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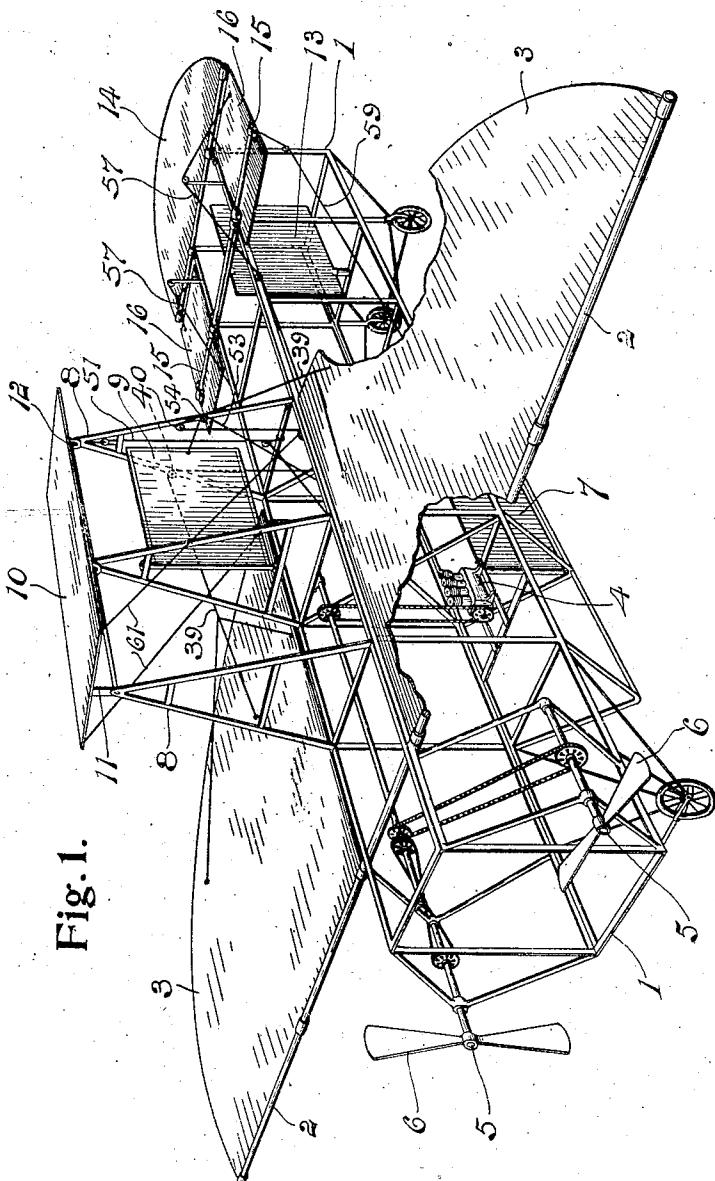
A. H. BLOUNT.

FLYING MACHINE.

APPLICATION FILED OCT. 4, 1910.

Patented Apr. 30, 1912.

