

July 5, 1966

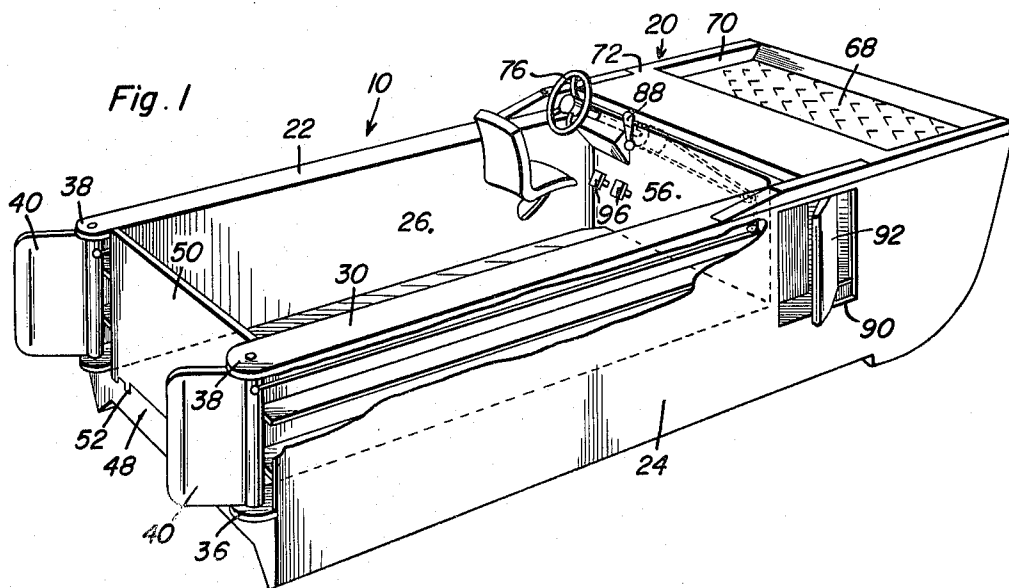
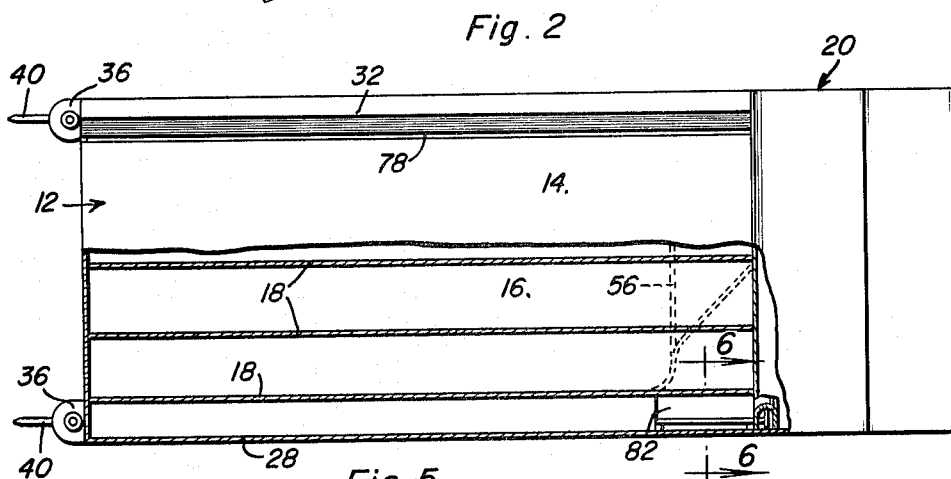
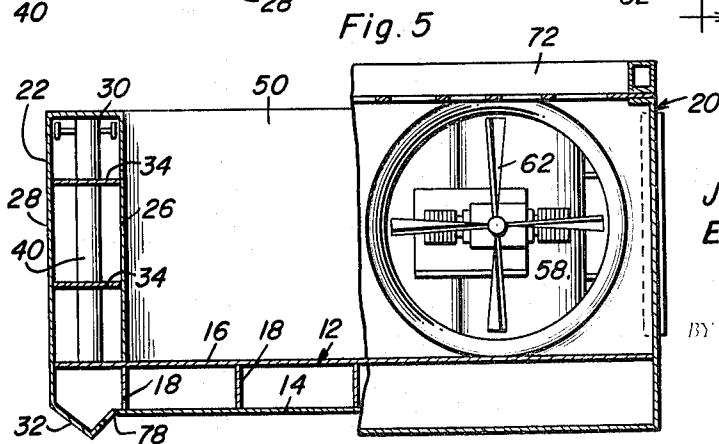
J. VAN VELDHUIZEN ETAL

