

J. F. Allen.
Vibrating Propeller.

N^o 54,481.

Patented May 8, 1866.

Fig. 2.

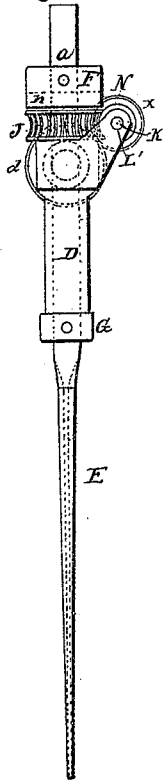


Fig. 1.

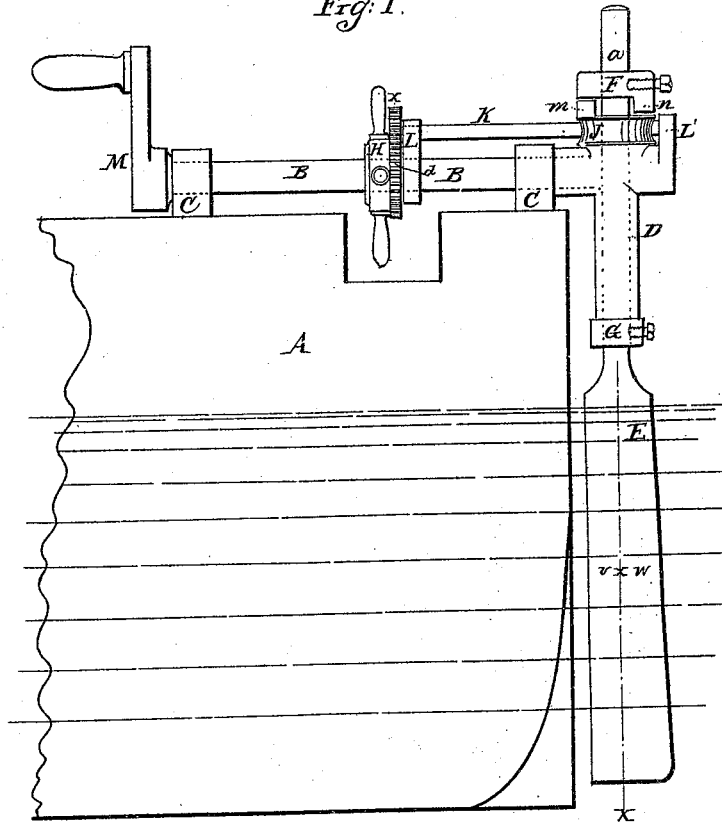


Fig. 3.

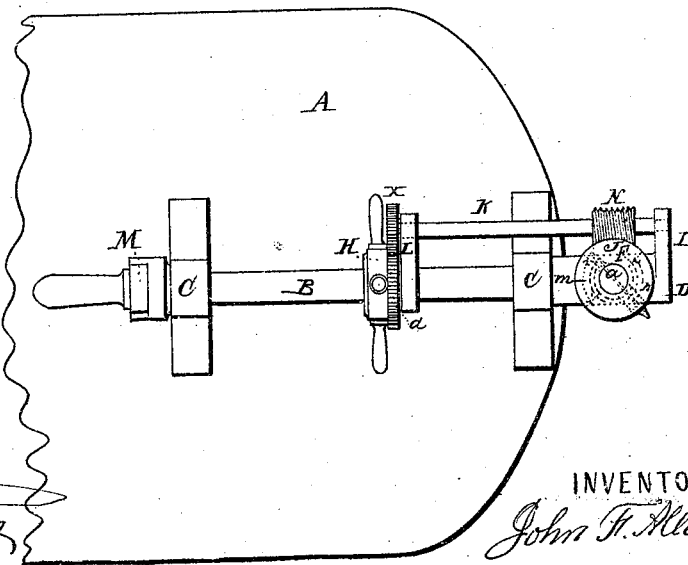
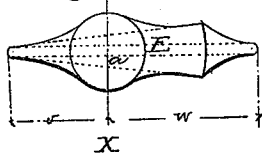


Fig. 4.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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IMPROVED PROPELLER.

Specification forming part of Letters Patent No. 54,481, dated May 8, 1866.

To all whom it may concern:

Be it known that I, JOHN F. ALLEN, of New York, in the county and State of New York, have invented a new and Improved Propeller; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in the arrangement of a propeller-blade, of a shape similar to an oar, attached to the end of a horizontal shaft, and receiving from said shaft a sidewise-vibrating motion, and combined with a projection at a suitable part on its shank, operating in combination with a projection or stop capable of being regulated and attached to the driving-shaft, whereby the pitch or position of the propeller-blade may be regulated in either direction in such a manner that while the boat or vessel will be propelled by the action of this propeller-blade said boat may at the same time be steered by the same.

Figure I represents a side view, Fig. II an end view, and Fig. III a top view or plan, of my improved propeller and the manner of attaching the same to the driving-shaft. Fig. IV shows, at an enlarged scale, a top view of the propeller-blade.

Similar letters represent similar parts.

In the accompanying drawings, A represents a part of a vessel, on the upper part of which the driving-shaft B is situated, supported in suitable bearings C C. To the end of this shaft B a box or tube, D, is attached, running at right angle to the line of this shaft B.

E is the propeller-blade. The upper part, *a*, of this propeller is made round and fitted into the box or tube D, and the lower part of said propeller is made about similar to the blade of an oar, only with this difference: that that side of said propeller-blade *w* aft of the center line is made of a greater surface than the side *v*, situated forward of the perpendicular center line, X.

