E. F. GALLAUDET.

AEROHYDROPLANE.

APPLICATION FILED FEB. 17, 1914.

1,165,770.

Patented Dec. 28, 1915.

2 SHEETS—SHEET 1.

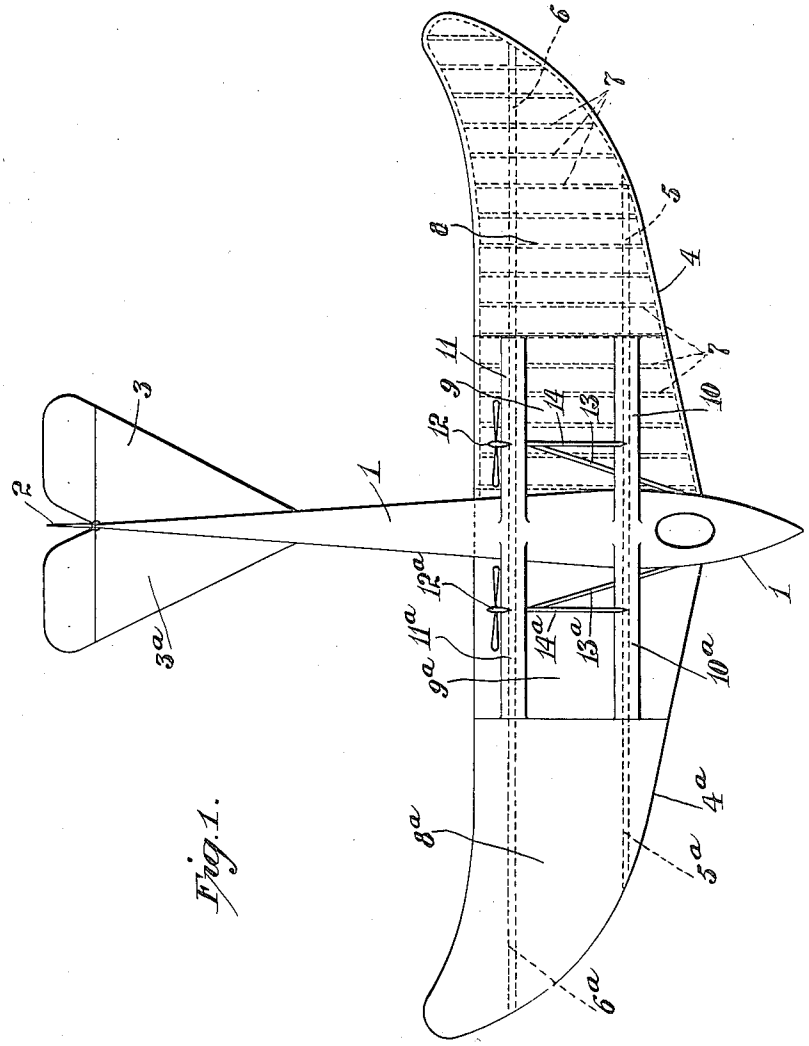


Fig. 1.

Witnesses:

Inventor:

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2 SHEETS—SHEET 2

Fig. 2.

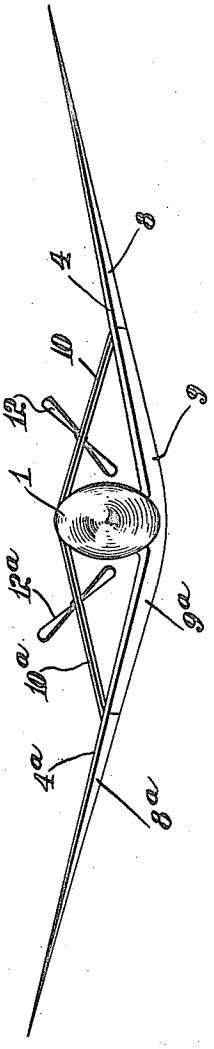
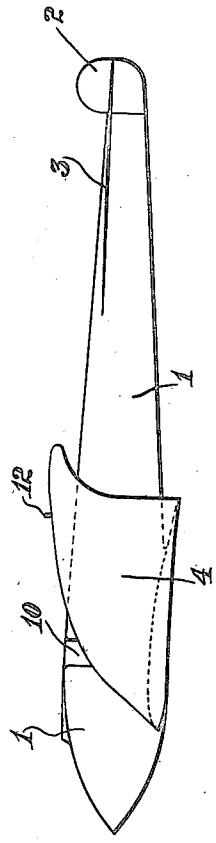


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

EDSON F. GALLAUDET, OF NORWICH, CONNECTICUT.

AEROHYDROPLANE.

