

P. PETERSON.
AERIAL NAVIGATION.
APPLICATION FILED FEB. 24, 1910.

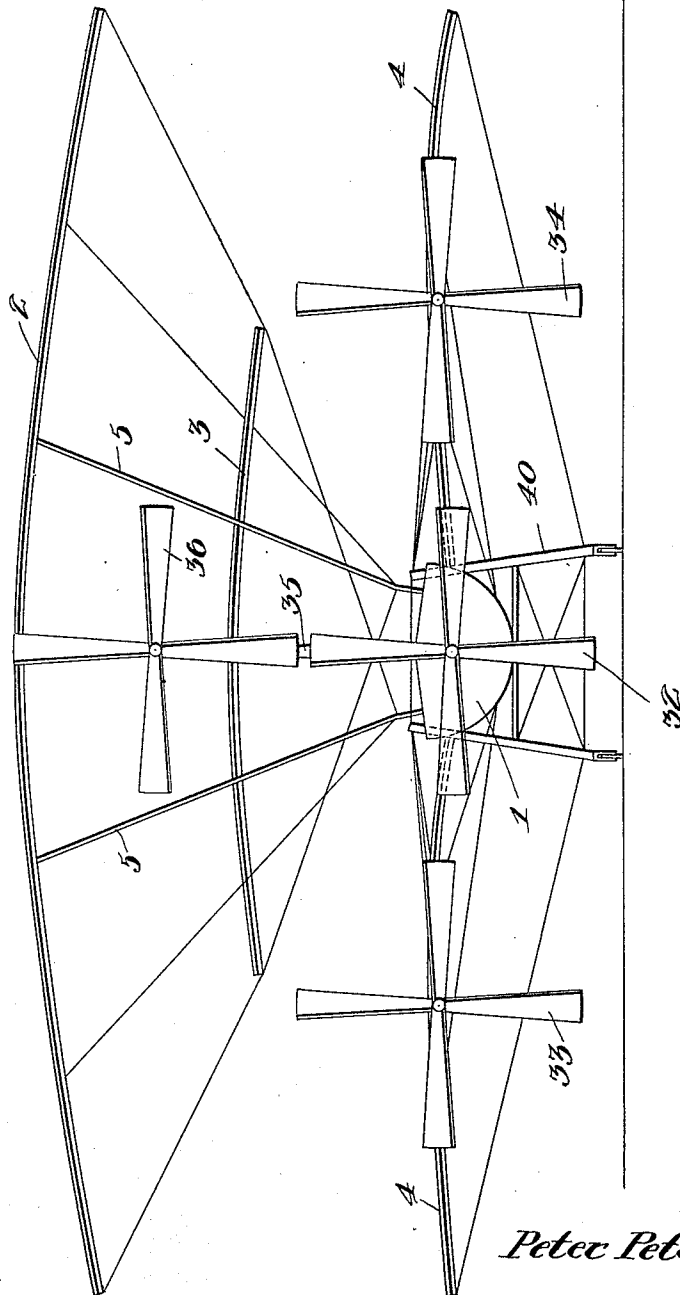
1,006,592.

Patented Oct. 24, 1911.

4 SHEETS-SHEET 1.

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Fig. 1.



