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O. J. ABRAHAMSON.

AEROPLANE.

APPLICATION FILED MAY 3, 1918.

1,366,895.

Patented Feb. 1, 1921.

3 SHEETS—SHEET 1.

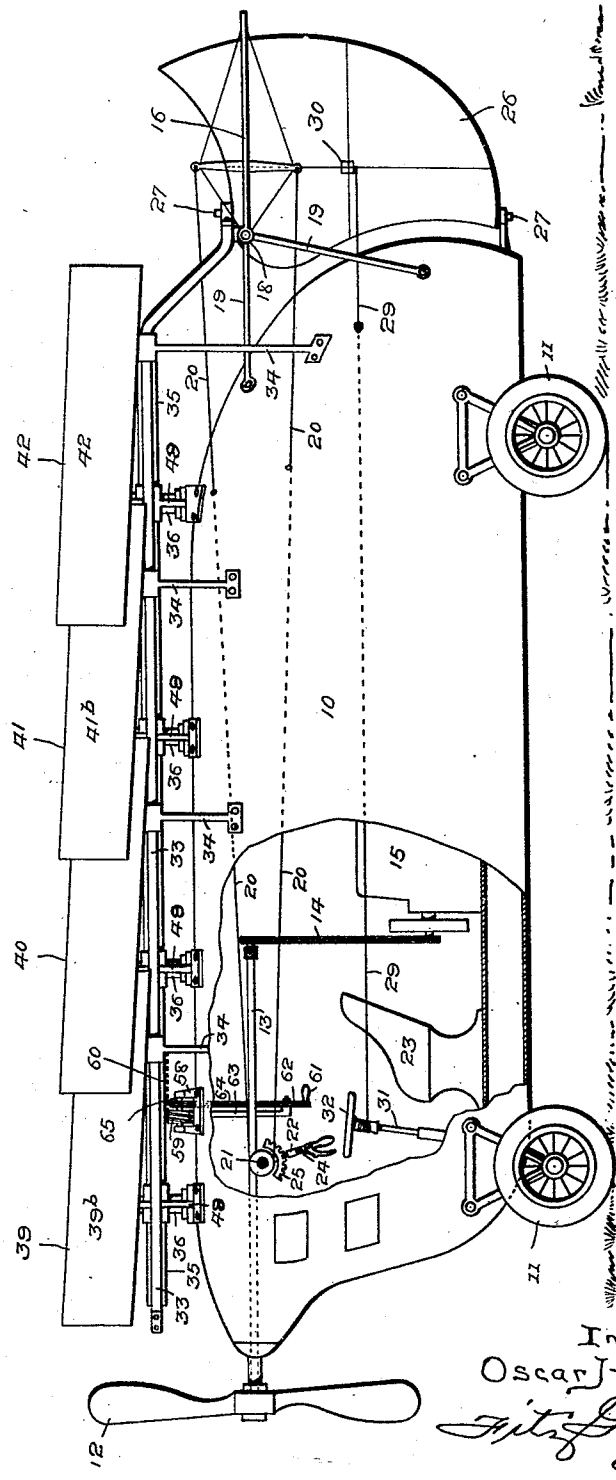


Fig. 1.

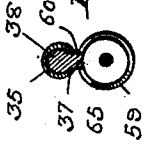


Fig. 7.

