O. & W. WRIGHT.

FLYING MACHINE.

APPLICATION FILED FEB. 17, 1908

1,122,348.

Patented Dec. 29, 1914.

4 SHEETS—SHEET 1.

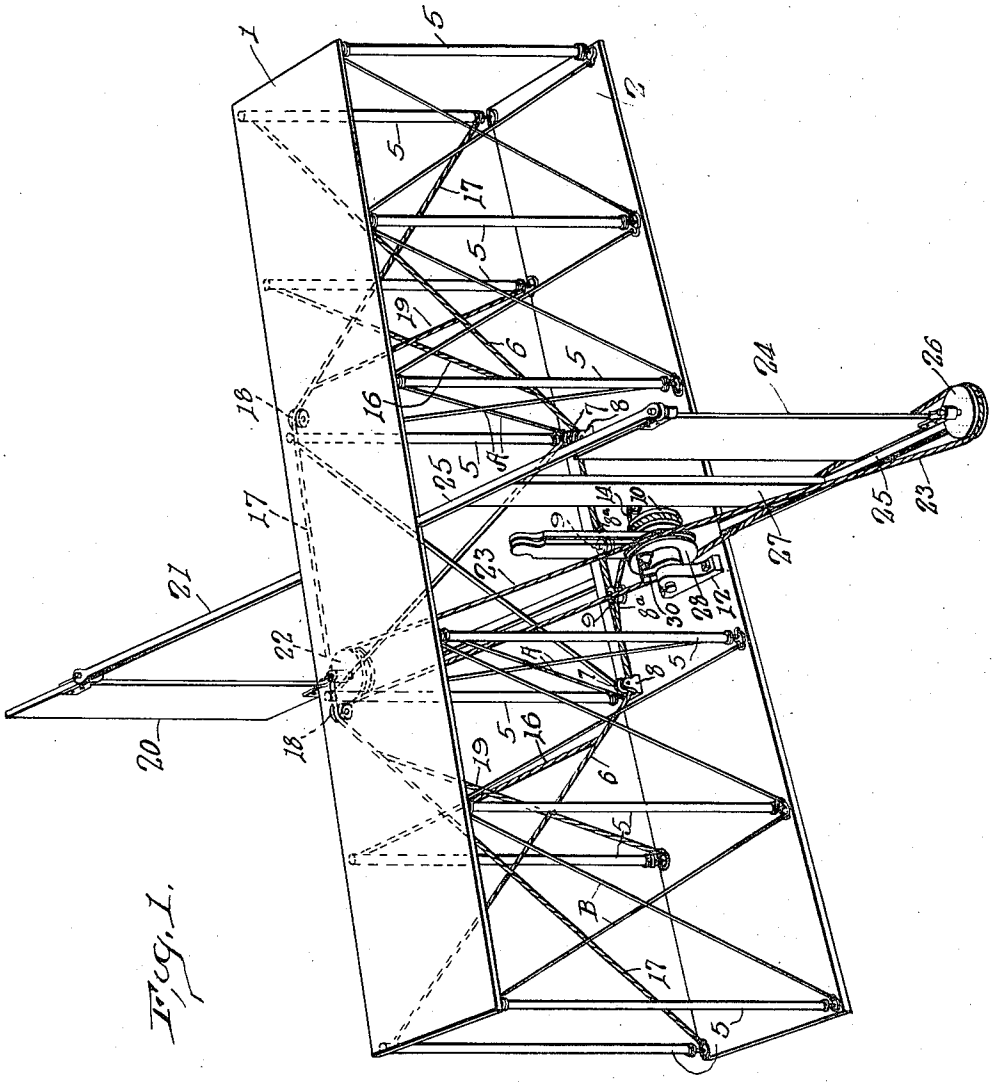

Fig. 1.

Witnesses

G. Howard Walmsley.

Edward F. Reed.

