

J. E. KAUPKE.

FLYING MACHINE.

APPLICATION FILED AUG. 27, 1910.

983,826.

Patented Feb. 7, 1911.

3 SHEETS-SHEET 1.

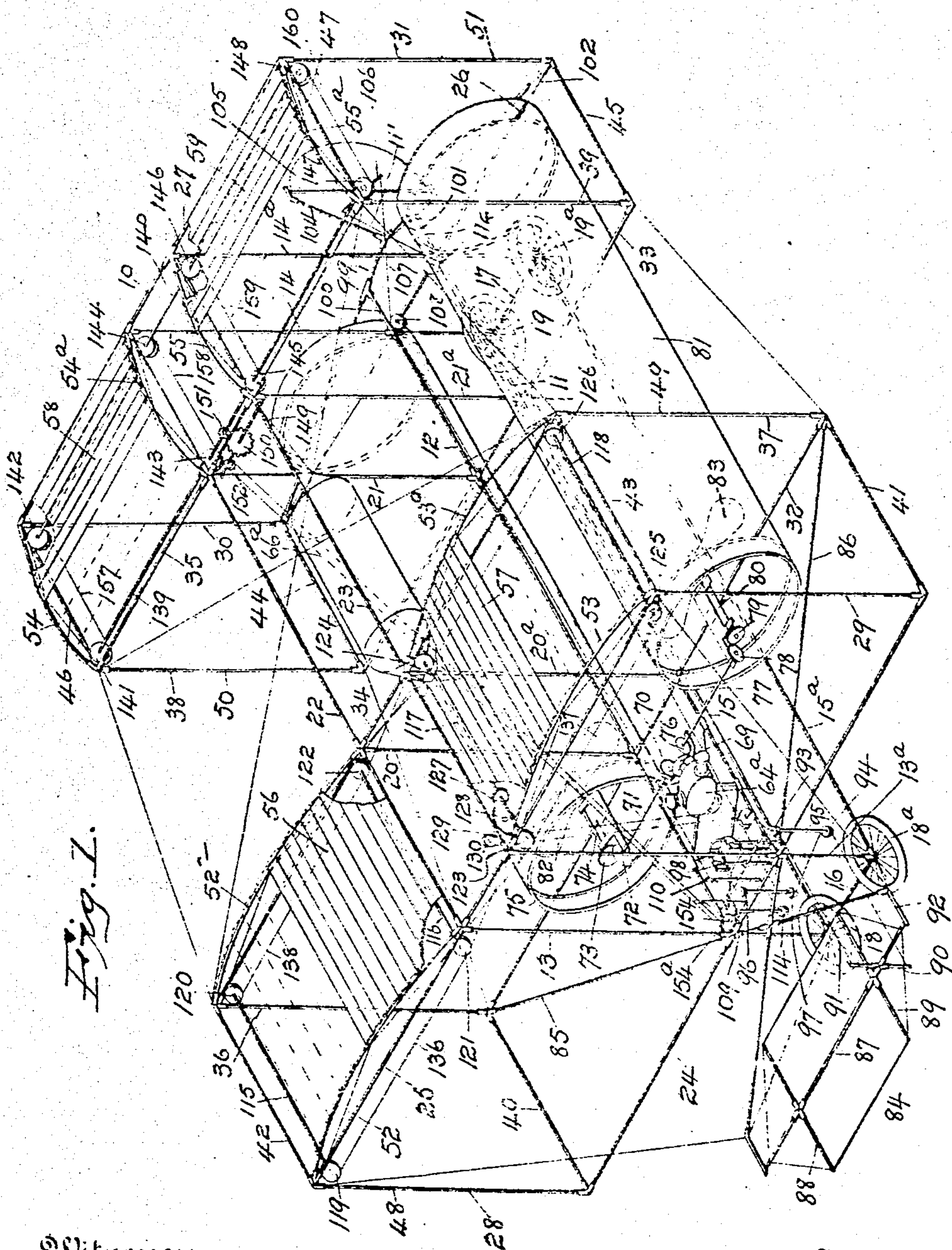


Fig. 1.

