

C. J. LAKE.
HULL FOR FLOATING BODIES.
APPLICATION FILED OCT. 6, 1917.

1,279,126.

Patented Sept. 17, 1918.

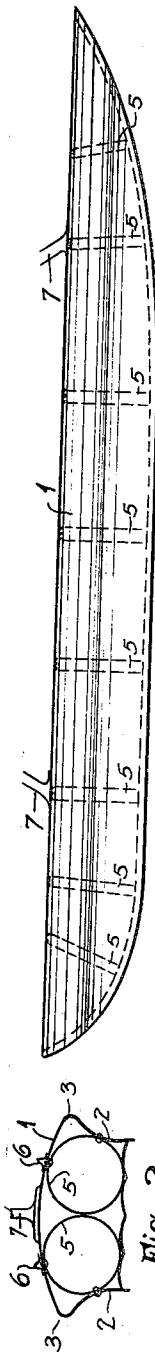


Fig. 1.

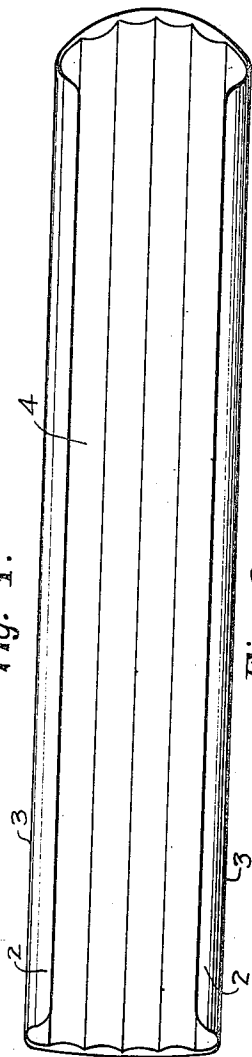


Fig. 2.

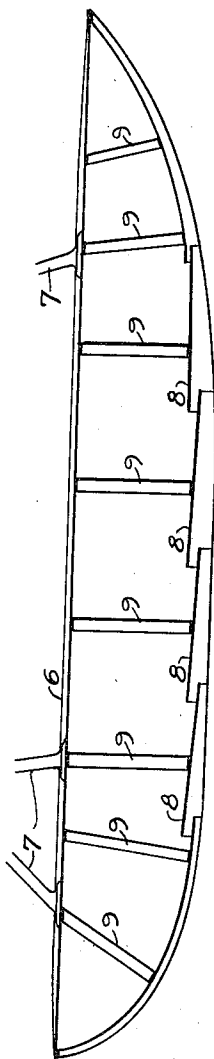


Fig. 3.

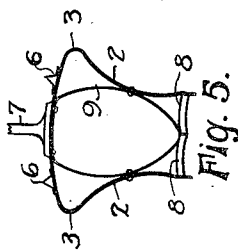


Fig. 4.

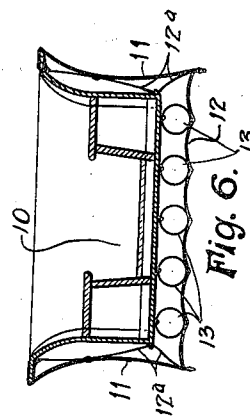


Fig. 5.

Christopher J. Lake INVENTOR
BY *F. B. Mc*
ATTORNEY

UNITED STATES PATENT OFFICE.

CHRISTOPHER J. LAKE, OF BRIDGEPORT, CONNECTICUT.

HULL FOR FLOATING BODIES.

Specification of Letters Patent. Patented Sept. 17, 1918.

1,279,126.

Application filed October 6, 1917. Serial No. 195,168.

To all whom it may concern:

Be it known that I, CHRISTOPHER J. LAKE, a citizen of the United States, and resident of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Hulls for Floating Bodies, of which the following is a specification.