5 SHEETS-SHEET 1.



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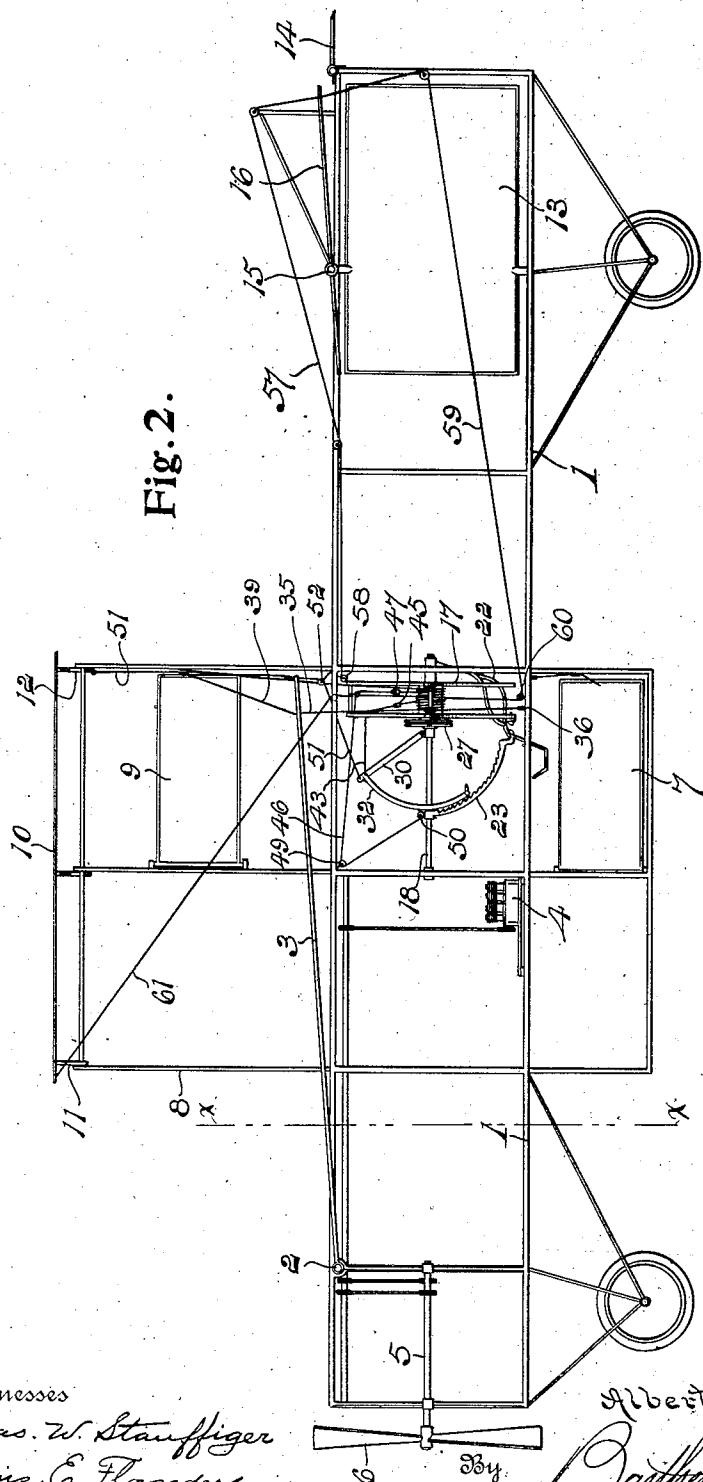
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5 SHEETS-SHEET 2.

Fig. 2.



Witnesses

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## FLYING MACHINE.

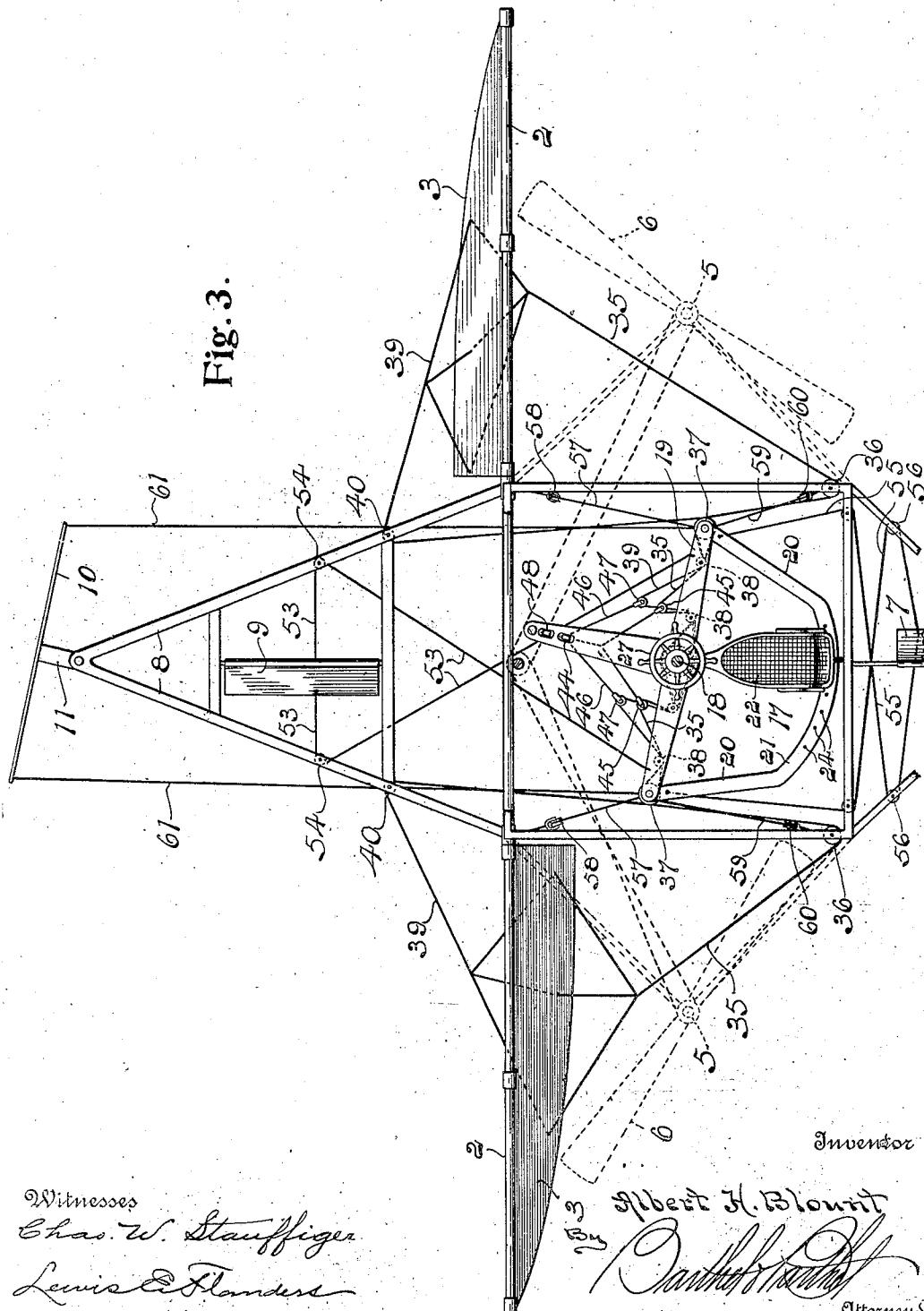
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5 SHEETS—SHEET 3.

