L. DOBBERTIN.

FLYING MACHINE.

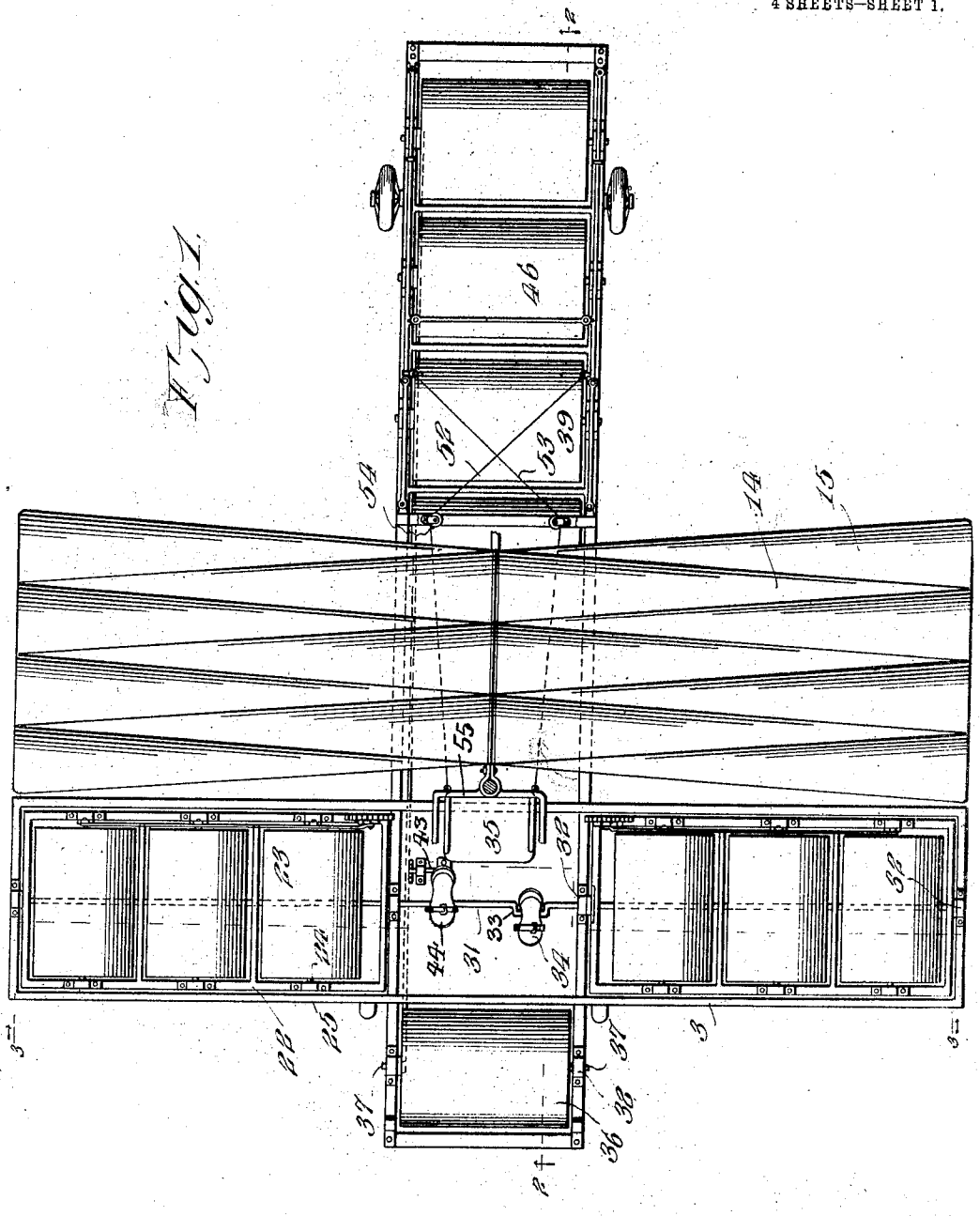
APPLICATION FILED MAY 6, 1911.

1,015,150.

Patented Jan. 16, 1912.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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4 SHEETS—SHEET 2.

