June 9, 1931. M. M. EGAN 1,809,680

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Filed Feb. 17, 1930 4 Sheets-Sheet 1

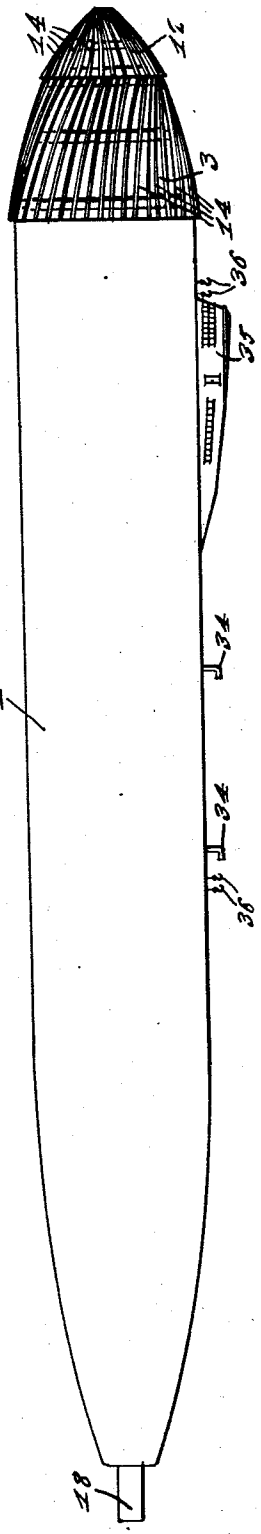


Fig. 1.

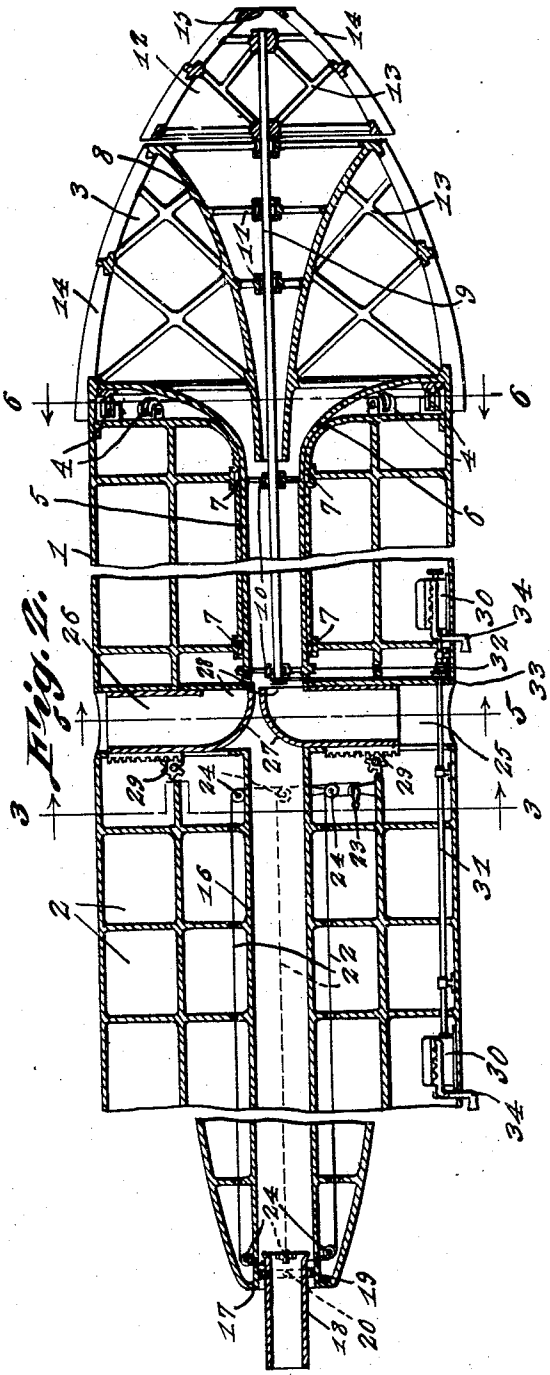


Fig. 2.