Fig. 3.



### Witnesses

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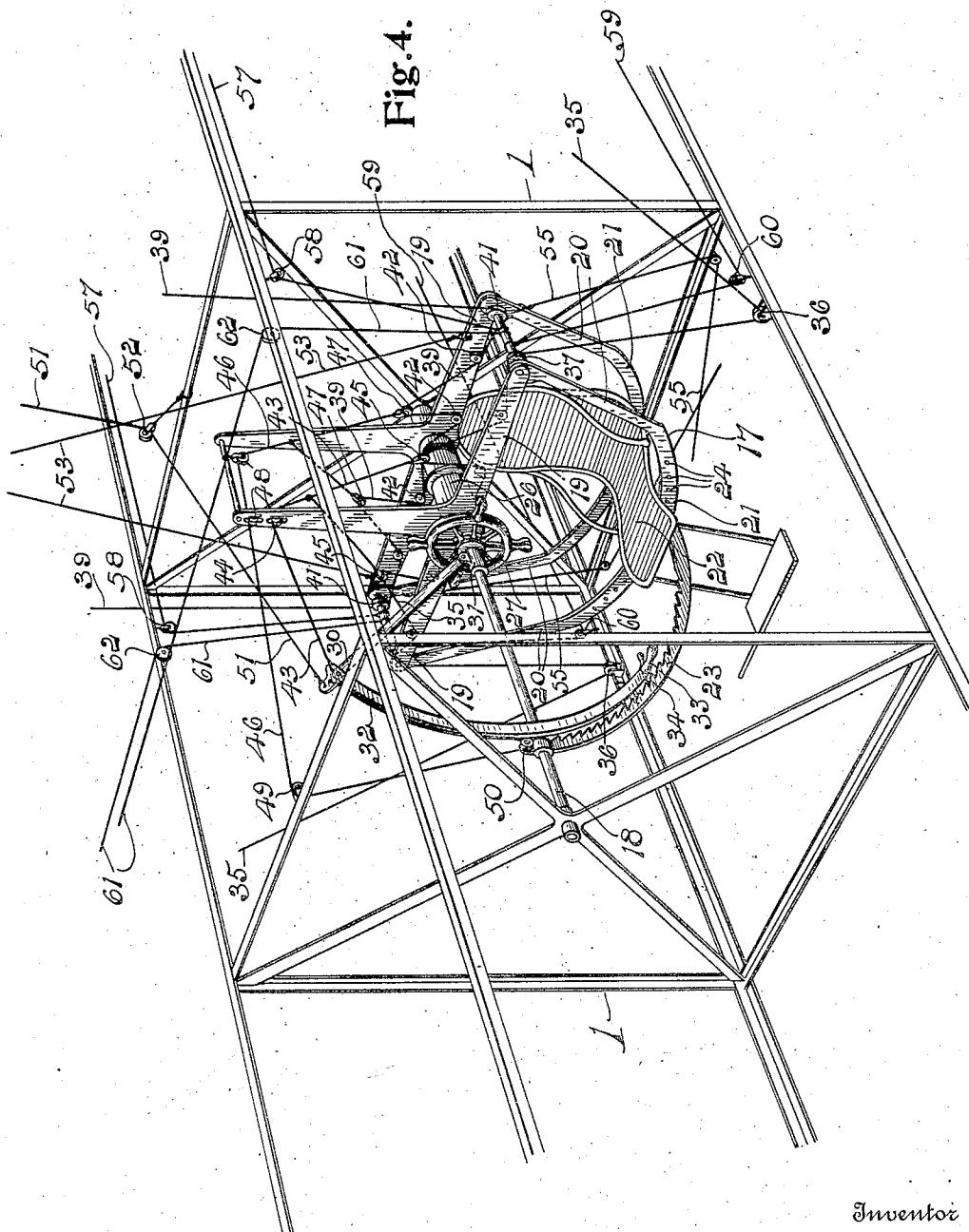
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5 SHEETS-SHEET 4.

