

J. A. TURNIDGE.

AIRSHIP.

APPLICATION FILED JAN. 21, 1909.

Patented Feb. 22, 1910.

6 SHEETS—SHEET 1.

949,810.

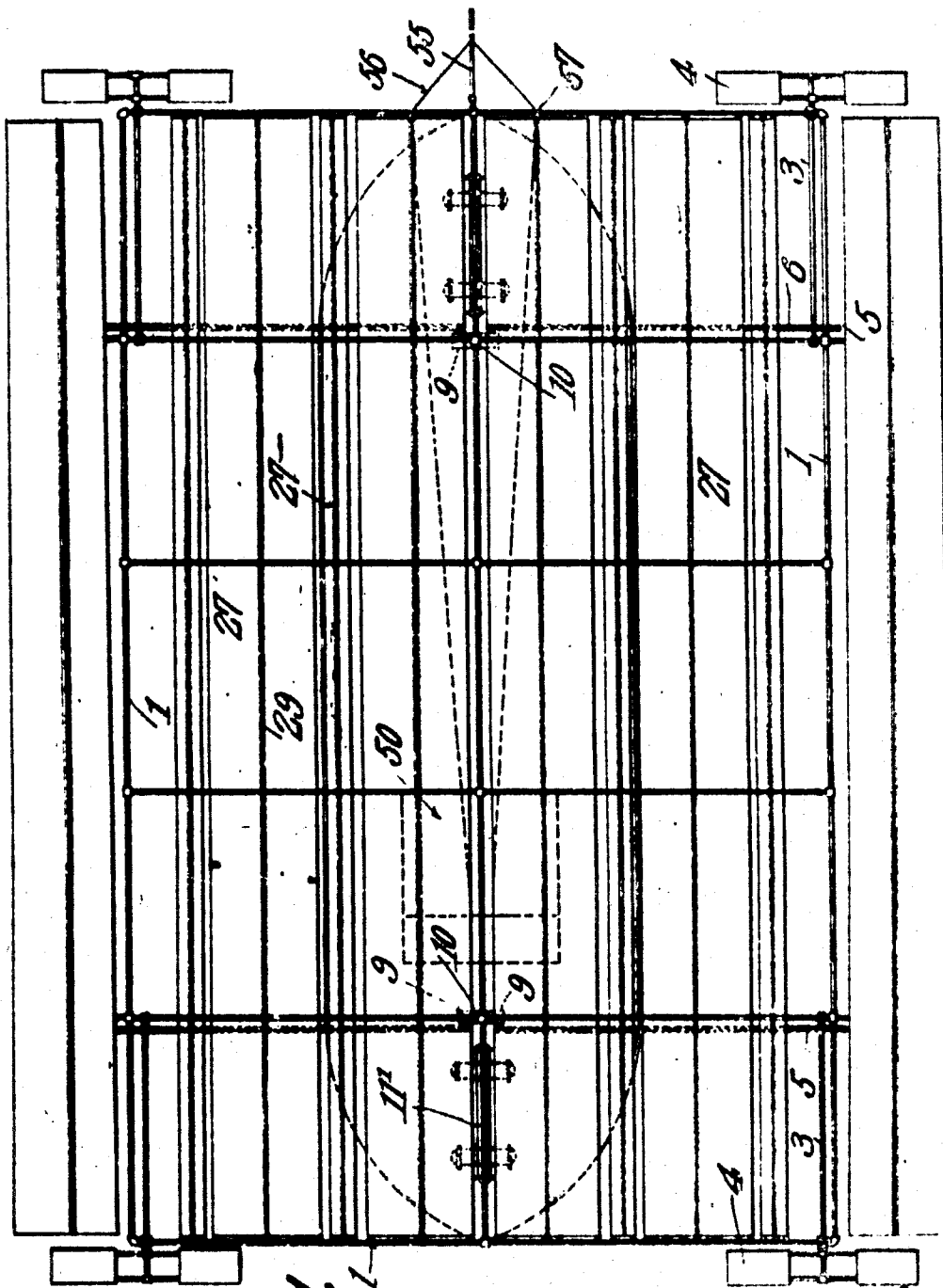


Fig. 1

Witnesses
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Inventor
