J. W. WOLFE.

AIR CRAFT.

APPLICATION FILED MAY 13, 1911.

1,014,276.

Patented Jan. 9, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

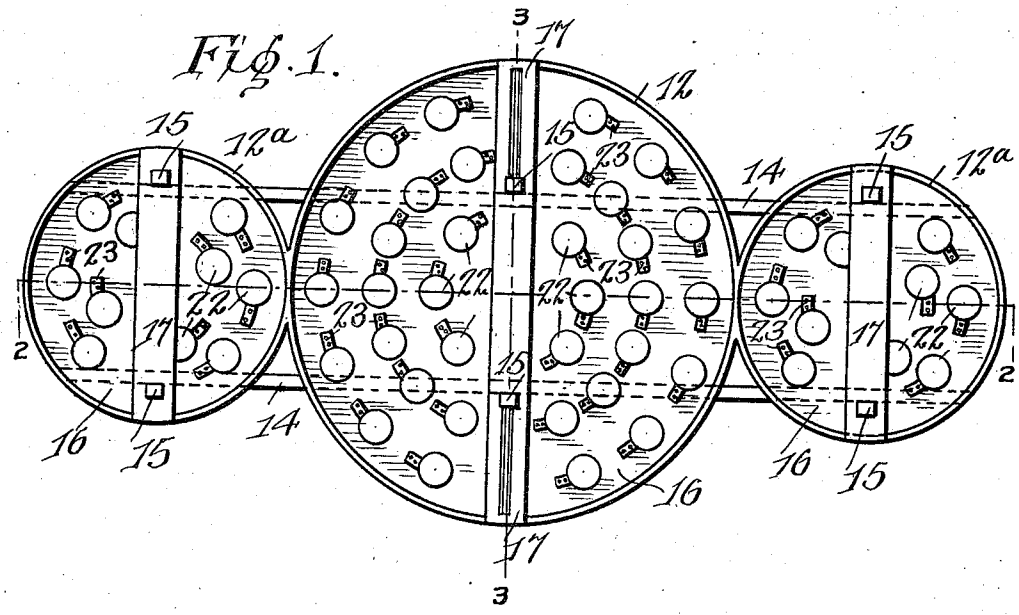
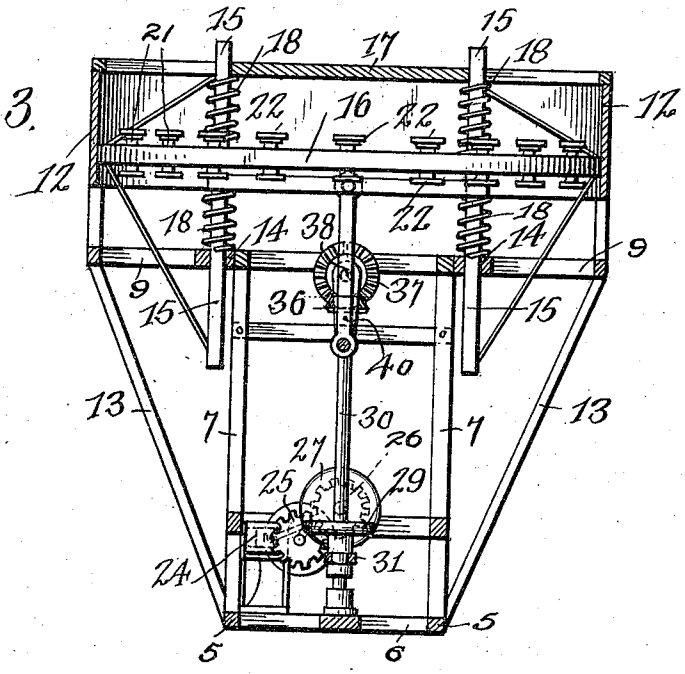


Fig. 3.