Fig. 4.



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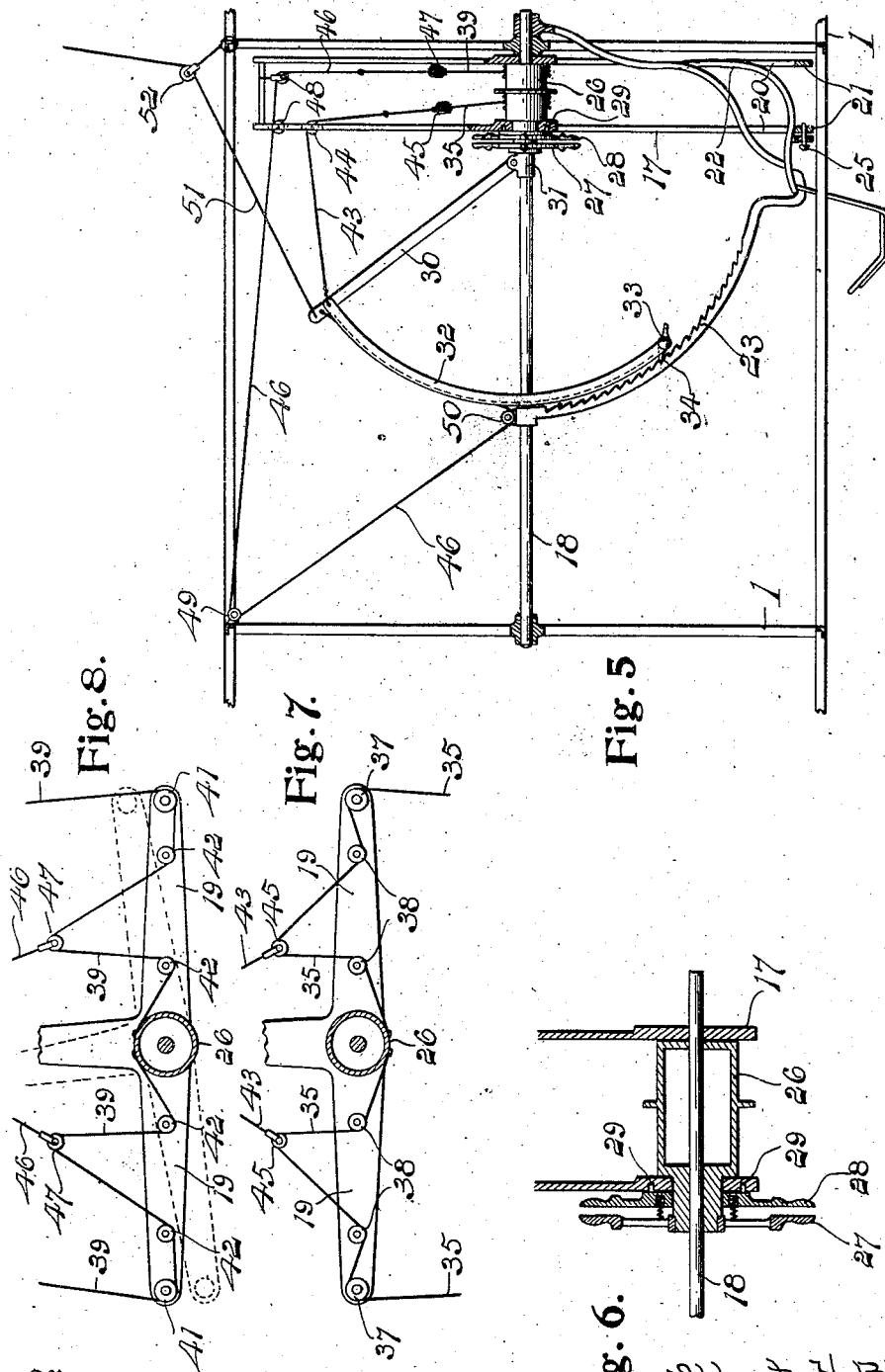
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5 SHEETS—SHEET 5.



### Witnesses

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Fig. 6. Inventor  
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# UNITED STATES PATENT OFFICE.

ALBERT H. BLOUNT, OF DETROIT, MICHIGAN.

## FLYING-MACHINE.

1,024,670.

Specification of Letters Patent. Patented Apr. 30, 1912.

Application filed October 4, 1910. Serial No. 585,207.

