

No. 610,371.

Patented Sept. 6, 1898.

J. & H. W. RITCHIE.
RECIPROCATING PROPELLER FOR VESSELS.

(Application filed June 9, 1897.)

(No Model.)

Fig. 1.

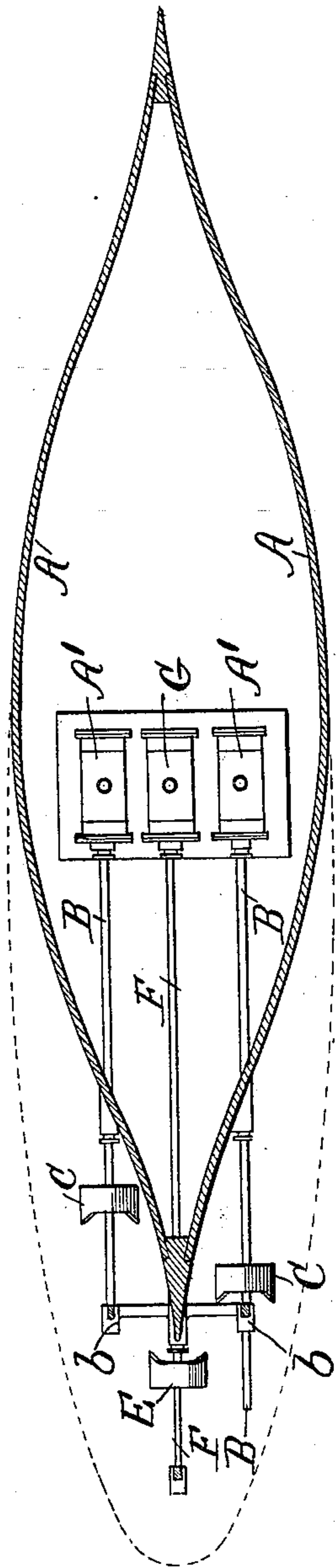


Fig. 3.

