J. E. BISSELL.

AEROPLANE.

APPLICATION FILED OCT. 7, 1909.

1,112,110.

Patented Sept. 29, 1914.

2 SHEETS—SHEET 1.

Fig. 1

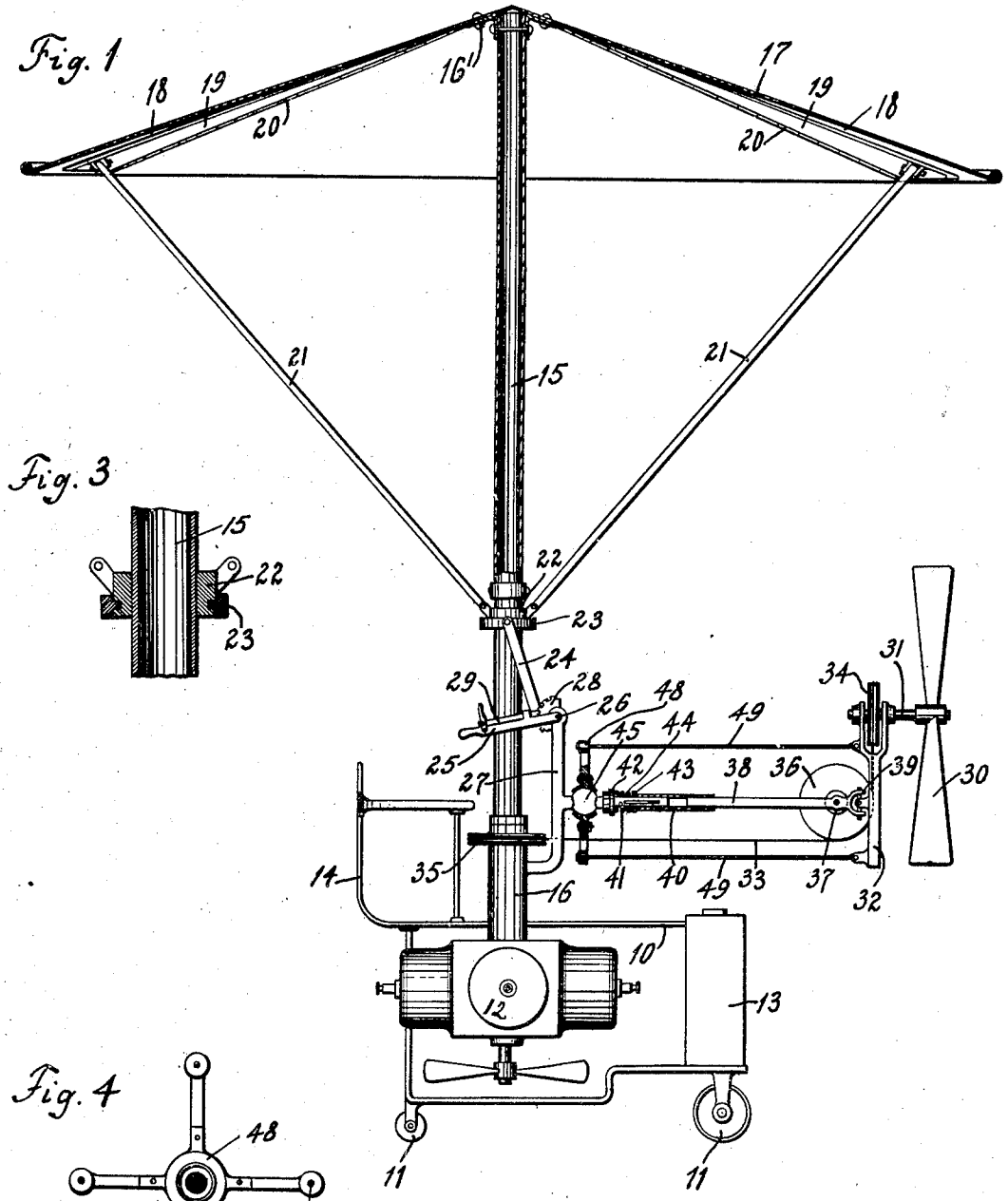


Fig. 3

Fig. 4

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2 SHEETS—SHEET 2.

