

V. E. D'URSO.
FLYING MACHINE.
APPLICATION FILED MAR. 9, 1911.

1,028,865.

Patented June 11, 1912.

3 SHEETS-SHEET 1.

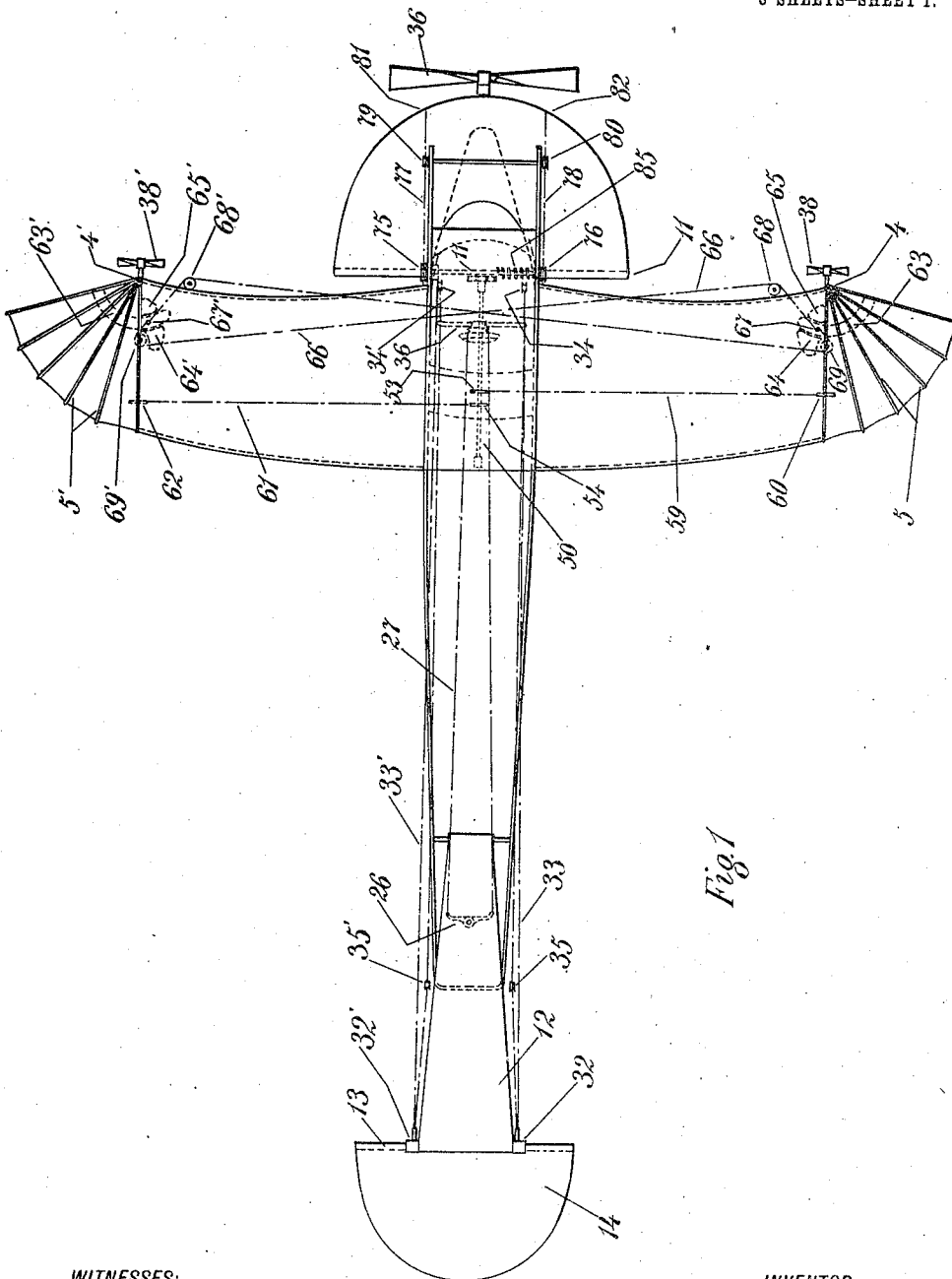


Fig. 1

WITNESSES:

Louis Grey
Lawrence J. Jambon

INVENTOR

VITO ETTORE D'URSO.

