

J. BEARD.
AERIAL MACHINE.
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950,427.

Patented Feb. 22, 1910.

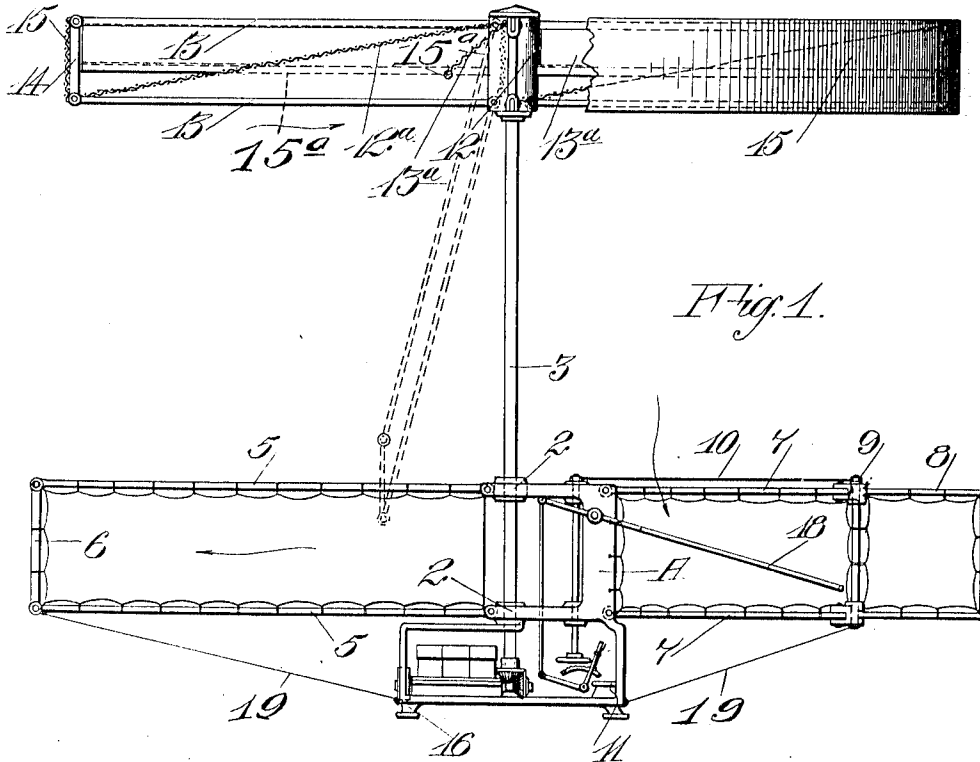


Fig. 1.

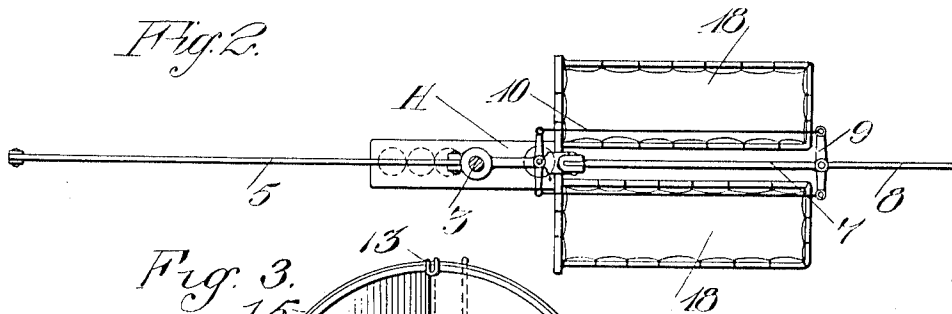


Fig. 2.

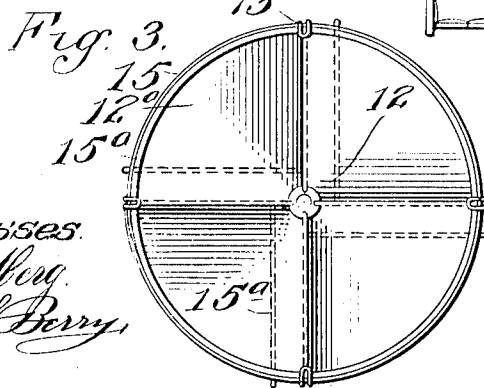


Fig. 3.

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UNITED STATES PATENT OFFICE.

JAMES BEARD, VETERANS HOME, CALIFORNIA.

