244-48
FIP8301 XR 1,312,686
Cross Reference

L. B. DORR.

AIRPLANE.

APPLICATION FILED AUG. 6, 1918.

1,312,686.

Patented Aug. 12, 1919.

5 SHEETS—SHEET 1.

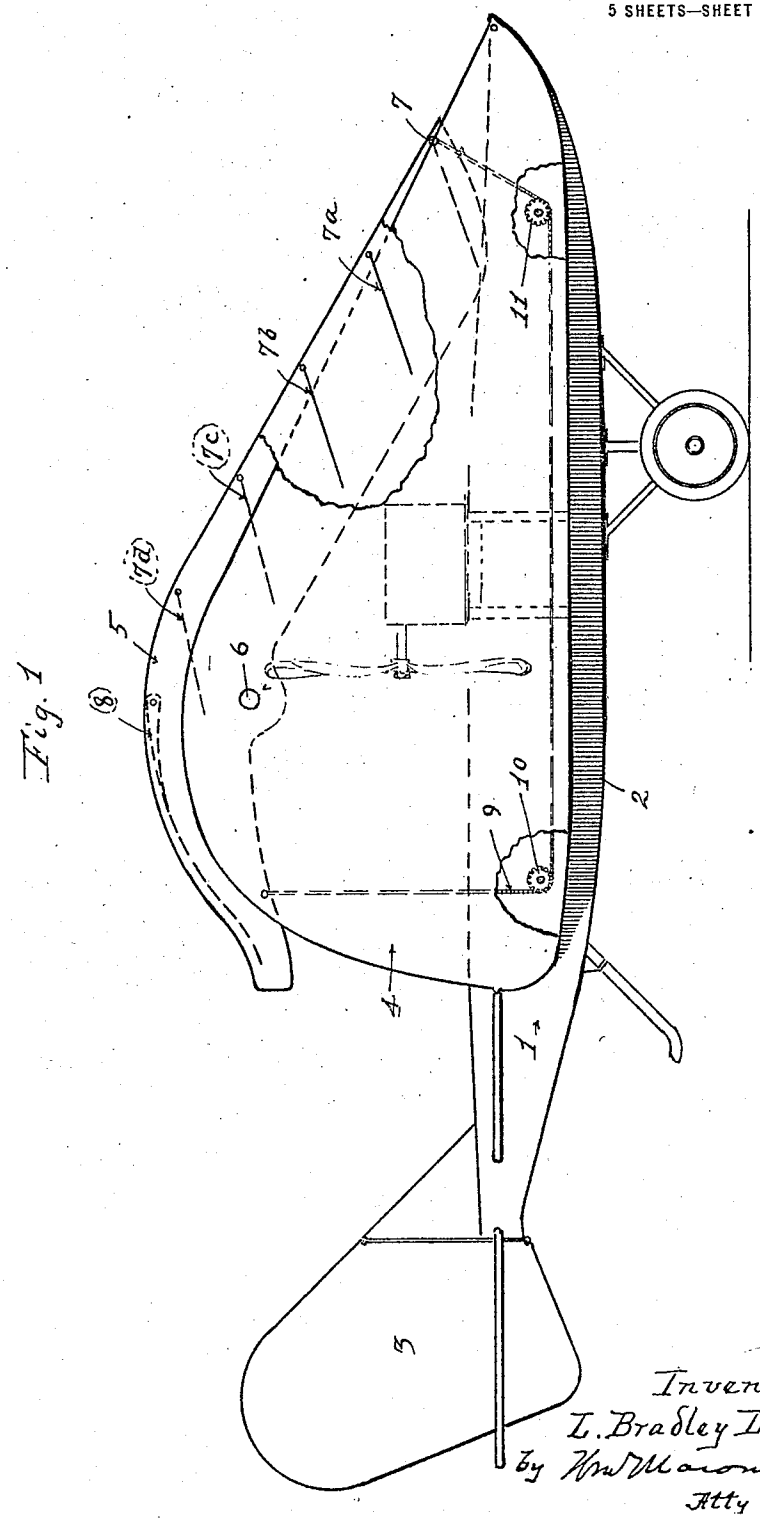


Fig. 1

Inventor:
L. Bradley Dorr,
by Wm Macomber
Atty

THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

244. AERONAUTICS.

48

Examiner

Cross Reference

L. B. DORR.

AIRPLANE.

