

F. D'ORBESSAN.
FLYING MACHINE.
APPLICATION FILED SEPT. 5, 1911.

1,052,803.

Patented Feb. 11, 1913

3 SHEETS—SHEET 1.

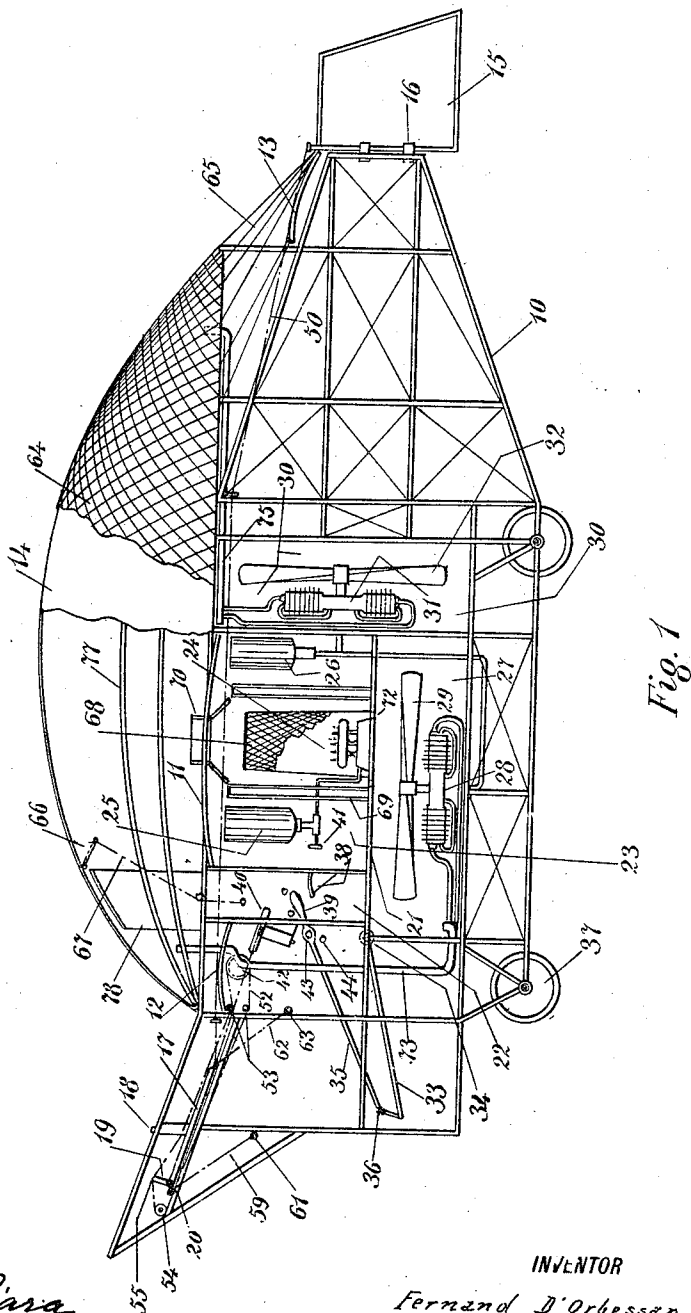


Fig. 1

WITNESSES:

