

J. W. WILSON.
FLYING MACHINE.

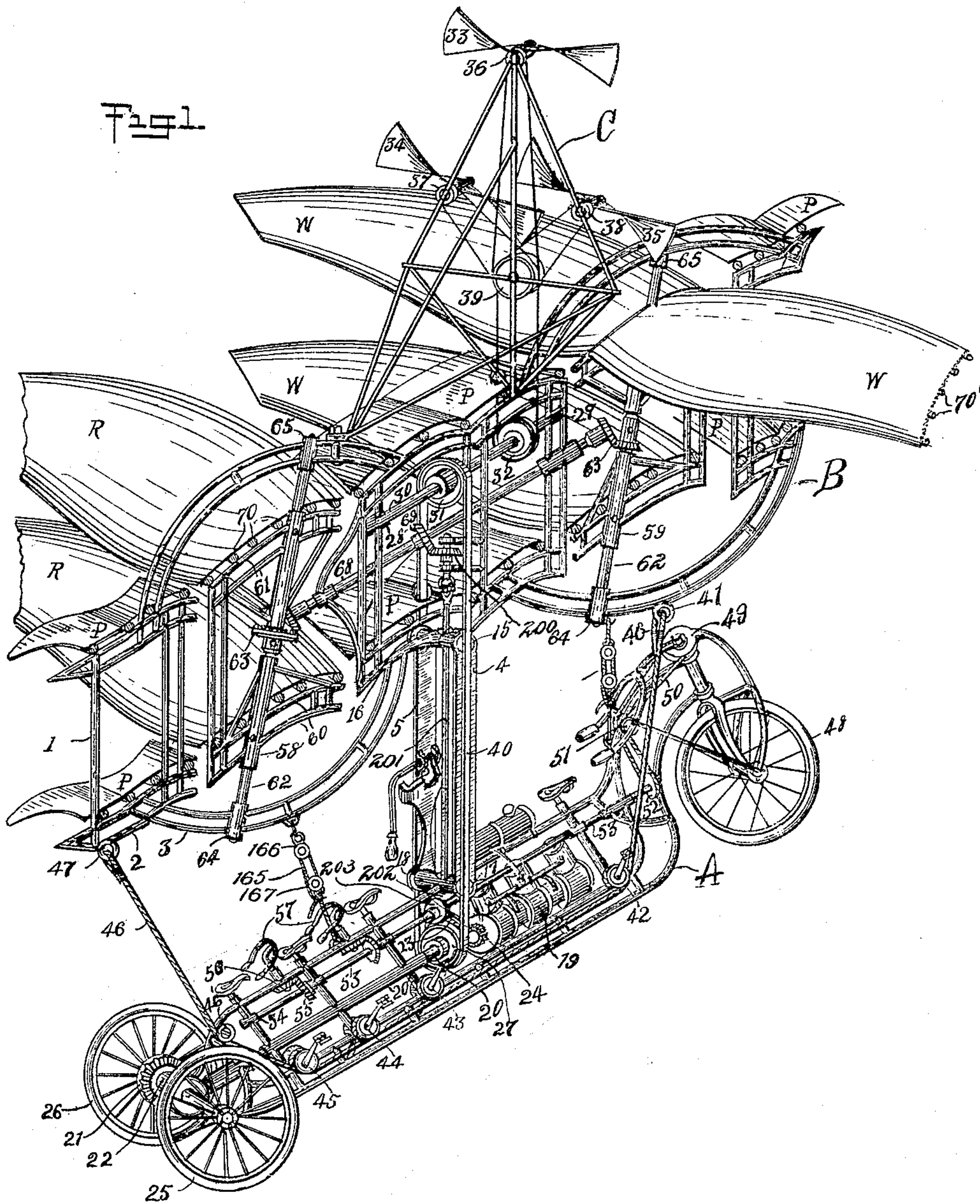
APPLICATION FILED JAN. 2, 1909.

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Patented Sept. 20, 1910

3 SHEETS-SHEET 1.

Fig 1



WITNESSES:

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3 SHEETS—SHEET 2.

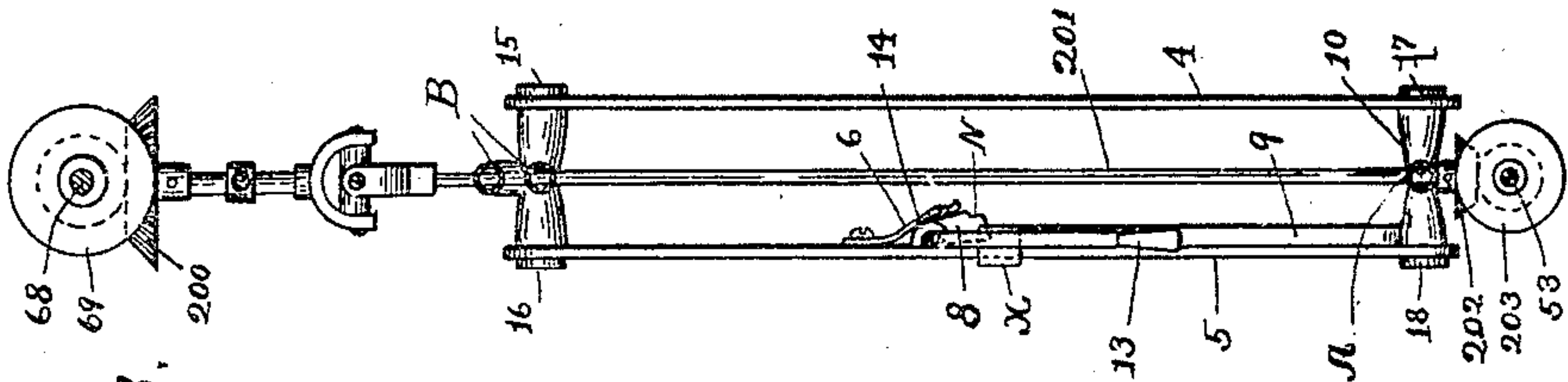


Fig. 3.

