

J. D. COOPER.
 FLYING BOAT OR LIKE CRAFT.
 APPLICATION FILED APR. 1, 1913.

1,084,401.

Patented Jan. 13, 1914.

2 SHEETS-SHEET 1.

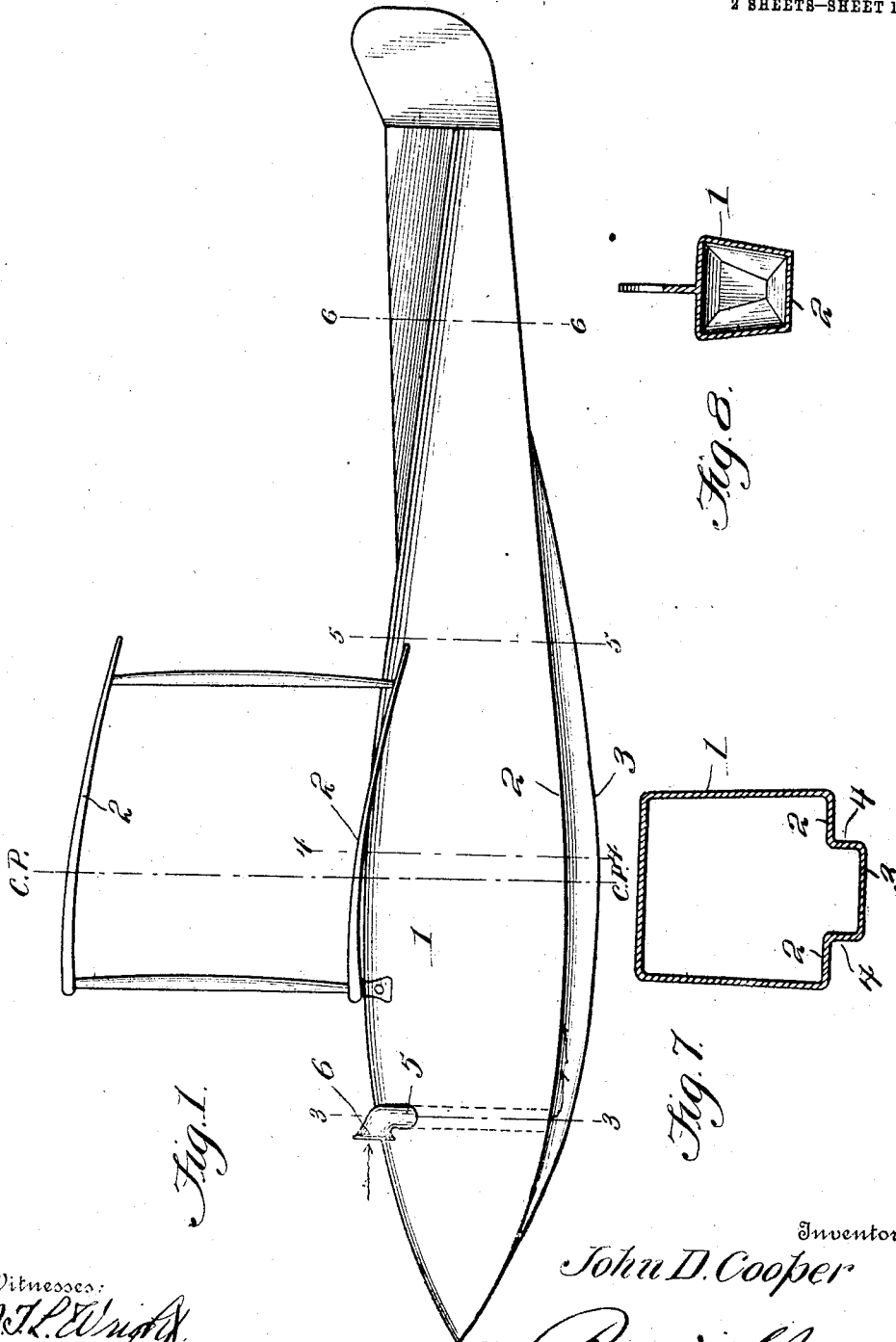


Fig. 1.

