Jan. 16, 1962 W. P. BROWN 3,016,861

CATAMARANS

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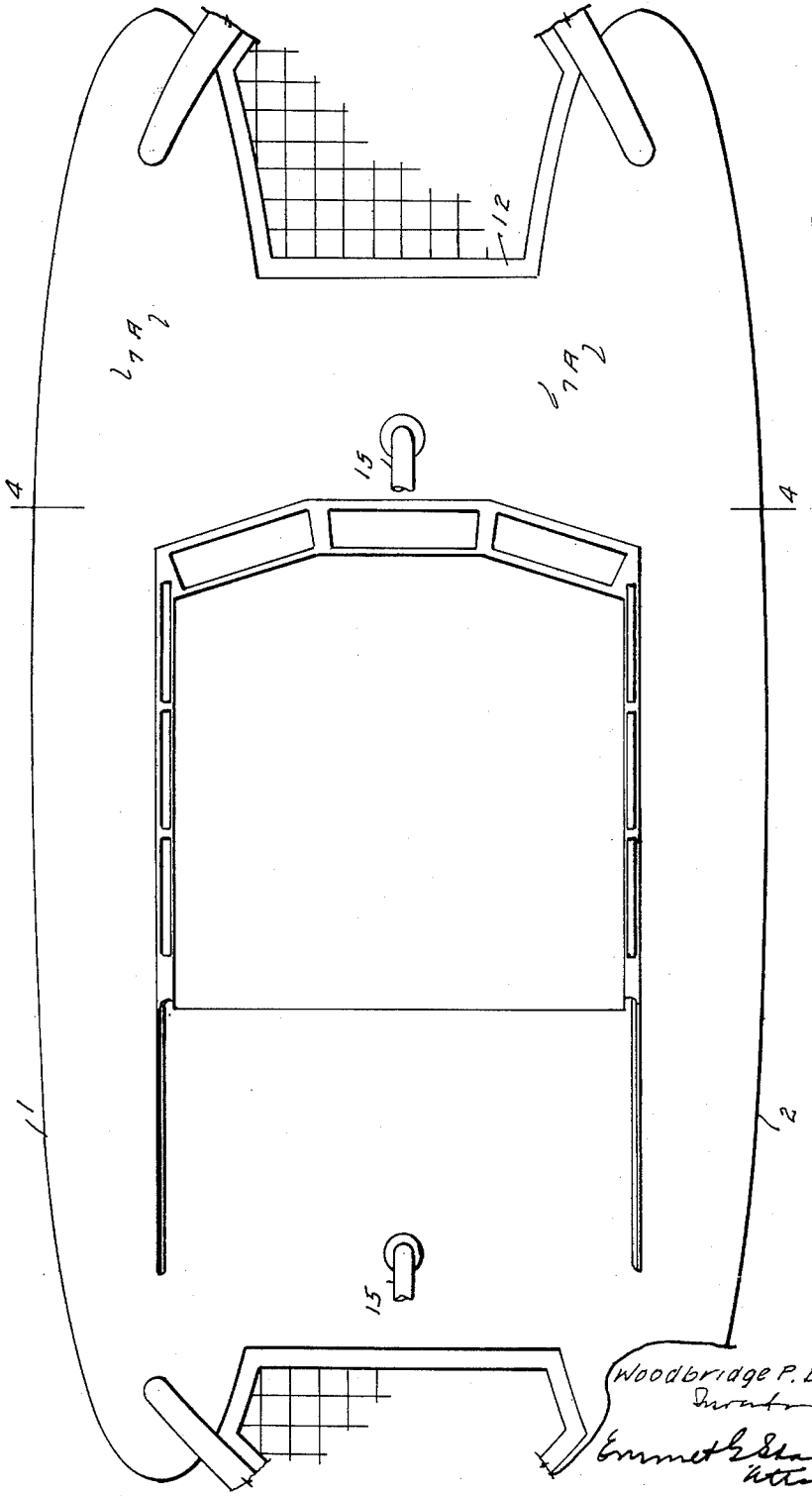


Fig. 1.