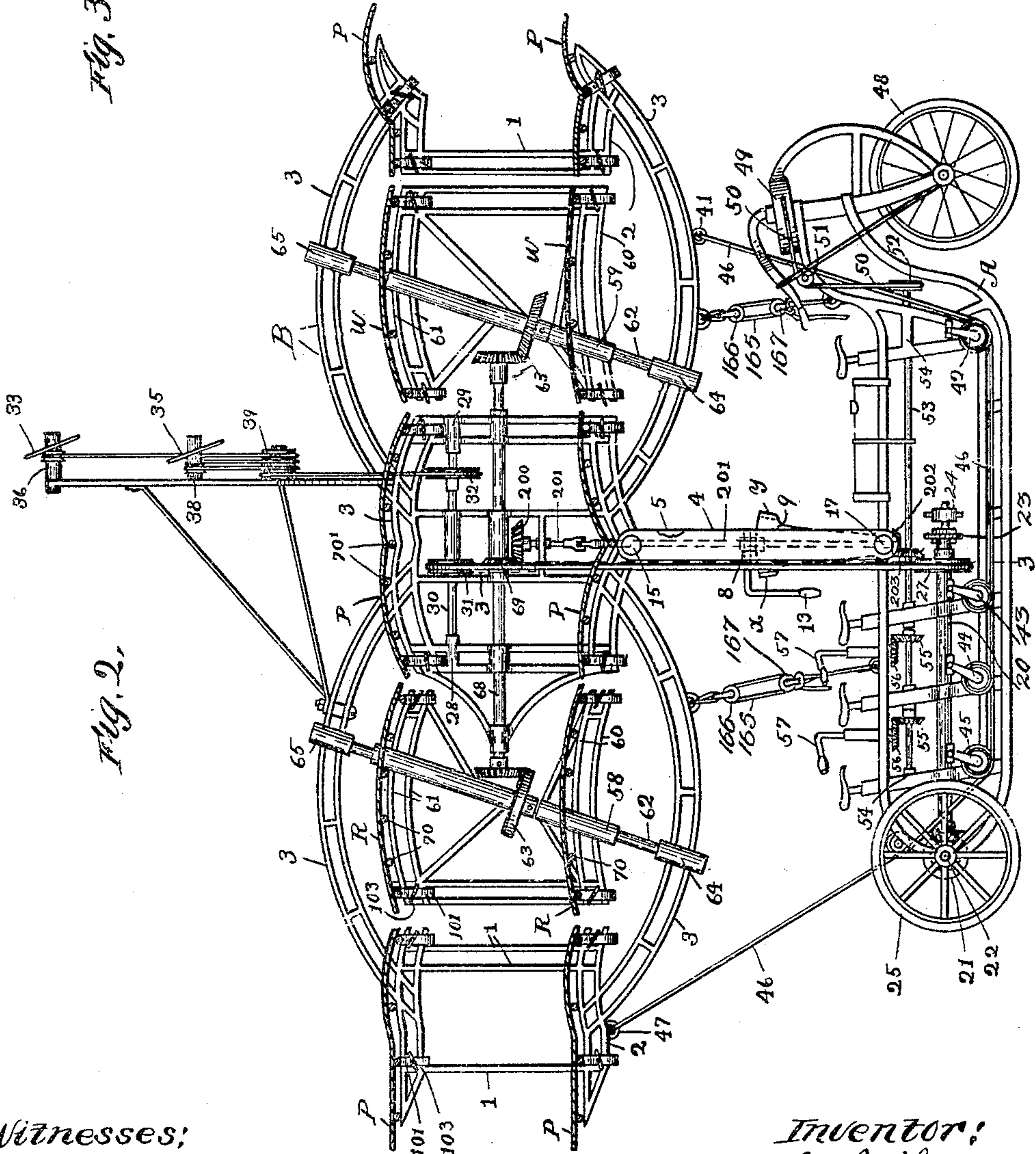


Fig. 2.

