

J. W. BAKER.
AEROPLANE.
APPLICATION FILED JUNE 12, 1912.

1,063,315.

Patented June 3, 1913.

6 SHEETS—SHEET 1.

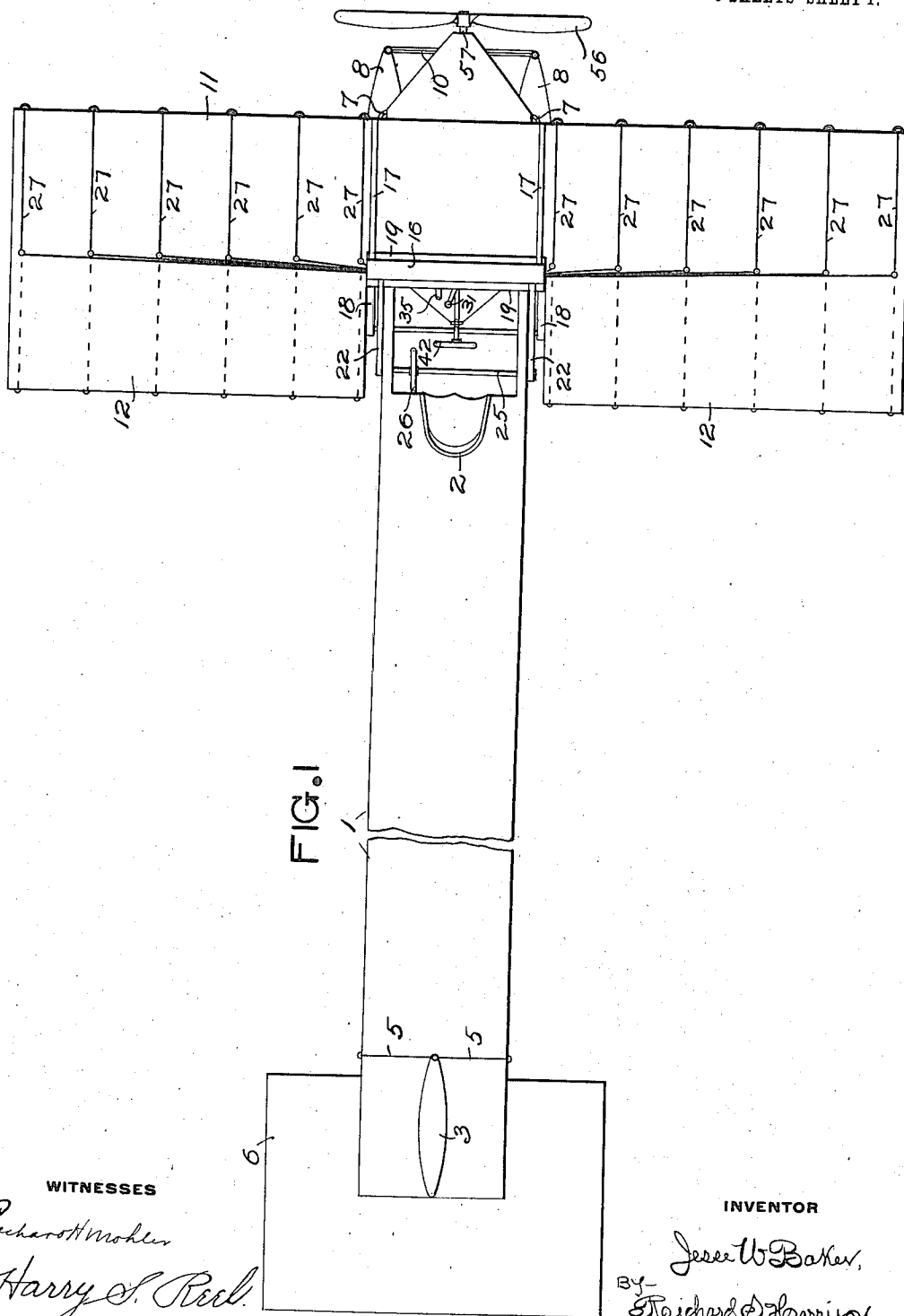


FIG. 1

WITNESSES

Richard H. Mohler
Harry S. Reel

INVENTOR

Jesse W. Baker
BY *Richard H. Harrison*
his attorney

J. W. BAKER.
AEROPLANE.
APPLICATION FILED JUNE 12, 1912.

1,063,315.

Patented June 3, 1913.

