

E. H. ANDRAE.
AEROPLANE.

APPLICATION FILED JUNE 2, 1910.

Patented Sept. 19, 1911.

3 SHEETS—SHEET 1.

1,003,687.

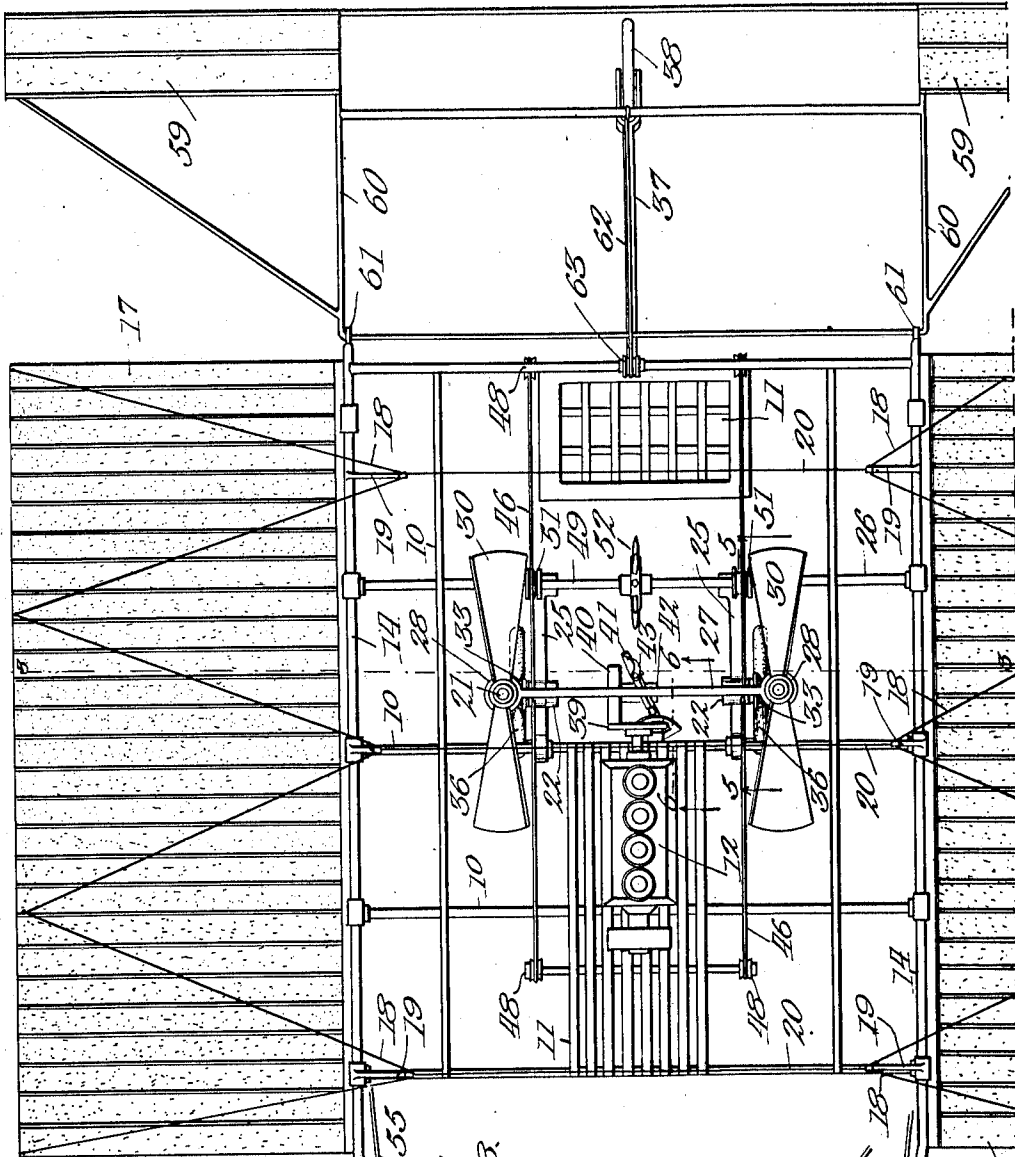


Fig. 1.

Witnesses

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3 SHEETS—SHEET 2.

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Fig. 2.

