E. S. BENNETT.

AEROPLANE.

APPLICATION FILED JAN. 28, 1911. RENEWED FEB. 3, 1912.

1,037,853.

Patented Sept. 10, 1912.

3 SHEETS—SHEET 1.

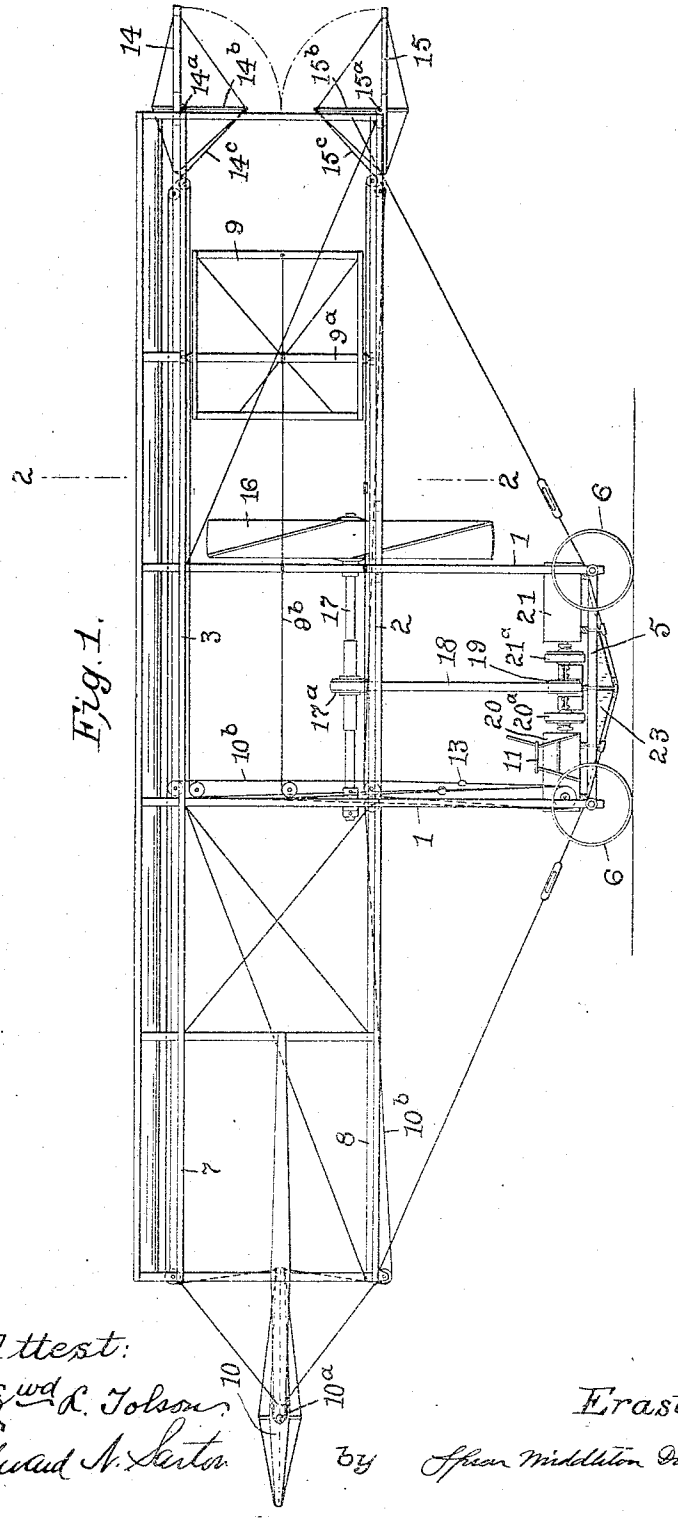

Fig. 1.

Attest:

Edwd. L. Tolson.

Edward N. Carter.

Inventor.

Erastus S. Bennett,

by Spear Middleton Donaldson & Spear

Attys.

E. S. BENNETT.

AEROPLANE.

APPLICATION FILED JAN. 28, 1911. RENEWED FEB. 3, 1912.

