

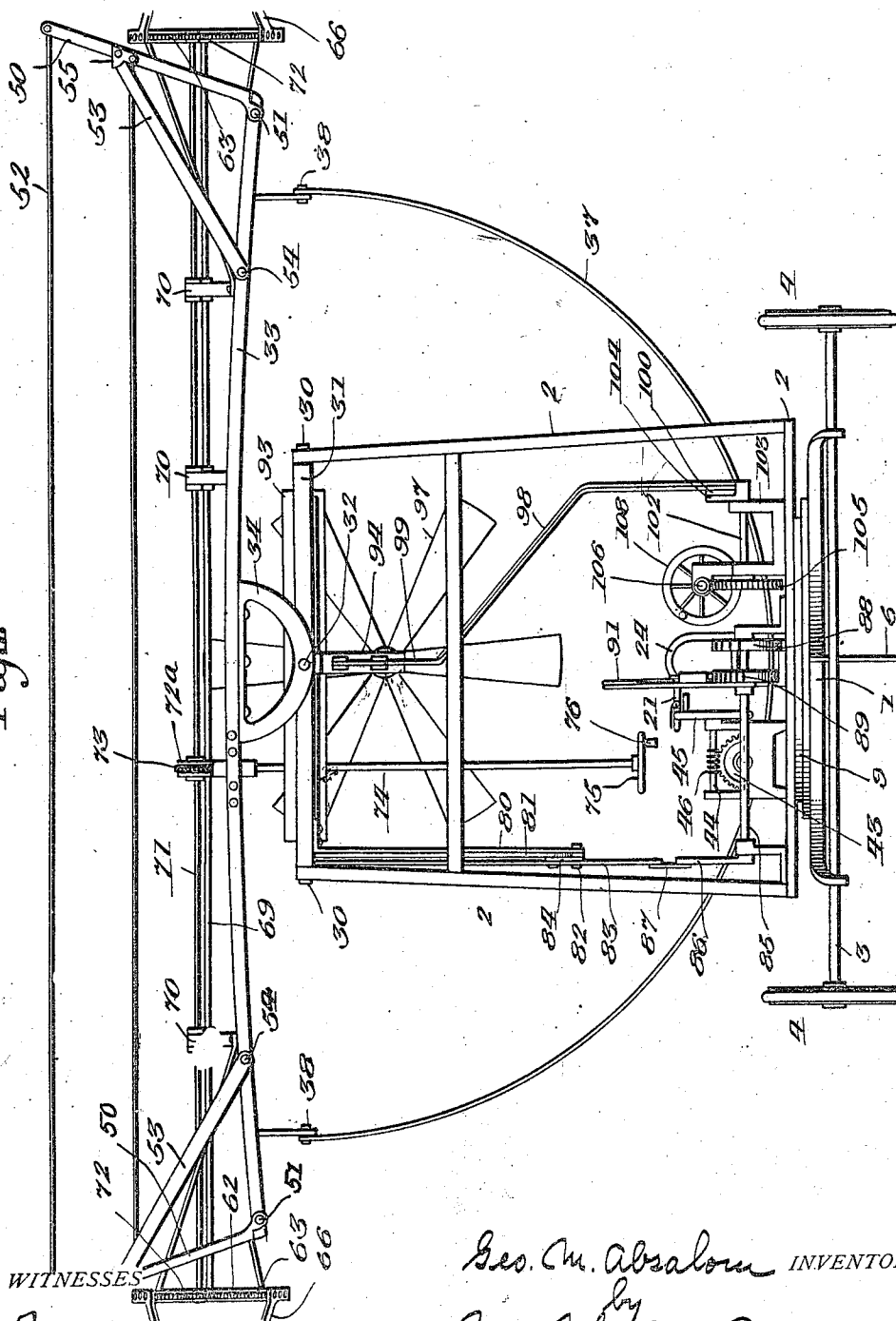
G. M. ABSALOM.
SAFETY BALANCED AIR MACHINE.
APPLICATION FILED AUG. 6, 1912.

1,045,657.

Patented Nov. 26, 1912.