Tullio V. Giara

Alexander M. Underbitch

INVENTOR

Fernand D'Orbessan

BY

Guido Lucidote
his ATTORNEY

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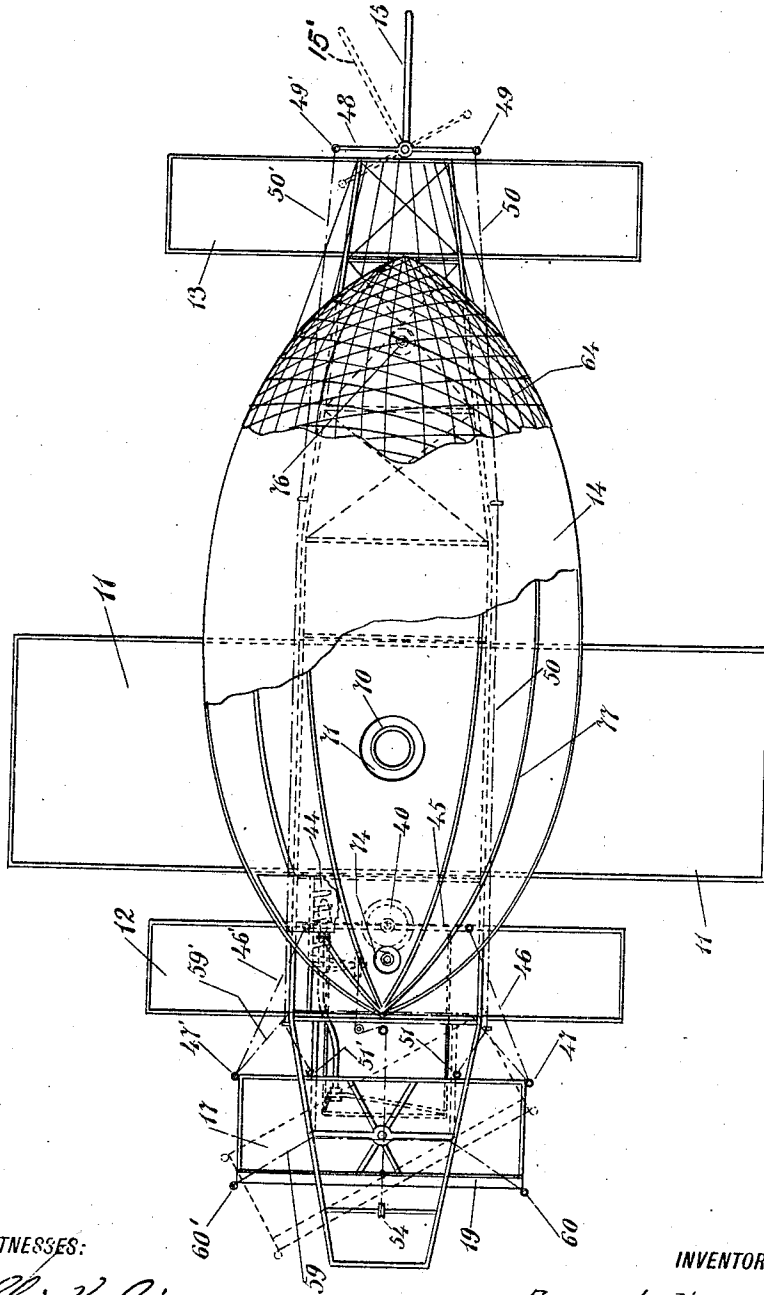


Fig. 2

WITNESSES:

Tullio V. Giara

Alexander M. Anderson

INVENTOR

Fernand D'Orbessan

BY

Guido Scudato
his ATTORNEY

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3 SHEETS-SHEET 3.

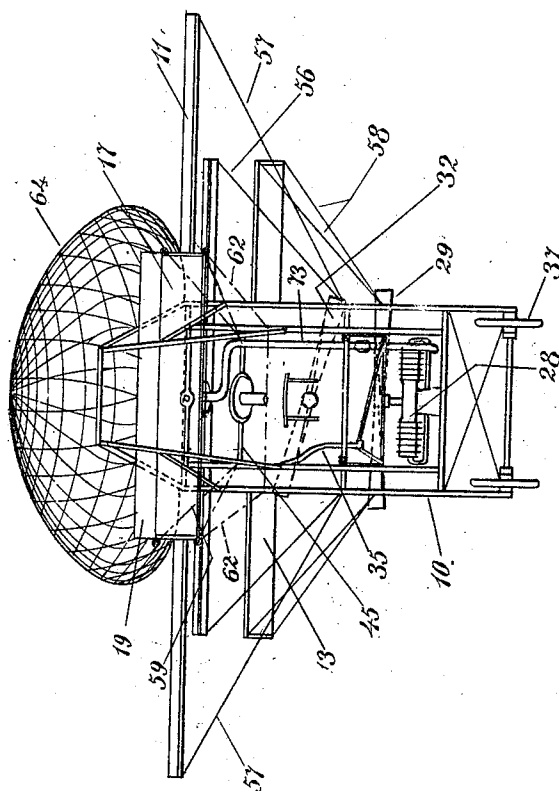


Fig. 3

WITNESSES:

Tullio V. Giara
Alexander H. Indubitzky

INVENTOR

Fernand D'Orbessan

BY

Guido Sacardote
his ATTORNEY

UNITED STATES PATENT OFFICE.