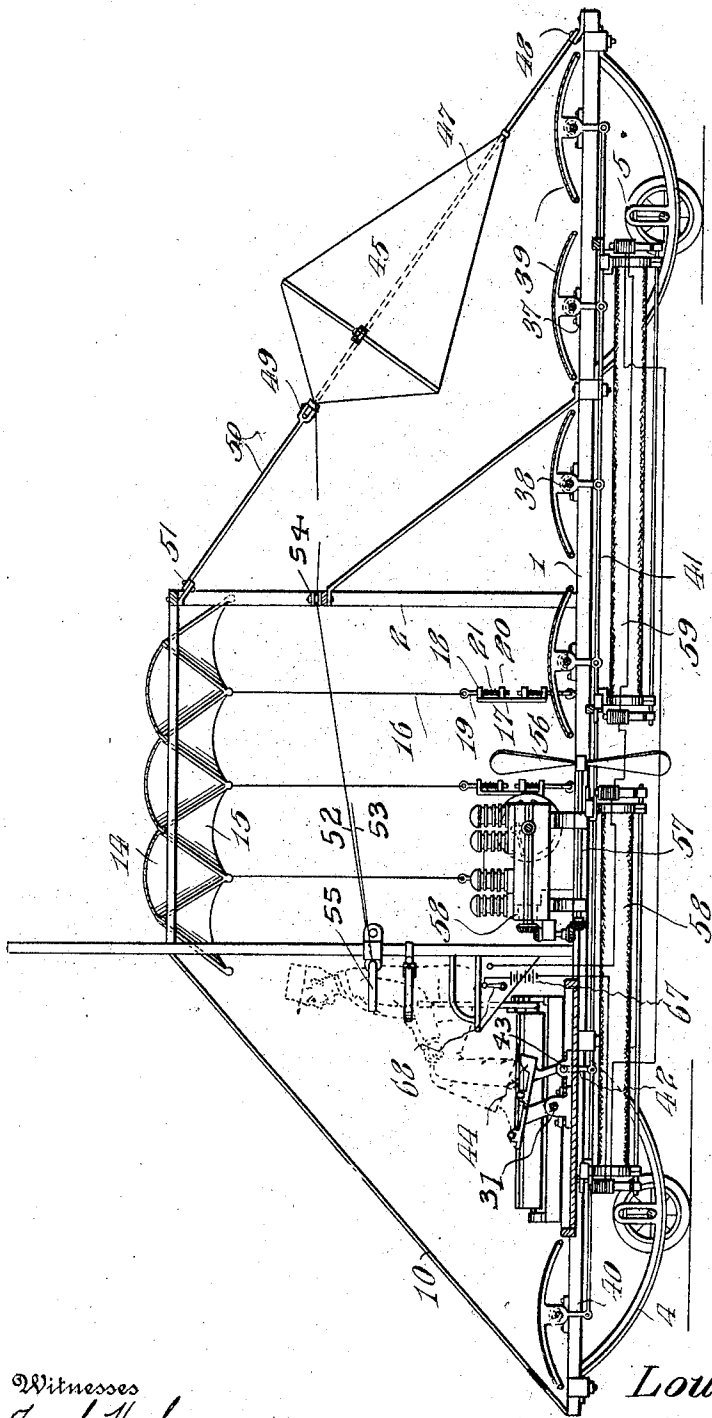

Fig. 2.

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4 SHEETS—SHEET 3.