4 SHEETS-SHEET 1.

Fig. 1



WITNESSES

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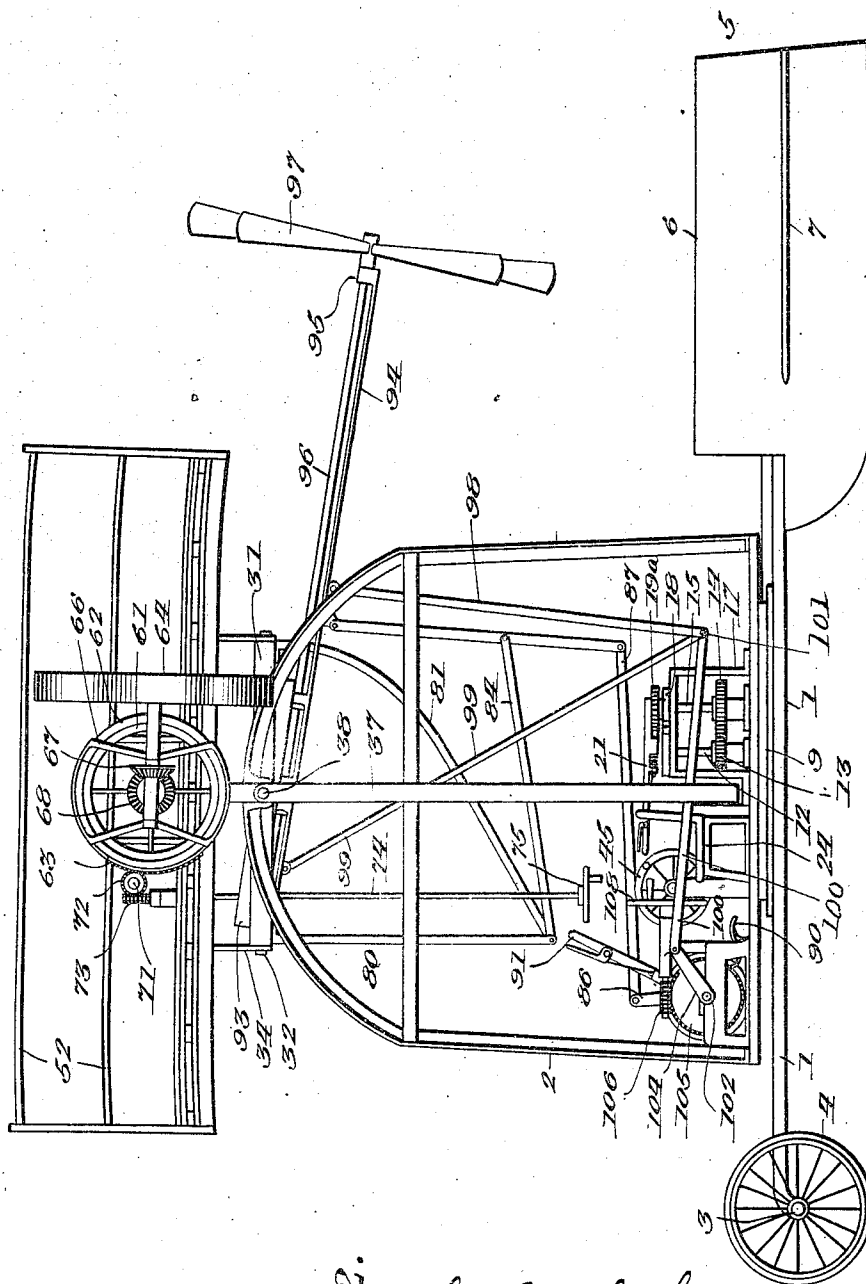
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4 SHEETS—SHEET 2.



WITNESSES

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Fig. 2.

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4 SHEETS—SHEET 3.

