May 4, 1937. F. E. CARLSON 2,079,486

PROPELLER

Filed Sept. 18, 1936

Fig. 1.

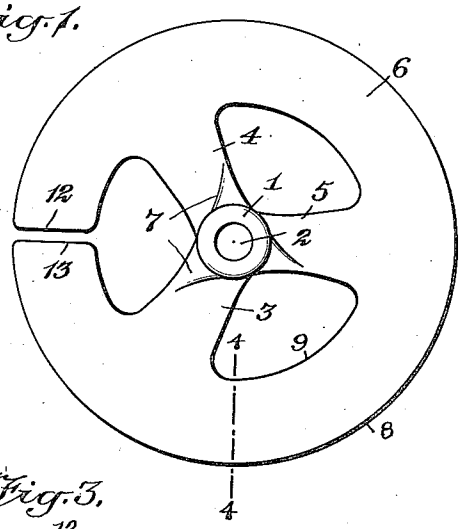


Fig. 2.

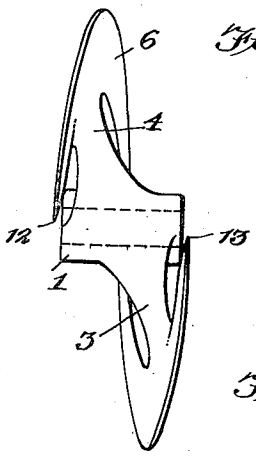


Fig. 4.

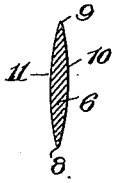


Fig. 3.

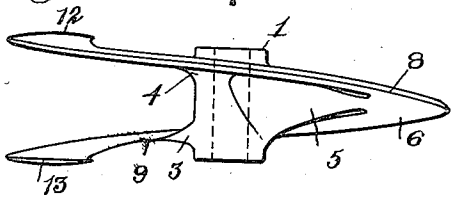


Fig. 6.

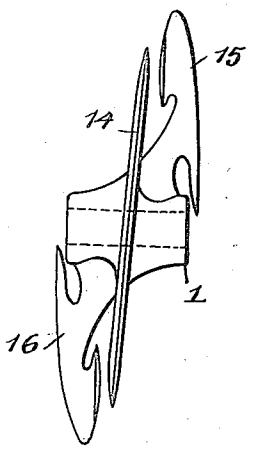
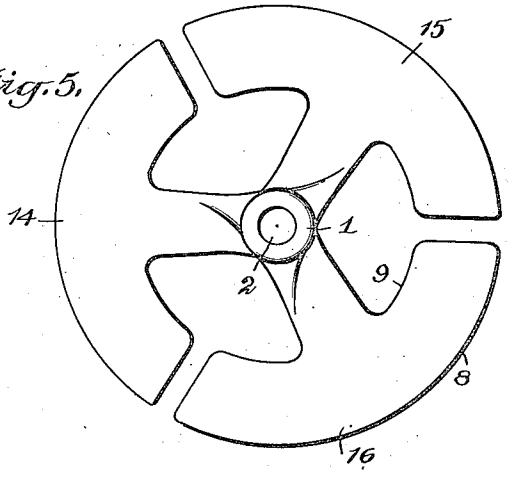


Fig. 5.



WITNESSES

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PROPELLER

Frank E. Carlson, Brooklyn, N. Y.

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5 Claims. (Cl. 170—167)

This invention relates to propellers, and has for an object to provide an improved construction adapted to secure a desired result with a minimum amount of vibration.

Another object of the invention is to provide a propeller adapted to operate wholly in the water or partly in the water.

An additional object, more specifically, is to provide a propeller having a peripheral propelling surface or rim arranged to have the end edges enter the water almost in a direct line while at the same time providing camming surfaces back of the edge.

A further object is to provide a propeller in which the rim or propelling part is arranged in a spiral either as a single formation or as a plurality of spaced formations all associated with a single hub.

In the accompanying drawing:

Fig. 1 is a side view of a propeller disclosing an embodiment of the invention;

Fig. 2 is an edge view of the propeller shown in Fig. 1;

Fig. 3 is also an edge view of the structure shown in Fig. 1 looking at the same at right angles to the illustration in Fig. 2;

Fig. 4 is an enlarged fragmentary sectional view through Fig. 1 on the line 4—4;

Fig. 5 is a view similar to Fig. 1 but showing a slightly modified construction;

Fig. 6 is an edge view of the structure shown in Fig. 5.

Referring to the accompanying drawing by numerals, 1 indicates the hub of the propeller which is provided with a bore 2 to receive the driving shaft. It will be understood that the hub 1 may be keyed or otherwise rigidly secured to the driving shaft whereby the propeller may be rotated at a desired speed. As shown in Fig. 1, the propeller is provided with three spokes, namely, spokes 3, 4 and 5. In the structure shown in Figs. 5 and 6, three spokes are also provided, but the impelling rim 6 is divided into three parts. It will be evident that four or more spokes could be used and the impelling rim divided into more than three parts or less than three parts without departing from the spirit of the invention.