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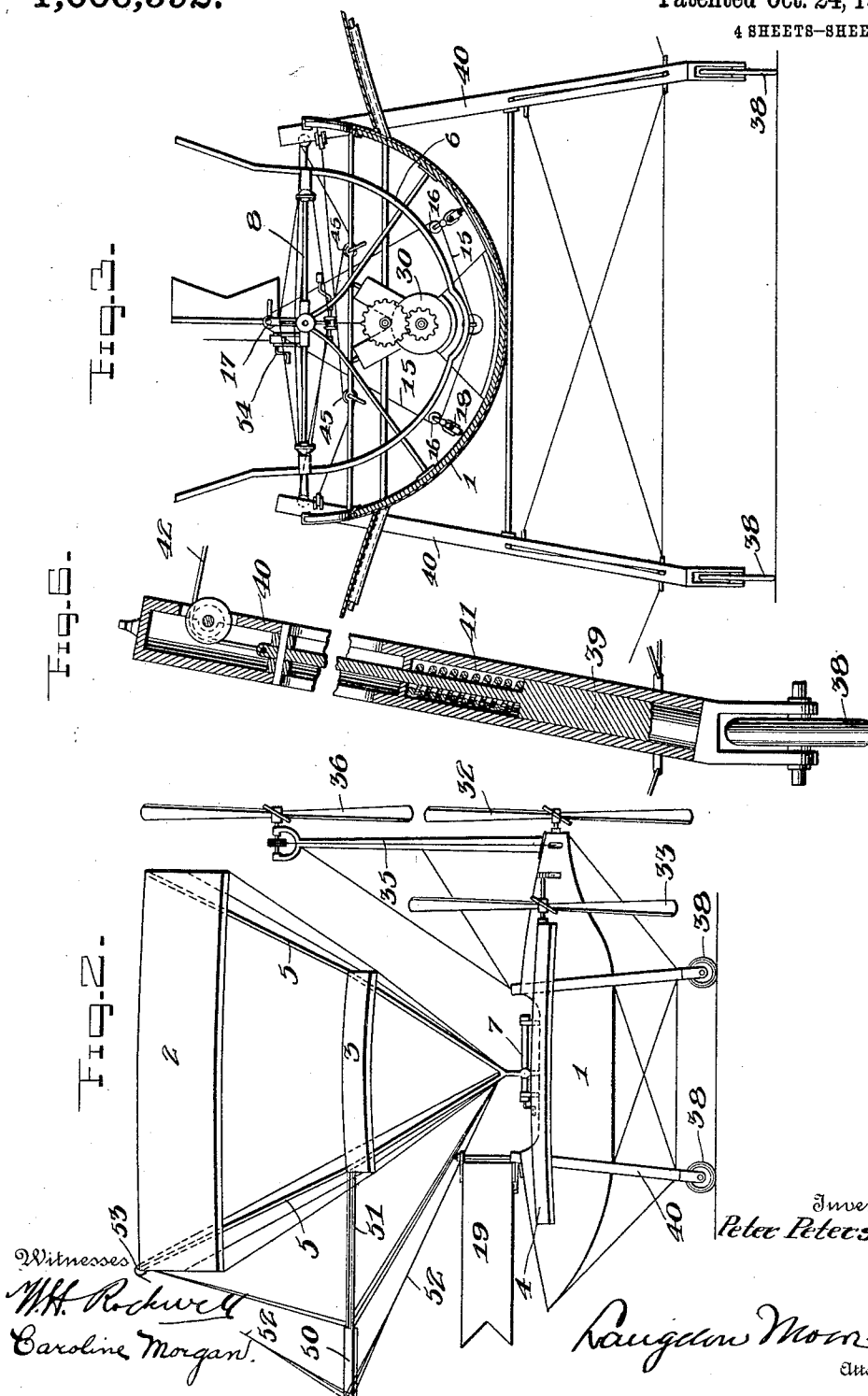
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Fig. 2.

Fig. 3.



