

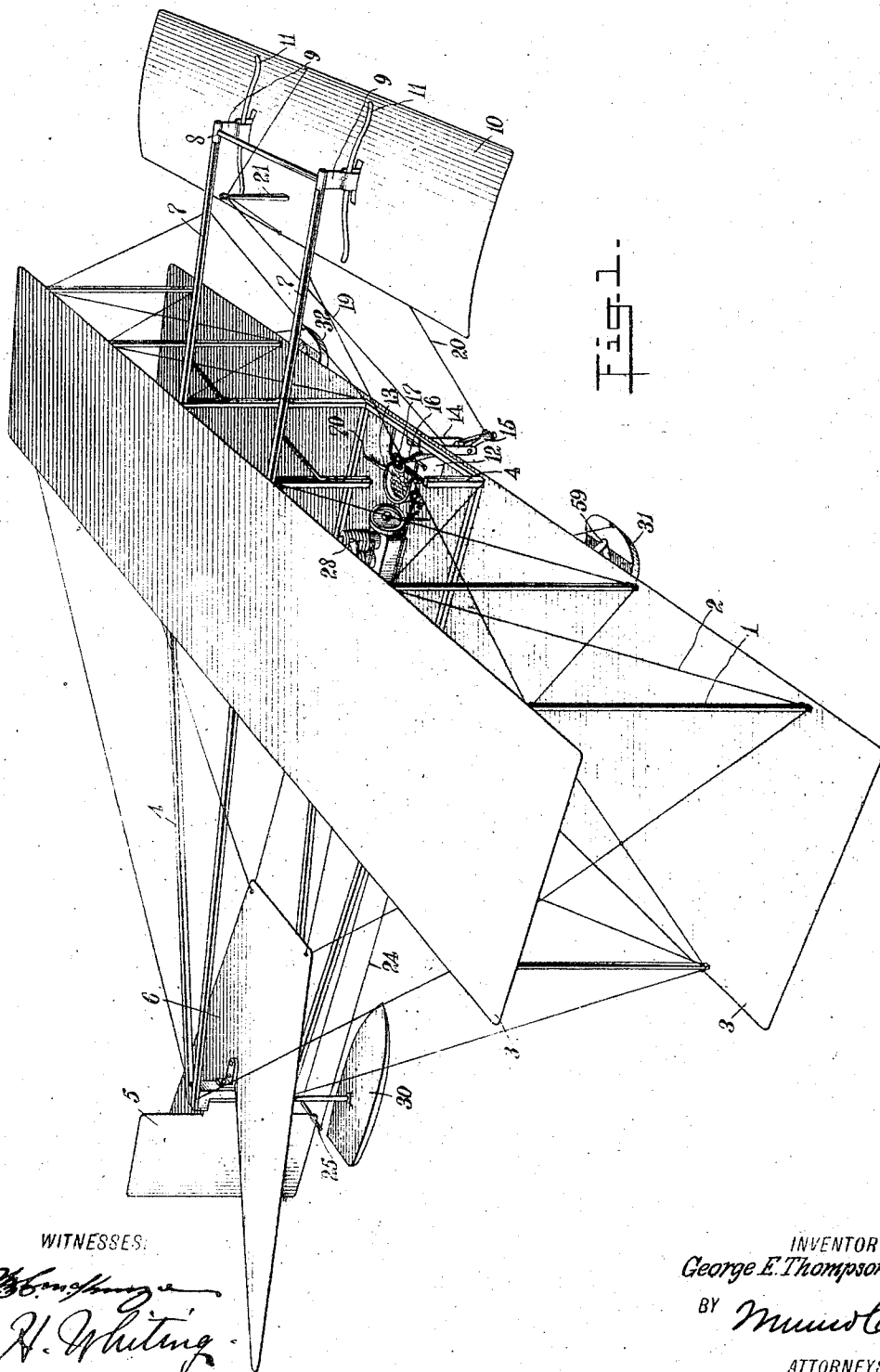
G. E. THOMPSON.
FLYING MACHINE.