6 SHEETS—SHEET 2.

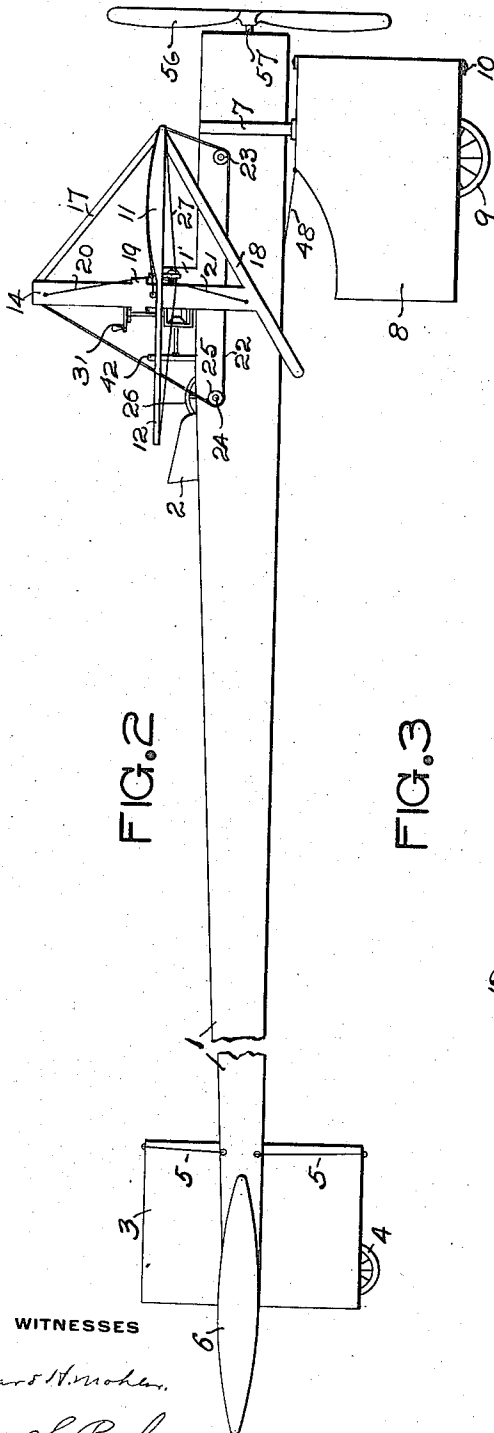


FIG. 2

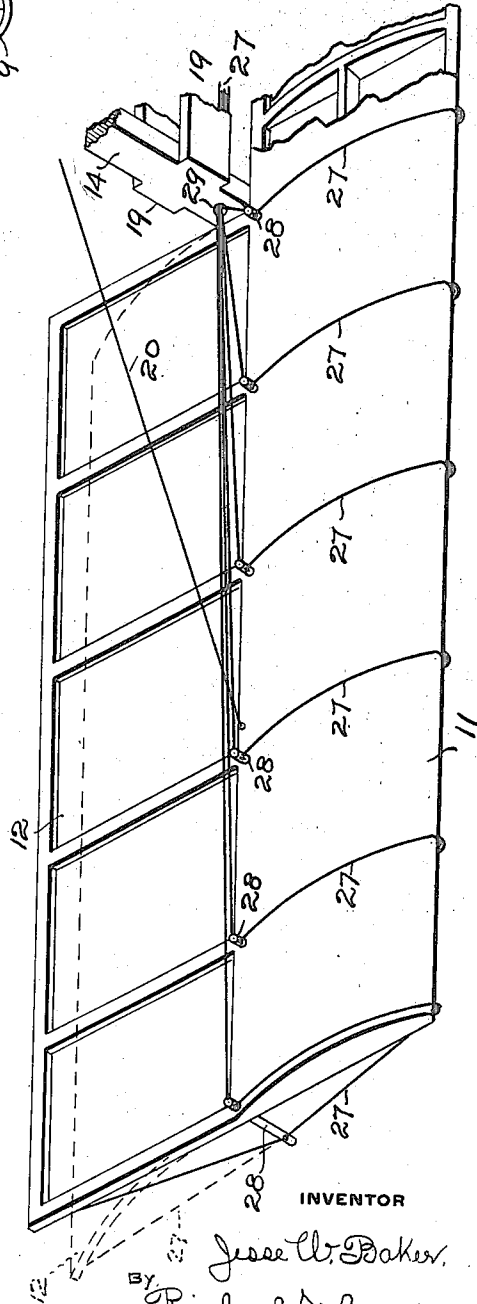


FIG. 3

WITNESSES

Richard W. Mohr,
Harry S. Reel.