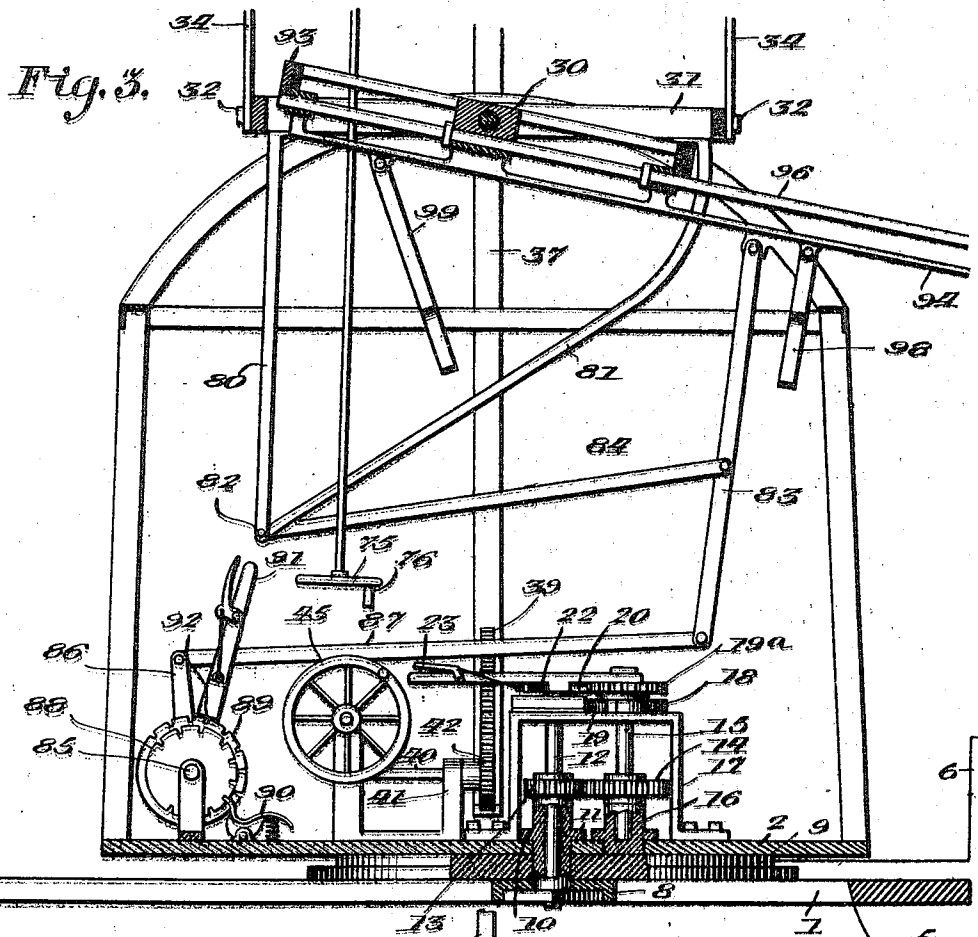
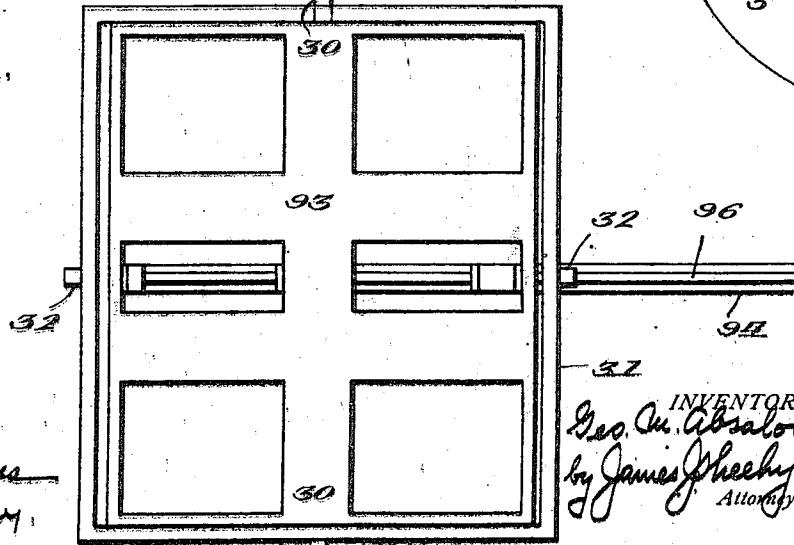


Fig. 4.



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Patented Nov. 26, 1915

4 SHEETS—SHEET 4.

Fig. 4. a

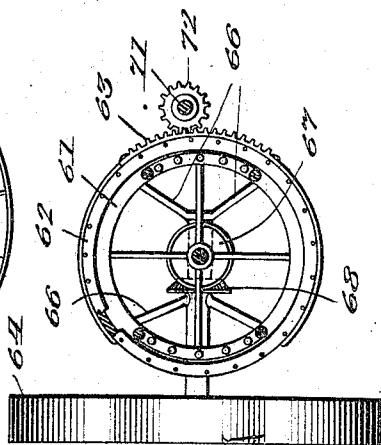
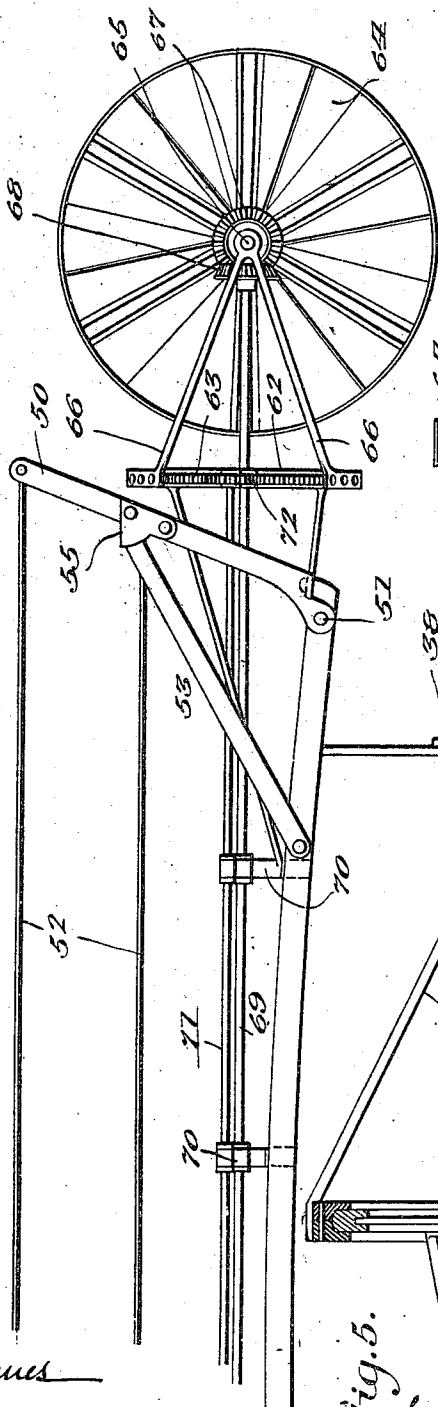


Fig. 6.