1,037,853.

Patented Sept. 10, 1912.

3 SHEETS—SHEET 2.

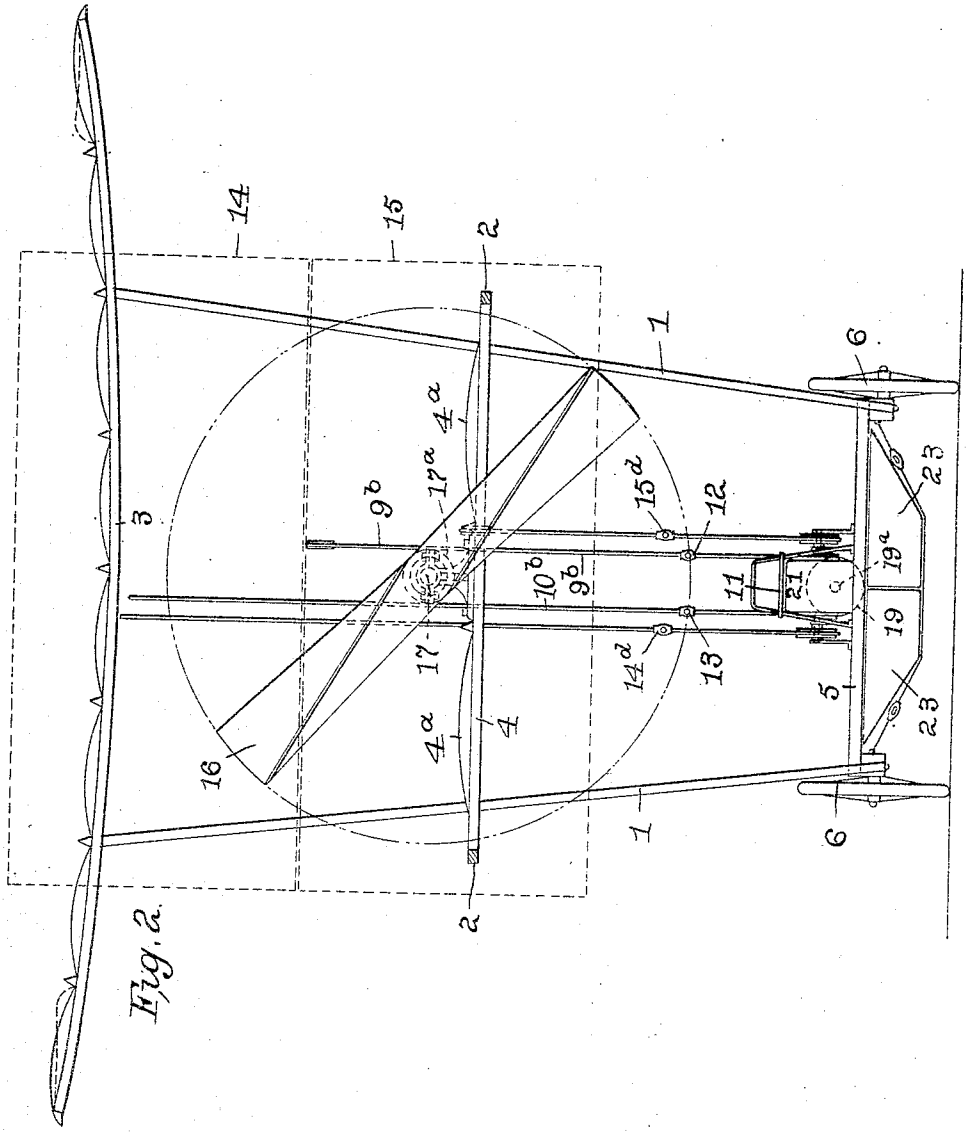

Fig. 2.

Attest:

Edwd L. Tolson

Edward A. Sexton

Inventor:

Erastus S. Bennett,

by Spear Middleton Donaldson & Spear

Attys

E. S. BENNETT.

AEROPLANE.

APPLICATION FILED JAN. 28, 1911. RENEWED FEB. 3, 1912.

