J. I. THORNYCROFT.

Screw-Propeller.

No. 167,136. Patented Aug. 24, 1875.

Fig. 2.

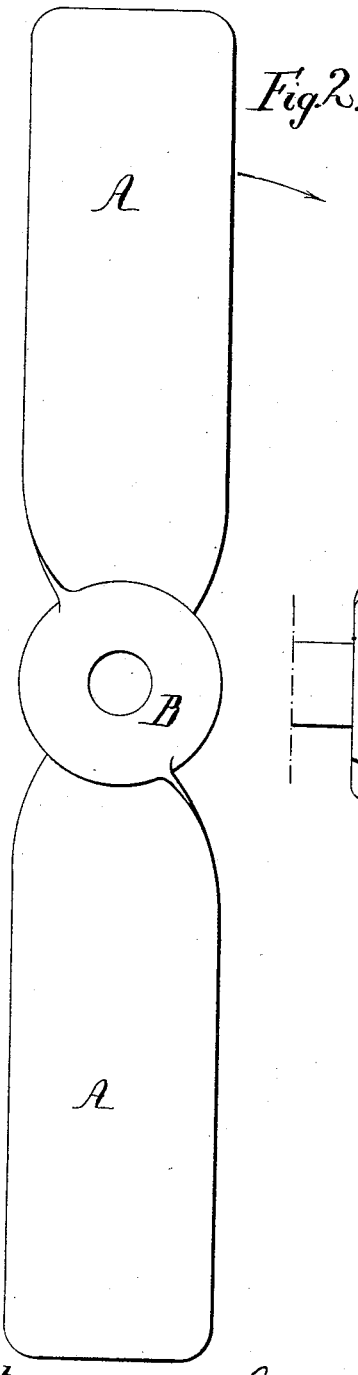


Fig. 1.

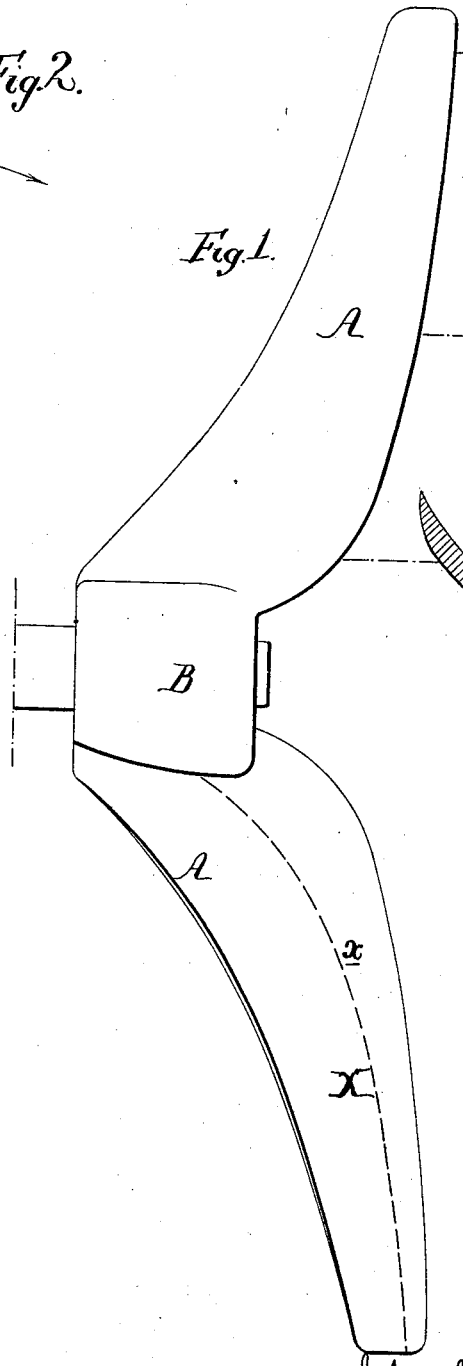
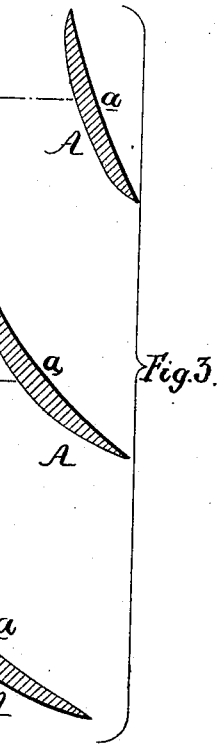


Fig. 3.