3,259,097

AIR-PROPELLED BOAT

Filed July 10, 1964

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Fig. 3

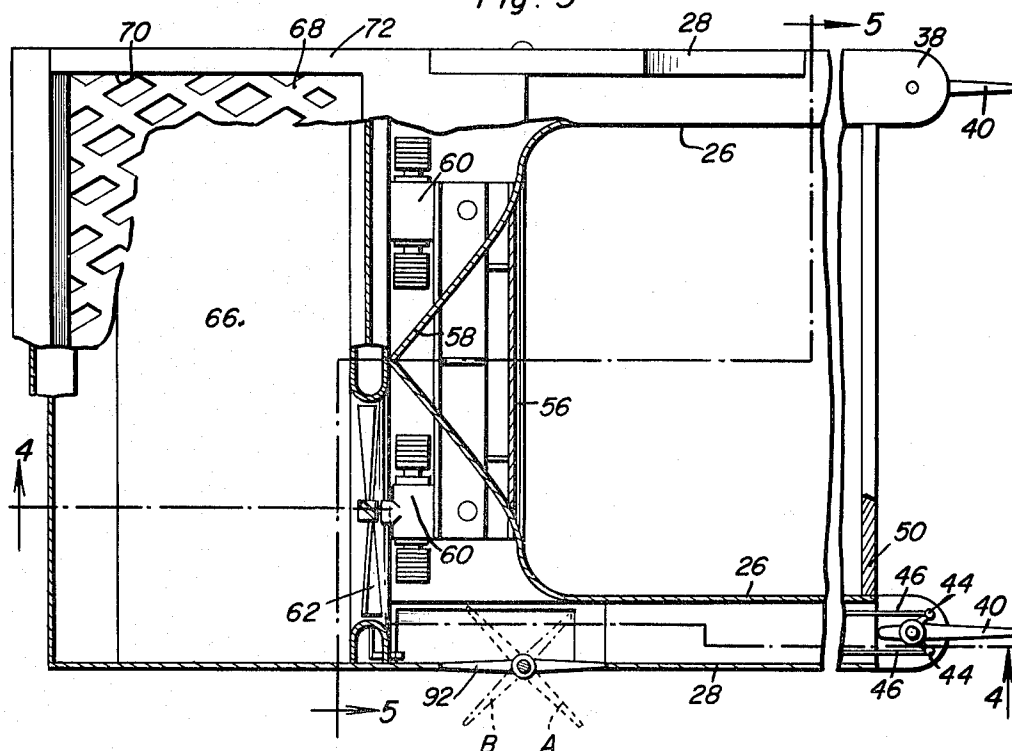


Fig. 4

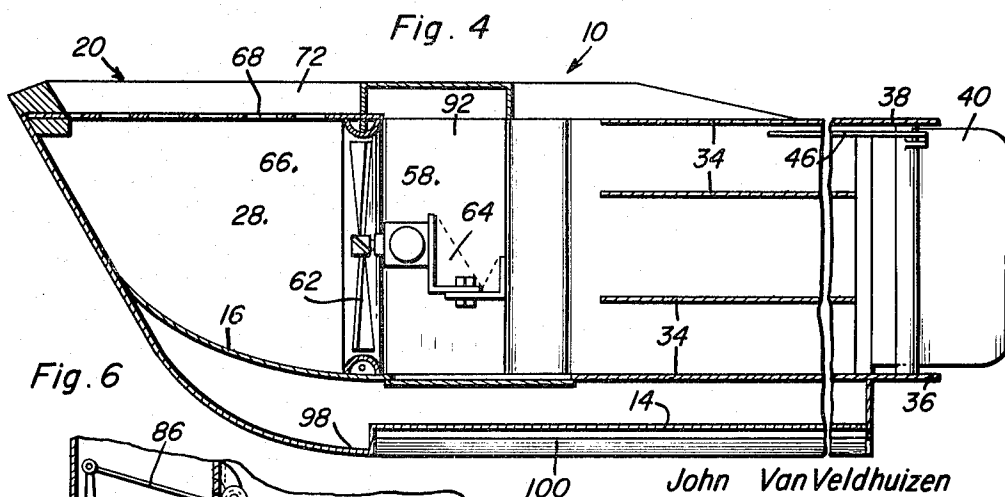
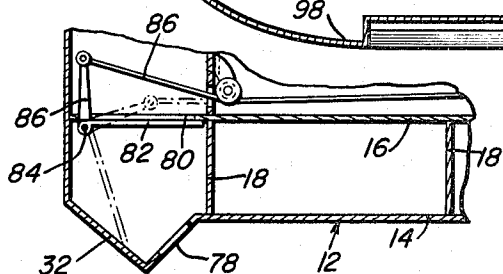


Fig. 6



John VanVeldhuizen
Edna M. VanVeldhuizen
INVENTORS

BY *Charles A. O'Brien*
and Harvey B. Jacobson
Attorneys

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3,259,097

AIR-PROPELLED BOAT

John Van Veldhuizen and Edna M. Van Veldhuizen, both
of P.O. Box 27, Vacation Village, Plantation Key,
Homestead, Fla.

Filed July 10, 1964, Ser. No. 381,693

23 Claims. (Cl. 115—15)

This invention relates to a novel and useful air-propelled boat and more specifically to a boat designed to be propelled by air, to be buoyed up by air, and to be steered by lateral discharges of air.

The air propelled boat of the instant invention includes high capacity air pump means including an air inlet at the forward end of the boat and a pair of air outlets at the rear end of the boat. A pair of rudder members are mounted for oscillation about an upstanding axis and are positioned rearwardly of the rearwardly facing outlets for the air pump means. Accordingly, it may be seen that the rudders may be oscillated in unison in a conventional manner for steering the boat as it is being propelled forwardly.

In addition, the air propelled boat of the instant invention includes opposite side ports or openings including flap valve means for varying the exhausting of air through said openings while simultaneously varying the direction of the discharge of air from said ports or openings. In this manner, the air discharged from the opposite side ports may be directed forwardly so as to act as a braking for the air-propelled boat.