FERNAND D'ORBESSAN, OF OZONE PARK, NEW YORK.

FLYING-MACHINE.

1,052,803.

Specification of Letters Patent.

Patented Feb. 11, 1913.

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To all whom it may concern:

Be it known that I, FERNAND D'ORBESSAN, a citizen of the United States, and resident of Ozone Park, in the county of Queens and State of New York, have invented certain new and useful Improvements in Flying-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to a flying machine, and more particularly to that class of flying machines in which special attention is given to the safety of the aviator, and in which special means are provided to insure the stability of the device while navigating in the air.

The primary object of my invention is the provision of an aeroplane fitted with a bag capable of increasing the lifting capacity of the device, when filled with some fluid element lighter than air, at the same time increasing the buoyancy of the same, on account of the larger volume of air displaced.

Another object of the invention is the provision of an aeroplane fitted with a hollow bag at its upper part, and having means for filling said bag with hot air, and with the products of combustion of the engines while traveling, thus utilizing the lifting energy due to their high temperature, which is now wasted.

A further object of the invention is the provision of a monoplane in which, besides the usual propeller rotating in a vertical plane, there is an auxiliary propeller rotating in a horizontal plane assisting in the lifting of the machine without gliding and also sustaining the machine while in the air.

A still further object of the invention is the provision of a monoplane having special means for steering the machine vertically and horizontally, designed with the object in view of obtaining a rapid control of the different movements to be effected by the machine.

With these and other objects in view, as will more fully appear as the description proceeds, my invention consists in certain constructions and arrangements of parts, the novel and useful points of which will be described and claimed in the appended claims.

In the accompanying drawings illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a side view in elevation of the

device, the air bag and the protective net for the same being partly broken away; Fig. 2 is a plan view from the top, with the air bag and net similarly broken away; and Fig. 3 is a front view in elevation of the same.

The drawings illustrate the preferred form of embodiment of the invention, comprising a skeleton frame structure 10 having an elongated shape, provided with a main plane 11, an auxiliary plane 12 in front of the same, and an auxiliary plane 13 at the rear end, to the upper part of which is secured an air bag 14.

At the rear end of machine is pivoted a vertical rudder 15, on hinges 16 at the front end is pivoted a steering plane 17 slightly inclined upwardly, on a pivot 18 and the same is pivoted with a surface resistance on which rests another inclined plane, which is lowered or elevated at the will of the aviator. Thus it acts as a biplane, when raised parallel to the lower plane.

The central part of the structure comprises a platform 21, above which is the aviator compartment 22, and a larger compartment 23 at the rear of the same, devoted to receive a hot air stove 24, a fuel tank for the same 25, a gasolene tank 26 for serving the engines, and such other supplies and contrivances as may be necessary or useful to carry while traveling. Underneath platform 21 there is a space or compartment 27, in which is mounted a motor 28 operating a lifting horizontal propeller 29. At rear of compartments 23 and 27 is another compartment 30, in which is mounted a motor 31 operating in front propeller 32^a vertical and a propeller 32 revolving in a vertical plane.

33 is an elevating plane pivoted in front of platform 21, operated by a lever 35 pivotally connected in 36 to said elevating plane.

The structure is provided with four wheels 37, for the purpose of sustaining the same while on the ground.

