No. 872,778. PATENTED DEC. 3, 1907.

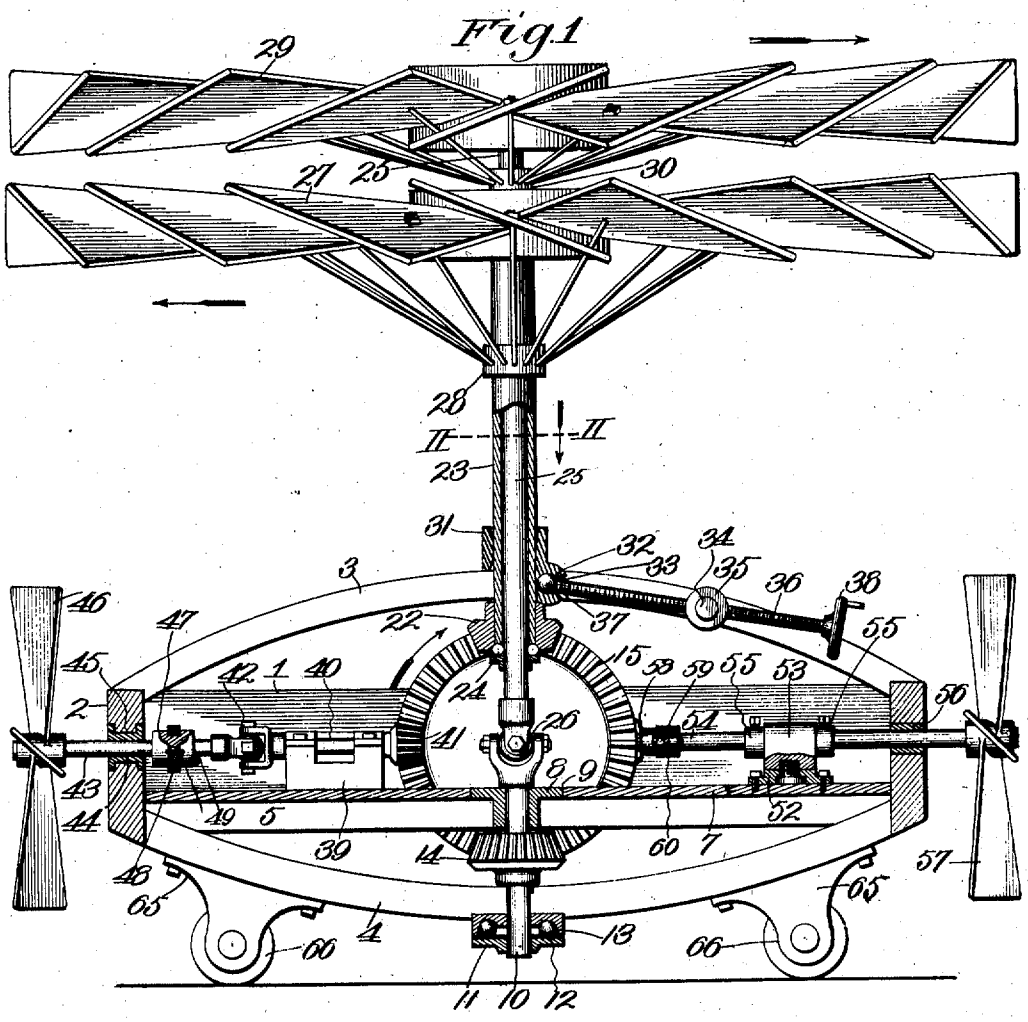
F. B. ASHLEY.

AERIAL VESSEL.

APPLICATION FILED DEC. 26, 1906.

2 SHEETS—SHEET 1.

Fig. 1



Witnesses

Gray b. R. Glore

H. C. Rodgers

Inventor

F. B. Ashley.

By Lowell & Thorpe Atty.

No. 872,778. PATENTED DEC. 3, 1907.

