

MONOPLANE.

Patented Sept. 3, 1912.

2 SHEETS--SHEET 1.

1,037,214.



Elia Desage
O. G. Remington

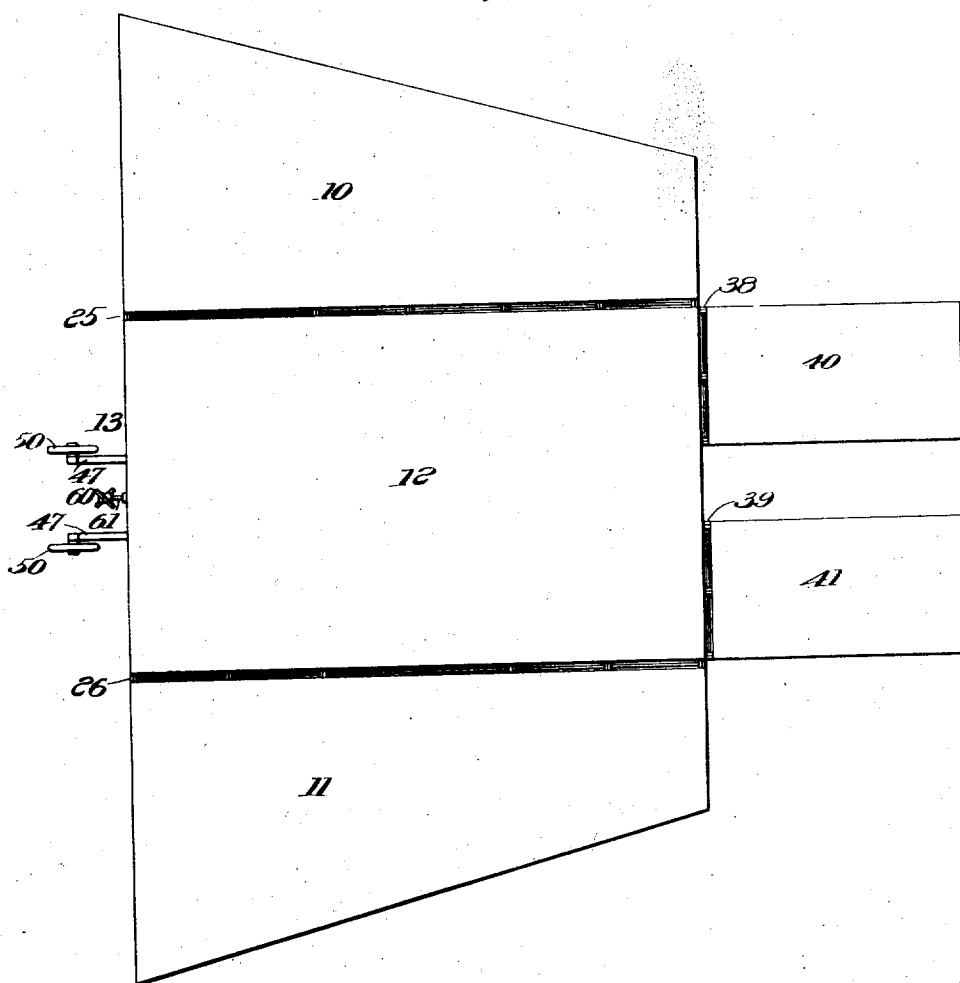
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 MONOPLANE.
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 2 SHEETS—SHEET 2.

Fig. 3.



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MONOPLANE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ANTHELME DESAYE, a citizen of the Republic of France, residing at Clifton, in the county of Passaic and State of New Jersey, have invented a new and useful Monoplane, of which the following is a specification.

This invention relates to flying machines of the monoplane type.

10 The object in general of the invention is to provide an improved monoplane having great flying stability which will be highly efficient in operation and easy to control.

15 A more particular object of the invention is to provide a monoplane having improved steering, elevating and descending means.

Other objects will appear from the following description.

20 A desirable embodiment of my invention is illustrated in the accompanying drawings in which—

25 Figure 1 is a side elevation of the invention; Fig. 2 is a front elevation thereof; Fig. 3 is a plan view thereof; Fig. 4 is a longitudinal sectional view of the invention taken on the line 4 of Fig. 3.

