March 22, 1949. G. A. WOOD 2,464,957

BOAT

Filed Feb. 27, 1945

2 Sheets-Sheet 1

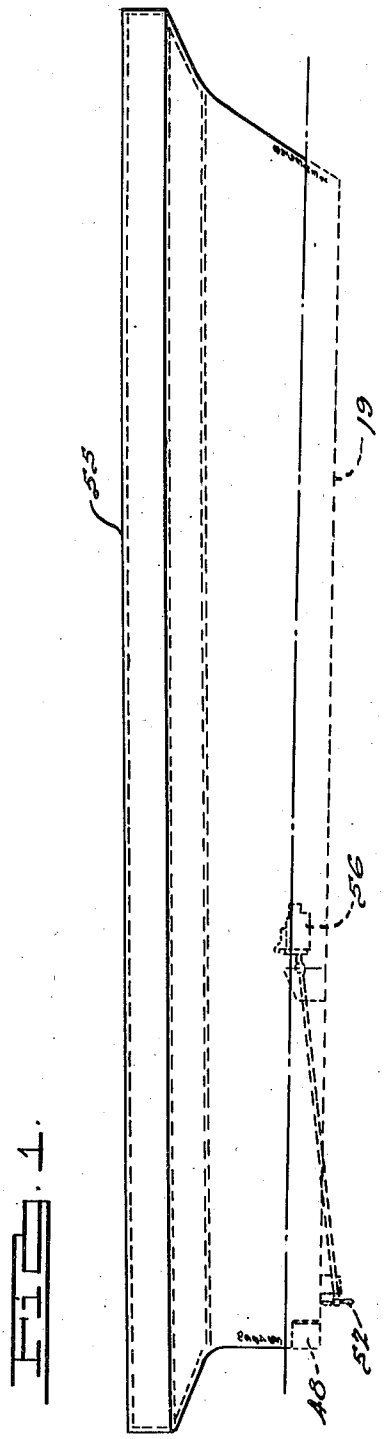


Fig. 1.

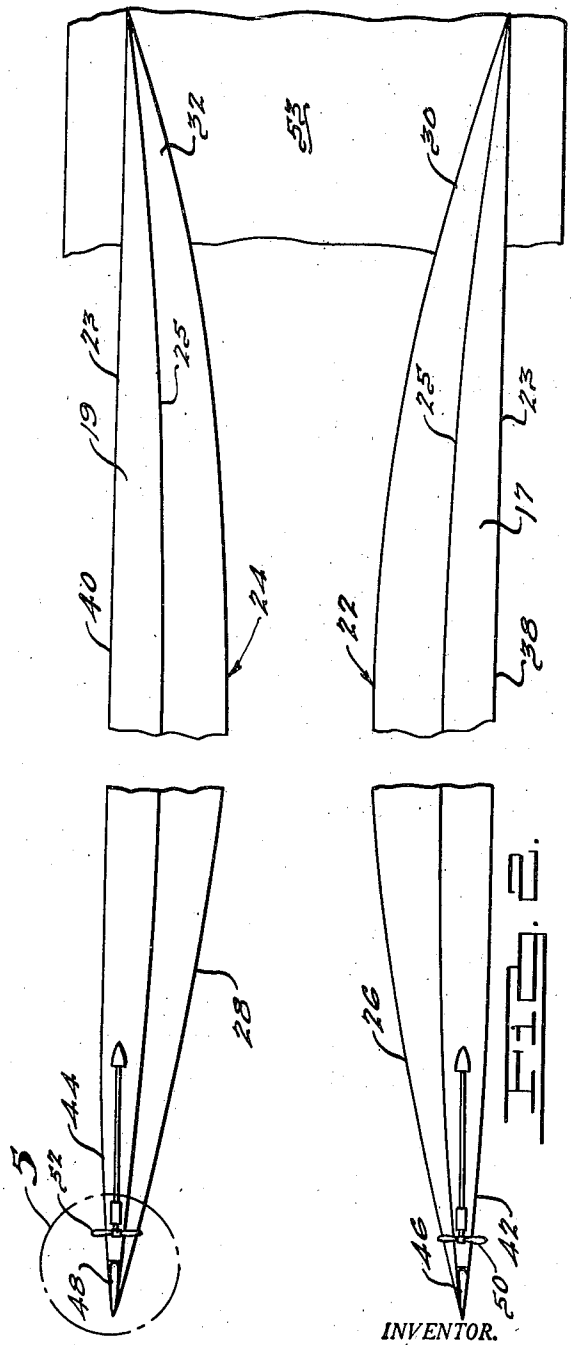


Fig. 2.

