June 5, 1934. W. R. MOBLEY 1,961,237

PROPULSION MEANS

Filed April 24, 1931

Fig. 1.

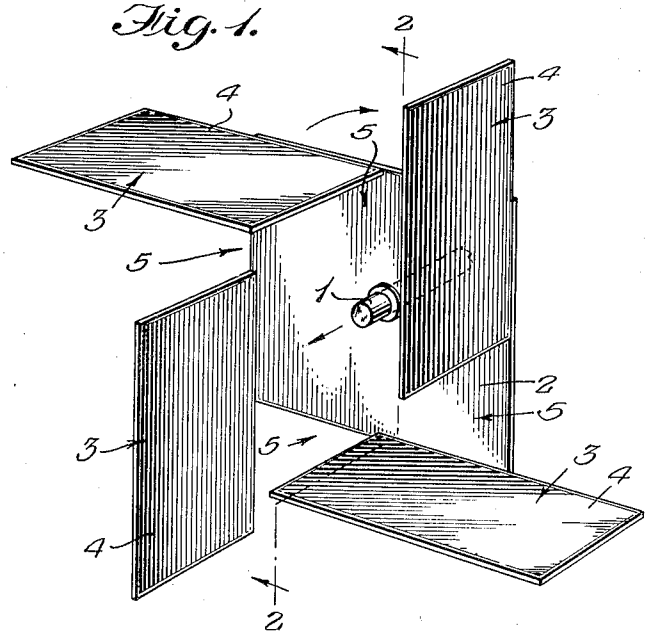
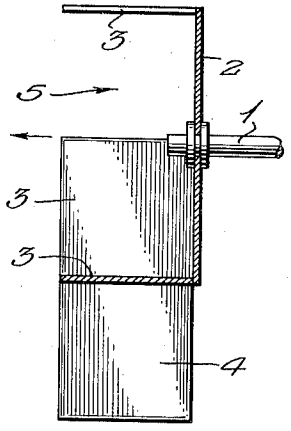


Fig. 2.



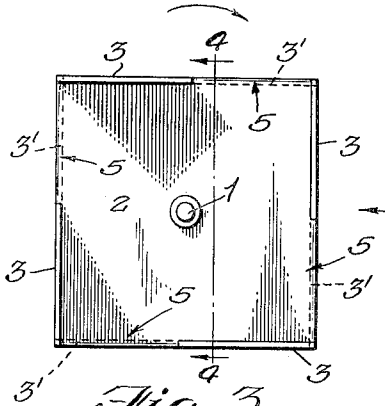


Fig. 3.

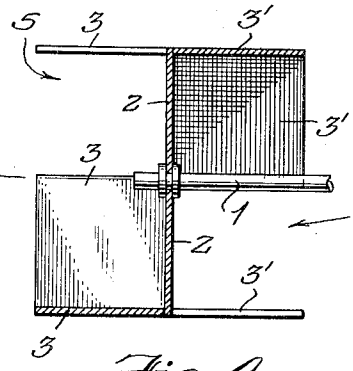


Fig. 4.

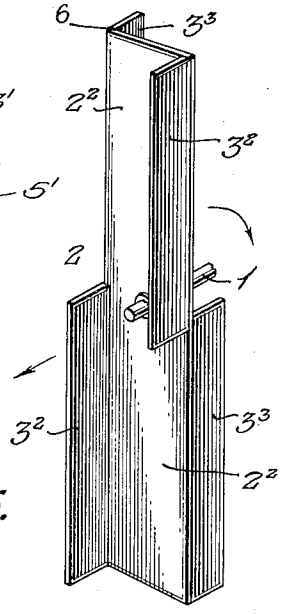


Fig. 5.

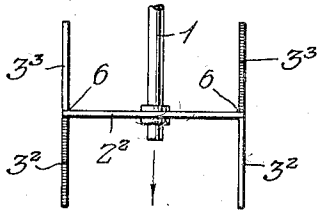


Fig. 6.

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PROPULSION MEANS

William R. Mobley, Miami, Fla.

Application April 24, 1931, Serial No. 532,558

11 Claims. (Cl. 170—135)

The object of my invention is to act on the air by new or improved means, in the structure of the propeller, so as to obtain more powerful reaction and propelling force therefrom for the driving of air, land or water vehicles.