BY

Guino Lucendo
his ATTORNEY

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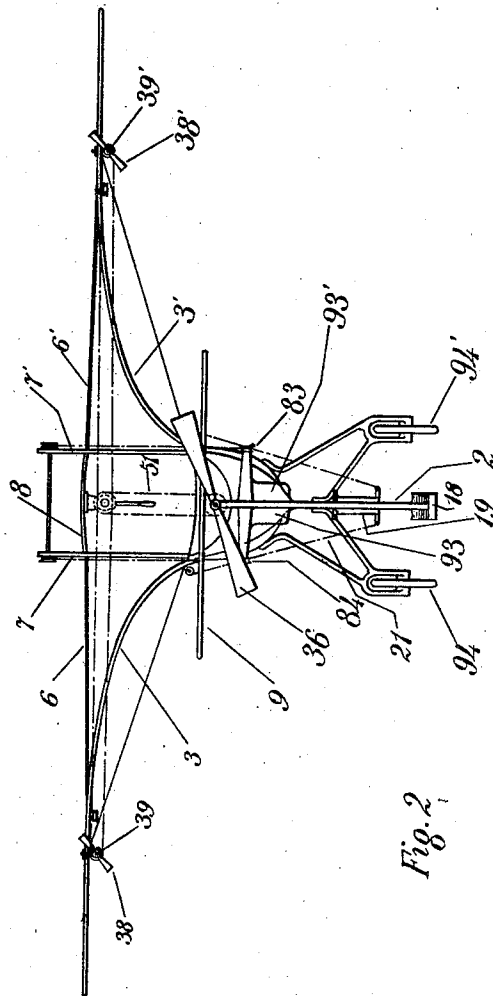


Fig. 2

WITNESSES:

James E. Gray
Laurence J. Fambourne

INVENTOR

VITO ETTORE D'URSO

BY *Guido Lucardot*
his ATTORNEY

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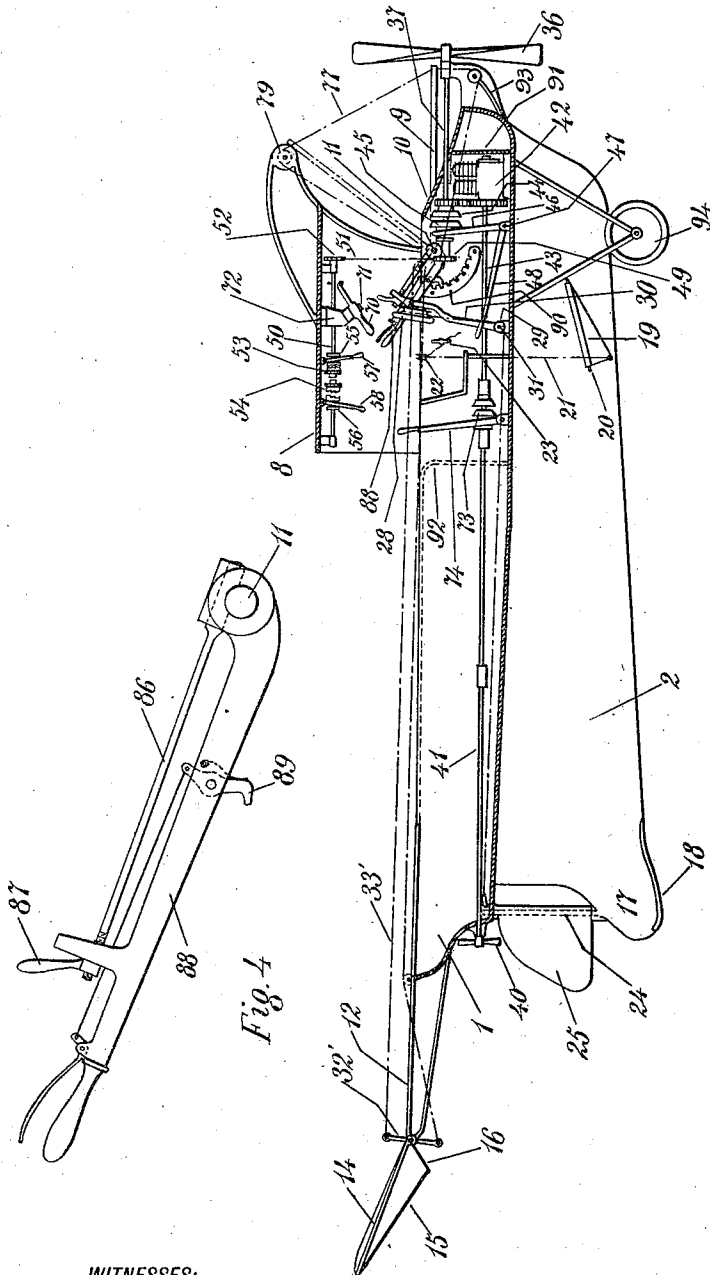