To all whom it may concern:

Be it known that I, ALBERT H. BLOUNT, a citizen of the United States of America, residing at Detroit, in the county of Wayne 5 and State of Michigan, have invented certain new and useful Improvements in Flying-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to flying machines in which one or more planes are employed to sustain the machine in its flight and the object of the invention is to provide means for maintaining the equilibrium of the machine by manipulating the main planes and also by providing stability planes adapted to be manipulated to maintain the machine in its upright position while in flight and to right the same if thrown out of balance. A further object of the invention is to provide suitable means for automatically adjusting the several planes to maintain the balance of the machine and further to provide certain other new and useful features 25 in the construction and arrangement of parts all as hereinafter more fully described reference being had to the accompanying drawings in which,

Figure 1 is a perspective view of a machine embodying the invention; Fig. 2 is a side elevation of the same; Fig. 3 is an enlarged transverse section substantially on the line  $x-x$  of Fig. 2 with parts removed; Fig. 4 is an enlarged perspective view of the 35 controlling mechanism; Fig. 5 is a longitudinal vertical section through the controlling mechanism shown in Fig. 4; Fig. 6 is an enlarged sectional detail of the controlling drum and its hand wheel; and Figs. 7 and 40 8 are diagrammatic views illustrating the main plane control.

For the purposes of illustration a machine of the mono-plane type is shown, but if found desirable a plurality of main sustaining planes may be used. Aeroplanes of the mono-plane or bi-plane type are liable to suddenly drop when tilted upon their main axis or thrown out of balance, owing to the slight resistance to edgewise movement offered by the main planes and the operator is mainly dependent upon the steering planes to right his machine. If at the time his machine is tilted it has lost headway owing to the stopping of the motor, the planes will have little effect in righting

the machine and if it is near the ground, the rudder plane will not act quickly enough to bring the machine to an upright position before it strikes.

In the accompanying drawings 1 is a suitable rectangular frame work upon which is mounted, transversely thereof and near its forward end, a shaft or spar 2, and to the laterally projecting ends of this spar are pivotally attached two main sustaining planes 3 extending rearwardly from the spar and adapted to be raised and lowered at their rear edges to change their angle of inclination to the frame and to the line of flight. A suitable motor 4 is supported upon the frame and motion is transmitted from said motor by any suitable means, such as sprocket wheels and chains, to shafts 5 supported in bearings on the forward end of the frame and provided with suitable propellers 6.

Located below the frame 1 within a suitable downward extension thereof is a stability plane 7 pivoted at its forward end to turn upon a vertical axis, and located above the frame 1, in a suitable frame work 8 forming an upward extension to said frame, is a stability plane 9 pivoted at its forward end to turn upon an upwardly extending axis. These planes 7 and 9 being located at an interval below and above the main longitudinal axis of the frame, when the machine is tilted on its main axis during flight, these planes offer resistance to such tilting and tend to right the machine, and by properly turning them at an inclination to the line of flight, their action is increased to quickly bring the machine back to its balanced position. The balancing of the machine is further aided by a manipulation of the main planes 3, as when the machine is tilted to one side, the plane at that side may be lowered at its rear edge and the plane at the other side similarly raised.

Pivotally attached to the upper end of the extension 8 of the frame, is a combined lifting and stability plane 10. The forward end of this plane is maintained at a certain distance above the main frame of the machine by an arm 11 which is pivoted to the upper end of the frame extension and at its rear end, the plane is attached to the frame by a similar arm which is provided with a slot 12 to permit the rear end of the plane to be raised or lowered. Said plane may thus be

tilted transversely to the line of flight or it may be inclined to the line of flight by lowering its rear end. This plane being located at the extreme upper end of the frame 5 extension, will, when tilted transversely to the line of flight, quickly right the machine should its motor stop and the machine tilt and start to fall edgewise, said plane when so tilted presenting a surface to resist side 10 movement, which surface is far above the main axis of the machine.

A rudder plane 13 is pivotally supported within the rear end of the frame 1 to swing in a vertical plane on an axis extending at 15 right angles to the axis of the main planes and pivotally attached to the extreme rear end of the frame is a rudder or altitude plane 14 for directing the machine upward or downward in its flight. A simultaneous 20 and like adjustment of both main planes will also cause the machine to rise or fall in its course.

Extending across the frame 1 near its rear end is a shaft or spar 15 upon the laterally projecting ends of which two auxiliary sustaining planes 16 are pivotally supported to be adjusted at an inclination to the line of flight similarly to the main planes 3.

