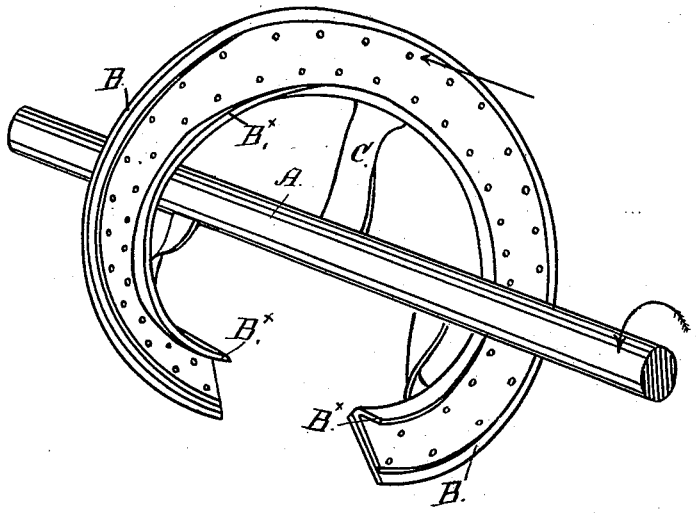
(No Model.) 3 Sheets—Sheet 1.

W. L. BOVYER.

PROPELLER FOR VESSELS.

No. 342,572. Patented May 25, 1886.

Fig. 1.



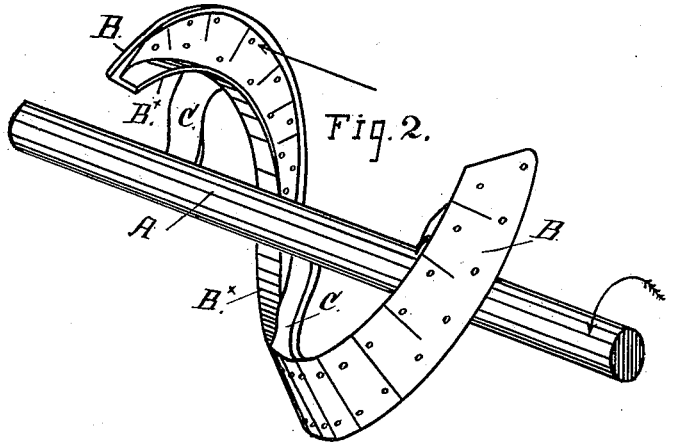


Fig. 2.

Witnesses:
Wm Mayer
John L. Taggard

Inventor:
Wm L. Bovyer
By his Atty., E. G. Dobbins

(No Model.) 3 Sheets—Sheet 2.

W. L. BOVYER.

PROPELLER FOR VESSELS.

No. 342,572. Patented May 25, 1886.

Fig. 3.

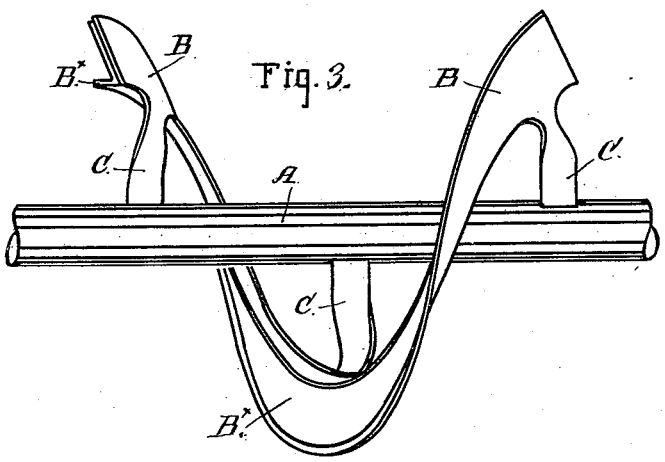
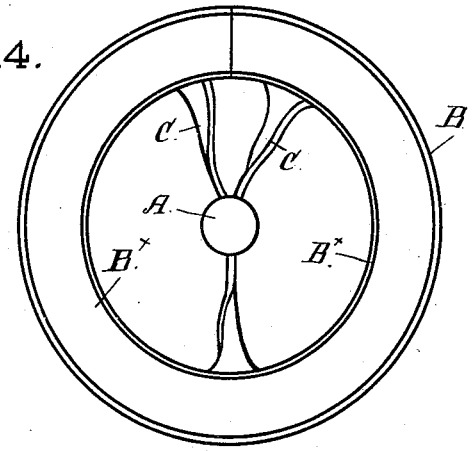