F. B. ASHLEY.

AERIAL VESSEL.

APPLICATION FILED DEC. 26, 1906.

2 SHEETS—SHEET 2.

Fig. 2.

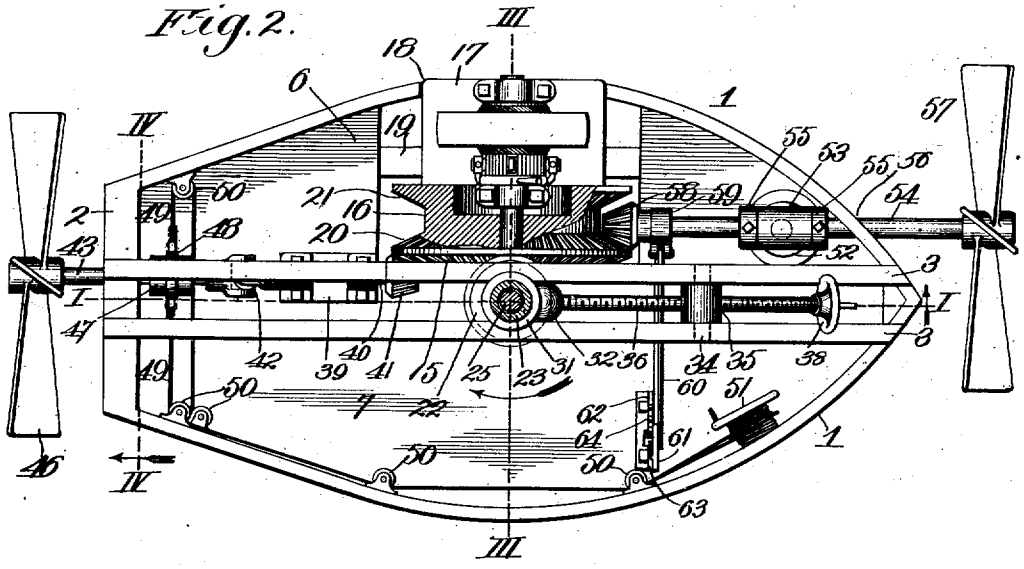


Fig. 3

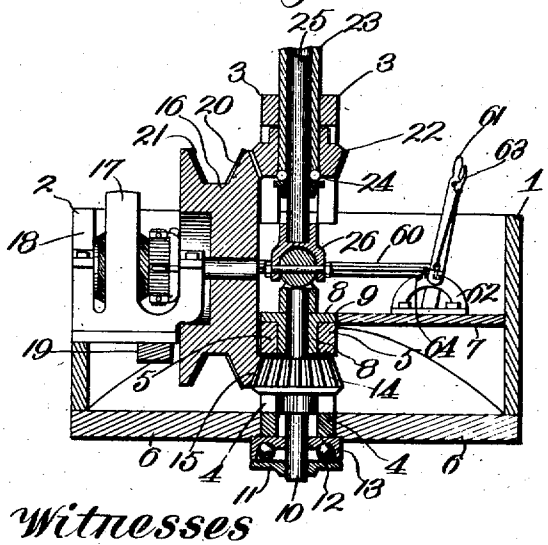
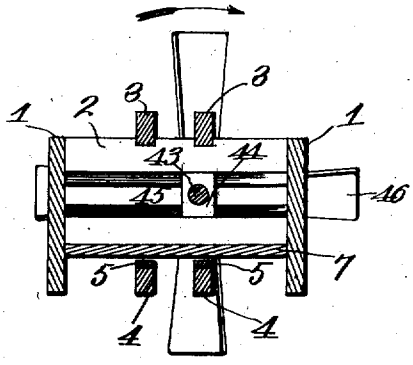


Fig. 4.



Witnesses

Frank P. Glore

H. C. Rodgers.

Inventor

F. B. Ashley

By George H. Thorpe Atty.

UNITED STATES PATENT OFFICE.