Finally, the air-propelled boat of the instant invention includes opposite side and bow portions which project below the bottom of the boat so as to define depending walls of a rearwardly opening pocket disposed beneath the bottom of the boat. The air pump means also includes outlets which open into the aforementioned rearwardly opening pocket and thereby enable a portion of the weight of the boat to be buoyed and the wetted area of the hull to be substantially reduced. The ports or outlets for buoying up the air-propelled boat are communicated with the air passage means in which the air pump means is disposed and valve means is provided for selectively communicating the air passage means with the outlet ports or openings disposed beneath the bottom of the boat. In this manner, the air-propelled boat may be selectively buoyed up as desired and thereby may be adapted to function more efficiently in various types of seas.

The main object of this invention is to provide an air-propelled boat including air pump means for propelling, steering and partially buoying up the hull of the air-propelled boat.

Another object of this invention is to provide an air-propelled boat including control means for laterally deflecting a rearward discharge of air from the boat utilized for propulsion purposes whereby the boat may be steered.

Still another object of this invention is to provide an air-propelled boat including means by which a portion of the air discharged therefrom may be deflected forwardly so as to enable the air pump means to also function as a brake.

Still another object of this invention is to provide an air-propelled boat including means for discharging a portion of the quantity of air pumped by the air pump means thereof into a rearwardly opening pocket defined beneath the bottom of the boat hull.

