G. O'BRYAN.

FLYING MACHINE.

APPLICATION FILED AUG. 15, 1911.

1,038,633.

Patented Sept. 17, 1912.

4 SHEETS—SHEET 1.

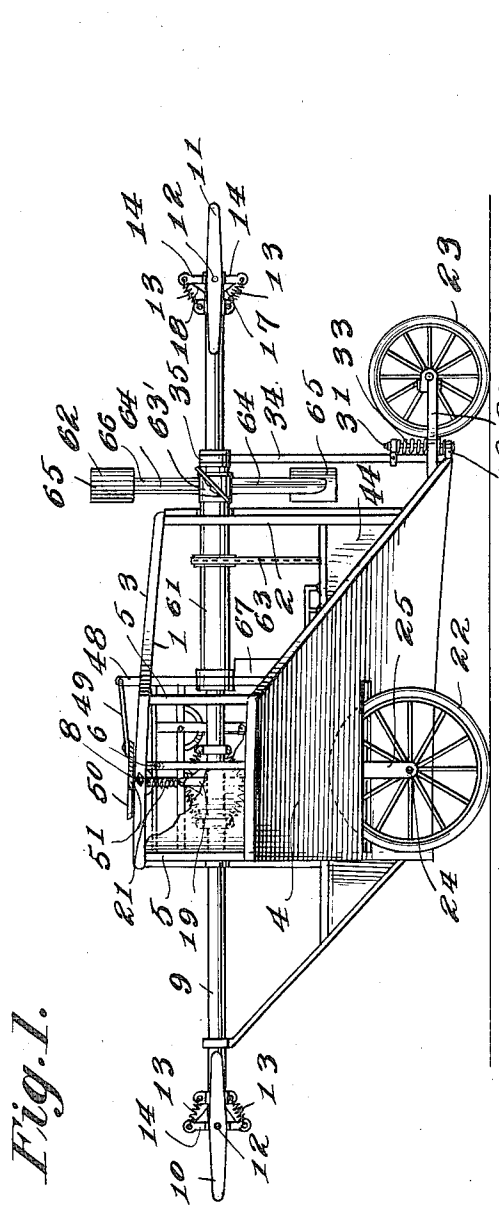

Fig. 1.

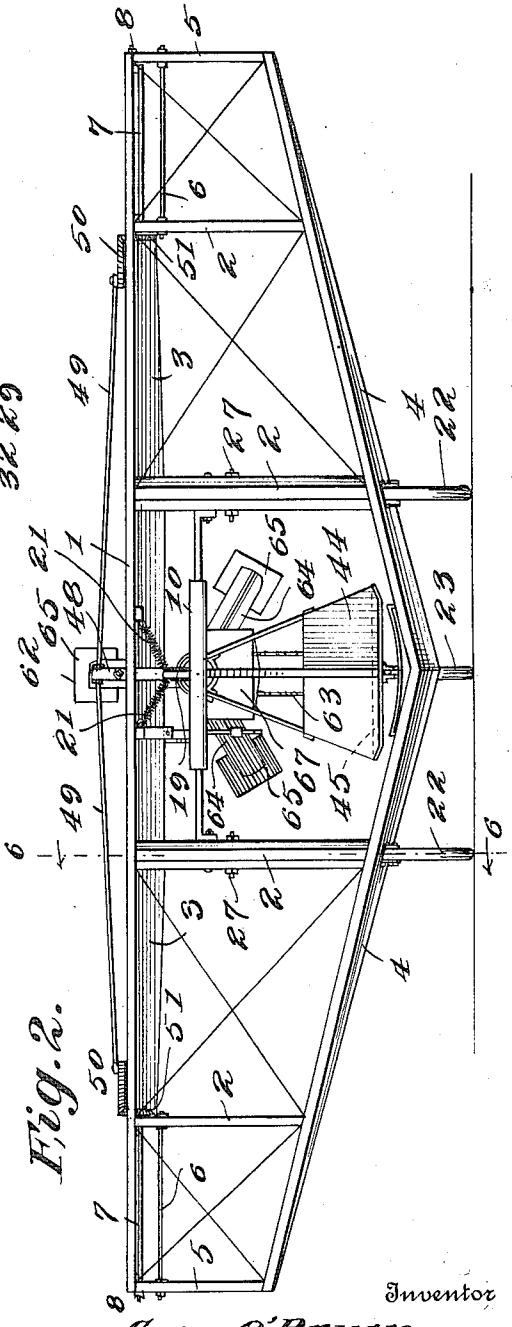

Fig. 2.