Inventors

Wilbur Wright,

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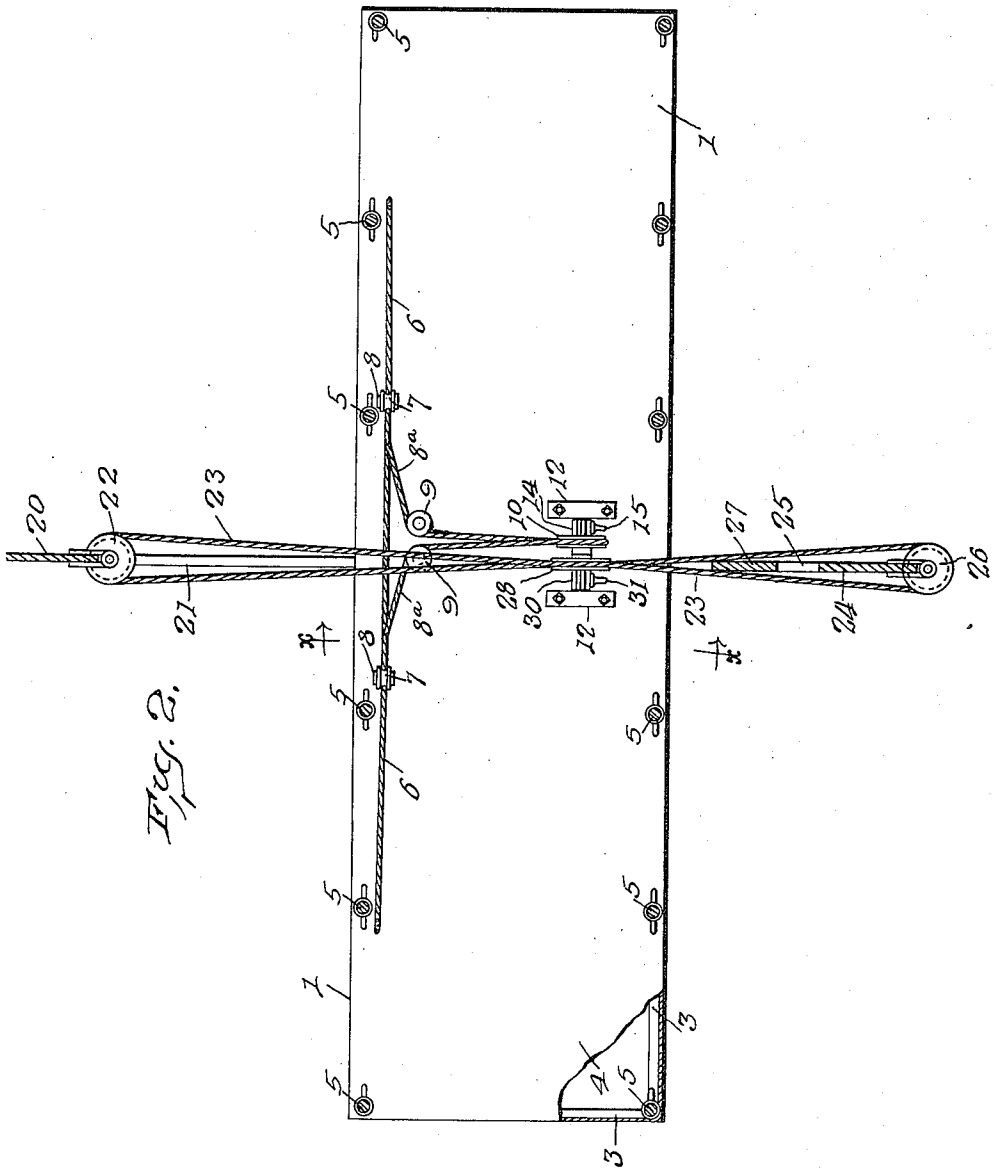

Fig. 2.

Witnesses

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4 SHEETS—SHEET 3.

Fig. 3.

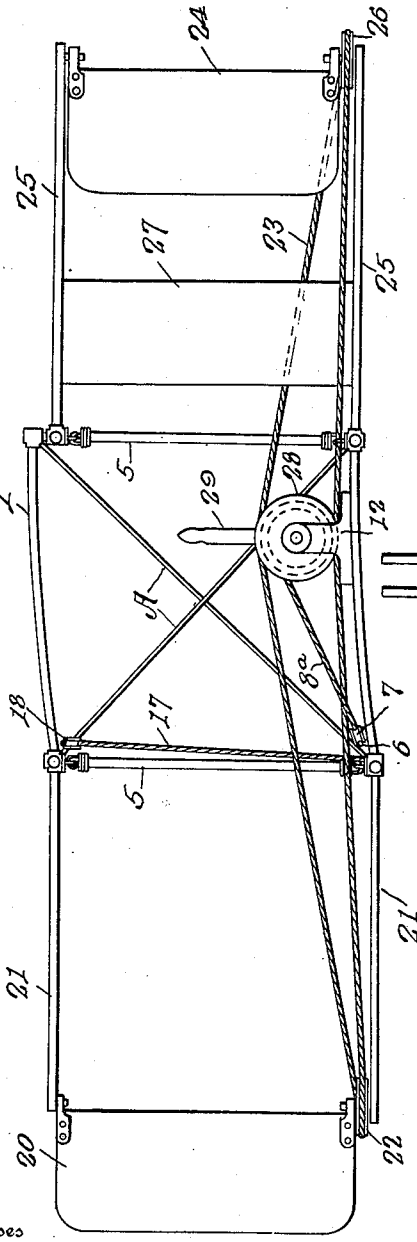
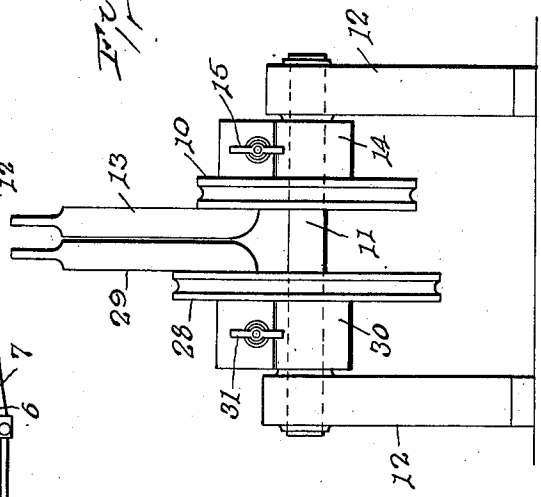


