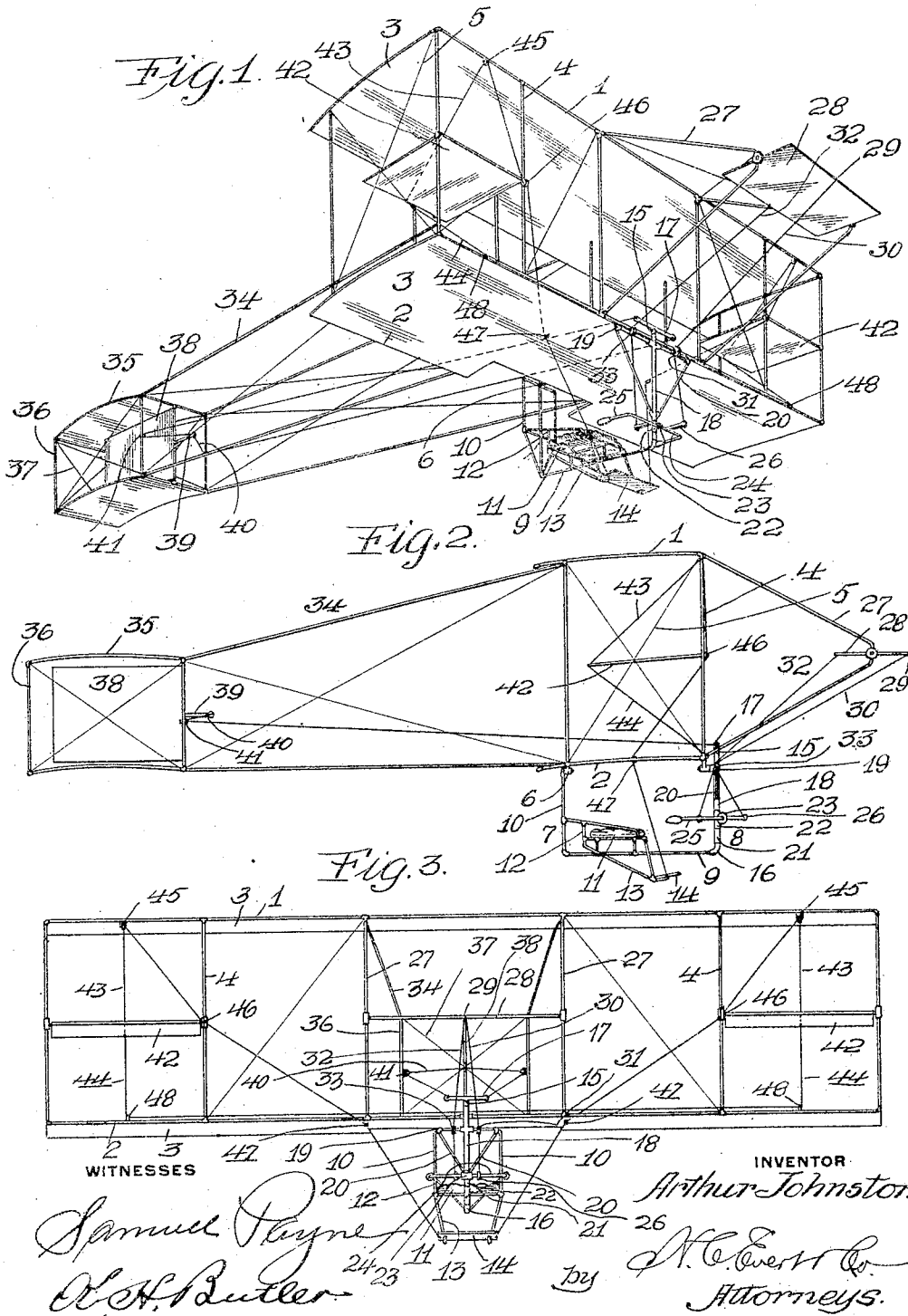


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AEROPLANE.

APPLICATION FILED MAR. 28, 1910.

1,045,035.

Patented Nov. 19, 1912.



UNITED STATES PATENT OFFICE.

ARTHUR JOHNSTON, OF JOHNSTOWN, PENNSYLVANIA.

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Specification of Letters Patent.

Patented Nov. 19, 1912.

