May 1, 1928. 1,667,987

M. A. RICHARDS

MEANS FOR AERIAL NAVIGATION

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Fig. 1.

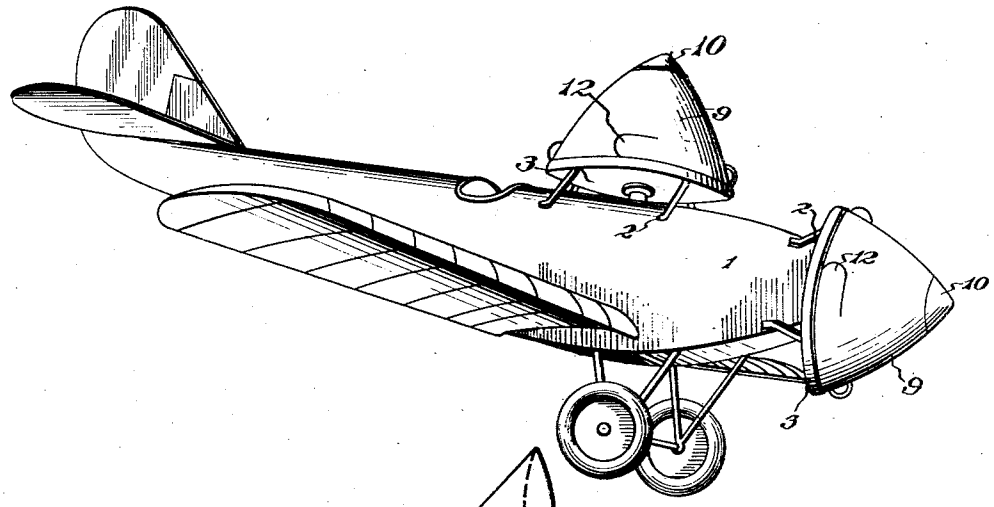
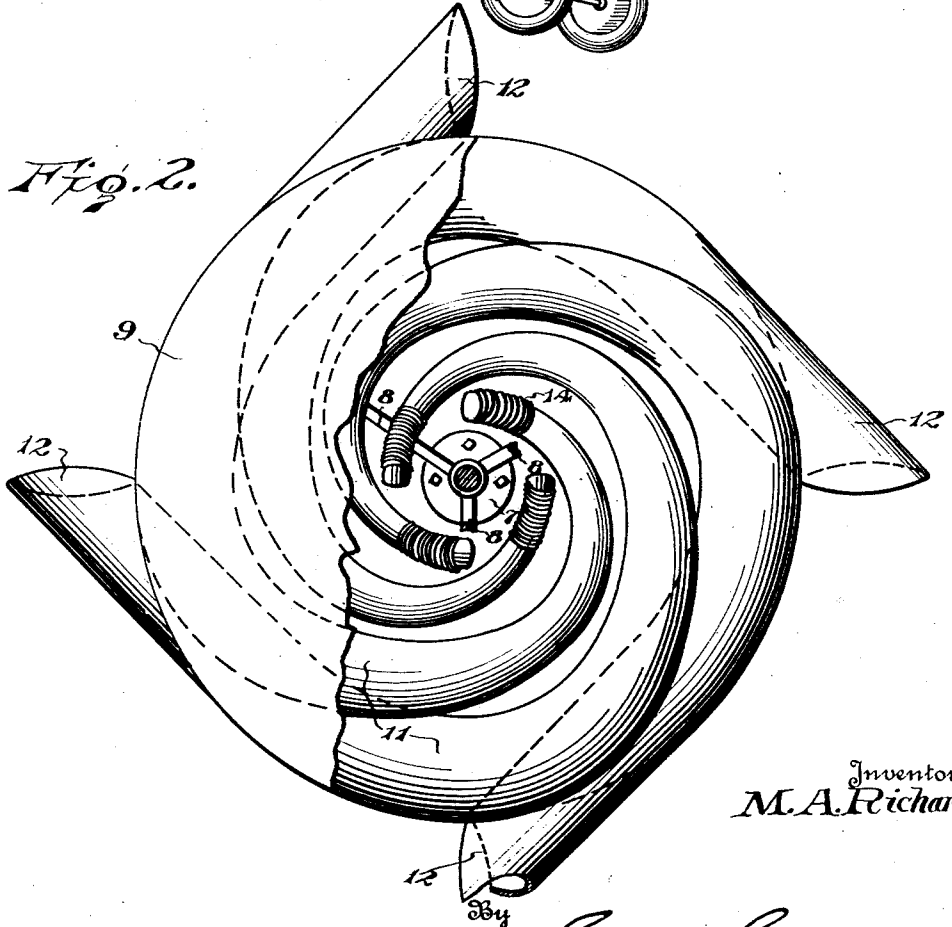


