May 21, 1946. W. A. RANDALL 2,400,782

WATERCRAFT

Filed Aug. 3, 1944 3 Sheets-Sheet 1

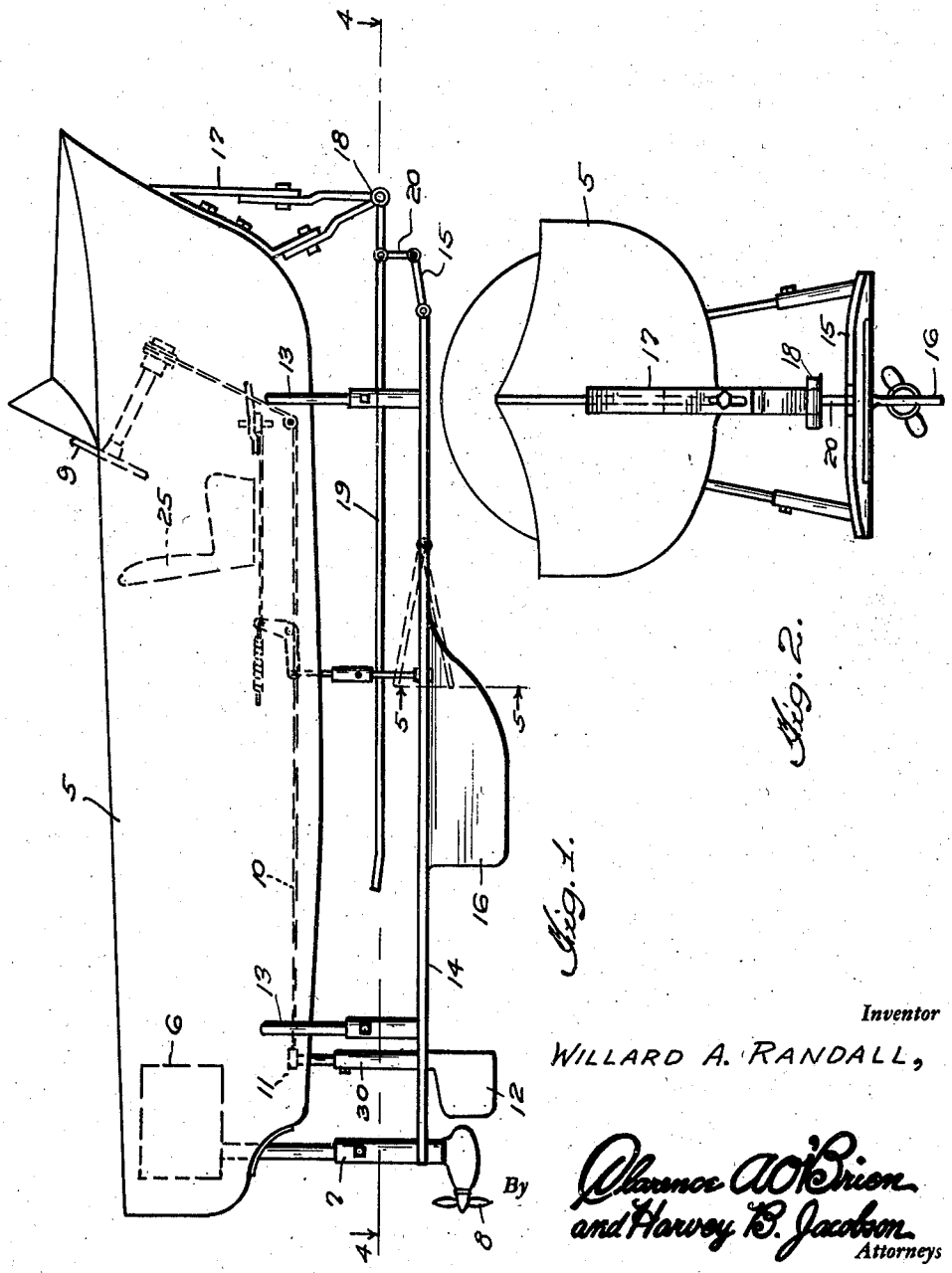


Fig. 2.

Fig. 1.

