United States Patent

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[54] GAS POWERED SWIMMING AID
8 Claims, 4 Drawing Figs.

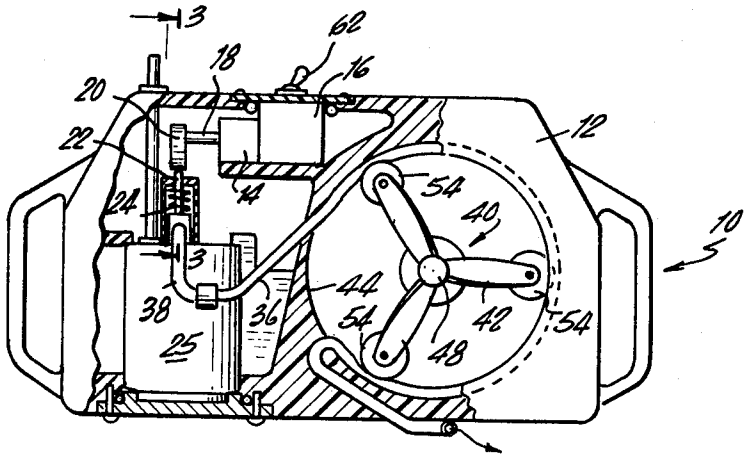
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[50] Field of Search ..... 114/16, 16A; 115/6.1; 103/149(Inquired)

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ABSTRACT: A marine propulsion device which operates by transfer of electrical energy to the intermittent discharge of a nontoxic gas into the confines of a nonporous tubing and the subsequent driving of a propeller by the gas discharge. The device includes a frame having cam means reciprocally operating a spring tensioned rod which controls the discharge of compressed gas from a container.