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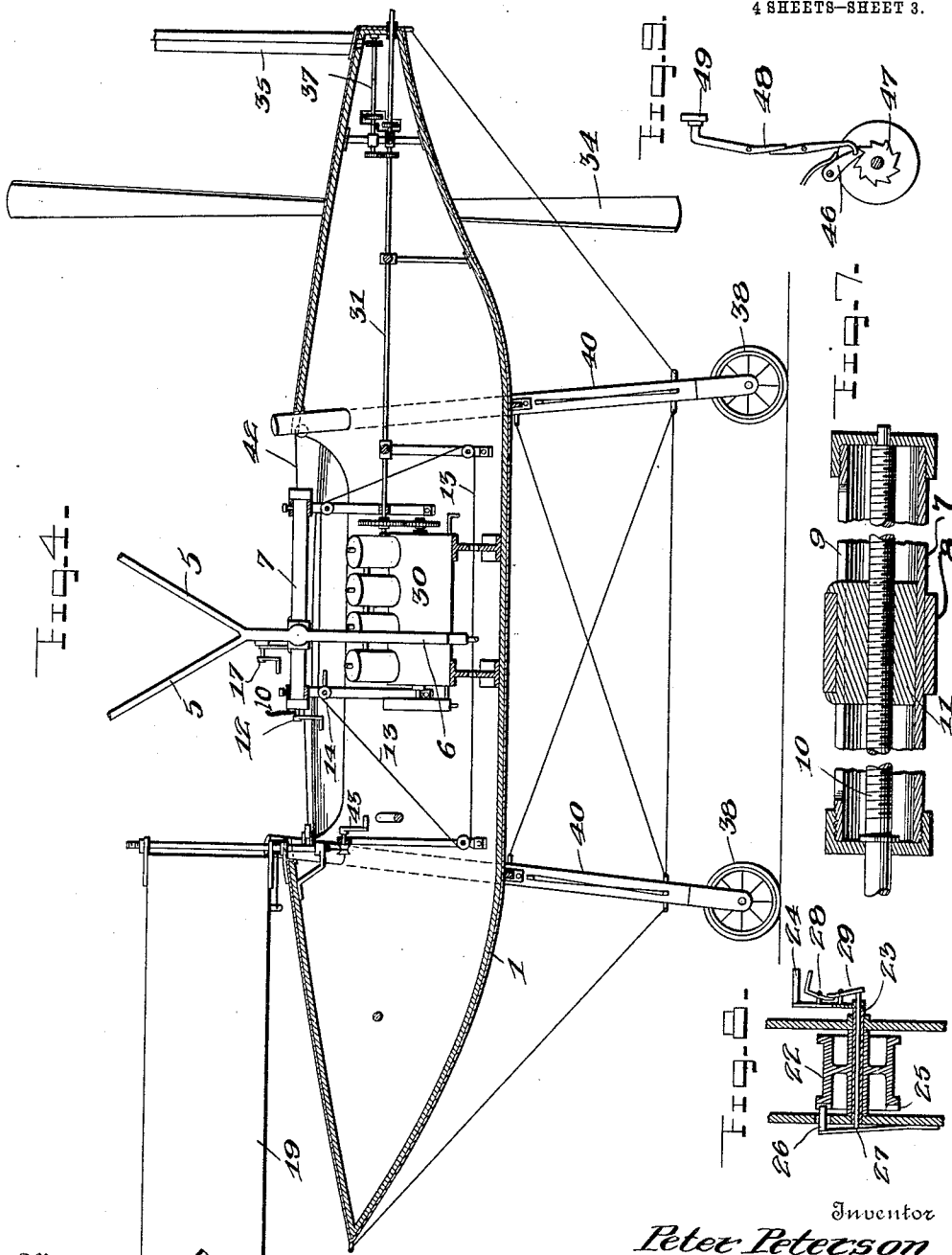
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4 SHEETS—SHEET 4.

Fig. 5.