Fig. 2.



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Fig. 3.

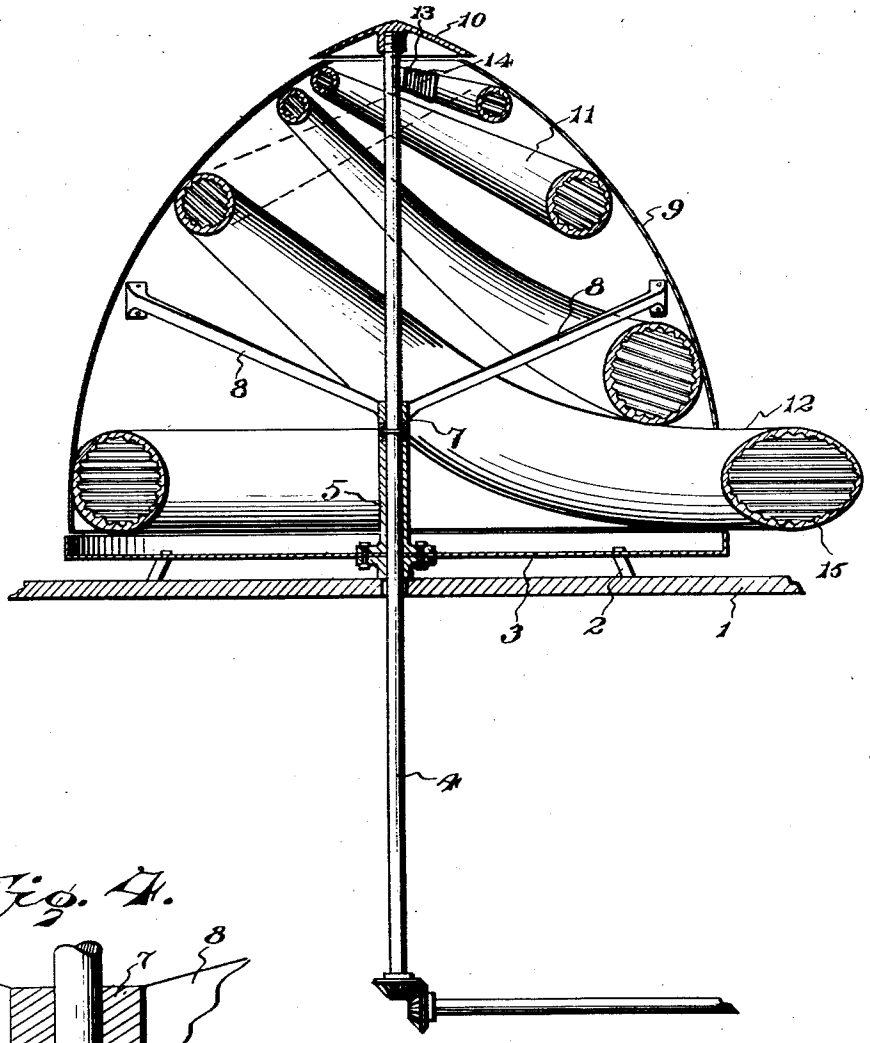
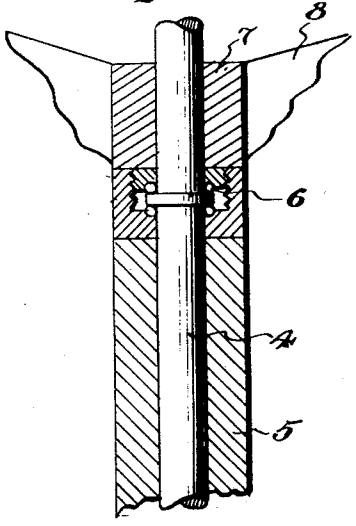


