I. HOURWICH.

AEROPLANE.

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1,008,152.

Patented Nov. 7, 1911.

Fig. 1.

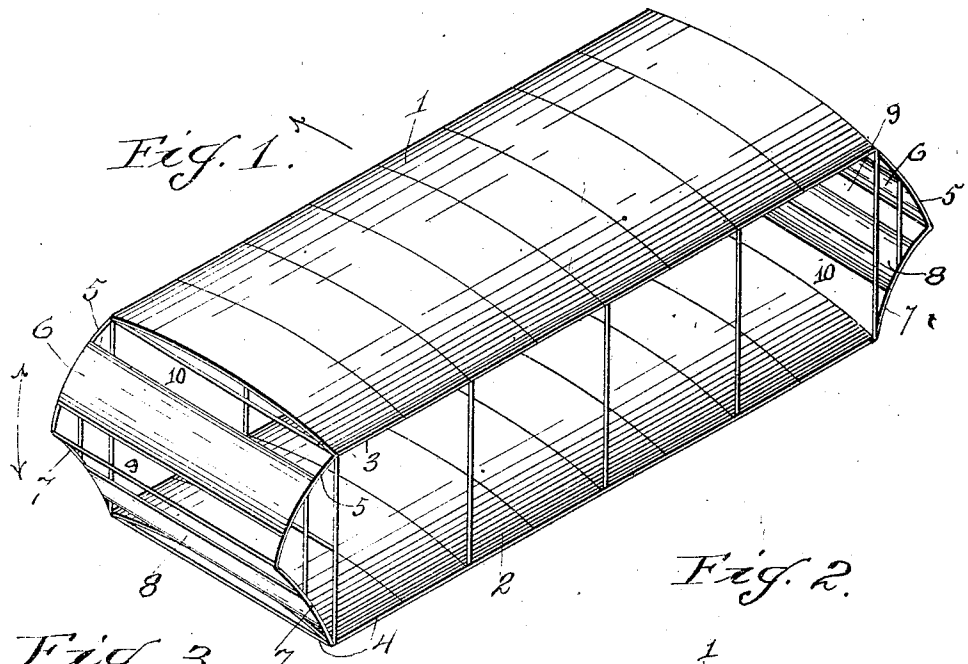

Fig. 2.

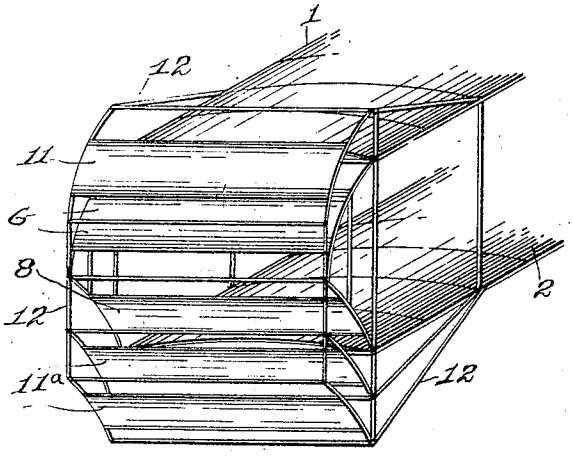

Fig. 3.

Witnesses

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UNITED STATES PATENT OFFICE.

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AEROPLANE.

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To all whom it may concern:

Be it known that I, ISKANDER HOURWICH, citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Aeroplanes, of which the following is a specification.

This invention relates to aeroplanes, and pertains especially to planes for balancing aeroplanes and neutralizing the dipping action thereof.

The object of the invention is to provide an ordinary aeroplane with a plurality of immovable end planes having such construction and arrangement relative to each other and to the line or direction of the dipping action or motion of aeroplanes, to which such end planes are connected, as to govern the course of the aeroplane.

A still further object of the invention is to provide a plurality of planes adapted to be attached to or connected with the ends of the main planes of aeroplanes and having such relation to each other and to the line of dipping motion of aeroplanes as to balance the latter and prevent skidding thereof.

With these and various other objects in view, the invention consists in a plurality of planes adapted to be fixed to or rigidly connected with the usual main planes of aeroplanes, and having such fixed position relative to each other and to the vertical plane of flight to control and equalize the dipping action of aeroplanes.

In the accompanying drawings forming part of this application: Figure 1 is a perspective view of the main or top and bottom planes of an ordinary aeroplane showing the application of a pair of balancing planes at each end of the main planes. Fig. 2 is a detail perspective view of one end of the main planes showing balancing planes. Fig. 3 is a diagram looking at the edge of the main planes showing three balancing planes at each end, and a computation of their resultant action on the flight course of an aeroplane.

The same reference numerals denote the same parts throughout the several views of the drawings.