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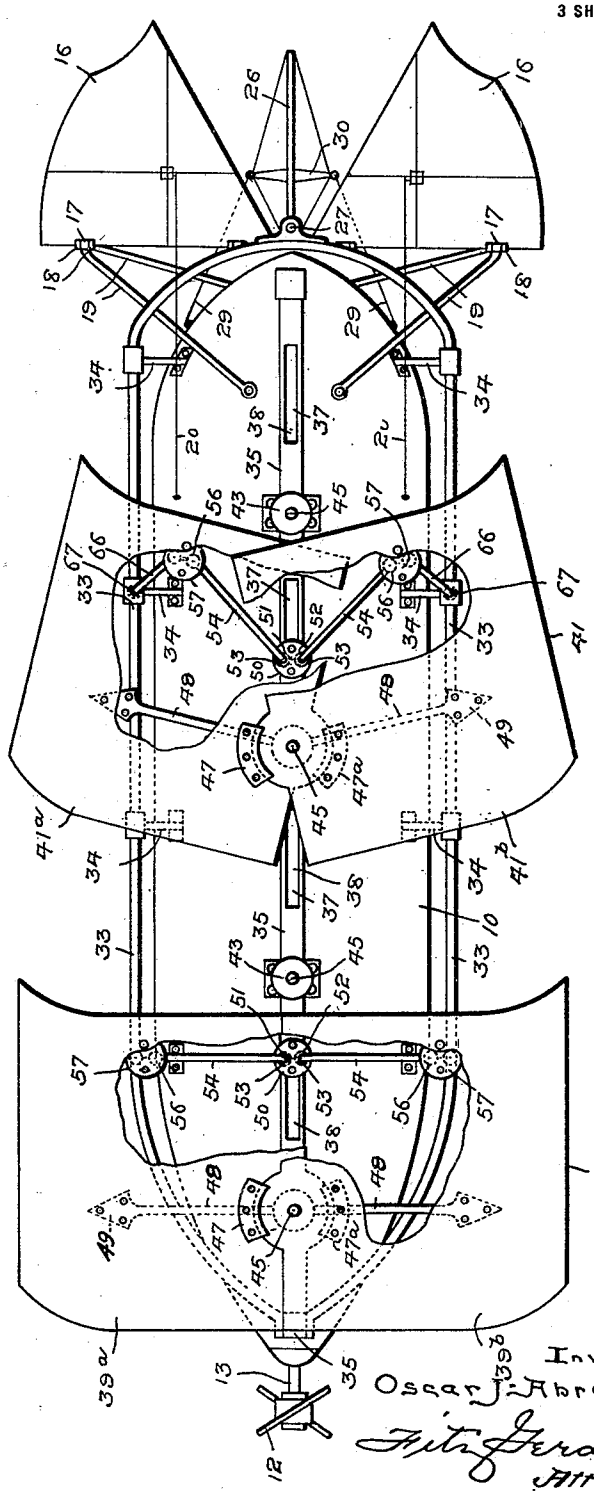
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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

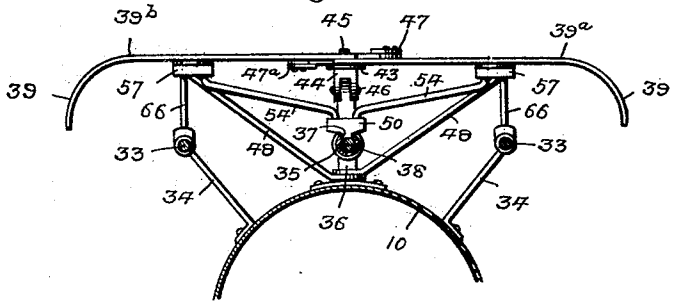


Fig. 4.

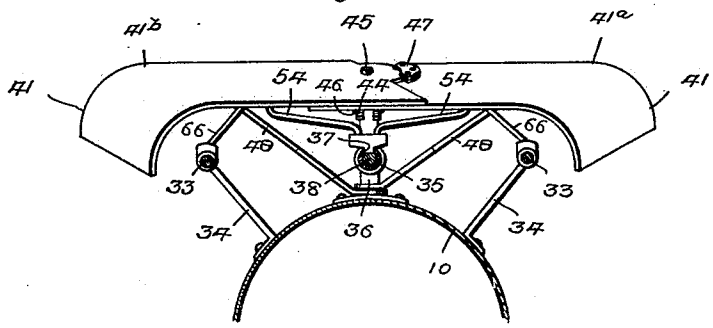


Fig. 5.

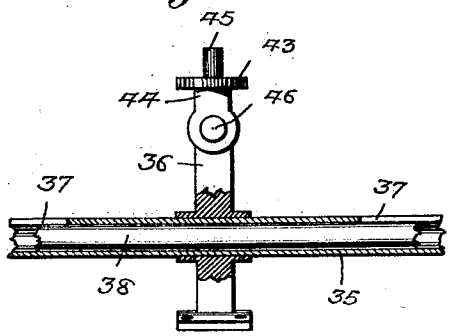
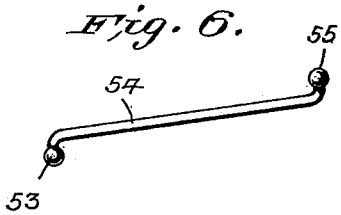


Fig. 6.



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UNITED STATES PATENT OFFICE.

OSCAR J. ABRAHAMSON, OF CARPENTER, NORTH DAKOTA.

AEROPLANE.

1,366,895. Specification of Letters Patent. Patented Feb. 1, 1921.

Application filed May 3, 1918. Serial No. 232,277.

