

A. L. McKEETH.

FLYING MACHINE.

APPLICATION FILED MAR. 22, 1910.

998,791.

Patented July 25, 1911.

6 SHEETS—SHEET 1.

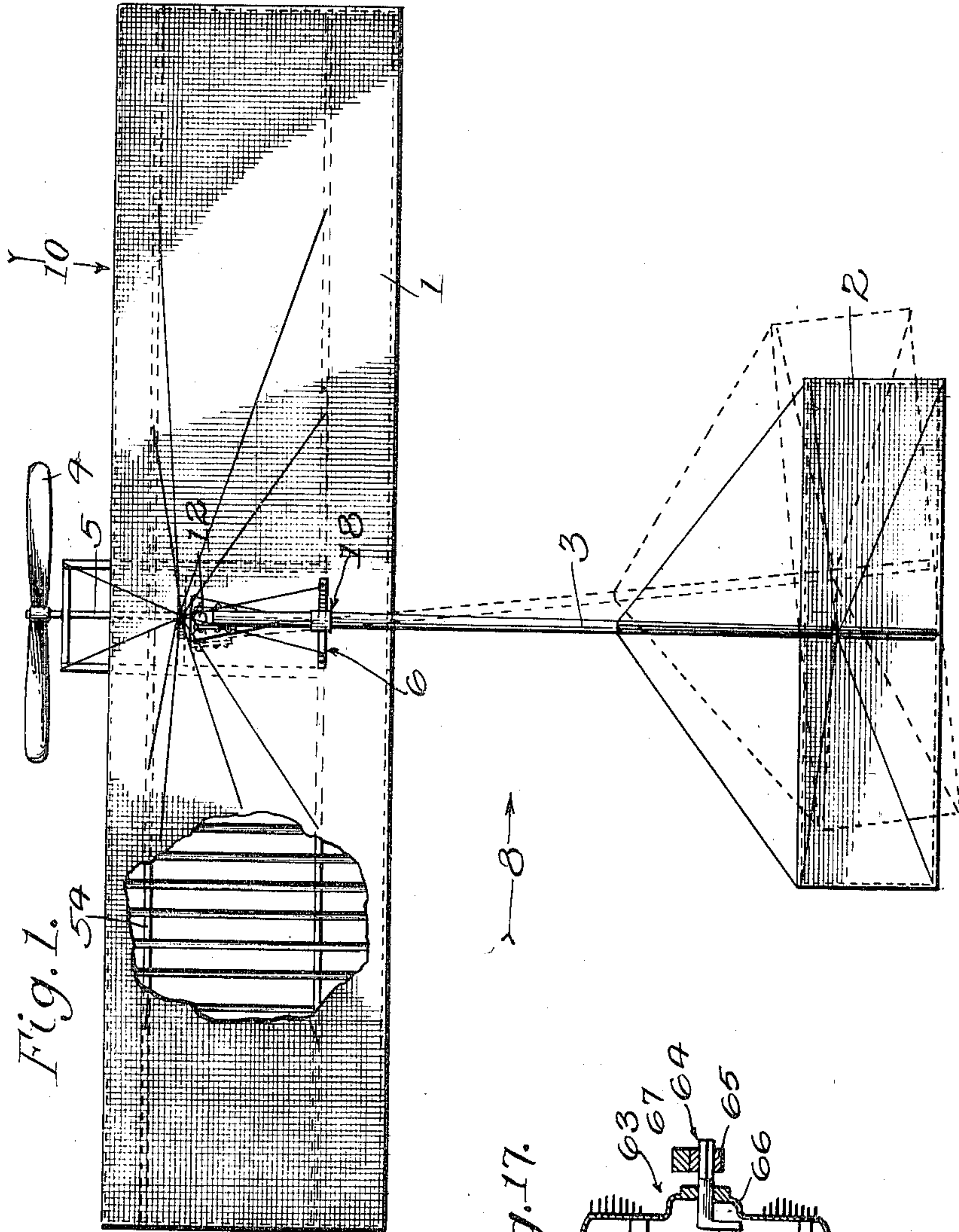
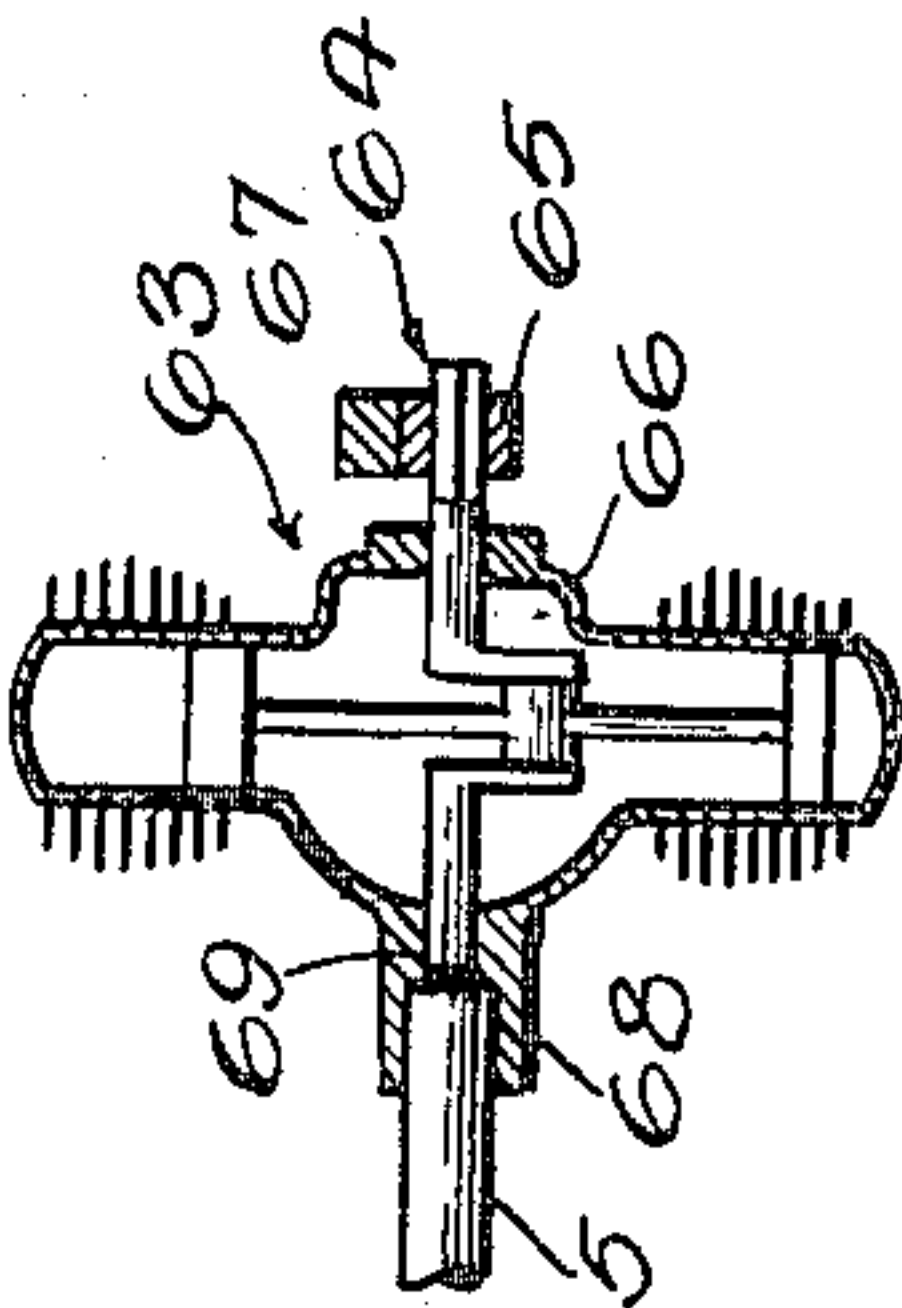


Fig. 17.