Witnesses

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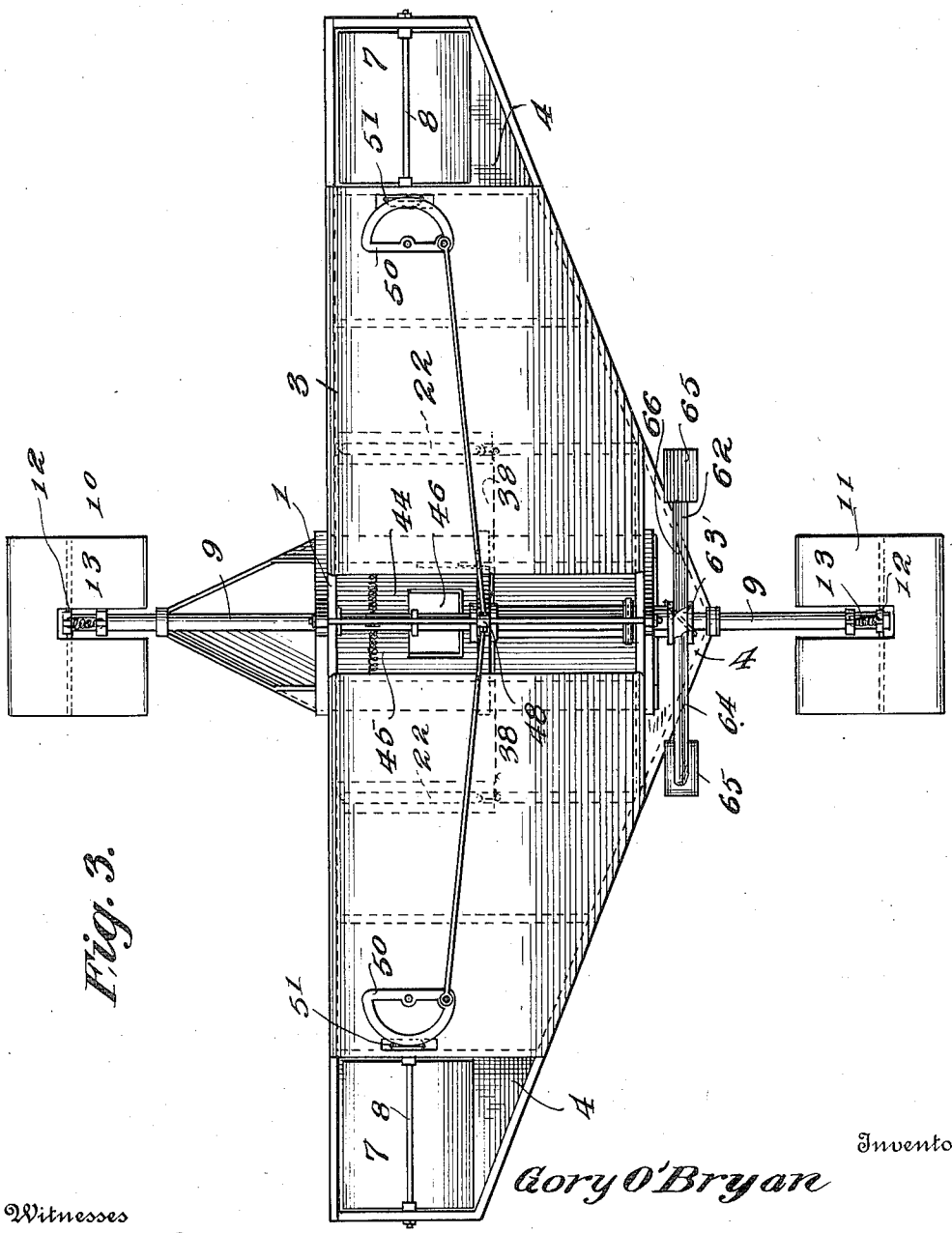

Fig. 3.