Similar characters of reference refer to similar parts in the drawing throughout the several views.

30 *Body.*—The body 1 of my improved monoplane comprises a suitable frame 2, provided with partitions 3 and 4, which divide the body into three longitudinal compartments 5, 6 and 7, and also form central 35 braces for the body.

Main planes.—Fulcrumed respectively at 8 and 9 at the upper side edges of the body 1, are the side planes 10 and 11, which extend the entire length of the body. The 40 top covering 12 of the body of the machine constitutes the intermediate rigid section of the monoplane 13, which comprises said intermediate section and the side sections formed by the side planes 10 and 11. Each 45 of the planes 10 and 11 is wider at its front end than at its rear end to provide a greater area of sustaining surface at the front end of the machine than at the rear end thereof, inasmuch as the front end of the machine is 50 the heavier, owing to the fact that the aviator and mechanism hereafter described are located in the forward part of the machine. Each of the planes 10 and 11 is inclined

slightly upwardly at its front end and slightly downwardly at its rear end from 55 its fulcrum point, so as to provide the upwardly inclined front sustaining surface 15, which extends from the front end of the plane to a point *x*, and the downwardly inclined rear sustaining surface 20, which 60 extends from said point *x* to the rear end of the plane.

Auxiliary planes.—Fulcrumed to the sides of the body 1, respectively at 25 and 26, directly below the fulcrum points 8 and 9 65 are the auxiliary planes 10^a and 11^a which extend the entire length of the body 1 parallel with the planes 10 and 11 and provide auxiliary inclined sustaining and protective surfaces 15^a and 20^a respectively at the front 70 and rear of the machine, the inclination and length of which correspond to the inclination and length of the surfaces 15 and 20 respectively of the side planes 10 and 11. Said auxiliary planes assist the side planes 75 in sustaining the machine and also break the force of any violent upward atmospheric pressure against the planes 10 and 11, whereby said planes are protected and 80 relieved of undue strain. Said auxiliary planes add materially to the strength, durability and efficiency of the planes 10 and 11. The formation of the planes 10 and 11 and the auxiliary planes 10^a and 11^a is such that 85 under normal horizontal flying conditions the action of the air against the forward angular surfaces 15 and 15^a of said planes and the reaction of the air against said surfaces, will sustain the forward end of the machine, while the action of the surfaces 20 90 and 20^a of said planes against the air and the reaction of the air against said surfaces will sustain the rear end of the machine on a level with the forward end thereof.

Stabilizing and descending devices.—Lo- 95 cated within the compartments 5 and 6 respectively and extending the entire length thereof are the tubular elements 30 and 31, which form longitudinal air chambers, and constitute the stabilizing and descending de- 100 vices of the machine. Said tubular elements are preferably hexagonal in cross section and are open at their respective ends, for the passage of air therethrough, and at their 105 lowermost sides for the admission of air therein. This construction of the tubular

elements provides the sides 30^a, 30^b and 30^c for the element 30 and the sides 31^a, 31^b and 31^c for the element 31 which sides provide pressure surfaces which act upon the air in the manner and for the purposes hereafter described.

Steering and elevating means.—Fulcrumed at the upper rear edge of the body 1 directly over the rear end of each of the tubular elements 30 and 31, and extending rearwardly of the machine, are the rudders and elevating planes 40 and 41 respectively, by means of which the machine is guided and elevated. Said rudders under normal horizontal flying conditions of the machine rest in a horizontal position substantially in alinement with the upper sides of said tubular elements, but are adapted to be swung upwardly on their fulcrums to guide or elevate the machine as will be hereafter more fully described.