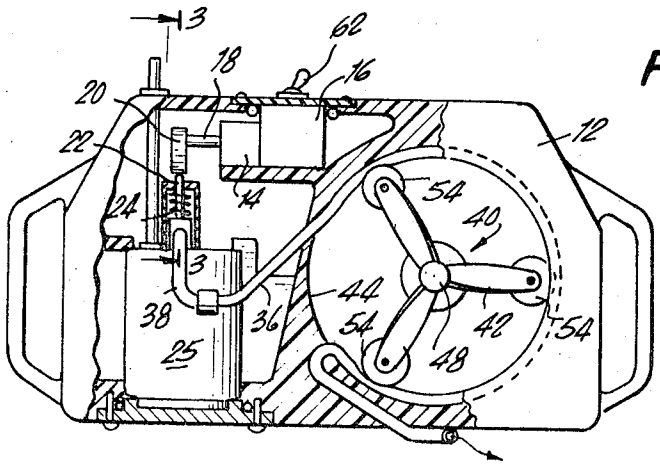


FIG. 1

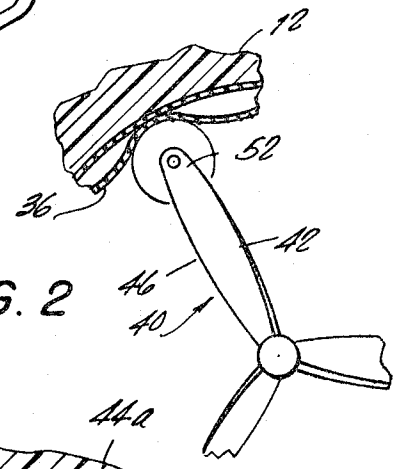


FIG. 2

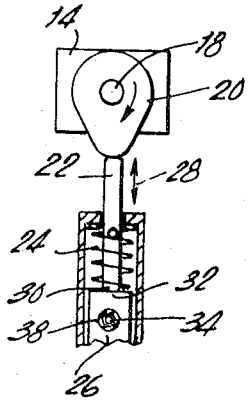


FIG. 3

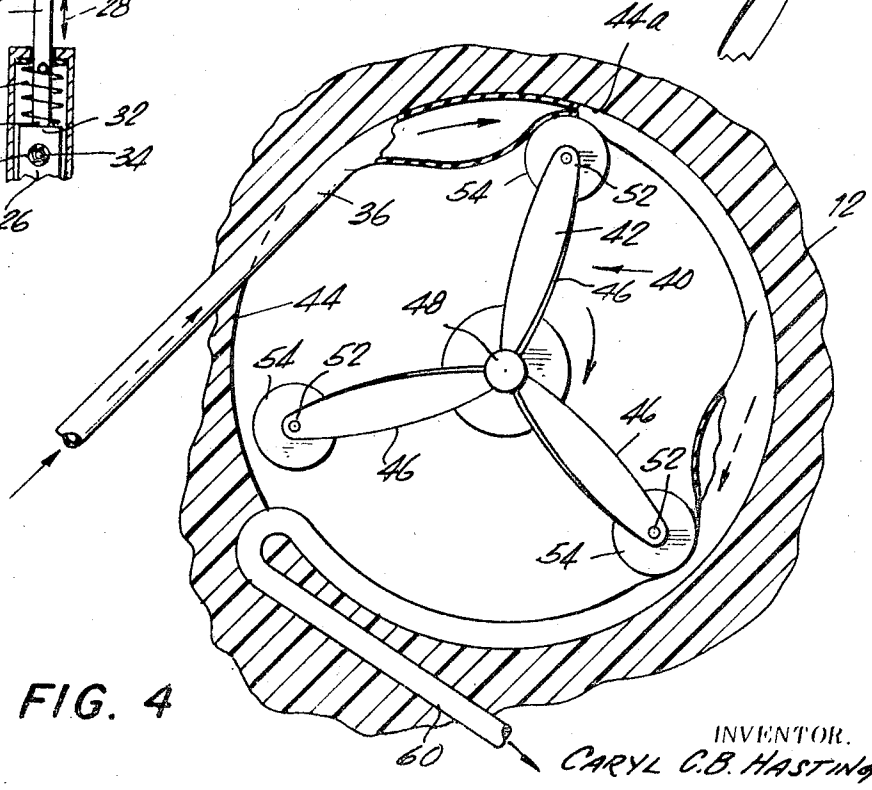


FIG. 4

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GAS POWERED SWIMMING AID

This invention relates to a marine propulsion device adapted to be used as a propulsion unit for a swimmer or diver.

One of the popular rapidly growing outdoor sports is underwater swimming or scuba diving. The swimmer or diver not only has the unusual ability of being able to stay for an extended period of time under water, but in so doing can perform useful functions of exploration, rescue operations, repair of equipment, etc. To this end, it is often desirable to provide the swimmer or diver with some mechanical means of accelerating progress through the water.

It is the primary object of the invention to not only provide a device for propelling the diver at a relatively high rate, but which is light in weight and therefore requires minimal exertion of the diver's effort thereby enabling him to perform his task with the greatest efficiency when he reaches his destination.

Another object of the invention resides in the provision of a device for propelling a diver in water which is small in size and easily controllable by the diver.

A further object of the invention resides in the provision of a safe and convenient marine propulsion device especially adapted for use as a safety device for use by a diver when operating at the surface so as to enable the diver to move against a light current over an average distance of 50 to 500 yards when fully laden with equipment and in a surfaced state.

Still another object of this invention resides in the provision of a marine device for a swimmer or diver which incorporates novel gas propulsion means employing replaceable parts which are readily available.

An additional object of this invention resides in the provision of a marine propulsion device which operates cleanly by means which do not contribute to the pollution of water.

Yet another object of this invention resides in the provision of a marine propulsion device which is virtually silent as it moves through water, thereby not frightening fish and other aquatic life.

Still further objects and features of this invention reside in the provision of a marine propulsion device that is simple in construction, capable of using various existing parts, which is attractive in appearance, and efficient in operation, and which requires relatively no maintenance.

These, together with the various ancillary objects and features of this invention, which will become apparent as the following description proceeds, are attained by this marine propulsion device, a preferred embodiment of which is shown in the accompanying drawings, by way of example only, wherein:

FIG. 1 is a partial front elevational view of the marine propulsion device according to the invention, parts being broken away to show other parts in detail;

FIG. 2 is an enlarged fragmentary elevational view of the gas propulsion means of the invention showing the manner in which the discharge of gas operates upon the propeller;

FIG. 3 is an enlarged fragmentary side sectional view of the intermittent operation of the cam upon the compressed gas container in order to effect discharge of gas taken along the plane of line 3–3 in FIG. 1 therefrom; and,

FIG. 4 is an enlarged elevational view of the gas propulsion means according to the invention.

With continuing reference to the accompanying drawings, wherein like reference numerals designate similar parts throughout the various views, and particularly with reference to FIG. 1, reference numeral **10** is used to generally designate a marine propulsion device illustrated in accordance with the concepts of the present invention. The marine propulsion device **10** includes an open frame **12**. Disposed in the frame is means for actuating the valve of an aerosol type container **25** of compressed gas and includes an electric motor **14** and suitable rechargeable batteries **16** for driving the motor **14**. Motor **14** drives a shaft **18** fixed to its side and extending outwardly thereof. Tapered cam **20** is mounted upon shaft **18**. Cam **20** abuts rod **22** tensioned by spring **24** against gas discharge button **26** of a compressed gas container **25**, preferably an aerosol type can. The sea water flows freely about the container **25**. Preferably, Freon is used because of its low cost, but any other nontoxic gas will work equally as well.

Referring now to FIG. 3, as motor **14** rotates cam **20** the rod **22** reciprocates in upward and downward movements in the direction shown by double arrow **28**. The lower portion **30** of rod **22** is rigidly fixed to a cylindrical cap **32** which is securely mounted upon gas discharge button **26** to prevent rod **22** from being jarred from its position as spring **24** expands. The reciprocating upward and downward movements of rod **22** caused by rotation of cam **20** is responsible for intermittent discharge of gas through gas discharge orifice **34**. The discharge orifice **34** opens into a nonporous elastic tube **36** by means of another section of tubing **38**. In lieu of the foregoing mechanism, a squeeze type "closed-open" valve arrangement can be provided for the tube **36**.