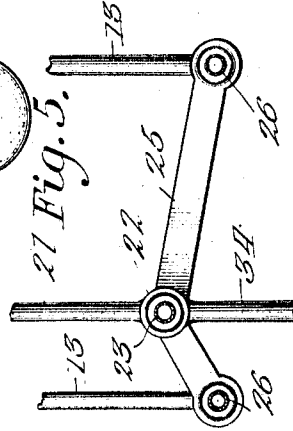
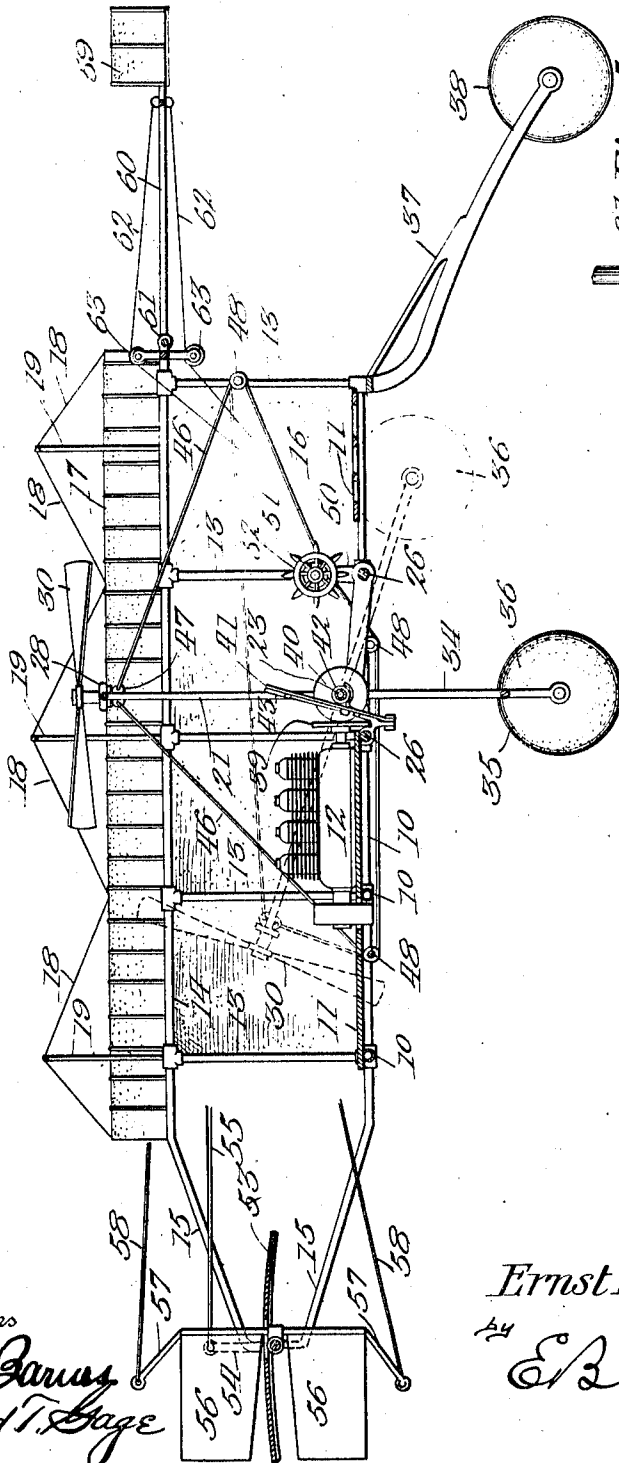


Fig. 5.

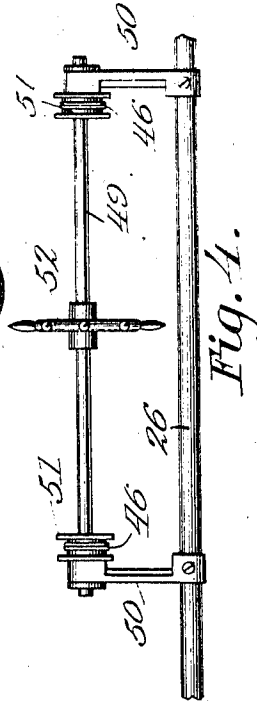


Fig. 4.

Witnesses

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3 SHEETS—SHEET 3.

