H. DISSIE.

AERIAL NAVIGATION.

APPLICATION FILED MAR. 17, 1909.

1,022,777.

Patented Apr. 9, 1912.

3 SHEETS—SHEET 1.

Fig. 1.

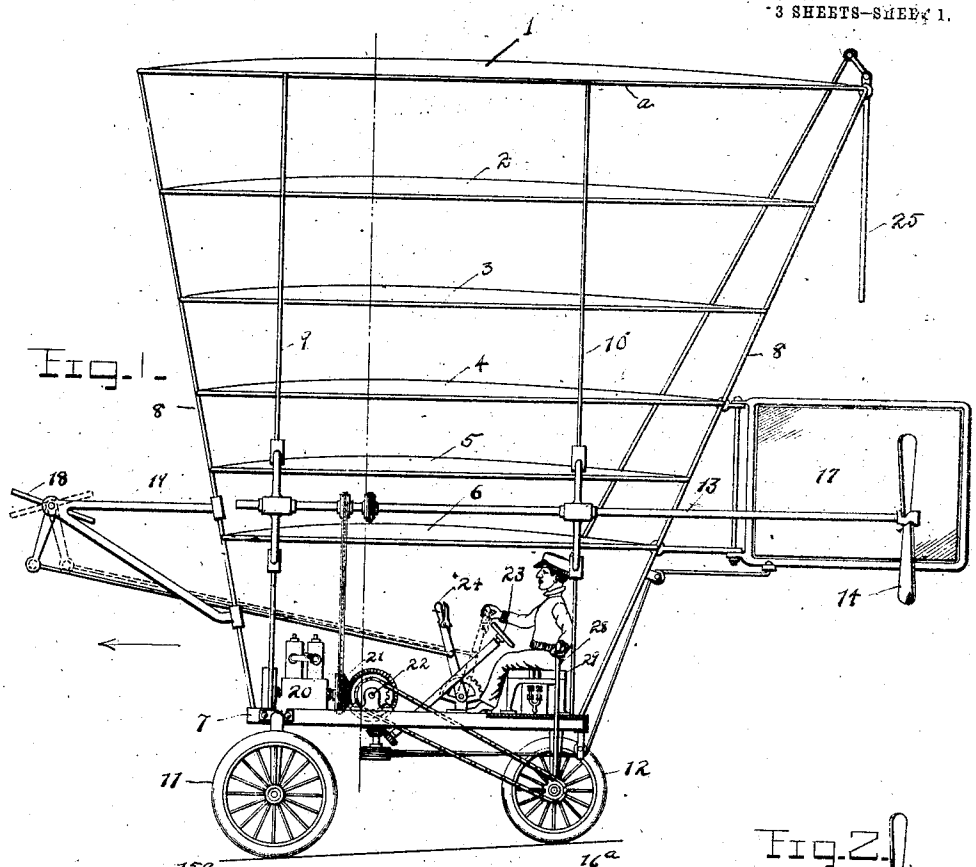
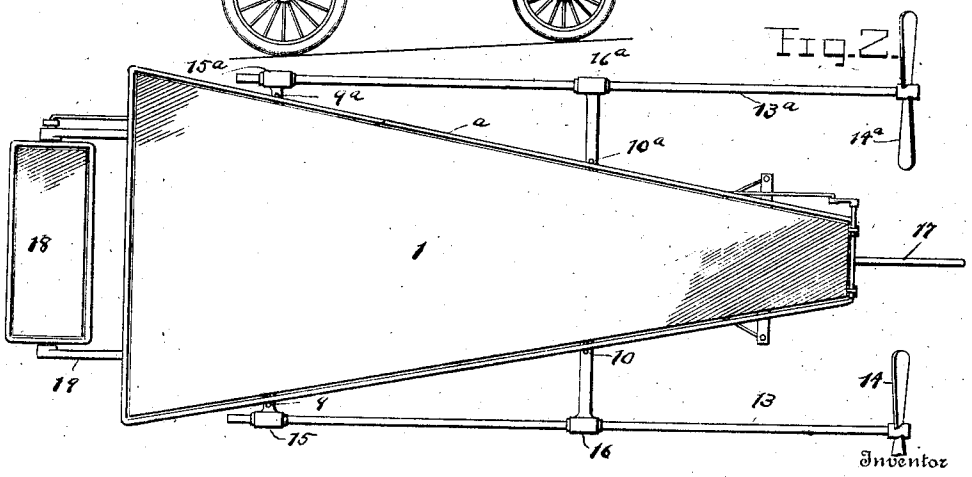


Fig. 2.