Going now into the details of construction and operation of the various parts, space 22 is provided with a seat 38, from which the aviator can operate lever 35 by means of handle 39, a steering wheel 40 for the control of rudder 15 and steering plane 17, a valve 41 for the supply of fuel to stove 24, and a wheel 42 controlling the inclination of surface of resistance 19. Lever 35 is provided with a hole 43, adapted to engage pins 44 located at different posi-

tions, thus securing elevating plane 33 at different inclinations above and below the horizontal. When traveling in a horizontal direction, plane 33 is held a trifle below the horizontal, to offset the effect of the upward inclination of steering plane 17; the positions above this are used when it is necessary to elevate the machine, while the positions below are used when the machine must come to the ground. Rudder 15 and steering plane 17 are used for steering the machine laterally, and are operated simultaneously. Steering wheel 40 is provided with a cross arm 45 connected by means of ropes 46 46' to points 47, 47' at the rear of plane 17. Rudder 15 is provided with a yoke 48 whose ends 49, 49' are connected with ropes 50, 50' to points 51, 51' also at the rear of plane 17. It can be seen that with this arrangement, by operating steering wheel 40 so as to cause plane 17 to rotate around pivot 18, assuming the position shown in dotted lines, the same will cause the rotation of rudder 15 in the same direction, thus assuming therefore the position 15' shown in dotted lines. In this position rudder 15 tends to change the direction of the machine to the right (Fig. 2), while the surface of resistance 19 in front, being raised, offers a resistance to the air, the normal component of which also tends to change the direction of the machine to the right. By the joint action of both rudder and steering plane the change of direction is thus effected in a most rapid manner. If the steering wheel is operated in the opposite direction, also the rudder and steering plane will assume an inclination opposite to that shown, and the direction of the machine will be changed to the left. Surface of resistance 19 can be lowered when desired, to lessen the resistance to flight. To this effect wheel 42 commands a rope 52 passing on guide pulleys 53, 54, and connected at the two ends to outer point 55 of surface 19. By rotating wheel 42, surface 19 is therefore set at any desired angle, to offer more or less resistance to the air.

Planes 11, 12 and 13 are the sustaining planes, proper of the machine, reinforced by stay wires 56, 57, 58; steering plane 17 however acts also as a sustaining plane, being reinforced by wires 59 running from point 60 to point 60' through guide points 61, and 62 running from point 47 to 47' through guide points 63. Said wires 59 and 62 can slide through said guide points 61, 63, thereby allowing the free motion of plane 17 around pivot 18.

The air-bag 14 is made of oiled silk or other suitable material as used in the construction of ordinary balloons, and is secured to the upper part of frame 10. Its shape is low and elongated, as shown in the drawings, so as to offer little resistance to

the air, at the same time insuring a large capacity. As it is well known, the buoyancy is equal to the weight of the fluid displaced, and the large volume of the bag is therefore an argument in its favor. The bag is protected by a net 64, held to the machine by means of a multiplicity of guy ropes 65, and can be fitted, if desired, with a valve 66, controlled by a rope 67, and normally closed. The object of this valve is to permit the escape of the hot air and gases contained in the bag, when it should be necessary to descend quickly to the ground. In normal cases however it will be sufficient to rotate propeller 29 in an opposite direction, and to keep plane 33 inclined downward, to effect the landing of the machine. The air bag can be inflated by the hot air issuing from a stove 24, or by the exhaust of engines 28, 31, or by both sources, as desired. Stove 24 is an ordinary alcohol or kerosene stove, the flame of which is inclosed in a metallic wire netting 68. This will render the use of the stove perfectly safe, with no danger of other parts of the machine catching fire, according to a well known principle commonly applied in the construction of miner's lamps. I further prefer to inclose the stove within a double wall 69, to prevent radiation, and to direct the heated air toward a hood 70 passing through an opening 71 and opening inside of the bag. The air to supply combustion can be taken from underneath platform 21, through openings 72 around the stove. The exhaust of engine 28 is collected in a pipe 73 directing the same inside of the bag, through an opening 74 in the bottom of the same; and in a similar manner the exhaust of engine 31 is collected in a pipe 75 directing the same inside of the bag, through an opening 76. Opening 71 is considerably larger than the funnel of hood 70, and openings 74, 76, are considerably larger than the pipes entering the same; thus giving the chance to the hot air and gases continuously produced, to expel the cooler fluids found in the bag. The bag is preferably made of a fireproof material, owing to the high temperature of exhaust gases issuing from pipes 73, 75, though the same are considerably cooler than when they issue from the engines, owing to the length of pipe exposed to the air. It is obvious that a gas bag can be built on similar lines, and made gas-tight, so as to be adapted to be filled with hydrogen gas, thus avoiding the use of the stove, of the fuel tank for the same, and utilizing the space occupied by the same in a different manner. The utilization of the exhaust however is cheaper and handier, since no special plant is required as is the case with the production of hydrogen gas. On starting the machine, the stove is first lighted by means of a mag-

