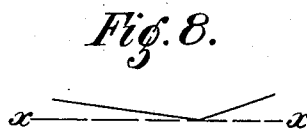
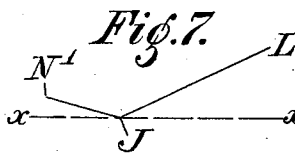
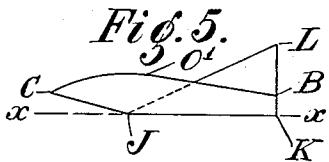
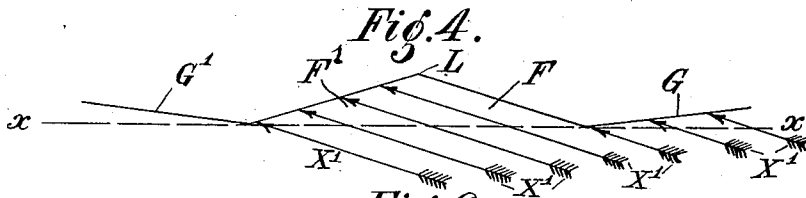
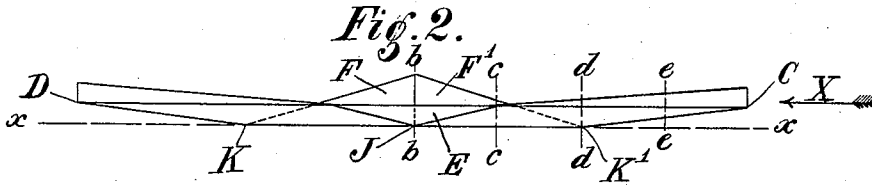
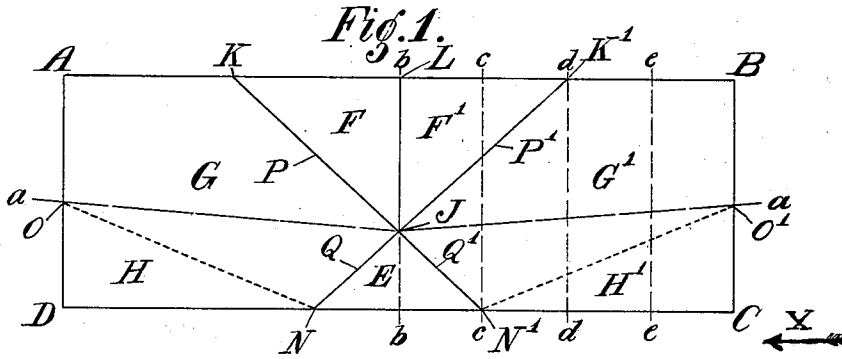
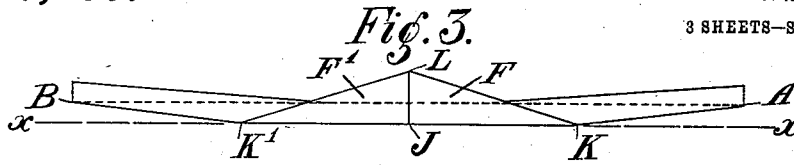


1,017,989.

Patented Feb. 20, 1912.

3 SHEETS—SHEET 1.



Witnesses

Carl J. Pries

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Fig. 10.