Witnesses

W. H. Rockwell

Caroline Morgan

Inventor

Henry Dissie,

By Langdon Moore

Attorney

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3 SHEETS—SHEET 2.

Fig. 4.

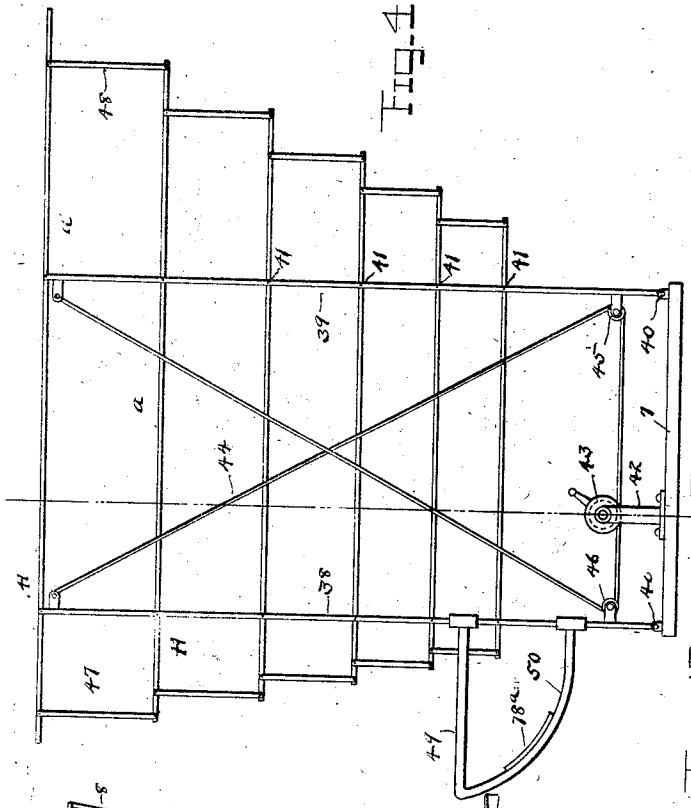


Fig. 12.

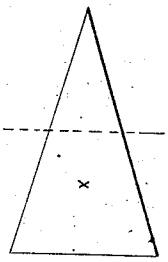


Fig. 11.

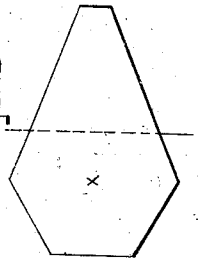


Fig. 10.

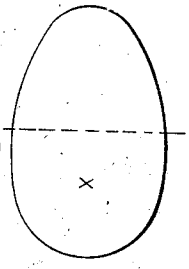
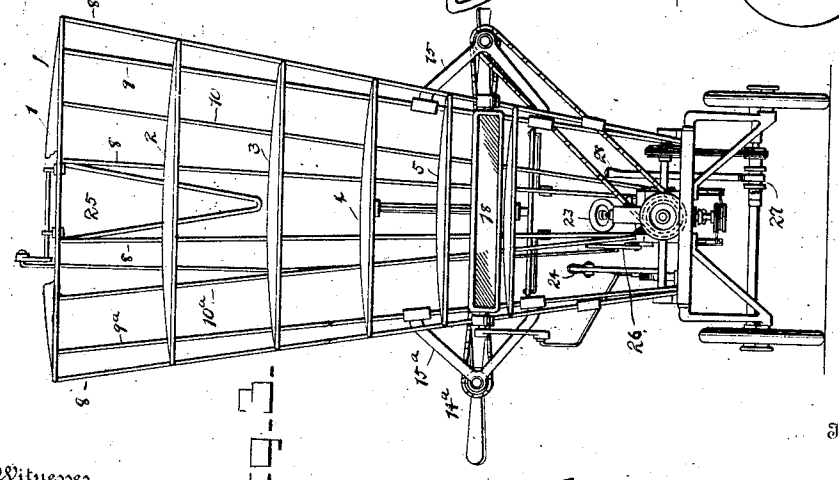


Fig. 5.