30 If the machine during its forward flight is tilted from any cause against the will of the operator, it is very quickly again brought into balanced position by the adjustment of the main planes 3 relative to 35 each other, the relative adjustment of the stability planes 7 and 9 and the tilting of the plane 10, and to automatically and simultaneously so adjust all of these planes to bring the machine into balanced position 40 a pendulous frame 17 is pivotally supported within the frame 1 upon a shaft 18, to swing transversely of the machine. This pendulous frame may be of any suitable construction to carry the operator or any object of 45 considerable weight so that the frame will be swung by the weight when the machine is tilted. As shown, the frame consists of arms 19 mounted upon the shaft to turn thereon and extending laterally therefrom. 50 The outer ends of the arms are connected by cross bars and downwardly extending bars 20 are secured to the ends of the arms 19 and the lower ends of said bars are connected by cross members 21. A suitable 55 chair or seat 22 is pivotally attached to the shaft 18 to turn thereon independently of said frame 17 and hangs downward therefrom within said frame. A curved rack bar 23 is pivotally attached to the shaft 18 60 at its upper end and is secured at its lower end to the forward side of the seat to support the same. In one of the cross bars 21 of the frame is a series of holes 24 and carried by the seat frame is a pin 25 to detachably engage the holes and connect the

seat frame with the cross bar of the frame 17 so that said seat and frame will swing together upon the shaft. Mounted upon the shaft 18 to turn thereon between the pairs of arms 19 is a drum 26 and a hand wheel 27 is secured to the end of the drum for turning the same, said wheel being made in two parts, the one part 27 being fast on the drum and the other part 28 slidably longitudinally thereof and provided with pins 29 to engage holes in the adjacent arm 19 of the frame and thus detachably connect the drum with the frame 17 to turn therewith upon the shaft 18. An arm 30 is pivotally attached at its lower end to a bearing 31 on the shaft 18 adjacent to the wheel 27 and to its upper end a curved bar 32 is attached, said bar extending downward adjacent to and guided upon the curved rack bar 23. The lower end of the bar 32 is provided with handles 33 by means of which it is manipulated by the operator, and a suitable pawl 34 is carried on the bar adjacent to the handles to engage the teeth of the rack bar 23 and hold the bar 32 in any position to which it may be adjusted by the operator.

Any suitable connections may be made between the pendulous frame and the several planes to be automatically operated thereby 95 so that when the machine is tilted and the frame swings laterally, the several planes will be properly adjusted to right the machine. As illustrating one manner in which such connections may be made, lines or cables are shown in the drawings running over suitable pulleys from the frame to the several planes. The main planes 3 are each operated by means of a line 35 attached to the plane at its under side and running 10 under a pulley 36 on the frame 1 and upward over a pulley 37 carried at the outer end of the laterally extending arms 19. This line then passes beneath pulleys 38 on the arm to the lower side of the drum 26 11 where it is secured to wind around the drum when said drum is turned relative to the arms 19. A similar line 39 is attached to the upper side of each main plane 3 and passing over a pulley 40 on the frame 8 extends downward and around a pulley 41 carried by the outer ends of the arms 19. The line passes from the pulley 41 beneath pulleys 42 on the adjacent arm and thence to the upper side of the drum 26 where it is 12 secured to wind upon the drum. The plane 3 at the other side of the machine is operated by like lines running in the same manner so that when the pendulous frame is swung by the tilting of the machine one of 121 the planes will be automatically raised at its rear edges and the other plane lowered.

In order that the operator may raise or lower both of the main planes simultaneously to direct the machine upward or 130

downward in its flight, a line 43 is attached to the upper end of the curved bar 32 and runs over a pulley 44 carried by an upwardly extending arm on the pendulous frame. From the pulley 44 the line extends downward and is branched to form two laterally extending ends which are each provided with a pulley 45 over which the lines 35 run between the pulleys 38, a loop 10 being thus taken up in each line 35 and said lines equally shortened to pull downward upon both of the main planes when the bar 32 is swung downward by the operator. The lines 39 running to the upper 15 sides of the two main planes must of necessity be let out an equal amount when the lines 35 are taken up in the manner described, and this is accomplished by providing a line 46 which is branched at one end 20 and the branched ends provided with pulleys 47 to engage loops in the lines 39 between the pulleys 42. The line 46 extends upward and over suitable pulleys 48 carried by the upwardly extending arms on the pendulous frame and thence forwardly over a pulley 49 and downward to a pulley 50 attached to an ear on the upper end of the rack bar 23. After extending over the pulley 50 it is passed along the edge of the bar 32 which is grooved to receive it and secured to the upper end of the bar. When the bar is moved downward, pulling upon the line 43, the line 46 is payed out an equal amount and thus as the loops in the lines 35 are increased the loops in the lines 39 are decreased and the planes are simultaneously lowered. An opposite or upward movement of the bar 32 will cause an opposite or upward movement of the planes.

