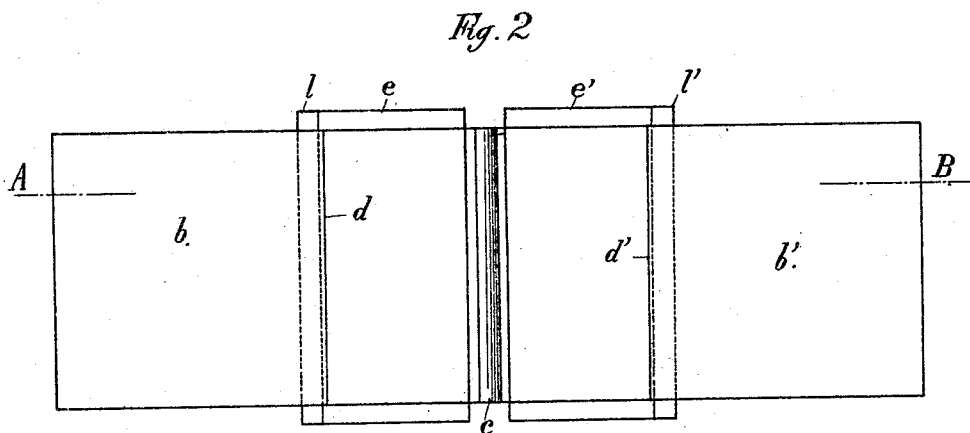
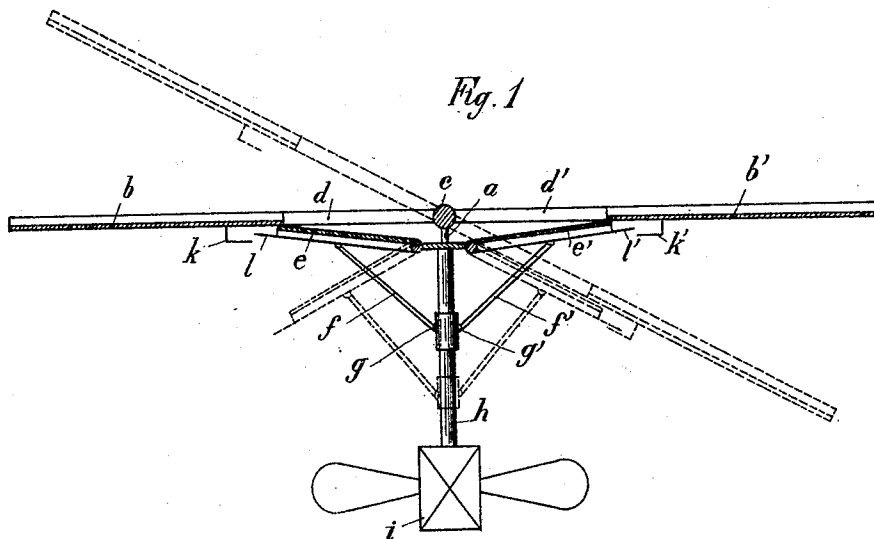


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AEROPLANE.

APPLICATION FILED JAN. 31, 1908.

929,217.

Patented July 27, 1909.



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UNITED STATES PATENT OFFICE.

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AEROPLANE.

No. 929,217.

Specification of Letters Patent.

Patented July 27, 1909.

Application filed January 31, 1908. Serial No. 413,599.

To all whom it may concern:

Be it known that I, OSCAR HEEREN, a subject of the Kingdom of Spain, and a resident of Paris, Seine, France, have invented certain new and useful Improvements in Aeroplanes, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to carry out the same.

This invention has for its object improvements in aeroplanes.

The object of these improvements is to provide a mechanism which will automatically return the supporting plane to the horizontal position when it is inclined upon the longitudinal axis, from which is suspended the load (the motor, aeronaut and so forth) this transverse inclination of the supporting plane causing the aeroplane to descend.

It is already known that when it is desired to turn an aeroplane, for instance, to the right, the left part of the supporting plane with regard to the longitudinal axis having a speed greater than the right part of the same plane experiences a greater resistance on the part of the atmosphere, which inclines the plane to the right. As soon as the plane is inclined it travels in this direction and descends toward the earth and one of the methods now employed for returning it to its original position consists in changing the direction, that is to say, in turning to the left.

The solution of the problem presented by the present invention consists in automatically diminishing the surface of the plane which experiences the greatest pressure from the air and thus to reestablish the equilibrium between the two parts of the aeroplane and to return it to its horizontal position. The variation of the relation between the two parts of the surface of the aeroplane can moreover be obtained in different manners either by arrangements which produce automatically openings in the part of the aeroplane which experiences a greater resistance from the air, or which diminish the surface in any other manner, or finally which augment the part of the surface of the aeroplane which receives from the air a less resistance. In the following description there is detailed by way of example one such construction.

