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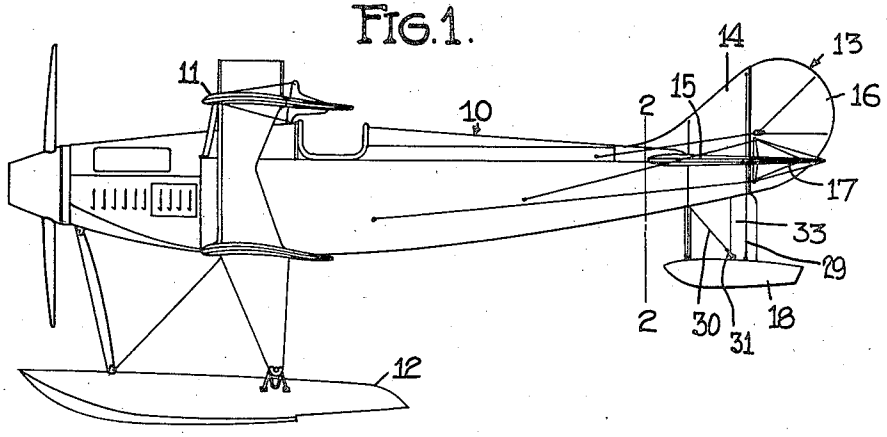
PONTOON MOUNTING FOR HYDROAEROPLANES.

APPLICATION FILED JULY 12, 1918.

1,373,408. Patented Apr. 5, 1921.

2 SHEETS—SHEET 1.

FIG. 1.



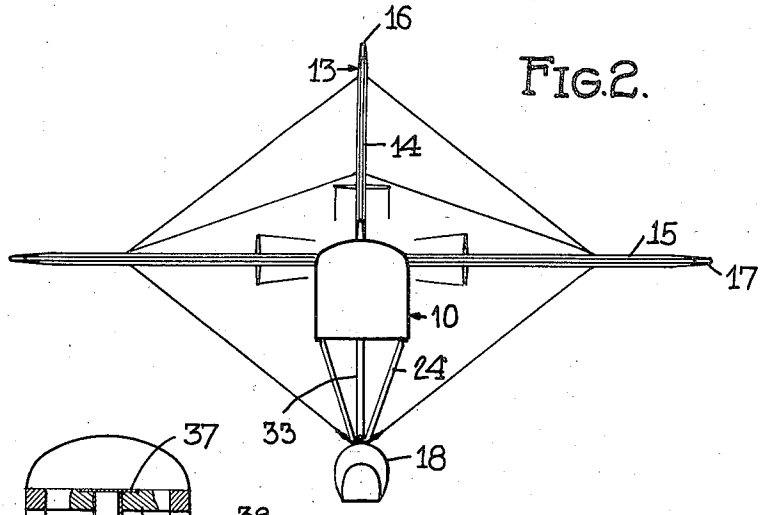


FIG. 2.

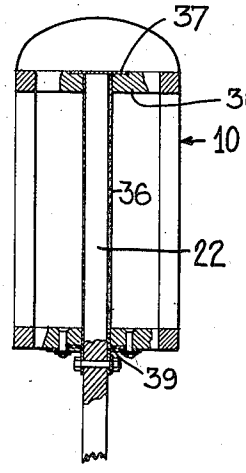


FIG. 8.

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2 SHEETS—SHEET 2.

FIG. 3.