A still further object of this invention is to provide an air-propelled boat including structural features readily adaptable for construction in various sizes.

Still another object of this invention is to provide an air propelled boat including control means for readily

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simultaneously turning, increasing or decreasing the buoyancy of, and directing at least a portion of the air discharged by said air pump means forwardly of the hull of the boat. In this manner, it may be seen that the boat of the instant invention is highly maneuverable and therefore easy to operate in close quarters.

A final object of this invention to be specifically enumerated herein is to provide an air-propelled boat constructed in accordance with the preceding objects which will conform to conventional forms of manufacture, be of simple construction and easy to use so as to provide a device that will be economically feasible, long lasting and relatively trouble-free in operation.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view of the air-propelled boat of the instant invention shown with portions thereof being broken away to more clearly illustrate the structural details thereof;

FIGURE 2 is a bottom plan view of the boat hull with portions thereof being broken away and shown in section;

FIGURE 3 is an enlarged fragmentary top plan view of the air-propelled boat shown with portions thereof broken away and illustrated in horizontal sections;

FIGURE 4 is a fragmentary longitudinal vertical sectional view taken substantially upon the plane indicated by section line 4—4 of FIGURE 3;

FIGURE 5 is a transverse vertical sectional view taken substantially upon a plane indicated by section line 5—5 of FIGURE 3; and

FIGURE 6 is an enlarged fragmentary transverse vertical sectional view taken substantially upon a plane indicated by section line 6—6 of FIGURE 2.

Referring now more specifically to the drawings, the numeral 10 generally designates the air-propelled boat of the instant invention.

As can best be seen from FIGURES 1, 3 and 6 of the drawings the boat 10 includes an air-tight bottom assembly generally referred to by the reference numeral 12 including a bottom member 14 and a false bottom 16 in vertically spaced relation above the bottom member 14. A plurality of longitudinal stringers or partitions 18 are interconnected between the bottom member 14 and false bottom 16. From FIGURE 4 of the drawings it may be seen that the false bottom 16 curves upwardly in the bow section of the boat 10 which is generally referred to by the reference numeral 20.

The boat 10 includes a pair of opposite side assemblies 22 and 24 which include inner and outer walls 26 and 28 interconnected at their upper and lower ends by means of an upper wall 30 and a V-shaped bottom 32. The remote partitions 18 form continuations of the inner walls 26 disposed below the false bottom 16 and a plurality of vertically spaced partitions 34 are secured between the inner and outer walls 26 and 28 with the lowermost of each partition 34 forming a side extension of the false bottom 16.

The lowermost partitions 34 each also includes a rear extension 36 while each of the top walls 30 includes a rear extension 38. Each pair of corresponding extensions 36 and 38 oscillatably supports a rudder member 40 therebetween and each of the rudder members 40 includes a pair of control arms 44 to which a pair of control cables 46 are secured.

The rear end of the bottom assembly 12 is closed by means of a rear panel 48 and a rear gate 50 is pivotally

supported between the side assemblies 22 and 24 by means of a pair of opposite side hinge assemblies 52. The hinge assemblies 52 mount the rear or end gate 50 for oscillation about a horizontal axis extending transversely of the boat 10 between the side assemblies 22 and 24 thereof and it is to be understood that the rear or end gate 50 may be swung from the substantially upright closed position illustrated in FIGURE 1 of the drawings to a horizontal position with its upper edge portion disposed rearward. It is herein contemplated that the rear or end gate 50 could be slightly rearwardly and downwardly inclined so as to form a ramp for retrieving objects disposed in the water rearwardly of the boat 10.