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WATERCRAFT

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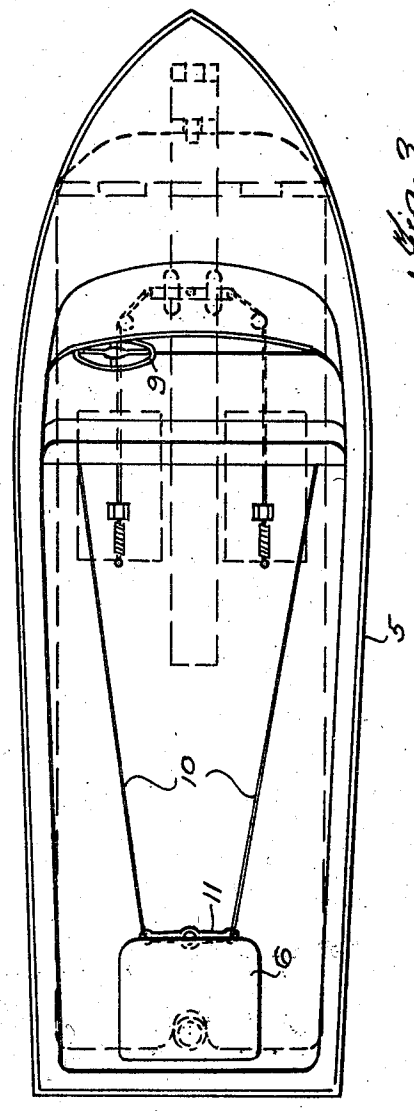


Fig. 3.

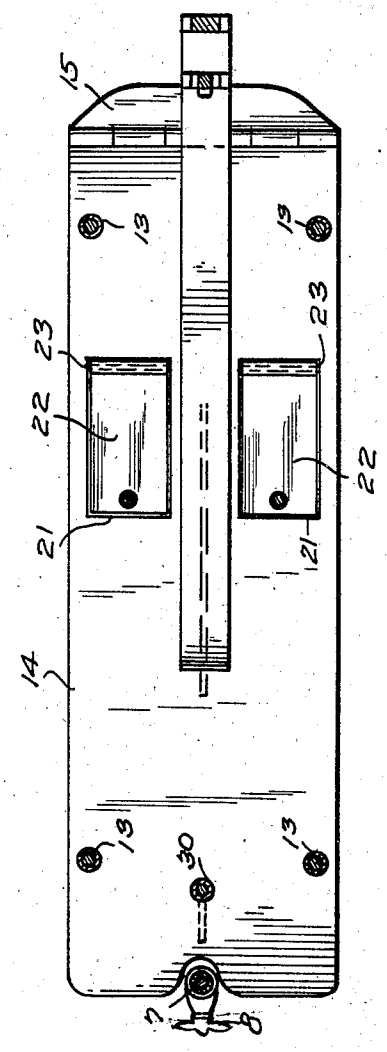


Fig. 4.

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WATERCRAFT

Filed Aug. 3, 1944 3 Sheets-Sheet 3

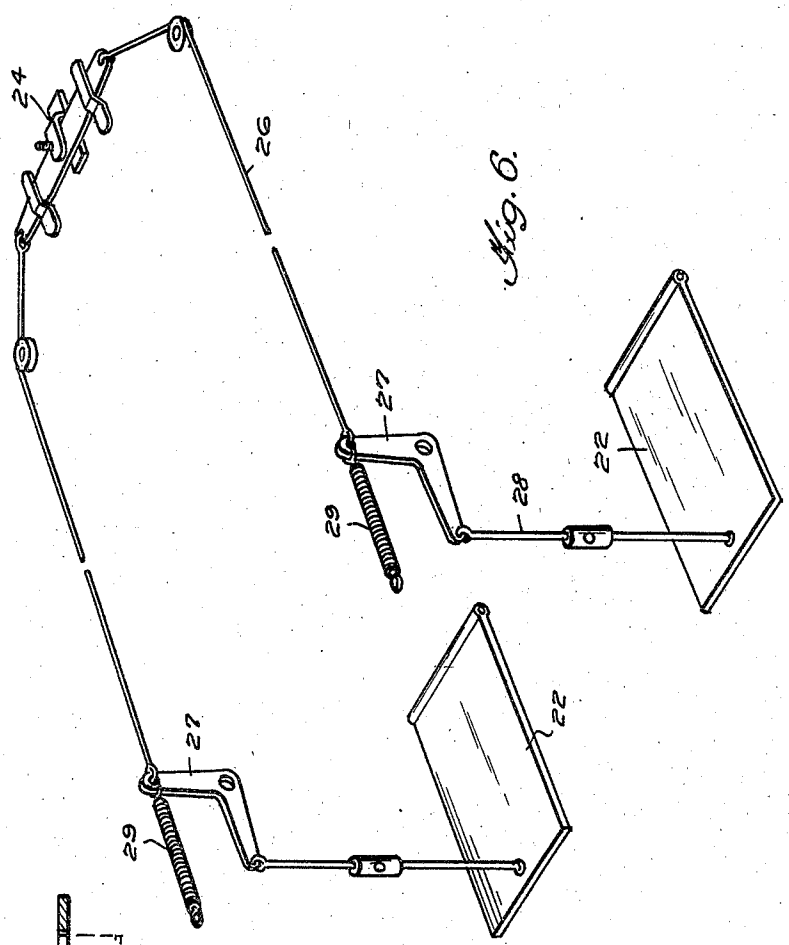


Fig. 6.

