June 13, 1967 G. A. CARTER III 3,324,822

MOTORIZED SURFBOARD

Filed Oct. 23, 1965 2 Sheets-Sheet 1

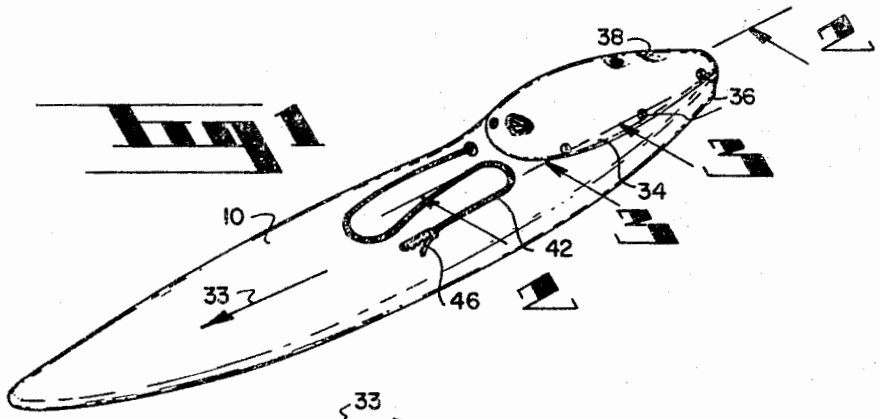

Fig. 1

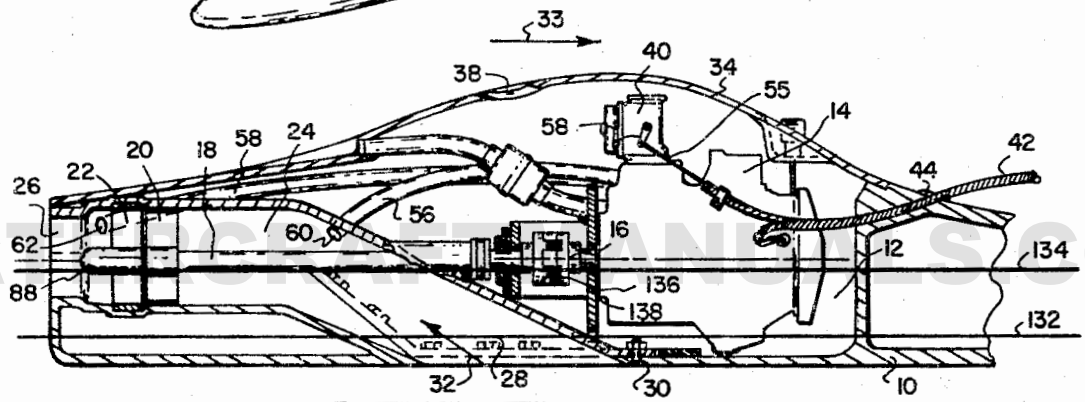

Fig. 3

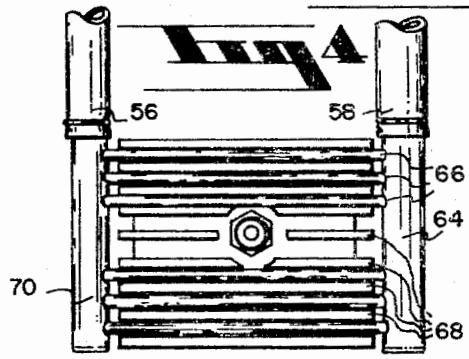

Fig. 4

