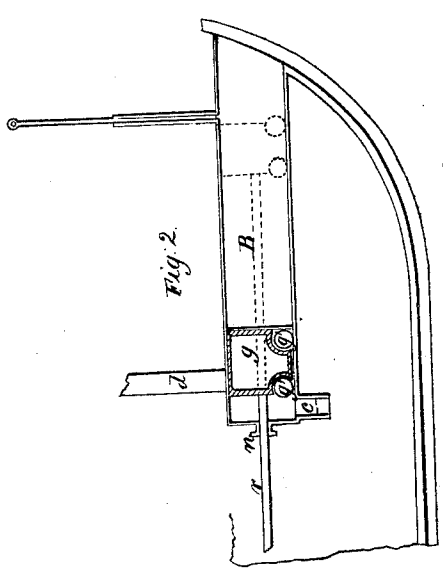
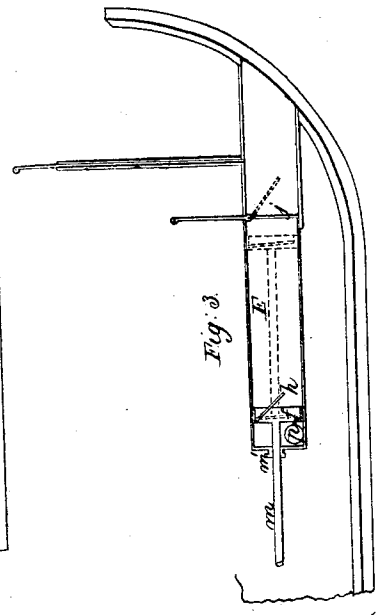
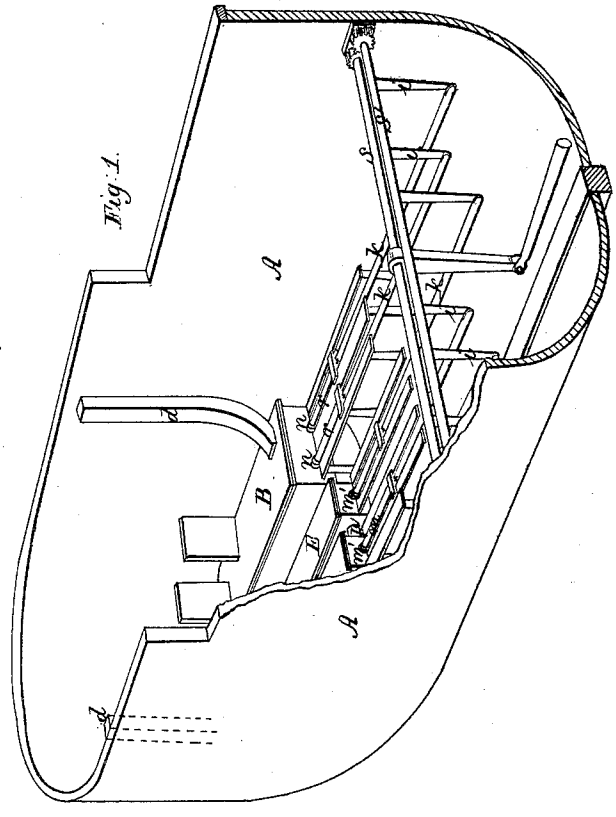
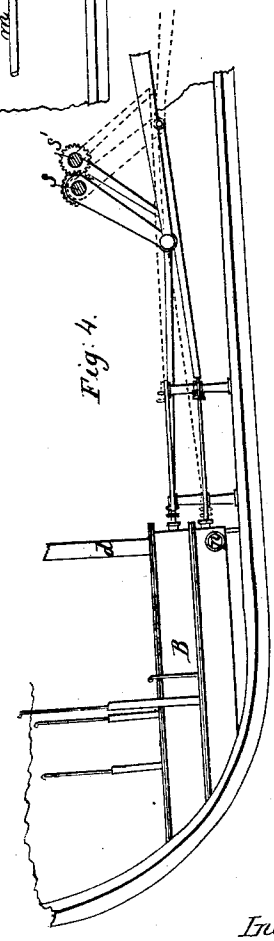
A. E. Harding,
Hydraulic Propeller.

No. 23,463. Patented Apl. 5, 1859.