APPLICATION FILED AUG. 6, 1918.

1,312,686.

Patented Aug. 12, 1919.

5 SHEETS—SHEET 2.

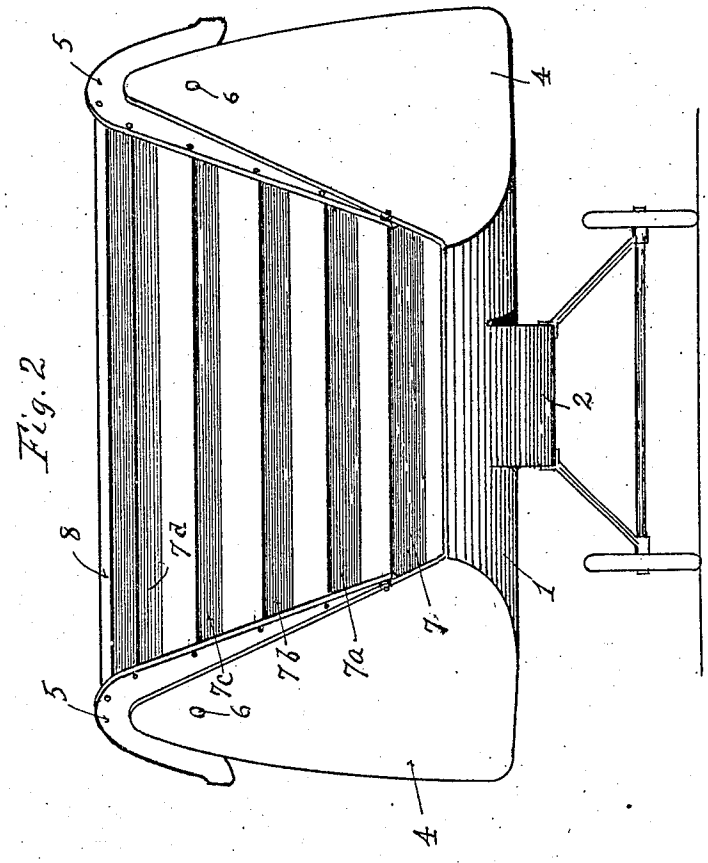


Fig. 2

Inventor:
L. Bradley Dorr
by Wm Macomber
Atty

THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

244. AERONAUTICS.
48
Cross Reference
Examiner

L. B. DORR.

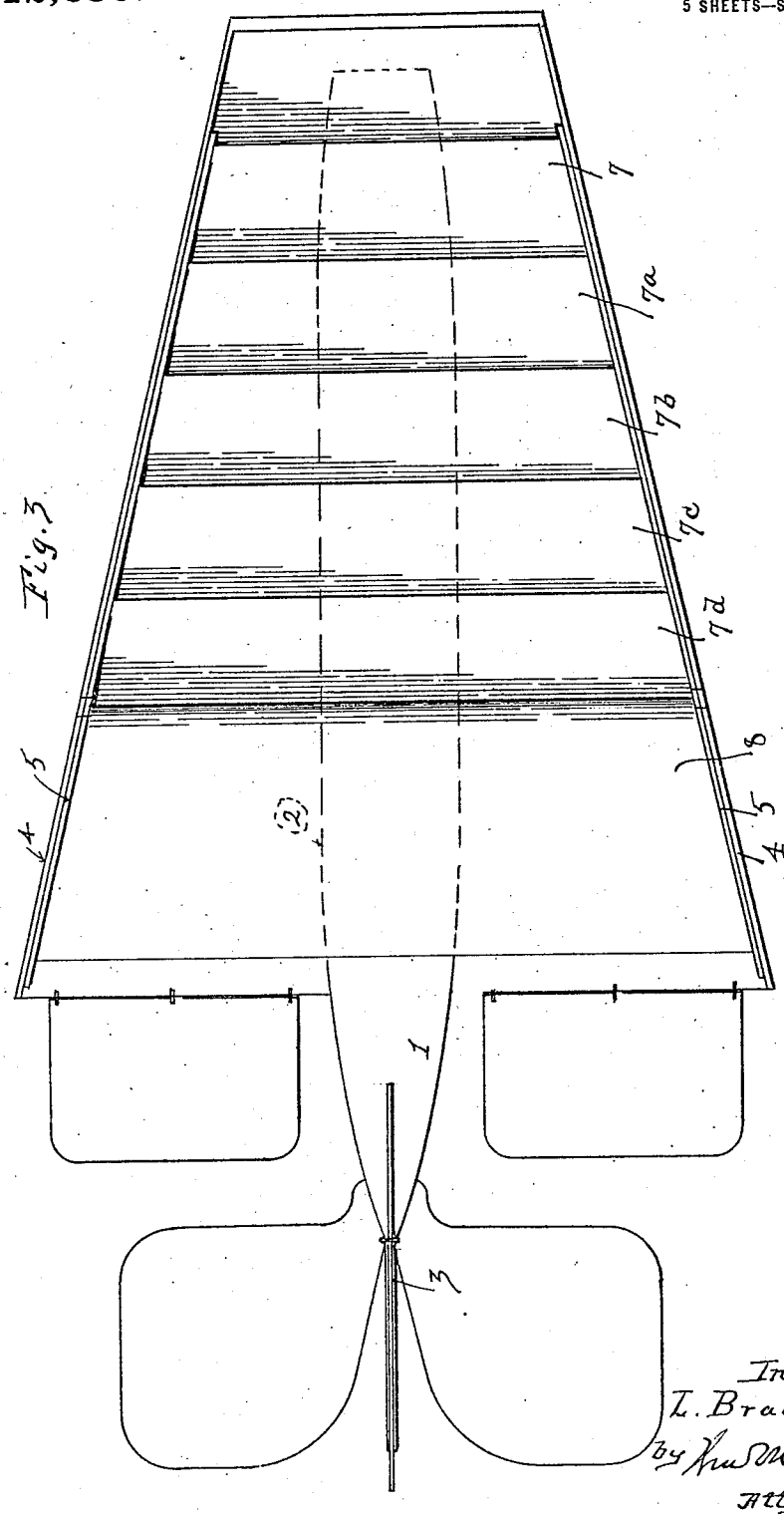
AIRPLANE.

APPLICATION FILED AUG. 6, 1918.

1,312,686.

Patented Aug. 12, 1919.

5 SHEETS—SHEET 3.



Inventor
L. Bradley Dorr
by Fred S. Macomber
Atty

THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

244. AERONAUTICS.

48

Cross Reference

Examiner

L. B. DORR.

AIRPLANE.

APPLICATION FILED AUG. 6, 1918.

1,312,686.

Patented Aug. 12, 1919.

