

998,834.

3 SHEETS—SHEET 1.



WITNESSES  
P. F. Nagle  
L. Rouville.

BY

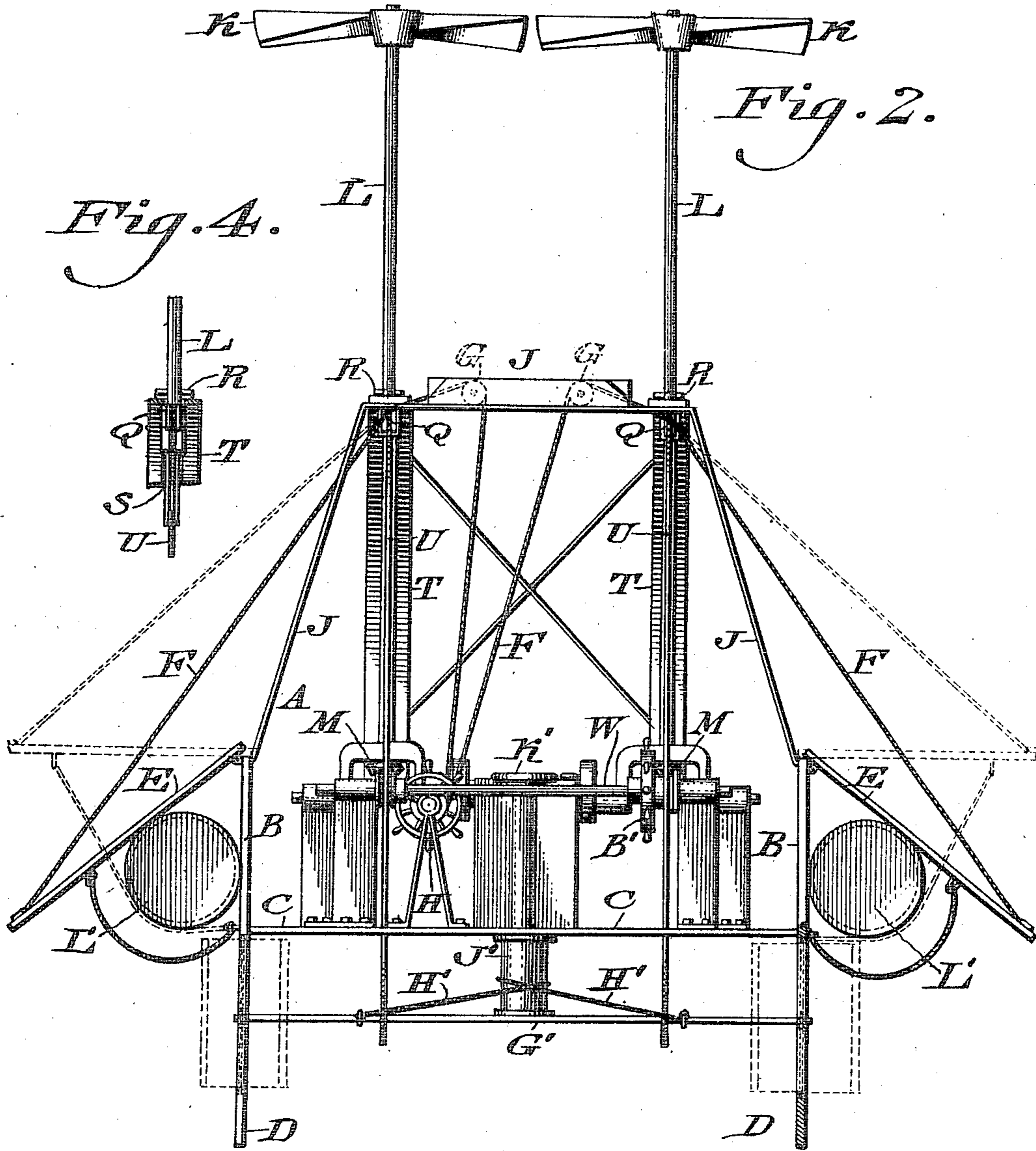
John W. Boughton INVENTOR  
Giedersheim & Harkness

## ATTORNEYS

J. W. BOUGHTON.  
AERIAL NAVIGATING DEVICE.  
APPLICATION FILED NOV. 13, 1909.

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Patented July 25, 1911.  
3 SHEETS—SHEET 2.



