

C. H. CORNELIUS.

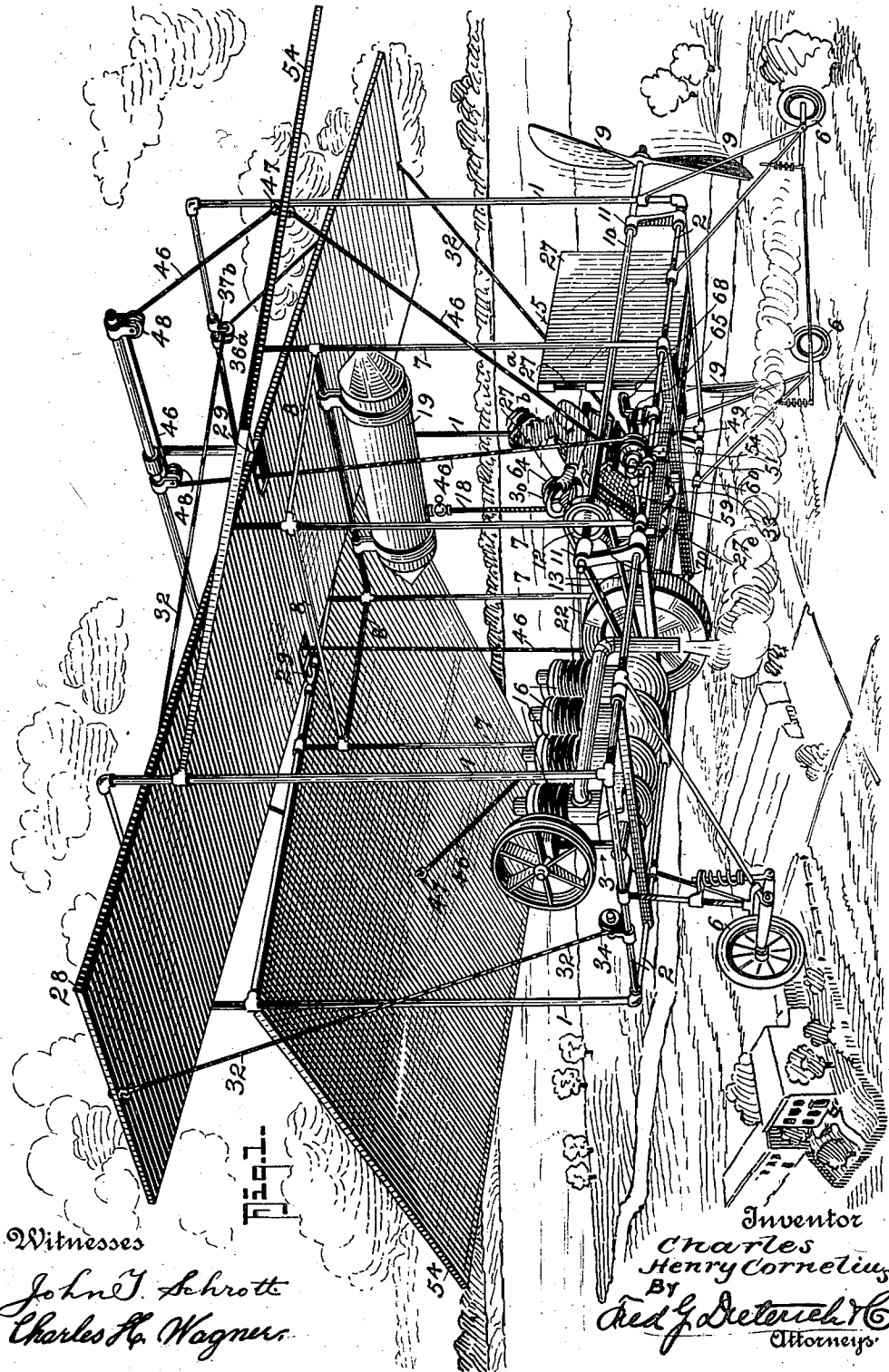
FLYING MACHINE.

APPLICATION FILED SEPT. 26, 1910.

Patented Mar. 28, 1911.

4 SHEETS—SHEET 1.

987,796.