Fig. 4.



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UNITED STATES PATENT OFFICE.

MARCUS A. RICHARDS, OF ZANESVILLE, OHIO.

MEANS FOR AERIAL NAVIGATION.

Application filed March 1, 1927. Serial No. 171,813.

My invention relates to aerial navigation and seeks to provide a very simple propelling mechanism whereby an aeroplane or dirigible airship may be effectually driven and may be caused to rise from the ground on a vertical line. The invention provides means whereby currents of air will be created to whirl above or at the end of the body of the aeroplane or airship and act to produce a sufficient suction in the vicinity of the vessel to lift the same and drive it forward. One embodiment of the invention is illustrated in the accompanying drawings and will be hereinafter fully described, the novel features being particularly pointed out in the appended claims.

In the drawings:

Figure 1 is a perspective view of an aeroplane having my invention applied thereto;

Fig. 2 is an enlarged plan view, partly broken away, of the propelling device;

Fig. 3 is a vertical section taken centrally of Fig. 2, and

Fig. 4 is an enlarged detail section.

In Fig. 1, I have shown the invention applied to an aeroplane, but it is to be understood that it may be applied to dirigible ships and that the construction of the vessel to which the invention is applied is immaterial. In carrying out the invention, I secure to the fuselage 1 a plurality of brackets or other supporting devices 2, and upon these brackets is carried a base member or platform 3. This base member or platform is of circular formation and the driving shaft 4 passes centrally through the same. I have illustrated the invention embodied in a vertically disposed propeller to effect ascent of the machine and also in a horizontally disposed mechanism at the front end of the fuselage to effect propulsion. The shaft 4 may be actuated by any convenient motor and passes through a bearing sleeve 5 secured to the platform 3, as shown clearly in Fig. 3. At the upper end of the sleeve 5 is an anti-friction bearing 6 which permits the shaft to rotate at high speed without excessive friction and above this bearing a collar or hub 7 is secured to the shaft, the bearing being so arranged as to prevent relative endwise movement of the shaft. From the hub or collar 7, arms 8 fixed thereto radiate in an upward and outward direction, and these arms carry a conoidal shell 9 of any light but strong and durable material. The shell 9 is open at its bottom, which is substantially equal in diameter to the platform 3, and at its top is also open, the shaft extending beyond the top or forward end of the shell and carrying a conoidal cap 10 whereby the entrance of rain or other elements into the shell will be prevented. Disposed within the shell and secured to and following the wall of the same are a plurality of helically spiral tubes 11 which diminish gradually in diameter from the lower ends to their upper ends. The lower larger ends of these tubes extend through the side of the shell substantially tangentially thereto, as shown at 12, and the under side of the projecting larger end of each tube is set somewhat backward from the upper side thereof, as will be understood upon reference to Fig. 2. The inner or upper smaller ends of the several tubes are turned slightly downwardly, as indicated at 13 in Fig. 3, and these ends of the tubes are wrapped with piano wire or similar material, as indicated at 14, to prevent splitting of the tubes. The inner surfaces of the tubes are constructed with longitudinal grooves 15 so that the air flowing through the tubes will be caused to flow axially without rotation about the axes of the tubes and, consequently, the formation of eddies within the tubes will be prevented.

