Feb. 20, 1968 C. J. JACOBSON 3,369,518

AQUATIC VEHICLE

Filed Nov. 3, 1966

FIG. 1

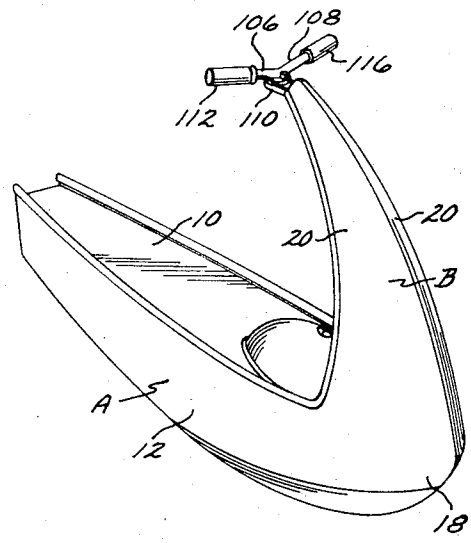
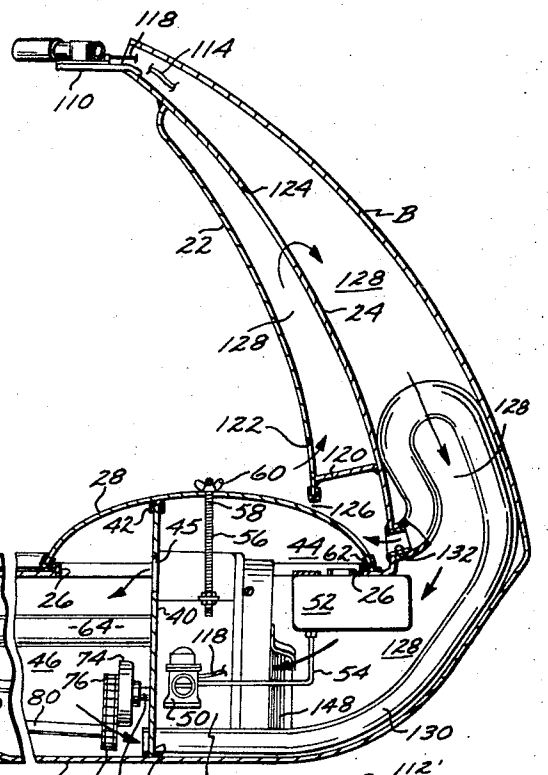


FIG. 2



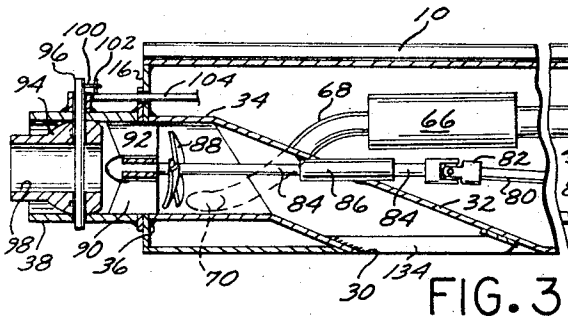
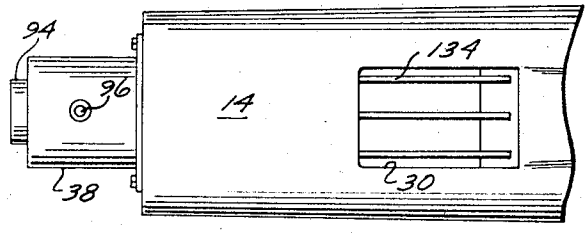


FIG. 3



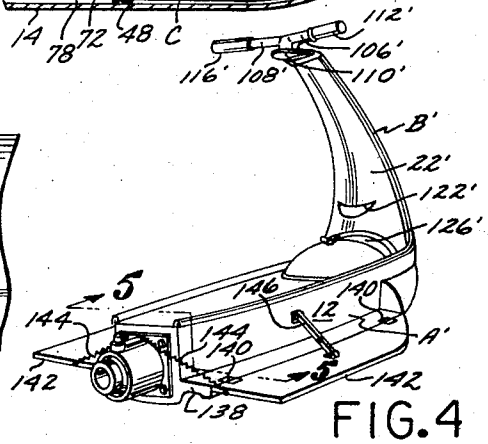


FIG. 4

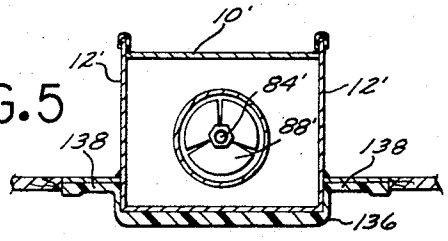


FIG. 5

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United States Patent Office 3,369,518 Patented Feb. 20, 1968

