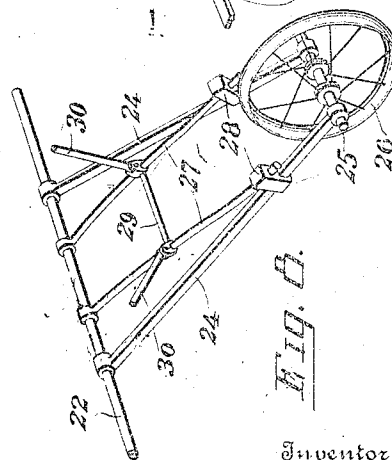
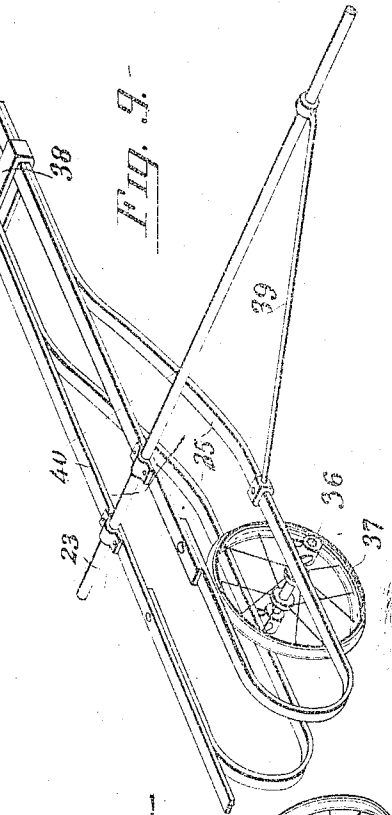
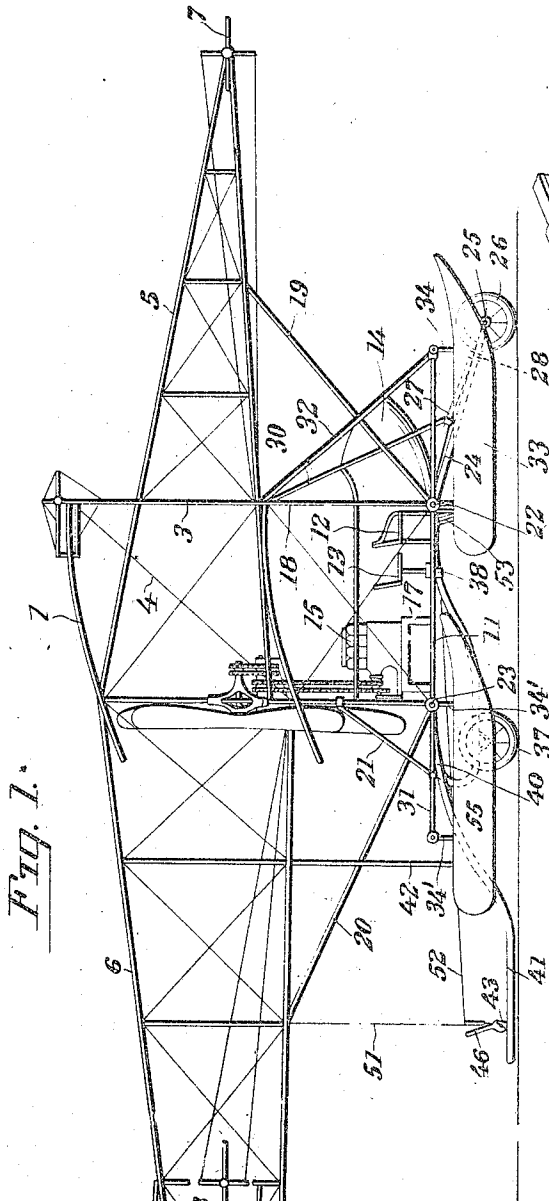


A. R. NORDSTROM.
FLYING MACHINE.
APPLICATION FILED JUNE 4, 1912.

1,061,198.

Patented May 6, 1913.

3 SHEETS—SHEET 1.



Witnesses
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By Victor J. Evans
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3 SHEETS-SHEET 2.

Fig. 2.

