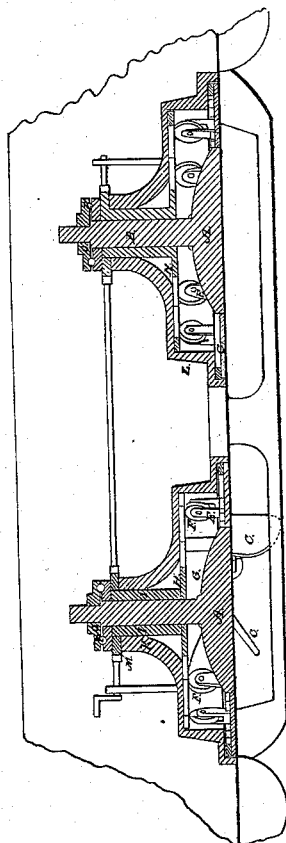


*Lear & Buck,  
Vibrating Propeller*

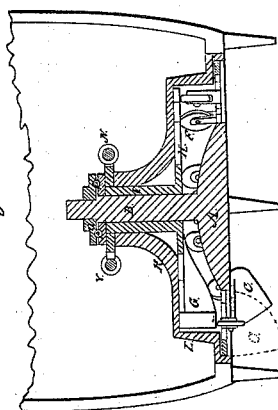
*N<sup>o</sup> 3,448.*

*Patented Feb. 20, 1844*

*Fig. 3.*



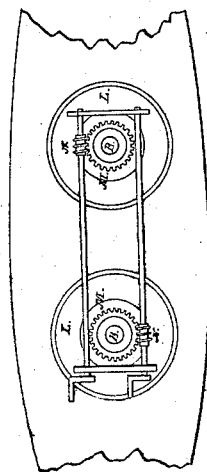
*Fig. 4.*



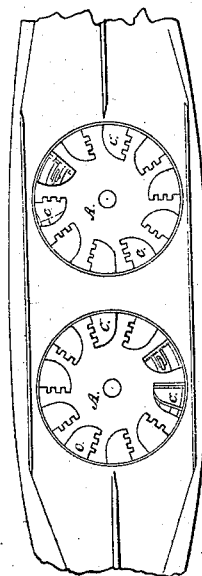
*Fig. 5.*



*Fig. 1.*



*Fig. 2.*



# UNITED STATES PATENT OFFICE.

PETER LEAR AND EPHRAIM BUCK, OF BOSTON, MASSACHUSETTS.

## IMPROVEMENT IN HORIZONTAL PADDLE-WHEELS.

Specification forming part of Letters Patent No. 3,448, dated February 20, 1844.

*To all whom it may concern:*

Be it known that we, PETER LEAR and EPHRAIM BUCK, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Machinery for Propelling Vessels, or for such other purposes to which the same may be successfully applicable; and we do hereby declare that the following description and accompanying drawings, taken together, constitute a full and exact specification of the construction and operation of the same.

Of the drawings above mentioned, Figure 1 represents a top view of the hull of a vessel in which our improved propelling apparatus is arranged, as will be hereinafter described. Fig. 2 is a view of the vessel turned bottom upward in order to exhibit the position and appearance of the propellers with respect to each other and the bottom of the ship. Fig. 3 is a longitudinal, vertical, and central section of the vessel and propellers. Fig. 4 is a transverse vertical section taken through one of the propellers.

Our propelling apparatus is calculated to be arranged in the bottom or hold of a vessel. It consists of a circular horizontal plate or frame A, Figs. 2, 3, and 4, applied to a vertical shaft B and having a series of apertures formed through it, each of which receives within it and has hinged to one of its sides a float or paddle-board C, as seen in Fig. 2, where two of the frames A are denoted as adapted (with their apparatus to be hereinafter explained) to a vessel. Each of these frames contains ten single-flap paddle-boards C C C, &c., or any other suitable number of the same, each of which (paddle-boards) has an arm E raised or projecting perpendicularly from its rear side, as more particularly seen in side view in Fig. 5, the same being a representation of one of the floats and cam by which the said floats are turned on their hinges from a horizontal to a vertical position. A friction roller or wheel F is arranged so as to traverse or turn upon journals in the top of each of the arms, the said friction-roller, as the wheel is turned around, coming in contact with an inclined plane or cam projecting downwardly from another circular horizontal plate or wheel H, arranged somewhat above and parallel to the plate or frame A.

