May 28, 1929. J. M. MARTIN 1,714,917

PROPELLER FOR AEROPLANES

Original Filed Aug. 8, 1927 2 Sheets-Sheet 1

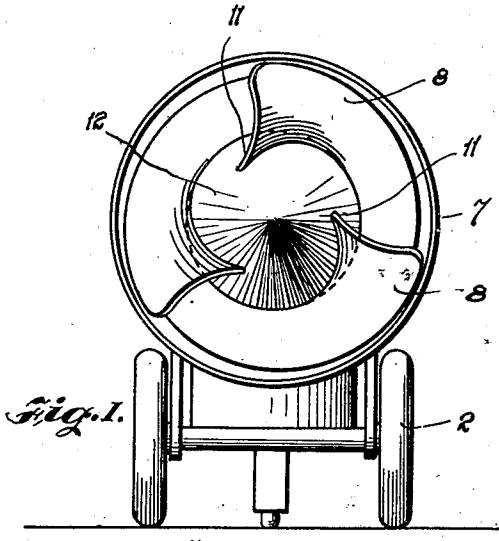


Fig. 1.

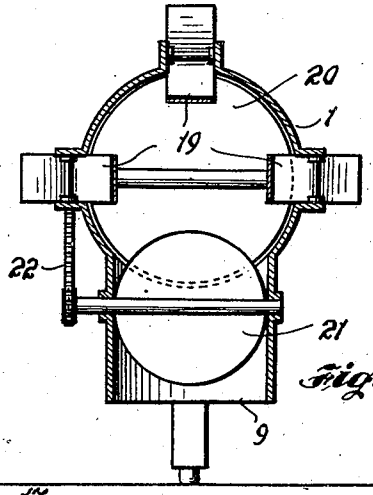


Fig. 2.

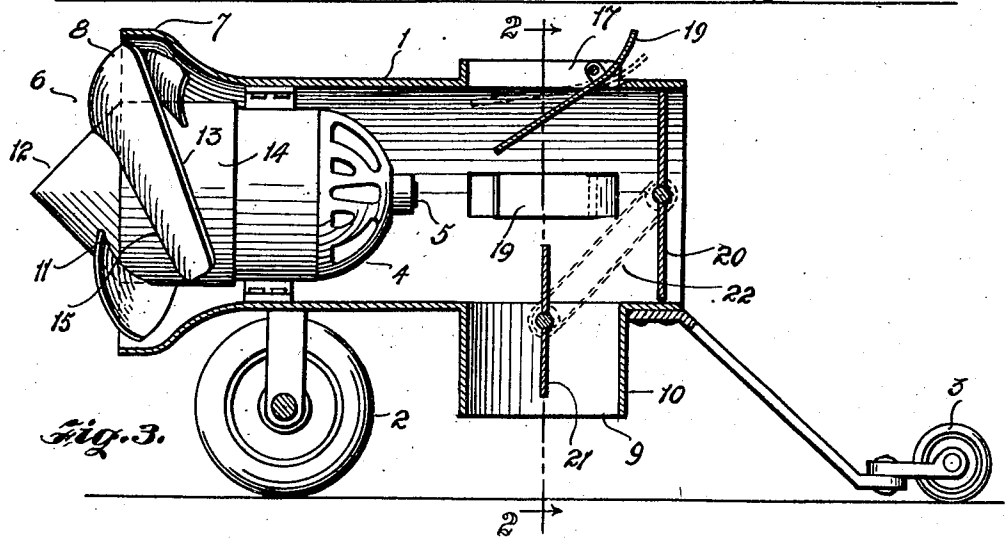


Fig. 3.

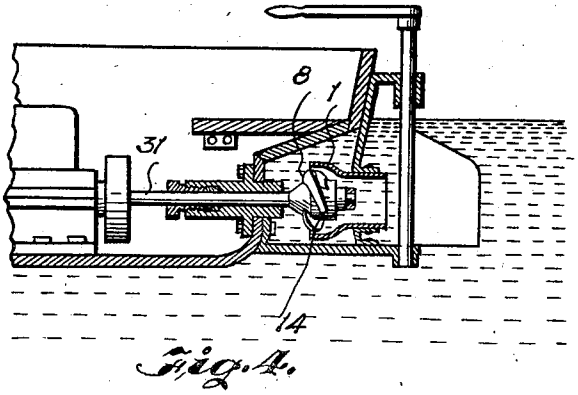


Fig. 4.

