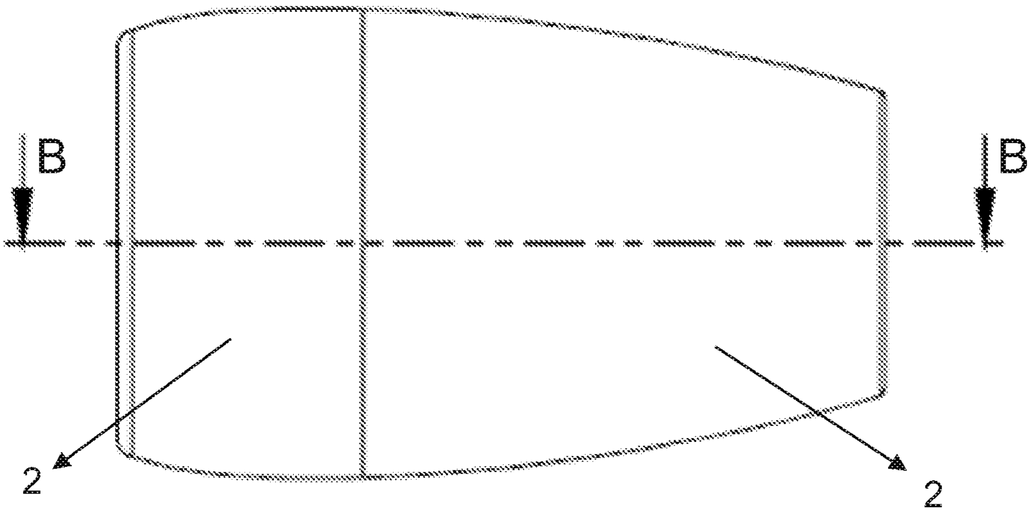


FIGURE 9

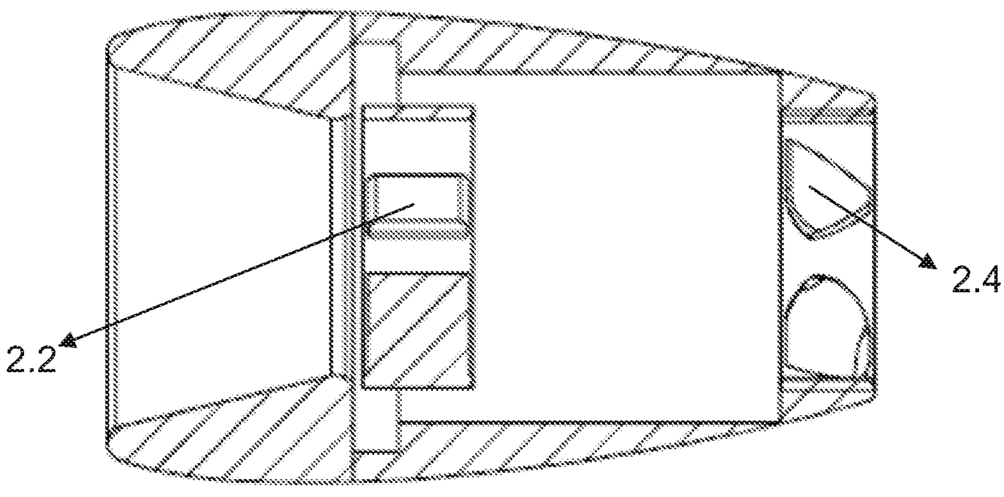
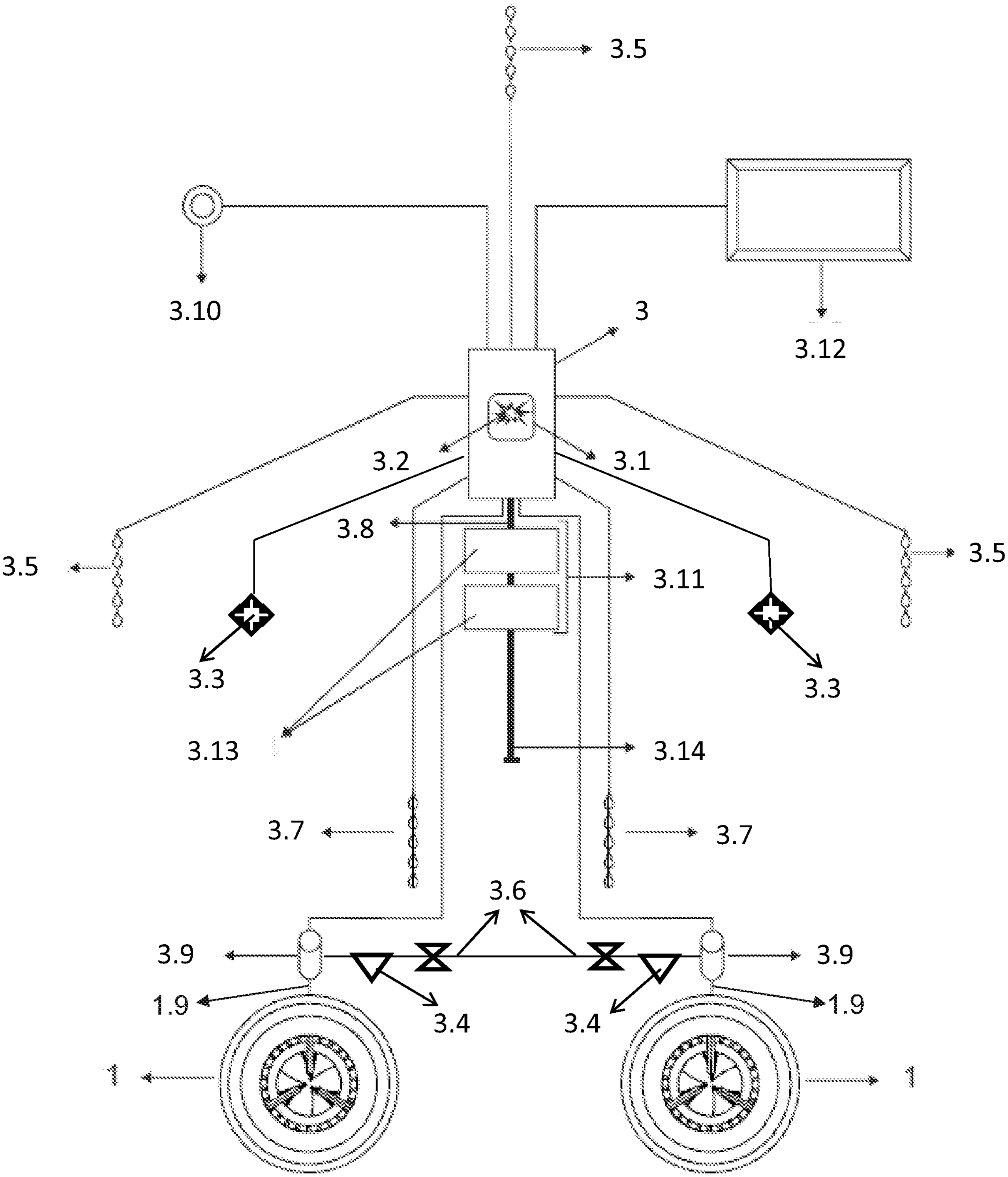