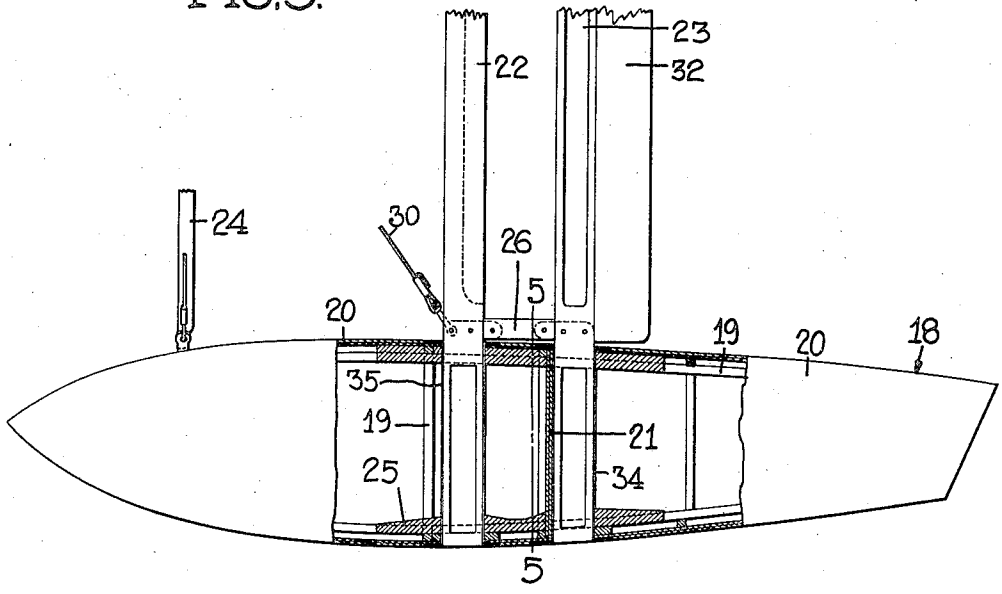


FIG. 4.

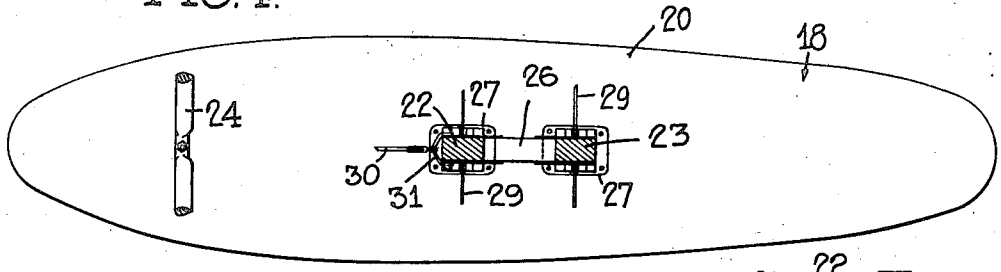


FIG. 5.

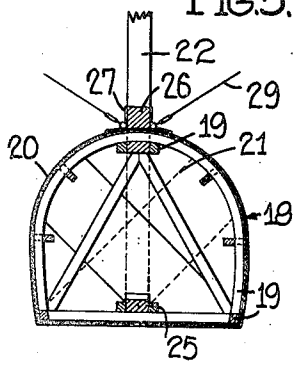


FIG. 6.

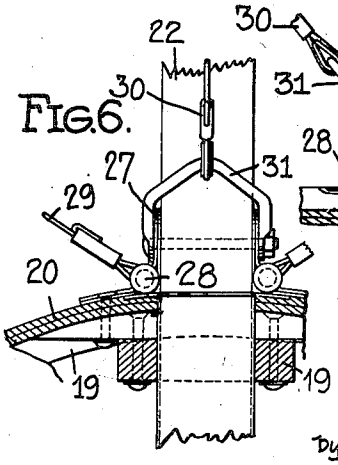
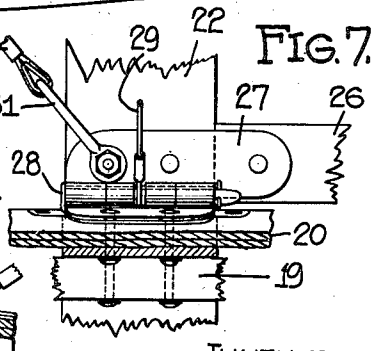


FIG. 7.



