J. WEISS & A. KEITH.

WING OR SUPPORTING PLANE FOR AEROPLANES AND AERIAL MACHINES.

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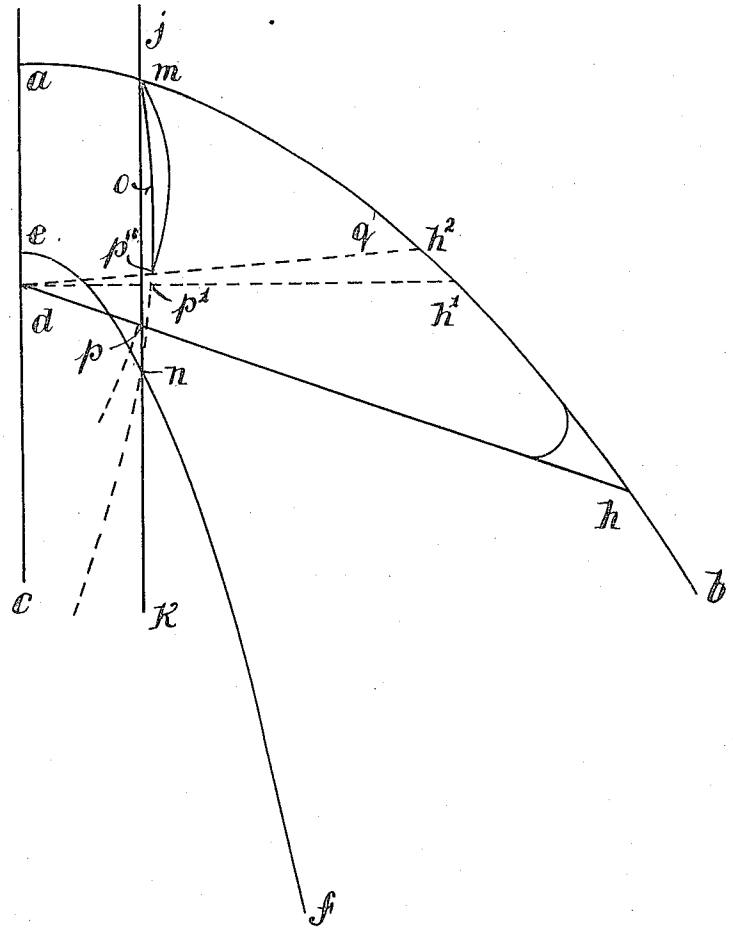
1,092,192. Patented Apr. 7, 1914.



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JOSÉ WEISS, OF HOUGHTON, ARUNDEL, AND ALEXANDER KEITH, OF LONDON, ENGLAND.

WING OR SUPPORTING-PLANE FOR AEROPLANES AND AERIAL MACHINES.

1,092,192. Specification of Letters Patent. Patented Apr. 7, 1914.

Application filed October 28, 1913. Serial No. 797,704.

To all whom it may concern:

Be it known that we, JOSÉ WEISS, artist, of Houghton House, Houghton, Arundel, in the county of Sussex, England, and ALEXANDER KEITH, of 4 Westbourne Park road, in the county of London, England, experimenter in aeronautics, have invented certain new and useful Wings or Supporting-Planes for Aeroplanes and Aerial Machines, of which the following is a specification.

This invention relates to bird-shaped aeroplanes and aerial machines, such for example as the Weiss type described in British Patent specification No. 17150, A. D. 1908, and has for its object to provide an improved form of wings or supporting planes.

It is known that the efficiency of an aeroplane wing results mainly from absence of drift, viz:—resistance to forward motion, and we have found that the main factor in reducing drift, is a shape adapting itself exactly to, or in a way absorbing, the wave set up in the air by the passage of the machine, that passage causing thus no eddies and consequently no resistance. Now there is considerable difficulty in defining the shape of that wave which arises from elasticity and cannot therefore be compared to waves in water due to gravity only.

The cushioning effect of the air on the wing is comparable to a spring which rebounds when suddenly compressed, and the object of this invention is to form or provide a wing upon which the energy expended in setting up that wave or rebounding action is automatically applied to assist forward or upward motion instead of letting the energy be wasted in eddies.

We have ascertained from experiments that an eddy-less wing is one which is made up of a series of parabolic curves having a definite relation and harmony between them.