For the purpose of illustration and to make the invention understood I have shown in the accompanying drawing means for carrying it into effect, but such means may be varied considerably in arrangement, shapes and proportions of parts without departing from the spirit of the invention. Details of bearings and vehicle are omitted as not necessary to an explanation of the invention.

In said drawing:

Fig. 1 shows a perspective view of a propeller embodying the invention in a preferred form.

Fig. 2 is a vertical section of the same.

Fig. 3 is a front view of a modification.

Fig. 4 is a section of the same on line IV—IV of Fig. 3.

Fig. 5 is a perspective view of another modification.

Fig. 6 is a top view of the same.

1 is the propeller shaft to which are attached the devices for moving the air and for receiving propelling force from the air or other fluid. This shaft is to be rotated in the direction indicated by the curved arrow by any suitable power means or motor (not shown).

2 is a plate or disk arranged crosswise to the shaft and suitably attached thereto, and the operation of the propeller is such as to cause a low pressure area or partial vacuum at the front of said plate and a relative high atmospheric pressure at the rear of the same.

The plate, shaft and vehicle advance, by reason of said relative air pressures, in the direction of the straight arrow.

3 indicates wings which are secured to or made as parts of the plate 2 and are arranged tangentially to the axis of revolution; that is to say, they would be tangent to an imaginary circle drawn from the axis as a center and touching said wings.

The wings may terminate at the edge of the plate 2 but preferably extend beyond the same as shown at 4. Between the inner or forward edge of one wing and the back of the next wing is an opening 5.

In Figs. 3 and 4 is shown a form of the invention in which I employ wings, 3, 3′ arranged on both the front and rear sides of the disk 2. In this case the disk is substantially square and the extensions 4 of the wings are omitted, the wings terminating at about the edge of the disk, and the openings 5, 5′ being of about the same area as the wings. But it will be understood that both the front and rear wings may have the extensions 4 as shown in Fig. 1.

It is an important feature in this construction that the opening 5′ at the rear side of the disk is in line with the wing 3 at the front side, and the opening at the front side is in line with the wing 3′ at the rear side.

In the operation of this construction the wings 3 in cooperation with the disk have substantially the effects already described, but in cooperation with the wings 3′ and openings 5′ there are additional useful effects, the front and rear wings cooperating to produce the relative low and high pressures at the front and rear sides respectively of the disk 2.

The wings 3′ have a cup effect on the air to draw it centripetally within the rear wings. That is to say, the air or some of it passes out through the openings 5 and inward through the openings 5′, so as to produce augmented pressure on the rear of the disk. The advance edge of the wings 3′ are further from the center than the rear edges giving the wing an inclination relative to the direction of rotation, whereby the rear wing has the air-gathering or cupping action above referred to.

The combined results give a strong forward propulsion to the shaft and vehicle body connected therewith.

Where the front (relative to direction of revolution) of the wing pushes against the air a partial vacuum forms at the rear face of the wing, and where the air is cupped by the rear or inner face of the wing air pressure is created at said rear face. In the structure of propeller shown in Figs. 3 and 4 air passes outward through the openings 5 and inward through the openings 5′.

The principle of advancing by screwing through the air does not get the best results from air movement, weight, resistance and reaction.

Stream-line construction of propeller blades and wings is usually inferior to angular construction, where the desired result is to take hold of and in a manner grasp the air.

My invention illustrates the angular construction in which the body or disk is at right angles to the axis or line of advance, and the wings are at right angles to the disk. The air is thus moved the most in proportion to the power expended and the propelling pressure created is the most advantageously received, and a relatively small propeller can be made to do the work of a much larger one of a usual type. Variations in respect of these angles may be made, however, without departing

from the spirit of my invention, but it is usually best to follow said right angle construction as nearly as is practicable.

In Figs. 5 and 6 I have illustrated a further simplified form of the invention, in which the shaft is provided with an elongated plate or shield 2. It has the arrangement and function of the shields described in connection with the other figures, but is elongated so as to form two blades or arms 2^2, extending radially and oppositely from the shaft.

