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AEROPLANE.

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Patented Oct. 29, 1912.

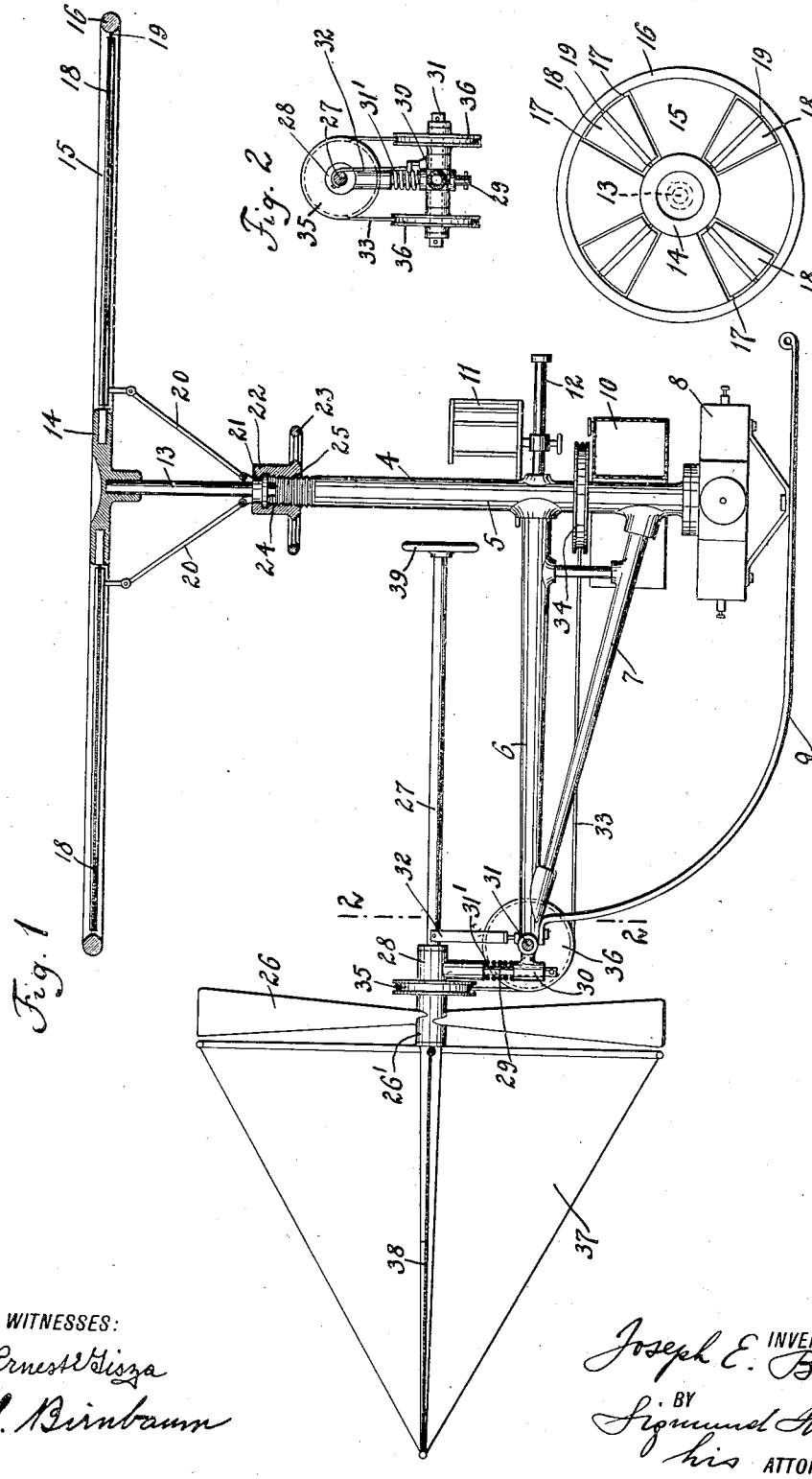

Fig. 1

Fig. 2

Fig. 3

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AEROPLANE.