Ground supports and shock absorber.—Journaled in the downwardly depending supports 45 rigidly secured to the under frame-work of the body of the machine at the rear end of the body, are the cushioned wheels 46 by means of which the rear of the machine is longitudinally movably supported when the machine is upon the ground. Journaled in the forward ends of the compound curved springs 47 which are secured at their rearward ends to the downwardly depending support 49, secured to the frame-work of the body of the machine, at the front end of said body, are the cushioned wheels 50, by means of which the front end of the machine is longitudinally movably supported, when the machine is upon the ground. The curvature and arrangement of the springs 47 are such as to allow considerable backwardly yielding movement of the wheels 50, when said wheels come in contact with the ground or any other non-yielding surface, with the direction of movement of the machine at such inclination to the ground or other surface that the reaction of the ground or such surface will press backwardly upon said wheels with unusually great force and violence, whereby the danger of the wheels and front structure of the machine being broken, and also the shock of the impact of the wheels against the ground or such surface, will be reduced to a minimum.

Propelling mechanism.—The machine is propelled by the propeller 60 which is mounted in front of the central upper part of the machine, on the forward end of the shaft 61, which extends centrally, longitudinally of the machine, and is journaled in bearings 62 in the upper frame-work of the body of the machine. The propeller is driven by engine 63, mounted in the forward part of the machine, through sprockets 64 and 65, respectively on the drive shaft 66 of the engine, and on the rear end of pro-

PELLER shaft 61, and chain 67 which runs on said sprockets.

Controlling means for rudders and elevating planes.—The rudders and elevating planes 40 and 41 are respectively controlled by levers 70 and 71, which are located in the forward end of the compartment 7 of the body of the machine at the respective sides of said compartment which correspond to the sides of the machine to which the rudders and elevating planes 40 and 41 are respectively fulcrumed. Said levers 70 and 71 are respectively connected to the rudders and elevating planes 40 and 41 by means of rod 72, bell crank lever 74 and rod 76, and by means of rod 73, bell crank lever 75 and rod 77. The rod 72 is connected at its respective ends to lever 70 and one arm of bell crank lever 74, which lever is fulcrumed in the lower rear frame-work of the body of the machine. The other arm of said bell crank lever is connected to one end of rod 76, the other end of which is connected to the rudder and elevating plane 40. The rod 73 is connected at its respective ends to lever 71 and one arm of bell crank lever 75, which lever is fulcrumed in the lower rear frame-work of the body of the machine. The other arm of said bell crank lever is connected to one end of rod 77, the other end of which is connected to the rudder and elevating plane 41.

Controlling means for side and auxiliary planes.—The side plane 10 and auxiliary plane 10^a and the side plane 11 and auxiliary plane 11^a are respectively controlled by levers 80 and 81, which are located in the forward end of the compartment 7 of the body of the machine, at the respective sides of said compartment which correspond to the sides of the machine to which the side plane 10 and auxiliary plane 10^a and the side plane 11 and auxiliary plane 11^a are respectively fulcrumed. The levers 80 and 81 are respectively connected to the side planes 10 and auxiliary planes 10^a and the side planes 11 and auxiliary planes 11^a by means of shafts 82 and 83, beveled gears 84 and 86 and 85 and 87, shafts 88 and 89, arms 90 and 91 and rods 92 and 93. The lever 80 is mounted on one end of shaft 82 which is journaled in bearings 94 on the lower frame-work of the machine. Beveled gear 84 is mounted on the other end of shaft 82 and meshes with beveled gear 86, which is mounted on the shaft 88. The shaft 88 extends longitudinally of the body of the machine and is journaled in bearings 95 on the frame-work at the lower side edge of the body below the planes 10 and 10^a. Each of the arms 90 is fixed to the shaft 88 and is connected at its outer end to a rod 92 which in turn is connected to the planes 10^a and 10. The lever 81 is mounted on one end of shaft 83, which is journaled in bearings 96, on

the lower frame-work of the machine. Beveled gear 85 is mounted on the other end of shaft 83 and meshes with beveled gear 87, which is mounted on the shaft 89. The shaft 89 extends longitudinally of the body of the machine and is journaled in bearings 97 in the frame-work at the lower side edge of the body below the planes 11 and 11^a. Each of the arms 91 is fixed to the shaft 89 and is connected at its outer end to a rod 93, which in turn is connected to the planes 11^a and 11. The rods 92 and 93 are respectively connected to the planes 10^a and 10 and 11^a and 11 at such points that the lifting and lowering force applied to said planes will be equally distributed thereto.

