J. A. SIMMS.

AEROPLANE.

APPLICATION FILED DEC. 14, 1917.

1,297,264.

Patented Mar. 11, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

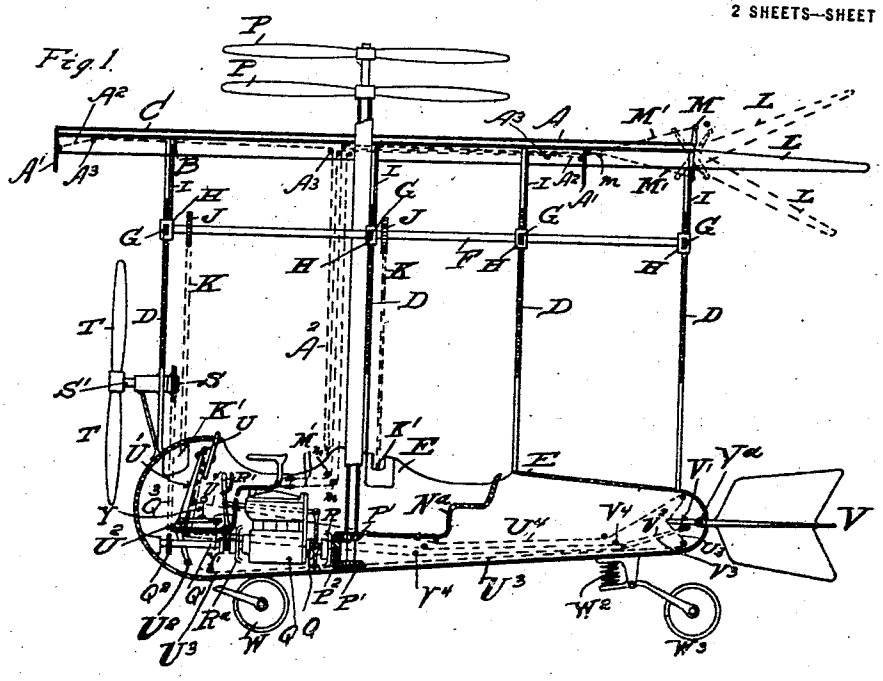
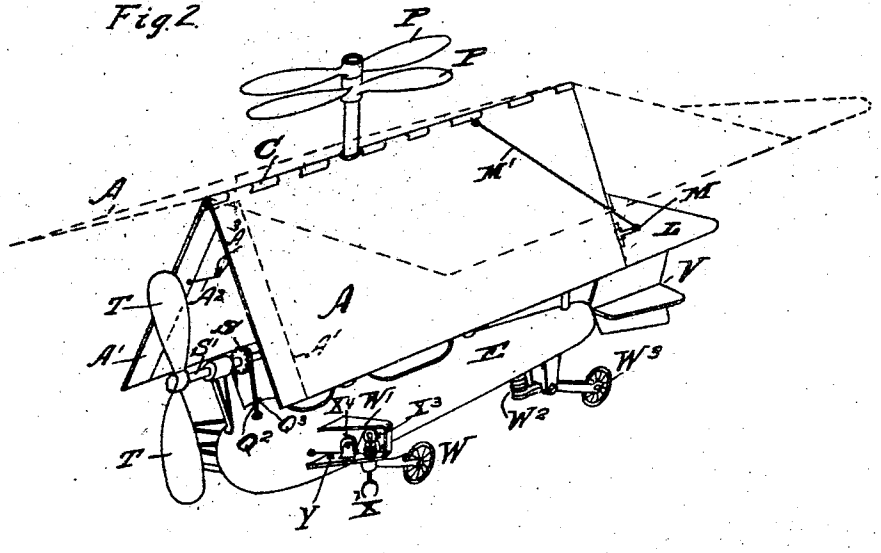


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

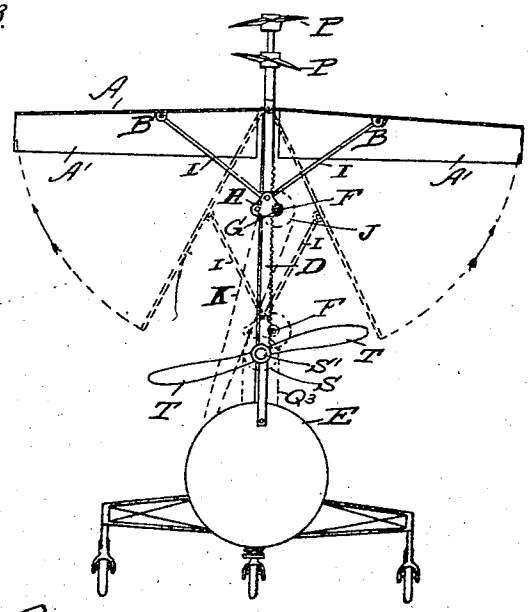


Fig 4.

