

J. M. GARDNER.

AIRSHIP.

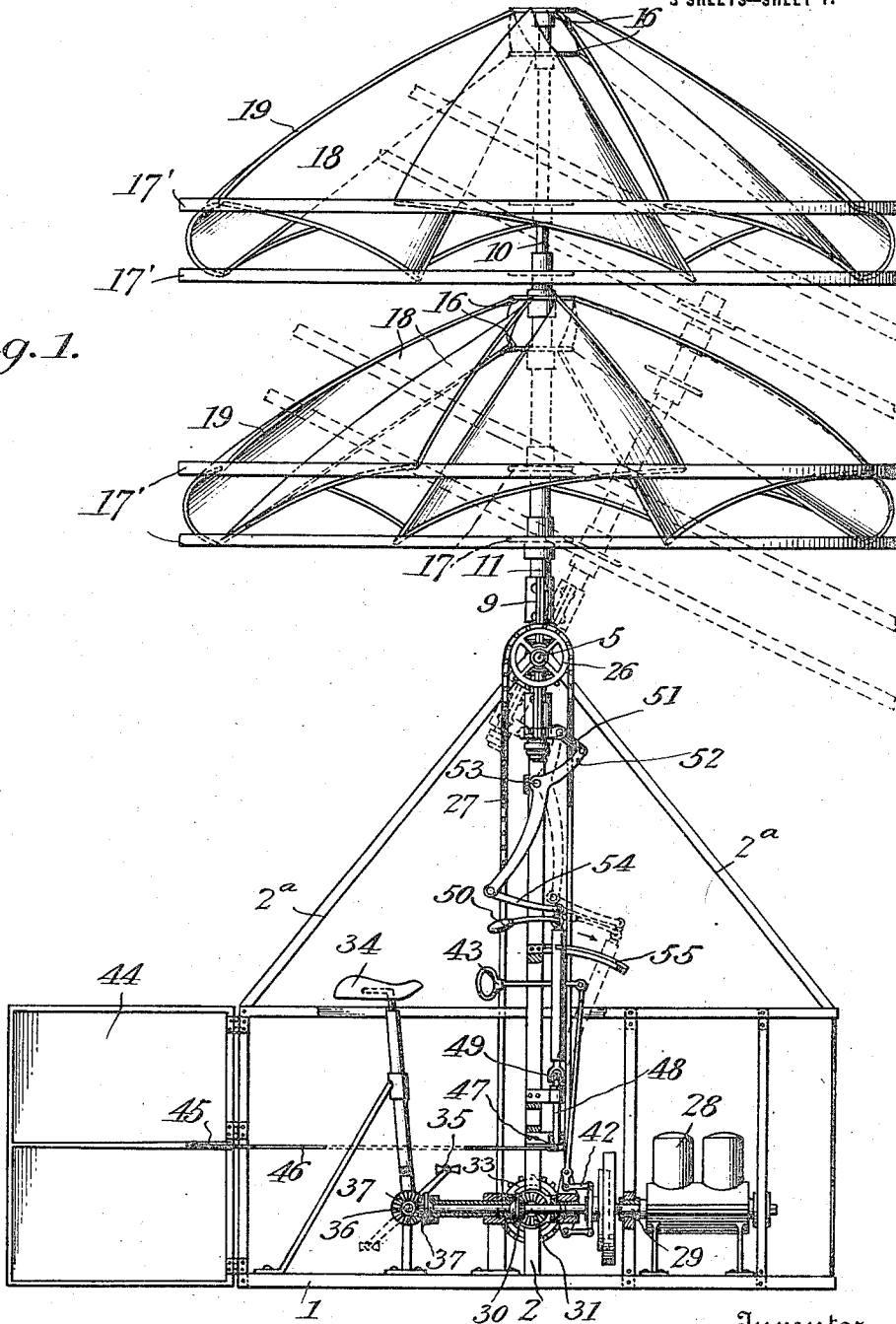
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Patented July 4, 1916.