APPLICATION FILED MAR. 24, 1910.

1,032,868.

Patented July 16, 1912.

3 SHEETS—SHEET 1.



WITNESSES:

W. H. Thompson
H. Whiting

INVENTOR
George E. Thompson
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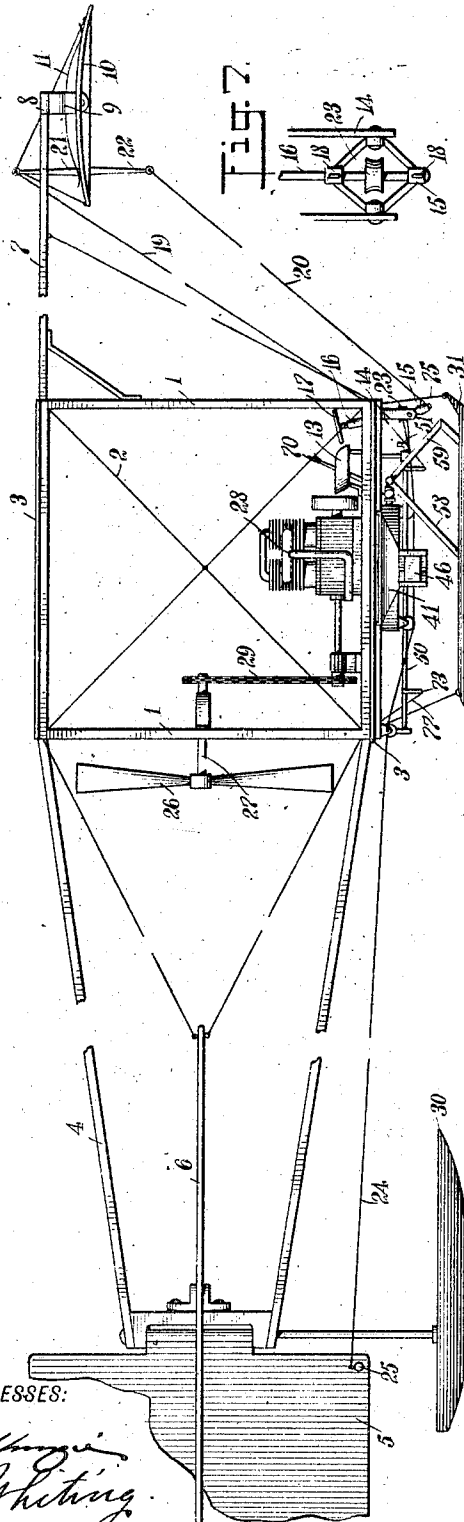
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3 SHEETS-SHEET 2.

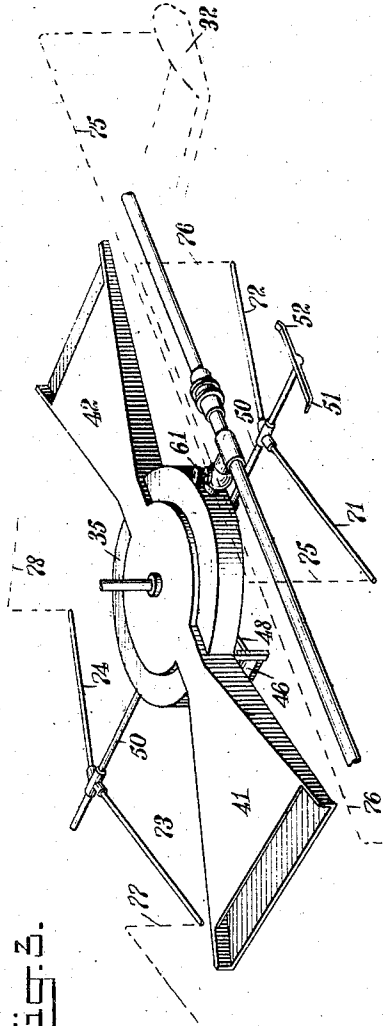
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Fig. 2.



