

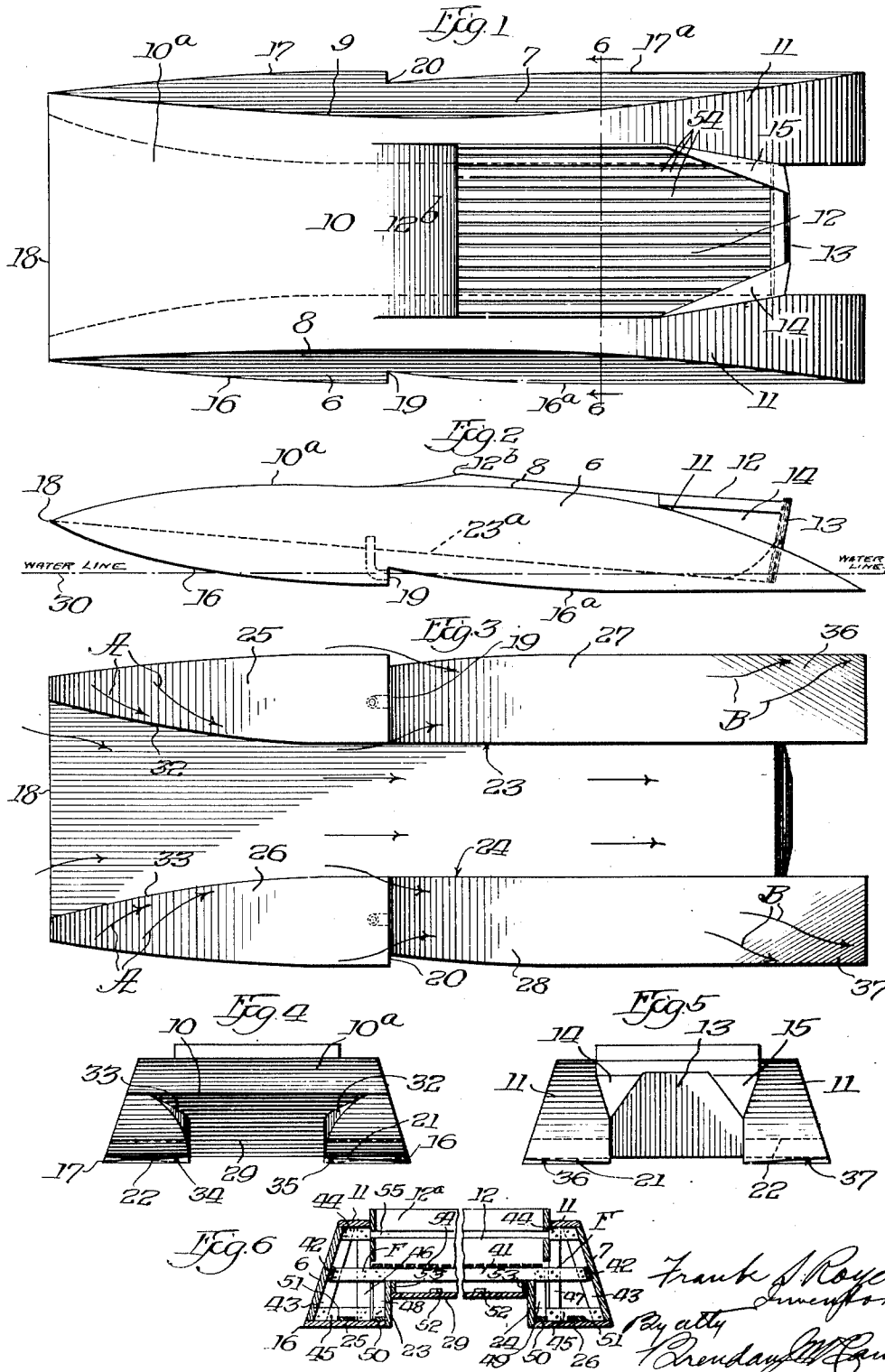
May 7, 1929.

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1,712,281

HULL FOR SPEED BOATS

Filed July 5, 1928



## UNITED STATES PATENT OFFICE.

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## HULL FOR SPEED BOATS.

Application filed July 5, 1928. Serial No. 290,437.

This invention relates broadly to water craft and more particularly to improvements in the hull construction thereof, more specifically to improvements in the type of hull suitable for use as a speed boat or so-called water-sled hull or for use as a pontoon or hull for seaplanes, flying boats and the like.

While for convenience in describing this invention, it is illustrated as a hull for what are commonly known as outboard water-sleds, it will be understood that the characteristics of the hull may be employed in the construction of pontoons and hulls for hydroplanes, airships, and, therefore, the invention finds a wide field of utility.

In the design of prior hydroplanes, speed boats, pontoons and hulls of watercraft and of seaplanes and the like known to me, these all possess more or less the defect of attempting to propel the hull through the water rather than on the surface thereof, without successfully overcoming either the inertia or the friction of the water and this will be observed upon watching the operation of nearly all so-called high speed watercraft, all known to me making a large swell or wake due to the power necessarily expended in pushing the hull through rather than on the surface of the water.