3 SHEETS—SHEET 1.

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Fig. 1.



Witnesses
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3 SHEETS—SHEET 2.

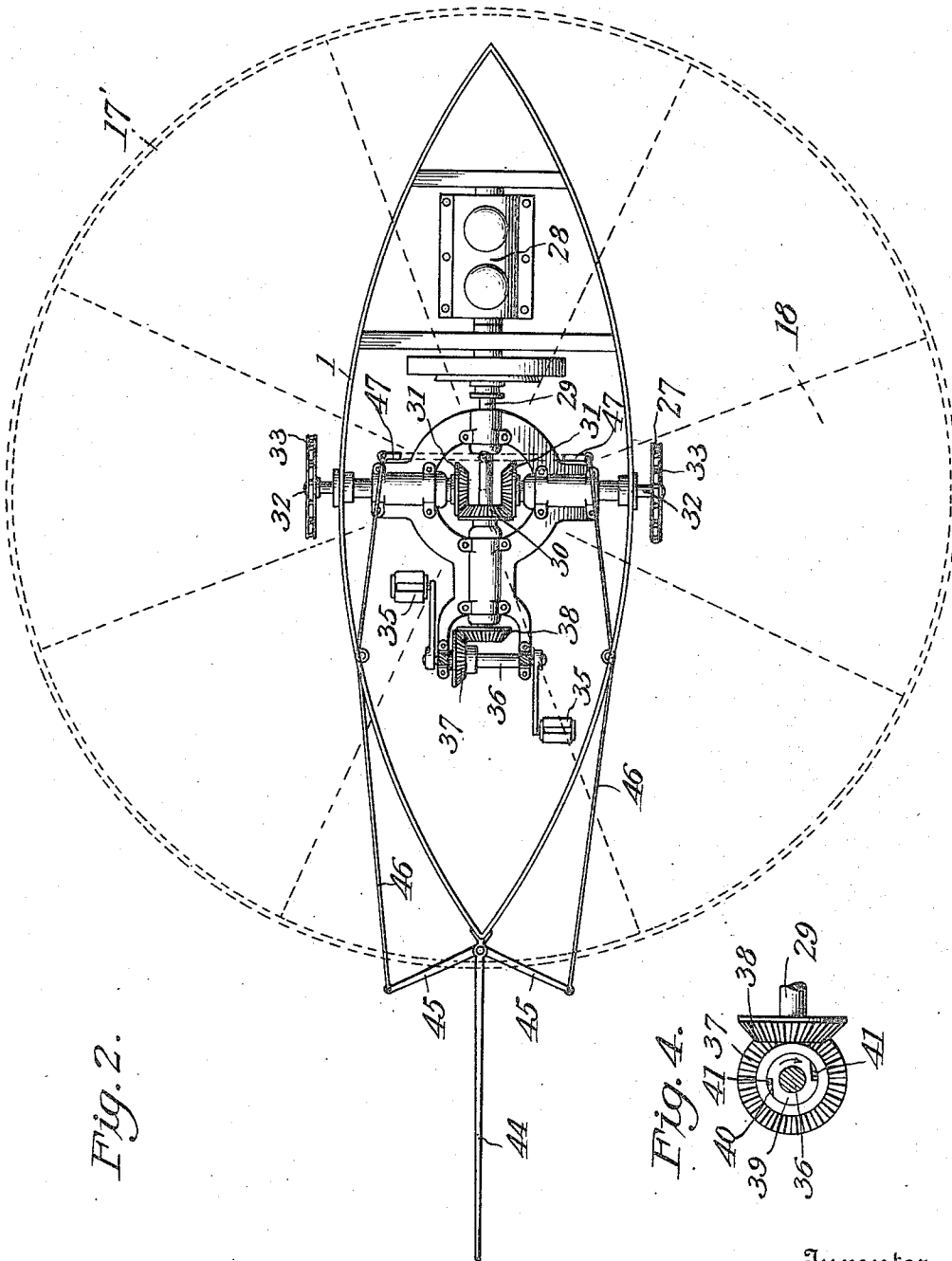


Fig. 2.