From FIGURES 1 and 3 of the drawings it may be seen that a front wall 56 is secured between the forward ends of the inner walls 26 and that the front wall 56 includes a false section 58 which is generally V-shaped in horizontal section with its apex disposed forwardmost. A pair of air pump assemblies 60 in the form of aircraft engines having air propellers 62 mounted on the drive shafts thereof are supported from mounting brackets 64 carried by the false front wall 58. The bow section 20 therefore defines an inlet chamber 56 below the upper edges of the outer walls 28 and it may be seen from FIGURES 1, 3, 4 and 5 of the drawings that the inlet chamber 66 opens upwardly of the bow section 20 and is covered by means of a protective screen 68 secured in an opening 70 formed in a removable bow section top wall 72 secured between the forward ends of the outer walls 28.

The opposite side assemblies 22 and 24 define branch passages whose forward ends are communicated with the inlet chamber 66 in which the air pump means 60 are disposed. Accordingly, upon operation of the air pump means 60, air will be drawn through a screen-like panel 68 and forced rearwardly through the branch passages defined between the partitions 34 and the inner and outer walls 26 and 28 of the side assemblies 22 and 24. The rudder members 40 are controllable by means of the steering wheel 76 through the control cable 46 which are operatively connected to the steering wheel 76 and it may be seen from FIGURE 6 of the drawings that the V-shaped bottom has a plurality of inwardly opening outlets 78 formed therein. The forward ends of the lowermost partitions 34 have openings 80 formed therein with which flap valve members 82 are operatively associated. The flap valve members 82 are pivotally supported from the outer walls 28 by means of pivot fasteners 84 and have actuating levers 86 secured thereto with control cables 88 extending between the actuating levers 86 and a control lever 88 supported from the front wall 56 adjacent the steering wheel 76.

Still further, it may be seen from FIGURES 1 and 3 of the drawings that the outer walls 28 have a pair of exhaust ports or openings 90 formed therein. Each of the exhaust ports has a control flap 92 of corresponding size and shape pivotally supported therein for oscillation about an upstanding axis and between various positions illustrated in solid and phantom lines in FIGURE 4 of the drawings.

With the control flaps 92 disposed as illustrated in solid lines in FIGURE 2 of the drawings, the exhaust ports 90 are of course closed and therefore the prior discharge of air from the air pump means 60 is directed rearwardly through the branch passage means defined by the side assemblies 22 and 24 and also outwardly through the openings 78, if the flap valve member 82 is in the open position. However, should the flap valve members 92 be pivoted to the positions illustrated by the phantom lines designated A in FIGURE 3 of the drawings, a portion of the discharge of air from the air pump means 60 will be directed laterally outwardly of the exhaust ports 90. Still further, should the flap valve members 92 be pivoted to the phantom line positions illustrated as at B in FIGURE 3 of the drawings, substantially all of the

air discharged from the air pump means 60, if the flap valve member 82 remains closed, will be laterally, outwardly and forwardly deflected so as to effect a rearward thrust on the boat 10.

Each of the flap valve members 92 is operatively connected to a suitable foot control 96 supported from the front wall 56 and therefore it may be seen that each of the flap valve members 92 may be individually oscillated between the various positions illustrated in phantom and solid lines in FIGURE 2 of the drawings. Still further, it may be seen that the boat 10 may be propelled in an oblique direction if the rudder members 40 are positioned as illustrated in FIGURE 1 of the drawings and the left hand flap valve member 92 is positioned as indicated at A in FIGURE 3 of the drawings.

In operation, the air pump means 60 may be operated in the conventional manner and the steering wheel 76 is utilized to oscillate the rudder members 40 in order to steer the boat 10 in the more conventional manner.

If it is desired to increase the lift on the boat 10, the flap valve 82 may be pivoted to the open position such as that illustrated in phantom lines in FIGURE 6 of the drawings whereby a portion of the discharge from the air pump means 60 will be directed downwardly through the opening 80 and into the lower portions of the side assemblies 22 and 24 and outwardly through the openings 78. The V-shaped bottoms 32 and the stepped forward portion 98 of the bottom assembly 12 define a rearwardly opening pocket 100 into which air being discharged through the discharge opening 78 is pumped. Air pumped into the pocket 100 will of course be partially entrapped by the stepped forward portion 98 and V-shaped bottoms 32 and therefore this air under pressure will effect a buoyant force on the boat 10.