Witnesses

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4 SHEETS—SHEET 3.

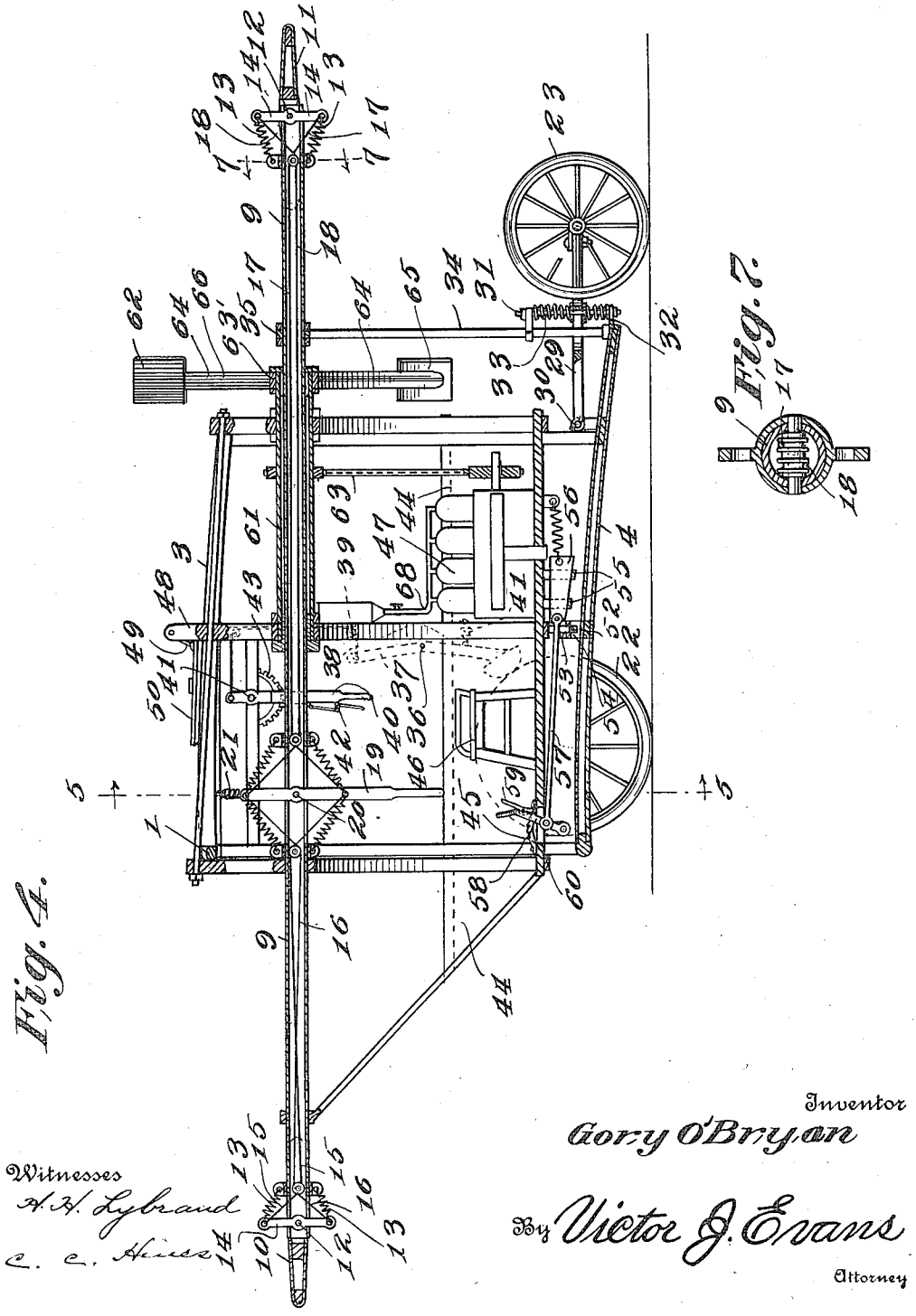

Fig. 4.