In accordance with this invention the front edge of the wing or main plane is in the form of a parabolic curve, the focus of which lies in the central or longitudinal axis of the machine, and for the purpose of describing this invention is called the front edge parabola. This edge lies in what may be termed the datum plane, the rear edge radiates laterally in a line straight in plan from the focus of the front edge parabola until it meets the said parabola, thus completing with the axis of the said parabola the boundary of the wing. For constructional requirements the extreme tip of the wing may be rounded off more or less. This parabola determines the shape of the under surface of the wing, as hereafter explained.

For the purpose of determining the height of the rear edge of the wing with respect to datum plane, and the curve of the upper surface of the wing, a second parabola is drawn on the same focus and in the same plane as the front edge parabola and for the purpose of this description we term this second parabola the datum parabola. The focal distance of the datum parabola is 1/7 or about 1/7 of the focal distance of the front edge parabola. In determining and setting out the under surface of the wing, straight lines representing sections taken at various points, are drawn parallel to the axis of the parabolas or axis of the machine, so as to cut both parabolas, whereby the level of various points of the rear edge of the wing can be determined by the intersection of the outer portion of the front edge parabola, when applied from the front edge curve to the datum parabola in a plane at right angles to the datum plane and represented by the before mentioned straight lines, with a vertical plane containing the rear edge of the wing.

The drawing accompanying this specification, shows in diagram, the curves and method of their application.

a b is the front, *a c* the axis, *d* the focus, and *e f* the datum parabola, *d h*, *d h'*, *d h''* being possible rear edges of the wing.

j k is a section line passing through the front edge parabola at *m* and datum parabola at *n*. *a b e* and *f* lie in the same plane. The under curve of the wing is obtained by applying that portion of the front edge parabola *a b* which is outside *j k* to the front edge curve and datum parabola in a plane at right angles to the datum plane so that the point *m* lies upon *m* and some other point on the front edge parabola lies on the datum parabola where the section cuts said datum parabola; in the section taken this point is *n*, then the curve *m o n* is the under curve which terminates at *p*, *p'* or *p''* according to the selection of the position of the rear edge. The curve *m p'' p' p n* is consequently identical with the curve *m q* where *m n*—*m q* and it is clear that the level

of the points p'' p' p may be determined specifically by this construction, but in certain circumstances we have found that the outer part of the rear edge and tip may, with advantage be raised somewhat above the point determined in this manner.

The upper curve is obtained by applying the datum parabola to the front edge curve in a plane at right angles to the datum plane so that the point on or near the axis lies on the front edge parabola and another point on the datum parabola lies on the point formed by the intersection of the under curve with the rear edge that is p'' p' p in the example given.

What we claim and desire to secure by Letters Patent is:—

1. A wing or supporting plane for aeroplanes and aerial machines, having its front edge in the form of a parabolic curve, the focus of which lies in the central or longitudinal axis of the machine, and its rear edge appearing as a straight line in plan, and radiating laterally from the focus of the front edge parabola until it meets the said parabola thus completing with the axis of the said parabola, the boundary of the wing.

2. A wing or supporting plane for aeroplanes and aerial machines, having its front edge in the form of a parabolic curve the focus of which lies in the central or longitudinal axis of the machine, and its rear edge appearing as a straight line in plan, and radiating laterally from the focus of the front edge parabola until it meets the said parabola thus completing with the axis of the said parabola, the boundary of the wing and having its underside curved from the front to the rear edge with a curvature equal to that of a portion of the front edge parabola.

3. A wing or supporting plane for aeroplanes and aerial machines, having its front edge in the form of a parabolic curve, the focus of which lies in the central or longitudinal axis of the machine, and its rear edge appearing as a straight line in plan and radiating laterally from the focus of the front edge parabola until it meets the said parabola thus completing with the axis of the said parabola, the boundary of the wing and having the level of each point of the rear edge determined by a point found by the intersection of the outer portion of the front edge parabola, when applied from the front edge curve to the datum parabola in a plane at right angles to the datum plane, with a vertical plane containing the rear edge of the wing.

4. A wing or supporting plane for aeroplanes and aerial machines, having its front edge in the form of a parabolic curve the focus of which lies in the central or longitudinal axis of the machine, and its rear edge appearing as a straight line in plan, and radiating laterally from the focus of the front edge parabola until it meets the said parabola thus completing with the axis of the said parabola, the boundary of the wing and having its underside curved from the front to the rear edge with a curvature equal to that of a portion of the front edge parabola, and having the level of each point of the rear edge determined by a point found by the intersection of the outer portion of the front edge parabola, when applied from the front edge curve to the datum parabola in a plane at right angles to the datum plane, with a vertical plane containing the rear edge of the wing.

