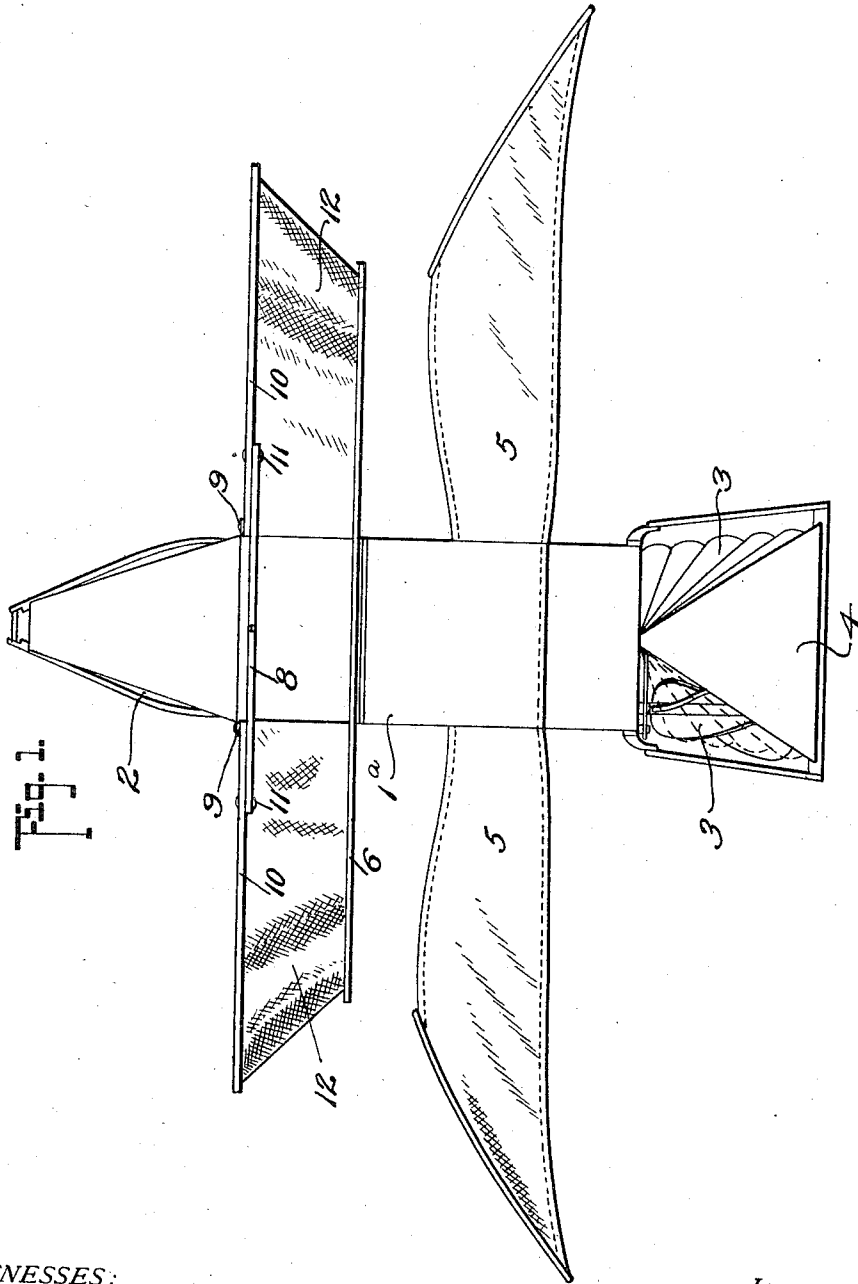


1,030,542.

J. T. RYDBERG.
AEROPLANE.
APPLICATION FILED JUNE 29, 1911.

Patented June 25, 1912.

2 SHEETS—SHEET 1.



WITNESSES:
Charles H. Wagner
H. C. Robb

INVENTOR
John T. Rydberg
BY *Beiler & Robb*
J. Robb Attorneys

1,030,542.

J. T. RYDBERG.
AEROPLANE.
APPLICATION FILED JUNE 29, 1911.

Patented June 25, 1912.