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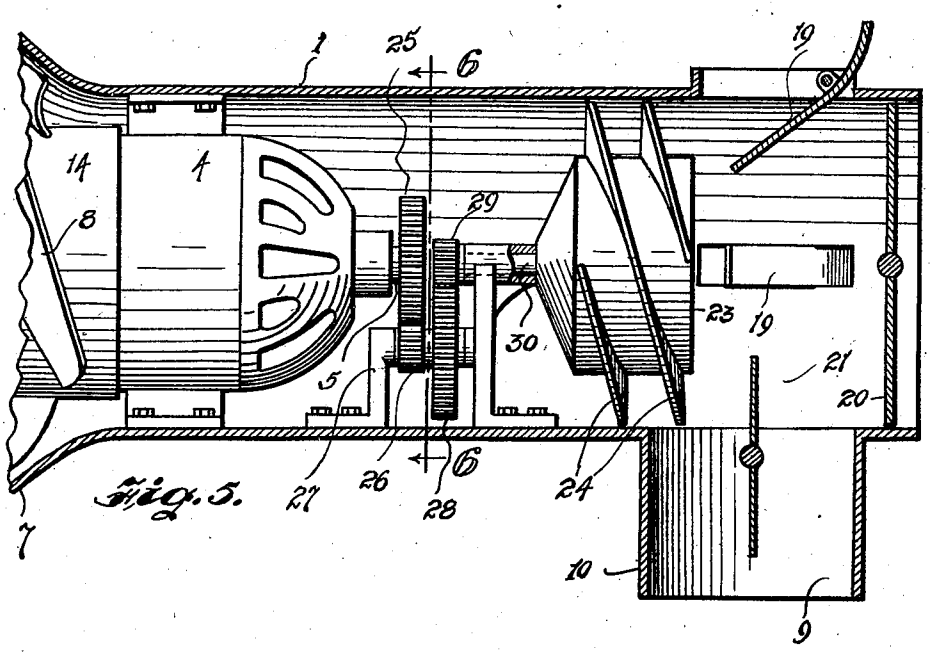


Fig. 5.

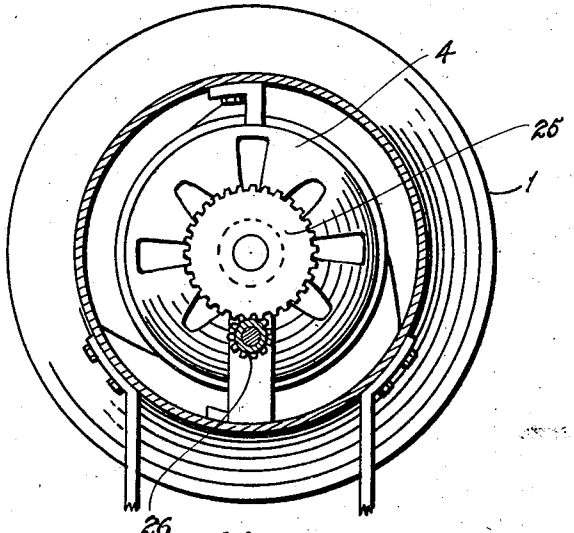


Fig. 6.

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UNITED STATES PATENT OFFICE.

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PROPELLER FOR AEROPLANES.

Application filed August 8, 1927, Serial No. 211,398. Renewed March 21, 1929.

This invention has for its object to provide a propeller for aeroplanes, air ships, dirigibles, motor boats, and the like, having in its arrangement and construction means for more effectually utilizing the power derived from the propeller, also for facilitating the directing, regulation and control of same while in operation.

Another object of the invention is to provide a propeller so arranged that the current of air set in motion by the propeller can be directed downwardly when the plane or ship is leaving the earth, so as to enhance the lifting power derived from the propeller.

A further object of the invention is to eliminate the danger incident to the whirling propeller blades of former type.

