

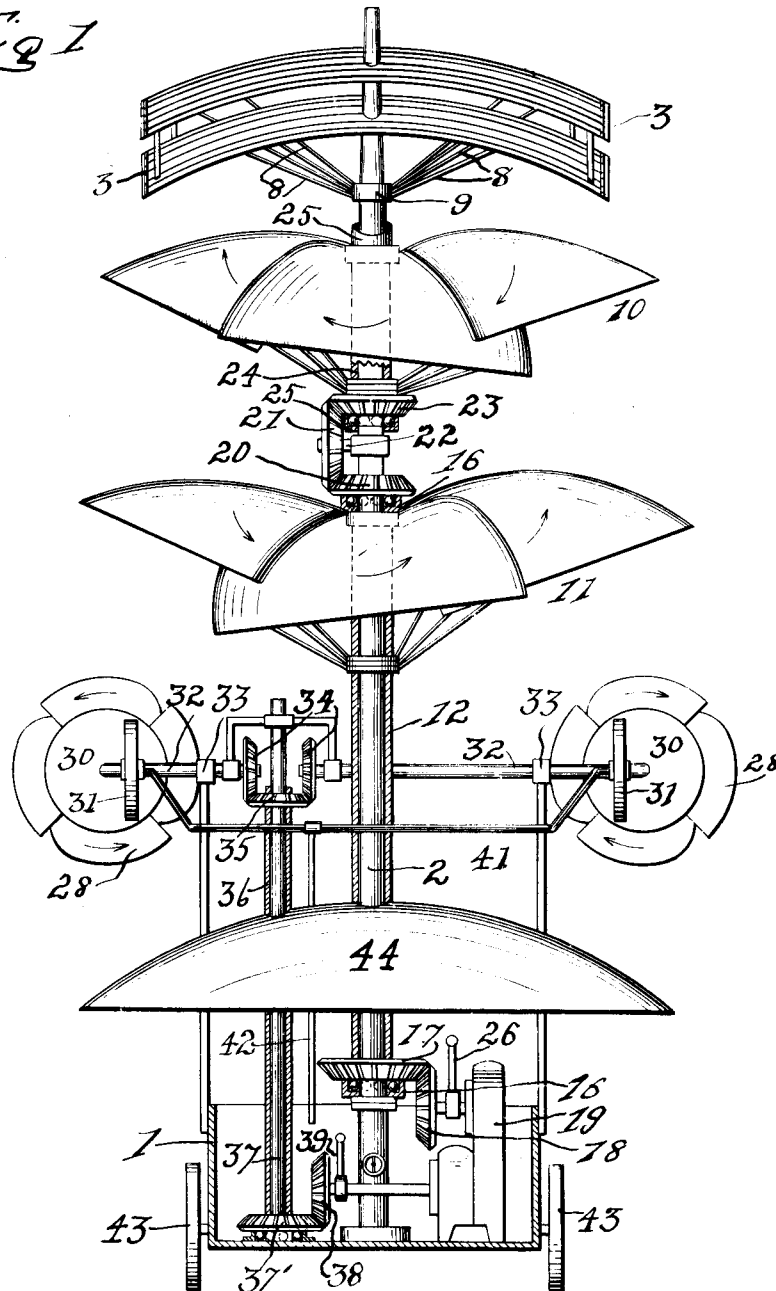
W. D. LE FEVRE.  
AIRSHIP.  
APPLICATION FILED NOV. 2, 1910.

1,028,891.

Patented June 11, 1912.