FIGURE 10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1

FIGURE 11

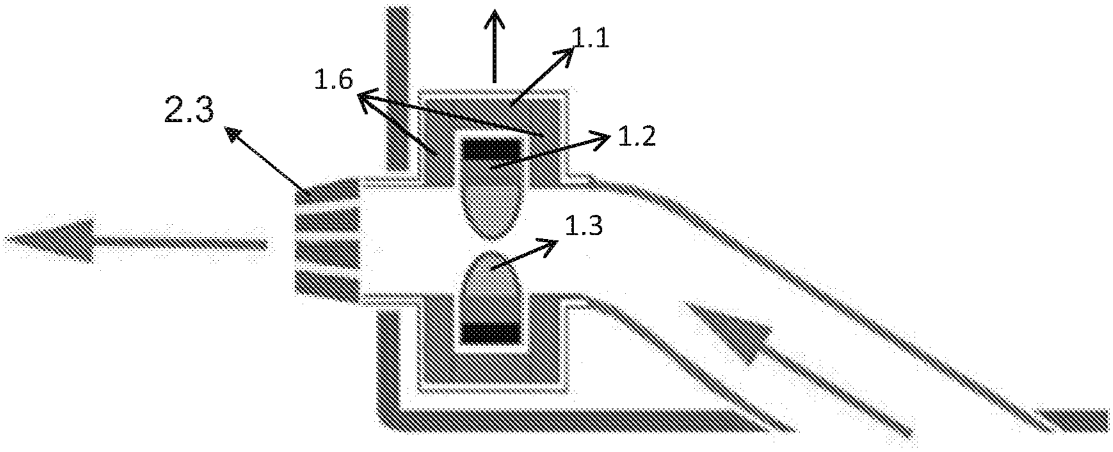

FIGURE 12

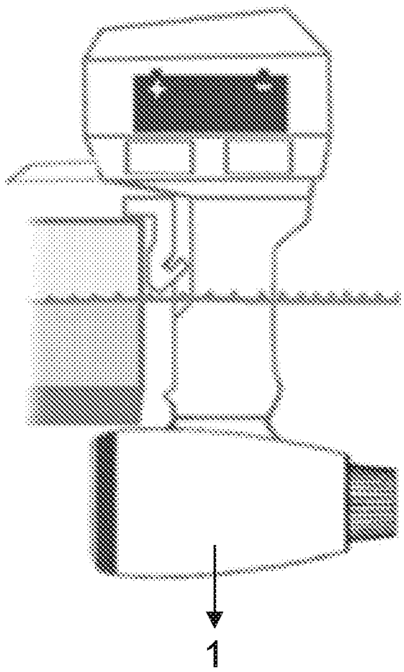

FIGURE 13

INTERNATIONAL SEARCH REPORT

International application No
PCT/TR2017/050727

A. CLASSIFICATION OF SUBJECT MATTER
INV. B63H11/113 B63H5/14 B63H5/15 H02K7/09 H02K7/14
H02K16/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B63H B63J H02K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	US 2013/157530 A1 (DAVIES BARRY JOHN [NZ]) 20 June 2013 (2013-06-20) figures 1-7 abstract	20

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Date of the actual completion of the international search
23 January 2019

Date of mailing of the international search report
30/01/2019

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Fax: (+31-70) 340-3016

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Freire Gomez, Jon

INTERNATIONAL SEARCH REPORT

International application No
PCT/TR2017/050727

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	US 5 702 273 A (CHO CHAHEE PETER [US] ET AL) 30 December 1997 (1997-12-30) figure 3 -----	1-31
Y	US 2009/111339 A1 (SUZUKI AKITAKA [JP]) 30 April 2009 (2009-04-30) paragraphs [0027], [0065] -----	11-14
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Information on patent family members

International application No
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TR 201109302 A2	23-01-2012	NONE	