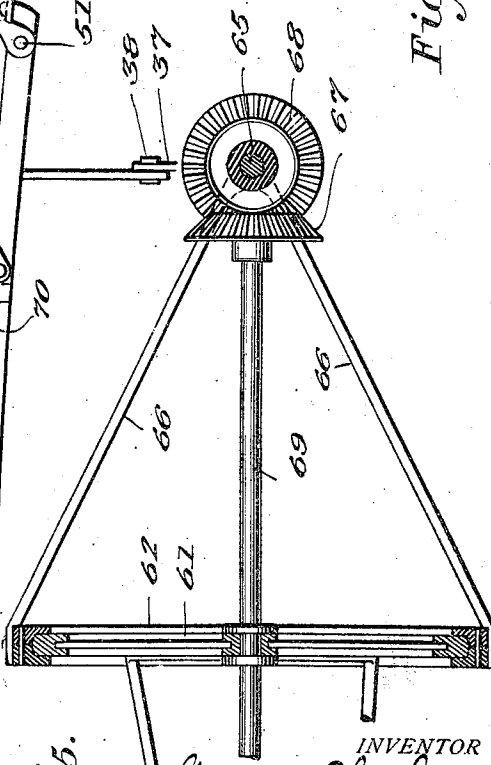


Fig. 5.

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UNITED STATES PATENT OFFICE

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SAFETY BALANCED AIR-MACHINE.

1,015,657.

Specification of Letters Patent.

Patented Nov. 26, 1912.

Application filed August 5, 1912. Serial No. 713,319.

To all whom it may concern:

Be it known that I, GEORGE M. ABSALOM, citizen of Canada, residing at Caistor Centre, in the Province of Ontario and Dominion of Canada, have invented new and useful Improvements in Safety Balanced Air-Machines, of which the following is a specification.

My present invention pertains to air ships of the aeroplane type; and it contemplates the provision of what may be properly denominated a safety-balanced air navigating machine since it will not turn over and will fly after the manner of a kite or bird, and this with steadiness since the large plane will act as a sail and the disposition of all the weight below the plane or planes will maintain the aviator at all times in a safe position.

The invention also contemplates the provision of a safety balanced air navigating machine in which all of the important elements are entirely under the control of the navigator and may be expeditiously manipulated by him as occasion demands.

The invention further contemplates the provision of an air navigating machine embodying means whereby the aviator is enabled to thoroughly control the movement of the machine on the ground prior to the ascent of the machine and subsequent to the descent of the machine.

The invention further contemplates the provision of propelling means entirely under the control of the aviator and so disposed as to enable the aviator by adjustment to use the said propelling means to the best advantage.

Other peculiar and advantageous characteristics of the invention will be fully understood from the following description and claims when the same are read in connection with the drawings, accompanying and forming part of this specification, in which:

Figure 1 is a front elevation of the machine constituting the best practical embodiment of my invention that I have as yet devised. Fig. 2 is a side elevation of the same. Fig. 3 is an enlarged view, partly in elevation and partly in section, showing certain of the controlling devices embraced in the machine and also showing the manner in which the main frame of the machine is pivotally mounted on the carriage. Fig. 4 is a detail horizontal view illustrating the relative arrangement of two sub-frames com-

prised in the machine. Fig. 4^a is a detail view showing the planes, a propeller at one end of the frame carrying the planes, and the means through the medium of which the propeller is adjusted; it being understood in this connection that a similar propeller and appurtenances is employed at the opposite end of the frame that carries the planes. Fig. 5 is an enlarged detail view showing partly in section and partly in elevation the means for adjusting the propeller vertically. Fig. 6 is a view taken at right angles to Fig. 4^a and showing the relative arrangement of the propeller, the means through which the same is adjusted, and the means through which the propeller is driven.

Similar numerals designate corresponding parts in all of the views of the drawings, referring to which:

1 is the carriage of the machine, and 2 is the main frame thereof. The carriage 1 may be of any light construction consonant with the purpose of my invention, and is provided at its forward end with an axle 3 bearing ground wheels 4, and at its rear end with a combined runner and vane 5; the said combined runner and vane comprising an upright portion 6, and blades 7 which extend laterally from opposite sides of the upright portion at an intermediate point in the height thereof.