Propeller means, generally designated by numeral **40**, comprises a pitched propeller **42** mounted within cylindrical opening **44**, the propeller comprising a plurality of individual spaced members **46** radiating from the center **48** of the propeller. Located at the outward ends **52** of the spaced members **46** are roller means **54** rotatably secured at the outer ends of the spaced members **46**. The roller means **54** rotatably mounted on the outer ends of the spaced members **46** are sized to fit within the opening **44** between the inner wall **44***a* of the opening **44** and the nonporous elastic tube **36** which is located against the inner wall **44***a* of the opening **44**. The nonporous elastic tube **36** extends about the opening **44** approximately 270° and then leaves the opening **44** by means of a discharge tube **60**.

When no compressed gas is being admitted to the nonporous elastic tube **36**, the propulsion device is in the static position as is best seen in FIG. 2. However, as compressed gas is admitted into the nonporous elastic tube **36**, the tube expands as is seen in FIG. 4 causing the roller **52** to advance in the direction of the movement of the compressed gas which action in turn causes the propeller to rotate thereby exerting its propelling force.

The faster the motor **14** is caused to operate by the activation of the switch **62** the more compressed gas is forced under pressure from the compressed gas container **25** which in turn causes the compressed gas to enter the nonporous elastic tube **36** at a faster rate which in turn drives the rollers **54** faster, thus causing the propeller **40** to rotate at a higher speed, thereby achieving faster propulsion for the propulsion device **10**.

A swimmer or diver can maintain complete control of the device by parallel hand grips **64** located on each side of the frame. Also, a door **66** is provided on the frame and is attached by fasteners **68** so that the compressed air container **25** may be replaced.

It is contemplated that various compressed gases can be used in this invention such as Freon and that all will operate equally as well, but Freon has been specified since it is readily available, low in cost and is not harmful to humans or wildlife. It is further contemplated that the pressure of the compressed gas within the compressed gas container can be under a pressure of about 180 pounds although this pressure is not critical. The water passing over the device controls the temperature of the liquid gas so that it can expand to its free state pressure. An air compressor hose can be attached for captive use if such is desired by provision of a nipple connection.

The nonporous elastic tube **36** may be made of nylon. Mylar or a similar elastic material either of synthetic or natural materials which are not affected by exposure to water or mineral deposits. Further, the rollers **54** may be fabricated of nylon Teflon or a similar material having a low coefficient of friction.

It is further to be understood that the nonporous elastic tube **36** may be set within a channel within the opening **44** so as to prevent any slippage or displacement of the tube **36**.

In use, it is merely necessary to actuate the switch **62** turning on the electric motor **14** in order to commence the use of the propulsion device of the invention. When the motor **14** is turned on, the motor **14** begins to rotate turning the shaft **18** which is connected to the cam **20**. As the cam **20** rotates, the follower rod **22** reciprocates up and down as shown at **28** operating the gas discharge button **26** which serves as a valve. As the gas discharge button **26** is actuated, compressed gas from the compressed gas supply tank **25** is allowed to leave the tank and flow into the nonporous elastic tube **36**. As the compressed gas enters the tube, a slight bubble is formed in the tube which is partially restricted by the roller **54**, causing the roller **54** to advance in front of the gas bubble thereby driving the propeller **40**.

A latitude of modification, change and substitution is intended in the foregoing disclosure, and in some instances some features of the invention will be employed without a corresponding use of other features. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the spirit and scope of the invention herein.

I claim:

1. A marine propulsion device comprising a frame having an opening extending therethrough, propeller means rotatably mounted in said opening and including a plurality of spaced members radiating from its center, container means for compressed gas mounted on said frame, tubing means connected to said container means and having a portion thereof mounted around the inner periphery of said opening, means for intermittently discharging compressed gas from said container means into said tubing means, and roller means mounted on said members and abutting and slightly compressing said tubing along the inner periphery of said opening for moving said rollers and rotating said propeller means as gas is intermittently discharged from said container means.

2. A device according to claim **1**, wherein said means for intermittently discharging compressed gas from said container includes cam means, a rod secured to the upper portion of said container and abutting the periphery of said cam means, and spring means about said rod for controlling the intermittent discharge of gas from said container by reciprocating upward and downward movement of said rod.

3. A device according to claim **1**, including a motor in said frame driving said cam means, a source of electrical power in said frame, and electrical connection means electrically connecting said source to said motor.

4. A device according to claim **1**, including means on said frame for removing said container means.

5. A device according to claim **1**, including a pair of complementary hand grips, each of said hand grips being parallel to one another and being attached to opposite sides of said frame for facilitating control of said device.

6. A device according to claim **1**, wherein the free end of said tubing means is secured to the outside of said frame for discharging gas from said device.

7. A device according to claim **1**, wherein said tubing means is fabricated from a nonporous elastic material.

8. A device according to claim **1**, wherein said compressed gas is Freon.