The frame or plate H may be attached to

the vessel's bottom or to a vertical hollow shaft I, through which the shaft B of the frame of paddles passes, as seen in Fig. 4. The shaft I traverses and is supported in a hollow cylinder or head K, extending upward from a cylindrical water-tight case or box L, surrounding the propelling apparatus and extending upward from the vessel's bottom; as seen in the drawings. A geared wheel M is fixed on the top of the hollow shaft I and extends over and rests upon the top of the cylinder K, thus supporting the frame or plate H in its position. An endless screw N, adapted to the teeth of the gear-wheel M, serves to turn the gear and plate H so as to bring the inclined plane or cam G into any position horizontally. A circular head or plate O is attached to the shaft B, the said plate resting upon the shaft I, and thereby sustaining the shaft B thereupon. A series of friction rollers or spheres P P may be introduced between the surfaces of the gear-wheel M and head O, as denoted by Fig. 4.

The power by which the propeller is operated is applied to the shaft B, which, being put in rapid revolution, brings the rollers F F, &c., of the paddle-arms C C, &c., successively in contact with the inclined plane or cam G, thereby throwing the paddles, one after another, outward or turning each of them (whose roller may happen to be traveling up or over the inclined plane) on its hinges. The instant the rollers leave the inclined plane the pressure or resistance of the water, in consequence of the motion of the wheels, closes the paddle or shuts it into the aperture or space formed in the plate A to receive it. Consequently the number of floats or paddles in action at once upon the water depends upon the length of the inclined plane, such paddles whose rollers are not in contact therewith being closed or shut into their apertures or raised into a horizontal position by the pressure of the water.

If two propellers are arranged in the bottom of the vessel, the one in front of the other, as represented in Figs. 1, 2, and 3, the paddles of the one may act on one side of the center keel, while those of the other operate on the opposite side thereof. This will create uniformity of action and cause the vessel to advance or recede (to go ahead or astern) according to the direction in which the floats

impinge against the water. By changing the position of the inclined plane G by the means adapted for that purpose—that is to say, by turning the plate H around so as to bring the plane into the requisite position—the paddles may be caused so to act upon the water as to propel the vessel sidewise or in a direction at right angles to the central keel. She may also be moved quartering or toward any point of compass desired, according as we change the position of the inclined planes of her propellers. With equal facility she may be caused to revolve within a circle, and in fact she may be moved in any direction with the utmost ease and dispatch—a desideratum for vessels of war possessed by no other propelling apparatus known to us. For the maneuvers of a war-steamer, both in attack and defense, these propellers will be found to be admirably adapted, as with them she may readily be put into any desirable position.

Our improved nautical propelling machinery having been thus explained, we shall claim—

1. The combination of the flaps or paddles hinged to the wheel as described, with the arms E E, &c., attached to the inner side of the flaps or paddles, and the inclined plane or cam of sufficient length to keep the flaps open during that portion of their circuit in which they act on the water to propel the ves-

sel, the whole being constructed and arranged substantially as hereinbefore set forth.

2. The above-described manner of arranging two sets of propellers upon a vessel or with respect to the keel thereof—viz., the placing the one in advance of the other and in a line or range with the keel or in the direction of the keel, instead of the usual method of placing one on each side of the keel and directly opposite to each other, the aforesaid arrangement effecting various important advantages in sailing and operating a vessel.

3. Arranging the frame or plate H of the inclined plane G so that it may be movable or be made to turn on its axis horizontally, or, in other words, changing the horizontal position of the inclined plane or cam, the same being for the purpose of throwing different paddles of the series into action and thereby imparting to the vessel or steamship a lateral, quartering, or other desirable movement, as set forth.

In testimony that the above is a true specification of our invention we have hereto set our signatures this 3d day of January, A. D. 1844.

PETER LEAR.  
EPHRAIM BUCK.

Witnesses:

R. H. EDDY,  
D. A. GRANGER.