

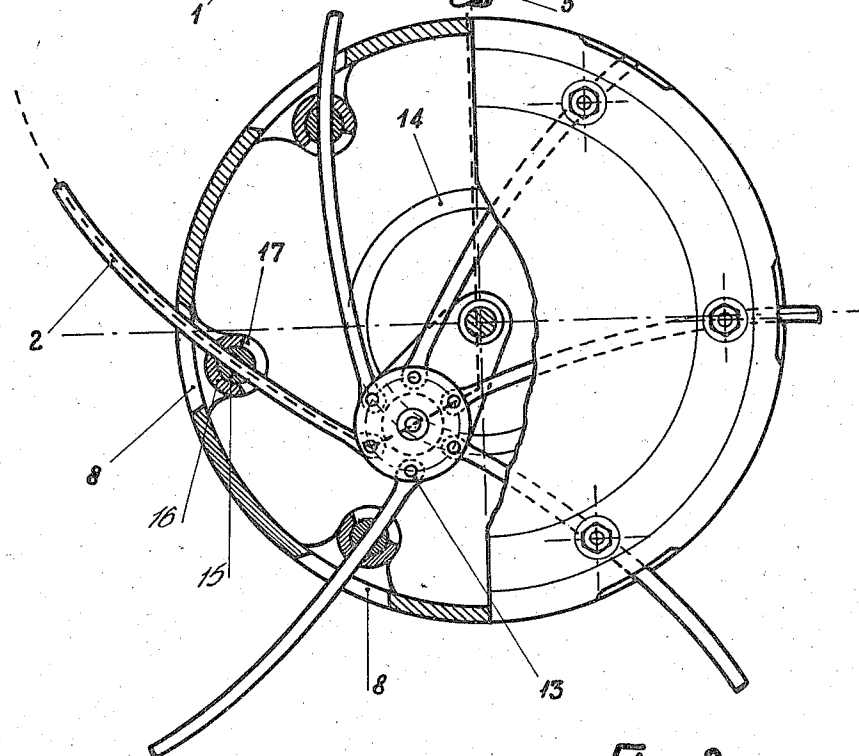
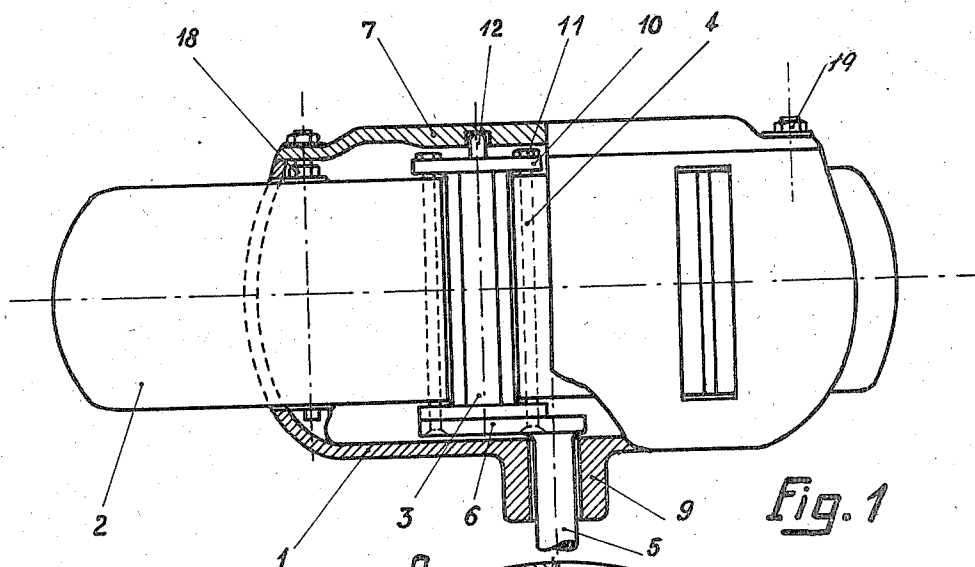
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PROPULSION SYSTEM

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PROPULSION SYSTEM

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This invention relates to improvements in propulsion means of the type of paddle wheels provided with blades or vanes which operate by direct contact with fluid medium, and which are suitable in the propulsion of sea-going vessels as well as aerial or terrestrial vehicles and in centrifugal pumps, hydraulic turbines, etc.