Richard G. V. Mytton
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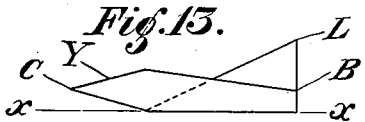
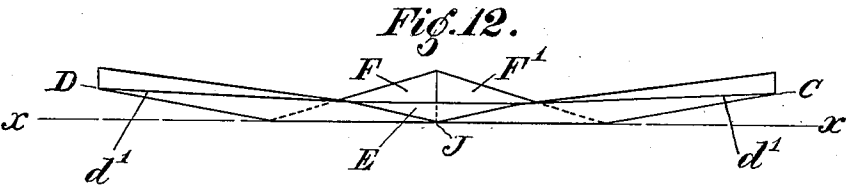
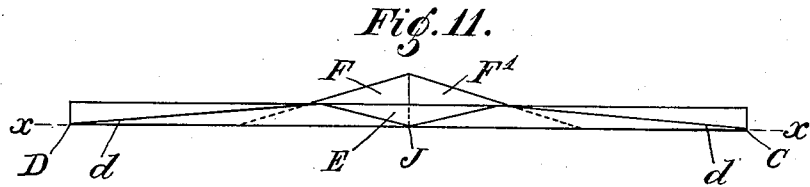
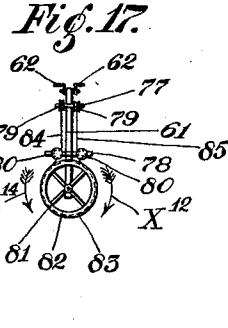
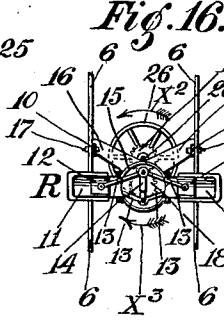
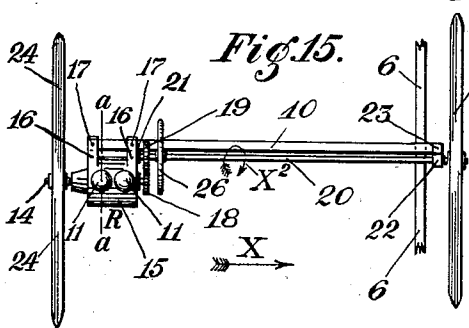
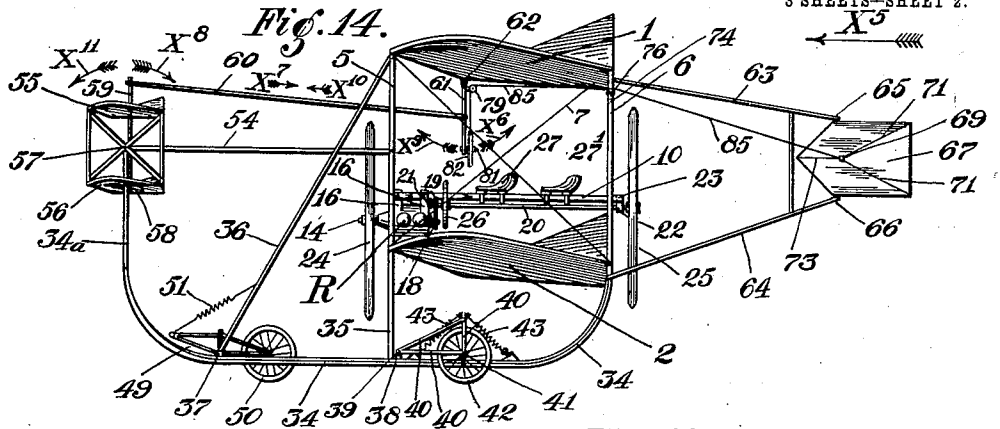
R. G. V. MYTTON, DEC'D.
D. BARKER, EXECUTOR.
FLYING MACHINE.

APPLICATION FILED JAN. 10, 1911.

1,017,989.

Patented Feb. 20, 1912.

3 SHEETS—SHEET 2.



Witnesses

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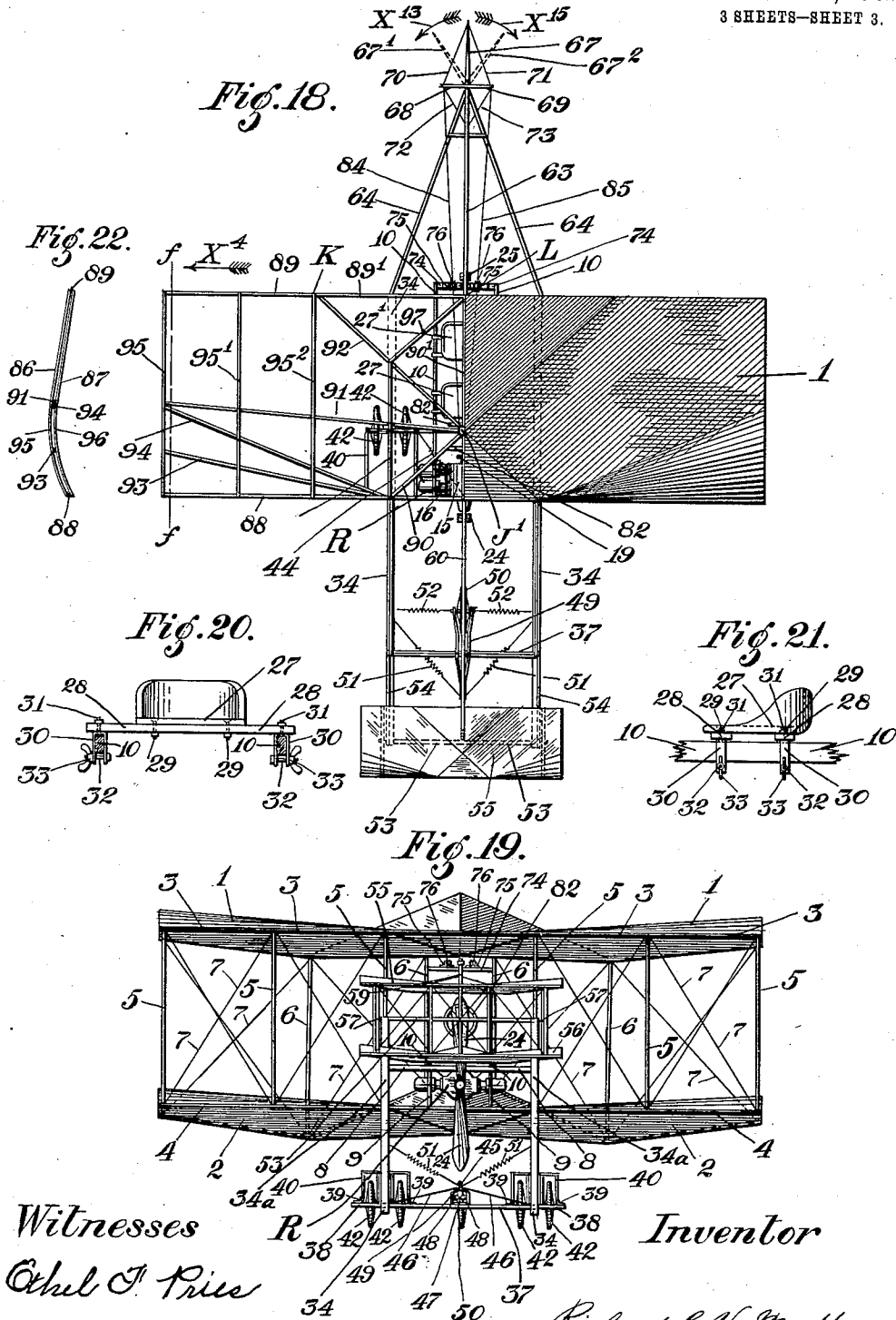
R. G. V. MYTTON, DEC'D.
D. BARKER, EXECUTOR.
FLYING MACHINE.