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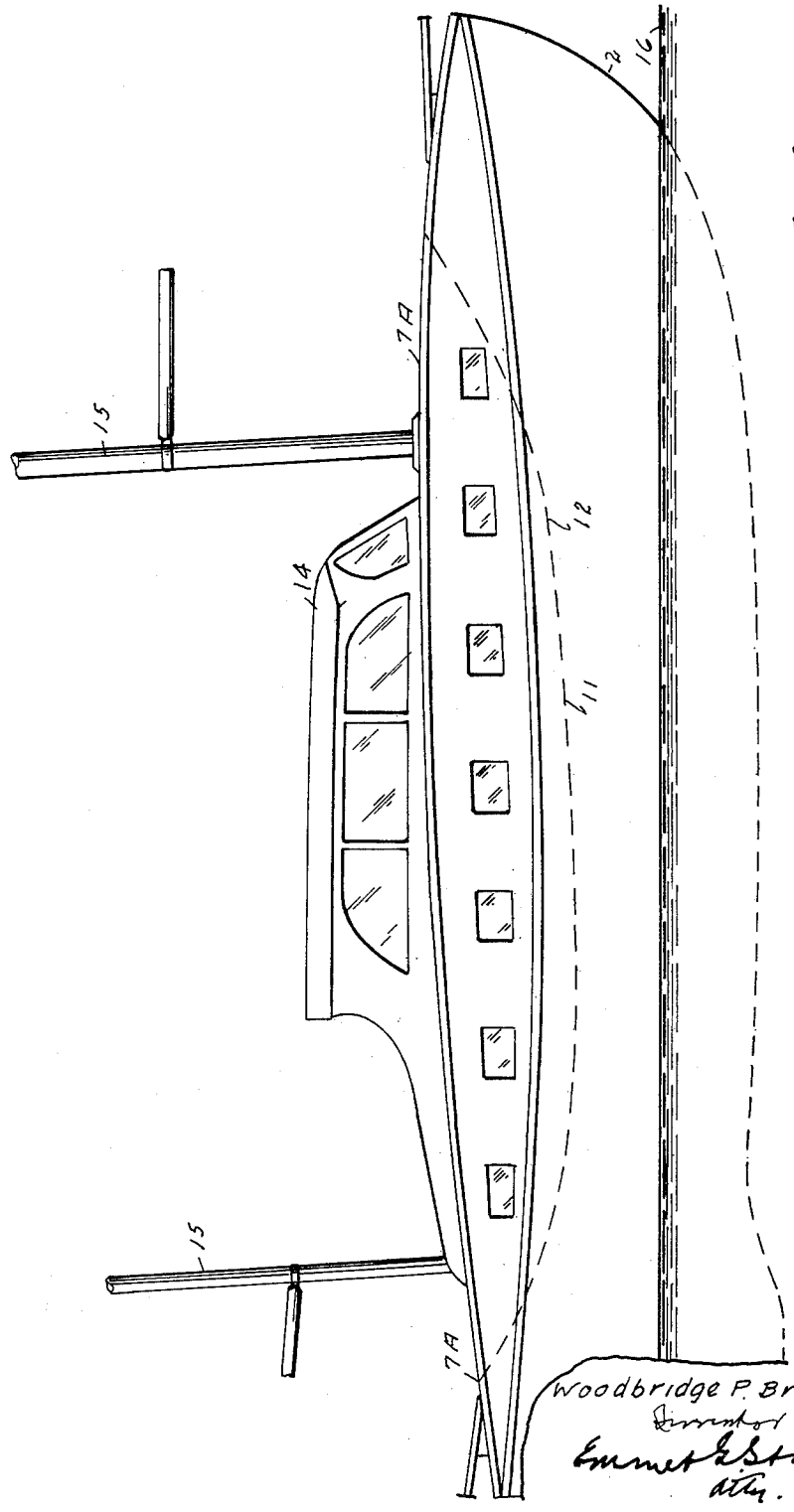


Fig. 2.

Woodbridge P. Brown
Inventor
Emmet L. Stack
Atty.

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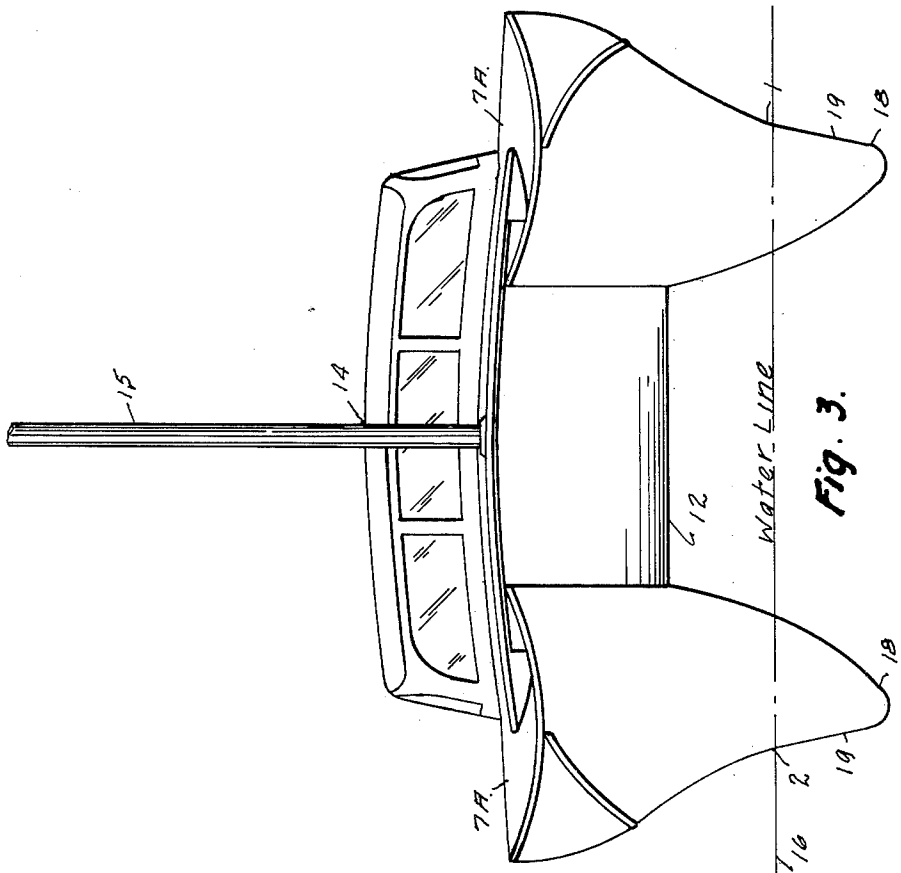