1,037,853.

Patented Sept. 10, 1912.

3 SHEETS—SHEET 3.

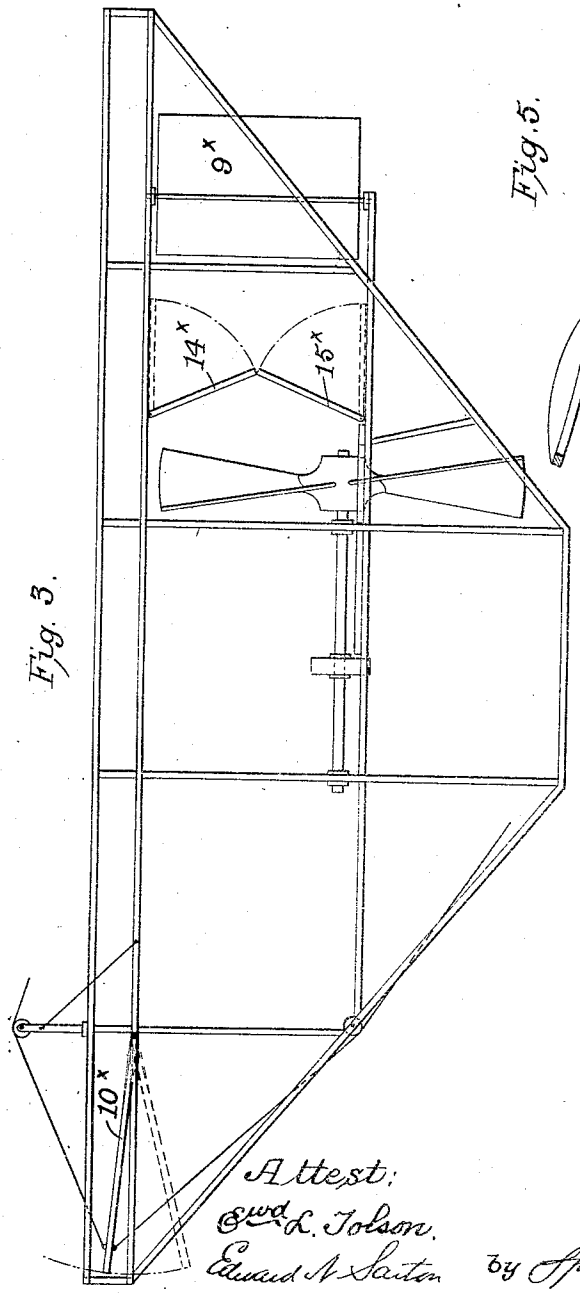

Fig. 3.

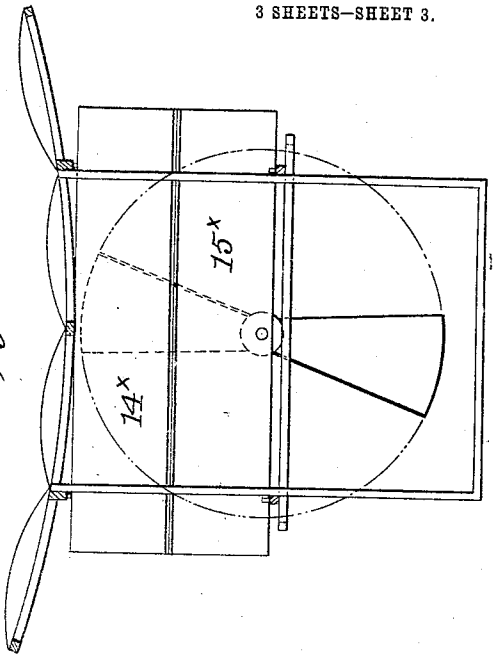

Fig. 5.

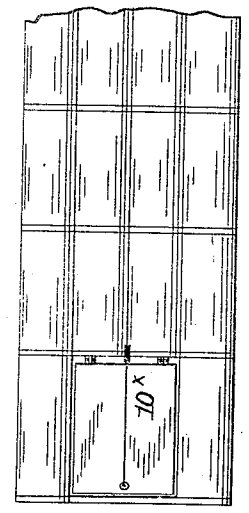

Fig. 4.