3 SHEETS-SHEET 1.

*Fig 1*



WITNESSES:  
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H. R. Markey

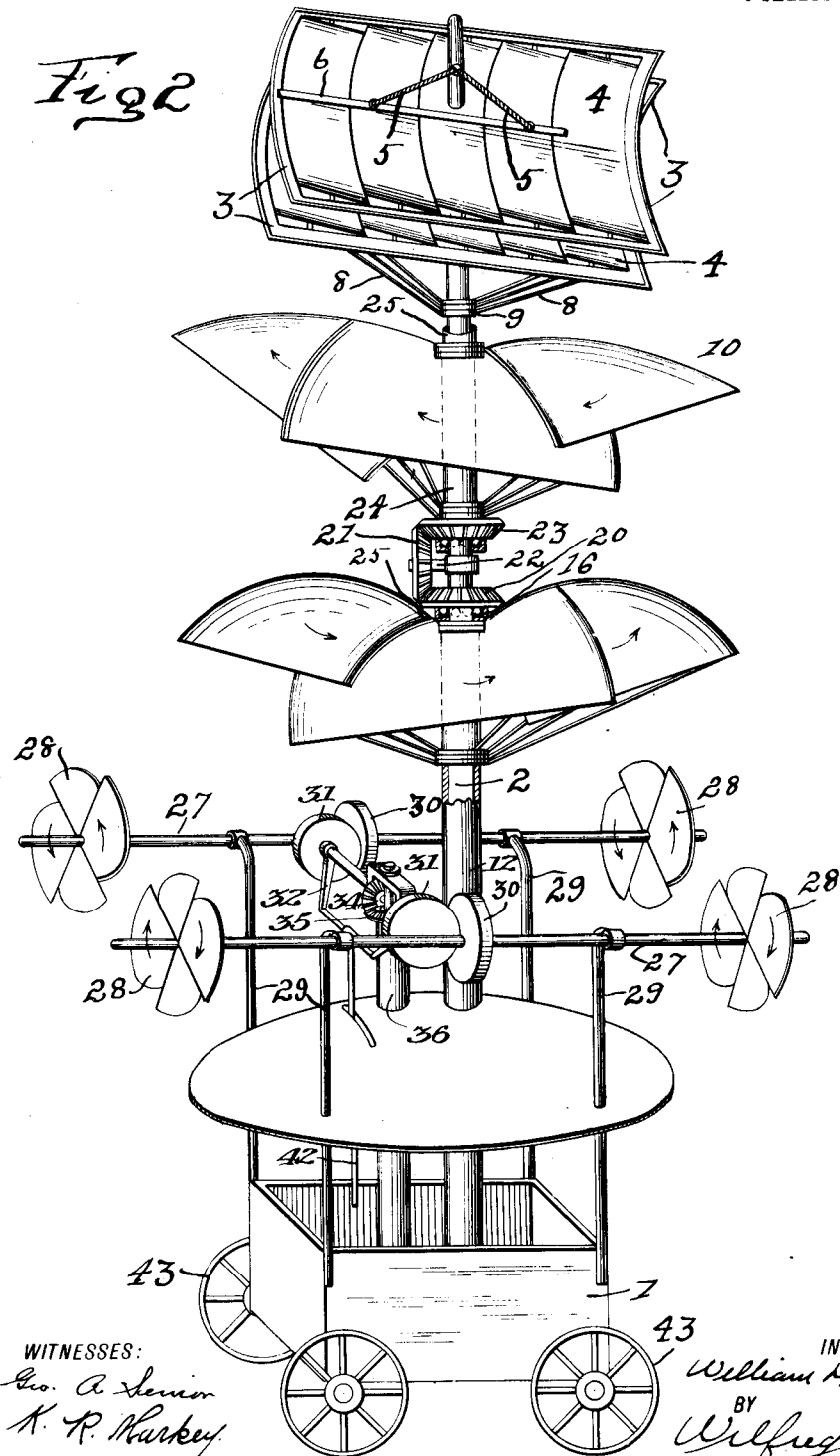
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3 SHEETS-SHEET 2.



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3 SHEETS-SHEET 3.