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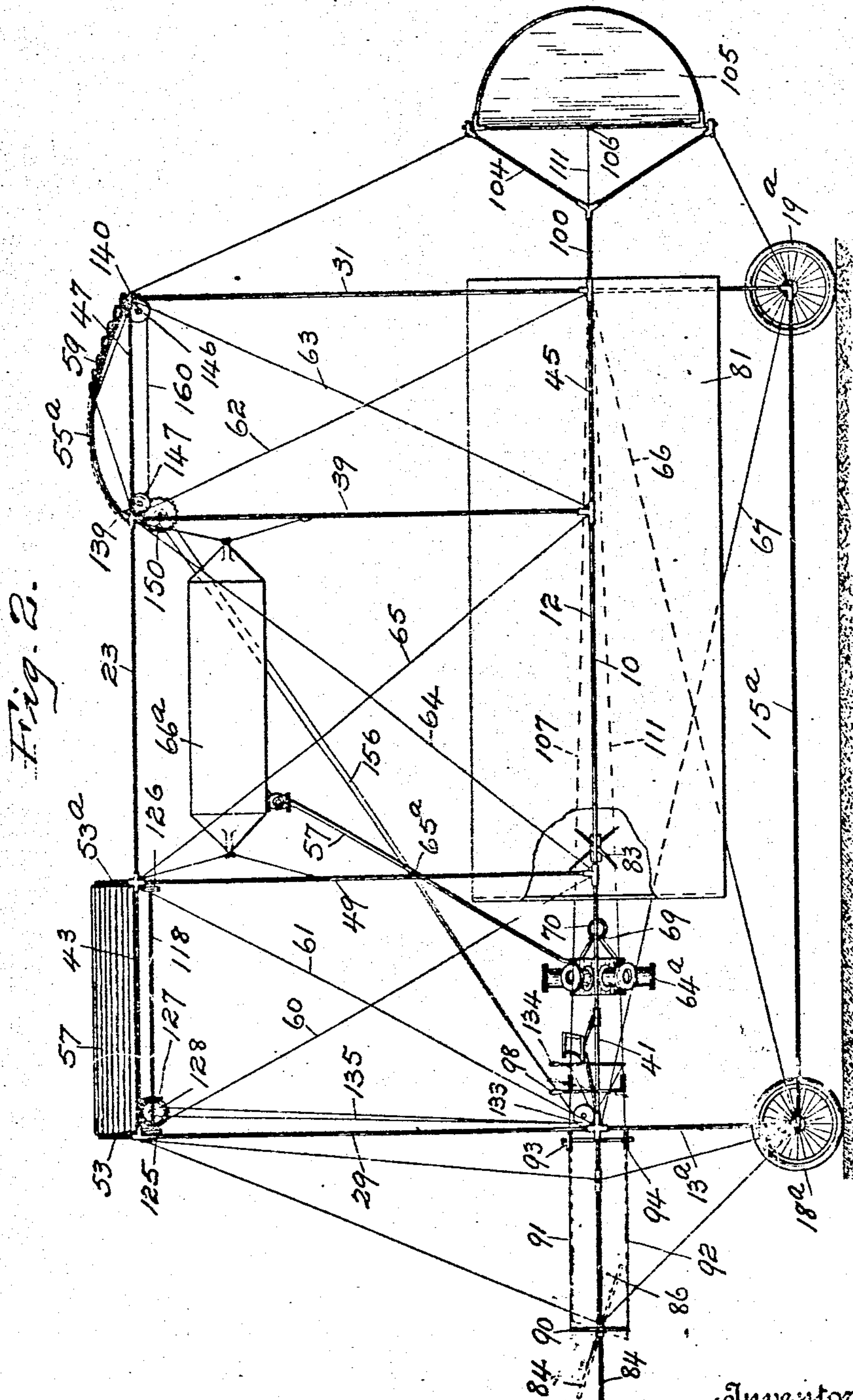
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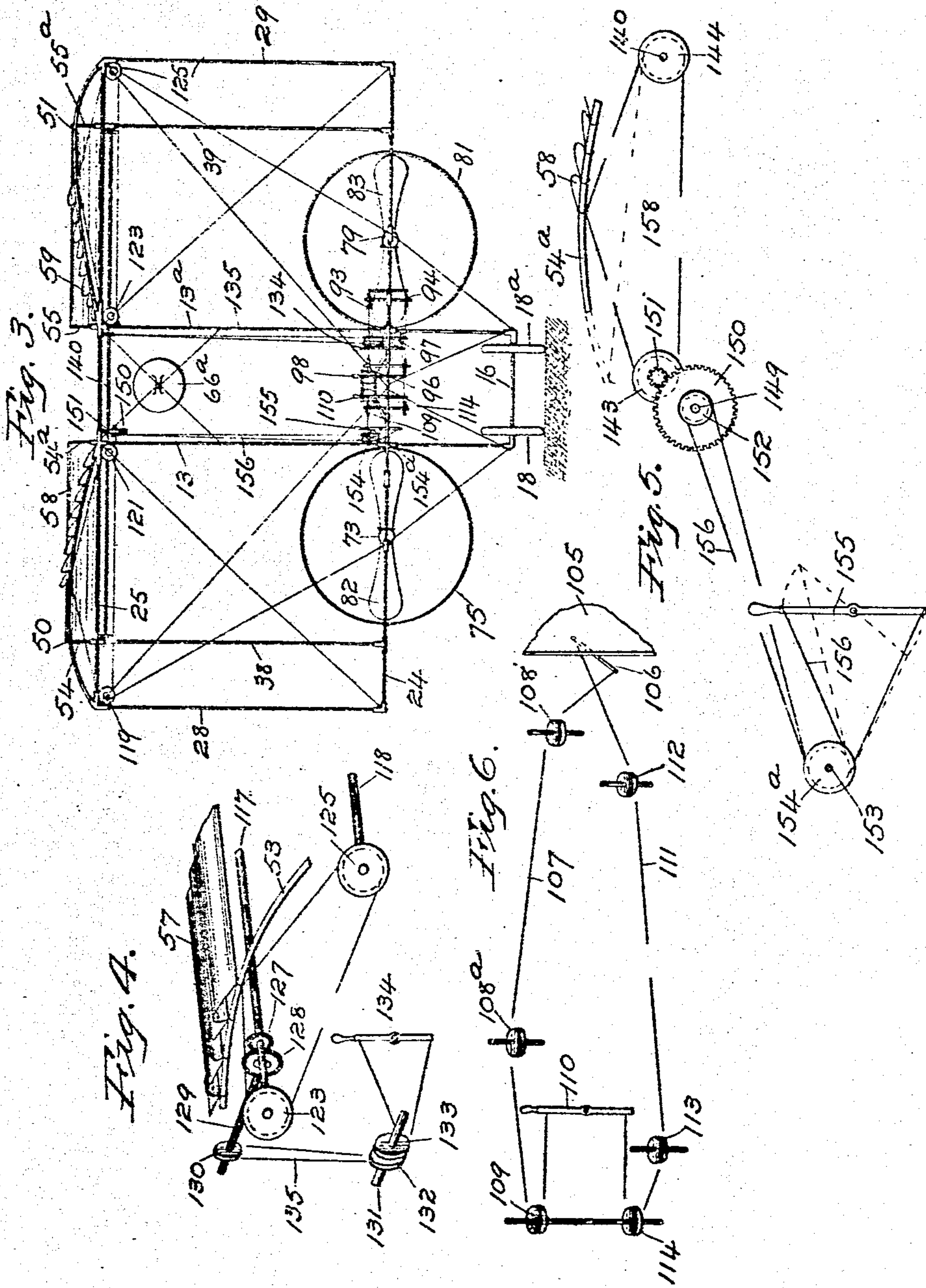
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UNITED STATES PATENT OFFICE.