Attest:
Edwd. L. Tolson.
Edward A. Sexton

Inventor:
Erastus S. Bennett,
by Spear Middleton Donaldson & Shea
Atty's.

UNITED STATES PATENT OFFICE.

ERASTUS S. BENNETT, OF NEW YORK, N. Y.

AEROPLANE.

1,037,853. Specification of Letters Patent. Patented Sept. 10, 1912.

Application filed January 28, 1911, Serial No. 605,265. Renewed February 3, 1912. Serial No. 675,339.

To all whom it may concern:

Be it known that I, ERASTUS S. BENNETT, citizen of the United States, residing at New York city, New York, have invented certain new and useful Improvements in Aeroplanes, of which the following is a specification.

My present invention relates to improvements in flying machines of the aeroplane type.

Among the objects of the invention are the following: 1, to produce an aeroplane that shall be practically non-upsettable, and which if upset at any considerable elevation, will right itself automatically and land lightly right side up; 2, to provide an aeroplane with an effective air-brake; 3, to so arrange the air-brake that the aeroplane can be halted over a war vessel or any point where it is desired to land; and to do this without the necessity of stopping the engine; 4, to so arrange the air-brake that it may be effectively employed to change the vertical direction of the aeroplane, at the will of the operator, in conjunction with a forward rudder, or without the forward rudder, in case the latter is ineffective, crippled or entirely missing; 5, to so arrange the air-brake that when not in use as an air-brake or rudder, it becomes a part of the plane and assists in supporting the machine; 6, to provide large area of plane surface without great width and thus diminish the width of clear space required for starting or alighting; 7, to reduce the "angle of incidence" against which aeroplanes are usually propelled, thus insuring greater speed with the same power, or less power with the same speed; 8, to construct an aeroplane so that it may "glide" from a high point till near the ground, or any alighting point, and then be made to drop in a vertical line, lightly, and always right side up; 9, to build an aeroplane that shall be practically self contained, *i. e.*, without "outrigging" carrying "vanes," rudders, "balancers," etc.; 10, to construct the main sustaining plane with a curve upward from its center to its sides, and to arrange the covering so as to form a number of inverted longitudinal troughs, each, when subject to pressure, curving downward from its center to its sides; 11, to provide a gasolene tank of large capacity, placed under the cab or car floor, built in compartments and so shaped as to present slight resistance to the air and assist in sustaining its own weight; 12, to increase the efficiency of the propeller by means of a diaphragm placed so as to prevent the swirling of the air.

With these and other objects in view the invention includes the novel features of construction and arrangement and combination of parts hereinafter described and particularly set forth in the appended claims.

The invention is illustrated by the aid of the accompanying drawings in which:—

Figure 1 is a side elevation. Fig. 2 is a section on line 2—2 of Fig. 1, and Figs. 3, 4 and 5 are views of a modified form.

Referring by reference characters to the drawing the numerals 1 designate the substantially upright members or standards of the main frame, 2 and 3 the lower and upper longitudinal members, and 4 the cross members. The platform or car indicated at 5 is carried at the lower ends of the upright members and provided with wheels 6 for starting purposes, and the entire frame is braced by stays or guys as indicated in the drawings.

7 designates an upper or main supporting plane and 8 a lower supplemental plane between which is mounted the rudder 9 pivoted upon a vertical axis 9^a which is slightly in advance of the center of the rudder so that the latter, under the action of the air, tends to assume a position parallel with or longitudinally of the machine. At the front end of the main frame I provide a forward rudder 10 pivoted upon a horizontal axis 10^a which is also in advance of the center of the rudder. The forward and rear rudders are designed to be operated by cords or wires 9^b and 10^b respectively passing over suitable guide pulleys as indicated, and brought into convenient reach of the seat 11 for the aviator, at which point they are provided with operating handles 12 and 13 so that by pulling up or down on said handles the respective rudders may be shifted in the proper direction to cause the aeroplane to ascend or descend, or turn to the right or left as desired.