5 SHEETS—SHEET 4.

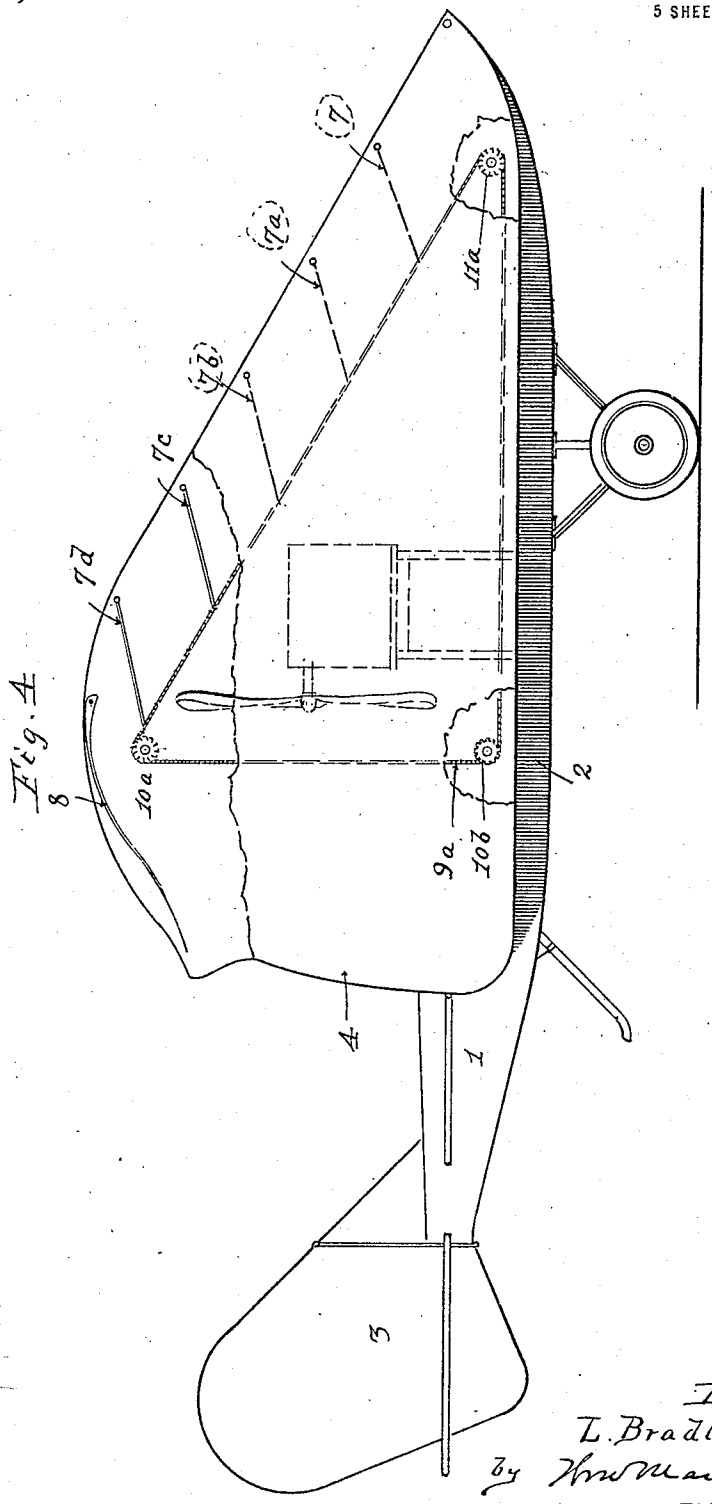


Fig. 4

Inventor:
L. Bradley Dorr
by Wm Macomber
Atty

Cross Reference

Examiner

L. B. DORR.

AIRPLANE.

APPLICATION FILED AUG. 6, 1918.

1,312,686.

Patented Aug. 12, 1919.