INVENTOR.
Garfield A. Wood.
BY
Harness, Dickey & Pierce
ATTORNEYS.

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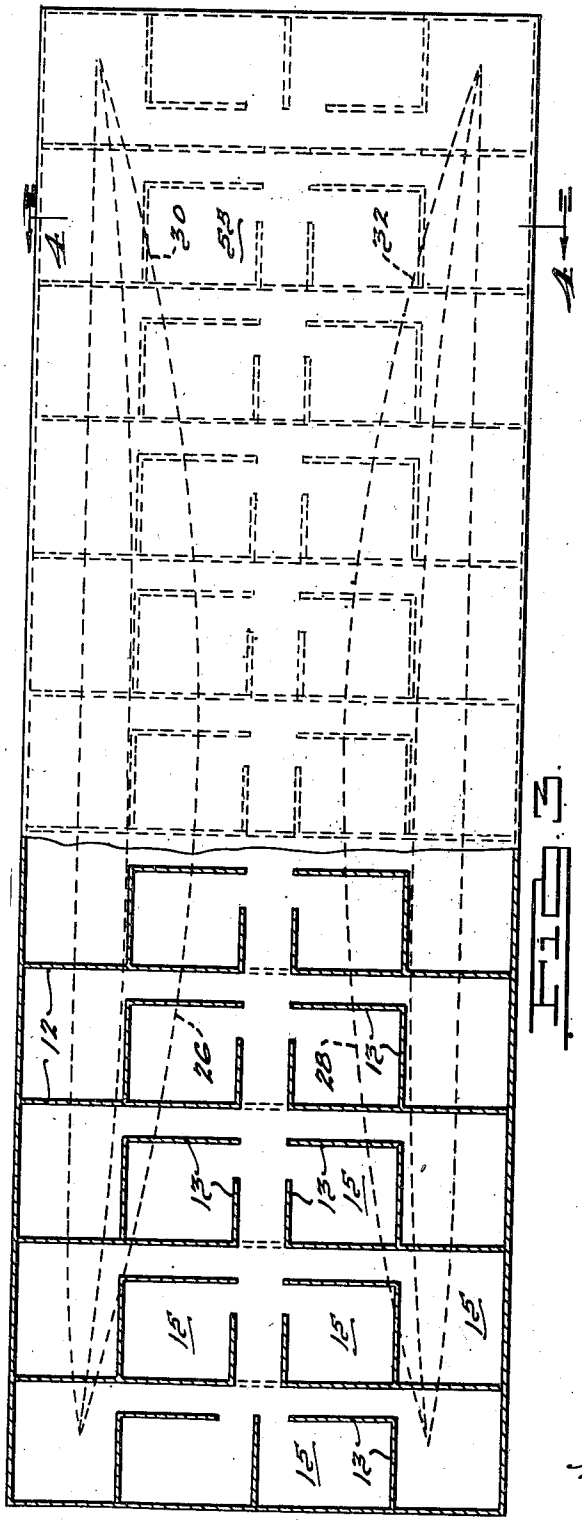


FIG. 3.

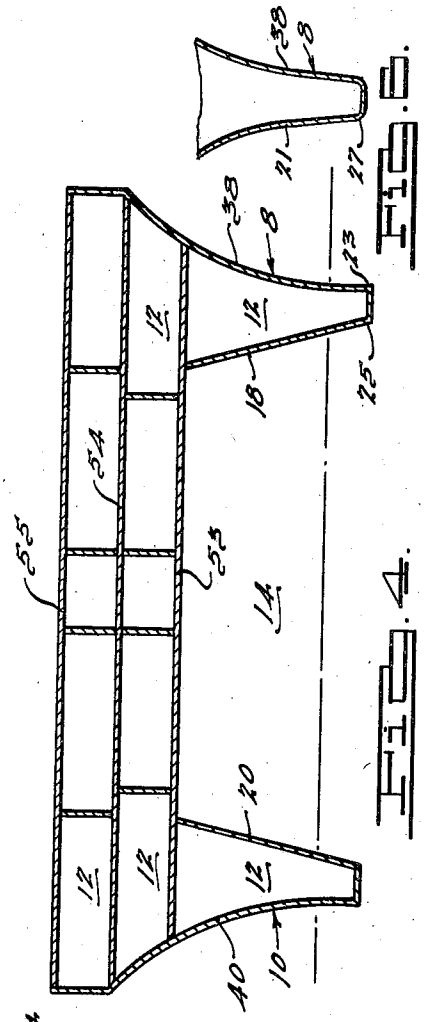


FIG. 4.