M. M. Egan, INVENTOR

BY Victor J. Evans

ATTORNEY

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Fig. 4.

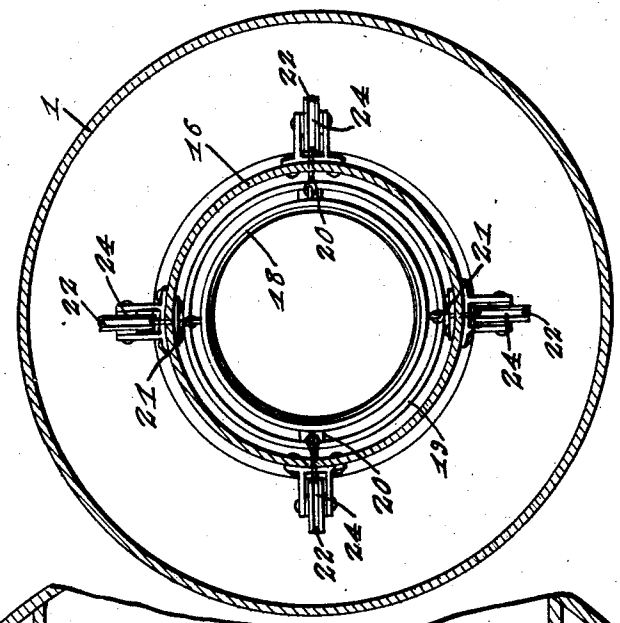
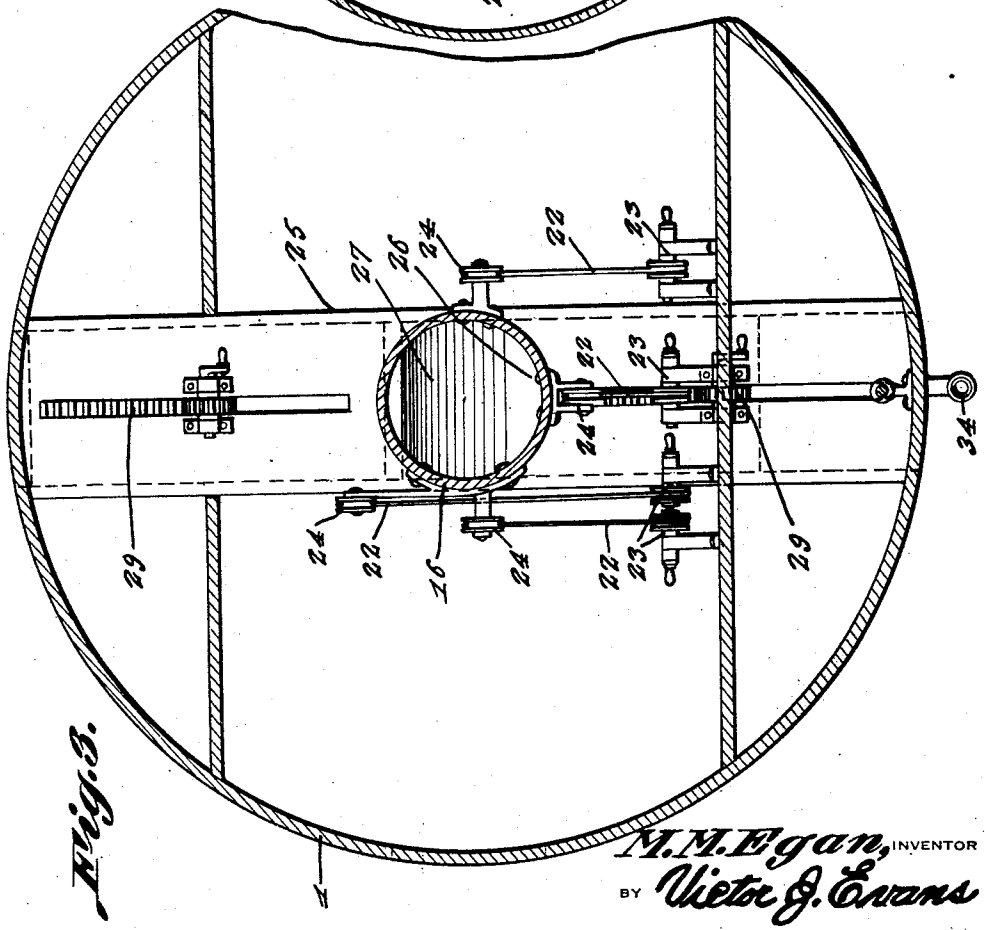


