

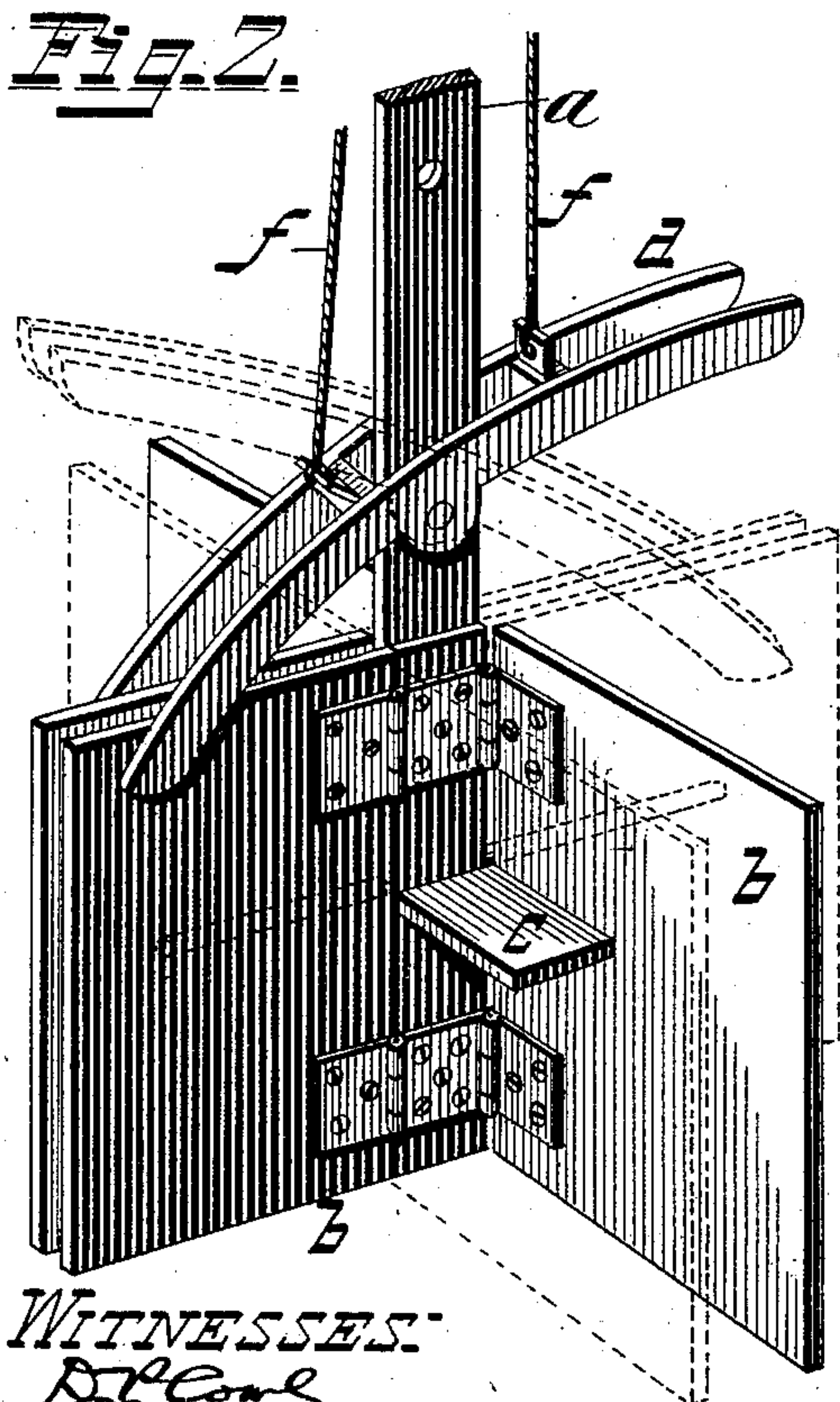