At an intermediate point of its length the carriage 1 is provided with a support 8, and upon said support is superposed a bearing 9 upon which in turn is superposed the main frame 2. Fixed to the carriage 1 in any suitable manner is an upright sleeve 10 which extends through the bearing 9 and also through the floor of the main frame, and is provided with a flange 11 which bears upon the floor 2 with a view to holding the said floor down upon the bearing 9, and the said bearing 9 down upon the carriage 1. The sleeve 10 fixedly surrounds a supporting shaft 12, and on said sleeve 10 is fixed a spur gear 13. This latter is intermeshed with a spur gear 14 carried by a shaft 15 which is stepped as shown, in a suitable bearing 16. The shaft 15 is also journaled in a small sub-frame 17 and above the said sub-frame the shaft is provided with a circular disk 18 against which bears a spring-pressed brake shoe 19 which has for its office to prevent too free movement of the carriage 1 under main frame 2. The shaft 15 is also provided at 19^a with a ratchet disk, and with

said disk is designed to cooperate a pawl 20 carried by a horizontal or substantially horizontal lever 21. The pawl 20 is designed to be retracted against the action of its spring 22 through the medium of the hand grip 23 mounted on the lever 21. By virtue of this construction it will be observed that the operator who occupies the seat 24, Fig. 2, is enabled to conveniently oscillate the lever 21, and incidental to said oscillation to turn the shaft 15 through the medium of the pawl 20 and the ratchet disk 19^a. Incidental to the turning of the shaft 15, the shaft 12 will also be turned and the carriage 1 will be moved in one direction or the other under the main frame 2. From this it follows that the operator is enabled to adequately guide the machine during its movement on the ground and prior to a flight, and is also enabled to properly guide the machine after it reaches the ground subsequent to a flight and before it loses its momentum. The shaft 12 is suitably fixed at 60 to the carriage 1.

The main frame 2 of the machine is preferably of the general construction illustrated, though it may be of any other suitable construction without involving departure from the scope of my claimed invention.

Pivotally mounted at 30 in the upper portion of the main frame 2 is a sub-frame 31 which is designed to be swung vertically in the direction of the length of the machine, and pivoted at 32 and 32 to the said sub-frame 31 is the plane frame 33; the said frame being provided with depending arcuate portions 34 through the medium of which the pivotal connection of the plane frame to the sub-frame 31 is effected. Thus it will be manifest that the plane frame 33 can be swung vertically in the direction of the width of the machine. For the purpose of enabling the operator in the seat 24 to so swing the plane frame and the parts carried thereby, I provide the means best shown in Figs. 1 and 3. The said means comprises a curvilinear bar 37 connected at its ends to the plane frame, as indicated at 38 and 38, and having at an intermediate point of its length a rack 39, a shaft 40 journaled in a bearing 41 on the floor of the main frame 2, and having at one end a spur gear 42 intermeshed with the rack 39, and also having at its opposite end a worm gear 43, Fig. 1, and a shaft 44 bearing a hand wheel 45 and also bearing a worm screw 46 that is intermeshed with the worm gear 43. By virtue of this construction it will be manifest that the aviator in the seat 24 is enabled by turning the wheel 45 to move the curvilinear bar 37 and through the same to tilt the plane frame in one direction or the other according to the direction in which the wheel 45 is turned. It will also be manifest that the said con-

struction is such that the curvilinear bar 37 and the plane frame 33 will be retained in the positions in which they are placed and against casual movement from said positions.

At its ends the plane frame 33 is provided with upwardly extending bars 50 which are hinged at 51 to the plane frame 33. Suitably connected to and extending between the bars 50 are planes 52 of which any suitable number may be employed; the said planes being separated by an intervening space and being designed to operate after the manner of sails with a view to lending buoyancy and stability to the machine while in the air. The bars 50 are maintained in the position shown in Fig. 1, so as to hold the planes 52 which are preferably of canvas or the like taut or under tension. The means I employ for said purpose are struts 53, pivoted at 54 to the plane frame and having their upper and outer ends removably arranged in sockets 55 on the bars 50. By virtue of this construction when the bars 50 are pressed outward sufficiently to enable the pockets 55 to clear the outer ends of the struts 53, the said struts may be swung inward, as may also the bars 50, and in said manner the planes 52 may be relieved of tension and the machine rendered more compact, as is desirable when the machine is to be stored away in a hangar.

