

J. BUCHANAN.
FLYING MACHINE.
APPLICATION FILED OCT. 9, 1909.

959,199.

Patented May 24, 1910.

2 SHEETS—SHEET 1.

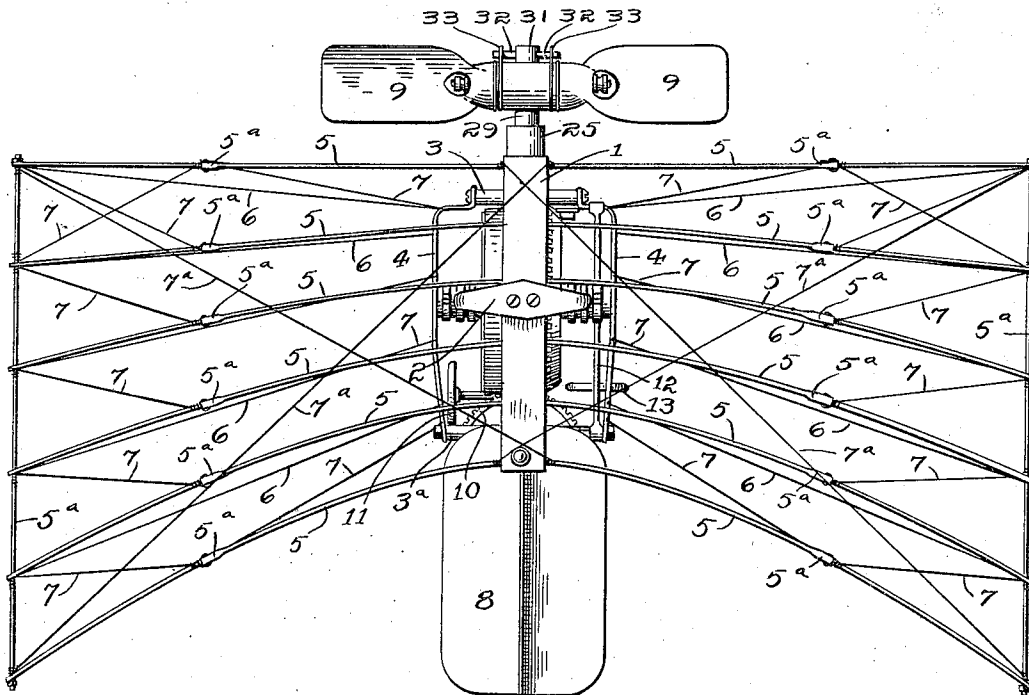


FIG. 1.

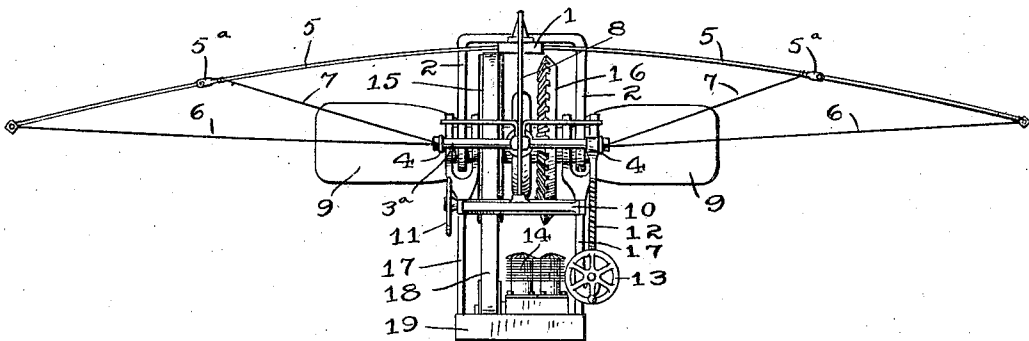


FIG. 2.

Witnesses
H. O. Van Antwerp
Minnie Johnson.

Inventor
JOHN BUCHANAN
BY L. V. Moulton
Attorney

959,199.

Patented May 24, 1910.

