

A. F. W. MACMANUS.
EQUILIBRIUM RETAINING DEVICE FOR FLYING MACHINES.
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1,010,286.

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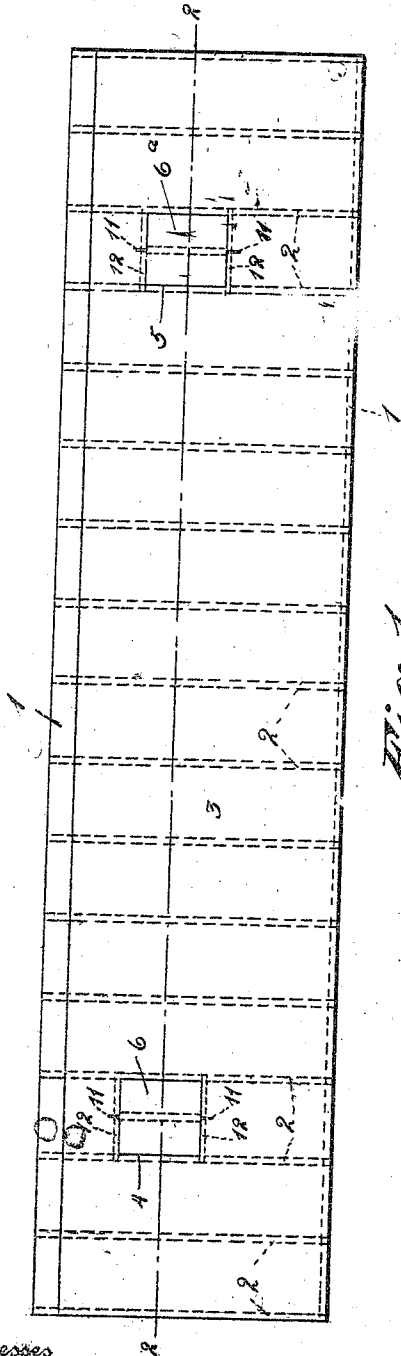


Fig. 1.



Fig. 2.

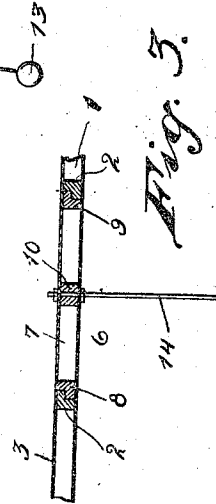


Fig. 3.

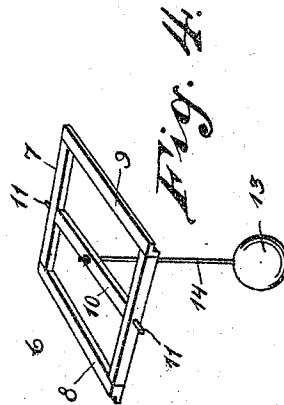


Fig. 4.

Witnesses

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EQUILIBRIUM-RETAINING DEVICE FOR FLYING-MACHINES.

1,010,286.

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To all whom it may concern:

Be it known that I, AUGUSTUS F. W. MACMANUS, a citizen of the United States, residing at San Antonio, in the county of Bexar and State of Texas, have invented certain new and useful Improvements in Equilibrium-Retaining Devices for Flying-Machines, of which the following is a specification.

My invention relates to heavier-than-air flying machines and particularly to automatic means for retaining the equilibrium of the same during flight.

My invention contemplates the provision of a plane or gliding structure with openings formed therethrough near the ends thereof, which openings have the passage of air through the same controlled by valves. These valves are adapted to automatically open and close, thus when the gliding structure tilts the valve near the lower end remains closed, while the valve near the higher end opens to reduce the resistance of that end of the gliding structure, whereby it is lowered to its normal horizontal position. Both valves remain closed when the gliding structure is in its normal horizontal position.

An important object of this invention is to provide a gliding structure with equilibrium retaining means, which means are simple in construction, and positive and automatic in operation.

Other objects and advantages of this invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate like parts throughout the same, Figure 1 is a plan view of a plane or gliding structure, equipped with my equilibrium retaining valves, Fig. 2 is a longitudinal sectional view taken on line 2-2 of Fig. 1, the plane or gliding structure being tilted, Fig. 3 is an enlarged detail sectional view through a portion of the plane or gliding structure and one of the equilibrium retaining valves, and, Fig. 4 is a perspective view of one of the equilibrium retaining valves.