Fig. 7.

Witnesses

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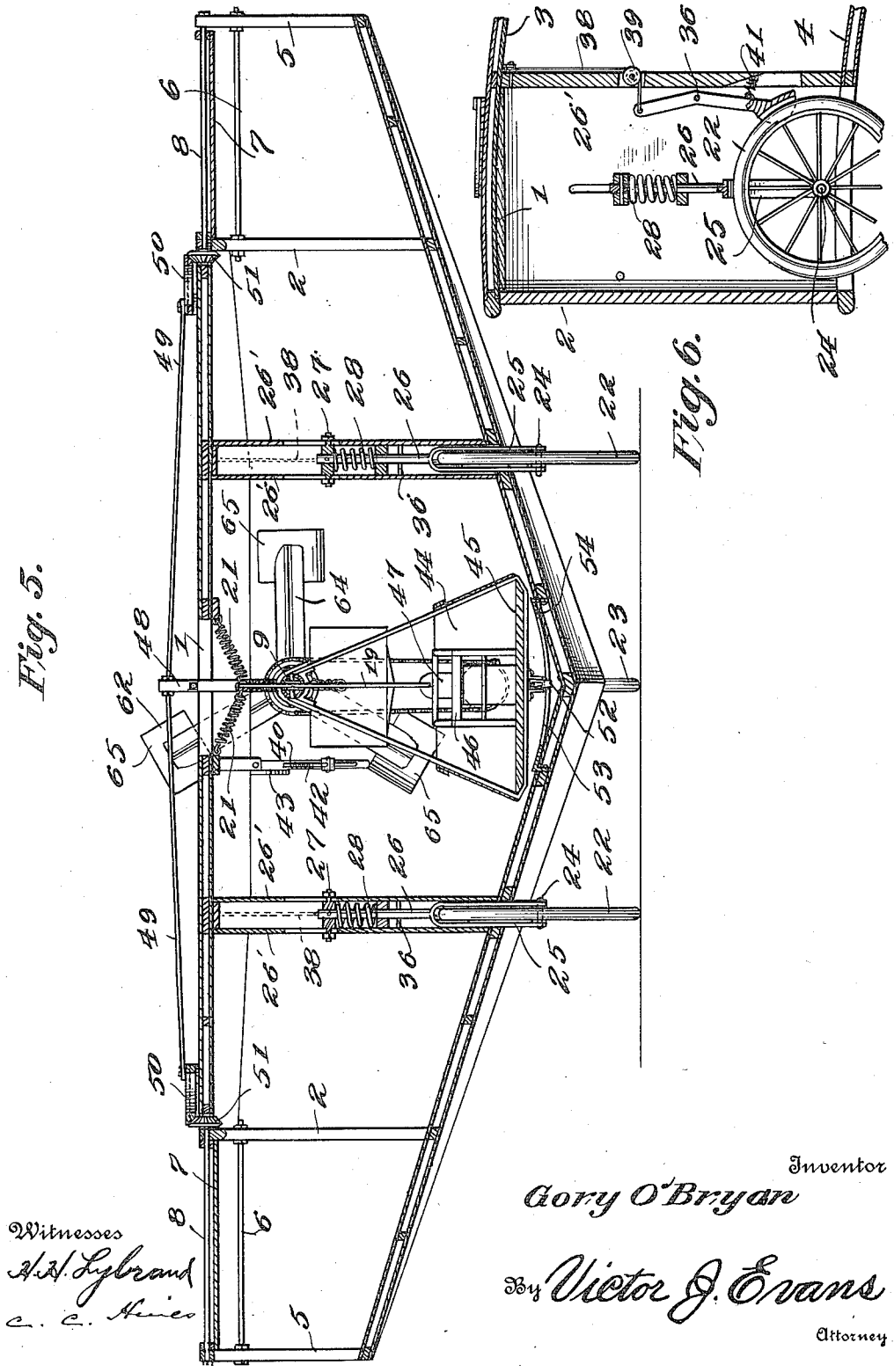

Fig. 5.