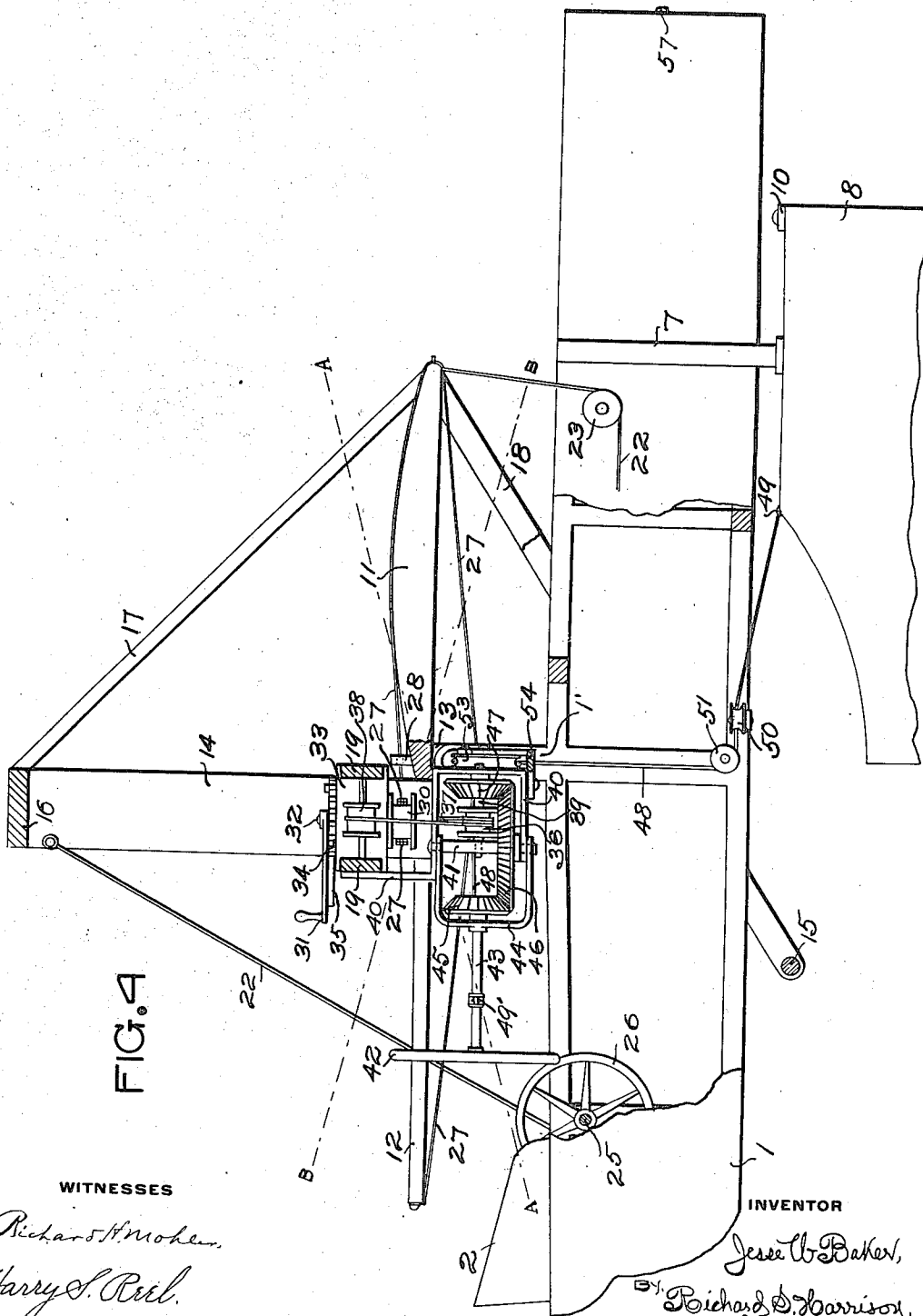
INVENTOR

Jesse W. Baker,
By *Richard S. Harrison,*
his attorney.

1,063,315.

Patented June 3, 1913.

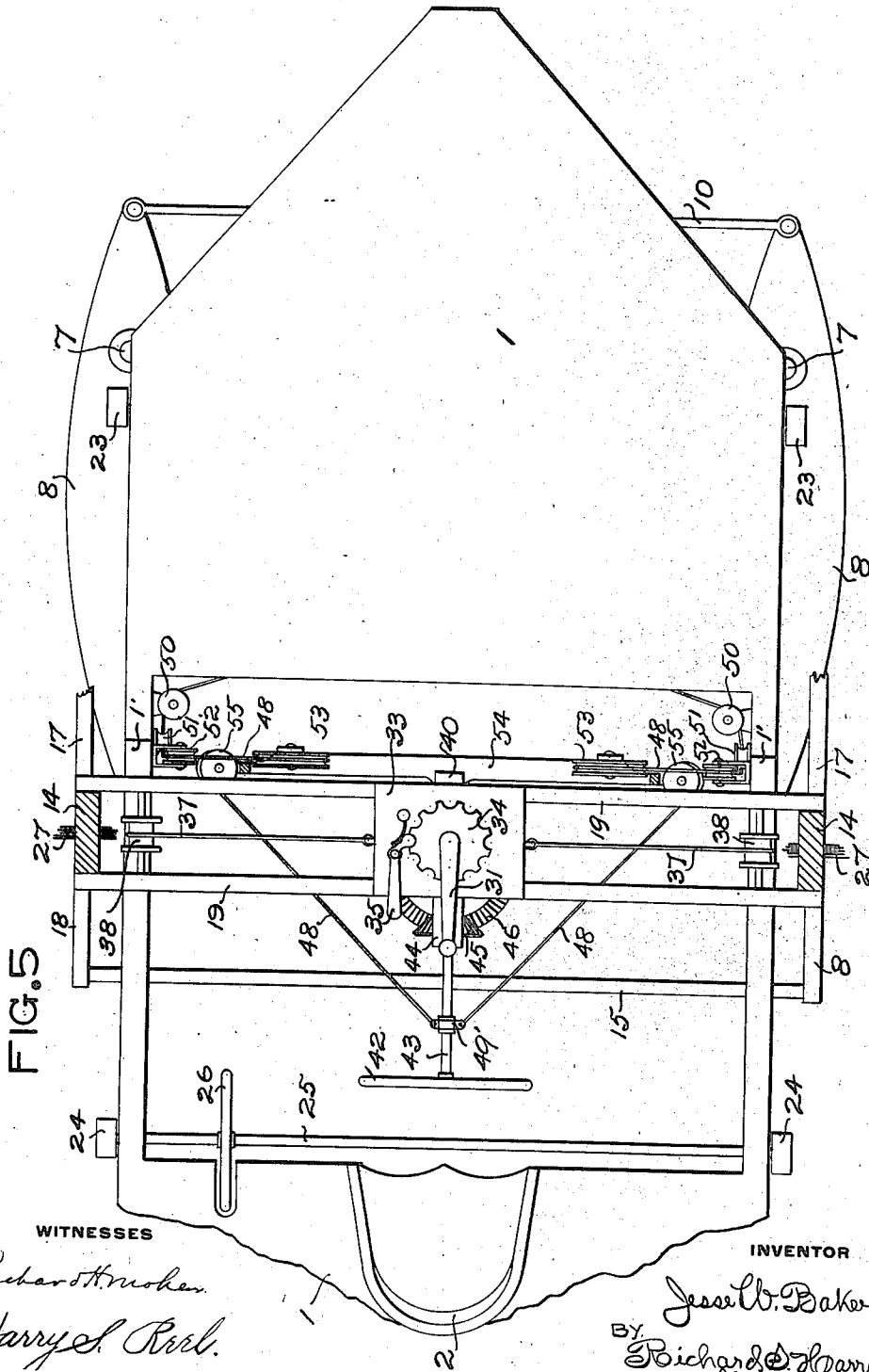
6 SHEETS-SHEET 3.



