

Dec. 20, 1949

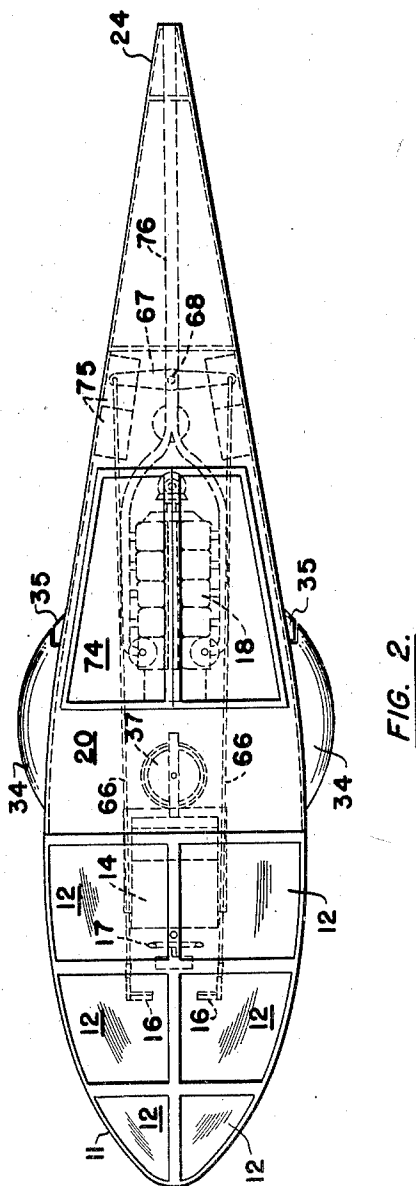
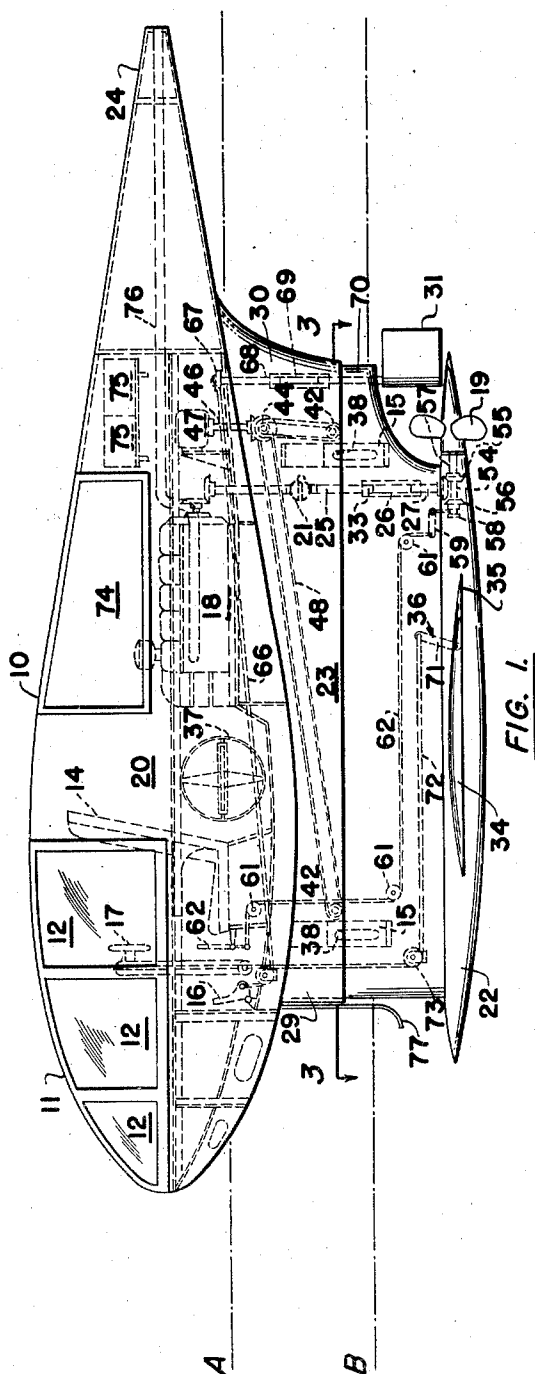
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2,491,541

AQUAPLANE

Filed July 25, 1947

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 3.