Fig. 3

Fig. 4

WITNESSES:

Louis Grey
Laurence Jamboni

INVENTOR

VITO ETTORE D'URSO

BY *Guido Sacchetti*
his ATTORNEY

UNITED STATES PATENT OFFICE.

VITO ETTORE D'URSO, OF NEW YORK, N. Y.

FLYING-MACHINE.

1,028,865.

Specification of Letters Patent.

Patented June 11, 1912.

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To all whom it may concern:

Be it known that I, VITO ETTORE D'URSO, a subject of the King of Italy, residing at New York, in the county 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.

My invention relates to flying machines, and more particularly to that class of flying machines which can keep afloat also in water, and in which means are provided for their propulsion and control also in this element.

The object of this invention is to provide a flying machine having novel means for safeguarding the life of the aviator in case of fall.

A further object is to provide a flying machine of an improved design, having novel and useful means for maintaining the direction of flight, and for controlling the amount of sustaining surface; and a still further object is to provide a flying machine having controlling means which can be used both when the machine is flying and when it is running in water.

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 plan view from the top, of my flying machine; Fig. 2 is a front view in elevation of the same; Fig. 3 is a side view in elevation, partly sectioned; and Fig. 4 is a detail view of the lever controlling the front plane.

1 designates a boat-like frame, provided with a rib or blade 2 extending longitudinally underneath the same, the object of this being to cut in an arrow-like manner the fluid in which the machine is traveling, helping toward maintaining the direction of its movement. In continuation of the sides of the boat-like frame, and extending upwardly and then horizontally therefrom, are the two wings or lateral sustaining planes 3, 3' consisting of a greater portion composed of a rigid frame and a suitable

covering, and of a smaller portion collapsible, mounted on members 5, 5' vertically pivoted at the forward ends 4, 4', of said rigid frames. Said wings are reinforced by truss members 6, 6', fixed to uprights 7, 7' vertically extending from the sides of the boat, and linked together by a member 8, acting as a protecting roof for the aviator, and supplementing the sustaining surface of the machine.

Right in front, and partly over the forward part of the boat, built as shown with an inclined covering surface 10, is provided a practically semicircular plane 9, normally horizontal, and pivotally movable upward to an angle of about 60 degr. around a horizontal axis 11, extending across the boat and laterally projecting therefrom.

The rear part of the boat is provided with an end sustaining plane or tail composed of an elongated rigid part 12 projecting therefrom, bearing at the end a horizontal pivot 13 laterally extending on its two sides, on which is pivotally mounted a practically semi-circular part 14, reinforced by truss members 15, 16.

The rear part of rib 2 descends vertically from the frame, to project in a downwardly inclined nose 17, whose lower edge is accompanied by two lateral surfaces 18 acting as a rear sustaining point of the structure when on the ground; said surfaces are inclined upward toward the front of the frame, and when the machine is immersed in water, and running, the same help in raising the machine from this element. This action is supplemented by the action of two side wings 19, pivotally mounted on inclined axes 20 near the forward part of rib 2. Said wings are normally kept folded down and against the surface of said rib 2 by the action of a spring (not shown), and operated to project laterally therefrom, by means of a cable or chain 21, passing on a pulley 22 on the side of the boat, and tightened in position with a knot around hook or fixed point 23.

