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FLYING MACHINE.

APPLICATION FILED APR. 4, 1913.

1,113,741.

Patented Oct. 13, 1914.

3 SHEETS—SHEET 1.

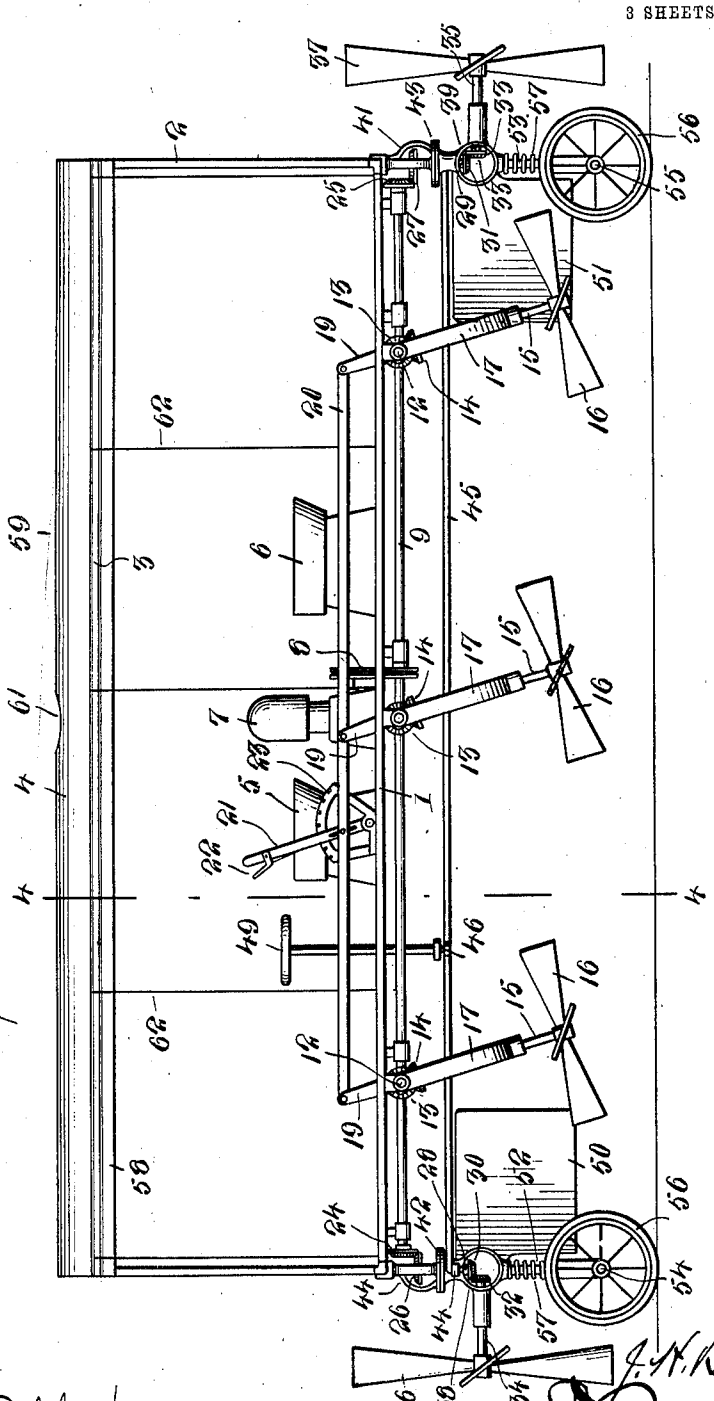


Fig. 1.