The object and main characteristic of this invention consists in a better form of propulsion mechanism of the type of paddle wheels, and comprises a special disposition of the blades suitable to permit them to be hidden, as described further on, inside of a special box or housing, during that period of rotation in which the blades are not desired to exercise forces of propulsion.

The drawing which accompanies the present specification, details one of the forms that can be used to realize this invention.

Fig. 1 represents a partial sectional view perpendicular to the axis of rotation.

Fig. 2 is a partial sectional side view, showing the mechanism of the eccentric, described later.

The most important elements of the mechanisms of propulsion wheels that refers to the present invention and indicated in the Figures 1 and 2, are the following:

A hollow box or housing 1 with its hub 9 may be constructed with different exterior forms, according to the use for which the propulsion wheel is intended. At all events, in applying the present invention to vehicles that advance in a liquid or aerial medium, this box or housing 1 has to be built in such a way that its outside forms an aerodynamical body. This is in order to present the smallest possible resistance against the liquid medium in which said wheel has to advance. This box or housing 1, is provided with a cover 7 which is secured by screws on one side thereof and gets the necessary impulsion or movements directly, through gearing or through some other transmission from the main motor or engine.

The blades or vanes 2, which can be straight or built with an adequate curvature, are to be made so as to match the outside lines or contour of the box 1. These blades are mounted on a cage 10, and are attached thereto by means of strong wrist-pins 4, which allow the necessary movement of all the blades when the propulsion wheel is working. Said wrist-pins 4 can be fixed at one end and tightened at the other end by means of special securing nuts 11. The propulsion blades, reinforced at the ends where the wrist-pins join them to the cage 10, are provided with brass sleeves, to be able to avoid as much as

possible play or lost motion between the blades 2 and the wrist-pins 4. The reinforced ends 13 of the propulsion blades 2 can be seen at Figure 2. The cage 10 connected to the crank arm 6 of the eccentric, by the spindle 3 can be placed by means of the shaft 5 in various angular positions as regards the housing to be able to regulate exactly the direction of the propulsion action of the blades. To insure efficiency of this device, the cage 10 is provided at the end opposite to the crank arm 6 of the shaft 5, with a guide pivot 12. This guide pivot can move very easily in the annular groove 14 which is concentric with the axis of shaft 5 (Fig. 2), thus providing the cage 10 with another bearing to resist flexion produced on it, as soon as the propulsion wheel starts working. Ball bearings may be furnished between said pivot and groove.

The spindle 3 around which the cage 10 revolves, can be placed in different desired positions, only by turning the arm 6 of the eccentric, all these driving parts working as a crank together with the driving shaft 5.

The nuts 19 which secure the cover 7 to the hollow box or housing 1 are placed below the main exterior surface of said cover so as not to project sideways, when tightened. In this way, any complementary resistance against the medium in which the propulsion wheel advances, can be practically avoided.

During the rotation of the hollow box or housing 1, the blades 2 turn with the special bearings 15 while sliding in slots provided in said bearings. These bearings provided with the necessary stuffing box to stop the fluid medium from getting inside the box 1, are mounted in specially reinforced sockets 16 of the outer walls of the box. To allow the necessary movement of the propulsion blades during the rotation of the box or housing, openings 8 for each blade have been furnished. The sockets 16 for the movable bearings 15 have also for the same reasons the necessary openings 17. This system of movable bearings, being of great importance for the proper working of the propulsion wheel, has been indicated and only drawn schematically in Figures 1 and 2. It is to be understood that many other details referring to their manner of fixing and automatic lubrication must be completed, and there may be two or three solutions for the various kinds of applications for which this kind of propulsion wheel can be applied.

