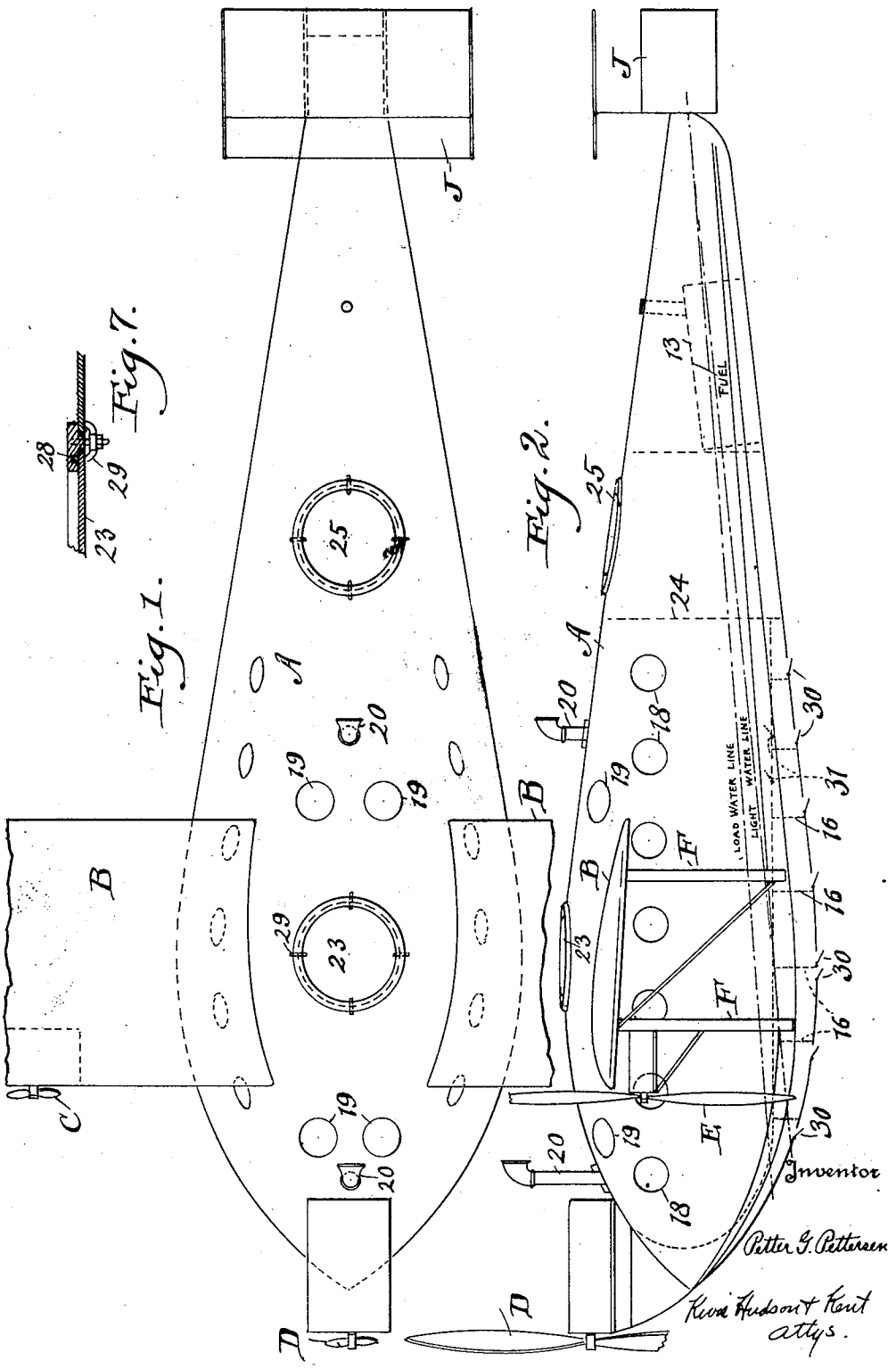
Oct. 14, 1930. P. G. PETTERSEN 1,778,467