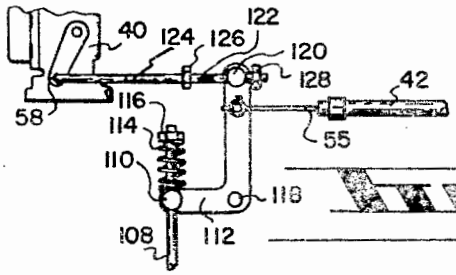

Fig. 5

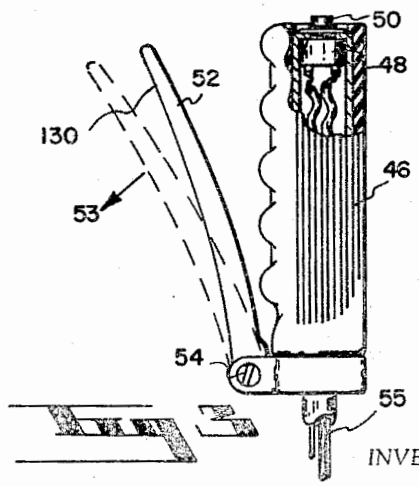

Fig. 2

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MOTORIZED SURFBOARD

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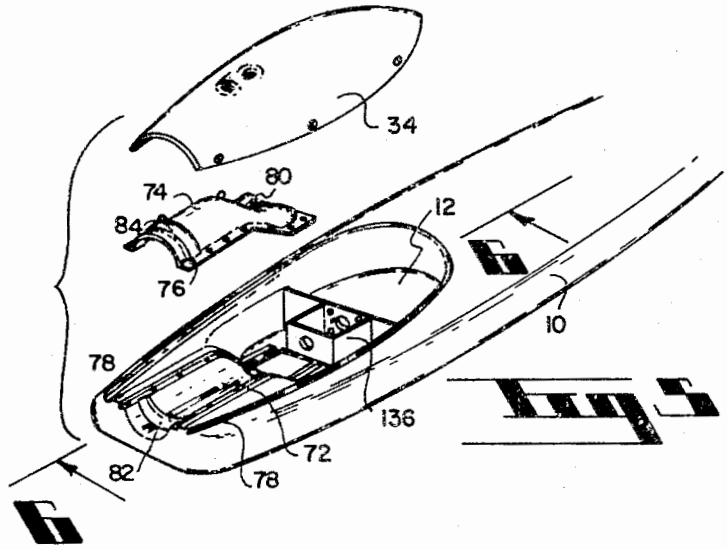

