May 15, 1956 J. V. MANIS 2,745,370

STABLE WATER JET HULL

Filed July 13, 1953 3 Sheets-Sheet 1

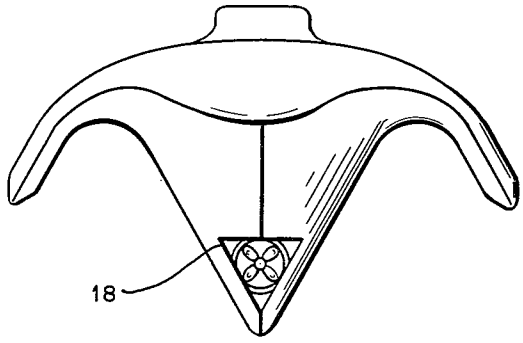

Fig. 4

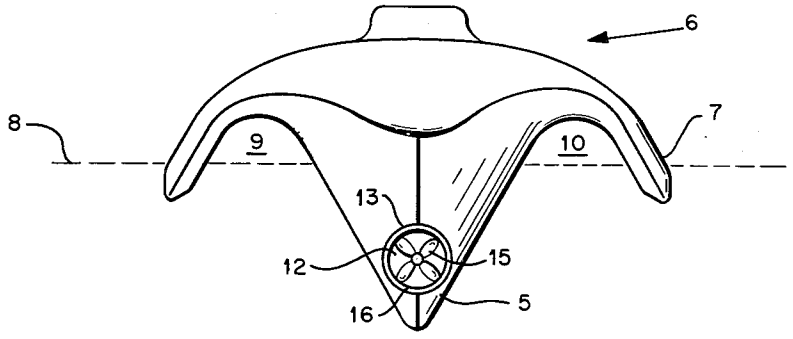

Fig. 1

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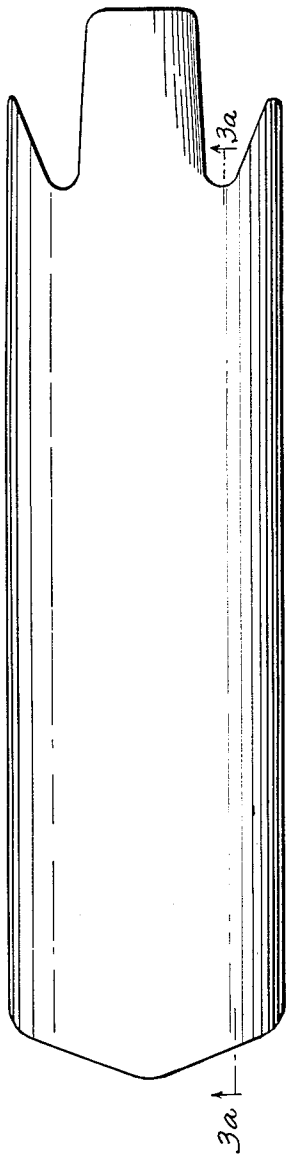