JOHN E. KAUPKE, OF NEW YORK N. Y.

FLYING-MACHINE.

983,826.

Specification of Letters Patent.

Patented Feb. 7, 1911.

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To all whom it may concern:

Be it known that I, JOHN E. KAUPKE, a subject of the Czar of Russia, and a resident of New York, borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Flying-Machines, of which the following is a full, clear, and exact specification.

10 This invention relates more particularly to a class of air ships wherein mechanism is employed for propelling and controlling the machine in its flight through the air.

My invention has for its primary object 15 to provide a flying machine adapted to be elevated to any desired height in the air and capable of being propelled in various directions, the movements of which may at the same time be positively controlled; and 20 to provide a flying machine having a plurality of collapsible wings so constructed and arranged as to efficiently assist the machine in its flight and serve to govern its ascent or descent.

25 Another object of the invention is to provide a light and strong flying machine which is adapted to have the propelling parts thereof operated by a suitable motor.

A still further object of the invention is 30 to provide a flying machine or air ship which in case of accident or emergency may be lowered to the ground or place of safety at a slow descent thus overcoming the danger of injuring the operator or passengers of the machine. 35

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification in which similar characters of reference indicate 40 corresponding parts in all the views, the said invention being more fully described hereinafter and then pointed out in the appended claims.

In the drawing, Figure 1 is a perspective 45 view of one form of my improved flying machine. Fig. 2 is a side elevation thereof. Fig. 3 is a front end view of the flying machine. Fig. 4 is an enlarged detail fragmentary view of the means for controlling 50 the collapsible planes of the front wings. Fig. 5 is an enlarged detail fragmentary view of the means for controlling the collapsible planes of the back wings. Fig. 6 is

an enlarged detail fragmentary view of the steering means of the flying machine. 55

The body 10 of my flying machine may be of any suitable form and made of any desired material. As illustrated, the body 10 is substantially rectangular in shape and consists of two parallel arranged longitudinal 60 rods or bars 11 and 12 which are suitably spaced apart, and at the opposed ends of each of said rods are provided two parallel arranged vertical rods or uprights, as 13, 13^a and 14, 14^a. Each of the vertical 65 rods 13, 13^a and 14, 14^a extend for some distance underneath the rods 11 and 12, and are braced against lateral displacement by longitudinal rods, as 15 and 15^a.

Arranged crosswise at each of the lower 70 ends of the vertical rods 13^a and 14^a is an axle 16 and 17 upon which are rotatably held wheels, as 18, 18^a and 19, 19^a by which the machine may travel at the required speed upon the ground before its ascent as 75 is usual with air ships of this class.

