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R. E. HEATH.

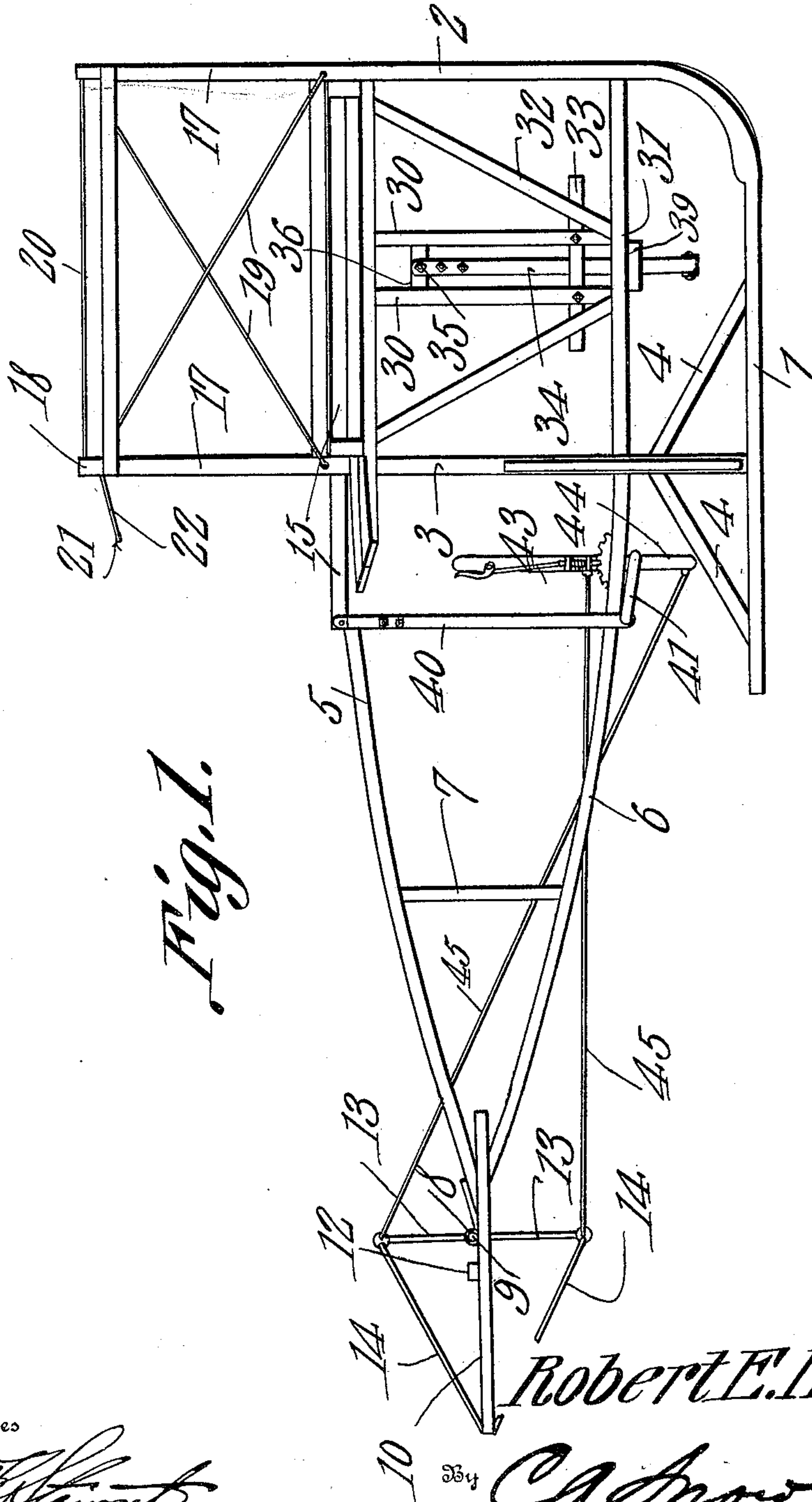
AERODROME.

APPLICATION FILED FEB. 3, 1910.

993,063.

Patented May 23, 1911.