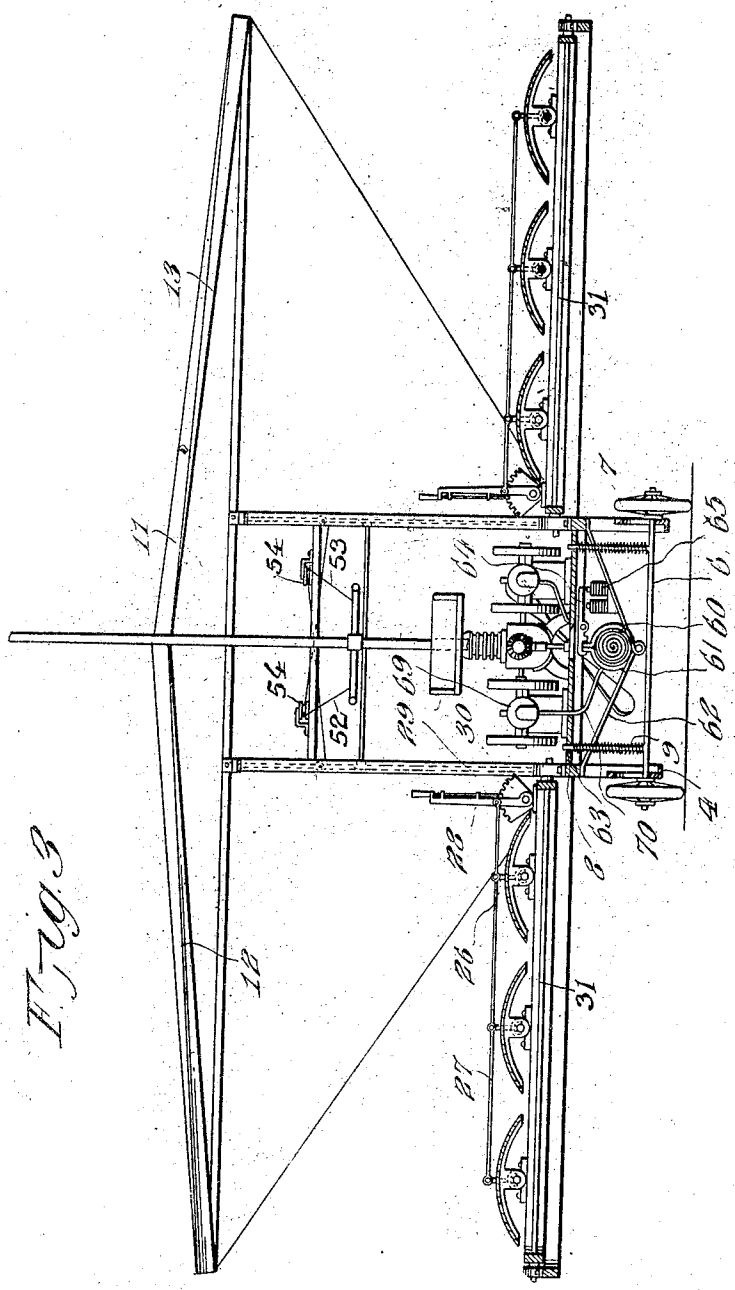

Fig. 3.

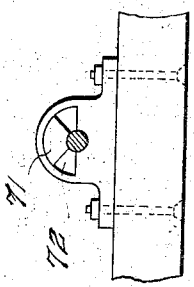

Fig. 4.

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4 SHEETS—SHEET 4.

Fig. 5.