Fixed at opposite ends of the plane frame 33 are circular supports 61, best shown in Figs. 4 to 6. The said supports 61 are preferably annular, as shown, for the sake of lightness, and are surrounded by rings 62 on which are racks 63. Carried by the rings 62 and disposed at right angles thereto are the side propellers 64 of the machine, which side propellers *per se* may be of the construction illustrated or of any other construction consonant with the purpose of my invention without involving departure from the scope of the same as claimed. The shafts 65 of the propellers 64 are journaled in stays 66 fixed to and extending outward from the rings 62. The said shafts 65 are also provided with miter gears 67, and with the said miter gears 67 are intermeshed miter gears 68 on a shaft 69 journaled in suitable bearings 70 on the plane frame. By transmitting rotary motion to the shaft 69 it will be manifest that the propellers 64 will be rotated.

Journaled in suitable bearings carried by the plane frame is a shaft 71, and on the ends of said shaft are pinions 72 which are intermeshed with the racks 63 on the rings 62, as clearly shown in Figs. 2 and 6 of the drawings, and also in Fig. 1. The shaft 71 is also provided with a screw gear 72, and with said screw gear is intermeshed a worm screw 73 carried by an upright shaft 74, journaled in suitable bearings in the plane

frame 33 and extending down within the main frame to a point adjacent the aviator's seat where it terminates in a wheel 75 having a handle 76. By turning the hand wheel 75 the aviator is enabled to swing the propellers 64 vertically so as to use the same to advantage, and by reason of the worm screw 73 coöperating with the worm gear 72, it will be understood that the propellers 64 will remain in the vertical positions in which they are placed, and will not be liable to move accidentally from said positions.

In the foregoing I have referred to the propellers 64 in the plural, and this notwithstanding but one propeller is shown. It will be understood, however, that the propeller at the opposite end of the plane frame with reference to the propeller shown in Fig. 4, is identical in construction with said propeller. It will also be understood that the vertical adjustment of the propellers 64 will not interfere with the transmission of rotary motion to the said propellers, inasmuch as the centers of the rings 62 and the shaft 69 are coincident.

By reason of the sub-frame 31 being pivoted at 30 and 30 to the main frame 2, the plane frame 33 and the parts carried thereby are capable of being swung vertically in the direction of the length of the machine. To so swing the sub-frame 31 on the centers formed by the bearings 30 and the pivotal connections 38, the mechanism best shown in Fig. 3 and at the left of Fig. 1 is provided. The said mechanism comprises an arm 80 fixed to and depending from the forward portion of the sub-frame 31, an arm 81 fixed to and depending from the rear portion of the sub-frame 31 and carried forward and connected at 82 to the depending arm 80, a lever 83 connected to and depending from the upper portion of the main frame 2, and a link 84 interposed between the lever 83, at an intermediate point in the length thereof, and the lower ends of the arms 80 and 81, and connected to said elements. Said mechanism also comprises a transverse shaft 85 journaled in suitable bearings on the floor of the main frame 2, and having an arm 86, a link 87 connecting the ends of the lever 83 and the arm 86, a notched disk 88 fixed on the shaft 85, a second notched disk 89 fixed on said shaft 85, a spring-pressed pawl 90 arranged within convenient reach of the aviator's foot and designed by coöperating with the disk 88 to lock the shaft 85 against rotation and thereby prevent casual swinging movement of the sub-frame 31 and the plane frame 33 in the direction of the length of the machine, and a hand lever 91 loosely mounted on the shaft 85 and carrying a spring-pressed detent 92 positioned to coöperate with the disk 89. From this it will be manifest that the aviator by pressing with his foot on the

pawl 90 to disengage the same from the disk 88, is enabled to release the parts for vertical swinging of the planes in the direction of the length of the machine, and then through the medium of the lever 91 and the detent 92 and the disk 89, the aviator is enabled to swing or tilt the planes in the direction of the length of the machine.

Pivotaly mounted in the sub-frame 31 at the points 30 is a second sub-frame 93. This second sub-frame 93 is designed to swing vertically in the direction of the length of the machine, and is provided with a rearward extension 94 having a bearing 95 at its rear end. Journaled in suitable bearings provided in the sub-frame 93 and also journaled in the bearing 95 is the shaft 96 of the main propeller 97 of the machine.

In order to enable the aviator in the seat 24 to adjust the sub-frame 93, the extension 94 and the propeller 97 vertically and in the direction of the length of the machine, I provide the mechanism best shown in Figs. 1 and 2, and partly shown in Fig. 3. The said mechanism comprises a link 98 pivoted to and depending from the extension 94, a link 99 pivoted to and depending from the sub-frame 93 at a point in front of the center of movement thereof, a link 100 connected at 101 to the lower ends of the links 98 and 99, a shaft 102 journaled in a support 103 on the floor of the main frame 2 and having an arm 104 connected to the forward end of the link 100, a worm gear 105 fixed on the shaft 102, and a shaft 106 journaled in the support 103 and having at one end a worm screw 107 intermeshed with the worm gear 105, and at its opposite and rear end a hand wheel 108 arranged in close proximity to the aviator's seat 24. From this it will be readily understood that the aviator is enabled by turning the wheel 108 to throw or adjust the propeller 97 upward or downward, as occasion demands; and I would also have it here understood that through the medium of the combined rudder and vane 5 the aviator is enabled to guide the machine while in the air toward one side or the other.