Fig. 6.

Witnesses

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UNITED STATES PATENT OFFICE.

GORY O'BRYAN, OF LOUISVILLE, KENTUCKY.

FLYING-MACHINE.

1,038,633. Specification of Letters Patent. Patented Sept. 17, 1912.

Application filed August 15, 1911. Serial No. 644,122.

To all whom it may concern:

Be it known that I, GORY O'BRYAN, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented new and useful Improvements in Flying-Machines, of which the following is a specification.

This invention relates to flying machines of the heavier-than-air type.

One object of the invention is to provide a machine which will be inherently self-balancing to a large degree.

A further object of the invention is to provide a machine embodying simple and effective means for automatically maintaining the lateral balance.

A still further object of the invention is to provide a novel construction of rudders for horizontal and vertical steering, and means for operating the same for either purpose.

A still further object of the invention is to provide a novel construction and mode of mounting a driving propeller, a novel construction of cushioned launching and landing wheels, and a novel means for throwing the automatic balancing mechanism into and out of operation.

A still further object of the invention is to provide novel brake mechanism for holding the machine from movement preparatory to its launching and for bringing the machine to a quick stop in landing.

A still further object of the invention is to provide a general construction and organization of parts whereby a rigid, strong and durable machine is produced.

With these and other objects in view, the invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a side elevation of a flying machine embodying my invention. Fig. 2 is a front elevation thereof. Fig. 3 is a top plan view of the machine. Fig. 4 is a vertical longitudinal section. Fig. 5 is a vertical transverse section. Fig. 6 is a detail longitudinal section on line 6—6 of Fig. 2. Fig. 7 is a detail section on line 7—7 of Fig. 4.

Referring to the drawings, 1 designates a suitable frame structure, including hollow uprights or standards 2, which frame structure may be made of any suitable material or materials. Carried by this frame structure are superposed supporting surfaces or planes 3 and 4, which may be of approximately triangular or other suitable form in plan. The wings of the lower supporting surface 4 are preferably arranged at a dihedral angle and project at their lateral extremities beyond the lateral extremities of the plane 3, whereby a large amount of inherent lateral stability is obtained. Extending upwardly from the lateral extremities of the plane 4 are short upright frame pieces 5, reinforced from the main frame by horizontal transverse braces 6. Arranged above the said lateral extremities of the plane 4 are ailerons or balancing planes 7 carried by shafts 8, mounted to permit said ailerons or balancing planes to tilt vertically. These planes are adjusted by means of automatic balancing mechanism, hereinafter described, and are limited in their downward motion by the braces 6. When the ailerons are in normal position, they form continuations of the upper supporting surface, thus increasing the lifting capacity of the machine.

Journaled upon the upper central portion of the main frame, immediately below the supporting surface is a hollow or tubular shaft 9, projecting parallel with the line of flight, and extending beyond the main frame at the front and rear thereof. Supported upon the front and rear projecting portions of this shaft are rudders 10 and 11, pivoted to swing vertically upon axles 12 and normally held in a horizontal position, parallel with the shaft 9, by springs 13. The springs 13 are attached to sets of oppositely projecting crank arms 14 on said axles 12, and from the sets of crank arms respectively extend pairs of wires or cables 15, 16, 17 and 18, which extend through the hollow shaft and are attached at their inner ends to an operating or controlling lever 19 above and below the pivotal point thereof, said lever being mounted on a transverse pin 20 passing through the shaft, whereby said lever is adapted to have independent fore and aft swinging movement and is coupled with the shaft to turn the same laterally in either direction. By the movement of the lever 19 in a fore and aft direction the rudders 10 and 11 may be tilted

vertically on their axes to steer the machine up or down, and by rocking the shaft 9 through the lateral movement of the lever the two rudders may be tilted laterally in unison at an angle to the line of flight to steer the machine horizontally, as will be readily understood. Springs 21 connect the lever 19 with the upper supporting surface 3, and serve to hold the said lever in a normal pendent position against casual lateral movement.