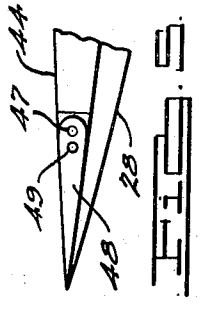


FIG. 5.

INVENTOR.
Garfield A. Wood.
BY
Harness, Dickey & Pierce
ATTORNEYS.

Patented Mar. 22, 1949 2,464,957

UNITED STATES PATENT OFFICE

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BOAT

Garfield A. Wood, Miami Beach, Fla.

Application February 27, 1945, Serial No. 579,903

4 Claims. (Cl. 114—61)

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This invention relates to boats or ships of the catamaran type.

The main objects of this invention are to provide a boat or ship which provides great stability and freedom from beam motion when in rough water; to provide a construction which substantially eliminates oscillation of the craft in a fore and aft direction; to provide a construction which is conducive to the reduction of wave development; to provide a construction of a boat or ship which will have a substantial air lift when in motion and which tends to reduce the amount of displacement; to provide a construction of a boat or ship which may be relatively light in weight and at the same time have great strength of structure as compared to the conventional type of boat or ship; to provide a boat or ship which may have extreme width of deck, while at the same time having relatively small and narrow portions for displacement in the water; to provide a boat or ship ideally suited for the construction of aircraft carriers, pleasure boats, and rescue boats; to provide a boat having a great amount of deck space and storage room as compared to the amount of hull displacement; and to provide a boat or ship having extreme stability coupled with extraordinarily good maneuverability.

An illustrative embodiment of this invention is shown in the accompanying drawings, in which

Fig. 1 is a view in side elevation of the improved craft which has been made up for use as a target for bombing practice;

Fig. 2 is a bottom plan view of the same;

Fig. 3 is a plan view with the top deck broken away, showing the outline of the hulls and their connecting trusses;

Fig. 4 is a vertical, transverse, sectional view taken on the line 4—4 of Fig. 3;

Fig. 5 is an enlarged fragmentary view of part of the structure enclosed in the broken circle 5 of Fig. 2; and

Fig. 6 is a fragmentary view in vertical, transverse section of a modified form of hull construction.

In the construction shown in the drawings, the improved boat or ship comprises a pair of elongated hulls generally designated 8 and 10, disposed in spaced generally parallel relation to form an open passageway 14 therebetween. The hulls 8 and 10 shown in the illustrated exemplification are surmounted by three horizontal decks 53, 54, and 55 vertically separated to form two below-deck spaces which are subdivided into a plurality of inner and outer cabin spaces 15 by

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walls 12 which extend transversely from side to side of the boat and inner partition walls 13.

The walls 12 extend downwardly within the hulls 8 and 10 to form bulkheads and tie the inner and outer sides of the hulls together.

It will be understood, however, that the hulls 8 and 10 may be surmounted and joined by a very wide variety of structures, depending upon the use and purpose the particular boat is designed for, and my invention is not to be limited in any way by the particular arrangement shown.

For instance, when the boat is for ocean passenger-carrying service, the hulls may be surmounted by several decks, thereby producing a large passenger-carrying capacity. The same is true where the boat is to be used for an aircraft carrier and the subdividing of the between-deck spaces is disposed for storing the aircraft in the usual manner of present aircraft carriers.

On the other hand, if the boat is to be used as a rescue craft, it may be that only one between-deck space is needed for housing the necessary rescue paraphernalia and quarters for the crew.