In order to understand the invention the method of carrying it out is described with reference to the accompanying diagrammatic drawings, in which:

Figure 1 is a transverse section on the line

A—B of Fig. 2. Fig. 2 is a plan view of the wings.

The supporting plane is composed of several parts articulated to a central longitudinal backbone *a*. A portion of the supporting plane is formed of two wings *b b'* mounted upon a rigid frame. The said frame can oscillate about the axis *c* of the backbone *a*. In the wings *b b'* are formed openings *d d'* on each side of the axis *c* of oscillation, and these openings are capable of being closed by two other smaller wings *e e'* each mounted upon a separate frame and each hinged to the backbone *a* a little below the axis of the plane of the large wings *b b'*. The two hinged wings aforesaid are connected together by means of jointed arms *f f'* fixed respectively at one end to the large wings and at their other end to a collar *g* which can slide up and down the bar *h* from which the load *i* is suspended. The outer edges of the wings *e e'* extend slightly underneath the internal edges of the wings *b b'* so that when the supporting plane formed by the combined surface of the wings *b b'* and *e e'* is in the horizontal position, the small wings *e e'* in consequence of the pressure of the air from beneath upon them, press against the large wings this action being moreover assured by other means, for instance by means of springs.

The wings *b b'* carry hooks *k k'* arranged at convenient distance from the projections *l l'* fixed at the outer ends of the wings *e e'* in such a manner that in the horizontal position of the wings *b b'* and *e e'* the projections *l l'* are not in engagement with the hooks *k k'* while the engagement of the projections *l* or *l'* in the hooks *k* or *k'* takes place only on the side where the large or small wings are inclined simultaneously toward the ground. The working of this arrangement will be explained more particularly. Supposing that in a flight the plane of the wings *b b'* take the position indicated in dotted lines, the small wing *e^o* on the right will also incline under the pressure of the large right wing *b'* and as the small right wing *e'* is connected through the arms *f f'* to the small wing on the left, this latter will also incline so as to take the corresponding position indicated in dotted lines. On the right the air resistance will press upon the surfaces of the large and small wings *b'* and *e'* and on the left only upon the surface of the large wing *b*, the opening *d* being open and by reason of this difference of resistance, the right surface

formed of the large and the small wings b' and e' will be raised, whereas the left surface formed solely of the large wing b , will be lowered. The supporting plane will thereby
 5 be restored automatically to its horizontal position when it inclines to the right or the left.

It will be seen that the wing b' when inclining engages by means of its hook k' the
 10 projection l' of the wing e' and when the wing b' rises again it straightens at the same time the small wings e and e' connected together through the arms ff' ; the same effect is produced each time the supporting plane is inclined to the right or to the left and it is thus
 15 brought again automatically to the horizontal position. It will, however, be possible in certain cases to do without the hooks k k' , the pressure of the air alone sufficing to straighten the little wings e e' . A light spring may be employed for holding them extended at the starting moment. This arrangement is described simply by way of example but it must be understood that the invention is not limited to this particular
 25 method of carrying it into effect and that it consists essentially, whenever the supporting aeroplane inclines at an angle to its longitudinal axis, in producing automatically an opening in the surface of that part of the
 30 plane on the side opposite to that which produces the inclination and in effecting this by any mechanical means suitable for producing this diminution of the surface.

35 In the foregoing description mention has only been made of the means which appear most convenient for diminishing the surface offering resistance to the air, consisting in forming openings in this surface, but the in-

vention is not limited to this special method, 40 and it comprises moreover all other methods which may have for a result to diminish the surface of one of the parts of the supporting aeroplane receiving more of the air resistance or in increasing the other one. 45

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. In an aeroplane, the means for causing a 50 suitable opening to be made in the supporting-plane, on either side of its central axis, when the main part of the supporting plane is otherwise than at right angles with the bar carrying the load of the aeroplane. 55

2. In an aeroplane, a supporting-plane composed of two large outer wings and two smaller inner wings on each side of a central axis, the outer wings being mounted on a rigid frame capable of oscillating on the said 60 axis, the inner wings being mounted upon separate frames and hinged or pivoted to the apparatus near the central axis, the said inner wings being overlapped by the outer wings or by the rigid frame on which the 65 said outer wings are mounted and each being connected by suitable articulated arms attached to them and to a collar sliding on the load carrying bar of the aeroplane, the whole operating substantially as hereinbefore described. 70

In testimony whereof I have hereunto set my hand in the presence of the two subscribing witnesses.

OSCAR HEEREN.

Witnesses:

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 H. C. COXE.