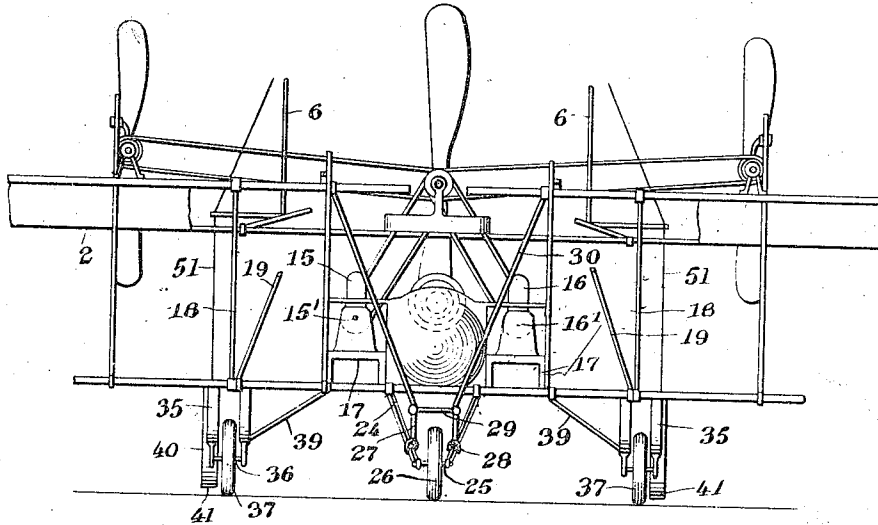
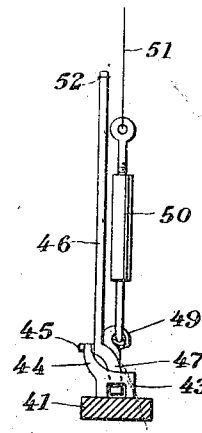
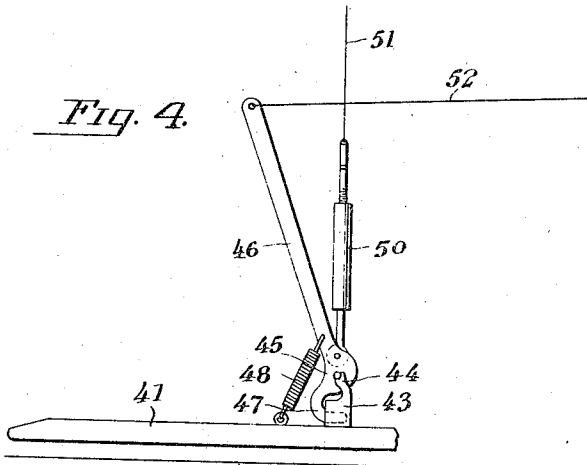


Fig. 3.