WITNESSES:
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Fig. 3.



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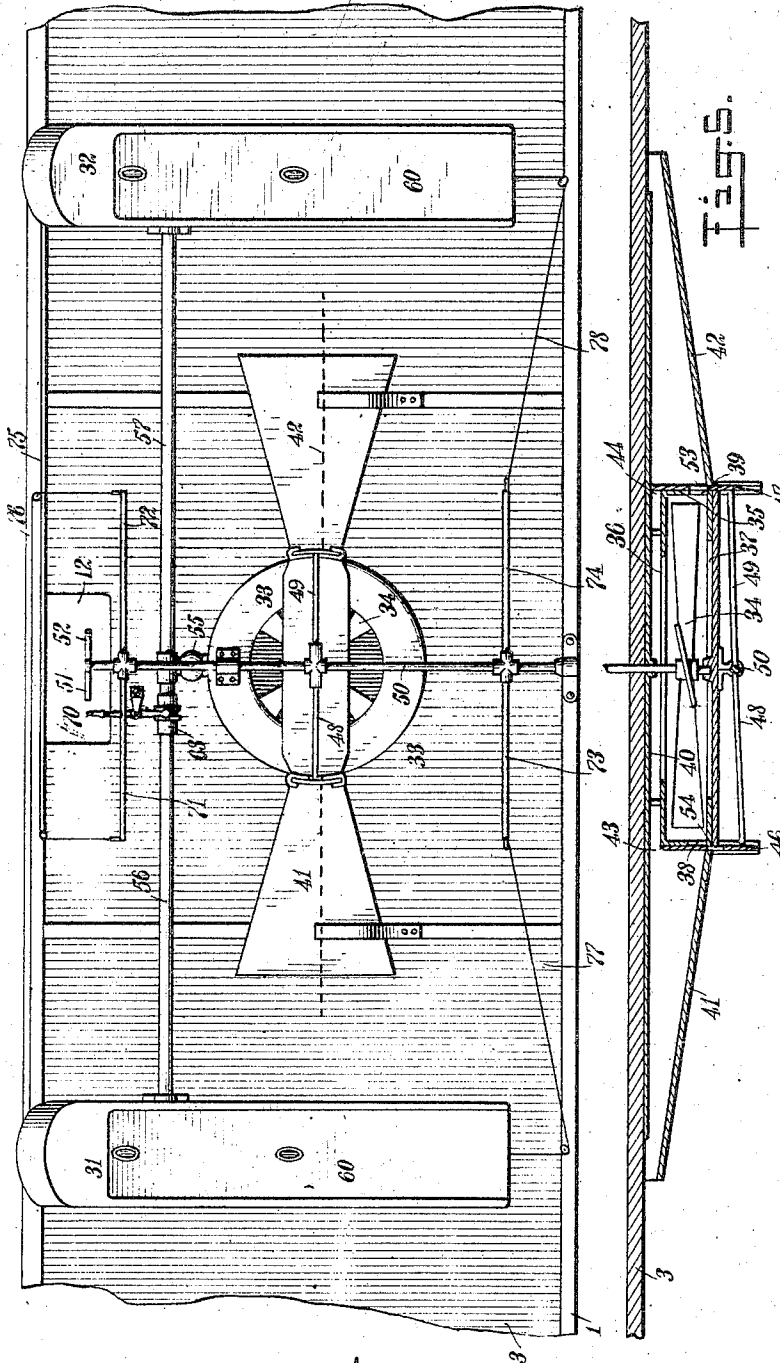


Fig. 5.

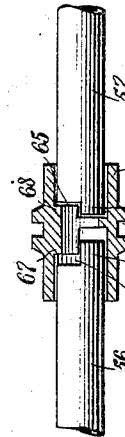


Fig. 6.

WITNESSES:

Wm. H. Thompson
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Fig. 4.

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UNITED STATES PATENT OFFICE.

