

Sept. 27, 1932.

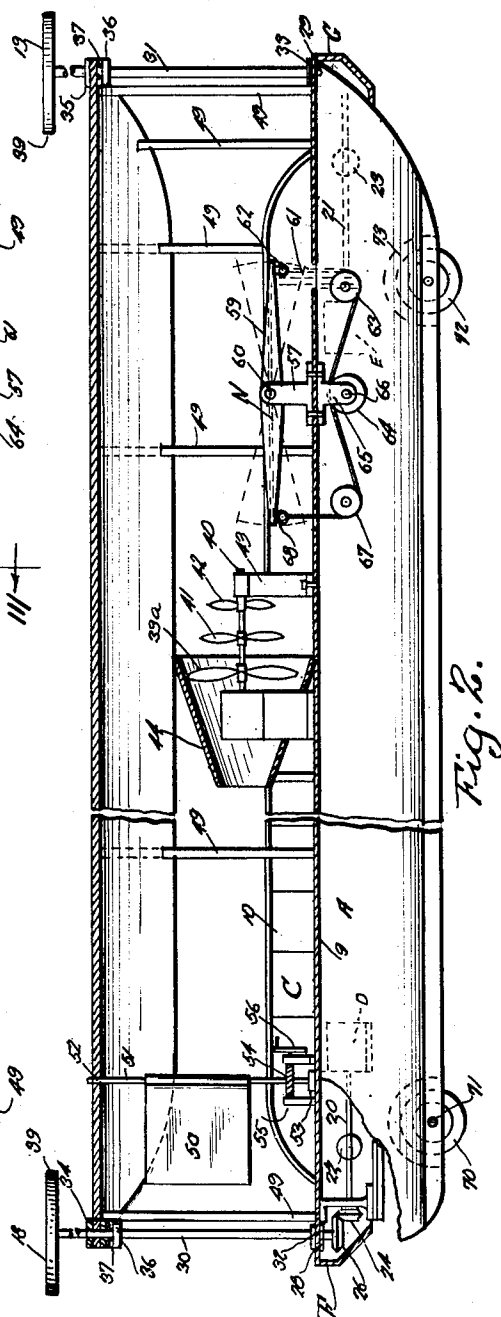
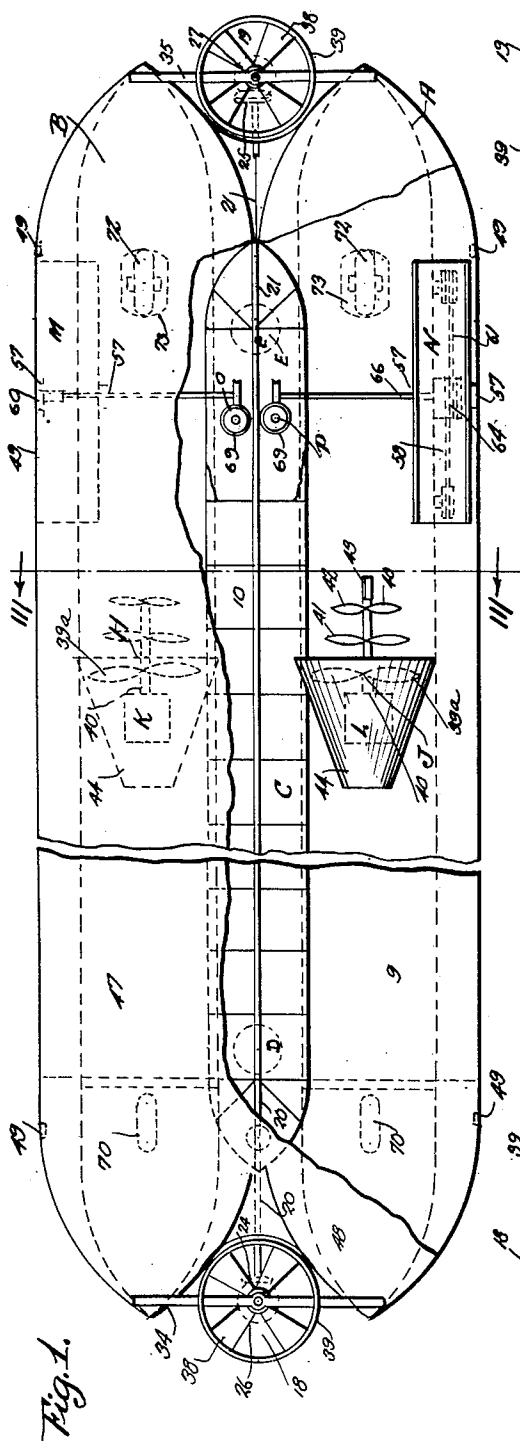
O. E. MANTOR