The main frame is mounted upon a pair of front launching and landing wheels 22 and a single central rear launching and landing wheel 23. Each wheel 22 is journaled upon an axle spindle 24 carried by a bracket 25 provided with an upwardly extending stem 26 inclosed within the adjacent partitions 26'. Arranged within said hollow upright is a guide member 27, and surrounding the stem between said guide member and the bracket 25 is a coiled actuating spring 28. The spring 28 yieldingly backs the wheels 22, so as to absorb all shocks and jars during the launching and landing operations. The wheel 23 is mounted upon an arm or bar 29 pivoted at its forward end to the central rear portion of the plane 4, as at 30, and slotted for the passage of a bolt or headed stem 31 projecting upwardly from a supporting member 32 secured to the plane in rear of the pivotal point of the bar. Surrounding the upwardly projecting portion of the bolt or stem between the bar and head on said stem is a coiled cushioning spring 33, adapted to permit the arm 29 and wheels 23 to have vertical movement and to cushion all shocks or jars sustained thereby. An upright 34 is fixed at its lower end to the member 32 and is provided at its upper end with a collar 35 engaging and embracing the rearwardly extending end of the shaft 9.

Pivotally supported in a vertical position upon the main frame, as at 36, are brake bars 37, the lower portions of which are arranged to engage the wheels 22, and the upper portions of which are coupled by wires or other flexible connections 38 running over guide pulleys 39 with an operating lever 40, pivoted to swing in a fore and aft direction, as at 41, whereby said brake bars may be thrown into and out of engagement with the wheels 22 to bring the machine on landing to a quick stop, or to hold the machine stationary while sufficient power is being developed by the propellers preparatory to launching the machine. The brake bars are normally held retracted by springs 41, and the lever is provided with a spring actuated pawl 42 adapted to engage a rack 43, whereby it may be locked in adjusted position to hold the brake bars either projected or retracted. By setting the brake bars, the aviator may hold the machine from movement after the starting of the motor until sufficient power is obtained for launching, thus obviating the necessity of attendants to hold the machine against movement in such operation.

Depending from and mounted to swing upon the shaft 9 as a center of rotation is a substantially triangular car 44, the lower portion of which forms a platform 45 to support the aviator's seat 46 and the driving motor 47. This car constitutes a gravity controlled balancing element for adjusting the ailerons or balancing planes 7, and is provided for that purpose with an upwardly extending arm 48 connected by rods or links 49 with gear sectors 50 meshing with pinions 51 on the shafts 8, whereby in the relative movements instituted between the machine and the car when the machine tilts laterally the ailerons or balancing planes will be automatically adjusted in opposite directions to restore the machine to a balanced position. The car normally maintains a perpendicular position through the force of gravity and the relative motions above referred to are established when the machine swings laterally upon the shaft 9 as a center of motion, as will be readily understood. The platform is provided with a depending projection 52 engaging a slot 53 in a guide member 54, fixed to the lower supporting surface, whereby the relative swinging motions between the car and machine structure are limited. Slidably mounted in guides 55 upon the bottom of the car is a wedge shaped locking element 56 connected by a link 57 with a foot lever 58, whereby said locking member may be drawn forwardly to wedge between the platform and guide to hold the car against swinging movement, or forced rearwardly to a retracted position to permit the car to have free swinging movement. It will thus be understood that the car may be locked against movement to throw the balancing mechanism out of operation in launching and landing the machine, and released for movement for the automatic operations of the balancing mechanism when the machine is in flight. The lever 58 may be provided with a spring actuated pawl or dog 59 to engage a rack 60, whereby it may be secured in locking position.