The direction of the boat 10 may also be controlled by the flap valve members 92 as hereinbefore set forth and the latter may also be utilized to drive the boat 10 in reverse.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. An air propelled boat including a bottom section, a pair of upstanding sides extending along and projecting upwardly from opposite longitudinal edge portions of said bottom section and including longitudinally extending hollow portions disposed above said bottom section, a bow section interconnecting the forward ends of said sides, portions of said bow section and said hollow portions of said sides defining air passage means including an inlet end portion in said bow section and also a pair of branch passages defined by said hollow portions communicated with said inlet end portion at their forward ends and opening rearwardly through the rear end portions of said sides above said bottom section, air pump means in said air passage means operable to pump air therethrough, said sides and said bow section each including portions projecting slightly below said bottom section, said sides including outlets communicated with said branch passages and opening inwardly through the portions of said sides which depend below said bottom section.

2. The combination of claim 1 wherein said air passage means includes valve means operable to selectively control communication of said outlets with said branch passages.

3. An air propelled boat including an elongated transversely extending bottom section defining a cargo receiving area thereabove, a pair of upstanding sides extending along and projecting upwardly from opposite longitudinal

edge portions of said bottom section, defining upstanding sides for said area and including longitudinally extending hollow portions disposed above said bottom section, a bow section interconnecting the forward ends of said sides, portions of said bow section and said hollow portions of said sides defining air passage means including an inlet end portion in said bow section and also a pair of branch passages defined by said hollow portions communicated with said inlet end portion at their forward ends and opening rearwardly through the rear end portions of said sides above said bottom section, and air pump means in said air passage means operable to pump air therethrough.

4. The combination of claim 3 wherein said air passage means inlet end portion opens upwardly through said bow section.

5. The combination of claim 3 including air flow control means carried by each of said sides and operable to controllably laterally deflect the air discharged from the rear ends of said branch passages.

6. The combination of claim 3 wherein said sides include outwardly opening exhaust ports adjacent the intersections of said branch passages and said inlet end portion, and control flap means carried by each of said sides and operable to selectively open and close said exhaust ports.

7. An air-propelled boat including a bottom section, a pair of upstanding sides extending along and projecting upwardly from opposite longitudinal edge portions of said bottom section and including longitudinally extending hollow portions disposed above said bottom section, a bow section interconnecting the forward ends of said sides, portions of said bow section and said hollow portions of said sides defining air passage means including an inlet end portion in said bow section and also a pair of branch passages defined by said hollow portions communicated with said inlet end portion at their forward ends and opening rearwardly through the rear end portions of said sides above said bottom section, and air pump means in said air passage means operable to pump air therethrough, said sides including outwardly opening exhaust ports adjacent the intersections of said branch passages and said inlet end portion, and control flap means carried by each of said sides and operable to selectively open and close said exhaust ports, said control flap means includes means for selectively terminating communication between said inlet end portion and said branch passages.

8. The combination of claim 7 wherein said control flap means also includes means operable to simultaneously forwardly deflect the discharge of air from said exhaust ports when said control flap means are operating to terminate communication between said inlet end portion and said branch passages.

9. The combination of claim 3 wherein said sides include outwardly opening exhaust ports adjacent the intersections of said branch passages and said inlet end portion, and control flap means carried by each of said sides and operable to selectively open and close said exhaust ports, said control flap means including control means operable to individually as well as simultaneously actuate said flap means.

10. The combination of claim 3 wherein said sides include outwardly opening exhaust ports adjacent the intersections of said branch passages and said inlet end portion, and control flap means carried by each of said sides and operable to selectively open and close said exhaust ports, said control flap means including panel like flap members complementary to and disposed in said ports and supported for oscillation about upstanding axes passing through said flaps and extending along the approximate vertical center lines of said ports.

11. The combination of claim 3 wherein each of said branch passages defines a set of individual vertically

aligned passage sections extending longitudinally of the corresponding side of said boat.