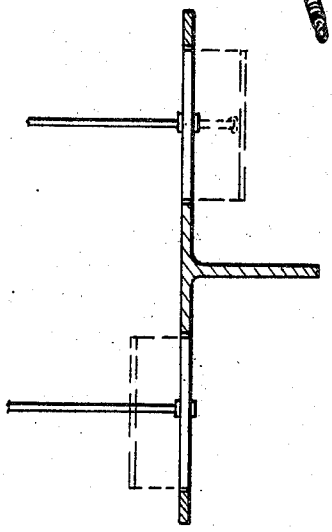


Fig. 5.

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2,400,782

UNITED STATES PATENT OFFICE

2,400,782

WATERCRAFT

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Application August 3, 1944, Serial No. 547,844

2 Claims. (Cl. 114—66.5)

This invention relates to a watercraft of the type provided with hydroplanes which, when the craft is driven ahead at a comparatively high speed, will lift the hull of the craft entirely out of the water.

The primary object of the present invention is to provide an improved watercraft of the above kind embodying a main hydroplane rigidly mounted in a substantially horizontal position beneath the hull and in spaced relation to the bottom of the latter, said main hydroplane having a vertically swinging hinged section at its forward end and being of a size to extend substantially from side to side and from bow to stern of the hull, and a ski hydroplane disposed longitudinally of and beneath the hull intermediate the latter and the main hydroplane, said ski hydroplane being hinged at its forward end to the bow of the hull for vertical swinging movement and being connected to the hinged front section of the main hydroplane so as to automatically adjust the latter as the speed of the craft increases.

Another object of the invention is to provide a watercraft of the above kind in which the main hydroplane is provided with a pair of vertically swinging flaps disposed in spaced side-by-side relation, and wherein means is provided, under control of the driver of the craft, for swinging said flaps in opposite directions respectively below and above the plane of the main hydroplane, so as to maintain the lateral stability of the craft in rough water and to aid in banking when making sharp turns.

A still further object of the present invention is to provide, in a watercraft of the above kind, means for vertically adjusting the hydroplanes relative to the hull so as to vary the distance between said hydroplanes and the hull in accordance with requirements as dictated by the size of the hull, the roughness of the water, etc.

Other objects and features of the invention will become apparent from the following description when considered in connection with the accompanying drawings, and the invention consists in the novel form, combination and arrangement of parts hereinafter more fully described, shown in the drawings and claimed.

In the drawings, wherein like reference characters indicate corresponding parts throughout the several views:

Figure 1 is a side elevational view of a watercraft constructed in accordance with the present invention.

Figure 2 is a front elevational view thereof.

Figure 3 is a top plan view of the same.

Figure 4 is a horizontal section taken on line 4—4 of Figure 1.

Figure 5 is an enlarged fragmentary transverse section taken on line 5—5 of Figure 1.

Figure 6 is a diagrammatic perspective view illustrating the hinged flaps of the main hydroplane and the actuating mechanism therefor.

Referring in detail to the drawings, the present watercraft includes a suitable hull 5 and is preferably powered by an inboard motor 6 having an extensible housed vertical drive shaft, as at 7, for the propeller 8. This is provided simply to regulate the depth at which the propeller 8 operates relative to the bottom of the hull 5. A suitable steering wheel 9 is operatively connected by cables 10 with the tiller 11 of a rudder 12 whose shaft is journaled in and extends upwardly through the bottom of the hull 5 adjacent the stern of the latter.

Fixed to opposite sides of the hull 5 adjacent the bow and stern of the latter are depending telescopic posts or struts 13 that are adjustable in length and that are fixed at their lower ends to a main substantially horizontal hydroplane 14 that is of a size to extend substantially from side to side of the hull, as well as substantially from bow to stern of the latter. The posts 13 rigidly support the hydroplane 14 in spaced relation to the bottom of the hull 5, and the distance at which the hydroplane 14 is spaced from the bottom of the hull may be adjusted by extending or collapsing the struts 13. The hydroplane 14 has a hinged vertically swinging section 15 at its forward end, and a stabilizing fin 16 is fixed to the under side of the hydroplane 14 at an intermediate point and centrally between the sides of the hydroplane 14. An adjustable bracket 17 is fixed to the bow of the hull 5 so as to depend below the latter, and hinged at its forward end to the bottom of the bracket 17, as at 18, is a ski hydroplane 19. The ski hydroplane 19 is disposed longitudinally of and centrally between the sides of the hull 5 and is also arranged between and spaced from the bottom of said hull and the main hydroplane 14. A link 20 operatively connects the hinged hydroplane section 15 with the ski hydroplane 19 adjacent its pivot 18, and the adjustable bracket 17 permits vertical adjustment of the hydroplane 19 so as to obtain the desired relationship between the latter and the hinged section 15 of the main hydroplane 14.