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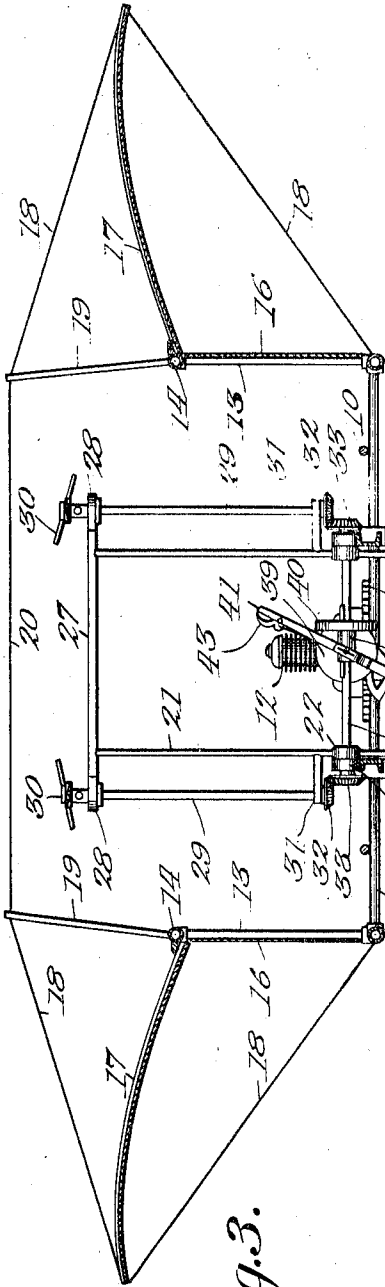


Fig. 3.

Fig. 8.

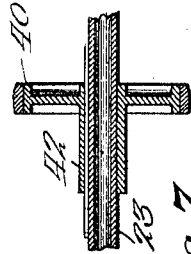
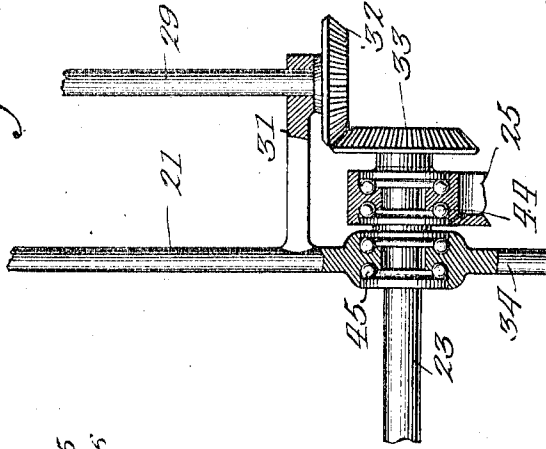


Fig. 7.

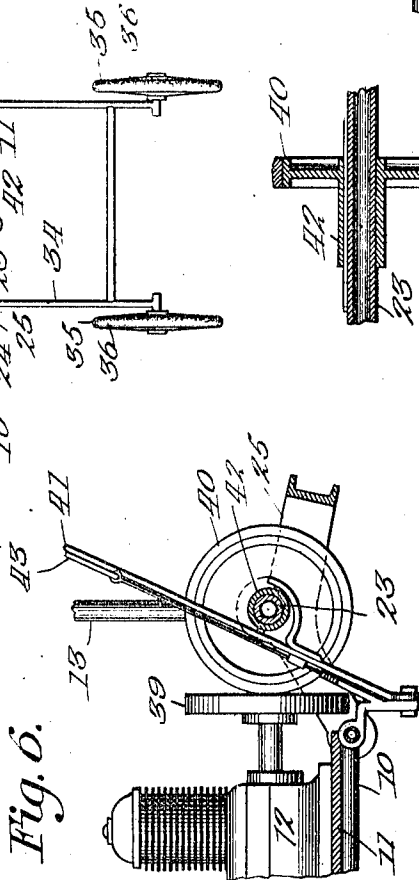


Fig. 6.

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UNITED STATES PATENT OFFICE.

ERNST H. ANDRAE, OF DALLAS, TEXAS.

AEROPLANE.

1,003,687.

Specification of Letters Patent. Patented Sept. 19, 1911.

Application filed June 2, 1910. Serial No. 564,658.