Fig. 4.



Witnesses

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4 SHEETS—SHEET 4.

Fig. 5.

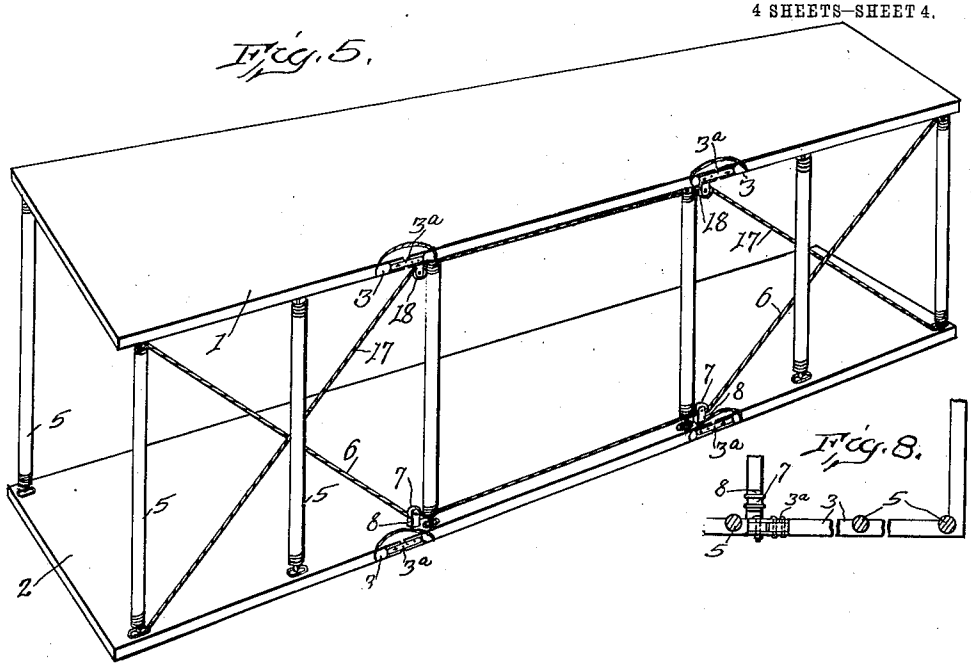

Fig. 8.

Fig. 7.

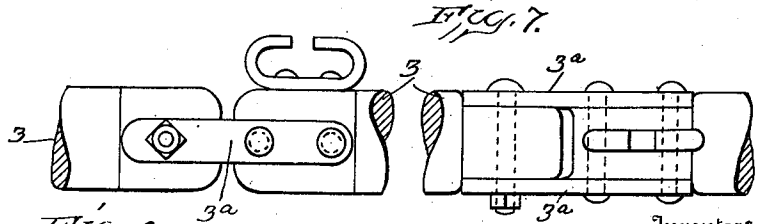

Fig. 6.

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UNITED STATES PATENT OFFICE.

ORVILLE WRIGHT AND WILBUR WRIGHT, OF DAYTON, OHIO, ASSIGNORS TO THE WRIGHT COMPANY, A CORPORATION OF NEW YORK.

FLYING-MACHINE.

1,122,348. Specification of Letters Patent. Patented Dec. 29, 1914.

Application filed February 17, 1908. Serial No. 416,275.

To all whom it may concern:

Be it known that we, ORVILLE WRIGHT and WILBUR WRIGHT, citizens of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, 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.

The present invention relates to that class of flying machines, in which the weight is sustained by the reaction resulting when one or more aeroplanes are moved through the air edgewise at a small angle of incidence either by the application of mechanical power or by the utilization of the force of gravity, and is in the nature of an improvement upon the machine shown and described in Letters Patent No. 821,393, granted to us May 22, 1906.