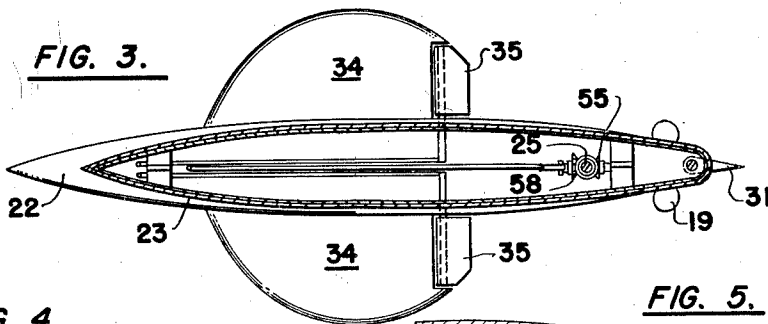


FIG. 4.

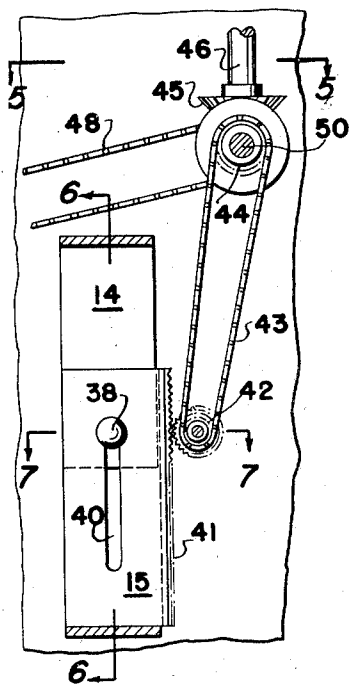


FIG. 6.

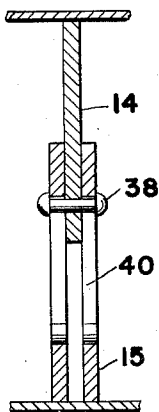


FIG. 5.

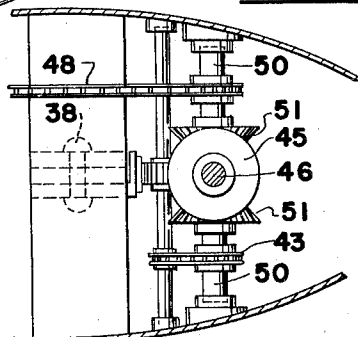


FIG. 7.

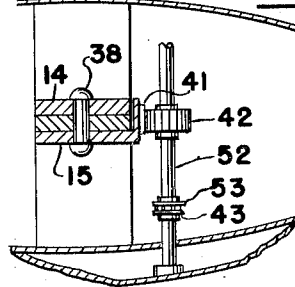


FIG. 8.

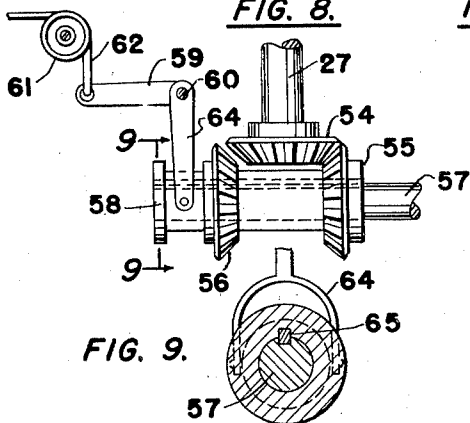


FIG. 10.

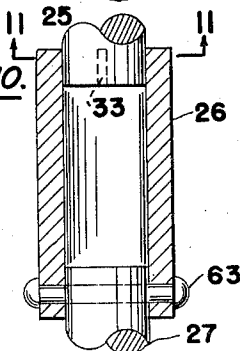
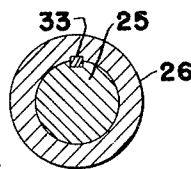


FIG. 11.