To all whom it may concern:

Be it known that I, ERNST H. ANDRAE, a citizen of the United States, residing at Dallas, county of Dallas, State of Texas, have invented certain new and useful Improvements in Aeroplanes, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to an aeroplane having propellers therefor adapted to be shifted into different positions for the purpose of raising the aeroplane or for driving it in different directions.

The invention has for an object to provide a novel and improved construction of an aeroplane comprising separated dihedral horizontal planes which lie in the same horizontal plane and having at their inner edges vertical planes which are disposed at opposite sides of the frame or platform of the machine which joins the base of said vertical planes.

A further object of the invention is to provide a novel and improved construction of the propelling mechanism for an aeroplane which is pivotally mounted and adjustable into different positions relative to the planes in order to produce either a rising movement thereof or a driving movement in a horizontal or other plane.

Other and further objects and advantages of the invention will be hereinafter set forth and the novel features thereof defined by the appended claims.

In the drawings—Figure 1 is a top plan of the aeroplane; Fig. 2 is a central longitudinal section thereof; Fig. 3 is a cross section on line 3—3 of Fig. 1; Fig. 4 is an elevation of the means for adjusting the propellers; Fig. 5 is a detail vertical section on line 5—5 of Fig. 1; Fig. 6 is a similar section on line 6—6 of Fig. 1; Fig. 7 is a detail vertical section of the adjustable friction gear; and Fig. 8 is a similar view of the mounting for the adjustable propellers.

Like numerals of reference refer to like parts in the several figures of the drawings.

The numeral 10 designates the frame of the machine which may be of any desired construction or configuration, preferably rectangular as shown. This frame is provided with suitable platforms 11 to receive the engine or motor 12 and for the operator. At each side of the frame, vertical standards 13 are provided, these being con-

nected at their upper ends by longitudinal bars 14 which, at the front of the machine, taper toward each other as shown at 15. These vertical standards 13 are covered with canvas or other suitable material to form parallel vertical planes 16 at each side of the frame extending the length thereof. At the upper end of these standards, intersecting planes 17 are mounted and extend outward therefrom in substantially a horizontal plane forming dihedral wings. The outer ends of these wings may be braced in any desired manner, for instance by guy wires 18 extending therefrom to the frame and also to the vertical extensions 19 above the frame provided for that purpose. These extensions may be connected by a brace 20 as shown in Fig. 2.

The propelling mechanism for the aeroplane comprises a pivotally mounted frame 21 which is journaled at 22 upon the driving shaft 23, this shaft being mounted in bearings 24 carried by an angle frame 25. This latter frame is mounted upon cross-bars 26 of the frame 10 and the apex of its angle raises the bearings 22 above the frame 10 sufficient to permit a proper swinging movement of the propeller frame 21. This frame is provided at its top with a cross-bar 27 having bearings 28 at each end to receive the propeller shafts 29, each of which carries a propeller 30 of any desired construction. The lower ends of the propeller shafts are mounted in bearings 31 and are provided with beveled gears 32 which cooperate with meshing gears 33 carried upon the ends of the shaft 23. The propeller frame is extended beneath the frame 10 as shown at 34 and there provided with pivotally mounted landing wheels 35, these being preferably covered with canvas or other material to form a plane for resistance against tilting or lateral displacement. The frame 10 is also provided with a rearwardly extending arm 37 having at its free end a covered wheel 38 similar to the wheel 35. These wheels provide means for supporting the frame above the ground when the aeroplane is at rest and also permit it to travel upon the ground when the propeller is disposed to so drive it.

The propellers may be driven by any desired character of engine 12 and connections therefrom, for instance by the friction disk 39 which cooperates with a similar disk 40

splined upon the shaft 23 to slide thereon. This sliding may be effected by means of a lever 41 connected to the collar 42 of the disk 40 and provided with a latch 43 to hold the parts in adjusted position. By this means, the driving shaft may be rotated at any desired speed or its rotation stopped without stopping the engines. The bearings of the driving shaft and of the propeller frame may be provided with balls of any ordinary construction, for instance as shown at 44 and 45, respectively, in Fig. 8.

