

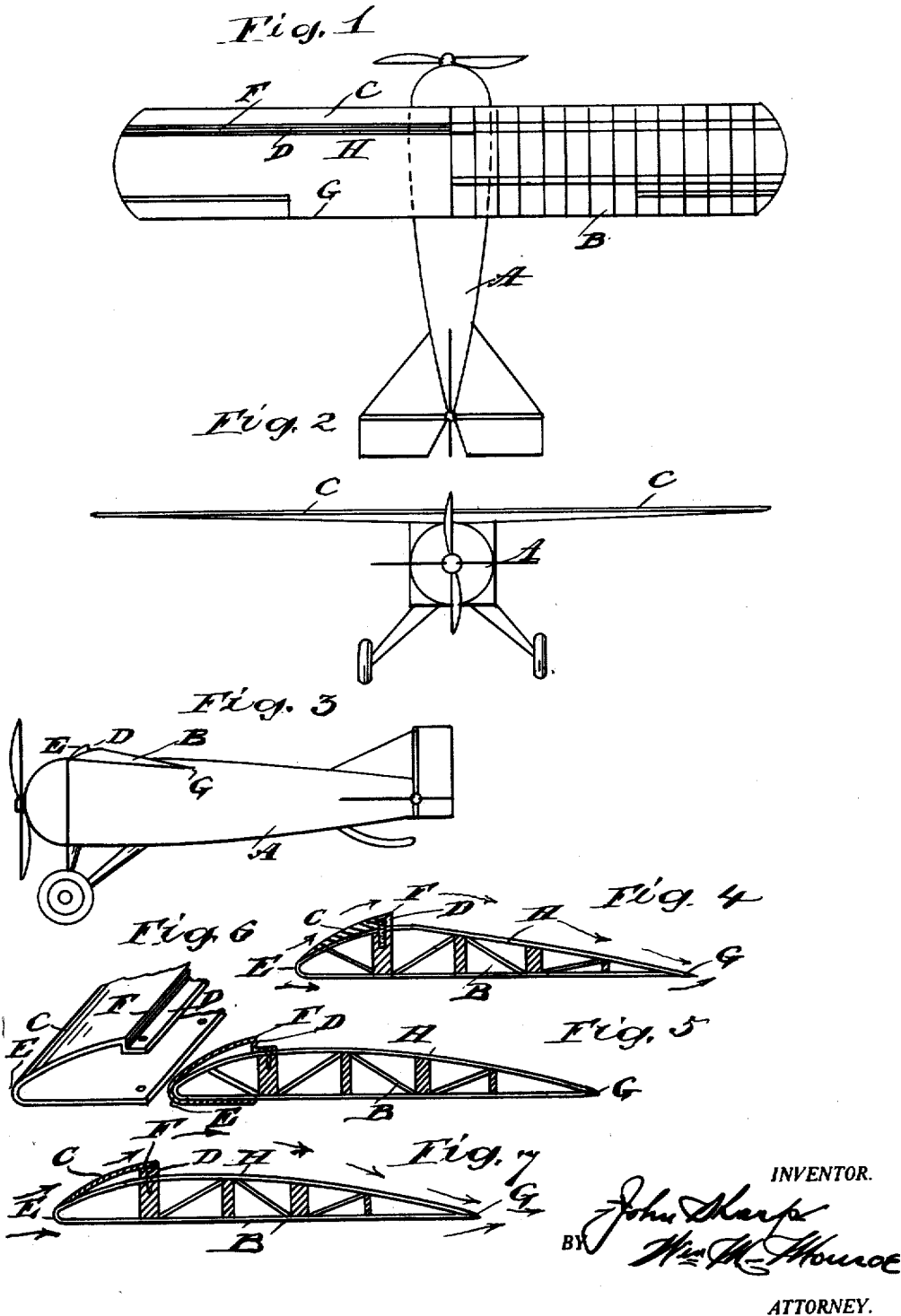
Nov. 10, 1931.

J. SHARP

1,831,780

AEROFOIL FOR AEROPLANES

Filed June 26, 1929



UNITED STATES PATENT OFFICE

JOHN SHARP, OF CLEVELAND, OHIO

AEROFOIL FOR AEROPLANES

Application filed June 26, 1929. Serial No. 373,743.

The objects of this invention are to provide means for increasing the efficiency of an aeroplane by increasing the area of the suction or vacuum producing space above the aerofoil and by intensifying the power of the vacuum or suction produced in that space.