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DUO-HYDROAIRCRAFT

Filed March 29, 1932

2 Sheets-Sheet 1



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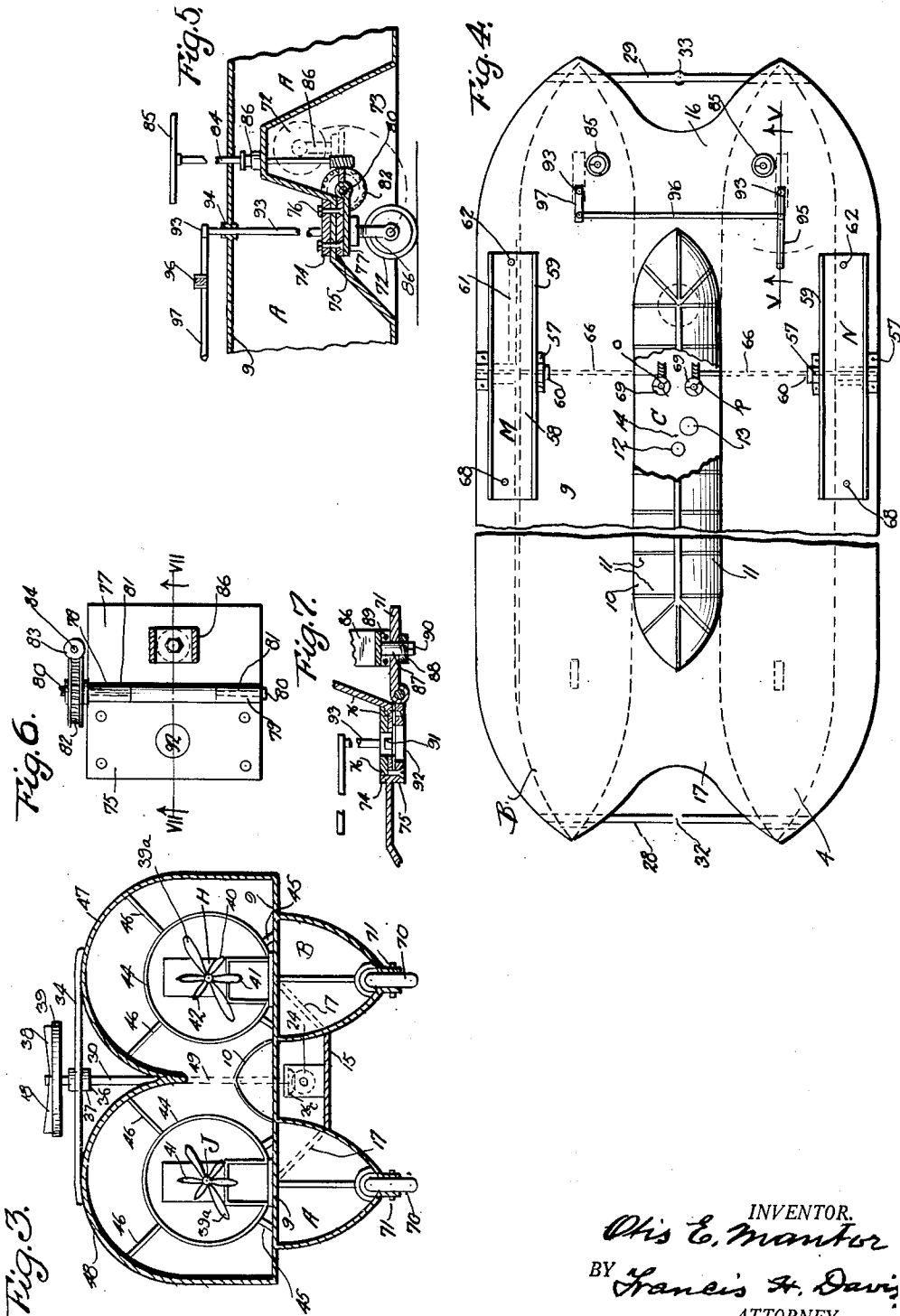
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UNITED STATES PATENT OFFICE

