J. B. STAGE.

AIRSHIP.

APPLICATION FILED NOV. 10, 1916.

1,233,820.

Patented July 17, 1917.

2 SHEETS—SHEET 1.

Fig. 1,

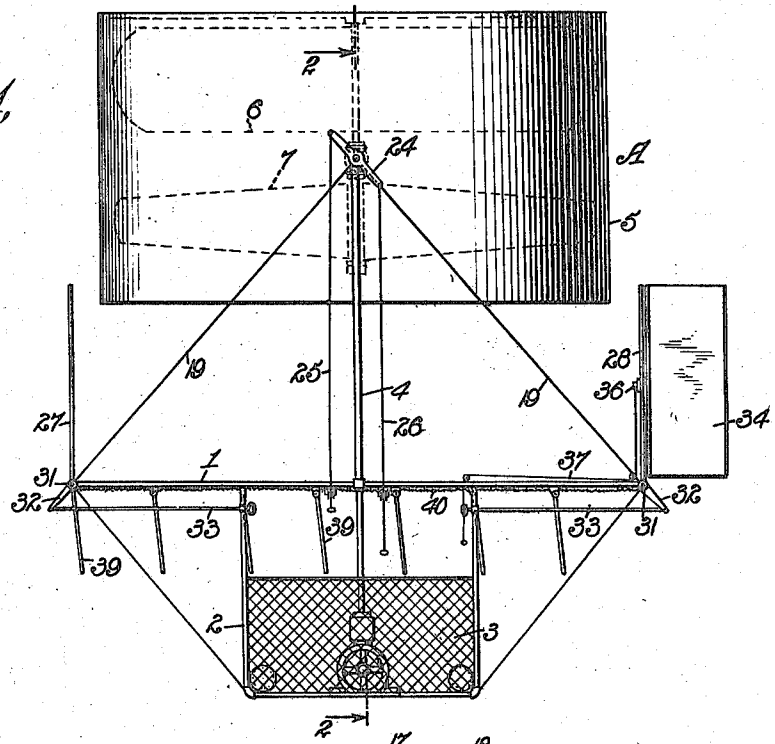
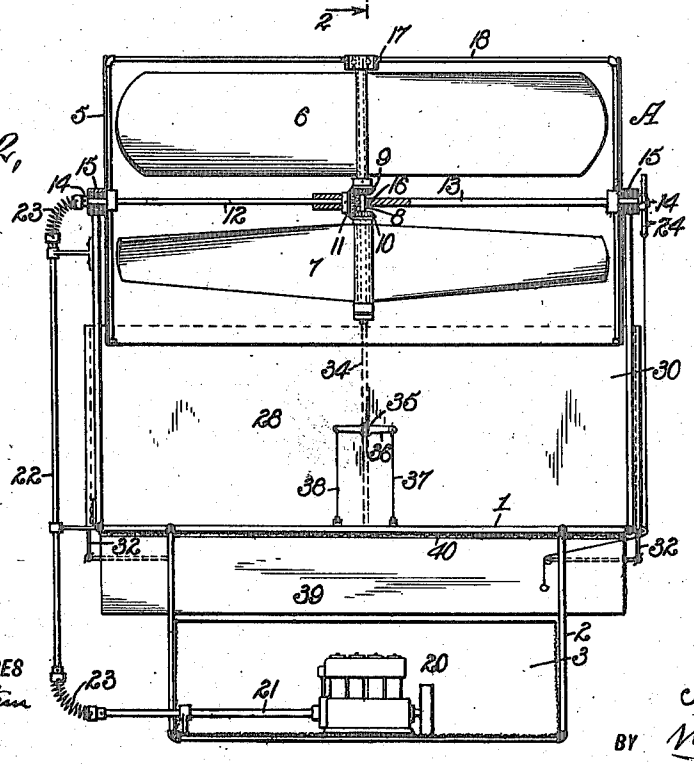


Fig. 2,



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 3.