In the drawings wherein is illustrated a preferred embodiment of my invention, a plane or gliding structure is shown, comprising a preferably rectangular frame formed of longitudinal and transverse strips

1 and 2, respectively. This frame is covered with canvas 3 or other suitable material, which may be attached to the frame by any desired means. This plane or gliding structure is designed to form the body plane of an aeroplane, and is disposed transversely to the course of flight, as illustrated in the Wright Brothers flying machine. When my invention is applied to a biplane, two of the planes shown in Fig. 1 are employed. The invention is also adapted to be used in connection with a monoplane, or the same may be used in connection with a horizontal rudder, and in fact, with any plane or gliding structure which it is desired to prevent from tilting.

The plane or gliding structure is provided near its ends with openings 4 and 5 formed therethrough, within which are mounted swinging valves 6 and 6^a. These valves are alike, so a description of one will answer for both. Each of the valves 6 and 6^a is formed of a rectangular, open frame 7, comprising side strips 8 and 9, which are substantially L-shaped in cross-section. The side strips 8 and 9 are inverted with relation to each other, that is to say, the horizontal flange of the strip 8 is adjacent the lower side thereof, while the horizontal flange of the strip 9 is adjacent the upper side thereof. In both valves 6 and 6^a the strips 9 are the inner and the strips 8 are the outer. The pairs of transverse strips 2 disposed adjacent and upon opposite sides of the valves 6 and 6^a, are L-shaped in cross-section, the strips in each pair being inverted with relation to each other to cooperate with the strips 8 and 9. Each of the valves 6 and 6^a further comprises a strip 10, disposed centrally within and rigidly connected with the frame 7. The end strips of the frame 7 carry pins 11, disposed midway the ends thereof, which engage strips 12, disposed at right angles to and rigidly connected with the strips 2. Each of the valves 6 and 6^a has rigid connection with a depending ball or weight 13, through the medium of a rigid rod 14, which is rigidly connected with the strip 10. Each of the frames 7 is covered with canvas or the like.

In the operation of my device, when the plane or gliding structure is tilted to raise the left end thereof, as shown in Fig. 1, the weight 13 will retain the valve 6 in its horizontal position, whereby the opening 4

will be partly uncovered to reduce the resistance of this end of the plane. The valve 6^a near the lower end of the plane will remain seated and held in such position by the weight 13. When the plane is tilted in a reverse direction the valve 6^a is unseated and the valve 6 held seated. My valves may also be used to prevent the tilting of the plane upon its longitudinal axis fore and aft with relation to the course of flight of the machine. These valves will then be disposed at the central transverse axis of the plane and will swing at right angles to the way in which they swing when used to prevent the tilting of the plane transversely to the line of flight.

I wish it understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same, and that certain changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus fully described my invention, I claim:—

1. In a flying machine, a gliding structure having openings formed therethrough and disposed upon opposite sides of the axis about which said gliding structure tilts in a direction transversely to the line of flight, valves pivotally mounted within said openings and so constructed that they are capable of oscillating in one direction only from their normal positions with relation to said gliding structure, and pendant structures connected with said valves.

2. In a flying machine, a gliding structure having an opening formed therethrough, a valve pivoted within the opening to completely close the same and form in effect a continuation of said gliding structure, said valve being so constructed that the same is capable of oscillating in one direction only from its normal position with relation to said gliding structure, and a pendant structure connected with said valve.

3. In a flying machine of the character described, a gliding structure having an opening formed therethrough, a valve disposed within the opening and pivotally connected with said gliding structure, the walls of the opening and the valve being so constructed that one end of the valve engages

the gliding structure upon one side thereof and the opposite end of said valve engages the gliding structure upon the opposite side thereof, said valve having the axis upon which the same turns disposed midway of its ends to equalize pressure upon said valve on opposite sides of the axes thereof, and a pendant structure rigidly connected with the valve at the axis thereof.

4. A gliding structure provided with an opening formed therethrough, opposite walls of said opening having portions thereof cut away, a swinging valve disposed within the opening and having its opposite side walls cut away to cooperate with the first named cut away walls, whereby the gliding structure is capable of having a relative oscillatory movement with relation to the valve upon tilting in one direction only.

5. A gliding structure provided with an opening formed therethrough, opposite walls of said opening being provided with cut-out portions, a swinging valve disposed within the opening and having its opposite side walls provided with cut-out portions to cooperate with the first named walls, whereby the gliding structure is capable of having a relative oscillatory movement with relation to the valve upon tilting in one direction only, and a weight disposed below and connected with said valve.

6. In a flying machine, a gliding structure having an opening formed therethrough, a valve pivoted within the opening to close the same and form in effect a continuation of the gliding structure, said valve having the axis upon which the same turns disposed midway of its ends to equalize the pressure upon said valve on opposite sides of said axis, said valve being so constructed that the same is capable of oscillating in one direction only from its normal position with relation to said gliding structure, and a pendant structure connected with the valve.

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

AUGUSTUS FREDERICK WATSON MACMANUS.

Witnesses:

LOUIS E. DREISS,
HERMAN A. NESTER.