Fig. 4.



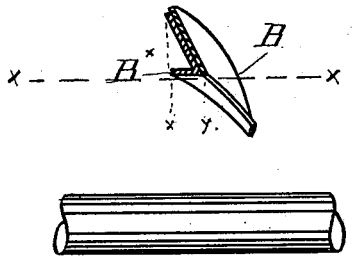
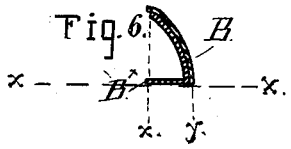


Fig. 5.

Fig. 6.



Witnesses:
Wm. Mayer
John L. Taggard

By his Atty:

Inventor:
Wm L Bovyer
E E Evans

(No Model.) 3 Sheets—Sheet 3.

W. L. BOVYER.

PROPELLER FOR VESSELS.

No. 342,572. Patented May 25, 1886.

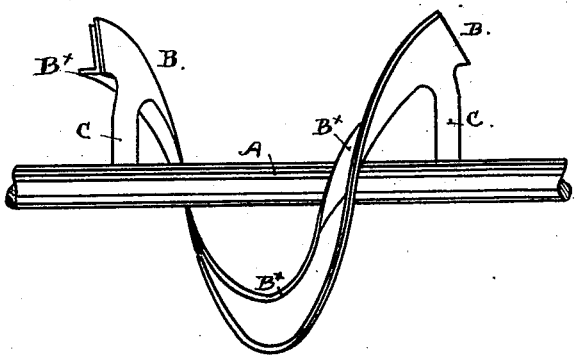


Fig. 7.

Witnesses:
Wm. Mayer
John LeTeggard

Inventor:
Wm. L. Bovyer
By his Atty., L. L. Coburn

UNITED STATES PATENT OFFICE.

WILLIAM L. BOVYER, OF SAN FRANCISCO, CALIFORNIA.

PROPELLER FOR VESSELS.

SPECIFICATION forming part of Letters Patent No. 342,572, dated May 25, 1886.

Application filed February 11, 1886. Serial No. 191,529. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. BOVYER, a citizen of the United States, residing in the city and county of San Francisco, in the State of California, have invented certain new and useful Improvements in Propellers for Vessels; and I do hereby declare that the following is a full, clear, and exact description of my invention, reference being had to the accompanying drawings.

My invention relates to improvements in screw-propellers for vessels; and it consists in the production of a propelling device of the form and upon the principle of construction hereinafter explained, and also in an improved form of blade for propellers, as set forth.

Referring to the accompanying drawings by figures and letters, Figures 1 and 2 are perspective views of a propeller with a single continuous spiral blade and an open center constructed according to my said invention. In Fig. 2 the shaft is turned one-half a revolution and the blade is brought into a position diametrically opposite to that shown in Fig. 1. Fig. 3 is a side elevation of the form of propeller shown in Figs. 1 and 2, and Fig. 4 is an end view taken from the left-hand side of Fig. 3. Figs. 5 and 6 are cross-sections of two forms of blade, one presenting a plane and the other a curved face and both having a pitch or inclination backward of the acting surface with respect to the line of the shaft. Fig. 7, Sheet 2, illustrates a form of the propeller in which the face of the blade is set perpendicular to the line of the shaft.