A still further object of the invention is to stabilize the aeroplane in air while in flight and to obtain greater buoyancy and to make landings with less velocity, thereby decreasing the hazard of landings in present practice in planes equipped with the usual type of propeller.

Finally, an object is to provide in the invention means for obtaining maximum of air within the shell, and the combined action of both the main and the auxiliary propellers to accelerate the movement of the air stream through the shell, thereby increasing the vacuum at the front of the machine and the atmospheric pressure in the rear, resulting in greater velocity and speed of the plane.

With the above objects in view, the invention will be clearly understood from a perusal of the following detailed description, taken in connection with the accompanying drawings forming part of this specification and wherein:

Figure 1 represents a front elevational view of the invention as applied to an aeroplane, no wings being shown.

Figure 2 is a cross-sectional view taken along the line 2—2 of Figure 3, the latter figure being a longitudinal sectional view of the invention.

Figure 4 represents a partial longitudinal sectional view of the propeller installed upon a motor boat.

Figure 5 represents a modified form of the propeller, Figure 6 being a cross-sectional view thereof along line 6—6.

Proceeding in accordance with the drawings and wherein similar numerals designate the various parts, 1 denotes a shell or body mounted upon the wheels 2 and 3. Within the shell 1 and firmly braced thereto is disposed a motor 4 of any preferred type for revolving the propeller. The motor includes a shaft 5 upon which is mounted the propeller 6. The shell 1 has an enlarged end which is flared as indicated at 7 and in which the propeller blades 8 are seated.

In order that the principle of the invention as carried out in the present embodiment herein illustrated may be clearly understood, it must be remembered that in aeroplane propellers as ordinarily constructed the blades are not enclosed, consequently considerable of the air set in motion by the propeller blades is dispersed over a broad area. It should also be understood that a vacuum is created in front of the propeller while it is in motion. In the present invention the shell or body 1 has an enlarged and flared end 7 which permits the blades of the propeller of the peculiar construction herein shown to be enclosed. Therefore when the air is set in motion by the blades 8 it is forced inside and longitudinally of the shell or body 1 and is then directed downwardly through the opening 9 into the circular extension 10. The blades 8 of the propeller are of circular and somewhat spiral form somewhat resembling a screw propeller, yet quite different. The points 11 of the blades are directed inwardly and overlap a cone-shaped nose 12, formed integrally with the blades 8. The purpose of the cone-shaped nose is to deflect the air when the aeroplane is in motion inwardly against the blades of the propeller. The free edges of these blades are curved inwardly of their length so that the edges 13 overlap their base 15 or point where the blades are attached to the hub 14. The revolution of the blades as arranged and constructed in this fashion thus causes the air to be drawn or sucked into the shell 1.

In the rear portion of the shell at the top and sides, indicated at 17 are openings to permit the air to escape. These openings are controlled by the panels 19 and may be set at any desired angle or entirely closed over the opening 17.

The rear end of the shell is open, but has a damper 20, while over the opening 9 is also a damper 21. Dampers 20 and 21 are connected by a chain 22, so arranged in the chain connection that when the damper 20 is closed over the opening at the rear end of the shell, the damper 21 is open, and vice versa. Thus,

when the machine is ready to rise from the earth, the air is drawn in by the propeller blades and will pass outwardly through the opening 9 and aid in the upward movement of the machine from the ground. After the machine has left the earth, the damper 21 is closed, which results in simultaneously opening, through the chain connection 22, the rear damper 20 and permitting the air to pass through the shell.

In Figure 5 is illustrated a modification of the invention and wherein is disposed an auxiliary propeller having a hub 23 and spirally arranged blades 24. The purpose of this auxiliary propeller is to move the air out faster through the opening 9 and through the end opening containing the damper 20. Thus, after the air is initially sucked and drawn in by the propeller blades 8, the auxiliary propeller, moving at a higher rate of speed than the regular propeller, acts as an accelerator to force the air at a still greater speed through the shell and the openings. In line with what has been heretofore pointed out regarding a vacuum, it will be now apparent that the auxiliary propeller by accelerating the movement of the air through the shell, will create a much greater vacuum at the front of the main propeller. This greater speed of the auxiliary propeller is attained by an arrangement of gears as shown in Figure 5. On the shaft 5 is a gear 25 in mesh with a spur gear 26. Spur gear 26 is mounted on a small shaft 27 which also carries a larger gear 28, the latter in mesh with a spur gear 29 on the shaft 30. The latter shaft carries the hub 23 on which is mounted the blades 24. The revolution of the blades is thus "stepped up" causing the auxiliary propeller to revolve considerably faster than the blades 8 of the regular propeller, thereby drawing and forcing the air outwardly at a much higher rate of speed.