Fig. 3.

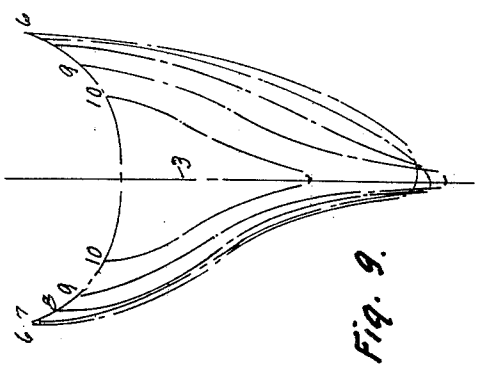


Fig. 9.

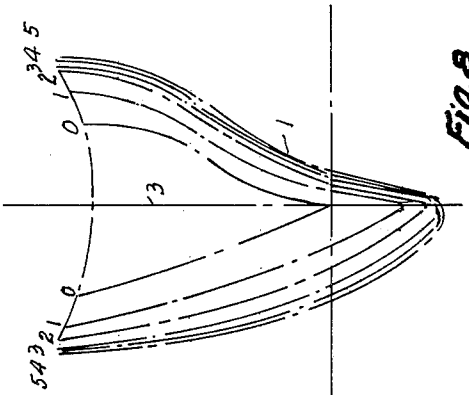


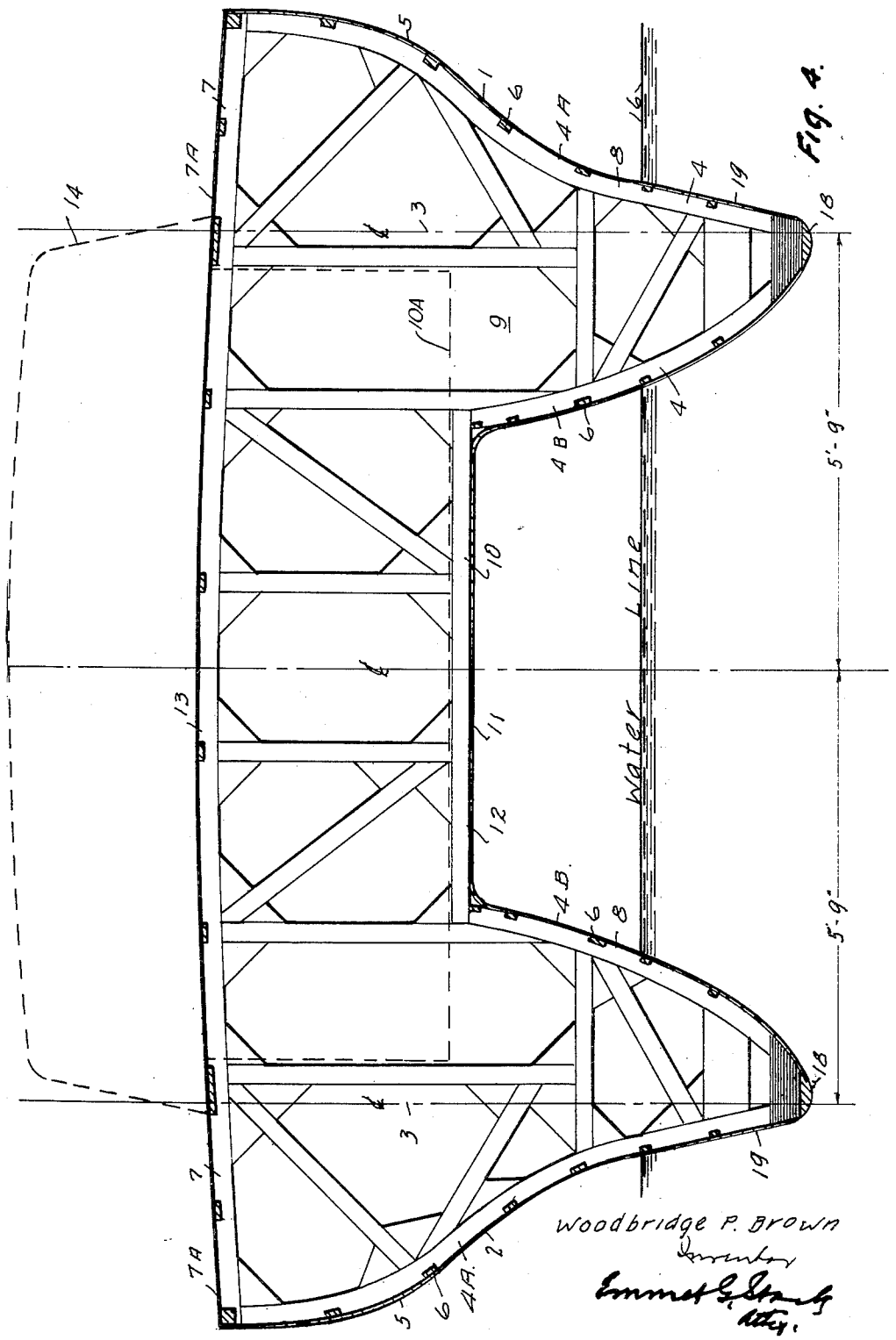
Fig. 8.