FREELAND B. ASHLEY, OF KANSAS CITY, MISSOURI.

AERIAL VESSEL.

No. 872,778. Specification of Letters Patent. Patented Dec. 3, 1907.

Application filed December 26, 1906. Serial No. 349,397.

To all whom it may concern:

Be it known that I, FREELAND B. ASHLEY, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Aerial Vessels, of which the following is a specification.

This invention relates to aerial vessels of that type provided with propellers for propelling the vessel and with rotary wheels for elevating and sustaining it, and my object is to produce an aerial vessel of the type mentioned which shall be under perfect control of the occupant of the car, and which is of strong, durable, compact and comparatively inexpensive construction.

To this end the invention consists in certain novel and peculiar features of construction and organization as hereinafter described and claimed; and in order that it may be fully understood reference is to be had to the accompanying drawings, in which—

Figure 1, is a view partly in side elevation and partly in section on the line I—I of Fig. 2. Fig. 2, is a section on the line II—II of Fig. 1 and also shows a part broken away which occupies a position below the plane of said section. Fig. 3, is a section on the line III—III of Fig. 1 but with one part in the plane of said section in elevation. Fig. 4, is a section on the line IV—IV of Fig. 2.

In the said drawings, 1 indicates a boat-shaped car having the usual pointed bow and square stern and connecting said bow and stern and bracing and stiffening the car is a pair of parallel arched bars 3 and bracing and stiffening the lower part of the boat is a truss-frame consisting of the parallel curved bars 4 and chord-bars 5.

6 indicates the bottom of the car, the same underlying the sides of the boat and secured at their inner edges to the outer sides of truss-bars 4, said bottom being curved to correspond with the said truss bars.

7 indicates a horizontal deck extending the full length of the boat or car and from one side of the same to and upon the bar 5 most remote from said side and secured rigidly to and between bars 5 at the proper point is a flanged bearing box 8, the deck 7 being cut away as at 9 to accommodate the flange of said bearing.

10 indicates a vertical shaft journaled in bearing 8 and extending down through the slot formed by and between bars 4 and secured on the lower end of the shaft is cap 11 for holding the balls 12 in the ball race or channel of an inverted cup 13 secured to bars 4. This cup, cap, and the interposed balls forms a ball-bearing between the lower part of the car and said shaft.

14 indicates a small bevel gear secured on shaft 10 and meshing with a large bevel gear 15 forming a part of or otherwise made rigid with the double bevel gear 16 keyed or otherwise secured rigidly on the transversely extending shaft of an electric or other motor 17, said motor being shown as mounted in the cut away portion 18 of one of the sides of the car and of a longitudinal supporting bar 19 secured to the car in any suitable manner.

20 and 21 respectively indicate the toothed faces of bevel gear 16 for driving the vessel forward or checking its motion as hereinafter explained.

22 indicates a bevel gear meshing with gear 15 and mounted rigidly on a vertical tubular shaft 23 journaled with a ball bearing relation as at 24 on a vertical shaft 25 projecting beyond both ends of shaft 23 and universally connected as at 26 to shaft 10. Secured rigidly on the upper end of the tubular or outer shaft 23 is a wheel 27 consisting by preference of a series of blades braced against upward movement from a collar 28 rigid with the shaft. 29 is a similar wheel with its blades inclined in the opposite direction from those of wheel 27 and the blades of said wheel 29 are likewise braced against upward movement by a collar 30 rigidly mounted on shaft 25 at the upper side of the hub of wheel 27.

To hold the wheel carrying shafts in a vertical position or inclined forwardly or rearwardly from such position, I journal upon shaft 23 above the arched bars or frame 3 as said bars in fact form a frame, a collar 31 provided at its front side by preference with a socket 32 depending into the slot formed by and between the bars of said arched frame, said socket having a flaring mouth 33.

