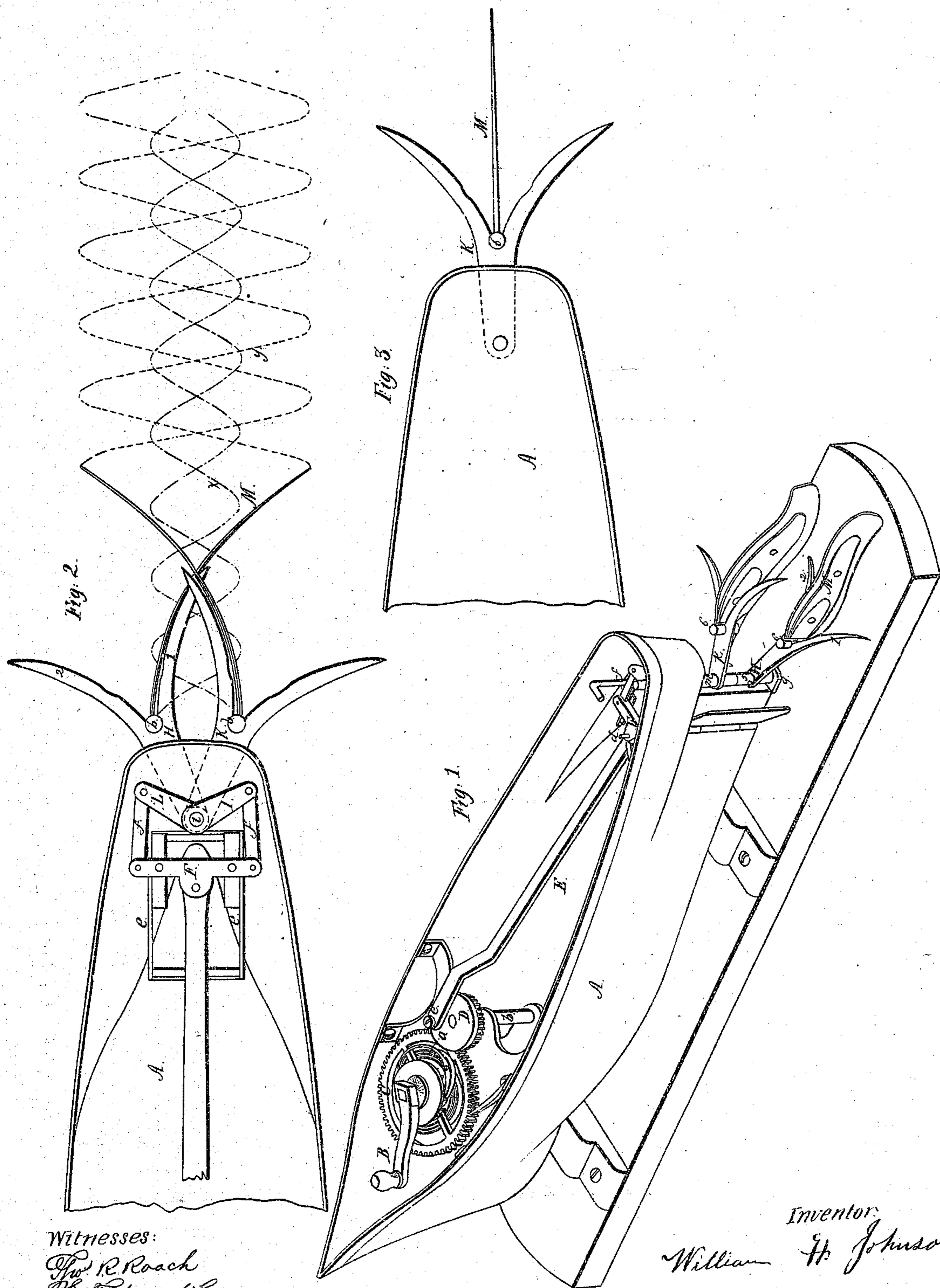


W. H. Johnson.
Vibrating Propeller.

N^o 35,451.

Patented Jun. 3, 1862.



Witnesses:
Thos R Roach
R. B. Schenck

Inventor:
William H. Johnson

UNITED STATES PATENT OFFICE.

WILLIAM H. JOHNSON, OF SPRINGFIELD, MASSACHUSETTS.

IMPROVED MARINE PROPELLER.

Specification forming part of Letters Patent No. 35,451, dated June 3, 1862.

To all whom it may concern:

Be it known that I, WILLIAM H. JOHNSON, of Springfield, in the county of Hampden and State of Massachusetts, have invented an Improved Propeller for Vessels, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view of a vessel with my improved propellers attached; Fig. 2, a plan of the propellers and after part of the vessel, and a diagram showing the path of the blades through the water when the vessel is being propelled; Fig. 3, detail to be referred to.