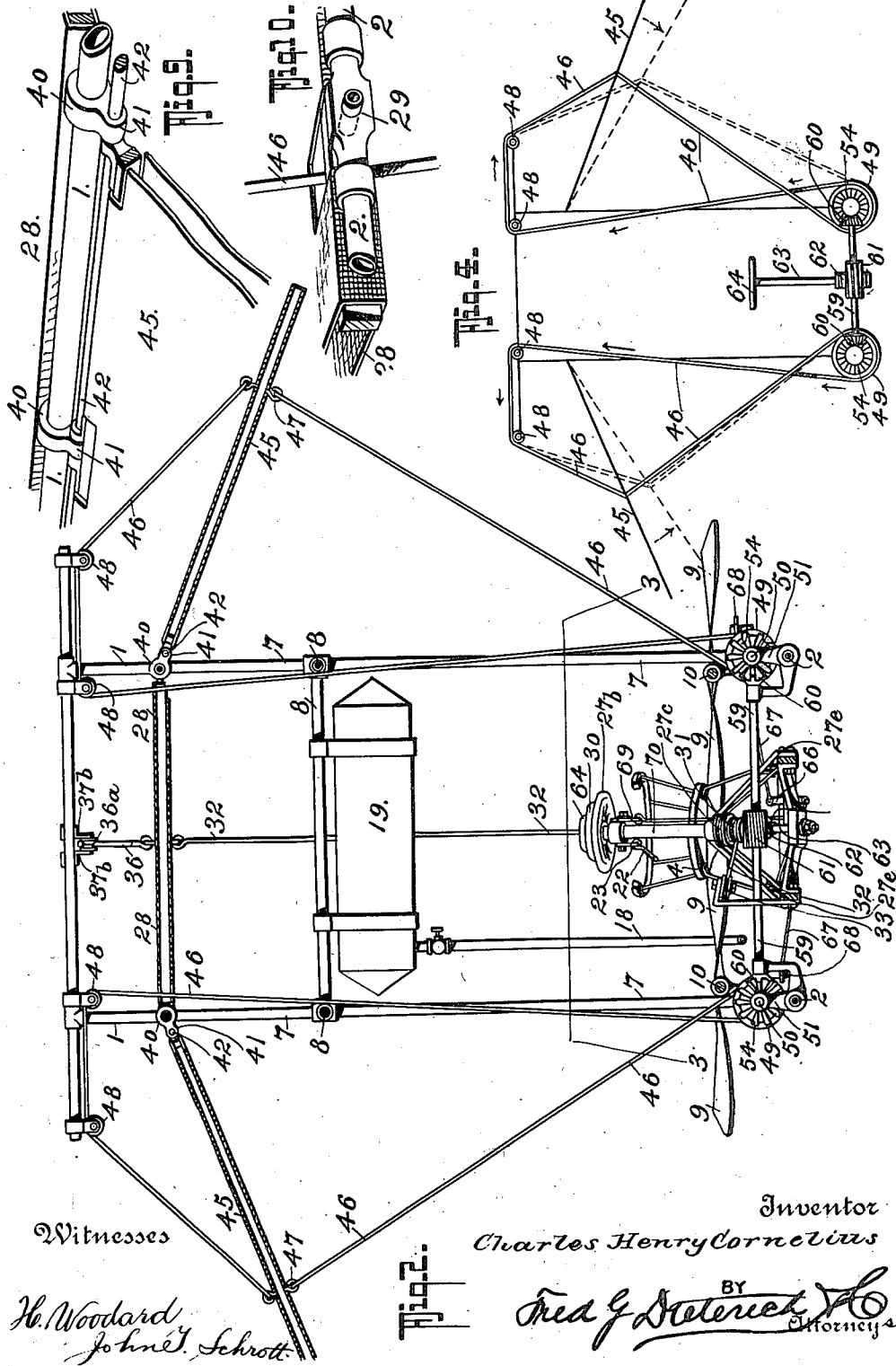
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SHEETS-SHEET 2.



Witnesses

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Fig. 2.