Fig. 3

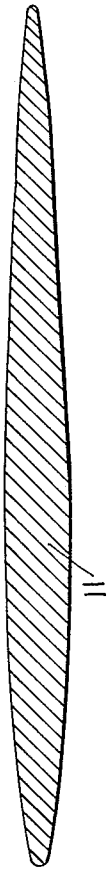

Fig. 3a

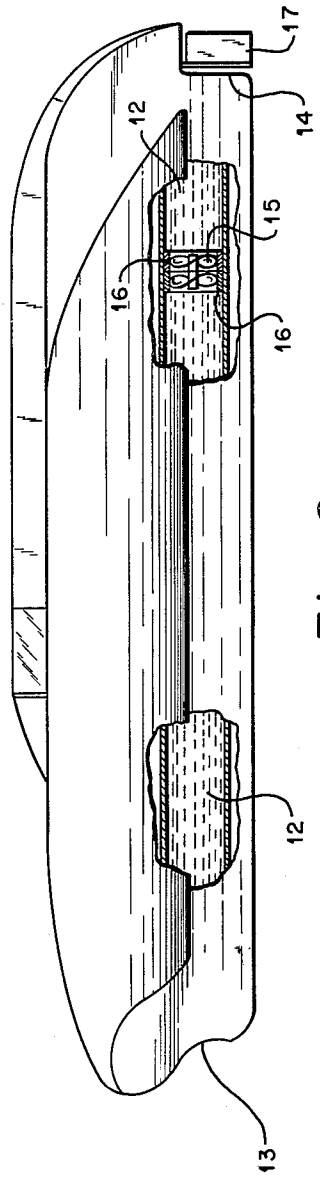

Fig. 2

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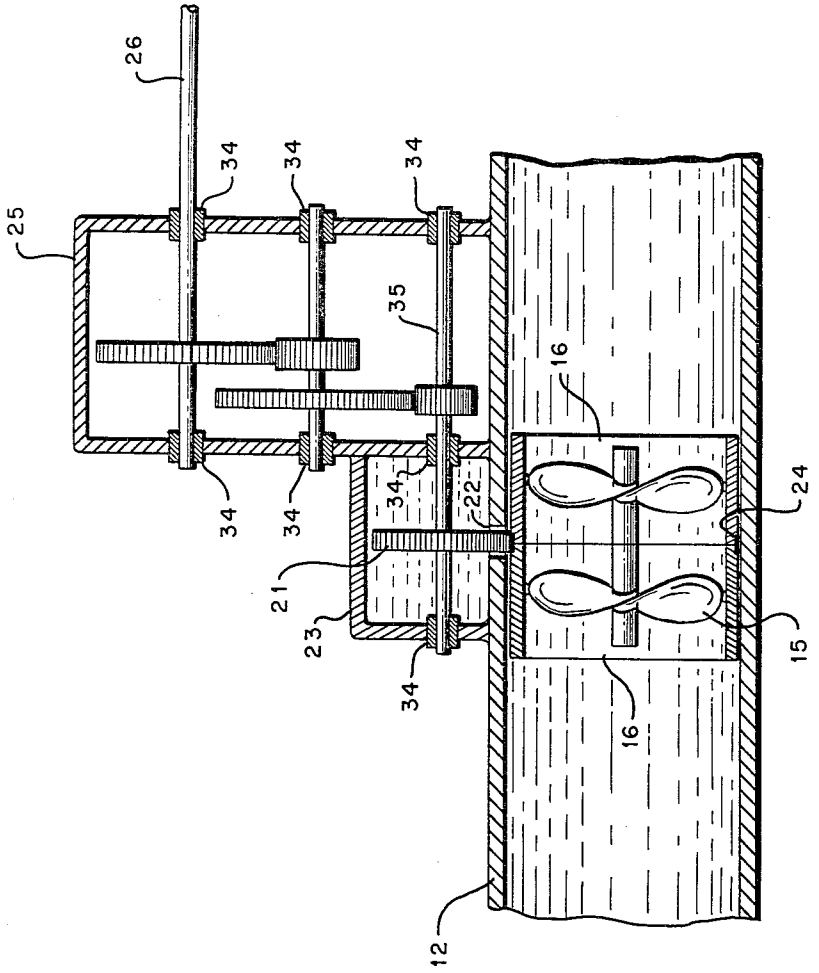

Fig. 5

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STABLE WATER JET HULL

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1 Claim. (Cl. 115—16)

The invention relates to a highly stable boat hull structure having novel means to increase stability compared to a boat or ship having many times its displacement and providing a structure of maximum efficiency of engine operation.

To accomplish this at present a ship must be of considerable displacement in order to get the stability necessary, thus sacrificing speed, maneuverability, and maximum efficiency of engine operation. Expensive items such as gyro-stabilizers, often abbreviated to gyro, are sometimes installed which help stabilize the craft but add weight and are costly.

Gyros are practical only on large vessels.

An object of this invention is to decrease the weight of the craft by the use of an air cushioning effect by the means of an overhang structure on the port and starboard sides of the craft, running longitudinally along the complete length of the craft.

Another object of the invention is to construct a tube or tubes, that is a tunnel or tunnels, longitudinally through the craft below the water line, thus using the water flowing through it or them as ballast as the craft rolls, yaws, or pitches. The tube or tubes also serve as screw housings to increase their efficiency, by controling or restricting the back wash directly to the rear in a concentrated jet action thus giving maximum engine efficiency.

Still another aim is to provide instant control response, made possible by mounting the rudder or rudders directly on the center lines of this tube or tubes.

Another purpose of this invention is to decrease the weight of a craft without sacrifice of pay load.

Still another object is to increase the stability of the craft insofar as pitch, yaw, and roll is concerned.

An additional object is to increase maneuverability of the craft by increasing rudder sensitivity.

Another object of this invention is to increase the efficiency of the screw and engine operation by creating a controlled or concentrated water jet flow to increase propulsion.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes beter understood by reference to the following detailed description when considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the figures thereof and wherein:

Fig. 1 shows a cross sectional view of a speed boat,

Fig. 2 illustrates a side elevation with cut-aways to show the tube structure and screw location,

Fig. 3 shows a plan view illustrating an airfoil cross section.

Fig. 3*a* is a sectional view of a portion of the hull taken along line 3*a*—3*a*, Fig. 3.

Fig. 4 presents a cross-sectional view of a speed boat showing an alternate form of the inventive device.

