

A. PUSTERLA.
FLYING MACHINE.
APPLICATION FILED MAR. 2, 1910.

1,009,855.

Patented Nov. 28, 1911.

3 SHEETS—SHEET 1.

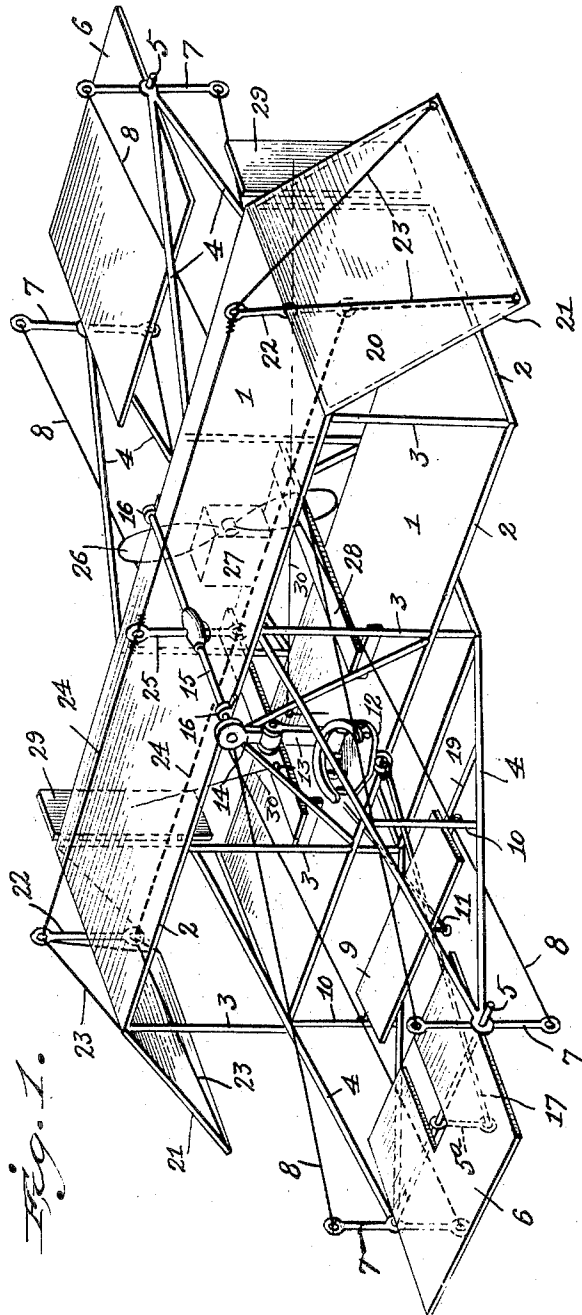


Fig. 1.