It is to be noted, however, that one of the features, common to all forms of the invention, is in the utilizing of the transverse partition walls 12 as truss structures for holding the hulls 8 and 10 in spaced, parallel relation. Also, the fore and aft partition walls 13 add rigidity to the transverse walls 12 by giving side support to them. Therefore, it is seen that the walls 12 and 13 serve the double function of structural trusses and room partitions. Thus the between-deck space is generally of cellular character, with all of the dividing walls also serving as structural members. Thus maximum strength is secured for the weight of the materials used.

The inner sides 18 and 20 of the hulls 8 and 10, as viewed in plan, are curved inwardly to form a Venturi-shaped passageway therebetween. The points of closest proximity, 22 and 24, of these inwardly curved sides are shown as being forward of midship, but such location is not critical and may be varied widely. The curvatures rearwardly of these points of closest proximity are sharper, as shown as 26 and 28, than the curvatures 30 and 32 forwardly of these points, but again, slight differences in curvature are not critical to the boat's performance.

As viewed in vertical cross section, as in Fig. 4, the inner sides of these hulls are straight and inclined inwardly toward each other, but it is to be understood that these sides may be curved, as shown at 21 in Fig. 6. Where the craft is con-

structed of plywood and the like, it is expedient to have both the inner sides of the hulls, as well as the outer sides, straight, as viewed in cross section. However, where the craft is constructed of steel plate, which may be curved in two directions, either or both of the hull walls may be curved as shown in Fig. 6.

In the embodiment shown in Figs. 1 to 5 inclusive, the outer sides 38 and 40 of the hulls 8 and 10, as viewed in vertical cross section, are curved or flared outwardly, but it will be understood that they may be vertically disposed, straight, plane surfaces, except near their rear ends. As shown at 42 and 44 in Fig. 2, these sides are curved inwardly so as to secure ease in turning of the craft and thereby produce extremely good maneuverability. This inward curving 42 and 44 of the outer sides adjacent the stern is one of the important features of the present construction, and such curvature may be lessened or increased, depending upon the turning radius desired. The more pronounced this curving is, the shorter will be the turning radius of the boat.

As illustrated most clearly in Figs. 1 and 2 of the drawings, the bottom surfaces 17 and 19 of the hulls 8 and 10 are straight, plane surfaces from bow to stern. This construction is of distinct advantage, because it produces a minimum of disturbance in passing through the water, and furthermore, when the stern is lower than the bow, which is the normal running position when the craft is under way, these plane surfaces help to lift the boat in the water, thus producing less displacement and greater efficiency.

In the construction shown in Figs. 1 to 4 inclusive, the craft illustrated is constructed with hard chines 23 and 25, but again, this is only an expedient resorted to by reason of the use of plywood and the like which cannot be readily curved in two directions. As illustrated in Fig. 6, these corners may be rounded as at 27, particularly where the construction is of steel plate, and such construction will result in some reduction of area of water contact. The construction illustrated in Fig. 6 may be preferable where the craft is to be used for large ships intended to carry heavy tonnage and in which very little lift is expected from the planing action of the straight, flat bottom surfaces 17 and 19.

The inner and outer surfaces of the hulls near their sterns taper gradually and fair into rudders 46 and 48, the sides of which form continuations of the sides of the hull when the rudders are in dead-ahead position. The rudders 46 and 48 may be pivoted about the axis 47, as shown, or may be pivoted rearwardly thereof as shown at 49, so as to be partially balanced by water pressure when turned.

In the construction illustrated, propellers 50 and 52 are shown positioned below the bottom surfaces of the hulls, forward of the rudders, but it is to be understood that there is a wide choice of propeller location as they may be located with the propeller shafts coming out through the curved sides 26 and 28, either above or below the bottom line of the hulls, and the determination of the exact position of the propellers may vary widely and will be determined by a number of different factors.

Each of the hulls 8 and 10 is provided with an appropriate power plant, the individual control and speed of which may be utilized to secure maneuverability in addition to the rudders 46 and 48.

The hulls 8 and 10 have been shown in somewhat diagrammatic form with some of their interior bracing omitted for purposes of clarity. Upon the use for which the boat is intended and its size, the materials used for construction may be greatly varied. The design is well adapted for the use of plywood, as well as steel plates or planking secured to ribs.

It is to be particularly noted that a craft of this construction has tremendous strength for its size, due to the fact that in a fore and aft direction it has four generally longitudinally extending, substantially vertical wall structures as compared to a craft having a single hull and therefore having only two wall structures. Furthermore, by having two hulls bridged by truss structures, these hulls may be widely spaced apart and thereby provide a great amount of deck area and storage space between decks without having excessive displacement of water by the hulls.