Fig. 2

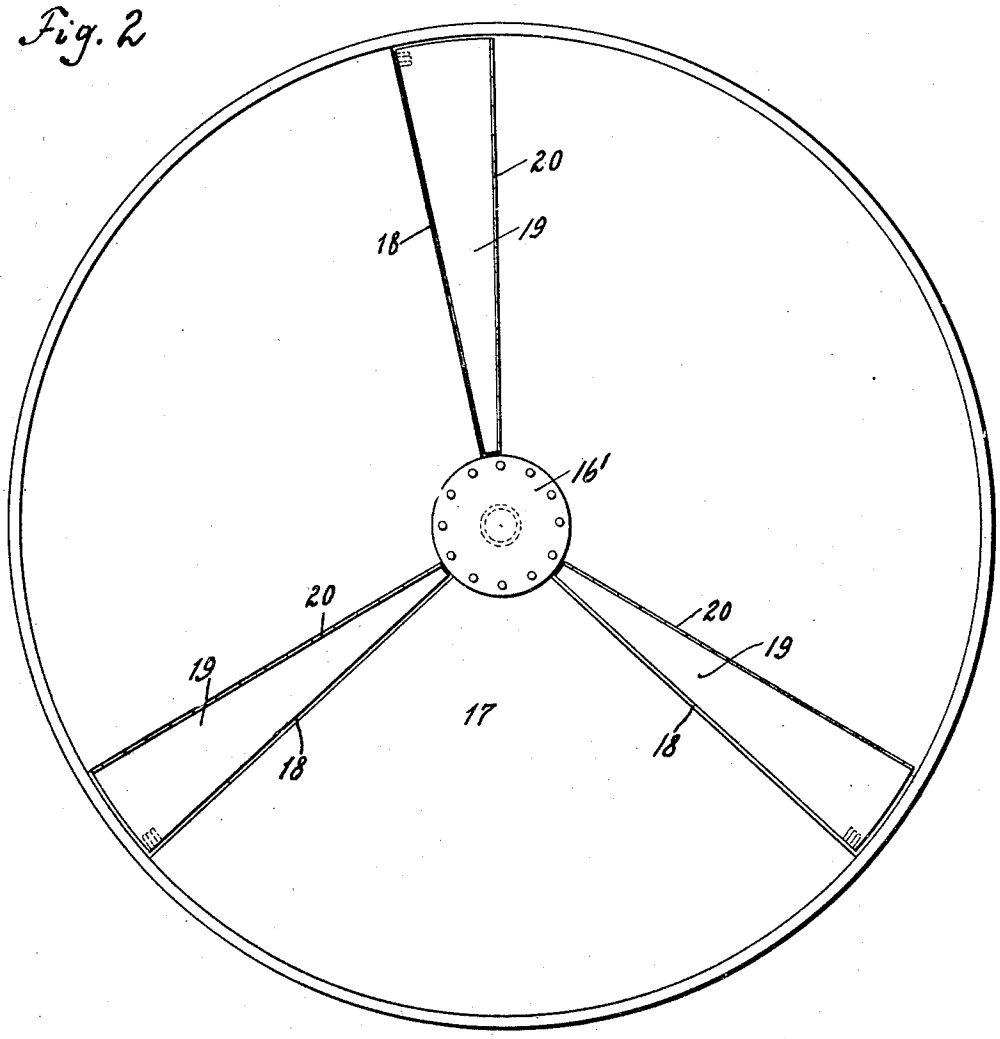


Fig. 5

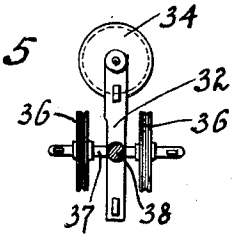
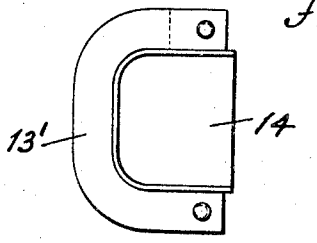


Fig. 6



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UNITED STATES PATENT OFFICE.

JOSEPH E. BISSELL, OF PITTSBURGH, PENNSYLVANIA.

AEROPLANE.

1,112,110. Specification of Letters Patent. Patented Sept. 29, 1914.

Application filed October 7, 1909. Serial No. 521,462.

To all whom it may concern:

Be it known that I, JOSEPH E. BISSELL, a citizen of the United States, and 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 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 principles of the aeroplane combined with the principles of gyration, whereby the aerial navigation is rendered practicable and safe.