2 SHEETS-SHEET 2.

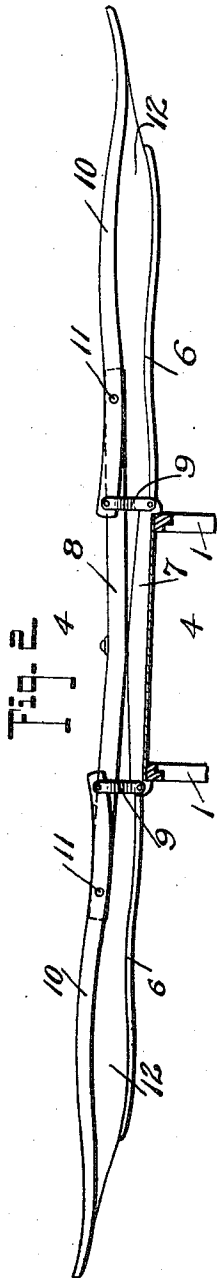


Fig. 2.

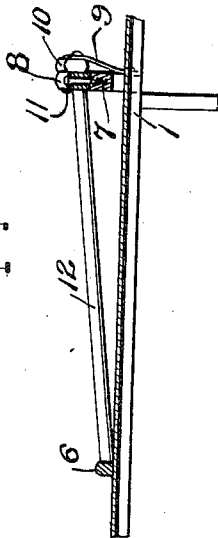
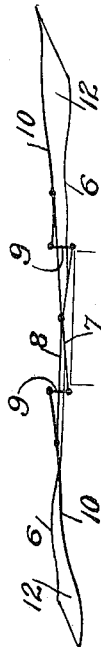


Fig. 4.



WITNESSES:

Charles H. Wagner.
H. C. Robb

INVENTOR

John T. Rydberg

BY *Robert Robb*

[Signature]

Attorneys

UNITED STATES PATENT OFFICE.

JOHN T. RYDBERG, OF GARWOOD, NEW JERSEY.

AEROPLANE.

1,030,542.

Specification of Letters Patent.

Patented June 25, 1912.

Application filed June 29, 1911. Serial No. 635,984.

To all whom it may concern:

Be it known that I, JOHN T. RYDBERG, a citizen of the United States, residing at Garwood, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Aeroplanes, of which the following is a specification.

This invention embodies improvements in machines for aerial navigation and relates particularly to the provision of novel means for automatically maintaining the equilibrium of the machine in flight.

More specifically, the invention comprises a peculiar form of stabilizing plane or planes arranged for coöperation with a system of levers, whereby when the machine is in flight, said plane or planes are warped simultaneously in such a manner as to counteract any tendency of the machine to become overbalanced.

For a full understanding of the invention, reference is to be had to the following description and to the accompanying drawings, in which—

Figure 1 is a top plan view showing a conventional type of flying machine having the invention applied thereto; Fig. 2 is a front elevation of the stabilizing planes, bringing out more clearly the arrangement of the controlling levers by which said planes are operated automatically; Fig. 3 is a diagrammatic front elevation showing more clearly the range of and relative movement of the stabilizing planes; Fig. 4 is a cross sectional view taken about on the line 4—4 of Fig. 2.

Throughout the following detail description and on the several figures of the drawings, similar parts are referred to by like reference characters.

I have illustrated my invention in connection with that type of flying machine shown and described in my Letters Patent No. 993,623, issued May 30, 1911, but it is to be understood that the stabilizing means hereinafter more fully set forth is equally adapted for use in connection with other types of air-craft than that shown in my patent above referred to.

As shown most clearly in the drawings, the flying machine with which my stabilizing means is associated, is comprised of a suitable frame 1 having at its front end a single propeller 2 and at its rear end a pair of propellers 3 located adjacent to a rudder 4. Wings 5 project from the opposite sides

of the machine and may be operated by any suitable mechanism to promote the flight of the air-craft under actual conditions of service.