neto and spark plug, in a similar manner to that used for starting engines; when the air bag is inflated, engine 28 is started, rotating horizontal propeller 29, plane 33 having been previously set to the desired inclination; the machine will then rise without necessity of gliding. When the air bag is empty, it will rest on a skeleton formed by longitudinal members 77, preventing the bag from coming in contact with hood 70 and with pipes 73, 75. On the front part of the bag, and internally to the same, I also prefer to provide a surface 78, which will prevent the pressure of the air due to the speed of the machine from deflating the bag thus diminishing its capacity.

It may be noted that I use two separate engines, one for each propeller; it is obvious that I could operate both propellers from the same engine, with separate clutches, but I prefer the disposition shown, because in the case one of the engines should stop, the other will contribute to the safety of the device, either by continuing to push the machine through its course, or by keeping it suspended in the air permitting a slow landing.

In normal operation engine 28 with its horizontal propeller will mainly be used when lifting the machine in the air from the position of rest; but when the machine will have assumed a sufficient horizontal speed it will be unnecessary to run the horizontal propeller.

The position of the elevating plane is such, as can be seen in the drawings, as to cause the center of pressure of the air on said plane to be at about the same height of the axis of propeller 32, or a little below the same; this gives more stability to the device the leverage of the two opposite pressures due to the speed and to the action of the propeller having thus been reduced to a minimum.

From the foregoing it can be seen that the peculiar arrangement of my machine goes far toward insuring its safety of control, its stability, its carrying capacity, and its duration of planing. The simplicity of its construction, and the substantial manner in which the machine can be built do furthermore insure a greater durability than can be expected in an aeroplane of the common type. The stability of the machine is insured by the center of gravity being lower than the sustaining planes, and also by the large surface of the planes and by the action of the air bag. There is no possibility for the machine to capsize, and the lifting power of the air bag greatly adds to the safety of travel. This naturally also improves the carrying capacity of the machine, which is well adapted for carrying merchandise, or mail, and the like, besides carrying a larger provision of fuel than is possible with other

machines of the same size. The simultaneous operation of the rudder and of the steering plane is also important, inasmuch as the operator is able to control the machine in a quicker manner. The working of the two propellers independently also adds to the safety of the machine, for the reasons stated; there being the additional advantage, quite important, of the possibility of rising without gliding, and of alighting without running.

It is to be understood of course that changes, variations, and modifications may be made such as come properly within the scope of the appended claims, without departing from the spirit of the invention or sacrificing any of its advantages.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States is:

1. In a flying machine, and in combination with the sustaining planes of the device, a frame, a steering plane in front mounted on a vertical pivot, a surface of resistance pivoted in front of said steering plane, means under the control of the operator for adjusting the inclination of said surface of resistance, and means under the control of the operator for controlling the movements of said steering plane.

2. In a flying machine, and in combination with the sustaining planes of the device, a frame, a vertical rudder at the rear of said frame, a steering plane vertically pivoted in front of the same, a surface of resistance pivoted in front of said steering plane, means for adjusting the inclination of said surface of resistance, and means under the control of the operator for simultaneously operating said rudder and steering plane so as to cooperate in changing the direction of the device.

3. In a flying machine, and in combination with the sustaining planes of the device, a frame, a bag mounted on the upper part of the same, a protective netting for the same, a controlling plane mounted on a vertical pivot at the rear, a steering plane mounted on a vertical pivot at the front, a resistance surface pivoted in front of said steering plane, means for varying the inclination of said resistance surface, means for simultaneously rotating said controlling plane and steering plane in the same direction, an elevating plane horizontally pivoted in front of said frame, means for operating the same, a horizontal propeller, a vertical propeller, engines driving the same, means for directing the exhaust gases of said engines internally to said bag, a stove capable of supplying hot air internally to said bag, a metallic netting around the flame of said stove, and a radiation protecting wall around said stove; substantially as described.