The object of the invention is to provide means for regulating lateral balance by the use of horizontal surfaces adjustable to different angles of incidence on the right and left sides of the center of the machine, and adjustable vertical surfaces for counterbalancing any resulting turning force about the central vertical axis of the machine.

With these objects in view our invention consists in certain novel features of construction and in certain parts and combinations hereinafter to be described, and then more fully pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of a flying machine embodying our invention; Fig. 2 is a horizontal sectional view of such a machine looking downwardly; Fig. 3 is a sectional view, taken on the line x x of Fig. 2 and looking in the direction of the arrows; Fig. 4 is a detail view of the adjusting mechanism. Fig. 5 is a rear perspective view showing the arrangement of the cables for operating the adjustable margins or controlling surfaces and illustrating the cables as attached to the horizontal members of the aeroplanes, and omitting all other parts, such as the front standards, truss rods and operating means for the cables; Fig. 6 is a detail view showing in elevation one of the joints for the rear frame members; Fig. 7 is a top plan view of such a joint; and Fig. 8 is a top plan view of a portion of the frame showing the manner in which the cable guides are secured thereto.

In these drawings, we have illustrated the preferred form of our invention and have shown the same as embodied in a flying machine, similar in its main features of construction to that shown and described in the above-mentioned patent, and comprising superposed connected aeroplanes capable of having their opposite lateral portions moved about a horizontal axis to give each a helicoidal warp or twist, thus enabling the operator to maintain the lateral balance of the machine by adjusting the twist of the lateral portions of the aeroplanes to vary the angle of incidence presented to the atmosphere by each of said lateral portions. These aeroplanes may be of any suitable construction and the helicoidal twist may be imparted thereto in any suitable manner, and while the adjustable lateral portions of the aeroplanes have been shown herein as integral portions of the main planes of the aeroplanes, they may be otherwise constituted. As here shown, the aeroplanes 1 and 2 each preferably consist of a substantially rectangular frame 3 having its greatest length extending transversely of the direction of travel of the machine and constructed of any suitable material which combines the necessary strength and the desired degree of flexibility, such as a suitable quality of wood or suitable bars of metal. These frames are provided with a suitable covering 4, preferably of fabric which forms the surface of the aeroplane, and the aeroplanes are connected one to the other by means of rods or standards 5, which are preferably rigid throughout their length and are connected at their opposite ends to the respective aeroplanes, thus maintaining the aeroplanes at a fixed distance one from the other.

The front row of standards 5, the front parts of the frames 3 and the stay wires B together form a rigid truss system which holds the front edges of the aeroplanes in a fixed position. But the rear portions of the frames 3 and the standards 5 are rigidly trussed by stay wires only near the center of the machine. At the extremities of this rigidly trussed central portion, the frame 3 has hinged connections, as shown at 3^a in Figs. 5 and 6. The parts of the frames 3 which extend beyond the hinged connections, together with the standards 5, form adjustable truss systems of a novel

kind which permit the regulation of the position of the rear edges of the aeroplanes without losing the characteristics of a truss system for supporting up or down pressures at the center of the machine, or at the tips. Thus, it will be apparent that one of the longitudinal members of each frame 3 is made up of a plurality of sections and that these sections are connected one to the other by hinged joints and that the corresponding longitudinal members of each frame are connected one to the other by vertical standards. The hinged member of the frame obviously may be arranged at either edge thereof, but we have, in the present instance, shown it at the rear edge of the frame, and, consequently, near the rear edge of the aeroplane. In the completed machine the two horizontal planes will have either their front or rear edges rigidly connected one to the other and will have the edges opposite said rigidly connected edges rigidly connected one to the other for a portion of their length, and those portions of said opposite edges extending beyond the rigidly connected portions will be movable relatively thereto. As stated, however, we prefer that the front edge should be rigid throughout and the rear edges hinged. Further, it will be understood that the term "front edge" and "rear edge," as used in the specification and claims with reference to the aeroplanes, refers to the longitudinal portions of the aeroplanes lying adjacent to the edges thereof. These longitudinal portions may extend inwardly a considerable distance from the extreme outer edges of the aeroplanes, and, in the construction here shown, each longitudinal portion or edge includes one of the longitudinal members of the frame 3 which may be located either at the extreme edge of the aeroplane or at a point removed therefrom. Stay wires A attached to the aeroplanes within the rigidly trussed central portion serve to maintain the fore and aft position of the aeroplanes with reference to each other.