Woodbridge P. Brown
Inventor
Emmet G. Stack
Atty.

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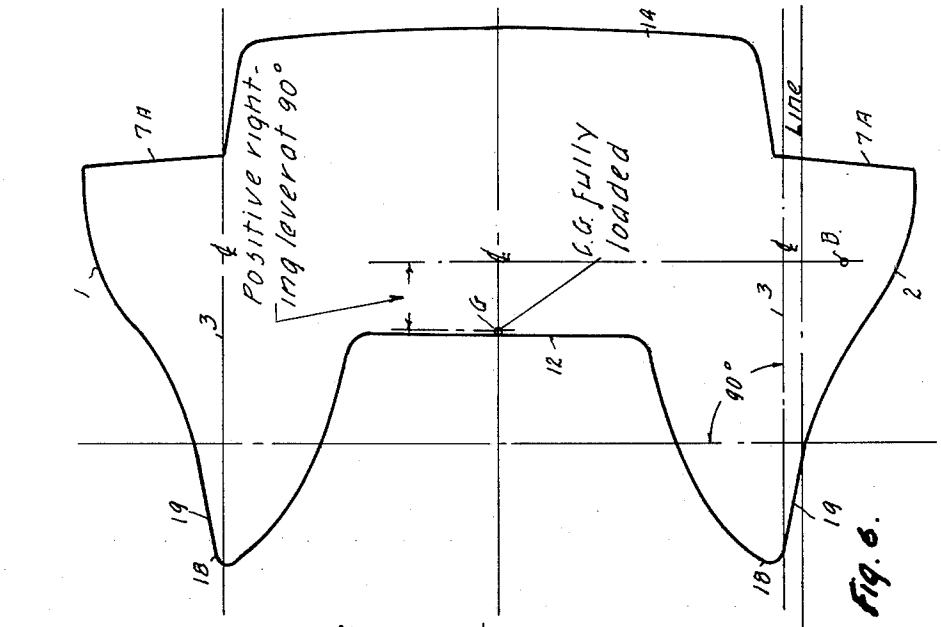


Fig. 6.