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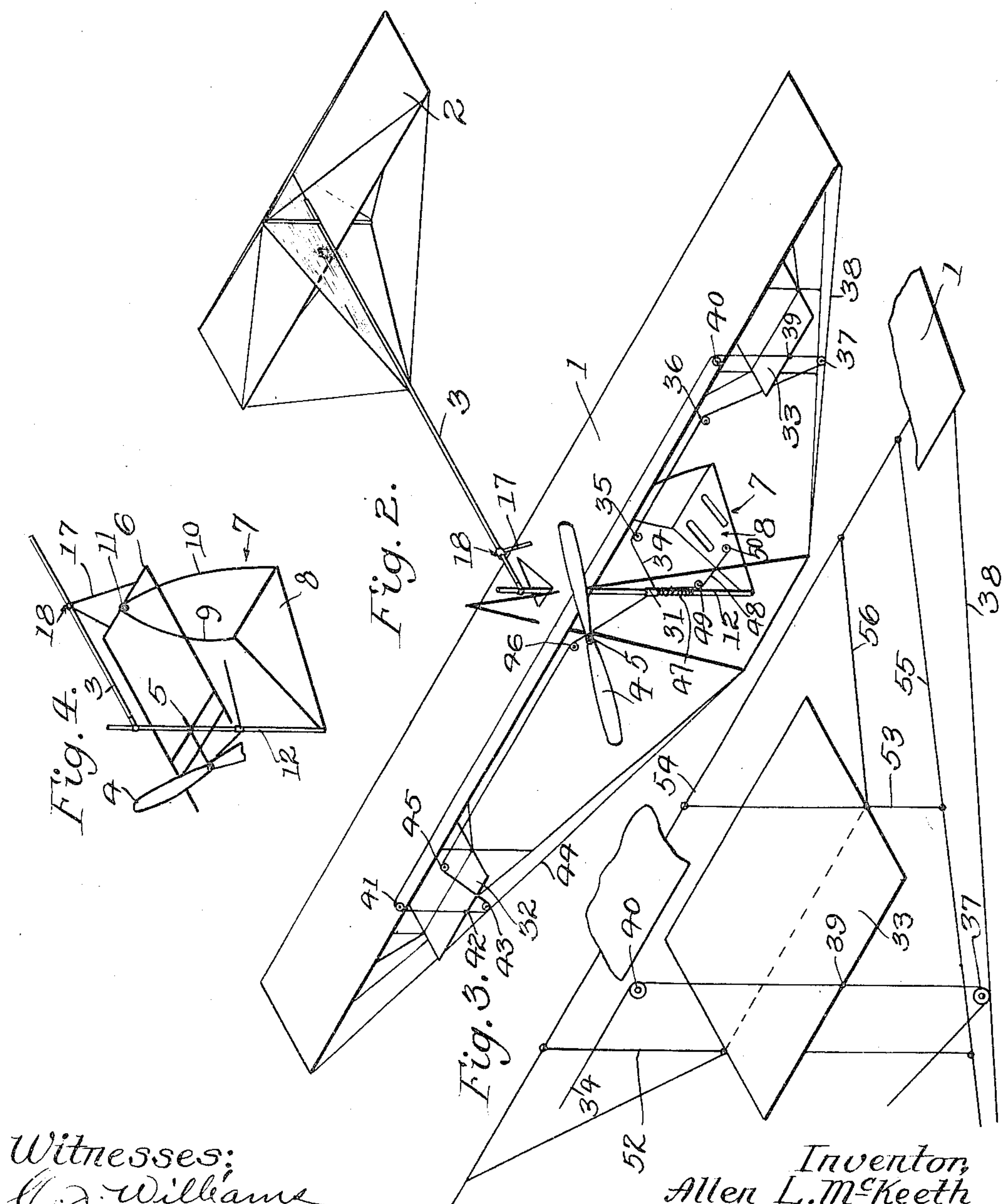
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Fig. 5.

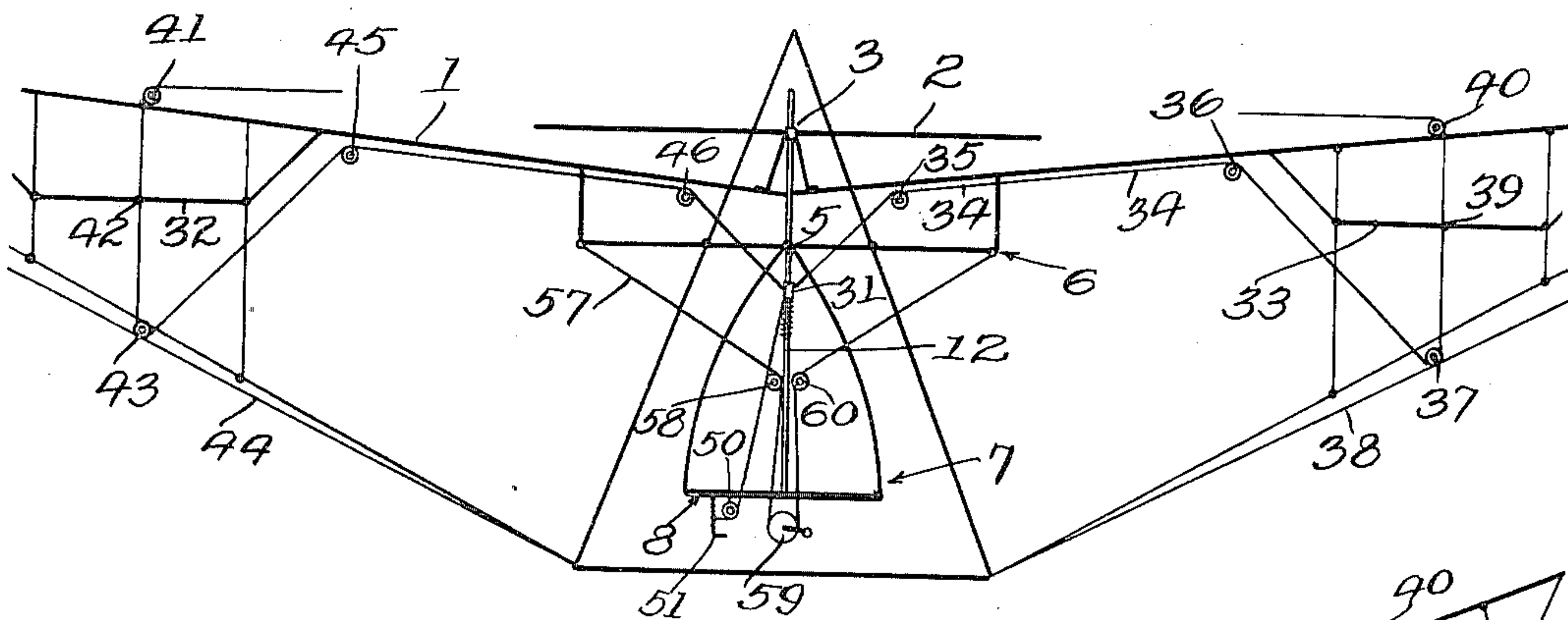


Fig. 6.