GEORGE E. THOMPSON, OF PITTSBURGH, PENNSYLVANIA.

FLYING-MACHINE.

1,032,868.

Specification of Letters Patent.

Patented July 16, 1912.

Application filed March 24, 1910. Serial No. 551,259.

To all whom it may concern:

Be it known that I, GEORGE E. THOMPSON, a subject of the King of Great Britain, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and Improved Flying-Machine, of which the following is a full, clear, and exact description.

This invention relates to a new and improved flying machine of the heavier-than-air or aeroplane type.

An object of this invention is to provide a device which will be simple in construction, light in weight, inexpensive to manufacture, strong, durable, and easily controlled and balanced.

Another object of this invention is to provide a flying machine adapted to float on water, with means for forming a fluid cushion between the water and the machine, whereby the machine may be raised from the water.

A further object of this invention is to provide a flying machine with a supporting plane, and with means for rarefying the air or compressing the air at either end of said plane, for the purpose of balancing the same.

A still further object is to provide a flying machine with equilibrium equalizers simultaneously operated with said air rarefying means, to maintain the equilibrium of the flying machine.

These and further objects, together with the construction and combination of parts, will be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a perspective view; Fig. 2 is a fragmentary side view in elevation; Fig. 3 is a detached perspective view showing the air blower, and also showing diagrammatically the connection with the floats or skees; Fig. 4 is an inverted plan view; Fig. 5 is a transverse vertical section through the blower and connected passages; Fig. 6 is a fragmentary sectional view through the clutch on the air-pipe; and Fig. 7 is an enlarged detail view of the steering device.

Referring more particularly to the separate parts of the device, 1 indicates a transverse frame, made of any suitable light

structure and material and suitably tied together by tension wires 2. Secured to the frame 1 in any well known manner, there are provided one or more supporting planes 3, preferably two in number, superposed one above the other in parallel relation.

Removably secured to the frame 1 in any well known manner, so that it can be taken apart for the purpose of transferring or storing, there is provided a longitudinal frame 4, which converges toward the rear to form a suitable pivotal support for a vertical rudder 5. Secured in this frame in any well known manner there is provided a bifurcated tail trailing plane 6, the arms of which extend to either side of the rudder 5 in a diverging manner, so as to allow room for the rudder to swing in.

Extending forwardly of the frame 4, adjacent the top thereof, there is provided a pair of arms 7, to which is removably secured in any well known manner, a bracket 8, having depending bifurcated arms 9, to which is pivotally secured a horizontal directing plane 10 of any suitable form and material. Secured between the bifurcations of the arms 9 in any well known manner, there are provided, semi-elliptical springs 11, which rest adjacent their ends on the directing plane 10, and normally hold said directing plane in a steady horizontal position. There is provided in the lower supporting plane 3, adjacent the front middle thereof, an opening 12, through which the operator controls the machine when seated on the operator's seat 13 juxtaposed thereto.

Located in a juxtaposition to the operator's seat 13, there is provided a bracket 14. Pivotaly secured to the bracket 14, so as to swing in a vertical plane, there is provided a member 15, which swivelly supports a shaft 16. The shaft 16 is provided at its upper end with a steering wheel 17, whereby it may be manipulated by the operator. Secured to the member 15, on opposite sides of its pivotal point with the bracket 14 and at equal distances therefrom, there are provided fastening devices 18 of any suitable character, to which are secured flexible connections 19 and 20, extending to arms 21 and 22 projecting from opposite sides of the directing plane 10. It will thus be seen that by swinging the shaft 16 back and forth, the member 15 will be pivoted so as to manipulate the directing plane 10 for the purpose of raising or lowering the flying ma-

chine as a whole. In order that the same shaft 16 may be utilized to steer the flying machine in a horizontal direction; that is, to the right or left, there is provided a pulley 23, secured to the shaft 16 in any well known manner and so located on the shaft 16 that it is co-extensive with the pivot point of the member 15, so that any swinging of the shaft 16 and the member 15 will not affect the pulley 23. Wound around the pulley 23, or secured thereto in any well known manner, there is provided a flexible connection 24, the opposite ends of which extend from opposite sides of the pulley 23 and are secured to the opposite ends of a lever 25 on the rudder 5. It will thus be seen that by rotating the hand wheel 17, the rudder 5 can be turned to the right or left and thereby steer the flying machine in a horizontal direction. It will further be seen that by simultaneously swinging the shaft 16 and rotating the hand wheel 17, the flying machine can be steered simultaneously in vertical and horizontal directions, thus causing it to travel in a diagonal line.