As stated, the aeroplanes 1 and 2 may be moved about a horizontal axis to impart the helicoidal twist thereto in any suitable manner, but we prefer to impart this movement in the manner herein shown which consists of a cable 6, secured at its opposite ends to the opposite lateral portions of the frame 3 of the upper aeroplane, preferably near the rear corners thereof, extending around suitable guides 7, preferably supported from the frame 3 of the lower aeroplane, by any suitable means, such as the brackets 8, and provided with suitable means for moving the same in the direction of the greatest length of the aeroplanes. This means may be of any suitable character, but we prefer the form herein shown, which consists in securing the opposite ends of an auxiliary cable 8^a to the cable 6 at points between the guides 7 and at some distance one from the other, and passing the central portion of the auxiliary cable about suitable guides 9 and thence about a drum 10 which is mounted on a suitable shaft 11 supported above the lower aeroplane, preferably by means of the brackets 12. The drum 10 is provided with a suitable handle 13 and its movement about the shaft 11 is controlled by means of a suitable friction clamp, which, in the present instance, consists of a suitable split collar 14, provided with a thumb nut 15, whereby the friction between the collar and the shaft 11 may be adjusted. A single cable 6 may be employed, but we prefer to provide auxiliary cables 16 which extend from the cable 6 at points near the guides 7 to the corresponding lateral portions or margins of the upper aeroplane and are secured thereto, preferably near the rear edge thereof. The length of the auxiliary cables 16 and their manner of connection to the cable 6 and the upper aeroplane is such that a strain imposed upon the cable 6 by the shifting mechanism is imparted to the outer end of said cable and to the auxiliary cables 16, and through these cables to the corresponding lateral portion of the aeroplane, thus distributing the strain along the rear edge of the aeroplane and preventing the same from bulging or becoming distorted between the outer end thereof and the hinge. A second cable 17 is secured to the opposite lateral portions of the frame 3 of the lower aeroplane, preferably near the rear corners thereof and extends upwardly and over suitable guides 18 supported from the frame 3 of the upper aeroplane, and is of such a length and connected to the lower aeroplane in such a manner as to be always taut. The cable 17 is also preferably provided with auxiliary cables 19 connected thereto and operating in a manner similar to the auxiliary cables 16 of the cable 6. Thus, it will be seen that, when the drum 10 is actuated to move the cable 6 to the left, thereby drawing down the rear of the right-hand lateral portion of the upper aeroplane, the corresponding portion of the lower aeroplane is likewise depressed, owing to the connection formed between the upper and lower aeroplanes by means of the rods 5. The downward movement of the lower aeroplane, acting through the cable 17, serves to elevate the rear of the left-hand lateral portion of the lower aeroplane, and thereby, through the medium of the connecting rods 5, to elevate the corresponding portion of the upper aeroplane, thus simultaneously imparting the desired helicoidal twist to both lateral portions of both aeroplanes. It will be seen that the location of this system of cables is approximately in one ver-

tical plane. This arrangement performs a very useful function, namely, it prevents the planes from being shifted edgewise when the margins are adjusted to different angles of incidence by the action of the cables, and so avoids fore and aft strains.

While we have herein shown and described our invention as embodied in an aeroplane in which the lateral-balance controlling-surfaces are formed integral with the bodies of the planes and to which a helicoidal warp is imparted in maintaining lateral balance it will be understood that this particular type of aeroplane is chosen for the purpose of illustration only and that the lateral-balance controlling-surfaces need not be formed integral with the planes themselves but may be arranged in any suitable manner.

By thus turning the right and left lateral portions of the aeroplanes about a horizontal axis, they are caused to present different angles of incidence to the atmosphere, the side presenting the greater angle of incidence being caused to rise or move upward by the wind pressure, while the side offering the smaller angle of incidence is permitted to move downward. This action, while enabling the operator, by the adjustment of the angles of incidence, to maintain the lateral balance of the machine, also causes the machine to turn about its vertical axis, this being due to the fact that the increased angle of incidence also produces a greater horizontal resistance to the atmosphere and permits that portion of the aeroplane having the smaller angle of incidence to move forward at a greater speed than that portion having the greater angle of incidence. To overcome this effect, we provide a suitable adjustable surface in the rear of the machine, such as the vertical rudder 20, which is pivotally mounted between rearwardly extending arms 21, and is provided near its lower pivotal support with a pulley 22, about which passes a cable 23 which extends to within reach of the operator, thus enabling the rudder 20 to be turned to receive a pressure from the air on that side which is toward the wing having the smaller angle of incidence. A turning movement can be produced only by a combination of forces acting in different directions. In the case of a machine of this character, the inertia of the machine may act as one of these forces and the pressure on the side of the vertical rudder placed behind the center of the machine may act as the other. In the present construction, the inertia of the machine is supplemented by active forces produced by wind pressure on additional vertical surfaces consisting of an adjustable rudder in front of the center of the machine and a fixed surface preferably situated between said rudders. However, this arrangement is not essential and a satisfactory turning couple may be provided either by the combination of two adjustable rudders or by the combination of a single adjustable rudder with a fixed vane, or by the combination of the two adjustable rudders and the fixed vane, as pointed out above, the arrangement and the manner of operation of the several rudders being determined by the conditions existing in the particular machine to which the same is to be applied. We prefer, however, to employ in addition to a rear rudder an adjustable rudder in front of the machine, with a fixed vane mounted between the front adjustable rudder and the machine itself and arranged preferably in alinement therewith. This construction is shown in the drawings and consists of a vertical rudder 24, pivotally mounted in arms 25 extending forwardly of the machine. This rudder is also provided near its lower end with a pulley 26, about which extends a cable, preferably the same cable 23 which extends about the pulley 22 of the rear rudder, the cable being crossed in order to turn the rudders in opposite directions. A fixed vertical vane 27 is preferably mounted between the arms 25 which support the forward rudder 24 and coöperates with the adjustable rudders, and, in case one of said adjustable rudders is more powerful than the other, the fixed surface, by its resistance to lateral movement, assists the weaker rudder in forming a turning couple, and, if one rudder is disabled or lost, it maintains with the remaining rudder a turning couple in the same direction as before. And a further function of this fixed vertical surface in its relation to the supporting plane is that of producing an acceleration of speed of the lower wing when, because of being tipped out of lateral balance, it tends to slide sidewise in the direction of the lower side. In aeroplanes, lateral sliding takes place or starts to do so when the supporting plane is out of lateral balance. This fixed surface being forward of the plane and being resisted by air pressure on the lower side, when lateral sliding starts or takes place, causes the depressed side of the plane to move forward relatively faster than the high side. This gives the greater angle at such depressed side increased lifting effect to restore lateral balance.