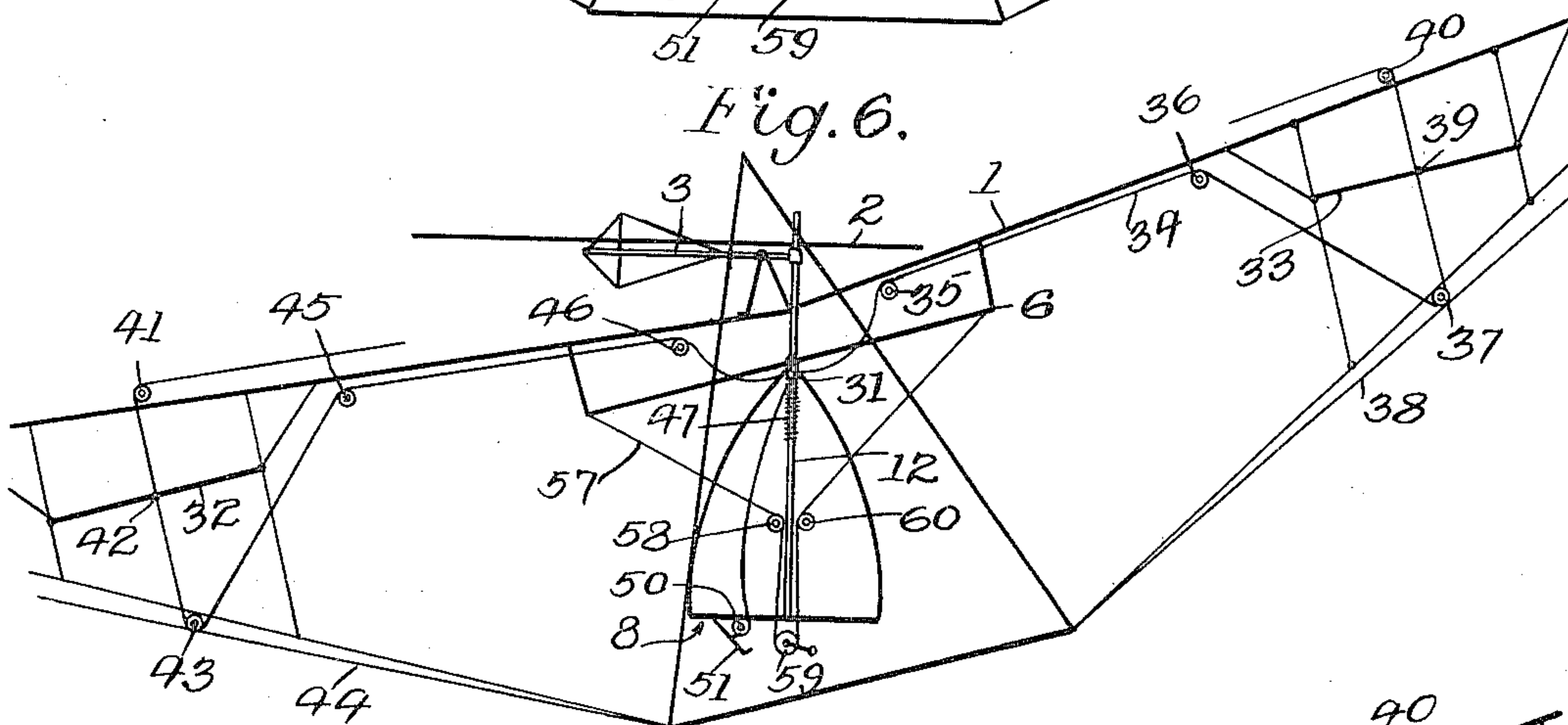
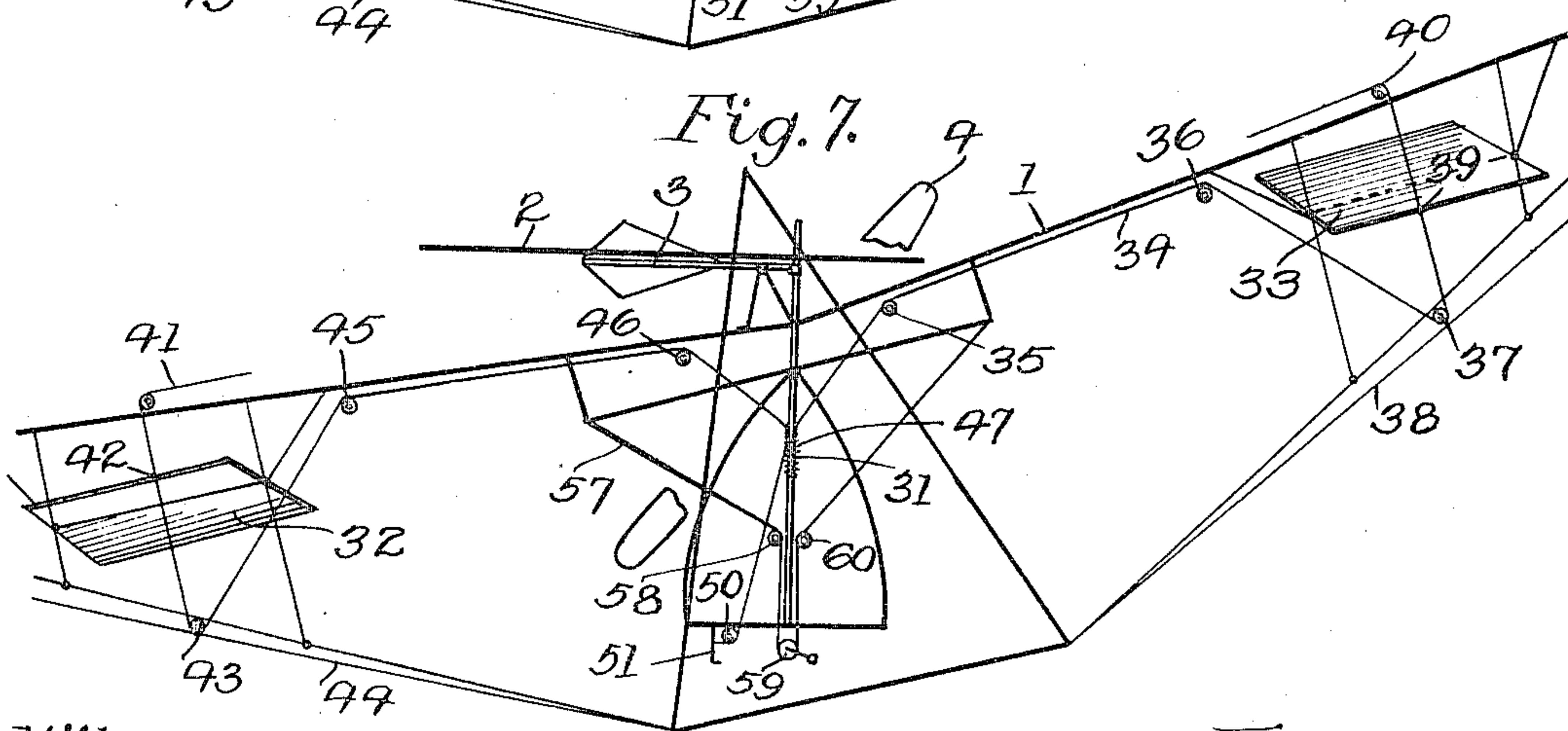


Fig. 7.