Any suitable type of engine may be employed for driving the rear propeller 97 and the side propellers 64, and I prefer to place the said engine on the forward portion or in front of the center of movement of the sub-frame 93 so that the weight of the engine will be somewhat counterbalanced by the long extension 94 and the propeller 97 disposed at the rear end of said extension. In this connection I would say that the engine *per se* forms no part of my present invention, nor do the driving connections intermediate the engine and the shafts 96 and 69. It is obvious, however, that any suitable driving connection might be employed between the engine and the shaft 96,

and a flexible shaft, for instance, might be employed intermediate the engine and the shaft 69, so as not to interfere with the driving of the propellers 64 incidental to manipulation or adjustment of the plane frame 33.

When my novel machine is in motion in the air, it will be manifest that raising of the forward portions of the plane and depression of the rear portions thereof will be attended by upward and forward movement of the machine, while raising of the rear portions of the planes and depression of the forward portions thereof will bring about downward movement of the machine, and when the engine is stopped, the machine will glide downward. I would also have it here understood that as the machine approaches the ground the aviator is enabled by tipping the plane or planes so as to make the forward portions thereof considerably higher than the rear portions, to utilize the planes as a brake so as to retard the machine and assure its landing easily and with little or no shock. While the machine is gliding downward and the aviator decides to move toward the right it is simply necessary for him to manipulate the hand wheel connected with the shaft 40 in the proper direction to raise the left hand end of the plane frame, while if the aviator desires to swoop toward the left, it is simply necessary for him to manipulate said hand wheel so as to raise the right hand end of the plane frame. The rear propeller 97 is raised and lowered to drive the machine in the direction desired, or rather to assist in making a quick and sharp ascent.

When the machine is in the air it will be manifest that the pivotal balance point and the weight are below the plane or planes, and hence there is no liability of the machine turning over under ordinary or normal conditions.

By reason of the described adjustability of the side propellers 64, it is obvious that the said side propellers can be positioned so as to drive the machine to the best advantage to propel the machine in the direction desired. For instance if the aviator is desirous of moving upward at a slight angle from the perpendicular, the propellers 64 are moved to and adjustably fixed in a position near the horizontal, while when the aviator is desirous of moving forward parallel or approximately parallel to the surface of the earth, the propellers 64 are moved to and adjustably fixed in a vertical or approximately vertical position, and when the rear propeller 97 tends to raise the machine above the height desired, the side propellers 64 can be adjusted and adjustably fixed to counteract the said tendency.

I have entered into a detailed description of the construction and relative arrangement of the parts embraced in the present and best

practical embodiment of my invention that I have as yet devised, in order to impart a full, clear and exact understanding of the said embodiment. I do not desire, however, to be understood as confining myself to the said specific construction and relative arrangement of parts as in the future practice of the invention such changes or modifications may be made as do not involve departure from the scope of my invention as defined in the claims appended. For instance it is manifest that the manipulating devices arranged adjacent the aviator's seat and within convenient reach of the aviator's hands and feet, may be of the construction illustrated and specifically described, or of any other construction compatible with the purpose of my invention; also, the main frame can be mounted upon the carriage in the manner shown and specifically described, or in any other approved manner.

Having described my invention, what I claim and desire to secure by Letters-Patent, is:

1. In a machine for the purpose described, the combination of a main frame, a sub-frame pivoted in the main frame to swing in the direction of the length of the machine, a plane frame pivoted to said sub-frame to swing in the direction of the width of the machine, a curvilinear bar extending through the main frame and pivoted to the plane frame at points in alinement with the center of movement of the sub-frame, means connected with the sub-frame for adjusting and adjustably fixing the same with respect to the main frame, and means coöperating with said curvilinear bar for adjustably fixing the plane frame with respect to the main frame and the sub-frame.

2. In a machine for the purpose described, the combination of a main frame, a sub-frame pivoted in the main frame to swing in the direction of the length of the machine, a plane frame pivoted to said sub-frame to swing in the direction of the width of the machine, a curvilinear bar extending through the main frame and pivoted to the plane frame at points in alinement with the center of movement of the sub-frame and having a rack, means connected with the sub-frame for adjusting and adjustably fixing the same with respect to the main frame, a gear carried by the main frame and intermeshed with the rack of the curvilinear bar, a worm gear fixed with respect to said gear, a worm screw intermeshed with said worm gear, and means through which the worm screw may be manipulated.