At an intermediate point, the main hydroplane 14 is provided with a pair of openings 21 disposed in spaced side-by-side relation, and disposed

within these openings are vertically swinging flaps 22 hinged at their forward ends, as at 23. The flaps 22 are movable through the openings 21 to positions above or below the plane of the hydroplane 14, as indicated by dotted lines in Figure 5, and manually operable means is provided for simultaneously actuating the flaps 22 so as to simultaneously swing them in opposite directions. For the latter purpose, a horizontally swinging foot bar 24 may be pivotally mounted in front of the driver's seat 25 and operatively connected by cables 26 with vertically swinging bell crank levers 27 that are in turn operatively connected by adjustable links or rods 28 with the respective flaps 22. Tension springs 29 are associated with the bell crank levers 27 to normally position the flaps 22 in parallel relation and in the plane of the hydroplane 14. Obviously, by swinging the foot bar 24 in one direction, one flap 22 may be elevated and the other lowered, and by swinging said foot bar in the opposite direction, the one flap may be lowered and the other raised. The action of the flaps 22 is to laterally stabilize the craft and to aid in banking when making sharp turns, the lowered flap elevating the adjacent side of the hull and the elevated flap permitting lowering of the other side of the hull as in laterally tilting the latter. Of course, when one flap is elevated, the water is permitted to pass upwardly through the associated opening 21, while the lowered flap 22 will direct the water away from its opening. The links or rods 28 are adjustable in length so that the flap mechanism may be properly set to accommodate variations in adjustment of the main hydroplane 14 with respect to the bottom of hull 5. It will also be noted that the tiller shaft 30 of rudder 12 is journaled in the rear end portion of main hydroplane 14 and is of an extensible type so that the adjustment of hydroplane 14 with respect to the hull 5 may also be compensated for.

When the craft is at anchor or traveling very slow, the hull 5 will rest upon the water in the same manner as an ordinary craft of the displacement type. As the craft is driven ahead and the speed of travel increases, the planes 14, 15 and 19 act to elevate the hull until the bottom of the latter is entirely out of the water and the ski plane rides upon the surface of the water. At this time, the main hydroplane 14 travels slightly below the surface of the water, and the ski hydroplane 19 has a vertical swinging movement so as to elevate the hinged hydroplane section 15 as the hull lowers toward the surface of the water and to raise said section 15 as the hull 5 rises from the surface of the water. It will thus be seen that the hull of the craft is lifted entirely out of the water when the craft is caused to travel ahead at relatively high speed, thereby permitting excessive speeds to be obtained with an expenditure of a minimum amount of motive power.

From the foregoing description, it is believed that the construction and operation, as well as the advantages of the present invention will be readily understood and appreciated by those skilled in the art. Minor changes in details of construction illustrated and described are contemplated such as fairly fall within the spirit and scope of the invention as claimed.

What I claim is:

1. In a watercraft having an elongated hull, a main hydroplane rigidly mounted in a substantially horizontal position beneath and in spaced relation to said hull and extending substantially from side to side and from bow to stern of the hull, said hydroplane having a hinged vertically swinging section at its forward end, a ski hydroplane located centrally between the sides of the first-named hydroplane and in spaced relation to and between the latter and the hull, said ski hydroplane being pivotally mounted at its forward end forwardly of the forward end of the first-named hydroplane and for vertical swinging movement, and a link connection between said pivoted section and said ski hydroplane for being moved by the latter.

2. In a watercraft having an elongated hull, a main hydroplane rigidly mounted in a substantially horizontal position beneath and in spaced relation to said hull and extending substantially from side to side and from bow to stern of the hull, said hydroplane having a hinged vertically swinging section at its forward end, a ski hydroplane located centrally between the sides of the first-named hydroplane and in spaced relation to and between the latter and the hull, said ski hydroplane being pivotally mounted at its forward end forwardly of the forward end of the first-named hydroplane and for vertical swinging movement, and a link connection between said pivoted section and said ski hydroplane for being moved by the latter, extensible struts for mounting the first-named hydroplane on the hull whereby the first-named hydroplane may be adjusted vertically relative to the hull, and a mounting bracket for the ski hydroplane which is adjustable in length for adjusting the ski hydroplane with the first-named hydroplane relative to the hull.

WILLARD A. RANDALL.