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2,448,075

Filed Sept. 14, 1945

2 Sheets-Sheet 1

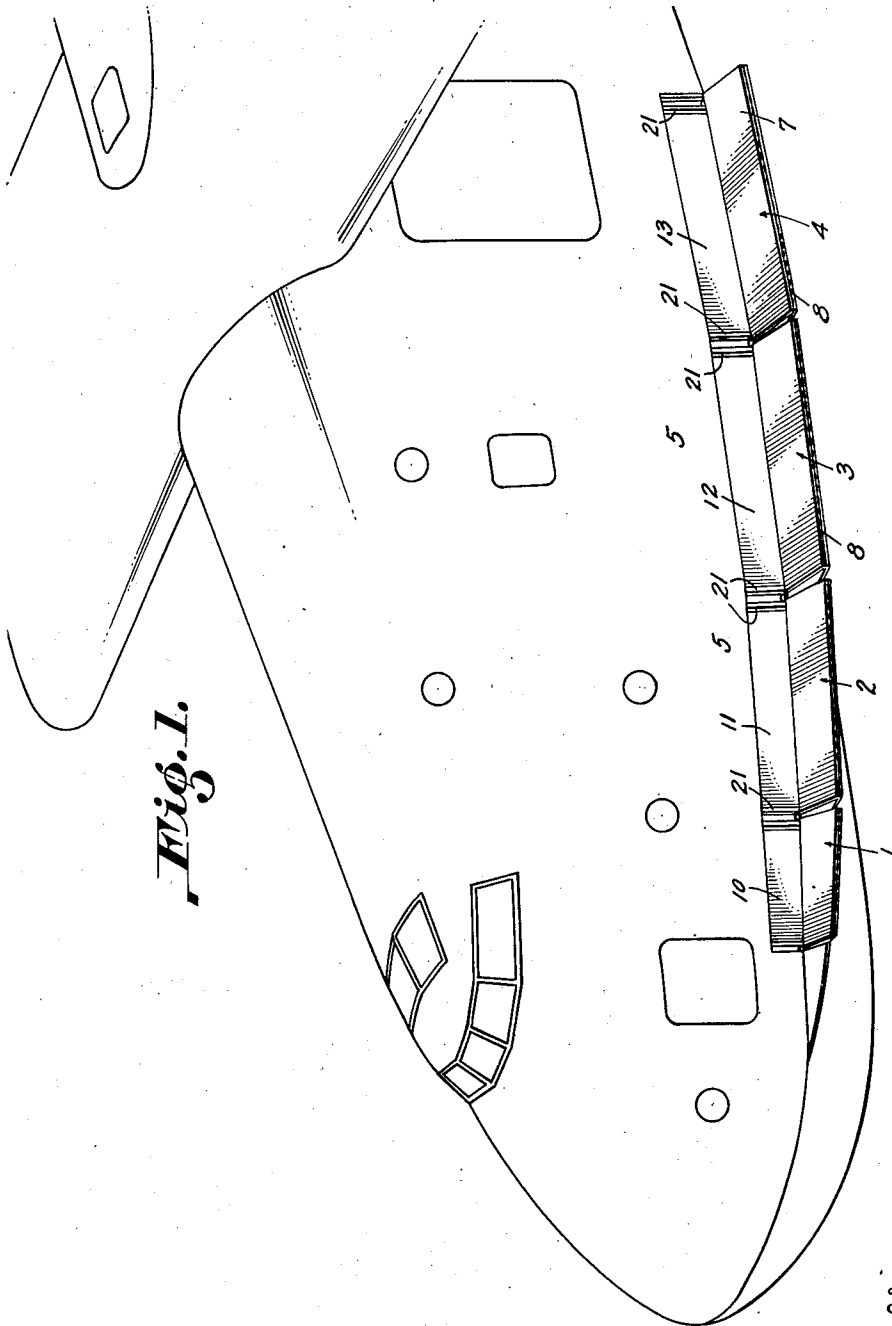


Fig. 1.