Fig. 3.



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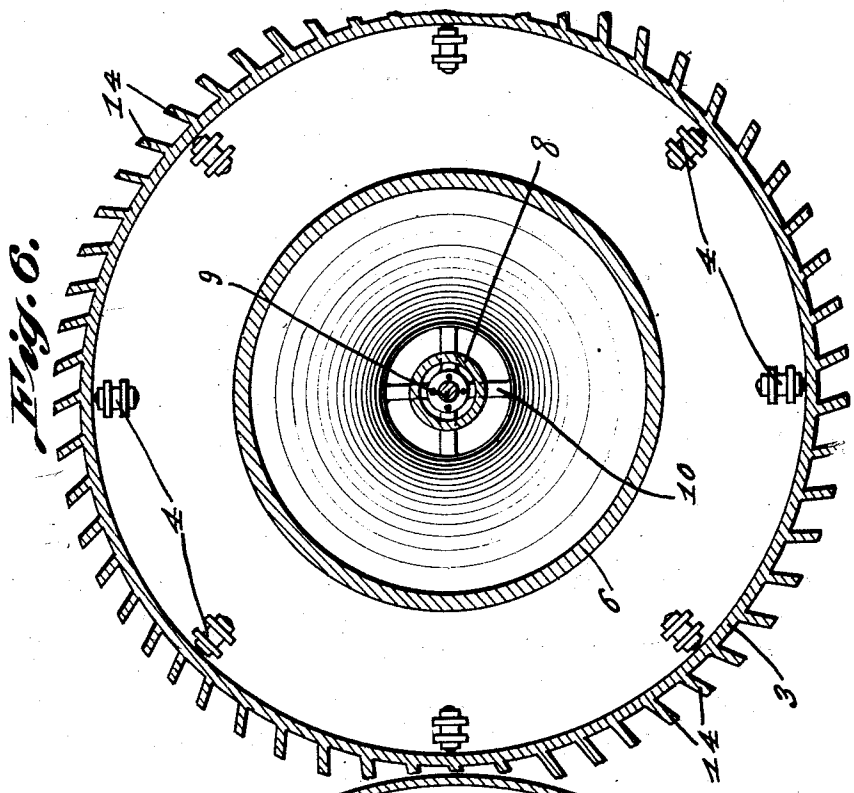


Fig. 6.