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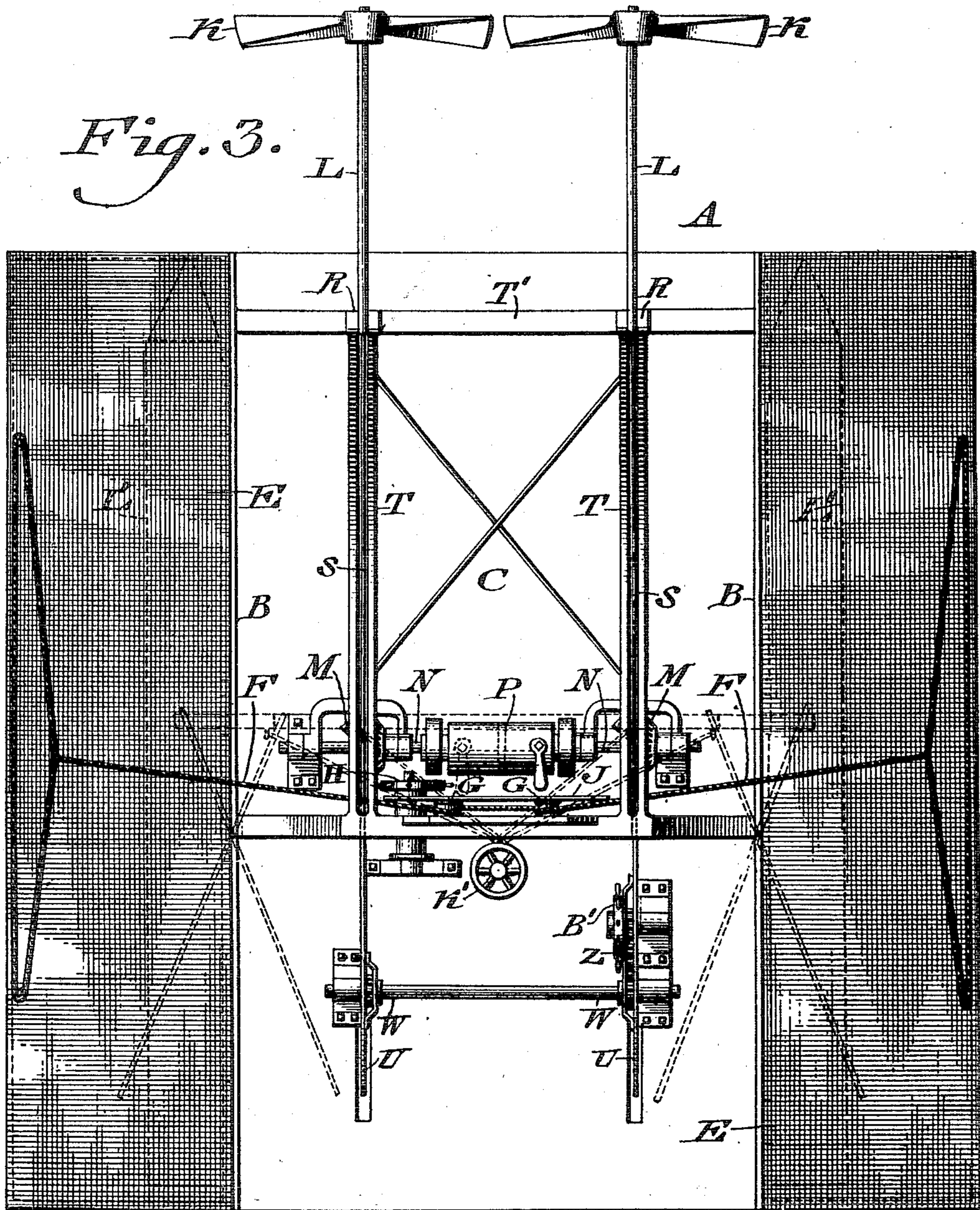
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*P. F. Nagle*  
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BY

*John W. Boughton*  
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# UNITED STATES PATENT OFFICE.