3 SHEETS-SHEET 1.



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Witnesses

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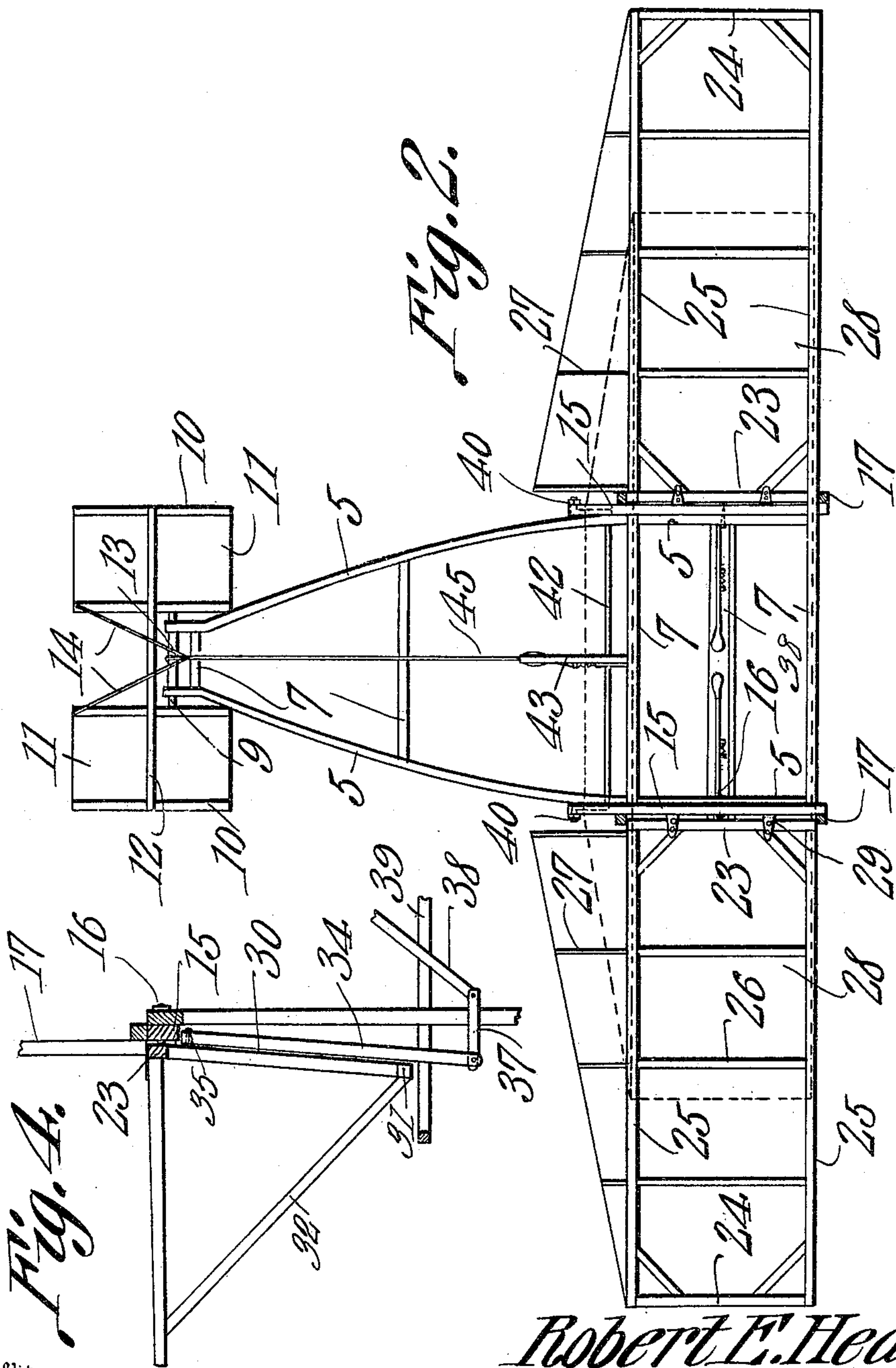