The adjustable rudders may be controlled by any suitable means, but the means which we prefer to employ, and that which is herein shown, consists of a drum or pulley 28, about which the cable 23 passes and which is controlled by the operator to shift the cable in the desired direction. This drum 28 is preferably mounted on the shaft 11 adjacent to the drum 10 and is provided with an operating handle 29, which preferably extends in close proximity to the

handle 13 of the drum 10 and occupies such a position relatively thereto, that, if desired, both the handle 29 and handle 13 may be grasped with one hand and both the drums 10 and 28 operated simultaneously, or each handle may be operated individually to move one drum independently of the other. The drum 28 is preferably provided with a friction clamp to control the movement thereof. This clamp may be of any suitable construction, but we prefer the form herein shown, which consists of a split collar 30 which is secured to the side of the drum 28 and provided with a suitable thumb-screw 31, by means of which the friction between the collar 30 and the shaft 11 may be regulated, thus enabling the rudders to be adjusted to the desired position and to be held in that position by the friction of said clamp until the drum is again operated by force applied to the handle 29. It will be noted that in this method of control we provide manually operated devices, such as the handles 13 and 29 and their cooperating devices, which are connected respectively with the horizontal lateral-balance controlling-surfaces and the adjustable vertical surfaces, and are so arranged that they may be manipulated either simultaneously to adjust the respective surfaces in unison or they may be manipulated separately to adjust the vertical surfaces relatively to the horizontal-surfaces or vice versa. In the present embodiment of the invention the lateral-balance controlling-surfaces comprise the adjustable wing tips, and the adjustable vertical surfaces comprise the front and rear adjustable rudders, but it will, of course, be understood that the particular construction and arrangement of these parts, here shown, are not essential to the successful control of the aeroplane; nor is it necessary that there should be two adjustable vertical surfaces, as the coöperation between the several parts would be substantially the same if a single adjustable vertical surface was used. While we have here illustrated one embodiment of this feature of the invention it will be understood that the invention is not limited to this specific embodiment but that the same results may be secured by use of various devices which will readily occur to one skilled in the art. It is known that the center of pressure on aeroplane rudders does not maintain a fixed position for different adjustments. It is, therefore, impossible to hinge the rudder so that it will always be in balance. The wind pressure will sometimes assist and sometimes resist the movement of the rudder by the operator, thus making accurate adjustment difficult. We have, therefore, introduced this friction so that the operator will be compelled to overcome resistance in making all adjustments. The amount of the friction is preferably regulated to be greater than the disturbing forces produced by the rudder, but less than that at the command of the operator for making adjustments.

While the fixed vertical vane has been shown as a single thin surface of greater height than breadth, it may be otherwise constituted, the essential feature being that a considerable fixed surface be exposed to the action of the air when the direction of the machine through the air is to the right or left of the horizontal axis of the machine. If an adjunct or part of the machine should, besides its other intended functions, also present a surface so exposed to the air when the direction of the machine through the air is to the right or left, as just stated, it would be an instance of otherwise constituting this fixed vane aforesaid.