Fig. 4.

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3 SHEETS—SHEET 3.

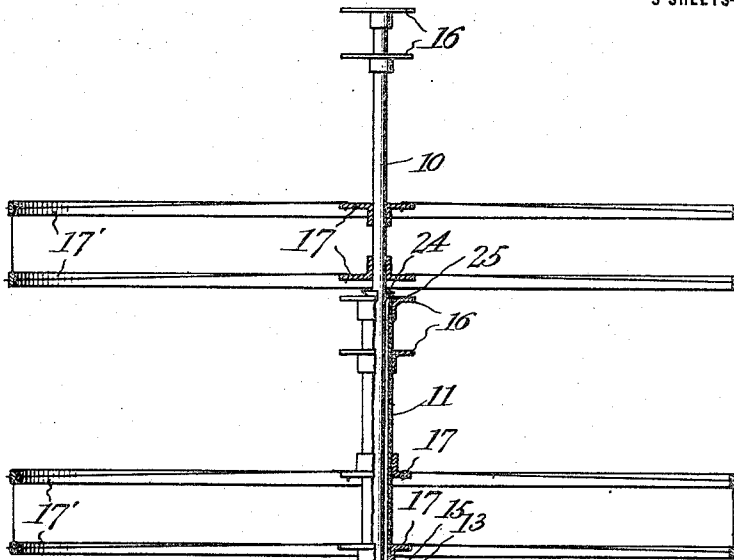


Fig. 3.

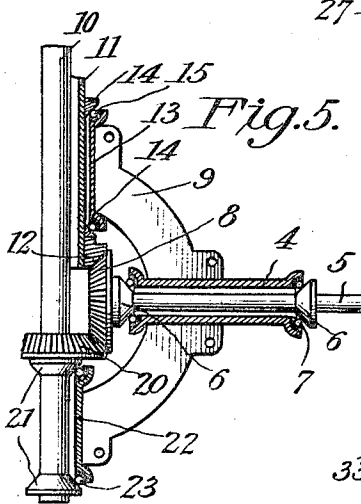


Fig. 5.

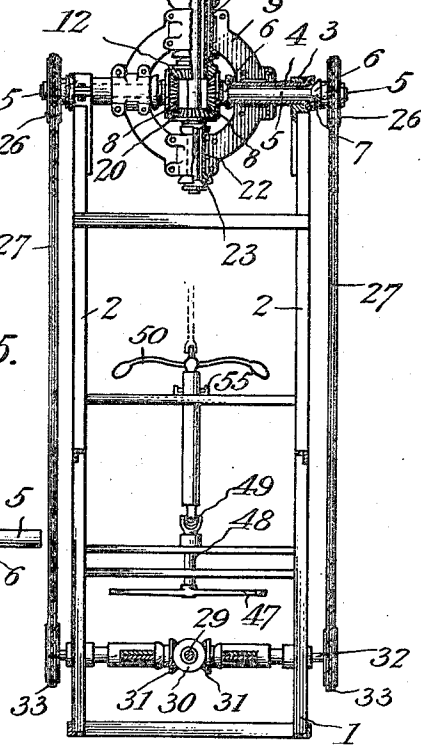
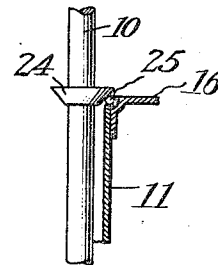


Fig. 6.

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UNITED STATES PATENT OFFICE.

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AIRSHIP.

1,189,680.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JEFFERSON M. GARDNER, a citizen of the United States, residing at New London, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Airships, of which the following is a specification.

This invention relates to airships.