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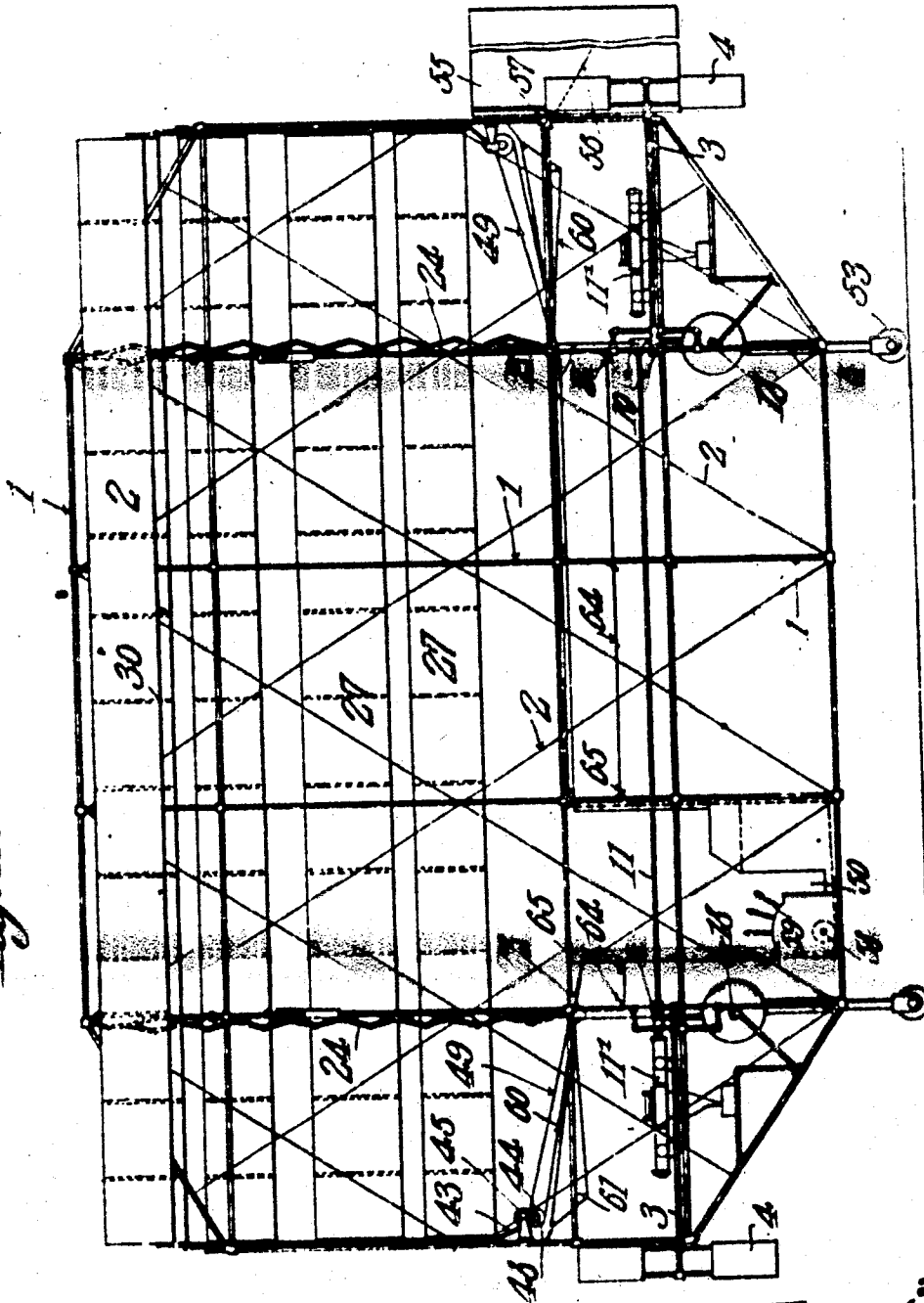
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SHEETS-SHEET 2.

949,810.

Fig. 2.