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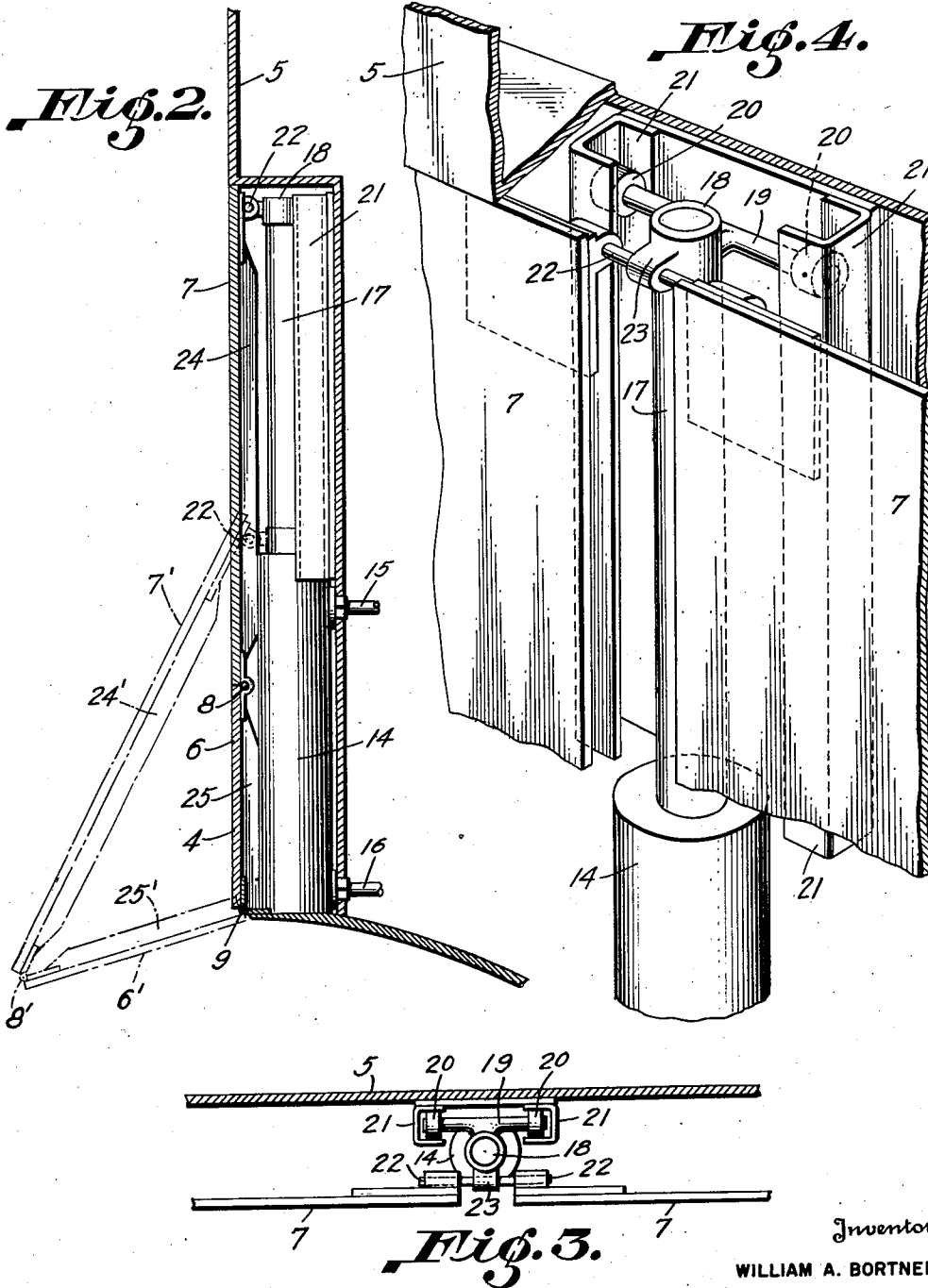
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RETRACTABLE SPONSON

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Application September 14, 1945, Serial No. 616,255

4 Claims. (Cl. 244-102)

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This invention relates to spray control on flying boats and more particularly to retractable spray control strips mounted along the chine of the hull.