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AQUAPLANE

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5 Claims. (Cl. 114—66.5)

1

This invention relates to boats and ships for marine uses and more particularly to a type of water vehicle, which is termed for purposes of identification in this specification, an aquaplane.

Boats and ships primarily float in the sea or water areas on the top surface thereof. Hydroplanes have floats of suitable hollow form which are used as temporary rest or floats, with the main body of the hydroplane out of the water and when the hydroplane is not performing its conventional traveling as a vehicle. The boats by reason of their large surface contact with the water in which they travel, have to overcome considerable friction relatively, and this in turn requires the use of power of considerable amounts when their speed is given any appreciable increase. The principal objection therefore to the use of conventional designs in boats and ships is that they cannot be driven at high speeds unless they have large power plants and the necessary fuel to supply them. These last requirements inherently increase the obstruction to an increase in speed.

It is therefore an object of the present invention to provide a new and improved marine vehicle that will avoid one or more of the disadvantages and limitations of the prior art.

Another object of this invention is to provide a new and improved marine vehicle that will decrease its relative frictional resistance to a lower proportion than that of the conventional forms of boats and ships as it increases in speed.

A further object of the invention is to provide a new and improved motor vehicle that will ride relatively smoothly, while at the same time having adequate control of its navigational features.

Other objects will become apparent as the invention is more fully set forth.

For a clearer understanding of the invention, its principles and the objects thereof, reference is directed to the appended drawings, which together with the following description describe a particular form of the invention. This form is intended to illustrate the invention as an example and not as a limitation as to its structure, while the claims emphasize the scope of the invention.

In the drawings:

Figure 1 is a side elevation of an aquaplane embodying this invention,

Figure 2 is a plan view of Figure 1.

Figure 3 is a sectional view taken along line 3—3 of Figure 1.

Figure 4 is an enlarged elevation of the aft lifting gear and shearing pin,

Figure 5 is a plan taken along lines 5—5 of Figure 4,

2

Figure 6 is a section taken along line 6—6 of Figure 4,

Figure 7 is a plan view taken on line 7—7 of Figure 4,

5 Figure 8 is an enlarged elevation of the reversing mechanism,

Figure 9 is a section taken along line 9—9 of Figure 8,

10 Figure 10 is an enlarged section of the slip ring sleeve, and

Figure 11 is a section taken along lines 11—11 of Figure 10.

Similar reference characters refer to similar parts throughout the drawings.

15 In the structure shown in the drawings, 10 represents the body of a ship, boat or aquaplane. It is of a tear-drop contour with the forward or front section 11 enlarged and with the tapered end for the stern or aft section 24 as shown in Figure 1. The front section 11 is provided with windows 12 to permit observation by the pilot while he is driving the vehicle. Seats 14 are installed in the section 11 for the pilot to use and convenient to the operation of pedals 16 and a wheel stick 17. The pedals 16 and the wheel 17 are connected to their respective mechanisms to operate the parts of the aquaplane so it can perform its functions in accordance with the wishes of the operator. The engine or power plant 18 for operating the propeller 19 of the aquaplane is located in the power room 20 suitably positioned in the body 10. The mechanism 21 connects the power plant 18 with the propeller 19. This mechanism is of a general conventional form except that it is necessary to extend it from the body 10 to reach the drift tube 22 on which propeller 19 is rearwardly mounted.

25 The drift tube 22 is attached to a relatively thin plate centerboard pylon 23 that extends vertically down from the keel 28 of body 10. It is longer than the centerboard 23 which latter has its front end portion 29 and rear end portion 30 tapered to reduce frictional resistance. The propeller 19 is mounted on this drift tube 22 and rotates on it as indicated. The drift tube 22 in general is of a streamline contour. The centerboard pylon is of rectangular form and extends from a point behind the forward section 11 to a point towards the rear 24 that will make its total length about one-half that of the aquaplane. A rudder 31 is mounted in the rear of the centerboard pylon 23 above the drift tube 22 and is hinged to operate on a vertical axis, with limit stops to control the extent of its movement. A pair of aligned vanes 34 situated horizontally on both sides of the drift

3

tube 22 near the middle thereof, serve with their movable water foils 35 to control the depth of the centerboard pylon 23 in the water, as well as assist in turning and stabilizing the aquaplane 10. The waterfoils 35 are normally horizontal, and are operated through the mechanism 36 by the pilot.