APPLICATION FILED JAN. 10, 1911.

1,017,989.

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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

RICHARD G. V. MYTTON, DECEASED, BY DONALD BARKER, EXECUTOR, OF LOS ANGELES, CALIFORNIA.

FLYING-MACHINE.

1,017,989.

Specification of Letters Patent.

Patented Feb. 20, 1912.

Application filed January 10, 1911. Serial No. 601,890.

To all whom it may concern:

Be it known that I, DONALD BARKER, executor of RICHARD G. V. MYTTON, deceased, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, do declare said RICHARD G. V. MYTTON to have invented a new and Improved Flying-Machine, of which the following is a specification.

This invention has for its object the provision of a flying machine wherein the sustaining surfaces shall be of such form that in conjunction with the correct adjustment of the center of gravity of the entire machine and its freight, the said machine shall possess inherent stability, that is to say said machine shall at all times have a tendency to remain in its normal flying position, to resist displacement therefrom, and to return promptly to its normal position when disturbed either in a fore and aft, or a lateral direction, or in any combination of the two directions, by exterior forces, such as gusts of wind; and to attain this end without any warping, twisting, or adjustment of the main sustaining surfaces, or of auxiliary surfaces, commonly known as "ailerons," either by manually operated or automatic means; thus eliminating all special stabilizing devices and greatly simplifying the construction and operation of a flying machine.

Other objects of the invention are to obviate the dangers incident to the use of "twin propellers" and to eliminate the usual transmission mechanism for the operation thereof; and in general to provide a flying machine which shall be simple in construction and simple and safe in operation.

These objects are attained by means of the mechanism set forth in the accompanying drawings, wherein:—

Figure 1 is a diagrammatic plan of one of the sustaining surfaces. Fig. 2 is a diagrammatic front elevation of one of the sustaining surfaces, corresponding to the plan Fig. 1. Fig. 3 is a diagrammatic rear elevation of one of the sustaining surfaces corresponding to plan and elevation in Figs. 1 and 2. Fig. 4 is a diagrammatic elevation of the rear edge alone, of one of the sustaining surfaces and corresponding to that

shown in Fig. 3. Fig. 5 is a diagrammatic side elevation of one of the sustaining surfaces, corresponding with the plan Fig. 1. Fig. 6 is a section taken upon the line *a—**a*, of Fig. 1. Fig. 7 is a section taken upon the line *b—b*, of Fig. 1, and viewed in the direction of the arrow X of said Fig. 1. Fig. 8 is a section taken upon the line *c—c*, of Fig. 1, and viewed in the direction of the arrow X of said Fig. 1. Fig. 9 is a section taken upon the line *d—d*, of Fig. 1, and viewed in the direction of the arrow X, of said Fig. 1. Fig. 10 is a section taken upon the line *e—e*, of Fig. 1, and viewed in the direction of the arrow X, of said Fig. 1. Fig. 11 is a diagrammatic front elevation of one of the sustaining surfaces, showing how the form thereof may be modified by adjustment of some of the truss wires. Fig. 12 is a diagrammatic front elevation of one of the sustaining surfaces, showing a second modification of the form thereof, which may be produced by adjustment of some of the truss wires. Fig. 13 is a side elevation of a modified form of sustaining surface possessing no curvature. Fig. 14 is a side elevation of a complete machine embodying the invention. Fig. 15 is a side elevation drawn to a larger scale, of the propelling mechanism and part of the framework of the machine. Fig. 16 is a section taken upon the line *a—**a*, of Fig. 15, and viewed in the direction of the arrow X of said Fig. 15. Fig. 17 is a rear elevation drawn to the same scale as Fig. 15; of the steering wheel and some of its adjuncts, and viewed in the direction of the arrow X⁵, Fig. 14. Fig. 18 is a plan of a complete machine whereof Fig. 14 is a side elevation. Fig. 19 is a front elevation of a complete machine, and corresponding with the side elevation Fig. 14. Fig. 20 is a front elevation drawn to a larger scale, of one of the seats, showing the supports therefor, in cross section. Fig. 21 is a side elevation of one of the seats, and corresponding with the front elevation Fig. 20. Fig. 22 is a section through the framework of one of the sustaining surfaces, said section being taken upon the line *f—f*, of Fig. 18, and viewed in the direction of the arrow X⁴, of said Fig. 18.