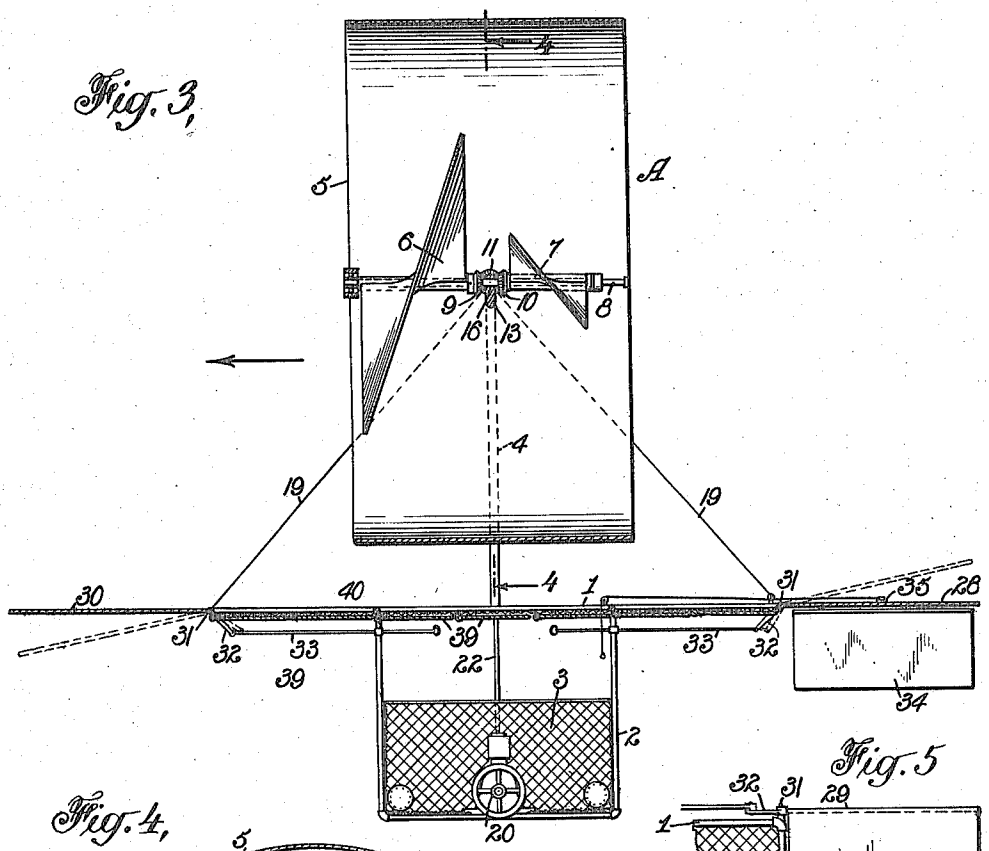


Fig. 4.

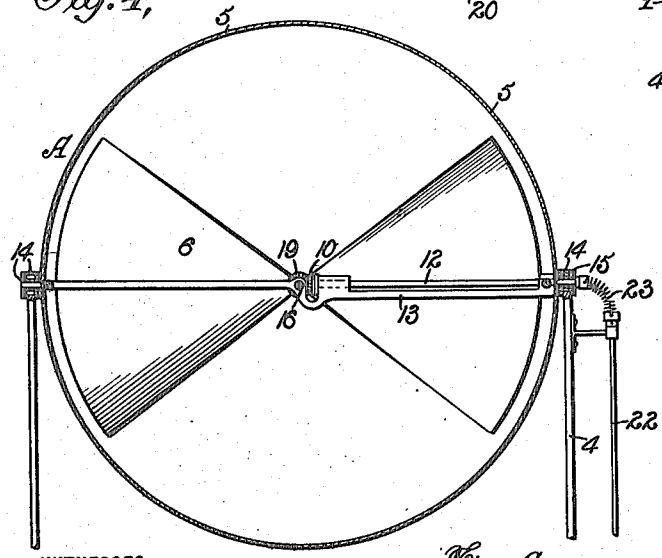


Fig. 5

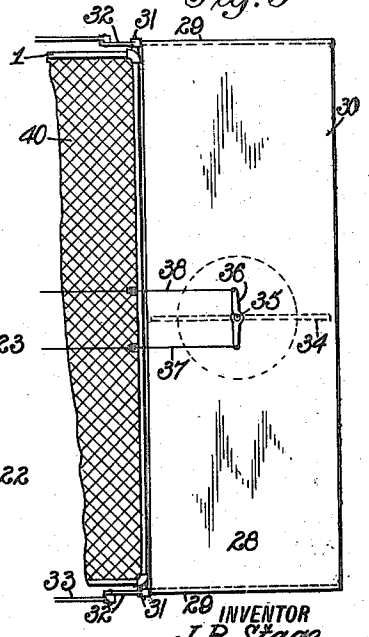
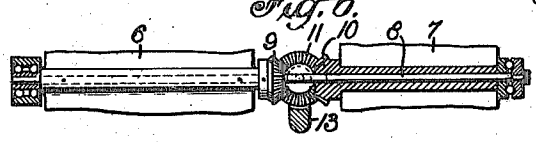


Fig. 6.