Fig 5

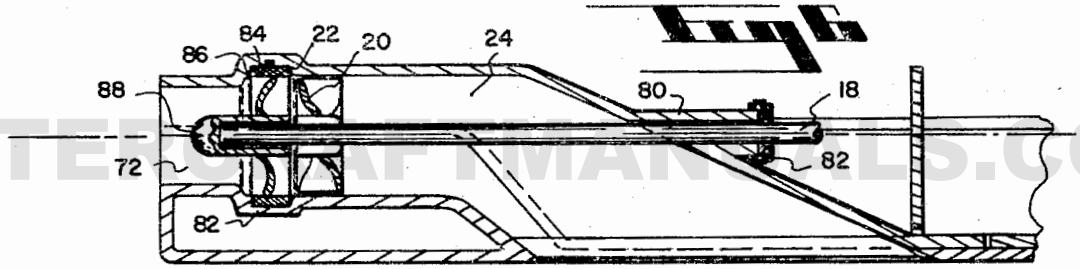

Fig 6

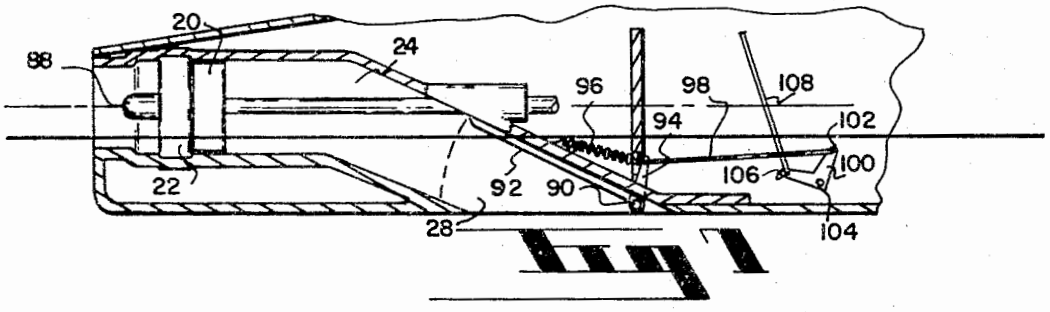

Fig 7

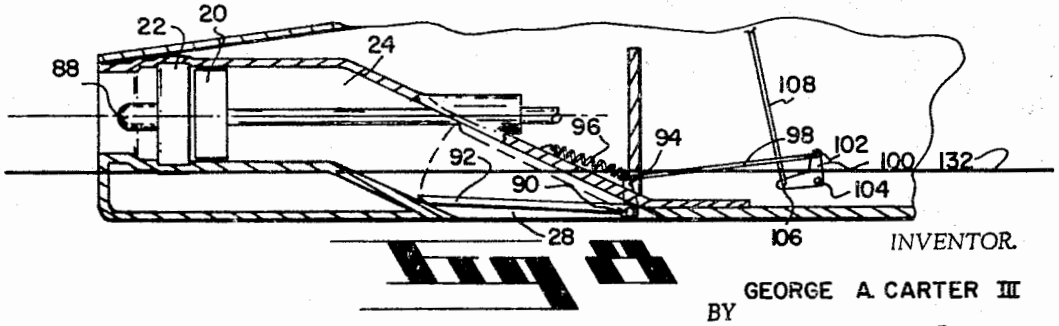

Fig 8

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MOTORIZED SURFBOARD

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Filed Oct. 23, 1965, Ser. No. 502,909
7 Claims. (Cl. 115—70)

This invention relates to a motorized surfboard, and particularly to a motorized surfboard which may be used to simulate the various surfboard riding attitudes, in the absence of waves, such that the motorized surfboard of the present invention may be used on smooth surface lakes, or the like.

Conventional watercraft construction is not readily useful in powering a surfboard-like watercraft. Conventional unpowered surfboards must be either manually powered or must be ridden on the crest of a wave and may be used either with the rider lying down, sitting up or standing on the surfboard. The general use of surfboards in these various positions and attitudes have heretofore been substantially limited to areas where there is a surf and sufficient waves on which to perform with surfboards.

Accordingly, it is an object of the present invention to provide a motorized surfboard which may be used in the surfs or on smooth surface bodies of water, to perform substantially all of the surboarding riding attitudes, and in addition some others which may be attained because of the power means which propels the surfboard of the present invention.

Another object of the invention is to provide a novel engine installation for motorized surfboards.

Another object of the invention is to provide a novel propulsion means for surfboards, which may be engine driven, when the surfboard is unloaded, without causing propulsion thereof, but which, when depressed by the weight of a passenger, causes the impeller of the invention to be sufficiently immersed in water to cause propulsion of the surfboard.

Another object of the invention is to provide a motorized surfboard having novel power control means which is remotely disposed relative to the power plant of the invention, and which may be operated in such a manner that a person standing on the surfboard may maintain control of the power plant, but which is automatically shut down in the event the rider of the surfboard loses control and his grip on the controls.

Another object of the invention is to provide a novel jet-powered motorized surfboard having an impeller in a duct means in the rear portion of the surfboard controlled by a flapper valve forwardly of the impeller, such that the valve may be closed to shut off flow of water through the duct and impeller, to thereby permit operation of the impeller, without causing propulsion of the surfboard, such that a person who falls from the surfboard in deep water, may climb on the surfboard, while the engine and impeller is running and may subsequently open the valve to permit water to flow through the impeller conduit, to thereby propel the surfboard on the surface of the water.

Another object of the invention is to provide a novel engine installation, wherein carburation of such engines is shielded from water, yet permitted sufficient air intake, and which is water cooled to permit it to be enclosed for shielding of the engine from water at the carburation intake.