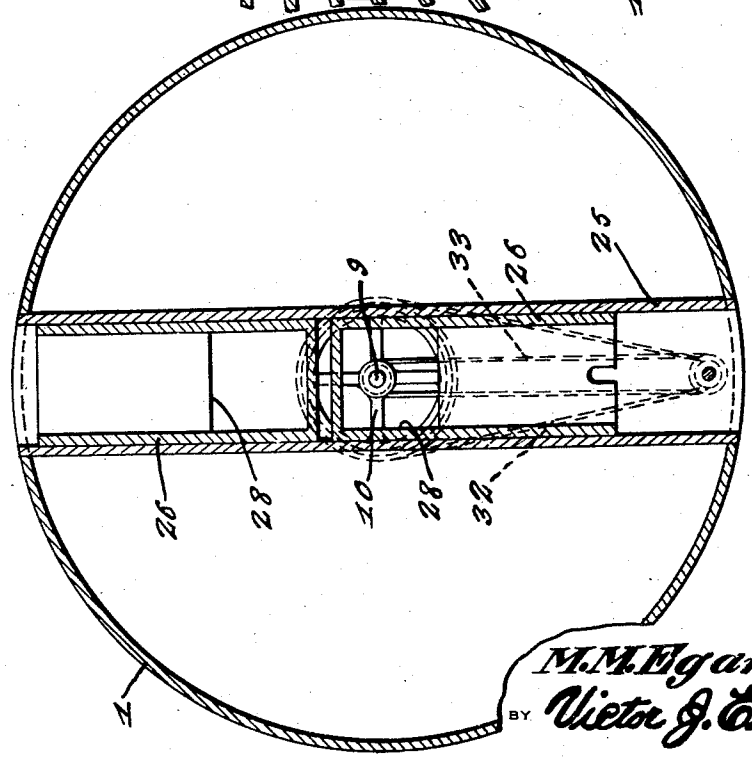


Fig. 5.

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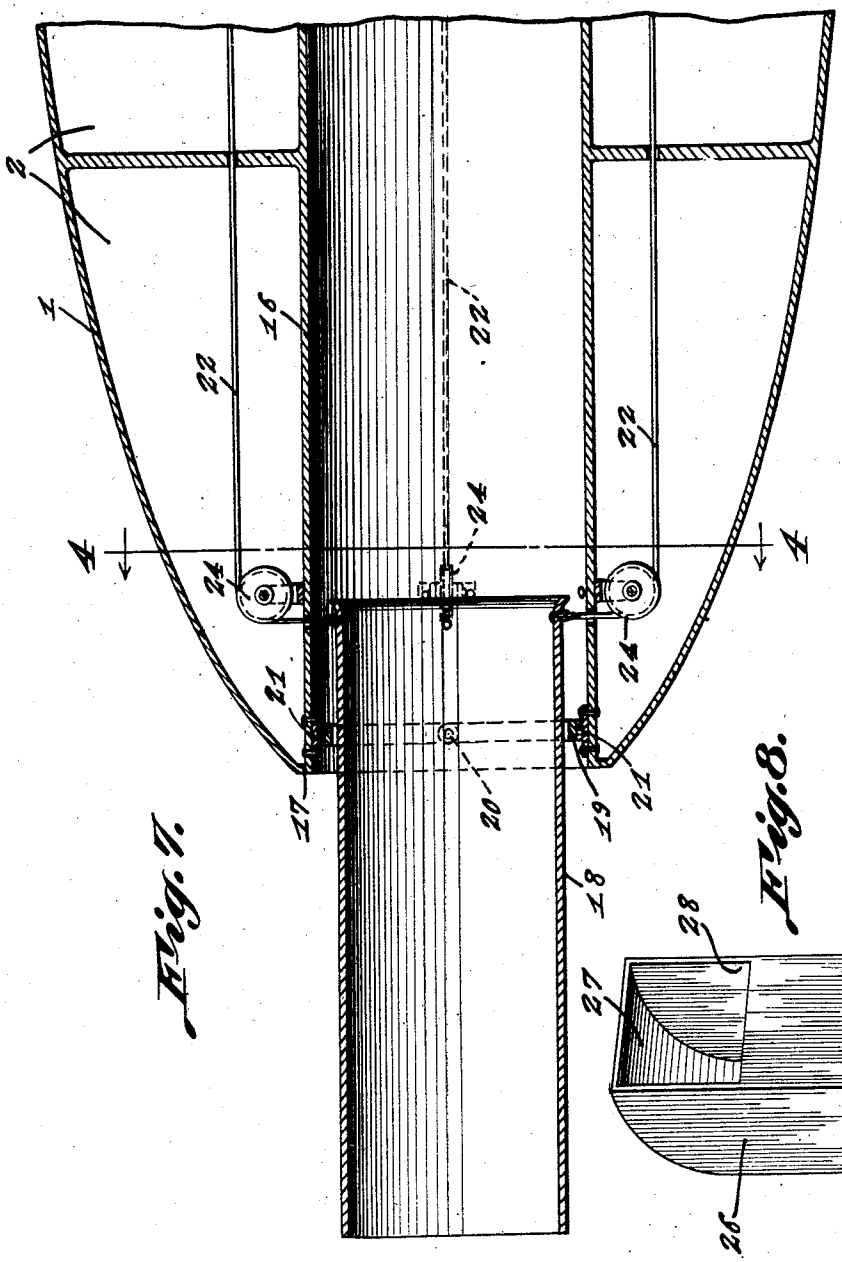


Fig. 7.