10 The object of the invention is to provide an airship of such construction that the danger of injury to the occupants or to the ship shall be reduced to a minimum.

Further objects are to provide an air ship 15 capable of easy manipulation to ascend or descend in a direct or inclined course, and which shall be capable of ascending and remaining for an indefinite period at a practically fixed elevated point.

20 Another object is to provide an airship of such construction that the body or car thereof shall at all times be maintained in a perpendicular position, and which in the event of the unintentional stoppage of the 25 motive power or of the breaking of a material part while the car is suspended in the air, shall descend gradually and alight with little or no shock.

With these objects in view the invention 30 consists of an airship having the generic and specific features of construction and arrangement of the parts substantially as hereinafter described and claimed.

The invention is illustrated in the accompanying drawing in which;

Figure 1 is a side elevation of the airship, one side of the body or car being removed, and the forwardly inclined position of the elevating wings being indicated by dotted 40 lines; Fig. 2 is a plan view of the car with the wing supports thereof, etc., removed, the wings being indicated by dotted lines; Fig. 3 is a rear elevation of the car, the treadle mechanism and its support being removed, 45 a portion of the outer driving shaft and other parts being shown in section; Fig. 4 is a sectional view showing a portion of the connection between the pedal shaft and the engine shaft; Fig. 5 is a fragmentary sectional view showing the bearings for the 50 lower ends of the wing shafts; and, Fig. 6 is a detail view showing the means for guiding the upper end of the inner wing shaft.

In these drawings 1 represents the body 55 or car of the ship which may be constructed

of any suitable material affording the requisite strength and lightness. The body is preferably made with one or both of the ends thereof pointed in order to offer a minimum resistance in the passage of the 60 ship through the air. Extending upward from the body 1 of the car at about the middle thereof are uprights or stanchions 2 secured in place by braces 2^a each attached at one end to an upright and at the other 65 end to the car. The upper end of each of the stanchions is provided with a bearing 3 in which is mounted a sleeve 4 each end of which is flaring. Mounted in each sleeve is a shaft 5 which is provided near each end 70 with a cone 6. Interposed between each cone of the shafts 5 and the flaring ends of the sleeves are balls 7 which in connection with the parts described form bearings and supports for the shafts. Secured to the inner 75 end of each shaft 5 is a beveled gear 8, which forms part of the means for driving the shafts of the elevating wings employed.

9 represents a bracket made in sections and secured together by bolts or otherwise, 80 the bracket being of a form to be clamped around the sleeves 7 and be rigidly attached thereto. The bracket has an opening in its middle and extending through the upper and lower sides of the bracket at right angles 85 to the sleeves, are openings for the reception of the shafts of the elevating wings.

The wings by which the ship is raised and suspended in the air are mounted on two 90 shafts 10 and 11, the outer shaft 11 being hollow, and the inner shaft being arranged within and capable of rotating in the outer shaft. The outer shaft 11 extends through the upper portion of the bracket 9 and is 95 provided at its lower end with a beveled gear 12 which meshes with the upper faces of the gears attached to the inner ends of the shafts 5.

Arranged in the upper opening through 100 the bracket 9 is a sleeve 13 having the ends thereof flaring. The sleeve 13 forms the bearing for the lower end of the shaft 11, and the shaft has formed with it two cones 14 spaced such a distance apart that when 105 suitable anti-friction balls 15 are interposed between them and the flaring ends of the sleeve 13 an anti-friction support for the shaft preventing longitudinal movement of the shaft 11 in either direction is provided. 110