It is preferred to locate the stabilizing means of this invention at the front portion of the machine adjacent to the upper end of the frame 1 and said means comprises essentially a rigid transverse beam 6 secured in any substantial manner to the frame 1 and having its ends projecting some distance beyond the opposite sides of the frame. In front of the beam 6 is a cross bar 7 also rigidly attached to the frame 1 but having its ends inclining downwardly from a central point so as to permit of free movement of a rocking beam 8 which is pivotally connected at a central point to the central portion of the cross bar 7 and arranged in substantial alinement with said bar. The opposite ends of the beam 8 incline upwardly or in a direction opposite to the inclination of the ends of the bar 7 and project some distance beyond the extremities of the latter. Brackets 9 are attached to the opposite ends of the bar 7 and project upwardly therefrom to points where they are pivotally attached to the inner ends of levers 10, said levers being pivoted intermediate of their ends at 11 to the outer end portions of the rocking beam 8. A pair of the levers 10 is provided and said levers have their central portions curving slightly upward and their outer ends curved downwardly and upwardly. The rocking beam 8, being situated in a horizontal plane above that of the bar 7, the stabilizing planes or plane sections 12 carried by the parts 6 and 10 are necessarily inclined upwardly toward the front end of the machine. The plane sections 12 are attached at their rear edges to the projecting ends of the beam 6 and at their front edges are primarily attached to the levers 10 as well as secured to the end portions of the rocking beam 8. The manner of attachment of the plane sections 12 to the levers 10, however, is such as to permit the front portions of said plane sections to be warped readily by the movement of the levers.

In the actual operation of the invention, it will be apparent that when undue pressure is exerted against the under side of one of the plane sections 12, the same will be forced upwardly, its lever 10 raising the adjacent end of the rocking beam 8, where-

by said beam is moved so as to correspondingly lower its opposite end and simultaneously lower the lever 10 with which said opposite end is connected. It will thus be apparent that the plane sections 12 are warped in opposite directions when undue pressure is received at the under side of either one of said planes, this action being obtained by the system of levers comprised by the beam 6 and levers 10.

In the actual flight of an air-craft having the stabilizing means above described applied thereto, the operation of the stabilizing planes or plane sections 12 is entirely automatic, eliminating the necessity of the employment of manual actuating devices such as most commonly employed at the present time. It will, of course, be understood that, should it be desired, the plane sections 12 might be continuous, or in other words, said sections might be the ends of a single plane, within the scope of the invention, the term plane sections used herein being merely relative.

In regard to the effect of the stabilizing means above described, in preserving the equilibrium of the air-craft, and having in view particularly the construction of machine illustrated in my Letters Patent hereinbefore referred to, it may be noted that the main weight of the machine depends from the upper longitudinal aeroplane 1^a. Under normal conditions, the air pressure at opposite sides of the machine, being the same, the aeroplane maintains its balance in flight very readily. However, in the event of undue pressure at one side of the machine greater than that at the other side, the natural tendency of the machine if such pressure is from the right, as shown in Fig. 1, is for the aeroplane to dip or tilt downwardly at the right side, the framework beneath the top plane 1^a moving to the left and the stabilizing planes inclining downwardly toward the right side of the machine. The tilting of the machine downwardly at the right creates an upward pressure naturally against the under side of the right stabilizing plane 12 warping the latter so that it remains practically in the position shown in Fig. 3, whereupon said stabilizing plane assists to lift the machine at the right side in order to counteract the pressure coming from that direction. Of course, when

the stabilizing plane 12 at the right of the machine is warped in the manner above described, that at the left side of the machine is warped in the opposite direction, thereby assisting in depressing the machine on the left side to restore the aeroplane to its normal counterbalanced position.

The operation is vice-versa in the event of undue pressure coming from the left side of the machine thereagainst, causing the machine to tilt downwardly to the left.

It is to be noted also that in the first operation of the parts just described, the inclination or warping of the plane 12 at the right, tending to lift the machine on that side, causes said plane to operate as a deflector, deflecting the air currents coming from the front end of the machine downwardly on top of the right wing 5 exerting a contra-pressure opposing that at the under side of the machine.

Having thus described the invention, what is claimed as new is:

1. In a machine for aerial navigation, the combination of a supporting frame, a rigid beam secured to said frame and having its ends projecting from opposite sides thereof, a rocking beam mounted on the frame in spaced relation to the rigid beam, levers, each pivoted between their ends to an end portion of the rocking beam, brackets connecting the inner ends of the levers to the frame, said levers having their intermediate portions curving upwardly and their outer ends curved downwardly and upwardly, and plane sections supported by and between the rigid beam and the levers.

2. In a machine for aerial navigation, the combination of a frame, plane sections supported thereon, movable levers supporting the front edge portions of the plane sections, and means whereby said levers may move simultaneously, the plane sections being inclined upwardly from their rear to their front ends, and the levers curving upwardly at their central portions and having their outer ends curving downwardly and upwardly, as described.

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

JOHN T. RYDBERG.

Witnesses:

NIELS P. HANSEN,
WILLIAM ANGER.