5 SHEETS—SHEET 5.

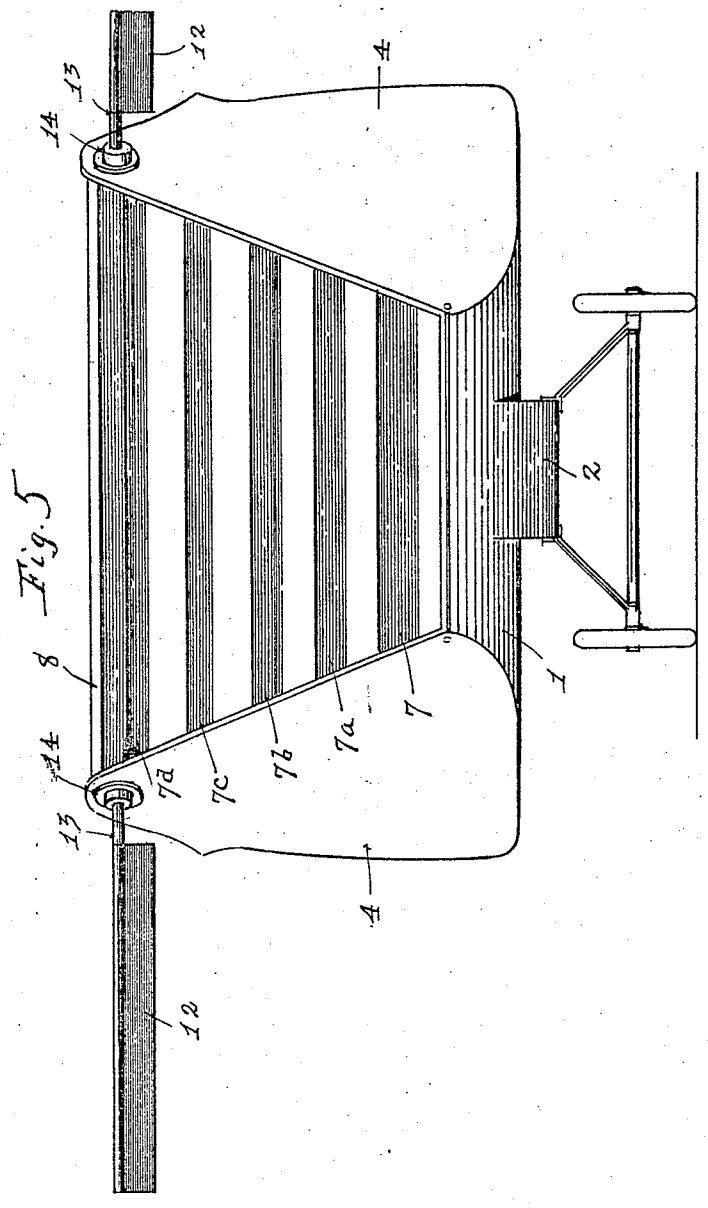


Fig. 5

Inventor:
L. Bradley Dorr
by Thos Macomber
Atty

THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

LUCIUS BRADLEY DORR, OF BUFFALO, NEW YORK.

AIRPLANE.

1,312,686. Specification of Letters Patent. Patented Aug. 12, 1919.

Application filed August 6, 1918. Serial No. 248,631.

To all whom it may concern:

Be it known that I, LUCIUS BRADLEY DORR, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Airplanes, of which the following is a specification.

This invention relates to airplanes. It embraces certain of the principles and discoveries disclosed in my pending application, Serial No. 228,831, filed April 16, 1918, and it embraces certain principles and discoveries which will be understood by those skilled in the art from the following specification.

The objects of my invention are to provide an airplane of great lifting and sustaining power and adaptable to high speed; an airplane which may be constructed chiefly of metal, and which may be equipped with a unit or units of power greatly in excess of that hitherto used. Another object is to materially shorten the ground run in getting up. These and other objects will be understood from this specification, the claims, and the drawings herewith, which are diagrammatic and illustrative, in which,—

Figure 1 is a side elevation, partly in section.

Fig. 2 is a front elevation.

Fig. 3 is a plan view.

Fig. 4 is a side elevation, partly in section, of a modified form of construction.

Fig. 5 is a front elevation of such modified form of construction.

Referring first to Figs. 1 to 3 inclusive, it will be seen that the body is boat-shaped and has a longitudinal trough or depression 2. This form of construction of the body 1 is preferable, but is not the only form which may be successfully used. The tail or rudder 3 may be of any desired form, and may have both vertical and horizontal rudder blades, as shown. The sides 4, preferably of sheet metal properly reinforced, are rigidly secured to the body 1.

Pivotally mounted inside of and bearing against the side walls 4 are carrying plates 5, the pivotal points being shown at 6. Rigidly secured to the plates 5 are the aerofoils 7, 7^a, 7^b, 7^c, 7^d, and 8. The engines and propellers are mounted upon the body 1 and within the area or partial inclosure formed by said body, the sides 4, plates 5 and the aerofoils 7, 7^a, etc., as indicated in broken outline in Fig. 1.

Rigidly secured to the plates 5 near their rear ends are chains 9, which pass down under sprockets 10 and 11, and thence up and are secured to the forward ends of the plates 5. By rotating either pair of sprocket wheels, 10 or 11, by any desired means, the chains 9 will tilt the plates 5 up or down on the pivots 6, and thus change the angle of inclination of each of the aerofoils. The chains 9 and the sprockets 10 and 11 and their bearings should be strong enough practically to carry the entire load,—the lift upon the pivots 6 being thus reduced to the minimum.