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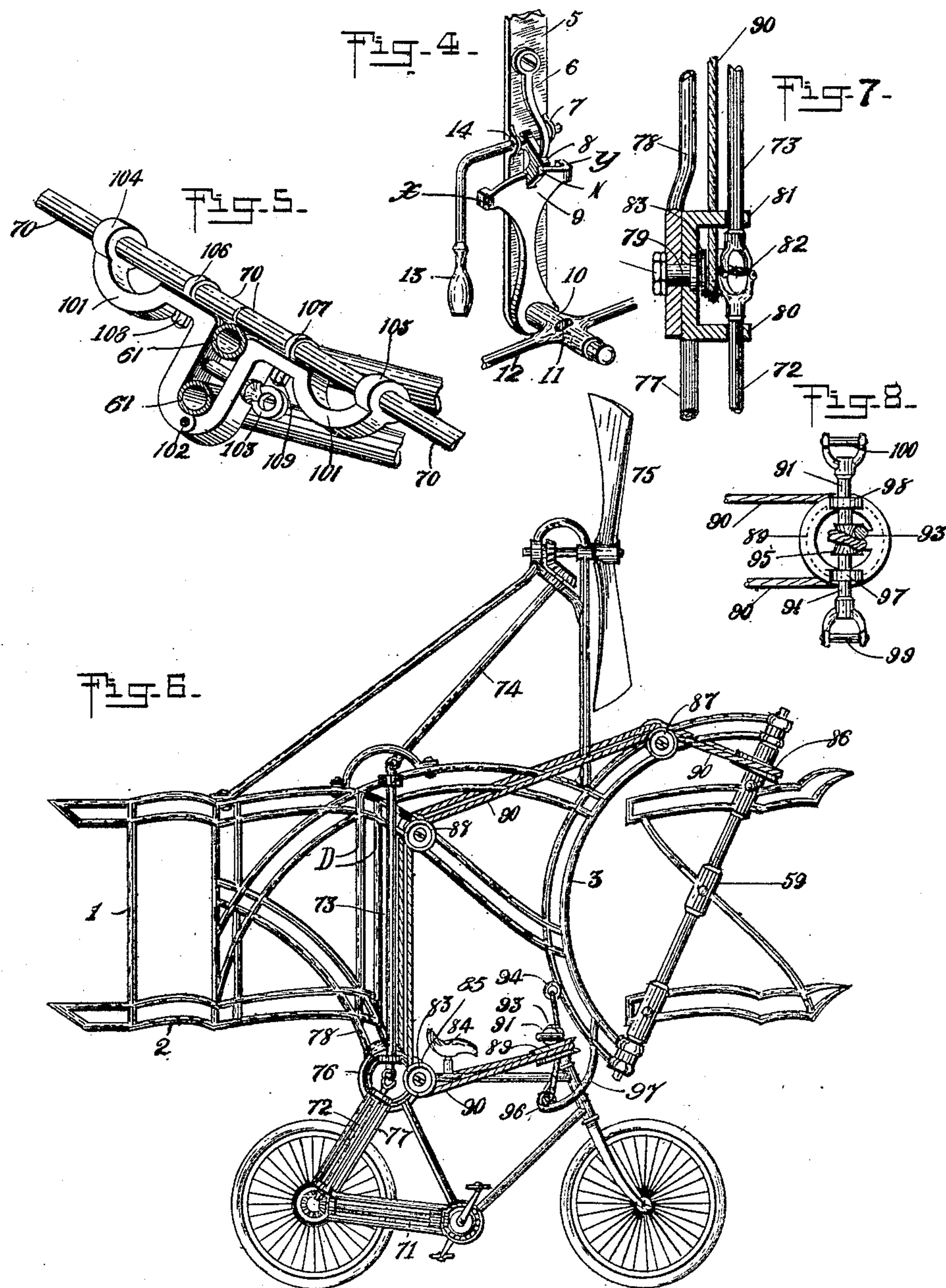
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3 SHEETS—SHEET 3.



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FLYING-MACHINE.

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To all whom it may concern:

Be it known that I, JOHN W. WILSON, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Flying-Machines, of which the following is a specification.

This invention relates to flying-machines of the heavier-than-air type, and is embodied in a machine having a seat-bearing frame and a plane-bearing frame connected together; and has for its object to provide the seat-bearing frame with driving-wheels, and the plane-bearing frame with propellers, and power-driven means for operating the driving-wheels and the propellers, whereby both frames are propelled for the purpose of overcoming their inertia and gaining momentum preparatory to ascending, until the required speed has been attained, and to arrange the propellers above the planes and preferably just forward of the middle of the machine, thereby disposing them directly above the center of gravity of the machine; also, to flexibly connect the two frames together, permitting longitudinal movement of one with relation to the other, and a tilting movement of the upper frame to vary the angle of incidence of the planes; also, to provide locking-means for holding said frames against longitudinal movement, one with relation to the other, yet permitting the upper frame to be tilted forward and backward to vary the angle of incidence of the planes; also, to provide means for tilting the upper frame forward and backward to vary the angle of incidence of the planes when said frames are held against longitudinal movement, one with relation to the other; also, to provide means for moving the lower frame with respect to the upper frame when the machine is in the air to shift the weight longitudinally and thereby vary the angle of incidence of the planes of the upper frame; also, to provide the machine with steering-mechanism for both the lower and upper frames, which are, or may be, operatively connected together, so that while running on the ground the direction of motion of both frames may be controlled, and while in the air the direction of motion of the upper frame may be controlled by means operated by the aviator; also, to so construct the steering-mechanism on the upper frame that it may be employed as the steering-means for the

machine while in the air, and also as a balancing-means for maintaining lateral balance of the machine or upper frame thereof when running on the ground, and for maintaining lateral balance of the machine when in the air; also to so construct the steering-mechanism on the upper frame that it may be employed as a supporting means for the machine when in the air; also, to provide oppositely extended planes on the upper frame, adapted to be moved simultaneously in opposite ways on an axis oblique to the perpendicular for maintaining lateral and longitudinal balance of the machine when in the air and also to steer the machine, whereby it may be easily and quickly operated and sharp corners easily and quickly turned.