Application filed March 28, 1910. Serial No. 552,023

To all whom it may concern:

Be it known that I, ARTHUR JOHNSTON, a citizen of the United States of America, residing at Johnstown, in the county of Cambria and State of Pennsylvania, have invented certain new and useful Improvements in Aeroplanes, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to aeroplanes, and particularly to that type of machine used in aeronautics by Curtiss, Wright brothers and other well-known designers.

The primary object of my invention is to provide a machine of the above type with a suspended cradle adapted to normally remain in an upright position by gravity and positive and reliable means are used in connection with the cradle for moving marginal tips and thereby maintaining the equilibrium of the machine.

Another object of this invention is to provide means convenient to the operator of the machine for moving a rear vertical rudder and a forward horizontal rudder, the angle of the surfaces of the latter being adjusted to different angles of incidence so as to cause the machine to tend upward or downward, this horizontal rudder coöperating with the adjustable tips whereby the horizontal course of the machine can be controlled. The rear vertical rudder is used only for steering to the right or left, in the same manner as a boat is steered by its rudder, and the means for controlling said rudder is located in such a manner as to allow the operator of the machine to at all times properly balance and maintain the equilibrium of the machine.

To the foregoing and other useful ends, the invention consists of the matter to be hereinafter specifically described and then claimed.

Referring to the drawing:—Figure 1 is a perspective view of a machine constructed in accordance with my invention, Fig. 2 is a side elevation of the same, and Fig. 3 is a front elevation of the machine.

In the accompanying drawing the reference numerals 1 and 2 denote horizontal super-imposed oblong frames adapted to support curved planes 3 made of canvas or other

material. The frames 1 and 2 are connected by vertical stanchions 4 arranged at the front and rear edges of the frames, these stanchions being suitably braced and connected by guy wires 5.

The frame 2 intermediate the ends thereof is provided with bearings 6 and pivotally suspended from these bearings is a cradle or chassis consisting of hangers 7 and 8 having the lower ends thereof connected by a longitudinal rod 9. The rear hanger 7 comprises a frame 10 which serves functionally as a back for a seat 11 supported by the rod 9 and the frame 10, the seat having side arms 12 connected to said frame. The seat 11 is provided with legs 13 to which is attached a foot rest 14.

The forward hanger 8 includes a vertically-disposed shaft having its lower end revolvably supported in an elbow-shaped bearing 16 secured to the forward end of the rod 9. Fixed to the upper end of the shaft 15 is a cross head 17 which is arranged above the plane of the bearing 6. The shaft 15 is retained in an upright position through the medium of a vertical hollow member 18 which is supported from one of the bearings 6 and which is provided near its top with a pair of lateral extensions 19, these latter being secured to the lower end of the member 18 by the angularly-disposed braces 20.

Movably mounted upon the shaft 15 between the lower end of the coupling piece 18 and the elbow 16 is a sleeve 21 and a steering member 22 capable of rotation upon said shaft. The steering member 22 is provided with a bearing 23 for a rock shaft 24 having the ends thereof provided with handle bars 25, said rock shaft at the sides of the bearing 23 having cranks 26.

Connected to the forward sides of the frames 1 and 2 intermediate the ends thereof are forwardly extending sets of spars 27, these spars converging and trunnioned between the forward ends of the sets of spars is a horizontal rudder 28. Connected to the forward edge of the rudder 28 intermediate the ends thereof, as at 29 is an operating cable 30. This cable extends downwardly over a sheave 31 revolvably mounted on the lateral extension 19 of the hollow member 18, said

cable being connected to the forwardly extending cranks 26 of the rock shaft 24. Another operating cable 32 is connected to the rear edge of the rudder 28 and extends
 5 downwardly over a sheave 33 revolvably mounted upon the lateral extension 19 opposite the sheave 31, the said cable 32 connecting with the rearwardly extending crank 26 of the rock shaft. The frames 1
 10 and 2 have the lower edges thereof provided with rearwardly extending converging spars 34 having the rear ends thereof provided with curved planes 35 connected by struts 36 and guy wires 37. Pivottally
 15 mounted between the forward edges of the planes 35 and adapted to be normally held centrally of said planes is a rear vertical rudder 38 having the pivot end thereof provided with a forwardly extending arm 39.
 20 Connected to the outer end of this arm are cables 40 extending over sheaves 41 carried by the forward struts 36, said cables extending forwardly and connecting with the ends of the cross head 17 of the shaft 15.