Witnesses

B. Rommers
may Ellis

Inventor

Attilio Pusterla

By

Henry Oniz

Attorney

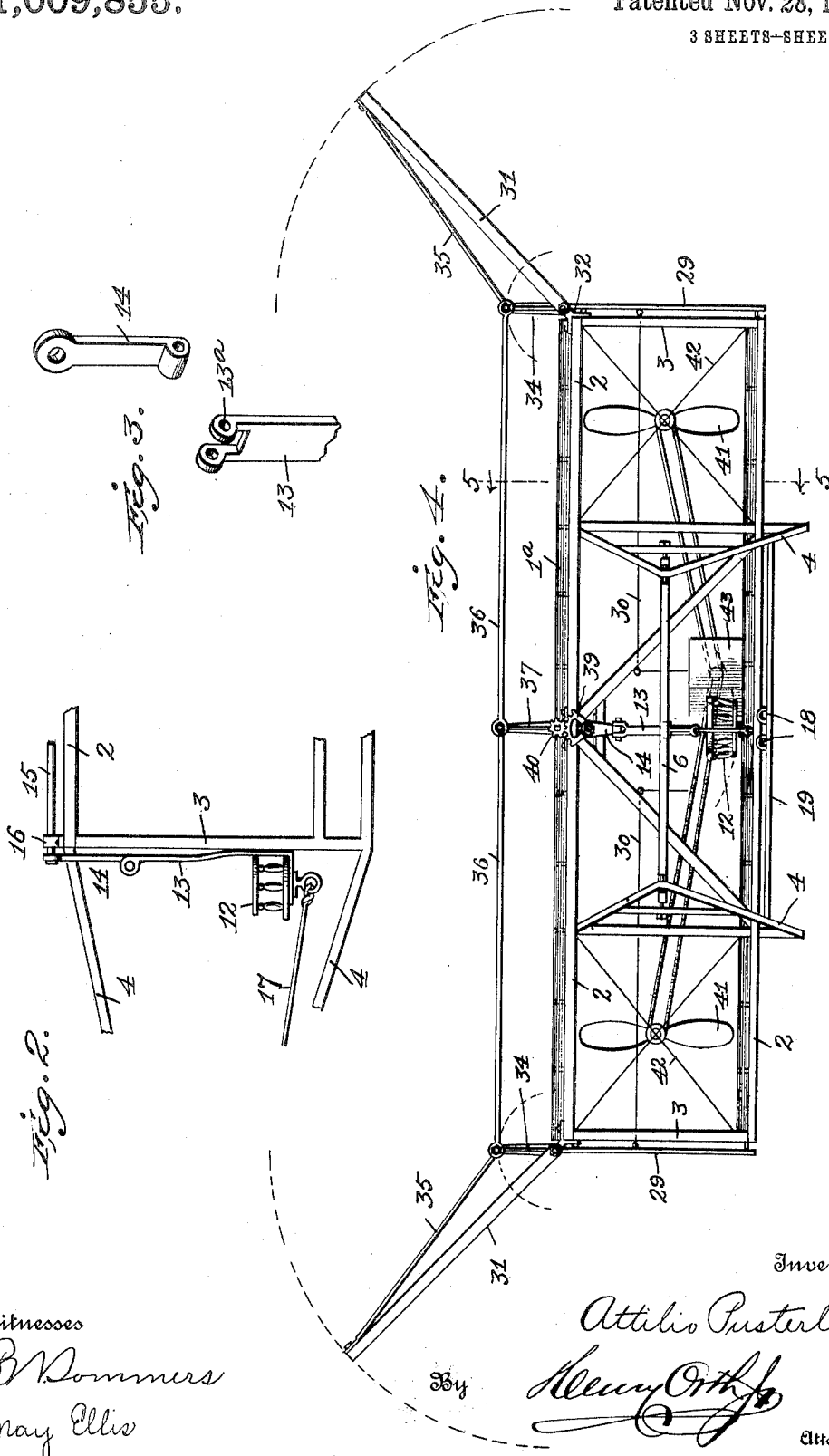
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B. Kommers

May Ellis

Inventor

Attilio Pusterla

Henry Orth

Attorney

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3 SHEETS—SHEET 3.