Witnesses,
Harry Smith
Hubert Howson

John I. Thornycroft
by his Attorneys
Howson and Sons

UNITED STATES PATENT OFFICE.

JOHN I. THORNYCROFT, OF CHISWICK, GREAT BRITAIN.

IMPROVEMENT IN SCREW-PROPELLERS.

Specification forming part of Letters Patent No. **167,136**, dated August 24, 1875; application filed November 9, 1874.

To all whom it may concern:

Be it known that I, JOHN I. THORNYCROFT, of Chiswick, county of Middlesex, Kingdom of Great Britain, have invented an Improved Propeller, of which the following is a specification:

The object of my invention is to so construct a propeller of a vessel as to counteract its tendency to drive the water in a lateral direction; and this object I attain in the manner which I will now proceed to describe, reference being had to the accompanying drawing, in which—

Figure 1 is a side view of a two-bladed propeller constructed in accordance with my invention; Fig. 2, an end view of the same; and Fig. 3, sectional views of the blade at the several points shown.

Ordinary propellers, when in operation, may be said to drive the water in two different directions, one volume of the disturbed water taking a backward course parallel to the axis of the propeller, and another a lateral course, at right angles to the same. While the water which takes the former course constitutes the propelling power, that portion which is forced laterally has not only no propelling effect, but represents a loss of power. This tendency to drive the water in a lateral direction is greatest nearest the hub or boss of the propeller, and decreases toward the tips of the blades.

It is with a view to counteract this tendency that I construct the propeller as shown in the accompanying drawing—that is, I make each blade A project rearward from the hub B of my propeller. The general direction of this rearward projection is represented by the dotted line X, Fig. 1, the curve being comparatively abrupt from the hub to about the point *x*, whence it gradually merges into an almost straight line at the tip of the blade. In other words, the rearward projection of each blade is made most prominent nearest the hub, and gradually decreases toward the tip. In addition to this rearward curve, I make each blade with an increasing pitch. I prefer to make the propeller of the sectional form shown in Fig. 3, the driving-face *a* being made slightly concave, and the opposite face convex.

When in operation, each blade, on account of the rearward projection and the increasing pitch imparted to it, will, at every revolution, catch the water, which has a tendency to take a lateral course, and throw the same rearward, and as this lateral tendency of the water is greatest nearest the hub, I make the rearward projection of the blade most prominent at that point in order the better to counteract said tendency. In this way, a large amount of power heretofore wasted is effectually utilized.

In practice I have found that a three-bladed propeller, five feet in diameter, and constructed according to my invention, will propel a steamboat eighty-seven feet long by twelve feet beam, (extreme dimensions,) on a river at an average speed of twenty-four and a half miles an hour.

I am aware that propellers have been heretofore constructed with their blades projecting rearward from the hub. This I do not claim; but

I claim as my invention—

1. A propeller the blades of which are projected rearward from the hub, said rearward projection being most prominent nearest the hub, and decreasing toward the tips of the blades, substantially as shown and described.

2. A propeller the blades of which have an increasing pitch, and are projected rearward from the hub, said rearward projection being most prominent nearest the hub, and decreasing toward the tips of the blades, substantially as shown and described.

JOHN ISAAC THORNYCROFT.

Witnesses:

W. LLOYD WISE,
Patent agent, London.
H. E. WILES, *London.*