WITNESSES

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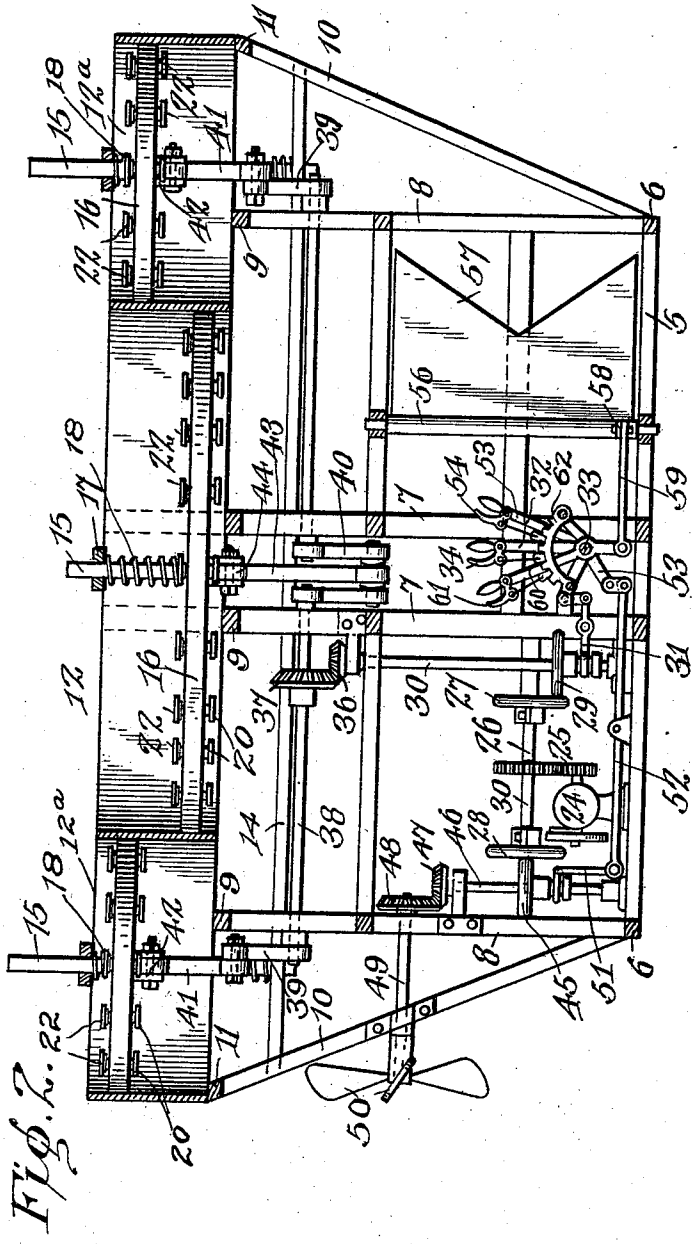

Fig. 2.

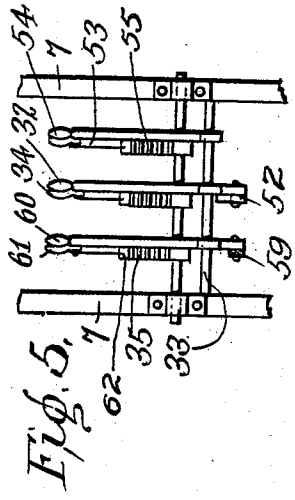

Fig. 5.

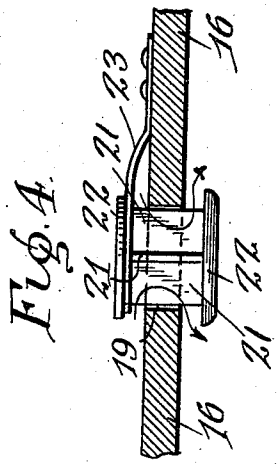

Fig. 4.

WITNESSES

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JOHN W. WOLFE, OF SHENANDOAH, IOWA.

AIR-CRAFT.

1,014,276. Specification of Letters Patent. Patented Jan. 9, 1912.

Application filed May 13, 1911. Serial No. 626,934.

To all whom it may concern:

Be it known that I, JOHN W. WOLFE, a citizen of the United States, residing at Shenandoah, in the county of Page and State of Iowa, have invented certain new and useful Improvements in Air-Craft, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to flying machines of the self propelled heavier than air type, and the principal object of the same is to provide novel sustaining means therefor which are at all times under the control of the aviator and which can be readily manipulated to cause the machine to ascend or descend.

A preferred and practical embodiment of the invention is shown in the accompanying drawings wherein—

Figure 1 is a top plan view of the improved flying machine. Fig. 2 is a longitudinal sectional view taken on the line 2—2, Fig. 1. Fig. 3 is a transverse sectional view taken on the line 3—3, Fig. 1. Fig. 4 is a detail fragmentary sectional view of one of the pistons showing one of the valves carried thereby. Fig. 5 is a fragmentary view in elevation of the controlling levers.

The improved air ship comprises a supporting frame including the parallel base members 5 that are connected by the end bars 6 and which carry the central and end standards 7 and 8, respectively, and also the outwardly inclined brace bars 10 at the ends. The oppositely disposed standards 7 and 8 are connected at their upper ends by the bars 10 and the similarly disposed braces 10 are connected at their upper ends by the bars 11. The bars 9 and 11 carry the intermediate and end cylinders 12 and 12ª the end cylinders being of the same diameter and the intermediate cylinder being of larger diameter than the said end cylinders. Bars 9 project well beyond the sides of the frame, and their outer end portions have brace connections 13 with the base of said frame.