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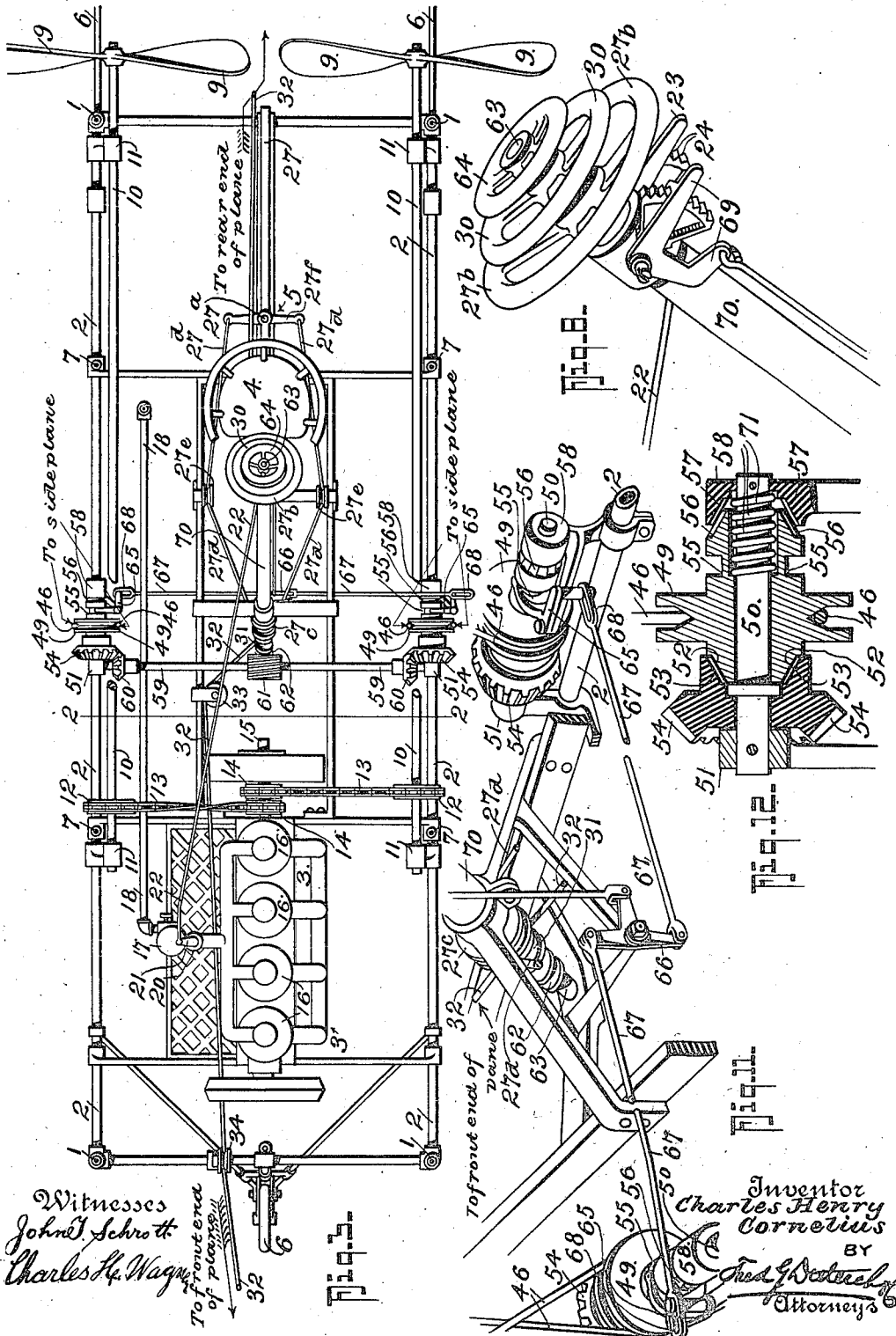
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