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Witnesses

E. J. Stewart
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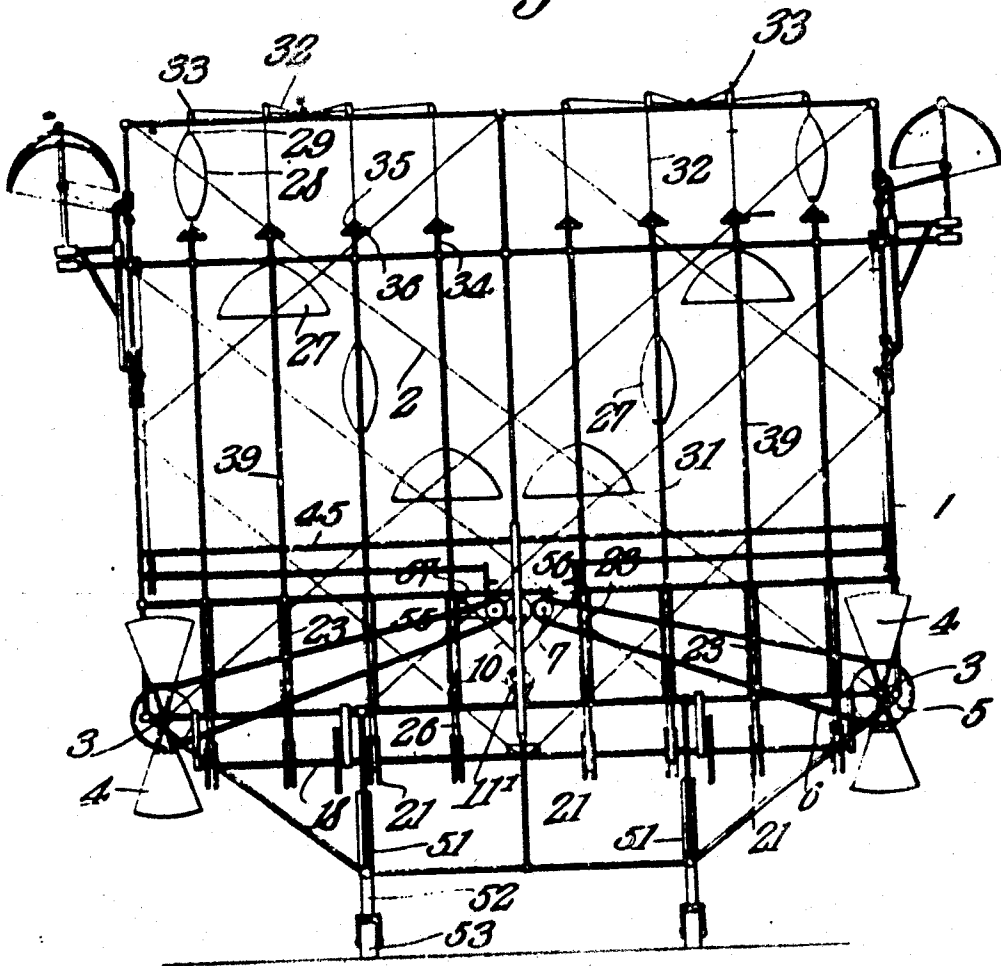
949,810.

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SIXTEEN—SHEET 3

Fig. 3.



Witnesses

E. J. Stewart
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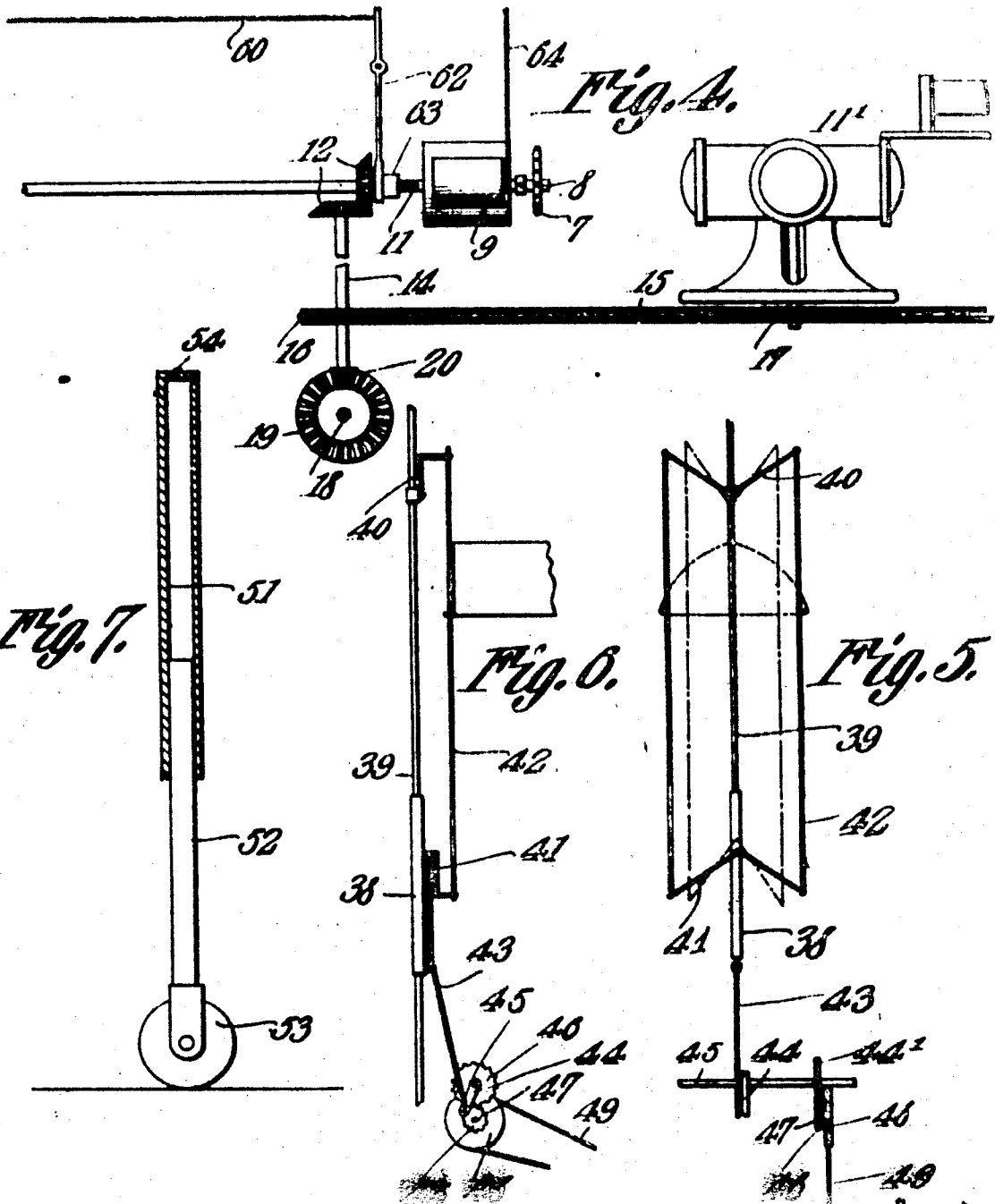
AIRSHIP.

APPLICATION FILED JAN. 21, 1900.