Figure 1 is a perspective view of a flying-machine embodying this invention, some of the planes being omitted for sake of clearness. Fig. 2 is a side view of the same, the motor being omitted. Fig. 3 is an enlarged vertical sectional detail taken on the dotted lines 3—3 Fig. 2. Fig. 4 is a detail of a locking-device for holding the upper and lower frames against longitudinal movement one with relation to the other. Fig. 5 is a detail of a clamping-device for the braces of the planes. Fig. 6 is a side view of a modified form of flying-machine embodying my invention. Figs. 7 and 8 are details to be referred to of the machine shown in Fig. 6.

Referring to Figs. 1 to 5 inclusive, a machine embodying my invention is shown, adapted to be operated by power.

The frame-work of the machine comprises essentially a lower frame A, adapted to afford supports for a motor and one or more seats, and an upper frame B, adapted to afford supports for the planes, and propellers, and said frames may be of any suitable construction to support the working and other parts, but preferably are made as open-work structures and very light. The upper plane-bearing frame, as here shown, is composed of vertical, horizontal and circular members, represented respectively at 1, 2 and 3, rigidly connected to form a frame which is continuous throughout its length. The upper plane-bearing frame and lower seat-bearing frame are connected together by means such as links 4, 5, pivotally connected at their upper ends at 15, 16, to the upper frames, and at their lower ends, at 17,

18, to the lower frame, permitting a tilting movement of the upper frame forward and backward relative to the lower frame to vary the angle of incidence of the planes, and
 5 also a longitudinal movement of one frame with relation to the other, yet adapted to support the upper frame in elevated position above the lower frame, when the machine rests on the ground, and to support
 10 the lower frame in suspension beneath the upper frame when the machine is in the air. Provision is also made for connecting the upper and lower frames at their ends or thereabout, which, as here shown, consists of
 15 cables 165 passing over pulleys 166, 167, connected with the frames, and either or both cables may be disconnected from the lower frame whenever desired.

As here shown, a motor 19, is employed
 20 for imparting rotary motion to a shaft 20, arranged in suitable bearings in the lower frame, and said motor may be of any well-known type, as for instance, it may be of a type adapted to revolve said shaft at differ-
 25 ent speeds, and also backward and forward, such type of motor being in common use at the present time for various purposes.

The shaft 20 bears at its rear end a gear which engages a gear 21, rigidly secured to
 30 a rear axle 22, borne by the lower frame, to thereby positively revolve said axle, and the wheels 25, 26, which are rigidly secured thereto or connected therewith; and said shaft 20 bears at its forward end a spur gear
 35 23, which engages a gear secured to a short shaft bearing another gear which in turn engages a gear 24 arranged on the motor-shaft. Yet, in lieu of this means of connect-
 40 ing the motor with the rear axle, other means may be employed whereby the same results are accomplished.

At the top of the upper frame, above the planes which are connected therewith, as will be hereinafter described, several pro-
 45 pellers are here shown, as 33, 34, 35, which are supported by a suitable frame-work just forward of the middle of the machine, and the several propeller-shafts are connected with a power-driven shaft, as for instance,
 50 they may be connected with the power-driven shaft 20, whereby they are all positively driven by said shaft 20. As here shown, said propeller-shafts have secured to them belt-pulleys 36, 37, 38, around which
 55 pass separate belts, which pass around a pulley 39. Another belt passes around the pulley 39, which extends downward and passes around a pulley 32, secured to a counter-shaft 30, which is horizontally arranged in
 60 the vertical plane of the upper frame, and has its bearings in said frame at 28, 29. A pulley 31 is secured to said shaft 30, around which a belt passes, which extends down-
 65 ward and around a pulley 27, secured to the main shaft 20. Thus it will be seen that

the power-driven shaft 20 is employed to operate the rear wheels of the lower frame and the propellers on the upper frame at the same time, enabling both frames to be pro-
 70 pelled when the machine is on the ground, to thereby overcome inertia and gain momentum preparatory to ascending until the required speed has been attained.

In lieu of the particular means here shown for transmitting power to the several
 75 propellers, other means may be employed adapted to be connected with the means employed for transmitting power to the driving-wheels of the lower frame, without departing from this invention, one such modi-
 80 fication being shown in Fig. 6, to be described. The means here employed for operating the propellers on the upper frame and the driving-wheels on the lower frame
 85 act in unison and may be operated either forward or backward and at different speeds according to the capabilities of the motor which is employed.

In order that the upper and lower frames may progress at the same velocity while
 90 on the ground both being propelled by power means, they may and preferably will be held against longitudinal movement, one with relation to the other, and to accom-
 95 plish this result, as here shown, a locking-device is provided which is connected with one of the upright links, as 5, for instance, and referring to Fig. 4, 10 represents a por-
 100 tion of the lower frame, upon which is rigidly mounted an upright plate 9, having a slot in its upper edge, adapted to receive a locking-arm 8 of sector or other shape, fixed to a shaft rotatably mounted in bear-
 105 ings 7 and 14, which is bent to form a handle 13. Movement of the handle acts to move the locking arm into and out of engagement with the notched plate 9, to lock or unlock
 110 the link 5, thereby rigidly holding the link or allowing it freedom of motion between two lugs x and y , formed on the plate 9 at the front and rear edges thereof. Thus one
 115 member of the locking-device is connected with the lower frame and the other member with the link. The spring 6 prevents accidental unlocking of the arm 8, and also holds the arm in its unlocked position by its
 120 free end entering a notch N formed in the arm. When running on the ground and the locking-device is engaged the cables will be disconnected from the lower frame to permit
 the upper frame to be tilted.