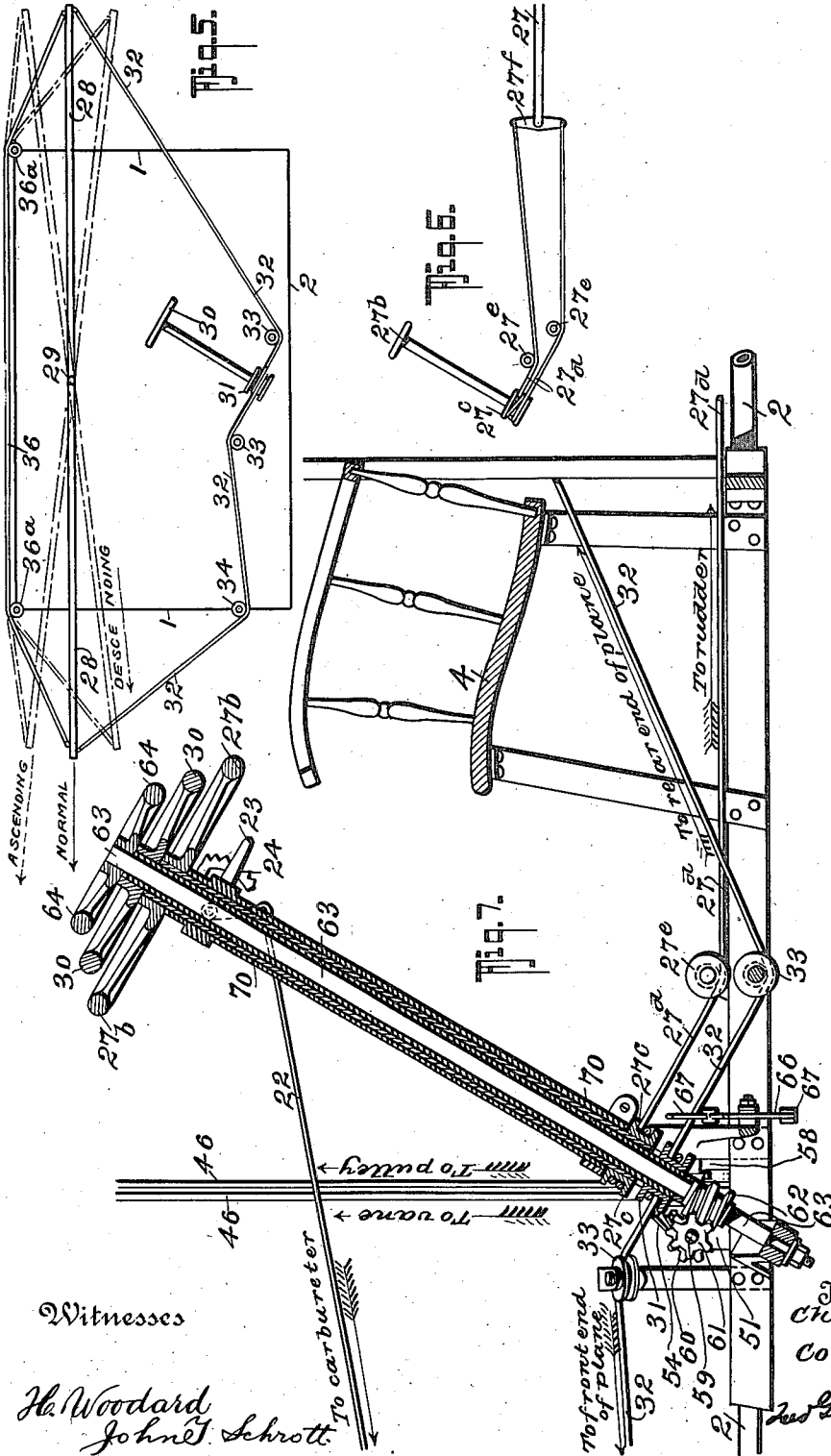
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FLYING-MACHINE.