2 SHEETS—SHEET 2.

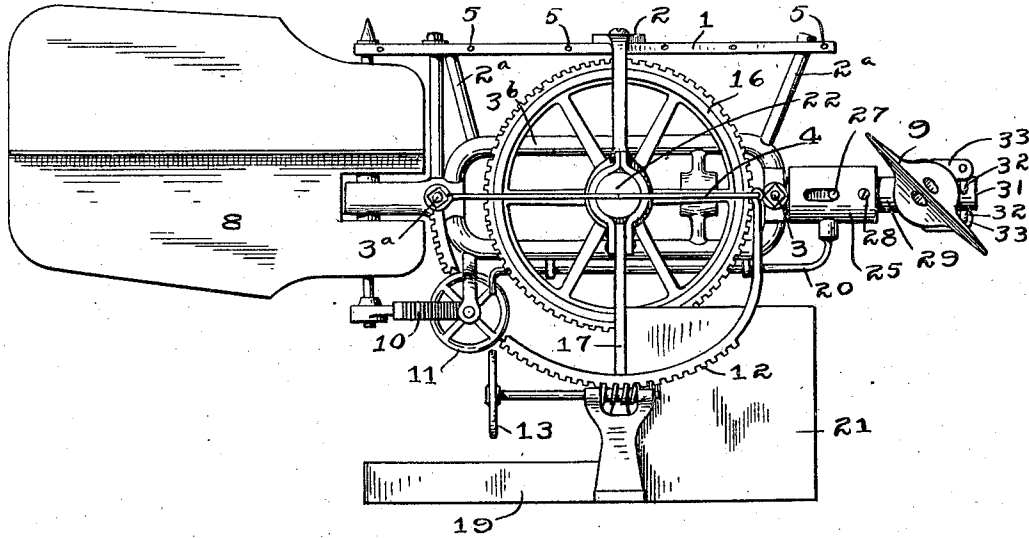


FIG. 3.

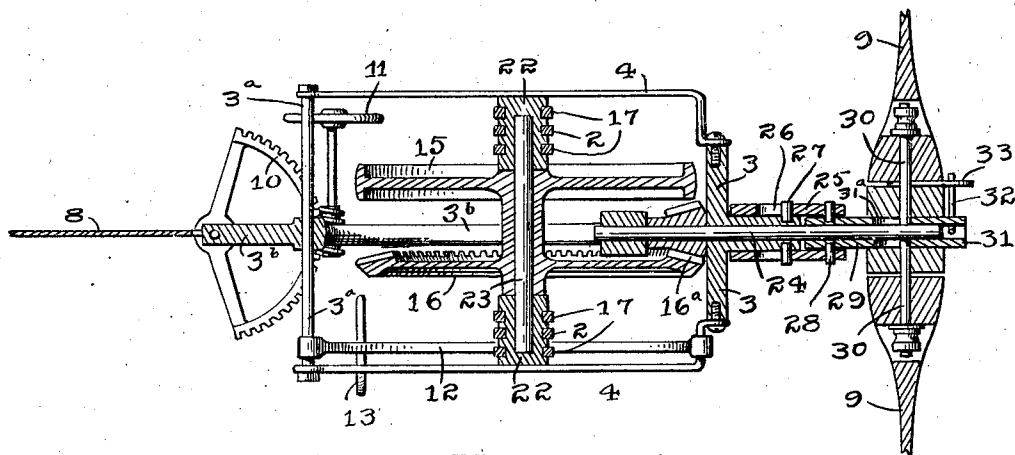


FIG. 4.

Witnesses
H. O. Van Antwerp
Minnie Johnson.

Inventor
JOHN BUCHANAN
BY L. V. Moulton
Attorney

UNITED STATES PATENT OFFICE.

JOHN BUCHANAN, OF HOLLAND, MICHIGAN.

FLYING-MACHINE.

959,199.

Specification of Letters Patent.

Patented May 24, 1910.

Application filed October 9, 1909. Serial No. 521,875.

To all whom it may concern:

Be it known that I, JOHN BUCHANAN, a citizen of the United States of America, residing at Holland, in the county of Ottawa and State of Michigan, 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.

My invention relates to that class of flying machines commonly known as "heavier than air" in which there are aeroplanes, propelling, and steering devices.

The object of my invention is to provide a device with various new and useful features hereinafter more fully described, whereby the device is more effectually balanced by suspending the weight considerably below the aeroplane; more conveniently steered and managed, and more effectually operated and propelled, reference being had to the accompanying drawings, in which:

Figure 1 is a plan view of a device embodying my invention; Fig. 2 a rear elevation of the same; Fig. 3 an enlarged elevation of the same with one aeroplane removed; and, Fig. 4 an enlarged horizontal section through the axis of the device.

Like numbers refer to like parts in all of the figures.

1 is a horizontally disposed upper member of the frame beneath which is suspended various parts of the propelling and steering machinery.

2 is a transverse yoke downwardly extended from the bar 1 in the lower end of the arms of which are supported the journal bearings 22 of the main shaft 23.

3 and 3^a are transverse oppositely extended arms of a main frame 3^b supported beneath the member 1, to which arms are attached side bars 4 also secured to the journal bearings 22.

5 are aeroplane ribs extending oppositely from the bar 1 and curved downward and also curved apart and rearward at their outer ends. The front rib 5 is substantially straight when viewed in plan view and the remaining bars curved rearward in increasing proportion toward the rear, thus broadening the outer ends of the aeroplane frame. The ends of these ribs are connected by longitudinal rods 5^a, and the frame is further

braced and strengthened by stays 6 extending from the outer ends of the ribs to the side bars 4 of the frame. Still further stays 7 extend from the ends of the ribs diagonally to the adjacent ribs near the middle thereof and thence inward to the side bars 4. Diagonal stays 7^a from the respective ends of the bar 1 to the opposite corner of the aeroplane frames also still further strengthen the frame, whereby a light and strong frame is furnished for the aeroplane, which latter consists of any suitable material (not shown) and attached to the described frame. To reduce the dimensions of the aeroplanes for convenience in shipment, storage, or other purposes, the ribs 5 are hinged near the middle and in a line just outside the inner or shorter stays 7, whereby the outer ends fold upward, for which purpose the stays 6 are detachably connected to the side bars 4 in any convenient manner.