This invention relates to a novel form of hull construction for boats in general, and particularly for hydroplanes and floats for hydroaeroplanes; my improvements comprehending certain formations and arrangements of parts to provide the greatest strength and stanchness with minimum weight, and offering a minimum resistance to speed; also to minimize the detrimental effect of wave force against the vessel, such as is productive of pitching, rolling and pounding.

The underlying principle of this invention is resiliency of structure and it aims toward the production of a novel type of hull composed of light, resilient and hard material, reinforced with resilient ribs or braces of sufficient stiffness to maintain its shape under normal conditions. This structure is inherently capable of resilient reaction against any impacting forces met with, such as when alighting on water as a hydroaeroplane float, or when running over rough seas, floating ice, or other objects, striking snags in shallow water, or when struck by projectiles.

The efficiency of this type of construction is further augmented by the cushioning quality of air inclosed within the hull, which is rendered effective through the yielding character of the entire shell.

With the usual rigid form of vessel, impact forces produce considerable stress in the material and at the joints, owing to the solid resistance of such construction, but in the type of vessel herein disclosed, the action of the yielding structure concomitantly with the compressibility of the inclosed air, absorbs these forces gradually, and dissipates them in like manner, thereby reducing appreciably the stress in the material.

By means of properly shaping the sides and bottom of the float or boat, as by forming them with a curve or a series of curves

of proper profile, these important results are achieved: (1) the resiliency of the structure is enhanced; (2) the sea in striking such formation will be deflected and thrown back and will be broken up into smaller parts, and thereby smaller units of impact will operate or smaller areas of surface will be exposed to attack, depending upon whether a single curve or a series of curves is employed; (3) the series of curves at the bottom will, in striking the water, entrap air with further cushioning effect.

These three effects enable the flat bottom boat to be used on a sea. It is well known that a straight sided, flat bottomed boat gives the greatest floating capacity with the least draft, and a vessel moves more easily by skimming over the surface than by cleaving through it. This form also gives the greatest lateral stability. But as ordinarily built, with rigid construction, the flat bottom boat is unsafe in a heavy sea, and certainly disagreeable for the passenger. When it rises on a wave, and in descending meets another, the shock may be sufficient to strain the structure and weaken it. Furthermore difficulty is experienced in bracing the bottom of such a boat to withstand the impacts it receives. Therefore the above noted effects of my improved construction comprehend a desirable addition to the art of rendering a flat bottom boat seaworthy.

The use of a hard resilient material includes metal of armor quality which will be largely bullet-pierce-proof, especially since it is resiliently mounted; thus making the vessel useful for war purposes, especially as applied to submarine chasers, on water and in the air.

My invention is not limited to any particular method of flotation, and includes the application of the principle of resilient structure to the open bottom type of vessel claimed in my co-pending patent application Serial No. 191,712.

In said type the resiliency of the sides augments the cushioning effect of the air or exhaust gases, and by curving the sides as shown they will be forced inwardly, against the pressure of the entrapped air, when the aquafoils are struck in landing, and the stresses in the metal forming said sides will

be thereby reduced, permitting the use of thin material.

Other features and advantages of my said invention will hereinafter appear.

5 In the drawing:—

Figure 1 is a side elevation of a closed bottom type of float, embodying my invention.

Fig. 2 is a cross section of the same.

Fig. 3 is a bottom plan view thereof.

10 Fig. 4 is a longitudinal, side sectional view, of an open bottom float for hydroplanes or hydroaeroplanes.

Fig. 5 is a cross section of the same, and

Fig. 6 is a cross sectional view of a resilient boat construction.

15 In the examples of my improved float or hull structures presented in the drawings, I have had in mind the use of metal as the material to be employed, because of its possessing the characteristics of hardness and resiliency which I find desirable for the purposes of my invention. But it will be perfectly obvious that the preference in material is expressed in terms of those characteristics qualities, and is not otherwise limited.