987,796.

Specification of Letters Patent. Patented Mar. 28, 1911.

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To all whom it may concern:

Be it known that I, CHARLES HENRY CORNELIUS, residing at Fresno, in the county of Fresno and State of California, have invented a new and Improved Flying-Machine, of which the following is a specification.

My invention relates to motor driven, heavier than air, types of flying machines, and it primarily has for its object to provide an improved construction of the machine of the class stated, and in which the parts are compactly arranged for a reliable and expeditious handling by the aviator, for controlling the altitude and lateral direction of the machine.

In its generic nature, my invention embodies a peculiar arrangement of the several planes whereby all coact to present a compact surface and combined to practically serve as a single gliding surface during the act of flying, and yet adapted for being quickly adjusted to increase or diminish the said surface, and to assume a parachute like condition while descending and in which the side or stability planes and a central or altitude controlling vane are arranged for a prompt and positive adjustment by the aviator controlled shifting means.

In its more complete nature, my invention embodies an improved means for adjusting or setting the side or stability planes, and the altitude plane, and the steering devices, and in its still more subordinate features my invention includes those details of construction and peculiar combination of parts, all of which will be hereinafter fully explained, specifically pointed out in the appended claims and illustrated in the accompanying drawings, in which:—

Figure 1, is a perspective view of my construction of flying machine, the parts being adjusted for directing the same to an upward course. Fig. 2 is a transverse section on the line 2—2 of Fig. 3, looking in the direction of the arrow. Fig. 3, is a horizontal section on the line 3—3 on Fig. 2 showing the power mechanism, the steering and the controlling devices. Fig. 4, is a diagram that illustrates the manner in which the side or stability planes are controlled. Fig. 5, is a similar view that shows the controlling devices for the central or horizontal

plane. Fig. 6, is a similar view that shows the steering or rudder mechanism. Fig. 7, is a view that shows the aviator's "wheel devices" for controlling the rudder and planes shifting mechanism. Fig. 8, is a detail perspective view of the controlling wheels. Fig. 9, is a detail perspective view that illustrates a hinge connection on the side planes. Fig. 10, is a detail view of the horizontal plane hinge connection. Fig. 11, is a detail sectional perspective view, showing the clutch shifting mechanism. Fig. 12, is a central vertical section of one of the clutch devices whereby one or the other of the side planes may be locked from movement while leaving the other plane to be adjusted.

In the practical application of my invention, the machine embodies a main keel frame formed preferably of a light, but strong, tubing, of aluminum or other suitable material and joined to form vertical rectangular frame sections 1—1 that constitute the front and back ends of the machine, and the lower ends of the frame sections 1—1 join with a horizontal frame section 2 of skeleton form on which the motor mechanism 3 the aviator's seat 4, the rudder or steering device 5 and the shifting means hereinafter described, are supported. To the bottom of the keel frame the usual wheel or skids 6—6 of any approved form are attached. The keel frame also includes the intermediate side frame sections 7—7 of less height than the end members and which are suitably braced by cross braces 8—8, it being understood that the exact manner of bracing the vertical members of the frame may be such as found necessary to obtain the desired frame stability under a minimum weight.

In the preferred construction, as shown in Fig. 1, the propellers 9—9 of which two are utilized, one at each side of the machine, are disposed at the rear end of the machine, each having its shaft 10 journaled in bracket boxes 11—11 mounted in the bottom bars of the keel frame and the inner or front ends of the said shafts 10 each carry a belt or pulley drive wheel 12—12 around which take the drive belts or chains 13—13 that join with the driven pulleys 14 on the engine shaft 15 that is mounted on the keel

frame as best shown in Figs. 1 and 3, by reference to which it will be noticed the engine cylinders 16 are located at the front of the machine and the said cylinders are all supplied with working agent, that passes through the carbureter 17 from the feed pipe 18 that leads to the fuel supply tank 19 preferably mounted overhead as shown in Figs. 1 and 2 from which it will be noticed the throttle valve 20 that controls the working agent to the engine is operated by a crank 21 on the valve stem a rod 22 and a shiftable lever 23 mounted on a post adjacent the aviator's seat and held to engage a segment rack 24, it being obvious that by shifting the lever 23 the aviator can readily control the feed of the working agent from the carbureter to the engine.

In the preferred form of my invention, the steering vane or rudder 27 is located at the rear end of the machine and its inner end is hinged to the rudder post 27^a so disposed relatively to the main frame that the rudder adjustment can be readily effected by the hand wheel 27^b in front of the aviator. The wheel 27^b has a sleeve 27^c around which the rudder cables or chains 27^d are passed. The cables 27^a pass over vertical guide pulleys 27^e 27^f and connect to the cross arm 27^g on the lower end of the post 27^a, the operation of said parts being clearly defined in the diagram, Fig. 6.