Fig. 8.

M. M. Egan, INVENTOR

BY Victor J. Evans

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Patented June 9, 1931

1,809,680

UNITED STATES PATENT OFFICE

MATHEW M. EGAN, OF FORT WORTH, TEXAS

AIRSHIP

Application filed February 17, 1930. Serial No. 429,172.

This invention relates to a dirigible, the general object of the invention being to provide a pair of revolving propellers at the nose of the ship, the vanes or blades of which are so formed as to force air into a tube extending longitudinally through the ship and terminating at the tail thereof, with means whereby the air flowing through the tube is used to steer the ship and to raise and lower the same, said air also acting to propel the craft forwardly as it escapes from the rear end of the tube.

Another object of the invention is to provide power driven means for rotating the propellers in opposite directions and to so form the propellers that air can enter the nose of the ship and flow into the tube from the center of the front propeller.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts, to be hereinafter fully described, illustrated in the accompanying drawings and specifically pointed out in the appended claims.

In describing the invention in detail, reference will be had to the accompanying drawings wherein like characters denote like or corresponding parts throughout the several views, and in which:—

Figure 1 is an elevation of the improved ship.

Figure 2 is a vertical longitudinal sectional view thereof.

Figure 3 is a section on line 3—3 of Figure 2.

Figure 4 is a section on line 4—4 of Figure 2.

Figure 5 is a section on line 5—5 of Figure 2.

Figure 6 is a section on line 6—6 of Figure 2.

Figure 7 is a longitudinal sectional view through the rear part of the ship.

Figure 8 is a view of one of the valve members.

In these drawings, the numeral 1 indicates the body of the ship which is preferably of cylindrical form with its front end flat and closed with the exception of an opening at the center and its rear end tapers. This body is of the usual or any desired construction and is formed with a plurality of gas cells 2. A frusto-conical propeller 3 is rotatably mounted at the front end of the body by means of the anti-friction bearings 4 and a tube 5 is rotatably supported at the center of the forward part of the body and has a flaring front end 6 which is connected with the rear end of the propeller 3, this tube being rotatably supported in the body by means of the bearings 7. A funnel shaped tube 8 is supported in the propeller 3 with its large front end opening out through the front end of the propeller and its small end projecting into the mouth of the tube 5. A shaft 9 is rotatably supported in the tube 5 by the spiders 10 and in the tube 8 by the spiders 11 and a substantially conical propeller 12 is fastened to the front end of the shaft which projects beyond the propeller 3 so that this propeller 12 is in front of the propeller 3. Each propeller is formed of a framework 13 and the vanes or blades 14, the blades of one propeller being curved in an opposite direction from the blades of the other propeller so that the blades of both propellers will force air inwardly when the propellers are rotated in opposite directions. The rear end of the front propeller is of slightly greater diameter than the front end of the rear propeller and the rear end of the rear propeller 3 is slightly larger than the diameter of the body so that surplus air can pass from the rear ends of the propellers.

The nose of the front propeller 12 is formed with an opening 15 so that as the ship is driven forwardly, air will enter the said opening and mix with the air driven inwardly by the blades of the front propeller. The combined air currents will pass through the funnel-shaped tube 8 of the rear propeller into the tube 5 and the currents of air forced inwardly by the blades of the rear propeller will pass through the flaring mouth of the tube 5 into said tube. A stationary tube 16 is arranged at the center of the rear portion of the body with its front end arranged to receive the air from the tube 5. An opening 17 is formed at the tail of the body into which the rear end of the tube 16 projects so that

the air passing through the tubes will escape at the rear of the ship and thus act against the air through which the ship is passing to propel the ship forwardly. The air escaping from the rear ends of the two propellers will flow along the outside of the body and converge at the tail thereof, thus increasing the propelling action of the air escaping from the rear end of the tube 16.