At a suitable distance intermediate of the uprights 13, 13^a and 14, 14^a, are provided vertical supporting rods 20, 20^a and 21, 21^a the lower ends of which are connected to 80 the longitudinal rods 11 and 12 respectively. Two longitudinal rods 22 and 23 corresponding to the rods 11 and 12 are connected to the upper ends of the vertical standards 13, 13^a and 14, 14^a, and also to the vertical 85 supporting rods 20, 20^a and 21, 21^a.

Connected to the front ends of the longitudinal rods 11 and 12 is a cross rod, as 24, and at the top of the vertical rods 13 90 and 13^a is arranged a cross rod 25 which is of the same length as the cross rod 24. At the rear ends of the longitudinal rods 11 and 12 is provided a cross rod 26, and at the top of the vertical rods 14 and 14^a is connected a cross rod 27 which is of the 95 same length as the cross rod 26. The ends of the cross rods 24, 25, 26 and 27 are connected by vertical rods, as 28, 29, 30 and 31. Upon the longitudinal rods 11 and 12 intermediate of the cross bars 24 and 26, and 100 at a suitable distance therefrom, are provided cross rods 32 and 33, and to the longitudinal rods 22 and 23 are fastened cross rods 34 and 35 of a corresponding length to the cross rods 32 and 33. The ends of the 105 cross rods 32, 34, 33 and 35 are connected by

vertical rods 36, 37, 38 and 39. The opposed ends of the cross rods 24 and 32 are connected by a bar 40 and 41, and the upper ends of the cross rods 25 and 34 are connected by bars 42 and 43. Connecting the opposed ends of the cross rods 33 and 26 are bars 44 and 45, and bars 46 and 47 likewise connect the opposed ends of the cross bars 27 and 35. By this arrangement of the framework two lateral substantially rectangular wings 48 and 49 are provided at the front of my flying machine and two substantially rectangular lateral wings, as 50 and 51 are provided at the rear of the machine. The wings 48 and 49 may be larger than the wings 50 and 51, and upon the top of each of the wings 48 and 49 are arranged two curved guide rods, as 52, 52^a and 53, 53^a. The curved guide rods 52, 52^a and 53, 53^a extend in opposite directions laterally with respect to the rectangular frame or body 10, and upon the top of each of the wings 50 and 51 are arranged two curved guide rods 54, 54^a and 55, 55^a. The curved guide rods 54, 54^a and 55, 55^a are disposed longitudinally with respect to the rectangular body 10, and for the purpose of varying the resistance of atmospheric pressure when my machine is ascending or descending I provide collapsible planes or sails, as 56 and 57, upon the curved guide rods 52, 52^a and 53, 53^a respectively. Also upon the curved guide rods 54, 54^a and 55, 55^a are arranged collapsible planes or sails 58 and 59 and all of said collapsible planes are adapted to be adjusted by the operator of the machine as will be hereinafter more fully described.

In order to brace the wings 48, 49, 50 and 51 against displacement with the rectangular body 10, as shown in Fig. 2, a number of cables or tie rods 60, 61, 62, and 63 are trained crosswise of each of said wings and the body 10 respectively, and crosswise of the body 10 between the front and rear sets of the wings are directed strengthening cables or tie rods 64 and 65. The lower part of the vertical rods 13, 13^a and 14, 14^a are also braced by cross cables or tie rods 66 and 67.

The machine may be propelled by any suitable motor or engine operated by gasoline, steam, electricity, etc. I prefer to operate my present flying machine by a combustion engine, as 64^a, which may receive its motive fuel through supply pipe 65^a connected in any suitable manner to a storage tank 66^a which is supported in the upper part of the rectangular body 10.

Upon the driving shaft of the combustion engine 64^a is held a bevel gear 69 one edge of which is in mesh with a bevel gear 70. The bevel gear 70 is provided upon one end of a shaft 71 and upon the opposite

end of said shaft is arranged a bevel gear 72 meshing with a bevel gear 73 held upon a shaft 74 which is rotatable within a tube 75. The tube 75 is carried on one side of the rectangular body 10 and may be of any desired length though said tube is preferably long enough to extend three-quarters the length of the machine.

Diametrically opposite to the bevel gear 70 and meshing with the bevel gear 69 is a bevel gear 76 arranged upon a shaft 77 having upon its opposed end a bevel gear 78. The bevel gear 78 is in mesh with a bevel gear 79 arranged upon a revoluble shaft 80 within a second tube 81 which is similar to the tube 75 and is carried on the opposite side of the rectangular body 10.

For the purpose of obtaining a high efficiency of speed for my flying machine I arrange within the forward part of each of the tubes 75 and 81 a propeller, as 82 and 83, which are keyed upon the shafts 74 and 80, and when operated by the combustion engine 64^a are adapted to force currents of air through said tubes at a high pressure.