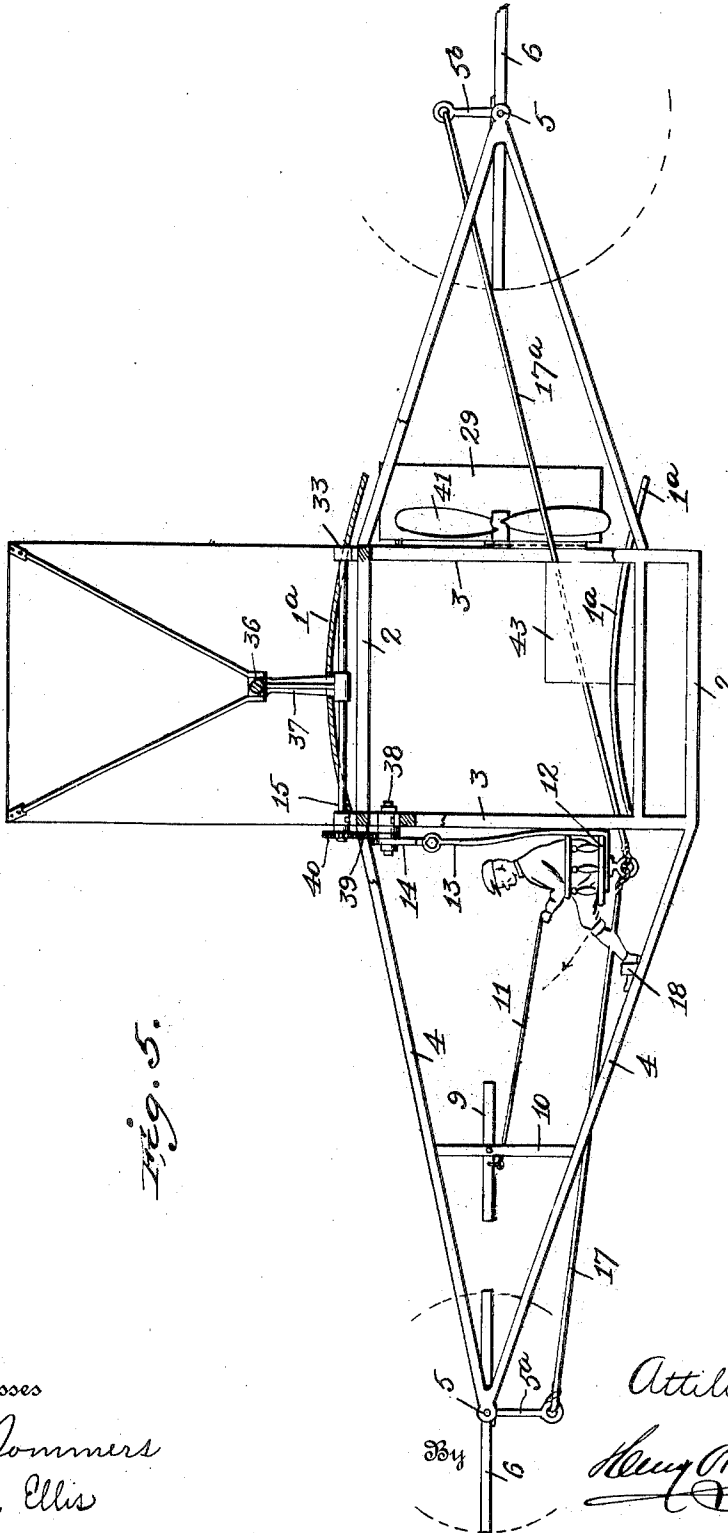


Fig. 5.

Witnesses
B. Rommers
May Ellis

Inventor
Attilio Pusterla
Henry O. Pusterla
Attorney

UNITED STATES PATENT OFFICE.

ATTILIO PUSTERLA, OF FORT WADSWORTH, NEW YORK, ASSIGNOR OF ONE-HALF TO
SAMUEL SCHENKEIN, OF NEW YORK, N. Y.

FLYING-MACHINE.

1,009,855.

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To all whom it may concern:

Be it known that I, ATTILIO PUSTERLA, a citizen of the United States, residing at Fort Wadsworth, Long Island, in the State of New York, have invented certain new and useful Improvements in Flying-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in flying machines of the heavier than air type, known as aeroplanes.

It is well known that while in flight in a straight path machines of this character maintain their lateral equilibrium owing to the equal resistance of the air on both ends of the planes, but when moved out of said path, by means of the rudders, the two ends of the planes move in paths of different length, and consequently at different speeds, thus causing an unequal resistance at the ends of the planes, so that the end moving at the greatest speed will rise above the other end and cause a change in the angle of incidence to the air, or a lateral tipping of the entire planes and of the support for the aviator.

I am aware that means, such as lateral wings, have been provided for the purpose of increasing and diminishing such resistance, and the object of my invention is to provide means for automatically operating such controlling planes or wings, and also to provide means whereby the support of the aviator will not be tilted during the interim between the time of tilting of the planes and the time of restoration to their normal position.

A further object of my invention is to provide means whereby other controlling members or dipping planes may be controlled and operated automatically by the support of the aviator, and said support controlled by the feet and legs of the latter, thus reducing the number of actuating members to be controlled by the hand of the aviator.