Further objects and advantages of the present invention may be apparent from the following specification, appended claims and accompanying drawings, in which:

FIG. 1 is a perspective view of a motorized surfboard, in accordance with the present invention;

FIG. 2 is an enlarged fragmentary longitudinal sectional view taken from the line 2—2 of FIG. 1;

FIG. 3 is a fragmentary side elevational view of a handgrip actuator member in connection with one end of a flexible control cable for remotely controlling the motorized surfboard of the invention, when a person is standing thereon;

FIG. 4 is a fragmentary side elevational view of a cylinder head of the engine of the present invention, showing a conductive water cooling system for cooling the engine, while it is contained in an enclosure of the invention;

FIG. 5 is a fragmentary exploded view of a modified form of the body and engine cover structure of the invention, showing additional details of the impeller duct structure thereof;

FIG. 6 is a sectional view taken from the line 6—6 of FIG. 5, showing the parts in section and in assembly and illustrating the structure on an enlarged scale;

FIG. 7 is a view similar to FIG. 6, but showing a flapper valve at the inlet of the impeller duct system and illustrating further control means for opening and closing the valve and illustrating the valve in open position;

FIG. 8 is a view similar to FIG. 7, but showing the valve at the inlet of the impeller duct closed; and

FIG. 9 is a fragmentary side elevational view of control leakage means of the invention, which concurrently controls a throttle valve of the engine of the invention, and, also, the impeller duct valve disclosed in FIGS 7 and 8 of the drawings.

As shown in FIG. 1 of the drawings, the motorized surfboard of the present invention is provided with a body **10** constructed of a polyurethane or equivalent foam filler and a stressed skin consisting of fiber glass cloth impregnated with a cured resin, such as a polyester or equivalent resin. Thus, the body **10** is a very lightweight body generally of a surfboard configuration; this body is elongated, as shown in FIG. 1 of the drawings, and is quite thin in vertical dimension in proportion to its width.

In the rear of this body **10** is a recess **12** wherein an internal combustion engine **14** is mounted. This engine is provided with an output shaft **16** coupled to an impeller shaft **18** which drives an impeller **20** adjacent to a stator **22**; both the impeller and stator being in a jet-flow duct **24** havings its exhaust open end **26** directed rearwardly away from said impeller **20**. This impeller or jet duct **24** is provided with an open receiving end **28** directed forwardly and downwardly to the bottom **30** of the body **10** forwardly of the impeller **20**, thus, to provide for flow in the direction of an arrow **32** into the impeller **20** through the stator **22** and outwardly in a rearward direction thorugh the impeller duct outlet **26**, to cause propulsion of the motorized surfboard of the invention, in the direction of an arrow **33**, shown in FIG. 2 of the drawings. As shown in FIGS. 1 and 2 of the drawings, the engine **14** is enclosed in the recess **12** by means of a cover **34** which is secured around the upper perimeter of the recess **12** by means of suitable screw-type fixtures **36** to provide a substantial watertight cover for the recess **12**. A rearwardly directed air intake opening **38** extends through the cover **34** to permit air to enter the carburetor **40** of the engine **14**.

A throttle and ignition control cable **42** extends through a water sealed grommet **44** forwardly of the cover **34** and this cable control **42** is an elongated flexible cable having a control actuator handle **46** on the extending end of the cable which may be held in the hand of a rider of the motorized surfboard of the invention in a standing position, thus, the cable **42** is sufficiently long to extend upward to a person's hands standing on top

of the body 10 of the motorized surfboard of the invention.

The actuator handle 46 is provided with a normally open ignition switch 48 for the engine 14 which may be held closed by a depressible switch button 50 which is held closed during operation of the motorized surfboard of the invention and when the rider falls from the surfboard, this switch 48 moves to its normally open position as the button 50 is released, thus, stopping operation of the engine 14 and consequently the surfboard in the area in which the rider falls off.

