R. COVINGTON.

MARINE PROPELLER.

No. 45,127. Patented Nov. 15, 1864.

Fig. 3.

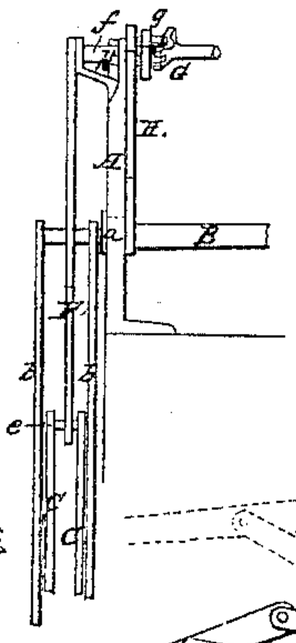


Fig. 1.

Fig. 4.

Fig. 5.

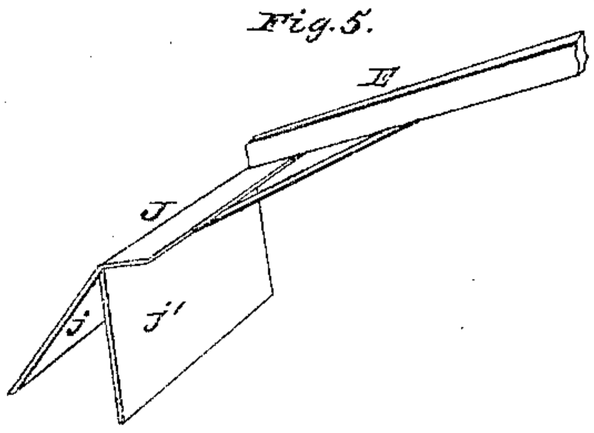
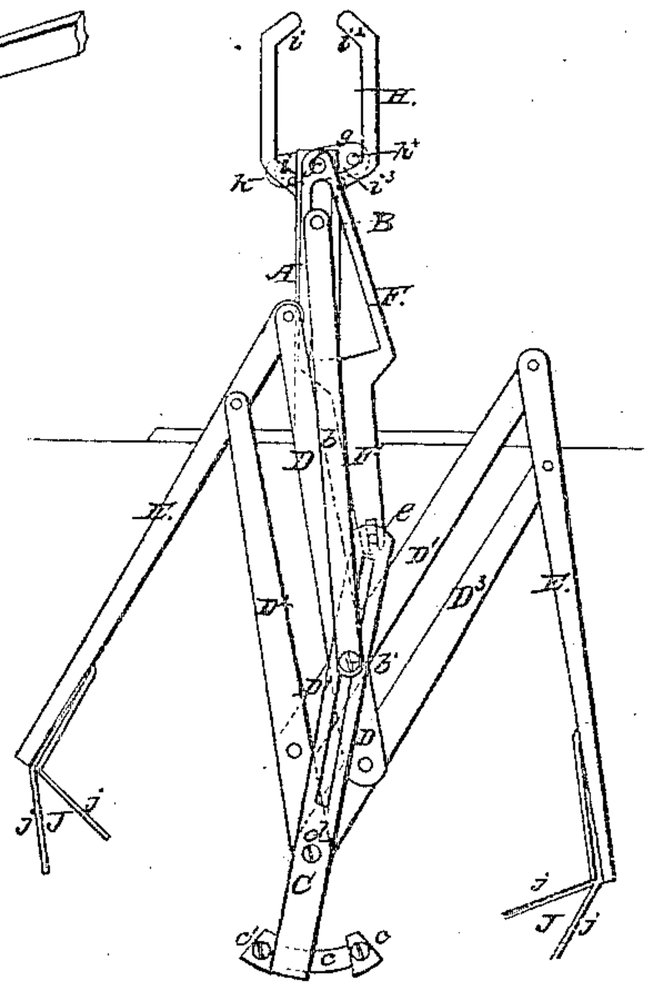


Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

RICHARD COVINGTON, OF WASHINGTON, DISTRICT OF COLUMBIA

IMPROVED MARINE-PROPELLER.

Specification forming part of Letters Patent No. **45,127**, dated November 15, 1864.