When a flying boat takes off from the water, it is moved forwardly through the water by the power of the engines and propellers until sufficient speed is obtained so that the hull is raised from its normal water line floating position until it planes on the contoured bottom of the hull. As more speed is attained, the flying boat is supported partially by planing on the hull bottom and partially by the aerodynamic lift of the airfoils. When the hull bottoms are formed to a contour that give a good planing surface they are very apt to cause a heavy spray to be thrown off, upwardly and outwardly from the chine of the hull. As the hull moves forwardly this heavy spray can cause serious interference with the tail surfaces of the airplane and therefore with some hull designs, it is necessary to locate these tail surfaces high off the water line. In some instances the spray will interfere with the engine and propellers.

The present invention has for its object retractable spray strips extending along the chine in the side of the hull of a seaplane. These spray strips extend from a position forwardly of the leading edge of the wing to a point under the wing along the chine. The spray strips so arranged are retractable into recesses in the sides of the hull and their outward surfaces present a smooth continuous hull surface so that a minimum of drag is offered by this structure when the seaplane is in flight. In the extended position these spray strips extend laterally of the chine to direct spray from the planing portions of the hull outwardly and downwardly, thus affording additional plane area and directional control for the spray from the hull.

A further object of this invention is the provision for a built-in hydraulically actuated mechanism for retracting the spray strips after take-off.

A further object of this invention is the provision of a means to control the spray from the chines of the hull to direct the spray so that it will not interfere with the functioning of the engine and propellers and control surfaces on the empennage.

Further and other objects will become apparent from the description of the accompanying drawings which form a part of this disclosure and in which like numerals refer to like parts.

In the drawings:

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Figure 1 shows a fragmentary perspective view of a flying boat embodying the invention.

Figure 2 is a side sectional view through the hull showing the spray strip in the extended and retracted positions.

Figure 3 is a plan sectional view through the side of the hull of the flying boat.

Figure 4 is a perspective view showing the retracting mechanism for the spray strips.

The spray strips shown in Figure 1 comprise sections 1 to 4 hinged along the chine attached to each side of the seaplane hull. In Figure 1, the spray strip sections are shown in the open or operative position. For purposes of illustrating the application of the invention, the spray strips are shown under the wing and extending forward of the leading edge of the wing, but it should be understood that these strips can be located wherever objectionable spray may be encountered. The spray from the chine of a seaplane hull has always been a problem and in some cases seriously interferes with good design of the airplane or the take-off characteristics of the plane. In some seaplane designs, a gull wing is employed to lift the engines and propellers up away from the surface of the water and out of the spray. But as seaplane sizes increase and greater spray is encountered from larger hulls, the gull wing construction presents a serious fabrication problem so that it is desirable to use a straight high wing extending from the top of the hull on which the engines and propellers are supported. The hull can be designed to minimize the spray but it can further be controlled through the use of the spray strips of this invention.

Due to the long sweeping curvature of the hull along the chine, it is necessary that the spray strip be fabricated in sections. These sections may be extended into their operative position simultaneously or as many sections may be extended as observation of the spray condition indicates are necessary.

Figures 2 and 3 show the relationship of the spray strips to the hull in closed position. The spray strips shown in Figures 2 to 4 for purposes of more clearly showing the invention are views through section 4 of the spray strip shown in Figure 1. The spray strip sections each comprise two portions, section 4 shown in Figures 2 to 4 comprise members 6 and 7 hinged by a piano hinge at 8. These members are reinforced on the inside but offer a plane, smooth surface on the outside so that in the retracted position they maintain smooth and continuous the side of the

hull. Reinforcing structures 24 and 25 are secured to the surface sheets to render members 6 and 7 sufficiently rigid to withstand the stresses involved when in the operative position. The lower end of section 6 is hinged at 9 to the chine of the seaplane hull. The members forming sponson 4 are shown in the operative position in phantom as portion 6' and 7'. The sections are capable of being moved into a flush position shown at 6 and 7 in the side of the seaplane hull. Cavities 10, 11, 12 and 13 formed in the side of the hull above the chine accommodate the structure of the spray strip sections 1 to 4.