1,165,770. Specification of Letters Patent. Patented Dec. 28, 1915.

Application filed February 17, 1914. Serial No. 819,148.

To all whom it may concern:

Be it known that I, EDSON F. GALLAUDET, a citizen of the United States, and a resident of the town of Norwich, county of New London, and State of Connecticut, have invented certain new and useful Improvements in Aerohydroplanes, of which the following is a specification.

My present invention relates to aerohydroplanes; that is to say, to machines which are adapted both to alight upon and plane over the surface of a body of water and to arise therefrom and fly in the air.

The object of the invention is to provide a combined flying machine and hydroplane, which is simple and strong in construction and which will afford a minimum of head resistance and at the same time provide a maximum of lateral stability both in the air and on the water.

With this object in view, one feature of my invention consists in mounting the body of the machine above, or substantially above, a pair of wings which are set at a dihedral angle so that the inner portions of the wings themselves shall serve as the supporting and planing surface of the machine when on the water.

Another feature consists in so framing and covering the wings, and particularly their inner portions, as to provide therein air and water-tight compartments which will support and give buoyancy to the machine when on the water.

Still another feature consists in mounting the propellers above and somewhat forward of the rear or trailing edge of the wings to thereby keep them from contact with the water when the machine alights thereon and to protect them from the waves, especially in rough weather, when the machine is in motion upon the water.

The invention also comprises certain other novel features of construction, arrangement, and combination of parts hereinafter described and more particularly pointed out in the appended claims.

The principle of the invention, and the best mode in which I now contemplate applying that principle, will be clearly understood by those skilled in the art from the following description, taken in connection with the accompanying drawings which form a part of this specification and in which—

Figure 1 is a plan view of an aerohydroplane embodying the several features of my invention, and Fig. 2 is a front, and Fig. 3 a side, elevation of the same.

Referring to the drawings, 1 is the body of the machine, which is a framed and inclosed structure preferably of pisciform or torpedo shape as shown, provided with the usual rear rudder 2 and elevating planes 3 3^a. The wings 4 4^a, set at a dihedral angle, are constructed with a framework (shown only in dotted lines in Fig. 1) which comprises main transverse spars 5 5^a, and 6 6^a, preferably I-beams extending integrally from the outer end of one through to the outer end of the other wing and joined at the angle midway of their lengths to the lower longitudinal member or members of the framework of the body, and a series of fore and aft ribs 7, of the usual or any suitable shape and construction. This framework is inclosed above and below with suitable surfacing material 8 8^a; preferably, throughout the central or inner portions 9 9^a of the wing structure, with a thin, light metal sheeting which is riveted or otherwise secured to the top and bottom flanges of the spars and edges of the ribs, to form air and water-tight compartments. The fore and aft central compartment or compartments of the wing structure serve, or may serve, as a double bottom for the body as far aft as the rear transverse spar, from which point the bottom of the body, or tail portion of the body, preferably inclines upwardly and so gradually diverges from the downwardly inclined rear portion of the wing structure. The wings are trussed by transverse members or tie-bars 10 10^a and 11 11^a which are secured centrally to the upper longitudinal member or members of the framework of the body and at their outer ends each to one of the transverse wing spars and which preferably are made to conform to the wings in fore and aft section and are set at substantially the same fore and aft angle, or angle of incidence, so as to offer a minimum head resistance and at the same time serve to some extent at least as auxiliary supporting surfaces. The propellers 12 12^a are mounted, one on each side of the body, above the wing structure and somewhat forward of its rear or trailing edge upon shafts which are journaled in suitable bearings provided for the purpose in or secured to the rear tie-bars 11 11^a and are driven in any suitable manner; for ex-

ample, by driving shafts 13 13ª which from within the body extend diagonally outward and to the rear and are coupled to the two propeller shafts, respectively, by universal joint connections, the propellers being braced against forward thrust by hollow cylindrical rods 14 14ª which are secured each at its forward end to a forward tie-bar and at its rear end, cut away on the inner side to accommodate the diagonal driving shaft, to the bearing of a propeller shaft.

The central portions of the wing structure, or the bottom of the body and the adjacent portions of the wings, form a flattened V-shaped pontoon which will support the machine when at rest upon the water and which, when its engine is started and the machine is in motion, will rise in and plane over the surface of the water, or, when the required speed is attained, will rise easily from the water into the air. The effect of setting the wings of a flying machine at a dihedral angle in securing the lateral stability of the machine is well known; and this disposition of the wings in my aerohydroplane also secures its lateral stability upon the water, since a tilting of the machine to either side so greatly increases the area of contact of the wing with and consequently the displacement of the water on that side as to effectively check the movement and restore the machine to normal horizontal position. The use of the objectionable lateral pontoons heretofore required in machines of this class is thus rendered unnecessary. It is also evident that by reason of their position the propellers will be kept from contact with the water when the machine alights thereon, and little difficulty will be experienced therewith, even in rough water, because of the protection afforded by the wings.