Thus, in Figs. 1, 2 and 3 will be seen a hull composed of a deck or upper portion 1, which is transversely arched, and of relatively rigid character; and sides 2 that are inwardly curved, thus providing an overhanging portion 3 where said sides join the deck or upper portion; the curvature involved serving to deflect waves which impinge therein. Also in these figures I show a bottom 4, which is formed by transverse curves into a series of longitudinal channels, having the effect, when the float alights upon the water, of entrapping air and thus helping to cushion the impact.

40 The material of the sides and bottom, being resilient, is capable of yielding when struck, thus serving as a cushion to deaden the force of the blow, and also in a measure avoiding the infliction of damage to the structure. But rigidity of the hull is also necessary, that it may stand up to its work. Therefore I provide relatively stiff spring ribs, arranged transversely within the hull, at suitable lengthwise intervals, and having points of contact with the top, bottom and sides of the hull, to diffuse the shocks and strains generally therethrough. As shown in Fig. 2 these ribs, as 5, may be arranged in lateral, contacting pairs, their circular contour enabling them to fill out the cross sectional area of the hull there indicated.

Longitudinal ribs, as 6, may also be provided upon the upper portion 1, to reinforce the lengthwise rigidity of the hull.

60 Portions of struts 7 serve to indicate the application of the float to hydroaeroplane use.

In Figs. 4 and 5 my improved resilient

construction of hull is shown in conjunction 65 with a float having an open bottom, provided with longitudinally spaced aquafoils 8, as in my co-pending patent application Serial No. 191712. Also, in this example, spring stiffening ribs 9 are indicated as arranged 70 transversely, in oval form, to engage with said aquafoils, and with the top and sides of the hull. Obviously the spring stiffening ribs aforesaid may be in either of the forms indicated, or in such other form or shape as 75 is calculated to brace the resilient hull structure, to stiffen it, without impairing its characteristic feature of yielding and reacting under the influence of shocks and strains, as set forth.

80 A further modification of the spring bracing or stiffening means is illustrated in Fig. 6, wherein a rigid cockpit 10 is shown as built into the boat, which has flexible sides 11 and bottom 12; curved spring ribs 12^a 85 being interposed between the hull sides 11 and the sides of the cockpit, and spring ribs 13, of suitable form interposed between the hull bottom 12 and the bottom of the cockpit.

90 Variations may be resorted to within the spirit and scope of my said invention, and parts thereof used without others.

I claim:—

1. A hull for the floats of hydroaeroplanes 95 having means for entrapping air at its bottom in alighting on water, the structure of said hull being resilient, to expand and thereby assist in absorbing the shocks of impact.

100 2. The combination, with a hull for boats and floats of stiff resilient metallic sides for said hull, and spring stiffening means for said sides.

105 3. The combination, with a hull for boats and floats, of a stiff resilient metallic bottom for said hull, and spring stiffening means for said bottom.

110 4. The combination, with a hull composed of stiff resilient metallic material for boats and floats, of a series of stiffening spring ribs connecting the top, sides and bottom of said hull.

115 5. The combination, with a hull composed of stiff resilient metallic material for boats and floats, of a system of internal spring bracing, to connect opposite parts of said hull, whereby local shocks and strains are intercommunicated for absorption through the entire structure.

120 6. A hull for boats and floats having a rigid portion and having its sides constituted of thin and hard metallic sheet material, which is resilient relatively to said rigid portion, whereby the resistance offered 125 by said sides will cause them to reformingly yield against the attacks of impacting forces.

7. A hull for boats and floats having a

rigid portion and having its bottom constituted of thin and hard metallic sheet material, which is resilient relatively to said rigid portion, whereby the resistance offered by
5 said bottom will cause it to reformingly yield against the attacks of impacting forces.
Signed at borough of Manhattan, in the

city, county, and State of New York, this
1st day of October, A. D. 1917.

CHRISTOPHER J. LAKE.

Witnesses:

F. W. BARKER,
MONTAGUE PALMER.