1,063,315.

Patented June 3, 1913.

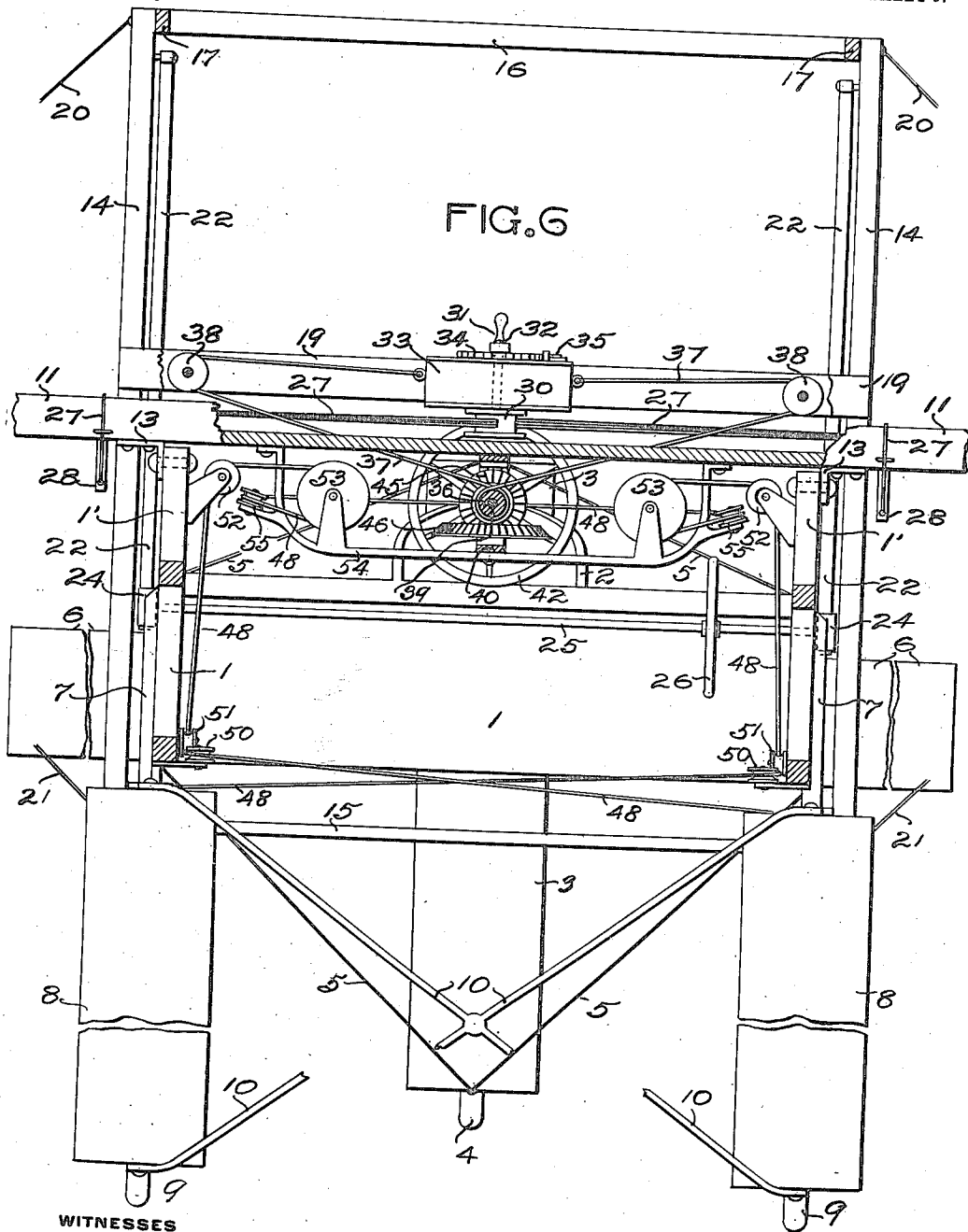
6 SHEETS—SHEET 4.



1,063,315.

Patented June 3, 1913.