1,042,758. Specification of Letters Patent. Patented Oct. 29, 1912.

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To all whom it may concern:

Be it known that I, JOSEPH E. BISSELL, a citizen of the United States, and a resident of the city of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Aeroplanes, of which the following is a specification.

The present invention relates to the improvements in the means of aerial navigation, and has particular reference to that type of aerial vessels which is termed the "aeroplane class."

One of the objects of the invention is to utilize the principle of aeroplanes combined with the principle of gyration, whereby the aerial navigation is rendered practical and safe.

Another object of the invention is to provide an aeroplane with a poiser or glider frame built upon the principle of a gyroscope, and having means, in the nature of rotary propellers, for causing said aeroplane to ascend, said means being adapted to control the flow of air, whereby the aeroplane descends safely.

A further object of the invention is to provide the aeroplane with a combined single propelling and steering apparatus, in the form of an ordinary propeller, in combination with means for varying the speed thereof, irrespective of the speed of the source of power actuating the same.

A still further object of the invention is to retain the advantages of the aerial vessels of the heavier than air type, while simplifying their construction and reducing their weight, and to provide more effectively, than in devices heretofore in use, against certain contingencies.

With the objects enumerated, and with others in view, as will more fully appear, the invention consists of certain novel features of construction and arrangement of parts, hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the appended claims, it being understood that various changes in the form, proportions, size and minor details of construction may be made without departing from the spirit or sacrificing any of the advantages of the invention.

One of the many possible embodiments of the invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a side elevation of the aerial vessel, partly in section, Fig. 2 a section taken on line 2, 2 of Fig. 1, and Fig. 3 a plan view on smaller scale of the gyroscopic sail.

The herein described embodiment of the aerial vessel comprises a main frame 4, made of a suitable rigid and light material and comprising a substantially tubular member 5, to which is attached a substantially horizontally arranged bracket 6, properly strengthened by a strut 7. To the lower end of the tubular member 5 is attached in any suitable manner a motor 8 for actuating the poiser-, propelling- and guiding-means, and being in the present case a multi-cylinder internal combustion engine.

The frame of the apparatus is mounted upon the sleigh-runners 9, whereby in starting the operation of the vessel, an initial movement may be imparted to the same by placing it upon an inclined plane, in the manner well known in the art. Upon the frame of the vessel is arranged a tank 10 containing the liquid fuel for said motor, the connections for the same having been omitted from the drawing as the same are obvious, and can be made by anybody skilled in the art. Part of the tank may be used for storing the lubricating material for the motor. Above the tank is arranged the operator's seat 11, adjustably carried by a support 12.

The cylinders of the engine are arranged, in the case illustrated in the drawings, horizontally; the crank-shaft being connected in the usual manner with a shaft 13, which is journaled in the tubular main frame 5 of the apparatus. To the upper end of the shaft 13 is attached a flange 14, to which is fastened a, preferably, circular poiser- or glider-sail or membrane 15, made of a light and preferably rigid material, such as for instance, aluminum, and having a substantially heavy peripheral portion 16, for the purpose hereinafter to be described. The frame is provided with radial and outwardly widening openings 17, 17, extending from the flange 14 substantially to the pe-

riphery of the poiser frame. Blades 18, 18, conforming to the configuration of the openings 17 and adapted to close the same, are pivoted at 19, 19, to the poiser frame. Rods 20, 20 are pivotally attached to the blades 18 and connected in a similar manner with a ring 21, slidably arranged on the shaft 13. The ring 21 is in engagement with the hub 22 of an operating wheel 23, which is arranged above the seat 11 and within the reach of the operator. The hub 22 of the wheel 23 is provided with screw threads 24, in mesh with the threads 25 upon the tubular frame portion 5. By means of this arrangement, the blades 18 may be shifted to and kept in any desired positions, that is to say their inclination to the horizontal plane may be varied from zero to a maximum. It will be observed that when the poiser sail or membrane rotates, the blades 18, if set open, will act in the manner of an ordinary screw propeller. Of course, the lifting power of these blades depends upon their angle of inclination, their size, and their speed.