In order to provide sufficient tractive force for the flying machine, there is provided a propeller 26, which is secured to a propeller shaft 27, rotatably supported in any well known manner on the frame. The propeller shaft 27 is connected in any suitable manner to a suitable motor 28, as by means of a chain-and-sprocket connection 29.

While this flying machine may be provided with suitable wheels or rollers and be adapted to ascend from, and descend to, the ground, it is preferably of a type adapted to alight on, and rise from, the water, and for this purpose, is provided with floats or skees 30, 31 and 32. The rear skee 30 is secured in any well known manner to the frame 4 adjacent the rudder 5, and supports the rear end of the flying machine when resting on the water. The front floats 31 and 32 are substantially rectangular in shape their forward ends being upwardly inclined, and the said floats are secured to the frame in such a manner that they are capable of being locked rigid in a horizontal position, or unlocked, so that they can be swung relative to each other when the flying machine is in the air, so as to aid in balancing the flying machine and maintaining its equilibrium. This means of connection will be described hereinafter.

Secured to the frame 1 in any well known manner, beneath the lower plane 3, there is provided a balancing device 33, of a type which is adapted to supply air to either end of the under side of the plane 3 and simultaneously withdraw the air from the opposite side, so as to maintain the equilibrium of the flying machine as a whole. For this purpose, the equilibrium device 33 is provided with a fan or blower 34, which is

driven from the motor 28 in any suitable manner. The fan 34 is inclosed by a casing 35, having central openings 36 and 37 for supplying the air thereto, and having peripheral openings 38 and 39 for exhausting therefrom the air compressed therein.

It will be noticed by particular reference to Fig. 5, that beyond the casing 35, there is provided a casing 40, which is connected to feeding funnels 41 and 42 extending on opposite sides of the casing 35, by means of passages 43 and 44. The funnels 41 and 42 also have communication with the interior of the casing 35 by means of the openings 38 and 39. It will thus be seen that when both the passageways 43 and 44 are opened, the fan 34 will naturally draw the air from both sides through both the funnels 41 and 42. In order to draw all of the air from one side and from one of the funnels 41 and 42, and to force it out at the opposite side, so as to create a pressure under one end of the lower supporting plane and a vacuum on the other end, thereby raising the first end and lowering the second end, there are provided valves 46 and 47, which are adapted to extend across the passageways 43 and 44 to cut off the inflow of air to the center of the fan. These valves are connected in any well known manner to arms 48 and 49, which are secured to a longitudinally-extending rod 50. This rod 50 is suitably journaled in bearings on the frame, and is provided with pedal arms 51 and 52 extending in juxtaposition to the opening 12, where the operator can readily rest his feet thereon, and thereby rotate the rod 50 to operate the valves 46 and 47. It will be noted that the valves 46 and 47 are so connected to the rod 50 that they will be simultaneously operated in opposite directions, so that when the passage 43 is entirely open, the passage 44 is entirely closed and vice versa. In order that when the passage 44 is closed for the purpose of shutting off the inhaust of air through the funnel 42, the valve 47 is provided with an opening 53, which is adapted to be brought into alinement with the opening 39 so as to permit the air compressed by the blower 34 to travel out through the funnel 42. Similarly the valve 46 is provided with an opening 53, which is adapted to be brought into alinement with the opening 38, when the valve 46 entirely closes the passage 43, so that the air compressed by the fan 34 will transude through the funnel 41. The pressure generated by the fan 34 is also utilized to raise the machine from the water. For this purpose, there is connected to the periphery of the fan, a pipe 55, having branches 56 and 57 extending in opposite directions to downwardly-extending legs 58 and 59, a pair of which are provided for each of the floats 31 and 32. These legs 58