To all whom it may concern:

Be it known that I, OSCAR J. ABRAHAMSON, a citizen of the United States, residing at Carpenter, in the county of Rolette and State of North Dakota, have invented certain new and useful Improvements in Aeroplanes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to aeroplanes and particularly to their wings and the primary object of the invention is to improve the construction, mounting and operation of the wings and their operative connections to regulate the lifting effect, the improvements being applicable, without requiring a specific form of body and other parts.

With this object in view, the invention consists in the improved construction, arrangement, and combination of parts hereinafter fully described and afterward particularly claimed.

In order that the construction and operation thereof may be readily comprehended, I have illustrated an approved embodiment of my invention in the accompanying drawings and will now proceed to fully and specifically describe the same in connection with said drawings, in which—

Figure 1 represents my improvements applied to an aeroplane, in side elevation, with parts broken away,

Fig. 2, a view in plan, of the invention, showing two sets of wings in different positions, parts of the wings being broken away, and parts shown in dotted lines,

Fig. 3, a transverse vertical sectional view of the body looking forwardly at the front wings in horizontal position.

Fig. 4, a similar view to that of Fig. 3, showing another pair of wings in inclined position.

Fig. 5, a view of a wing post and connection, partly in elevation and partly in vertical, longitudinal section,

Fig. 6, a view, on an enlarged scale, of one of the arms of the wings, and

Fig. 7, a detail sectional view.

Like reference characters indicate the same parts, wherever they appear in the several figures of the drawings.

Referring specifically to the drawing, 10 indicates the body of the aeroplane which may be a hydroplane or a flying machine of any class, which, in this instance is shown as mounted on wheels 11 and provided with a propeller 12 on a shaft 13 driven by a sprocket chain 14 connecting a sprocket on the propeller shaft with one on the shaft of a motor 15 of any desired form or class.

At 16, 16 are shown horizontal rudders to govern the rise and fall of the machine which are shown as mounted upon horizontal pivots 17 journaled in bearings 18 on braces 19 secured to the body and are operated by chains or cords 20 leading from vertical bars on the rudders to a shaft 21 which is rotated by a hand lever 22 in reach of the operator in his seat 23, a usual pawl 24 and curved ratchet or rack 25 being provided to retain the parts in their adjusted positions.

At 26 is a vertical, or steering plane or rudder, pivoted at 27 and operated by chains or cords 29 leading from the ends of a cross bar 30 on the rudder to a steering bar or post 31, with suitable hand wheel 32, adjacent to the seat 23.

The operation of the rudders will be readily understood from the foregoing by any person skilled in the aeronautic art, and these parts may be varied at the will of the maker or user.

At 33 is a metallic frame located above and around the body and supported therefrom by brackets 34, said frame being straight along its sides and curved at front and rear, serving at the rear as a support for the pivot of the vertical rudder 26 and at the front to receive the forward end of a hollow bar or pipe 35 centrally placed and supported above the body by posts 36 supported on top of the body.

Within the pipe 35, and exposed through slots 37 therein, is a slidable rod 38.

At 39, 40, 41, and 42 in Fig. 1, are shown four pairs or sets of wings of which the sets 39 and 41 are shown in Fig. 2, the set 39 in Fig. 3 and the set 41 in Fig. 4. The number of sets may be varied.

The wings are arranged in pairs longitudinally of the machine, as indicated at 39^a and 39^b, and 41^a and 41^b, respectively. The inner edge portions of each pair of wings are overlapped and supported on one of the posts 36. Said posts have upper pieces or portions 45 pivoted thereon to swing forwardly and rearwardly about transverse axes, and a washer 43 is disposed on each portion 45 and bears on a shoulder 44. Thus, each pair of

wings being pivotally engaged on the respective portion 45, can swing forwardly and rearwardly in the plane of the wings, and the pair of wings can also swing forwardly and rearwardly to different angular positions about transverse axes with the portion 45. Thus, the pivotal mounting of the wings on the portion 45 permits of the wings swinging relatively to one another around said portion as a pivot, and the transverse pivot 46 connecting the portion 45 and posts 36 permits the pair of wings to be tilted to different inclinations for regulating the lifting effect. The outer edge portions of the wings are curved downwardly as shown.

On one of the wings is a guide plate, as at 47 in Fig. 3, curved on the wing pivot as a center and raised off the wing 39^a sufficiently to permit the curved inner edge of the other wing 39^b to engage under it, while on the wing 39^b is a similar curved plate 47^a to receive the curved inner edge of the other wing 39^a, which arrangement causes the wings along their inner edges to move smoothly on each other on their pivots and not become separated or bent apart.