With this general description I will now refer to the aerofoil or multiplane construction more particularly. The aerofoils 7, 7^a, 7^b, 7^c, and 7^d are secured to the plates 5 preferably equidistantly with reference to their front or cutting edges, but unequally, as will presently appear, with reference to their rear edges. Let it be assumed 7 is positioned twenty degrees from the normal horizontal. Then the angle of aerofoil 7^a would be about eighteen degrees; the aerofoil 7^b about sixteen degrees; the aerofoil 7^c about fourteen degrees; and the aerofoil 7^d about twelve degrees. In other words, the aerofoils (excepting 8) progressively approach more nearly to the normal horizontal. This necessarily makes between any two aerofoils a progressively-increasing cross-section of space; and it also is to be noted that, as the sides 4 and plates 5 diverge rearwardly, there is transverse as well as vertical increase of these cross-sections of space. The object of this construction is two-fold. First, it reduces the pressure upon the under sides of the aerofoils and consequently reduces the friction. Second, it increases the vacuum action upon the upper sides of the aerofoils, and thus increases the lifting effect.

The construction and function of the aerofoil 8 is somewhat different. It is preferably bull-nosed on the cutting edge and is ogee-curved rearwardly and is much wider than the other aerofoils. Furthermore, its rear portion extends down to the rear of the propeller blades and reduces, somewhat, the discharge area at the rear of the propellers. Hence, while the aerofoil 8 has the lifting effect extending substantially over

its entire upper surface, the rear portion of its under side serves rather to retard and compress the air at the discharge zone, which eventuates in speed rather than lift by rendering the air against which the propellers act of greater density. It now is to be noted that the cutting edges thus arranged impinge the air upon different planes or strata, thus giving them a multiplane effect; and the number of aerofoils and their lengths may be varied as desired, or a multiple unit construction—one structure above another—with corresponding increase of power for propulsion may be employed. Also it is to be noted that the air flowing over the front edge or nose of the body has, in manner similar to the aerofoils, a substantial lifting effect; and the bottom of the body, built upon modified streamlines, has comparatively small resistance but a considerable lifting power. Thus the purpose of providing what may be termed an inclosed area upon the underside of the aerofoils is threefold: (1) to reduce the air friction, (2) to increase the vacuum effect, (3) to increase the density of the air against which the propeller blades act. While the aerofoils may be made of equal length, so that the side plates will be parallel, the double angle construction as shown, and as above indicated, is preferable for the reason that it increases the air cross-section horizontally rearwardly as well as vertically, with the result that the vacuum effect is increased.

In Figs. 4 and 5 I have shown a modified form of construction relating to the means for effecting change of angle of the aerofoils—the other features being substantially as already shown and described. Instead of employing the plates 5 pivotally connected to the sides of the body, the aerofoils 7, 7^a, 7^b, 7^c, 7^d, are pivoted on their ends and adjacent to their cutting edges directly to the side plates 4. The aerofoil 8, in this construction, is rigidly secured to the plates 4, and is therefore not movable. The rear edges of the aerofoils 7, 7^a, 7^b, 7^c, 7^d are connected by chains or cables 9^a, which pass over sprockets or drums 10^a, 10^b, and 11^a. By movement of such chains or cables by rotation of a pair of sprockets or drums by any desired means, the aerofoils (excepting aerofoil 8) are uniformly moved to change their angle. This is a typical modification, and it will be understood by those skilled in the art that such change of angle may be otherwise effected without departing from my invention,—as, for example, by pivoting the rear ends of the plates 5 to the sides 4 and using any desired means for raising and lowering the front ends of the plates 5; or such pivoting and raising and lowering means may be reversed in position.

In connection with the modified form of construction shown in Figs. 4 and 5, I have shown stabilizing wings 12, which upon their front edges are rigidly secured and webbed to tubular shafts 13, which shafts are journaled through the side walls 4, as shown at 14, and are connected interiorly of the body with any well-known control means (not shown). In normal equal angle of inclination these wings 12 act as stabilizers; and by change of angle, one with the other, correction, or control, or banking may be effected. Such wings obviously may be applied to the construction shown in Figs. 1 to 3; and while these are advantageous, I wish it to be understood that they are not essential to the successful operation of my invention.