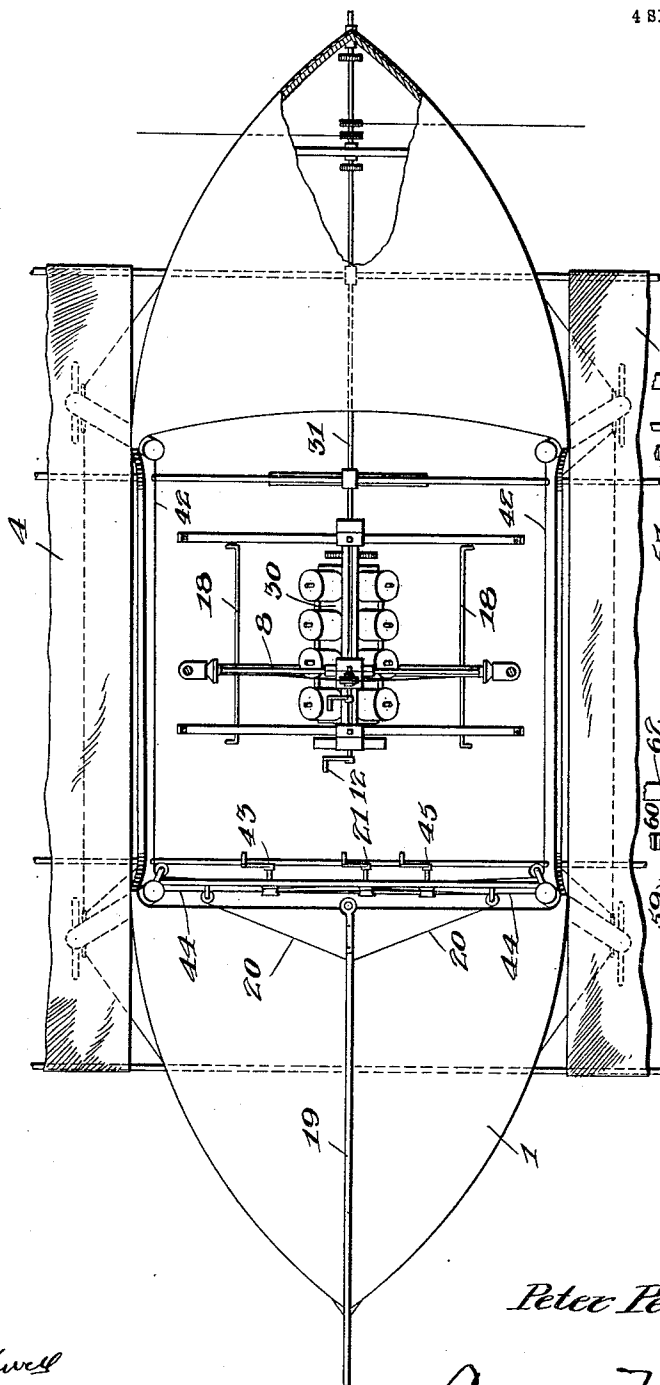


Fig. 11.

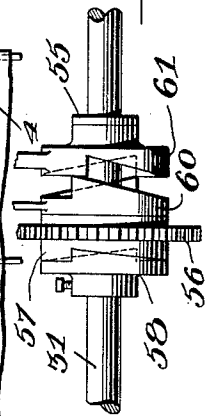
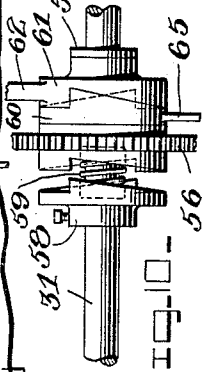


Fig. 10.



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46

UNITED STATES PATENT OFFICE.

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AERIAL NAVIGATION.

1,006,592.

Specification of Letters Patent.

Patented Oct. 24, 1911.

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To all whom it may concern:

Be it known that I, PETER PETERSON, a subject of Russia, residing at San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in Aerial Navigation, of which the following is a specification.

This invention relates to improvements in aerial navigation, and more particularly to a device belonging to the general type of aerial craft known as heavier-than-air flying machines.

It is the object of this invention to provide a craft of this character with means carried upon the frame work which will impart to it the initial upward start after the propellers have been set in motion.

This invention also contemplates the use of one or more aeroplanes mounted above the body and an aeroplane rigidly secured on each side of the body.

It is the further object of this invention to mount and support the upper aeroplanes in such a manner upon the body as to enable to change both the vertical and horizontal relation of the uppermost planes to the body in order to control both the vertical and horizontal directions of travel. The point of support may be also changed relatively to the body to compensate for any change in the center of gravity of the device occasioned by the addition or lessening of the weight of any part thereof, as where additional fuel or additional passengers are taken on board or as the fuel is consumed. The propelling force consists in four propellers located in the forward portion of the body. The propellers are arranged in pairs, one pair is a vertical plane and the other pair is a horizontal plane, and the propellers of each pair are operated to revolve in opposite directions.

The advantages of this construction are numerous. The mechanisms which give the initial upward start to the device after the propellers have been started also act as a shock absorber when making a landing. By connecting the support of the uppermost planes to the body with a universal movement, the device is at all times under the perfect control of the operator and the relation between the body and the uppermost plane may be changed to meet all conditions that may arise, and yet retain a perfect balance.

In a device of this character it is not neces-

sary to use a rudder except when traveling in a side wind, because by changing the horizontal relation between the body and the uppermost plane by moving the body to the right or left, the horizontal direction of travel may be controlled and by changing the vertical relation between the body and the uppermost plane by moving the body forward or backward, the vertical direction of travel may be controlled. By mounting the propellers in pairs with their shafts in planes at right-angles to each other and causing the propellers of each pair to rotate in opposite directions upon the forward portion of the machine an equal distribution of the air current formed by their revolution is formed and as the propellers are mounted on shafts in planes at right-angles to each other there can be no tendency to deviate from the straight course by the revolution of the propeller blades.