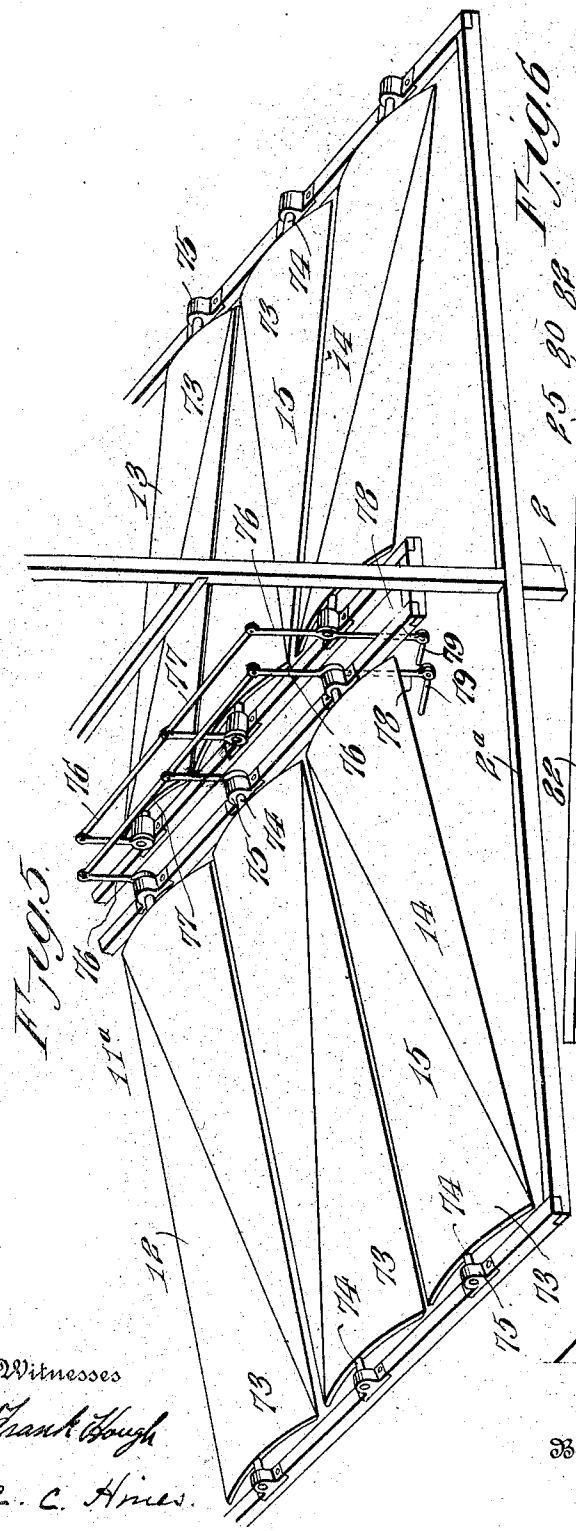


Fig. 6.

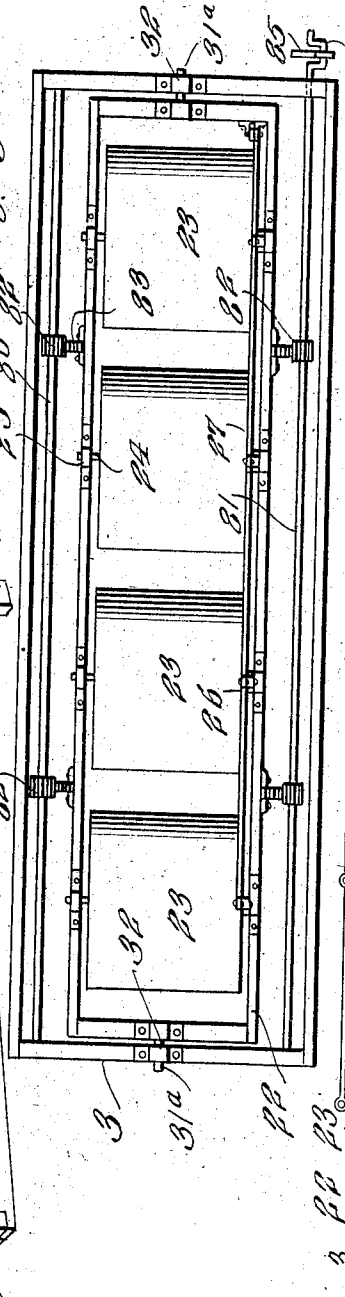
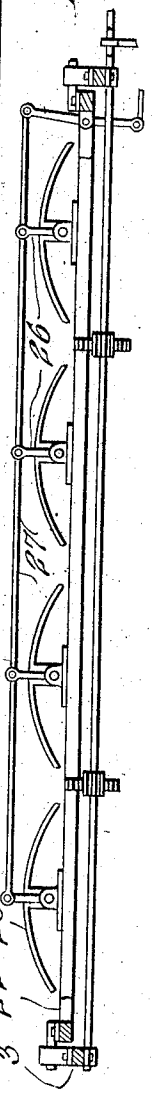


Fig. 7.



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UNITED STATES PATENT OFFICE.

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FLYING-MACHINE.