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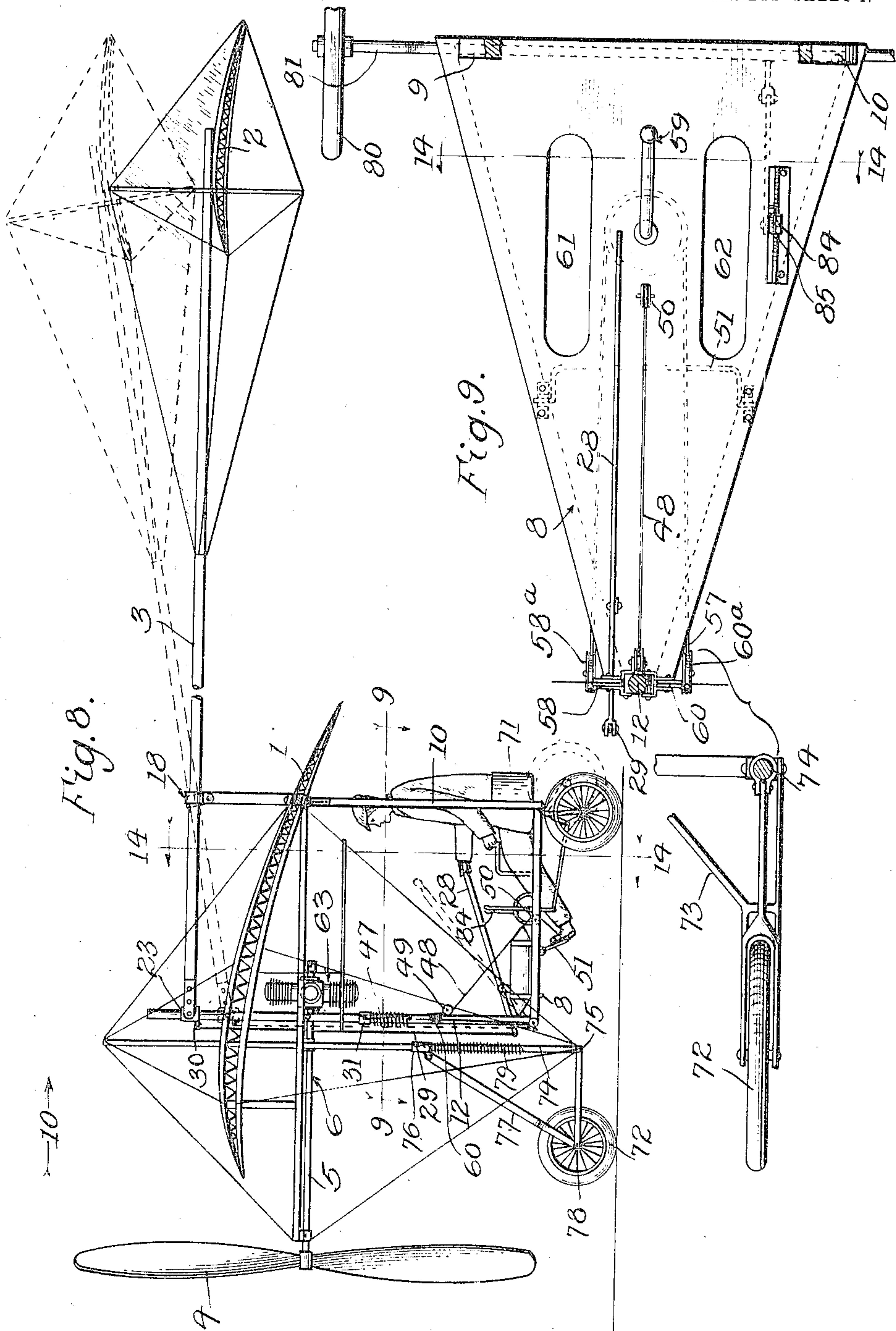
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6 SHEETS—SHEET 4.