Aviator's seat.—A seat 100 is located in the forward end of the compartment 7 upon which the aviator sits to operate the machine.

The operation of my improved monoplane is as follows: Assuming the machine to be on the ground in the position shown in Fig. 1 of the drawing and the aviator desires to ascend and fly in the machine, he first swings the elevating planes 40 and 41 upwardly in unison with each other upon their fulcrums by means of levers 70 and 71 and their connections with said planes and starts the engine 63, whereupon the machine is propelled forwardly by the propeller 60; as the machine moves forwardly the action of the elevating planes against the air and the reaction of the air against said elevating planes will hold down the rear end of the machine, while the action of the air against the forward surfaces 15 and 15^a of the side and auxiliary planes 10 and 11 and 10^a and 11^a respectively, under these conditions, will cause the front end of the machine to rise; when the forward end of the machine has risen to such position that the machine assumes the desired angle of flight to elevate the machine, the aviator then swings down the elevating planes 40 and 41 by means of levers 70 and 71 and connections to such angle that the rear end of the machine is held down with such force that the machine ascends at such desired angle of flight until the desired altitude is reached, when the aviator swings the elevating planes down by said levers into their horizontal positions, whereupon the machine is brought into horizontal position and assumes a horizontal line of flight.

When the aviator desires to turn the machine to the right he swings up the right rudder 40 by means of lever 70 and its connections with said rudder, (which lever is in convenient reach of his right hand), whereupon the action of the rudder against the air and the reaction of the air against the rudder will retard the velocity of the right side of the machine and allow the left side thereof to go ahead at a greater velocity

than that of the right side, whereupon the machine will swing around to the right. As the machine swings around to the right, the action of the rudder 40 against the air and the reaction of the air against said rudder will cause the right side of the machine to descend. In order to maintain the machine in lateral equilibrium, when the right rudder 40 is swung up and the right side of the machine starts to descend, the aviator, by means of lever 81 (which is within convenient reach of his left hand) through the connections between said lever and the side and auxiliary planes 11 and 11^a swings said planes upwardly on their fulcrums until they assume such an angle, that the areas of the sustaining surfaces of said planes will be reduced to such dimensions, that the sustaining power of the left side of the machine will equal that of the right side thereof, whereupon the left side of the machine will descend at the same velocity at which the right side thereof descends and on a level with the right side. Upon returning the rudder and planes to their initial positions the machine will assume its normal horizontal direction of flight.

When the aviator desires to turn the machine to the left he swings up the left rudder 41 by means of lever 71 (which is within convenient reach of his left hand) through the connections between said lever and rudder, whereupon the action of the rudder against the air and the reaction of the air against said rudder, will retard the velocity of the left side of the machine and allow the right side thereof to go ahead at a greater velocity than that of the left side, whereupon the machine will swing around to the left. As the machine swings around to the left the action of the rudder 41 against the air and the reaction of the air against the said rudder will cause the left side of the machine to descend. In order to maintain the machine in lateral equilibrium, when the left rudder 41 is swung up and the left side of the machine starts to descend, the aviator by means of lever 80 (which is within convenient reach of his right hand) through the connections between said lever and the side and auxiliary planes 10 and 10^a swings said planes upwardly on their fulcrums until they assume such an angle, that the areas of the sustaining surfaces of said planes will be reduced to such dimensions that the sustaining power of the right side of the machine will equal that of the left side thereof, whereupon the right side of the machine will descend at the same velocity at which the left side thereof descends and on a level with the left side. Upon returning said rudder and planes to their initial positions the machine will assume its normal horizontal direction of flight.

The columns of air which pass through

the tubular elements 30 and 31 during flight of the machine afford great stability to the machine. In case either side of the machine should suddenly ascend, an upward action upon the air column on such side of the machine by the inner surfaces of the sides 30^a or 31^a of the tubular element 30 or 31, as the case may be, will be produced, whereupon the downward reaction of said air column against said surfaces, will cause said side of the machine to descend until lateral equilibrium of the machine is restored. Conversely if either side of the machine should suddenly descend, a downward action upon the air column on such side of the machine, by the inner surfaces of the sides 30^b and 30^c or 31^b and 31^c of the tubular element 30 or 31, as the case may be, will be produced, whereupon the upward reaction of said air column against said surfaces, will cause said side of the machine to ascend until lateral equilibrium of the machine is restored.