28 designates the main or longitudinal plane which is centrally hinged as at 29, see Fig. 5, to swing in the vertical plane, it being obvious that the raising of the front end of the plane 28 causes the machine to rise and by projecting it in a downward direction the machine will be caused to descend. The control of the plane 28 is effected by the means diagrammatically shown in Fig. 5 by reference to which and to Figs. 1 and 7 it will be observed the hand wheel 30 operates a drum 31 around which is wound a cable 32, the ends of which pass over the vertically disposed guide rollers 33, thence over the guide sheave or pulley 34 and connect with the front and rear ends of the altitude or horizontal plane 28. For taking up slack of cables and giving the desired rigidity to the plane 28 a guy cable 36 is connected at its opposite ends to the upper side of the front and rear ends of the plane 28 and the said cable 36 passes over guides 36^a on the brackets 37^a—37^b of the frame posts. By reason of the arrangement of the cables and the pulleys therefor that cooperate with the planes 28 the turning of hand wheel 30 effects the desired tilting of the longitudinal plane 28.

The lateral or stability planes 45 of which there are two, are each hinged to the upper side bars of the frame in the manner best shown in Fig. 9, from which it will be seen the cuff members 40 are secured to the side

bars and have pendent ears 41 in which journal the rods 42 on which the frames of the side planes 45 are hinged. Each side plane 45 has a cable 46 connected thereto at 47, the cable 46 passing over idler pulleys 48 on the keel frame and around the drums 49 on a shaft 50 secured in bearings 51—58 on the keel frame. The drums 49 each have a clutch face 52 to engage the clutch face 53 of a loose pinion 54. Each drum 49 also has a shifting groove 55 and a second clutch face 56 that may be made to lock against the clutch face 57 of the bearing 58 to hold the drum 49 from turning.

59 is a countershaft having pinions 60 to mesh with both pinions 54 at all times. The shaft 59 has a worm 61 that meshes with a worm gear 62 on the shaft 63 of the controlling and steering post, the shaft 63 being turned by a wheel 64.

The drums 49 are shifted into and out of engagement with the pinions 54 and bearings 58 when desired, by bell crank levers 65 that are joined to a double bell crank lever 66 by rods 67 having eyes 68 to allow for a selective shifting of the drums 49. The bell crank 66 is moved by a lever 69 on the steering post 70. By moving the lever 69 to either of its extreme positions, one or the other of the drums 49 will be disengaged from its respective pinion 54 and locked to the fixed bearing 58 so as to cut out the action of the adjusting mechanism on the particular side plane while leaving the other side plane free to be independently moved or adjusted by a manipulation of the hand wheel. When the lever 69 is in its central position, however, the springs 71 will insure the drums 49 and their respective pinions 54 being kept in mesh so that both side planes may be simultaneously manipulated. By turning the hand wheel 63 both side planes may be raised or lowered as conditions may require, or they may be separately moved by the hand wheel when only one of the drums 49 is in mesh with its respective pinion.

From the foregoing description, taken in connection with the accompanying drawings, the complete construction and the general method of operation and control of the different vane and rudder setting devices will be readily understood by those skilled in the art to which my invention belongs.

Among the advantages of my construction of flying machine is the compact arrangement of the parts and the positiveness of action, the several drums and the engine control being in immediate command of the operator, the shifting devices being of a simple and inexpensive character and so mounted that they cannot easily become disarranged under sudden gusts of wind, the several vanes coacting in such manner that under direct flying they present a large

plane gliding surface, the area of which is easily reduced and the vanes so flexed that the lateral and vertical directions can be quickly and positively acquired.

5 Having thus described my invention, what I claim is:

1. A flying machine, including a keel frame, a main plane longitudinally tiltably mounted on said keel frame, side planes
10 hinged on the keel frame at the sides of and adjacent to the longitudinal planes, a rudder, a motor driven propelling mechanism, an aviator's seat, and means from the aviator's seat for adjusting the positions of the
15 several planes and means for controlling the rudder and propelling mechanism.