Patented Feb. 22, 1910.

6 SHEETS—SHEET 4.

949,810.



Jesse A. Turnidge.

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Witnesses

A. J. Stewart
& J. J. Smith

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AIRSHIP.

APPLICATION FILED JAN. 21, 1909.

Patented Feb. 22, 1910.

SHEETS-SHEET 5.

949,810.

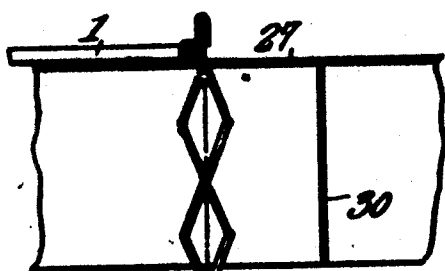


Fig. 9.



Fig. 10.

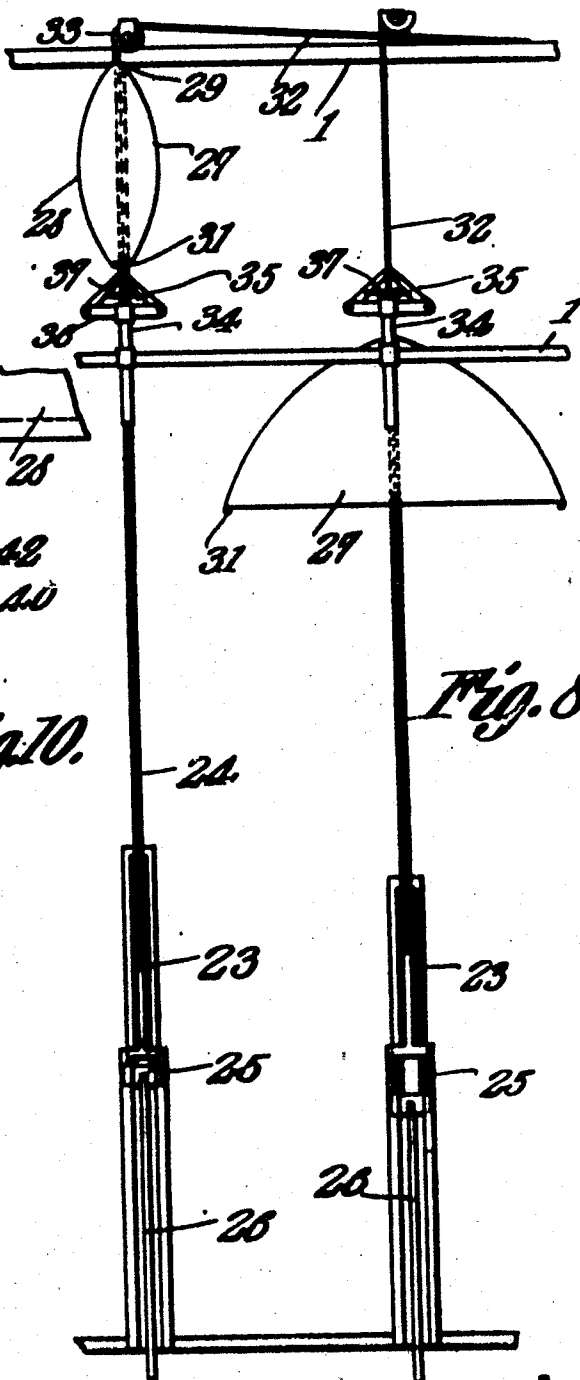
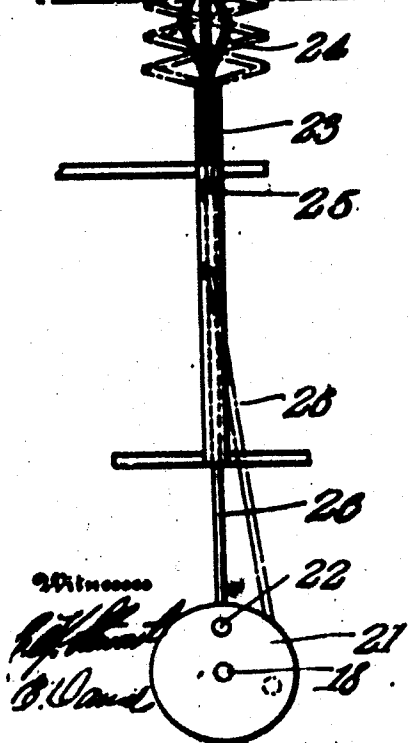


Fig. 8.