4. In a flying machine, and in combina-

tion with the sustaining planes of the device, a frame, and a steering member in front composed of a vertically pivoted steering plane and of a plane projecting from the surface of the same, offering a transverse surface of resistance to the air.

5. In a flying machine, and in combination with the sustaining planes of the device, a frame, a vertical rudder at the rear of the same, a steering plane vertically pivoted in front of said frame, a surface of resistance in front of said steering plane, and means under the control of the operator for simultaneously operating said rudder and steering plane so as to cooperate in changing the direction of the device.

6. In a flying machine the combination of a frame, sustaining planes for the same, a steering plane vertically pivoted in front of said frame, a surface of resistance in front of said steering plane, a plane pivoted at the lower front part of said frame, and means under the control of the operator for adjusting the inclination of said plane.

7. In a flying machine the combination of a frame, sustaining planes for the same, a vertical rudder at the rear of said frame, a steering plane vertically pivoted in front of said frame, a surface of resistance in front of said steering plane, means under the control of the operator for simultaneously operating said rudder and steering plane, a plane pivoted at the lower front part of said frame, and means under the control of the operator for adjusting the inclination of said plane.

8. In a flying machine and in combination with a frame, and with the sustaining planes of the device, an upwardly inclined vertically pivoted steering plane at the upper front part of said frame, a downwardly inclined transversely pivoted plane at the lower front part of the same, and means under the control of the operator for adjusting the inclination of said plane.

9. In a flying machine the combination of a frame, a main sustaining plane, an auxiliary sustaining plane at the front and one at the rear, a steering plane vertically pivoted in front of said frame, a surface of resistance in front of said steering plane, a vertical rudder at the rear of said frame, an elevating plane, means under the control of the operator for simultaneously operating said rudder and steering plane, and means for controlling said elevating plane.

10. In a flying machine the combination of a frame, sustaining planes for the same, a steering plane vertically pivoted in front of said frame, a surface of resistance in

front of said steering plane, a vertical rudder at the rear of said frame, a cross arm connected at each end with said steering plane, a yoke controlling said rudder, and connections between said steering plane and said yoke; substantially as described.

11. In a flying machine the combination of a frame, sustaining planes for the same, a gas bag secured to the upper part of said frame, a propeller at the lower part of said frame rotating in a horizontal plane, an upwardly inclined steering plane at the upper front part of said frame, a downwardly inclined plane transversely pivoted at the lower front part of said frame counter-balancing the lifting effect of said steering plane, and means under the control of the operator for adjusting the inclination of said plane; substantially as set forth.

12. In a flying machine the combination of a frame, sustaining planes for the same, a gas bag secured to the upper part of said frame, a propeller rotating in a transverse vertical plane, a propeller at the lower part of said frame rotating in a horizontal plane, motors driving said propellers, an upwardly inclined steering plane at the upper front part of said frame, a downwardly inclined plane transversely pivoted at the lower front part of said frame, means under the control of the operator for adjusting the inclination of the same, a vertical rudder at the rear of said frame, and means under the control of the operator for simultaneously rotating said rudder and said steering plane, in the same direction.

13. In a flying machine the combination of a frame having an elongated shape having the central part forming four main compartments, two of which are above the main platform, one underneath the same, and one at the rear, planes sustaining said frame, a bag secured to its upper part, a propeller rotating in a transverse vertical plane in the rear compartment, a propeller rotating in a horizontal plane in the lower compartment, motors driving said propellers, a rudder vertically pivoted at the rear of said frame, an upwardly inclined steering plane vertically pivoted at the upper front part of the same, a surface of resistance projecting therefrom, means for controlling said rudder and said steering plane, a downwardly inclined plane pivoted at the front part of said frame, and means for operating the same; substantially as described.

FERNAND D'ORBESSAN.

Witnesses:

TULLIO V. GIARA,
GUIDO SACERDOTE.