Fixed to the outer face of the shaft 11 are two sets of flanges 16, 16 and 17, 17, which afford means for securing to the shaft the vanes 18 which form the principal portion of one of the wings by which the ship is elevated. The vanes are composed of any suitable fabric and are triangular in general contour being narrow at their upper ends and gradually increasing in width toward their lower ends. The wings are preferably formed of a frame 19 over which is stretched a fabric such as canvas or the like. One edge of the upper portion of each wing is attached to the upper one of the flanges 16 and the opposite edge of the upper portion is attached to the lower one of the upper flanges 16. The lower edges of the vanes are attached respectively to the upper and lower flanges 17. This arrangement is such as to give the vanes an inclined position, and the frames are preferably so formed that the vanes are convex on their outer faces. In arranging the vanes on the flanges each edge of each vane is caused to overlap each adjacent vane a short distance, the upper edge of each vane overlapping the lower edge of the adjacent wing. The result is the production of a structure having inclined outwardly curved vanes which when rotated will exercise a powerful lifting effect.

The inner shaft 10 has fixed to the lower end thereof a beveled gear wheel 20 which meshes with the lower faces of the gear wheels 8 of the respective shafts 5. The shaft 10 has formed with it near its lower end two cones 21, and arranged in the lower opening in the bracket 9 is a sleeve 22 having flaring ends. The sleeve forms a bearing for the lower end of the shaft 10, and interposed between the cones of the shaft and the flaring ends of the shaft are anti-friction balls 23. Fixed to the shaft 10 above the upper flange 16 of the shaft 11 is a cone 24 which bears upon anti-friction balls 25 arranged in a groove formed in the upper face of the flange 16. This manner of maintaining the shaft insures its free rotation and maintains it in proper operative position without imposing undue friction upon it.

The shaft 10 is provided with flanges 16 and 17 to which are attached vanes corresponding to those on the shaft 11. Inasmuch as the shafts are rotated in opposite directions the vanes on the shaft 10 are oppositely arranged to those on the shaft 11.

Arranged on the outer end of each shaft 5, outside the uprights or stanchions 2 is a sprocket wheel 26 over which runs a sprocket chain 27 which receives motion from any suitable motive power to rotate the shaft 5 and consequently to similarly move the elevated wings.

The means for imparting motion to the sprocket chains herein shown consist of an

engine 28, the shaft 29 of which has on it a beveled gear 30 which meshes with corresponding gears 31 fixed to the inner ends of oppositely arranged shafts 32 to the outer end of each of which shafts are fixed sprocket wheels 33 over which run the sprocket chains 27. By the described arrangement of the gearing it will be seen that movement imparted to the shaft 29 of the engine will through the gears and other connection drive the shafts of the elevating wings through both the shafts 5, and that should one of such shafts or some of the parts connected therewith be broken or displaced it will not interfere with the driving of the wings.

Mounted in the body of the ship is a driver's seat 34 and adjacent to the same are pedals 35 rigidly attached to a shaft 36 on which is loosely mounted a beveled gear 37 which meshes with a corresponding gear 38 fixed to the rear end of the engine shaft 29. The arrangement of the parts is such that motion may be given to the shaft of the engine by movement of the pedals to start the engine. In order that the pedals may remain idle during the rotation of the shaft of the engine the loose gear 37 has interposed between it and the shaft 36 a sleeve 39 which is fast to the shaft 36 and has in the outer face thereof inclined notches 40 in which are arranged rollers 41. The construction permits in a well known way the independent rotation of the engine shaft, and at the same time permits the rotation of the shaft by movement of the pedals.

Interposed in the engine shaft is a clutch 42 capable of movement into or out of position to connect or disconnect the parts of the shaft by means of an operating rod 43 arranged in convenient position to be grasped by an operator on the seat 34.

It will be seen from an understanding of the arrangement of the shafts 5 and of the supporting shafts for the wings that these parts and the connections between them may be moved in the upper end of the uprights or stanchions to cause the wing shafts to project at any angle from the shafts 5 without interfering with the driving of the shafts 5 through the described sprocket chains driven by the engine. When the ship is elevated from the ground the body or car of the ship is supported from the shafts 5 by the uprights or stanchions 2 which swing from such shaft in a manner to insure the perpendicular position of the stanchions under all conditions. The result is that while the ship is in the air the body of the car maintains uniformly a level position irrespective of the inclination of the wing shafts.