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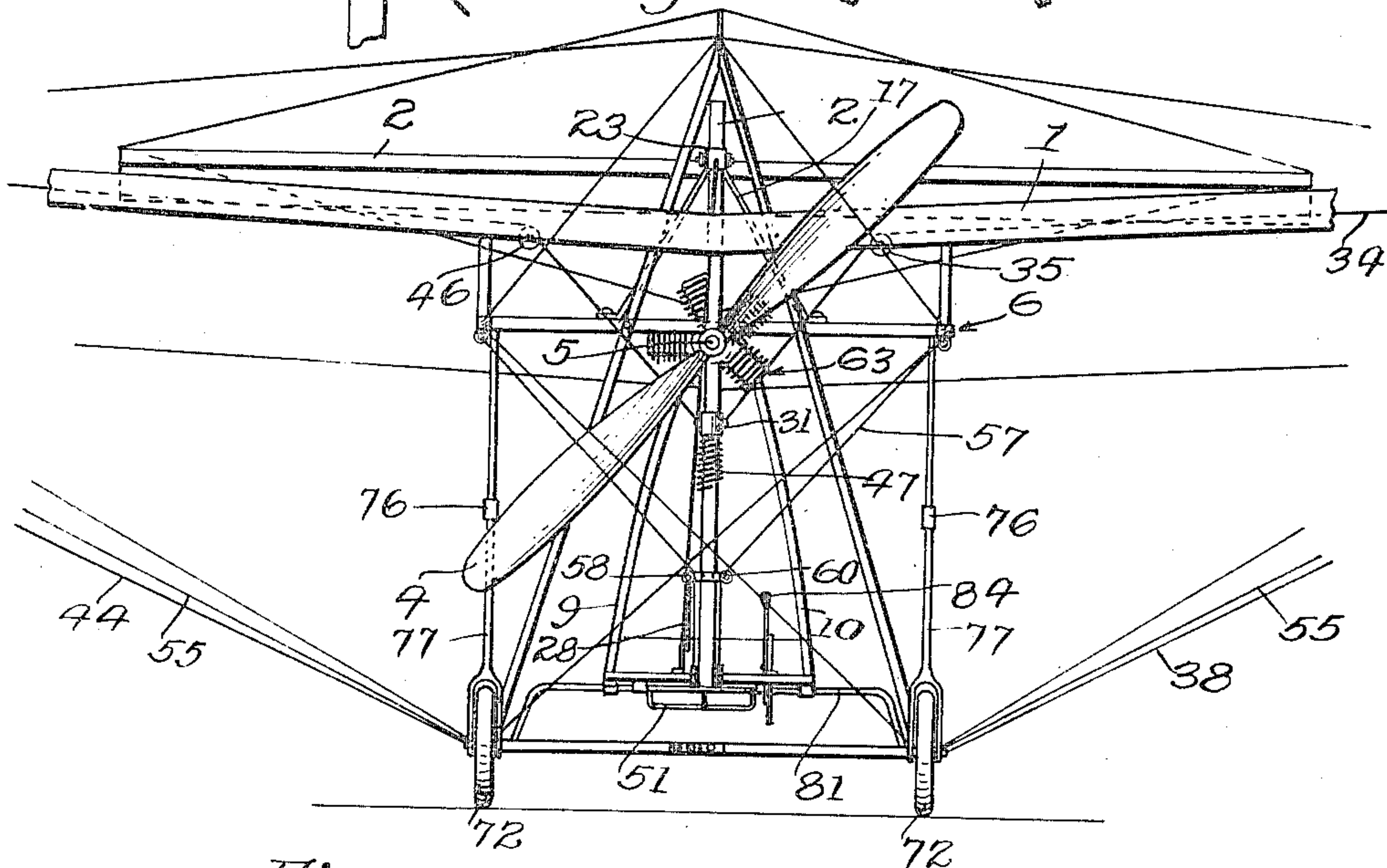
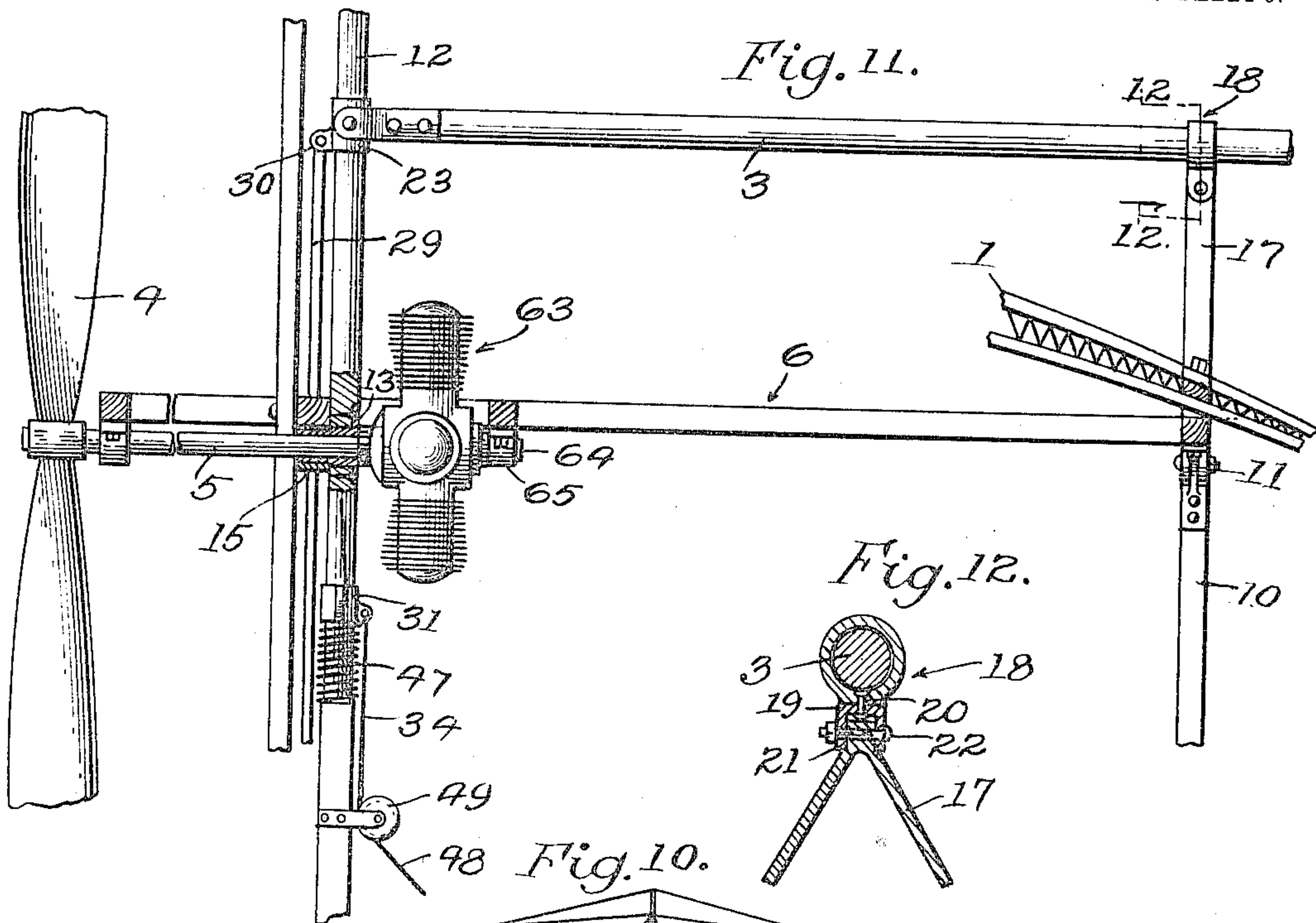
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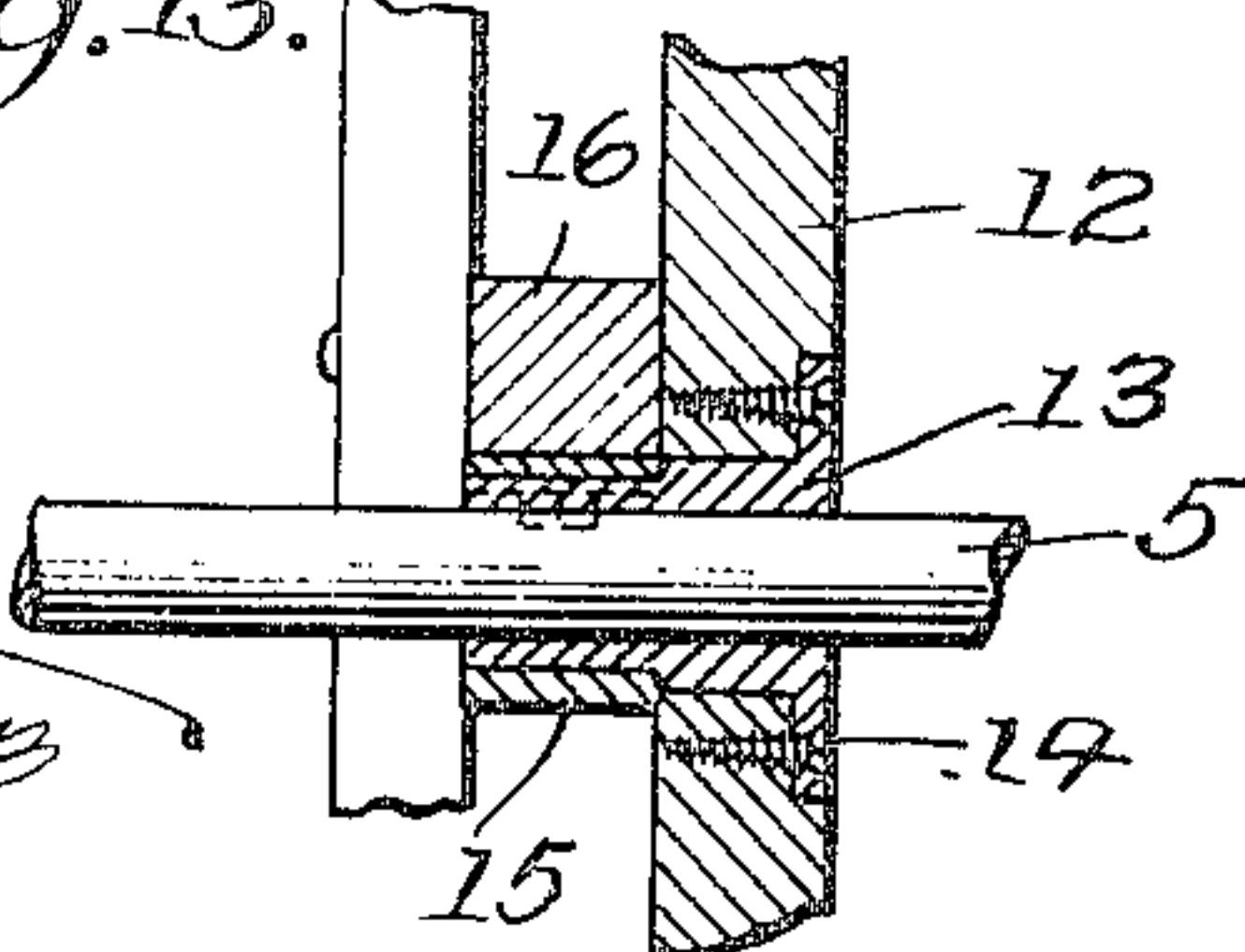
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6 SHEETS—SHEET 5.



