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INBOARD MOTORBOAT HULL OF THE PLANING TYPE HAVING A CAVITATION PLATE

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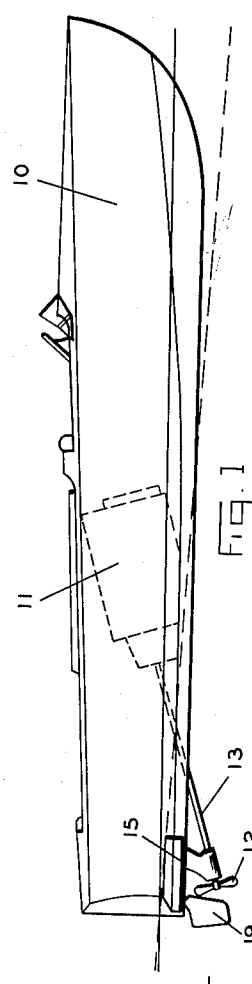

Fig. 1

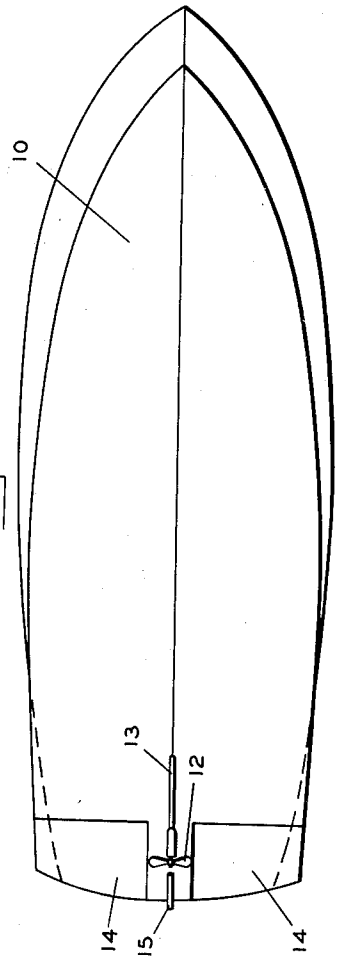

Fig. 2

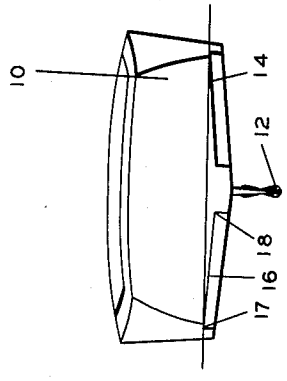

Fig. 3

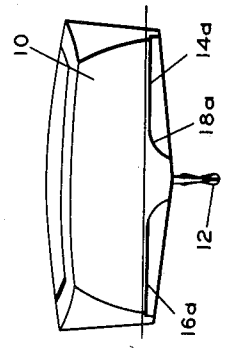

Fig. 4

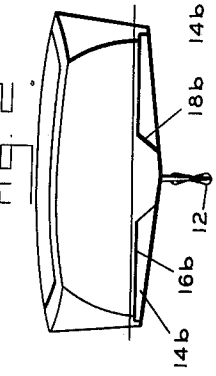

Fig. 5

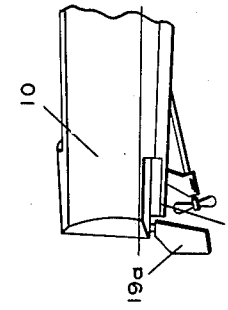

Fig. 6

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INBOARD MOTORBOAT HULL OF THE PLANING TYPE HAVING A CAVITATION PLATE

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7 Claims. (Cl. 114—66.5)

My invention relates to an inboard motorboat. It has to do, more particularly, with the design and construction of the hull of a motorboat of the inboard motor and planing type.

In ordinary small planing inboard motorboats, the balance point is too far forward when loaded with the crew ahead of the motor which is generally located just aft of an amidship position. This necessitates compromise designing to carry the load which results in poor planing performance, suction under the stern, and a generally bow-heavy performance, which, in some cases, becomes very dangerous.

It is the main object of my invention to provide a motorboat hull for an inboard motor planing type boat of such design that the center of buoyancy is shifted far enough aft in the boat to permit designing the boat with a straight keel with parallel bottom lines and with a light buoyant bow.

According to my invention I provide in the bottom of the boat at the stern two cut-outs or upward indentations which are open at their outer and rear sides. Between these two cut-outs, a narrow plane consisting of an extension of the dynamic support portion of the hull bottom continues on towards the stern and functions as an anti-cavitation area over the propeller and drive-shaft as well as to provide a convenient mounting location for the drive-shaft structure and the rudder. This arrangement has the effect of shifting the balance point of the supporting portion of the hull bottom, when at planing speed, back a distance equal to the fore-and-aft length of the cut-outs. Also, the weight of the hull over these cut-outs acts as an additional lever, when at planing speed, to move the balance point even farther aft.

The preferred embodiment of my invention is illustrated in the accompanying drawing wherein similar characters of reference designate corresponding parts and wherein:

Figure 1 is a side elevational view of an inboard motorboat constructed according to my invention.

Figure 2 is a bottom plan view of the boat of Figure 1.

Figure 3 is a stern view of the boat of Figures 1 and 2.

Figure 4 is a stern view illustrating a modification of the cut-outs at the stern.

Figure 5 is a view similar to Figure 4 and illustrating another modification of the cut-outs.

Figure 6 is a side elevational view of the stern portion of a boat illustrating a different arrangement for the cavitation plate, integral with the hull, and illustrating the associated rudder.