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PONTOON-MOUNTING FOR HYDROAEROPLANES.

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To all whom it may concern:

Be it known that I, WILLIAM S. BURGESS, a citizen of the United States, residing at Marblehead, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Pontoon-Mountings for Hydroaeroplanes, of which the following is a specification.

My invention relates to airplane launching and landing gear construction and more particularly to improvements in pontoon mounting as applied to hydro-aircraft.

Broadly stated the object of the invention is the mounting of the pontoon in a manner giving it absolute rigidity, strength and seaworthiness without undue weight or head resistance. This mounting comprises landing gear or pontoon struts carried from the bottom of the pontoon into the fuselage to a point beyond the undersurface thereof. These struts are preferably extended into the pontoon to engage its bottom surface at or near a point calculated to best withstand the impact strains of landing. In this way they directly carry the stress into the fuselage for distribution over an extended area thereof.

The invention is further characterized by the extension of one of the pontoon struts through and beyond the fuselage for termination at or near the top edge of the vertical stabilizing fin. It thus serves a two fold purpose, *i. e.*, in one instance as a pontoon support and in the second instance as a stabilizer brace. Not only is this construction stronger and better than the current practice of providing separate elements at the points mentioned but it is also cheaper as the pontoon strut and stabilizer brace may be said to constitute, in effect, continuations of the tail post of the fuselage. Further objects and advantages of the invention will more fully appear from the following description taken in connection with the accompanying drawings illustrating the preferred form of the invention, in which,

Figure 1 is a side elevation of hydro-aircraft having a pontoon supported and mounted in the manner herein claimed.

Fig. 2 is an enlarged transverse sectional view (looking aft) on the line 2—2 of Fig. 1.

Fig. 3 is a detail view, partly in elevation and partly in section, illustrating the manner in which the pontoon struts extend into the pontoon for connection with its interior bottom surface.

Fig. 4 is a plan view of the pontoon showing its supporting struts in section.

Fig. 5 is a transverse section on the line 5—5 of Fig. 3.

Fig. 6 is a fragmentary sectional view illustrating the connection of one of the pontoon supports or struts with the pontoon at its point of intersection with the deck.

Fig. 7 is a similar view or section taken at right angles to Fig. 6, and

Fig. 8 is a transverse section taken through the fuselage near its stern end showing the connection between it and the forward pontoon strut.

In the embodiment of the invention selected for illustration I have disclosed a tail pontoon in connection with which the improved mounting of the invention is used. It may, however, be used equally as well in connection with the main pontoon except that in the latter instance the supports or struts would extend into the fuselage for termination at points within its confines, rather than beyond its covering. It is the broad idea of extending the struts into the fuselage for effectually distributing stresses of landing over an extended area thereof upon which I rely for generic protection. The fuselage, designated 10, the supporting surfaces, designated 11, the main pontoon designated as 12 and the empennage designated as 13 may be of any well known construction. The latter comprises the usual vertical stabilizer 14, horizontal stabilizer 15, rudder 16 and elevator flaps 17. As is customary in hydroaeroplanes the tail pontoon designated as 18 is mounted directly beneath and at the extreme rear end of the tail end of the fuselage 10. It comprises the usual frame members 19 and covering 20. Intermediately it is cross-braced by a transverse bulk head 21 extending substantially the full depth of the pontoon. This bulk head lies at or near that section of the pontoon calculated to receive the heaviest impact strains in landing.

The support of the pontoon includes two vertical struts 22 and 23 and a forward V-brace 24. The struts 22 and 23 are carried through the deck of the pontoon for connection with its bottom. Footings 25 are provided at the foot of these struts that they may be rigidly held in place. These foot-

ings extend fore and aft beyond the struts to adequately distribute the impact strains over a wider area of the pontoon bottom than that actually braced by the struts themselves. The rearmost of the struts (23) lies contiguous to the transverse bulk head 21 to vertically reinforce and stiffen it.