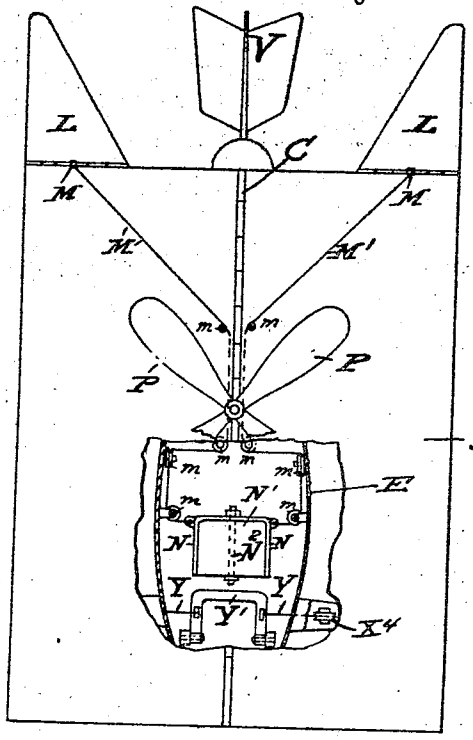
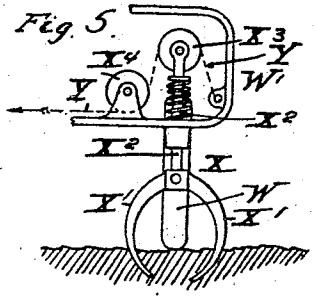


Fig. 5.



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UNITED STATES PATENT OFFICE.

JOSEPH A. SIMMS, OF DETROIT, MICHIGAN, ASSIGNOR OF ONE-HALF TO JAMES H. GREGG AND GEORGE A. GREGG AND ONE-FOURTH TO ANTHONY LASZLO, ALL OF DETROIT, MICHIGAN.

AEROPLANE.

1,297,264. Specification of Letters Patent. Patented Mar. 11, 1919.

Application filed December 14, 1917. Serial No. 207,173.

To all whom it may concern:

Be it known that I, JOSEPH A. SIMMS, citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Aeroplanes, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to aeroplanes shown in the accompanying drawings and more particularly pointed out in the following specification and claims.

One of the objects of this invention is to provide means whereby the aeroplane may rise vertically to a suitable altitude preceding its horizontal flight, or descend in a like manner that it may be operated within a restricted ground area.

Another object of the invention is to provide means whereby the device may be readily converted into a parachute in the event of the disablement of the operating mechanism, to insure the safe landing of the aviator.

Another object of the invention is to provide for folding the sustaining surface of the aeroplane to a wedge-like form preceding its vertical ascent, in order to avoid the resistance it would otherwise offer to a rapid upward movement.

Another feature of the invention is the stabilizing means employed to maintain equilibrium, which is under the direct control of the aviator.

Another feature of the invention is the employment of two propellers, or a multiple of two, for the vertical raising of the aeroplane, the propeller blades rotating in opposite directions in order to prevent the rotation of the aeroplane itself about its vertical axis.

Another feature of the invention is the employment of other independently operated propeller blades adapted to drive the aeroplane in a horizontal direction, upon arriving at a proper altitude.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention also resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment herein disclosed may be made without departing from the scope of the invention.

In the drawings accompanying this specification:

Figure 1 is a vertical longitudinal sectional view,—diagrammatic in character,—showing an aeroplane embodying my invention.

Fig. 2 is a perspective view of the same, also of a diagrammatic character, showing the sustaining surface folded, as when making a vertical ascent, and in dotted lines the sustaining surface extended, as in horizontal flight.

Fig. 3 is a diagrammatic front end elevation of the aeroplane showing the sustaining surface in dotted lines as it would appear when folded.

Fig. 4 is plan view with a portion of the sustaining surface broken away to show the mechanism connected to the aviator seat for warping the stabilizing ailerons, also the foot lever controlling the operation of the landing clamp.

Fig. 5 is a detail view of the landing clamp or anchoring device to secure the aeroplane against "drifting" when resting upon the ground.

