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FORM OF HULL OR FLOAT

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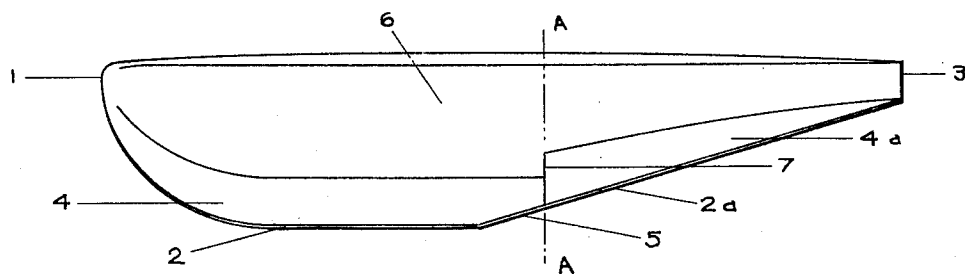


FIG. 1

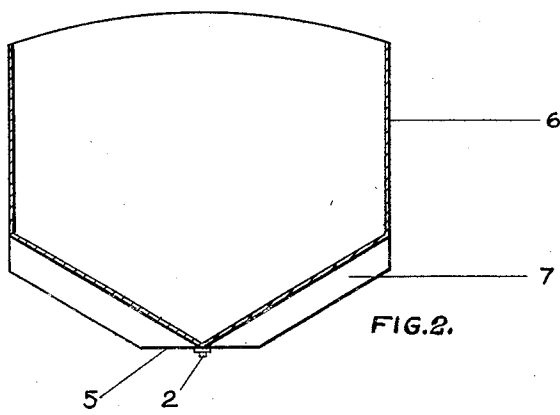


FIG. 2.

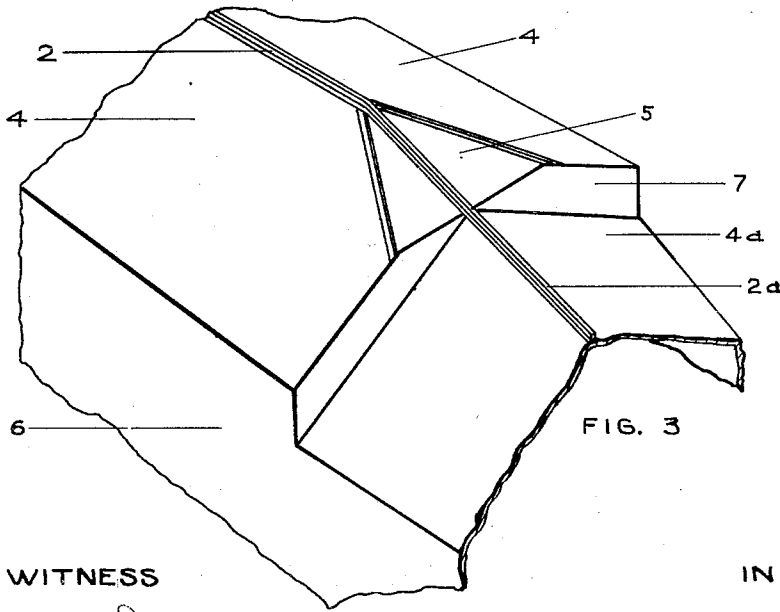


FIG. 3

WITNESS

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FORM OF HULL OR FLOAT

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My invention relates to improvements in hulls or floats and more particularly to hulls or floats adapted to be propelled by means of an air screw, as the flotation member of a seaplane, flying boat, or amphibian airplane.

Upon the earliest seaplane hulls with flat bottoms were commonly used, largely because less power was required to lift a hull of this type from the water. This advantage was largely offset, however, by disadvantages in maneuvering or taxiing upon the water, and by the shock attendant upon alighting.

With the development of powerful engines of light weight, the trend of hull design has been toward a hull with a V-shaped bottom. A bottom of V section provides a considerable shock absorbing quality upon alighting on or upon taxiing over rough water. On smooth water the effect is present but, of course, less noticeable. As the power available for airplanes of this type increased, the tendency of hull builders was to increase the steepness of the V bottom. A bottom in which each side makes a 30° angle to the horizontal is in general use today.

In order to reduce the suction of the water in taking off, one or more steps are usually provided in the bottom, and that part of the bottom to the rear of the step or steps is sloped upward to keep its surface clear of water leaving the step. This construction permits rapid acceleration of the airplane and consequent early take-off.

Despite the improvements in performance of hulls with a V bottom and a step, such construction is still unsatisfactory in some respects. The V bottom is a disadvantage when applied to an amphibian airplane for the reason that in order to provide ample clearance for land operations the landing gear must be designed to lift the entire airplane much higher from the ground than would be the case with a flat bottomed hull. This makes the airplane ungainly and awkward upon land, where its high center of gravity is a great handicap in cross-wind maneuvering. The landing gear required to provide ample clearance is necessarily heavier than one with shorter members. In alight-

ing upon water, too, the V bottom has a tendency to rock or bounce, which is inherently dangerous, for it occurs just as flying speed is lost and the operator has a minimum of control over his plane.