Witnesses

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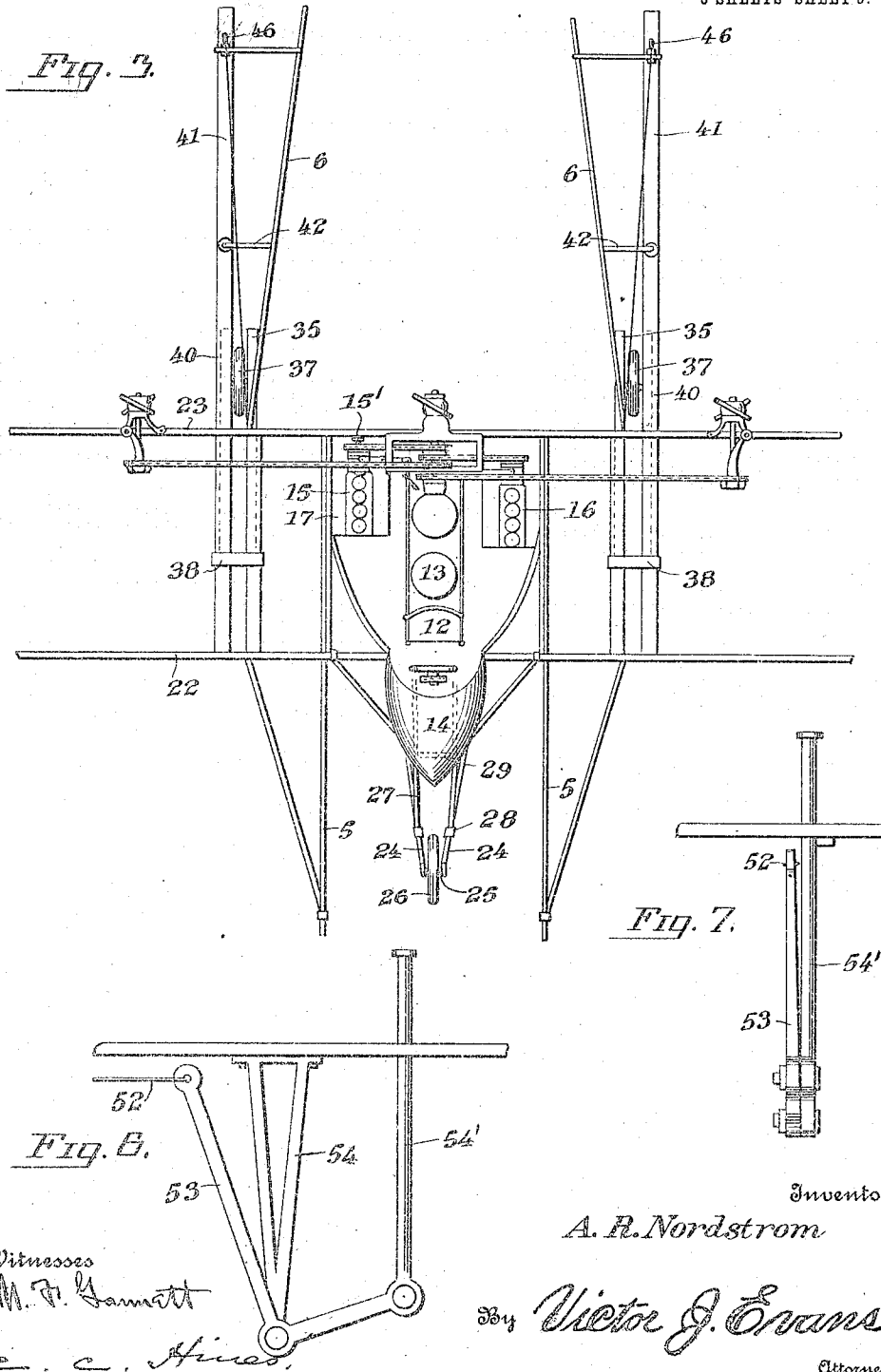
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3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

AXEL R. NORDSTROM, OF WEST LYNN, MASSACHUSETTS, ASSIGNOR OF THREE-SIXTEENTHS TO MARTIN BOWMAN, OF ROCKFORD, MASSACHUSETTS, AND ONE-SIXTEENTH TO CARIN E. NORWALL AND ONE-FOURTH TO GUSTAF F. HELLSTROM, SR., AND GUSTAF F. HELLSTROM, JR., OF WEST LYNN, MASSACHUSETTS.

FLYING-MACHINE.

1,061,198.

Specification of Letters Patent.

Patented May 6, 1913.

Original application filed December 27, 1911, Serial No. 668,046. Divided and this application filed June 4, 1912. Serial No. 701,578.

To all whom it may concern:

Be it known that I, AXEL R. NORDSTROM, a subject of the King of Sweden, residing at West Lynn, in the county of Essex and State of Massachusetts, have invented new and useful Improvements in Flying-Machines, of which the following is a specification.

This invention relates to flying machines of the aeroplane type, and the present application is a division of my prior application #668,046, filed December 27, 1911.

The object of the present invention is to provide a novel construction and arrangement of carriage or chassis, cushioned launching and landing gear including skids, and means adapting the skids, to serve as brakes, together with hydroplane floats adapting the machine to alight upon, run along and rise from a body of water.

The invention consists of the features of construction, combination and arrangement of parts hereinafter fully described and claimed, reference being had to the accompanying drawing in which:—

Figure 1 is a side elevation of a flying machine embodying my invention. Fig. 2 is a sectional front elevation through the carriage and lower supporting surface. Fig. 3 is a sectional plan view of the parts shown in Fig. 3, omitting the lower supporting surface. Figs. 4 and 5 are side and front elevations of one of the skid holding and releasing devices. Figs. 6 and 7 are detail side and front views of the controlling device therefor. Figs. 8 and 9 are views of the front and rear ground wheels and their resilient supports.