With reference to the drawing, Figures 1, 2 and 3 illustrate one form of my invention. The hull **10**, to achieve maximum performance, is designed with a straight keel and parallel bottom lines. The motor **11** is disposed in the usual location centered relative to the keel line and slightly aft of an amidship position. The motor **11** directly drives the propeller **12** in the usual way by the drive-shaft **13**.

According to my invention I provide at the stern, the

two cut-outs **14** in the bottom of the boat. These cut-outs open at their rear sides at the stern of the boat and at their outer sides at the outer sides of the boat. They are so arranged that they provide a narrow plane between them which acts as a cavitation plate **15** over the propeller **12** and shaft **13**. The cut-outs **14** are shown in Figures 2 and 3 as each having a flat top wall **16**, a forward wall **17** perpendicular thereto, and an inner wall **18** perpendicular to the top wall **16** and at right angles to the forward wall **17**. However, the cut-outs **14** need not be of this particular shape. For example, in Figure 4, I have shown cut-outs **14*a***, in which the inner side walls **18*a*** curve and merge with the top wall **16*a***. In Figure 5, I have shown still another type, in which the inner walls **18*b*** of the cut-outs **14*b*** are angularly disposed relative to the top wall **16*b***. In each case, however, the forward wall is at a sharp angle relative to the bottom of the boat.

The narrow extension of the dynamic support portion of the boat bottom, forming the cavitation plate **15**, may extend from the front of the cut-outs to the stern as shown in Figure 1 or, as shown in Figure 6, the integral cavitation plate **15*a*** may terminate short of the stern. With the arrangement of Figure 1, the rudder **19** is supported by and below the rear end of the cavitation plate **15** while with the arrangement of Figure 6 the rudder **19*a*** is supported independently of the cavitation plate **15*a*** and directly behind it.

It will be apparent that the two cut-outs **14**, **14*a*** or **14*b*** on the bottom of the boat begin at the stern and run forwardly a distance which is variable and depends on the length of the boat and its point of balance. Usually, this will be approximately 7% to 11% of total boat length. Heights of the cut-outs will vary according to boat length, draft and buoyancy desired when the boat is at rest in the water. The upper solid line in Figure 1 shows the water line when the boat is at rest. The narrow cavitation plate or strip extends from the front of the cut-outs to the stern, as shown at **15** in Figure 1, or, if desired, a partial distance from the front of the cut-outs to the stern, as shown at **15*a*** in Figure 6. This strip, which is an integral part of the hull can be of variable width as required to prevent air from interfering with the effectiveness of the propeller or rudder.

These cut-outs are not "steps" in the accepted sense of hydroplane terminology inasmuch as the trailing edges of the cut-outs do not offer any dynamic lift while the boat is under way. Instead, the entire area of these cut-outs becomes completely free of water contact once the boat reaches a reasonable planing speed, indicated by the lower dotted line in Figure 1, since the boat has a forward motion faster than the depressed area of water under the hull and can again rise to a level with the body of water surrounding the boat.

The purpose of my hull design is twofold:

1. To establish a center of buoyancy in relation to the planing portion of the hull (that which supports dynamic lift) further aft than is now possible with direct drive of engine to propeller and of conventional monoplane design. In relation to the entire length of the boat, the center of buoyancy in planing attitude will move back a distance somewhat greater than the fore-and-aft length of the cut-outs due to the weight of that part of the hull and its contents above the cut-outs. This weight acts as leverage to further move the planing balance point aft. With this new balance point, the forward portion of the hull will become lighter, creating a safer craft and also one that can absorb cleaner and swifter bottom lines than is now possible.

2. The cut-outs also eliminate static buoyancy, allowing the back portion of the hull to rest lower in the water and, consequently tend to allow the forward portion of the hull to float somewhat higher, thereby causing the

craft to rest with the keel more parallel with the water line of the craft. This improved attitude, when at rest, allows the craft to raise to a planing position with a lower overall bow raise than with conventional hulls and consequently minimizes the changes in attitude between at rest position in the water and at planing speed position in the water.

In summary, planing craft properly utilizing my hull arrangement will be faster than conventional monoplane motor boats, will be safer due to a lightened bow, and will have a more moderate change in attitude allowing greater visibility in allaround performance.

Various other advantages will be apparent.

Having thus described my invention, what I claim is:

1. A motorboat of the inboard motor and planing type comprising a hull having a pair of identical cut-outs in the bottom at its stern with a cavitation plate therebetween extending amidship from a line coinciding with the forward walls of said cut-outs towards the stern of the boat, said cavitation plate having a lower surface which is a continuation of the surface of the bottom of the hull, said cut-outs being open at their outer and rear sides and the forward wall of each cut-out being at an abrupt angle relative to the bottom surface of the hull, the stern of the cavitation plate also terminating at an abrupt angle relative to the lower surface thereof, and a propeller driven from the motor of the boat and located beneath said cavitation plate.

2. A motorboat according to claim 1 wherein the cavitation plate is an integral part of the hull.

3. A motorboat according to claim 1 wherein the cavitation plate terminates at the stern of the boat.

4. A motorboat according to claim 1 wherein the cavitation plate terminates at a point spaced ahead of the stern of the boat.

5. A motorboat according to claim 1 wherein the inner walls of the cut-outs merge with the cavitation plate.

6. A motorboat according to claim 1 wherein the inner walls of the cut-outs are at an abrupt angle relative to the cavitation plate.

7. A motorboat according to claim 1 wherein the inner walls of the cut-outs are angularly disposed relative to the cavitation plate.

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