The general accessories such as gyrostabilizers 37 and other equipment may be included in the aquaplane to suit the conditions and needs of the latter. The centerboard 23 may be raised to avoid obstructions or grounding. The space employed for such movement does not interfere with the apparatus on board the aquaplane or the pilot. The position of the apparatus used to raise the centerboard 23, is arranged about a housing 40. The various mechanisms are provided with splines and slip joints wherever required to enable the parts to function properly and adjust themselves to whichever position the centerboard pylon may be in.

As the aquaplane is propelled at a slow speed through the water by the propeller 19 with all controls in normal position for horizontal traveling the vehicle floats through the water at its normal level due to its weight and the water conditions, which is on about the level A. Then as the speed is increased to cruising speed and the water foils or ailerons 35 tilted to an appropriate angle, the aquaplane rises in the water until the level B is reached. The water foils 35 are then straightened out so the speed of the craft will keep it at the level B. At this level the frictional contact of the boat with the water will be greatly reduced and the resistance lowered. This is especially true when the body rises above the water level. If the water foils 35 are tilted the opposite way they will tend to make the boat press with more pressure against the water and increase the frictional resistance. The boat will not submerge but simply press heavier against the surface of the water due to the slightly increased depth it will sink to in the water.

Another feature of the structure shown is that the centerboard pylon 23 is made in two sections, the upper 14 and lower 15 respectively. They are held together by semi-soft shearing pins 38 which slide in an elongated slot 40 each time the lower section 15 is raised or lowered through the action of its rack gear 41 and spur gear 42. The gear 42 is mounted on a shaft 52 and is turned by sprocket 53 and turned by chain 43 driven by sprocket 44. The sprocket 44 is mounted on a shaft 50 and rotated by a bevel gear 51 meshed with a bevel gear 45 attached to shaft 46 of the electric motor 47. A chain 48 is driven by a sprocket similar to sprocket 44 and drives a sprocket gear 42 to raise and lower the forward end of the counterboard pylon 23 in a manner similar to that shown for operating the rear end.

The mechanism 21 comprises a splined driving shaft 25 and key 33 which is rotated by the engine 18 and slides in and out of a collar 26. The collar 26 is attached to a short shaft 27 which drives a bevel gear 54. A pair of bevel gears 55 and 56 are slidably mounted on a propeller shaft 57 having a key 65. The rotation of the propeller 19 is controlled by the shifting of bevel gears 55 and 56 into contact with the driving bevel gear 54 at periodic intervals. The gears 55 and 56 are mounted on a single collar and shifted through the operation of a collar 53 and fork 64. The fork 64 with its arm 59 is mounted on a pin 60 and operated back and forth through a cable 62 moving over wheel 61 to a lever 62.

The rudder 19 is operated by pedals 16 attached

4

by cables 66 to a cross arm 67 mounted on a shaft 68 which operates a sliding collar 69 which is similar in construction to collar 26. The shaft 70 is attached to the lower end of the sliding collar 69 and the rudder 31.

The mechanism 36 for operating the waterfoils 35 comprises a lever 71 which is operated by the wheel 17 by a cable 72 which run over wheels 73. A gasoline tank 74 supplies fuel to the engine 18 and batteries 75 furnish the electric current for lighting and starting etc. An exhaust pipe 76 carries the exhaust from the engine through the aft section 24. A pendulum or pressure sensitive tube 77 is positioned in the front of the boat to determine the depth the boat is at the moment.

The form shown has several advantages over the conventional forms of ships. It is non-cap-sizing as the pylon will resist such a tendency. It will steer a straighter course. It will navigate more readily and the vanes will enable it to ride at a level that will afford the greatest efficiency. The adjustments afforded by the waterfoils 35 on the vanes 34 will enable it to establish a level in the water that is most suitable for smooth sailing. The addition of the pylon structure 23 and drift tube 22 does not increase the cost of building the aquaplane excessively and such increase in cost as may arise will be readily recompensed by the increase in efficiency and reduction of operational costs.