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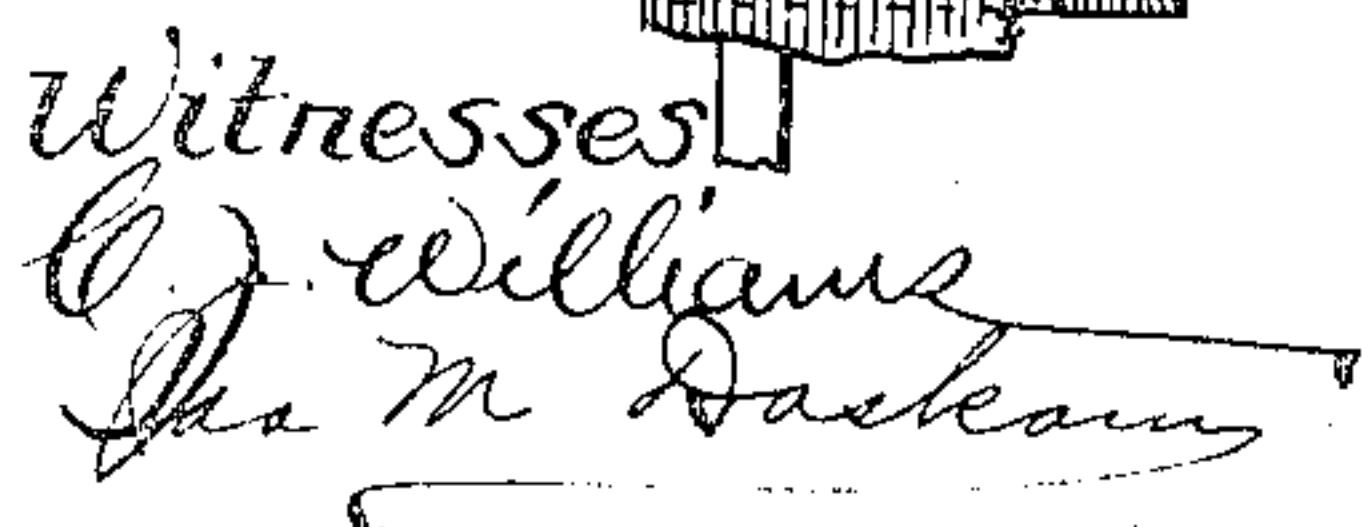


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# UNITED STATES PATENT OFFICE.

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## FLYING-MACHINE.

998,791.

Specification of Letters Patent.

Patented July 25, 1911.

Application filed March 22, 1910. Serial No. 550,962.

*To all whom it may concern:*

Be it known that I, ALLEN L. McKEETH, a citizen of the United States, residing at Los Angeles, California, have invented a new and useful Flying-Machine, of which the following is a specification.

My object is to produce an aeroplane flying machine having automatic lateral balancing planes, and my invention consists of the novel features herein shown, described and claimed.

In the drawings: Figure 1 is a top plan view of the flying machine embodying the principles of my invention. Fig. 2 is a diagrammatic perspective drawn for the purpose of illustrating the automatic lateral balancing planes. Fig. 3 is an enlarged diagrammatic view of one of the balancing planes. Fig. 4 is a diagrammatic view showing the connection between the swinging basket or carriage and the tail. Fig. 5 is a diagrammatic front elevation with the parts in position to go straight ahead. Fig. 6 is a view analogous to Fig. 5 with the parts in position to turn from a straight line, the balancing planes being released so as to allow the supporting plane to tilt. Fig. 7 is a detail analogous to Fig. 6 with the balancing planes in action as required to right-up or level the supporting plane. Fig. 8 is a side elevation as seen looking in the direction indicated by the arrow 8 in Fig. 1. Fig. 9 is a horizontal section on the line 9—9 of Fig. 8 and looking downwardly, and drawn for the purpose of showing a plan of the platform of the basket or carriage. Fig. 10 is an enlarged front elevation, the extremities of the supporting plane being broken away, the view being taken looking in the direction indicated by the arrow 10 in Figs. 1 and 8. Fig. 11 is a fragmentary vertical longitudinal section drawn for the purpose of showing the mounting of the engine and propeller. Fig. 12 is a sectional detail on the line 12—12 of Fig. 11, and drawn for the purpose of showing the rear support of the tail. Fig. 13 is a fragmentary sectional detail through the rear bearing of the propeller shaft and showing how the forward end of the swinging basket is mounted. Fig. 14 is an enlarged vertical cross section on the line 14—14 of Fig. 8. Fig. 15 is an enlarged fragmental detail illustrating the operation

of the rear wheels whereby the supporting plane is tilted upwardly at its forward side so as to rise from the ground. Fig. 16 is a fragmental sectional detail on the line 16—16 of Fig. 14, and showing the mounting of the forward end of the tail. Fig. 17 is a fragmental diagrammatic view showing the mounting of the engine on the propeller shaft.

Referring to the drawings in detail and first to Fig. 1 there is a main supporting plane 1, said plane being about three times as long on the line crosswise of the line of travel as it is wide on the line of travel. The tail plane 2 is of substantially the same shape as the supporting plane but a great deal smaller in plan, and the tail plane is attached to the rear end of the stem 3, said stem being mounted to rotate slightly and to tilt up and down and sidewise. The propeller 4 is mounted upon the forward end of the propeller shaft 5 and said propeller shaft is mounted in a frame which extends forwardly of the supporting plane 1, the propeller shaft being considerably below the forward edge of the supporting plane.