3,369,518

AQUATIC VEHICLE

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Filed Nov. 3, 1966, Ser. No. 591,729
9 Claims. (Cl. 115—70)

The present invention relates generally to the field of aquatic vehicles, and more particularly to a lightweight, portable hydroplane-like vehicle of novel design.

In the past, various types of propeller-driven aquatic vehicles have been devised, but they have not been widely accepted because of the hazard to which operators thereof are subjected should they accidently come into contact with the exposed propellers.

A major object of the present invention is to provide a lightweight, portable, propeller-driven aquatic vehicle in which the user can stand or be seated, with the propeller being so disposed within the confines of the vehicle that the operator cannot come into contact therewith or be inadvertently thrown from the craft.

Another object of the invention is to supply an aquatic vehicle that can be fabricated from standard commercially available materials which require no elaborate plant for the commercial production thereof, is structurally simple, requires a minimum of maintenance, and can be sold at a sufficiently low price as to encourage the widespread use thereof.

Another object of the invention is to furnish an aquatic vehicle that is propelled by a jet of water discharged from the rear portion thereof, with the direction of the jet being controllable by the operator thereof to guide the same, and the vehicle being operable in shallow water.

A further object of the invention is to provide a water sports vehicle in which the prime mover thereof is an air-cooled internal combustion engine that is so located within the structure of the craft that it will not be contacted by waer should the vehicle be inadvertently upset.

Yet another object of the invention is to furnish an aquatic vehicle that supplies a continuous flow of air to the air-cooled combustion engine powering the same, to maintain the engine at a safe operating temperature.

Another object of the invention is to supply an aquatic vehicle in which portions thereof fold upon the hull thereof to permit the vehicle to be stored in a minimum of space when not in use.

These and other objects and advantages of the invention will become apparent from the following description of a first and alternate form thereof, together with the accompanying drawing illustrating the same, in which:

FIGURE 1 is a front perspective view of a first form of the aquatic vehicle;

FIGURE 2 is a longitudinal cross-sectional view of the device shown in FIGURE 1;

FIGURE 3 is a bottom plan view of the rearward portion of the vehicle shown in FIGURE 1;

FIGURE 4 is a perspective view of an alternate form of the craft that has hinged portions thereof which may be pivoted to upwardly extending positions adjacent the hull whereby the vehicle occupies a minimum of space when stored; and

FIGURE 5 is a transverse cross-sectional view of the device shown in FIGURE 4, taken on the line 5—5 thereof.

With continuing reference to the drawing for the general arrangement for the first form of the invention, it will be seen to include a hollow elongate hull A that includes a flat deck **10**, two laterally spaced side walls **12**, and a flat bottom **14**. A rigid member **16** extends transversely between the rear edges of the bottom **14**, side walls **12** and deck **10** to provide the stern of the hull. The side walls **12**, as well as the forward portion of the

bottom **14**, curve upwardly to define a bow **18**. The upper end of bow **18** develops into an upwardly and rearwardly extending hollow control support B, which is defined by two upwardly extending wall members **20** that are formed as an integral part of side walls **12**. The rear portions of walls **20** are connected by a first wall **22** and a partition **24** as best seen in FIGURE 2.

A first opening **26** is formed in the rear of the control support B adjacent deck **10**, and this opening is normally sealed by a convex, concave cover **28** as shown in FIGURE 2. A second opening **30** is formed in the rear of bottom **14**, and is in communication with a first upwardly and rearwardly extending tube section **32**, the rear of which end section develops into a second tube section **34**. Tube section **34** communicates with an opening **36** formed in member **16**. A third tube section **38** is rigidly connected in a rearwardly extending position to member **16** by conventional means, and is in coaxial alignment with opening **36** and tube section **34**.

A partition **40** is transversely disposed in hull A and secured to the interior surface of the bottom **14** and side walls **12** by conventional means. The dimensions of partition **40** are predetermined to permit it to project upwardly through the opening **26**. A bead of resilient material **42** is disposed on the upper edge of partition **40**, which material seals with the interior surface of cover **28** when it is positioned as shown in FIGURE 2. Partition **40** serves to divide the hull A into a forward compartment **44** and rear compartment **46**. A first, upper port **45** is formed in partition **40** as well as a lower port **48**, the purposes of which will later be explained.