When the main planes are lowered by the movement of the bar 32 to direct the machine upwardly in its flight it is desirable that the plane 10 be lowered at its rear end in a like proportion. To so lower the rear 45 end of the plane 10 a line 51 is attached thereto and extends downward and around a pulley 52 attached to the frame 1 and thence extends forwardly and is secured to the upper end of the bar 32 so that when 50 said bar is swung downwardly to lower the rear edges of the main planes a pull will be exerted upon the line 51 and the rear end of the plane 10 will also be lowered. Upon an opposite movement of the bar 32 to raise 55 the planes 3, the line 51 will be slackened and the plane 10 will be free to rise at its rear end so that the action of the air against its under side will raise it to the limit of the movement permitted by the line.

The stability planes 7 and 9 are automatically turned when the machine tilts, by lines attached to the pendulous frame. The upper plane 9 is turned by lines 53 attached to the plane near its rear end and extended laterally in each direction over pulleys 54 on

the upward extension 8 of the main frame. These lines after passing over said pulleys are crossed and attached at their lower ends to the arms 19 of the frame 17. Lines 55 are secured at one end to the frame 17 and 70 extending downward therefrom, are crossed and extend over pulleys 56 on the downward extension of the main frame and are then attached to opposite sides of the plane 7. By this arrangement of the lines, when 75 the machine is tilted toward one side the plane 9 will be turned toward that side of the machine and the plane 7 will be turned in an opposite direction, thus presenting their surfaces to the action of the air as the 80 machine is propelled forwardly in a manner which will tend to right the machine.

The auxiliary planes 16 are adjusted up and down with a movement corresponding to the movement of the main planes and simultaneously therewith upon the tilting of the machine, by lines 57 attached to their upper sides and extending forwardly over suitable pulleys 58 on the main frame above the pendulous frame 17 and thence downward and secured to the outer ends of the arms 19 of said frame. Lines 59 are attached to the lower side of said planes 16 and extending forwardly over suitable pulleys and around pulleys 60 on the main 95 frame, are also attached to the ends of the laterally extending arms of the pendulous frame.

The plane 10 is tilted upon its longitudinal axis by means of lines 61 secured to said 100 plane near its forward end, and extending downwardly over pulleys 62, and these lines are attached at their lower ends to the outer ends of the arms 19 of the frame 17. Said plane is thus tilted with the swinging of 105 the pendulous frame, caused by the tilting of the machine, and presents a side surface to the action of the air when the machine starts to fall edgewise which will turn the machine on its main axis to an upright 110 position again.

Any suitable means (not shown) may be provided for operating the rudders 13 and 14. If it is found desirable to tilt the machine when in flight and maintain the same 115 in its tilted position, as when traveling in a circle or against a heavy side wind, the machine may be so tilted and held by adjusting the seat or chair 22 relative to the pendulous frame as shown in Fig. 3. The 120 arms of the frame will thus be tilted, the seat remaining in a vertical position and the several planes operated by the swinging of the pendulous frame will be correspondingly shifted, causing the whole machine to 125 tilt and this tilted position will be maintained by the holding of the frame 17 in its tilted position by the weight of the operator in the chair. The main planes 3 may also be manipulated in opposite directions inde- 130

pendently of the swinging of the frame 17, by turning the drum 26 by means of the hand wheel 28 independently of said frame. The drum may be held in the position to 5 which it is turned to hold the planes in their adjusted position by the engagement of the pins 29 with the holes in said frame. In this construction the equilibrium of the machine is automatically maintained by the 10 swinging of the pendulous frame and at the same time the operator may adjust any or all of the planes to suit the varying conditions of flight. He may also set planes and hold the same at any desired angle to main- 15 tain the machine in a tilted position during its flight. The operator is relieved from the necessity of watching the varying air currents in order to properly adjust his planes to maintain his machine in balance 20 and he has otherwise perfect control over it to direct it as desired in its flight.

Having thus fully described my invention what I claim is:—

1. An aeroplane comprising a main frame 25 with its main axis extending in the direction of the line of flight, main sustaining planes extending laterally from said frame and supported to turn upon a horizontally extending axis angularly to the line of flight, 30 lines running from the main frame to the upper side of each of said planes, lines running from the main frame to the lower side of each of said planes, means for forming loops in said lines to shorten the same and 35 turn the planes, and means for operating the loop forming means to simultaneously let out the lines running to one side of the planes and take up the lines running to the other side of said planes.
- 40 2. An aeroplane comprising angularly adjustable planes, a main frame to which the planes are attached, a frame pivotally supported upon an axis extending longitudinally of the main frame to swing trans- 45 versely of said frame upon the tilting of the aeroplane, means attached to said frame for adjusting said planes when the said pivoted frame swings, a pendulous weight carrying member pivoted to swing upon an axis 50 coincident with the axis of said pivoted frame, and means for adjustably connecting said pivoted frame and pendulous member to cause the same to turn together upon the tilting of the aeroplane.
- 55 3. An aeroplane comprising angularly adjustable planes, a main frame, a pendulous member supported on the main frame to turn upon an axis extending longitudinally of the main axis of said frame, a drum turning upon an axis coincident with the axis 60 upon which said pendulous member turns and rotatable independently of said member, and lines secured at one end to said drum to be wound thereon and at their opposite ends to said planes, to adjust the

same, said lines being also operatively attached to said pendulous member to be operated thereby upon the swinging of said member.