A lever 52 is pivoted to the actuator 46 by means of pin 54 and this lever actuates a pull cable 55 coupled to the throttle arm 58 of the carburetor 40 so that the lever 52 may be squeezed toward the actuator handle 46 to move the throttle toward an open position. The handle 52 is spring loaded in a direction of an arrow 53 so that the throttle tends normally to close when the handle 52 is released.

Internally of the recess 12 and below the cover 34 are cooling system conduits 56 and 58, the conduit 56 is provided with an open end 60 communicating with the interior of the jet passage upstream of the impeller 20 and the conduit 58 is provided with an open end 62 communicating with the interior of the jet passage conduit 24 downstream relative to the stator 22 and impeller 20, whereby differential pressure in the tubes 56 and 58 is created which causes water to flow into the tube 58 and a manifold 64 communicating therewith, the water then flows through cross tubes 66 connected to the manifold 64 and these cross tubes are disposed intermediate fins 68 which are cooling fins of the engine 14. The tube 66 being conductively coupled to the fins 68 so that water forced therethrough from the manifold 64 exchanges heat from the engine to the water. The opposite ends of the tubes 66 from the manifold 64 are coupled to a manifold 70 which communicates with the tube 56, thus, water flows into the open end 62 of the tube 58 through the manifold 64 and tube 66 and then the manifold 70 and outwardly through the conduit 56 and the open end 60 into the stream of water passing through the jet tube 24.

In a preferred form of the invention, shown specifically in FIGS. 5 and 6, the body 10 of the surfboard includes an integral cast lower semi-circular in cross-section portion 72 which forms a lower half section of the jet passage structure 24. An upper half section 74 of this jet tube structure is formed as a separate part and is secured by a flange structure 76 to ledges 78 at opposite sides of the jet tube passage. A packing gland portion 80 on the part 74 forms one-half of a packing gland holder 82 through which the shaft 18 extends.

The cover 34 is fitted over and above the jet tube section 74 in a similar manner to that hereinbefore described.

Semi-circular recess portions 82 and 84 are disposed in the portion 72 and the portion 74 for holding the periphery of a ring 86 of the stator 22 and, also, to support a shaft bearing 88 held centrally by veins of the stator.

In the modification of the invention, as shown in FIGS. 7, 8 and 9, a flapper valve is disposed to alternately shut off flow through the jet tube 24 and this flapper valve is disposed near the inlet 28 of the jet tube passage.

As shown in FIGS. 7 and 8, a pivot pin 90 connected to the body 10 near a forward portion of the inlet 28 forms a pivotal mounting for the flapper valve 92 which may be pivoted from an open position as shown in FIG. 7, to a closed position, as shown in FIG. 8.

Thus, the flapper valve 92 extends over the cross-section of the inlet 28 of the jet tube passage 24 and when pivoted into closed position, limits flow through the tube and, thus, shuts off propulsion effect of the impeller 20.

Coupled to the valve 92 at its pivotal axis, is a lever 94 to which is connected a tension spring 96 tending to hold the valve 92 in the closed position, as shown in FIG. 8. A link 98 coupled to the lever 94 is also pivoted to a bell crank 100 at 102. This bell crank is pivoted to the body 10 at 104 and is pivotally connected at 106 to an actuating link 108.

As shown in FIG. 9, this actuating link 108 is slidably engaged in a pivoted nut 110 carried on a bell crank 112. A compression spring 114 surrounding the link 108 bears on the nut 110 and on another nut 116 spaced from the nut 110, the nut 116 being fixed to the link 108.

The bell crank 112 is pivoted at 118 to the body 10 and at its upper end is provided with a slide nut 120 slidably mounted on a portion 122 of a carburetor throttle actuating rod 124 which is pivoted to the throttle actuating arm 58 of the carburetor 40. The nut 120 is adapted to slide between six stops 126 and 128 on the rod 124.