Fig. 3

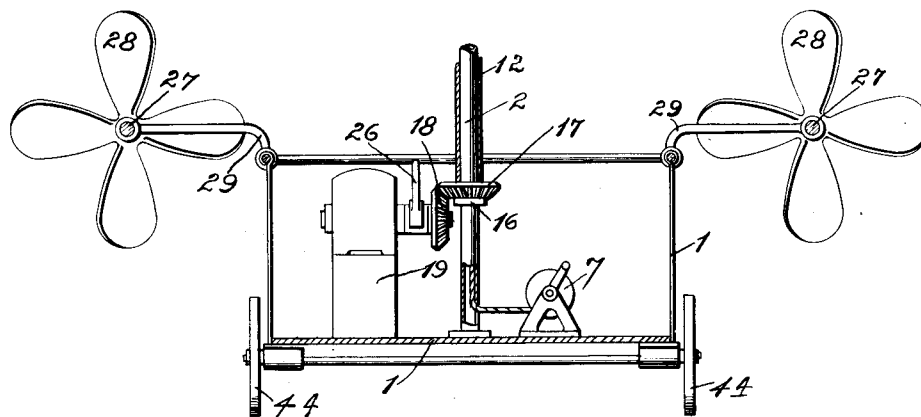
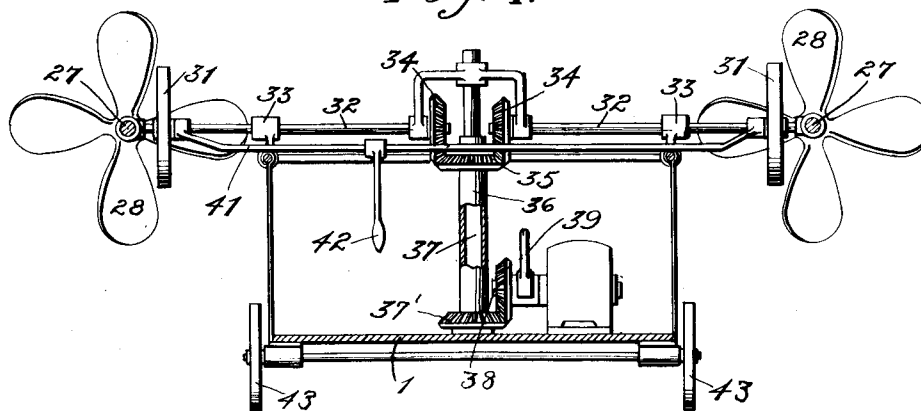


Fig. 4



Witnesses  
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# UNITED STATES PATENT OFFICE.

WILLIAM DAVID LE FEVRE, OF DOVER, DELAWARE.

## AIRSHIP.

1,028,891.

Specification of Letters Patent. Patented June 11, 1912.

Application filed November 2, 1910. Serial No. 590,293.

*To all whom it may concern:*

Be it known that I, WILLIAM D. LE FEVRE, a citizen of the United States of America, residing in Dover, in the county of Kent and State of Delaware, have invented certain new and useful Improvements in Airships, of which the following is a specification.

This invention relates to certain improvements in that class of airships which are particularly designed and adapted for use in conjunction with an operating means which both propels and guides the ship, and the object of the invention is to provide a device of this general character employing two masts, preferably vertical, one of said masts being adapted for the working of horizontal side propellers either alone or in conjunction with the vertical lifting propellers working in connection with the second shaft so that the ship can be carried vertically up into the air before being propelled horizontally or forward, suitable means being connected with both of the masts and the propellers to readily permit the simultaneous or independent operation of the lifting propellers and the impelling propellers.

The invention consists in certain novel features of construction, and combinations and arrangements of the several parts of the improved airship whereby certain important advantages are attained and the device is rendered simpler, less expensive and otherwise better adapted and more convenient for use, all as will be hereinafter more fully set forth.

The novel features of the invention will be carefully defined in the claims.

In order that my invention may be the better understood, I will now proceed to describe the same with reference to the accompanying drawings, wherein:—

Figure 1, is a view, partly in elevation, and partly in section, illustrating an airship constructed in accordance with my invention; Fig. 2, is a view in perspective of the airship disclosed in Fig. 1; Fig. 3, is a sectional horizontal view through the carriage and horizontal propellers; Fig. 4, is a view similar to Fig. 3, taken on a different line and shown partly in section, illustrating certain details of construction.

The invention contained in this application is an improvement on the device disclosed in Letters Patent No. 932,712, dated

August 31st, 1909, issued to William D. Le Fevre and Enoch S. Le Fevre.