6 SHEETS—SHEET 5.



WITNESSES
Richard H. Mooker,
Harry L. Paul.

INVENTOR
Jesse W. Baker,
By Richard S. Harris,
his attorney.

1,063,315.

Patented June 3, 1913.

6 SHEETS—SHEET 6.

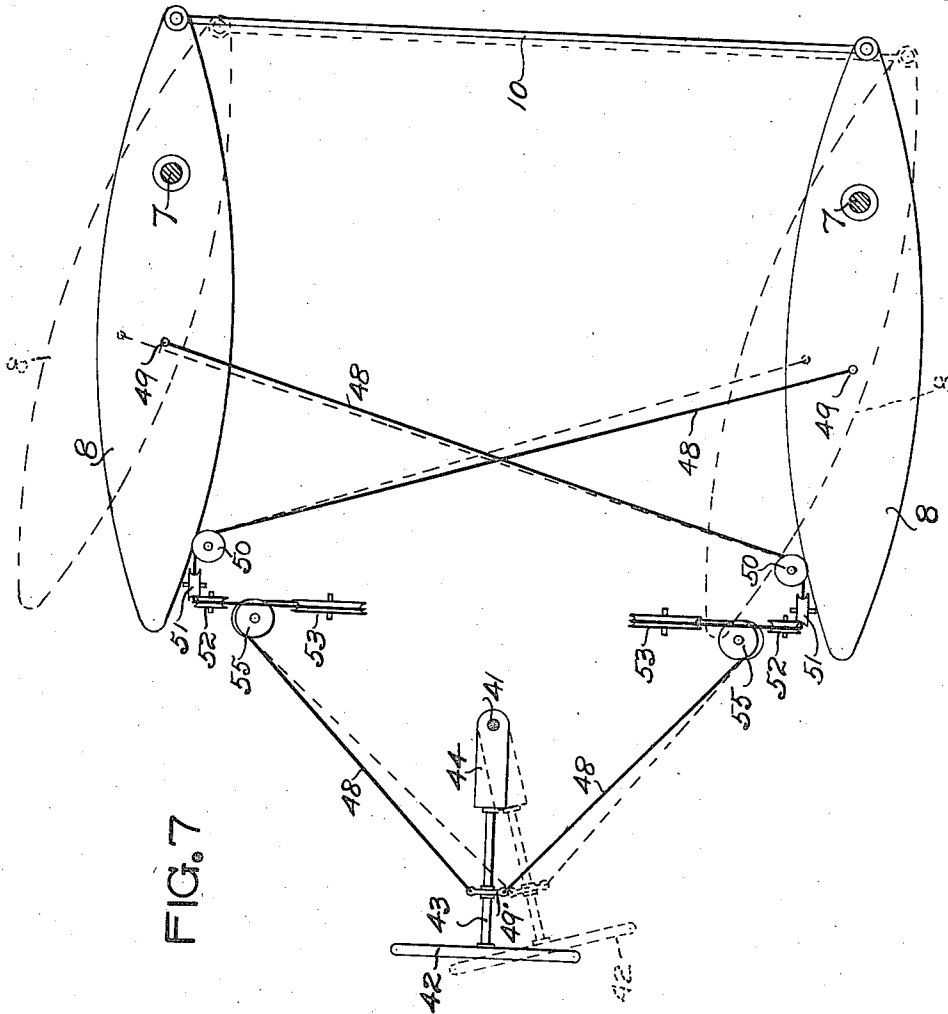


FIG. 7

WITNESSES

Richard H. Mollen.
Harry S. Reed.

INVENTOR

Jesse W. Baker,
By *Richard S. Harrison,*
his attorney.

UNITED STATES PATENT OFFICE.

JESSE W. BAKER, OF PITTSBURGH, PENNSYLVANIA.

AEROPLANE.

1,063,315.

Specification of Letters Patent.

Patented June 3, 1913.

Application filed June 12, 1912. Serial No. 763,106.

To all whom it may concern:

Be it known that I, JESSE W. BAKER, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Aeroplanes, of which improvement the following is a specification.

My invention relates in particular to the class of aeroplanes known as "monoplanes," and has for its objects, to provide a monoplane which may be easily and readily operated and controlled in its various necessary movements, be simple in construction, light in weight, strong, durable, and of as few parts as possible.

With the above objects in view, the invention consists in certain novel features of construction, arrangement, and in certain parts and combination of parts, as will be hereinafter more fully described and then pointed out in the appended claims.

One embodiment of my invention is illustrated in the accompanying drawings, forming a part of this specification, wherein the main detail parts are each given an individual numeral and referred to by such in the specification, the various views given in the drawings being as follows:

Figure 1 is a plan of the complete monoplane. Fig. 2 is a side elevation thereof. Fig. 3 is a perspective of a portion of the supporting plane and flexible wing extension, enlarged. Fig. 4 is a partial side elevation of the forward part of the aeroplane, enlarged and partly in section. Fig. 5 is a plan thereof, partly in section. Fig. 6 is a front elevation thereof, partly in section. Fig. 7 is a diagram of the steering rudders and operating mechanism.

The structure shown, comprises a lightly constructed skeleton body 1, of elongated form, covered with tightly drawn canvas or other suitable material, except that portion in front of the seat 2 which is left open, said body having its sides converging at its forward end and decreasing in depth toward its rear.

