H. F. SHAW.

PROPELLER.

APPLICATION FILED MAY 27, 1908.

954,053.

Patented Apr. 5, 1910.

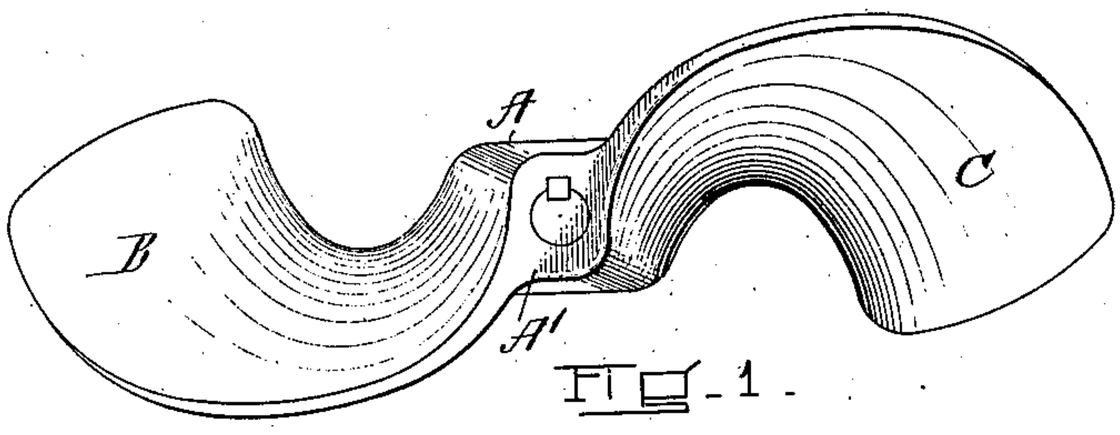

FIG. 1.

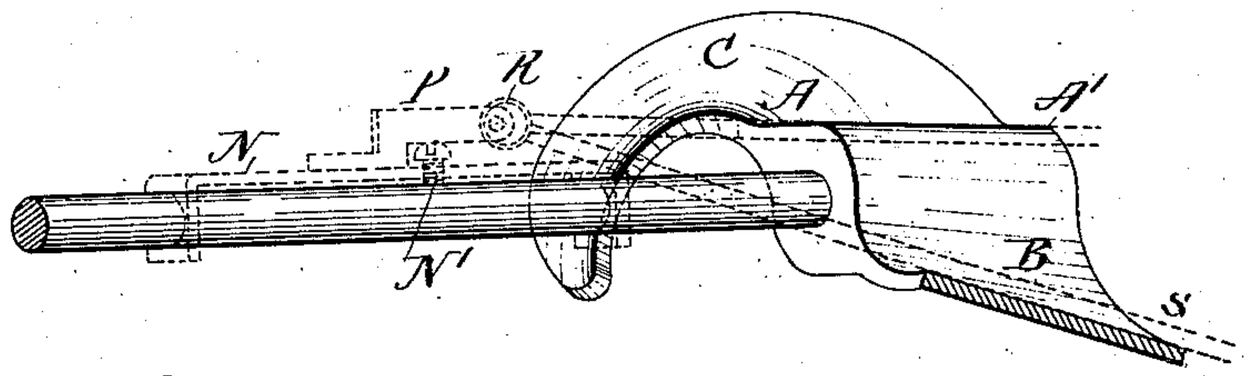

FIG. 3.