In these views 1 denotes the body or carriage of the ship which may be of any desired shape and construction, and forms no essential part of the invention. In or about the center of the body is a fixed shaft 2, to the upper portion of which are attached the stationary aeroplanes 3, with movable slats 4, working on suitable pivots and capable of operation to be opened or closed in unison. When the ship is ascending the slats are in open position to permit the air to pass freely therethrough but while the ship is moving forward or descending they are closed or arranged at a proper angle to catch or ride upon the air. These slats are opened or closed by a chain or other flexible connection 5 extending from a rod 6, that controls the slats and down through the mast 2, which is hollow to a drum or other rotatable member 7, working preferably by manual means although other means may be employed with equal facility. The aeroplanes are held in position by suitable braces or stays 8 held to the mast by the rings or collars 9, which is thought to be obvious.

Revolving around the mast 2 in counter directions, are the series of vertical lifting aeroplane propellers 10 and 11. These propellers ride upon the air and follow each other like large kites, each one gathering up its own air and at the same time being reinforced by the air that each one discharges upon the other. The aeroplane lifting propellers are slightly concave underneath and slightly lower on the outer edge so as to catch and hold the air until it has passed through and performed its lifting underneath the full length of the planes.

The series of lifting planes 11, is mounted on the sleeve 12, embracing the mast 2 and held against longitudinal movement by the rings or collars 16, fixedly secured to the mast 2. The lower end of the sleeve 12, carries a bevel gear 17, meshing with a second gear 18, fixed to the driving shaft 18, of the motor 19. Carried by the same sleeve 12, but above the series of lifting planes 11, is a bevel gear 20, which meshes with the gear 21, mounted on the stub shaft 22, suitably fixed to the mast 2. This gear 21, meshes with the gear 23, fixed to a second sleeve 24, embracing the shaft and capable of rotation therearound, said second sleeve 24 having affixed thereto the second series

of lifting planes 10. The second sleeve 24 is held against longitudinal movement by the rings or collars 25 fixed to the mast 2. A lever 26 is provided to operate the controlling means of the motor 19 and is positioned in ready access for the operator.

The horizontal side propellers are arranged on each side of the ship, secured to the body, and extending out at any desired distance therefrom, and neither too high up or too low down, but at the intermediate position where they will give the best pull on the ship. The side shafts 27, have fixed to the opposite ends thereof the impelling blades 28 which may be constructed in any desired shape or form. The shafts are held in desired position on the body of the ship by the brackets 29.

Fixed to each side shaft 27, and in transverse alinement with each other are friction disks 30 engaged by the friction disks 31, carried by the transverse shafts 32, mounted in suitable supports or bearings 33. Fixed to the inner ends of the shafts 32, are bevel gears 34, meshing with a bevel gear 35 carried by a sleeve 36, embracing a short mast 37 projecting upward from the body 1 to which said mast 37 is securely affixed. On the lower end of the sleeve 36, is the bevel gear 37' in mesh with the bevel motor gearing 38. The lever 39 controls the operation of the gear 38, as is believed to be apparent.

The friction disks 31, are movably mounted on the shafts 32, longitudinally thereof and in order to effect such movement, the disks 31, are engaged by a rod 41, provided with a hand lever 42. When the disks 31, are at equal distances from the center of the disks 30, the ship will move straight forward, but if the disks 31, are moved either to the right or left, the side propellers will move slowly on one side and swiftly on the opposite side, and like rudders on a boat, will turn the ship.

As a protection against the elements and as a means to assure safe descent in case of accident a parachute 44, is provided which may be positioned at any point of the ship, but preferably beneath the impelling propellers, as is particularly shown in Figs. 1 and 2. And in order that the ship may be easily and conveniently manipulated when on the ground, the body 1, is provided with the traction wheels 43.

From the above description it will be seen that the device is of an extremely simple and comparatively inexpensive nature, and is particularly well adapted for use by reason of the convenience and accuracy with which the travel of the ship may be controlled, and it will also be obvious from the foregoing description that the device is susceptible of considerable modification without material departure from the principles and spirit of the invention, and for this rea-

son I do not desire to be understood as limiting myself to the precise formation and arrangement of the parts of the device as herein shown in carrying out my invention in practice.