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SHEETS-SHEET 6.

949,810.

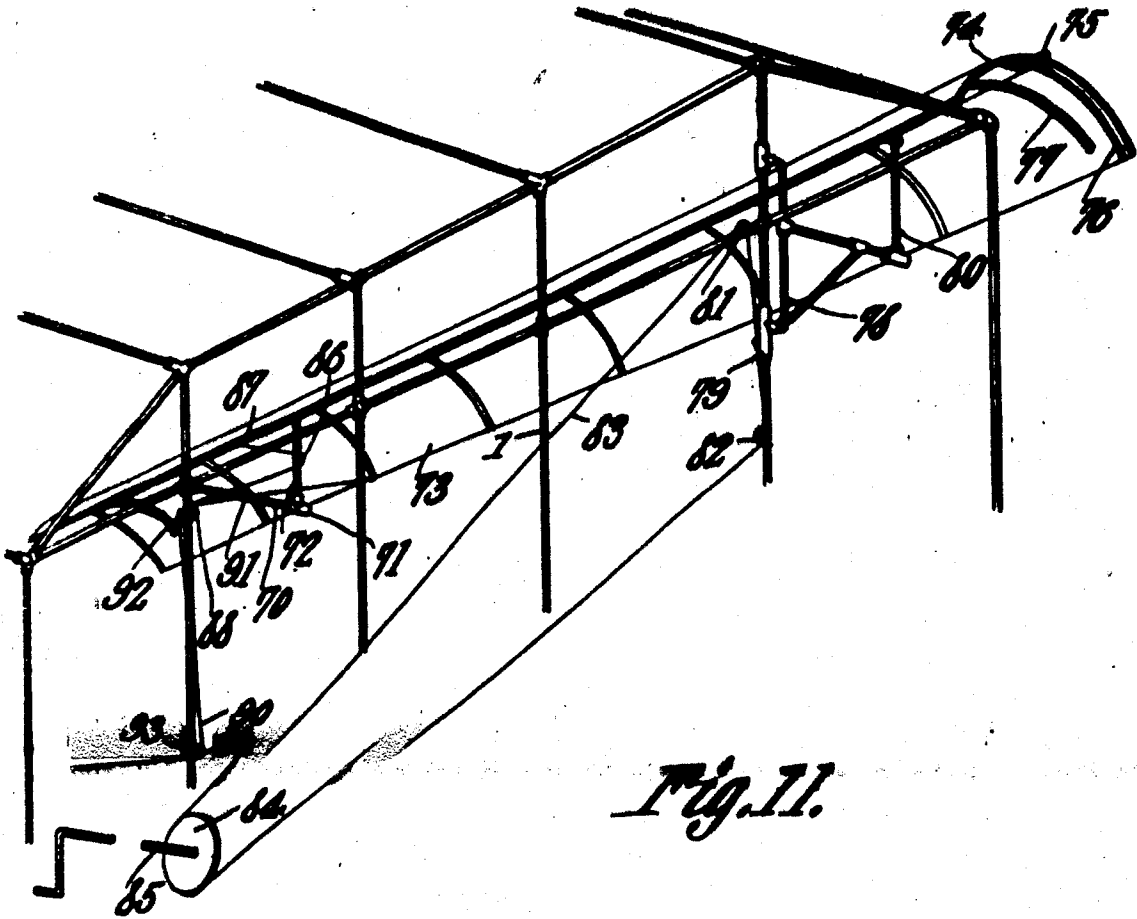


Fig. 11.

Jesse A. Turnidge, ^{Inventor}

By ^{Attorney} C. A. Snow & Co.

Witnesses

E. H. ...
W. M. Pigott

UNITED STATES PATENT OFFICE.

JESSE A. TURNIDGE, OF WEBB CITY, MISSOURI, ASSIGNOR TO COMMERCIAL AERIAL NAVIGATION CO., OF WEBB CITY, MISSOURI.

AIRSHIP.

049,810.

Specification of Letters Patent.

Patented Feb. 22, 1910.

Application filed January 21, 1909. Serial No. 473,441.

To all whom it may concern:

Be it known that I, JESSE A. TURNIDGE, a citizen of the United States, residing at Webb City, in the county of Jasper and State of Missouri, have invented a new and useful Airship, of which the following is a specification.

This invention has relation to air ships and it consists in the novel construction and arrangement of its parts as hereinafter shown and described.

The object of the invention is to provide, in a structure as indicated, a series of wings adapted to be operated to cause the ship to ascend to a desired elevation, the said ship having propellers mounted thereon for causing the same to traverse courses when at a desired elevation.

A further object of the invention is to provide means for causing all of the wings to spread promptly in case of accident, thereby presenting sufficient area to the air to prevent the ship from having a too rapid or disastrous descent.

A further object of the invention is to provide on a ship as indicated a set of counterbalancing sails adjustably mounted and means for adjusting the same independently or simultaneously whereby the ship may be maintained in a horizontal or level position both longitudinally and laterally.