To all whom it may concern:

Be it known that I, RICHARD COVINGTON, of Washington city, District of Columbia, have invented a new and Improved Marine Propeller; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side elevation of my improved propeller, showing it by the aid of red lines in two positions. Fig. 2 is a side elevation of the propeller in a contracted condition. Fig. 3 is an edge view of the upper portion of the propeller. Fig. 4 is a plan view of the device for oscillating the propeller and reversing its action. Fig. 5 is a perspective view showing the construction of the paddles and their application to the arms of the propeller.

This invention consists in the employment of two expanding and contracting paddle-carrying arms, which are operated by contrivances hereinafter to be described, and receive a reciprocating and an oscillating motion, which cause said paddle-arms to act alternately upon the water with a drawing and a pushing stroke, as will be hereinafter set forth.

My invention also consists in the application of a shifting device to the mechanism for oscillating the paddle-arms, which is intended for reversing the movements of these arms at pleasure, as will be hereinafter described.

My invention further consists in a compound paddle, which is so constructed and applied to expanding and contracting arms that one or the other of the float-boards of said paddle shall always maintain a position which is nearly perpendicular to the surface of the water, and enter and leave the water in said position, as will be hereinafter described

My invention finally consists in a marine propeller which has its paddles applied to the outer extremities of expanding and contracting arms at equal distances from a common center, about which said arms oscillate at every alternate backward and forward stroke of the paddles, as will be hereinafter described.

To enable others skilled in the art to make and use my invention, I will describe its construction and operation.

In the accompanying drawings, A represents a vertically-slotted standard, which is suitably secured to the frame-work of a vessel; and *a* is a sliding block, which receives a vertical reciprocating motion in the slot or between the guides of said standard. Through this sliding block, and securely affixed to it, passes the main shaft B, which latter receives its motion directly from the piston-rod of the engine. Two pendent rods, *b b*, are pivoted to the outer projecting end of the driving-shaft B, and being carried down the side of the vessel a suitable distance, these rods are connected together at their lower ends by a short rod, *b'*, which passes through the long slots of two parallel oscillating arms, C C. Said pin or rod *b'* also forms the joint of the upper pair of expanding arms or levers D D', as clearly shown in Figs. 1 and 2.

The lower ends of the oscillating slotted arms C C are guided by a sector, *c*, which is secured rigidly to the side of the vessel in such a position as to admit of a free oscillation of the arms C C on each side of a central line passing vertically through the axis of shaft B. At each extremity of the sector-guide is a stop block, *c'*, which limits the movement of said arms. The axis of motion of the arms C C is at *d*, and at this point a strong pin passes perpendicularly into the side of the vessel, and through the inner ends of the lower pair of expanding arms or levers D^2 D^3, which arms, as well as those lettered D D', are held in place latterly by the two oscillating arms C C. The extremities of both pairs of levers D D' D^2 D^3 have pivoted to them the paddle-arms E E', which are inclined at any desired angle from a horizontal plane, which inclination is obtained by shortening the leverage of the upper pair of levers or lengthening that of the lower pair. The lever D is pivoted to the lever D^3 at a point near the fixed center *d*, and the lever D' is pivoted at a corresponding distance from the center *d* to the lever D^2, and as both levers D D' are pivoted at *b'* it will be seen that when the shaft B is thrown up and this point *b'* thus raised by the connecting rods or stirrups *b b*, the outer extremities of the two paddle-arms E E' will be contracted and assume the position represented in Fig. 2. Then when the shaft B is again depressed the arms E E' will assume the expanded position represented in Fig. 1.

The centers of motion of the levers and pad-

dle-arms are arranged in such relation to each other that the extremities of the paddle-arms E E′ move in nearly a straight line, while the levers to which they are pivoted move in the ares of circles.

The upper ends of the two slotted arms C C are connected together by a pin, *e*, to which is pivoted by a sliding slotted connection (shown in Figs. 1 and 2) a vibrating lever or pendulum, F, the upper end of which is rigidly affixed to the outer extremity of a short rock-shaft, *f*. This shaft has its bearings in the upper end of the standard A, and carries on its opposite end a cross-head, *g*, through which two tripping-pins, *h h′*, play loosely. These pins are pivoted to a T-shaped lever, which is connected by a pivot to the cross-head *g*. The lever G is used to reverse the motion of the pendulum, and consequently to reverse the oscillation of the paddle-arms, as will be hereinafter described.