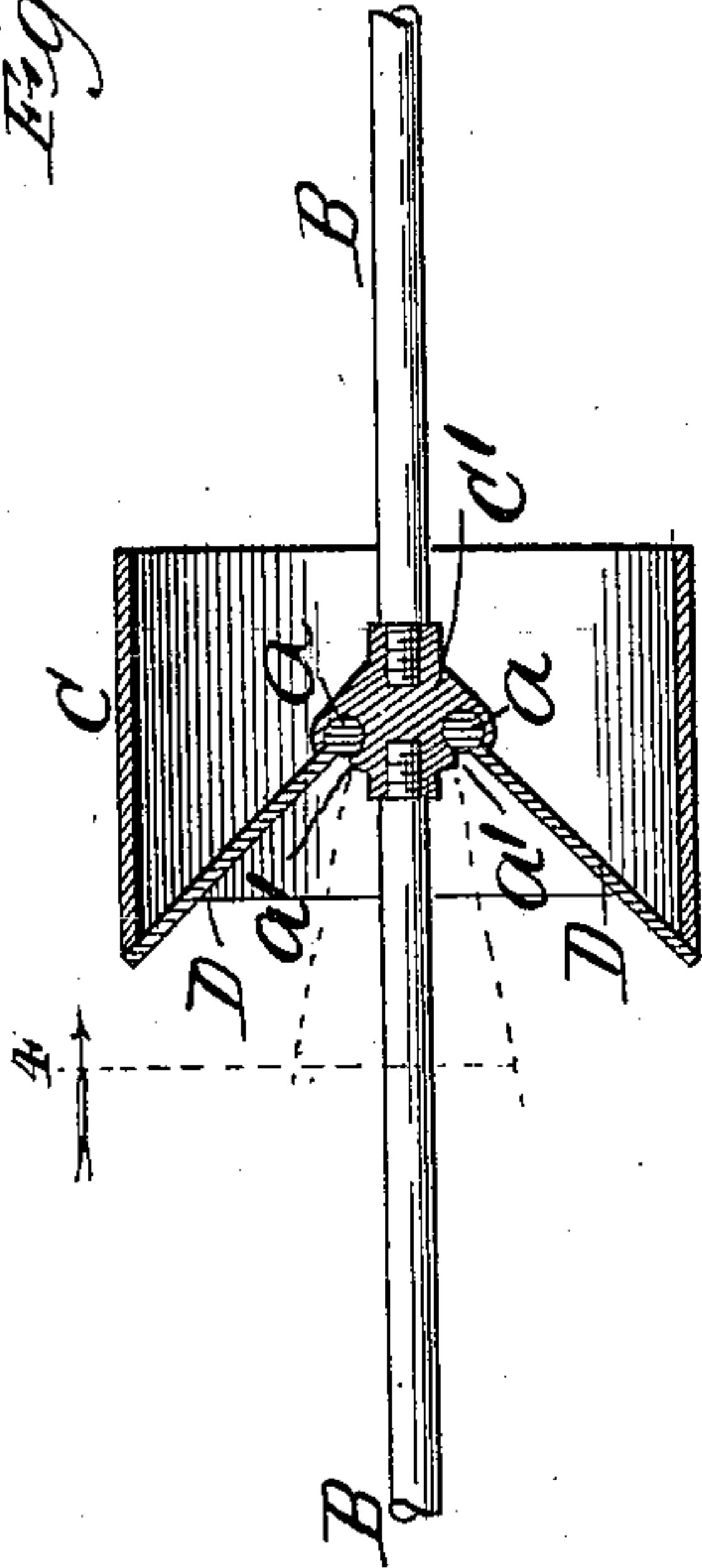


Fig. 4.