1,015,150. Specification of Letters Patent. Patented Jan. 16, 1912.

Application filed May 6, 1911. Serial No. 625,484.

To all whom it may concern:

Be it known that I, LOUIS DOBBERTIN, a citizen of the United States, residing at Lake Charles, in the parish of Calcasieu and State of Louisiana, have invented new and useful Improvements in Flying-Machines, of which the following is a specification.

This invention relates to flying machines of the heavier-than-air type, and its objects are first; to provide a construction of machine wherein a plurality of horizontal rudders are employed which operate as supplemental supporting surfaces and by their arrangement increase the longitudinal stability of the machine and its sensitiveness to steering motion in a vertical plane and which are further designed to act as wind brakes in landing the machine and controlling the speed of motion thereof, second; to provide a novel construction and arrangement of vertical rudders which increase the lateral steering qualities and serve to effectually prevent skidding of the machine, third; to provide supporting surfaces of increased efficiency and adapted to render the machine to a larger extent inherently stable, one of which surfaces is made up of sections adjustable to control the lateral stability, fourth; to provide means whereby the machine will float and may be propelled to land in the event of its descent into the water, and, finally, to provide a machine of generally improved construction and general efficiency of action.

With these and other objects in view, the nature of which will more fully appear as the description proceeds, the invention consists of the features of construction, combination and arrangement of parts, hereinafter more fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a top plan view, with parts removed, of a flying machine embodying my invention, showing the floats folded up. Fig. 2 is a vertical longitudinal section on the line 2—2 of Fig. 1. Fig. 3 is a vertical transverse section on the line 3—3 of Fig. 1. Fig. 4 is a detail view illustrating the construction of one of the bearings and coacting trunnion. Fig. 5 is a fragmentary perspective view of the upper main plane, illustrating a modification. Fig. 6 is a top plan view of one of the wings of the lower main plane, illustrating a modification. Fig. 7 is a longitudinal section of the same.

The machine comprises a central longitudinally extending main frame 1, a vertical frame portion 2 rising from said main frame at a point somewhat in advance of the transverse center thereof, and outriggers or laterally extending frames 3 projecting from the opposite sides of the main frame at a point in advance of the vertical frame and between the same and the forward end of the main frame. Depending from the front and rear of the main frame are brackets 4 having slotted standards 5 receiving the ends of transverse shafts 6 on the extended ends of which are mounted wheels 7 to run along the surface of the ground. The shafts are vertically movable in the slotted standards and rods 8 projecting upwardly therefrom and slidably engaging openings in the body of the main frame, springs 9 being arranged about said rods between the main frame and shafts to normally sustain the weight of the body of the machine and permit the axles and wheels to have cushioning movements in running over inequalities of ground surface and coming in contact with the earth in making a landing. Supported by the upright or vertical frame structure 2, which is reinforced from the main frame by suitable braces 10, is an upper main plane or supporting surface 11, extending longitudinally at right angles to the line of flight and comprising laterally extending wings 12 and 13 normally inclined at a slight angle downwardly and outwardly from their inner ends to their outer extremities. Each of these wings is preferably made up of a plurality of longitudinally tapering or partially conical sections 14 and 15, extending longitudinally in the direction of length of the supporting surface, and alternately arranged so that the sections 14 taper to points outwardly, while the sections 15 taper to points inwardly, the bases or enlarged ends of the sections 14 and points of the sections 15 meeting at the transverse center of the supporting surface, as shown. By this construction each wing is corrugated or fluted between its front and rear edges in such a way as to provide at any point in the transverse section of said wing air channels varying alternately in cross sectional dimensions and increasing alternately in dimensions re-

spectively toward the inner and outer ends of the wing. Hence, the air striking the surfaces of the wings will be caused to travel across the wings from front to rear and toward the inner and outer ends of the wings, thus distributing its pressure equally along the surfaces of the wings and preventing excess pressures from falling at any point thereon. The pockets or channels formed by the flutes or corrugations also provide for the retention of the air for a determined period, to secure the full effect of its dynamical reactions, and to prevent to a large extent any sudden excess pressure upon any portion of the surface of the plane, whereby either the lateral or longitudinal equilibrium of the machine is liable to be disturbed.