This is accomplished by definitely fixing the point of deflection of the air current from the unobstructed upper cambered surface, of the aerofoil by providing a narrow leading edge, at the highest point of which and of the center of pressure and stability thereof and is formed an elevated margin in front of the said upper surface, which is connected with said surface by means of a closed uninterrupted surface or shoulder.

In this manner the lifting and sustaining power of the aerofoil is increased without increasing the amount of motive power, or the area of the surface of the aerofoil.

In this manner a definite fixed air releasing edge is provided at the rear margin of the leading edge which is followed by the air tight shoulder which is connected with the smooth unobstructed and unimpaired convex upper surface of the aerofoil at a lower level, and an increase in the lifting power of the aeroplane is produced by the elevation of this edge and a more perfect and steady suction or vacuum is thus obtained without thickening the body of the aerofoil, thereby making it more graceful and slender in appearance and less resistant to air pressure and less cumbersome and unwieldy in construction, and also lighter in weight. The air is instantly and more easily released from the upper surface and the amount of suction remains constant, since there is no shifting of the releasing edge, backwards and forwards, over the body of the aerofoil, as the angle of attack changes. It is important that the upper surface of the body of the aerofoil should be smooth and unobstructed to the trailing edge.

In this manner a greater effect is produced than could be effected by thickening the entire body, and a stream line effect is produced that facilitates the passage of the plane through the air.

By the aid of a fixed elevation at the rear of the narrow leading edge from which the air is released quickly when it suddenly loses contact with this edge, it continues to flow just above the surface of the aerofoil back of the shoulder formed by the projection, until it reaches the trailing edge without making contact with the surface of the aerofoil, but close thereto. Also this edge being rigid it can not shift with variations in the angle of attack. In this manner a larger and more powerful suction or vacuum space is created between the swiftly moving stream and the surface of the aerofoil back of the shoulder, in all flying positions of the plane.

To accomplish these and other valuable objects the invention comprises, the device, the nature and operation of which, is hereinafter more fully described, illustrated in the accompanying drawings and particularly pointed out in the claims.

In the drawings Fig. 1 is a plan of an aeroplane equipped with this device; Fig. 2 is a front elevation thereof; Fig. 3 is a side elevation thereof; Figs. 4, 5, 6 and 7 are similar views showing an attached leading edge of the character described.

In these views, A is the fuselage of an aeroplane, B and B are the aerofoils and C is the elevated portion of the leading edge which is raised above the smooth surface of the aerofoil body.

The surface C is shown in Figs. 3 and 5 to be gradually curved upward and terminating in a shoulder D which may be vertical as in Figs. 4, 5, 6, and 7 or inclined as shown in Figs. 3 and 4.

By the employment of this elevated and fixed air releasing edge, three operating edges and the surface of the aerofoil body are brought into action when the aeroplane is in flight, and control and steady its action in the air.

First, the leading edge E, second, the air releasing edge F upon it and the closed and abrupt shoulder D, and next the smooth unobstructed surface of the aerofoil and last the trailing edge G of the aerofoil.

The function of the leading edge is to first

attack and divide the air, part of which flows swiftly above it and is released abruptly from the elevated edge F and at the same time the other part of the air flows swiftly underneath the aerofoil to the trailing edge A, where it is released.

The surface of the leading edge E rises smoothly to the elevated releasing edge F, so that there is a sudden drop, at D, to the upper surface H, of the aerofoil.

The releasing edge F, causes the easy and immediate release of the air stream passing over it.

The point of release is in a definite fixed position and can never shift with the changes in the angle of attack of the plane. This shifting of the point of release will always occur in the use of an aerofoil body of standard construction.

The area of suction surface can be predetermined by the position of this elevated edge in front of the unobstructed curved upper surface of the aerofoil, which is not limited thereby, and which may be advanced or retarded according to the amount of suction surface desired.

This shoulder D may be vertical or inclined as shown in Figs. 4 and 5 and 6 and thus produce a greater amount of suction surface.

The provision of an elevated air releasing edge located upon the rear margin of the leading edge of the aerofoil, has many advantages over the standard aerofoil.

It can be attached to any standard aerofoil to increase its efficiency.

It is extremely useful in starting the plane quickly since the propeller will force a stream of air over the raised edge that will cause a greater and more powerful suction or vacuum behind it that tends to raise the plane, from the ground.

