C. E. J. DE VALLAT.

PROPELLER.

APPLICATION FILED MAR. 15, 1912.

1,042,506. Patented Oct. 29, 1912.

Fig. 1.

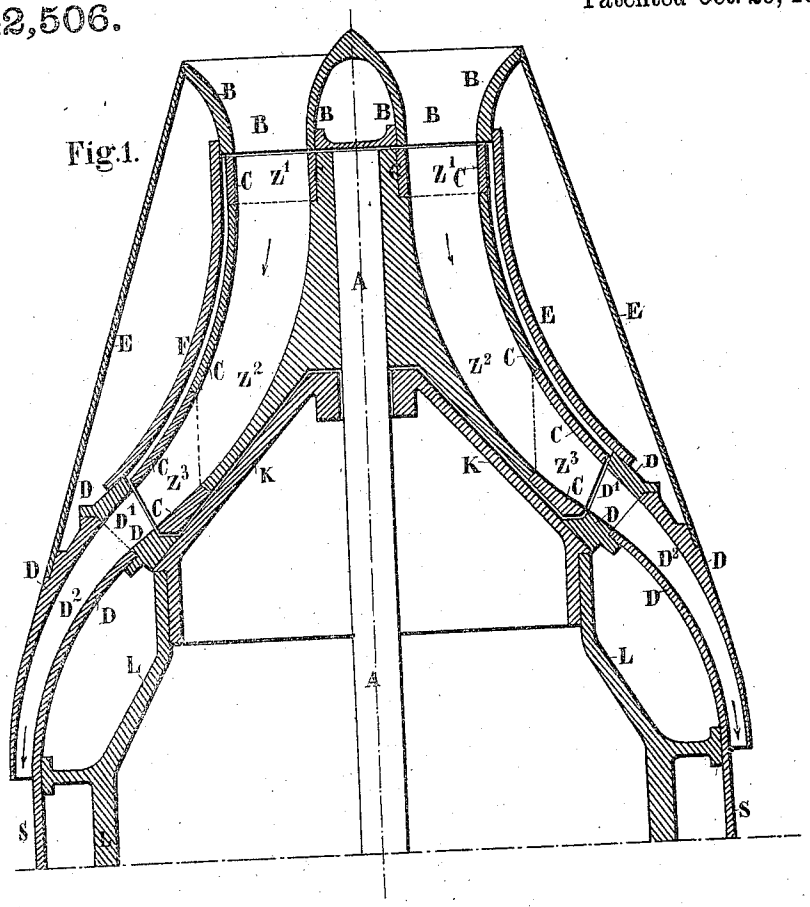
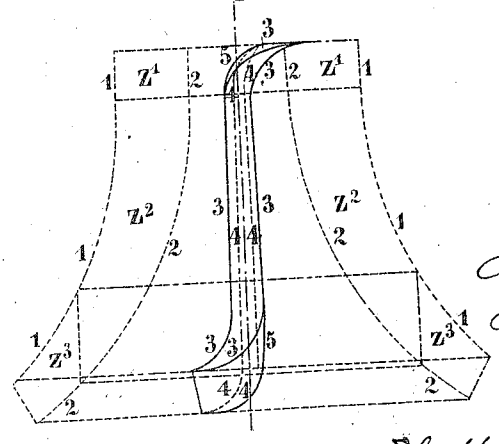


Fig. 2.



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PROPELLER.

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Application filed March 15, 1912. Serial No. 683,922.

To all whom it may concern:

Be it known that I, CHARLES EMILE JULES DE VALLAT, a citizen of the Republic of France, and resident of Paris, France, have invented new and useful Improvements in Propellers, which improvements are fully set forth in the following specification.

The present invention relates to propellers and has for object an improved propeller for working in water, air or any fluid.

The improved propeller according to this invention comprises a rotating part and two fixed parts, viz., an inlet distributer and an outlet diffuser. The purpose of the inlet distributer is to give the desired direction to the fluid streams impinging on the rotating part. In the example subsequently described this direction is parallel to the axis of rotation.

The outlet diffuser has for its object, as will be seen hereinafter, to make the outflow of the fluid as far as possible parallel to the axis of rotation, which itself lies in the direction of the propulsion. In this manner there is preserved an additional axial effort, forming part of the useful effort, derived from a residual rotational movement which we attempt to eliminate, or from the divergence of the fluid streams around the axis after issue from the propeller, which divergence we attempt to diminish or do away with entirely.

The movable part imparts to the fluid a movement of rotation owing to which centrifugal force tends to urge the fluid toward the circumference, and owing to the structure of the propeller, to cause it to flow oppositely to the direction of propulsion. There is thus produced more or less of a vacuum or pressure diminution effective in the direction of propulsion, and moreover, the blades of the rotating part act on the fluid in the manner of the blades of a screw propeller.