Directly on the rear of rib 2 is mounted on a vertical pivot 24 a rudder 25; pivot 24 projects inside of the boat, and attached to the end has a yoke 26. The control of said rudder is obtained in a most simple manner, by means of a continuous cable or chain 27 running from one end of said yoke to a hand wheel 28, and from this to the other end of said yoke, through return pulleys 29. Handwheel 28 is mounted on lever

30, longitudinally swinging on a horizontal cross pivot 31 on the same axis as return pulleys 29, so that the operation of cable or chain 27 takes place freely in any position of said lever 30. The swinging of this lever 30 is utilized to command the motion of rear swinging part 14, in the following manner: Swinging part 14 is provided with two yokes, 32, 32', one at each side of part 12, mounted on pivot 13. A cable, or chain 33, 33', runs from one arm to the other of each yoke, passing alongside the boat, on return and guide pulleys 34, 35, 34', 35'. Lever 30 has a cross arm 36', attached at the two ends to said cables or chains 33, 33'; any longitudinal motion of said lever 30 will therefore be transmitted simultaneously to both chains and to yokes 32, 32', thereby changing the inclination of part 14. This, and the yokes attached thereto are disposed in such a manner, that part 14 can assume inclined positions below, and above the horizontal from fulcrum 13.

The machine is propelled in the air by a main propeller 36, mounted on shaft 37, right in front, and by two auxiliary propellers 38, 38', mounted on shafts 39, 39', at the ends of the rigid frames of wings 3, 3'. In water the machine is propelled by a propeller 40 at the rear, mounted on shaft 41.

42 is the motor, located at the forward part of the boat-like frame, having a shaft 43 directly in line with shaft 41, and a clutch 44 loosely revolving on shaft 37 of the main propeller.

45 is the clutch sleeve, operated by means of a shifter 46, mounted on a shaft 47, operated in its turn by a hand lever 48.

On shaft 37 is also mounted a sprocket wheel 49, driving a shaft 50 attached to top 8, by means of a chain 51 and a sprocket wheel 52.

53, 54, are sprocket wheels mounted on clutch collars on shaft 50; the same are independently rotated by clutch sleeves 55, 56, operated by hand levers 57, 58. Sprocket wheel 53 drives shaft 39 by means of a chain 59; and a sprocket wheel 60 mounted on said shaft, and sprocket wheel 54 drives shaft 39' in a like manner, by means of chain 61 and sprocket wheel 62.

Pivoted elements 5, 5' of the collapsible parts of the wings, are operated by means of circular segments 63, 63', attached at one end to the outward pivoted element 5, 5', on each side; said segments 63, 63', running between guides 64, 65, 64', 65', and being caused to open or to close said collapsible parts of the wings by means of a continuous cable or chain 66, attached at points 67, 67' to said circular segments. From point 67 said cable runs to a guide pulley 68, and then to a guide pulley 69', and to point 67'; from this to guide pulley 68', and crossing

the first branch of the cable, to guide pulley 69 and again to point 67. Owing to this disposition, the pulling of one of the branches of said cable or chain 66 in either direction, results in the simultaneous closing or opening of the collapsible part of both wings. The pulling of said cable or chain 66 in either direction is facilitated by a lever 70 swinging around fulcrum pin 71, on bracket 72, attached to top 8, said lever being within convenient reach of the aviator.

Rear propeller 40 is normally stationary, but a clutch 73, operated by a hand lever 74 can connect the same to main shaft 43 when wanted to revolve.

Axis or shaft 11, on which is fixed front plane 9, is operated by a hand lever 88, provided with a catch 89, locking the lever in different positions defined by notches on a segment 90. It is desirable however, in case of accident, when the machine should fall head down, that means be provided to enable the aviator to quickly set the front plane in the inclined position shown in dotted lines in Fig. 3. On shaft 11, at the two sides of the boat, are provided drums 75, 76, with a clutch arrangement of any convenient type (not shown), to contact them or release them from the shaft. On said drums are wound for one or two turns, cables or chains 77, 78, one end of which goes to guide pulleys 79, 80 on uprights 7, 7', and then to the outer points 81, 82 of the front plane; and the other end of which goes to guide pulleys 83, 84 underneath said plane and then to said points 81, 82. Inside of the boat, on shaft 11 is wound a helical spring 85, tending constantly to revolve the shaft so as to bring the front plane in the inclined position. Lever 88 is provided with a locking bolt 86 acting on a well known principle; said locking bolt is shaped to accompany the circumference of the shaft for a certain section, and is threaded at one end; by pulling the same transversely to the shaft by means of a threaded nut or hand lever 87, it will positively lock the lever to the shaft, while by revolving the nut or lever in the opposite direction, lever 88 will be released and be loose on the shaft. The operation of the front plane takes place therefore in the following manner. Under normal conditions, drums 75, 76, are released from shaft 11, catch 89 freed from notches on segment 90, and lever 88 swung, setting shaft 11 and plane 9 fixed thereon in the desired position; drums 75, 76, are then clutched to shaft 11 so that cables or chains 77, 78 become fixed and able to reinforce plane 9 and keep the same in position. In case of danger, it is sufficient for the aviator to release lock bolt 86 by means of nut or hand lever 87, thereby freeing the shaft from lever 88. Drums 75, 76,