In the present instance, I have shown the application of my invention to a flying machine of the biplane type, in which the superposed supporting planes or surfaces 1 and 2 are connected in the usual manner by struts 3 and stay wires 4, said machine being provided with head and tail frames 5 and 6 carrying the elevator or horizontal rudders 7 and 8. The tail frame also carries a vertical or direction rudder 9 and stabilizing planes or surfaces 10, which operate also to sustain the weight of the tail frame when the machine is in flight.

The machine is mounted upon a carriage or chassis comprising a car or platform 11 which supports the aviator's seat 12, one or more passenger's seats 13, and a substantially cigar-shaped or torpedo-shaped body or shield 14, in which the seats are inclosed, said body or shield serving to protect the aviator and passenger from the force of the wind. The seats 12 and 13 are preferably arranged in tandem relation in the central longitudinal line of the machine, in order that the weight of the occupants thereof may be properly distributed to trim or balance the machine. The car or platform 11 also supports a pair of motors 15 and 16, which rest upon suitable beds 17 arranged on opposite sides of the longitudinal center of the machine so as to properly position the motors for balancing effect and to dispose the same in the path of the air for an effective cooling action.

The car or platform 11 is secured to the frame of the plane 1 by vertical struts or stanchions 18, and said car or platform is reinforced from the head and tail frame by sets of braces 19 and 20, and from the frame of the lower plane by suitable braces 21, in connection with which suitable truss wires may be employed, if desired. The car or platform includes front and rear rods or tubes 22 and 23, which extend laterally beyond the platform to a required degree.

Forwardly converging bracket arms 24 are hinged at their rear ends to the rod 22 and incline downwardly and forwardly therefrom and form a support for an axle spindle 25 on which is journaled a front central supporting wheel 26. Also pivoted at their rear ends to the rod 22 are spring bars 27, the forward ends of which slidably engage cuffs or sleeves 28, secured to the arms 24, by which the wheel 26 is yieldingly mounted for a cushioning action. The spring bars 27 are coupled for movement in unison by a cross piece 29 and are reinforced from the frame of the plane 1 by braces 30, thus preventing the wheel 26 from having undue vertical play. Rods 31 also project from the bar 22 and are connected with the plane 1 by braces 32, said rods forming sup-

ports for the forward end of a pair of hydroplane floats 33, which are suspended therefrom by short hangers 34.

Secured at their rear ends to the bar or platform 11 are looped suspension springs 35, arranged in pairs, each pair of springs forming a support for an axle spindle 36 carrying a rear supporting wheel 37, the two wheels being arranged on opposite sides of the longitudinal center of the machine and cooperating with the wheel 26 to support the machine upon the ground and to yieldingly sustain the shocks and jars in launching and landing. The forward ends of the springs 35 are slidably fitted in sockets 38 secured to the car to permit said springs to have vertical play. The rear ends of the springs are connected with the rods 23 by braces 39, which may be hinged or pivoted to allow the springs to have the requisite freedom of motion. Projecting from the rear of the platform are resilient bars 40 which are bent at their rear ends to provide skids or runners 41, which are stayed at their forward ends from the tail frame by braces 42. These skids or runners are adapted by their spring action to move downward in contact with the ground. For the purpose of holding said skids elevated and in an inoperative position, each skid is provided with a keeper socket 43 carrying a bearing member 44 provided with an open bearing recess engaged by a fulcrum pin 45 on the lower end of a holding and releasing lever 46, which terminates at its lower end in a hook or locking member 47 to engage the socket 43 and is connected with the skid above its pivotal point by a coiled contractile spring 48, normally serving to hold the hook in engagement with the socket. The lever is provided at one side with an eye or hook 49 which is engaged by the eye at one end of a turn buckle or tensioning device 50, which is connected with a stay wire 51 secured to the tail frame 6, whereby the lever is sustained in operative position. The two controlling levers 46 have cables 52 leading to one arm of a bell crank lever 53 fulcrumed on a bracket 54 attached to the car, to the other arm of which lever is coupled a sliding rod or controlling member 54', adapted to be depressed by the foot of the aviator, whereby the levers may be adjusted to throw the hooks 47 out of engagement with the sockets 43, whereupon the parts 44 and 45 are freed for disengagement, allowing the skids to drop down into contact with the ground to serve as a brake to bring the machine to a quick stop in landing. Rear hydroplane floats 55 are supported by hangers 34' from the rods 31 adjacent the rear supporting wheels 37.