The invention consists in the construction,

combination and arrangement of parts as hereinafter more particularly set forth and specified in the claims.

In the accompanying drawings—Figure 1 is a perspective view of an aeroplane embodying the features of my invention. Fig. 2 is a detail side view of the aviator's seat and its support. Fig. 3 shows in perspective detail parts of the seat support. Fig. 4 is a front elevation of a modified form of aeroplane, and Fig. 5 is a section on line 5—5 of Fig. 4.

The main sustaining members of the machine, shown in Fig. 1, comprise an upper and a lower aeroplane, as 1, stretched on suitable rectangular frames 2, which are held in fixed relation to each other by perpendicular posts 3. Extension frames composed of converging side bars 4, project to the front and rear of the frames 2, and in the outer ends of these extension frames are journaled shafts 5 on which are fixed controlling members or dipping planes 6. Two-armed levers 7 are fixed on the shafts 5 at both ends of the dipping planes and at right angles thereto. The levers of the front dipping plane are connected to the levers of the back dipping plane by means of flexible members 8 in such manner that said planes will move simultaneously in opposite directions; for example, if the front end of the front plane is moved downward, as will be hereinafter described, the front end of the rear plane will move upward. This is effected by connecting, by means of said flexible members 8, the upper arms of the front levers with the lower arms of the rear levers, and the lower arms of the front levers with the upper arms of the rear levers. As will be apparent, one lever on each shaft may be omitted.

An auxiliary rudder 9 is journaled on brace rods 10 of the front extension frame, between the auxiliary plane and the aeroplane 1. Said rudder is operated by a rod 11 hinged thereto, so as to permit of the rocking of the rudder on its axis by the aviator, for whom a seat 12 is provided directly in front of the aeroplanes 1. The seat 12 is adapted to swing automatically both longitudinally of the direction of movement of the machine and laterally thereof.

The seat support performs the function of

a lever for controlling the position of the balancing wings hereinafter described, and consists of two articulated members 13 and 14. The member 13 is in the form of an angle-bar, on one arm of which is fixed the seat 12, and the other arm is provided with ears 13^a to form a hinge connection with the member 14 which is keyed on a shaft 15 journaled transversely to the aeroplanes in bearings 16 on the top frame 2.

The front shaft 5 is provided with a crank arm 5^a projecting below the plane and connected to the member 13 by a rod 17 in such manner as to permit lateral movement of said member, but any backward or forward movement of the latter will rock the front auxiliary plane and through the flexible connections 8 simultaneously rock the rear dipping plane.

To control the movement of the seat, stirrups, 18, are provided for the feet of the aviator, on a cross-rod 19 of the front extension frame.

Lateral balancing wings, as 20, are normally positioned below the top aeroplane 1, and are preferably formed by extending the material of the top aeroplane over the ends of the top frame 2 and securing said extensions to rectangular frames 21 which are hinged to the end bars of said top frame. Pivotaly mounted at the center of the end bars are two-armed levers 22, both arms of which are connected to the free ends of the wing-frames 21 by stays 23, and both arms of the levers 22 are connected by ropes 24 to a two-armed lever 25 fixed on the transverse shaft 15.

It will readily be understood that when one side of the aeroplane 1 is raised or lowered, caused by a change in the direction of flight of the machine as above described, the normal perpendicular relation of the planes to the seat support will be changed, and such change will automatically cause a simultaneous raising and lowering of the lateral planes; or, in other words, the area of the top plane 1 will be increased on one end and diminished on the other. A propeller 26 is operated by a motor 27 which is mounted on a suitable framing 28 in a well known manner. Lateral movement of the machine is effected by vertical rudders 29 pivoted on the rear posts 3 and controlled by means of ropes 30 which are connected to the free sides of the rudders and extend within convenient reach of the aviator.

