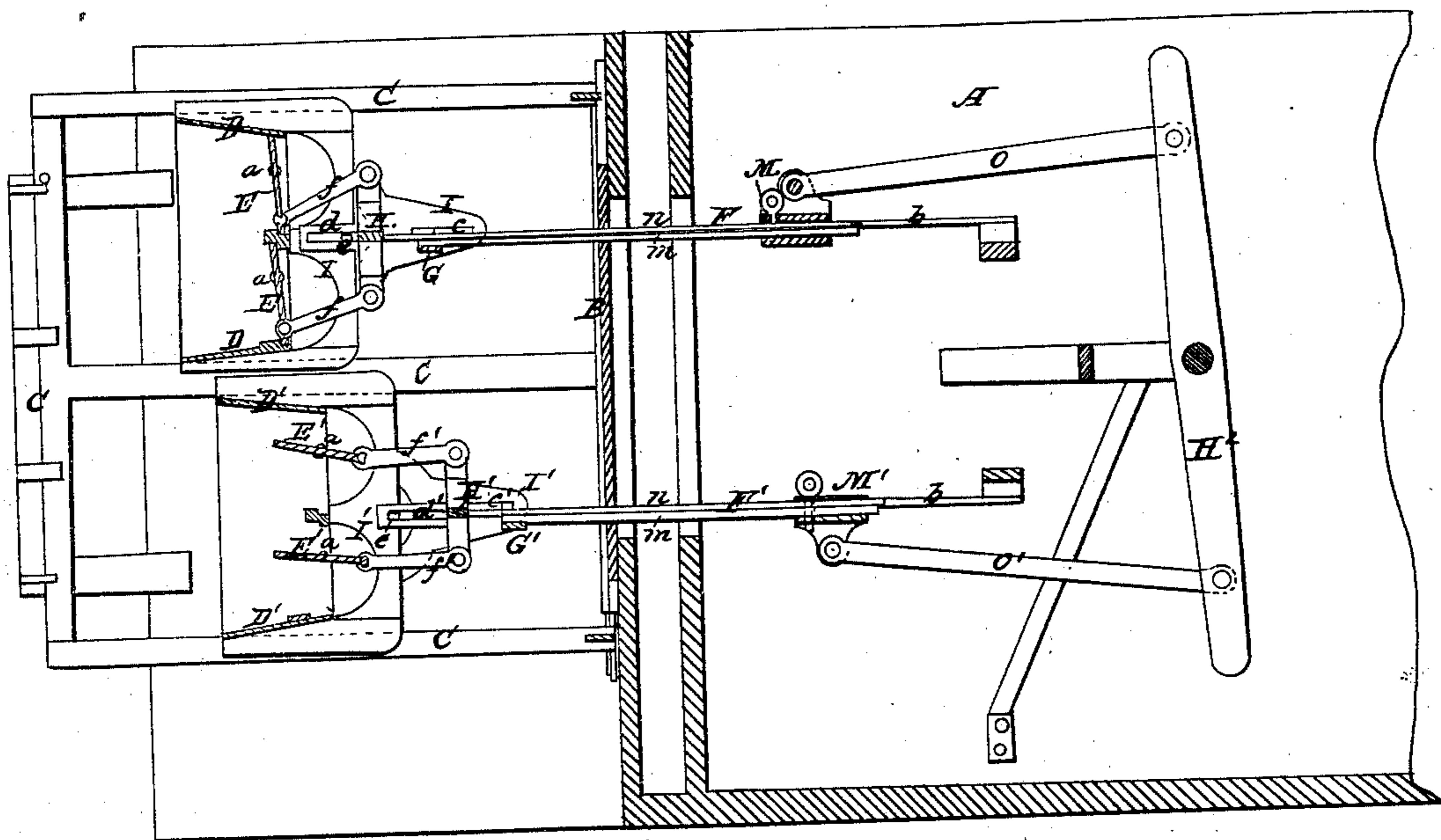
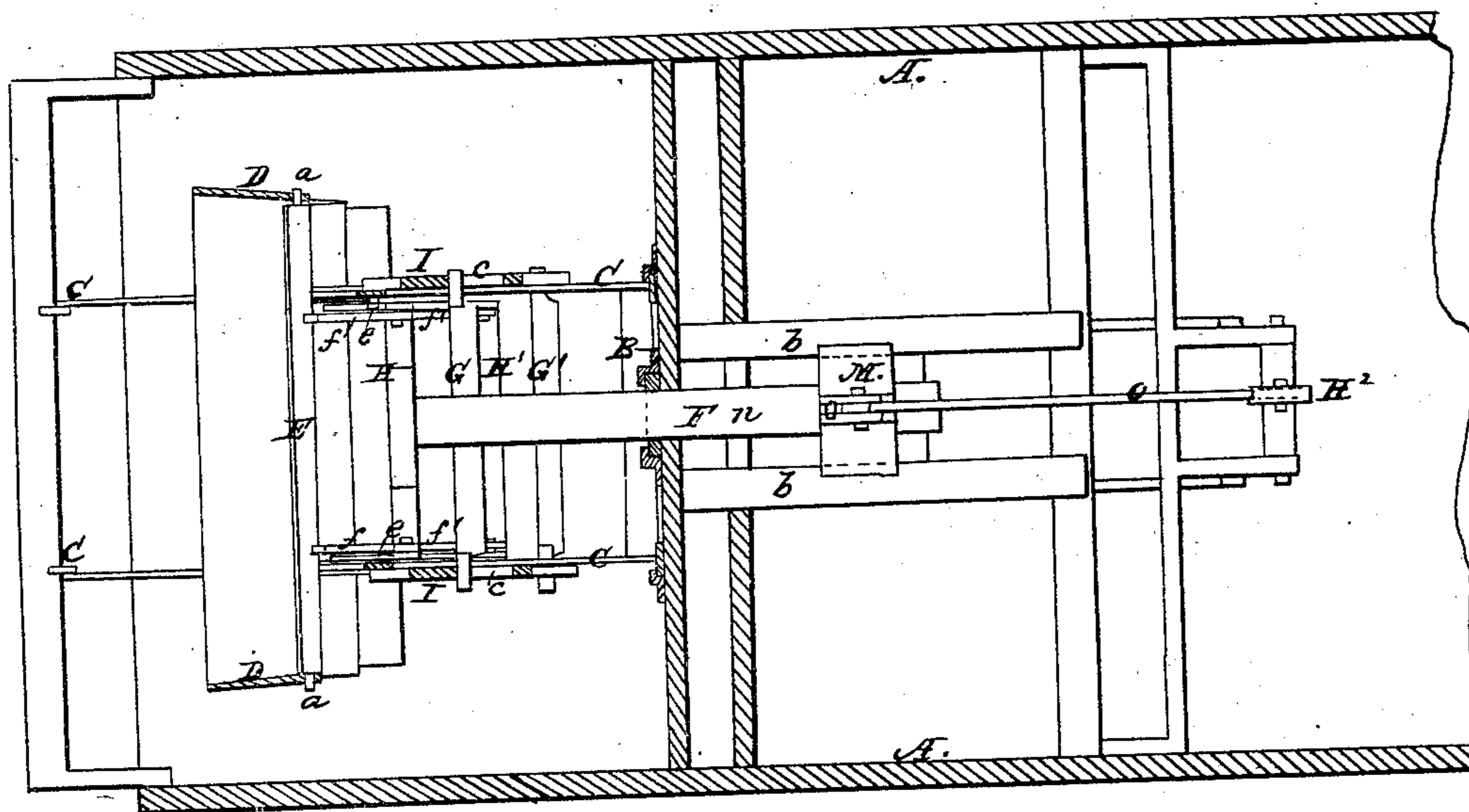