The combined propelling and steering means of the aeroplane comprises a screw-propeller 26 (whereby a screw-propeller is meant both the blades of the propeller and its hub), and it will be understood that this propeller is of suitable size, and that the pitch of its blades is such as is found desirable. The hub of this propeller is rotatably mounted in a bearing 28; and this bearing 28 is secured to a spindle 29, and the spindle 29 is slidably mounted in a bearing 30, which bearing 30 is in turn pivotally attached at 31 to the bracket 6 of the main frame of the apparatus. Thus it will be observed that the propeller is pivoted in a vertical plane to the bracket 6 while the engagement of the spindle 29 and the bearing 30 permits also a horizontal pivoting of the propeller with respect to the frame 6, and thus there is a universal joint between propeller and machine frame. A spring 31′ coiled upon the spindle 29 and acting against the bearing 28 above and the bearing 30 below tends to hold the propeller at a maximum distance from the arm 6. Upon the hub of the propeller is a pulley 35 and upon the main shaft 13 of the machine is a pulley 34, and a belt is provided which runs over the pulleys 34 and 35 (its path being directed by the idler 36—36) whereby power is imparted from the main shaft 13 to revolve the propeller 26. The belt employed is preferably in the form of a steel wire. The hub of the propeller and the bearing 28 upon which it is journaled have an axial opening through which extends an operating rod 27. Upon the end of this operating rod 27 extended to a position adjacent to the passage or seat, is conveniently attached a hand-wheel 39. It will be understood that by manipulation of this operating rod 27 the passenger is able to swing the propeller moving its axis to any desired position, and it will further be observed that in consequence of the elastic connection between the bearing 28 and the bearing 30, the driving belt 33 will be kept taut whatever be the axial position to which the propeller is brought. Means for causing variation in the speed at which the propeller travels with relation to the speed at which the main shaft 13 of the machine turns, consist in making the operating rod 27 rotatable in the axial opening through bearing 28 and the hub of the propeller, and is provided with a flexible strap 32, one end of which is securely attached to the bracket 6 and the other end of which, attached to the rotatable arm 27, is capable of being wrapped upon the arm when the arm is rotated. If the operator wishes to diminish the speed of rotation of the propeller relatively to the speed of rotation of the main shaft 13 of the machine, he rotates the rod 27 by means of the hand-wheel 39, and in so rotating it wraps the strap 32 to some extent upon the said shaft. In so doing he compresses the spring 29, diminishes the distance between the bearing 28 and the bearing 30, allows the belt 33 to slip somewhat upon the pulley 35, and so reduces the speed of the driven propeller.

In order to increase the stability of the apparatus, when in flight, a substantially vertical plane 37 is fastened, in front of the propeller 26, to the rod 27, which plane is intersected by a substantially horizontal plane 38, also fastened to said rod.

The operation of the device is as follows: In starting the glide of the machine, the blades 18, 18 are set by means of the hand-wheel 23 at an angle to the general plane of the poiser wing or membrane 15, and then the motor is put in operation, which gives the desired speed to the poiser frame, to the blades 18, and to the screw propeller 26, the shaft 28 of which is arranged, when starting, in a horizontal plane. The operation of the blades 18 causes at once an air disturbance of such character that the atmospheric pressure is changed so as to create a partial vacuum above the poiser sail, and, by means of the expansive force of the atmosphere below the same, the machine is floated with its poiser sail gyrating, whereby the vessel is kept in an upright position. The substantially vertical plane 37 serves to prevent the rotation of the main frame of the apparatus with the main shaft thereof. Of course, the propeller 26 may be set at the same time, if found necessary, so as to produce a current of air which counteracts to some extent that generated by the propeller blades 18, and serving thus as an additional means for preventing the rotation of the main frame. When the desired height or level is attained, the blades 18 in the poiser frame may be set so as to diminish or close

