(Model.)

E. BENNETT.

SCREW PROPELLER.

No. 345,761. Patented July 20, 1886.

FIG. 1.

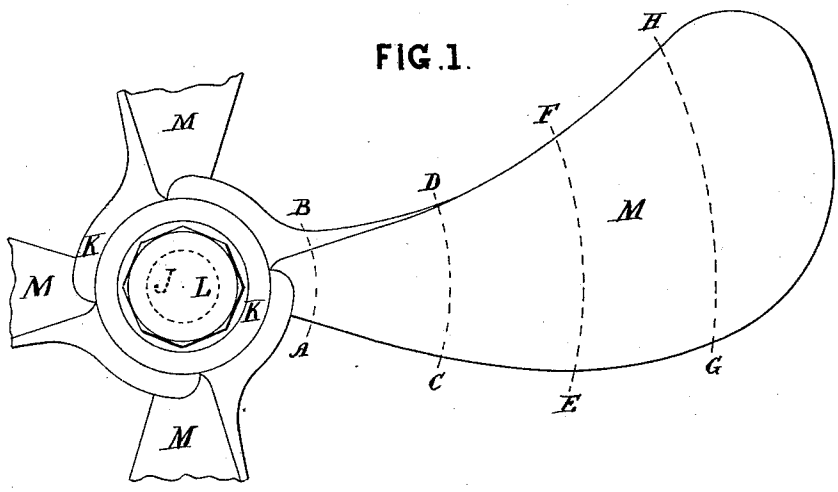

FIG. 2.

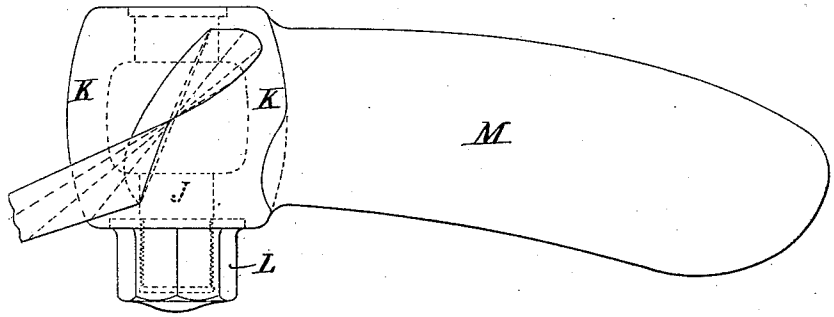

FIG. 3.

FIG. 5.

FIG. 4.

FIG. 6.

Witnesses.
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UNITED STATES PATENT OFFICE.

EDWIN BENNETT, OF RIO DE JANEIRO, BRAZIL, ASSIGNOR OF ONE-HALF TO RICHARD LAVERY, OF BOSTON, MASSACHUSETTS.

SCREW-PROPELLER.

SPECIFICATION forming part of Letters Patent No. 345,761, dated July 20, 1886.

Application filed November 21, 1885. Serial No. 183,576. (Model.)

To all whom it may concern:

Be it known that I, EDWIN BENNETT, a subject of the Queen of Great Britain, residing at Rio de Janeiro, in the Empire of Brazil, South America, have invented a certain new and useful Improvement in Screw-Propellers entitled a "Differential Pitch-Screw Propeller," of which the following is a specification.

My invention relates to that form of screw-propeller wherein the angle of pitch varies from the hub to the periphery, and is termed an "expanding" pitch, also the angle of the blades varies on the pitch-line. The blades are deflected backward, to admit of an easier motion on entering the water.

The objects of my invention are greater efficiency and less vibration to the vessel; and to that end I advance the blade adjoining the hub, and make it the leading edge in its spiral path while revolving in the water and propelling the vessel ahead, and likewise make the blade at this same point the greatest pitch. The blades of the screw, as they project outward from the hub, decrease in pitch until the periphery is reached, where the pitch is least. The forward edge of the blade at periphery is also the last to cut the water in its spiral path. I prefer to make the proportion of surface of blade to immersed amidship-section as two is to seven. I prefer to make the pitch of the screw greatest at the hub, and gradually diminish the pitch toward the periphery, thereby deflecting the current of water toward the hub of the propeller, where the combined currents, upon meeting, will react upon each other and finally be deflected in a direction diametrically opposite to the course of the vessel. For example, the screw, when in operation, will force the water backward at a greater velocity at the hub or center of the wheel than at the periphery, and thereby form a partial vacuum or vortex at the hub or center of the wheel, into which the water from the outer circle of the wheel (as described by the sweep of the propeller-blades) will have a tendency to rush, and in meeting will react upon each other and upon the vessel, after which they will take a course directly astern. The water, in moving in straight lines, will have less tendency to churn or whirl at the periphery of the screw.

Referring to accompanying drawings, which form part of this specification, Figure 1 is a rear view of the propeller as it appears attached to the shaft with portions of three of the blades broken away. Fig. 2 is a top or plan view, looking downward upon the propeller as it is attached to the shaft. Figs. 3, 4, 5, and 6 are sections of one of the blades.

A B C D E F G H, Fig. 1, denote the radii at which the sections as represented by Figs. 3, 4, 5, and 6 are taken.

J represents a portion of the shaft; K, the hub; L, the nut for securing the propeller on the shaft; M M M M, the four blades of the propeller, only one of which is complete, the others are shown broken off. The leading edge of the blade projects forward at the hub K, and is represented by the curve A C E G, Fig. 1. At A, Fig. 1, the pitch is greater than at C, and diminishes outwardly toward the periphery.

The trailing edge of the blade is represented by the curve B D F H, Fig. 1. The pitch at B is greater than at D, and gradually diminishes outwardly toward the periphery also. I prefer to make the pitch of the trailing edge greater than the leading edge.

To illustrate the advantages derived from my propeller, when in operation, the blades as they sweep through the water in their spiral path project streams of water backward at different velocities. The pitches of the blades being greatest at the center or hub, the maximum velocity of the current of water moving backward will be at that point. As a resultant, a partial vacuum will be created, to fill up which a current of water from the periphery will set inward, and thereby counteract the flow due to centrifugal force.

What I claim as my invention, and desire to secure by Letters Patent, is—

A screw-propeller with the leading edges of the blades of less pitch at the hub than the trailing or after edges of the blades at the hub, the pitches of both leading and after edges diminishing toward the periphery, substantially as set forth and specified.

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

EDWIN BENNETT.

Witnesses:
C. G. S. SHALDERS,
C. C. ANDREWS.