At the deck of the pontoon the struts 22 and 23 are uninterrupted although connected by a brace 26 arranged between them. This brace is held in place by means of fittings 27 mounted upon the opposite faces of the respective struts and of a size such that they extend at one end beyond the strut edges to overlap said brace. These fittings also provide a fastening means for the struts themselves. They are of angular formation (see Fig. 6) and lie flat against both the outside surface of the deck and the outside faces of the struts. At the angles of these fittings (they are constructed in hinge form) hinge pins 28 are provided. Each hinge pin serves not only as a connection between the separable fitting parts but also as an anchorage for brace wires 29 which extend divergently upwardly for connection with the horizontal stabilizer 15. In addition to the wires 29 a forward diagonal wire 30 is provided. This wire extends from the point of connection of the V-brace 24 with the fuselage to the point of intersection of the strut 22 with the pontoon deck. Its function is to rigidly brace the pontoon in a longitudinal direction. One of the belts used for fastening the fittings 21 of the strut 22 serves also as the anchorage for this wire. By providing a clevis 31 at the lower end of the wire, this form of connection may be used.

The struts 22 and 23 do not terminate in the plane of the bottom of the tail end of the fuselage as heretofore. They extend uninterruptedly beyond this point, one of them terminating in the horizontal plane of the fuselage covering and the other at a point determined by the vertical stabilizer 14. This latter strut (23) is thus continuous from the top edge of the stabilizer 14 to and through the fuselage, (thus replacing the usual stern post,) to and through the deck of the pontoon, to the pontoon bottom. In this way the three airplane parts, *i. e.*, the empennage, fuselage and tail pontoon are constituted a rigid unitary structure. The strut 22 supplements this connection although it does not extend into the stabilizer 14 as does the strut 23. If desired, the struts 22 and 23, by the use of faring 32 and fabric 33 may be stream-lined together. This cuts down the resistance of the struts at least one-half. In addition to the wire 29 the pontoon is braced against laterally directed shocks by the V-brace 24. This V-brace is preferably of integral formation and placed forwardly of the struts not far removed from the bow end of the pontoon. In this way the pontoon in its entirety is effectually trussed fore and aft.

Metal sockets 34, 35 and 36 are provided at the strut ends to receive and hold the struts rigidly in place. The socket 34 at the foot of the strut 23 and the socket 35 at the foot of the strut 22 are sufficiently elongated to extend from the deck to the bottom of the pontoon, each being seated at its lower end in one of the footings 25. The socket 36 at the upper end of the strut 22 is also elongated. Its length however is determined by the depth of the fuselage rather than the pontoon. The ends of this socket are flanged as at 37 to overlie in one instance the adjacent top horizontal fuselage strut 38 and in the other instance to abut a fitting 39 fastened to the underneath surface of the fuselage and through which the strut extends.

It will be noted upon reference to Figs. 5, 6 and 7 that the structural elements of the pontoon frame-work enter into the system of bracing for added strength. Certain of the longitudinal stringers or frame members of the pontoon lie upon opposite sides of the struts 22 and 23 to laterally brace them while others intersect the struts at right angles. Still others (see Fig. 5) intermediately brace the strut by extending divergently downwardly for connection with the pontoon bottom at or near its chines. The continuation of the struts from the bottom of the pontoon to the top edge of the stabilizing fin in one instance and from the bottom of the pontoon to the top of the fuselage in the other is however the main feature of the mounting herein set forth. This construction, as intimated, not only lessens the cost of manufacture but renders the pontoon stronger and better able to withstand the heavy impact strains of landing. Moreover, the impact strains are carried and distributed over a larger area of the fuselage and to points in the fuselage designed to withstand this strain most efficaciously.

While I have described my invention in detail in its present preferred embodiment, it will be obvious to those skilled in the art after understanding my invention, that various changes and modifications may be made therein without departing from the spirit or scope thereof, and I aim in the appended claims to cover all such modifications and changes.