Referring to Figs. 2 and 4 the main frame 6 is rigid with the supporting plane 1 and the basket or carriage 7 has a platform 8 mounted considerably below the level of the frame 6, said platform being triangular in plan, and two posts 9 and 10 extend upwardly from the rear corners and are swingingly connected at their upper ends to the main frame 6 by a pivot 11, and a mast 12 extends upwardly from the forward end of the platform said mast being pivotally connected near its upper end to the main frame 6, so that the basket may swing freely from side to side, that is, on a line transverse of the line of travel. In Fig. 13 I have shown the details of this connection. A sleeve 13 is inserted through the mast 12 and secured in position by screws 14 inserted through the flange of the sleeve into the mast, and the forward end of the sleeve is turned down and inserted through a bearing 15 secured to the sill 16 of the frame, and the rear end of the propeller shaft 5 is mounted on this sleeve 13, so that the weight of the swinging basket is supported by the sill 16 and so that the propeller shaft 5 runs freely and at the same time allows the basket



to swing freely. A post 17 extends upwardly from the rear side of the main frame 6 and a bearing 18 is mounted upon the upper end of this post, the details of this bearing being shown in Fig. 12. The post 17 is an A-shaped bracket and the bearing 18 is a sleeve in which the stem 3 of the tail is slidingly mounted. An attaching plate 19 is secured to the bearing 18 by a swivel pin 20 and ears 21 extend downwardly from the attaching plate and are hingedly connected to the upper end of the bracket 17 by the pivot pin 22, so as to make a substantially universal joint allowing the stem 3 to swing laterally and up and down. The forward end of the stem 3 is slidingly connected to the upper end of the mast 12, the details of this connection being shown in Fig. 16. A sleeve 23 is slidingly mounted upon the mast 12 and pintles 24 and 25 extend from the sleeve in transverse alinement. Hinge members 26 and 27 are bolted to the forward end of the mast and have openings to fit upon the pintles 24 and 25, so that the sleeve 23 may slide up and down on the mast, and so that when the mast swings sidewise relative to the supporting plane either by the swinging of the plane or the swinging of the basket the stem 3 is turned in the bearing 18, thereby holding the tail level with the basket.

Referring to Fig. 8 a hand lever 28 is pivotally mounted upon the platform and a connecting rod 29 connects the forward end of the hand lever to ears 30 extending from the sleeve 23, so that by manipulating the hand lever 28 the forward end of the stem 3 may be raised and lowered thereby raising and lowering the tail plane 2.

Referring to Fig. 2 a sleeve 31 is slidingly mounted upon the mast 12, below the propeller shaft, the balancing planes 32 and 33 are pivotally mounted some distance below the ends of the supporting plane 1, and a cord 34 starts from the sleeve 31 and runs upwardly and laterally over the guide roller 35, then over the guide roller 36, said guide rollers 35 and 36 being attached to the supporting plane, then downwardly over the guide roller 37 attached to the guy rope 38, then upwardly and attached to the forward edge of the balancing plane 33 by the knot 39, then upwardly over the guide roller 40 carried by the supporting plane, then to the other side of the machine over the guide roller 41 carried by the supporting plane, then downwardly and secured to the forward edge of the balancing plane 32 by the knot 42, then downwardly around the guide roller 43 secured to the guy rope 44, then upwardly over the guide roller 45, then toward the center of the machine and over the guide roller 46, said guide rollers 45 and 46 being carried by the supporting plane, and then to the sleeve 31.

Referring to Fig. 8 an expansive coiled spring 47 is placed upon the mast 12 under the sleeve 31, the tension of said spring being exerted to raise the sleeve and a cord 48 is attached to the sleeve and extends downwardly around the guide roller 49 carried by the mast, then backwardly and downwardly over a guide roller 50 carried by the platform 8, and then downwardly and forwardly and attached to the foot lever 51, said foot lever being pivoted to the bottom of the platform 8 and depending downwardly, so that when the foot lever is pushed forwardly the sleeve 31 is pulled downwardly against the tension of the spring 47 to tighten the cord 34 so that when the mast 12 swings laterally relative to the supporting plane the balancing planes 32 and 33 will be tilted up and down in opposite directions by the action of the cord, and so that when the foot lever is released the spring 47 will raise the sleeve 31, thereby loosening the tension upon the cord 34 and allowing the balancing planes 32 and 33 to swing freely and out of action.

Referring to Fig. 3 cords 52 and 53 are stretched between the frame 54 of the supporting plane and the guy rope 55 in parallel vertical positions, and a cord 56 is attached to the frame 54 at one end and extends downwardly and laterally and is attached to the cord 52, then extends horizontally and is attached to the cord 53, and then extends upwardly and laterally and is attached to the frame thereby forming a pivot for the balancing plane. The details of each balancing plane are or may be identical.

Referring to Figs. 5, 6 and 7, in Fig. 5 the balancing planes, the supporting plane, the tail and the swinging basket are all in normal positions as required for the machine to go straight ahead, and the cord 34 is under tension, so that if the supporting plane and the swinging carriage move relatively to each other the balancing planes will move automatically to restore the equilibrium. A cord 57 is attached at one end to one side of the main supporting frame and passes inwardly and downwardly over the guide roller 58 carried by the mast 12, then around the controller 59 carried by the platform 8, then upwardly over the guide roller 60 carried by the mast and upwardly and outwardly to the other side of the supporting frame, so that when it is desired to turn the machine from a straight course the controller 59 may be manipulated to tilt the supporting plane relatively to the swinging carriage as shown in Fig. 6 and at this time the foot lever 51 is released allowing the cord 31 to become loose thereby throwing the balancing planes out of action and the tilting of the mast 12 swings the tail plane 2 laterally and tilts the tail plane rel-



ative to the level of the supporting plane, and the action of the tail plane in this position will cause the machine to travel forwardly in a circular line. When the controller 59 is operated to tighten the cord 57 and shorten the distance between the mast 12 and one side of the main frame the supporting plane will be pulled downwardly upon that side because the weight in the swinging basket will tend to cause the swinging basket to maintain a vertical position. After the course of the machine has been turned to suit the operator and he desires to again go straight ahead the foot lever 51 is operated to tighten the cord 34, thereby swinging the forward edge of the balancing plane 32 upwardly and the forward edge of the balancing plane 33 downwardly, so that the balancing plane 32 will pull upwardly on the lower side of the supporting plane and the balancing plane 33 will pull downwardly on the upper side of the balancing plane and the controller 59 is released to allow the cord 57 to run freely thereby causing the machine to assume its normal position as in Fig. 5, and go straight ahead, and when the machine is going straight ahead with the cord 34 under tension, the swinging of the supporting plane relative to the swinging basket will operate the cords 31 to vibrate the balancing planes and cause the machine to maintain its equilibrium.

The controller 59 is mounted horizontally under the platform 8 as shown in Figs. 9 and 14, the handle of the controller being within easy reach of the operator when seated upon the rear end of the platform as shown in Fig. 8. Openings 61 and 62 are formed in the platform so that the operator may reach the foot lever 51 with his feet and the handle end of the lever 28 is also within reach of the operator.