The particular form of the sustaining surface or surfaces whereby inherent stability is attained in this flying machine, is illustrated in Figs. 1 to 10 inclusive, such a surface being in reality a composite surface formed of smaller plane and curved surfaces disposed in certain relations to one another. In Fig. 1, the surface appears in plan as a rectangle A, B, C, D, of which D, C, is the forward edge, and each of such surfaces is composed of a central forward triangular portion E, through the center of which passes the fore and aft center line $b-b$ of the rectangle A, B, C, D; and symmetrically arranged upon either side of said center line $b-b$ are the equal and similar triangular portions F and F', the equal and similar irregular pentagonal portions G and G', and the equal and similar triangular portions H and H'. Each of said portions E, F, F', G and G' is in itself a plane surface, but said surfaces are disposed at various angles relatively to one another, and to the horizontal line $x-x$ (Figs. 2 to 10 inclusive) and the portions H and H' are curved. For the purpose of clear illustration and description the lines J, K, and J, K' at the base of the triangle portions F and F' are shown in a horizontal position in Figs. 2, 3, and 5, and the triangular portions F and F' extend upwardly and rearwardly from their bases J, K,—J, K', respectively, to the point L where their apices meet; and the adjacent sides of said triangular portions F and F' meet to form a rearwardly and upwardly extending ridge J, L. The irregular pentagonal portions G and G' are set at a small dihedral angle relatively to one another and in a greater degree to the triangular portions F and F' respectively. The foremost sides J, N, and J, N', of the pentagonal portions G and G', respectively, join adjacent sides of the forward triangular portion E; valleys P and P' being thus formed upon the lines J, K, and J, K' and other very slight valleys Q and Q', upon the lines J, N, and J, N'. The sides N, O, and N', O', (indicated by dotted lines in Fig. 1) of the pentagonal portions G and G', tangentially join the curved portions H and H', respectively. The curves of said portions H and H' are approximately those of a portion of the surface of a cone, said curves expanding from vanishing points or apices N, and N', respectively, at the front edge D, C, of the rectangular surface A, B, C, D, to their outer bounding edges O, D and O', C, respectively. In its simplest form the forward edge D, C, of the surface A, B, C, D, lies in a straight line both in plan (Fig. 1) and in elevation (Figs. 2 and 3) but it may be depressed at the ends as shown in front elevation in Fig. 11, wherein are the depressed ends d , and d' ; or elevated as shown

in front elevation in Fig. 12, wherein are the elevated ends d' , and d' ; such modification of form being capable of accomplishment by simple adjustment of tension upon some of the truss wires 7, Fig. 19. It is possible also to dispense with the curvature of the triangular portions H, H', that is to say, they may be plane surfaces extending upwardly and rearwardly from their front edges D, N, and N', C, respectively, as shown in side elevation in Fig. 13, wherein appears one of said plane surfaces Y; without destroying the quality of inherent stability of the surface.

While Figs. 1 to 13 inclusive, show the base line $x-x$ as being horizontal, it will be understood that the surface as a whole may be tilted so as to dispose it at a greater or lesser angle to the remainder of the structure of a flying machine of which it forms a part, and so as to increase or decrease its angle of incidence when in flight.

A single supporting surface of the nature described, when ballasted so that the center of gravity is at or about the point J, which corresponds to the center of pressure of the surface in its normal flying position, (Fig. 1) possesses absolute inherent stability even though the preponderance of weight be placed above the surface, so that when dropped from a height in any position it will quickly regain its normal flying position and thereafter glide smoothly to the ground. The self righting qualities are due to the formation of the surface with dihedral angles of the fore and aft and lateral portions from the common point J, (Fig. 1) and to the further fact that when in the normal or flying position there is a balance of pressures about the point J where the center of gravity of the machine is situated, and the formation of the surface in such manner that when the lifting effect of one portion of the surface upon one side of the center of gravity of the machine is momentarily increased by an exterior disturbing force such as a gust of wind, the lifting effect of another portion of the surface upon the other side of the center of gravity of the machine is immediately thereafter increased in a greater degree so that equilibrium is restored; for instance referring to Fig. 4, let the parallel arrows X' indicate a gust of wind tending to raise the side G of the surface, above its normal position, it is evident that the portion F' of the surface which is placed in a position more nearly normal to the direction of the gust and which is upon the opposite side of the center of gravity of a flying machine, will be receiving the same gust and having its lifting effect thereby increased as it passes across and beneath the sustaining surface, counteract the effect of said disturbance upon the portion of the