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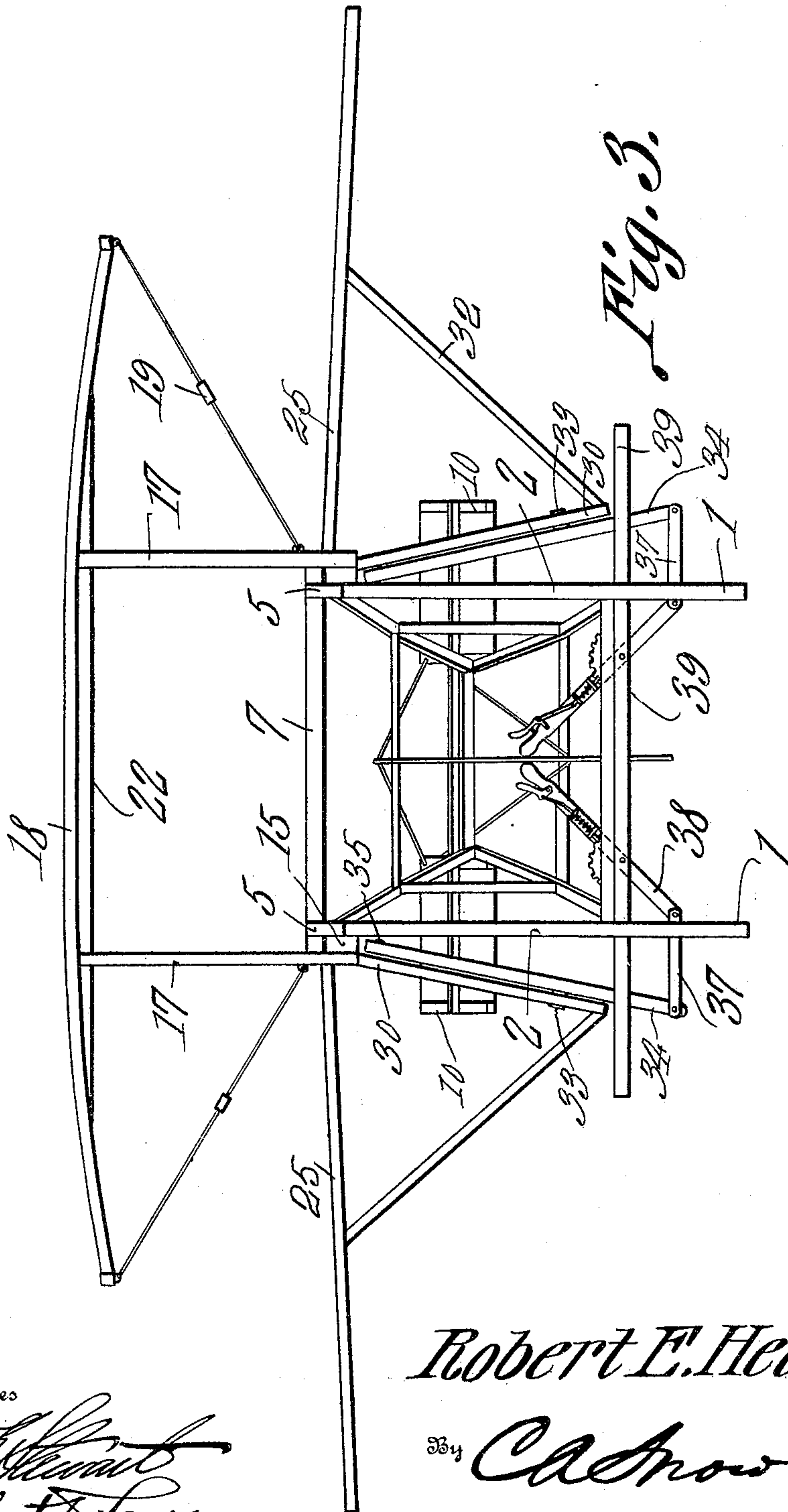
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UNITED STATES PATENT OFFICE.