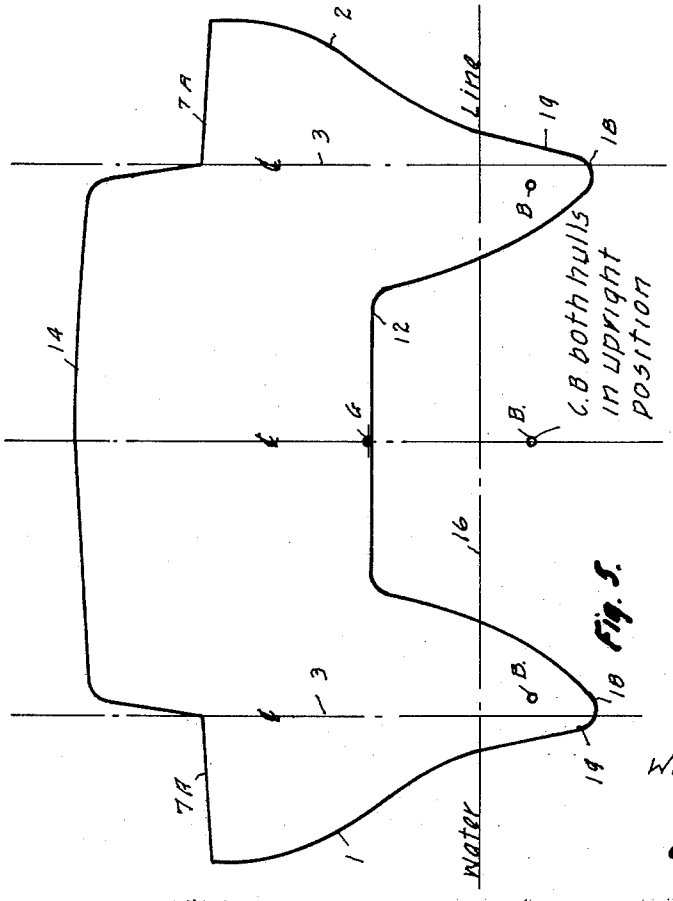


Fig. 5.

Woodbridge P. Brown
Inventor
Emmet G. Stark
Atty

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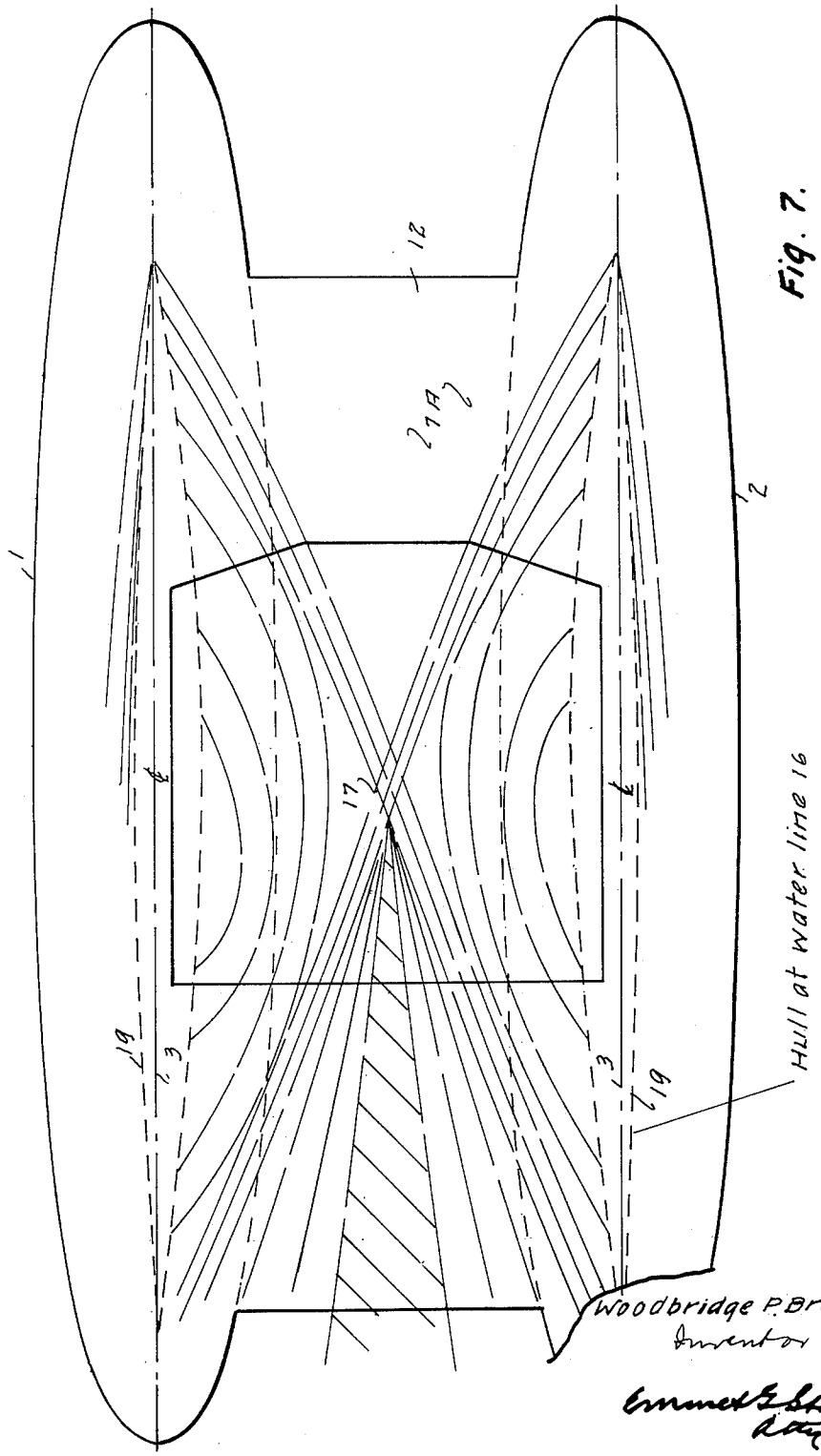


Fig. 7.