Witnesses

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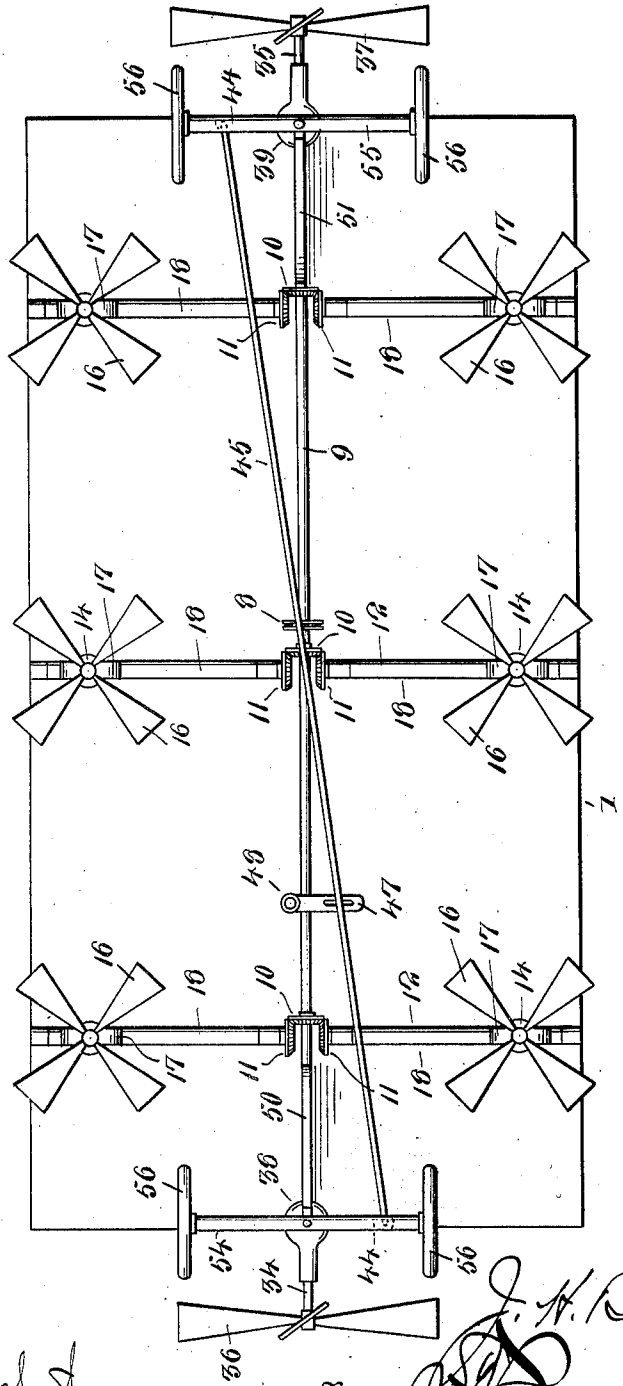
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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 4.