BOAT STRUCTURE FOR SEAPLANES

Filed Jan. 28, 1928 2 Sheets-Sheet 1

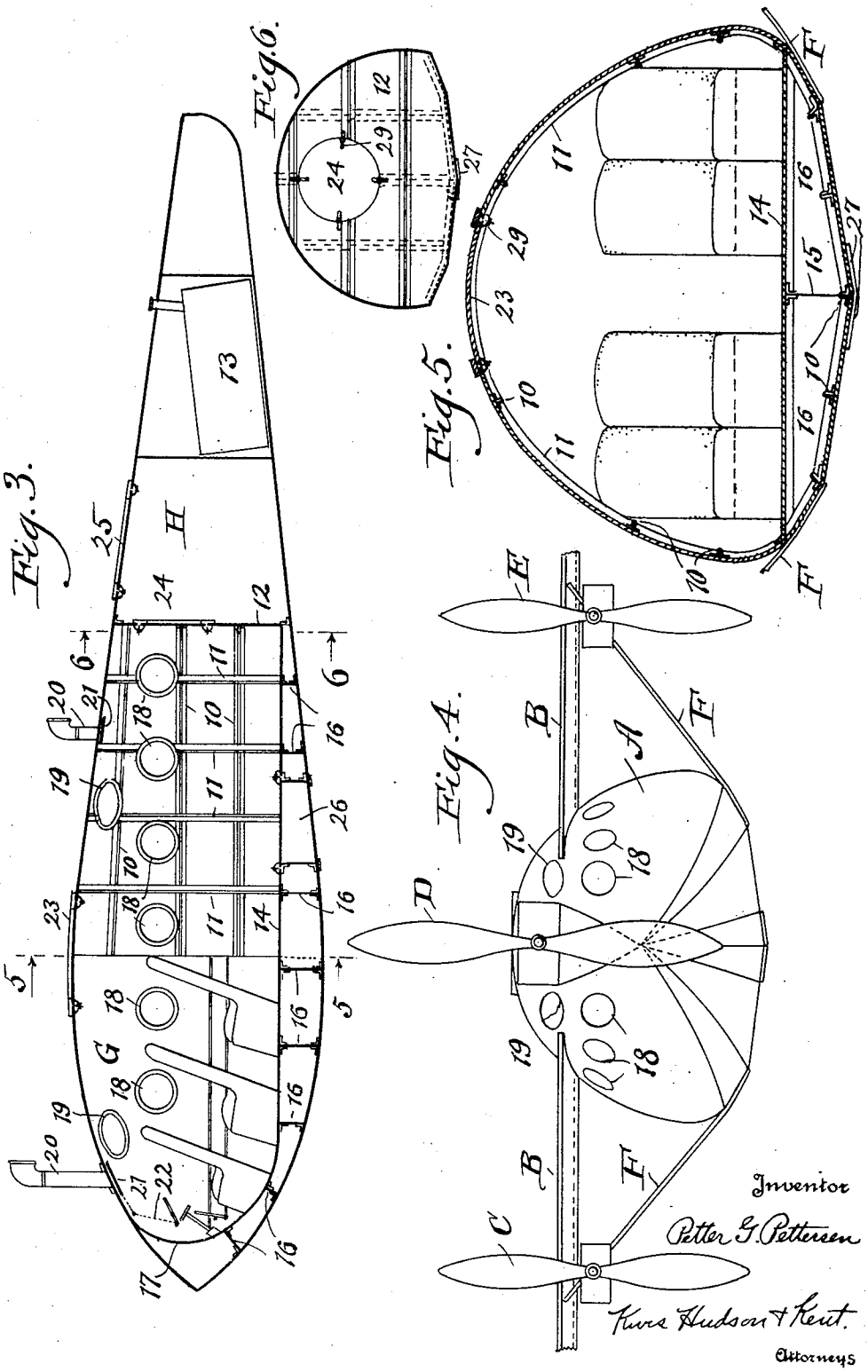


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BOAT STRUCTURE FOR SEAPLANES

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UNITED STATES PATENT OFFICE

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BOAT STRUCTURE FOR SEAPLANES

Application filed January 28, 1928. Serial No. 250,143.

This invention relates to improvements in boat structures for seaplanes.

With airplanes and seaplanes as heretofore constructed, long distance flights over water are highly hazardous, for the reason that the floating structures as heretofore constituted are not adapted to stand buffeting of rough seas for any considerable length of time where forced landings upon the water are necessary.

One of the objects of my invention is the provision of a boat structure for seaplanes adapted to remain afloat indefinitely and to automatically right itself in the event that it should be overturned in an unusually rough sea.

Another object is the provision of means for ballasting the boat and so arranging the ballast that it shall be difficult to overturn the boat, and that the boat will automatically right itself under such conditions.

A further object is the provision in a boat of this character of a series of fluid tight compartments beneath the deck of the passenger carrying section of the boat, whereby the buoyancy of the boat will not be greatly impaired by any local staving in of the bilge plates.

Another object is the provision of an entirely enclosed water-tight hull of sufficient strength above the water line to render the boat sea-worthy and substantially non-sinkable when over-turned as well as in upright position.

Still another object is the connection of the wing struts to the boat structure below the deck within the confines of water-tight compartments, whereby damage to the boat through strains put upon the struts will be confined to areas enclosed between water-tight bulkheads beneath the deck.