A hollow shaft 61 is mounted to rotate upon the shaft 9 and carries a driving propeller 62, said shaft 61 being driven from the motor 47 by a chain or other driving connection 63. The propeller 62 preferably comprises a hub 63 having a series of angularly arranged arms 64 carrying transversely disposed blades 65 at their outer ends, said blades being arranged at a proper working angle for a propulsive action. The arms 64 may also be formed to provide auxiliary blades or propelling surfaces 66,

increasing the efficiency of the propeller. Supported by the car is a fuel tank 67 for the supply of gasolene or other fuel to the motor through a conductor 68.

From the foregoing description, taken in connection with the drawings, the construction and mode of operation of my improved flying machine will be readily understood, and it will be seen that the invention provides a machine which embodies means for securing the desired ends in a highly efficient manner. While the construction shown is preferred, modifications within the scope of the invention, as defined by the appended claims, may be made without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described the invention, what I claim as new is:

1. In a flying machine, a gliding structure, a guide member thereon, balancing planes, a swinging car having a projection engaging said guide member, operating connections between the car and balancing planes, a wedge arranged in rear of and movable forwardly between the guide member and car to lock the latter against movement, a spring for retracting said wedge, and means for drawing the wedge forward to locking position.

2. In a flying machine, a main frame, an upper supporting surface, a lower supporting surface having its wings dihedrally inclined and extending at their lateral extremities beyond the upper supporting surface, balancing planes at the ends of the upper supporting surface above the said lateral extremities of the lower supporting surface, gearing for swinging the balancing planes including toothed sectors, a laterally swinging car having a projection, and links connecting said projections with the toothed sectors, whereby the balancing planes are automatically operated in the swinging movements of the car.

3. In a flying machine, a gliding structure, a longitudinally extending hollow shaft, balancing planes, a laterally swinging car supported by said shaft, connections between said car and the balancing planes, rudders pivoted to tilt vertically upon the shaft, an operating device for rocking shaft laterally and pivoted upon said shaft to swing longitudinally, and connections between said operating device and the rudders extending through the hollow shaft.

4. In a flying machine, a gliding structure, a guide member thereon, balancing planes, a swinging car having a projection engaging said guide member, operating connections between the car and balancing planes, a wedge movable between the guide member and car to lock the latter against movement, and means for operating said wedge.

5. In a flying machine, a main frame carrying supporting surfaces, a shaft extending fore and aft, balancing planes, a laterally swinging car supported by said shaft, connections between said car and the balancing planes, rudders pivoted to tilt vertically upon the shaft, and means for tilting said rudders in unison and rocking the shaft laterally to adjust the rudders at an angle to the line of flight.

6. In a flying machine, a main frame carrying supporting surfaces, a longitudinally extending shaft mounted to rock laterally, a laterally swinging car supported by said shaft, balancing planes, operating connections between the car and balancing planes, rudders pivoted to tilt vertically at the ends of said shaft, means for tilting the rudders vertically and also rocking the shaft laterally to turn said rudders at an angle to the line of flight, a second shaft journaled on the first-named shaft, a propeller carried by said second shaft, a motor supported by the car, and gearing between said motor and the propeller shaft.

7. In a flying machine, a gliding structure, a longitudinally extending shaft mounted thereon, a car pivotally supported by said shaft, balancing planes, operating connections between the car and balancing planes, a rudder pivotally mounted on the shaft, an operating device movable laterally to rock the shaft and longitudinally to adjust the rudder, a second shaft journaled on the first-named shaft, a propeller carried by said second shaft, a motor supported by the car, and gearing between said motor and the propeller shaft.

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

GORY O'BRYAN.

Witnesses:

GEO. O. ARTHUR MOEBIUS,

WILLIAM FRANKENBERGER.