A particular feature of the construction is in having the outer sides of the boat, from the bow to a point aft of midships straight forward and aft as viewed in horizontal plane, and the after section of the outside of the boat is curved to conform to the desired turning required, as distinguished from the ordinary catamaran structure in which two symmetrically-shaped hulls are bridged together. The outer sides may be curved outwardly, as viewed in transverse vertical section, above the point of contact of the water.

The present structure is developed by severing a conventional hull from bow to stern in a vertical plane, then reversing the positions of the two severed sections so that the plane sides are outwardly and the curved sides adjacent each other. This is modified by curving inwardly the stern ends of the outer sides, and when bridged by connecting trusses, the structure provides a Venturi-shaped opening from end to end which produces a substantial lift to the craft when driven at speed. It is understood that the sides may be curved outwardly above the possible water contact. The rudder being a section of the boat and streamlined, greatly reduces the skin friction and drag of the conventional type rudder used on ordinary boats.

The term "yawing" is the distortion of the true course of a boat when it is operating in heavy seas, and the reason for the distortion is difference of pressure on the curved sides of the boat near the bow, caused by more wetted surface on one side than the other alternately, due to the rolling of the boat. Now when the curved bow sides of the boat are reversed, as in this design, the pressure developed by the rolling of the boat, works in the opposite direction and eliminates yawing entirely. In other words, if the starboard side was merged deeper than the port side at the bow, the boat would tend to go to starboard immediately instead of to port, as in the conventional boat, and this movement in effect would tend to force the port side deeper into the water, which would automatically counterbalance the starboard pressure and hold the boat on a true course.

It is to be noted that one of the main advantages which accrues from the herein disclosed construction is the minimizing of yaw in an angularly approaching sea or wave, which results in the craft maintaining a set course with little or no correction from the helm.

In a boat of the conventional construction, a forwardly approaching sea striking the com-

poundedly curved surface at one side of the bow will lift the bow and deflect from its course.

In the present construction, an angularly approaching wave striking the outer flat side of one hull and the inner curved or inclined side of the other hull will lift the latter and depress the former, so that the combined action will result in the craft staying on its course.

Another feautre of the present construction is in so distributing the masses of the two hulls that the center of gravity will be such as to not unduly stress either the upper or lower chords of the cross trusses that connect the two hulls together.

The distribution of weight is such as to normally place the lower chords of the trusses in compression and the upper chords in tension. With this arrangement wave action against the inner converging sides adjacent the bow will tend to first neutralize the stresses in the chords before reversing the forces therein.

What is claimed is:

1. A boat or ship having two hulls spaced apart in generally parallel relation, the inner adjacent sides of said hulls being curved in plan view and the outer sides of said hulls being substantially straight from bow to midship and curved inwardly adjacent the sterns of said hulls for a distance sufficient to influence helm response.

2. A boat or ship having two spaced hulls joined in catamaran fashion forming a longitudinal opening extending from end to end, the inner adjacent sides of said hulls being curved to form a Venturi-shaped passageway, and the outer sides of said hulls being substantially straight from bow to past midship, the stern ends of said outer sides being curved inwardly in plan view for a distance sufficient to influence helm response.

3. A boat or ship having two hulls spaced apart in generally parallel relation, the inner adjacent sides of said hulls being curved in plan view and the outer sides of said hulls being substantially straight from bow to midship and curved inwardly adjacent the sterns of said hulls, and the bottoms of said hulls being straight plane surfaces from bow to stern.

4. In a boat or a ship of the catamaran type, a pair of hulls joined in spaced, substantially parallel relation, the outer side of one hull adjacent the bow being substantially straight in a fore and aft direction and substantially a vertical plane surface at and below the water line, the inner side of the other hull adjacent the bow being curved in a fore and aft direction and being inclined toward the first mentioned hull whereby an angularly approaching wave will tend to raise the second mentioned hull and depress the first mentioned hull and thereby minimize the yaw, the outer sides of said hulls, for a substantial distance adjacent their respective sterns, being curved inwardly in plan view in accordance with the turning radius desired for the boat.

GARFIELD A. WOOD.

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