2. In a flying machine of the character described, a keel frame, motor driven propelling mechanism mounted thereon, a longitudinally extended plane centrally hinged to
20 swing in the direction of its length, a side plane hinged at each side of and adjacent to the longitudinal plane to swing up or down, means operable from the aviator's seat for tilting the longitudinal plane and other similarly operated means for swinging the side
25 planes in unison and for sustaining them at their set positions.

3. The combination with a suitable framework, propelling means mounted thereon; of a plurality of movable planes, comprising a central longitudinal plane, centrally pivoted to swing in the direction of its length, means operable from the aviator's seat connected to
35 the said central plane for pulling one end up as the other pulls down, side planes hinged at the opposite sides of and adjacent to the central plane, means for swinging the said opposite planes in unison.

4. In a flying machine of the character stated, a keel frame, a longitudinally extended main plane hinged on a transverse axis to said keel frame, side planes hinged
40 on longitudinal axes to said keel frame, one on each side of said main plane, a steering post, a drum for each side plane, a power transmission mechanism between said drums and said steering post whereby said drums
45 may be turned, endless cables connecting said drums with their respective side planes whereby said side planes may be raised or lowered as said drums are turned.

5. In a flying machine of the character stated, a keel frame, a longitudinally extended main plane hinged on a transverse axis to said keel frame, side planes hinged on longitudinal axes to said keel frame, one on
55 each side of said main plane, a steering post, a drum for each side plane, a power transmission mechanism between said drums and said steering post whereby said drums may be turned, endless cables connecting said
60 drums with their respective side planes whereby said side planes may be raised or lowered as said drums are turned, and means

for operatively disconnecting said drums from said power transmission mechanism.

6. In a flying machine of the character stated, a keel frame, a longitudinally extended main plane hinged on a transverse
70 axis to said keel frame, side planes hinged on longitudinal axes to said keel frame, one on each side of said main plane, a steering post, a drum for each side plane, a power transmission mechanism between said drums
75 and said steering post whereby said drums may be turned, endless cables connecting said drums with their respect side planes whereby said side planes may be raised or lowered as said drums are turned, and means for op-
80 eratively disconnecting said drums from said power transmission mechanism, and locking the drum so disconnected, from movement.

7. In a flying machine, a keel frame, a
85 longitudinal main plane supported thereby, a pair of side planes hinged to the keel frame on longitudinal axes, one on each side of the main plane, an aviator's seat carried by the keel frame, means controlled from the aviator's
90 seat for simultaneously moving said side planes to adjust the position of the same, and another means controlled from the aviator's seat for operatively disconnecting the said side planes from said last-mentioned
95 means, said main plane being pivoted to said frame on a transverse axis and said vertical planes being hinged to said frame on longitudinal axes adjacent to said main plane.

8. In a flying machine, a keel frame, a
100 main supporting plane and side planes carried by said keel frame, said side planes being pivotally connected to said keel frame to be adjustable, an aviator's seat on the keel frame, means controlled from the aviator's
105 seat for simultaneously or selectively moving said side planes as desired, said main plane being pivoted to said frame on a transverse axis and said vertical planes being hinged to said frame on longitudinal axes
110 adjacent to said main plane.

9. In a flying machine, a keel frame, a main plane carried by said keel frame and pivoted on a transverse axis, a pair of side wing planes hinged on a longitudinal axis,
115 one on each side of the main plane, an aviator's seat on the keel frame, a steering and controlling post adjacent to the aviator's seat, means for connecting said post with said main plane for controlling said main
120 plane, means connected with said post and said side planes for controlling said side planes, a motor driven propelling mechanism, means connecting said post and said motor driven propelling mechanism for controlling the same, a rudder and means connecting said rudder with said post for controlling said rudder, said post including
125 separate controlling elements for the parts controlled thereby.

10. In a flying machine, the combination with a suitable frame work, a propelling and a steering means mounted thereon; of a longitudinal and centrally disposed plane
5 pivotally mounted midway its length, a wing plane hinged at each side of the central plane, the hinge connection being in the plane of the pivot of the central plane, devices under control of the aviator for tilting the central and wing planes.

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Witnesses:

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