To control the position of the machine in its ascent or descent a plane 84 is provided in front of the rectangular body 10. From one of the extreme lower corners of the wings 48 and 49 extend diagonally two supporting rods 85 and 86, and pivotally held upon the free ends of said rods is a shaft 87. Spaced apart at a required distance are arranged cross bars 88 and 89 and between said cross bars is held the plane 84 which is adapted to be revolved to any desired angle vertically with respect to the height of the machine.

Rigidly held upon the shaft 87 adjacent to cross-bar 89 is a bar 90 to both ends of which are fastened cables 91 and 92 which are directed over grooved pulleys 93 and 94 loosely held upon an upright shaft 95 which is connected to the wing 49. From the grooved pulleys 93 and 94 the cables 91 and 92 pass over grooved pulleys 96 and 97 and are connected to the upper and lower part of a lever, as 98, which is adapted to be moved by the operator of the machine for adjusting the plane 84.

As a means to efficiently steer the machine in its flight through the air a supporting bracket 99 is arranged at the rear of the wings 50 and 51. The supporting bracket 99 comprises two rods or arms 100 and 101 which extend from the longitudinal rods 11 and 12, and connected upon the free ends of the arms 100 and 101 is a rod 102 the opposed ends of which are also fastened to the wings 48 and 49. Centrally of the rod 102 is provided a substantially V-shaped vertical bracket 104. Pivoted in the ends of the V-shaped bracket 104 is a rudder 105 which,

as illustrated, is semi-circular in shape though it is clear that said rudder may be of any preferred form. Controlling the lateral movement of the rudder 105 a cross-bar 106 is connected thereto, and to one end of said cross-bar is fastened one end of a cable 107 which is trained over a grooved pulley 108 held to the wing 48 and is directed through the rectangular body 10 to the forward part of the machine and over grooved pulleys 108^a and 109 to the upper part of the lever 110, Fig. 6. To the opposite end of the cross-bar 106 is connected a second cable 111 which is trained over a grooved pulley 112 held to the wing 49. The cable 111 is directed through the opposite side of the rectangular body 10 to the forward part of the machine and over pulleys 113 and 114 to the lower end of the lever 110. The lever 110 is pivoted to the rectangular body 10, and it is clear that when said lever is moved forward or backward by the operator of the machine the rudder 105 will be moved laterally in the desired direction.

As a means to operate the collapsible planes or sails 56 and 57 at the upper lateral ends of each of the wings 48 and 49 are pivoted cross-rods, as 115, 116, 117, and 118, and at the opposed ends of each of said cross-rods is held a grooved pulley, as 119, 120, 121, 122, 123, 124, 125 and 126. Upon the cross-rod 117 and adjacent to the grooved pulley 123 is a bevel gear 127 which meshes with a bevel gear 128 held upon a stud or short shaft 129 journaled in the upper part of the rectangular body 10. At the opposite end of the stud 129 is provided a grooved pulley 130, and to the lower rod of the front end of the body 10 is connected a short shaft 131 upon which is loosely held two grooved pulleys, as 132 and 133. To a lever 134, which is pivoted to the front part of the rectangular body 10, is connected one end of a line 135 which passes over pulley 132 and is trained upward and over pulley 130 to the pulley 133 and to the lower end of the lever 134. The collapsible plane 56 is connected to a line or cable 136 which is passed over grooved pulleys 119 and 120. A second line 137 is connected to the collapsible plane 57 and passes over pulleys 123 and 125, and to both of the collapsible planes 56 and 57 is connected another line 138 which passes over pulleys 120 and 121 thence across the top of the rectangular body 10 to and over pulleys 124 and 126. By this arrangement it is evident that when the operator moves the lever 134 the line 135 will revolve the short shaft 129 whereby the bevel gear 128 will rotate the bevel gear 127 and the cross-rod 117. By rotating the cross-rod 117 the line 137 will simultaneously revolve the cross-rod 118 and will move the line 138 which in turn will revolve the cross-rods 116 and 115 so that both of the collapsible planes

56 and 57 may be moved to any required distance upon the curved guide-rods 52, 52^a and 53, 53^a.