Pivoted loosely on the wing posts 36 are braces 48, which extend upward and outward and have their outer ends, as at 49, riveted or otherwise fastened to the under sides of the wings to prevent the wings moving unevenly on their pivots. Said braces 48 are sufficiently loose on the posts 36 to tilt with the wings forwardly and rearwardly.

For each set of wings there is provided a plate, as at 50, secured to the slidable rod 38 in which are two sockets, 51 and 52, to receive the inner end balls 53 of links or braces 54 whose outer end balls 55 enter sockets 56 in similar socket plates 57 secured under the wings. Braces or links 66, similar to the links or braces 54, have end balls engaging loosely within the plates 57, and sockets 67 on the frame 33, thereby anchoring said braces 66 to fixed positions on the frame, and providing loose connections between the wings and frame, whereby to control the positions of the wings when swung or moved to different positions.

Brackets 58 support a shaft carrying a worm 59 which engages rack teeth 60 on the slidable rod 38 and said worm 59 is rotated by a crank 61 on a sprocket wheel 62 journaled at the lower end of a bracket 63 and connected by a sprocket chain 64 with a sprocket wheel 65 on the shaft of the worm.

When the worm is thus rotated, its engagement with the rack teeth causes the rod 38 to move longitudinally in the hollow bar or pipe 35, carrying with it the socket plates 50, and by means of the links or braces 54 also moving the outer socket plates 57, this movement being limited and governed by the braces 66. Thus, when the inner ends of the links 54 are moved rearwardly toward a straight line position in plan view, said links will push the rear portions of the wings of the respective pair outwardly away from one another, thereby swinging the wings forwardly in the plane thereof, and due to the anchoring of the wings by the braces 66 to the frame, said braces 66 will tilt the wings to different angles when they are swung relatively to one another. Thus, when the wings are swung forwardly, their rear portions are raised by the braces 66 to or nearly into a horizontal position. Conversely, when the links 54 are moved forwardly, they will pull the rear portions of the wings toward one another, and the braces 66 will serve to swing the rear portions of the wings downwardly simultaneously thereby bringing the wings at an angle, to increase the lifting effect, and at the same time, the rearward swinging of the wings will bring the outward downwardly curved portions into action for increasing the lifting effect. Thus, when the wings are swung rearwardly, they are tilted to a greater angle from the horizontal, and at the same time, the downwardly curved edge portions of the wings are swung rearwardly to increase the lifting effect and when the wings are swinging forwardly, they are brought toward a horizontal position and the effect of the downwardly curved portions lessened.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. An aeroplane embodying a body, wings extending toward opposite sides, and having their outer end portions curved downwardly, means for mounting the inner ends of the wings on the body for swinging movement in the plane of said wings, and for forwardly and rearwardly tilting movement to different angles, means for swinging said wings in the plane thereof to move said downwardly curved portions forwardly and rearwardly, and means for swinging the rear edges of the wings downwardly and upwardly, respectively, when said downwardly curved portions are moved rearwardly and forwardly.

2. An aeroplane including a body, a member pivoted to the body to swing about a transverse axis forwardly and rearwardly, a pair of wings extending toward opposite sides having their inner end portions overlapping and mounted on said member for swinging movement in the plane of said wings, and for tilting movement with said member, the outer end portions of said wings being curved downwardly, braces between the wings and body having loose connections therewith to lower and raise the

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rear edges of the wings when said downwardly curved portions are moved rearwardly and forwardly respectively, and means operable for swinging said wings to move said downwardly curved portions forwardly and rearwardly.

3. An aeroplane including a body, a wing, means for mounting the wing on the body for swinging movement in the plane of the wing and for tilting movement forwardly and rearwardly to different angles, a brace between the wing and body having loose connections therewith to tilt the wing to different angles when it is swung in the plane thereof, a manually operable member, and a link connecting said member and wing to swing it to different positions.

4. An aeroplane including a body, a pair of wings having downwardly curved portions at opposite ends, means for mounting the adjacent ends of said wings on the body in overlapping relation for relative swinging movement in the plane thereof and for simultaneously forwardly and rearwardly tilting movement to different angles, braces between the wings and body having loose connection therewith to tilt the wings to different angles when they are swung relatively, a manually operable member, and links connecting said member and wings for swinging them relatively to one another.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

OSCAR J. ABRAHAMSON.

Witnesses:
K. B. VAN METER,
ARTHUR J. ABRAHAMSON.