The lateral stability afforded by the passage of the air column through the air chambers of the tubular elements 30 and 31, is such, for example, that the machine may easily maintain a straight line of flight, at a rate of twenty-five miles an hour, in a breeze blowing at a rate of twelve miles an hour at right angles to the line of flight. In case the machine should drop on account of failure of the engine, or for other reasons, and the forward end of the machine, which is heavier than the rear end thereof, should tend to drop foremostly, with the machine in a vertical position, the aviator, by swinging up his rear elevating planes 40 and 41 may swing the forward end of the machine upwardly to such an extent that the action of the air column passing through the tubular elements 30 and 31 will afford the machine sufficient buoyancy and stability to enable the machine to descend longitudinally with the front end foremost, at an angle to the earth, while the elevating planes 40 and 41 will retard the falling velocity of the machine to such an extent that the machine will descend slowly and safely to the earth with parachute effect.

The elevating power of the elevating planes 40 and 41 and the stabilizing power of the tubular elements 30 and 31 plus the force of gravity, are in such ratio to each other that it is impossible for said planes to elevate the front end of the machine high enough to cause the machine to turn over backwardly.

By means of tubular elements 30 and 31 the aviator may descend with safety at any time, of his own volition, at a relatively high velocity, upon stopping the engine entirely, or at a relatively lower velocity, governed by the speed, below minimum flying speed to which he reduces his engine.

I do not limit myself to the exact con-

struction herein shown and described as variations and modifications of my invention may be made within the scope of the invention.

Having described my invention I claim:

1. A flying machine of the monoplane type comprising a body, a sustaining plane, propelling means, elevating and steering means, and stabilizing and descending devices comprising hexagonal tubular elements open at their ends and at their lower sides, located at the respective sides of the body, and extending longitudinally thereof.

2. A flying machine of the monoplane type comprising a body, a sustaining plane consisting of an intermediate stationary section and a side section pivoted to each side of said intermediate section, a tubular element located at each side of the longitudinal center of the machine and extending longitudinally thereof, a horizontally pivoted rudder located rearwardly of each of said tubular elements in alinement therewith, operating means respectively for the right and for the left rudder, and operating means respectively for the right and for the left side section of the sustaining plane.

3. A flying machine comprising a body, a sustaining plane consisting of an intermediate stationary section and a side section pivoted to each side of said intermediate section, a tubular element located at each side of the longitudinal center of the machine and extending longitudinally thereof, said tubular elements being open at their ends and at their under sides, a rudder located in the rear of each of said elements, operating means respectively for the right and for the left rudder and operating means for the right and for the left side sections respectively of the sustaining plane.

4. A flying machine comprising a body, a sustaining plane consisting of an intermediate stationary section and a side section pivoted to each side of said intermediate section, a tubular element located at each side of the longitudinal center of the machine and extending longitudinally thereof, a rudder located in the rear of each of said tubular elements, operating means respectively for the right and for the left rudder, and operating means respectively for the right and for the left side section of the sustaining plane.

5. A flying machine comprising a body, a sustaining plane consisting of an intermediate stationary section and a side section pivoted to each side of said intermediate section, a tubular element located at each side of the longitudinal center of the machine and extending longitudinally thereof, a horizontal rudder pivoted at the upper rear edge of each of said tubular elements, operating means respectively for the right and for the left rudder and operating means

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respectively for the right and for the left side section of the sustaining plane.

6. A flying machine comprising a body, a sustaining plane consisting of an intermediate stationary section and a side section pivoted to each side of said intermediate section, a hexagonal tubular element located at each side of the longitudinal center of the machine and extending longitudinally thereof, a rudder located rearwardly of each of said tubular elements in alinement there-

with, operating means respectively for the right and for the left rudder and operating means respectively for the right and for the left side section of the sustaining plane. 15

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ANTHELME DESAYE.

Witnesses:

T. W. RENNISON MECHEW,
ELIA DESAYE.