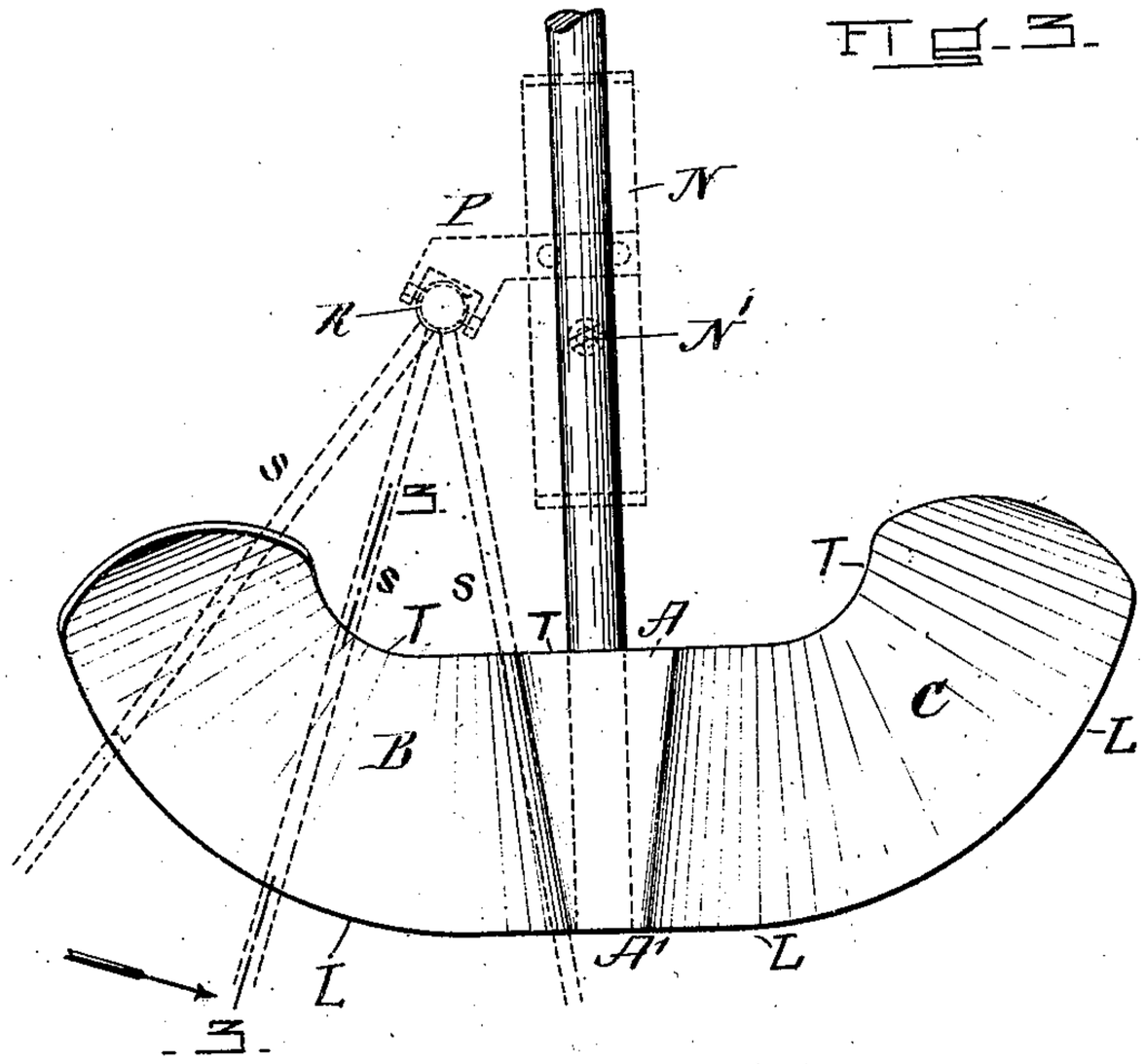

FIG. 2.

WITNESSES

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HENRY F. SHAW, OF BOSTON, MASSACHUSETTS.

PROPELLER.

954,053. Specification of Letters Patent. Patented Apr. 5, 1910.

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To all whom it may concern:

Be it known that I, HENRY F. SHAW, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Propellers, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to the surface form of the blades of a propeller for boats, and consists in so forming the surface of the blades that the propeller itself has the power while in rotation to cause the water in its field of action to flow inwardly as well as rearwardly, thus always furnishing a steady and even resistance for the propeller to react upon.

The object is to construct a propeller for boats that will admit of a high speed of rotation and still retain a firm and steady hold upon the water in its field of action. I attain this advantage by the construction illustrated in the accompanying drawings, in which—

Figure 1 is a rear end view of one of the propeller wheels. Fig. 2 is a plan view of one of my propellers and its shaft, also showing in dotted lines a method of determining the required surface form of the blades. Fig. 3 is a side view showing one of the blades in full and one in section, also indicating by dotted lines a method of determining the required surface of form of the blades.

It is well known that the propellers now in use if made to rotate above a certain velocity will break up the water and thus lose their hold upon the water and consequently their efficiency. The cause of this breaking up the water is that the propeller blades have heretofore been so shaped that when made to rotate with a velocity of rotation above a certain fixed rate they throw the water that is in their field of action outwardly and then break it up.

My propeller has blades the working surfaces of which are so formed that all of the water that comes within their field of action is thrown inwardly as well as rearwardly; thus the water is kept within the working space of the blades of the propeller, thus giving the propeller a body of water to act upon.

In Fig. 1 of the drawings the propeller is shown in elevation; the hub A, A^1, which may be shaped in the form approximating that of a frustum of a cone or pyramid, the larger end being indicated by A and the smaller by A^1. The blades B and C have working surfaces that are generated by the movement of a line one end of which is always at the point R and the other end directed by a circle, the plane of which is at right angles to a line that passes through the point R and the center of said circle. In other words, the working surfaces of the blades lie in the surface of a right cone the axis of which will be at an angle with the propeller shaft and the apex of the cone will be in front of the propeller and at a distance from the shaft, as shown in Figs. 2 and 3. The distance that the apex of the cone, that is, the point R, is from the propeller and from the shaft must depend upon circumstances. I have found by theory and experiment that the distance of the said apex from the center of the shaft is about one-half of the width of the blade, and the distance that the said apex is in front of the rear edge of the hub is about two and a quarter times the width of the blade.

The dotted lines refer to a device that I have used laying out the surface of the working side of the blade, and consists in an adjustable sliding piece N, which may be held at any desired position by the set screw N^1; an arm P extends laterally from the said sliding piece N and has a "ball and socket" joint at R. The radial wire S swings on this joint as indicated in the drawing Figs. 2 and 3. The moving end of the wire is directed by a circle the diameter of which and the distance of its plane from the point R will determine the angle or pitch of the blade. The above suggested location of the apex of the cone is not to be considered as exact but only approximate.

For convenience and ease of description I will term the boundary lines of the propeller blades as follows: The lines L L L of Fig. 2 I call the aft lines and the lines T T T, Fig. 2, the fore lines. The end A^1 of the hub is the aft end, and the end A is the fore end. The lines L L L indicate aft boundary lines and lie approximately in the surface of an imaginary cone the axis of which coincides with that of the axis of rotation of the propeller; that is, if the propeller is rotated in sand the pit left in the

said sand will be shaped as a frustum of a cone.

Claim.

A propeller having a coned hub larger on its fore end than on its aft end, and blades whose working surfaces leave the hub as a surface tangent to the surface of the said hub and continuing therefrom constituting coned surfaces, said coned surfaces of each blade being a part of the surface of a cone the axis of which is inclined to the axis of rotation of the propeller as described; the aft boundary lines, that is, the aft edge lines of the propeller blades, lie approximately in the surface of a cone the axis of which coincides with that of the rotation of the propeller; substantially as and for the purpose set forth.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, on this sixth day of May A. D. 1908.

HENRY F. SHAW.

Witnesses:

WILLIAM EDSON,

JAMES MACLEAN.