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W. H. Rockwell

Caroline Morgew

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Henry Dissie,

By Langdon Moore

Attorney

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3 SHEETS—SHEET 3.

Fig. 5.

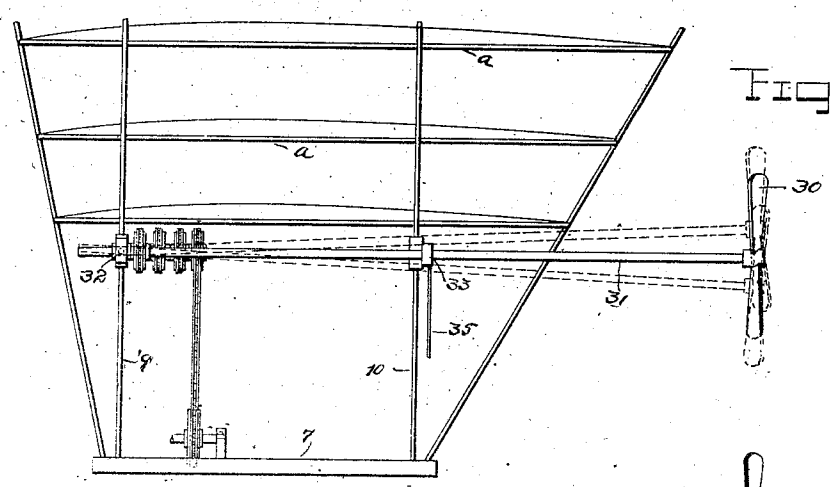


Fig. 6.

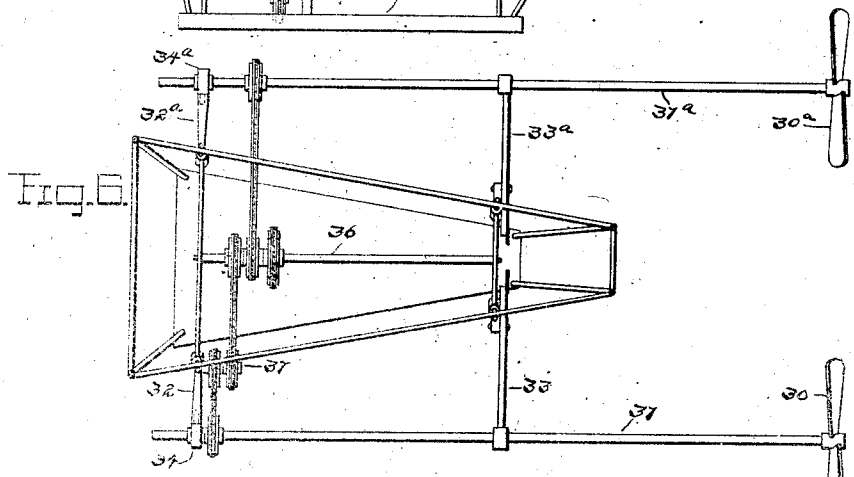


Fig. 7.

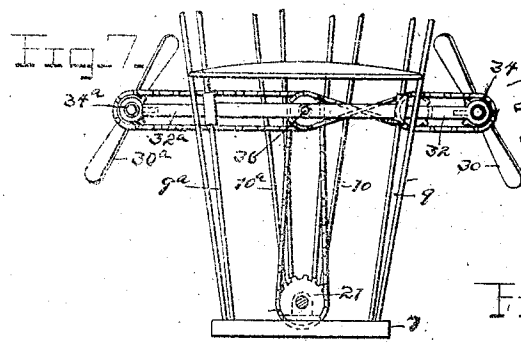


Fig. 8.