AERIAL MACHINE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JAMES BEARD, citizen of the United States, residing at Veterans Home, in the county of Napa and State of California, have invented new and useful Improvements in Aerial Machines, of which the following is a specification.

My invention relates to aerial machines.

It consists of a frame adapted to cover the operator and motor, with suitable guiding mechanisms, and a vertical shaft having a horizontally revoluble propeller of peculiar construction, which propeller is also capable of forming a parachute when desired.

It also comprises combinations of parts and details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a side elevation, partially in section. Fig. 2 is a plan view of the lower planes and frame-work. Fig. 3 is a top plan view of Fig. 1 on a reduced scale.

A is a vertically disposed frame having sufficient depth, carrying journal-boxes 2 at top and bottom, within which boxes a vertical shaft 3 is mounted and revoluble. Beneath the lower part of the frame a motor is mounted, and by means of bevel gear, or other suitable mechanism, the power of the motor may be transmitted to revolve the vertical shaft, and with it the propeller; which will be more fully described hereafter. To the front of the frame are hinged bars 5, the ends of which are connected by a link or links 6. This frame may be covered with light woven fabric, and it serves as a sort of keel to assist in maintaining the upright position of the apparatus. From the rear of the frame extend similarly hinged or pivoted bars 7, and to the rear ends of these bars a rudder-frame 8 is connected. The upper and lower bars of this rudder-frame are pivoted to the rearwardly extending bars 7, and a transverse double tiller 9 has tiller ropes 10 leading from it forward to a point within easy reach of the operator, who is conveniently seated at 11 on the main frame. Suitable levers, not here shown, serve to control the motor, which may be of any suitable character, sufficiently light and strong for the purpose for which it is designed. The upper end of the vertical shaft 3 has a hub 12 of suitable length, and to

the top and bottom of this hub are hinged the arms 13. The outer ends of these arms are connected by links 14; and by reason of the hinging of the arms in the hub, they may drop down so that they lie approximately parallel with the vertical shaft; the connection with the hub and the links at the end acting with the main bars in the manner of a parallel ruler, so that the main bars will be substantially close together when the arms hang downwardly, but when they are thrown outwardly by centrifugal force caused by the revolution of the shaft, they will present substantially rectangular outlines. Of these sets of bars I have shown four, and the upper bar of each member is connected with the lower bar of the next contiguous one, by suitable light, flexible fabric 12^a; and when all the bars are thus connected, the connecting fabric stands at an incline between each top bar and the next adjacent lower bar in the rear, thus forming an inclined blade which, when the shaft is revolved, will cause the air to strike the lower inclined surfaces of these planes, and thus provide a force to lift the apparatus. Between the upper and lower bars of each of these frames extends a flap 13^a of flexible fabric, the upper edge of which is fixed to the upper bar, while the lower edge is left free, so that the fabric may swing into a position substantially parallel with the interconnecting inclined surfaces of the propeller. This allows the air to escape freely above the upper surfaces of these propeller blades, so that in rapid revolution there is no obstruction formed by these flaps. Around the peripheral connecting links of these arms is fixed a band 15, also of flexible fabric, and these fabrics are all readily foldable, so that when the apparatus is not in motion the arms forming the propeller will immediately drop, by reason of their hinged connections with the hubs, and will thus hang substantially or approximately parallel with the driving shaft 3.

The main frame of the apparatus may have legs or supports of any description, as shown at 16; and when it is to be started, the motor is engaged with the driving gears of the vertical shaft, thus causing it to revolve with any desired rapidity. The propeller arms will then immediately spread and rise about their hinged connections with the hub, and will extend the inclined connecting fab-