25 Pivottally mounted between the forward stanchions 4 at the ends of the frame 1 and 2 are marginal tips 42 and connected to the rear ends of these tips are cables 43 and 44. The cables 43 extend upwardly over
 30 sheaves 45 carried by the forward edge of the frame 1, downwardly over sheaves 46 carried by the inner stanchions 4, downwardly through openings or eyelets 47 carried by the lower plane 3, said cables connecting
 35 with the ends of the foot rest 14. The cable 44 extends over one marginal tip to the other through eyelets 48 provided therefor upon the forward edge of the frame 2.

The spars 34 and the planes 35 constitute
 40 a tail adapted to assist in maintaining the equilibrium of the machine, and the operator in the cradle can easily adjust the rudder 38 by swinging the handle bars 25 in a horizontal plane, thus moving the rear vertical
 45 rudder to the right or left, whereby the machine can be steered to the right or left. The same operator can tilt the horizontal rudder 28 by simply rocking the shaft 24 through the medium of the handle bars,
 50 without interfering with the position of the vertical rudder 38, thereby allowing the horizontal plane 28 to be set at a desired inclination to cause the machine to ascend or descend. Under the control of the same
 55 operator are the marginal tips 42, and these tips will be automatically actuated owing to the fact that the cradle normally remains in a vertical position by gravity. It will be seen that when one side tends to depart from
 60 the horizontal balance that the machine can be immediately brought back to normal equilibrium by the tip upon one side being thrown downwardly and by raising the tip upwardly at the opposite side, this move-
 65 ment of the tips being accomplished by the

arrangement of the cables and the swinging cradle. In this way the lateral equilibrium is regained.

The entire framework of the machine is made of light and durable wood and certain fittings thereof of metal, while the best quality of wire is used for the guy wires and operating wires or cables.

I reserve the right to embody the principle of my invention in a monoplane, bi-
 70 planes of various types and any other air navigating machine that utilizes planes for sustaining the machine in the air. Instead of arranging the cradle beneath the lower-
 75 most plane, the cradle can be easily arranged between the planes to accomplish the same result in connection with various types of machines. Furthermore, in lieu of the
 80 marginal tips adjustable planes of various types can be used, for instance, the flap or warping planes, it being understood that the planes are arranged whereby they can be actuated by an operator located in the cradle.

It is obvious that an engine of a suitable type can be used in connection with the machine for operating the propellers to drive
 85 the machine against an air current.

Having now described my invention what I claim as new, is:—

1. An aeroplane comprising superposed
 95 planes, an adjustable marginal tip pivottally arranged between said planes at each end thereof, a front and a rear hanger pivottally suspended from the lower of said
 100 planes, a longitudinal bar connecting the lower ends of said hangers together, a weight operated seat carried by said bar and rear hanger and including a foot rest, a vertical shaft carried by and projecting above said
 105 front hanger, a cross head attached to the upper end of said shaft, a handle attached to said shaft and capable of being shifted on a vertical and a horizontal axis, a front rudder pivoted on a horizontal axis forwardly
 110 of said planes, a rear rudder pivoted on a vertical axis rearwardly of said planes, shifting cables between said tips and said foot rest, shifting cables between said forward rudder and said handle and shifting
 115 cables between said cross head and said rear rudder.

2. An aeroplane comprising superposed
 120 planes, an adjustable marginal tip pivottally arranged between said planes at each end thereof, a front and a rear hanger pivottally suspended from the lower of said
 125 planes, a longitudinal bar connecting the lower ends of said hangers together, a weight operated seat carried by said bar and rear hanger and including a foot rest, a vertical shaft carried by and projecting above said
 130 front hanger, a cross head attached to the upper end of said shaft, a handle attached to said shaft and capable of being shifted on a vertical and a horizontal axis simulta-

neously or independently, oppositely disposed cranks carried by said handle, a front rudder pivoted on a horizontal axis forwardly of said planes, a rear rudder pivoted
5 in a vertical axis rearwardly of said planes, shifting cables between said tips and said foot rest, shifting cables between said forward rudder and said cranks, and shifting

cables between said rear rudder and said cross head.

In testimony whereof I affix my signature
in the presence of two witnesses.

ARTHUR JOHNSTON.

Witnesses:

KARL H. BUTLER,
A. H. RARSAG.