The plane can also land more easily and at a slower rate of speed, since the increased amount of suction lift will support it as the plane loses speed.

The plane can support a greater load per area of aerofoil and at a given engine power, since the lifting area of the plane is not reduced.

The releasing edge being fixed, the amount of suction remains constant at all angles of attack.

The amount of area over which a suction or vacuum can be created can be varied by fixing the position of the releasing edge forward or backward within the curvature of the narrow leading edge.

The improved releasing edge may be added to an ordinary aerofoil, thus increasing its lifting power without increasing the size of the aerofoil.

In Figures 4, 5, 6, and 7, an attachable leading edge, which may be applied to any standard wing is shown. In Fig. 4 it is wedge

shaped and feathered at the front edge where it is applied to the smooth upper surface of the wing and the rear edge forms a vertical shoulder and is secured to the front longitudinal bar of the wing, and in Figures 6 and 7 it is formed of sheet metal bent in V form and passed around the leading edge. Also the upper side of the sheet of metal has its rear edge bent downwardly to form the shoulder D, and is flanged for attachment to the upper surface of the wing—thus securing the parts together.

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

1. In combination with the leading edge of an aerofoil a wedge shaped detachable edge member superimposed thereon, having a fixed elevated air releasing edge upon its rear margin.

2. In combination with the leading edge of an aerofoil, a detachable leading edge superimposed thereon, said superimposed leading edge having a substantially vertical shoulder terminating in an elevated air releasing edge fixed upon its rear margin and having its front edge coinciding with and merging into the surface of said leading edge.

3. In a device for deflecting the air pressure from the upper surface of an aerofoil, a detachable and attachable member having a horizontal front edge applied to the leading edge of said aerofoil, and provided with an elevated rear edge, and means for elevating said rear edge.

4. In a device for deflecting the air pressure from the upper surface of an aerofoil, a V shaped sheet metal plate, passed around the leading edge of said aerofoil, and having its rear edge elevated above the upper surface of said aerofoil, and its lower surface coinciding with the lower surface of said aerofoil and vertical means for supporting the rear elevated edge of said plate, substantially as described.

5. An aerofoil attachment for airplane wings, said aerofoil attachment being adapted to be placed on the leading edge of the airplane wing, providing a thickened leading edge on said wing, and a sharp rear edge on said aerofoil, said rear edge producing a lifting vacuum on the airplane wing.

6. In combination with an aerofoil, a temporary structure thereon enclosing the leading edge of the aerofoil and falling away abruptly to the upper surface of the aerofoil to form therewith a modified aerofoil having different characteristics.

7. In combination with an aerofoil, a supplementary rigid unit fixed over and about the leading edge thereof to modify the aerodynamical characteristics of the aerofoil, the aerofoil forming a support therefor, the

said rigid unit structure falling away abruptly at right angles at its rear edge to the aerofoil in front of the center line of the aerofoil.

5 8. In combination with an aerofoil, a supplementary rigid unit fixed over and about the leading edge thereof to modify the aerodynamical characteristics of the aerofoil, the aerofoil forming a support therefor, the said
10 rigid unit structure being recessed at its rear edge and falling away abruptly to the aerofoil in front of the center line of the aerofoil.

15 9. In combination with an aerofoil, a supplementary rigid unit fixed over and about the leading edge thereof to modify the aerodynamical characteristics of the aerofoil, the aerofoil forming a support therefor, the said
20 rigid unit structure being recessed at its rear edge and falling away abruptly to the aerofoil in front of the center line of the aerofoil, and an attaching step projecting rearwardly from the rear edge of said unit structure.

25 In testimony whereof I affix my signature.
JOHN SHARP.

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CERTIFICATE OF CORRECTION.

Patent No. 1,831,780.

Granted November 10, 1931, to

JOHN SHARP.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, line 8, strike out the paragraph beginning with the word "This" and all through and including the word "shoulder" in line 17, and insert instead:

This is accomplished by definitely fixing the point of deflection of the air current from the unobstructed upper cambered surface of the aero-foil, by providing a narrow leading edge, at the highest point of which is formed an elevated margin in front of the said upper surface and of the center of pressure and stability thereof, and which is connected therewith by means of a closed uninterrupted surface or shoulder.

and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 16th day of February, A. D. 1932.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.

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