While but one general form of the invention is shown in the drawings and described in the specifications, it is not desired to limit this application for patent to this particular form or in any other way otherwise than limited by the scope of the claims, as it is appreciated that other forms of construction could be made that would use the same principles and come within the scope of the appended claims.

Having thus described the invention, what is claimed is:

1. An aquaplane comprising in combination, a body, a multi-part centerboard pylon extending down from said body below the normal level of the body into the water, a drift tube mounted on said pylon and extending longitudinally thereon, means on the said drift tube for propelling the body through the water and mechanism for operating said means, a rudder on said pylon for guiding the body through the water, vanes on the side of the pylon for facilitating the operation of the aquaplane through the water, waterfoils on the vanes for controlling the position of the body in the water, mechanisms for operating said waterfoils and rudder controlled from inside the body, and means for adjusting the position of one of the parts of the pylon with respect to the other of said parts.

2. An aquaplane comprising in combination, a body, a multi-part centerboard pylon extending down from said body below the normal level of the body into the water, a drift tube mounted on said pylon and extending longitudinally thereon, means on the said drift tube for moving the body through the water and mechanism for operating said means, a rudder on said pylon for guiding the body through the water, vanes on the side of the pylon for facilitating the operation of the aquaplane through the water, waterfoils on the vanes for controlling the position of the body in the water, mechanisms for operating said waterfoils and rudder controlled from inside the body, means for adjusting the position of one of the parts of the pylon with respect to the other of said parts, and means in said mechanisms for allowing ad-

5

justments therein in accordance with the position of the pylon.

3. An aquaplane comprising in combination, a body, a multi-part centerboard pylon extending down from said body below the normal level of the body into the water, a drift tube mounted on said pylon and extending longitudinally thereon, means on the said drift tube for moving the body through the water, a rudder on said pylon for guiding the body through the water, vanes on the side of the pylon for facilitating the operation of the aquaplane through the water, waterfoils on the vanes for controlling the position of the body in the water, mechanisms for operating said waterfoils and rudder operated from inside the body, means for adjusting the position of one of the parts of the pylon with respect to the other of said parts means in said mechanisms for allowing adjustments therein in accordance with the position of the pylon, and means for holding said pylon to permit its shearing off if the aquaplane strikes a substantial obstruction.

4. An aquaplane comprising in combination, a body, a multi-part centerboard pylon extending down from said body below the normal level of the body into the water, a drift tube mounted on said pylon and extending longitudinally thereon, a propeller on the said drift tube for moving the body through the water and mechanism for operating said propeller, a rudder on said pylon for guiding the body through the water, vanes on the side of the pylon for facilitating the operation of the aquaplane through the water, waterfoils on the vanes for controlling the position of the body in the water, mechanisms for operating said waterfoils and rudder operated from inside the body, means for adjusting the position of one of the parts of the pylon with respect to the other of said parts, means in said mechanism for allowing adjustments therein in accordance with the position of the pylon, means for holding said pylon to permit its shearing off if the aquaplane strikes a substantial obstruction, said drift tube being relatively small in diameter and tapered towards its ends to lessen frictional resistance thereof.

6

5. An aquaplane comprising in combination, a body, a multi-part centerboard pylon extending down from said body below the normal level of the body into the water, a drift tube mounted on said pylon and extending longitudinally thereon, means on the said drift tube for moving the body through the water, a rudder on said pylon for guiding the body through the water, vanes on the side of the pylon for facilitating the operation of the aquaplane through the water, waterfoils on the vanes for controlling the position of the body in the water, mechanisms for operating said waterfoils and rudder operated from inside the body, means for adjusting the position of one of the parts of the pylon with respect to the other of said parts, means in said mechanisms for allowing adjustments therein in accordance with the position of the pylon, means for holding said pylon to permit its shearing off if the aquaplane strikes a substantial obstruction, said drift tube being relatively small in diameter and tapered towards its ends to lessen frictional resistance thereof, said vanes being arranged with their underside relatively flat and upper surfaces slightly arcuate and directed to flow towards said waterfoils.

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