Having described all the principal parts of this invention, I may now explain the working of said propulsion wheel.

As soon as the hollow box or housing 1 actuated in conventional manner by the gearings upon the center hub 9 fixed to the hollow box, gets into rotation, the paddles or blades 2 rotate in the same direction, having their rotation center on the spindle 3 of the already mentioned cage 10. The distance between this spindle and the axis of rotation of the hollow box 1 is constant; but its position along a circumference described with a radius equal to said distance can be changed by means of the shaft 5. In this manner some of the propulsion blades will project outside the box during a limited space of their circular trajectory. During this time, they act against the fluid medium wherein the wheel moves, pushing it directly backward or forward. The extent of this outward projection of the blades starts to diminish as soon as the best pushing zone has been passed, and there is one point where each blade disappears completely inside the hollow box, not offering at this time any resistance at all against the fluid medium in which the propulsion wheel is working.

This very important fact constitutes the improvement in the efficiency of this wheel type, as compared with other propeller types or propulsion wheels.

By placing the spindle 3 in the opposite position to the one shown in Figure 2, the greatest acting zone of the propulsion blades has been changed 180°, which happens to be the smallest or non-acting zone of said blades. Therefore, it is possible to obtain by means of this device, a direct push driving a vehicle forward or backward, upward or downward, without changing the direction of rotation of the main axle which is transmitting the working power from the central motor or engine.

After these explanations, it can be easily seen that the propulsion wheel of the present invention, can be used to drive aerial as well as seagoing vehicles, by the propulsion work of the blades which are adjustable to any point of its circular trajectory. The wheel can be used, not only as a propulsion means, but also for steering the ship or helm; furthermore, the forward movement can be changed into a backward one, leaving the same rotation sense of the propulsion wheel.

The application of this propulsion wheel system can be also amplified for the cases of centrifugal pumps and hydraulic wheels. In these cases the propulsion paddles or blades would of course only act where the greatest push or action zone is required; they would not offer any resistance

on those zones where no effective work can be done. For all these applications the working way and idea of the present invention will be absolutely the same as described. Of course, it is possible that some constructive details, regarding the best shape of the propulsion planes or their bearings, have to be changed or improved.

I claim:—

1. A propulsion wheel provided with blades for the propulsion of aerial and seagoing vehicles, centrifugal pumps, hydraulic turbines and other similar devices; consisting in the combination of a substantially cylindrical housing closed on all sides and adapted to receive rotation movement about its central axis from a source of power; said housing containing a plurality of blades adapted to be reciprocated through openings in the peripheral wall of said housing, an adjustable crank shaft coaxial with said central axis, an eccentrically positioned spindle secured to the crank shaft, a cage revolvable on said spindle, pivots adjacent the peripheral edge of said cage upon which pivots the inner ends of the blades are pivoted, means for adjusting the angular position of said spindle with reference to said housing, a projecting guide pivot on said cage engaging in a circular groove having a radius equal to the distance between the axis of said spindle and the axis of said crank shaft, and individual movable bearings acting as guide members for said blades mounted in sockets provided adjacent the peripheral wall of the housing.

2. A propulsion wheel, in accordance with claim 1, in which the axis of said cage spindle is placed eccentrically to the axis of rotation of the wheel by means of an arm fixed to the crank shaft.

3. A propulsion wheel according to claim 1, in which the contour of said housing is given a suitable aerodynamical shape in order to avoid a too great resistance against the fluid medium in which the wheel advances.

4. In a device of the character described a revolvable housing, a shaft extending into said housing, a crank on the end of said shaft within said housing, a spindle secured to said crank eccentrically to said shaft, the wall of the housing opposite to the end of the shaft having a circular groove therein, the radius of which equals the eccentricity of the spindle with reference to the shaft and a projection co-axially fitting in said groove, of such a character that a second bearing for the spindle is formed.

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