34 is a pivot mounted in and extending across the said arched frame and engaged within said slot and provided with a worm seat 35 engaged by a longitudinally extending worm rod 36 extending through the flaring mouth of the socket and provided within the latter with a ball head 37, the worm rod having a handle 38 at its front end whereby the operator may turn the rod and thus swing the shafts 23 and 25 forward or rearward of the position shown in Fig. 1, the uni-

versal joint 26 forming the axis of such movement.

39 indicates a bearing secured on deck 7 for the longitudinal shaft 40 equipped with a small bevel gear 41 meshing with gear 15 and universally connected at 42 to the shaft 43 journaled in a boxing 44 mounted and adapted to slide laterally in the transverse slot 45 in the stern 2 of the car or boat, said shaft being equipped rearward of the car or boat with a propeller 46.

47 indicates an annularly grooved collar secured on shaft 43 within the car, and 48 a ring journaled in said groove and connected at opposite sides to a pair of cables 49 extending around suitable guide pulleys 50 secured to the car and to a suitable drum 51, said cables extending around the drum at opposite sides of the same so that when the latter is turned one cable will be wound upon and the other unwound from the drum, this action resulting in swinging shaft 43 to the right or left and thus tending to turn the ship or vessel to the left or right respectively, it being understood that any suitable means, not shown, such as a pawl and ratchet mechanism, is adapted to be employed to secure the drum at any desired point of adjustment so that the vessel may be propelled in a comparatively straight line without giving constant attention to the adjustment of said propeller.

To assist in propelling the vessel I provide the following mechanism: 52 indicates an anchor plate secured to the deck, and 53 a bearing swiveled thereon in any suitable manner. 54 is a longitudinal shaft journaled in said swiveled bearing and 55 collars secured to the shaft at opposite ends of the bearing to prevent material endwise movement of the shaft in the bearing, said shaft projects beyond the front end of the bow of the boat or car and at such point is journaled in a bearing 56. At its front end the shaft is equipped with a propeller 57 with its blades disposed in the same direction as the blades of the propeller 46 because it is adapted to rotate in the same direction and secured to the rear end of said shaft 54 is a bevel gear 58 which normally meshes with teeth 20. 59 is a sleeve journaled on shaft 54 and pivotally connected by a link 60 to a lever 61 mounted on a sector 62 secured to the deck, said lever having a catch mechanism 63 to engage one of a series of three teeth 64 in said sector. When the catch mechanism is engaged with the right hand tooth the gear 58 is in engagement with the gear teeth 20. To oscillate shaft 54 the lever may be thrown to the left see Fig. 3, this action withdrawing the bevel gear 58 from engagement with the teeth 20 to throw the propeller to inoperative position, the latter being secured in such position by the engagement of the catch with the middle notch.

If it be desired to check the speed of the vessel the wheel 58 can be thrown into engagement with gear teeth 21 by throwing the lever its full distance to the left and it may be locked in this position by engagement of the catch with the left hand notch 64.

In the construction shown the weight of the motor may be counterbalanced approximately by that of the occupant or occupants who will ordinarily be stationed on the deck 7. The vessel is provided with depending bearings 65 equipped with wheels 66 to normally sustain the vessel, which wheels in practice will be equipped with suitable buffer springs to cushion the shock on alighting after flight, said buffer springs because they are common and form no part of this invention, not being shown. When flight is to occur the operator after taking his position in the car starts the motor so as to rotate wheel 15 in the direction indicated by the arrow Fig. 1, this action causing wheel 27 to rotate in the direction indicated by the arrow Fig. 2, and the wheel 29 to rotate in the opposite direction and furthermore causing propellers 46 and 56 to rotate in the proper direction to advance the machine, it being understood of course that the lifting wheels 27 and 29 must attain a very high speed before they will raise the vessel from the ground. If it be desired to raise the vessel vertically the lever 61 will be operated to so dispose shaft 54 that the propellers will oppose each other and thus prevent either advance or retrograde movement. As the vessel attains the desired height if it has moved upward in a substantially vertical direction, the front propeller through the medium of lever 61 is caused to coöperate with lever 26 in propelling the vessel forward and when it is desired to turn to the left or right the rear propeller is swung in the proper direction through the manipulation of the drum as hereinbefore explained.