At the rear of the upper and lower planes I provide what I term an air brake, which consists of a pair of wings or planes 14 and 15 the former of which is hinged at or to

the rear edge of the upper plane upon a horizontal axis 14^a, while the latter is similarly hinged to the rear edge of the lower plane upon a horizontal axis 15^a. These wings are provided with cross rods 14^b and 15^b to the ends of which are connected flexible elements such as cords or wires 14^c and 15^c which are conducted over suitable guide pulleys as shown and into convenient reach of the aviator where they are provided with operating handles 14^d and 15^d. By the proper manipulation of these handles the brake wings may be caused to lie in planes coincident with the upper and lower planes, as indicated in full lines in Fig. 1, or be swung into position at right angles thereto, as indicated in dotted lines, thus closing the space between the planes completely and affording an effective air brake tending to retard the forward movement of the machine, and this whether the propeller be in motion or not.

Obviously the brake wings may be adjusted to any position intermediate of the two positions described whereby a greater or less braking effect may be secured. As the brake wings are capable of independent operation one or the other may be used to supplement the forward rudder, or they may be used entirely for steering should the forward rudder become disabled.

The axes of the brake wings are preferably located intermediate of the upper and lower edges, and slightly to one side of the center so that when opened out they will project above and below the upper and lower planes, and yet will tend automatically to return to horizontal position when released. When in such horizontal position it will be seen that they increase or augment the surface area of the upper and lower planes. The operating elements may be provided with any frictional holding or locking means by which they may be held in any position to which they have been adjusted by the operating handles.

16 designates the propeller which may be of the ordinary or any desired construction and which rotates in an opening in the lower plane of sufficient size to permit free action of the propeller. The lower plane is made in double concavo-convex form with the convex surface 4^a on each side of the axis of the propeller uppermost. This provides two concave portions beneath the planes on opposite sides of the axis which take the air from the propeller and cause it to flow backward toward the rear of the machine. The lower plane surrounding the propeller as it does, serves to prevent any swirling of the air and gives maximum power to the propeller. The propeller is mounted on a shaft 17 which is driven by a belt 18 passing over pulley 17^a on shaft 17 and around a pulley 19 on the driving shaft 19^a. I prefer to provide two engines 20 and 21 which are shown conventionally and either or both of which may be connected to the driving shaft by any suitable clutch mechanism indicated conventionally at 20^a and 21^a.

If an aeroplane of any present known type becomes tilted beyond a certain limit the entire weight of the machine, its engine and operator, is thrown on the edge of the plane which cuts the air, like a sheet of tin falling vertically with its edge down. There is no counteracting force, no way provided by which the weight may be shifted automatically or otherwise, from the edges to the surface of the plane or the machine righted, and wreck is inevitable. In order to avoid this objection I form the upper plane of concavo-convex form with the concave side uppermost. As the main portion of the weight, to wit, the car with its engine and passengers, and other load, is suspended below this plane and preferably at a distance about two-thirds of the width of the plane, should the aeroplane on encountering a dangerous air current become tilted to one side or the other and start to fall with the planes edgewise, the curved form of the main plane will cause it to describe an outward arc tending toward a horizontal line, gradually increasing the resistance of the plane to the air and causing the car by its greater weight to move faster and the whole machine to right itself automatically. A concave plane is of slightly less supporting power han a true horizontal plane, and to overcome this objection I provide a slight amount of looseness or slack in the cloth or other material of which the covering is made, between the longitudinal cleats by which it is secured to the frame, so that under normal conditions the cloth assumes the position shown in full lines, which compensates for any loss in supporting power due to the concave under face of the plane. In falling sidewise the cloth between the cleats would assume the position shown in dotted lines and be converted into air pockets directly opposed to the downward motion thereby assisting the self righting action.