Any suitable construction and arrangement of means for operating the rudders and maintaining lateral stability may be em-

ployed, and any suitable type of propelling mechanism may be provided and suitably driven from the motors 15 and 16.

I claim:—

1. A flying machine including a car or platform, a main frame rising therefrom and carrying a supporting surface, a bracket formed of rods pivotally connected with the car or platform and carrying a supporting axle, a ground wheel journaled on said axle, springs connected with the platform and slidably connected with the bracket rods, a member connecting said springs to move in unison, and braces connecting said member with the main frame to limit the pivotal play of the bracket. 70 75 80

2. A flying machine including a car or platform, a main frame rising therefrom and carrying a supporting surface, a bracket formed of rods pivoted to the main frame and extending downwardly and forwardly in convergent relation therefrom and carrying at their converging ends a supporting axle, a wheel mounted upon said axle, longitudinally bowed springs connected with the car or platform and slidably engaging the bracket rods, a connection between said springs to adapt them to move in unison, and downwardly and forwardly diverging braces coupled to said connection and to the main frame, and serving to limit the pivotal play of the bracket. 85 90 95

3. A flying machine including a frame structure, pairs of longitudinally extending looped springs, arranged on opposite sides of the longitudinal center of the frame structure, the springs of each pair having their forward ends slidably connected with the framework and their rear ends rigidly connected therewith, axles extending between and carried by the springs of each pair, ground wheels supported by said axles, and braces flexibly connecting each pair of springs with the framework to limit the play of said springs. 100 105 110

4. In a flying machine, the combination of a car or platform having front and rear transverse supporting rods, a bracket hinged to the front supporting rod and extending outwardly and downwardly therefrom, a supporting wheel carried by said bracket, springs secured at one end to the front supporting rod and slidably connected at their opposite ends to the bracket, braces connecting said springs with the framework of the machine to limit the yielding pivotal play of the bracket, pairs of longitudinally extending looped springs arranged on opposite sides of the longitudinal center of the machine and connected at their rear ends with the rear transverse rod and slidably connected at their forward ends to the car or platform, a transverse axle extending between and carried by each pair of springs, ground wheels mounted on said axles, and 115 120 125 130

braces flexibly coupling said springs to the framework of the machine to limit the play of the springs.

5 5. A flying machine including a car or platform having front and rear transverse rods extending laterally therefrom, a front ground wheel yieldingly supported upon the front transverse rod in the central longitudinal line of the machine, rear ground
10 wheels arranged on opposite sides of the longitudinal center of the machine, supporting springs for said ground wheels coupled to the rear transverse rod and slidably connected with the car or platform, means for
15 limiting the play of said springs, and front and rear pairs of floats suspended from the transverse rods on opposite sides of and in transverse alinement with the front and rear wheels.

20 6. In a flying machine, a car or platform, a resilient skid connected therewith and adapted for contact with the ground, a keeper socket on said skid having an open bearing recess arranged above the same, a
25 locking lever pivotally supported upon the frame and having a fulcrum pin to engage said recess and a hook to engage the keeper socket, a spring yieldingly connecting said lever above its pivotal point with the skid,
30 and means for swinging said lever on its

supporting pivot to release the hook from the keeper socket and the fulcrum pin from engagement with the bearing recess, to free said resilient skid for downward movement.

7. In a flying machine, a supporting 35 framework, a resilient skid connected therewith and adapted to contact with the ground, a keeper socket on the skid provided with an open bearing recess, a support coupled to the main frame of the ma- 40 chine, a locking lever pivoted to said support and provided with a hook to engage said keeper socket and a fulcrum pin to engage said open bearing recess, whereby to hold the skid elevated above the ground, a 45 spring connecting said skid with the lever above the pivotal point of the latter, a bell crank lever fulcrumed on the framework, a connection between said lever and the locking lever whereby the latter may be ad- 50 justed to throw its hook out of engagement with the keeper socket and release the skid, and means for operating said bell crank lever.

In testimony whereof I affix my signature 55 in presence of two witnesses.

AXEL R. NORDSTROM.

Witnesses:

GUSTAF F. HELLSTROM, Sr.,

JOHN H. MATTEON.