JOHN W. BOUGHTON, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE BOUGHTON FLYING MACHINE CO., A CORPORATION OF SOUTH DAKOTA.

## AERIAL NAVIGATING DEVICE.

998,834.

Specification of Letters Patent. Patented July 25, 1911.

Application filed November 13, 1909. Serial No. 527,765.

### *To all whom it may concern:*

Be it known that I, JOHN W. BOUGHTON, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Aerial Navigating Device, of which the following is a specification.

My invention consists of an aerial navigating device of the order of a helicopter, in which I employ blades, with means to adjust them in vertical, horizontal and intermediate positions, so that the device may be raised and propelled ahead or in reverse directions at the will of the aviator.

It consists further in providing the body of the device with wings at the side thereof, the same being adapted to be angularly lowered to lessen the resistance to the air in rising, and when at a desired height to be raised horizontally for further operative purposes.

It consists further of the application to the body of the device, of a receptacle for air or gas to increase the buoyancy of the device during navigation and provide a pontoon or float to sustain the device should it fall into water.

It consists further of novel steering mechanism.

It consists further of details of construction as will be hereinafter set forth.

For the purpose of explaining the invention, the accompanying drawings illustrate a satisfactory reduction of the same to practice, but the important instrumentalities thereof may be varied, and so it is to be understood that the invention is not limited to the specific arrangement and organization shown and described.

Figure 1 represents a side elevation, partly broken away, of an aerial navigating device embodying my invention. Fig. 2 represents a rear end elevation thereof. Fig. 3 represents a top or plan view thereof. Fig. 4 represents a section of a portion on line  $x-x$ , Fig. 1. Fig. 5 represents a side elevation of a detached portion. Fig. 6 represents a section thereof on line  $y-y$ . Fig. 7 represents a section on line  $z-z$ .

Similar letters of reference indicate corresponding parts in the figures.

Referring to the drawings:—A designates the body of an aerial car or navigating device, the same being composed of the sides or bulwarks B, the floor C, and the keels D, the latter forming a stand or support for the device when on the ground.

Hinged to the sides B are the wings E, which are adapted to be placed in horizontal or downwardly inclined positions by means of the cords F which are secured to the said wings, passed over the pulleys G and extended to the windlass H, which latter is mounted on the floor C, said pulleys being mounted on the frame J, which rises from the sides B, it being evident that when said windlass is operated, the wings may be raised or lowered, so that when lowered, they lessen the resistance to the air in the ascent of the device, and when at a desired height they may be placed in horizontal position for further operation of the device.

K designates blades, which are carried on the rotatable shafts L, the latter being connected by the gearing M with the driving shaft N, which is operated from the engine P in any suitable manner, said shafts L being adapted to turn on the shaft N, so as to occupy vertical, horizontal or intermediate positions, whereby when power is communicated to the shafts L, the blades K are rotated, and thus the device may be raised or propelled ahead, according to the angular positions that said shafts L may occupy, they being shown vertical in Figs. 1 and 2 and horizontal in Fig. 3.

The shafts L are passed freely through the sleeves Q, with which are connected the heads R, the necks of which freely occupy the slots S of the segmental guides T, which are firmly connected with the cross piece T' above the floor of the body A and the top of the frame J, it being noticed that the heads R are adapted to slide on said slots S in the operation of adjusting the angular position of the shafts L, and consequently of the blades.

To the sleeves Q, there are pivotally at-

attached the swinging arms U, the lower portions having therein the slots V, through which passes the shaft W, the latter having its bearing in standards rising from the floor of the body A, the walls of said slots V being adapted to slide on said shaft W in the rising and falling motions of said arms U. A portion of said walls of each slot V is toothed, forming the rack X, with which meshes a pinion Y on said shaft W, so that by the operation of the pinions, motions are imparted to the racks, and consequently to the arms U, whereby the shafts L may be raised and lowered in their angularly-adjustable positions, so as to place the blades in vertical, horizontal, or intermediate position while rotary motions are being imparted to said shafts L from the engine employed.

