

ROBERT HUNTER.

Improvement in Flexible Propellers.

No. 114,944.

Patented May 16, 1871.

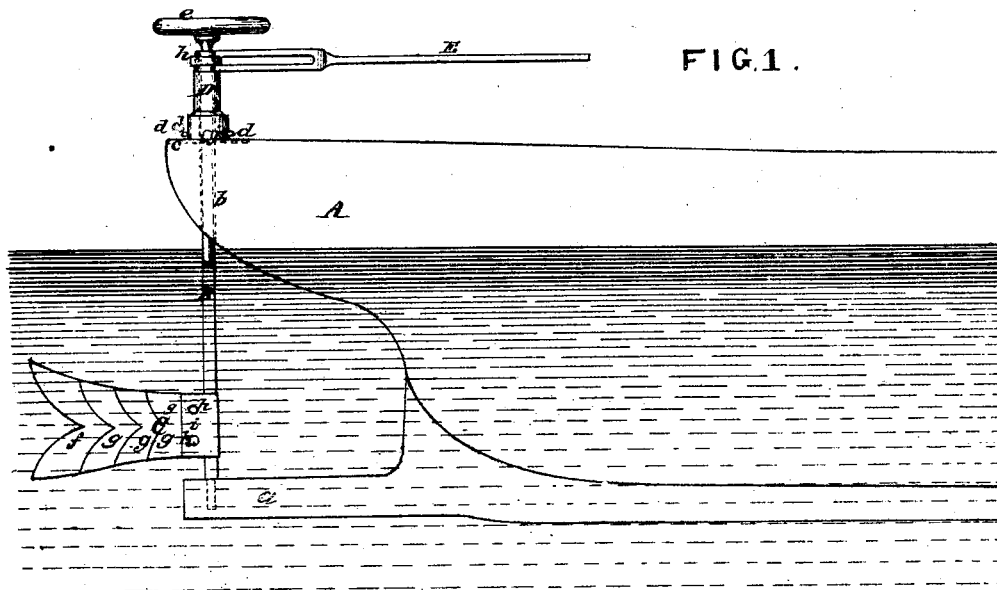


FIG. 1.

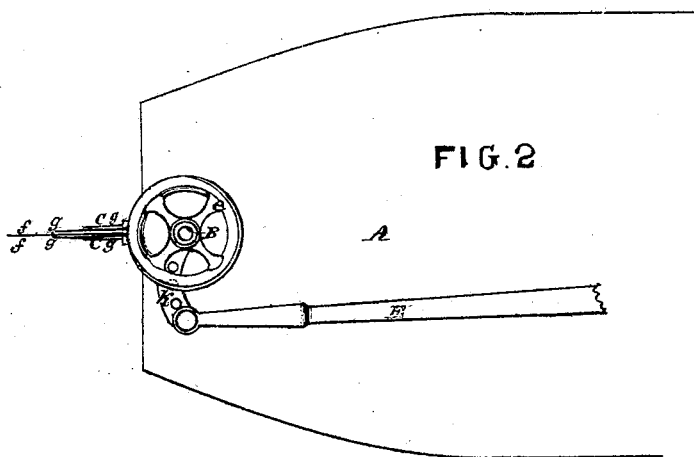


FIG. 2

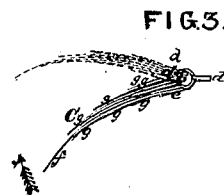


FIG. 3.

WITNESSES.

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ROBERT HUNTER, OF CINCINNATI, OHIO.

Letters Patent No. 114,944, dated May 16, 1871.

## IMPROVEMENT IN FLEXIBLE PROPELLERS.

The Schedule referred to in these Letters Patent and making part of the same.

I, ROBERT HUNTER, M. D., of Cincinnati, in the county of Hamilton and State of Ohio, have invented an Improved Propeller for Vessels, of which the following is a specification.