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UNITED STATES PATENT OFFICE.

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AIRSHIP.

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To all whom it may concern:

Be it known that I, JOSEPH B. STAGE, a citizen of the United States, and a resident of Bold Spring, in the county of Humphreys and State of Tennessee, have invented a new and Improved Airship, of which the following is a full, clear, and exact description.

This invention relates to aeronautics, and deals particularly with crafts of the heavier-than-air type.

The invention has for its general objects to improve the construction and operation of machines of this character so as to be reliable and efficient in use, easily controlled, and so designed as to provide the maximum stability while being driven or while coasting or descending without power.

A more specific object of the invention is the provision of a novel propelling mechanism which is adjustable to enable an ascent in a vertical line, and then adjustable to permit of flight in a horizontal line, there being a novel arrangement of planes used in combination with such propelling means whereby the planes are operative during horizontal flight and inoperative during ascension or descension.

With such objects in view, and others which will appear as the description proceeds, the invention comprises various novel features of construction and arrangement of parts which will be set forth with particularity in the following description and claims appended hereto.

In the accompanying drawings, which illustrate one embodiment of the invention and wherein similar characters of reference indicate corresponding parts in all the views,

Figure 1 is a side view of the machine with the parts adjusted for vertical flight;

Fig. 2 is a vertical section on the line 2—2, Fig. 1;

Fig. 3 is a vertical longitudinal section with the propelling means adjusted for horizontal flight;

Fig. 4 is a transverse section on the line 4—4, Fig. 3;

Fig. 5 is a plan view of the rear plane and rudder; and

Fig. 6 is a detail sectional view of the gearing between the two propellers.

Referring to the drawing, 1 designates a horizontal frame made of tubing or other light material and hanging therefrom is a basket frame 2 which carries a basket 3 preferably of netting so as to reduce air resistance. Rising from the sides of the frame 1 are standards 4 on which is mounted the propelling mechanism A.

This propelling mechanism A comprises a hood or cylinder 5 open at opposite ends, and mounted therein are two parallel propellers 6 and 7 journaled on a common shaft 8. The propeller 6 is pinned to the shaft while the propeller 7 is free to rotate thereon, the hubs of the propellers being provided with bevel gears 9 and 10 respectively, which mesh with a driving bevel gear 11. This bevel gear 11 is carried by a horizontal shaft 12 journaled in a bracket 13 extending diametrically of the hood 5. The hood has journals 14 which rotate in bearings 15 on the upper ends of the standards 4, and the shaft 12 extends through one of these journals so that the said shaft can be connected with a suitable motor. The shaft 8 is journaled in bearings 16 and 17 on the brackets 13 and 18. The propellers rotate in opposite directions so that there is no tendency for the machine to turn as a unit when an ascent is made. By enshrouding the propellers by a hood 5 they act more effectively on the air to increase the propelling efficiency.

Between the main frame 1 and upper ends of the standards 4 are guy wires or braces 19 for holding the propelling mechanism more or less rigidly with respect to the frame of the machine. In the present instance a motor 20 is shown in the basket 3, and the motor shaft 21 is connected through a vertical shaft 22 with the propelling driving shaft 12. Spring driving couplings 23 are interposed between the said shafts, such couplings serving to permit of limited relative movement under stress and strain of the motor and propelling mechanism without any danger of the moving parts binding.

During ascension of the machine the propellers and also the hood 5 are arranged with their axes vertical, as shown in Fig. 1, but during horizontal flight their axes are horizontal, as shown in Fig. 3. This adjustment of the propelling mechanism may be accomplished in any suitable manner, as, for instance, by a double crank lever 24 fastened

to the hood 5, as shown in Fig. 1, and extending downwardly from this lever are operating elements 25 and 26. By pulling downwardly on the element 25 the propelling mechanism is shifted from the position shown in Fig. 1 to that shown in Fig. 3, and by pulling downwardly on the element 26 the propelling mechanism is shifted to the position shown in Fig. 1 from that shown in Fig. 3.