While the invention is primarily intended for aeroplanes and flying machines, it is not restricted to this application, as it is applicable to the propulsion of motor boats, etc. Toward this end and as illustrated in Figure 4, the propeller shown in the front of the machine shown in Figure 1 may be attached to the shaft 31 of a motor boat engine, the joining being made at the apex of the cone-shaped nose 12. The shell, propeller blades 8 and the hub being disposed in the water and the shell braced to the boat, in this instance no dampers are required, the water being drawn through the open ends of the shell or body 1. The result is that the propeller blades provide a greater power than would ordinarily be the case if the shell were not present, because all the force exerted by the propeller is conserved, forcing all the water set in motion by the propeller against the walls of the shell and outward through the shell from end to end. Obviously, without the shell 1, the water would be agitated and moved in directions not tending to move the boat and such power exerted would be lost.

In the operation of the propeller as applied to an aeroplane the motor being started, the damper 21 is opened fully, which results in fully closing the damper 20. The panels 19 are adjusted according to prevailing air currents. The air drawn in by the propeller blades 13 is directed to the ground. Where the auxiliary propeller is used the same procedure is carried out.

While the present invention illustrates an embodiment of the principle thereof as applied to aeroplanes and motor boats, it is not to be understood as restricted to this particular mode of application, nor to the specific and particular construction and arrangement shown, as modifications other than those shown may be made.

What is claimed is:

1. A propeller for aeroplanes and air ships including a shell body of hollow interior, said shell body having an enlarged and flared open end in which the propeller is seated; a motor for revolving the propeller and seated within the shell; the flared end of the shell enclosing the blades thereof; said shell body having openings at its rear end and sides and including adjustable dampers for opening and closing said openings.

2. A propeller for aeroplanes and air ships including a shell body of hollow form having an enlarged and flared open end in which the propeller is seated to revolve; a motor for revolving the propeller and seated within the shell body; an auxiliary propeller adjacent and to the rear of the first mentioned propeller; a shaft upon which said auxiliary propeller is mounted; gears connecting said motor to the shaft of the auxiliary propeller; openings in the rear end and sides of said shell body and including adjustable dampers for opening and closing said openings.

3. A propeller as set out in claim 1 and wherein said propeller includes a hub with a cone-shaped nose, said blades of the propeller set on the hub obliquely and inclined inwardly of the hub to form an overhanging effect, one of said openings in said shell body having an extension to direct the indrawn air from the propeller toward the ground to aid in the rising of the aeroplane.

4. A propeller as set out in claim 2 and wherein said auxiliary propeller is geared to the propeller at the front of the shell body, the gearing enabling the auxiliary propeller to accelerate the movement of the air drawn in by the front propeller and augumenting and increasing the vacuum at the front of the machine; and including means at one of the rear openings to direct the air from both propellers to the ground in assisting the plane to rise.

5. A propeller for aeroplanes including a shell body of hollow interior, said body having an enlarged and flared open end in which the propeller is seated, a motor enclosed by the shell; an auxiliary propeller seated within the shell, adjacent to and geared to the first-mentioned propeller; said shell having openings in the sides and rear end thereof to permit escape of air; dampers for opening and closing said openings; said auxiliary propeller so geared to the first mentioned propeller as to cause the auxiliary propeller to revolve at a higher rate of speed than the first-mentioned propeller and enabling the air drawn into the shell to be accelerated in its passage through the shell; the object being to stabilize the aeroplane in air while in flight and to obtain greater buoyancy and to make landings with less velocity, thereby decreasing the hazard of landings, said auxiliary propeller augmenting and increasing the vacuum in front of the main propeller and the atmospheric pressure at the rear, resulting in greater velocity and speed of the machine.

In testimony whereof I affix my signature.

JOHN M. MARTIN.