Sept. 29, 1942. K. M. BRIEN 2,296,977

HYDROPLANE HULL STRUCTURE

Filed March 3, 1941

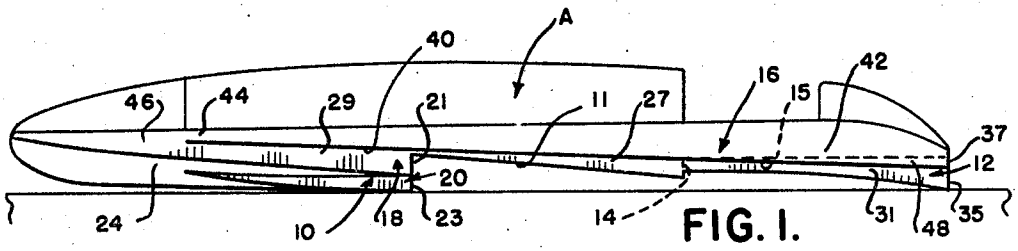


FIG. 1.

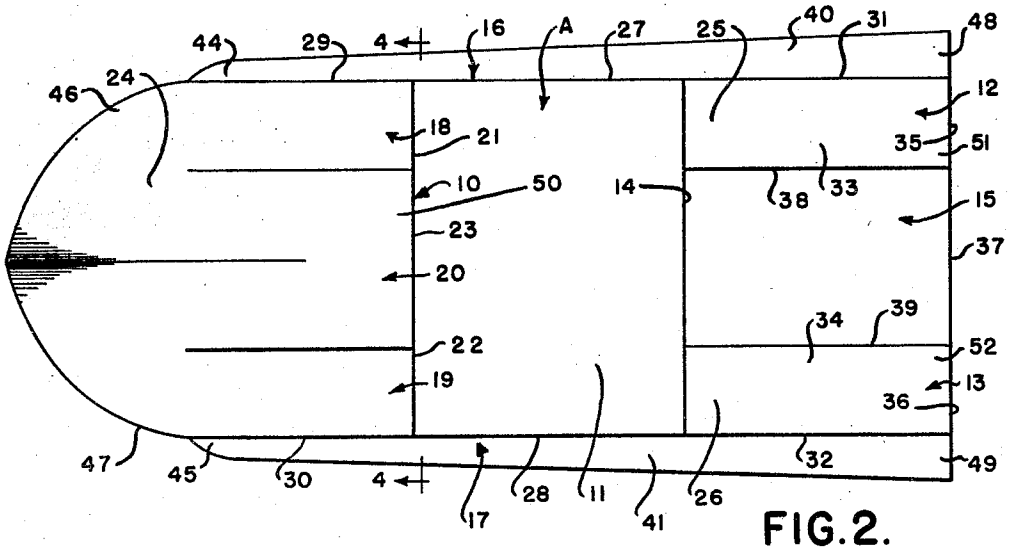


FIG. 2.

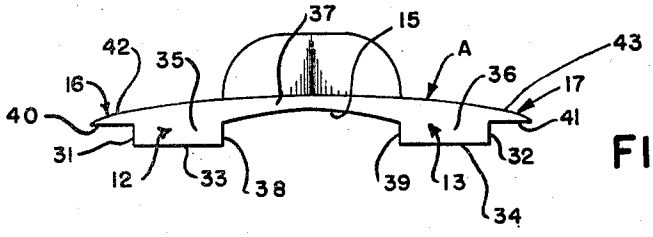


FIG. 3.

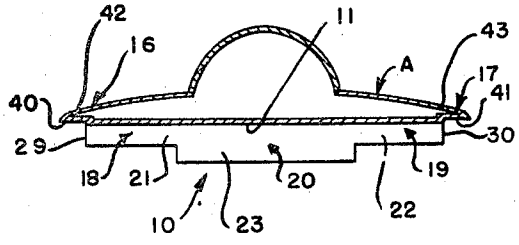


FIG. 4.

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HYDROPLANE HULL STRUCTURE

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5 Claims. (Cl. 114—66.5)

This invention relates generally to hull structures of boats and refers more particularly to the hull structure of hydroplanes and the like.