having also been released, spring 85 is free to act, causing plane 9 to swing upward to its most inclined position. In a headdown fall, the aeroplane can be rebalanced by the action of said plane 9, offering a resistance to the air, and the action of which can be supplemented by proper control of rear plane 14.

91 designates a wall closing an air chamber in the fore part of the boat, and 92 shows another wall, forming an air chamber in the rear part of the boat; these chambers having the object of insuring the unsinkability of the boat.

93, 93' are two surfaces provided in front of the boat, facilitating the gliding of the fore part of the same when the machine is descending to water, head first.

When on the ground, the machine is supported by two front wheels 94, 94', and by rear surface 18. As before mentioned when it is necessary to raise the machine to flight from the water, side wings 19 are raised to a position at 90 degrees to rib 2, their flat top surfaces resting now against the sides of said rib 2, by means of cables or chains 21, securing these to hooks 23. The surfaces thus formed being inclined upwardly toward the front of the boat, by giving to this a suitable speed the same will lift the boat from the water, supplemented in this by the action of inclined surface 18, and by a proper arrangement of the front and rear planes.

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

1. In an aeroplane, and in combination with the sustaining plane or planes of the device, an auxiliary front plane horizontally pivoted along its inner side, means under the control of the operator for operating the same and for setting the same at different angles, and means for causing said front plane to assume automatically an upwardly inclined position; substantially as described.

2. In an aeroplane, and in combination with the sustaining plane or planes of the device, a body, a shaft extending across the front of the same, a plane mounted on said shaft, a lever also mounted on said shaft, for operating the same, means tending to cause said plane to assume an upwardly inclined position, and means to loosen said shaft from said lever; substantially as described.

3. In an aeroplane, and in combination with the sustaining plane or planes of the device, a body, a shaft extending across the front of the same, a plane mounted on said shaft, an operating lever also mounted on said shaft, means tending to cause said plane to assume an upwardly inclined position, means for setting said lever and plane at different positions, means for reinforcing said plane, and means for loosening said

shaft from said lever; substantially as described.

4. In an aeroplane, and in combination with the sustaining plane or planes of the device, a body, a shaft extending across the front of the same, a plane mounted on said shaft and outwardly extending therefrom, an operating lever also mounted on said shaft, drums loosely mounted on said shaft, means for fixing the same on said shaft, means for setting said lever and plane at different positions, and flexible reinforcing means wound upon said drums having each end attached to the outer portion of said plane after being passed through points near the extreme positions which can be assumed by said outer portion; substantially as described.

5. In an aeroplane, and in combination with the sustaining plane or planes of the device, a body, a shaft extending across the front part of the same, a plane mounted on said shaft and outwardly extending therefrom, an operating lever also mounted on said shaft, means for setting said lever and plane at different positions, drums loosely mounted on said shaft, means for fixing the same to and for loosening the same from said shaft, flexible reinforcing means wound upon said drums having each end attached to the outer portion of said plane, after being passed through points near the extreme positions which can be assumed by the same, means tending to cause said plane to assume an upwardly inclined position, and means for loosening said shaft from said lever; substantially as described.

6. In an aeroplane, and in combination with the sustaining plane or planes of the device, a body, a shaft extending across the front part of the same, a plane mounted on the same and outwardly extending therefrom, an operating lever also mounted on said shaft, and a locking member adapted to lock to or to release said lever from said shaft; substantially as described.