The flexible shaft 56 of the control cable 42 is coupled to the lever 112, such as to actuate both the throttle arm 58 and the flapper valve 92. Under such conditions, the control cable 56, as shown in FIG. 3, may be the only control connected to the actuator 46 and the switch 48 may be eliminated so that the engine may remain running at all times during which the throttle valve 92 may be closed, as will be hereinafter described.

The arm 52 of the actuator 46, when moved with the modification, shown in FIGS. 7 and 8, may operate from a broken line position 130 to the solid position, shown in FIG. 3, for the purpose of moving the flapper valve 92 from the solid line position, shown in FIG. 8, to the open line position, shown in FIG. 7. During this movement, the nut 120 traverses the throttle rod 124 from the stop 126 to the stop 128 and then, further movement of the lever 52 toward the handle 46 causes the throttle to be progressively opened. During this time, the spring 114 has overcome tension of the spring 96 and opened the valve 92 and continues to hold it open, compression of the spring 114 then occurs progressively as the lever 52 is moved to carry the throttle rod 124 by the nut 128 and while the lever 52 is moved toward the handle 146, the spring 114 is then compressively and progressively actuated while the rod 108 holds the flapper valve 92 in open position.

When the lever 52 is released as a person falls off the motorized surfboard of the invention, the throttle is automatically released and retracted by means of the spring 96 which also closes the flapper valve 92, shutting off flow through the jet passage 24. The spring 96, thus, moves the flapper valve closed and the throttle arm 58 to an idling position where the engine is only permitted to idle at low speed, but the impeller 20 still operates and during this time, this impeller is prevented from gaining traction due to the fact that there is no water flow permitted to pass through the jet passage 24.

It will be seen from the disclosure of FIGS. 7 and 8, as well as the disclosure of FIG. 2, that when the motorized surfboard of the invention is unloaded, its buoyancy supports it in such a manner that it is disposed relative to the water level, as indicated at 132 and when the motorized surfboard of the invention is loaded by the weight of a person, the water level is disposed at 134. Thus, the impeller 20 is immerged and caused to be disposed in the water to thereby cause propulsion of water through the jet passage 24. It will be appreciated by those skilled in the art that the buoyancy of the body of the invention, thus, automatically raises the impeller 20 out of the water when a body 10 is unloaded, such that the motor may be started and the engine may be in idling operation with the impeller 20 above the level of the water at 132. Thus, the propulsion effect of the impeller 20 is not attained until the rider boards the body 10 and depresses the impeller 20 downward into the water, such that it is at a relative disposition with the water level, as shown at 134.

Additionally, it will be understood that the flapper valve 92 may automatically move into position, as hereinbefore described, when a rider falls off the motorized surfboard of the invention and the engine may continue to idle. This

is an important factor, when the rider falls off the body **10** of the invention in deep water. The necessity of restarting the engine is alleviated and a person needs only to climb back on the body of the invention and to actuate the lever **52** from the broken line position **130** to the solid position, shown in FIG. 3, thereby opening the valve **92** and starting to open the throttle **58** as hereinbefore described, which causes propulsion action of the impeller **20** in the water in the jet passage **24.**

It will be understood by those skilled in the art that the entire body of the invention may be made of fiber glass and resin or other suitable high strength lightweight materials and that an engine mount **136** may be cast integral with the fiber glass and resin structure of the invention, said engine mount **136** being suitable for mounting anyone of a variety of internal combustion engines. Additionally, the engine mount may be of other material and cast into place or secured by bolts or otherwise, as desired.

A flexible shaft coupling **138**, as shown in FIG. 2 of the drawings, may be in the form of any suitable universal joint to make a connection between the engine output shaft **16** and the impeller shaft **18.**

It will be obvious to those skilled in the art that various modifications of the invention may be resorted to in a manner limited only by a just interpretation of the following claims.

