No. 706,198. Patented Aug. 5, 1902.

W. W. PHARES.

VIBRATING PROPELLER.

(Application filed Dec. 10, 1901.)

(No Model.)

Fig. 8.

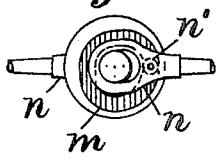


Fig. 1.

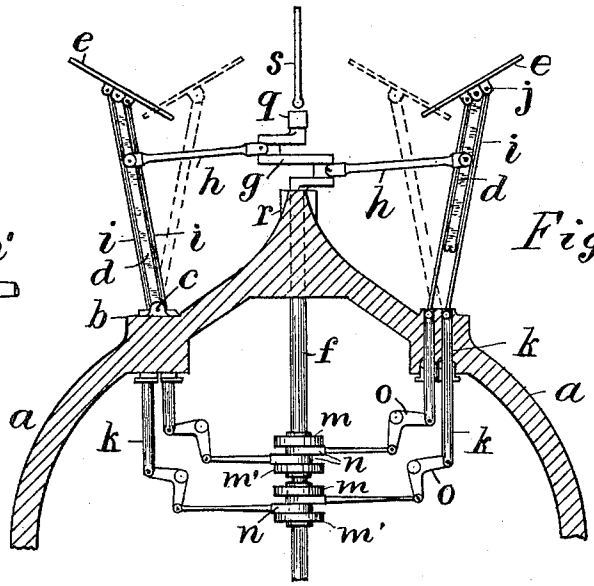


Fig. 2.

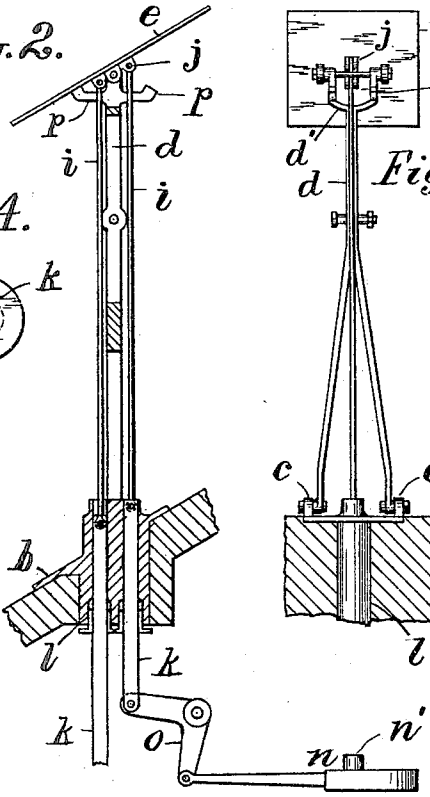


Fig. 3.

Fig. 4.

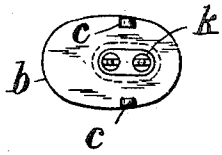


Fig. 5.



Fig. 6.

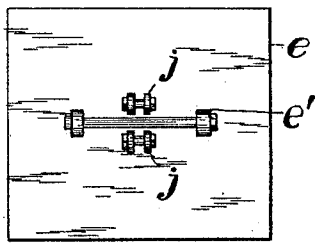
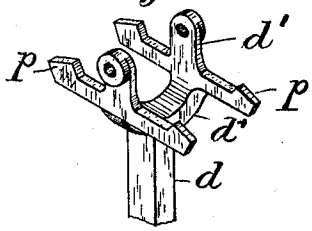


Fig. 7.



Attest:
L. Lee,
Walter H. Talmage.

Inventor.
William W. Phares, per
Thomas L. Crane, Atty.

UNITED STATES PATENT OFFICE.

WILLIAM W. PHARES, OF NEW YORK, N. Y.

VIBRATING PROPELLER.

SPECIFICATION forming part of Letters Patent No. 706,198, dated August 5, 1902.

Application filed December 10, 1901. Serial No. 85,358. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. PHARES, a citizen of the United States, residing at 43 West Thirty-sixth street, in the city, county, and State of New York, have invented certain new and useful Improvements in Vibrating Propellers, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The present invention relates to that class of devices used for propelling vessels in air or water and which is provided with two vibrating arms, each having at the end an oscillating blade, which is by suitable mechanism tipped in opposite directions as the blades are moved back and forth, so as to present an inclined surface to the water or air in the direction adapted to push the vessel forward. In the present invention the two arms are placed at equal distances from the center of the vessel and are vibrated by opposed cranks upon a central driving-shaft and the blades are tipped near the end of each vibration by connecting-rods attached to plungers, which are movable through stuffing-boxes in the hull of the vessel and are reciprocated by eccentrics or cams upon the driving-shaft.

