

W. S. HULL.
Screw-Propeller.

No. 204,575.

Patented June 4, 1878.

Fig. 1.

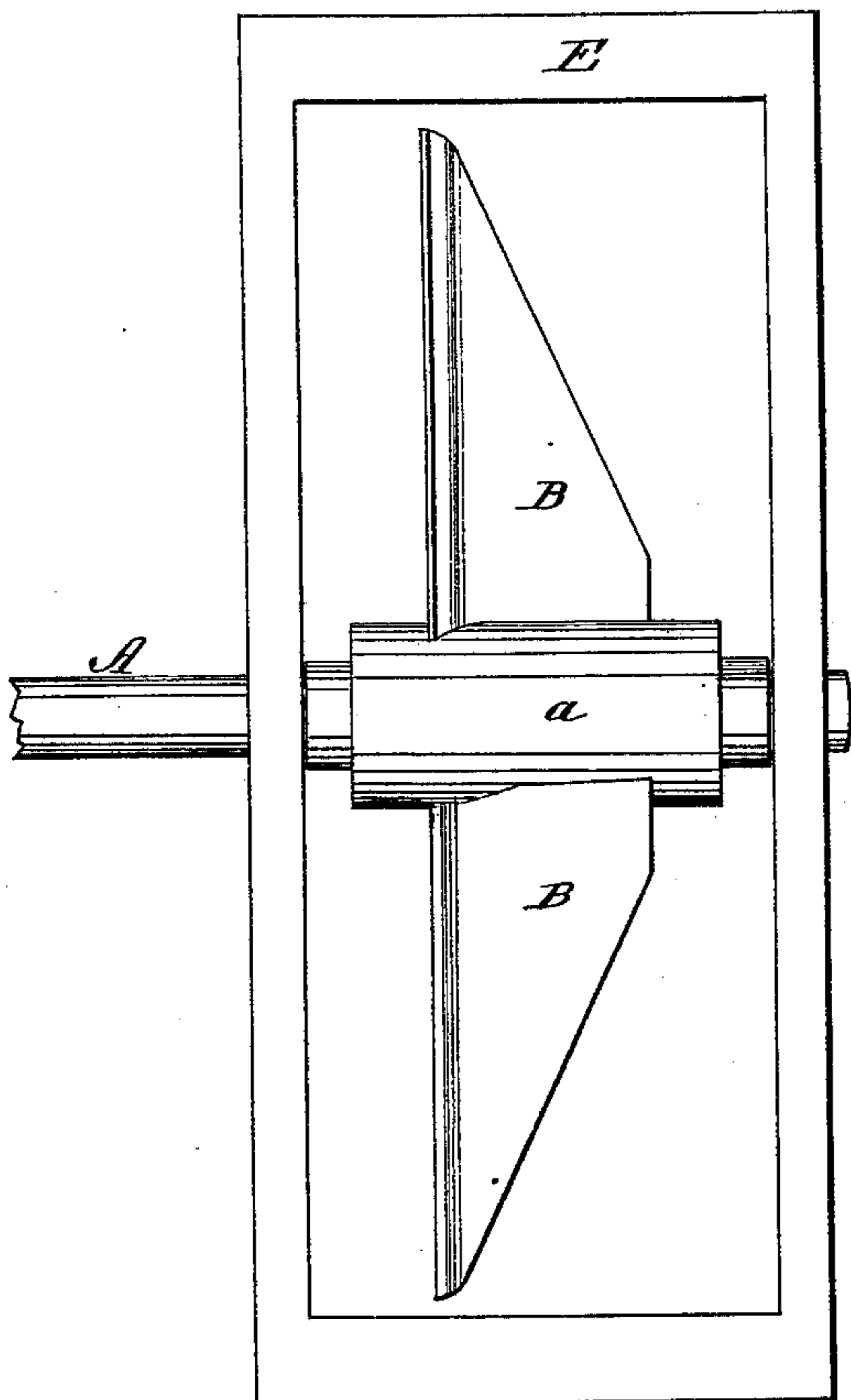
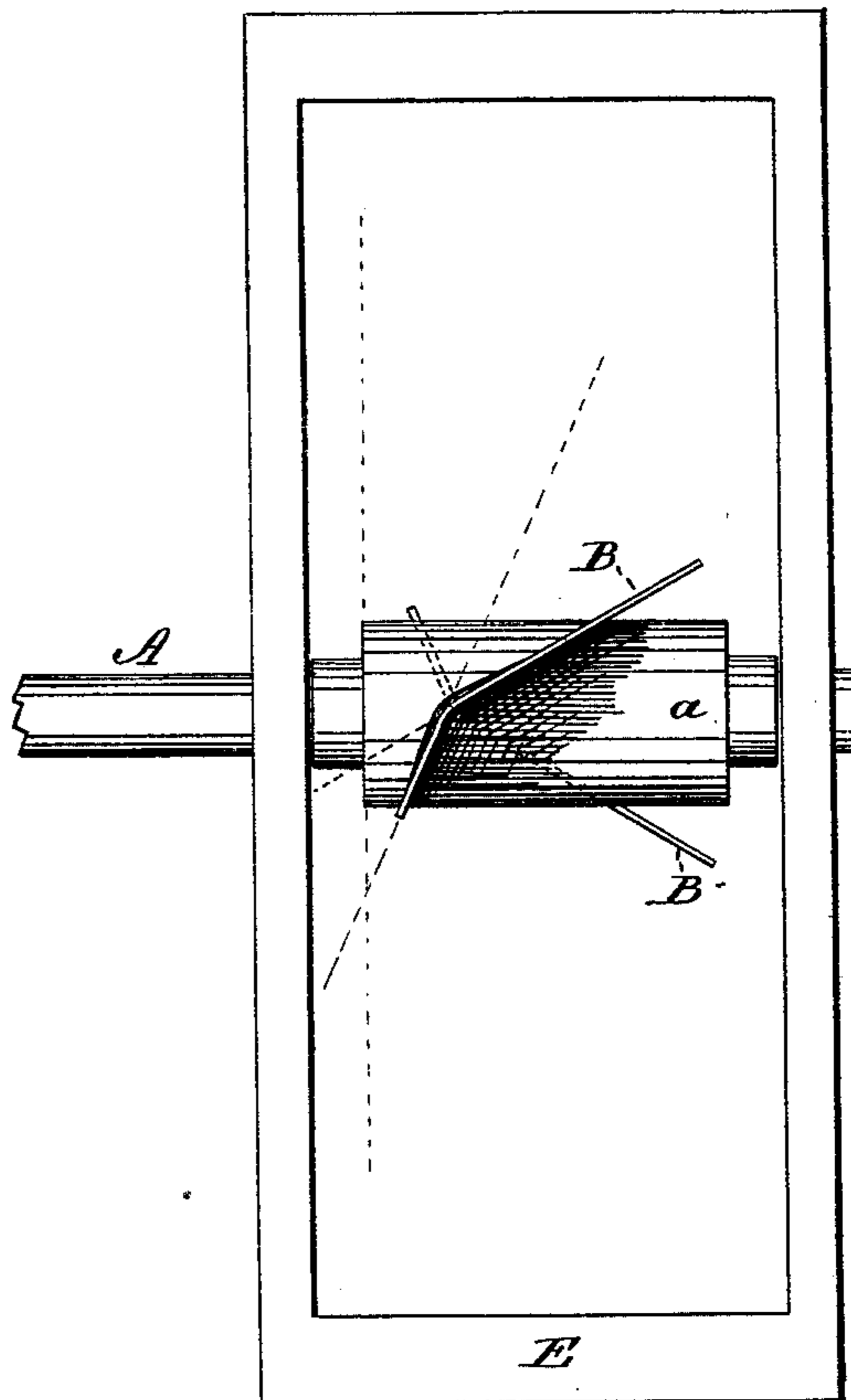