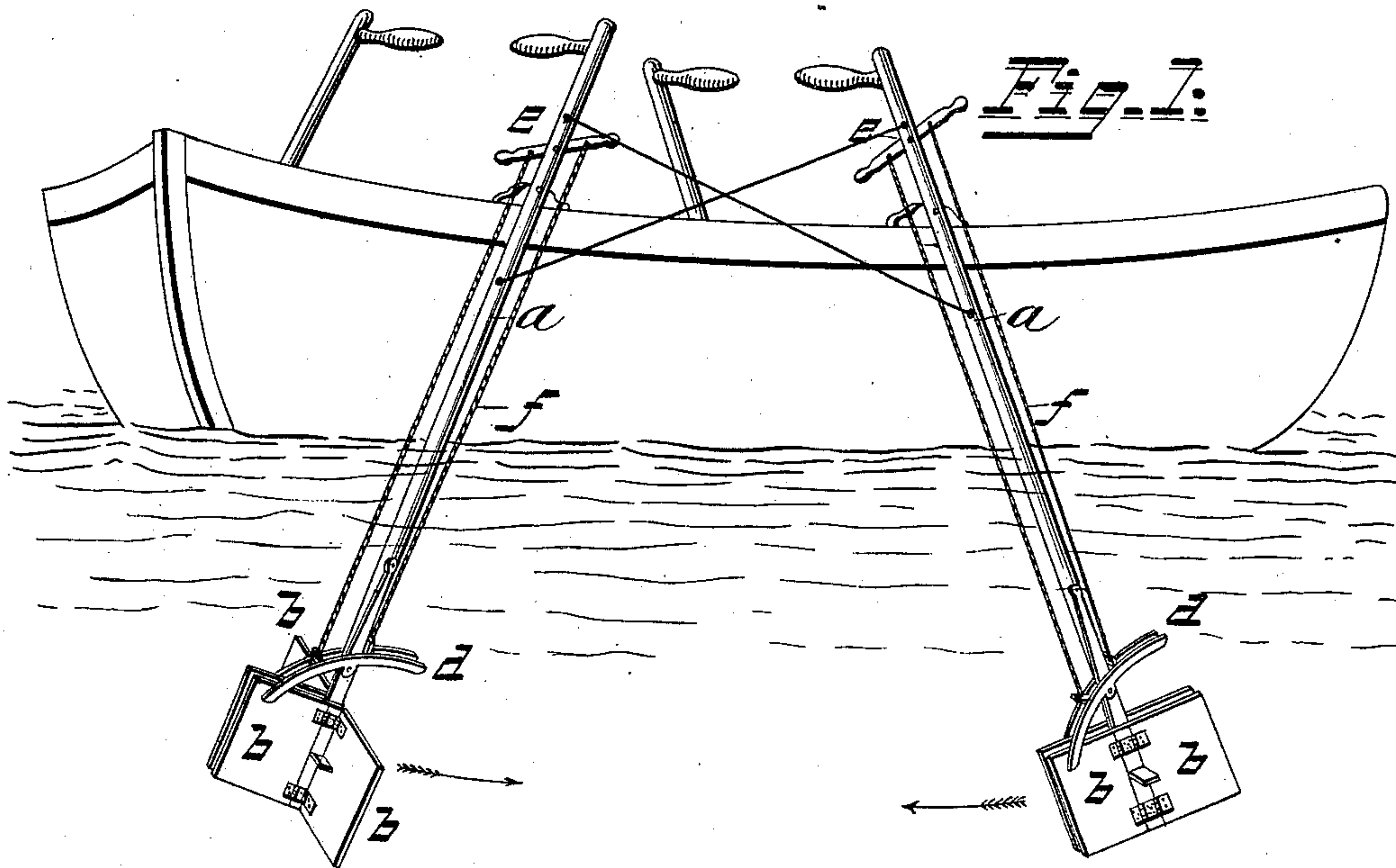
(No Model.)