*J. Galt.*  
*Vibrating Propeller.*  
*No 24,552.* *Patented Jun. 28, 1859.*

*Fig. 1.*



*Fig. 2.*



*Witnesses.*

*Henry C. Clark*  
*John M. Jones,*

*Inventor.*

*John Galt*

# UNITED STATES PATENT OFFICE.

JOHN GALT, OF PHILADELPHIA, PENNSYLVANIA.

## RECIPROCATING PROPELLER.

Specification of Letters Patent No. 24,552, dated June 28, 1859.

*To all whom it may concern:*

Be it known that I, JOHN GALT, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain  
5 new and useful Improvements in Reciprocating Propellers for Vessels; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings,  
10 forming a part of this specification, in which—

Figure 1 is a longitudinal vertical section of the after part of a vessel showing the application of a pair of my improved pro-  
15 pellers. Fig. 2 is a horizontal section of the same.

Similar letters of reference indicate corresponding parts in both figures.

My invention relates to that kind of re-  
20 ciprocating propeller consisting of a horizontally reciprocating upright frame fitted with buckets which, as the frame moves in a backward direction, present their broad-  
25 sides to the water and close up the frame, and which, as the frame moves in a forward direction, present their edges to the water and leave the frame open.

My invention consists in a certain mode of combining the buckets with the frame of  
30 the propeller, and with the driving rod, or its equivalent, whereby the closing and opening of the buckets before the commencement of the movement of the frame in either direction is insured.

35 It also consists in the construction of the frame of the propeller, and the application of the buckets thereto, in such manner substantially as hereinafter specified, that as the propeller moves back against the water  
40 to propel the boat it collects the water in a compact body against its buckets and so acts with the greatest possible effect. And it further consists in a simple method of providing for the reversing of the action  
45 of the propeller to back the vessel.

To enable others to make and use my invention I will proceed to describe its construction and operation.

50 A is the hull of the vessel, behind the stern B of which are built stationary guide frames C, C to support and guide the propellers.