Other objects and features of novelty will appear as I proceed with the description of that embodiment of the invention which, for the purposes of the present application, I have illustrated in the accompanying drawings, in which

Figure 1 is a plan view of a seaplane boat structure embodying the invention.

Figure 2 is a side elevational view of the same.

Figure 3 is a longitudinal view of the structure, principally in vertical section, a portion of the inner sheathing being removed to more clearly disclose the frame work, and some of the parts of the structure being illustrated more or less diagrammatically.

Figure 4 is a front elevation showing the arrangement of wing struts.

Figure 5 is a cross sectional view of the hull of the boat, taken substantially on the line 5—5 of Figure 3.

Figure 6 is another cross-sectional view of the hull taken substantially on the line 6—6 of Figure 3.

Figure 7 is a detail sectional view illustrating a form of sealing and fastening which may be employed upon the hatches of the boat.

In the drawings I have illustrated a flying boat of the monoplane type, although the invention is equally well adapted to use upon biplanes or other types of air craft. The boat structure is indicated generally by the reference character A and the wings by the reference character B. Any number of propellers and driving motors may be employed, three being here illustrated at C, D and E. The wings are braced by inclined struts F, which are attached to the boat structure in a manner to be described hereinafter. The empennage assembly is diagrammatically indicated at J.

The material employed in the construction of the boat is principally metal, preferably an aluminum alloy of a high strength-weight ratio, and one that is resistant to the corrosive action of salt water and salt air. The specific makeup of the frame work is of no particular moment so far as my invention is concerned, but by way of example I have shown a series of longerons 10 of double angle or T section, and a series of ribs 11 intersecting the longerons and secured thereto, the ribs being of single angle form. To the outer sides of the frame work I rivet, weld or otherwise secure sheet metal plates to completely enclose the hull, being careful to keep all joints water-tight.

In shape, the boat structure may approximate roughly a torpedo, this form affording low resistance to the air during flight. It is divided by a transverse partition 12 into a forward or passenger carrying section G and an aft section H which may be utilized for the storage of freight, mail, etc., and may carry a fuel tank 13. In the forward section of the boat I provide a deck 14 which is water-tight, and is connected to the sides of the boat by water-tight joints. The deck 14 is located well down towards the bottom of the boat at a height near the widest part of the boat and also near the water line. The space between the deck 14 and the bilge plates may vary considerably, but for a boat designed to carry twenty or thirty people a maximum depth below the deck of approximately one foot is at present preferred. The space below the deck is divided up into a series of water-tight, and preferably air-tight compartments, by means of a longitudinal central bulkhead 15, extending upwardly from the keel of the boat and a series of transverse bulkheads 16. At its forward end the deck 14 is preferably deflected upwardly, as indicated at 17, so as to provide a water-tight compartment in the bow of the boat also.

Light for the passenger section of the boat may be admitted through a series of port holes 18 in the side walls and other port holes 19 in the top wall. The windows for the port holes are preferably permanently set in their closed position. Ventilation is provided by two or more ventilators 20, having movable cowls that can be turned horizontally into position to admit and discharge the desired amount of air. These ventilators may be closed or opened at will by means of sliding valves 21. Preferably the ventilator cowls and ventilator valves are connected for operation from the pilot's seat, and this may be done in any suitable manner, a lever and linkage 22 for the forward valve being illustrated by way of example in Figure 3.

Entrance to and exit from the passenger compartment are had through a hatch 23 which is arranged to be fastened from the inside of the boat, water-tight joints being provided. Communication between the two sections G and H of the boat may be had through a hatch 24, which is also arranged to be fastened and unfastened from the forward section G. Access to the storage section H of the boat may be had through a hatch 25, which can be fastened and unfastened from below. In the bottom of the boat I provide an additional hatch 26 which is of considerable thickness, being flush with the deck on its upper side and flush with the bilge plates on its lower side. This latter hatch will ordinarily not be utilized but is supplied as an emergency exit in the event the boat should be upturned and fail for any reason to right itself.

Along each side of the keel I preferably attach wear strips 27 to the outer surfaces of the bilge plates. The wing struts F are secured to the bilge of the boat between adjacent transverse bulkheads 16, so that if unusual strains upon the struts break them loose from the boat and damage the bilge plates in so doing, the resulting leak will affect only the water-tight compartments surrounding the attachment points of the struts.

In Figure 7 I have illustrated one means for sealing and fastening the hatches of the boat, but of course, any other suitable means may be employed. In this figure I have shown an annular soft rubber gasket 28 against which the hatch 23 is pressed by means of a fastening clamp 29.