C. A. SMITH.

PROPELLING APPARATUS FOR VESSELS.

No. 358,170.

Patented Feb. 22, 1887.



WITNESSES:
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UNITED STATES PATENT OFFICE.

CHARLES A. SMITH, OF SAN FRANCISCO, CALIFORNIA.

PROPELLING APPARATUS FOR VESSELS.

SPECIFICATION forming part of Letters Patent No. 358,170, dated February 22, 1887.

Application filed June 1, 1886. Serial No. 203,781. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. SMITH, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Propelling Apparatus for Vessels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that class of propellers which have a reciprocating or vibratory movement, and in which hinged or pivoted blades are caused to present their flat sides to the water when moving in one direction and their edges when making the return-stroke, commonly called "duck's-foot propellers," and known under the classification of the Patent Office as "vibrating propellers." Its object is to provide a means for propelling vessels which shall be effective in operation, cheap and simple in construction, and which may be instantly reversed to propel the vessel in the opposite direction; and to these ends it consists in the construction and combination of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, which are herein referred to, and which form a part of this specification, Figure 1 represents an elevation in perspective of a boat provided with my propeller, and illustrating the mode of operation. Fig. 2 represents a perspective view of the propeller, the full lines and dotted lines, respectively, showing it set for operation in opposite directions.

The construction of my propeller is as follows: To the opposite sides of a lever or arm, *a*, are hinged pairs of leaves or blades *b b*, which are adapted to be closed together or spread apart, as clearly shown in the drawings. The leaves or blades are hinged so as to open outward or away from each other, and stops *c* are arranged between the two pairs to support and hold them in operative position. As the propeller begins its forward movement in the direction of its effective stroke, the action of the water causes the blades to open or spread outward, while in the reverse movement the action of the water on their rear faces causes them to close together, so as to offer but

slight resistance to their passage in making the return-stroke. The stops *c* are laterally-projecting studs on the arms or levers *a*, and they are arranged between the pairs of blades, so as to serve for both pairs. Above the leaves or blades *b*, and standing in the same plane when the leaves are closed together, is a pivoted vibrating lever, *d*, which is bifurcated at its ends, so as to close down over either pair of blades and hold them together. This lever is provided with means for operating it from the vessel, so as to lock or unlock either pair of blades at will, according to the direction in which it is desired to propel the vessel. As a means for effecting this operation I have shown two cords or chains, *f*, attached to the lever *d* at opposite sides of its pivot, and connected at their upper ends with a lever, *e*, which is pivoted to the arm or lever *a* at a point within reach of the occupant of the vessel. The two levers *e d* being connected, the vibration of the first causes a corresponding vibration of the second, and locks or unlocks one pair of the blades *b*, as may be desired.

In large vessels, when it is desired to manipulate the propellers from the pilot-house or other point remote from the arms *a*, the cords are passed over a bearing at the pivot or fulcrum of the arm *a*, and thence to the place from which they are to be operated.

When two or more pairs of these propellers are used, they may be connected by crossed wires, cords, or chains above and below their pivots, as shown in Fig. 1, so that as one moves forward in making its effective stroke the other moves backward, or makes its return-stroke, by which a continuous propelling action is effected. This, however, is not new, and I make no claim thereto.

The arrangement shown in Fig. 1 is for the application of manual power, the handles *g* being intended to be grasped by the hands of the operators. It is manifest, however, that other power may be employed—as, for example, a crank-shaft driven by hand or foot power may be connected with the arms or levers *a*; or the piston of a steam-engine may be connected therewith. It is to be understood, however, that the present invention relates only to the construction of the propeller, and not to the means for applying power thereto, the latter being referred to merely for the pur-

pose of more clearly explaining the operation of my invention.

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

5 1. A propeller of the character hereinbefore described, consisting of a vibrating arm or lever, *a*, blades hinged thereto in pairs on opposite sides, standing when closed in the plane of vibration and opening outward therefrom, stops *c*, to support the blades in operative position, and a double acting lock to lock either pair of blades together, substantially as shown and described.

15 2. The combination of a vibrating arm or lever, *a*, blades hinged thereto in pairs on opposite sides to close together in the plane of vibration and to open outward therefrom, a vibrating lever, *d*, arranged above the blades and bifurcated at its ends, as shown, to engage
20 and lock either pair of blades, and stops ar-

anged between the pairs of blades to support the same in operative position, substantially as shown and described.

3. The combination of a vibrating arm or lever, *a*, blades hinged thereto in pairs on opposite sides to close together in the plane of vibration and to open outward therefrom, stops *c* between the pairs of blades to support the same in operative position, a vibrating lever above said blades bifurcated at both ends
25 30 to engage and lock either pair, a lever, *e*, pivoted to the arm *a* within reach of the occupant of the boat, and connections between the levers *d* *e*, as and for the purpose described.

In testimony whereof I have affixed my signature in presence of two witnesses.

CHARLES A. SMITH.

Witnesses:

D. P. COWL,

SCHUYLER DURYEE.