D, D' are the propeller frames, and E, E, E', E', the buckets made with journals a, a,

at their ends to be received in bearings in the said frames D, D'.

55

F, F' are the driving rods of the two propellers provided at their front ends with cross heads M, M', fitted to work on stationary guides b, b, within the vessel, and passing through the stern in which stuffing  
60 boxes should be provided for them. The said rods are constructed with cross-heads G, G', and H, H', of which G, and G', work in slots c, c, and c', c', in plates I, I, and I', I', that are secured rigidly to their re-  
65 spective frames D, D', and H, H', contain slots d, d, and d', d', which work on pins, or projections e, e, and e', e', secured in the plates I, I, and I', I'. The cross-heads H, H', are connected by links f, f, and f', f',  
70 with the buckets E, E, and E', E'.

The driving rods F, F', of the two propellers are connected by the cross-heads M, M', with rods O, O', and the said rods O, O', are connected with a lever H<sup>2</sup>, in such  
75 a manner that as one propeller moves forward the other moves back, and to this lever motion is given by the engine to work both the propellers, each of which operates as follows: As the driving rod F, or F', moves  
80 forward the cross-head G, or G', moves forward in the slots c, c, or c', c', and the slots d, d, or d', d', move forward on the pins e, e, or e', e', till the buckets E, E, or E', E', operated by the links f, f, or f', f', are pre-  
85 sented nearly edgewise fore and aft, by which time the cross-head G, or G', arrives at the front ends of the slots c, c, or c', c', and the rear ends of the slots d, d, or d', d', arrive at the pins e, e, or e', e', and the driv-  
90 ing rod commences to draw forward the propeller bodily. The buckets remain open until the movement of the driving rod is reversed, when, before the frame D, or D', begins to move back, the buckets are closed by  
95 the movement permitted to the cross-heads in the slots c, c, or c', c', and on the pins e, e, or e', e', and the propeller does not commence to move back bodily to exert its  
100 propelling power until the buckets are perfectly closed when the frame D, or D', is moved back by the cross-head G, or G', having arrived at the rear ends of the slots c, c, or c', c', and the front ends of the slots d, d, and d', d', having arrived in contact with  
105 the pins e, e, and e', e'. The upper pro-

propeller is represented in Fig. 1 as moving backward, and in the act of propelling, and the lower one is represented as moving forward, and not exerting any propelling action.

It will be seen by reference to the two figures of the drawing that the frames D, and D', are made of some considerable depth from back to front, that they are made flaring toward the rear, and that the buckets are fitted into the front or smallest part. By this construction the propeller, when moving backward to exert its propelling power, is caused to collect the water in a compact body against its buckets, and so to act upon the water with the greatest possible effect.

To provide for the reversing of the action of the propellers for the purpose of backing the vessel, the buckets E, E, E', E', are made to present a larger area on that side of the journals *a, a*, to which the cross-heads H, H', are connected as shown in Fig. 1, and the driving rods F, F', are made each of two pieces *m, n*, placed one above the other, the lower piece *m*, of each being attached permanently to its respective cross-heads M, or M', and G, or G', and the upper piece *n*, of each being only attached permanently to its respective cross-head H, or H'. When the vessel is desired to go ahead the upper piece *n*, of each driving rod is connected with its respective cross head M, or M', by means of a ring-headed bolt *p*, that is dropped through holes provided in the said cross-head, and piece *n*, and the two pieces *m, n*, are equivalent to parts of the same rod. But when it is desired to back the vessel the bolts *p, p*, are simply drawn out, and the pieces *n, n*, of the driving rods become disconnected from the engine, thus

disconnecting the buckets; and as the propeller frames D, D', continue their reciprocating movement, the buckets E, E, and E', E', are opened by the resistance of the water during the backward movement and closed by similar agency during the forward movement, thus causing them to propel the vessel in a backward direction. The backing is thus effected without reversing the engine.

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

1. Combining the buckets E, E, and E', E', with the frames D, D', and with the driving rods F, F', or their equivalents by means of cross-heads G, G', and H, H', link connections *f, f, f', f'*, and slots *c, c, c', c'*, and *d, d, d', d'*, substantially as and for the purpose herein specified.

2. The construction of the propellers with their frames D, D', of flaring form, and with their buckets fitted to the smaller front portions thereof, substantially as and for the purpose herein specified.

3. Constructing the driving rods each in two parts, one of which, connected with the buckets, is capable of being connected with or disconnected from the other at pleasure, for the purpose either of closing the buckets before the backward movement, and opening them before the forward movement of the propeller frame D, or D', commences, or of causing the closing of the buckets before the forward, and the opening of them before the backward movement, as may be desired, and thereby enabling the action of the propeller to be reversed without reversing the engine.

JOHN GALT.

Witnesses:

HUGH CLARK,  
JOHN M. JAMES.