The gasolene tanks are shown at 23 as located beneath the floor of the car and made in compartment form. They are made of elongated form so as to cover a large area and their tapered form offer minimum resistance to the air. Pressure within the tanks may be created in any suitable manner to cause the gasolene to flow to the engines.

If desired I may locate the rear steering rudder 9^x at the extreme rear end of the aeroplane, and the brake wings or members 14^x and 15^x between the propeller and the rear rudder as indicated in Figs. 3 and

5. Similarly the front rudder 10^x may be located wholly within the area bounded by the main plane as indicated in Figs. 3 and 4.

Having thus described my invention what I claim is:—

1. An aeroplane comprising a longitudinally disposed rectangular imperforate supporting plane of concavo-convex form in cross section with the concave side uppermost and wholly exposed, a car of materially less width and length than said plane and supported centrally therefrom at a material distance below the plane, an engine carried by the car, and a propeller below but in proximity to the plane, and means for driving the same from the engine.

2. An aeroplane comprising a longitudinally disposed rectangular imperforate supporting plane of general concavo-convex form in cross section with the concave side uppermost said plane having a plurality of longitudinally disposed concavities in its under surface extending the entire length and width of the plane, a car of materially less length and width than the plane suspended centrally below the same, an engine carried by the car, and a propeller below the plane but in proximity thereto and driven from the engine.

3. An aeroplane having a longitudinally disposed upper plane of concavo-convex form in cross section, a lower longitudinal plane connected thereto of less width than the upper plane and substantially straight in cross section, a propeller having its axis located substantially on a line with said lower plane, a car suspended below the lower plane, and an engine carried by said car and having driving connections to said propeller.

4. An aeroplane having a longitudinally disposed main supporting frame of substantially concavo-convex form in cross section with its convex side downward, a covering material secured to said frame on longitudinally parallel lines with a fullness between said lines, a second straight longitudinal frame below and of less width than said main frame, a covering material secured thereto on longitudinally parallel lines and having fullness between such lines, a propeller having its axis substantially coincident with said lower plane, a car suspended beneath the lower frame, and a motor carried by the car and having driving connections to said propeller.

5. An aeroplane comprising a main supporting plane and suspended car, and an air brake device coöperating with said plane and comprising a pair of hinged vanes located one above the other adapted to be brought into a position substantially at right angles to said plane to obstruct the passage of air longitudinally beneath said plane, and means for operating said vanes singly for vertical steering.

6. An aeroplane comprising a main supporting plane, a suspended car and engine, and a propeller driven therefrom and a hinged air brake member having its pivoted axis substantially in alinement with said plane and intermediate the center and rear end of said plane, and means whereby said air brake member may be inclined for steering purposes and may also be brought into and held in a position substantially at right angles to the main plane and in the path of the air flowing beneath said plane.

7. An aeroplane having upper and lower parallel planes and supplemental planes hinged in proximity to said upper and lower planes, and having their free edges capable of being brought into contact for obstructing the space between said planes.

8. An aeroplane having upper and lower parallel planes and vertical and horizontal steering rudders, and supplemental planes having edges hinged in proximity to said parallel planes and extending normally horizontally rearward from their hinged axis, and capable of being swung toward each other, and means for operating said supplemental planes either singly or together.

9. An aeroplane having upper and lower parallel planes and upper and lower supplemental planes hinged to the respective parallel planes at their rear edges with means for operating them to swing them into inclined position or to bring their free edges into contact, and a rudder pivoted between said planes on a vertical axis, and a second rudder hinged on a horizontal axis at the front intermediate of said planes.

10. An aeroplane comprising parallel horizontally disposed planes the upper of which is continuous and of greater lateral area than the lower, a car suspended beneath the lower plane, a propeller revolving through an opening in the lower plane, and driving means for said propeller, and supplemental planes or members hinged at the rear ends of said parallel planes with means for controlling the position thereof, said supplemental planes being capable of being swung simultaneously inward to bring their edges in contact.

In testimony whereof, I affix my signature in presence of two witnesses.

ERASTUS S. BENNETT.

Witnesses:
FRANCIS N. FLETCHER,
JOHN L. BURST.