The rear end of the body is provided with a vertically disposed stabilizer 3 fixed thereto, which is of elliptic form in cross-section and in the direction of flight, a wheel 4 being rotatively mounted within

the lower end thereof, said stabilizer being further connected to the body by guy wires 5. A horizontally disposed stabilizer 6, also of elliptic form in the direction of flight, is suitably secured to and extends beyond the rear of the body. Both of the above rudders, 3 and 6, are constructed of light skeleton frames, covered with canvas or other suitable material.

To the underside of the forward end of the body 1, is pivotally secured, upon the vertically disposed bars 7 secured thereto, a pair of rudders 8, each of elliptic form in the direction of flight and constructed of a light skeleton frame covered with canvas or other suitable material, each of said rudders having a wheel 9 mounted within the lower end thereof and both connected, pivotally, at their forward ends by a cross frame 10 for maintaining them in parallel relation.

Extending transversely of and slightly above the body 1 is a supporting plane 11 having integral rearwardly extended flexible wings 12, said plane being constructed of a rigid but light skeleton frame, of segmental shape in cross-section with the flattened side uppermost, covered with canvas or other suitable material and pivotally secured, by brackets 13, to the uprights 1' of the body to permit of its being inclined in the direction of flight. The rearwardly extended wing portions of the plane are each formed of a thin flexible skeleton frame covered upon their undersides with tightly drawn canvas or other suitable material.

To the supporting plane 11, adjacent the pivotal brackets 13, is fixed a pair of uprights 14 extending down each side of the body and connected at their lower ends by a bar 15, the upper ends of said uprights being connected by a cross-piece 16, which rights are further secured to the supporting plane by the downwardly extended braces 17 and the upwardly extended braces 18, said uprights being provided with a pair of transversely disposed slide bars 19 at a point slightly above the supporting plane.

To more rigidly secure the supporting plane to the uprights, guy wires 20 are extended outwardly from the upper ends of the uprights down to and connect with the upper side of the plane, and like guy wires

21 extend outwardly from the lower ends of the uprights up to and connect with the underside of the plane.

For adjusting the supporting plane and integral rearwardly extended wings, upon its pivots in the direction of flight, a pair of belts 22 are connected to the upper ends of the uprights and the forward end or edge of the plane, one at each side, each belt passing over a pulley 23 mounted upon the forward end of the body and thence over a similar pulley 24 upon the shaft 25 which extends through the body in front of the seat 2, a hand wheel 26 being mounted upon said shaft for controlling the adjustment.

The flexible wing extensions of the supporting plane are adapted to be flexed or concaved, when desired, in a transverse direction, as shown in Fig. 3, the mechanism for accomplishing the same comprising a plurality of draw wires 27 for each wing, each of said wires being connected to and extending from the rear edge of the wing underneath, across, through an eye in the lower end of the pin 28 fixed to the plane, up over the forward edge of the plane, through an eye in the upper end of said pin, and thence in a direction toward and through an opening 29 in the upright, the inner ends of all draw wires from one wing extension being connected to one side of the drum 30 and the inner ends of all draw wires from the other wing extension being connected to the opposite side of said drum, as shown at Figs. 4 and 6. This drum is adapted to be rotated, to draw or slacken the wires, as desired, by means of a hand lever 31 fixed to the upper end of the drum shaft 32 which passes up through the slide head 33, a ratchet wheel 34 being also fixed to the drum shaft and normally engaged by a lever 35 pivotally secured to the slide head to secure the drum in adjusted position.

The flexing or concaving of either wing extension and the flattening of the other, or the increasing of the flexity in one and decreasing thereof in the other, for balancing of the aeroplane, is provided, the means for so doing comprising a drum 36 having a wire 37 wound thereupon, the ends of which wire pass up and over the pulleys 38, mounted upon the slide bars 19, and connect with the slide head 33, the rotation of which drum will adjust the slide head to slacken up the draw wires of one wing and tighten up the draw wires of the other. The drum 36 has its shaft 39 mounted to a strap 40, secured to one of the slide bars 19 and to the underside of the supporting plane 11, and to a vertically disposed pin 41 extending through said strap, rotative adjustment of the drum being effected by means of a hand wheel 42, the shaft 43 thereof being mounted to a strap 44 pivotally attached to the pin 41, said hand wheel shaft being provided with

a beveled gear pinion 45 meshing with the beveled gear wheel 46, loosely mounted upon the pin 41, which gear wheel meshes with a beveled gear pinion 47 fixed to the drum shaft.

The adjustment of the steering rudders 8, upon their pivots 7, is effected by lateral movement of the steering wheel shaft 43 and strap bearing 44 upon the pivotal pin 41, by means of the two wires 48, each connected at one end to a pin 49 on one of the rudders, and at its opposite end to a winged collar 49' loosely mounted upon the hand wheel shaft 43. Each of these wires pass from the rudder, across the body to and about a pulley 50 fixed thereto, thence about and over the pulleys 51 and 52, fixed to the body, thence over and down about the pulley 53, mounted upon the frame 54 secured to the strap 40 and the underside of the supporting plane, and then over about the pulley 55, also mounted to said frame 54, to the winged collar upon the steering wheel shaft.