A represents the outer end portion of a propeller-shaft. Its bearings and supports and the connection with an engine or motive power are not shown, as they have no particular relation to the invention and are not necessary either in the drawings or the description to a clear understanding of the nature of my invention or the mode of applying and carrying it out.

B is the propeller blade or surface acting against the body of water. It is formed of a continuous spiral blade of uniform pitch held by radial arms C in position around and equally distant from the shaft in such manner that the center is open all round the shaft and for the full length of the spiral. It is considered sufficient for all practical purposes to make but one revolution of the spiral around the shaft and to have the fore and aft ends pass or meet on the same longitudinal line.

The supporting-arms C may be flat or of any suitable form and character of construction adapted to hold the blade firmly in position clear of the shaft. The arms will be secured to the shaft also in a suitable manner.

Along the inner edge of the blade or that edge which is next to the shaft when the blade is set I form a flange or projecting surface, B*, either by turning up the edge portion of the blade and fixing it in such position that it extends from the face of the blade backward at an angle, or by securing along the edge of the blade an angle-plate, B*, Figs. 1 and 2. This projecting surface stands parallel with the line of the shaft and either at a right angle or an acute angle to the face B, according as this face of the blade is set perpendicular to or is fixed at an inclination with respect to the line of the shaft. In either case the lower or inner edge of the spiral blade is turned backward at an angle with the face B of the blade and parallel with the axis of the imaginary cylinder around which the blade is wound.

In that form of the propeller-blades composed of these two angular faces which is shown in Fig. 7 of Sheet 2 the principal face B is set perpendicular to the axis; but in the other views the construction represented has the outer edge of the blades pitched rearward, and the principal surface is therefore inclined toward the axis. The result of this mode of setting the blade is to produce a continuous plane surface without the warp or twist that is found in the form where the blade is set perpendicular to the axis. The same result will be obtained by making the blade B of a curved or concave plate, as illustrated in Fig. 6. All these forms are designed to secure effective hold upon the body of water and prevent dispersion, the turned or rearwardly-projecting inner edge acting to hold the water against lateral displacement under the pressure exerted by the principal face, and the inclination of this face tending to confine the water along the outer edge and cause it to be driven directly aft, thereby obtaining the greatest possible exertion of the spiral surface against the body of water around it.

It should be observed that the particular angle for the blade employed in this propeller shown in the several views of Sheet 1 may be varied without departing from the essential features of my invention, as I do not limit myself to such degree of inclination from the perpendicular, although I consider it to be the best for general purposes; neither do I limit myself to the particular width of angular face or projection B* on the edge of the blade. I have made this surface, however, about equal to the distance between the inner and outer edge of the blade B, projected upon the axis. Such projection is the distance from *x* to *y* on the line *x x*, Figs. 5 and 6.

The blade B should be of the character of construction best adapted to give lightness and stiffness with requisite strength. It may be built up of layers or segments or sections formed and bent to the required curve, or it can be made of a continuous plate.

The size of the propeller, as well as other conditions under which it is required to work, will determine the best mode of forming the blade.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A propeller for vessels, consisting of a spiral blade fixed around a shaft, as A, by supports that leave the center open, and having the inner edge next the shaft turned backward to stand at angle with the acting surface of the blade, substantially as herein described.

2. In a propeller for vessels, a blade having its acting face formed of two surfaces standing at a right angle or less than a right angle to each other, and having one surface substantially parallel with the line of the propeller-shaft and the other surface extending outward perpendicular to or at an angle with such parallel surface, substantially as described.

3. A propeller for vessels, having a spiral blade, as B, with a projecting flange or surface, as B*, on the inner edge and fixed to the propeller-shaft by arms, as C, the principal face of the blade being inclined to the axis and the face B* standing substantially parallel with it.

WILLIAM L. BOVYER.

Witnesses:
JAMES L. KING,
EDWARD S. OSBORN.