While the preferred form of this invention is illustrated in the accompanying sheets of drawing, yet it is to be understood that minor detail changes may be made without departing from the scope thereof.

Figure 1 is a view in front elevation of a complete machine. Fig. 2 is a view in side elevation of a complete machine. Fig. 3 is an enlarged cross section through the body with the upper planes removed. Fig. 4 is a view in enlarged longitudinal section through the body with the upper planes removed. Fig. 5 is an enlarged plan view of the body with the upper planes removed. Fig. 6 is a detail view partly in section illustrating the starting springs and shock absorbers. Fig. 7 is an enlarged detail view partly in section of the plane shifter. Fig. 8 is an enlarged detail view of the winding drum for the steering mechanism. Fig. 9 is an enlarged detail view of the spring wheel drum. Figs. 10 and 11 are enlarged detail views of the propeller clutches.

The preferred form of this invention as illustrated upon the drawings comprises a body or car 1 having two planes 2 and 3 supported above the body and a plane 4 rigidly secured and extending from each side of the body. All of the planes are rectangular in shape with their longest edge at right-angles to the direction of travel. Of the planes supported above the body, the lower one 3 is one-half the area of the upper plane 2, and the combined areas of the two planes 4, extending from each side

of the body is three-quarters the area of the uppermost plane 2, so that the combined areas of the supporting planes 2 and 3 is twice that of the rigid or steadying planes

4. The body or car is a cigar shaped frame completely covered with the exception of an opening in the top for the operator and supporting means for the upper planes thereby reducing the resistance to the air as much as possible.

The front and rear edges of each plane are supported by rigid braces 5, the braces on each side of the center line converging as shown in Fig. 1, and the braces on the same side of the center line converging and meeting as shown in Fig. 2. The fore and aft braces after joining each other are connected with the corresponding braces on the opposite side of the center line by a semicircular integral portion 6. A horizontal longitudinal support 7 is secured in the opening by braces extending to the sides of the body 1. A transverse supporting arm 8 is centrally pivoted upon the longitudinal support 7 and the extremities of this arm are pivotally connected at diametrically opposite points upon the semicircular member 6 joining the fore and aft braces of the plane. The longitudinal support 7, as shown in detail in Fig. 7, comprises a cylindrical casing 8 having a slot 9 extending throughout the upper side thereof and a centrally mounted screw threaded member 10 with a block 11 in engagement therewith and adapted to move within the tubular member upon the rotation of the screw threaded member by the handle 12 on the rear extremity thereof. The traveling block 11 is provided with projections extending upward through the slot and engaging the fore and aft edges of the portion of the transverse arm 8 which surround the tubular casing. The transverse arm is therefore pivotally mounted and the extremities of the arm may have a vertical movement while the entire arm may have a horizontal movement over the tubular casing.

As the plane supports 5 are pivotally mounted upon the extremities of the transverse arm 8, the front end of the plane 3 may be tilted upward or downward by imparting a slight movement to the lower portion of the semicircular connecting member 6 by means of the controlling rope 13 extending fore and aft from the lowermost portion of the semicircular connecting member and passing over the pulleys on the fore and aft transverse braces of the framework to a drum 14 upon the rear supports of the longitudinal member 7.

As the transverse arm 8 to which the plane supports 5 are pivoted is capable of a turning movement about the longitudinal support 7, the lateral edges of the plane may be tilted upward or downward for the

purposes of guiding by imparting a slight lateral movement to the bottom of the semicircular connecting member 6 of the braces. As shown in Fig. 3, this lateral movement is imparted by the controlling cord 15 from the lowermost portion of the semicircular connecting member 6 which passes over pulleys 16 on each side of the central line of the body to a drum 17 carried upon the traveling block 11. As the transverse arm is capable of a movement in the horizontal plane, the pulleys 16 on each side of the center line over which the controlling cord 15 passes are mounted upon longitudinal tracks 18 to compensate for the horizontal movement of the transverse arm 8, as shown in Fig. 5.

Under ordinary conditions, the flight may be completely controlled by changing the relation of the planes to the body. The vertical direction of travel may be altered by tilting the foremost edges of the plane upward or downward, and the horizontal direction of travel may be controlled by tilting the lateral edges of the plane upward or downward. A vertical rudder 19 is mounted at the rear of the opening in the body 1 for use when traveling in a side wind, and is operated by the rudder cords 20, shown in Fig. 5, extending from each side of the rudder and passing over pulleys on each side of the center line of a drum or tiller having a handle 21.