At the back or on the inside of the standard A, and secured to the vertically-reciprocating slide *a*, is a bifurcated tripping device, H, provided with inclined edges *i i′ i² i³*, which act upon their respective pins *h h′* as the shaft B is reciprocated, and give an intermittent vibrating motion to the pendulum F, which in its turn vibrates the arms C C and transmits an oscillating motion to the two arms E E′. When the end of pin *h* is exposed beyond the surface of the cross-head *g*, as shown in Figs. 1 and 4, the inclined surfaces *i i′* of the fork H will be brought into action, and when the pin *h′* is thrust out from said cross-head the inclined surfaces *i² i³* will be brought into action, and by thus adjusting the pins *h h′* the oscillating motion of the paddle-arms can be reversed at pleasure.

The paddles J J′ on the extremities of the arms E E′ are both constructed alike; hence a description of one will give a clear understanding of the other. The paddle J (represented clearly in Fig. 5) consists of two boards, *j j*, secured in any suitable manner to the arm E, so that the upper edges will meet. These boards are secured at different angles to their arm, which angles will vary according to the inclination of their arm; but it is intended that the outer board, *j*, shall leave the water when the propeller is working, as shown in Fig. 2, in a perpendicular position to its surface, and the inner board, *j′*, is intended to enter the water in a position perpendicular to its surface when the arm E is extended. When thus arranged, one of the paddle-boards will gradually assume a vertical position as the other one looses this position.

The operation of my propeller is as follows: We will suppose that the tripping pin *h′* is thrust out from its cross-head, as shown in the drawings. A reciprocating motion is given to the shaft or beam B, which causes the expansion and contraction of the two paddle-arms E E′, as represented by the two positions in Figs. 1 and 2. As the shaft B ascends, and just before it completes its upward stroke, the inclined surface *i³* of the fork H strikes the pin *h′*, and oscillates the propellers so as to force one paddle, J′, into the water and the other paddle, J, out of the water. The shaft B now descends, and the paddle-arms are expanded. Before this shaft B completes its downstroke, the inclined surface *i²* strikes the pin *h′* and tilts the paddle-shafts again, so that this time the paddle J′ is out of the water and the paddle J is in a position to operate upon the water at the succeeding upstroke of the shaft B. We thus have an alternate thrusting and pulling action, and while one paddle is operating upon the water the other is out of the water, but moving in a position to operate at the next stroke.

When it is desired to reverse the motion of the paddles, the pin *h* is brought into action and operates as above described, when struck by the inclined surfaces on the opposite prong of the fork. This reversal can be made without stopping the engine.

In practice the paddles can be set on one side of their respective arms, and the entire mechanism for operating them brought very closely and compactly to the side of the vessel, so that when housed in very little obstruction on this account will be offered to the speed of the vessel. Where the propellers are applied to the sides of a vessel, one engine can be made to work both, and the beam or shaft B can be elevated sufficiently above the deck to allow free access for passengers to walk under it.

In some cases of river or ocean vessels, one propeller working in the center of the vessel may be used, the latter being of course so constructed as to admit of this change.

I do not desire to limit my invention to the use of the contrivance which I have herein described for oscillating the levers and arms which operate the paddles, as other means may be employed for this purpose; nor do I confine myself to the expanding and contracting arms and levers for giving motion to the compound paddles, as it is obvious that this part of my invention may be carried out in many different ways.

The contrivance for reversing the action of the propellers may be arranged over the center of the deck and worked directly from the piston-rod, so as to operate upon both propellers simultaneously.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. Giving an oscillating motion to expanding and contracting paddle-arms by means substantially as described.

2. Reversing the action of expanding and contracting propellers by means of a rock-shaft, *f*, and pendulum F, acted upon by a fixed fork, H, or the equivalents thereof, substantially as described.

3. The levers D D′, with an oscillating

frame, C, moving about a fixed center, *d*, substantially as described.

4. The fixed guide *c* and stops *c' c'*, in combination with a pivoted frame, C, and devices for oscillating this frame, substantially as described.

5. The paddle J *j j*, substantially as and for the purpose described.

6. The employment of expanding and contracting levers D D' D² D³ and E E', arranged on each side of and supported by a fixed or an oscillating frame, C, or the equivalent thereof, substantially as described.

7. The arms D D², pivoted at different points on the paddle-arm E, substantially as and for the purposes set forth.

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Witnesses:

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