The invention will be understood by reference to the annexed drawings, in which—

Figure 1 is a diagram showing in plan the nature of the various connections. Fig. 2 is a section of the connections for one of the propeller arms and blades, the view being taken on line 2 2 in Fig. 3. Fig. 3 is an elevation of the same viewed from the right-hand side of Fig. 2. Fig. 4 is a plan of the plate carrying the stuffing-boxes for the plungers and the forward joint of the arm. Fig. 5 is an edge view of one of the blades, and Fig. 6 the forward side of the same. Fig. 7 is a perspective view of the rear end of one of the arms. Fig. 8 is a cross-section of the central rotary shaft f and cam m.

a represents the hull of the vessel at the stern; b, the plates carrying the hinge-lugs c for the arms d.

e represents the blades, pivoted upon the arms by hinge-lugs e', and f is the central rotary shaft, having opposed cranks g, connected with the arms d by connecting-rods h. The cranks vibrate the arms normally from their outer positions (shown in full lines) to their inner positions, (shown in dotted lines,) and the blades e are tipped, as indicated, respectively, by the full and dotted lines, by means of links i, connected to the blades e by arms j, and reciprocated by plungers k, extended through stuffing-boxes l upon the plates b. The plungers k may be reciprocated by any suitable means, and I have shown grooved cams m and m' upon the crank-shaft for actuating the plungers by connection with bell-cranks o. A very small movement of the plunger is required to oscillate the plate e, and one arm of the bell-crank is therefore shown pivoted directly to the plunger and the other arm attached to a slide n, having a roller n', fitted to the groove in the cam m. The groove of the cam is so shaped in practice as to reverse the position of the plate e near each end of its stroke, the position after its reversal being indicated in the full and dotted lines in Fig. 1. To support the blade when thus tipped, the arm d is forked at its outer end, and its extensions d' are provided with opposed ears p, forming stops, against which the forward side of the blade rests during the active part of its movement when propelling the vessel. The links i operate under a tensile strain, pulling the plate alternately in opposite directions against the stop next to such rod and holding it in contact therewith during the active movement of the blade to prevent vibration. The arm d is forked at the base also, where it is fitted or hinged to separate lugs c upon the plate b, the separation of its two feet serving to brace the arm and the blade at its extremity to resist vertical strains. The plate b is formed with the parallel sockets adjacent to one another, through which the plungers slide, and the forking of the arm at its base permits the attachment of the arm strongly to the plate b without obstructing the portion through which the plungers and the links i operate, and I have therefore made claim to this special construction.

A post q is shown at the rear of the stern-bearing r to support the rudder s, and the

driving-shaft would in practice have a bearing in such post, if necessary, to support the outer one of the cranks *g*.

The invention is shown in the drawings applied to a marine vessel, in which it is necessary to exclude the water from the hull, and in such construction the plungers *k*, extended through stuffing-boxes in the hull of the vessel, are essential to the operation; but the vibrating propeller may be constituted to operate in air by using mere guides in the place of the stuffing-boxes, so that the plungers may be retained to convey the motion from the bell-cranks to the links *i*.

Having thus set forth the nature of the invention, what is claimed herein is—

1. A vibrating propeller comprising two arms *d* hinged at opposite sides of the driving-shaft *f*, the cranks *g* upon the driving-shaft, the rods *h* connecting the cranks with the arms to vibrate the same, the blades *e* pivoted upon the ends of the arms, and means for tipping the blades when moved in opposite directions.

2. A vibrating propeller comprising two arms *d* hinged at opposite sides of the driving-shaft *f*, the cranks *g* upon the driving-shaft, in the rear of the stern-bearing *r*, the rods *h* connecting the cranks with the arms to vibrate the same, the blades *e* pivoted upon the ends of the arms, the plungers *k* extended through the hull of the vessel and provided with means for reciprocating the same, and the links *i* actuated by the plungers to tip the blades in opposite directions, substantially as herein set forth.

3. A vibrating propeller comprising two arms *d* hinged at opposite sides of the driving-shaft *f*, the cranks *g* upon the driving-shaft in the rear of the stern-bearing *r*, the rods *h* connecting the cranks with the arms to vibrate the same, the blades *e* pivoted upon the ends of the arms, the plungers *k* extended through the hull of the vessel, the links *i* connecting the plungers with the blade at opposite sides of the arm, cams upon the driving-shaft *f*, and connections from the cams to the plungers to suitably reciprocate the same and tip the blades, substantially as herein set forth.

4. A vibrating propeller comprising two arms *d* hinged at opposite sides of the driving-shaft *f*, the cranks *g* upon the driving-shaft, the rods *h* connecting the cranks with the arms to vibrate the same, links *i* pivoted to the blades at opposite sides of the arms, with means for reciprocating the links to tip the blades as set forth, and the stops *p* attached to the arms to support the blades when wholly tipped, substantially as herein set forth.

5. A vibrating propeller comprising two arms *d* hinged at opposite sides of the driving-shaft *f*, the cranks *g* upon the driving-shaft, the rods *h* connecting the cranks with the arms to vibrate the same, links *i* pivoted to the blades at opposite sides of the arms with means for reciprocating the links to tip the blades as set forth, and the arms being provided with the forked extensions *d'* each having the stops *p* projecting from opposite sides thereof to support the blades when wholly tipped, substantially as herein set forth.

6. A vibrating propeller comprising two arms *d* hinged at opposite sides of the driving-shaft *f*, the cranks *g* upon the driving-shaft, the rods *h* connecting the cranks with the arms to vibrate the same, links *i* pivoted to the blades at opposite sides of the arms, the arms *d* being forked at the base and having the feet pivoted upon separate lugs *c*, and means extended through the hull of the vessel between such feet for reciprocating the links and tipping the blades, substantially as herein set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WM. W. PHARES.

Witnesses:
W. H. JENNINGS,
C. M. HUSSEY.