4. An aeroplane comprising a main frame, 70 a main sustaining plane pivoted to turn angularly to the line of flight, lines running to the upper and lower sides of said plane to adjust the same, a pendulous frame upon the main frame to which said lines are attached to operate the plane upon the swinging of said pendulous frame, means for forming loops in said lines to shorten the same and turn the plane, an arm pivotally supported at one end to turn in a vertical 75 plane longitudinally of the main frame, a short line attached to said arm and to the means for forming the loop in the line running to one side of the plane, a pulley, and a line attached to said arm and extending over said pulley and attached to the means 80 for forming the loop in the line extending to the other side of the planes to simultaneously actuate both loop forming means when the arm is turned and let out one loop in one 85 line and take up the loop in the other line:

5. An aeroplane comprising two angularly adjustable planes, a main frame to which said planes are pivotally attached, a pendulous frame adapted to swing laterally of 95 the main frame upon the tilting of the aeroplane, a drum arranged to turn upon an axis coincident with the axis of the pivotal support of the pendulous frame, lines attached at one end to said planes and at the opposite end to said drum to wind thereon and operatively connected to said pendulous frame to be operated by the swinging of said frame to adjust said planes, means for turning said drum independently of said frame, and means for forming a loop in each of 100 said lines simultaneously shorten the same and adjust the planes independently of the operation of said drum and pendulous frame.

6. An aeroplane comprising angularly adjustable planes, a main frame upon which said planes are pivotally supported, a pendulous member comprising a seat for a person, supported by the main frame to swing laterally thereof upon the tilting of the aeroplane, a drum supported by the main frame, a hand wheel to turn said drum, means on the hand wheel for engaging the frame and holding the drum in the position to which 110 it is turned, lines attached at one end to the planes and at their opposite ends to the drum to wind thereon and operatively connected to the pendulous member, to be operated by the swinging of said member to adjust the planes, a rack bar adjacent to the seat, means for forming a loop in each of the lines to operate the planes independently of the movement of the pendulous member or the turning of the drum, and an operat- 115 120 125 130

ing member engaging the rack bar to hold said loop forming means in adjusted position.

7. An aeroplane comprising a main frame, main sustaining planes extending laterally from said frame and pivoted to turn upon horizontally extending axes independently of each other, a stability plane above the frame adjustable angularly to the line of flight and tiltable upon an axis extending longitudinally of the line of flight, means for automatically turning the sustaining planes in opposite directions and simultaneously tilting the stability plane upon the 10 tilting of the aeroplane, and means under the control of the operator for turning the sustaining planes simultaneously in the same direction and for simultaneously adjusting the stability plane angularly to the line of flight.

8. In an aeroplane the combination of a main frame, sustaining planes extending laterally from said frame and pivotally supported thereby to turn angularly to the line of flight, stability planes upon the frame above and below the sustaining planes and pivoted to turn upon vertical axes angularly to the line of flight, a horizontally disposed stability plane above the upper stability 25 planes adapted to be adjusted angularly to the line of flight and to be tilted upon an axis extending longitudinally of the line of flight, means supported by the frame for automatically turning the sustaining planes 30 in opposite directions upon the tilting of the aeroplane and for simultaneously adjusting the upper and lower stability planes in opposite directions and tilting the hori-

zontal stability plane, and separate means under the control of the operator for turning the sustaining planes together in the same direction and simultaneously adjusting the horizontal stability plane angularly to the line of flight.

9. In an aeroplane the combination of a frame arranged with its longitudinal axis in the direction of the line of flight, sustaining planes extending laterally from the sides of said frame and supported to turn upon a horizontal axis, auxiliary sustaining planes extending laterally from the sides of the frame adjacent to its rear end and mounted to turn upon a horizontal axis, a stability plane mounted upon the frame to turn upon a vertical axis in the vertical plane of the center line of said frame above the main sustaining planes, a stability plane mounted upon the frame below the main planes to turn upon a vertical axis in the vertical plane of the longitudinal center line of the frame, a horizontally disposed stability plane mounted upon the frame above the upper stability plane and adapted to be adjusted angularly to the line of flight and to turn upon an axis extending longitudinally of the frame, a vertically disposed rudder plane mounted upon the rear end of the frame, and means for adjusting the several planes.

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

ALBERT H. BLOUNT.

Witnesses:

OTTO F. BARTHEL,  
LEWIS E. FLANDERS.