If it is desired to ascend in a gradually inclined plane and thus avoid loss of time due to the ascent in a direct line, the worm rod 36 can be adjusted to swing shafts 23 and 25 rearward of the vertical position shown in Fig. 1 and thus cause the plane of wheels 27 and 29 to diverge with respect to the longitudinal axis of the vessel. If it is desired to descend at a slight angle said shafts can be swung forward of the position shown in Fig. 1 so that the plane of the wheels shall converge with respect to the longitudinal axis of the vessel. It will thus be seen that means are provided for almost instantly causing the vessel to direct its course upward to avoid obstructions or downward to effect the descent at a particular point and without the delay incident to a vertical descent which would be accomplished by causing the propellers to counteract each other in the manner hereinbefore explained.

If the vessel on alighting should be moving forward it will run upon the wheels without injury, it being of course understood that just before it alights the motor will be shut off so as to leave the propelling and lifting elements free to turn until they run down, it being of course understood that any suitable brake, not shown, to arrest them gradually may be employed, which brake as it forms no part of the invention is not herein disclosed. The front propeller may also be thrown out of gear if desired, or may be thrown into gear with the teeth 21, so as to offer opposition to forward movement of the machine on the ground after alighting. In case an exceedingly quick descent is necessary at any time the motor may be reversed for the purpose of reversing wheels 27 and 29 and causing them to coöperate with the gravitative tendency of the vessel.

From the above description it will be apparent that I have produced an aerial vessel possessing the features of advantage enumerated as desirable and I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described as obvious modifications will suggest themselves to one skilled in the art.

Having thus described the invention what I claim as new and desire to secure by Letters Patent is:—

1. An aerial vessel, comprising a car, a shaft suitably journaled therein and having a universal joint, a lifting wheel secured to the upper end of said shaft, a tubular shaft journaled on the first-named shaft above said universal joint and provided with a lifting wheel at its upper end, and a drive wheel geared to said shafts with its axis coincidental with said universal joint.

2. An aerial vessel, comprising a car, a shaft suitably journaled therein and having a universal joint, a lifting wheel secured to the upper end of said shaft, a tubular shaft journaled on the first-named shaft above said universal joint and provided with a lifting wheel at its upper end, a drive wheel geared to said shafts with its axis coincidental with said universal joint, and means to swing said shafts forward or rearward of the vertical plane without throwing them out of gear with said drive wheel.

3. In an aerial vessel, a car, a driven wheel therein having oppositely disposed gear teeth, a shaft pivoted to swing horizontally and projecting beyond the front end of the car and provided with a propeller, a gear mounted on the rear end of said shaft, means to swing said shaft, and means to hold it with its gear in engagement with one set or the other of the gear teeth of said driven wheel and between and out of engagement with said sets of teeth.

4. An aerial vessel, comprising a car, a pair of parallel arched bars extending longitudinally of the car, a vertical shaft suitably journaled and disposed between said arched bars and having a universal joint below the same, a lifting wheel secured to the upper end of said shaft, a drive wheel geared to said shaft with its axis coincidental with said universal joint, a collar journaled on said shaft above the arched bars and provided with a socket portion depending into the space formed by and between the arched bars, a screw suitably mounted in the car and extending into the socket portion and provided within the latter with a ball-head, means for adjusting said screw to move the collar toward the bow or stern of the car and thereby swing said shaft forwardly or rearwardly without throwing the same out of gear with said drive wheel, and means geared to said drive wheel for propelling the car at an angle to the movement imparted to it by the lifting wheel.

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

FREELAND B. ASHLEY.

Witnesses:
H. C. RODGERS,
G. Y. THORPE.