7. In an aeroplane, and in combination with the main sustaining plane or planes of the device, a body, a shaft extending across the front part of the same, a plane mounted on said shaft along one of its sides and outwardly extending therefrom, means for setting said plane at different positions, means for causing said plane to assume automatically an upwardly inclined position, an auxiliary sustaining plane at the rear of said body longitudinally extending therefrom, a controlling plane horizontally pivoted along its inner side at the end of said rear sustaining plane, and means under the control of the operator, for operating the same.

8. In an aeroplane, and in combination with the main sustaining plane or planes of the device, means at each end for augment-

ing or diminishing the functional surface of said planes, means under the control of the operator for simultaneously operating the same, a boat shaped frame, a shaft horizontally extending across the front part of the same, a plane mounted on said shaft along one of its sides and outwardly extending therefrom, means for setting said plane at different positions, means for causing said plane to assume automatically an upwardly inclined position, an auxiliary sustaining plane longitudinally extending from the rear of said frame, a controlling plane horizontally pivoted along its inner side at the end of said rear sustaining plane, and means under the control of the operator for operating the same.

9. An aeroplane having a substantially bird-like structure, comprising a boat shaped frame, planes laterally extending therefrom, means at each end for augmenting or diminishing the functional surface of said planes, means under the control of the operator for simultaneously operating the same, a plane horizontally pivoted along its inner side at the front of said frame, an auxiliary sustaining plane longitudinally extending from the rear of said frame, a controlling plane horizontally pivoted along its inner side at the end of said rear sustaining plane, means under the control of the operator for operating said front and said rear planes, and means for causing said front plane to assume automatically an upwardly inclined position; substantially as described.

10. In an aeroplane, and in combination with the main sustaining plane or planes of the device, a boat shaped frame provided with a rib longitudinally extending underneath the same, a vertical rudder at the rear of said rib, a plane horizontally pivoted along its inner side at the front of said frame, an auxiliary sustaining plane longitudinally extending from the rear of said frame, a controlling plane horizontally pivoted along its inner side at the end of said rear sustaining plane, means under the control of the operator for operating said front and said rear planes, means for controlling said rudder, means for fixing said front plane at different positions, and means under the control of the operator for causing said front plane to assume automatically an upwardly inclined position; substantially as described.

11. In an aeroplane, and in combination with the main sustaining plane or planes of the device, means at each end for augmenting or diminishing the functional surface of said planes, means under the control of the operator for simultaneously operating the same, a boat shaped frame provided with a rib longitudinally extending underneath the

same, a plane horizontally pivoted at the front of said frame, a rudder at the rear of said rib, an auxiliary sustaining plane at the rear of said frame, a controlling plane horizontally pivoted at the end of said rear sustaining plane, means for controlling the position of said front and rear planes, means for controlling said rudder, and means for propelling the device; substantially as described.

12. In an aeroplane, and in combination with the sustaining plane or planes of the device, a boat shaped frame having a rib longitudinally extending underneath said frame, a horizontally pivoted auxiliary front plane having means under the control of the operator for fixing said front plane in any desired position, and means for causing said front plane to assume automatically an upwardly inclined position, a vertically pivoted rudder at the rear of said rib, a rear sustaining plane having a longitudinally elongated shape, a controlling plane horizontally pivoted at the end of said rear sustaining plane, independent means for propelling the machine in water or in air, and means under the control of the operator for commanding the motion of said rudder and of said controlling plane, all of the character, and for the purposes substantially as described.

13. In an aeroplane, and in combination with the sustaining plane or planes of the device, a boat shaped frame having a rib longitudinally extending underneath said frame, a horizontally pivoted front plane having means under the control of the operator for fixing said front plane in any desired position, and means for causing said front plane to assume automatically an upwardly inclined position, a vertically pivoted rudder at the rear of said rib, means connected to said rib for facilitating the lifting of the machine to flight from water, a rear sustaining plane having a longitudinally elongated shape, a controlling plane horizontally pivoted at the end of said rear sustaining plane, a motor, means for propelling the machine in water and in air, means under the control of the operator for connecting to and disconnecting said propelling means from said motor, means at each end for augmenting or diminishing the functional surface of said sustaining planes, and means under the control of the operator for independently operating the above mentioned controlling means, all of the character, and for the purposes substantially as described.

VITO ETTORE D'URSO.

Witnesses:

ALFRED PECKLY,
GUIDO SACERDOTE.