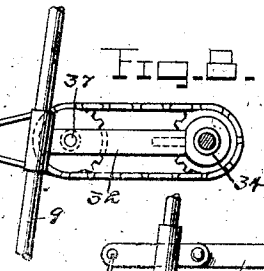
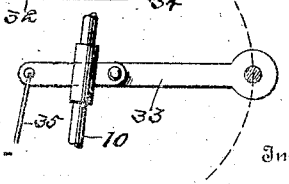


Fig. 9.



Inventor

Witnesses

W. H. Rockwell

Caroline Morgan

By Henry Dissie

Langdon Moore

Attorney

UNITED STATES PATENT OFFICE.

HENRY DISSIE, OF WASHINGTON, DISTRICT OF COLUMBIA.

AERIAL NAVIGATION.

1,022,777. Specification of Letters Patent. Patented Apr. 9, 1912.

Application filed March 17, 1909. Serial No. 484,027.

To all whom it may concern:

Be it known that I, HENRY DISSIE, a citizen of the United States, residing at Washington, in the District of Columbia, have invented new and useful Improvements in Aerial Navigation, of which the following is a specification.

This invention relates to aerial navigation and more particularly to that form of air ship known as a heavier-than-air machine.

The broad idea as contemplated by this invention is a construction on the aeroplane principle comprising a series of parallel superposed aeroplanes of any form or shape arranged so that their longest diameters lie in the same vertical plane, and whose centers of area fall on the longest diameter of each respective plane but to one side of the center thereof. The superposed planes should be so arranged that their centers of area will lie in the same vertical line. The framework, aeroplanes, and driving mechanism should be so constructed and arranged that the center of gravity of the entire machine will be below the lowermost aeroplane and normally in the line of centers of area of the aeroplanes as above described. The machine is contemplated to move in the direction of the longest diameter with that side of the aeroplane nearest the center of area toward the front.

While the accompanying drawings illustrate the preferred forms, minor detail changes may be made without departing from the scope of the invention.

Figure 1 is a side elevation of one form of complete machine. Fig. 2 is a top plan view. Fig. 3 is a front end elevation. Fig. 4 is a diagrammatical view of a modified form. Fig. 5 is a side elevation in detail of a modification. Fig. 6 is a plan view of Fig. 5. Fig. 7 is a front elevation of Fig. 5. Fig. 8 is a detail view of one of the forward shaft brackets. Fig. 9 is a detail view of one of the rear shaft brackets. Figs. 10, 11 and 12 are views illustrating different forms of planes.

In Figs. 1, 2, and 3 the aeroplanes are designated by the numerals 1, 2, 3, 4, 5 and 6. Each plane is similar in form to the one above it, but somewhat smaller in size, their homologous sides lying in the same planes and their centers of area lying in a straight line perpendicular to the uppermost plane. The contour of each aeroplane is preserved by the light framework *a* and the surface of the aeroplane is composed of canvas or cloth stretched over this framework. 7 is a platform parallel to the superposed aeroplanes and connected thereto by posts 8, 8, 8, 8 attached to each corner of the framework *a*. 9 and 9^a are additional strengthening posts perpendicular to platform 7 on each side of the forward end, connecting the platform with the outer edges of the frame *a*. 10 and 10^a are similarly disposed posts arranged near the rear of platform 7 connecting the platform to the frames in the same manner. A pair of wheels 11 are secured to the underside of the forward part of the platform 7, and a pair of smaller wheels 12 are secured to the rear of platform 7 to support the plane while upon the ground. 13 and 13^a are propeller shafts, carrying propellers 14 and 14^a, mounted to revolve in brackets 15 and 16 on one side and in brackets 15^a and 16^a on the other side. These brackets 15, 16, 15^a and 16^a being carried by posts 9, 10, 9^a and 10^a respectively. 17 is a vertical rudder supported between the rear posts 8 and adapted to steer the machine in a horizontal plane. 18 is a horizontal rudder supported by brackets 19 from the forward posts 8 adapted to raise and lower the forward ends of the plane. 20 is an engine arranged centrally upon the platform 7 and may be of any form, a two cylinder gas engine being illustrated in this instance. 21 is a double driving wheel carried by the engine shaft comprising a sprocket wheel and miter gear wheel. The sprocket wheel is connected by a chain to a sprocket wheel carried by shaft 13. Shaft 13^a is connected to shaft 13 by a chain passing over sprockets on both of said shafts. By passing the chain over the top of one sprocket and under the bottom of the other sprocket a reverse movement is imparted to the two shafts. The miter gear carried by the driving wheel meshes with the miter gear wheel carried upon the transverse shaft 22, which carries a sprocket wheel connected by a chain to the sprocket carried on the shaft of the rear wheels 12. 23 is a steering wheel connected to rudder 17, and 24 is an operating lever connected to horizontal rudder 18. 25 is a tail or drag pivoted to the rear of frame *a* of the uppermost plane and is operated by the lever 26. 27 is a clutch mechanism carried on the shaft of rear wheels 12 adapted to connect