OTIS E. MANTOR, OF MONTEREY, CALIFORNIA

DUO-HYDROAIRCRAFT

Application filed March 29, 1932. Serial No. 601,821.

This invention relates broadly to a duo hydro-air craft, but more particularly to a craft embodying both driving and lifting mechanism.

The invention is primarily designed for large craft suitable for bombing purposes, although it can be arranged for smaller crafts.

My invention has for its objects the following desiderata:—

To provide a wing surface comprising two parallel wings of semi-circular cross-section pointed fore and aft and secured above the deck by suitable structural members arranged to carry the wings at a desirable height thereabove. The inner wing edges being fastened together so as to form two semi-circular tunnels adapted to float over the air.

To provide a horizontally-operable propeller at each end of the craft, said propellers being disposed in a plane above the wing surface and in alinement with the valley between the wings, said propellers being adapted and arranged to lift and sustain the ship in the air, particularly when taking-off or when landing.

To provide novel vertically-operable propellers adapted for forward propellance of the craft.

To provide certain funnel-like elements for each propeller, adapted to concentrate the air behind said propellers to react against the atmosphere so as to aid propellance.

To provide certain independently-operable elevator elements to deflect the craft up or down from a horizontal plane or to tilt the craft when curving right or left.

To provide two sub-located boats, each axially-disposed under the axis of each said wing, said boats being bridged across by and secured to a deck so as to leave a substantial space between said boats.

To provide a cabin space between said boats sunk below the level of said boats and communicating therewith; the floor of said cabin sloping upwardly and flaring outwardly at each end to connect with the stems and sterns of the respective boats. The fore slope serving to compress the atmosphere to afford

additional buoyancy, and the aft slope affording stream-line effect.

To provide certain novel landing wheels, and means operable from the craft, whereby the front wheels may be retracted or brought into operable position, and means to cut said wheels synchronously so as to guide the craft when on land; together with other objects and advantages hereinafter appearing, particularly pointed out in the claims and illustrated in the drawings attached hereto and made part hereof, in which:—

Figure 1 is a top plan view of my invention with portions broken away.

Figure 2 is a side elevational view with parts of the wings and of the stern of one boat cut away.

Figure 3 is a section taken on the line III—III of Figure 1.

Figure 4 is a broken plan view of the deck with the wings removed.

Figure 5 is an enlarged sectional view of the assembly of one front wheel, taken on the line V—V of Figure 4.

Figure 6 is a top plan view of the wheel-carrying hinge and the worm and worm gear to operate it.

Figure 7 is a section taken on the line VII—VII of Figure 6.

Similar reference indicia refer to similar parts throughout the several views.

In carrying out my invention I provide the twin boats A and B suitably spaced apart and secured to the under side of the deck 9.

It will be noted by reference to Figure 3 that the cabin C is disposed between the respective boats and is partially sunk between them. Access may be had to either boat from the cabin. Said cabin extends well fore and aft of the craft as will be seen by reference to Figures 1, 2 and 4. The upper portion 10 of the cabin is composed of partitioned transparent sections provided with doors for ingress and egress, which may be provided with hinges as indicated at 11—11 or be arranged to slide. A portion of the cabin floor is perforated at 12 to permit the dropping of bombs or the like so that they may fall down between said boats without interference. 13 in-

dicates a suitable cover for said perforation adapted to swing in a horizontal plane round the pivot 14, well shown in Figure 4.

The front and rear ends of the cabin which protrude above the deck 9 are substantially half cones, whereas, the floor 15 of the cabin slopes upwardly and flares outwardly at 16 and 17 to make stream-line juncture with the respective stems and sterns of said boats, as indicated in dotted lines in Figure 3.