ric to form the blades or propellers, which, acting upon the air with sufficient force of revolution and area of surface, raise the machine bodily from the ground; the air acting
 5 on the lower surfaces of the connecting webs, and being allowed to escape freely between the bars above these surfaces. If for any reason the apparatus should be in condition to descend, by reason of stopping the motor,
 10 the extended connecting webs of the propellers will bear upon the air, and as the air will be inclined to escape up the inclined lower surfaces and between the upper and lower bars of each propeller arm, the loosely
 15 attached flaps will swing backwardly and cover these open spaces, thus forming pockets to prevent an easy escape of the air. These surfaces will also belly upward somewhat, and thus increase the buoyant parachute-like action, while the band extending
 20 around the outer periphery of the arms provides a sufficient depth to complete the pocket and to retain the air, so that the device will then act very completely as a parachute.
 25 To propel the apparatus, in conjunction with the lifting propellers, I have shown aeroplanes 18 which are pivoted to the main body or frame A and extend rearwardly upon each side of the frame which carries
 30 the rudder. When the apparatus is moved forwardly through the air, these planes, if inclined downwardly from their fulcrum points, will act upon the air in such a manner as to tilt the apparatus slightly with the
 35 head downward, and in this position the propellers and the propeller shaft will also be tilted, to a certain extent, so that the propellers will then revolve at an angle, and in addition to their lifting quality will also act
 40 to drive the machine forward. Other propellers, not here shown, may be mounted upon horizontal, or approximately horizontal, shafts, and act in conjunction with the previously described apparatus to propel it. If
 45 it is desired to reverse the movement of the apparatus, the aeroplanes 18 may be lifted about their hinged points so as to incline upwardly, and in this position they will act, if the apparatus is driven rearwardly, to tilt
 50 it in that direction, thus assisting in producing an opposite movement to that previously described.

In order to have the device act as a parachute, the flaps 13^a are used, these flaps being secured fixedly to the topmost bars of the frames 13 and hanging downward, and having secured to their lower ends the cross-bars 15^a. When the vanes are revolving,
 55 these flaps 13^a swing outwardly to the rear, as shown in Fig. 1, and allow the air to pass through and strike against the inclined plane formed by the wing fabrics 12^a by which the vessel is buoyed up. In case of stopping the machine while in midair and using the vanes
 60 as a parachute, the upward rush of air

against the inclined planes 12^a will force the fabric flaps 13^a backward into vertical position, as shown in dotted lines in Fig. 1, and bringing the bottom rods 15^a with one end
 70 against the hub and the other against the outside vertical uprights 14 of the radial frames. Consequently sealed pockets will be formed between each of the vertical flaps 13^a, flap 12^a and outside rim sheet 15.

19 represent cords or guy lines by which
 75 the frame members 5—6—7—8 are prevented from flying upward during flight. Releasing these stay lines 19 allows the members 5—7—8 to fold up like a parallel ruler, parallel with the shaft 3.
 80

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

1. In an apparatus of the character described, a vertically disposed main frame
 85 adapted to carry a motor, a vertical parallelogram hinged to the front of the main frame extending forwardly therefrom and having connecting links at its forward end, a similar parallelogram frame hinged to the
 90 rear of the main frame and having a rudder and turning means connected therewith, and horizontal aeroplanes having their forward ends hinged to the main frame extending
 95 rearwardly and capable of being tilted upward and downward with relation to a horizontal plane.

2. In an apparatus of the character described, a main frame with vertically disposed, hinged, keel-like structures projecting forwardly and rearwardly therefrom, a vertical shaft journaled in the main frame,
 100 a propeller composed of a series of arms hinged to the shaft one above the other, each pair having their outer ends connected by hinged links and capable of being extended
 105 into approximately horizontal position by centrifugal force, and a flexible fabric having its front edge connected with the upper bar of one of said frames, and its lower edge with the lower bar of the next succeeding
 110 frame.

3. In an apparatus of the character described, a main frame, a vertically journaled shaft projecting upwardly therefrom having
 115 an enlarged hub at the top, a series of arms, the uppermost of which are pivoted to the upper portion of the hub, and the lower arms in vertical line below, to the lower end
 120 of the hub, hinged links connecting the outer ends of said pairs of arms, and forming with the hub, parallelograms capable of being extended by centrifugal action and foldable against the shaft by gravitation
 125 when not in motion, flexible fabrics connecting the upper bar of each parallelogram with the lower bar of the next succeeding, vertical flexible flaps having their upper
 130 edges fixed to the upper bars, said flaps capable of dropping to close the space be-

tween the upper and the lower bars, and a flexible band extending around the outer connecting links of the propeller arms.

4. In an apparatus of the character described, a vertical revoluble shaft, propeller arms hinged to the shaft and capable of extension by centrifugal force, connecting flexible webs between the upper bar of each arm and the lower bar of the next succeeding, whereby inclined propeller elements are provided, vertical flaps fixed to the upper of each propeller bar and extending loosely

down to the lower bars, and a surrounding band forming the periphery for the extended arms, whereby, when stationary, the device serves as a parachute. 15

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JAMES BEARD.

Witnesses:

RIEL J. THOMSON,
WM. H. DUNN.