To tilt the upper frame on its pivots 15 and 16, to vary the angle of incidence of the planes, when the upright connecting links are locked and thus rigidly held relative to
 125 the lower frame, means are provided, adapted to be operated by one or more pedal-shafts or other suitable means, on the lower frame, and, as here shown, one end of a cord
 130 46 is attached to the forward end of the up-

per frame, at 41, which extends downward and around several windlasses 42, 43, 44, 45, (any suitable number being provided) and thence upward, and its other end is attached to the rear end of the upper frame at 47. Said windlasses are mounted in suitable bearings on the lower frame, and are each provided with pedal-bearing cranks whereby they may be revolved. They are revolvable in either direction, and when revolved in one direction, as by pressing on the right pedal, will cause the forward end of the upper frame to descend, and the rear end to ascend, and when revolved in the opposite direction, as by pressing on the left pedal will cause the upper frame to tilt in the opposite way.

When running the machine on the ground, preparatory to ascending, the upper frame may be tilted forward, the cables being disconnected from the lower frame and the planes borne by said frame thereby inclined downward at their forward ends, to assist in keeping the machine on the ground; and when it is desired to ascend said upper frame will be tilted backward and the planes borne by it will be correspondingly moved and inclined upward at their forward ends, acting to raise the machine. As soon as the machine is in the air, the locking-device is operated to disengage the lower frame, and said lower frame then becomes held in suspension beneath the upper frame, and the cables are then connected to the lower frame and act to limit the longitudinal movement of the frames, one with relation to the other. While in the air the angle of incidence of the upper frame may be varied by shifting the weight longitudinally beneath said upper frame forward and backward. When the weight is shifted forward the forward end of the upper frame will be lowered and when shifted backward said forward end will be raised. Such shifting of the weight is accomplished by revolving the aforesaid windlasses 42, 43, 44, 45, by means of the pedal-cranks, which, when the lower frame is held in suspension act to move said lower frame longitudinally with respect to the upper frame, and thereby shift the weight forward and backward, as required. Means are also provided on both the upper and lower frames for steering them while the machine is running on the ground, and also while moving in the air, and said steering means is also employed for maintaining lateral balance of the machine while running on the ground, and also for maintaining lateral balance of the machine while in the air. As here shown, the lower seat-bearing frame has a steering-wheel 48 arranged at its forward end, to the head of the frame of which a pair of handle-bars are secured, and by means of said steering-wheel the lower frame may be moved to steer the

machine while running on the ground. A grooved pulley 49 is secured to the head of the frame bearing the steering-wheel, to the opposite sides of which, at diametrically opposite points, the opposite ends of a cord 50 are attached, and said cord extends downward over idle pulleys 51, and around a pulley 52, which latter is secured to a longitudinal shaft 53 supported in a bearing 54. Several miter gears 55 are rigidly secured to said shaft 53 which mesh with gears 56 operatively connected with auxiliary handle-bars 57. The steering-wheel may thus be operated manually simultaneously from several different points. The shaft 53 also may be employed as the operating-shaft for the steering and balancing-means borne by the upper frame.

As here shown, two steering and lateral balancing-members are provided on the upper frame, which are made alike, or substantially so, and connected to the same operating-means whereby they are operate simultaneously. 62 represents an upright shaft extending from top to bottom of the upper frame, and having its end bearings in said frame, at 64, 65. Said shaft is arranged obliquely to the perpendicular, being inclined forward. A gear 63 is secured to said shaft, preferably at a point midway its length, which engages a gear secured to a horizontal shaft 68, supported by the upper frame, and a gear 69 is secured to said shaft 68 which engages a gear 200, secured to the upper end of an upright shaft 201, supported at its upper end by the upper frame and at its lower end by the lower frame, and said shaft 201 has a gear 202 at its lower end which engages a gear 203 on the shaft 53, so that the shaft 68 is adapted to be oscillated by said shaft 53 and the shaft 62 thereby oscillated. As the shaft 53 is oscillated by the handle-bars said shaft 62 is correspondingly turned by them. The shaft 201 is made flexible by the interposition of universal joints to admit of relative movements of the upper and lower frames. To said oblique or forwardly inclined shaft 62, near the opposite ends thereof, two frame-bars 60 and 61 are secured, disposed respectively above and below the middle gear 63, and said frame-bars are composed of several small bars connected together to form open structures, and said frame-bars are rigidly connected together. The frame-bars are arranged in parallel or thereabout, and horizontally with respect to the upper frame, and, therefore, obliquely to the shaft 62 to which they are attached, and, as here shown, said shaft 62 passes through both frame-bars, so that said bars extend in opposite ways from said shaft. A pair of oppositely extended planes or wings R, R, are attached to the frame-bar 60, and a like pair of oppositely extended planes or wings R, R, are

attached to the frame-bar 61, and said planes are made of any suitable material or fabric, and are supported by ribs or braces 70.