sustaining surface first struck by said gust of wind. Similarly if a gust of wind strikes beneath the opposite side G' of the sustaining surface, its disturbing effect will be counteracted by its action upon the under side of the portion F of said sustaining surface. The lateral stability is also assisted in some degree by the dihedral placement of the portions G , and G' , of the sustaining surface, whereby as one side of the machine is slightly raised said side loses some of its supporting effect or efficiency, while the opposite side correspondingly gains in lifting effect or efficiency. In the event of exterior disturbance tending to abnormally elevate the sustaining surface in the rear, it is evident that the under side of the rear gable-shaped portion F , F' , will be diminished in lifting effect, while the upper side thereof will meet with more and more resistance from the air in front tending to press said rear gable-shaped portion downward by reacting upon its inclined surfaces so as to restore the fore and aft equilibrium of the flying machine.

It is evident that if the sustaining surface be abnormally elevated in front, the rear portions of said sustaining surface will receive increased pressure from below and decreased resistance from the front, so that equilibrium will be again restored. If the surface be allowed to fall in an inverted position, the center of pressure thereby no longer coinciding with the center of gravity, but being behind said center of gravity, the surface will be immediately overturned by the excess of pressure upon the rearward portion of said sustaining surface with the center of gravity J , as a fulcrum. Again if the surface be dropped with its forward edge D , C , uppermost, the reaction of the air against the inclined under sides of the portions F and F' will force the rear portion of the machine backward and the forward portion being the heavier will cause the surface to take the inverse position whence it will be righted as hereinbefore described.

The proportioning of the various areas of the various portions of the surface and their position angularly to one another is a matter of mathematical calculation, said angles being dependent upon the amount of curvature given to the portions H and H' of the surface which again is modified by considerations of speed and load capacity required. In general for the form illustrated in front elevation in Fig. 2, the points A , B , C , and D , are at a common level and at a height above the base line $x-x$, approximately equal to the height of the highest points O and O' , above said points A , B , C , and D . The portions F and F' being set at a negative angle should be as small as pos-

sible in area in relation to the entire surface, 65 as their lifting value is relatively small, but they must be of sufficient area to produce the necessary fore and aft and lateral stabilizing effect, it being necessary to some extent to sacrifice carrying capacity or lifting 70 efficiency, to considerations of stability, safety, and simplicity of construction and operation.

Referring to the plan Fig. 1, the point J is situated about one third of the distance 75 from front to rear of the surface, and the maximum spread of the gable portion consisting of the two portions F and F' is about one half of the lateral spread of the entire surface. 80

It is evident that as a single surface of the form described possesses absolute inherent stability such a surface may be used singly as a "monoplane," in pairs as a "biplane," in groups of three as a "triplane," or several 85 in a group as a "multiplane."

In Figs. 14, 18, and 19, a "biplane" is illustrated equipped with sustaining surfaces of the nature described, whereof 1 is the upper, and 2 is the lower surface, said 90 surfaces being connected at their forward edges 3 and 4, respectively, to opposite ends of vertical struts 5, 5, 5, 5, 5, 5, and being similarly connected in the rear to vertical struts 6, 6, 6, 6, 6, 6, the whole structure being also braced fore and aft and laterally, 95 by truss wires or their equivalents, some of which are marked 7, in Figs. 14 and 19. Attached at each end to one of the vertical struts 5, is a cross-bar 8, which is further 100 supported by legs 9, 9, and to said cross-bar 8 are attached at the forward end, longitudinally placed members 10, 10, Figs. 14, 15, 16, 18, and 19, one of said members 10, being shown broken away in Fig. 14, and one member 10 being shown removed in Fig. 15, so as to expose the propelling mechanism. To the longitudinal members 10, 10, are attached the engine R , Figs. 14, 15, 16, 18 and 19 whereof are cylinders 11, 11, 11, 11, pistons 12, 12, 12, 12, Fig. 16, connecting rods 13, 13, 13, 13, crankshaft 14, and crank-case 15, having lugs 16, 16, whereby the engine is secured to the longitudinal members 10, 10, by bolts 17, 17. To the crankshaft 14 is secured a gear-wheel 18 shown in full lines in side elevation in Figs. 14 and 15; and in dotted lines in front elevation in Fig. 16, and meshing with the gear-wheel 18 is another gear-wheel 19 secured to a rearwardly extending shaft 20, adapted to rotate in bearings 21, and 22, the bearing 22, being secured to a cross-bar 23 which is bolted or otherwise fastened to the members 10, 10. Upon the forward end of the crankshaft 14 125 is mounted and secured a propeller 24, and upon the rear end of the shaft 20 is another propeller 25; the said propellers being of