The ends of the wings are connected with the main frame by stay wires 16, each coupled to the main frame by a turn buckle consisting of a plate 17 having at each end a perforated ear 18 for the passage of a sliding bolt 19, one of the bolts being connected at its outer end to the stay wire, and the other connected at its outer end to the main frame. The inner end of each bolt carries a nut 20 held from rotation by bearing contact with the plate 17, between which and the coöperating wheel 18 is arranged a coiled spring 21. The springs permit sliding motion of the bolts under excess strain upon the stay wires to allow sufficient slack motion to prevent possibility of breakage, in which action the nut 20 is adapted to act as a bumper to engage the ears 18 and limit the outward movements of the bolts, the springs serving when the excess pressure is dissipated to take up all slack in the wires and restore the normal position thereof. Each outrigger or frame 3 is open to receive a cradle or frame 22 carrying a series of small wings, ailerons or balancing planes 23, which are of concavo-convex form at right angles to the line of flight and having their concave surfaces facing downward. Each of these planes is provided at front and rear with trunnions 24 to turn in bearings 25 at the front and rear of the cradle 22, the rear trunnions of the series of planes being provided with crank arms 26 connected by a link 27 with each other and with a lever 28, by which all of the planes may be tilted outwardly or inwardly. The lever 28 is provided with a locking pawl or dog 29 to engage a rack 30, whereby it and all of the planes may be locked in adjusted position. The two cradles 22 are mounted upon a common rock shaft 31 extending across the main frame and longitudinally to the outer ends of the outriggers, said shaft being journaled in bearings 32 to rock in a fore and aft direction. Formed at an intermediate point upon the shaft is a crank 33 operatively connected with a foot stirrup or lever 34, by which the shaft may be turned forwardly to adjust the cradles to rock the forward ends of all the ailerons downwardly or tilted rearwardly to rock the forward ends of all the ailerons upwardly. By this construction the ailerons may be adjusted to vary their angle of incidence to cooperate with the horizontal rudder in steering the machine upwardly or downwardly, also to vary the resistance to flight, and to operate as wind brakes to check the speed of descent of the machine in making a landing. By means of the levers 28, the ailerons may be tilted laterally to control the lateral balance of the machine and to bank the same in making turns.

The operating devices above described, and thus hereinafter set forth are arranged so as to be conveniently manipulated from the aviator's seat 35. Mounted upon the front portion of the main frame is an elevating plane or horizontal rudder 36, said rudder being provided with trunnions 37 journaled in bearings 38 to tilt vertically in a fore and aft direction, and mounted in the same manner upon the rear portion of the main frame is a series of similar planes or rudders 39 which latter operate both as horizontal rudders and supporting surfaces. These planes correspond in shape to the ailerons 23 and are disposed lengthwise at right angles to the line of flight, the trunnions at one side of said rudders being provided with depending crank arms 40, all of which are connected by a link rod 41, so that said rudders may be adjusted in unison to control the fore and aft balance of the machine or to steer the same up and down in a vertical plane. The link rod is connected by a crank arm 42 with a rock shaft 43 operated by a treadle or foot lever 44, by which motion may be communicated thereto to adjust all of the rudders in unison. By this construction and arrangement of the horizontal rudders, which also act as supporting surfaces, it will be seen that sensitive control over the machine when it tilts fore and aft in either direction, or in guiding it up and down or making a landing, is secured.

Arranged in rear of the frame structure 2 and above the rear portion of the main frame is a vertical rudder comprising a pair of spaced kite-shaped planes 45 connected for movement in unison by a link 46 and carried by rods 47 hinged at their lower ends to the rear cross bar of the main frame as at 48. The upper ends of the rods 47 terminate in line with the upper ends of the vanes and are pivoted at 49 to rods or links 50, which are pivoted at their upper ends to the frame structure 2, as at 51, the several rods being pivoted to allow the vanes to swing laterally in unison. The rudder vanes normally incline in an upward and forward direction and lying in planes parallel with the line of flight, and are adapted to be adjusted at an angle to the line of flight in

either direction laterally to steer the machine horizontally in one direction or the other. To the upper ends of the rods 47 are connected cords 52 and 53 which pass over guide pulleys 54 and are connected at their forward ends to a shoulder fork or other suitable operating device 55, whereby the rudder may be operated.