3. In a machine for the purpose described, the combination of a main frame, a sub-frame pivoted in said main frame to swing in the direction of the length thereof, a plane frame pivoted on said sub-frame to swing in the direction of the width of the

machine, means for adjusting and adjustably fixing the plane frame with respect to the main frame and the sub-frame; the connection of said means with the plane frame being coincident with the center of movement of the sub-frame, arms connected with and depending from the forward and rear portions of the sub-frame, a lever connected with the main frame, a link connecting said arms with said lever, and means on the main frame for adjusting and adjustably fixing said lever.

4. In a machine for the purpose described, the combination of a main frame, a plane frame pivotally connected with the main frame to swing in the direction of the width of the machine, a curvilinear bar extending through the main frame and having its ends connected with the plane frame, at opposite sides of the main frame, and having a rack, a gear carried by the main frame and intermeshed with the rack of the curvilinear bar, and means on the main frame for operating and controlling the said gear.

5. In a machine for the purpose described, the combination of a carriage having ground wheels on its forward portion and a combined rudder and vane on its rear portion, a main frame superposed on said carriage, a shaft extending loosely through the floor of the main frame and fixedly connected to the carriage and having a spur gear at a point above said floor, a second shaft journaled in bearings on the carriage and having a spur gear intermeshed with the first-named spur gear, means for creating friction and thereby preventing too free rotation of the said shaft, a lever, and means intermediate the lever and the second-named shaft for transmitting motion from the former to the latter.

6. In a machine for the purpose described, the combination of a suitably equipped carriage, a main frame pivoted thereon and provided with an aviator's seat, a lever arranged adjacent said seat, means connected with said lever whereby the aviator is enabled to swing the carriage under the main frame, a sub-frame mounted in the main frame to swing in the direction of the length thereof, means within convenient reach of the aviator's seat whereby the aviator is enabled to so swing the sub-frame, a plane frame pivoted on the sub-frame to swing in the direction of the width of the machine, and means within convenient reach of the aviator's seat whereby the aviator is enabled to so swing and adjustably fix the plane frame.

7. In a machine for the purpose described, the combination of a suitably equipped carriage, a main frame pivoted thereon and provided with an aviator's seat, a lever arranged adjacent said seat, means connected with said lever whereby the aviator is enabled to swing the carriage under the main frame, a sub-frame mounted in the main

frame to swing in the direction of the length thereof, means within convenient reach of the aviator's seat whereby the aviator is enabled to so swing the sub-frame, a plane frame pivoted on the sub-frame to swing in the direction of the width of the machine, means within convenient reach of the aviator's seat whereby the aviator is enabled to so swing and adjustably fix the plane frame, a second sub-frame mounted within the first-named sub-frame to swing in the direction of the length of the machine, a propeller carried by said second-named sub-frame, and means within convenient reach of the aviator's seat whereby the aviator is enabled to adjust and adjustably fix the second-named sub-frame.

8. In a machine for the purpose described, the combination of a suitably equipped carriage, a main frame pivoted thereon and provided with an aviator's seat, means arranged adjacent the aviator's seat whereby the aviator is enabled to swing the carriage under the main frame, a sub-frame mounted in the main frame to swing in the direction of the length thereof, means within convenient reach of the aviator's seat whereby the aviator is enabled to so swing the sub-frame, a plane frame pivoted on the sub-frame to swing in the direction of the width of the machine, means within convenient reach of the aviator's seat whereby the aviator is enabled to so swing and adjustably fix the plane frame, a second sub-frame mounted within the first-named sub-frame to swing in the direction of the length of the machine, a propeller carried by said second-named sub-frame, means within convenient reach of the aviator's seat whereby the aviator is enabled to adjust and adjustably fix the second-named sub-frame, adjustable propellers carried at the ends of the plane frame, and means arranged within convenient reach of the aviator's seat whereby the aviator is enabled to adjust and adjustably fix said propellers.

9. In a machine for the purpose described, the combination of a plane frame, bars hinged to the end portions thereof and having pockets, one or a plurality of planes of flexible material connected with and extending between said bars, and struts pivoted to the plane frame and removably arranged in the pockets of said bars.

10. In a machine for the purpose described, the combination of a plane frame, a main frame positioned under the plane frame, a sub-frame to which the plane frame is pivoted to swing in the direction of the width of the machine; said sub-frame being pivoted in the main frame to swing in the direction of the length of the machine, a second sub-frame pivoted in the first-named sub-frame to swing in the direction of the length of the machine, a propeller carried

by said second-named sub-frame, adjustable
propellers carried by the plane frame, and
means carried by the main frame and posi-
tioned or hung under the plane frame for
5 adjusting and adjustably fixing the first-
named sub-frame, the second-named sub-
frame, the plane frame and the propellers
at the ends of said plane frame.

In testimony whereof I have hereunto set
my hand in presence of two subscribing wit- 10
nesses.

GEORGE M. ABSALOM.

Witnesses:

JAS. M. SHEPARD,
RICHARD BUTLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