or disconnect these wheels with the driving mechanism. 28 is an operating lever for such clutch. 29 is a seat for the operator.

The operation of this machine is as follows: The platform 7 and the superposed planes being parallel, and the rear wheels 12 being of less diameter than the forward wheels 11, when the machine is upon the ground the forward ends of the planes will be tilted upward. To cause the machine to begin its flight, the horizontal rudder 18 is placed in the position shown in full lines on Fig. 1. The tail 25 is raised parallel to the uppermost plane 1, the engine started and the clutch 27 thrown in to connect the rear wheels with the driving mechanism. As the machine gains in speed upon the ground, the pressure of the air upon the underside of the superposed aeroplanes will cause the machine to rise, clutch 27 is thrown out, and the propellers 14 and 14ª will continue the flight. The horizontal direction of the machine is controlled by the rudder 17 and the vertical direction of the machine is controlled by the horizontal rudder 18. The tail 25 will operate as a drag when it is desired to reduce the speed or in making a landing.

In the form just described the series of superposed aeroplanes, platform supports and propeller shafts are all rigidly connected, and the vertical direction of the machine is controlled entirely by the forward rudder 18. This invention also contemplates a separate means for controlling the vertical direction which may be used alone, or in connection with the horizontal rudder 18. This form is shown in detail in Figs. 5, 6, 7, 8, and 9. This means of governing the flight comprises a vertical movement being imparted to the propeller shafts, and is carried out in the following manner. The propellers 30 and 30ª carried by shafts 31 and 31ª are mounted in the brackets 32 and 32ª secured to the forward supporting posts 9 and 9ª, and the brackets 33 and 33ª secured to the rearward supporting posts 10 and 10ª. The brackets 32 and 32ª are rigidly secured, but the shaft bearings 34 and 34ª are pivotally mounted thereon and the brackets 33 and 33ª are pivoted to the posts 10 and 10ª, so that an upward or downward angle may be imparted to the propeller shaft by the movement of the latter brackets about their pivotal points, the movement being controlled by the operating rods 35 and 35ª. 36 is a driving shaft centrally mounted and above the platform 7 between the posts 9, 9ª, 10 and 10ª in line with the brackets 32 and 32ª, and the pivots of brackets 33 and 33ª. Shaft 36 is connected by a chain to the sprocket on the driving wheel 21 of engine 20. Power may be transmitted from this shaft 36 to the propeller shaft by chains directly, as shown on the upper side of Fig. 6, one chain being crossed to give opposite direction of rotation to the two shafts, or, if the vertical movement of the propeller shaft is too great, an intermediate shaft 37 may be secured to bracket 32, or at the pivotal point of bracket 33 to form a flexible connection between the driving shaft 36 and the propeller shafts.