Referring to Fig. 5, it will be seen that the operating cables 6 and 17 are fastened to the horizontal members of the aeroplanes and run over supports fastened to such members, as also illustrated in Figs. 1 and 3. The effect is that of avoiding fore and aft strains, as before explained; and it will be understood that it is immaterial whether the cables be fastened to the horizontal members of the aeroplanes, by running over supports secured to such members, or be otherwise secured, so long as they be in substantially a vertical plane, as explained.

The operation of the machine as a whole will be readily understood from the description of the several parts thereof, and it will be apparent that we have provided in a flying machine comprising superposed connected aeroplanes means for maintaining lateral balance by the combination of horizontal surfaces adjustable to different angles of incidence on right and left sides of the center of the machine with adjustable vertical rudders and fixed vanes producing a turning force about a vertical axis whose value can be varied by suitable adjustments, thereby compensating for the unequal backward pressure on the opposite lateral portions or margins of the aeroplanes, or controlling surfaces, caused by the different angles of incidence of said lateral portions or margins, or controlling surfaces; further, that we have provided means for adjusting these vertical surfaces either simultaneously with the adjustment of the horizontal surfaces or independently thereof, and means for maintaining such adjustments until the operator forces a change. And further, it will be apparent that the construction of the several parts herein shown may be changed and widely varied without departing from the spirit of our invention, and, therefore, we wish it to be understood that we do not desire to be limited to the exact details of construction shown and described, for ob-

vious modifications will occur to a person skilled in the art.

Having thus fully described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. In an aeroplane flying machine, the combination, with horizontal, adjustable surfaces, and means of operating said surfaces while in flight to cause the same to face forward at different angles of incidence on the right and left sides of the machine, of a vertical, adjustable rear rudder, a vertical, adjustable front rudder, and means for operating said rudders.

2. In a flying machine, the combination, with an aeroplane having lateral portions capable of being adjusted to different angles of incidence, of a vertical rudder adjustably mounted in the rear of said aeroplane, a second vertical rudder adjustably mounted in front of said aeroplane, and means for simultaneously operating said rudders.

3. In a flying machine, the combination, with an aeroplane having lateral portions capable of being adjusted to different angles of incidence, of an adjustable, vertical rudder, and a fixed vertical vane coöperating therewith to form a turning couple.

4. In a flying machine, the combination, with an aeroplane having lateral portions capable of being adjusted to different angles of incidence, of a vertical rudder adjustably mounted in the rear of said aeroplane, and a fixed vertical vane mounted in front of said adjustable rudder.

5. In a flying machine, the combination, with an aeroplane having lateral portions capable of being adjusted to different angles of incidence, and means for operating said portions, of a vertical rudder adjustably mounted in the rear of said aeroplane, a second vertical rudder adjustably mounted in front of said aeroplane, and a fixed vertical vane mounted between said adjustable rudders.

6. In a flying machine, the combination, with an aeroplane, and means for imparting a helicoidal warp thereto while in flight, of a vertical rudder adjustably mounted in the rear of said aeroplane, a second vertical rudder in front of said aeroplane, and a fixed vertical vane mounted between said rudders.

7. In a flying machine, the combination, with an aeroplane having lateral portions capable of being adjusted to different angles of incidence, of a vertical rudder adjustably mounted in the rear of said aeroplane, a second vertical rudder adjustably mounted in front of said aeroplane, and a fixed vertical vane mounted between said last-mentioned rudder and said aeroplane.

8. In a flying machine, the combination, with an aeroplane, and means for moving the right and left lateral portions of said aeroplane to cause the same to face forward at different angles of incidence, of vertical rudders mounted in the front and rear of said aeroplane, and means for simultaneously actuating both said rudders and said aeroplane.

9. In a flying machine, the combination, with superposed connected aeroplanes, of a cable secured at its opposite ends to the opposite lateral portions of one of said aeroplanes, a guide carried by the other of said aeroplanes and adapted to engage said cable, an auxiliary cable connected at one end to said cable intermediate said guide and the point of connection of said cable with said aeroplane, and at its other end to said first-mentioned aeroplane at a point removed from the point of connection of the main cable to said aeroplane.

10. In a flying machine, the combination, with a frame embracing approximately parallel horizontal beams connected through hinged joints by vertical standards, of guides and cables connected with said frame, one of said beams, the guides and cables lying in approximately one vertical plane.

11. In an aeroplane flying machine, the combination, with lateral-balance controlling-surfaces, a cable for adjusting the same, an adjustable vertical rudder, and a cable for controlling said rudder, of actuating devices connected with said cables and arranged to permit said cables to be adjusted with reference to each other or simultaneously, and frictional means to control the movement of said actuating devices.

12. In a flying machine, the combination, with an aeroplane, a cable connected to said aeroplane for adjusting the opposite lateral portions thereof, a vertical rudder, and a cable connected to said rudder, of a shaft supported from said aeroplane, a plurality of drums journaled on said shaft, each of said drums being adapted to be engaged by one of said cables, and means for controlling the movement of said drums.