An air-cooled or water-cooled internal combustion engine C is provided that is mounted in compartment **45**, preferably located just forwardly of partition **40**. Engine C is conventional that it includes a carburetor **50** which receives fuel from a tank **52** by means of a tube **54**. Tank **52** is also located in the forward compartment **44**. A threaded rod **56** projects upwardly from engine C, and passes through an opening **58** in cover **28**. The projecting portion of rod **56** is engaged by a thumbscrew **60**, and when this screw is tightened, the peripheral edge of the cover **28** which is provided with an endless resilient band **62**, is forced into a watertight seal with portions of the deck **10** adjacent first opening **26**, as shown in FIGURE 3.

The exhaust from motor C discharges through a first tube **64** to a muffler **66**, and from the muffler through a second tube **68** to a discharge opening **70** formed in the rear portion of one of the side walls **12**. The opening **70** is located sufficiently high on side wall **12** as to be above the water level at all times and eliminate back pressure on the engine exhaust.

During operation the internal combustion engine C drives a shaft **72** that is connected to a centrifugal clutch **74**. When rotating at a predetermined speed clutch **74** drives a gear **76** that is in toothed engagement with a second gear **78** mounted on the forward end of a first drive shaft section **80**. The rear end of shaft section **80** is connected to a universal joint **82**, and the rear end of this joint is connected to a second drive shaft section **84**. The intermediate portion of shaft section **84** is journalled in a tubular bearing **86** that extends through a forward portion of the first tube section **32**, as may be seen in FIGURE 2. A propeller, impeller or other water-moving element **88** is mounted on shaft section **84** situated within the confines of the second tube section **34**. A spider **90** is mounted within the confines of the tube sections **34** and **38** (FIGURE 2), and supports a thrust bearing **92** that rotatably supports a rear end portion of drive shaft section **84**. When rotating, propeller **88** draws water upwardly through tube section **32** into tube section **34** to discharge it rearwardly as a jet into tube section **38**.

A nozzle **94** is pivotally mounted in the third tube section **38** rigidly secured to a pin **96**, which is journalled in openings formed in tube section **38**. An orifice **98** extends longitudinally through nozzle **94** through which water is discharged rearwardly as a jet by rotation of the propeller **88**. An arm **100** projects from the upper end of pin **96** and pivotally engages a pin **102** secured to a rod **104** which can move longitudinally relative to the hull A. Rod **104** (FIGURE 2) is at least partially disposed within the confines of the rear compartment **46**.

Two oppositely extending handles **106** and **108** are supported on the upper end of the support B by a bracket **110**, or other conventional mounting means. Handle **106** is partially defined by a movable member **112** from which a cable **114** extends that is disposed within the confines of support B. Cable **114** extends to a conventional linkage mechanism (not shown) that translates motion imparted thereto by movement of cable **114** into longitudinal movement that is transferred to rod **104** to pivot the nozzle **94** relative to the tube section **38**.

Pivoting of nozzle **94** varies the direction of the jet of water (not shown) discharged through the orifice **98** to permit the vehicle to be guided by the operator thereof. The handle **108** also includes a movable portion **116** that actuates a cable **118**, and this cable extends downwardly through the support B to the carburetor **50**, as may be seen in FIGURE 2. Thus, movement of the handle members **112** and **116** controls the direction of travel of the vehicle, as well as the speed at which it is driven over the surface of a body of water.

The end piece **120** of support B, as can best be seen in FIGURE 2, extends between the lower portion of wall **22** and partition **24**. An air inlet opening **122** is formed in wall **22** above the end piece **120**, and an opening **124** is also formed in partition **24**, preferably in the upper portion thereof. The lower end of wall **22** is spaced above the cover **28**, and cooperates with the cover to define an air discharge opening **126**. The wall members **20**, partition **24** and wall **22** cooperatively provide a tortuous first air inlet passage **128** that communicates with the air inlet opening **122** and the forward compartment **44** (FIGURE 2). Air flowing through the opening **122** to the inlet passage **128** serves to cool the engine C, as well as supply air for the operation thereof.