Arranged at or about midway of the length of the main frame is a driving propeller 56 which rotates in the space bounded by the side bars of said main frame and is mounted upon a shaft 57 in gear with the shaft of a suitable driving motor 58. Disposed beneath the main frame in longitudinal alinement with each other and in front and rear of the path of rotation of the propeller are pontoons or floats 58 and 59, which are similar in construction, each comprising a body of elastic material adapted to roll in collapsed form, as shown in Figs. 2 and 3, and to be expanded into cylindrical or other suitable form for use, as will be readily understood. Holders or clasps, each comprising a pair of semi-circular members 60, are provided to engage and support the collapsed floats and are pivoted at their lower ends to rods 61 carried by supporting brackets 62, said members being adapted to swing upwardly to engage the float and downwardly to release the same. The free ends of the members are provided with lugs 63 to engage a latch 64, one end of which forms an armature controlled by electromagnets 65, arranged in a circuit 66, containing a suitable source of energy, such as a battery 67, for the magneto of the sparking mechanism of the motor, the circuit being normally open and adapted to be closed by a switch 68 to energize the magnets and thereby retract the catches, to permit the pontoons to expand. Air compression pumps 69 are arranged to be operated by the motor and have supply pipes 70 leading therefrom to the respective pontoons, whereby the latter may be charged with air and expanded to support the weight of the machine in a body of water. Any suitable type of means may be employed to throw the pumps into and out of operation at will, or instead of the motor driven pumps hand-operated pumps of any suitable type may be employed. If through accident or otherwise the machine should fall into a body of water the aviator by closing the switch of the electric circuit may release the pontoons and charge the same with air to keep the machine afloat, and through the described arrangement of the propeller 56, the latter may then be operated as a marine propeller to drive the machine through the water to shore.

In practice, the trunnions or shafts of the ailerons and wings are journaled in similar bearings, all of which are alike in construction, each carrying a segmental lug 71 moving in a semi-circular slot 72 in the bearing and adapted to contact with the bottom walls thereof to limit the tilting movements of the ailerons or rudders to a prescribed degree.

In Fig. 5 I have shown a modification in the construction of the upper main plane 11^a, in which each wing of the plane is made up of a series of smaller planes 73 arranged one in rear of the other. Each of these small planes 73 is curved fore and aft and is provided with trunnions 74 journaled in bearings 75 in a frame 2^a to rock or tilt in a fore and aft direction. The wings incline downwardly and outwardly as before described, and each plane is corrugated to provide the tapering portions 14 and 15, which alternate in arrangement across the wing, as in the structure disclosed in Figs. 1, 2, and 3. Crank arms 76 are fixed to the trunnions at the inner ends of the small planes of each wing and the crank arms of each set are connected by a rod or link 77. Associated with each set is a depending crank arm 78, to which is attached a rod or other connection 79 leading to a suitable operating device (not shown) whereby the sets of planes may be simultaneously or independently adjusted to vary their angle of incidence or to coöperate with the ailerons and horizontal rudders to maintain the longitudinal and lateral equilibrium of the machine.

In Figs. 6 and 7 I have shown a modification in the mode of mounting and tilting the cradle 22 of each wing structure of the lower main plane. In this modification the central shaft 31 is dispensed with and the cradle is provided with trunnions 31^a to turn in the bearings 32. Shafts 80 and 81 also extend longitudinally of the outrigger in front and rear of the cradle and carry pinions 82 which mesh with gear segments 83 on the cradle, whereby the latter is adapted to be tilted in a fore and aft direction. One of the shafts terminates at its inner end in a crank 84 engaged by a connection 85 which may be coupled to any suitable operating device by which positive motion may be transmitted to said shaft, the other shaft forming a supporting medium, as will be readily understood.