5. A wing or supporting plane for aeroplanes and aerial machines, having its front edge in the form of a parabolic curve, the focus of which lies in the central or longitudinal axis of the machine, and its rear edge appearing as a straight line in plan, and radiating laterally from the focus of the front edge parabola until it meets the said parabola thus completing with the axis of the said parabola, the boundary of the wing and having the level of each point of the rear edge raised somewhat above a point found by the intersection of the outer portion of the front edge parabola, when applied from the front edge curve to the datum parabola in a plane at right angles to the datum plane, with a vertical plane containing the rear edge of the wing.

6. A wing or supporting plane for aeroplanes and aerial machines, having its front edge in the form of a parabolic curve, the focus of which lies in the central or longitudinal axis of the machine, and its rear edge appearing as a straight line in plan, and radiating laterally from the focus of the front edge parabola until it meets the said parabola thus completing with the axis of the said parabola, the boundary of the wing, and having its underside curved from the front to the rear edge with a curvature equal to that of a portion of the front edge parabola and having the level of each point of the rear edge raised somewhat above a point found by the intersection of the outer portion of the front edge parabola, when applied from the front edge curve to the datum parabola in a plane at right angles to the datum plane, with a vertical plane containing the rear edge of the wing.

7. A wing or supporting plane for aeroplanes and aerial machines, having its front edge in the form of a parabolic curve, the focus of which lies in the central or longitudinal axis of the machine, and its rear edge appearing as a straight line in plan, and radiating laterally from the focus of the front edge parabola until it meets the said parabola thus completing with the axis

of the said parabola, the boundary of the wing, and having its upper surface curved from the front edge to the rear edge to a curvature obtained by applying the datum parabola to the front edge curve in a plane at right angles to the datum plane so that a point near the axis lies on the front edge parabola and another point on the datum parabola lies on the point formed by the intersection of the under curve with the rear edge of the wing.

8. A wing or supporting plane for aeroplanes and aerial machines, having its front edge in the form of a parabolic curve, the focus of which lies in the central or longitudinal axis of the machine, and its rear edge appearing as a straight line in plan, and radiating laterally from the focus of the front edge parabola until it meets the said parabola thus completing with the axis of the said parabola, the boundary of the wing, and having its underside curved from the front to the rear edge with a curvature equal to that of a portion of the front edge parabola, and having its upper surface curved from the front edge to the rear edge to a curvature obtained by applying the datum parabola to the front edge curve in a plane at right angles to the datum plane so that a point near the axis lies on the front edge parabola and another point on the datum parabola lies on the point formed by the intersection of the under curve with the rear edge of the wing.

9. A wing or supporting plane for aeroplanes and aerial machines, having its front edge in the form of a parabolic curve, the focus of which lies in the central or longitudinal axis of the machine, and its rear edge appearing as a straight line in plan, and radiating laterally from the focus of the front edge parabola until it meets the said parabola thus completing with the axis of the said parabola, the boundary of the wing, and having the level of each point of the rear edge determined by a point found by the intersection of the outer portion of the front edge parabola, when applied from the front edge curve to the datum parabola in a plane at right angles to the datum plane, with a vertical plane containing the rear edge of the wing, and having its upper surface curved from the front edge to the rear edge to a curvature obtained by applying the datum parabola to the front edge curve in a plane at right angles to the datum plane so that a point near the axis lies on the front edge parabola and another point on the datum parabola lies on the point formed by the intersection of the under curve with the rear edge of the wing.

10. A wing or supporting plane for aeroplanes and aerial machines, having its front edge in the form of a parabolic curve, the focus of which lies in the central or longitudinal axis of the machine, and its rear edge appearing as a straight line in plan, and radiating laterally from the focus of the front edge parabola until it meets the said parabola thus completing with the axis of the said parabola, the boundary of the wing, and having its underside curved from the front to the rear edge with a curvature equal to that of a portion of the front edge parabola, and having the level of each point of the rear edge determined by a point found by the intersection of the outer portion of the front edge parabola, when applied from the front edge curve to the datum parabola in a plane at right angles to the datum plane, with a vertical plane containing the rear edge of the wing, and having its upper surface curved from the front edge to the rear edge to a curvature obtained by applying the datum parabola to the front edge curve in a plane at right angles to the datum plane so that a point near the axis lies on the front edge parabola and another point on the datum parabola lies on the point formed by the intersection of the under curve with the rear edge of the wing.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JOSÉ WEISS.
ALEXANDER KEITH.

Witnesses:
ALFRED BEESLEY CAMPBELL,
HENRY SIMONS BAKER.