Any preferred means may be used for adjusting the propeller frame, a desirable form thereof being illustrated which comprises cords or cables 46 connected to the propeller frame at 47 and extending over suitable idler pulleys 48 to the shaft 49 which is supported from the frame by the standards 50 and provided with winding drums 51. This shaft is provided with a hand wheel 52 by which it may be rotated in either direction for the purpose of shifting the propeller frame in an arc of a circle extending in either direction from a vertical plane.

The front of the machine is provided with a horizontal rudder 53 pivotally mounted upon the portion 15 of the frame and adapted to be adjusted by means of the crank arms 54 and connections 55 extended to any convenient point. A vertical rudder 56 is also disposed above and below the horizontal rudder and adapted to be shifted by means of the crank arms 57 and the connections 58 extended therefrom to a convenient point. At the rear of the frame, an adjustable plane or rudder 59 is carried by the frame 60 said frame being pivoted at 61 and adapted to be shifted vertically by means of the cords or cables 62 extending over the idlers 63 to any desired point.

In the operation of the invention, when the propellers are in the position shown by full lines in Fig. 2, the aeroplane is caused to rise from the ground and when it is in the air this propeller is shifted so as to drive the aeroplane forward at any desired angle to produce either an ascending or descending movement or to travel in a horizontal plane. The propeller is shown by dotted lines in Fig. 2 in position to propel the aeroplane forward, when shifted to the opposite position, the momentum thereof may be retarded or the travel reversed to produce a backward movement. The aeroplane may also be driven upon the ground by shifting the propeller to the dotted line position. The means shown for shifting the propeller permit it to be at all times controlled while the depending latter frame and wheel act to counterbalance the weight of the propeller and its frame above so as to render the shifting easily accomplished.

The driving connections permit any desired speed of rotation and also a reversal of the direction of the propellers. The arrangement of the planes at a dihedral angle form separated wings having at their inner edges vertical planes joined by the platform of the frame, thus giving a low center of gravity and providing an extended supporting area in case of a side tipping or tilting of the aeroplane. This tilting movement is also resisted by the covered depending wheels which produce a leverage and a resistance which aids the automatic stability of the aeroplane.

The invention presents a simple and efficient construction of aeroplane having the greatest stability against tilting or lateral displacement by currents of air or other causes, thus greatly increasing the safety of the operator, while the pivoted propellers provide a single, simple means by which the movement of the aeroplane can be controlled in any direction and its ascension and landing easily effected. This construction permits the propellers to be disposed in the space between the planes which is at all times clear and unobstructed, thus effecting the most efficient action thereof as the air currents from the propellers are not affected by an adjacent surface.

Having described my invention and set forth its merits, what I claim and desire to secure by Letters Patent is—

1. In an aeroplane, a frame, vertically disposed planes, at opposite sides thereof, dihedral horizontally disposed planes extending outwardly from said vertical planes, said horizontal planes being mounted in the same horizontal plane, an adjustable support mounted at the rear of the upper portion of said frame and provided at opposite sides of the frame with horizontally disposed planes, and means for shifting said support in a vertical plane.

2. In an aeroplane, a frame comprising a platform having parallel standards at its opposite sides, vertical planes secured to said standards, horizontally disposed planes extending outwardly from said standards, said horizontal planes being in the same horizontal plane, a drive shaft mounted in said frame, a propeller frame pivotally mounted on said drive shaft, a balancing frame disposed beneath said propeller frame having a vertical plane, and means for swinging said propeller frame and holding the same in its adjusted position.

3. In an aeroplane, a main frame provided with planes, a propeller frame pivotally mounted upon said main frame, propellers mounted in said propeller frame, driving means for said propellers, means for shifting said propeller frame, a depending frame from said propeller frame, and a wheel carried by said depending frame.

4. In an aeroplane, a main frame provided with planes, a propeller frame pivotally mounted upon said main frame, propellers mounted in said propeller frame, driving means for said propellers, means for shifting said propeller frame, a depending frame from said propeller frame, and covered wheels carried by said depending frame.

5. An aeroplane comprising a frame having spaced horizontal and vertically disposed planes to form a central opening, a horizontal drive shaft mounted in said

frame and extending across said opening, a propeller frame pivotally mounted between said planes on said drive shaft, a balancing frame disposed beneath said propeller frame, and means for adjusting said propeller frame. 15

In testimony whereof I affix my signature in presence of two witnesses. 20

ERNST H. ANDRAE.

Witnesses:

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S. H. EVANS.