One of the essential objects of the invention is to provide a hull structure of this type having a three-point internal suspension that possesses all the good riding points of other boats, but has greater lift and stabilization characteristics. For example, the hull structure forming the subject-matter of this application acts like an outrigger on a canoe but is devoid of the laterally projecting side boards of such outrigger, hence the gravity side pull on the height of the hull has been accordingly very materially reduced. In other words, the suspension is underneath the boat and of such construction that the maximum efficiency for speed and good riding is obtained.

Another object is to provide a hull structure having suitable means such as laterally spaced runners constructed and arranged in such a way that they will provide a greater lift for the rear end of the boat and will reduce surface resistance to a minimum.

Another object is to provide a hull structure having a "tunnel back" or arched portion provided with upright side walls for stopping lateral skidding and to cut down the amount of friction, especially when making curves at relatively high speed.

Another object is to provide a hull structure having an arched or "tunnel back" portion that is constructed in such a way that it will cut down back pressure.

Another object is to provide a hull structure having relatively narrow wings extending lengthwise of the hull at opposite sides thereof to ride the air foam and to aid stabilization of the boat.

Another object is to provide a hull structure having a transversely extending step at the forward end of the "tunnel back" portion to assist the runners and a stepped structure adjacent the forward end of the boat to provide the proper stabilization and lift for the boat when changing from low to high speeds.

Another object is to provide a hull structure wherein the rearmost lower transverse edge portions of the stepped structure just mentioned and of the side runners constitute the riding points of and provide the proper stabilization for the boat when traveling at high speed.

Other objects, advantages and novel details of construction of this invention will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawing, wherein:

Figure 1 is a side elevation of a hull structure embodying my invention;

Figure 2 is a bottom plan view thereof;

Figure 3 is a rear end view thereof;

Figure 4 is a sectional view taken substantially on the line 4—4 of Figure 2.

Referring now to the drawing, A is a hydroplane hull embodying my invention provided on the underside thereof with a stepped structure 10, a substantially flat portion 11, side runners 12 and 13, a transverse step 14, an arched or "tunnel back" portion 15, and longitudinally extending side wings 16 and 17.

As shown, the stepped structure 10 is in advance of the center of the hull and comprises two longitudinally extending low steps 18 and 19, respectively, at opposite sides of the hull, and an intermediate longitudinally extending high step 20. Preferably such steps 18, 19 and 20, respectively, have substantially flush, upright, rear ends 21, 22 and 23, respectively, extending transversely of the hull adjacent the center thereof and taper forwardly from said rear ends to and merge with the shaped underside 24 of the hull at the forward end thereof. Depending upon circumstances, the depth of the steps 18, 19 and 20, respectively, at their rear ends may vary, but I have found that very satisfactory results are obtained when the depth of each of the low steps 18 and 19 is approximately three inches and the depth of the high step 20 is approximately six inches. Primarily the steps 18 and 19 are for low speeds while the step 20 is for high speeds.

The flat portion 11 spans the center of the hull from the flush rear ends 21, 22 and 23, respectively, of the steps 18, 19 and 20 to the transverse step 14 at the forward end of the arched portion 15. The flat portion 11 is equal in width to the stepped structure 10 and has opposite side walls 27 and 28 thereof substantially in alignment with the outer side walls 29 and 30, respectively, of the low steps 18 and 19. Preferably this flat portion 11 inclines downwardly and rearwardly from the stepped structure 10 to the transverse step 14.

The side runners 12 and 13 extend rearwardly from the transverse step 14 to the rear end of the hull. The outer side walls 31 and 32, respectively, of the runners 12 and 13 are substantially flush with and constitute rearward extensions of the side walls 27 and 28 of the flat portion 11, while the bottom faces 33 and 34, respectively, of

said runners are curved longitudinally throughout their length as illustrated in Figure 1. The rear upright ends 35 and 36, respectively, of the runners are substantially flush with the straight upright rear end 37 of the hull. The inner upright side walls 38 and 39, respectively, of the runners are straight and constitute the side walls of the intermediate transversely arched or "tunnel back" portion 15 which in the present instance extends lengthwise of the hull from the transverse step 14 to the rear end 37 of the hull. As shown, the outer and inner side walls 31, 32, 38 and 39, respectively, of the runners taper forwardly from the rear end 37 of the hull to the transverse step 14, while the side walls 27 and 28, respectively, of the flat portion 11 taper forwardly from the transverse step 14 to the rear end of the stepped structure 10.