ROBERT ERNEST HEATH, OF YORKVILLE, SOUTH CAROLINA.

AERODROME.

993,063.

Specification of Letters Patent.

Patented May 23, 1911.

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To all whom it may concern:

Be it known that I, ROBERT E. HEATH, a citizen of the United States, residing at Yorkville, in the county of York and State of South Carolina, have invented a new and useful Aerodrome, of which the following is a specification.

This invention relates to aerodromes of that type commonly known as triplanes and its object is to provide a machine of this character utilizing an upper sustaining plane and laterally extending lower planes which are shiftable relative to said body, means being provided whereby the said lower planes can be independently moved about axes parallel to the line of flight for the purpose of meeting atmospheric disturbances and thus maintaining or restoring the equilibrium or lateral balance of the machine.

Another object is to provide a machine of this character the shiftable planes of which are provided with means whereby they can be simultaneously moved about an axis extending transversely to the line of flight for varying the angle of incidence and thus controlling the rise and fall of the machine while being propelled in a forward direction.

A still further object is to provide a tail plane or horizontal rudder mounted for swinging movement upon an axis extending transversely to the line of flight, said rudder being provided with means whereby both the rudder and the shiftable planes may be moved in unison.

A still further object is to provide means whereby both of the shiftable planes can be simultaneously moved about transverse axes irrespective of the angles of said planes relative to each other.

With these and other objects in view the invention consists of certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claims.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings:—Figure 1 is a side elevation of a machine embodying the present improvements, the propelling mechanism being removed therefrom. Fig. 2 is a horizontal section through the supports of the upper plane, the said upper plane being outlined by dotted lines. Fig. 3 is a front ele-

vation of said machine. Fig. 4 is an enlarged vertical transverse section through the inner end portion of the frame of one of the lower planes and a portion of the mechanism utilized for actuating the same.

Referring to the figures by characters of reference 1 designates each of two supporting runners the front ends of which are curved upwardly and merge into standards 2 while additional standards 3 extend upwardly from said runners at intermediate points and are suitably braced, as shown, at 4. The upper ends of the standards 2 and 3 are connected by the front portions of rearwardly extending downwardly curved frame pieces 5 the rear ends of which are secured in any desired manner to the rear ends of upwardly curved lower frame pieces 6 attached to the standards 2 and 3 at points adjacent the runners 1. These frame pieces 5 and 6 may be connected at desired points by braces 7 and the rear or meeting ends thereof are provided with journals 8 in which are mounted the ends of a shaft 9. The ends of this shaft are fixedly secured to frames 10 on which are stretched the cloths 11 constituting the tail planes or horizontal rudder of the machine. It will be noted that the two frames 10 are fixedly connected by means of a central cross strip 12 and it will be further noted that the shaft 9 is attached at points in advance of the central connecting strip 12. Arms 13 extend from the center of the shaft 9 and are perpendicular to the upper and lower faces of the frames 10, each of these arms being connected by rearwardly diverging cords 14, to the inner rear corners of the frames.

Side bars 15 are mounted upon the side faces of the side strips 5 adjacent the front ends thereof and are connected thereto by pivot devices 16 on which the bars 15 are designed to swing. Each of these bars 15 has front and rear standards 17 fixedly secured to it and extending upwardly therefrom, the said standards being secured, at their upper ends, to spars, 18 preferably bowed downward at their ends and connected at their ends by brace wires 19, to the lower portions of the standards 17. These spars extend beyond the standards 17 and the sides of the machine and have a cloth 20 stretched upon them and constitute the upper sustaining plane of the machine. An extension frame 21 is preferably formed upon the rear

spar 18 and has a cloth 22 stretched upon it so as to form an auxiliary rearwardly extending wing which is preferably inclined downwardly and rearwardly at a slight angle relative to the plane 20. Each of the lower planes of the machine consists of inner and outer end strips 23 and 24 connected by front and rear spars 25, there being any suitable arrangement of braces 26 whereby the said strips and spars can be rigidly connected. Each frame has supplemental ribs or arms 27 extending rearwardly therefrom and a cloth 28 is stretched upon the frame and ribs so as to complete the plane. The inner end strip 23 of each of these planes is connected, by means of hinges 29, with the adjoining tiltable side bar 15, it being understood that the length of the inner end strip 23 is slightly less than the distance between the standards 17. Parallel hangers 30 are fixedly secured to and extend downwardly from the inner end strip 23 of each of the lower planes and are connected at their lower ends by a cross strip 31 to which are secured braces 32 extending upwardly to the ends of the strip 23, thus forming a strong frame hanging downward from said strip 23. An elongated loop 33 is secured to the inner faces of the hangers depending from each of the lower wings and mounted loosely within each of these loops is a connecting strip 34 the upper end of which is pivotally attached, as at 35, to a cross strip 36 secured to and located between the upper end portions of the hangers 30. The connecting strip 34 extends below the hangers and is pivotally attached to a link 37 which is in turn pivotally connected to the lower end of a lever 38. This lever is fulcrumed within a longitudinally slotted bar 39 which projects beyond the sides of the body of the machine, the strip 34 being extended loosely through it. It will be apparent therefore that, while the hangers 30 and the parts connected thereto can be swung laterally by means of the levers 38, said levers, as well as the strips 34, will always be held in the same plane by the slotted guide bar 39 which is of course fixedly secured to the frame of the machine, the said guide bars being shown attached to the side strips 6 at points between the standards 2 and 3.