As before stated the center of gravity of the machine is below the aeroplane 6 and in the line of the centers of area of the aeroplanes. When the operator mounts his weight will throw the center of gravity slightly to the rear of this line of centers, and when the machine has left the ground this movement of the center of gravity will cause a downward tilt to the rear portion of the aeroplanes, which will impart a rising motion to the machine. At times during flight it may become desirable to impart a slightly different angle to the aeroplanes. In Fig. 4 I have shown in diagram a means by which this may be accomplished. In this case the frames *a* of the superposed aeroplanes are not rigidly connected by the posts 8, 9 and 10. Posts 38 and 39 are provided on each side of the platform 7, and are connected thereto by hinges 40. These posts engage the outer sides of frame *a* of each aeroplane, and are pivoted thereto as at 41. 42 is a bracket secured to platform 7 supporting drum 43. 44 is a flexible brace secured to the upper end of post 38, which passes over pulley 45 carried near the bottom of post 39, thence around drum 43, over pulley 46 carried near the bottom of post 38, and is secured to the upper end of the post 39. These braces will normally hold posts 38 and 39 rigid, but when the drum 43 is rotated in one direction or the other, the posts 38 and 39 will be moved in the corresponding direction and the aeroplanes will be moved in a body in the same direction, while still remaining parallel with each other, thus moving the center of gravity of the entire machine which consequently affects the angles of the aeroplanes. In this form the forward and rearward ends of each plane may be supported by the pivotal connections 47 and 48.

In Fig. 4 a modified form of horizontal rudder is shown. Instead of having the horizontal pivoted rudder 18 supported by rigid bracket 19, a bracket 49 is provided having a lower track portion 50 in the form of a segment of a circle, in which the rudder 18ª may be moved back and forth in either direction to impart the desired angle to the rudder.

In aerial navigation the conditions are exactly opposite to those encountered in marine navigation, yet in marine navigation the equilibrium of a vessel depends upon the center of gravity being below the center of buoyancy, and in aerial navigation the sta-

bility of the air ship or flying machine also depends upon the distance the center of gravity is below the center of buoyancy. When an aeroplane constructed in accordance with this invention is propelled through the air with its forward ends slightly raised the center of the resistance of the surface thus presented by the underside of the plane to the air becomes the center of buoyancy of the aeroplane. When the proper angle to secure the maximum efficiency during flight is determined the ideal condition of stability would be established by arranging the center of gravity in the line of the center of buoyancy, which in this case is the center of resistance. In a machine constructed in accordance with this invention the center of gravity, without considering the operator, normally lies in the line of center of area of the aeroplanes. The weight of the operator brings the center of gravity slightly to the rear of the center of area during flight, and at the same time the centers of buoyancy will fall in a line slightly to the rear of the line of the centers of area, so that by the proper regulation of the vertical directing means the center of gravity may be caused to fall in the line of the centers of buoyancy of the aeroplanes, making stability of the machine perfect and the manipulation of the machine will be entirely at the command of the operator in directing the flight. By arranging the aeroplanes with their centers of area in the same straight line and by providing means by which these planes may be shifted so that the center of gravity, which is at all times below the lowermost aeroplane, may be brought to fall in said straight line of centers, it becomes impossible for the machine to turn turtle under any condition, and should the propelling mechanism become disabled the relative position of the aeroplanes may be so altered that the machine will descend to the earth in the same manner as a parachute.

What I claim is:—

In an aeroplane, a plurality of planes of similar shape having their greatest axes in the direction of travel and their centers of area forward of their longitudinal centers, said planes increasing in size one above the other with their centers of area in the same vertical line, a relatively smaller platform of similar shape, means pivoted to the platform and to each plane supporting the planes one above the other in parallel relation to each other and to the platform, whereby upon movement of the planes they remain parallel to each other and to the platform, means for shifting the supporting means about its pivots upon the platform whereby the planes may be shifted fore and aft and remain in the same horizontal plane.

HENRY DISSIE.

Witnesses:
LANGDON MOORE,
CAROLINE MORGAN.