A short tubular member 18 projects through the opening 17 and is pivoted at its forward end at two diametrical points to a ring 19, as shown at 20, and this ring is pivoted to the end of the tube 16 at two diametrical points, as shown at 21, the pivotal points 21 being at right angles to the pivotal points 20 so that the tubular member 18 can be swung to the right or left or up and down. As the air from the tube 16 escapes through the member 18, the direction of the escape of this air can be controlled by the movement of the member 18 so that the ship can be steered to the right or left or vertically by the adjustment of this member 18. This adjustment of the member 18 is secured through means of the cables 22 connected with the manually operated drums 23, the cable passing over the guiding pulleys 24.

A vertically arranged tube 25 of square shape in cross section intersects the point of junction of the tubes 5 and 16, the ends of the tube 25 opening out through the top and bottom of the body. A valve member 26 is slidably arranged in each of the top and bottom parts of the tube 25, the upper valve member having a curved lower end, as shown at 27, with an opening 28 in its forward wall at the lower end thereof so that when this valve member is moved downwardly, some of the air from the tube 5 will pass into the opening 28 and be directed upwardly by the curved wall 27 so that this air will pass through the top of the tube 25 and act on the air above the ship and thus force the ship downwardly. The upper end of the lower valve member 26 is formed similar to the lower end of the upper valve member so that when this lower member is raised, some of the air from the tube 5 will be caused to pass through the lower end of the tube 25 and thus act on the air under the ship to raise the ship. These valve members are each operated manually by means which include the ratchet means 29. Suitable means should be provided to prevent the movement of each valve member from entirely closing the central passage so that some of the air can always escape through the rear of the body no matter what position the valve members are in.

A pair of motors 30 is carried by the body and these motors are connected together by a shaft 31 in such a manner that the shaft can be driven by either motor or by both, as desired. This shaft is belted to the inner end of the tube 5, as shown at 32, and it is also belted to the inner end of the shaft 9, as shown at 33, one of the belts being crossed so that the tube 5 and the shaft 9 will be driven in opposite directions. The exhausts for the motors are shown at 34, the cabin is shown at 35 and the landing cables at 36.

From the foregoing it will be seen that the ship is propelled by a pair of oppositely rotating propellers at its nose which are so formed as to force air through a tube at the center of the ship so that the air is discharged at its tail, which also acts to propel the ship forwardly and the ship is steered by controlling the direction of escape of the air at the tail of the ship. The ship is raised or lowered by directing some of this air upwardly or downwardly at approximately the center of the ship. The front propeller will travel at a greater speed than the rear propeller on account of its reduced surface. The opening at the nose of the front propeller will engulf the dead air ahead of the propeller and cause it to pass through the central tube, thus increasing the flow of air through the tube. This will also cause a displacement of vacuum in front of the ship.

Attention is called to the fact that the stability of the craft does not depend on any outside fins or rudders as the air directed in any desired direction steers and stabilizes the craft.

It is thought from the foregoing description that the advantages and novel features of the invention will be readily apparent.

It is to be understood that changes may be made in the construction and in the combination and arrangement of the several parts, provided that such changes fall within the scope of the appended claims.

What I claim is:—

1. A dirigible comprising a body, a longitudinally arranged passage passing through the central part of the body, a pair of propellers at the front end of the body, one propeller being arranged in front of the other, means whereby the blades of the propellers will force air into the front end of the passage so that the air escaping from the rear end of the passage will act to force the ship forwardly, means at the rear end of the passage for directing the air in certain directions to guide the ship, means whereby some of the air from the passage can be directed through the top of the ship to force the ship downwardly and means whereby some of the air from the passage can be forced through the bottom of the ship to raise the ship such means comprising a vertically arranged tube passing through the body and intersecting the passage, a valve member in the lower part of the said tube which, when raised, will direct some of the air from the passage downwardly through the lower part of the ship to raise the same and a second valve member in the top part of the tube which, when low-

ered, will force some of the air from the passage upwardly through the top of the ship to cause the ship to descend.