The objects of my invention are to provide a hull for airplanes adapted to operate from water, which will permit speedy take-off, improve maneuverability, reduce bouncing upon alighting, permit the use of less cumbersome landing equipment when used on amphibian airplanes, and permit the lowering of the center of mass without reducing the effective ground clearance of such an airplane while operating upon land. Other objects are either obvious or will be pointed out hereinafter.

Referring to the drawings, Figure 1 is a side elevation of a hull in which the invention is incorporated; Figure 2 is a sectional view at the step; and Figure 3 is a perspective of the bottom surface of the hull turned bottom up and presenting the rear face of the step.

The hull has a nose 1, preferably blunted to provide an easy entrance into the water, together with a high degree of buoyancy.

A keel 2, 2a, may run the length of the hull, following the center line from the nose or bow 1 to a stern 3. The stern 3 may be used to support the tail surfaces of the airplane in some types of construction. At an angle upward from the keel 2, front bottom surfaces 4, and rear bottom surfaces 4a slope outward to side surfaces 6.

The front bottom surfaces 4 and the rear bottom surfaces 4a are angularly disposed toward each other and are connected by a step 7.

The hull in Figure 1 is shown in the position it should assume when the airplane it supports is at rest upon the water. In this position the keel 2 bends upward from the horizontal at a point slightly forward of the step and continues as 2a to the stern 3, following the center line of the upwardly sloping rear bottom surfaces 4a heretofore referred to.

A triangular flat bottom surface 5 having its apex at the bend of the keel 2—2a and extending backward to the step 7 is formed by flattening the bottom surfaces 4 just for-

ward of the step. This triangular flat bottom 5 is preferably in the same plane as the keel 2a, so that the keel 2a is unbroken by the step 7. The latter is divided into port and starboard sections, and by reason of the flat surfaces has a gentle slope at the center line instead of the abrupt break characteristic of such steps in ordinary practice. This flat surface 5 and "washed out" step 7 relatively central of the hull is responsible for noticeably improved performance when used in conjunction with an airplane. A hull of this type is more easily maneuvered in the water, it leaves the water with less expenditure of power, and upon alighting has less tendency to rock or bounce. When used on an airplane of the amphibian type, it has the added advantage of permitting reasonable ground clearance with comparatively light and short undercarriage members. In an amphibian the hull, during land operations, assumes a different position from that shown in Figure 1 with the keel 2a approximately parallel to the ground. Without the "washed out" step 7 high clearance would have to be provided to protect the pointed angle of the step, but with my construction the same effective clearance may be obtained without lifting the entire structure so far from the ground. The advantages of the lower center of mass and the lighter undercarriage members are readily apparent to anyone skilled in the art.

I do not desire to limit my invention to the precise embodiment illustrated, but to include all modifications which come fairly within its scope.

I claim:

1. A float having fore and aft bottom surfaces in angular relationship, a center line common to both surfaces, a flattened portion on the forward surface in the same plane as the center line of the rear surface, and a step connecting the rear surface to the forward surface.

2. A float having fore and aft V shaped bottom surfaces and a step connecting said surfaces, said step having a flattened center section in the same plane as the center line of the rear bottom surface.

3. A float having a V bottom, a step, and a triangular flattened section of the V bottom in the vicinity of the step reducing the height of the central portion of the step.

4. A float having a forward and rear bottom surfaces in angular relationship, a keel common to both surfaces, a step connecting both surfaces, and a triangular flattened portion of the forward bottom surface on each side of the keel extending back to the step.

5. In a float having greater length than width, fore and aft bottom surfaces in angular relationship to each other and meeting on the center line, and a step having a sloping wedge-shaped center connecting said surfaces across their width.

6. A float having fore and aft bottom surfaces angularly disposed toward each other, a center line at the lowermost portion of said surfaces, and a step aft of the angle of the center line and on both sides thereof connecting the two surfaces, the height of said step diminishing at said center line.

7. A float having fore and aft bottom surfaces in angular relationship, a center line common to both surfaces, a flattened portion on the forward surface in the same plane as the center line of the rear surface, and a step connecting the rear surface to the forward surface and to the flattened portion.

8. A float having fore and aft bottom surfaces, a step connecting said surfaces, said step joining the after surface at approximately a right angle, and joining part of the forward surface at approximately a right angle, and the balance of the forward surface at an obtuse angle.

9. A float, a plurality of bottom surfaces on said float, said surfaces being angularly disposed toward each other in fore and aft relationship, keels at the lowermost part of said bottom surfaces, a step connecting the adjacent ends of said surfaces, said step being flattened at its central part to permit of the extension of the keel of the rearward surface to meet the keel of the forward surface.

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