Another object of the invention is to provide an aeroplane with a poiser- or glider-frame in the form of a parachute, having means, in the nature of rotary propellers, for causing said aeroplane to ascend; said means being adapted to control the flow of the 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 screw propeller, which propels and guides the vessel in all directions.

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

With the objects enumerated and with others in view, as will more fully hereinafter appear, the invention consists of certain novel features of construction and arrangement of parts, hereinafter more fully described, illustrated in the accompanying drawings, and particularly 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 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 plan view of the same; Figs. 3, 4 and 5 are details of construction; and Fig. 6 is a plan view of a modification of a detail of construction.

The herein described embodiment of the aerial vessel comprises a main frame 10, made of a suitable, rigid and light material, and being provided, preferably, with a plurality of rollers or wheels 11, facilitating the transportation of the apparatus and aiding the ascent of the same. Upon this frame is mounted a suitable source of power for actuating the poising, propelling and guiding means, which comprises in the present case an internal combustion engine 12, having a plurality of cylinders, the number of which may vary according to the requirements. There is furthermore arranged upon said frame a tank 13 containing the liquid fuel for said motor, the connections therebetween having been omitted as the same are obvious, and may be made by anybody skilled in the art. Part of the tank 13 may be used for storing the lubricating material for the motor. Above the motor 12 is arranged the operator's seat 14, in front of which are located the actuating levers for the different devices upon the vessel. The fuel tank may be arranged around the operator's seat, as shown at 13′ in Fig. 6 of the drawings.

The cylinders of the motor are arranged horizontally, its vertical crankshaft being connected with a, preferably, tubular shaft 15, which is rotatably journaled in a tubular support 16, fixedly attached to the main frame 10 of the apparatus. To the upper end of the shaft 15 is attached a flange 16′, to which is fastened a, preferably, parachute-shaped poiser or glider-wing 17, made of or covered by a light and preferably rigid material, such as, for instance, aluminum. The frame is provided with radial and outwardly widening openings 18, 18, extending from the flange 16′ substantially to the rim of the parachute-shaped wing. A blade 19, conforming to the configuration of the openings 18 and adapted to close the same, is hinged at 20 to one longitudinal edge of each opening. Rods 21, 21 are pivotally attached to the blades 19 and connected in a similar manner with a ring 22, slidably arranged upon the shaft 15. The ring 22 is in engagement with a ring 23, which is connected by means of a rod 24 with an operating lever 25, arranged in

front of the operator's seat 14, and pivoted at 26 to a support 27, fixedly attached to the tubular member 16 of the main frame of the apparatus. Near to the pivot 26 is arranged a stationary notched segment 28, the notches of which are adapted to be engaged by a latch 29, slidably mounted upon the lever 25, whereby the rings 22 and 23 may be kept upon the shaft 15 in any predetermined positions, and thus the inclination of the blades 19, 19 with respect to the plane of the poiser wing adjusted as the particular circumstances will require. It will be observed that, when the poiser-wing rotates, the blades 19, when set open, will act in the manner of an ordinary screw propeller with a lifting power limited only by the size of said blades and by the size of the motor and the speed thereof. Of course, the lifting power of these blades depends also upon their angle of inclination, which may be predetermined as hereinbefore mentioned.

The combined propelling and steering means of the aeroplane comprises a screw propeller 30 of suitable size and pitch, which is fixedly attached to a shaft 31, rotatably mounted upon a cross-shaped support 32, connected with and supported by the main frame of the apparatus in a manner hereinafter to be described. The propeller is actuated from the main shaft of the machine by a belt 33, preferably, of steel wire, running over a pulley 34, mounted upon the propeller shaft 31, and a pulley 35, fixedly attached to the tubular shaft 15, said steel wire being guided by idle pulleys 36, 36, rotatably mounted upon a spindle 37, attached to a supporting rod 38, which is connected by a universal joint 39 with the cross-shaped member 32. The inner end of the supporting rod 38 carries fixedly attached thereto a sleeve 40, slidably arranged upon a rod 41, which is attached to the support 27. The rod 41 and the sleeve 40 are provided with flanges 42 and 43, respectively, against which bears a spring 44, forcing the supporting rod 38 and the parts carried thereby outwardly, keeping thus the belt 33 taut. The rod 41 is provided near to the support 27 with a spherical member 45, either secured to said rod or, preferably, made integral therewith. Upon this member is articulated by a universal joint a cross-shaped body 48, the legs of which are connected with the corresponding legs of the cross-shaped member 32 by means of guide wires 49, 49, for holding the screw propeller 30 in the desired positions.