and 59 are also in the form of pipes, and conduct the air compressed therein to a rectangular recess or cavity 60 formed in the bottom of each of the floats 31 and 32, as shown in Fig. 4. The recess 60 is open at the bottom so that the air forms a film between the float and the surface of the water. The flow of compressed air through the pipe 55 is controlled by a valve 61 located adjacent the operator's seat.

In order that the floats 31 and 32 may be moved relative to each other, for the purpose of balancing the flying machine when once in the air, the pipes 56 and 57 are not permanently connected together, and they are further rotatably supported in the frame. The particular type of connection between the pipes 56 and 57 is shown in Fig. 6. These pipes 56 and 57 are provided on their facing ends with angular projections 62 and 63, forming recesses 64 and 65 in the respective ends of the pipes 56 and 57. Engaging the ends of the pipes 56 and 57, there is provided a sleeve 66, which has flanges 67 and 68, which are adapted to engage in the corresponding recesses 64 and 65 in the ends of the pipes 56 and 57. The recess 64 is somewhat deeper than the recess 65, so that when the sleeve 66 is shifted in the direction of the pipe 56, the flange 68 will be removed from the recess 65, so that the pipes 56 and 57 can move relative to each other. The sleeve 66 is provided with an external groove 69, which is adapted to be engaged by a bifurcated lever 70, for the purpose of shifting the sleeve 66 in the manner of a clutch.

In order to manipulate the floats 31 and 32 relative to each other and in synchronism with the movement of the valves 46 and 47, there are provided arms 71, 72, 73 and 74, secured to the rod 50 in any well known manner, which are connected by means of flexible connections 75, 76, 77 and 78, respectively, to the front of the float 32, the front of the float 31, the rear of the float 31, and the rear of the float 32. These connections are shown in the plan view, Fig. 4, and are also illustrated diagrammatically in the perspective view Fig. 3. These flexible connections 75 to 78 pass over suitable pulleys, so that when the foot pedal 51 is depressed, the arms 71 and 73 will be depressed, and the arms 72 and 74 elevated, thereby simultaneously raising the front end of the float 32 and the rear end of the float 31. On the other hand, when the foot pedal 52 is depressed, the front end of the float 31 will be elevated, and the rear end of the float 32 elevated. By this means, the floats 31 and 32 act as deflecting planes for elevating or lowering each side of the flying machine, simultaneously with the action of the valves 46 and 47, which also tend to control the flow of air in such a manner as

to elevate or depress the lateral portions of the flying machine.

The operation of the device will be readily understood when taken in connection with the above description. The machine is ordinarily adapted to float on the water, and when it is desired to rise into the air, the propeller 26 is rotated by means of the motor 28, and when it has gained sufficient momentum to warrant an attempt at flight in the air, the directing plane 10 is elevated at the front edge by pulling back on the hand-wheel 17, and the air in the pipe 55 permitted to flow out with its full force into the cavities 60 on the under sides of the floats 31 and 32. These floats when the flying machine rides on the surface of the water, are normally locked back and held in their normal horizontal position. The air may be admitted to the cavities 60 beneath the floats previous to the attempt to rise from the water, in order to form an anti-friction film on which the flying machine rests, permitting it to travel with great speed over the surface of the water after the manner of a hydroplane. When the machine has risen in the air, it can be directed to the right or left by rotating the hand-wheel 17, thereby swinging the rudder 5 to the right or to the left. The up and down motion of the machine can be regulated by manipulating the hand-wheel 17 forward and backward, so as to simultaneously lower and elevate the front end of the directing plane 10. In fact, the flying machine can be directed both up or down, and to the right or left simultaneously, by the operator manipulating the single lever to which the hand-wheel 17 is attached. When the flying machine is in the air the pipes 56 and 57 are disconnected by shifting the sleeve 66 so that the flange 68 comes out of the recess 65, by manipulating the lever 70. This leaves the floats 31 and 32 free to swing at the will of the operator, for the purpose of balancing the machine and maintaining its transverse equilibrium. If, while in the air, the flying machine should dip toward the right, the operator would naturally swing his body toward the left and counterbalance the abnormal cant of the machine. By doing this, he would press down with his foot on the pedal 52, thereby closing the inlet passage 43 and opening the inlet passage 44, and simultaneously bringing the opening 54 into alinement with the opening 38, and forcing the opening 53 out of alinement with the opening 39. This will cause the air to be drawn entirely from the left side of the machine and projected from the right side of the machine, so that there will be a vacuum formed under the left side of the lower plane, and a compression formed under the right side of the lower plane. This will tend to correct the downward tilt