With the above object in view the ship includes a frame having engines positioned thereon and a series of propeller blades operatively connected to the said engines. Wings are mounted for vertical movement within the said frame, which movement is accomplished through lazy-tong mechanisms and connecting pitmen in such a manner that when the said wings are descending they automatically open, and when ascending close in a similar manner.

In the accompanying drawings: Figure 1 is a top plan view of the air ship. Fig. 2 is a side elevation of the same. Fig. 3 is an end elevation of the same. Fig. 4 is a detail view, illustrating one method by which an engine may be connected up with the propelling and wing-operating mechanism of the ship. Fig. 5 is an elevation of a means for spreading the wings of the ship. Fig. 6 is an elevation of the same means shown in Fig. 5, looking at the edge thereof. Fig. 7 is a detail sectional view of a hollow standard and roller used upon the ship. Fig. 8

is an end elevation of several wings of the series used on the ship, indicating the manner in which the said wings are opened and closed. Fig. 9 is an elevation of the mechanism shown in Fig. 8, viewing the same at a right angle from the view illustrated in Fig. 8. Fig. 10 is a detailed edge elevation of the upper portion of the means for spreading the wings of the ship. Fig. 11 is an under perspective view of one of the counterbalancing sails of the ship.

The frame 1 is composed of pipe or tubing suitably connected together and braced by the guy cables 2. The general outline of the frame 1 is that of a parallelogram, but it may have other configuration if desired.

The propeller shafts 3 are journaled for rotation upon the frame 1, and blades 4 are mounted upon the said shafts 3. A sprocket wheel 5 is mounted upon each of the shafts 3, and the sprocket chain 6 passes around the said sprocket wheel 5 and the sprocket wheel 7 mounted upon the stub shafts 8. A friction roller 9 is mounted upon each of the shafts 8 and is adapted at times to be brought into frictional contact with the roller 10 mounted upon the shaft 11. Said shaft 11 is journaled for rotation at the lower middle portion of the frame 1, and is operatively connected with the engine 11' by means of the intermeshing beveled pinions 12, one of which is mounted upon the shaft 11 and the other upon the shaft 14, which is operatively connected with the shaft of the engines 11' by the sprocket chain 15 and the sprocket wheels 16 and 17.

The shafts 18 are journaled for rotation at the forward and rear portions of the frame 1 and extend transversely across the same. The beveled pinion 19 is mounted upon the shafts 18 and meshes with a beveled pinion 20, mounted at the lower end of the shaft 14. The disks 21 are arranged in pairs and are located at suitable intervals along the shafts 18. The members of each pair of disks 21 are connected together by wrist-pins 22, which are eccentrically disposed with relation to the disks.

The standards 23 are mounted upon the frame 1, and the lower members of a series of lazy-tong levers are pivoted, one series to each of the said standards 23. The cross-heads 25 are arranged to slide vertically along the standards 23 and are operatively connected with the lower members of the

lazy-tong levers 24. A pitman rod 26 is pivotally connected at its upper end to each of the cross-heads 25, and the lower end of each pitman rod 26 is journaled upon one of the wrist-pins 22 between the disks 21.

The wings 27 are mounted upon the upper members of the lazy-tong levers 24. The wings 27 consist of the side members 28, which are hingedly connected together at their upper edges as at 29. The members 28 of the wings are preferably composed of canvas drawn over the ribs 30, the members 28 being of concaved configuration. The rollers 31 are mounted at the ends of the members 28 and at the lower edges thereof. The pulleys 33 are mounted upon the top of the frame 1, and the cables 32 pass over the said pulleys and are connected at their ends with the wings 27.

The standards 34 are mounted upon the upper portion of the frame 1, and the bars 35 are pivotally connected with the cross-bar 36, located at the upper end of each standard 34. The ends of each set of bars 35 are normally held together by a traction spring 37, which is connected at its ends with the said bars. The bars 35 are located in the paths of movement of the rollers 31 carried by the side members 28 of the wings 27. The sleeves 38 are slidably mounted upon uprights 39 located at the forward and rear end portions of the frame 1 and the arms 40 are pivotally mounted at the upper end portions of the said uprights 39. The arms 41 are pivotally connected at their inner ends with the sleeves 38 and the rods 42 connect the outer ends of the arms 41 with the outer ends of the arms 40. The said rods 42 lie between the rollers 31 carried by the members 28 which form the wings 27. The pitmen 43 are pivotally connected at their upper ends with the sleeves 38, and the lower end of each pitman 43 is connected with a crank arm 44, mounted upon a shaft 45. The wheel 46 is mounted upon a counter-shaft 47, and the said wheel 46 meshes with the wheel 44' mounted on the shaft 45. The pulley 48 is mounted upon the counter-shaft 47 and the band 49 passes around the pulley 48 and a similar pulley (not shown) which is located in the operator's compartment 50.