Having thus described my invention and having shown an embodiment of the same which is the best known to me and which will enable others skilled in the art to employ it in the same or kindred constructions, I claim:

1. An airplane comprising a body and sides adapted to engage with a plurality of aerofoils, a plurality of aerofoils mounted within said sides upon progressively decreasing angles of impact and having their cutting edges progressively higher from front to rear, mechanism for simultaneously changing the angle of said aerofoils with reference to said body, and an aerofoil at the rear of said bank of aerofoils of greater width and extending down into the rear interior area to reduce the size of the discharge opening, a source of power and propellers mounted within said area formed by said body, sides and bank of aerofoils.

2. In an airplane, a plurality of aerofoils arranged in upwardly receding formation, a bottom and vertical sides connecting said bottom and said aerofoils and propelling means therefor.

3. In an airplane, a plurality of aerofoils arranged in upwardly receding formation with progressively decreasing angles of impact from front to rear, sides and a bottom therefor forming a semi-closed area underneath said aerofoils and a motor and propeller therefor.

4. In an airplane, a plurality of aerofoils arranged in upwardly receding formation with progressively decreasing angles of impact from front to rear, a body and sides thereon, plates rigidly secured to said aerofoils and pivoted to the sides of said body and means for moving said plates upon their pivots to change the impact angles of said aerofoils and means for propelling the airplane.

5. In an airplane, a body, sides rigid with said body and in vertical diverging planes from front to rear, a plurality of aerofoils carried by said sides and arranged upon progressively decreasing angles and having their cutting edges arranged progressively

higher from front to rear and means for propelling the airplane.

6. In an airplane, a body, sides rigid with said body and in vertical diverging planes from front to rear, a plurality of aerofoils carried by said sides and arranged upon progressively decreasing angles of impact and having their cutting edges progressively higher from front to rear, means for simultaneously changing the angle of said aerofoils with reference to said body and means for propelling the airplane.

7. In an airplane, a body, sides rigid with said body and in vertical diverging planes from front to rear, carrying-plates pivoted to said sides, a plurality of aerofoils rigidly secured to said carrying-plates and arranged upon progressively decreasing angles of impact and progressively impinging higher strata of air, means for tilting said carrying-plates upon their pivots to simultaneously change the angle of said aerofoils with reference to said body and means for propelling the airplane.

8. In an airplane, a body, sides rigid with said body and in vertical diverging planes from front to rear, a plurality of aerofoils arranged upon progressively decreasing angles of impact and having their cutting edges progressively higher from front to rear and having their ends pivotally connected to said sides, means for simultaneously changing the angle of said aerofoils with reference to said body and means for propelling the airplane.

9. An airplane comprising a body and vertical sides, a plurality of aerofoils mounted within said sides upon progressively decreasing angles of impact and having their cutting edges progressively higher from front to rear, mechanism for simultaneously changing the angle of said aerofoils with reference to said body, and an aerofoil at the rear of said bank of aerofoils of greater width and extending down into the rear interior area to reduce the size of the discharge opening, a source of power and propellers mounted within said area formed by said body, sides and bank of aerofoils.

10. An airplane comprising a body, rearwardly-diverging sides, and a bank of aerofoils arranged progressively rearwardly one above the other and upon decreasing angles of impact from front to rear to reduce the friction and to increase the vacuum effect upon said aerofoils, a motor and propeller within the area thus formed, and an aerofoil extending downwardly to the rear of said propeller to reduce the air exit and increase the driving effect of said propeller, and means for simultaneously changing the angle of said bank of aerofoils with reference to said body.

11. In combination with the elements set forth in claim 10, stabilizing means comprising wings pivotally secured to said sides and means for moving said wings, the one independently of the other, upon said pivots to effect correction, banking, or balance of the airplane.

12. In an airplane, a plurality of aerofoils having their cutting edges arranged in a plane extending upwardly and rearwardly and the impact surfaces of said aerofoils arranged upon progressively reduced angles to the normal horizontal, an inclosing body underneath said aerofoils, whereby the friction upon their undersides is reduced and whereby the vacuum effect is increased, and means for propelling the airplane.

L. BRADLEY DORR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."