In order that the upper and lower planes may be simultaneously moved about an axis extending transversely of the line of flight, each of the strips 15 is extended rearwardly a desired distance as shown especially in Figs. 1 and 2 and has a pitman 40 attached to its rear end, the said pitman receiving motion from a crank 41 located at the end of a transversely extending rock shaft 42. This shaft is perfectly journaled upon the lower side strips 6 and has an actuating lever 43 attached to it. An arm 44 extends downwardly from the lever and in alinea-

ment therewith and crossed cords 45 are secured to the outer ends of the two arms 13 and to the lever 43 and arm 44 respectively so that when the lever 43 is actuated, the two shafts 42 and 9 are simultaneously rocked in opposite directions.

It is to be understood that the machine herein described may be provided with any suitable means for propelling it. In preparing for a flight the lower planes are shifted, by means of the levers 38, so as to lie in substantially the same plane after which lever 43 is actuated to swing the side bars 15 upon their pivots 16 and thus elevate the front or advancing edges of said lower wings as well as of the upper plane. Motion will be at the same time transmitted through the cords 45 to the tail planes so as to elevate the rear edges thereof. When the machine is driven forward the pressure of the air against the lower faces of the planes will cause the machine to soar upwardly and the pressure of the air against the upper faces of the tail planes will result in the slight tilting of the entire machine upon an axis extending transversely to the line of flight. Obviously the pressure of air against the tail plane and the upper and lower sustaining planes will be such as to preserve the balance of the machine during its flight. Whenever it becomes desirable to maintain the equilibrium of the machine by shifting the lower planes about axes extending parallel with the line of flight, as for example during an atmospheric disturbance, either or both of the levers 38 can be shifted desired distances so as to transmit motion to the links 37 and strips 34 to the frames of the lower wings which will thus be swung upon the hinges 29. It will be apparent that this swinging movement of the lower planes can be obtained irrespective of the angle produced by the manipulation of the lever 43, this being due to the fact that the hangers 30 connected to the lower planes are shiftable relative to the strips 34.

Various changes can of course be made in the construction and arrangement of the parts without departing from the spirit of the invention or sacrificing any of the advantages of the invention as defined in the appended claims.

What is claimed is:—

1. An aerodrome including a frame, upper and lower sustaining planes, means for simultaneously tilting said planes, about a single axis extending transversely of the line of flight, and separate means operable independently of the first mentioned means, for independently tilting the lower planes about axes extending parallel to the line of flight.

2. An aerodrome including a frame, upper and lower sustaining planes, means for simultaneously tilting the said planes rel-

ative to the frame about a single axis extending transversely of the line of flight, and separate means for independently tilting the lower planes about axes extending
5 parallel to the line of flight, and irrespective of the tilting of the planes about their transverse axis.

3. A combination with a frame, and tiltable side bar connected thereto of an upper
10 sustaining plane supported above and movable with said bars, lower side sustaining planes hingedly connected to said bars, hangers depending from the lower sustaining planes, means for simultaneously tilting
15 the side bars to correspondingly tilt the upper and lower sustaining planes about a common axis extending transversely of the line of flight, separate means for actuating the lower planes about their hinges, and
20 means, slidably engaged by the hangers, for transmitting motion to the hangers and lower planes from said actuating means ir-

respective of the angle to which the planes may be tilted about their transverse axis.

4. An aerodrome including a frame, side 25 strips pivotally connected thereto, an upper sustaining plane supported above and movable with said strips, lower side sustaining planes hingedly connected to the strips, hangers fixed relatively to and depending 30 from the lower planes, connecting strips pivotally attached to the hangers and depending therefrom, guide loops movable with the hangers and loosely embracing said strips, actuating levers, and connections between 35 said levers and the respective connecting strips.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

ROBT. ERNEST HEATH.

Witnesses:

I. E. WILKIN,

E. M. STANTON.

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