Woodbridge P. Brown
Inventor

Emmett E. Steed
Atty.

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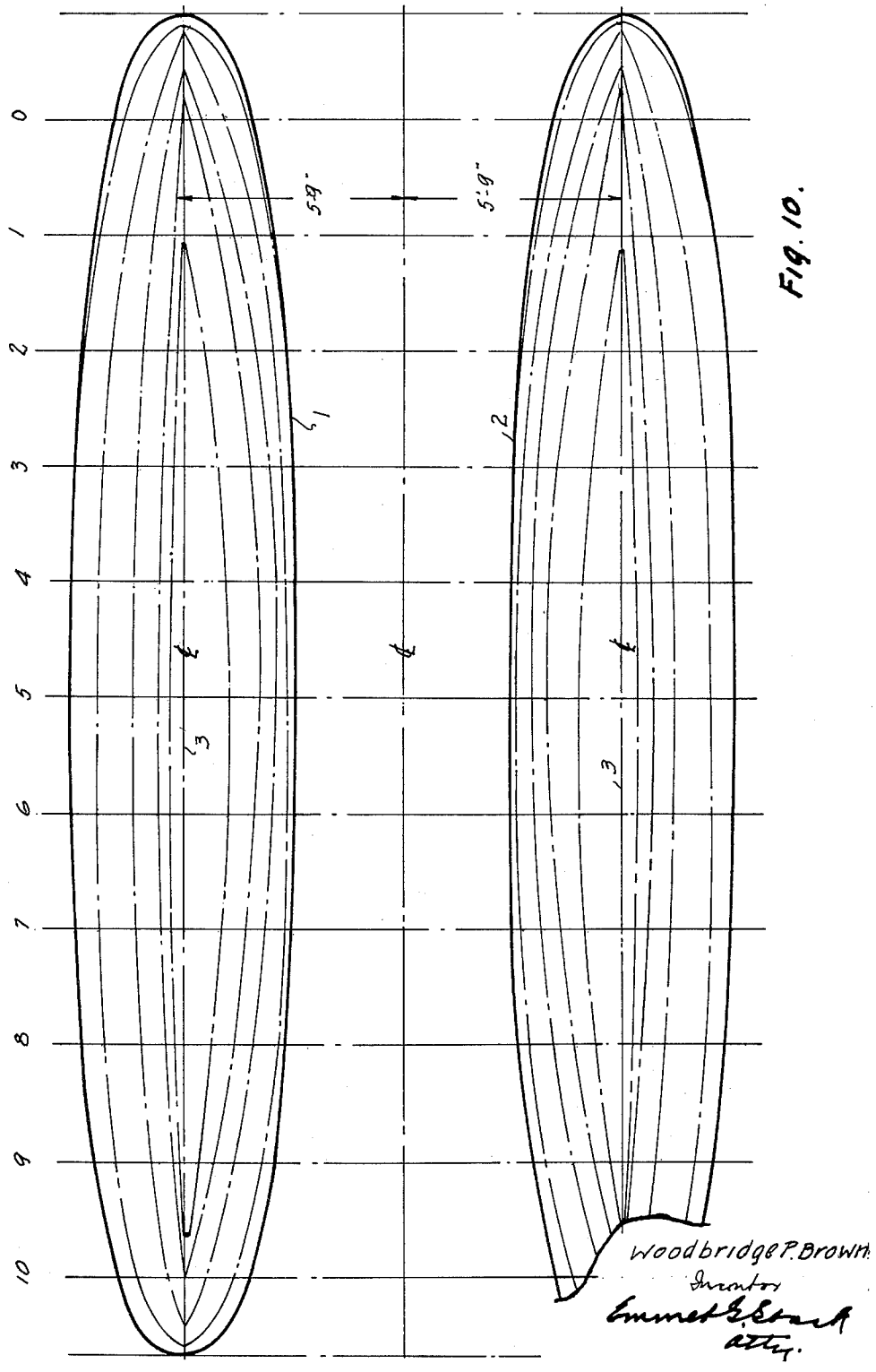


Fig. 10.

Woodbridge P. Brown
Inventor
Emmet E. Ebert
Atty.

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3,016,861

CATAMARANS

Woodbridge P. Brown, 3716 Campbell Ave., Honolulu, Hawaii

Filed Sept. 4, 1959, Ser. No. 838,176
5 Claims. (Cl. 114—61)

My invention relates to sailing craft having spaced hulls tied together by a deck there-between and known to the public as a catamaran.

These two-hull craft are very speedy, much speedier than ordinary single-hull craft, but are at the same time readily capsized.

The principal objective of my invention is to provide a speedier craft and one which is not readily capsized.

This dual objective of my invention is had in the way the hulls are formed and joined together.