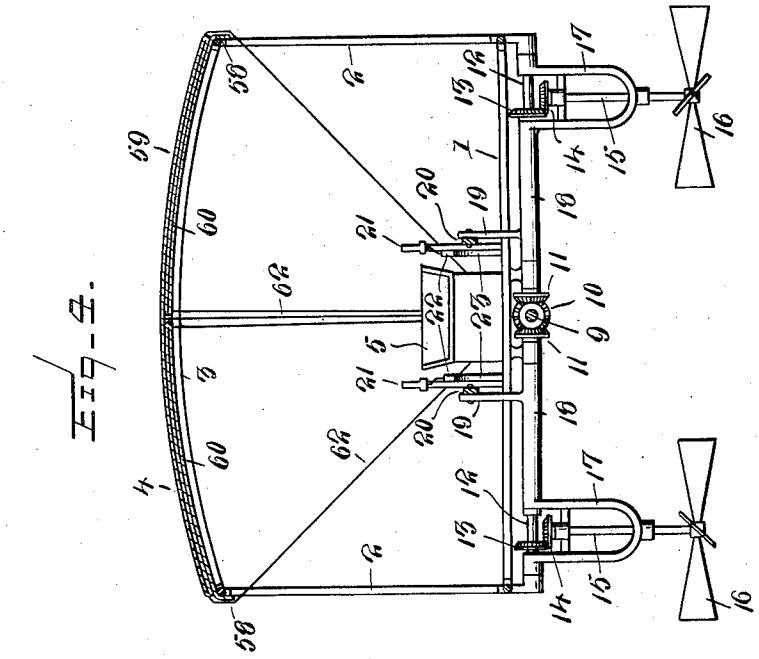
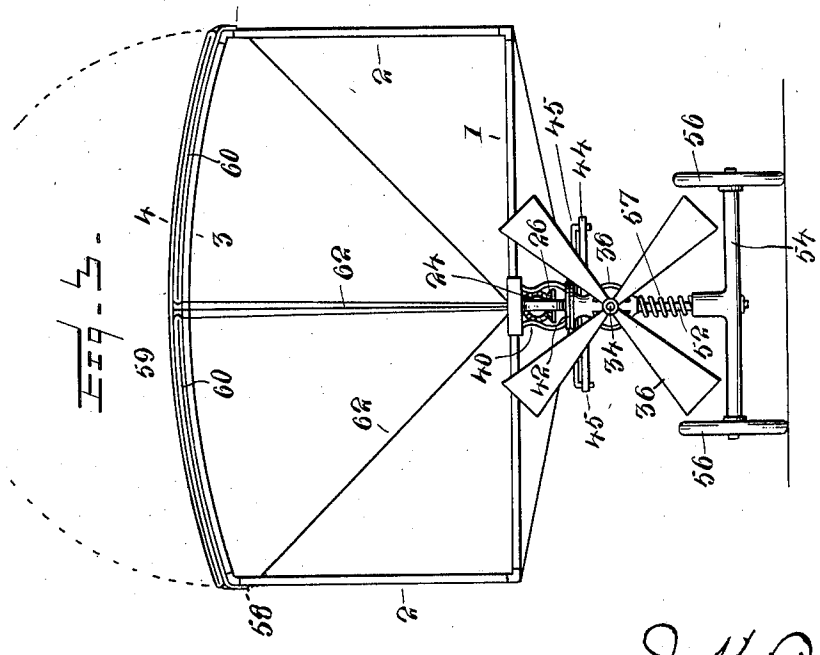


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

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FLYING-MACHINE.

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Application filed April 4, 1913. Serial No. 758,926.

To all whom it may concern:

Be it known that I, JAMES H. BENSCOTER, a citizen of the United States, residing at Perrysville, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Flying-Machines, and do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to flying machines of the combined aeroplane-helicopter class, and particularly to means for propelling, steering and controlling machines of this character with greater efficiency, as well as to secure a higher degree of safety in the operation of such craft.

One object of the invention is to provide means for launching the machine directly from the ground, sustaining the machine in travel so that comparatively heavy loads may be carried, or the machine caused to hover over a given point, driving the machine ahead in straightaway flight, controlling the speed of descent, and maintaining both longitudinal and lateral equilibrium.

Another object of the invention is to provide simple and effective means for steering the machine, both on the ground and in the air, through a single set of steering elements, which means embodies propellers adapted for both lateral steering and direct propulsion.

Still another object of the invention is to provide a supporting surface convertible into a parachute in case of danger, to arrest the speed of descent and insure a safe landing.

With these and other objects in view, the invention consists of the features of construction, combination and arrangement of parts hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a side elevation of a flying machine exemplifying my invention, showing the main propellers in sustaining and propelling position. Fig. 2 is a bottom plan view of the same. Fig. 3 is a front elevation of the machine. Fig. 4 is a vertical transverse section on line 4—4 of Fig. 1.

In the practical embodiment of my invention, I provide a gliding structure preferably of greater length than width and comprising a car or platform 1, uprights 2 rising therefrom and a head frame 3 carrying a supporting surface 4 constituting a combined aerofoil and parachute, as hereinafter fully described. The platform 1 supports an aviator's seat 5, one or more passengers' seats 6, the driving motor 7, which is preferably arranged with relation to the seats so that the load weight will be properly distributed and balanced, and the controlling devices, as hereinafter set forth, which are arranged in convenient proximity to the seat 5.