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

1. In an air-ship, the combination with oppositely disposed longitudinal-flight propellers having blades, of vertical-flight propellers having blades, the blades of one longitudinal flight propeller being oppositely inclined to those of the other longitudinal flight propeller and the blades of one vertical flight propeller being oppositely inclined to those of the other vertical flight propeller, the car body, two masts of different height secured thereto, sleeves on the higher mast to which said vertical flight propellers are respectively secured, driving means between the sleeves on the higher mast, a gear on one of said sleeves, a sleeve on the shorter mast, driving means between the sleeve on the shorter mast and the horizontal flight propellers, a gear on the last named sleeve, horizontal driving shafts, and gears on the latter respectively connected with the said gears on the sleeves.

2. In an air-ship, the combination with a car body and two masts of substantially unequal height, of an aeroplane secured at the upper part of the higher mast, rotatable slats pivotally supported by the frame of the aeroplane and forming the body of the latter, vertical-flight propellers sleeved on the higher mast beneath the aeroplane, longitudinal-flight propellers rotatably mounted on the car-body at the sides thereof and on opposite sides of the higher mast and below the vertical flight propellers and immediately between the top and bottom of the ship, a sleeve on the lower mast, driving connections between said sleeve and the longitudinal flight propellers, a parachute beneath the longitudinal-flight propellers and over the car-body, and means for independently actuating the sleeve on the lower mast and the vertical-flight propellers.

3. In an air-ship, the combination with a mast secured thereto, of vertical-flight propellers sleeved thereon, a second mast and a rotatable sleeve thereon, a gear on the sleeve, a frame on the air-ship, propeller shafts mounted on the frame at opposite sides of the first mast, longitudinal-flight propellers on said shafts, the propellers having blades the blades of one propeller being inclined in a direction opposite to those of its companion propeller, driving shafts mounted on the frame, a gear on each driving shaft in mesh with said gear on the rotatable sleeve, a friction wheel mounted on each driving shaft to rotate therewith but slidable longitudinally thereon, a friction

disk fixed to each propeller shaft and engaged by the corresponding friction wheel, means for shifting the friction wheels radially upon their respective friction-disks, 5 means for driving the vertical-shaft propellers and the sleeve on the second mast, and means to independently control the rotation of the vertical shaft propellers and said sleeve.

10 4. In an air-ship, the combination with oppositely disposed longitudinal-flight propellers having blades, of vertical-flight propellers having blades, the blades of one longitudinal flight propeller being oppositely 15 inclined to those of the other longitudinal flight propeller and the blades of one vertical flight propeller being oppositely inclined to those of the other longitudinal flight propeller, an aeroplane, slats pivotally 20 supported by the frame of the aeroplane and forming the body portion of the same, means for rotating the slats on their pivots, a mast, sleeves thereon by which the vertical flight propellers are respectively driven, a 25 second mast, a sleeve thereon, a frame on which said longitudinal flight propellers are mounted, driving connections between the last named sleeve and the longitudinal flight propellers for simultaneously rotating 30 them in mutually opposite directions, a controlling device for said driving connections, means for simultaneously rotating the sleeves on the first mast in mutually opposite directions, and means to rotate the 35 sleeve on the second mast.

5. In an air-ship, the combination with a

car, of two masts fixed thereto, a sleeve rotatable on one mast, longitudinal flight propellers disposed at opposite sides of the car and rotatably mounted thereon, the blades 40 of one propeller being oppositely inclined to those of the other, gearing connecting the rotatable sleeve to each propeller to simultaneously rotate them in opposite directions, means controlling said gearing and 45 adaptable to operate said gearing to change the relative speed of rotation of said propellers, a rotatable sleeve supported by the second mast, a vertical-flight propeller secured to the last named sleeve, a second rotatable sleeve supported by the second mast, 50 a vertical-flight propeller secured to the said second sleeve, the blades of one vertical-flight propeller being oppositely inclined to those of the other, gearing connecting the two rotatable sleeves on the second 55 mast to rotate one sleeve in a direction opposite to that of the other, an aeroplane secured to the second mast, slats pivotally supported by the frame of the aeroplane 60 and forming the body of the latter, means for rotating the slats on their pivots, and means to independently control the rotation of the sleeve on the first mast and one of the 65 sleeves on the second mast.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

WILLIAM DAVID LE FEVRE.

Witnesses:

JOHN MILTON DAVIDSON,

FRANK E. MALONEY.