While I have illustrated and described only one specific embodiment of my invention, it will be understood that it can be variously modified in its several details, that mechanical equivalents can be substituted for its different parts, and that one or more of its features can be entirely omitted, without departing from the spirit or sacrificing the advantages thereof.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a machine of the character described, the combination, with a body of stream line form, of a pair of relatively narrow laterally extended dihedral wings adapted both to float and laterally balance the machine upon water and to provide a planing surface therefor.

2. In a machine of the character described, the combination, with a body of stream line form, of a pair of dihedral wings which provide a flattened V-shaped planing surface beneath and substantially coincident with the bottom of the body and are adapted both to support the machine in the air and to support and float it upon water.

3. In a machine of the character described, the combination, with an inclosed body of stream line form, of a pair of dihedral wings framed to the lower framework of the body and provided with a lower surface covering which forms below the body a flattened V-shaped surface adapted to float and plane the machine upon water.

4. In a machine of the character described, the combination, with a body, of a pair of dihedral wings forming therewith a central hydroplane bottom for the machine and propelling means mounted and located above the wings intermediate their entering and trailing edges.

5. In a machine of the character described, the combination, with a body, of a pair of dihedral wings forming therewith a hydroplane bottom for the machine and propellers mounted one on each side of and adjacent the body directly above the wings and below the level of their outer ends.

6. In a machine of the character described, the combination, with a body of stream line form, of a pair of dihedral wings which provide a flattened V-shaped surface below and substantially coincident with the bottom of the body, and propellers which are mounted one on each side of the body above the wings and forward of their trailing edges.

7. In a machine of the character described, the combination, with a body, of relatively narrow laterally extending dihedral wings framed to the bottom of the body and trussed by narrower auxiliary supporting planes secured centrally to the top of the body.

8. In a machine of the character described, the combination, with a pisciform body, of dihedral wings the inner trailing portions of which are united below the body to form a planing surface adapted to raise the tail of the body from the water when the machine is in motion thereon.

9. In a machine of the character described, the combination, with a pisciform body, of dihedral wings having a lower central surface substantially coincident with the bottom of the body for the greater part of its length fore and aft but gradually divergent therefrom from a point near and thence back to the trailing edge.

10. In a machine of the character described, the combination, with a framed and inclosed pisciform body, of framed dihedral wings having transverse frame members secured to a lower longitudinal frame member of the body and inclosed above and below to form water-tight compartments adjacent the body on each side, tie-members secured centrally to an upper longitudinal frame member of the body and at their outer ends to the transverse frame members of the wings, and propellers mounted upon the rear tie-

members above the wings and in front of their trailing edges.

11. In a machine of the character described, the combination, with a framed and inclosed pisciform body, of framed dihedral wings having transverse frame members secured to a lower longitudinal frame member of the body and inclosed above and below to form water-tight compartments adjacent the body on each side, the lower surface covering of the wings being substantially coincident with the bottom of the body for the greater portion of its length fore and aft and gradually divergent therefrom from the rear transverse frame member to the trailing edge.

12. In a machine of the character described, the combination, with a framed and inclosed pisciform body, of framed dihedral wings having transverse frame members secured to a lower longitudinal frame member of the body and inclosed above and below to form water-tight compartments adjacent the body on each side, the lower surface covering of the wings being substantially coincident with the bottom of the body for the greater portion of its length fore and aft and gradually divergent therefrom from the rear transverse frame member back to the trailing edge, tie-members secured centrally to an upper longitudinal frame member of the body and at their outer ends to the transverse frame members of the wings, and propellers mounted upon the rear tie-members above the wings and in front of their trailing edges.

13. In a machine of the character described, the combination, with a framed and inclosed pisciform body, of framed dihedral wings having transverse frame members secured to a lower longitudinal frame member of the body and inclosed above and below to form water-tight compartments adjacent the body on each side, the lower surface covering of the wings being substantially coincident with the bottom of the body for the greater portion of its length fore and aft and gradually divergent therefrom from the rear transverse frame member back to the trailing edge, tie-members secured centrally to an upper longitudinal frame member of the body and at their other ends to the transverse frame members of the wings and adapted to provide auxiliary wing surfaces, and propellers mounted upon the rear tie-member above the wings and in front of their trailing edges.

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Witnesses:
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