At the front and rear ends of the main frame 1 are planes 27 and 28 respectively which swing on horizontal axes 31 at the inner edges of the planes. Each of these planes is composed of a pair of side arms 29 which support a strip of canvas 30 forming the sustaining surface of the plane. These arms are hinged at 31 to the main frame and each has a crank arm 32 connected with an operating rod 33. By operating these rods simultaneously the plane as a unit can be shifted from a vertical position, as shown in Fig. 1 to a horizontal position, as shown in Fig. 3, and when in this latter position either corner of the plane may be warped by operating the associated rod 33. On the rear plane 28 is a vertical steering rudder 34 pivoted at 35, and the rudder has a lever 36 connected with operating elements 37 and 38, which, like the elements 25 and 26 and rods 33, are accessible from the basket so as to be readily controlled. Between the main vanes 27 and 28 are auxiliary vanes 39 each pivoted at its forward or upper edge on a horizontal axis, so that the vanes can hang in a vertical position, as when ascending, or they can assume a horizontal position so as to constitute a plane between the front and rear planes, as in horizontal flight, as shown in Fig. 3. The shifting of these auxiliary planes or vanes 39 takes places automatically according to the motion of the machine. The planes 39 are substantially as wide as the main planes and coöperate therewith to provide a large area of sustaining surface. The front and rear planes can be inclined to any degree for making a gradual ascent or descent. It will be understood that suitable means will be employed for holding the operating elements in adjusted position, but as such holding means form no part of the present invention they need not be illustrated or described. The auxiliary vanes are arrested in their upward movement by bearing against a horizontal net 40 carried by the main frame.

From the foregoing description taken in connection with the accompanying drawings, the advantages of the construction and method of operation will be readily understood by those skilled in the art to which the invention appertains, and while I have described the principle of operation, together with the machine which I now consider to be the best embodiment thereof, I desire to have it understood that the machine shown is merely illustrative and that such changes may be made when desired as fall within the scope of the appended claims.

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

1. An air ship comprising a frame, a propelling mechanism mounted thereon and adjustable for producing horizontal or vertical flight, and sustaining planes mounted on the frame at a point under the said mechanism and adjustable to vertical or horizontal position.

2. An airship comprising a frame, a propelling mechanism mounted thereon and adjustable for producing horizontal or vertical flight, sustaining main planes mounted on the frame and adjustable to vertical or horizontal position, and auxiliary planes pivoted on the frame to swing automatically to vertical or horizontal position, said propelling mechanism being disposed above both main and auxiliary planes.

3. An airship comprising a frame, a propelling mechanism mounted thereon and adjustable for producing horizontal or vertical flight, sustaining main planes mounted on the frame and adjustable to vertical or horizontal position, and auxiliary planes pivoted on the frame to swing automatically to vertical or horizontal position, said main planes being at the front and rear and the auxiliary planes being disposed between the main planes and in substantially the same horizontal plane therewith.

4. In an airship, a propelling mechanism comprising a plurality of oppositely rotating propellers, and a hood surrounding the propellers and stationary with respect thereto, in combination with sustaining planes located below the propelling mechanism.

5. In an airship, a propelling mechanism comprising a plurality of oppositely rotating propellers, and a hood surrounding the propellers, the hood and propellers having their axes coincident, and means supporting the hood and propellers to turn on a horizontal axis, whereby the propellers may be employed for vertical or horizontal flight, in combination with sustaining planes located below the propelling mechanism.

6. An airship comprising a frame, a propelling mechanism mounted thereon and adjustable for lifting or horizontal propulsion, front and rear planes mounted to swing on horizontal axes, each plane comprising a pair of side arms and a strip of flexible material whereby the plane is warped by the swing of either arm, and whereby the plane can be moved from vertical to horizontal position by the simultaneous movement of the arms, and means for actuating the arms.

7. An airship comprising a frame, a propelling mechanism mounted thereon and ad-

justable for lifting or horizontal propulsion, front and rear planes mounted to swing on horizontal axes, each plane comprising a pair of side arms and a strip of flexible material whereby the plane is warped by the swing of either arm, and whereby the plane can be moved from vertical to horizontal position by the simultaneous movement of the arms, means for actuating the arms, and pivoted planes intermediate the front and rear planes and automatically movable to vertical or horizontal position, according to the direction of movement of the airship.

JOSEPH B. STAGE.