Having thus described the invention, I claim:—

1. A flying machine having a supporting surface composed of laterally extending wings, each provided with a series of longitudinally extending pockets or channels, alternately increasing and diminishing in depth respectively toward the ends of the wings.

2. A flying machine having a supporting surface composed of laterally extending wings corrugated to provide longitudinally extending air channels between their front

and rear edges, each wing having its channels alternately tapering in opposite directions toward the respective ends of the wing.

3. A flying machine having a supporting surface composed of laterally extending wings corrugated to provide longitudinally extending air channels, the air channels of each wing being formed by a substantially conical section arranged to taper alternately toward opposite ends of the wing, the corresponding inwardly and outwardly tapering portions of the respective wings being arranged in longitudinal alinement with each other.

4. In a flying machine, a supporting plane provided with longitudinally extending pockets or channels, alternately increasing and diminishing in depth respectively toward the ends of the plane.

5. In a flying machine, a supporting plane curved in a direction transversely thereof, and provided with longitudinally extending pockets or channels, said pockets or channels increasing or diminishing in depth respectively toward the ends of the plane.

6. A flying machine comprising a main frame, head and tail frames, laterally extending wing frames arranged in advance of the main frame, a supporting device carried by said main frame, a series of horizontal rudders mounted upon the head and tail frames, means for tilting said rudders in unison, wings mounted upon the wing frames to tilt laterally and longitudinally of the line of flight, and means for tilting said wings.

7. A flying machine embodying a main frame, outriggers extending laterally from the main frame, cradles mounted upon the outriggers to tilt vertically in a fore and aft direction, a series of planes pivotally mounted on each cradle to tilt vertically in a direction transversely to the line of flight, and means for tilting the cradles and planes.

8. A flying machine embodying a main frame, outriggers extending laterally from the main frame, cradles extending longitudinally at right angles to the line of flight and mounted upon the outriggers to tilt vertically in a fore and aft direction, a series of planes pivotally mounted on each cradle to tilt vertically in a direction at right angles to the line of flight, and independent devices for respectively controlling the cradles and sets of planes.

9. A flying machine embodying a main frame, an upright frame rising therefrom, inclined rods pivoted at their rear ends to the rear end of the main frame, links connecting the forward ends of said rods to the rear portion of the upright frame, kite-shaped rudder planes carried by the rods, connections between the rods to adapt the same to swing laterally in unison, and operating means for imparting lateral motion thereto in either direction.

10. A flying machine including a main frame, normally collapsed inflatable pontoons carried by the main frame and arranged one in rear of the other, means for holding said pontoons collapsed, means for releasing said holding means, and a driving propeller arranged to operate between said pontoons.

11. A flying machine including a main frame, longitudinally extending normally collapsed pontoons arranged in tandem upon the main frame, means for holding the same normally collapsed, means for rendering the holding means inoperative to free the pontoons for expansion, and a driving propeller arranged to operate between said pontoons.

12. A flying machine embodying a main frame extending longitudinally in the line of flight, an upright frame rising from said main frame, a supporting surface carried by said upright frame, outriggers extending laterally from the main frame, a longitudinal series of vertically tilting horizontal planes mounted upon the main frame, means for tilting the same in unison, a plurality of horizontal planes mounted upon each outrigger to tilt vertically in both a longitudinal and transverse direction, and means for tilting the same.

13. A flying machine including a frame, an inflatable pontoon supported thereby and adapted to be rolled into normally collapsed condition, means for holding said pontoon collapsed, and electrically controlled means for releasing said holding means.

14. A flying machine including a frame, a normally collapsed flexible pontoon supported thereby, a latch for holding said pontoon in collapsed condition, an electromagnet for retracting said latch and means for energizing said magnets.

15. A flying machine including a frame, a normally collapsed inflatable pontoon carried thereby, means for holding said pontoon collapsed, and electrically controlled means for releasing said holding means.

In testimony whereof I affix my signature in presence of two witnesses.

LOUIS DOBBERTIN.

Witnesses:
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DAVID N. LEVINGSTON.