In the modified form of machine, shown in Figs. 4 and 5, the rear dipping plane 6 is connected directly with the supporting member 13 by means of a rod 17^a which is connected with a crank arm 5^b fixed on the rear shaft 5, which arm extends above the plane instead of below it. By this arrangement the rotation of the dipping planes in opposite directions is effected. The main sus-

taining members 1^a are of well known form of aerocurves. The lateral balancing wings are formed independently of the aerocurves and are normally held at an angle above the top aerocurve. The wings here shown consist of rectangular frames 31 mounted on shafts 32 which are journaled in bearings 33 on the ends of the top frame 2. Lever arms 34 are fixed to the shafts and held in fixed relation to the frames 31 by stays 35 running from the free ends of the levers 34 to the outer corners of the frames 31. The lever arms 34 are pivotally connected by means of rigid rods 36 to a central lever 37 keyed on the transverse shaft 15. As the normal position of the wings 31 is the reverse of that of the wings 20 means are provided for reversing the operation of the seat-support 13-14. Instead of the member 14 being fixed on the transverse shaft 15, said member 14 is keyed on a stub-shaft 38 journaled beneath the transverse shaft 15, and keyed on the stub-shaft 38 is a segmental gear 39 which meshes with a gear 40 keyed on the transverse shaft 15. It will thus be seen that when the aerocurves are tilted, and the normal perpendicular relation of the aerocurves to the seat-support is changed, the segmental gear will cause the transverse shaft to rotate, rocking levers 37 and 34 in the direction of its rotation, which will automatically cause the wings to be simultaneously lowered and raised. Two propellers, as 41, are mounted in suitable frames as 42, and operated by a single motor, as 43, in a well-known manner.

While I have described and illustrated my improvements applied to a machine of the bi-plane type, they are equally applicable to a machine of the mono-plane type.

It will be apparent that various changes or modifications may be made in the machine, and will readily suggest themselves to any one making and using the same, and I do not restrict myself to the specific construction, combination and arrangement of parts herein shown and described, but reserve to myself all equivalents thereof as might come within the terms of the claims.

The operation of my invention has already been sufficiently described in connection with the foregoing description of form and arrangement of parts, so that a further description of the operation is deemed unnecessary.

I claim—

1. In a flying machine, the combination with the frame, a main sustaining member mounted thereon, of lateral balancing wings adapted to swing on axes at right angles to the longitudinal axis of the sustaining member, front and rear planes pivoted on axes parallel to the axis of the sustaining member, an articulated controlling member having an aviator's seat on the lower end

thereof, means connecting the controlling member with the wings, said means adapted to simultaneously raise one wing and lower the other when the normal perpendicular relation of said members is changed, said articulated member capable of being oscillated in planes parallel to and at right angles to the longitudinal axis of the sustaining member, and means connecting the articulated member with the planes adapted to rock the latter simultaneously in opposite directions, said frame comprising a brace-rod which constitute a foot support whereby the movements of the seat is under the control of the aviator.

2. A flying machine comprising a frame, a main sustaining member thereon, wings pivotally connected with the ends of the sustaining member, a two-armed lever mounted on the axis of each wing, a shaft journaled between and parallel to the wing axes, a two armed lever fixed on said shaft, stays connecting the ends of said two-armed levers, a depending lever fixed on said shaft adapted to swing in a plane at right angles to the direction of flight, and a seat support hinged to the depending lever adapted to swing in a plane at right angles to the plane of movement of the depending lever, said frame comprising a brace-rod which constitutes a foot support whereby the move-

ments of the seat is under the control of the aviator.

3. A flying machine comprising a main sustaining member, wings pivotally connected with the ends of the latter, a two-armed lever mounted on the axis of each wing, a shaft journaled between and parallel to the wing axes, a two armed lever fixed on said shaft, stays connecting the ends of said two-armed levers, a depending lever fixed on said shaft, and a seat support hinged to the depending lever adapted to swing in a plane at right angles to the plane of movement of the depending lever, front and rear planes, two-armed lever fixed to the axles of the planes, crossed stays connecting the levers of the front and rear planes, and means connecting the seat support with said planes adapted to rock the latter, said frame comprising a brace-rod which constitutes a foot support whereby the movements of the seat is under the control of the aviator.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

ATTILIO PUSTERLA.

Witnesses:

PLACIDO MORI,
JOHN COTALDO.