Fig. 8 is an enlarged detail view of the drum used for the controlling rudder cords. The barrel 22 of the drum is rigidly secured to a hollow shaft 23 rotatably mounted in the frame work to which is rigidly secured an operating handle 24. The edge of the barrel opposite the handle is provided with a series of depressions 25 for engagement with a spring pressed pin 26 operated by a rod 27 mounted in the hollow shaft and extending on each side thereof. A bell crank lever 28 is pivoted upon one arm to the portion of the operating handle at right-angles to the shaft with the extremity of the pivoted arm in engagement with one end of a lever 29 similarly pivoted to the framework of the handle and having its opposite extremity in contact with the rod 27 passing through the hollow shaft, so that when the hand grip of the handle is grasped, the fingers will also close over the free arm of the bell crank lever and thereby force the operating rod through the hollow shaft and release the barrel of the drum. By this means either the planes or the rudder may be positively secured in the desired position.

The engine or source of power 30 is centrally mounted in the body between the semicircular connecting member 6 of the plane braces and the longitudinal support 7. A driving shaft 31 extends forward through the central portion of the body and is pro-

vided at its exterior end with a propeller 32. Propellers 33 and 34 are mounted at equal distances from the center upon the forward edges of the stationary or steadying planes 4 extending outward from each side of the body, and a vertical post 35 is provided at the forward extremity of the body for supporting a fourth propeller 36. These propellers are all operated from the main driving shaft 31, and the propellers of each pair having their shafts in the same plane are driven in opposite directions by means of the counter shaft 37 operated by the main driving shaft. That is to say the two propellers 33 and 34 mounted upon the steadying plane 4, which are in the same horizontal plane, are operated in opposite directions by one being operatively connected to the main driving shaft 31 and the other to the counter shaft 37. Of the pair of propellers with shafts in the same vertical plane, the lowermost 32 is directly connected or carried upon the main driving shaft 31, and the uppermost one 36 is operatively connected to the counter shaft 37, and thereby are revolved in opposite directions. In the preferred form, the driving sprockets of the propellers 33, 34 and 36 are provided with a sliding clutch upon the main and counter shafts controllable by the operator so that one propeller 32 upon the main shaft may be operated alone, the propellers with shafts in the same vertical plane may be operated alone, or the propellers with shafts in the same horizontal plane and propeller 32 may be operated without propeller 36 in order to meet different conditions.

The clutch mechanism is illustrated in Figs. 10 and 11. Fig. 10 illustrates the sprocket wheel disconnected and Fig. 11 shows the sprocket wheel in connection with the driving shaft. A collar or thrust block 55 is secured to the driving shaft 31. The sprocket wheel 56 is carried upon a rotatable member 57 having a cam face and abutment adapted to be forced into engagement with a corresponding cam face and abutment upon the member 58 secured to the shaft. The spring 59 normally forces the members 57 and 58 apart and out of engagement with each other and causes the member 57 to engage the rotatable member 60. The members 60 and 61 are rotatably mounted upon the shaft with member 61 abutting block 55. Member 61 is withheld from rotation with the shaft by the brace 62 secured to the frame of the body. The adjacent faces of members 60 and 61 are provided with corresponding cam faces and abutments. The member 61 is provided with an actuating lever 65. When the lever 65 is rotated the sprocket wheel member will be thrown into engagement with the shaft as the cam faces upon members 60 and 61 rise up on each other. The driving sprockets upon the main

and counter shafts are each mounted in this way, but they appear in so small a scale on Figs. 4 and 5 that the connection has been illustrated in detail on Figs. 10 and 11.

For traveling upon the ground, the body is supported upon two pair of wheels 38 arranged on each side of the center line, each wheel 38 being carried upon a shaft 39 slidably mounted within a hollow brace 40 rigidly secured to the body 1. A compression spring 41 engaging the brace and shaft normally retains the shaft in the extended position. The inner ends of the shafts of the forward pair of wheels are connected by a controlling cord 42 passing over pulleys to a drum 43 whereby the shafts may be withdrawn within the tubular braces and place the springs therein under compression. The springs of the rear pair of wheels may be compressed in the same manner by controlling cords 44 passing over pulleys to a separate drum 45. As shown in detail in Fig. 9, these controlling drums 43 and 45 are provided with a pawl 46 and ratchet 47, whereby the drum will be locked as the springs are compressed and may be released by the pivoted levers 48 and push-button 49.