opposite pitch, that is to say, one of said propellers being right-handed and the other left-handed. Upon the shaft 20 is secured a starting wheel 26. In rear of the starting wheel 26 and slidably mounted upon the members 10, is an operator's seat 27 detailed in Figs. 20 and 21, secured to laterally placed slats 28, 28, by bolts 29, or otherwise secured thereto, said slats 28, 28, having metallic clips 30, 30, secured thereto by bolts 31, 31, or otherwise secured thereto, and capable thereby of clamping the seat 27 to the members 10 by means of bolts 32, 32, and wing nuts 33, 33. Another seat 27' may be provided, similarly constructed and attached as is the seat 27, for the purpose of carrying a passenger.

In the construction illustrated in Figs. 14, 18, and 19, the machine is provided with skids 34, 34, attached to the lower surface 2, at its rear edge, and at the front edge of said surface, by being secured to vertical struts 35, 35, and to diagonal struts 36, 36. A cross member 37 spans the skids 34 at the base of the struts 36, 36, and another cross member 38, spans and extends laterally beyond the skids adjacent to the base of the struts 35, 35. To hinges 39, 39, 39, 39, attached to the cross-bar 38, are pivotally attached frames 40 sustaining axles 41, of wheels 42, and supporting the weight of the machine upon the ground by means of tension springs 43, 43, secured at their upper ends to said frames 40 and at their lower ends to the skids 34, 34. Springs 44, one of which is shown in Fig. 18 attached at one end to the cross-member 38, at or near its center, and at the opposite ends to the inner ends of the axles 41, serve to limit in some degree, the lateral movement of the frames 40 and of the wheels 42. At the center of the cross-member 37 is a truss rod bearing post 45, for a truss rod 46, and upon said post 45 is a swivel 47 having laterally projecting pins 48, 48 upon which is pivoted a rocking frame 49 for a wheel 50; the vertical and lateral movements of the frame 49 and wheel 50 being limited by tension springs 51, 51, screwed at opposite ends to the frame 49 and the struts 36; and by the tension springs 52, 52, secured at opposite ends to the frame 49 and the skids 34. The forward ends 34^a, 34^a, of the skids 34, are vertically extended and connected at their upper ends by a cross-bar 53 and attached to the skids at their upper ends are braces 54, 54, each of which is attached at its opposite end to one of the vertical struts 5. An elevator which is preferably of the double surface type as shown in Fig. 14, whereof is an upper surface 55 and a lower surface 56, is pivotally mounted upon pins 57 upon the ends 34^a, of the skids 34; the lower surface 56, having slots 58, there-

through, for the passage of said ends 34^a. A rigid vertical member 59 is attached to, and extends above the upper elevator surface 55; and pivoted at one end upon said member 59 is a reach rod 60 which is pivoted at its opposite end to a swinging lever 61, Figs. 14 and 17, pivoted upon a bracket 62 attached to the under side of the upper surface 1.

Attached to the rear edges of the main surfaces 1 and 2 are rearwardly extending members 63, 64, 64, Figs. 14 and 18, containing at or near their rear extremities, pivots 65 and 66 for a rudder 67 having laterally extending arms 68 and 69 from which pass truss wires 70, 71, 72, and 73, to the corners of the rudder 67. Between and near the top of the central vertical struts 6, 6, is a cross-bar 74, Figs. 14 and 19, having brackets 75, 75, attached thereto and within which are adapted to revolve sheaves 76, 76. Attached to the swinging lever 61 are cross-arms 77 and 78, Figs. 14 and 17 and upon the cross-arm 77 are rotatively mounted sheaves 79, 79; and upon the cross-arm 78 are rotatively mounted sheaves 80, 80, the axes of the sheaves 80, 80, being horizontally disposed at an angle of 90 degrees to the axes of the sheaves 79, 79. Rotatively mounted upon a pin 81 is a steering wheel 82, having a peripheral groove 83 in the rim thereof, around which passes a cable or cord 84, 85, one portion of which 84 passes around one of each of the pulleys 80, 79 and 76, and is attached to the rudder arm 68; and the other portion 85, of which passes around each of the other pulleys 80, 79 and 76, and is attached to the other rudder-arm 69.