In Figure 2 I have illustrated diagrammatically a series of valves in the bilge plates of the boat, arranged upon opposite sides of the center bulkhead 15, there being one valve for each compartment below the deck, except those at the bow which are above the water line. Any suitable means may be employed for opening and closing these valves from the passenger compartment, either individually or collectively or in groups. Also in the deck 14 above some or all of the water-tight compartments, I may form openings, diagrammatically indicated at 31 in Figure 2, controlled by valves or hatches.

The valves 30 are normally closed. When the seaplane is forced to alight upon the water these valves may be permitted to remain closed, and do remain so if the sea is calm, the compartments under the deck thus adding considerably to the buoyancy of the boat. If, however, there should be a heavy sea, or if no engine power should be available to hold the boat into the wind, buoyancy would become secondary in importance to stability. Under such circumstances some or all of the valves 30 would be opened until the corresponding compartments filled with water, and would then be closed again. The ballast thus provided would tend to prevent capsizing. As a precaution against possible capsizing the ventilators 20 and all hatches would be tightly closed. Now should the boat be rolled over temporarily the fact that its center of gravity, due to the ballast, is considerably above its center of buoyancy, would cause the boat to right itself immediately.

It will, of course, be appreciated that instead of water ballast I may, if desired, employ some part of the necessary load of the plane, as for instance, fuel or baggage freight. In that event such load will be introduced into or removed from the water-tight compartments through the openings 31 above mentioned.

The compartment structure beneath the deck of the boat has the advantages, not only of providing buoyance for the boat should water enter through a hole resulting from a collision or the like, and providing spaces across the bottom of the boat for the retention of ballast, but also on account of the numerous bulkheads employed this portion of the boat is rendered very rigid and is, therefore, capable of withstanding indefinitely the buffeting which it must undergo in a heavy sea.

Although in the accompanying drawings and foregoing description I have explained more or less in detail a specific embodiment of the invention, I desire it to be understood that such disclosure is primarily for the purpose of illustration and should not be construed as a limitation of the invention.

Having thus described my invention what I claim is:

1. In a seaplane, a boat structure, a deck therein, an enclosed compartment above said deck, a wing arranged transversely of said boat structure, a wing strut extending from said wing diagonally downward and secured to the bilge of the boat, and a water-tight compartment within the bilge above the attachment of said strut, occupying a fraction only of the space between the deck and bilge.

2. In a seaplane, a boat structure, a wing arranged transversely of said boat structure, a deck within said boat structure, a wing strut extending from said wing diagonally downward and secured to the bilge of the boat beneath said deck, and a water-tight compartment between said deck and bilge extending forwardly and rearwardly beyond the attachment of said strut.

3. In a seaplane, a boat structure, a wing arranged transversely of said boat structure, a water-tight deck within said boat structure, a series of water-tight bulkheads between said deck and the bilge of the boat dividing the space beneath the deck into a series of water-tight compartments, and a wing strut extending from said wing diagonally downward and secured to the bilge of the boat between adjacent bulkheads.

4. In a seaplane, a boat, two wings extending laterally from the upper portion of said boat, braces extending downwardly at an angle from said wings and attached to the lower portion of said boat, said boat being widest substantially at the water-line and gradually decreasing in width toward the top thereof and having its greatest vertical dimension above the water-line, said boat being entirely enclosed, and a deck within the boat substantially at the water-line thereof.

5. In a seaplane, a boat, two wings extending laterally from the upper portion of said boat, braces extending downwardly at an angle from said wings and attached to the lower portion of said boat, said boat being widest substantially at the water-line and gradually decreasing in width toward the top thereof and having its greatest vertical dimension above the water-line, said boat being entirely enclosed, and being provided with a water-tight deck spaced from the bottom of the boat, said deck being near the water-line and near the widest portion of the boat.

6. In a seaplane, a boat, two wings extending laterally from the upper portion of said boat, braces extending downwardly at an angle from said wings and attached to the lower portion of said boat, said boat being widest substantially at the water-line and having its greatest vertical dimension above the water-line, said boat being entirely enclosed, and being provided with a water-tight deck spaced from the bottom of the boat, said deck being near the water-line and near the widest portion of the boat, the space between said deck and the bottom of the boat being divided into water-tight compartments.

7. In a seaplane, a boat, two wings extending laterally from the upper portion of said boat, braces extending downwardly at an angle from said wings and attached to the lower portion of said boat, said boat being widest substantially at the water-line and having its greatest vertical dimension above the water-line, said boat being entirely enclosed, and being provided with a water-tight deck spaced from the bottom of the boat, said deck being near the water-line and near the widest portion of the boat, the space between said deck and the bottom of the boat being divided into water-tight compartments, and valves in the bottom of the boat below said compartments for the admission or the discharge of water.

In testimony whereof, I hereunto affix my signature.

PETTER G. PETTERSEN.