The movement of the members forming the spray strips is accomplished by a hydraulic cylinder 14 having fluid connections 15 and 16 to the hydraulic system. The thrust member 17 of the hydraulic cylinder carries a fitting on its outer end 18 to which is attached a bracket 19 to support rollers 20. These rollers are guided by roller channels 21 secured in the cavities in the side of the hull. The upper ends of member 7 are hinged at 22 to a bracket 23, also secured to fitting 18. It will be noted in Figure 1 that the adjacent ends of the spray strips or sponsons such as the ends of sponsons 3 and 4 can be connected to a single fitting 18 so that one power unit may operate the adjacent ends of the sponson sections. This sponson construction is located as shown in Figure 1 along the chine so that spray from that portion of the hull extending forward of the first step will be deflected outwardly and downwardly.

Prior to take-off the hull is afloat and depending upon the water line some portion of the spray strip or some sections may be under water. As the hull moves forwardly, it rises out of the water and begins to plane on the bottom surface of the hull. As the seaplane gathers speed the hull rides on the forward step and from this time until take-off it is most important to control or direct the spray from the hull away from the critical operating parts of the airplane mentioned above. When it is observed that the spray is objectionable any or all of the spray strips may be extended to the operative position shown in Figure 2. Portion 6 shown in the extended position 6' forms a smooth continuous extension of the hull bottom which directs the spray outwardly and downwardly that would normally move upwardly around the chine and interfere with the control or operation of the seaplane. As soon as the airplane leaves the surface of the water the spray strips may be moved to the retracted position and thereafter maintained in a closed position in the cavities to offer little or no drag to the flight of the airplane.

For the purposes of illustration, the sections of the spray strips in the drawings are shown with a space between the adjacent edges but depending upon the clearances and tolerances required, the adjacent sections of the spray strip can be as closely spaced as is practical.

It is to be understood that certain changes, alterations, modifications and substitutions can be made without departing from the spirit and scope of the appended claims.

I claim as my invention:

1. A seaplane hull having a recess extending along the chine forward and aft of the leading edge of the wing, a panel pivoted along the chine

adapted to move to a position extending laterally of said hull so that the outer surface of said panel forms a continuation of the bottom thereof, a second panel pivoted to the outer end of said first panel, a bracket secured to the upper end of said second panel, track means in said recess and guide means on said bracket moving in said track means, hydraulic means secured to said bracket to retract said hinged panels into said cavity and to extend said first mentioned panel into its operative position forming an extension of the hull bottom.

2. In combination in a seaplane hull having a recess extending along the chine forward and aft of the leading edge of the wing, a panel pivoted along the chine adapted to move to a position extending laterally of the seaplane hull forming a continuation of the bottom thereof, a second panel pivoted to the outer end of said first panel, a bracket secured to the upper end of said second panel, track means in said recess and rollers on said bracket moving in said track means, a hydraulic cylinder secured to said bracket to retract said hinged panels into said cavity and to extend said first mentioned panel into its operative position to form an extension of the hull bottom.

3. A seaplane hull having a shallow recess formed in the side thereof, above the chine forward and aft of the leading edge of the wing, a sectional spray strip including pairs of panels placed one above the other mounted in said recess, having the outer surface flush with the surface of the seaplane hull, the lower edge of the lower panel being hinged along the chine, the upper edge of the lower panel being hinged to the lower edge of the upper panel, the top edge of the upper panel being secured to a mechanism mounted within said recess to lower each pair of panels so that the lower panel is moved to a position extending laterally from said hull so that the outer surface of said panel forms a continuation of the bottom thereof, along the chine.

4. A seaplane hull having a sectional spray strip comprising panels hingedly secured along the chine adapted to be moved to a position extending laterally therefrom, the outer surface thereof forming a continuation of the bottom of said seaplane hull, other panels each having one edge secured to each of said first mentioned panels at the outer edge thereof, bracket members secured to the upper edge of said second panel, a mechanism secured to said brackets to move the upper edge of said second panel toward said chine so that said first mentioned panel is moved to said laterally extending position.

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