I claim:

1. In a motorized surfboard, the combination of: a buoyant body; a motor mounted thereon; an impeller driven by said motor; duct means in which said impeller is rotatably mounted; said duct means having an open exhaust end disposed rearward relative to said impeller and directed toward the rear of said body; said duct means having a forwardly and downwardly directed open water receiving end disposed forwardly relative to said impeller, said water receiving open end communicating with the bottom of said body; said body sufficiently buoyant normally to hold said impeller and an intermediate portion of said duct at an elevation relative to the surface level of water on which said body is supported, whereby said impeller may rotate without substantial engagement with said water and without a substantial tendency to propel said body on said water, and whereby the loading of said body, by the weight of a person, forces said impeller and duct downwardly into the water to a level at which said impeller is sufficiently immersed in the water to cause substantial propulsion of water through said duct to thereby propel said body on said water; valve means in said duct means and disposed forwardly relative to the inlet side of said impeller, whereby said valve, when closed, shuts off flow of water through said duct means and permits said motor to operate and said impeller to rotate when said body is loaded by the weight of a person, and whereby said rotative operation of said impeller, with said valve closed, prevents said impeller from propelling water through said duct means and from propelling said body on water; control means for said engine and said valve means comprising a normally closed throttle for said engine and means tending normally to close said valve; and a common manually operable actuator member tending, when grasped by the hand of a person, to hold said throttle in an open position and concurrently to hold said valve in an open position.

2. In a motorized surfboard, the combination of: a buoyant body; a motor mounted thereon; an impeller driven by said motor; duct means in which said impeller is rotatably mounted; said duct means having an open exhaust end disposed rearward relative to said impeller and directed toward the rear of said body; said duct means having a forwardly and downwardly directed open water receiving end disposed forwardly relative to said impeller, said water receiving open end communicating with the bottom of said body; valve means in said duct means and disposed forward relative to the inlet of said impeller, whereby said valve means, when closed, shuts off the flow of water through said duct means; control means for said engine and said valve comprising a normally closed throttle for said engine; and means tending normally to close said valve; and a common manually operable actuator member tending, when grasped by a person's hand, to hold said throttle in an open position and concurrently to hold said valve in an open position.

3. In a motorized surfboard, the combination of: a buoyant body; a motor mounted thereon; an impeller driven by said motor; duct means in which said impeller is rotatably mounted; said duct means having an open exhaust end disposed rearward relative to said impeller and directed toward the rear of said body; said duct means having a forwardly and downwardly directed open water receiving end disposed forwardly relative to said impeller, said water receiving open end communicating with the bottom of said body; valve means in said duct means and disposed forward relative to the inlet of said impeller, weherby said valve means, when closed, shuts off the flow of water through said duct means; control means for said engine and said valve comprising a normally closed throttle for said engine; and means tending normally to close said valve; and a common manually operable actuator member tending, when grasped by a person's hand, to hold said throttle in an open position and concurrently to hold said valve in an open position; an extending flexible cable control of said control means, said flexible cable control coupled to said throttle and said valve and having said actuator member connected to an extending portion of said cable control, whereby a person may stand on said body and hold said actuator member in his hand thereabove.

4. In a motorized surfboard like water craft, the combination of: a buoyant body; a motor mounted thereon; an impeller driven by said motor; duct means in which said impeller is rotatably mounted; said duct means having an open exhaust end disposed rearward relative to said impeller and directed toward the rear of said body; said duct means having a forwardly and downwardly directed open water receiving end disposed forwardly relative to said impeller, said water receiving open end communicating with the bottom of said body; said body sufficiently buoyant normally to hold said impeller and an intermediate portion of said duct at an elevation relative to the surface level of water on which said body is supported, whereby said impeller may rotate without substantial engagement with said water and without a substantial tendency to propel said body on said water, and whereby the loading of said body, by the weight of a person, forces said impeller and duct downwardly into the water to a level at which said impeller is sufficiently immersed in the water to cause substantial propulsion of water through said duct to thereby propel said body on said water; an extendable flexible cable and cable control means for said engine; a throttle of said engine coupled to said cable control means; and an actuator member of said cable control means disposed in spaced relationship with said throttle and extended to a position to be held in a person's hand, when standing on said body, said actuator member movable universally in all directions above said body, when held in a control hand of a human operator to thereby allow the operator's control hand freedom of movement for balancing in response to varying speeds and maneuvers, and for boarding said water craft.