To render the working of the improved propeller clear, in the present example, the rotary part will be assumed as consisting of two series of surfaces: blades arranged around the axis more or less radially and sleeves or surfaces of revolution concentric to the axis, adapted to guide the fluid and utilize the vacuum which has been created. The part between two consecutive sleeves will be referred to as the "annulus," and to simplify the description and drawings, in the example selected for the purpose of illustrating the invention, it will be assumed that there is only one annulus. In this annulus there are three zones, an inlet zone a central zone and an outlet zone. In the central zone are the blades formed substantially of radial planes, which may thicken from inside to outside or from front to back. In this zone the absolute motion of the fluid is the resultant of its rotational movement of entrainment and its relative movement which takes place in a radial plane. In the inlet zone the blades are suitably inclined in the direction of rotation, so as to transmit to the fluid entering parallel to the axis, the rotational motion of the propeller. In the central zone the motion of the fluid acquires a radial component without important alteration of the axial component. In the outlet zone the blades are curved backward if it is desired to preserve all or part of the power taken up in imparting rotation to the fluid, or if a component is desired tangential to the velocity of the fluid. This division of the movable part into three zones may in certain cases, render the elimination of the inlet distributer and outlet diffuser permissible. On the same principle, the presence of the distributer and diffuser may allow the elimination of the central zone and outlet zone in the moving part. In the outlet diffuser the residual rotational motion of the fluid may be converted into an additional axial effort, and the radial component of the velocity then more or less diminished for the same purpose, according to the requirements. In the example illustrated in the drawings these two kinds of surfaces of the moving part, the three zones of this part, and the two zones of the outlet diffuser, are considered distinct. An inlet distributer with several zones could also be constructed In practice however these zones more or less merge into one another and it is not indispensable that in the central part the blades should be radial planes. They may be curved and inclined to the axis.

In the drawings, Figure 1 is a section through the axis of the rotating part, distributer and diffuser. Fig. 2 is a side elevation of a single blade of the moving part, the outer sleeve and the fixed parts surrounding this sleeve being assumed removed.

A denotes the driving shaft; B the inlet distributer; C the annulus, in which Z_1 is

the inlet zone, Z_2 the central zone, and Z_3 the outlet zone.

D is the outlet diffuser divided into two parts D_1 and D_2.

E denotes the connections between the inlet distributer and the outlet diffuser, K the fixed surface opposite the annulus, L the frame of the propelled body and S the external surface of the same behind the propeller.

In Fig. 2, the line 1 shows the apparent contour (meridian) of the inner face of the outer sleeve and the line 2 the apparent contour of the outer face of the inner sleeve. 3 is the line of insertion of the blades on the outer sleeve and 4 the line of insertion of the blade on the inner sleeve. 5 indicates portions of the curved sides of the blade.

The propeller is shown situated in front of the body to be translated, which thus does not oppose its own resistance to forward motion.

It is of advantage, in the case of working in air, to heat the propeller by means of the exhaust gases from the engine or otherwise, to prevent the formation of ice on the propeller and to give the engine certain advantages.

For facility of construction each annulus may be split up into its two or three zones, which can be cast separately and attached to each other. The remaining construction offers no difficulties and the arrangements are capable of infinite variation. For example, annular bearings, thrust bearings, screw adjustments of clearances, etc. may be embodied in the construction as required.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:—

1. In a propeller, a rotating member having an annular space containing the blades and traversed by the fluid in which the propeller works, said space comprising three zones, an inlet zone in which the blades are inclined in the direction of rotation, a middle zone in which the blades are substantially at right-angles to the direction of rotation, and an outlet zone in which the blades are curved backward from the direction of rotation, the walls of the annulus having a curvature adapted to guide the fluid oppositely to the direction of propulsion.

2. In a propeller, a rotating member having an annular space containing the blades and traversed by the fluid in which the propeller works, said space comprising an inlet zone in which the blades are inclined in the direction of rotation and the walls of the annulus having a curvature adapted to guide the fluid oppositely to the direction of propulsion; a fixed inlet distributer in front of the rotating member and adapted to give the desired direction to the fluid streams impinging on this latter; and an outlet diffuser arranged behind the rotating member and adapted to guide the fluid discharged therefrom in a direction parallel to that of the propulsion.

3. In a propeller, a rotating member having an annular space containing the blades and traversed by the fluid in which the propeller works, said space comprising three zones, an inlet zone in which the blades are inclined in the direction of rotation, a middle zone in which the blades are substantially at right angles to the direction of rotation, and an outlet zone in which the blades are curved backward from the direction of rotation, the walls of the annulus having a curvature adapted to guide the fluid oppositely to the direction of propulsion, a fixed inlet distributer in front of the rotating member and adapted to give the desired direction to the fluid streams impinging on this latter; and an outlet diffuser arranged behind the rotating member and adapted to guide the fluid discharged therefrom in a direction parallel to that of the propulsion.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CHARLES EMILE JULES DE VALLAT.

Witnesses:
EMILE LEDRET,
LUCIEN MEMMINGER.