The drive shaft of the motor 7 is connected by sprocket gearing 8 with a longitudinally extending main drive shaft 9 arranged beneath the car or platform. This shaft 9 is provided with a series of beveled gears 10, each of which meshes with a pair of beveled gears 11 upon the inner ends of a pair of alined transversely extending transmission shafts 12. Three pairs or sets of these transverse shafts 12 are preferably employed, the central pair being centrally located with relation to the longitudinal extremities of the car and the remaining pairs being spaced at equal distances between the central pair and the front and rear ends of the car, respectively. All three pairs of transverse shafts are driven at uniform speed from the shaft 9, and the outer ends of the respective pairs of shafts are provided with beveled gears 13 meshing with similar gears 14 on shafts 15, each carrying a lifting and driving propeller 16. The propellers 16 are arranged in longitudinal series on opposite sides of the longitudinal axis of the machine, the propellers of one series revolving in an opposite direction to those of the other, so that the tendency of one set of propellers to set up a lateral thrust pressure and deflection of the machine from its straight course of travel will be entirely counteracted by the thrust pressure of the other set of propellers.

Each propeller shaft 15 is journaled in a swinging yoke 17 carried by a sleeve 18 mounted to turn upon the co-acting shaft 12, said sleeves being provided with upwardly extending crank arms 19. The crank arms of the carrier sleeves of each longitudinal series of propellers 16 are connected for movement in unison by a link rod or bar 20, coupled to a controlling lever 21, whereby the propellers of each series may

be simultaneously adjusted to vary their working angle in an arc of 90°, from a vertical to a substantially horizontal position, and vice versa. Each lever 21 is provided with a dog or pawl 22 to engage a rack 23, whereby the associated propellers may be held at any working angle within their range of adjustment. It will thus be understood that the propellers 16 may be arranged to operate in a horizontal plane by disposing their shafts vertically to give a direct upward lifting impulse whereby the machine may be caused to rise directly from the ground, may be supported in a stationary position in the air so as to hover over a given point, or the speed of descent of the machine controlled by varying the speed of the propellers so as to work at a desired rate less than sustentation speed. By swinging the shafts 15 rearwardly and upwardly to a greater or less degree the propellers may be disposed to work at an angle between the vertical and horizontal, so as to give a lifting impulse to sustain the machine and at the same time give a working thrust pressure to propel the machine forwardly. It will be further understood that by causing the two sets of propellers at opposite sides of the machine to work at different relative angles, both longitudinal and lateral stability may be maintained in a simple and effective manner. Inasmuch as through the working action of the propellers 16 the machine may be governed in its ascent and descent at will, the necessity of employing horizontal rudders or elevators and of ascending or descending at a gliding angle is obviated, although, if desired, rudders of this type for vertical steering may be employed.

The front and rear ends of the shaft 9 are provided with beveled gears 24 and 25 which mesh with similar gears 26 and 27 on the upper ends of vertical shafts 28 and 29 carrying at their lower ends beveled gears 30 and 31 meshing with like gears 32 and 33 on horizontal shafts 34 and 35 carrying front and rear driving and steering propellers 36 and 37, the shaft 34 and the lower end of the shaft 28 being journaled in a bracket or casing 38, while said shaft 35 and the lower end of the shaft 29 are journaled in a similar bracket or casing 39. The upper ends of the respective shafts 28 and 29 are journaled in bearing brackets 40 and 41 fixed to the framework of the gliding structure and suitable fifth-wheel or turntable connections 42 and 43 are provided between the respective sets of brackets, whereby the casings 38 and 39 are mounted to swing laterally on the shafts 28 and 29 as their axes of motion. The said casings 38 and 39 are provided with oppositely projecting lateral crank arms 44 coupled by a connecting or link rod 45 having a pin 46 engaging a slotted crank arm 47 upon the lower end of a control shaft 48 operable by a control wheel 49, whereby the propellers may be simultaneously swung laterally to steer the machine in a horizontal plane to the right or left, as desired. Preferably vertical rudder planes 50 and 51 are rigidly connected with the respective brackets or gear casings 38 and 39 for movement in unison with the steering propellers, thus enabling a rapid, sensitive and positive lateral steering action to be secured. It will be understood that the propellers 36 and 37 are also employed as driving propellers for forward propulsion in conjunction with the propellers 16, thus enabling great speed to be obtained, to keep the machine advancing while the propellers 16 are disposed in a strictly lifting position. Fixed to and depending from the casings 38 and 39 are axle rods or stems 52 and 53 on which are slidably and non-rotatably mounted front and rear axles 54 and 55 carrying suitably cushioned wheels 56 for launching and landing purposes. Surrounding each axle rod between the bracket and axle is a coiled cushioning spring 57 affording a yielding backing to take up all shocks and jars in landing the machine and in its travel over irregular ground surfaces. It will be understood that by this construction the axles are also mounted to turn with the vertical rudders and steering propellers, whereby the machine is adapted to be steered on the ground or in the air through the instrumentality of a single set of steering devices.