8 is the rudder pivoted on a vertical axis to the rear of the main frame and provided with the usual horizontal and vertical planes.

9 is a reversible propeller arranged in advance of the main frame and so located that the current of air driven backward therefrom will pass beneath the aeroplane and assist in supporting the same.

10 is a segment attached to the rudder 8, operated by a worm and hand wheel 11 to turn the rudder on this vertical axis. The horizontal axis upon which the device turns is at the axis of the main shaft 23.

Hangers 17 are journaled on the bearings 22 and a car 19 is suspended beneath the main frame on these hangers. The motor 14 is mounted on this car, and the operator is also supported by the same. This brings the principal weight low down, thus forming a pendent ballast, which will remain substantially vertical beneath the axis of the main shaft. Connected to the main frame is a segment 12 and manually adjusted relative to the hangers 17 by means of a worm and hand wheel 13. The longitudinal axis of the frame, rudder, and aeroplanes can thus be adjusted inclined upward or downward by means of this segment and screw, whereby the vertical steering movement is accomplished.

It is often desirable to check the forward movement of such a device and for this purpose, I provide a reversible propeller, the blades 9 of which are rotatively mounted on oppositely projecting arms 30 on a propeller

shaft 24, which shaft is driven by a pinion 16^a engaged by a gear 16 on the main shaft 23, which shaft is driven by a pulley 15 connected by a belt 18 to the driving pulley of the motor 14. These blades 9 of the propeller are held in adjustment by levers 33 attached thereto, and engaged by pins 32 in a tube 29 slidable on the shaft 24, and adjusted by pins 28 rotative in a groove in the tube and mounted in a sleeve 25 longitudinally movable on the bearing of the shaft 24 and held from rotating by pins 27 in said bearing extending through longitudinal slots 26 in the sleeve. This sleeve is longitudinally adjusted by a rod 20 extending rearward to a convenient position near the steering mechanism, thus by sliding this sleeve to and fro, the propeller will be reversed as occasion may require.

In operation the horizontal steering is effected by turning the rudder on its vertical axis and the vertical steering by turning the main frame with the propelling and supporting mechanisms on the horizontal axis by means of the segment 12 and wheel 13, and the principal weight being considerably below the aeroplane, the device will not readily capsize.

What I claim is:—

1. A flying machine, comprising a main frame, aeroplanes extending oppositely from the upper member thereof, a car pivotally suspended from the main frame, a toothed segment attached to the main frame and extending downward therefrom, a manually operated worm engaging the segment and mounted on the car, a propeller wheel at the front of the frame, a rudder pivoted on a vertical axis at the rear of the frame, a motor on the car and connected to the propeller wheel to rotate the same, and means for adjusting the rudder on its vertical axis.

2. In a flying machine, a longitudinally extended frame member at the top thereof, ribs oppositely projecting from said member, downwardly extended hangers attached to the member, side bars attached to the frame, stays connecting the ribs at intervals to the side bars, a car suspended below the frame, a propeller at the front, a rudder at the rear, means for rotating the propeller

mounted on the car, and means for adjusting the rudder on its vertical axis.

3. In a flying machine, a longitudinally extended frame member at the top, a yoke extending downward from the same, side bars attached to the yoke, downwardly and rearwardly curved ribs projecting oppositely from the frame member, said ribs having joints intermediate their ends, stays extending from near the joints to the side bars and attached thereto and stays extending from the outer ends of the ribs to the side bars and detachably connected thereto, whereby the ribs may be folded upward, a car pivotally suspended beneath the yoke, means for adjusting the angular relation of the car and frame, a propeller at the front, a rudder at the rear, means for rotating the propeller, and means for adjusting the rudder.

4. In a flying machine, a frame having a longitudinally extended upper member, a downwardly extended yoke arranged transversely of said member, a main frame beneath said member and parallel therewith, a driving shaft journaled in the first named yoke, a driven shaft journaled in the main frame, a propeller mounted on the driven shaft, gearing connecting said shafts, a car pivotally suspended beneath the yoke, a segment concentric with the axis of the driving shaft, and a worm on the car engaging the segments.

5. In a flying machine, an upper frame member, ribs extending oppositely therefrom and curved rearward progressively from the front to rear, a main frame extending downward from said frame member, side bars attached to the frame, stays connecting the ribs to each other and to the side bars, a propeller wheel at the front, a rudder at the rear, a car pivotally suspended below the frame, and means for adjusting the angular relation of the car and frame.

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

JOHN BUCHANAN.

Witnesses:

GEORGINA CHACE,
L. V. MOULTON.