Fig. 2.



WITNESSES:

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BY

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UNITED STATES PATENT OFFICE.

WILLIAM S. HULL, OF HINDS COUNTY, MISSISSIPPI.

IMPROVEMENT IN SCREW-PROPELLERS.

Specification forming part of Letters Patent No. **204,575**, dated June 4, 1878; application filed March 28, 1878.

To all whom it may concern:

Be it known that I, WILLIAM S. HULL, in the county of Hinds and State of Mississippi, have invented a new and Improved Screw-Propeller; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is a side view taken at right angles to the blades. Fig. 2 is a side view taken in the plane of the blades.

My invention relates to an improvement upon the screw-propeller for which Letters Patent were granted me February 20, 1877.

Said improvement consists in giving to the leading-edge of the right-angled triangular blade a finer pitch, or smaller angle to the plane of rotation of the blades, than the pitch or angle of the rear portion of the blade.

It also consists in forming the propeller-shaft with a boss, and attaching the blades directly thereto, without the use of radial arms, as hereinafter more fully described.

In the drawing, A represents a portion of a propeller-shaft arranged in bearings in a frame, E, and rotated by any suitable driving mechanism. B B are the right-angled triangular blades, which are attached at their right angles to the shaft, and have one of their sides arranged radially and extended from said shaft at right angles, so as to form, with the hypotenuse, laterally-projecting tapering blades, the rear and less acute apices of which are deflected away from the shaft, all as substantially set forth in my said previous patent.

In connecting said blades to the shaft, however, instead of being supported upon radial arms, as in my said patent, I attach them directly to a boss, *a*, upon the propeller-shaft, which boss is about one-seventh the diameter of the propeller. Said boss is made solid when the propeller is to be used in water, but when designed for the air it is made hollow.

In fastening the blades to the boss they are arranged spirally, and are secured by stems which enter the boss, and grooves which receive the edges of the blade; or they may be fastened in any other desired way.

In constructing the propeller-blades, about

one-fourth of its width at the leading-edge is bent to a finer pitch, and at an angle of about thirty degrees less to the plane of rotation than the rear portion of the blade. The object of this arrangement is to prevent any flow of fluid to the front.

The angle or taper of the blades should be about the same as that laid down in my previous patent, or that formed when the shortest side of the blade is two-thirds the length of the longer side. This angle may be varied, however, and any number of blades may also be used.

The faces of the main portion of the propeller-blades should present a plain surface to act upon the fluid, by reason of the fact that no groove or channel can be made to carry a current under all velocities of the propeller. This is pursuant to my discovery of the fact that there is a constantly-varying direction of the discharge-current as the speed of the propeller is accelerated or retarded. Under a low velocity the current has a centripetal tendency, moving spirally inward. As the speed is accelerated the current varies in direction until a point is reached where the fluid is discharged directly to the rear of the point from which it is taken in the fore part of the propeller. It follows, therefore, that lines concave to the fluid will flood the active surface, and lines convex to the fluid will flood the passive surface of the propeller at velocities increased or diminished beyond that which is nominal.

Having thus described my invention, what I claim as new is—

1. The screw-propeller having right-angled triangular blades arranged spirally, as described, and having plain main surfaces, with the leading-edges of the blades bent to a finer pitch, substantially as and for the purpose described.

2. The propeller-shaft having a boss, E, in combination with the right-angled triangular blades arranged spirally, as described, and connected directly to said boss, as and for the purpose described.

WILLIAM S. HULL.

Witnesses:

H. F. CLINGAN,
JNO. T. HULL.