In the operation of engine C, heat will obviously be radiated therefrom, and warm the air in compartment **44**. Warm air from compartment **44** passes through the port **45** into the rear compartment **46**, and therefrom into a tube **130** that is in communication with lower port **48**. Tube **130** extends forwardly in compartment **44** and through support B to terminate in an air discharge opening **132** formed in the lower portion of partition **24**, as seen in FIGURE 2. Air discharged from opening **132** passes through opening **126** into the ambient atmosphere. Opening **30** formed in the bottom **14** preferably is provided with spaced bars **134** which extend thereacross, to prevent entry of weeds, debris or other foreign material into tube section **32** during operation of the aquatic vehicle.

The hull A and extension B are preferably formed from sheet metal, such as aluminum or the like, although it will be apparent that other sheet materials may be used for this purpose, such as a resin-impregnated Fiberglas. The forward part **94***a* of nozzle **94**, which permits pivotal movement thereof in tube section **38**, is a truncated portion of a sphere.

An alternate form of the invention is shown in FIGURES 4 and 5, which is of the same general structure as the form just described, other than that the hull A is dimensionally narrower. Inasmuch as this alternate form of the aquatic vehicle includes all of the component parts described in connection with the first form thereof, the same identifying numerals will be used in the drawing in designating like elements, except that primes are added thereto.

The first alternate form of the vehicle has a sheath **136** extending the length thereof, and two shoulders **138** project from the sides thereof. Sheath **136** may be formed from a plastic if desired. Hinges **140** are mounted on shoulders **138** and pivotally support longitudinally extending wings **142** which project outwardly in opposite directions from the shoulders, as shown in FIGURE 4. Two tensioned springs **144** at all times tend to pivot the wings **142** to upwardly extending positions adjacent the hull A'. Two pivotally connected locking members **146** extend between the side walls **12'** and the wings **142** to hold the wings in the outwardly extending position shown. When so disposed, wings **142** stabilize the alternate form of the aquatic vehicle illustrated in FIGURES 4 and 5 as it travels through the water, and minimize the possibility of inadvertent overturning of the vehicle.

Operation of either form of the invention is relatively simple. The cover **28** or **28'**, as the case may be, is first removed from the vehicle and the engine C started by conventional means, such as by use of a pull rope **148** and then replaced, whereby the vehicle is ready for use. The operator (not shown) mounts the craft by stepping onto the deck **10** or **10'**, and by manipulation of the movable members **112** and **116**, is able to control the speed of the vehicle on a body of water (not shown), as well as the direction of movement thereof.

When the first form of the vehicle is in operation, the rotating propeller **88** draws water upwardly through the tube sections **32** and **34** and expels the same with substantial force through the orifice **98** in the form of a jet. This rearwardly moving jet propels the vehicle forwardly. Fresh air is continuously drawn in through inlet **128** to cool the engine C in compartment **44**, with the air being heated by contact with the engine as well as radiation of heat therefrom flowing through the port **45** to the compartment **46**. Heated air from compartment **46** flows through the tube **130** into the ambient atmosphere.

Operation of the alternate form of the vehicle shown in FIGURES 4 and 5 is identical to that of the first form thereof illustrated in FIGURES 1 to 3, except that the alternate form is easier to ride, for the wings **142** impart greater lateral stability thereto, and reduce the likelihood that an inexperienced operator will inadvertently be upset from the vehicle. Only the centrifugal clutch **74** rotates the drive shaft section **80** when the engine speed exceeds a predetermined number of revolutions per minute. The controls **112** and **116** are preferably spring-loaded, and should an opeartor fall from the aquatic vehicle during use therof, and the vehicle upsets, these control members immediately return to first positions. When the control **108** is in the first position it causes idling of the engine C. During idling of engine C the clutch **74** does not rotate drive shaft section **80**, and the possibility that the vehicle will travel unattended through a body of water for any appreciable distance is eliminated.

It will be particularly noted in FIGURE 5 that the air inlet opening **122'** is centrally disposed on the support B', and as a result, water will not enter this inlet, even if the vehicle is floating on its side. The air discharge tube **130** is also centrally located relative to the hull A' and support B', and likewise will be disposed above the surface of a body of water on which the first form of the vehicle may float when disposed on its side. What has been said of the alternate form of the vehicle relative to air passage means **128** and **130** is also true of the first form of the invention shown in FIGURES 1 to 3 inclusive.

The word propeller as used herein as well as the claims, is used in a broad sense, and includes impellers and other elements that move water when rotated therein.