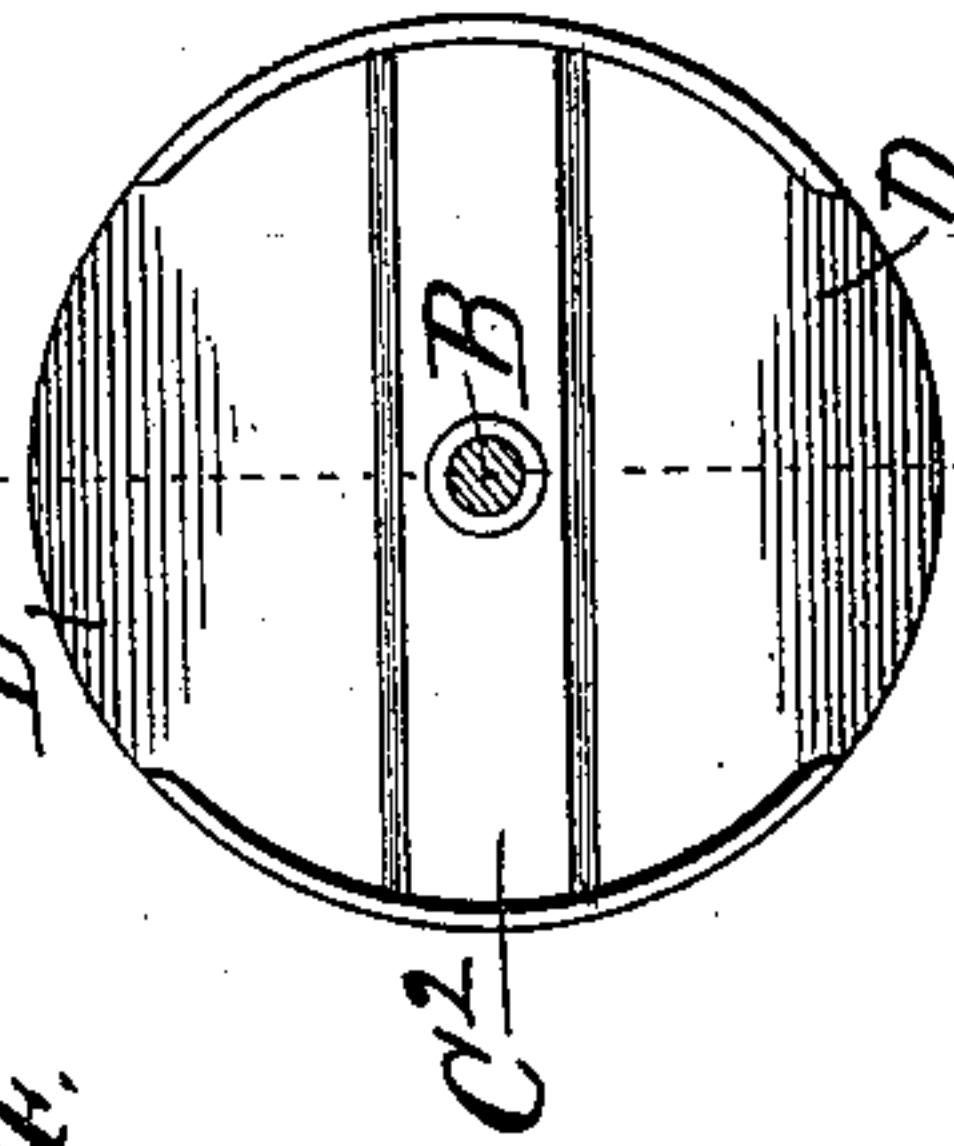
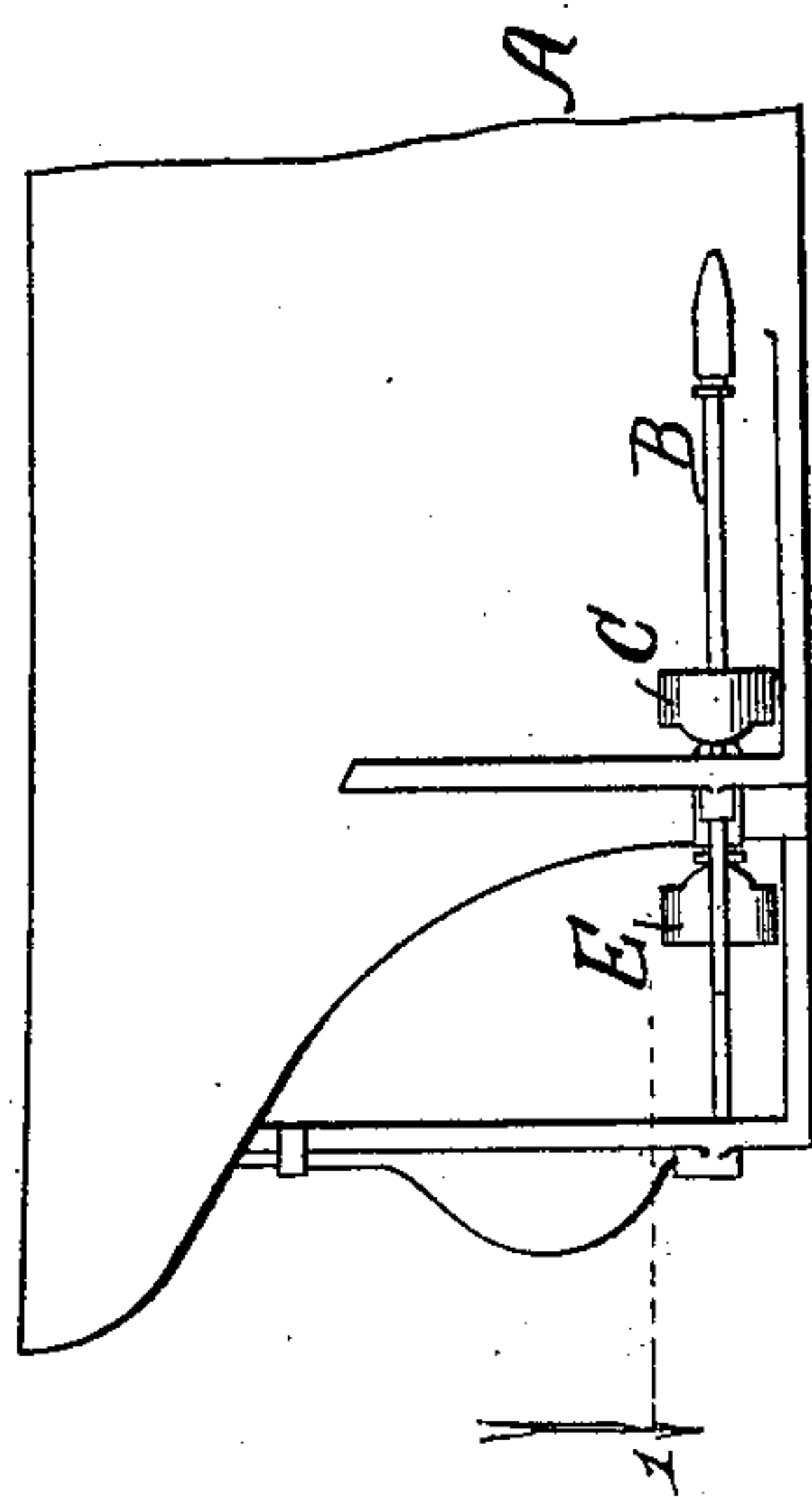