The hollow standards 51 depend from the frame 1 and the plungers 52 are arranged to slide in the said standards 51. The wheels or rollers 53 are journaled for rotation at the lower ends of the plungers 52; each standard 51 is provided at its upper end portion with a reduced aperture 54, through which air may escape from the interior of the standards, whereby the plunger 52 may telescope or move within the standards.

The rudder 55 is hingedly mounted at the rear end of the frame 1, and may be swung laterally by the cables 56 which are attached at their ends to the opposite sides of the said

rudder and pass over the pulleys 57 mounted upon the frame 1. From the said pulleys 57 the said cables pass to and enter the operator's compartment 50, and pass around drums 58, which are operated by the handle 59 levers 59. Thus it will be seen that means are provided for swinging the rudder 55.

The cables 60 pass from the operator's compartment 50, thence about the pulleys 61 mounted upon the frame 1 and connect with the levers 62, which, in turn, are operatively connected with the clutch members 63, mounted upon the shaft 11. The cables 64 also extend from the operator's compartment 50 and pass about pulleys 65, mounted upon the frame 1, and connect with the movable friction rollers 9.

From the above description it is obvious that when the cable 64 is drawn a roller 9 is brought into frictional contact with the roller 10; and thus movement is transmitted from the shaft 11 through the sprocket chains 6 to the propeller shafts 3. It will also be seen that, by drawing upon the cables 60, the clutch member 63 will be moved upon the shaft 11, whereby the pinion 12 mounted upon the said shaft is caused to rotate with the same. Thus rotary movement is transmitted from the shaft 14 to the shaft 11, which, through its connections rotates the propeller shafts 2. As the said shafts 10 rotate the disks 21 are carried around and the pitman rods 26 are reciprocated, which, in turn, move the cross-head 25 along the standards 23. Thus, the lazy-tong levers 24 are opened and closed in the manner as indicated in Fig. 9 of the drawings, and the wings 27 are reciprocated in vertical lines. As the said wings 27 move down the rollers 31 come in contact with the bars 35, and the lower portions of the members 28 of the said wings swing outwardly with relation to each other, and the wing is opened. Thus sufficient area is presented to the air to have a tendency to lift the ship as the said wings are drawn down. As one wing 27 descends and draws with it the cable 32, the wing 27 attached to the other end of the said cable 32 ascends. As the wings 27 ascend the lower edge portions of the members 28 thereof swing together, and when the rollers 31 come in contact with the under sides of the bars 35, the said rollers force the ends of the said bars apart against the tension of the spring 37 and the rollers 31 pass between the said bars 35 and occupy positions above the same.

When it is desired to open all of the wings suddenly to prevent accident or for other reasons, the operator causes the band 49 to turn the pulley 48, which, in turn, through the connecting parts, turns the shaft 17, and the pitman 43 is moved longitudinally. Through the movement of the pitman 43 the sleeves 38 are moved longitudinally along the uprights 39, and when the sleeves

38 descend the arms 41 approach positions approximately in alignment with each other and the rods 42 are spread apart. As the said rods 42 spread they engage the rollers 5 31 carried by the side members 28 of the wings 27, and the wings are opened, as above indicated.

Arms 70 are fixed at the forward portion of the frame 1 and in the vicinity of the upper sides thereof and the sleeves 71 are pivoted to the said arms. The uprights 72 are mounted upon the sleeves 71 and the forward portions of the sails 73 are mounted upon the upper ends of the uprights 72. The said sails 73 consist of sections 74 which are hinged together as at 75 (best seen in Fig. 10 of the drawings). The said sections 74 are provided upon their under sides with the ribs 76 which are normally held spread with relation to each other by means of the springs 77 which bear at their ends against the under sides of the said sections 74. The brackets 78 are provided with sleeves 79 which receive uprights 25 composing part of the framework 1 which are located at the rear portion thereof. Each bracket 78 is provided with an upright 80 which attaches at its upper end with the hinged edges of the sail sections 74. The pulleys 81 are journaled at the upper portion of the frame 1 above the lower sleeves 79 of the brackets 78 and the pulley 82 is journaled at the upper portion of the frame 1 below the lower sleeve 79 of the bracket 78. A cable 83 is attached at one end to the lower sleeve 79 of the bracket 78 and passes up over the pulley 81, from thence down and around the pulley 81 which is mounted upon a shaft 85 which in turn is journaled for rotation at any suitable points upon the frame 1. Any approved means may be provided for rotating the shaft 85. The opposite end of the cable 83 passes under the pulley 82 and is attached 45 to the lower sleeve 79 of the bracket 78. By this means it will be seen that by rotating the shaft 85 and causing the cable 83 to move longitudinally around the pulley 81, the bracket 87 will be raised and lowered along that member of the frame 1 upon which it is mounted. Thus means is provided for raising and lowering the rear ends of the sails 73 and inasmuch as the forward ends of the said sails may tilt with the sleeve 72 it is apparent that by manipulating the said sails the body of the vessel may be kept horizontal or at a desired level, thus effecting a counterbalance for the entire structure. Pulleys 86 are mounted upon the uprights 72 and the upper end of a cable 87 is attached to the edge of the sail section 71 and passes around the pulley 86, thence over a pulley 88 mounted upon one of the uprights of the frame 1, thence down and under a pulley 89. By drawing upon the last

said cable which is referred to as 90, it will be seen that the inner sail sections 74 may be swung toward the upright 72. A cable 91 is attached at its upper end to the edge of the outer sail section 74 and thence passes 70 over a pulley 92, thence down under a pulley 93, both of which pulleys are journaled upon the uprights of the frame structure 1 and by drawing upon the said cable 91 it will be seen that the outer sail section 74 may be 75 swung toward the uprights 72. Thus means is provided for drawing both of the sail sections toward each other independently or simultaneously, as desired.