Fig. 7.

Fig. 8.

Witnesses:
J. L. Wright

A. C. Hines

Inventor:
John D. Cooper

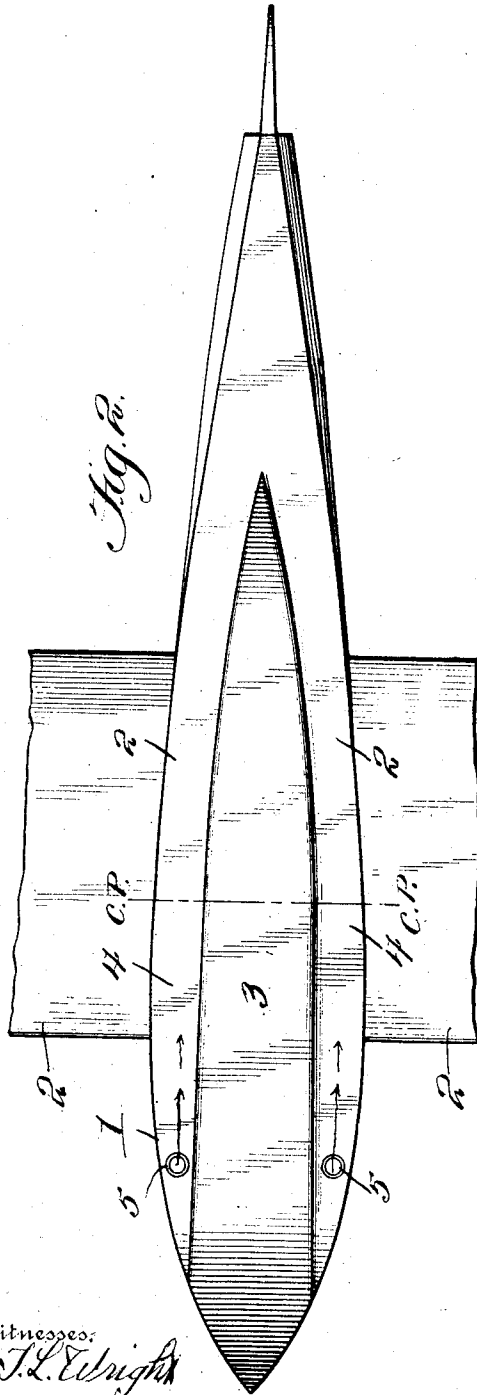
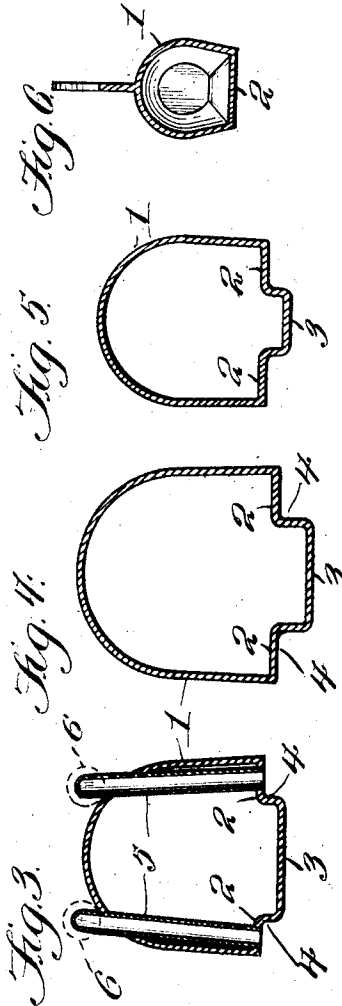
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 Attorney.

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UNITED STATES PATENT OFFICE.

JOHN D. COOPER, OF BRIDGEPORT, CONNECTICUT.

FLYING-BOAT OR LIKE CRAFT.

1,084,401.

Specification of Letters Patent.

Patented Jan. 13, 1914.