The main supporting surfaces are preferably formed of upper and lower layers of fabric 86 and 87, respectively, enclosing the framework between them. The said framework may be constructed in a number of different ways, the preferred method of construction being that shown on the left hand half of Fig. 18, wherein is a rib 88 forming the front edge of the surface, a rib 89 forming the rear edge of the surface; straight ribs 90, 91, 92 and 90' radiating from a point corresponding to the point J, Fig. 1, and secured thereat in any suitable manner such as by being bolted to a metallic plate J', Fig. 18; other ribs 93 and 94 radiating from a point on the front rib 88 corresponding to the point N, Fig. 1, said rib 90 being secured at its outer extremity to the rib 88; said ribs 92 and 90' being secured at their outer extremities to the rear edge rib 89, and said ribs 91, 93 and 94 being secured at their outer extremities between an upper curved member 95 and a lower curved member 96 between which are also inclosed the front rib 88, and the rear rib

89. Other curved members 95' and 95² are applied similarly above and below the said ribs 88, 89, 91, 93 and 94. The rib 89 has a central portion 89' which is dihedrally disposed at the point K to the outer portion of said rib 89 and said central portion 89', meets and is joined to the central rearwardly and upwardly extending rib 90', and another rib 97 is joined at one end to the ribs 89' and 90' at their junction point L, and at its opposite end to the rib 92. The method of attaching the various members of the framework to one another may be by bolting, nailing or gluing or by any combination of these methods.

In Figs. 14, 18, and 19, the elevator surfaces 55 and 56 are shown as being formed upon the same identical lines as the main surfaces 1 and 2, but though this is desirable it is not absolutely essential; the function of the elevator being merely to direct the upward and downward motion of the machine rather than to create fore and aft stability, this condition being rendered possible by the inherent stability of the machine, which is brought about by the nature of the main sustaining surfaces hereinbefore described.

In order to relieve the machine from any laterally tilting tendency due to the reactionary and gyroscopic effect of the driving mechanism are provided means for balancing the torque upon said driving mechanism by providing the equivalent of equal and oppositely revolving weights; thus avoiding the necessity for increasing the angle of incidence or the amount of surface in the side of the machine which tends to become depressed. For instance, in the construction illustrated in Figs. 14, 15, and 16, the propeller 24, crankshaft 14, gear-wheel 18, and a certain proportion commonly calculated as revolving weight of the connecting rods 13, 13, 13, 13, revolve in one direction as in that indicated by the arrow X³, Fig. 16; while the gear-wheel 19, the starting-wheel 26, the shaft 20, and the propeller 25, revolve in the opposite direction which is that indicated by the arrow X², Fig. 16. The product of the weight and speed reduced to a common distance from their axes of the parts revolving in one direction being equal to the product of weight and speed of the oppositely revolving parts reduced to the same terms. This balance being conveniently achieved by making the starting wheel 26 of suitable weight. The effect of the forward propeller 24, is to pull, and of the rear propeller 25, to push the machine forward.

To operate the machine the operator occupies the seat 27, and turns the starting wheel in the direction of the arrows X², Figs. 15 and 16, thus turning the attached

shaft 20 and attached gear wheel 19 in the same direction and thereby the crankshaft 14 in the opposite direction through the medium of the intermeshing gear wheels 19 and 18. The engine then continues to revolve the shafts 14 and 20 with their attached propellers 24 and 25, in opposite directions, said propellers being formed left and right handed, respectively. The machine is thus driven rapidly forward along the ground on its wheels 42 and 50, in the direction of the arrow X⁵, Fig. 14. The operator after starting the engine, grasps the steering wheel 82, and when the machine has gathered sufficient speed said operator swings the swinging lever 61 in the direction of the arrow X⁶ thereby drawing the reach-rod 60 in the direction of the arrow X⁷ and rotating the elevator surfaces 55 and 56 about the pins 57, 57, in the direction of the arrow X⁸, Fig. 14, the angle of incidence of said elevator surfaces 55 and 56 being thereby increased, their lifting effect is also increased, with the result that through the medium of the skids 34, 34, the struts 36, 36, and the braces 54, 54, the entire machine is tilted up at the front, the pivotal point being situated at the axles 41, 41, of the supporting wheels 42, 42, 42, 42; the angle of incidence and consequent lifting effect of the main surfaces 1 and 2 being thus temporarily increased owing to the increased vertical component of the air pressure beneath said main surfaces 1, and 2, the machine leaves the ground. Thereafter when the operator wishes to decrease the elevation of the machine he swings the lever 61 in the direction of the arrow X⁹, Fig. 14, thus moving the reach-rod 60 in the direction of the arrow X¹⁰ and rotating the elevator surfaces 55 and 56 about the pivot pins 57, in the direction of the arrow X¹¹, Fig. 14, the decreased angle of incidence of the elevator surfaces 55 and 56, thus decreasing the lifting effect of the forward part of the machine and causing the machine to descend. To gain elevation the lever 61 is swung backwardly in the direction of the arrow X⁶ as previously described. Steerage of the machine to the right is accomplished by rotating the steering wheel 82 in the direction of the arrow X¹⁴, Fig. 17, thus drawing upon the cable 84, and by its attachment to the rudder arm 68 rotating said rudder 67 in the direction of the arrow X¹³, Fig. 18, as indicated in dotted lines 67', and causing the machine to turn to the right. When it is desired to steer the machine to the left, the steering wheel 82 is rotated in the direction of the arrow X¹², thus drawing upon the cable 85, Figs. 14 and 18, and by its attachment to the rudder arm 69, rotating said rudder 67 in the direction of the arrow X¹⁵, Fig. 18, and into the position shown in

dotted lines 67², Fig. 18, and thereby causing the machine to turn to the left. In descending, before reaching the ground the engine is stopped and the elevator raised so as to cause the machine to be retarded in forward progress by increased resistance of the air from in front. The remaining shock of alighting being absorbed by the springs 51, 51, 52, 52, 43, and 43.