2. A dirigible comprising a body having a centrally arranged passage therein extending from one end of the body to the other, a tube rotatably arranged in the body and forming the forward part of the passage, a frusto-conical propeller connected with the front end of the tube, a substantially conical propeller arranged in front of the first propeller, a funnel-shaped tube in the first propeller for receiving the air from the second propeller and introducing it into the front part of the tube, a shaft rotatably supported in the tubes and connected with the second propeller, said second propeller having an opening in its front end, means connected with the shaft and the first mentioned tube for rotating said parts in opposite directions, the blades of the propellers being arranged to force the air inwardly into the tubes whereby the air will pass through the passage and escape from the rear end thereof and thus act to move the ship forwardly.

3. A dirigible comprising a body having a centrally arranged passage therein extending from one end of the body to the other, a tube rotatably arranged in the body and forming the forward part of the passage, a frusto-conical propeller connected with the front end of the tube, a substantially conical propeller arranged in front of the first propeller, a funnel-shaped tube in the first propeller for receiving the air from the second propeller and introducing it into the front part of the tube, a shaft rotatably supported in the tubes and connected with the second propeller, said second propeller having an opening in its front end, means connected with the shaft and the first mentioned tube for rotating said parts in opposite directions, the blades of the propellers being arranged to force the air inwardly into the tubes whereby the air will pass through the passage and escape from the rear end thereof and thus act to move the ship forwardly, and means for controlling the movement of the ship by the air escaping from the passage.

4. A dirigible comprising a body having a centrally arranged passage therein extending from one end of the body to the other, a tube rotatably arranged in the body and forming the forward part of the passage, a frusto-conical propeller connected with the front end of the tube, a substantially conical propeller arranged in front of the first propeller, a funnel-shaped tube in the first propeller for receiving the air from the second propeller and introducing it into the front part of the tube, a shaft rotatably supported in the tubes and connected with the second propeller, said second propeller having an opening in its front end, means connected with the shaft and the first mentioned tube for rotating said parts in opposite directions, the blades of the propellers being arranged to force the air inwardly into the tubes whereby the air will pass through the passage and escape from the rear end thereof and thus act to move the ship forwardly, means for controlling the movement of the ship by the air escaping from the passage, such means comprising a tubular member for receiving the air from the rear end of the passage and manually operated means for swinging said tubular member either to the right or left or up or down.

5. A dirigible comprising a body having a centrally arranged passage therein extending from one end of the body to the other, a tube rotatably arranged in the body and forming the forward part of the passage, a frusto-conical propeller connected with the front end of the tube, a substantially conical propeller arranged in front of the first propeller, a funnel-shaped tube in the first propeller for receiving the air from the second propeller and introducing it into the front part of the tube, a shaft rotatably supported in the tubes and connected with the second propeller, said second propeller having an opening in its front end, means connected with the shaft and the first mentioned tube for rotating said parts in opposite directions, the blades of the propellers being arranged to force the air inwardly into the tubes whereby the air will pass through the passage and escape from the rear end thereof and thus act to move the ship forwardly, means for controlling the movement of the ship by the air escaping from the passage, such means comprising a tubular member for receiving the air from the rear end of the passage, manually operated means for swinging said tubular member either to the right or left or up or down, a vertically arranged tube passing through the body of the ship and intersecting the passage, a valve member in the lower part of said tube which, when raised, will direct some of the air from the passage downwardly through the lower part of the ship to raise the ship, a second valve member in the top part of the said tube which, when lowered, will force some of the air from the passage upwardly through the top of the ship to cause the ship to descend and manually operated means for adjusting each valve member.

In testimony whereof I affix my signature.

MATHEW M. EGAN.