The standards 7 and 8 and end braces 10 carry upper frame members 14 that are parallel with the base members 5 and through which the guides 15 of the pistons 16 of the cylinders 12 and 12ª are slidable. Rods 15 are also slidable through bars 17 that extend across the upper ends of the cylinders 12 and 12ª, springs 18 being coiled about the upper and lower portions of rods 15 and bearing against the pistons 16 and the members 14 and bars 17, respectively, and yieldably oppose reciprocatory movements of said pistons. The pistons 16 are provided with circular rows of openings 19 through which the valves 20 are slidable. Valves 20 are equipped with ribs 21 that space them from the edges of the openings 19 and also provided with overhanging flanges 22 at their ends. Springs 23 are carried by the pistons 16 and engage the valves 20 to yieldably oppose movements of the same.

A motor 24 is carried by the base of the supporting frame and has a gear connection 25 with a power shaft 26 that is equipped with friction gears 27 and 28 at its ends. Gear 27 is in mesh with a friction gear 29 carried by a vertically arranged transmission shaft 30. Gear 29 is slidable on shaft 30 and its hub is engaged by a shifting arm 31 that is pivotally connected to a handlever 32 mounted on a shaft 33. Lever 32 is equipped with a hand operated pawl 34 for engaging a rack 35 to lock said lever in the desired position. Obviously, by manipulating lever 32, gear 29 will be adjusted relative to the center of gear 27 and thereby regulate the speed and direction of rotation of shaft 30.

The upper end of shaft 30 carries a beveled gear 36 that is in mesh with a similar gear 37 carried by a drive shaft 38 that is journaled in the upper cross bars of the frame and which is provided with end cranks 39 and an intermediate crank 40. The end cranks 39 have link connections 41 with the piston rods 42 of the pistons 16 of the end cylinders 12ª, and the intermediate crank 40 has a link connection 43 with the piston rod 44 of the piston 16 of the central cylinder 12. The intermediate crank 40 projects in an opposite direction to the end cranks 39 so that the central piston operates opposite to the end pistons. Gear 28 is in engagement with a friction gear 45 slidable on a vertical transmission shaft 46. Shaft 46 carries a beveled gear 47 at its upper end that is in mesh with a similar gear 48 carried by the inner end of the propeller shaft 49. A propeller 50 is carried by shaft 49. A shifting lever 51 engages the hub of gear 45, said lever having a connection 52 with a hand lever 53 mounted on shaft 33. Lever 53 carries a hand operated

pawl 54 that engages a rack 55 to hold said lever in the desired position. As will be obvious, by manipulating lever 53, gear 45 will be adjusted relative to the center of gear 28 thereby controlling the speed and direction of rotation of shaft 46. A rudder shaft 56 is vertically journaled in the forward portion of the supporting frame and carries the rudder 57. Shaft 56 carries a laterally projecting crank arm 58 that has a link connection 59 with a hand lever 60 mounted on shaft 33. Lever 60 is manipulated to operate the rudder 57 and carries a hand operated pawl 61 for engaging a rack 62 to prevent accidental movement of said lever.

It will be understood from the foregoing that the motor 24 drives the propeller 50, the speed and direction of rotation of said propeller being governed by the position of gear 45 relative to the center of gear 28, and that said motor imparts reciprocatory movements to the pistons 16 of cylinders 12 and 12^a, the speed and direction of movement of said pistons being governed by the position of gear 29 relative to the center of gear 27. With this type of power it will be clear that the motive power of the machine can be controlled by the aviator by manipulating the hand levers 32 and 53, and that the rudder 57 can also be controlled by the aviator through the hand lever 60.

As has been explained, the intermediate piston operates in alternation with the end pistons, and said intermediate piston is preferably of a diameter equal to the combined diameters of the two end pistons. By this arrangement there is a constant lifting pressure being exerted that tends to maintain an even balance of the machine. Obviously the valves 20 open on the upstrokes of the pistons to reduce the opposition of the air to such stroke, and close on the downstrokes to prevent air passing through said pistons.

What I claim as my invention is:—

1. A flying machine comprising a frame, sustaining means therefor including end cylinders and an intermediate cylinder, said cylinders being vertically arranged and disposed in alinement longitudinally of said frame, the intermediate cylinder equaling in area the combined areas of the end cylinders, pistons in said cylinders, said pistons being provided with means for permitting air to pass through the same on their upstrokes and to prevent such passage of air on their downstrokes, and means for reciprocating the intermediate piston in alternation to the end pistons.

2. A flying machine comprising a frame, a longitudinal row of vertical cylinders carried thereby, pistons in said cylinder, said pistons being provided with openings, valves slidable in said openings and provided with ribs for spacing the same from the edges of said openings, said valves being provided with flanged ends that overlap said openings, springs carried by said pistons and engaging said valves, and means for reciprocating said pistons.

3. A flying machine comprising a frame sustaining means, therefor including vertical end and intermediate cylinders, the intermediate cylinder equaling in diameter the combined diameters of the end cylinders and pistons in said cylinders provided with means for permitting air to pass through on their upstrokes and to prevent such passage of air on their down strokes.

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

JOHN W. WOLFE.

Witnesses:
J. A. CHENEY,
OLIVER SHAFFER.