Application filed April 1, 1913. Serial No. 758,200.

To all whom it may concern:

Be it known that I, JOHN D. COOPER, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Flying-Boats or like Craft, of which the following is a specification.

My invention relates to improvements in hulls or bodies for craft of that kind adapted for both aerial and marinal use, such as flying boats or yachts, hydroaeroplanes, etc.

The primary object of the invention is to provide a body or hull construction which will oppose a minimum of resistance to travel in air or water, and which adapts the vehicle to alight upon, run along and rise from the surface of a body of water with ease and facility.

A further object of the invention is to provide a hull or body having a bottom planing surface of such form as to secure stability of the craft in water, a reduction of the shock of impact when the craft alights upon the surface of the water, and an avoidance of suctional resistance when the craft rises from the water.

The invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a side elevation of a combined air and water craft embodying my invention, omitting certain well known aerial features. Fig. 2 is a bottom plan view of the same. Figs. 3, 4 and 5 and 6 are vertical transverse sections through the body or hull on the lines 3—3, 4—4, 5—5 and 6—6 of Fig. 1. Figs. 7 and 8 are sections corresponding to Figs. 4 and 6 of a slightly modified construction.

In the illustrated exemplification of my invention, I provide a body or hull 1 carrying a supporting surface composed of superposed planes 2, and which may be provided in practice with any suitable construction, arrangement and type of steering and stabilizing devices.

The body 1 comprises a longitudinally tapered, streamline car or shell which may be of any preferred cross-sectional contour. In Figs. 1 to 5, inclusive, I have shown a body which is rounded at the top and provided with straight sides and a transversely flat bottom, while in Figs. 7 and 8 I have

shown a body which is rectangular in outline and varies from an oblong rectangular to a frusto-pyramidal form at different points in its length, due to its tapering conformation. Any suitable streamline form may, however, be employed, but it is preferred to have the sides converge and the top slope fore and aft from a point adjacent to or coinciding with the line C. P. of the mean center of pressure, as shown.

The bottom 2 of the body 1 is transversely flat at all points, but is longitudinally curved, having an upward slope both forwardly and rearwardly of the center of pressure, at which point the body is of the greatest depth. By this means the body is adapted to sustain the craft in water, and when at rest, with a minimum amount of displacement, and the surface 2 is made to have an efficient aerofoil action and to form a hydroplane which allows the craft to quickly gain speed and skim with a minimum of resistance over water and to rise therefrom with facility.

I provide the bottom 2 with a longitudinally extending projection 3, which is curved longitudinally to conform thereto, and is also transversely flat. This projection is substantially U-shaped in outline in cross section, of less width than the bottom 2, and of a longitudinally tapering outline, corresponding substantially to that of the body. The sides of said projection intersect, at their divergent forward ends, the converging ends of the sides of the body at the bow, from which the projection tapers to a point at its rear end, which terminates approximately midway between the stern end and the point of greatest depth of the said body and projection. This projection serves as a fin giving sufficient displacement and hold upon the water to secure stability and prevent skidding, while diminishing to a material degree the amount of displacement and resistance to travel over structures presenting a hydroplane surface of the continuous transverse type. Furthermore, the projection 3 serves as a hydroplane surface of restricted area on which the craft may rise with greater facility in launching it into the air, and it also diminishes by virtue of its shape, the shock of impact in alighting on the water, by allowing a portion of the water displaced to escape before the flat surface 2 comes in contact with the water. By reason of the construction described channels 4 are

also provided along the longitudinal sides of the projection, which allow the water to have free clearance, and, as the water flowing along these channels tends by reaction to give a forward impulse impact against such surfaces of the projection, increased speed is obtained.

For the purpose of further promoting speed of travel of the craft in water, and also to facilitate its rise from the water, I provide air supply pipes or tubes extending downward through the body at the bow and communicating at their lower ends with the channels 4, said tubes or pipes having at their upper ends forwardly facing inlets 6. As the craft travels along the surface of the water air flows from the pipes along the walls of the hydroplane surface and serves as a lubricant to diminish the skin resistance. At the instant of rising from the water the entering air also breaks the suctional resistance of the water to the elevation of the body therefrom, thereby adapting the craft to rise at less speed and with less driving power.