A suitable propeller 56 is mounted upon a shaft 57 at the forward end of the body, the means for rotating the same not being here shown.

In practice, the aeroplane before starting rests upon the forward wheels 9 and rear wheel 4, and when it is desired to ascend the operator unlocks the drum 36, by disengaging the pivoted lever 35 with the ratchet wheel 34, and adjusts the hand crank 31 so as to adjust said drum upon its axis and wind the draw wires 27 of each wing thereupon sufficient to place the desired flexity or concaving upon the wing extensions for the air to act thereupon and effect a lifting during ascent. The operator then starts the propeller rotating, takes hold of the hand wheel 26 and adjusts it so as to adjust the lifting plane and attending wings upon its pivotal connection, as indicated by the dotted line A—A in Fig. 4, with the result that as the machine is propelled forward it leaves the ground and is elevated by the action of the air upon the underside of the supporting plane and wing extensions, the elevation attained, within a given distance, depending upon the inclination given the plane and wings with respect to the body 1.

Should the machine lose its balance, from any cause, on either side, as for instance, if the dip be on the right side, the operator increases the flexity or concavity of the right wing and decreases the flexity or concavity on the left wing, by turning the steering wheel 42 a little to the left, causing the drum 36 to be rotated in an opposite direction and, through the medium of the wire 37, adjust the slide head (with its locked drum 30) to the left, thus slackening up the draw wires 27 of the left wing, to reduce the warping, and tightening up those upon the right wing, increasing the warping on the

right wing, or causing the left wing to become wholly flattened and the right wing flexed, in accordance to how far the steering wheel be adjusted upon its axis, thus causing the air to exert a greater pressure upon the underside of the right wing than upon the left wing, and as the balance is again being established the flexibility is gradually decreased in the right wing and reestablished in the left wing, by turning the steering wheel in the opposite direction, with a consequent return of the slide head, until the flexibility in both wings are equal and the balance is fully established.

When it is desired to turn, the rudders 8 are adjusted upon their pivotal bars 7, in accordance to the direction desired, as for instance, if it be desired to turn to the right, as indicated by the position shown by dotted lines in Fig. 7, the operator adjusts the hand steering wheel 42, and attending parts, in a lateral direction, toward the right, upon the pivotal pin 41, as shown in said Fig. 7, which movement of the steering wheel exerts a pulling force upon the wire 48 connected to the rudder on the right, and as both rudders are connected by the cross-frame 10, they will both move, upon their pivotals, in unison and in parallel relation, the space within which the turn be made depending upon the movement given to the steering wheel.

In traveling at a high speed, the drum 30 is unlocked, by disengaging the hand lever 35 from the ratchet wheel 34, and turned by the crank 31 so as to slacken up the draw wires 27 of the wings, causing said wings to become flattened so as to reduce the resistance of the air acting thereon.

To descend, the supporting plane is adjustably inclined upon its pivotals, by exerting an upward pressure upon the steering wheel 42 of the mechanism carried thereby, to cause the plane to dip downward, as shown by dotted line B—B, in Fig. 4, and permit the air to exert its pressure upon the upper side of the plane and its wing extensions.

During flight, the rear stabilizer 3 serves to maintain a balance at the rear of the body, and the stabilizer 6 serves to support the body in a horizontal position.

Various changes may be made in the detail parts of the structure and be within the limits of the appended claims.

Having thus shown and described an embodiment of my invention, what I claim and desire to secure by Letters Patent, is:

1. In a monoplane, an elongated body, a transversely disposed supporting plane pivotally mounted thereupon and terminating at each side of the body in a rearwardly flexible wing, adapted to be inclined upon its pivotals in the direction of flight, means for controlling the inclination of said plane,

a plurality of draw wires connected to each wing for flexing the same, and means for operating said draw wires.

2. In a monoplane, an elongated body, a transversely disposed supporting plane pivotally mounted thereupon and terminating at each side of the body in a rearwardly flexible wing, adapted to be inclined upon its pivotals in the direction of flight, means for controlling the inclination of said plane, a plurality of draw wires connected to each wing for flexing the same, and means for operating said draw wires for flexing either wing.

3. In a monoplane, an elongated body provided with stabilizers at its rear, a transversely disposed supporting plane pivotally mounted thereupon and terminating at each side of the body in a rearwardly flexible wing, adapted to be inclined upon its pivotals in the direction of flight, means for controlling the inclination of said plane, means for flexing the flexible wings of the plane transversely to the direction of flight, vertically disposed steering rudders of elliptic form in cross-section each pivotally mounted beneath and to the forward end of the body, and means for adjusting said steering rudders upon their pivotals.

4. In a monoplane, an elongated body provided with stabilizers at its rear, a transversely disposed supporting plane pivotally mounted thereupon and terminating at each side of the body in a rearwardly flexible wing, adapted to be inclined upon its pivotals in the direction of flight, means for controlling the inclination of said plane, means for flexing either of the flexible wings of the plane transversely to the direction of flight, vertically disposed steering rudders of elliptic form in cross-section each pivotally mounted beneath and to the forward end of the body, and means for adjusting said steering rudders upon their pivotals.