Around the shank *a* of the propeller-blade, and resting upon the top of the box or tube D, a worm-wheel, J, is placed, having on its upper surface a projection, *m*. Above this wheel J a collar, F, is fastened to the shank *a* of the propeller-blade E, provided with a suitable projection, *n*, on its under side, and resting upon the worm-wheel J, and by which

said collar F the propeller-blade E is likewise kept in its desired position and prevented from falling out of the box or tube D. A collar or washer, G, is fastened to the lower part of the shank *a*, bearing against the bottom of the tube D, so as to keep the propeller-blade in its desired and fixed position. By this arrangement the propeller-blade E is kept firm in the box or tube D, but capable of turning around in the same in the manner hereafter described.

At the after part of the driving-shaft B a small shaft, K, is placed parallel with the shaft B and supported in bearings L L', fast to said shaft B and to the end of the box or tube D. This shaft K is provided at its forward end with a wheel or pinion, *x*, meshing into a wheel, *d*, fast to a hand-wheel, H, and moving, together with said wheel *d*, loosely around the driving-shaft B. On this shaft K a worm, N, is fastened, working into the worm-wheel J.

At the inner end of the driving-shaft B a crank, M, is attached, to which the power is applied to give to this shaft B and the different parts attached to the same a vibrating motion.

When motion is given to the shaft B the propeller-blade E will be moved from one side of the vessel to the other side, describing a part of a circle with the shaft B as a center. The friction of the water will act at the same time against the surface of the propeller-blade, and, as before described, the surface *w* on one side of the center line is larger than the surface *v* on the other side of the perpendicular center line, X, the act of forcing the propeller-blade through the water will turn the propeller-blade E so as to bring the surface *v* or the front of the propeller-blade forward of the center line, X, turning the same so far around until the projection *n* on the under side of the collar F comes against the projection *m*, on the top of the worm-wheel J, and passes in that position through the water from one side to the other side. When the shaft B is turned in the other direction the water will act again against the propeller-blade, so as to turn the same around, bringing again the forward end of said blade E forward toward the line of motion, until stopped by the projection *n* coming in contact with the opposite side of the projection *m*.

By this arrangement it will readily be per-

ceived that while the power applied to the shaft B will move the propeller-blade from one side of the vessel to the other side backward and forward, the action of the water against said blade will always, at the beginning of each stroke either way, turn the blade around so as to bring the forward part of the blade forward to its line of motion, until stopped by the projection *n*, on the under side of the collar F, coming in contact with either the one or the other side of the projection *m*, on the top of the worm-wheel J. The length of the projection *m* and the position of the same will consequently regulate the inclination at which the propeller-blade E will be forced through the water, or, in other words, the pitch of the propeller-blade. When this worm-wheel J is moved by its gearing in a position, as represented in Fig. III, so that the stop or projection *m* will be in the center line of the shaft B and project equally on both sides, the inclination or pitch of the propeller-blade, while passing from one side of the vessel to the other side and back again, will be consequently in both directions exactly the same, (supposing that the collar F is fastened on the shank *a* of the propeller-blade, so that the projection *n* at its under side projects equally on each side of the center line of the blade,) exerting therefore an equal force in either direction upon the water, and propelling thereby the vessel straight ahead.

When the shaft K is turned by means of the hand-wheel H the worm N will act upon the worm-wheel J so as to turn the same either in one or the other direction, moving thereby the projection *m* likewise, so that the same will project more on one side of the center line than on the other side, in consequence of which the inclination or pitch of the propeller-blade will be increased in one direction and diminished in the other direction of its motion, and consequently its action upon the water, as well as propelling-power upon the vessel, will be increased and be greater in this one direction than in the other, acting, therefore, so as to move the vessel more toward one side than toward the other side, or steer the vessel into that direction. This operation of changing the pitch of the propeller-blade, either in the one or in the other direction, for the purpose of steering the vessel, can be accomplished while the propeller is in motion, making thereby the propeller to act at the same time as the rudder of the vessel.

On the after part of the vessel, at each side

of the propeller, stops or projections may likewise be attached, against which the forward part of propeller-blade shall come in contact near the end of its stroke, so that by the same the blade will be turned around its center into the other direction into the required position, instead of depending altogether upon the friction of the water against the propeller-blade to perform this operation; but I believe in practice this will not be found necessary, and that the action of the water acting against the surface of the blade (which, as before described, is greater on one side of the perpendicular center line, X, than on the other side) will perform the turning of the propeller-blade in the desired position at the beginning of each stroke without any further mechanical contrivance.

When the vessel is light and high out of the water the propeller may be easily lowered downward, so as to get always the required amount of hold on the water.

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

1. The arrangement of a propeller-blade at the end of a vibrating shaft which gives motion to said propeller-blade when said propeller does move at a regular and fixed pitch during the whole length of its motion, and is capable of being operated by the action of the water against its surface at the beginning of each stroke, in such a manner that thereby its forward edge shall always be brought forward to its line of motion independent of the direction in which this motion may be communicated, substantially as described.

2. The collar F, with a projection, *n*, fastened to the propeller, in combination with the worm-wheel J, provided with a projection or stop, *m*, and operating together in the manner and for the purpose described.

3. The arrangement of the worm-wheel J, with a suitable stop or projection, *m*, operated by suitable gearing, for the purpose of regulating and altering the pitch of the propeller-blade, substantially as set forth.

4. The arrangement described for changing the pitch of the propeller-blade while in motion, so as to make said propeller act at the same time as a rudder for the vessel, substantially as set forth and specified.

JOHN F. ALLEN.

Witnesses:

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DAVID MOSHER.