In order to more clearly bring out the present improvement a brief résumé of a catamaran structure is believed to be in order.

Catamaran hulls are usually built symmetrical about their vertical center line. These symmetrical hulls require the use of deep keels, center-boards, or lee boards in order to minimize the tendency of the hull to move sidewise in the direction of the wind acting on the sail.

Another objective is to dispense with deep keels, center-boards, or lee-boards, and still prevent much of this tendency to drift leeward. This movement to leeward when the boat is moving forward sets up a drag on the hull and reduces speed.

One of the disadvantages of the catamaran is its tendency to capsize when the wind pressure against its sail overcomes its stability. This is due to the relatively low center of buoyancy of the hulls.

Therefore, it is a further objective of my invention to raise this center of buoyancy as the hull tends to capsize.

When the hull keels over at an angle of 90 degrees or thereabout the center of buoyancy remains higher than the center of gravity thus creating a continuing righting movement.

A still further objective of my invention is to provide a hull in which the tendency to heel over is continuously resisted by an inherent tendency to right itself.

How these objectives are accomplished will now be minutely described and illustrated in the accompanying drawings of which FIGS. 1, 2, and 3, thereof, are mere outline drawings of the plan, side elevation and end elevation of the catamaran with a minimum of detail. FIG. 1 is the plan view; FIG. 2 is the side view; and FIG. 3 is the end view; FIG. 4 is an enlarged vertical section developed on the line 4—4 of FIG. 1; FIG. 5 is a diagrammatic drawing showing the relationship of the center of gravity to the center of buoyancy when the catamaran is normally upright in the water; FIG. 6 is a similar diagrammatic drawing showing the above relationship when the catamaran is heeled over at 90 degrees; FIG. 7 is a diagrammatic plan showing the movement of the bow waves as they merge and pass between the hulls when the boat is moving forward; FIG. 8 shows the development of the hull lines looking aft; FIG. 9 shows the development of the hull lines looking forward, and FIG. 10 shows the longitudinal lines of a hull.

Thruout the drawings and the specification similar numerals refer to similar parts.

Since this invention is directed to those skilled in the boat-building art it is assumed that these men are competent to develop the lines and detail of a desired catamaran within the scope of the invention described and claimed. As a consequence all detail that is not absolutely necessary to carry out the invention has been omitted.

The hulls 1 and 2 of the catamaran of my invention differ from the ordinary catamaran hulls in that they are not symmetrical about their vertical center line but on the contrary are asymmetrical about said line 3 as shown in FIG. 4. FIGS. 8, 9, and 10 show the development of the hulls of the catamaran and each frame thereof. The vertical curvature or contour of each rib or frame side with relation to the vertical centerline 3 is shown on FIGS. 8 and 9 while FIG. 10 shows the position of each frame in the hull. In other words, FIGS. 8 and 9 show that the vertical curvature or contour of one frame, as 5, differs from that of an adjacent frame, as 4 or 6, and that the vertical curvature or contour of each frame is different on each side of the vertical centerline 3. The reason for the asymmetrical hulls will be apparent as we proceed.

The hulls 1 and 2 include the ribs 4 covered by the skin (as plywood) 5 which is stretched over the longitudinal battens 6 recessed into the ribs 4 as to be flush with the exterior surface thereof. As is known to those skilled in the boat-building art the outboard rib portion 4A and the inboard rib portion 4B, when joined together by the deck beam 7 constitute a frame 8. Desired frames 8 may be sheathed laterally to form diaphragms 9 which serve to strengthen the hulls and form water-tight compartments in said hulls. FIG. 4 shows how these frames 8 may be braced.

The spaced hulls 1 and 2 of the catamaran are tied together at the frames by the bottom tie members 10 positioned along a line as 11, shown in FIG. 4, to form the floor 10A of the intermediate or tie portion 12. See FIGS. 3 and 4 too. The upper members 13 of the intermediate tie portion 12 may be sheathed over as a continuance of the deck portion 7A of the hulls 1 and 2. Desired portions of this intermediate tie portion 12 may be formed and covered to provide a cabin 14 as suggested by the dotted outline in FIG. 4. This intermediate tie portion 12 also provides support for the catamaran mast 15. It is to be noted in FIG. 4 that this intermediate tie portion 12 bridges the two hulls 1 and 2 at a point considerably above the water line indicated at 16 in said figure. This FIG. 4 clearly shows the relation of the hulls 1 and 2 to each other and to their respective vertical centerlines 3 which are on 11′ 6″ centers in a 34′ catamaran.