10 Having thus described the invention, it is desired to secure Letters Patent for the specified forms and features of construction as set forth in the following claims:

15 1. In a flying machine, a sustaining surface having dihedrally disposed lateral portions, and whereof the angle of incidence is positive except at the rearward central portion and the forward lateral portion thereof.

20 2. In a flying machine, a sustaining surface having dihedrally disposed lateral portions, and whereof the angle of incidence is relatively negative at the rearward central portions and the forward lateral portions thereof.

25 3. In a flying machine, a sustaining surface having obliquely upwardly convergent rearward central portions, disposed at a negative angle of incidence and obliquely divergent lateral portions disposed in part at a positive angle of incidence, said lateral portions being plane surfaces tangentially merged into curved surfaces each of a negative angle of incidence upon lines oblique to the forward margin of said sustaining surface.

35 4. In a flying machine, a sustaining surface having obliquely upwardly convergent rearward central portions, disposed at a negative angle of incidence and obliquely divergent lateral portions disposed in part at a positive angle of incidence, said lateral portions being plane surfaces tangentially merged into curved surfaces each of a negative angle of incidence upon lines oblique to the forward margin of said sustaining surface, the obliquity of said lines being in a direction laterally and rearwardly from said forward margin.

40 5. In a flying machine, a sustaining surface having obliquely upwardly convergent rearward central portions disposed at a negative angle of incidence, obliquely divergent lateral portions disposed in part at a positive angle of incidence, and a forward central portion disposed at a positive angle of incidence.

50 6. In a flying machine, a sustaining surface having obliquely upwardly convergent rearward central portions disposed at a negative angle of incidence, a forward central portion disposed at a positive angle of incidence, and obliquely divergent lateral portions disposed in part at a positive angle of incidence, said lateral portions being

plane surfaces tangentially merged into curved surfaces each of a negative angle of incidence upon lines oblique to the forward margin of said sustaining surface.

7. In a flying machine, a sustaining surface having obliquely upwardly convergent rearward central portions disposed at a negative angle of incidence, a forward central portion disposed at a positive angle of incidence, and obliquely divergent lateral portions disposed in part at a positive angle of incidence, said lateral portions being plane surfaces tangentially merged into curved surfaces each of a negative angle of incidence upon lines oblique to the forward margin of said sustaining surface, the obliquity of said lines being in a direction laterally and rearwardly from said forward margin.

8. In a flying machine, a sustaining surface whereof successive portions are disposed at opposite angles of incidence upon each of lines extending diagonally from each front corner of said sustaining surface to the center of the rear margin thereof; the angle of incidence upon said diagonal lines being, from front to rear, first negative, then positive, then finally negative.

9. In a flying machine, a sustaining surface having a central rearwardly situated rearwardly and upwardly inclined gable-shaped portion, a front central, upwardly, and forwardly inclined portion; and lateral dihedrally disposed portions arched rearwardly from their front margins.

10. In a flying machine, a sustaining surface having a central rearwardly situated rearwardly and upwardly inclined gable-shaped portion, a front central, upwardly, and forwardly inclined portion; and lateral dihedrally disposed portions arched rearwardly from their front margins, the curvature of each of said arched portions corresponding approximately to that of a portion of the surface of a cone having its apex situated at the front margin of said sustaining surface.

11. In a flying machine, the sustaining surface having the rearwardly and upwardly inclined triangular portions F, and F' the valleys P, and P', the valleys Q, and Q', the upwardly and forwardly inclined central forward triangular portion E, the lateral dihedral irregular pentagonal portions G, and G', and the arched triangular portions H, and H'; said dihedral portions G, and G' joining said triangular portions F, and F', along the valleys P, and P', respectively, and joining the central triangular portion E, along the valleys Q, and Q', respectively, and being tangentially merged into the arched portions H, and H', respectively, along the lines O N and O' N', respectively.

12. In a flying machine, the combination
with the framework thereof, of sustaining
surfaces each having a central rearwardly
situated rearwardly and upwardly inclined
5 gable-shaped portion, a front central up-
wardly and forwardly inclined portion and
lateral dihedrally disposed portions arched
rearwardly from their front margins, and
propelling and steering mechanism, sub-
10 stantially as set forth.

In testimony to the above witness my sig-
nature at Los Angeles, county of Los
Angeles, and State of California, in the
presence of the subscribing witnesses.

DONALD BARKER,

*Executor of the estate of Richard G. V.
Mytton, deceased.*

Witnesses:

F. E. LINN,

RUPERT TURNBULL.

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