Witnesses;
William Moore
Alexander Ube

Inventor;
A. E. Harding

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UNITED STATES PATENT OFFICE.

A. E. HARDING, OF MIDDLETOWN, OHIO.

SHIPS' PROPELLING APPARATUS.

Specification of Letters Patent No. 23,463, dated April 5, 1859.

To all whom it may concern:

Be it known that I, A. E. HARDING, of Middletown, in the county of Butler and State of Ohio, have invented a new and useful Improvement in Modes of Propelling Boats and Vessels; and I do hereby declare that the following is a full and clear description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, made to form a part of this specification.

My invention relates to the arrangement, and combination of, propellers, and propeller, and water chambers within boats and vessels, in such manner that the said propellers may be operated, without material friction, loss of power, or the formation of a vacuum, and also discharge the water which may be admitted within the propeller chambers, without interfering, with the operation of the propellers.

By reference to the accompanying drawings, Figure 1, is a perspective view, representing, the stern portion of a vessel hull, provided with my improved device for propulsion, with all its working parts arranged for operation. Fig. 2, is a longitudinal sectional view, showing the construction and arrangement of the propellers. Fig. 3, is a sectional view showing the arrangement, of the pistons, valves and gates within the water chamber. Fig. 4, is a sectional view showing the relative arrangement of the propeller chambers, and water chambers.

(A) represents a portion of the hull of a vessel.

(B, B) are propeller chambers, constructed water tight, except the rear end, which is open to the water; and arranged at the stern of the vessel's hull, as represented.

(*d*, *d*) are air tubes, arranged near the inner ends of the chambers, B, B, to supply air behind the propellers, and thus prevent the formation of a vacuum within the propeller chambers while the propellers are being forced outwardly. Each of these chambers (B, B) is formed with a vertical longitudinal partition so that it is really a double chamber and affords facility for the operation of two distinct propellers, on each side of the boat or vessel. They are provided near their rear ends, with slide valves, so that their communication with the water may be cut off when desired. They are also provided with openings (C) at their bottoms, near their forward ends, to allow the escape of water which may be admitted within the chamber (B) behind the propellers.

(*g*, *g*,) are propellers formed to fit as closely as possible, (avoiding friction) within the chambers (B) and provided with rollers (*g'*) so that they may be operated with the least possible power and without material friction. These propellers (*g*, *g*) are operated by means of rods (*r*) which work loosely through the boxes (*n*), no packing being used about the propellers or boxes.

(E, E) are water chambers, arranged below the propeller chambers (B, B) so that water may readily flow into them from the chambers (B, B) through the openings (C).

(*f f*) are pistons made to fit and work closely, within the water chambers (E, E), and provided with hinged valves (*h*, *h*) which open outwardly, so that when the pistons (*f f*) are drawn forward, the contained water may flow through the piston, and as the pistons (*f f*) are forced outwardly the valves (*h*, *h*) will close, and thus enable the pistons to force the water through the gates (*j*, *j*). These gates are hinged at their tops, and open, only, outwardly, so that when the contained water has been forced beyond them, the external pressure of the water will instantly close them.

(*p*) is a water pipe communicating with both the chambers (E, E), so that water may flow from one to the other, and thus equalize the quantity to be forced from them.

The pistons (E, E) are operated by means of piston rods (*m*, *m*) working through stuffing boxes (*m'*, *m'*). Motion is given to the rods (*r*) and piston rods, (*m*) by means of the two shafts (*s*, *s'*) through the medium of arms (*i i i i i i*) and pitman rods (*k*, *k*). These arms (*i*) are attached alternately to the shafts (*s*, *s'*) so that the propellers (*g*) and pistons (*f*) are made to operate alternately.

What I claim as new of my own invention and desire to secure by Letters Patent is—

1. The rollers (*g'*) arranged and operating substantially as herein described.

2. I claim the arrangement and combination, of the propeller chambers (B, B). Air tubes (d, d), openings (c), chambers (E, E), pistons (f, h, f, h), gates (j j), pipe (p) and propellers (g, g'), all arranged substantially as herein described for the purposes set forth.

In testimony of which invention I have hereunto set my hand.

A. E. HARDING.

Witnesses:
WILLIAM MOORE,
ALEXANDER URE.