### *Nature and Objects of the Invention.*

My invention relates to fish-tail propellers, and consists in the employment or use of a thin elastic plate of suitable shape, supported by similar plates or leaves of decreasing length, applied equally to its respective sides to form a tapering flexible blade, which is, consequently, easily reversible, and has the strain distributed equally over its length, besides operating in a superior manner.

### *Description of the Accompanying Drawing.*

Figure 1 is an elevation of the stern of a boat, with my improved propeller applied in illustrative manner.

Figure 2 is a plan view of the same.

Figure 3 is a plan view of the propeller-blade and shaft as shown in the other figures, illustrating the operation of the blade, which is shown in two positions by full and dotted lines; the direction in which the blade is supposed to be moving being indicated by an arrow.

Like letters of reference indicate corresponding parts in the several figures.

### *General Description.*

A represents the hull of a boat, adapted, by a rearward keel-extension, *a*, a vertical socket, *b*, over said extension, and a metal bearing-plate, *c*, at the top of said socket, for the reception of one of my improved propellers.

B represents a vertical shaft, stepped in the support *a*, extending up through the socket *b*, and provided, above the plate *c*, with a pair of clutch-pins, *d*, and at top with a hand-wheel, *e*.

C represents a tapering flexible propeller-blade, composed of a thin plate, *f*, of steel or other elastic material and of proper shape, and a number of similar plates or leaves, *g*, of decreasing length, applied equally to the sides of the former, the whole being united and attached to the shaft B by bolts or rivets, *h*, passing through cheek-plates, *i*, projecting from the said shaft, between which the thick end of the blade is clamped.

D represents a clutch-sleeve, applied to the upper end of the shaft B, and constructed with a plurality of sets of clutch-notches, *j*, and an arm, *k*, having a series of perforations for the reception of the coupling-pins *l* of a pitman, E, reciprocated by a steam-engine or other motor.

The plates or leaves of the propeller-blade may be cut from sheet-steel, and may be of uniform thickness.

Two or more plates or leaves may obviously be substituted for each one in the arrangement represented and described without departing from the invention, so long as the flexibility and taper of the blade are retained.

The mode of uniting the plates or leaves of the blades and attaching the same to the propeller-shaft is variable; also, the manner of mounting the propeller-shaft.

The blade may further be employed without the shifting-gear described, or with any substitute therefor, and the said shifting-gear may be employed with any fish-tail propeller.

Two or more propeller-blades may be employed and in any effective position.

### *Operation.*

The blade C, being oscillated through its shaft B under the action of said shaft, the resistance of the water, and its own flexibility, is deflected, as represented in fig. 3, at the beginning of each stroke. The blade, being moved forward in this deflected condition, (see fig. 3,) and so presenting an oblique surface to the water, acting in the same manner as the tail of a fish, will impart a powerful impulse to the vessel in any direction desired, according to the position to which the blade is adjusted.

At the termination of each impulse of the shaft the end of the blade which receives the greatest deflection will, by its resilience, be thrown over instantaneously to the extremity of its stroke, in readiness for the return motion.

The taper of the blade causes its deflection and the strain incident thereto to be distributed in the most beneficial manner.

By lifting the sleeve D, and causing different sets of the clutch-notches of the same to engage with the clutch-pins *d* on the shaft B, the angle of the blade relative to its operating-arm *k* may be varied to any desired extent. In this action the hand-wheel *e* or its equivalent is used, the resistance of the water and the continued motion of the sleeve and vessel assisting.

The said wheel (or its equivalent) may further be employed for producing continued changes of the angle of the blade, as in steering up to a landing; the clutch-sleeve being maintained in an elevated position.

The series of perforations in the operating-arm or crank *k* admits of a variation of stroke, as desired.

The steersman or pilot may thus effectually and

almost entirely control the boat, both as to the speed and direction of its movement, without the aid of the engineer.

*Claim.*

I claim as my invention—

The propeller herein described, consisting of a number of plates or leaves of different sizes rigidly

attached at their inner ends to a common oscillating shaft, disconnected at their outer ends, and arranged, as herein specified, so as to support each other with a yielding pressure.

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Witnesses:

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