To operate the collapsible planes or sails 58 and 59 a cross-rod, as 139, is journaled in the top of one end of the wings 50 and 51, and a second cross-rod 140 is journaled in the opposite top part of said wings. Upon the cross-rods 139 and 140 are held grooved pulleys 141, 142, 143, 144, 145, 146, 147, and 148. In the upper part of the rectangular body 10 is journaled a stud 149 upon which is held a gear 150 which meshes with a pinion 151 provided upon the cross-rod 130 adjacent to the grooved pulley 143. On the stud 149 is arranged a grooved pulley 152, and in front of the rectangular body 10 is held a short shaft 153 having two loosely held grooved pulleys 154 and 154^a thereon. To the upper part of a lever 155, which is pivoted to the front part of the rectangular body 10, is fastened one end of a line 156 which passes over the grooved pulley 154 and is trained upward and over the grooved pulley 152 downward to and back over the grooved pulley 154^a to the lower end of the lever 155. Over the grooved pulleys 141 and 142 is trained a line 157. Over pulleys 143 and 144 is directed a line 158 and to the lines 157 and 158 is fastened the opposed lateral ends of the collapsible plane 58. From the grooved pulleys 145 and 146 is trained a line 159. Over the pulleys 147 and 148 is directed a line 160, and to each of the lines 159 and 160 is connected the opposed lateral ends of the collapsible plane 59. When the lever 155 is moved the line or cable 156 will rotate the grooved pulley 152 and simultaneously therewith the gear 150 will be revolved. A rotary movement will thereby be imparted to the pinion 151 which in turn will rotate the cross-rod 139 and through the means of the lines 157, 158, 159, and 160 the cross-rod 140 will be simultaneously revolved. It is obvious by this arrangement that the collapsible planes 58 and 59 may be adjusted by the operator of the machine in an opposite direction to the planes 56 and 57 as occasion requires.

It will be understood that changes may be made in the forms and proportions of the parts of my flying machine, and that the same may be made of any preferred metal or material without departing from the scope and spirit of the invention, therefore I do not wish to be limited to the particular form of machine and the operative parts thereof as herein described and shown.

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 substantially rectangular body; of two substantially rectangular wings pro-

vided upon the opposed lateral sides at the forward part of the rectangular body; two substantially rectangular wings provided upon the lateral sides at the rear part of said rectangular body; a guide rod held at the opposed sides on top of each of the forward rectangular wings; a guide rod held at each of the lateral ends on top of said rear rectangular wings; a collapsible plane adapted to be moved upon the guide rods of each of said rectangular wings; means adapted to simultaneously move the collapsible planes upon the guide rods of the forward rectangular wings in a lateral direction with respect to the rectangular body; means adapted to simultaneously move the collapsible wings upon the guide rods of the rear rectangular wings in an opposite direction to the movements of the collapsible planes of the forward rectangular wings; and means adapted to propel the flying machine through the air.

2. In a flying machine, the combination with a substantially rectangular body; of two substantially rectangular wings arranged upon the opposed sides at the forward part of the rectangular body; two substantially rectangular wings arranged upon the opposed sides at the rear of the rectangular body; a guide rod provided at the opposed sides on the top of each of the forward rectangular wings; a guide rod provided at the lateral ends on top of each of the rear rectangular wings; a collapsible plane movably held upon the guide rods of each of the forward wings; a collapsible plane movably held upon the guide rods of each of the rear rectangular wings; means adapted to simultaneously move the collapsible planes upon the guide rods of the forward rectangular wings in a lateral direction with respect to the rectangular body; means adapted to simultaneously move the collapsible planes upon the guide rods of the rear rectangular wings in an opposite direction to the movement of the collapsible planes of the forward wings; a tube provided upon one side of the rectangular body; a second tube provided upon the opposite side of said body; a propeller rotatably held in one end of each of the tubes; a motor; and means connected to the motor and to the propeller to rotate each of said propellers.

3. In an air ship, the combination with a substantially rectangular body; of two substantially rectangular wings arranged upon the opposed sides at the forward part of the rectangular body; two substantially rectangular wings arranged upon the opposed sides at the rear part of the rectangular body; a guide rod provided at each of the opposed sides on top of the forward rectangular wings; a guide rod provided at

each lateral end on top of the rear rectangular wings; a collapsible plane having each of its opposed sides movably held upon the guide rods of each of the forward rectangular wings; a collapsible plane having its opposed ends movably held upon the guide rods of the rear rectangular wings; means adapted to simultaneously move the collapsible planes upon the guide rods of the forward rectangular wings in a lateral direction with respect to the rectangular body; means adapted to simultaneously move the collapsible wings on the guide rods of the rear rectangular wings in an opposite direction to the movement of the collapsible planes of the forward rectangular wings; a plane provided at the front end of the rectangular body; means adapted to adjust said plane at any desired angle vertically with respect to the height of the rectangular body; a rudder provided at the rear end of the rectangular body; means adapted to move the rudder in a lateral direction; a motor, and means connected to the motor and adapted to propel the flying machine through the air.

