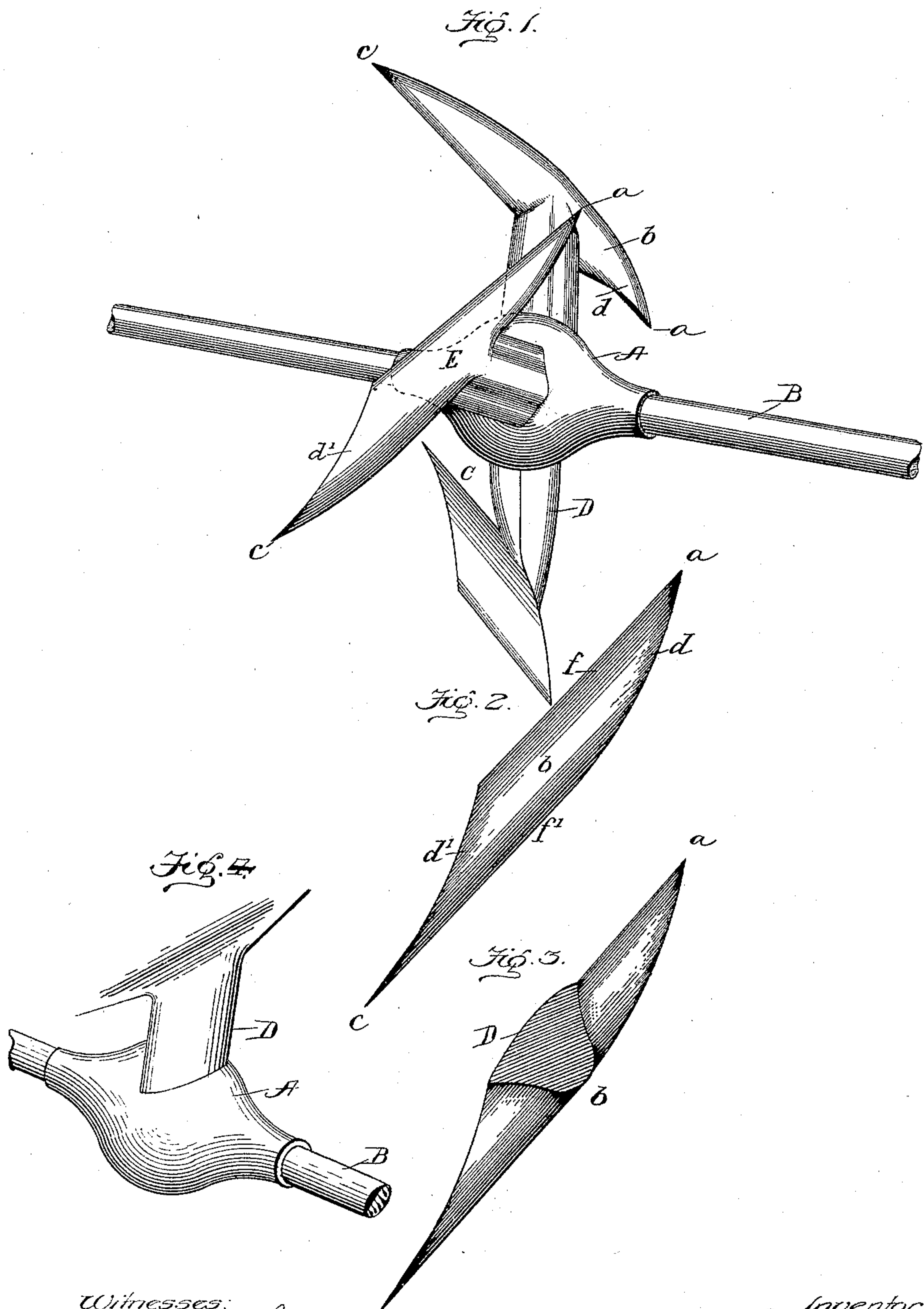


(Model.)

J. R. J. ZUBERBUHLER.  
SCREW PROPELLER.

No. 584,449.

Patented June 15, 1897.



Witnesses:

J. M. Fowler Jr.  
J. L. O'Leary

Inventor  
Johann R. J. Zuberbühler

By J. W. Barker  
his Att'y.



# UNITED STATES PATENT OFFICE.

JOHANN R. J. ZUBERBÜHLER, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO W. CULLEN BREWSTER, OF SAME PLACE.

## SCREW-PROPELLER.

SPECIFICATION forming part of Letters Patent No. 584,449, dated June 15, 1897.

Application filed July 3, 1896. Serial No. 597,950. (Model.)

*To all whom it may concern:*

Be it known that I, JOHANN R. J. ZUBERBÜHLER, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Screw-Propellers, of which the following is a full, clear, and exact specification.

The purpose of this invention is to produce a screw-propeller of a novel and such improved construction as to minimize resistances, frictional and otherwise, reduce vibration and positive slip, while obtaining the most effective thrust in propelling a ship.