In the operation of the device, the shaft 4 is driven at a high speed in such direction that the lower larger ends of the tubes will move forwardly against the surrounding atmosphere and will, consequently, cause the air immediately adjacent the tubes to flow into the same. Inasmuch as the diameter of the tubes decreases toward the inner upper ends thereof, the air taken into the tubes will attain great velocity as it reaches the upper ends of the several tubes and will emerge therefrom with pronounced force creating a lifting force or a propelling force of great power immediately under the cap. The circulation of air through the tubes will have the effect of a natural tornado and will effectually lift or propel the ship and support it in flight without requiring a great spread of wing or the use of a large number of supplemental propellers, thus permitting the entire extent of a dirigible ship to be utilized for supporting a cabin. It will be understood that the action of the device is to lift the machine or to propel it accordingly as the force is exerted above the

machine or at the end of the same, and it will, of course, be understood that the motor will be provided with suitable clutch arrangements whereby either the lifting propeller or the driving propeller may be actuated accordingly as the machine is to rise or to move forward, and, if desired, both propellers may be simultaneously actuated. By having the upper edge of the inlet of each tube overhang the lower edge thereof, the entering air is efficiently caused to enter the tube in an axial direction rather than upwardly across the diameter of the tube and this is desirable inasmuch as the desired circulation or movement of the air is thereby more quickly attained. Moreover, this construction causes the entering air to exert an upward rather than a downward pressure on the walls of the tubes while the air not entering the tubes slides over the curved top surface of the projecting ends. The effect of the concentration of the several streams of air at the restricted outlet beneath the cap is to create a pressure against the cap in addition to the upward pressure in the tubes and also to establish a flow under the lower edge of the shell and upwardly through the shell which aids in sustaining the machine.

The device is built throughout of the lightest material having the strength necessary to successfully withstand the strains and stresses to which it is subjected in operation.

Having thus described the invention, I claim:

1. Means for operating aerial vessels comprising a conoidal shell, a cap secured over the apex of the shell in spaced relation thereto, a plurality of helical tubes disposed within the shell and diminishing in diameter gradually from their intake ends to their outlet ends, the intake ends of the tubes projecting from the lower end of the shell and their outlet ends being directed toward the bottom of the cap, both ends of the tubes being open and the inner surfaces of the tubes having longitudinal corrugations, and means for rotating the shell and the tubes.

2. Means for operating aerial vessels comprising a conoidal shell, a cap secured over the apex of the shell and spaced therefrom, a plurality of helical tubes disposed within the shell with their lower ends projecting from the shell and their upper ends directed toward the bottom of the cap, the tubes diminishing in diameter gradually from their lower ends to their upper ends, a restraining reenforcing covering upon each tube at the upper smaller end of the same, and means for rotating the shell and the tubes.

3. Means for operating aerial vessels comprising a conoidal shell, a cap secured over the apex of the shell and spaced therefrom, a plurality of helical tubes secured in the shell with their lower ends projecting from the shell and their upper ends disposed adjacent the top of the shell and directed toward the bottom of the cap, the tubes diminishing in diameter gradually from their lower ends to the upper ends and the lower ends of the tubes having their upper edges overhanging their lower edges, and means for rotating the shell and the tubes.

4. Means for operating an aerial vessel comprising a conoidal shell, a cap over the apex of the shell and in spaced relation thereto, a plurality of helical tubes secured on the inner wall of the shell with their intake ends projecting laterally from the shell at the base thereof and their outlet ends arranged adjacent the apex of the shell and the cap, and means for rotating the shell and the tubes whereby the tubes will be caused to take up air currents at their intake ends and discharge the same forcibly at their outlet ends against the lower surface of the cap.

In testimony whereof I affix my signature.

MARCUS A. RICHARDS. [L. S.]