The main or top and bottom supporting planes 1 and 2 respectively are simply employed to exemplify the application of the invention and the latter is not confined or restricted in its use or application, but may be used successfully in connection with various aeroplanes for neutralizing the dipping action thereof.

In carrying out the invention the aeroplane frame 3 has a support 5, projecting downwardly and outwardly from each end thereof for supporting an upper balancing plane 6; and the aeroplane frame 4, has a support 7, projecting upwardly and outwardly from each end thereof for supporting a lower balancing plane 8. The planes 6 and 8, extend across the ends of the aeroplane so as to leave a space or air passage 9, between the planes and a similar space or air passage 10, between said planes and the ends of the aeroplane. It is important that the position of the planes 6 and 8, relative to each other and to the planes 1 and 2, be such as to balance the aeroplane and counteract or prevent the dipping action thereof, therefore the balancing planes are arranged in pairs of one plane 6, and one plane 8, at each end of the aeroplane; the planes 6, being at an angle of less than 45° to the vertical plane of flight of the aeroplane, and the planes 8, being at an angle of more than 45° to the vertical plane of flight of the aeroplane. It is also important that the balancing planes be properly spaced apart and apart from the ends of the planes 1 and 2, as to form air passages of equal capacity.

In Fig. 2, is shown one end of an aeroplane having an additional balancing plane 11, above and parallel with the plane 6, and two of such planes 11^a, are added to the plane 8, parallel with each other and with the plane 8. The said additional planes are supported by a frame 12, and such planes may be multiplied, or reduced in number (to not less than one pair 6 and 8 at each end of the aeroplane) as desired or as may be found expedient in the practical application of the same.

It will be understood that the frames of the balancing planes may be permanently fixed or they may have such means of attachment as to permit them to be fixed in proper position and to be readily adjusted or removed; that when said planes are in working position they are stationary or immovable by hand or by wind currents, and that their relative location and the air spaces between them and between them and the planes 1 and 2 are necessary to the successful carrying out of the invention and the results attained thereby, as will now be fully set forth.

Referring to Fig. 3, of the drawings, when either end (for example the left end) of the aeroplane dips downwardly the plane 6, at this end will pull in a direction perpendicular to the force OD, which has been found not to exceed one hundred pounds, and as the supporting area of the plane 6, is about twenty-five square feet, this amounts to approximately four pounds to the square foot, which may be produced by an aeroplane the angle of incidence of which is about 30° to the vertical plane of flight. The forces OE and OD represent the amount each force pulls for completing the square, the resultant force being OF, and the direction of the aeroplane is deflected from a downward path or direction to the path or direction indicated by the line OB. The planes 11, have an angle of incidence about 42° or 43° to the vertical plane of flight, and as the sum of their areas is double that of the planes 6, they exert a force in an upward direction double that of the force of the planes 6. Denoting OC' as the force of the planes 11, at the left end of the aeroplane and completing the square one side of which is OF, and the other side of which is OC', the resultant force and direction of the aeroplane is AO. In the practical working of the invention OB' is the actual direction because the plane 8, exerts an upward force less than the force of the downward motion of the aeroplane. The planes on the other end of the aeroplane also opposes the upward push and thereby neutralize the dipping motion of the aeroplane.

It should be understood that the shape, material and size of the equalizing balancing planes may be such as to produce the best results according to their particular application, and that they may be attached in any suitable and expeditious manner so as to assume fixed position at such angle as may be desired.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a flying machine, the combination, with supporting planes, of a pair of parallel balancing planes projecting from each end of the supporting planes parallel therewith so as to leave an air passage between the balancing planes and the ends of the supporting planes, the balancing planes of both pair converging toward each other and having an air passage therebetween.

2. In a flying machine, the combination, with supporting planes, of a balancing plane projecting downward laterally from each end of the supporting planes, and a balancing plane projecting upward laterally from each end of the supporting planes, said balancing planes having an air passage between them, and air passages between these planes and the ends of the supporting planes.

3. In a flying machine, the combination, with supporting planes, of a plurality of balancing planes fixed to each end of the supporting planes, such planes being arranged in upper and lower parallel sets, the planes of the upper set inclining outwardly and downwardly and the planes of the lower set inclining outwardly and upwardly with air passages between the planes of both sets, air passages between both sets of planes, and air passages between all of the balancing planes and the ends of the supporting planes.

4. In a flying machine, the combination, with supporting planes, of a pair of immovable balancing planes projecting from each end of the supporting planes, the upper planes of both pair having equal angles of incidence and the lower planes of both pair having equal angles of incidence, with an air passage between the planes of both pair and air passages between the ends of the supporting planes and both pair of balancing planes.

In witness whereof I hereunto set my hand in the presence of two witnesses.

ISKANDER HOURWICH.

Witnesses:
C. T. Belt,
J. Ross Colhoun.