Attempts to overcome the inertia of the water and the friction thereof have been made, such for example as in providing steps in the bottom of the hull to cause the water to break away. However, these steps themselves cause suction and to avoid this I provide an improved arrangement of the steps and breather tubes therefor.

The principal objects and advantages of this invention reside in the provision of an improved hull for self-propelled vessels; the provision of an improved method of increasing the buoyancy of the hulls of vessels, particularly those of speed boats, hydroplanes and the like; the provision of an improved hull for vessels which operates to compress air therebeneath for increasing the buoyancy thereof in motion; the provision of a boat hull having means for compressing air therebeneath particularly below the locality of greatest weight; the provision of a boat hull wherein the shape of the topside deck thereof is such as to create a suction or lift when in motion tending to raise the hull, such lift preferably taking place at a point above the location of greatest weight; the provision of

a boat hull having runners or skids below the bottom thereof for reducing the actual area of contact between the hull and the water, and for relieving the bottom of water impact in motion; the provision of runners or skids on a boat hull which have surfaces tending to induce entrance of air beneath such skids and the bottom, and facilitating escape of the water at the forward and after portions, respectively; the provision of a boat hull having improved means for reducing surface of contact in motion between the hull and surface of the water; and the provision of an improved internal hull construction, which is sturdy and durable and highly efficient in operation.

The foregoing and such other objects and advantages as may appear or be pointed out as this description proceeds are attained in the structural embodiment illustrated in the accompanying drawing, in which:

Figure 1 is a top plan view of a hull of a boat incorporating the improvements of this invention;

Figure 2 is a side elevational view of the same;

Figure 3 is a bottom plan view;

Figure 4 is an elevational view looking at the bow;

Figure 5 is an elevational view looking at the stern and

Figure 6 is a transverse vertical sectional view taken on the line 6—6 of Figure 1 looking in the direction indicated by the arrows.

Referring now more particularly to the drawing, the hull 5 of a so-called sea-sled includes the slanting sides or strakes 6, and 7, which are each preferably a single plane extending the full length of the hull and having their upper margins connected at 8 and 9 to the deck 10.

It will be observed that the strakes have their upper edges 8 and 9 curved so as to approximate the upper camber or curvature of the wing of an airplane with the exception that the forward portion 10<sup>a</sup> of the deck is of a more gradual rise than that of an airplane wing, but that the after parts 11, 11 curve off somewhat sharply so that the curve of suction thus created by the forward motion of the vessel will be greatest adjacent and above the stern so as to assist in applying lift to the hull at its heaviest portion, that is, at the cockpit 12.

The cockpit has stern sheet planking 13 in

which a so-called outboard motor (not shown) may be suspended and fixed. The after side walls 14 and 15 of the cockpit are inclined or diagonal to the fore and after center line of the hull so as to give a streamline effect and also to reduce the athwartship dimension of the sternsheet 13, and thereby reduce the drag caused by suction at this point, which, in all other hulls for this purpose known to me, is of such dimension as to cause the water to tend to follow the hull and thus retard its forward movement.

The lower edges 16 and 17 of the sides 6 and 7, at their forward portions are curved upwardly to meet the downwardly curving edges 8 and 9, and deck 10, to form the stem 18, which, in this instance, is horizontal instead of vertical and made suitably watertight.

The lower edges of the sides 6 and 7 are stepped as at 19 and 20 for reducing the surfaces of contact between the bottom runners or skids, generally designated 21 and 22, and the surface of the water, the lower edges 16<sup>a</sup> and 17<sup>a</sup> being curved abaft the steps.

Upon reference to Figure 6, it will be seen that within the hull I provide auxiliary inboard sides or strakes 23 and 24 spaced from the sides 6 and 7 and complementary thereto, and connected by forward and after skid planking 25 and 26, and 27 and 28, respectively, the joints between the sides 6 and 7 and inboard sides 23 and 24, respectively, being made watertight in any approved manner. At the stern, the deck portions 11, 11 connect with planking 27 and 28 in a watertight joint. The contour of the inboard sides 23 and 24 is substantially that defined by the dotted line 23<sup>a</sup> and edge 16, step 19 and edge 16<sup>a</sup> as viewed in Figure 2, these sides extending the full length of the hull.

The sides 6 and 7, sides 23 and 24, and skid or runner planking 25, 26, 27 and 28 thus form runners or skids projecting below the true bottom 29 of the hull, which bottom is substantially uniform throughout and extends from the stem 18 to the sternsheet planking 13, which latter is preferably laminated to give additional strength and to prevent warping.

The dotted line 23<sup>a</sup> defines substantially the plane of the bottom which, it will be observed in Figure 2, is inclined upwardly and forwardly relatively to the trim of the hull when afloat and at rest, the water line being normally at about the dotted line 30. The function, of course, of disposing the bottom 29 inclined is three-fold namely, to lift the forward portion as much as possible out of contact with the water and thus remove shock on the same; to induce air to enter beneath the bottom, and, by virtue of the decreasing space toward the stern, obtain a compression of the air and thus tend to raise the after portion of the hull in the locality of greatest

weight and consequently greatest normal draft. To enhance the carrying out of these functions, the inboard sides 23 and 24 are curved outwardly as at 32 and 33 (Figures 3 and 4) and by virtue of the curvature of the joining edges 8 and 9 of deck and sides 6 and 7 and curved portions 32 and 33, the skids are thus tapered vertically as well as horizontally at their forward portions.