5 Referring to Fig. 5, the ribs 70 are arranged on the frame-bar 61, in alinement, and they are secured to said frame-bar by clamping-members 101, 101, hinged together at 102, and formed with a U-shaped portion
10 embracing the frame-bars and secured by a through-bolt 103. The ribs extend through holes in the portions 104, 105, of the clamping-members, and if desired they may be connected together, and they are additionally
15 secured to the clamping-members by bolts 106, 107, extending through the clamping-members and held in position by nuts 108, 109. Each steering and lateral balancing-member on the upper frame has as many
20 oppositely extending planes as desired. The planes on the forward member are herein represented at W. Said planes R, R, and W, W, serve as a means of support, and being made quite large may be employed to
25 serve as the main supporting means. They are arranged approximately at right angles to the upper frame, and when in normal position occupy substantially horizontal planes. As the upper frame is tilted said
30 planes will be correspondingly moved and angles of incidence formed which are varied according as the upper frame is tilted, and the machine is thereby maintained in the air. Said planes are movable edgewise inde-
35 pendently of the upper frame on an axis oblique to the perpendicular by turning the shafts 62, which are connected with the steering handles, for the purpose of main-
40 taining the lateral balance, and also for steering the machine, and it will be observed that as said shafts 62 are arranged obliquely and the planes are secured to them obliquely to their axes, when they are turned in one or
45 the other direction the plane or planes on one side will be moved edgewise in a downward and forward direction on an axis oblique to the perpendicular, and the plane or planes on the other side will be moved
50 edgewise in an upward and rearward direction on an axis oblique to the perpendicular, and also, while said planes are being so moved, their angle of incidence will be constantly changed. By moving one plane in a
55 downward and forward direction, and the other in an upward and rearward direction, ever so little on axes oblique to the perpendicular, the direction of movement of the machine is changed, and any lack of balance corrected. Said steering and lateral bal-
60 ancing members, one or more of which may be employed, constructed and operating substantially as herein described, form one of the most important features of my invention, and they are applicable to other forms
65 of flying-machines than the one herein illus-

trated. By their use, while serving as supporting-means for the machine while the machine is in the air, they may be operated easily to change the direction of the machine and also to correct lack of balance. 70 While running the machine along on the ground it is as necessary to maintain the lateral balance as when moving in the air,—otherwise it will tip over; and said lateral
75 balancing members, operating as herein described, are therefore employed for assisting in the accomplishment of this result. In addition to the aforesaid planes R and W other planes may be employed, as P, which
80 are fixedly supported on the upper frame, as many such planes being employed as desired, which will be made of any suitable shape, size and construction.

Referring to Figs. 6, 7 and 8 a machine embodying my invention, designed for carrying but one person, is shown. In said machine the means for transmitting motion to the propeller and for changing the angle of incidence of the planes are similar to the means, previously described. Shafts 71, 72, 73, 74, with their connections, form the means for transmitting motion from the pedal-shaft to the propeller 75. The upper frame is pivotally connected to the lower frame at 76, and is adapted to be tilted to vary the angle of incidence of the plane borne by the upper frame. 95

Referring to Fig. 7, 77 represents a portion of the bicycle frame, which latter constitutes the lower seat-bearing frame of the machine, and 78 a portion of the upper plane-bearing frame, said frames being pivotally connected together by a bolt 79. 72 and 73 represent portions of two of the transmitter members which pass through projecting portions 80 and 81 of the lower frame and are connected by a universal joint 82. An idle pulley 83 is mounted on the lower frame just forward of the joint 82, and just below and at the rear of the seat 84, and a like idle pulley is arranged on the opposite side of the frame 85, and a cord 90 passes over said idle pulleys and also over similar idle pulleys 88 and 87 and around a pulley 96 on the oblique shaft of the steering and balancing-member, and also around a pulley 89 on the head of the steering-wheel frame, so that by turning said steering-wheel frame by means of the handle-bars 99 and 100 connected thereto, said steering and balancing plane-bearing member will be turned correspondingly with the steering-wheel. For the purpose of changing the angle of incidence of the upper plane-bearing frame a cord 93 is attached at one end to said frame at 94 which passes about and around a windlass 95 on the handle-bar mechanism 91, thence passing down through the member 89 and terminating at a loop 96 formed in the free end of 130

the member 97 which is secured to the upper frame. Rotation of the handle-bar mechanism operates to pull the cord and thereby move the upper frame.

5 It is obvious that the several features of my invention herein described may be separately employed.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

10 1. In a flying-machine, the combination of a lower seat-bearing frame and an upper plane-bearing frame, connected together, driving-wheels borne by the lower frame, 15 propellers borne by the upper frame and arranged entirely above the planes for propelling the machine forward, and power-driven means for operating said driving-wheels and said propellers, substantially as 20 described.

2. In a flying-machine, the combination of a lower seat-bearing frame and an upper plane-bearing frame, connected together and movable longitudinally one with relation 25 to the other to shift the weight, propellers borne by said upper frame and arranged above the planes, a power-driven shaft borne by the lower frame, and means, connected with said shaft, for operating said propellers, substantially as described. 30

3. In a flying-machine, the combination of a seat-bearing frame and a plane-bearing frame, flexibly connected together, separate propelling means for both frames, and locking-means for holding said frames against 35 longitudinal movement, one with relation to the other, substantially as described.