The operation of the device is as follows: In starting the glide of the machine, the blades 19, 19, which operate to levitate the device are set by means of the operating lever 25 at an angle to the plane of the poiser-wing 17 and then the motor is put in operation, which gives the desired speed to the poiser-wing, the blades 19 and the screw propeller 30, the shaft 31 of which is arranged, when starting, in a horizontal plane. The operation of the blades 19 and the propeller 30 cause at once an air disturbance of such character that the atmospheric pressure is changed so as to create a partial vacuum above the machine, and by reason of the expansive force of the atmosphere below the poiser-wing, the machine is floated with the parachute-shaped poiser-wing gyrating, whereby the vessel is kept in an upright position. It is, of course, obvious that, in order to prevent the rotation of the main frame of the apparatus with the main shaft thereof, the propeller 30 may be set so as to produce a current of air, which counteracts to some extent that generated by the propeller blades 19. When the desired height or level it attained, the blades 19 in the poiser-wing are set so as to close the openings 18 in the same. The frame is, however, left to rotate, increasing thereby the stability of the machine, and serving at the same time as a fly-wheel of the motor 12.

Obviously the poiser-wing serves also as a parachute, its action being governed by the blades 19 and openings 18; more particularly with fully closed openings the frame acts in the manner of an ordinary parachute, while with free or partially free openings the parachute action thereof is decreased.

The machine is propelled and guided in its movement by the propeller 30, the movement being entirely dependent upon the angle at which the propeller shaft 31 is arranged relative to its pivot. If the shaft 31 is arranged in a horizontal plane, the aeroplane will move horizontally, its direction depending upon the angle at which the plane of the propeller 30 is arranged relative to the supporting shaft 38. The propeller may, of course, be set in the horizontal plane by shifting the horizontal legs of the cross-shaped member 48 in the horizontal plane. When the propeller shaft 31 is set in the vertical plane at an angle to the supporting shaft 38 by shifting the vertical legs of the cross-shaped member in the vertical plane, the aeroplane will proceed in a plane inclined to the horizontal, rise or descend, depending upon the position of the propeller shaft 31 in the vertical plane.

In the drawings, a general arrangement of the aeroplane, constructed in accordance with the invention, has been illustrated, but no particular proportions or sizes of the invention have been specified, since the said proportions and size must depend upon the particular requirements. Furthermore specific arrangements for adjusting the blades in the poiser-wing and for varying the position of the propeller 30, for guiding the

machine in the different planes, have been described, but it will be apparent to those skilled in the art that numerous other devices can be employed to attain the desired adjusting effect without departing from the spirit and scope of the invention.

It should be stated that the essential features of the invention lie in the peculiar formation of the poiser- or glider-wing in connection with the lifting blades arranged in the same, in the manner in which the aeroplane is guided in its movement, that is in the provision of an ordinary screw propeller adapted to vary its position in all directions around a point, and in the parachute action of the poiser.

What I claim is:

1. In an aeroplane the combination of a frame, a gyroscopic poiser-wing including an extended and substantially undistortable membrane rotating in a general plane of its extent, the continuity of such membrane being interrupted by a radially extending opening, a levitator-blade extending adjacent such opening and movable to close such opening, means for moving said levitator-blade, and means for rotating said poiser-wing, substantially as described.

2. In an aeroplane the combination of a main frame, an outwardly extensible arm carried by said frame, a supplemental frame pivoted on said arm, a propeller shaft rotatable in and carried solely by said supplemental frame, a motor carried in the said main frame, and flexible operative connections between said motor and the propeller shaft carried in said supplemental frame, substantially as described.

3. In an aeroplane, the combination of a frame, a motor carried in said frame having its power shaft extending in a vertical direction, a gyroscopic poiser-wing secured directly to said power shaft and including an extended and substantially undistortable membrane rotating in a general plane of its extent, the continuity of such membrane being interrupted by a radially extending opening, a levitator blade extending adjacent such opening and movable to close such opening, means for moving said levitator blade, and a relatively heavy rim forming the periphery of said membrane and serving as a fly-wheel for said motor and a gyroscopic balance for said aeroplane.

Signed at Pittsburgh, in the county of Allegheny, and State of Pennsylvania, this 25th day of September, A. D. 1909.

JOSEPH E. BISSELL.

Witnesses:
W. D. KING,
W. C. COOK,
WALTER NORRIS.