Fig. 5 shows a cross-sectional view of ring gear and gear train means associated with the screw propeller of Fig. 2.

Referring to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views:

A V-type hull **5** curves upwardly and outwardly as it reaches close to the top of the deck **6** and as it curves outwardly to a desired distance it starts to curve downwardly as shown at **7** to dip below the water line **8**. This forms tunnels **9** and **10** approximately semi-circular in cross-section which run longitudinally along the port and starboard outer sides of the craft. The longitudinal wall thickness cross-section **11** is of an airfoil section to give the craft added lift and cushioning effect as the trapped air rushes through the tunnels at a fair speed.

A tube **12** runs longitudinally through the craft below the water line, entrance aperture **13** being disposed at the prow and the exit aperture **14** at the stern. The water rushing through this tube tends to stabilize the ship insofar as roll, yaw, and pitch are concerned (since the weight of the volume of water displaced by the tube acts as ballast when the ship tends to pitch, roll, or yaw). If desired, a plurality of tubes may be inserted below the water line and longitudinally of the boat, as for example where a plurality of screws are to be used for propulsion purposes or where more ballast effect is necessary. The tubes may be made separate from or integral with the hull as desired.

The screw **15** is also housed in this tube. (A suggested method of transmitting power to the screw if not by a shaft would be to cast the screw inside of a ring **16** having an approximate diameter equal to the inside diameter of the tube. The outer rim of the ring would have gear teeth that would mesh with another arrangement of gears transmitting energy from the power unit.) Having the screw thus located would prevent any side energy waste, since the back wash from the screw would be restricted or controlled by the walls of the tube. This method would give a concentrated column of energy with force directed at the exit **14** of the tube. As shown in Fig. 2 a plurality of screws **15** in tandem might be housed in the tube. A preferred location of the screw or screws **15** to reduce friction loss and improve power transmission would be relatively near the stern as compared with distance from the bow as indicated in Fig. 2.

In addition, the location of the rudder **17** which may be mounted directly to the rear of and on a center line with the tube is subject to the concentrated jet water or energy blast coming out of it. This gives instant response reaction.

In Fig. 4 a cross section shows a hollow V keel tunnel construction **18** in place of the tubular construction **12**. This may be used when found more practical on some types of V hulls. The screw is located inside the hollow V keel **18** as in the tubular type.

As shown in Fig. 5, the outer rim of ring **16** has gear teeth **24** which may mesh with the teeth of gear **21**, through an opening **22** which may be provided at the top of the tube **12**. If desired ring bearings (not shown) may be disposed on the screw housing **16** and rotated in grooved guides (not shown) along tube **12** and spaced longitudinally from the outer rim gear of ring **16** so as to avoid power loss due to undue friction or possible wobbling of ring **16**. Gear **21** would be mounted in bearings **34** in a waterproof gear box **23**. Shaft **35** on which gear **21** is mounted may be driven by a gear train generally designated at **25** and which may transmit power from engine drive shaft **26**. The arrangement of the gear train could be designed to increase or decrease the R. P. M. (revolutions per minute) as desired.

It is within the scope of this invention to dispose tubes externally of specially built or existing hulls varying location as found feasible as for example underneath the hull structure.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claim the invention may be practiced otherwise than as specifically described.

I claim:

A marine craft comprising a V-shaped hull having an upper-deck portion and a below-water portion, said hull having diverging sides curving upwardly and outwardly at the upper deck portion and thence curving downwardly, the outer downward tip of the sides being in normally submerged position to form a tunnel approximately semi-circular in cross-section running the complete length on each side of the craft, said sides at the tunnel surrounding areas being of airfoil section so that during rapid motion added lift and cushioning will be effected on the craft as trapped air rushes through the tunnels, a tube disposed longitudinally through the craft below the waterline, said tube having an entrance aperture at the prow of the craft and an exit aperture at the stern, to permit water to rush through the tube in motion of the craft, thereby stabilizing the craft with respect to roll, yaw, and pitch, since the weight of the water displaced by the tube acts as ballast when the craft tends to pitch, roll, or yaw, a ring having an approximate diameter equal to the inside diameter of the tube, a propulsion screw disposed within the ring, said ring having an outer rim comprising gear teeth, gear train means meshing with the gear teeth of said ring to thereby transmit power to said screw, thereby preventing side energy waste since the back wash from the screw is restricted by the tube walls to present a concentrated column of energy force directed at the tube exit during operation of said craft, a rudder disposed directly to the rear of and on a center line with the tube, said rudder thereby being subject to the concentrated jet of water from the tube in craft operating condition to give rapid rudder response action, the craft thereby possessing for its size characteristics of high stability, high efficiency of engine operation, rapid control response and relatively large pay load capability.

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