Referring now to the letters of reference spread upon the drawings,—

A, denotes a sustaining surface supported by a suitable framework B, and hinged to a ridge member as indicated at C, that it may be adjusted to a wedge-like form when making a vertical ascent. D, indicates a plural number of vertically arranged rack bars extending downwardly from the ridge member to the body E. F, indicates an adjustable shaft lying parallel with the ridge member provided with pinions G, in mesh with the respective rack-bars. H, denote castings fitted to the shaft F, and adapted to slide upon and respectively embrace the rack-bars that the pinions may be maintained in meshed relation therewith. I, are brace rods hinged to the castings and to the frame supporting the sustaining surface A.

J, indicates sprocket wheels mounted upon the shaft F, and K, are sprocket hand-chains for the use of the aviator and his assistant in manually raising or lowering the sustaining surface. K', indicate pockets in the body E, to receive the free end of the chains.

L, L are stabilizing ailerons spaced apart and hinged at the rear end of the sustaining surface. M, denotes a rocking lever secured to each aileron for tilting the latter.

M′, indicates cables connected to each end of each lever,—supported by suitable pulleys m,—and respectively connected with the opposite arms N, of the aviator's seat N′, which in turn is adapted to tilt upon a longitudinally arranged support N^2.

N^3, is a seat for the aviator's assistant conveniently placed for the operation of one of the sprocket chains K.

A′, A′ are swinging walls hinged to the sustaining surface A, and provided with an operating cable A^2, (guided and supported by suitable pulleys A^3) for manually raising or lowering the walls, whereby the sustaining surface may be converted into a parachute should the motive power become disabled.

P, P, are propeller blades mounted on vertical shafts, adapted to be rotated in opposite directions,—which while serving to lift the aeroplane vertically coöperate to prevent the rotation of the aeroplane around its vertical axis. One of the vertical shafts is tubular in form to receive the other shaft and each shaft at its lower end is fitted with a bevel gear P′, in mesh with a driving gear P^2, mounted on the drive shaft Q′, of the prime mover Q. R, denotes a suitable clutch mechanism, manually actuated by the lever R′, from the aviator's seat to control the operation of the propeller blades P, P. Q^2, is a sprocket wheel on the forward end of the drive shaft, connected by a sprocket chain Q^3, with a sprocket wheel S, carried by a suitably journaled horizontal stub shaft S′. On the outer end of the shaft S′, is mounted the propeller blades T, for driving the aeroplane in a forward or horizontal direction.

R^2, denotes a clutch mechanism also under the control of the lever R′, governing the operation of the propeller blades T;—the arrangement being such that when the controlling lever R′, is operated to actuate the propeller blades P, P, the propeller blades T, are disengaged, and vice versa. U, indicates a steering wheel journaled upon a rocking standard U′, pivoted at U^2, to a supporting platform or frame. V, denotes a horizontal and vertical steering rudder having a universal joint V^a, whereby it may be operated in a vertical or in a horizontal direction. V′, indicates an arm for operating the rudder, connected by cables V^2, V^3, with the drum of the steering wheel U, for operating the rudder to the right or left.

V^4, are pulleys for guiding and supporting the cables. The rocking standard U′, is provided with a downwardly directed arm U^2, connected by a cable U^3, with the operating arm V′ of the rudder for tilting the latter in an upward direction upon manually operating the rocking standard. A cable U^4, also connects the standard, above its pivot, with the rudder arm V′, that it may be given a downward inclination when required;—suitable pulleys being provided for supporting and guiding the cables: W, indicates the usual alighting wheels supported in suitable brackets W′. W^2, is a tension spring between the body and the pivotal arm supporting the alighting wheel W^3.

X, denotes a landing clamp or anchor designed to prevent "drifting" of the aeroplane after it has alighted upon the ground, consisting of a pair of arc-shaped members X′, X′, connected to a spring actuated plunger X^2. X^3, is a pulley journaled in the end of the plunger, and X^4, is a pulley secured to the frame adjacent to the plunger. Y, indicates a cable passing over and under said respective pulleys with one end secured to the frame, its opposite ends being connected with a foot treadle Y′ which when manually operated serves to force the arc-shaped members of the landing clamp into the ground.

The several parts having now been indicated by reference letters, the construction and operation of the invention will be readily understood.

When about to make an ascent the aviator causes the sustaining surface to fold into a wedge-like form by operating the sprocket hand-chains K, controlling the rotation of the pinions G, of the adjustable shaft in mesh with the rack-bars D. The adjustable shaft F, is thus lowered and with it the castings H, to which are secured the brace rods I, in turn connected to the frame of the sustaining surface. The sustaining surface may thus be folded into the form indicated in Fig. 2 thereby offering less resistance to a rapid vertical ascent. The prime mover being in operation, the clutch mechanism R, is manually actuated by means of the lever R′, causing the propeller blades P, P, to rotate in opposite directions as previously explained. Having reached a proper altitude the sustaining surface is opened (as indicated in full lines in Fig. 3) either mechanically, or by the force of the wind, the clutch mechanism R, is then released by a reverse movement of the lever R′, whereupon the propeller blades P, P, cease to operate, simultaneously with the engagement of the clutch R^a, controlling the operation of the propeller blades T, driving the aeroplane in a forward direction.