What is claimed is:

1. In an airplane, a fuselage comprising an inside framework and an outer covering within which the framework is inclosed, a pontoon mounted beneath the fuselage and having a rigid hydroplaning surface, and a mounting for the pontoon including a supporting strut deeply embedded in the fuselage at one end and deeply embedded in the pontoon at its opposite end, the first men-

tioned end of the strut being fastened to the fuselage framework and the opposite end directly fastened to the hydroplaning bottom surface of the pontoon.

2. In an airplane, a fuselage, a pontoon mounted beneath the fuselage and having an inside framework, an integral rigid hydroplaning bottom surface, and an outer covering within which the inside framework is inclosed and a mounting for the pontoon including two supporting struts, both of which are deeply embedded in the pontoon as a part of its inside framework and both of which extend uninterruptedly through the covering thereof for continuation uninterruptedly therebeyond, the lower ends of the struts terminating at and being fastened to the integral hydroplaning bottom surface.

3. In an airplane, a fuselage, a pontoon mounted beneath the fuselage and having an inside framework, an integral rigid hydroplaning bottom surface, and an outer covering within which the inside framework is inclosed and a mounting for the pontoon including two supporting struts both of which are deeply embedded in the pontoon as a part of the inside framework and both of which extend uninterruptedly through the covering of the pontoon for continuation therebeyond, the lower ends of the struts terminating at and being fastened to the integral hydroplaning bottom surface and the struts themselves being disposed respectively fore and aft of the transverse center line of the pontoon.

4. In an airplane, a fuselage comprising an inside framework and an outer covering within which the framework is inclosed, a pontoon mounted beneath the fuselage and comprising an inside framework and a covering within which the framework is inclosed, and a mounting for the pontoon including a supporting strut deeply embedded in the fuselage at one end and deeply embedded in the pontoon at its opposite end, the first mentioned end of the strut being fastened to the fuselage framework and the opposite end being fastened to the inside framework of the pontoon.

5. In an airplane, a fuselage comprising an inside framework and an outer covering within which the framework is inclosed, a pontoon mounted beneath the fuselage and comprising an inside framework and an outer covering within which such framework is inclosed, and a mounting for the pontoon including two supporting struts deeply embedded in the fuselage at one end and deeply embedded in the pontoon at their opposite ends, the ends of the struts being directly fastened respectively to the inside framework of the fuselage and to the inside framework of the pontoon and located respectively fore and aft of the transverse center line of the pontoon.

6. In an airplane, a fuselage comprising an inside framework and an outer covering within which the framework is inclosed, a pontoon mounted beneath the fuselage and having a rigid hydroplaning surface, a vertically elongated socket inclosed in the fuselage and fastened to the structural framework thereof, and a mounting for the pontoon including a supporting strut deeply embedded in the fuselage at one end and fastened to the pontoon at its opposite end, the first metioned end of the strut being extended into the socket where it is fastened.

7. In an airplane, a fuselage comprising an inside framework and an outer covering within which the framework is inclosed, a vertically elongated socket inclosed in the fuselage and fastened to the structural framework thereof, a pontoon mounted beneath the fuselage and having a rigid hydroplaning bottom surface, a bulk head inclosed in the pontoon, the bottom edge of the bulk head engaging the hydroplaning bottom surface, and a mounting for the pontoon including two supporting struts, both of which are deeply embedded in the fuselage at one end and deeply embedded in the pontoon at their opposite ends, said struts being disposed respectively fore and aft of the transverse center line of the pontoon and one of said struts at one end being seated in the socket and at its opposite end disposed adjacent the bulk head to stiffen it and at the same time distribute the hydroplaning and landing stresses over an extended area of both the fuselage and the hydroplaning bottom surface.

In testimony whereof I hereunto affix my signature.

WILLIAM STARLING BURGESS.