The forward (with reference to the direction of rotation) part of each arm is provided with a wing 3^2 extending toward the front of the propeller, and the rear part of each arm is provided with a wing 3^3 extending toward the rear of the propeller. These wings are formed with or suitably attached to the arms. The arms are arranged in planes which are crosswise of the shaft and preferably at right angles to the propeller axis, and the wings are each arranged at an angle to its arm, preferably a right angle, but there may be variation as to these angles without departure from my invention.

In operation, the propeller revolving in the direction of the arrow, each wing forces air radially creating a partial vacuum around the propeller. Also a partial vacuum is formed behind each of the forwardly extending wings 3^2, which relieves air pressure on the front of the shield consisting of the arms 2^2. At the front of the rearwardly extending wings 3^3 the air is caught in the angle 6 formed by the wings 3^3 and arms 2^2 and creates a pressure part of which acts against the rear faces of the arms.

Consequently the propeller and attached vehicle advance in the direction of the straight arrow.

The described parts of the propeller are symmetrically located on opposite sides of the axis of revolution, in what may be termed a balanced arrangement, so that each part is balanced by a similar opposite part.

What I claim is:

1. A propeller having an axis of revolution and means to force air radially, the air-forcing means having surfaces located tangentially to a circle around said axis, and in a forward and rearward direction being parallel with said axis, and having a plate or shield occupying substantially all of the space transverse to the axis of revolution through which air could otherwise pass rearwardly, the said air-forcing means consisting of wings arranged marginally on said plate.

2. A propeller having an axis of revolution and means to force air radially, the air-forcing means having surfaces located tangentially to a circle around said axis, and in a forward and rearward direction being parallel with said axis, and having a plate or shield occupying substantially all of the transverse plane of revolution of the propeller to receive pressure from air at the rear thereof, said air-forcing means consisting of wings arranged along margins of said plate.

3. A propeller comprising wings having air-engaging and forcing surfaces substantially parallel with the axis of the propeller, said surfaces being tangential to a circle around the axis, and comprising front and rear pressure-receiving surfaces arranged at substantially right angles to the axis to be acted on respectively by relative low and high air pressures, said wings extending across the axis of the propeller in planes which are distant from said axis.

4. In a propeller a plate arranged crosswise of an axis of revolution and adapted to be exposed to partial vacuum or low air pressure on its front surface, and combined therewith wings arranged on the front face of and near and along the edge of said plate and at an angle thereto and tangentially to the axis of revolution and parallel with said axis and adapted to force air radially or centrifugally from said axis, said wings causing relative low and high pressures respectively at the front and rear of said plate.

5. A propeller having a plate and a series of wings as described in claim 4, and in balanced arrangement on said plate around the axis of revolution.

6. A propeller comprising wings having air-engaging and forcing surfaces substantially parallel with the axis and tangential to a circle around said axis, and a pressure-receiving surface at substantially right angles to the axis, certain of said wings extending forward from the pressure receiving surface and other of said wings extending rearward from the pressure-receiving surface, said wings extending across from side to side of said axis and at a distance therefrom.

7. A propeller comprising a pressure-receiving shield having wings extending forwardly therefrom, and openings at the margin of the shield and between said wings.

8. A propeller comprising a pressure-receiving shield having wings extending forwardly therefrom and wings extending rearwardly therefrom, and providing openings between one wing and the next, each wing being in line with an opening.

9. In a propeller a plate arranged crosswise of an axis of revolution and adapted to be exposed to different air pressures on its surfaces, and combined therewith wings arranged on the front face of said plate and at an angle thereto and tangentially to the axis of revolution and adapted to force air radially or centrifugally from said axis, said wings causing relative low and high pressures respectively at the front and rear of said plate, said wings providing intermediate openings, and wings extending rearwardly from said plate and arranged in line with said openings, and providing openings in line with the forwardly extending wings.

10. In a propeller the combination of a plate arranged crosswise of an axis of revolution, and wings on the front of the plate and extending forward from the margin of the plate and extending laterally to the periphery of the plate, and providing openings between the advance edges of the wings and the rear faces of succeeding wings.

11. A means for propelling a shaft endwise, having in combination, a plate arranged transversely to and connected with said shaft, and wings attached to said plate and arranged in a series around said shaft and plate in the form of a polygon, so as to leave spaces between the leading edge of said wings and the back faces of the plates.

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