of the right-hand side of the frame. However, the air blower is aided in its work by the floats 31 and 32, which act as deflecting planes. Simultaneously with the operation just described, the front end of the float 31 will be elevated, and the front end of the float 32 depressed, so that there will be an additional force, tending to raise the right-hand side of the flying machine and lower the left-hand side. There is thus provided two coöperating devices for instantaneously correcting any eccentric transverse movement of the flying machine. When it is desired to alight, the floats 31 and 32 may be positively connected together and held in their horizontal position, and the machine brought gradually in a long sloping line by manipulating the directing plane 10 until it rests lightly and gently on the water.

While I have shown one embodiment of my invention, I do not wish to be limited to the specific details thereof, but desire to be protected in various changes, modifications and alterations which I may make within the scope of the appended claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. In a flying machine, the combination with a supporting plane, of one or more floats for supporting said plane on water, a longitudinally extending rod mounted to turn and under the control of the operator, and connections between said rod and the floats for manipulating said floats to control the transverse equilibrium of said plane in the air.

2. In a flying machine, the combination with a supporting plane, of a pair of floats pivotally connected to said supporting plane, a longitudinally extending rod mounted to turn and under the control of the operator, arms on said rod, and connections between said arms and the said floats for simultaneously swinging said floats in opposite directions on turning said rod.

3. In a flying machine, the combination with one or more supporting planes, of one or more floats connected to said supporting plane and adapted to support said planes on water, said floats having cavities in their under surfaces, and means for supplying air under pressure to said cavities.

4. In a flying machine, the combination with one or more supporting planes, of one or more floats connected to said supporting planes and adapted to support said planes on water, said floats having cavities in their under surfaces, and a blower for supplying air under pressure to said cavities.

5. In a flying machine, the combination with one or more supporting planes, of one or more floats for supporting planes on water, a blower connected to said supporting planes, said floats having recesses in

their under surfaces, and a plurality of pipes connected to said blower and to each of said recesses, for projecting air under pressure into said recesses.

6. In a flying machine, the combination with a supporting plane, of an air compressor connected to said supporting plane, and means whereby the said air compressor is caused to simultaneously draw the air from under one side of said supporting plane and project the air underneath the other side of said supporting plane.

7. In a flying machine, the combination with an aeroplane, of a blower connected to said aeroplane, a pair of funnels extending in opposite directions, connected to said blower, valves for controlling the flow of air through said funnels, and means under the control of the operator for actuating said valves.

8. In a flying machine, the combination with an aeroplane, of a blower connected to said aeroplane, a pair of funnels extending in opposite directions, connected to said blower, and means for forcing the air compressed by said blower through one of said funnels, and simultaneously drawing the air to be compressed through the other of said funnels.

9. In a flying machine, the combination with an aeroplane, of a compressor connected to said aeroplane, a pair of conduits extending in opposite directions, connected to said compressor, and means for making either of said conduits the intake for said compressor or the outlet for said compressor.