In order that air will be induced to flow inwardly at the forward portions of the runners and that the escape of water will be facilitated at the after portions thereof, the bottoms 25 and 26 of the runners are inclined inwardly and upwardly, as indicated at 34 and 35, (Figure 4) and the runner bottoms 27 and 28 are inclined outwardly and upwardly at their after ends, as indicated at 36 and 37, in Figures 3 and 5. This construction functions to cause air striking the surfaces 34 and 35 to be deflected inboard upon forward motion and the surfaces 36 and 37 facilitate planing of the after ends of the runners 27 and 28 by facilitating the escape of water from beneath the same. The operations explained above are indicated by the arrows A, A and B, B, respectively, in Figure 3.

It will be observed from an inspection of Figures 4, 5 and 6, that the sides 6 and 7 slant outwardly from top to bottom. I find that in actual operation that this tends to prevent sea water from climbing along these sides when the vessel is in motion, but, should an exceptionally large wave be encountered, the corners indicated at 16 and 17 will serve to groove the wave and prevent material pitching of the hull.

As to the interior detail construction, any convenient and sufficiently strong construction may be resorted to, but, for the sake of lightness and yet possessing the required strength and rigidity, I prefer to construct the hull interiorly, for example, as shown in Figure 6.

In Figures 1 and 6, the cockpit 12 is shown and this is defined by cutting the deck 10 and providing a combing 12<sup>a</sup> around three sides thereof, the deck having an upwardly inclined portion 12<sup>b</sup> which forms a wind-break for an occupant of the cockpit.

I provide a series of frames F in the hull comprising the athwartship members 41, which extend entirely across the hull and connect to longitudinals 42, 42 lying against and made secure to the side planking 6 and 7. The members 41 are in turn secured by copper or brass fittings, screws, nails or the like to the diagonal ribs 43, 43 which extend from the deck 10, or its portions 11, to the runner bottom planking 25 and 26, and, therefore, serve to strengthen and make rigid the sides 6 and 7. The ribs 43 are connected at their ends to the outboard ends of upper and lower brace members 44, 44 and 45, 45, which latter

have their respective inboard ends connected to inboard standing rib members 46 and 47, and thereby the members 44 and 45 serve to maintain rigid the deck portions and the planking 25 and 26.

Inboard standing ribs 48 and 49 lie against the inboard strakes or sides 23 and 24 and maintain these members rigid and are connected at their ends to the athwartship member 41 and to the lower brace members 45. Thus each frame structure is completed.

A plurality of inboard and outboard longitudinals 50, 50 and 51, 51 lie on the bottom planking 25 and 26 to which the longitudinals are secured by screws or the like.

The deck portions 11 are secured by screws at their outboard edges to the sides 6 and 7, the latter are connected by screws to the outboard edges of the planking 25 and 26, and the inboard sides 23 and 24 of the runners are secured by screws to the adjacent edges of the planking 25 and 26.

Longitudinals 52, 52 and 53, 53 lie on the bottom 29 and are secured by screws thereto and the longitudinals 53 are screwed to the sides 23 and 24, the member 41 of each frame resting on the top edges of the sides 23 and 24.

A foot boarding 54 may be nailed to the athwartship frame members 41 for an obvious purpose. It will be understood that the members 44, forward of the cockpit, extend entirely across the forward portion of the deck as indicated at 55 in Figure 6.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is:

1. In a boat hull, a bottom, and means for trapping and compressing air therebeneath for raising said hull throughout its length as it is propelled through the water, said means

including spaced runners having outwardly rising after bottom portions for permitting ready escape of water from beneath the same.

2. A boat hull having a configuration which in general cross-section is substantially the contour of an air-foil, and runners or skids also having a curvature substantially that of an air-foil, said runners being interrupted intermediate their ends for inducing the entrance of air therebeneath.

3. In a boat hull, a bottom, and a runner or skid associated therewith said runner having a supporting surface disposed below said bottom, and said runner having a step therein intermediate the ends thereof, and means for introducing air beneath said runner adjacent to said step.

4. In a boat hull, a bottom, and means for trapping and compressing air therebeneath for raising said hull throughout its length as it is propelled through the water, said means including spaced runners having inwardly rising forward bottom surfaces for inducing air to enter therebeneath, and having outwardly rising after bottom surfaces for facilitating the escape of water from beneath the same.

5. A boat hull having a sloping bottom and spaced runners or skids along the outboard edges thereof and extending below the plane of said bottom, said runners tapering toward the forward portion of said hull, steps in said runners permitting air to enter therebeneath, and the after bottom surfaces of said runners being flared upwardly and outwardly to hasten the escape of water laterally from beneath the same.

In testimony whereof, I have hereunto signed my name.

FRANK S. ROYER.