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOHN RITCHIE AND HARVEY W. RITCHIE, OF CHICAGO, ILLINOIS.

RECIPROCATING PROPELLER FOR VESSELS.

SPECIFICATION forming part of Letters Patent No. 610,371, dated September 6, 1898.

Application filed June 9, 1897. Serial No. 639,946. (No model.)

To all whom it may concern:

Be it known that we, JOHN RITCHIE and HARVEY W. RITCHIE, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Reciprocating Propellers for Vessels; and we 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.

This invention relates to improvements in the art of propelling marine vessels, and has for its object to provide an arrangement of this character that has a direct action and is very effective in operation, as will be hereinafter set forth in detail.

In the drawings, Figure 1 is a longitudinal horizontal section through the hull of a vessel on line 1, Fig. 2, looking in the direction indicated by the arrow and showing a plan of the propelling mechanism; Fig. 2, a broken-away side elevation of the stern part of the hull embodying the improved features; Fig. 3, a sectional elevation of one of the propelling devices on line 3, Fig. 4; and Fig. 4, a rear end elevation on line 4, Fig. 3, the propeller-shaft being shown in cross-section.

As the motive power may be of a varied character, no particular form of motor will be described, as that is no part of the invention. One form of a steam-motor is, however, illustrated, showing the relative position and connection. The propeller does not have a rotary action, as is ordinarily the case, but has a reciprocating endwise movement in a straight line.

Referring to the drawings, A may represent the hull of a vessel, A' a pair of steam-cylinders constituting the motive power in this illustration, and B B the propeller-shafts.

The inboard ends of the propeller-shafts are shown as having a direct connection with the steam-cylinders. This is but one form of connection, however, and any other form may be employed that is best adapted in practical working.

The propeller proper consists of a supporting-case C, open at both ends and provided with a central hub C' and rigidly mounted on the propeller-shaft, so as to equally surround the same. The hub and sides of the case are

connected by a cross-bar C², forming an integral part of the hub, as illustrated in Fig. 4.

The inner edges of the companion propeller-blades D D have a hinge connection with the hub and its cross-bar, as at *a*, adapts the blades to have a limited automatic opening and closing action in accordance with the direction in which the shaft is moving.

On the outward movement or thrust of the propelling-shaft the pressure of the water against the outer adjacent surface of the blades will force them out to the position shown in Figs. 3 and 4, the edges coming to a stop against the edges of the inclosing case and limiting the opening movement. The inclosing case illustrated is of a cylindrical form and the blades of a contour corresponding thereto, so that the blades when in their open propelling position entirely close the passage and prevent the flow of water therethrough, thus presenting the whole surface area of the blades in action. On the inner or return movement of the shaft the pressure of the water on the inner sides of the blades will fold or close the same up to a position slightly at an oblique angle with reference to the right line of the propeller-shaft, so that they will take the action of the water quickly and open out at once as the shaft begins its outward stroke. The stop-shoulders *a'* on the hub limit the closing movement of the blades to the position indicated by dotted lines in Fig. 3. The blades in their folded position open the passage through the case for the flow of the water and offer but a slight resistance to the return stroke of the propellers. Thus on the outward thrust of the shaft the propeller or pusher has a direct action and strikes a solid body or wall of water and receives the full benefit of the entire surface of the propelling-blades and utilizes much more of the force or power expended proportionately and drives the vessel faster than is possible with the same amount of power applied to the ordinary paddle-wheel or screw. The slip of the water over the edges of the screw-propeller or paddle-wheel causes a material loss of power that is avoided by this arrangement, with an increase of efficiency over that of any of the ordinary forms of propellers. The loss by friction is also less, and by having a direct push the full benefit of the elasticity of the

wall of water is obtained, which becomes more dense by reason of the direct push, affording a greater resistance and giving a better result for the amount of power expended.

5 Companion or "twin" propellers are shown in the drawings, the outer ends of the shafts being provided with the outboard bearings *b*. Where two propellers are used, they may be arranged to have an alternate action or move
10 in unison, as circumstances require.

The stopping and backing propeller *E* is mounted on an independent shaft *F* and is driven from the steam-cylinder *G*. This propeller is of the same construction as the "go-ahead" propeller, but is mounted on its shaft
15 in a reversed position.

The cylindrical casing and the form of propeller-blades shown may be departed from and the casing elongated into an oval form
20 and the blades made of a shape to correspond thereto or any suitable form adopted without departing from the spirit of our invention. The propellers may be mounted on the shaft so that the blades will open and close in a
25 horizontal plane instead of swinging vertically, as shown. Two propeller-blades are shown; but a greater number may be used and arranged radially.

30 Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination with a supporting-case, open at both ends, of a central hub, provided with a cross-bar, connecting with said case

at opposite sides, the companion propeller- 35 blades hinged to the hub and its cross-bar, and the propeller-shaft, having a reciprocating endwise movement, substantially as described.

2. The combination with a propeller-shaft, having a reciprocating endwise movement, of 40 a hub, rigidly mounted on said shaft and provided with a cross-bar extending from opposite sides thereof, a case, surrounding the propeller-shaft and supported on the ends of said cross-bar, and the companion propeller- 45 blades, hinged to said hub and cross-bar, and having an opening and closing action, substantially as described.

3. The combination with a propeller-shaft, having a reciprocating endwise movement, of 50 a case, open at both ends and surrounding said shaft, a hub, rigidly mounted on said shaft, and provided with a cross-bar supporting said case in position, and companion propeller-blades, hinged to said cross-bar and 55 hub and adapted to have an opening and closing action, the opening movement of which being limited by contact with said case and the closing movement by shoulders formed on said hub, substantially as described. 60

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN RITCHIE.

HARVEY W. RITCHIE.

Witnesses:

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L. B. COUPLAND.