The engine 63 is attached directly to the propeller shaft 5 as shown in Fig. 11, the details of the attachment being shown in Fig. 17. The crank shaft 64 is mounted rigidly and non-rotatively in the bearing 65 and the casing 66 of the engine has a hub 67 which is rotatably mounted upon the crank shaft and a hub 68 which is rigidly and non-rotatively connected to the propeller shaft 5. The round end 69 of the crank shaft which is opposite the squared end 64 is rotatably mounted in the hub 68 in longitudinal alignment with the propeller shaft so that the casing of the engine may rotate around the rigid crank shaft thereby driving the propeller shaft.

An opening 70 is formed in the center of the main supporting plane 1 so as to allow the forward end of the stem 3 of the tail plane to vibrate up and down and sidewise, and so as to allow the upper end of the mast 12 to vibrate sidewise. A seat 71 extends

upwardly and backwardly from the platform 8.

In Fig. 9 I have shown the controller wheel 59 mounted below the platform 8 and the cord 57 runs downwardly from the guide rollers 58 and 60, and then backwardly under guide rollers 58<sup>a</sup> and 60<sup>a</sup> to the controller wheel.

Referring to Figs. 8 and 9 the forward ground wheels 72 are mounted in an arched frame 73, said frame being connected to the lower end of the vertical posts 74 of the main frame by hinges 75, so that the wheels may swing from a vertical position forwardly and upwardly to a horizontal position. Sleeves 76 are slidingly mounted upon the posts 74, and links 77 connect the sleeve 76 to the axis 78 of the wheels. Retractable coiled springs 79 are mounted upon the posts 74, said springs being connected at their lower ends to the posts and at the upper ends to the sleeve 76 and the tension of the springs being exerted to pull the sleeve 76 downwardly so as to swing the wheels 72 downwardly toward the vertical position. The tension of the spring 79 tends to raise the front of the machine and tilt the supporting plane upwardly in starting.

Referring to Figs. 8 and 15 the rear ground wheels 80 are mounted upon a crank axle 81 and a crank arm 82 is connected to the link 83, said link being connected to the lower end of the hand lever 84 and said hand lever being controlled by a pawl and rack 85 and the handle end of the hand lever being within reach of the operator, so that when the machine is standing upon the ground as in Fig. 8 and it is desired to start the machine and rise from the ground, the hand lever 84 is operated to lower the side of the frame, thereby tilting the front edge of the supporting plane upwardly and when the machine gets under way and the supporting plane begins to lift the tension of the spring 79 will raise the front side of the frame.

I wish to call especial attention to the arrangement for securing automatic equilibrium. The carriage or basket carrying the load is pivotally connected to the main supporting frame. The tail plane is connected to the carriage so as to be vibrated relative to the supporting frame by the vibration of the carriage relative to the supporting frame and the balancing planes are pivotally attached so as to swing freely and take care of themselves when their use is not required, and they are connected together so as to swing in opposite directions and they are connected to the swinging basket so as to be operated in opposite directions by the swinging of the basket relative to the supporting plane, and means is provided for throwing the balancing planes into or out of action, and means is provided for connecting the



swinging carriage to the supporting frame so as to tilt the supporting frame by the weight of the carriage when desired, and means is provided for tilting the forward side of the supporting frame upwardly when it is desired to rise from the ground. When the machine is in operation in the air and running straight ahead the connection between the swinging basket and the supporting plane is loosened, the connection between the balancing planes and the swinging basket is tightened and the machine will automatically maintain its equilibrium and go straight ahead.

It is obvious that any style of warping plane may be substituted for the balancing planes I have shown and described, and that the principles of my invention may be applied to any style of mono-plane or bi-plane.

I claim:

1. In a flying machine, a supporting aeroplane; a basket depending from the supporting aeroplane and mounted to swing from side to side; a bracket extending upwardly above the pivot of the swinging basket; a tail plane mounted with its main rib extending through a bearing in the bracket; a mast extending upwardly from the forward end of the swinging basket, above the pivot and connected to the forward end of said tail plane rib; so that when the basket swings one way the tail plane will swing the other way.

2. In a flying machine, a supporting aeroplane; a basket depending from the supporting aeroplane and mounted to swing from side to side; a bracket extending upwardly above the pivot of the swinging basket; a tail plane mounted with its main rib extending through a bearing in the bracket; a mast extending upwardly from the forward end of the swinging basket above the pivot, the front end of said tail plane rib being slidably connected to the mast; a manual means for sliding the connection up and down; so that the tail plane may be raised and lowered, and so that when the carriage swings one way the tail plane swings the other way.

3. In a flying machine, a supporting aeroplane; a basket depending from the supporting aeroplane and mounted to swing from side to side; a bracket extending upwardly above the pivot of the swinging basket; a tail plane mounted with its main rib extending through a bearing in the bracket; a mast extending upwardly from the forward end of the swinging basket above the pivot, the front end of said tail plane rib being slidably connected to the mast; the mast being held upright by the gravity of the basket when the supporting aeroplane tilts.

4. In a flying machine, a supporting aeroplane; a basket depending from the sup-

porting aeroplane and mounted to swing from side to side; a tail plane mounted in a bearing upon the rear side of the supporting aeroplane and extending forwardly from said bearing; a mast extending upwardly from the forward end of the basket above the pivot of the basket and connected to the forward end of the tail plane; and a means for sliding the connection up and down.

5. In a flying machine, a supporting plane; a basket pivotally connected to and depending from the supporting plane; a tail plane pivotally mounted upon the supporting plane and a mast extending upwardly from the basket and connected to the tail plane in front of its supporting pivot; so that when the basket swings one way the tail plane swings the other way.

6. In a flying machine, a supporting plane; a basket pivotally connected to and depending from the supporting plane; a tail plane pivotally mounted upon the supporting plane and a mast extending upwardly from the basket and connected to the tail plane in front of its supporting pivot; so that when the basket swings one way the tail plane swings the other way; balancing planes pivotally mounted below the supporting plane on each side of the basket; connections between the balancing planes and the swinging basket; so that when the basket swings, one plane tilts upwardly and the other plane tilts downwardly, and a means for releasing the connections so as to allow the balancing planes to run freely.

7. In a flying machine, a supporting plane; a basket pivotally connected to and depending from the supporting plane; so as to swing from side to side; balancing planes pivotally mounted below the supporting plane on each side of the swinging basket; a sleeve mounted to slide vertically upon the swinging basket; a cord attached to the sleeve and extending upwardly over pulleys carried by the supporting plane and downwardly under pulleys, and upwardly and attached to the forward edges of the balancing planes, and a cord running over pulleys carried by the supporting plane, and downwardly and attached to the forward edges of the balancing planes; so that when the carriage swings, one balancing plane tilts upwardly and the other downwardly.

8. In a flying machine, a supporting plane; a basket pivotally connected to and depending from the supporting plane; so as to swing from side to side; balancing planes pivotally mounted below the supporting plane on each side of the swinging basket; a sleeve mounted to slide vertically upon the swinging basket; a cord attached to the sleeve and extending upwardly over pulleys carried by the supporting plane and downwardly under pulleys, and upwardly



and attached to the forward edges of the  
balancing planes, and a cord running over  
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5 edges of the balancing planes; so that when  
the carriage swings, one balancing plane  
tilts upwardly and the other downwardly;

and a foot lever connected to the sleeve for  
tightening or releasing the cords so as to  
allow the balancing planes to run freely.

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