4. In a flying machine, the combination with a substantially rectangular body; of two substantially rectangular wings held upon the opposed sides at the forward part of the rectangular body; two substantially rectangular wings held upon the opposed sides at the rear part of the rectangular body; a guide rod provided at the opposed sides on top of each of the forward rectangular wings; a guide rod provided at the lateral opposed ends of each of the rear rectangular wings; a collapsible plane movably held upon the guide rods of each of the forward rectangular wings; a collapsible plane movably held upon each of the guide rods of the rear rectangular wings; means adapted to be operated from the front end of the rectangular body to simultaneously move the collapsible planes on the guides of the forward rectangular wings in a lateral direction with respect to the rectangular body; means adapted to be operated at the front end of the rectangular body to simultaneously move the collapsible planes on the guide rods of each of the rear rectangular wings; a movable plane provided in front of the rectangular body; means adapted to be operated at the front end of the rectangular body to adjust the movable plane to a desired angle vertically with respect to the height of the rectangular body; a substantially semi-circular rudder pivotally held in a vertical position at the rear of the rectangular body; means adapted to be operated from the front end of the rectangular body to move said rudder laterally in any desired direction; a tube provided upon one of the

longitudinal sides of the rectangular body; a second tube provided upon the opposite longitudinal side of the rectangular body; a propeller rotatably held in the forward end of each of the tubes; a motor; and means connected to the motor and to the propellers and adapted to rotate both of said propellers.

5. In a flying machine, the combination with a substantially rectangular body consisting of two spaced apart parallel longitudinal rods, a vertical rod held upon one end of each of the longitudinal rods, a vertical rod held upon each opposite end of said longitudinal rods, a cross-rod connected to one end of the longitudinal rods, a second cross-rod connected to the opposed ends of said longitudinal rods, a cross-rod connecting the upper ends of two of the vertical rods, a cross-rod connecting the upper ends of the opposite pair of vertical rods, two supporting rods each having one end thereof connected to one of the longitudinal rods and spaced apart from one pair of the vertical rods, two supporting rods each having one end thereof connected to one of the longitudinal rods and spaced apart from the vertical rods at the opposite end of the longitudinal rods, two longitudinal rods connected to the upper ends of each of the vertical rods and supporting rods respectively; of two substantially rectangular wings provided upon the opposed lateral sides at the forward part of the rectangular body; two substantially rectangular wings provided upon lateral sides at the rear part of said rectangular body; a guide rod held at the opposed sides on top of each of the forward wings; a guide rod held at each of the lateral ends on top of said rear wings; a collapsible plane movably held upon the guide rods of each of the forward wings; means adapted to move the collapsible planes upon the guide rods of the forward rectangular wings in a lateral direction with respect to the rectangular body; means adapted to move the collapsible wings on the guide rods of the rear rectangular wings in an opposite direction to the movement of the collapsible planes of the forward rectangular wings; a plane provided at the front end of the rectangular body; means adapted to adjust said plane at any desired angle vertically with respect to the height of the rectangular body; a rudder provided at the rear end of the rectangular body; means adapted to move the rudder in a lateral direction; a tube provided upon one of the longitudinal sides of the rectangular body; a second tube provided upon the opposite longitudinal side of the rectangular body; a propeller

rotatably held in the forward end of each of the tubes; a motor arranged in the forward part of the rectangular body; and means adapted to transmit motive power to rotate both of the propellers in said tubes.

6. In a flying machine, the combination with a substantially rectangular body; of two substantially rectangular wings arranged upon the opposed lateral sides at the forward part of the rectangular body; two substantially rectangular wings provided upon the lateral sides at the rear part of said rectangular body, each of the rectangular wings consisting of two spaced apart vertical rods connected to the rectangular body, two spaced apart crosswise rods each having one end thereof connected to the rectangular body and to said vertical rods respectively, two spaced apart cross-rods having one end thereof connected to the top of the vertical rods, two spaced apart vertical rods having each end thereof connected to the ends of the first cross-rods and to the second set of cross-rods respectively; a collapsible plane movably held on top of each of the rectangular wings; means adapted to be operated at one end of the rectangular body to move the collapsible planes on top of the rectangular wings; a movable plane arranged in front of the rectangular body; means arranged in the forward end of the rectangular body and adapted to adjust the movable plane to a desired angle vertically with respect to the rectangular body; a substantially semi-circular rudder pivotally held in a vertical position at the rear end of the rectangular body; means adapted to be operated in the forward part of the rectangular body to move the rudder laterally with respect to the rectangular body; a tube provided upon one of the longitudinal sides of the rectangular body; a second tube provided upon the opposite side of the rectangular body; a propeller rotatably held in the forward end of each of the tubes; a motor arranged in the forward part of the rectangular body; and means adapted to transmit motive power from the motor to rotate both of the propellers in said tubes.