The step 14 extends transversely of the hull from one side to the other of the flat portion 11 at the forward ends of the runners 12 and 13 and intermediate "tunnel back" portion 15 and assists said runners and the stepped structure 10 to provide the proper lift and stabilization for the boat when changing from low to high speeds.

The side wings 16 and 17 are relatively narrow and extend longitudinally of the hull from points adjacent the forward ends of the low steps 18 and 19 to the rear end 37 of the hull. Preferably the bottom surfaces 40 and 41, respectively, of these wings are flat throughout their length and extend along the outer side walls of the low steps 18 and 19, of the flat portion 11, and of the runners 12 and 13, while the top walls 42 and 43 thereof are flush with and curve downwardly and outwardly from the top of the hull to the outer side edges of said wings. The forward ends 44 and 45, respectively, of the wings curve into the curved side walls 46 and 47 of the hull at its forward end, while the rear ends 48 and 49, respectively, of the wings are straight and substantially flush with the upright rear end 37 of the hull.

Thus, from the foregoing it will be apparent that the lower surfaces of the stepped structure 10 and flat portion 11 incline downwardly and rearwardly relative to the lower faces 40 and 41 of the side wings; that the lower surfaces of the side runners are curved longitudinally throughout their length; and that the rearmost transverse lower edge portions 50, 51 and 52, respectively, of such stepped portions and runners constitute a three-point internal suspension upon which the hull rides at high speed. When making curves at high speed, the inner side walls 38 and 39 of the runners serve effectively to prevent lateral skidding. The "tunnel back" or arched portion 15 cuts down back pressure. When changing from low to high speeds, the transverse step 14 assists the stepped portion 10 and runners 12 and 13 to provide the proper stabilization. The wings 16 and 17 ride the air foam and cooperate to stabilize the hull at its rear end. Thus, all of the features of the hull structure lend themselves to greater and better stabilization.

What I claim as my invention is:

1. A hull structure comprising a hull provided on the underside thereof with a stepped portion, a substantially flat portion, side runners, a tunnel back or arched portion, and a transversely extending step, the stepped portion being adjacent the forward end of the hull, the flat portion being intermediate the stepped portion and side runners, the said side runners extending from the flat portion to the rear end of the hull, the tunnel back or arched portion being between and extending lengthwise of the side runners, and the transversely extending step being at the forward end of the tunnel back or arched portion.

2. A hull structure comprising a hull provided on the underside thereof with a stepped portion, a substantially flat portion, and side runners, the stepped portion being adjacent the forward end of the hull and including low steps extending lengthwise of the hull at opposite sides thereof and a higher step extending lengthwise of the hull between the low steps, the side runners being at the rear end of the hull, and the flat portion being intermediate the stepped portion and side runners, the flat portion being above the stepped portion, and the lower faces of the side runners being curved longitudinally throughout their length.

3. A hull structure comprising a hull provided on the underside thereof with a stepped portion, and a tunnel back or arched portion, the stepped portion including two low steps and one intermediate high step extending lengthwise of the hull adjacent its forward end, and the tunnel back or arched portion extending lengthwise of the hull at its rear end.

4. A hull structure comprising a hull provided on the underside thereof with a stepped portion, a tunnel back or arched portion, and a transversely extending step, the stepped portion including two low steps and one intermediate high step extending lengthwise of the hull adjacent the forward end thereof, the tunnel back or arched portion extending lengthwise of the hull at its rear end, and the transversely extending step being at the forward end of the tunnel back or arched portion.

5. A hull structure comprising a hull provided on the underside thereof with a stepped portion, a flat portion, side runners, and side wings, the stepped portion being at the forward end of the hull, the side runners being at the rear end of the hull, the flat portion being intermediate the stepped portion and side runners, and the side wings extending lengthwise of the hull from points adjacent the forward end of the stepped portion to the rear end of the hull, the lower faces of the side wings being substantially flat, the lower faces of the stepped portion and flat portion respectively inclining downwardly and rearwardly relative to the flat low faces of the side wings, and the lower faces of the side runners being curved longitudinally.

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