With these objects in view the leading features of my invention may be summarized as follows:

*Geometrical features.*—First, propeller-blade rhomboidal in shape, having an inner concave surface and an outer convex surface, both surfaces thereof being curved parabolically to form fine leading lines, such blades presenting sharp piercing points and sharp tailing points; second, a propeller-blade having the above-mentioned characteristics that is suitable in length and which is supported upon an arm in such an angular position that the leading lines thereof are approximately in the path of successive pressure; third, the boss which connects the blades with the propeller-shaft consists of a spherical body tapering toward the shaft in front and rear to give less obstruction to the water through which it passes; fourth, short arms uniting the blades with the boss, said blade being of such section, angular arrangement, and inclination as to offer a minimum of resistance during their passage through the water.

In order that my invention may be clearly understood and explained in detail, I have annexed drawings hereto, in which—

Figure 1 is a perspective view of my improved screw-propeller. Fig. 2 is a detached side view of the back of a blade substantially positioned like blade E in Fig. 1, showing the sharp forward or piercing point *a*, the sharp rearward or tailing point *c*, the inner leading edge *d*, the outer leading edge *d'*, the generating edges *f* and *f'*, and the convex back of

the blade *b*. Fig. 3 is a section through one arm, looking down upon the blade. Fig. 4 is a perspective view of the boss and one arm, showing the latter's position on the boss, the inner side or face of the arm being shown.

In said figures, A indicates the boss of the propeller, which is mounted upon shaft B and supports blades C by means of intermediate arms D. I do not wish to be limited to the number of said blades C which may be used, but I have shown a propeller having three blades in this application.

The boss A comprises a body having a certain diameter at its central portion, wherefrom the blades C project, and said boss tapers axially at both ends, so as to enable it to pass through the water with but slight resistance, whether the vessel be moving forwardly or rearwardly.

The arms D are shaped in cross-section at the point where they connect with the boss substantially the same as the longitudinal shape of the boss, excepting that said arms D have sharp side edges *d* wherewith to cut through water. The curvature of arm D upon its inner side decreases gradually from the point of contact with the boss to the connection with the blade, where it conforms to the contour of the inner surface of said blade.

The arms D, while projecting radially from the boss, are preferably warped and hold the blades C at an angle suitable for the best service, preferably at about forty degrees. Said blades C, as seen, are rhomboidal in shape and have each a concave inner surface and a convex outer surface. Said blades have each what may be termed a "sharp entering point" *a*, a "sharp entering edge" *b*, and a "sharp leaving point" *c*. The inner edge *d* and outer edge *d'* are approximately in the line of successive pressure, so that as much as possible of the blade acts successively and uniformly on the water set in motion, the pressure, the resultant effective pressure, being almost due aft.

It is to be understood that the rhomboidal shape of the blades may be modified by slightly curving any or all of the edges of said blades. It is also understood that the



arms may be shortened to any extent or may be altogether omitted, so that the blades rest directly on the boss.

*Determination of its action.*—By the construction set forth the blade acts on the water as a wedge with its sharp entering point and edge and passes therethrough, so as to make a drawing cut that acts powerfully against the water in a direction parallel to that of the shaft to give a maximum of effective thrust directly rearward with a minimum of ineffective vertical pressure, thereby effecting a saving in motive power.

The inclination of my propeller-blades to the line of vertical motion and the diagonal position of said blades with reference to the shaft and the simultaneous horizontal movement when the ship is in motion combine to set the water in motion along the inner surface of the blades in a direction approximately at right angles to the carrying-arms, resulting in powerful thrust in the direction of the axis or shaft. The movement of the water being in the line of the leading edges it follows that every part of the blades does effective work, while the diagonal position of the blades on short arms (which latter are so shaped as not to induce a continuous flow of water from the boss toward the outer edge of the blades) reduce the disturbing influence of centrifugal force to a minimum.

Still another important result obtained is that of a more uniform action of each blade during its successive positions around its center, which is attained by reason of the shape and manner of positioning the blades to extend their reach, thereby obtaining more equal resistances above and below the center

line of rotation, which diminishes the amount of vibration and the consequent loss of power therefrom.

Having described my invention, what I desire to claim as new and useful is—

1. In a propeller, a boss tapering axially at its ends, arms radiating from said boss and supporting blades, said blades being rhomboidal in shape and having an inner concave surface and an outer convex surface, both of said surfaces being curved parabolically, said blades being arranged diagonally to said boss, substantially as set forth.

2. In a propeller, a boss, and blades on arms projecting radially from said boss, said blades being each rhomboidal in shape and having an inner concaved surface and an outer convex surface, both being curved parabolically, the leading edges of said blades being approximately at right angles to the radial carrying-arms, substantially as described.

3. In a propeller, a boss, and radial arms supporting blades diagonally to the axis of the boss, each of said blades being shaped as a concavo-convex rhomboid, substantially as set forth.

4. In a propeller, blades diagonally to the axis of the boss, each of said blades being shaped as a rhomboid, the leading lines of said blades being approximately at right angles to the radius of said boss.

In testimony that I claim the foregoing I have hereunto set my hand this 30th day of June, 1896.

JOHANN R. J. ZUBERBÜHLER.

Witnesses:

T. BRIDGWATER JONES,  
F. W. BARKER.