Although the present invention is fully capable of achieving the objects and providing the advantages here-

in before mentioned, it is to be understood that it is merely illustrative of the presently preferred embodiments thereof and I do not mean to be limited to the details of construction shown and described, other than as defined in the appended claims.

I claim:

1. A power-driven aquatic vehicle, including:

(a) an elongate hollow hull structure defined by a deck, bottom, stern, together with two side walls that cooperatively define a bow, and in which deck a first forwardly disposed opening is formed, with a second opening being formed in the rear portion of said bottom;

(b) a transverse partition in said hull that divides the interior thereof into a forward compartment and a rear compartment, in which partition first and second ports are formed;

(c) cover means for removably closing said first opening;

(d) an air-cooled internal combustion engine and fuel supply tank located in said first compartment, which engine includes a drive shaft that extends rearwardly through a third opening formed in said partition;

(e) a hollow internally partitioned support projecting upwardly from said bow that is provided with air inlet and air discharge means, with said air inlet means permitting air to flow from the ambient atmosphere into said forward compartment to cool said engine and provide air for operation thereof, which air after becoming heated in said forward compartment passes through said first port to said rear compartment, and which heated air in said rear compartment flows therefrom through said second port to said air discharge means into the ambient atmosphere;

(f) forwardly and rearwarly extending tube means supported by said stern, which tube means is in communication with said second opening;

(g) a propeller disposed in said tube means;

(h) transmissions means for conveying rotary power from said drive shaft to said propeller;

(i) a nozzle pivotally supported in said tube means rearwardly of said propeller that discharges a jet of water rearwardly from said hull to propel said aquatic vehicle over the surface of a body of water when said engine is operated above a predetermined speed;

(j) handle means provided on said support; and

(k) first and second movable control means on said handle that can be manipulated by the operator of said vehicle to control the speed of said engine as well as the rate at which said vehicle is propelled through the water and to pivot said nozzle relative to said tube means to guide said vehicle when so propelled.

2. An aquatic vehicle as defined in claim 1 which further includes:

(l) two elongate wings hingedly supported from said side walls; and

(m) means for removably locking said wings in outwardly projecting positions relative to said side walls to stabilize said vehicle as it is propelled over a body of water by said propeller.

3. An aquatic vehicle as defined in claim 1 wherein said cover means comprises:

(l) a convex-concave plate;

(m) a resilient band mounted on the peripheral edge of said plate;

(n) a threaded, upwardly extending rod disposed in a fixed position relative to said hull, which rod projects through an opening in said plate; and

(o) a nut that threadedly engages said rod, which nut when rotated in an appropriate direction exerts a downward force on said plate to press said band into sealing contact with a portion of said deck adjacent said first opening.

4. An aquatic vehicle as defined in claim 1 which further includes:

(l) a muffler disposed in said rear compartment;

(m) a first length of tubing connecting said muffler to the exhaust from said engine; and

(n) a second length of tubing connecting said muffler to a third opening in said hull located above the waterline thereof when an operator is aboard said vehicle.

5. An aquatic vehicle as defined in claim 1 wherein said transmission means includes:

(l) a first section of a driving shaft;

(m) a centrifugal clutch connected to said engine drive shaft;

(n) means for conveying rotary motion from said clutch to said first shaft section when said engine rotates said clutch above a predetermined speed;

(o) a universal joint connected to said first section;

(p) a first bearing extending through a forward portion of said tube means; and

(q) a second section of a driving shaft journaled in said first bearing and connected to said universal joint, with said propeller being rigidly mounted on the rear portion of said second section.

6. An aquatic vehicle as defined in claim 5 which further includes:

(r) a spider disposed in said tube means rearwardly of said propeller; and

(s) a thrust bearing supported by said spider in said tube means that rotatably supports the rear end portion of said second section of drive shaft.

7. An aquatic vehicle as defined in claim 1 wherein said tube means comprises:

(l) a first tube section in said second compartment connected to said second opening and extending upwardly and rearwardly therefrom;

(m) a second tube section which is connected to said first section and is in communication with an opening in said stern; and

(n) a third tube section supported from said stern and projecting rearwardly therefrom, with said third section being in longitudinal alignment with said second section and said opening formed in said stern.

8. An aquatic device as defined in claim 1 wherein said first and second control means serve as a part of said handle means.

9. An aquatic vehicle as defined in claim 2 which further includes:

(n) spring means for maintaining said wings in upwardly extending positions adjacent said hull when said vehicle is not in use.

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