The inboard rib portion 4B of each hull, as shown in FIG. 4, is smoothly curved up to the junction with the bottom tie member 10 of the intermediate tie portion 12, with the curvature of each inboard rib portion 4B being oppositely curved with respect to the other. Since the two spaced hulls 1 and 2 are similarly but oppositely curved longitudinally too it is apparent from a perusal of FIG. 7 that a plane between the hulls at the waterline would have the general configuration of a Venturi throat. As a consequence the bow wave from one hull is deflected toward the bow wave from the other hull. When the catamaran is moving slowly the bow waves converge at approximately the most constricted portion of the throat 17, and as the catamaran speeds up the convergence takes place further aft of said most constricted portion. The inboard side of my catamaran hulls have a greater longitudinal curvature than the outboard side thereof hence a low pressure area is built up adjacent the inboard sides and the water fills in the suction or vacuum area created to the rear of the throat 17. The result is that the speed of the catamaran forward is increased. FIG. 7 has indicated thereon the longitudinal lines of the hull at the water line and their relation to the centerlines of the hulls.

The formation of the outboard rib portion 4A, and in-

cidentally the hull side, is entirely different from the formation of the inboard rib portion 4B, and incidentally the hull side. Starting at the lowest or keel end 18 of the hull the outboard rib portion 4A rises upwardly to approximately the water line 16 in a substantially straight line deflected from the vertical hull center line 3. At approximately the water line 16 the outboard rib portion 4A starts to curve outwardly and upwardly and then back approximately parallel to the center line 3 before it reaches the deck line 7A.

This straight face portion 19 below the water line 16 serves to minimize the drift to leeward against the action of the wind against the sail as the catamaran moves forward. As a consequence the means now employed to minimize this drift, such as deep keels, center-boards, and lee-boards may be dispensed with. When the above mentioned means are dispensed with the drag on the hull they create is also dispensed with. As a result the speed of the catamaran is increased.

The bulging curvature of the outboard rib portion 4A, described above, permits the center of buoyancy to be positioned outboard from the vertical center line 3 and above the center of gravity. These centers are designated by the numerals B and G, respectively, in FIGS. 5 and 6. Just what takes place when the catamaran starts to heel over is clearly illustrated in the above figures without further description.

In addition to the safety feature the bulging structure shown and described permits another advantage to be had, namely, additional cubic hull content without adding to the beam of the hull at the water line.

It is believed that one skilled in the boat-building art may adapt my invention, set forth in the appended claims, to catamarans of greater or less length and beam, therefore,

I claim all that comes fairly within the scope of said appended claims.

I claim:

1. A catamaran hull having both sides thereof vertically curved with the sides asymmetrical to the vertical center line of said hull and both sides horizontally curved with the sides asymmetrical to the longitudinal center line of the hull said horizontal curvature being continuous from stem to stern and said longitudinal center line being straight from stem to stern.

2. A catamaran having a pair of hulls spaced apart laterally one from the other and having their adjacent inboard sides similar in configuration and their outboard sides of similar configuration but of a configuration different from the configuration of the inboard sides both sides of each hull being vertically curved and asymmetrical to the vertical center line of said hull and horizontally curved with the sides asymmetrical to the longitudinal centerline of the hull said horizontal curvature being continuous from stem to stern and said longitudinal center line being straight from stem to stern.

3. A catamaran having a pair of hulls spaced apart laterally and means to tie said hulls together, including a deck portion positioned above the water line when the hulls are afloat, said hulls having similar oppositely disposed inboard sides convexly curved vertically from keel to bottom of the deck portion and convexly curved longitudinally from stem to stern and having similar oppositely disposed outboard sides convexly curved longitudinally from stem to stern said outboard sides having a straight flare from keel to water line and a reverse curve from the water line to the deck portion the convex portion of said reverse curve being adjacent the deck portion.

4. A catamaran having a pair of hulls spaced apart laterally and connected above the normal water line by a deck portion, the center of gravity of the hulls and deck portion being above said water line when the hulls are afloat in an upright position with the center of buoyancy below said water line, said hulls having similar oppositely disposed inboard sides convexly curved vertically from keel to deck portion and convexly curved longitudinally from stem to stern and having similar oppositely disposed outboard sides convexly curved longitudinally from stem to stern, said outboard sides having a straight flare from keel to the water line and a reverse curve from the water line to the deck portion the convex portion of said reverse curve being adjacent the deck portion said last named convex curvature encompassing a hull portion which when submerged brings the center of buoyancy below and ahead of the center of gravity whereby the center of gravity acts to provide a positive righting moment to return the catamaran to its former position.

5. A catamaran having a pair of spaced asymmetrical hulls oppositely disposed, each hull having a plurality of pairs of ribs each pair of said ribs being joined top and bottom to form a frame each outer face of which has a vertically curved contour, the contour of one side of said frame differing from the contour of the opposite side of said frame both contours being equally spaced from the hull centerline at the top of the frame only, the frame contour on the inboard side of the hull being substantially convex throughout and the frame contour on the outboard side of the hull having an outwardly flared bottom portion and a convex top portion said portions being joined by an intervening outwardly flared concave portion.

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