7. In a flying machine, the combination with a substantially rectangular body; of two substantially rectangular wings arranged upon the opposed sides at the forward part of the rectangular body; two substantially rectangular wings arranged upon the opposed sides at the rear part of the rectangular body; a guide rod held at the opposed sides on top of each of the forward rectangular wings; a guide rod held at the lateral ends on top of each of the rear rectangular wings; a collapsible plane movably held upon the guide rods of each of the forward wings; a collapsible plane movably held upon the guide rods of each of the

rear rectangular wings; means provided in the forward part of the rectangular body and adapted to simultaneously move the collapsible planes upon the guide rods of the forward rectangular wings in a lateral direction with respect to the rectangular body; means provided in the forward part of the rectangular body and adapted to simultaneously move the collapsible planes upon the guide rods of the rear rectangular wings in an opposite direction to the movement of the collapsible planes of the forward wings; a vertically movable plane arranged in front of the rectangular body; means provided in the forward end of the rectangular body and adapted to adjust the movable plane to a desired angle; a substantially semi-circular rudder pivotally held in a vertical position at the rear end of the rectangular body; means adapted to be operated in the forward part of the rectangular body to move the rudder laterally with respect to the rectangular body; a tube provided upon one of the longitudinal sides of the rectangular body; a second tube provided upon the opposite side of the rectangular body; a propeller held upon a shaft rotatable in the forward part of each of the tubes; and a motor arranged in the forward part of the rectangular body and having a driving shaft; a bevel gear arranged upon the driving shaft; a shaft disposed cross-wise with respect to the driving shaft and journaled in one side of the rectangular body; a bevel gear held upon one end of the crosswise shaft and meshing with the bevel gear upon the driving shaft; a bevel gear provided upon the opposite end of the crosswise shaft and meshing with a bevel gear held upon the rotatable shaft within one of said tubes; a second shaft disposed crosswise with respect to the driving shaft and journaled in the opposite side of the rectangular body; and a bevel gear held upon one end of the second crosswise shaft and meshing with the bevel gear upon the driving shaft; a bevel gear arranged on the opposite end of the second crosswise shaft and meshing with a bevel gear held upon the rotatable shaft within the second tube.

8. In a flying machine, the combination with a substantially rectangular wing, of two guide rods arranged at each of the opposed sides on top of the rectangular wing; a collapsible plane movably held upon the guide rods; and means adapted to move the collapsible plane upon the guide rods, said means consisting of two cross-rods rotatably held in the upper part of the rectangular wing at the opposed ends thereof, a grooved pulley held at the ends of each of the cross-rods, a line trained over each pair of the pulleys at each side of the rectangular wing, a bevel gear held upon one of the cross-rods

adjacent to one of the pulleys, a stud journaled in the upper part of the rectangular wing and having a bevel gear upon one end thereof which meshes with the bevel gear upon the cross-rod; a grooved pulley held upon the opposite end of the stud, a lever, a short vertical shaft having a grooved pulley held upon each end thereof, and a line having one end connected to the upper end of the lever and trained over one of the grooved pulleys to and over the grooved pulley upon the short stud to and over the grooved pulley held upon the opposite end of the short shaft and connected to the lower end of the lever.

9. In a flying machine, the combination with a substantially rectangular body having a substantially rectangular wing connected to one side thereof; of two guide rods each held at the opposed ends on top of the rectangular wing; a collapsible plane movably held upon the guide rods, and means adapted to move the collapsible plane upon the guide rods, said means consisting of a cross-rod rotatably held at one side at the top of the rectangular wing, a second cross-rod rotatably held at the opposite side of said rectangular wing; two grooved pulleys one of which is held upon each end of the rotatable rods, a line directed over each pair of the grooved pulleys, a pinion held upon one of the rotatable rods adjacent to one of the pulleys, a stud journaled in the rectangular body in proximity to one of the upper corners of the rectangular wing, a gear held upon the end of the stud and meshing with said pinion; a grooved pulley also held upon the stud adjacent to said gear, a lever pivotally held at the front part of the rectangular body, a vertical shaft arranged in front of the rectangular body and having a grooved pulley upon each end thereof, and a line having one end connected at the top of the lever and trained over one of the grooved pulleys at the end of the vertical shaft to and over the grooved pulley upon the short stud and to and over the pulley upon the opposite end of the vertical stud and connected to the lower end of the lever.

10. In a flying machine, the combination with a substantially rectangular frame; of a tube of substantially three-quarters the length of the rectangular frame and held upon one side of said frame; a second tube of substantially three-quarters the length of the rectangular frame and held upon the opposite side of said frame; a shaft rotatably held in one end of each of the tubes; a propeller arranged upon each of the rotatable shafts; a bevel gear keyed upon the free end of one of the rotatable shafts and meshing with a bevel gear held upon one end of a crosswise shaft disposed at a right angle to the rotatable shaft, a bevel gear held upon

the opposite end of the crosswise shaft; a bevel gear held upon the free end of the rotatable shaft within the second tube and meshing with a bevel gear held upon end of a
5 crosswise shaft disposed at a right angle to the rotatable shaft and having upon the opposite end thereof a bevel gear; a motor having a driving shaft; and a bevel gear mesh-

ing with the two bevel gears held upon the two crosswise shafts.

This specification signed and witnessed
this twenty-sixth day of August, A. D. 1910.

JOHN E. KAUPKE.

Witnesses:

ROBT. B. ABBOTT,
S. SALMER.

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