12. An air propelled boat including a bottom section, a pair of upstanding sides extending along and projecting upwardly from opposite longitudinal edge portions of said bottom section and including longitudinally extending hollow portions disposed above said bottom section, a bow section interconnecting the forward ends of said sides, portions of said bow section and said hollow portions of said sides defining air passage means including an inlet end portion in said bow section and also a pair of branch passages defined by said hollow portions communicated with said inlet end portion at their forward ends and opening rearwardly through the rear end portions of said sides above said bottom section, air pump means in said air passage means operable to pump air therethrough, said sides and said bow section each including portions projecting slightly below said bottom section, said sides including outlets communicated with said branch passages and opening inwardly through the portions of said sides which depend below said bottom section, each of said branch passages defining a set of individual vertically aligned passage sections extending longitudinally of the corresponding side of said boat, the lowermost passage section of each of said branch passages being directly communicated with said outlets, the inlet ends of the passage sections of each branch passage opening into said inlet end portion.

13. The combination of claim 12 wherein said boat includes valve means operatively associated with said inlet end portion and said lowermost passage sections and operable to selectively control communication of said lowermost passage sections with inlet end portion.

14. An air-propelled boat including a bottom section, a pair of upstanding sides extending along and projecting upwardly from opposite longitudinal edge portions of said bottom section and including longitudinally extending hollow portions disposed above said bottom section, a bow section interconnecting the forward ends of said sides, portions of said bow section and said hollow portions of said sides defining air passage means including an inlet end portion in said bow section and also a pair of branch passages defined by said hollow portions communicated with said inlet end portion at their forward ends and opening rearwardly through the rear end portions of said sides above said bottom section, air pump means in said air passage means operable to pump air therethrough, said bottom section being buoyant and said boat including an upstanding rear gate pivotally secured to said bottom section for swinging movement about an axis extending along the lower and rear edge portions of said gate and said bottom section between an upstanding position extending between the rear end portions of said sides and a horizontal position providing ready access to the interior of said boat above said bottom section and between said sides.

15. The combination of claim 14 wherein said sides and said bow section each projecting slightly below said bottom section, said sides including outlets communicated with said branch passages and opening inwardly through the portions of said sides which depend below said bottom section.

16. The combination of claim 15 wherein said air passage means includes valve means operable to selectively control communication of said outlets with said branch passages.

17. The combination of claim 16 including air flow control means carried by each of said sides and operable to controllably laterally deflect the air discharged from the rear ends of said branch passages.

18. The combination of claim 17 wherein said sides include outwardly opening exhaust ports adjacent the intersections of said branch passages and said inlet end portion, and control flap means carried by each of said

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sides and operable to selectively open and close said exhaust ports.

19. The combination of claim 18 wherein said control flap means includes means for selectively terminating communication between said inlet end portion and said branch passages. 5

20. The combination of claim 19 wherein said control flap means also includes means operable to simultaneously forwardly deflect the discharge of air from said exhaust ports when said control flap means are operating to terminate communication between said inlet end portion and said branch passages. 10

21. The combination of claim 3 wherein said inlet end portion of said air passage means includes rearwardly divergent portions communicated with the forward ends of said branch passages, said sides including outwardly opening exhaust ports aligned with the ends of said divergent portions communicated with said branch passages, and control flap means carried by each of said sides and operable to selectively open and close said exhaust ports. 15 20

22. The combination of claim 21 wherein said control flap means includes panel-like flap members complementary to and disposed in said ports and supported for oscillation about upstanding axes passing through said flap and extending along the approximate vertical centerlines of said ports. 25

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23. The combination of claim 3 wherein said boat includes an upstanding rear gate pivotally secured to said bottom section for swinging movement about an axis extending along the lower and rear edge portions of said gate and bottom section between an upstanding position extending between the rear end portions of said sides and a horizontally disposed position providing ready access to said cargo receiving area of said boat above said bottom section disposed between said sides.

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MILTON BUCHLER, *Primary Examiner.*

FERGUS S. MIDDLETON, *Examiner.*

T. M. BLIX, *Assistant Examiner.*