In order to operate the pinions Y, I employ the idler Z, which meshes with one of said pinions and with a pinion A' on the shaft of the hand wheel B', said idler and hand wheel being mounted said standards rising from the floor of the body, and said hand wheel being in convenient reach of the aviator, so that when the wheel is rotated, motion may be communicated quickly to the pinion Y geared therewith and then by the shaft W to the opposite pinion, whereby the arms U may be raised and lowered, as hereinbefore referred to, and in an easy and rapid manner.

As one of the walls of each slot V is un-toothed, in order to prevent the pinion Y from frictional contact therewith, the shaft of said pinion has secured thereto the collar C', which is located aside of said pinion and is adapted to ride freely on the un-toothed wall of a slot D', formed on a separate plate or track E', which is secured to the side of the adjacent portion of the arm U and somewhat set-out therefrom, as best seen in Figs. 6 and 7.

F' designates the rudders of the device, the same being freely fitted in openings in the keels D, and pivoted to the walls thereof, they being coupled by the cross bar G', so as to work in unison, said bar having connected with it the cord H', which is passed around the windlass or drum J', the latter having a hand wheel K', whereby when said wheel is operated the bar G' receives motion to the right or left and the same is communicated to the rudders, so as to conveniently and effectively steer the device.

Mounted on the sides of the keels D, are closed cylinders L' which form receptacles for air or gas, serving to impart buoyancy to the device during navigation, and provide a pontoon, float or raft to float the device should it drop into water.

The engine P may be duplicated, the two

engines to be coupled to the shaft N, so that either engine may be run independently of the other, and one engine run slow and the other engine run fast in order to preserve the equilibrium of the device. Again, should one engine be disabled, the other may be used, and so the device may continue its navigation or land as desired, and this with safety.

In landing the device, the blade shafts L are placed in vertical position and the speed of the blades is decreased, and the device may be backed when so desired.

The sleeves Q are sustained by the arms M', which rise from the bearings of said shafts L and are connected with said sleeves and bearings, and so retain said sleeves in proper position on said shafts.

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

1. In an aerial navigating device, a propeller blade, means for rotating the shaft thereof, a tubular member in which said shaft is mounted, a driving shaft on which the propeller shaft is mounted to turn from a vertical to a horizontal position, a swinging arm pivotally attached to said tubular member and having at its lower end a slot with a rack, a pinion meshing with said rack within said slot, and means for operating said pinion to raise and lower said shaft in its angularly adjustable position.

2. In an aerial navigating device, a propeller blade, means for rotating the shaft thereof, a tubular member in which said shaft is mounted, a driving shaft on which the propeller shaft is mounted to turn from a vertical to a horizontal position, a swinging arm pivotally attached to said tubular member and having at its lower end a slot with a rack, a pinion meshing with said rack within said slot, means for operating said pinion to raise and lower said shaft in its angularly adjustable position, and a slotted segmental guide in which said tubular member is guided.

3. In an aerial navigating device, a propeller blade, a shaft carrying the same, means for rotating said shaft, a driving shaft on which the propeller shaft is mounted to turn from a vertical to a horizontal position, a segmental guide, a head on the propeller shaft movable in said guide, a slotted arm pivotally connected with said propeller shaft and disposed oppositely to said guide, and means cooperating with the slot of the swinging arm for actuating the latter to adjust the angular position of the propeller blade.

4. In an aerial navigating device, a propeller blade, a shaft carrying the same, means for rotating said shaft, a bearing for said shaft, a tubular member connected

with said bearing and having said shaft mounted freely therein, a guiding piece attached to said member, a frame having a curved slot in which said shaft and guide are movable, a swinging arm connected with said tubular member, and means for moving said arm in opposite directions, whereby the direction of said shaft and consequently of said blade may be changed angularly.

JOHN W. BOUGHTON.

Witnesses:

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