the openings 17 in the same. The sail, of course, continues to gyrate, whereby the stability of the machine is much increased; said frame acting in the manner of a gyroscope, and serving at the same time as a flywheel of the motor 8. Obviously the poiser sail serves also as a parachute, the degree of its action being determined by the position of blades 18 in the openings 17.

The substantially horizontal plane 38 serves as an additional means for steadying the apparatus, and more particularly prevents the overturning of the same.

The machine is propelled and guided in its movement by the propeller 26, the direction of movement being entirely dependent upon the angle at which the propeller shaft is arranged relative to the bracket 6 which carries it. If the shaft 27 is arranged in a horizontal plane, the propeller will move horizontally, its direction depending upon the angle at which the propeller is arranged laterally with relation to the longitudinal axis of the bracket 6. If the shaft 27 is set vertically at an angle to the axis of the brace 6, the aeroplane will proceed in a plane inclined to the horizontal, rise or descend, depending upon the position of the propeller shaft in the vertical plane. The propeller is, of course, set and held in the desired position by manual movement of shaft 27, which is provided with a hand-wheel 39 within reach of the passenger. It will be observed that the planes 37 and 38 are shifted with the propeller and act thus also as guiding means. When the shaft 27 is shifted in a vertical plane, the propeller turns upon the pivot 31, while, when shifted in a horizontal plane, it turns upon the spindle 29.

The spring 31, hereinbefore described, serves to keep the belt 33 taut, whereby the full power, generated by the motor 8, is transmitted to the propeller 26. When it is desired to decrease the number of revolutions of the propeller on maintaining the speed of the motor, the shaft 27 is given a turn by means of the hand-wheel 39 so that part of the flexible connection 32 is wound upon the shaft 27, bringing thus the bearings 28 and 30 nearer to each other, whereby a certain slippage of the belt upon the pulleys 34 and 35 is obtained, decreasing thus the speed of the propeller.

What I claim is:

1. In an aeroplane the combination of a main frame, an extensible auxiliary frame pivoted to the main frame, a propeller rotatable in said auxiliary frame, a shaft rotatable in the main frame, means for imparting rotary movement to the said propeller on rotation of the shaft in the main frame and means for effecting a variation in the extension of the said extensible frame to accomplish a variation in the relative speeds of the said propeller and the said shaft in the main frame, substantially as described.

2. In an aeroplane the combination of a main frame, a spring-actuated extensible auxiliary frame pivoted to said main frame, a propeller rotatably carried in said extensible auxiliary frame, a shaft rotatable in said main frame, a pulley on the hub of said propeller, a pulley on said shaft rotatable in the main frame, a belt engaging both of said pulleys and means for diminishing the degree of extension of the said extensible frame against the spring tension, substantially as described.

3. In an aeroplane, the combination of a main frame, an auxiliary frame pivoted to the main frame, a propeller rotatable in the said auxiliary frame, means for rotating said propeller, and a directing rod extending through an axial opening in the hub of said propeller, substantially as described.

4. In an aeroplane the combination of a main frame, an auxiliary frame pivoted to the main frame, a propeller rotatable in said auxiliary frame and provided with an axial opening through its hub, a directing rod extending through the axial opening in said propeller hub, and a stability wing carried by said directing rod and extended in a plane, substantially at right angles to the general plane of rotation of said propeller, substantially as described.

Signed at Pittsburgh, in the county of Allegheny and State of Pennsylvania, this 24th day of January, A. D. 1910.

JOSEPH E. BISSELL.

Witnesses:

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J. J. NORDMAN.