4. In a flying machine, the combination of a seat-bearing frame and a plane-bearing 40 frame, and means connecting them together, permitting longitudinal movement of one with relation to the other and an independent tilting movement of the plane-bearing frame, and means for limiting longitudinal 45 movement of said frames and preventing independent tilting movement of the plane-bearing frame, and means for holding said frames against longitudinal movement, yet permitting independent tilting movement of 50 the plane-bearing frame, substantially as described.

5. In a flying-machine, the combination of a seat-bearing frame and a plane-bearing frame, and means connecting them together 55 permitting longitudinal movement of one with relation to the other and a tilting movement of the plane-bearing frame, a locking means for holding said frames against longitudinal movement one with relation to the 60 other yet permitting a tilting movement of the plane-bearing frame, substantially as described.

6. In a flying-machine, the combination of a lower seat-bearing frame and an upper 65 plane-bearing frame, a link arranged be-

tween and pivotally connected at its opposite ends to said frames, whereby said frames may move longitudinally one with relation to the other and the upper frame tilt forward and backward, and a locking-means 70 for holding said frames against longitudinal movement, one with relation to the other, substantially as described.

7. In a flying-machine, the combination of a lower seat-bearing frame and an upper 75 plane-bearing frame, a link arranged between and pivotally connected at its opposite ends to said frames, whereby said frames may move longitudinally, one with relation to the other, and the upper frame tilt forward and backward, and locking-means for 80 rigidly connecting said link with the lower frame, thereby holding said frames against longitudinal movement, one with relation to the other, yet permitting the upper frame 85 to tilt forward and backward, substantially as described.

8. In a flying-machine, the combination with a plane-bearing frame, of a seat-bearing frame flexibly suspended beneath the 90 plane-bearing frame, a pedal-shaft borne by the seat-bearing frame, and means operatively connected with said shaft and with the plane-bearing frame for moving said seat-bearing frame fore and aft on the points 95 of suspension, to shift the weight and thereby tilt the plane-bearing frame forward and backward, substantially as described.

9. In a flying-machine, the combination of an upper plane-bearing frame and a lower 100 seat-bearing frame, flexibly connected together, whereby the lower frame is held in suspension below the upper frame when the machine is in the air, a pedal-shaft borne by the lower frame, and means, operatively 105 connected with said shaft and with the upper frame, whereby said lower frame may be moved longitudinally with respect to the upper frame to shift the weight and thereby vary the angle of the upper frame, substantially as described. 110

10. In a flying-machine, the combination of a plane-bearing frame and a seat-bearing frame, flexibly connected together, locking-means for holding said frames against longitudinal 115 movement, one with relation to the other, a pedal-shaft borne by the seat-bearing frame, and means, operatively connected therewith and with the plane-bearing frame, for tilting said plane-bearing frame forward 120 and backward while said frames are held against longitudinal movement one with relation to the other, substantially as described.

11. In a flying-machine, the combination 125 of a plane-bearing frame and a seat-bearing frame, flexibly connected together, locking-means for holding said frames against longitudinal movement, one with relation to the 130 other, and means for tilting the plane-bearing

ing frame forward and backward while said locking-means is in engagement, and for moving said seat-bearing frame longitudinally with respect to the plane-bearing frame when said locking-means is disengaged, to shift the weight and thereby vary the angle of the plane-bearing frame, substantially as described.

12. In a flying-machine, the combination of an upper plane-bearing frame and a lower seat-bearing frame, flexibly connected together, locking-means for holding said frames against longitudinal movement, one with relation to the other, a pedal-shaft borne by the lower frame, means, operatively connected therewith and with the upper frame, for tilting said upper frame when the locking means is in engagement and for moving longitudinally the lower frame with respect to the upper frame when the locking-means is disengaged, to shift the weight and thereby vary the angle of the upper frame, substantially as described.

13. In a flying-machine, the combination of an upper plane-bearing frame and a lower seat-bearing frame, a link pivotally connected at its opposite ends, respectively, to said frames, thereby flexibly connecting them together, a locking device, one member of which is borne by the lower frame and the other by the link, for rigidly connecting said link and lower frame together, whereby the lower frame is held against longitudinal movement with respect to the upper frame, a pedal-shaft, and means, for tilting said upper frame when the locking-device is in engagement and for moving said lower frame longitudinally with respect to the upper frame when the locking-device is disengaged, substantially as described.

14. In a flying-machine, the combination of a plane-bearing frame and a seat-bearing frame, connected together, a pair of oppositely extended planes on the plane-bearing frame, and supporting-means therefor, permitting simultaneous movement of said planes in opposite ways fore and aft about an axis oblique to the perpendicular, substantially as described.

15. In a flying-machine, the combination of a plane-bearing frame and a seat-bearing frame, connected together, a pair of oppositely extended planes borne by the plane-bearing frame, an oblique shaft bearing them, and means for oscillating said shaft, whereby the planes are moved simultaneously in opposite directions, substantially as described.

16. In a flying-machine, the combination of a plane-bearing frame and a seat-bearing frame, connected together, a pair of oppositely extended planes borne by the plane-bearing frame, a supporting-shaft for said planes, means for connecting said planes

with said shaft obliquely to the axis thereof, and means for oscillating said shaft, whereby the planes are simultaneously moved in opposite directions, substantially as described.