The forward slope 16 aids the buoyancy of the craft by reacting on the air while the craft is moving rapidly forward.

D and E show diagrammatically engines which are adapted to operate the respective fore and aft horizontally-operable propellers 18 and 19, the connections of said engines being conventional are unnecessary to show. The respective engine shafts 20 and 21 are provided with the diagrammatically shown clutch and transmission elements 22 and 23 which are conventional and adapted to control the starting, speed and stopping of the respective propellers 18 and 19. Said respective shafts carry the respective bevel pinions 24 and 25 acting on the bevel gears 26 and 27. Said gears being mounted in the respective assemblage structures F and G, which may well be gear-boxes adapted to contain lubricant. The cross members 28 and 29 extend across and are secured to the respective sterns and stems of the boats. Said gears are fast to the lower ends of the respective vertical shafts 30 and 31, the lower ends of which are journaled respectively at 32 and 33 of said members; said shafts extend upwardly through the cross members 34 and 35, being journaled therein and each provided with a collar 36 acting against the antifricition elements 37 interposed between said collars and said members. The shaft 30 carries the propeller 18; the shaft 31 carries the propeller 19, each of which is provided with vanes as 38 the outer ends whereof being secured to a ring as 39.

The vertically-operable propellers H and J are secured to the deck 9 in axial alinement above the respective keels of the respective boats A and B. I prefer to use compound propellers comprising blades 39a of large diameter adjacent the respective diagrammatically-shown engines K and L; blades 41—41 of less diameter suitably spaced forward of the blades 39a, and the blades 42—42 of still less diameter suitably placed forward of the latter, all said blades being secured to the shaft 40, the outer end of which is journaled in the bearing 43 fastened to said deck. The respective sets of blades, 39a, 41 and 42 being set radially on said shafts 40.

The funnel elements 44—44 house the respective blades 39a and are appropriately secured in alinement and concentric with the respective shafts 40 by the braces 45 secured to said deck and by the braces 46 which are

fastened to the respective wings 47 and 48. It is assumed that said engines are appropriately connected with a fuel supply and controls, which form no part of the present invention.

The wings 47 and 48 comprise twin, semi-cylindrical members placed truly side by side in the same horizontal plane, their contiguous inner sides being secured to each other; the whole dual structure being secured to the deck 9, at a suitable height above it by structural members as 49 adapted and arranged to thoroughly secure the wing members to the deck and the respective boats A and B. It being understood that other suitable struts, braces and the like may be added for additional security.

The rudder 50 is secured to the rockable shaft 51 journaled at 52 and 53 under control of the worm gear 54 acted on by the worm 55 controlled by the hand-wheel 56.

The respective elevators M and N are mounted on the deck in bearings as 57—57, each elevator comprises the longitudinally-disposed, wing member 58 provided with the tapering flanges 59 for reenforcement and is mounted for tiltable movement on the pivot 60.

The elevators M and N are used to make the craft ascend or descend. They may be worked in the same horizontal plane or independently at varying angles from each other.

The flexible members 61—61 attached beneath the respective elevator ends at 62, their loose ends pass downwardly through suitable apertures in the deck to bring them down outside said respective boats, are then passed under the sheaves 63, a few turns are next taken round the drum 64 mounted in the bracket 65 fast to the shaft 66, passed up round the sheave 67 and are then brought up through suitable apertures in the deck, drawn taut and made fast to the respective elevator ends at 68—68. Said respective shafts pass at right angles through said boats into the cabin C and are provided with the respective worm and worm gear elements O and P which are sufficiently near to each other for manipulation by an operator. Said worms and gears being of locking pitch, said arrangement of parts constituting means to elevate or depress said elevators when the respective hand wheels 69—69 are suitably rotated.