10. In a flying machine, the combination with an aeroplane, of means for simultaneously drawing the air from under one side of said aeroplane and projecting air underneath the other side of said aeroplane, the said means including a blower, conduits connected to the blower and extending in opposite directions, valves for controlling the flow of air through said conduits, and means under the control of the operator and connected with said valves for simultaneously operating said valves in opposite directions.

11. In a flying machine, the combination with an aeroplane, of means for simultaneously drawing the air from under one side of said aeroplane and projecting air underneath the other side of said aeroplane, for maintaining the equilibrium of said aeroplane.

12. In a flying machine, the combination with an aeroplane, of a pair of balancing members connected to said aeroplane, a rod mounted to turn and under the control of the operator, means for projecting a stream of air to either side of said aeroplane, and controlled by said rod, arms on the said rod, and connections between the said arms and the said balancing members for simultane-

ously manipulating said members, for controlling the transverse equilibrium of said aeroplane.

13. In a flying machine, the combination with an aeroplane, of a pair of floats pivotally connected to said aeroplane, and a clutch for detachably connecting said floats rigidly together.

14. In a flying machine, the combination with an aeroplane, of a pair of floats pivotally connected to said aeroplane, a clutch for detachably connecting said floats rigidly together, and means for supplying one or more jets of air to each of said floats.

15. In a flying machine, the combination with an aeroplane, of a horizontal steering plane for directing said aeroplane in a vertical direction, a vertical steering plane for directing said aeroplane in a horizontal direction, a bracket located adjacent to the operator's seat and having spaced depending arms, a member pivotally secured between the arms of the bracket to swing in a vertical plane, the said member having bearings at its ends at opposite sides of the pivotal point, a shaft mounted to turn in said bearings, fastening devices on the bearing ends of said member, the fastening devices being at equal distances from the pivotal point, arms projecting from opposite sides of the horizontal steering plane, flexible connections between the said fastening devices and the said arms, a pulley on the said shaft between the fastening devices and in line with the pivotal point of said member, a lever on the vertical steering plane, and flexible connections between the said pulley and the opposite ends of the said lever.

16. In a flying machine, the combination with a support, of a horizontally arranged steering plane pivoted to said support, semi-elliptical springs secured to said support and resting at their ends on the said steering plane to normally hold said plane in a horizontal position, and means for manipulating said plane to either side of said normal position.

17. In a flying machine, the combination with a transverse frame, a supporting plane carried by said frame, arms extending forwardly of the frame, and a bracket secured to the front ends of said arms and having depending bifurcated arms, of a horizon-

tally arranged steering plane pivotally secured to said bifurcated arms, springs secured between the bifurcations of the arms and resting at their ends on the said steering plane to hold the said plane normally in a horizontal position, arms projecting from opposite faces of the said steering plane, and means connected with said arms for manipulating said steering plane.

18. In a flying machine, the combination with a transverse frame, a longitudinal frame secured to the transverse frame and converging toward the rear, a vertical rudder pivotally supported at the rear converging end of said longitudinal frame, a bifurcated trailing tail piece secured to the said longitudinal frame, the arms of said tail piece extending to either side of the rudder in a diverging manner, to allow room for the rudder to swing in, and means for manipulating said rudder.

19. In a flying machine, the combination with a transverse frame, supporting planes carried thereby, arms extending forwardly of the transverse frame, and a bracket secured to the said arms and having depending bifurcated members, of a steering plane pivotally connected with the said depending members of the bracket, semi-elliptical springs secured between the bifurcations of said members and bearing at their ends on the upper surface of the said steering plane to hold the plane in a normal horizontal position, a pivoted member connected with the said steering plane to move the same out of normal position in either direction, a rudder, and means connected with said pivoted member for manipulating said rudder.

20. In a flying machine, the combination with an aeroplane, of one or more floats for supporting said aeroplane on water, means for supplying air under pressure to the under side of said floats to form an anti-friction film, and means for controlling the supply of air to the under side of said floats.

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

GEORGE E. THOMPSON.

Witnesses:

THOMAS E. HECKMAN,
DAVID R. ELPHINSTONE.