5. In a motorized surfboard like water craft, the combination of: a buoyant body; a motor mounted thereon; an impeller driven by said motor; duct means in which said impeller is rotatably mounted; said duct means having an open exhaust end disposed rearward relative to said impeller and directed toward the rear of said body; said duct means having a forwardly and downwardly directed open water receiving end disposed forwardly relative to said impeller, said water receiving open end communicating with the bottom of said body; said

body sufficiently buoyant normally to hold said impeller and an intermediate portion of said duct at an elevation relative to the surface level of water on which said body is supported, whereby said impeller may rotate without substantial engagement with said water and without a substantial tendency to propel said body on said water, and whereby the loading of said body, by the weight of a person, forces said impeller and duct downwardly into the water to a level at which said impeller is sufficiently immersed in the water to cause substantial propulsion of water through said duct to thereby propel said body on said water; valve means in said duct means and disposed forwardly relative to the inlet side of said impeller, whereby said valve, when closed, shuts off flow of water through said duct means and permits said motor to operate and said impeller to rotate when said body is loaded by the weight of a person, and whereby said rotative operation of said impeller, with said valve closed, prevents said impeller from propelling water through said duct means and from propelling said body on water; a manually operable and flexible cable and cable control means for said engine; a throttle for said engine coupled to said cable control means and an actuating member on an extended end of said cable control means and manually operable to be held in a person's hand when said person is standing on said body, said actuator member movable universally in all directions above said body, when held in a control hand of a human operator to thereby allow the operator's control hand freedom of movement for balancing in response to varying speeds and maneuvers, and for boarding said water craft.

6. In a motorized surfboard, the combination of: a buoyant body; a motor mounted thereon; an impeller driven by said motor; duct means in which said impeller is rotatably mounted; said duct means having an open exhaust end disposed rearward relative to said impeller and directed toward the rear of said body; said duct means having a forwardly and downwardly directed open water receiving end disposed forwardly relative to said impeller, said water receiving open end communicating with the bottom of said body, said body having a recess in which said engine is contained; a cover for said engine; a rearwardly directed air intake opening in said cover; and water cooling means for said engine; inlet and outlet conduits of said water cooling means communicating with the interior of said duct means downstream and upstream respectively to said impeller.

7. In a motorized surfboard, the combination of: a buoyant body; a motor mounted thereon; an impeller driven by said motor; duct means in which said impeller is rotatably mounted; said duct means having an open exhaust end disposed rearward relative to said impeller and directed toward the rear of said body; said duct means having a forwardly and downwardly directed open water receiving end disposed forwardly relative to said impeller, said water receiving open end communicating with the bottom of said body, said body having a recess in which said engine is contained; a cover for said engine; a rearwardly directed air intake opening in said cover; and water cooling means for said engine; inlet and outlet conduits of said water cooling means communicating with the interior of said duct means downstream and upstream respectively to said impeller; an intermediate conductive conduit portion of said water cooling means conductively connected with said engine and connected to said inlet and outlet conduits.

References Cited

UNITED STATES PATENTS

2,434,700	1/1948	Keckley	115—16 X
3,062,172	11/1962	Moore	115—6.1
3,105,353	10/1963	Schulz	115—16 X
3,136,288	6/1964	Hardy	115—70
3,144,849	8/1964	Maser	115—70
3,150,632	9/1964	Evans	115—70
3,262,413	7/1966	Douglas et al.	115—70

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