13. In a flying machine, the combination, with an aeroplane, a cable connected to said aeroplane for adjusting the opposite lateral portions thereof, a vertical rudder, and a cable operatively connected to said rudder, of a shaft supported from said aeroplane, a plurality of drums journaled on said shaft, each of said drums being adapted to be engaged by one of said cables, means for controlling the movement of said drums, and handles secured to said drums and lying in close proximity one to the other, whereby said drums may be actuated simultaneously or individually.

14. A flying machine comprising susbtantially parallel horizontal planes having their front edges rigidly connected one to the other throughout their length, having their rear edges rigidly connected one to the other for a portion of their length and

the remainder thereof movable relatively to said rigid portions, and means for controlling said movable portions.

15. A flying machine comprising substantially parallel horizontal planes, a rigid truss system connecting the front edges of said planes, a rigid truss system connecting a portion of the rear edges of said planes, and a flexible truss system connecting the remainder of said rear edge, whereby the central portions of the planes are rigidly trussed and the portions of one edge extending beyond said central portion are adjustable relatively thereto, and means for controlling said adjustable portions.

16. The combination, with an aeroplane having adjustable lateral portions, of an adjustable vertical surface mounted in the rear of the aeroplane, and a second adjustable vertical surface mounted in front of said aeroplane, and means for operating said surfaces to throw them laterally more or less out of line of flight, whereby, through the coöperation of the adjustable lateral portions of said aeroplane and said adjustable surfaces, the lateral balance of the machine is maintained and controlled.

17. In a flying machine, the combination, with superposed aeroplanes and interconnecting standards, of operating cables for manipulating the aeroplanes and their guides suitably connected and occupying substantially one vertical plane.

18. In a flying machine, the combination, with superposed connected aeroplanes having a rigidly trussed central portion, and guides carried by said aeroplanes, of a cable secured at its opposite ends to the opposite lateral portions of the upper aeroplane and engaging the guides carried by the lower aeroplane, and a second cable secured at its ends to the opposite lateral portions of the said lower aeroplane and engaging the guides on said upper aeroplane, whereby when one of said cables is actuated to move one of said lateral portions of one of said aeroplanes downward, the opposite lateral portion is moved upward, and vice versa, the said guides and cables being located in substantially one vertical plane.

19. In a flying machine, the combination, with horizontal adjustable surfaces and means for adjusting said surfaces while in flight, of an adjustable vertical surface mounted in the rear thereof, and a second adjustable vertical surface mounted in front thereof, and means for operating said vertical surfaces to throw them laterally more or less out of line of flight, whereby through the coöperation of the horizontal adjustable surfaces and said vertical adjustable surfaces, the lateral balance of the machine is maintained and controlled.

20. In a flying machine, the combination, with horizontal adjustable surfaces and means for adjusting said surfaces while in flight, of an adjustable vertical surface and a fixed vertical surface coöperating therewith to form a turning couple.

21. In a flying machine, the combination, with horizontal adjustable surfaces, of cables and guides for adjusting said surfaces while in flight, said cables and guides being located in substantially one plane.

22. In a flying machine, the combination, with horizontal adjustable surfaces, of cables for adjusting said surfaces while in flight, said cables and guides being located in substantially one plane, and vertical fore and aft surfaces, and means for operating one or more of them.

23. In an aeroplane flying machine, the combination, with horizontal lateral-balance controlling-surfaces, and an operating member connected therewith, of an adjustable vertical surface, and an operating member connected therewith, said operating members being arranged in close proximity one to the other, whereby both may be grasped by the hand and operated in unison, or one may be operated relatively to the other.

24. In an aeroplane flying machine having adjustable lateral-balance controlling surfaces, an adjustable forward vertical surface, an adjustable rear vertical surface, and means to adjust said surfaces.

25. In an aeroplane flying machine having adjustable lateral-balance controlling-surfaces, an adjustable vertical surface, and a fixed vertical surface.

26. In an aeroplane flying machine having adjustable lateral-balance controlling-surfaces, an adjustable forward vertical surface, and a fixed vertical surface.

27. In an aeroplane flying machine having adjustable lateral-balance controlling-surfaces, an adjustable forward vertical surface, an adjustable rear vertical surface, and a fixed forward vertical surface.

28. In an aeroplane flying machine having adjustable lateral-balance controlling-surfaces, an adjustable rear vertical surface, and a fixed forward vertical surface.

In testimony whereof, we affix our signatures in presence of two witnesses.

ORVILLE WRIGHT.
WILBUR WRIGHT.

Witnesses:
C. E. TAYLOR,
LADOSKIE MILLER.