I claim:—

1. A hull for flying boats or like craft comprising a body having a transversely flat bottom provided with a longitudinally curved, rearwardly tapering projection, of less width than said bottom and of varying depth throughout, said projection being of maximum depth approximately in line with the mean center of lifting pressure.

2. A hull for flying boats or like craft comprising a longitudinally tapering body having a transversely flat bottom provided with a central longitudinally extending and longitudinally curved rearwardly tapering projection, said projection being of less width than said flat bottom, of varying depth throughout and of maximum depth substantially in line with the mean center of pressure and extending from the bow to a point between the mean center of pressure and the stern of the body.

3. A hull for flying boats and like craft comprising a longitudinally tapering body having a longitudinally curved, transversely flat body of maximum depth substantially in line with the mean center of pressure, said bottom being provided with a correspondingly shaped central projection of less width than said body and also of maximum depth in line with the mean center of pressure, said projection having the divergent ends of its sides intersecting the sides of the body at the bow thereof and the convergent ends of its sides spaced a maximum distance from the sides of the body and terminating in a point substantially midway between the said center of pressure line and the stern end of the body.

4. A hull for flying boats or like craft comprising a longitudinally tapering stream-

line body having a transversely flat, longitudinally curved bottom of maximum depth substantially in line with the mean center of pressure and thence sloping upwardly toward the bow and stern, said body being provided with a correspondingly shaped central projection of less width than said body and also of maximum depth in line with the mean center of pressure, said projection having the divergent ends of its sides intersecting the sides of the body at the bow thereof and the convergent ends of its sides spaced a maximum distance from the sides of the body and terminating in a point substantially midway between the said center of pressure line and the stern end of the body.

5. A hull for flying boats or like craft comprising a body having a transversely flat bottom provided with a longitudinally curved, rearwardly tapering projection, of less width than said bottom and of varying depth throughout, said projection being of maximum depth approximately in line with the mean center of lifting pressure, and means for conducting air down through the bow end of the body beneath the bottom thereof and at points between the sides of the body and projection.

6. A hull for flying boats or like craft comprising a longitudinally tapering body having a transversely flat bottom provided with a central longitudinally extending and longitudinally curved rearwardly tapering projection, said projection being of less width than said flat bottom, of varying depth throughout and of maximum depth substantially in line with the mean center of pressure and extending from the bow to a point between the mean center of pressure and the stern of the body, and means for conducting air down through the bow end of the body beneath the bottom thereof and at points between the sides of the body and projection.

7. A hull for flying boats or like craft comprising a longitudinally tapering body having a longitudinally curved, transversely flat body of maximum depth substantially in line with the mean center of pressure, said bottom being provided with a correspondingly shaped central projection of less width than said body and also of maximum depth in line with the mean center of pressure, said projection having the divergent ends of its sides intersecting the sides of the body at the bow thereof and the convergent ends of its sides spaced a maximum distance from the sides of the body and terminating in a point substantially midway between the said center of pressure line and the stern end of the body, and means for conducting air down through bow end of the body beneath the bottom thereof and at points between the sides of the body and projection.

8. A hull for flying boats or like craft comprising a longitudinally tapering stream-line body having a transversely flat, longitudinally curved bottom of maximum depth substantially in line with the mean center of pressure and thence sloping upwardly toward the bow and stern, said body being provided with a correspondingly shaped central projection of less width than said body and also of maximum depth in line with the mean center of pressure, said projection having the divergent ends of its sides intersecting the sides of the body at the bow thereof and the convergent ends of

its sides spaced a maximum distance from the sides of the body and terminating in a point substantially midway between the said center of pressure line and the stern end of the body, and means for conducting air down through the bow end of the body beneath the bottom thereof and at points between the sides of the body and projection.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN D. COOPER.

Witnesses:

C. C. TOLLSTAM,

GEO. BEECH.