5. In a monoplane, an elongated body provided with stabilizers at its rear, a transversely disposed supporting plane pivotally mounted thereupon and terminating at each side of the body in a rearwardly extended flexible wing, adapted to be inclined upon its pivotals in the direction of flight, means for controlling the inclination of said plane, a plurality of draw wires connected to each wing for flexing the same, means for operating said draw wires, vertically disposed steering rudders of elliptic form in cross-section each pivotally mounted beneath and to the forward end of the body, and means for adjusting said steering rudders upon their pivotals.

6. In a monoplane, an elongated body provided with stabilizers at its rear, a transversely disposed supporting plane pivotally mounted thereupon and terminating at each side of the body in a rearwardly extended

flexible wing, adapted to be inclined upon its pivots in the direction of flight, means for controlling the inclination of said plane, a plurality of draw wires connected to each wing for flexing the same, means for operating the wires to flex either of said wings, vertically disposed steering rudders of elliptic form in cross-section each pivotally mounted beneath and to the forward end of the body, and means for adjusting said steering rudders upon their pivots.

7. In a monoplane, an elongated body provided at its rear with a vertically disposed stabilizer and with a horizontally disposed stabilizer, both fixed thereto and of elliptic form in cross-section, a transversely disposed supporting plane pivotally mounted thereupon and terminating at each side of the body in a rearwardly extended flexible wing, adapted to be inclined upon its pivots in the direction of flight, means for controlling the inclination of said plane, a plurality of draw wires connected to each wing for flexing the same, means for operating the draw wires, vertically disposed steering rudders of elliptic form in cross-section each pivotally mounted beneath and to the forward end of the body, and means for adjusting said steering rudders upon their pivots.

8. In a monoplane, an elongated body provided at its rear with a vertically disposed stabilizer and with a horizontally disposed stabilizer, both fixed thereto and of elliptic form in cross-section, a transversely disposed supporting plane pivotally mounted thereupon and terminating at each side of the body in a rearwardly extended flexible wing, adapted to be inclined upon its pivots in the direction of flight, means for controlling the inclination of said plane, a plurality of draw wires connected to each wing for flexing the same, means for operating the draw wires of either wing to flex the same, vertically disposed steering rudders of elliptic form in cross-section each pivotally mounted beneath and to the forward end of the body, and means for adjusting the steering rudders upon their pivots.

9. In a monoplane, an elongated body, provided with stabilizers at its rear, a transversely disposed supporting plane pivotally mounted thereupon and terminating at each side of the body in a rearwardly extended flexible wing, adapted to be inclined in the direction of flight upon its pivots, means for controlling the inclination of said plane, a plurality of draw wires connected to each wing for flexing the same, means for operating said wires, vertically disposed steering rudders each pivotally arranged at the forward end of said body, and means for adjusting said steering rudders upon their pivots.

10. In a monoplane, an elongated body

provided with stabilizers at its rear, a transversely disposed supporting plane pivotally mounted thereupon and terminating at each side of the body in a rearwardly extended flexible wing, adapted to be inclined upon its pivots in the direction of flight, means for controlling the inclination of said plane, a plurality of draw wires connected to each wing for flexing the same, means for operating said wires, steering rudders at the forward end of said body, and means for adjusting said rudders.

11. In a monoplane, an elongated body provided with stabilizers at its rear, a transversely disposed supporting plane pivotally mounted thereupon and terminating at each side of the body in a rearwardly flexible wing, adapted to be adjustably inclined upon its pivots in the direction of flight, means for controlling the inclination of said plane, a plurality of spaced draw wires connected to the rear edge of each wing for flexing the same, means for operating said wires, means for adjusting the wire operating means to increase or decrease the flexibility of either wing, steering rudders carried by said body, and means for operating said rudders.

12. In a monoplane, an elongated body provided with stabilizers at its rear, a transversely disposed supporting plane pivotally mounted thereupon and terminating at each side of the body in a rearwardly disposed flexible wing, adapted to be adjustably inclined upon its pivots in the direction of flight, means for controlling the inclination of said plane, a drum, a plurality of spaced draw wires connecting the rear edge of each wing extension with said drum for flexing said extensions, steering rudders carried by said body, and means for operating said rudders.

13. In a monoplane, an elongated body provided with stabilizers at its rear, a transversely disposed supporting plane pivotally mounted thereupon and adapted to be adjustably inclined upon its pivots in the direction of flight, means for controlling the inclination of said plane, a drum, a plurality of spaced draw wires extending therefrom and connecting the rear edge of said plane for flexing the same transversely, means for adjusting said drum longitudinally of the plane, steering rudders carried by said body, and means for operating said rudders.

14. In a monoplane, an elongated body provided with stabilizers at its rear, a transversely disposed supporting plane pivotally mounted thereupon and adapted to be adjustably inclined upon its pivots in the direction of flight, means for controlling the inclination of said plane, a drum, a plurality of spaced draw wires extending therefrom and connecting the rear edge of said plane

for flexing the same transversely, means for
locking said drum against rotation, means
for adjusting the same longitudinally of the
plane, steering rudders carried by said body,
5 and means connecting said rudders with the
longitudinal adjusting means of the drum
for adjusting said rudders.

In testimony whereof, I have hereunto
signed my name in the presence of two sub-
scribing witnesses.

JESSE W. BAKER.

In the presence of—

R. S. HARRISON,
A. F. ALLEWELL.