Having described my invention, what I 80 claim as new, and desire to secure, by Letters Patent, is:—

1. In an air ship a vertically movable, collapsible wing, and a series of toggle levers upon which the wing is mounted. 85

2. In an air ship a collapsible wing made up of side members hingedly connected together, means for moving the wing vertically, and means for opening the wing upon its downward movement. 90

3. In an air ship a wing composed of side members hingedly connected together, a series of lazy-tong levers for moving the wing vertically, and means for opening the side members of the wing upon its downward movement. 95

4. In an air ship a wing composed of side members hingedly connected together, a series of lazy-tong levers connected with the wing and adapted to move the same vertically, means for causing the side members of the wing to swing open upon their downward movement, and an additional means for swinging the side members of the wing open at any point of its movement. 100 105

5. In an air ship a vertically movable, collapsible wing, means for opening the wing upon its downward movement, and an additional means for opening the wing at any point of its movement. 110

6. In an air ship a vertically movable wing consisting of side members hingedly connected together, means for causing the side members to open upon the downward movement of the wing, and an additional 115 means for opening the side members of the wing at any point of their movement.

7. In an air ship a vertically movable, collapsible wing, a series of lazy-tong levers for moving the wing, means for opening the wing upon its downward movement, and an additional means for opening the wing at any point along its movement. 120

8. In an air ship a wing consisting of side members hingedly connected together and 125 mounted for vertical movement, means for moving the said wings vertically, projecting members carried by the wing, and spring-retained arms located in the paths of movement of the said projecting members, and 130

adapted to open the wing upon its downward movement.

9. In an air ship a series of vertically movable wings, a series of lazy-tong levers connected to the wings for moving the same vertically, a cable attached at one end to one wing, and at its other end to an adjacent wing of the series, and guiding devices supporting the intermediate portion of the cable.

10. In an air ship a series of vertically movable wings, a series of lazy-tong levers connected to the wings for moving the same vertically, means for opening the wings upon their downward movement, a cable connected at one end with one wing and at its other end with an adjacent wing and guiding devices supporting the intermediate portion of the cable.

11. In an air ship a series of vertically movable, collapsible wings, means for opening the wings upon their downward movement, an additional means for opening the wings at any point of their movement, a cable connected at one end with one wing, and at its other end with an adjacent wing, and guiding devices supporting the intermediate portion of the cable.

12. In an air ship a series of vertically movable collapsible wings, levers connected with each wing and adapted to move the same vertically, means for opening each wing upon its downward movement, and additional means for opening each wing at any point of its movement, a cable connected at one end with one wing, and at its other end with an adjacent wing, and guiding devices supporting the intermediate portion of the cable.

13. In an air ship a vertically movable, collapsible wing, means for opening the wing upon its downward movement, and additional means for opening the wing at any point of its movement, consisting of laterally spreadable rods, and projections carried by the wing and adapted to be engaged by the

14. In an air ship a vertically movable,

collapsible wing, projections carried by the wing, arms mounted upon the frame of the ship and located in the path of movement of the said projections, and adapted to open the wing when engaged by the projections, an additional means for opening the wing at any point of its movement, consisting of laterally spreadable arms, which normally lie between the projections carried by the wings.

15. In an air ship a vertically movable, collapsible wing having projections, arms mounted upon the frame of the ship and located in the path of movement of the projections, a means for opening the wing at any point of its movement, consisting of a sleeve slidably mounted, arms pivoted at their inner ends to the sleeve, arms pivoted to fixed points of the frame of the ship, and rods connecting the said fixed arms and the movable arms together, and lying between the projections of the wings.

16. In an airship having vertically movable wings, counterbalancing sails located at the side of the ship structure, and means for raising and lowering one end of the sails with relation to the opposite end thereof.

17. In an airship, vertically movable wings, counterbalancing sails located at the sides of the ship structure, means for contracting or expanding the sails and means for raising and lowering one end of each sail with relation to the opposite end thereof.

18. In an airship, vertically movable wings, counterbalancing sails located at the sides of the ship structure and including sail sections hingedly connected together, means for swinging the said sail sections toward each other and means for raising and lowering one end of each sail with relation to its opposite end.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JESSE A. TURNIDGE.

Witnesses:

E. H. SILVEN,
J. W. FREY.