The rear wheels 70—70 are recessed up into the bottoms of the respective boats and rotate upon their axles 71. The respective front wheels 72—72 are adapted to be withdrawn into the recesses 73 by mechanism comprising:—

The cross-frame member 74 within the shell of the respective boat, the stationary hinge member 75 coincidentally beneath within said recess, both being secured in place by bolts as 76. The hinge member 77

is complementary to the member 75 being provided with the lugs 78 and 79 which are keyed fast to the shaft 80 at 81—81. The worm gear 82 is keyed to the end of said shaft and is acted on by the locking-pitch worm 83 provided with the shaft 84 and the hand wheel 85, the stuffing-box 86 being provided to prevent water entering the boat. The hinge member 77 is arranged to open out flat as shown in Figures 6 and 7 and to fold up under the member 75 when suitably acted on by the hand wheel 85. The member carries the fork 86 mounting the wheel 72 the connection being had by the shoulder pivotal stem 87, and the nut 88, the anti-friction elements 89 being interposed between said fork and the adjacent surface of the member 77. The portion 90 of said pivot protrudes beyond said nut and is polysided to engage the complementary socket 91 which it does by passing up through the opening 92 when the members 75 and 77 are brought together as shown in Figure 5. Said socket centers in the opening 92 and is carried as an extended socket-wrench by the shaft 93 which is journaled at 94 and passes up for a suitable distance above the deck to carry the lever 95 to which is pivotally connected the rod 96 linking said lever with the arm 97 fast to the shaft 93 of the corresponding elements in the boat B, obviously manipulation of the lever 95 will synchronously cut both said wheels so as to guide the craft either on land or water.

It should be noted that the respective ends of the wings 47 and 48 come to medial points, and that the respective ends of the deck 9 are cut away to correspond with the arc of the rings 39 thereby relieving back-pressure from the propellers 18 and 19.

It is believed that my invention and the advantages to be gained by the use thereof are fully explained. In reducing the invention to practice, certain minor features in construction, combination and arrangement of parts may necessitate alteration, to which the patentee is entitled, providing such alteration is comprehended in the scope of what is claimed.

What I claim is:—

1. In a craft of the kind described, twin parallel boats, a deck bridging the same and twin wings carried thereby, a cabin disposed between the boats, a horizontally-operable propeller at each end of the craft disposed above said wings in line with the valley therebetween, a keel for each boat, vertically-operable propellers axially disposed vertically above the axes of the respective keels, engines adapted to drive said horizontally-operable propellers, engines adapted to drive said vertically-operable propellers, a rudder and operable means therefor, a non-cuttable ground-engaging wheel mounted aft of each boat, a retractable ground-engaging, cuttable

wheel mounted forward adjacent the stem of each boat, means arranged to project and retract said wheels, means arranged to cut said wheels, both said means controllable from the craft; elevators mounted forward at each side said deck and operative means therefor.

2. In a craft as specified in claim 1, said deck coming to a point coincidental with the respective stems and sterns of said boats and scalloped at each end between said points to conform to the arc of said horizontal propellers.

3. In a craft as specified in claim 1, said vertically-operable propellers comprising a plurality of sets of propeller blades of diminishing diameters extending forwardly on the same shaft, and funnel elements adapted to compress the air behind said propellers.

4. In a craft as specified in claim 1, said means to operate the rudder comprising a worm gear and worm of locking pitch and means to rotate said worm.

5. In a craft as specified in claim 1, said elevators comprising air-engaging members disposed longitudinally one at each side of the deck, said members pivoted for upward and downward cant and flexible means controlling said movements.

6. In a craft as specified in claim 1, a movable hinge member upon which is mounted said cuttable wheel, means arranged to apply radial movement to said member thereby carrying said wheel from inoperative to ground-engaging positions and vice versa, said means comprising a pivotal stem with a protruding end, a rotatable socket member adapted to engage said end, and means to rotate said member.

7. In a craft as specified in claim 1, having a fixed and a movable hinge member, a pivotal shaft keyed to the latter member, a worm gear fixed to the shaft, a worm acting on the gear and regulable means to operate the worm.

8. In a craft as specified in claim 1, an additional cuttable front wheel to form a pair and means to cut them.

9. In a craft as specified in claim 1, said cabin being shorter than said boats, a horizontally-disposed floor extending the length of the cabin and upwardly and outwardly extending from the respective floor ends to the level of said deck.

10. In a craft as specified in claim 1, a floor, said floor apertured, and a cover controlling said aperture.

In testimony whereof I affix my signature this 23d day of March, 1932.

OTIS E. MANTOR.