As illustrated in Figs. 1 to 4, it will be seen that the rim 6 is a single spiral and the rim is supported by the three spokes 3, 4 and 5. Spoke 5 is arranged centrally of the hub and extends substantially radially while spoke 3 is near one end and spoke 4 is near the opposite end. Spokes 3 and 4 are inclined from a radial line as shown in Fig. 2 so as to merge into the rim 5 and also to present inclined camming surfaces to the water as the propeller rotates. This is indicated by the respective lines 7 in Fig. 1. Although the rim 6 is spiral, a line drawn from the outer edge 8 of rim 6 to the inner edge 9 would be normal to the bore 2. It will therefore be seen that the curved surfaces 10 and 11 present a smooth camming surface which is almost at right angles to the hub 1. This permits the respective edges 12 and 13 to enter or leave the water without pushing the water to one side so that the surface of the rim 6 can act on the water to produce a desired pull or push according to the direction of rotation of the propeller. This arrangement permits the ends of the rim to cut into the water with very little disturbance and consequently the water is not pushed radially outwardly but the slightly spiral surface of the rim will produce a pressure on the water tending to force the same rearwardly and consequently the boat or ship carrying the propeller forwardly. Practically all of the power used in driving the propeller acts to push against the water in a way to urge the ship forwardly. In this way a high efficiency is secured as practically none of the power is used for forcing the water radially of the propeller. As shown in Figs. 1 and 2, the ends 12 and 13 are spaced axially apart approximately one-tenth the peripheral edge of the rim 6.

When the propeller is made with a small pitch and is driven at high speed, an almost one hundred percent straight push is secured because none of the energy is used to force the water laterally away from the propeller. As a matter of fact, the propeller is entering or passing through the water in a screw-like manner. Where large propellers are used the same structure as shown in Fig. 1 could be utilized, but preferably the structure shown in Figs. 4 and 5 is used. In this last structure it will be observed that the rim is divided into three sections, namely, sections 14, 15 and 16. The adjacent ends of these sections are separated and slightly spaced apart longitudinally so that each section can have its end enter the water directly in a screw-like manner. In this way each section of the rim engages a different part of the water.

As is well known, the working surface of all propellers now in existence is only the outer part, and consequently in the disclosure shown in the drawing the outer part is indicated as the impelling rim and all the remaining part is cut away except sufficient to provide the desired supporting spokes. While both forms of the invention may

be used on any boat or ship, preferably the high speed boats or high speed ships use the single rim 6 as shown in Fig. 1, while the slow speed boats or ships use the divided rim as shown in Fig. 5. By reason of the fact that the action of the propeller is to force the water rearwardly rather than laterally, vibration will be reduced to a minimum.

I claim:

1. A propeller comprising a hub, a spoke extending substantially radially from the center of the hub, a spoke at each end of the hub extending in a direction inclined from a radial line, and a substantially uniform spiral rim formed in sections carried by the outer ends of said spokes with the respective ends spaced axially apart, the axial length of the propeller and the spacing of said ends being approximately equal.

2. A propeller provided with a hub, a plurality of substantially radiating spokes, and a flat rim secured to said spokes formed substantially as a continuous single spiral, said rim having convex sides positioned so that a line drawn from the center top edge of the rim to the center bottom edge of the rim at any point will be substantially normal to said hub.

3. A propeller comprising a hub, a plurality of spokes, and a spirally positioned substantially flat rim carried by the outer end of said spokes, the ends of said rim being spaced axially apart a distance substantially equal to the length of said hub.

4. A propeller comprising a hub, a rim presenting a generally spiral formation with adjacent ends offset in a direction parallel to the axis of said hub, the fore and aft length of said rim being substantially the same as the length of said hub and positioned to surround the hub, and three spokes merging into said hub and said rim, said spokes connecting said rim to said hub, one spoke being positioned centrally of said hub and the other spokes being arranged adjacent the respective ends of said hub, said spokes being spaced 120° apart, each of said spokes being provided with camming surfaces to assist said rim as the propeller rotates.

5. A one-piece high speed propeller comprising a hub, an impelling rim spaced from and surrounding the hub, and a plurality of spokes merging into said hub at one end and into said rim at the other end, one of said spokes being arranged centrally of said hub and its base extending from near one end of the hub to the other, said centrally positioned spoke tapering from said hub to said rim and with its sides forming camming surfaces, and a spoke adjacent each end of said hub formed substantially like the central spoke but inclined in opposite directions from the center of the hub, said spokes being spaced substantially an equal distance apart.

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