17. In a flying-machine, the combination of a plane-bearing frame and a seat-bearing frame, connected together, a pair of oppositely extended planes borne by the plane-bearing frame, an oblique supporting-shaft for said planes, means for connecting said planes with said shaft, obliquely to its axis, and means for oscillating said shaft, whereby the planes are simultaneously moved in opposite directions, substantially as described.

18. In a flying-machine, the combination of a plane-bearing frame and a seat-bearing frame, connected together, a pair of oppositely extended planes borne by the plane-bearing frame, supporting-means therefor, permitting movement of said planes simultaneously in opposite directions, a steering-wheel on the seat-bearing frame, and means, operatively connecting said steering-wheel and said planes, for moving them in unison, substantially as described.

19. In a flying-machine, the combination of a plane-bearing frame and a seat-bearing frame, connected together, a pair of oppositely extended planes borne by the plane-bearing frame, supporting-means therefor, permitting simultaneous movement thereof in opposite directions about an axis oblique to the perpendicular, a steering-wheel on the seat-bearing frame, and means for operatively connecting said steering-wheel with said planes, whereby they are all moved in unison, and means for turning said steering-wheel and thereby correspondingly moving the planes, substantially as described.

20. In a flying-machine, the combination of a plane-bearing frame and a seat-bearing frame, connected together, a pair of oppositely extended planes borne by the plane-bearing frame, an oblique shaft supporting them, whereby they are moved simultaneously in opposite directions, a steering-wheel on the seat-bearing frame, means, operatively connecting said steering-wheel with the oblique-shaft, whereby they are moved in unison, and means for turning said steering-wheel, substantially as described.

21. In a flying machine, a pair of oppositely-extended planes and supporting means therefor, permitting simultaneous movement thereof in opposite ways fore and aft about an axis oblique to the perpendicular, substantially as described.

22. In a flying-machine, a pair of oppositely-extended planes and supporting means therefor, permitting simultaneous movement thereof in opposite ways fore and aft about an axis oblique to the perpendicular,

and means for moving said supporting means on a horizontal axis, substantially as described.

23. In a flying-machine, the combination 5 of a seat-bearing frame and a plane-bearing frame, connected together, oppositely extended balancing-planes borne by the plane-bearing frame, and means for moving said planes simultaneously in opposite ways about 10 an axis oblique to the perpendicular to maintain the lateral balance of the machine, substantially as described.

24. In a flying-machine, the combination 15 of a seat-bearing frame and a plane-bearing frame, connected together, oppositely extended balancing-planes, connected together, and borne by the plane-bearing frame, and means arranged on the seat-bearing frame for moving said balancing-planes simul- 20 taneously in opposite ways about an axis oblique to the perpendicular to maintain lateral balance of the machine, substantially as described.

25. In a flying-machine, the combination 25 of a seat-bearing frame and a plane-bearing frame, connected together, an oblique shaft oppositely extended balancing-planes connected to said shaft, handle-bars arranged on the seat-bearing frame, and means connecting said handle-bars with said oblique 30 shaft, whereby the balancing planes are moved about an axis oblique to the perpendicular to maintain lateral balance of the machine, substantially as described.

35 26. In a flying-machine, the combination of a frame bearing stationary supporting-planes and a substantially horizontally arranged balancing-plane supported by said frame, movable edgewise in a plane about 40 an axis oblique to the perpendicular, and means for moving said balancing-plane, substantially as described.

45 27. In a flying-machine, the combination of a frame bearing stationary supporting-planes and a pair of oppositely - extended substantially horizontally arranged balancing-planes supported by said frame and

movable edgewise about an axis oblique to the perpendicular, and means for moving said balancing-planes, substantially as de- 50 scribed.

28. In a flying machine, the combination of a frame adapted to tilt fore and aft, bearing stationary supporting-planes, balancing- 55 planes supported by said frame, movable about an axis oblique to the perpendicular, means for moving said balancing-planes, and means for tilting said plane-bearing frame, substantially as described.

29. In a flying-machine, the combination 60 of a frame bearing stationary supporting-planes, and another supporting-plane borne by said frame, arranged substantially horizontally and movable edgewise about an axis oblique to the perpendicular, to maintain 65 lateral balance and to steer the machine, and means for operating said movable plane, substantially as described.

30. In a flying-machine, the combination of a frame bearing one or more pairs of sta- 70 tionary supporting-planes, and another pair of supporting-planes borne by said frame, arranged substantially horizontally and movable edgewise about an axis oblique to the perpendicular, to maintain lateral bal- 75 ance and to steer the machine, and means for operating said movable planes, substantially as described.

31. In a flying machine, the combination of a frame adapted to tilt fore and aft, bear- 80 ing one or more pairs of stationary supporting-planes, and another pair of supporting-planes borne by said frame, movable about an axis oblique to the perpendicular, to maintain lateral balance and to steer the ma- 85 chine, means for moving said supporting-planes, and means for tilting said plane-bearing frame, substantially as described.

In testimony whereof I have affixed my signature, in presence of two witnesses.

JOHN W. WILSON.

Witnesses:

J. EDWARD WILSON,

CHAS. S. WILSON.