The upper movable planes 2 and 3 are provided with a horizontal rudder 50 pivotally mounted upon frames 51 extending rearwardly from the lower plane 3. A rudder cord 52 extends upward from the free rear portion of the rudder over the pulley 53 upon the center of the upper plane 2 to a drum 54 upon the transverse arm 8 and thence to the under side of the rudder. By proper manipulation of this rudder the equilibrium of the car body is maintained.

Before beginning the flight, the springs of the four wheels are placed under compression, the engine is started and the forward edges of the plane tilted slightly upward, then the springs in the forward pair of wheels are released which will give the forward portion of the car an upward impetus which in connection with the uppermost planes will aid in causing the machine to leave the ground, then the springs of the aft wheels will be released and the entire machine will be given an initial impetus in leaving the ground. As above described, the course of flight is at all time under complete control by means of the universal movement of the planes in relation to the body. In making a landing, as the compression has been released from the springs of the wheels, the same will act to absorb the shock of the machine engaging the earth.

What I claim is:—

1. In a device of the character described, a car body, steadying planes rigidly secured upon each side thereof, a plurality of movable planes supported thereabove, a pair of propellers laterally of the machine having

their shafts in the same horizontal plane, a pair of propellers centrally of the machine having their shafts one above the other in the same vertical plane, said propeller shafts
5 being fixed in relation to the car body and means to rotate the propellers of each pair in opposite directions, and means to alter the longitudinal and lateral relation of the upper planes to the car body without altering
10 the relation of the propellers to the car body.

2. In a device of the character described, a car body, steadying planes rigidly secured upon each side thereof, a plurality of movable planes supported thereabove, a pair of propellers laterally of the machine having their shafts in the same horizontal plane mounted upon the steadying planes on each side of the car body, a pair of propellers
15 centrally of the machine having their shafts one above the other in the same vertical plane, said propeller shafts being fixed in relation to the car body, means to rotate the propellers of each pair in opposite directions, and means to alter the longitudinal
20 and lateral relations of the upper planes to the car body without altering the relations of the propellers to the car body.

3. In a device of the character described, a car body, a plurality of planes supported above the car body, means to change the lateral and longitudinal angular relation of the planes to the car body, and longitudinally sliding means upon the car body for changing
30 the relation of the point of support of the planes to the center of the car body.

4. In a device of the character described, a plurality of planes mounted thereabove, braces supporting the planes, a universal
40 connection between the plane braces and the car body, and longitudinally sliding means upon the car body for altering the relation between the universal connection and the car body.

5. In a device of the character described, a car body, a plurality of planes mounted thereabove, braces supporting the planes, a

support in the car body, a transverse arm centrally pivoted upon the support and movable longitudinally thereon, a pivotal connection between the extremities of the arm
50 and the plane braces, means for securing the transverse arm in different lateral positions about the pivotal support, and means for securing the pivoted plane braces in different
55 longitudinal positions about the pivotal connection of the arm.

6. In a device of the character described, a car body, a plurality of planes mounted thereabove, fore and aft braces supporting
60 the planes on each side of the center line, the fore and aft braces on the same side of the center line meeting and joining the corresponding braces on the opposite side of the center line, a support in the car body, a
65 transverse arm pivotally mounted upon the support and adapted to travel thereon, pivotal connections between the extremities of the arm and the joined braces on opposite sides of the center line.

7. In a device of the character described, a car body, steadying planes rigidly secured upon each side thereof, a plurality of movable planes supported thereabove, a pair of propellers laterally of the machine having
75 their shafts in the same horizontal plane mounted upon the steadying planes on each side of the car body, a pair of propellers centrally of the machine having their shafts one above the other in the same vertical
80 plane, said propeller shafts being fixed in relation to the car body, means to rotate the propellers of each pair in opposite directions, means for operating the propellers separately or in unison, and means for altering
85 the longitudinal and lateral relations of the upper planes to the car body without altering the relation of the propellers to the car body.

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Witnesses:

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