To steer the aeroplane to the right or left, the cables V^2, V^3, connected with the rudder arm V′, and with the drum of the steering wheel U, are operated by rotating the steering wheel to the right or left in the usual manner.

To cause the aeroplane to make a gradual ascent or descent, the rudder is tilted by means of the cables U^3, U^4, connected with

the rudder operating arm V′, and the rocking standard U′, as previously indicated. In order to maintain equilibrium the balancing surfaces or ailerons L, L hinged to the sustaining surface are actuated by the aviator by means of the cables M′, connected with the respective arms of the aviator's tilting seat N′. In the event of the prime mover or other operating mechanism becoming disabled the aviator may make a safe landing by converting the sustaining surface into a parachute by releasing the swinging walls A′, A′ that they may assume a vertical position, thereby affording greater resistance to the descent of the aeroplane.

On landing upon the ground the aeroplane may be secured against "drifting" along its surface, by operating the foot lever Y′, with which a cable is connected adapted to actuate the landing clamp X, the operation of which has been explained. When making a vertical landing it will be obvious that the propeller P, P will serve to check or reduce the speed of the descent. While only one propeller T, is shown to drive the aeroplane in a forward direction a plural number may be employed if desired.

Having thus described my invention what I claim is:—

1. In an aeroplane, a sustaining surface composed of two side members hingedly connected together along their inner longitudinal edges and adapted to be folded longitudinally, means for adjusting the degree of angularity given to the respective portions of the sustaining surface, a prime mover, means actuated thereby to cause the aeroplane to rise vertically, and manually adjustable, relatively narrow, vertically swinging members secured to said sustaining surface, adapted to resist the escape of air from beneath the sustaining surface, whereby the latter may be converted into a parachute to provide for a safe landing in the event of an accident to the operating mechanism.

2. In an aeroplane, a body, a folding sustaining surface of a length substantially the length of the body, means for adjusting the angularity of each portion of said sustaining surface, relatively narrow transversely disposed ailerons hinged to each portion of the sustaining surface, and means for manually adjusting said ailerons to effect equilibrium.

3. In an aeroplane, a longitudinally hinged sustaining surface, a plurality of vertically arranged rack-bars, a vertically adjustable shaft fitted with pinions in mesh with the respective rack-bars, suitable castings, in which said shaft is journaled, sleeves upon the rack-bars and adapted to maintain the pinion in meshed relation with said rack-bars, and means for manually rotating the shaft, whereby the respective portions of the sustaining surface may be adjusted with reference to each other.

4. In an aeroplane, a longitudinally hinged sustaining surface, a plurality of vertically arranged rack-bars, a vertically adjustable shaft fitted with pinions in mesh with the respective rack-bars, suitable castings, in which said shaft is journaled, sleeved upon the rack-bars and adapted to maintain the pinion in meshed relation with said rack-bars, rods connecting said castings with the sustaining surface, and means for manually rotating the shaft, whereby the respective portions of the sustaining surface may be adjusted with reference to each other.

5. In an aeroplane, a longitudinally hinged sustaining surface, a prime mover, a pair of vertical concentrically disposed shafts extending through the hinged sustaining surface along the line of said hinged connection, a horizontal shaft, propeller blades mounted upon the respective shafts, means actuated by the prime mover adapted to rotate the vertical shafts with their respective propeller blades in opposite directions, and manually operated means for alternately connecting the vertical and horizontal shafts in driving relation with the prime mover.

6. In an aeroplane, a sustaining surface, a plurality of vertically arranged rack-bars, a vertically adjustable shaft fitted with pinions in mesh with the respective rack-bars, means for rotating the shaft whereby the sustaining surface may be adjusted.

7. In an aeroplane, a longitudinally hinged sustaining surface, a plurality of vertically arranged rack-bars, a vertically adjustable horizontal shaft provided with pinions adapted to mesh with the rack-bar, and means for rotating the shaft whereby the respective portions of the sustaining surface may be adjusted with relation to each other.

In testimony whereof, I sign this specification in the presence of two witnesses.

JOSEPH A. SIMMS.

Witnesses:
S. E. THOMAS,
JOHN CONSIDINE, Jr.