Pivotaly attached to the rear of the car is a rudder 44 having projecting from each side thereof arms 45 to each of which is attached

one end of a rope 46 the other end of which is attached to one end of steering arms 47 which project from each side of a steering shaft 48 mounted in suitable brackets adjacent to the driver's seat 34. The steering shaft has in it a universal joint 49 and attached to its upper end are handle bars 50.

In order that the wing shafts may be maintained in a position perpendicular to the car or be inclined forwardly or rearwardly according to the direction which the car is desired to take, there is connected to the lower end of the bracket 9, by a link 51 the upper end of a lever 52 which is mounted on a rod 53 extending between the uprights or stanchions 2. The lower end of the lever 52 is connected to the steering shaft 48 by a link 54 in a manner to allow the shaft to rotate independently of the link. The upper end of the steering shaft is arranged in a guide way 55 in a manner to allow such upper end to be moved forward or rearward. By the described connection between the steering shaft and the bracket 9 it will be seen that a forward movement of the steering handles will cause a forward inclination of the wing shafts, and that a reverse movement of the steering handle will cause a reverse movement of the wing shafts. Therefore by giving one or the other inclination to these shafts the ship will, when the wings are being rotated, be directed either forward or rearward as desired. By maintaining the steering shaft in a position perpendicular to the car the wing shafts are kept in similar positions, and therefore the upward or downward movement of the ship will be in a straight course. The described arrangement of the parts permits the forward or rearward movement of the handle bars without changing the position of the rudder, or of the manipulation of the rudder without affecting the position of the wings.

The wings being driven by the described gearing to cause them to rotate in opposite directions there is no tendency to cause the car to gyrate as it is carried upward by the wings, any such tendency of one wing being counteracted by the other wing. The wings being in the general form of parachutes their stoppage in the event of the stopping of the engine or of the breaking of any of the connections between the engine and the wing shafts will not endanger the car or its occupants, as pressure of the air on the lower faces of wings as the car descends will sufficiently retard the down-

ward movement of the ship to prevent injury to it on reaching the earth.

An airship constructed as hereinbefore described offers comparatively little surface to the action of currents of air, therefore it is capable of ascending and descending in any desired direction under all atmospheric conditions according to the manipulation of the rudder or the disposition of the wings relatively to the other parts of the car. By proper adjustment of the parts and regulation of the speed at which the wings are rotated the ship may be elevated to any desired altitude and maintained in practically a fixed position for any length of time.

I claim:

1. An airship comprising a car or body, an upright or stanchion extending upward from each side of the car or body, a horizontal sleeve mounted on each of the uprights or stanchions and capable of rotating, a bracket rigidly secured to the inner ends of the sleeves, horizontal shafts each having a gear on its inner end mounted in the sleeves, upright wing shafts mounted in the bracket and having gears engaging those on the horizontal shafts, and means for rotating the sleeves and thereby tilting the wing shafts.

2. An airship comprising a car or body, an upright or stanchion extending upward from each side of the car or body, a horizontal rotatable sleeve mounted on each of the uprights or stanchions, a sectional bracket rigidly secured to the inner ends of the sleeves, horizontal shafts each having a gear on its inner end mounted in the sleeves, upright wing shafts mounted in the bracket and having gears engaging those on the horizontal shafts, and means for rotating the sleeves and thereby tilting the wing shafts.

3. An airship comprising a car or body, uprights extending from the body, transverse shafts mounted on the uprights, wing shafts supported on the transverse shafts and capable of being inclined relatively thereto, a rudder, a rotatable steering shaft capable of tilting, a lever pivotally mounted between the steering shaft and the wing shafts, and links connecting the lever with such shafts and with the steering shaft.

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

JEFFERSON M. GARDNER.

Witnesses:

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