My present invention has for its object to produce a propeller for vessels which shall utilize and render effective for the propulsion of the vessel a large proportion of the power applied to operate the propeller, and to which the power of the engines may be readily and economically applied; and my invention consists in a propeller having a rigid vibrating arm to which is pivoted an elastic blade.

I am aware that an elastic blade firmly attached to a rigid arm has been used as a propeller; but the action of the pivoted blade is entirely different. In the latter case the elastic blade, in its attempt to follow the sinuous path described by its pivot, as the arm is vibrated at the same time the vessel is advancing, has a considerable proportion of its surface constantly reacting against the body of water behind it, thus tending to drive the vessel ahead with the greater part of the power used to vibrate the arm to which the blade is connected.

That others skilled in the art may understand and use my invention, I will proceed to describe the manner in which I have carried out the same.

In the said drawings, A represents the hull of a steam-vessel. For the purpose of illustrating the movement of the propeller, I have placed in the vessel a coiled spring, *a*, which is wound up by a crank, B, which spring, when released, revolves a cog-wheel, C, which engages with a pinion, D, on a vertical shaft, *b*, supported in suitable bearings. A connecting-rod, E, is pivoted at *c* eccentrically to the face of the pinion D. The other end of this rod E is pivoted at *d* to a cross-head, F, which

slides on suitable ways, *e*, attached to the vessel. To each end of this cross-head is pivoted a rod, *f*. I will here state that I have represented two of my propellers applied to this vessel, and that I prefer to use them in pairs, vibrating in opposite directions, as one counteracts and balances the other and prevents the oscillating motion which a single one would communicate to the vessel. A vertical shaft, *i*, placed immediately abaft the stern-post G, rests on a step, *g*, projecting aft from the keel. To this shaft is attached, by means of a collar, 5, and pin, at a short distance above the step, a rigid forked arm, H, and to the upper end of this shaft, above where it passes up through the stern of the vessel, is attached an arm, I, to the outer end of which is pivoted one of the rods *f*. A sleeve, *m*, to which is attached another rigid forked arm, K, embraces the shaft *i* above the collar 5. It has attached to its upper end, immediately beneath the arm I, a similar arm, L, to the outer end of which is pivoted the other rod *f*. Thus as the cross-head F is moved back and forth on its ways the two forked arms H and K are vibrated horizontally in opposite directions. The edges of these arms should be made thin, to offer as little resistance as possible in passing through the water.

As the propellers are similar, I need describe but one of them. The arm H has its fork or legs 1 and 2 curved gradually outward and brought to a point at the extreme end. Between these ends and at the crotch of the fork is pivoted to the arm H on a vertical pivot, 6, an elastic blade, M, which is free to vibrate horizontally between the legs 1 and 2 of the fork. The blade M here shown is made of sheet-brass stiffened along the middle of its length and at the end which is pivoted by additional layers or scales. Other metals may be used—such as galvanized steel—and other modes of constructing the blade may be adopted, the object being to have the blade as flexible and elastic as is consistent with the strength required by its dimensions, the size of the blade as well as the length of the arm H being apportioned to the size of the vessel and power of the engine.

The legs 1 and 2 or fork may in some cases be dispensed with; but I prefer to use them, as

they carry the blade M through a greater lateral sweep than it would otherwise take.

When the engine is not in operation, the propeller or propellers may occupy a position in the axis of the vessel, as shown in Fig. 3, and offer but little obstruction to her passage through the water, in this respect being well adapted to use as an auxiliary power to sailing-vessels.

The motions of this propeller will be understood from the diagram in Fig. 2. The red line *x* represents, approximately, the path of the pivot 6 and the front end of the blade M. This will of course vary with the relative rapidity with which the rigid arm H is vibrated and the speed of the vessel through the water. The dotted line *y* shows, approximately, the path which would be described by the extreme end of the blade if it were only slightly flexi-

ble and were carried around by the legs 1 and 2 of the fork; but the more flexible the blade is made throughout its length the more nearly will its path approach to that of its pivot 6, which it endeavors to follow. This sinuosity of the blade M enables it to present at all times some portion and during the greater part of its sweep a large proportion of effective propelling-surface to the water.

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

A propeller for vessels, consisting of a rigid vibrating arm, H, to which is pivoted an elastic blade, M, substantially as specified.

WILLIAM H. JOHNSON.

Witnesses:

THOS. R. ROACH,

P. E. TESCHEMACHER.