The supporting surface 4 is of novel construction and includes a body of fabric or other suitable material secured at its longitudinal margins 58 to the sides of the head frame 3 and of sufficient fullness to be folded in compact form to serve as an aerofoil and when released to open and fill with air and form a parachute. As shown the material is folded in such manner as to produce a top layer 59, formed by its intermediate portion and inturned between the same in the form of doubled bottom layers 60 on opposite sides of its longitudinal center, by which the portions of the fabric between its center or body and secured edges are accordion-plaited to collapse and expand bellows-fashion. The body portion or top layer is provided with a central vent opening 61 for the slow escape of air when the said surface is in use as a parachute. Cords or other retaining elements 62 lead from the marginal edges of the folded portions of the fabric to a point in proximity to the aviator, where they are suitably secured to hold the fabric normally collapsed. By releasing or severing these cords it will be apparent that the aviator, in the event of danger, may release the body of fabric so that it will open and fill under air pressure

and form a parachute, as indicated in dotted lines in Fig. 3, whereby the speed of descent of the machine will be arrested, allowing a safe landing to be made.

I claim:—

1. In a device of the character described the combination with a gliding surface, of a longitudinally extending drive shaft, gears secured to the longitudinally extending drive shaft at each end and at spaced intervals throughout its entire length, transversely extending transmission shafts in gear with the spaced gears on the longitudinal drive shaft, tubular members surrounding the transmission shafts and rotatable with relation thereto, U-shaped members formed intermediate the ends of the tubular members, the arms of the U-shaped members being formed integral with the tubular members, propeller shafts journaled in the U-shaped members and projecting through the bight portion thereof, propellers carried by the lower ends of the propeller shafts, gears carried by each propeller shaft and by each transmission shaft, said gears being in mesh and adapted to drive the propeller shafts, and arms formed integral with the tubular members near the inner ends thereof, said arms extending from the tubular members in an opposite direction from the U-shaped members, means connected to the arms to hold the same at the desired angle and thereby control the angle in which the propellers on the propeller shafts operate.

2. In a device of the character described, the combination with a gliding structure, of a longitudinally extending drive shaft, lateral transmission shafts in gear with the drive shaft, propellers in gear with the laterally extending transmission shafts, means to control the direction in which the propellers operate, gear casings secured to the gliding structure, at each end of the longitudinal drive shaft, transmission shafts journaled in the gear casings and extending vertically therethrough, horizontal propeller shafts journaled in the gear casings and adapted to be driven by the vertical transmission shafts, propellers carried by the free ends of the propeller shafts, each of said gear casings being rotatably mounted and adapted to swing laterally, rudders carried by the gear casings and adapted to move in unison therewith, axles secured to the gear casings and adapted to move in unison therewith, and wheels rotatably mounted on the free ends of the axles to provide a supporting means for the device when it is at rest on the earth.

3. In a flying machine, the combination of a gliding structure, a longitudinally extending drive shaft, vertical transmission shafts in gear with said drive shaft, gear casings receiving the transmission shafts and journaled thereon to swing laterally, horizontal propeller shafts journaled in said casings and in gear with the transmission shafts, steering and driving propellers mounted upon the propeller shafts, means connecting said gear casings for swinging the propellers laterally in unison, rudders fixed to said casings to swing therewith, axles slidably connected with the casings, and cushioning springs backing said axles.

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

JAMES H. BENSCOTER.

Witnesses:
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