J. M. McMASTER.

Improvement in Propulsion of Canal Boats.

No. 120,823. Patented Nov. 14, 1871.

Fig 1.

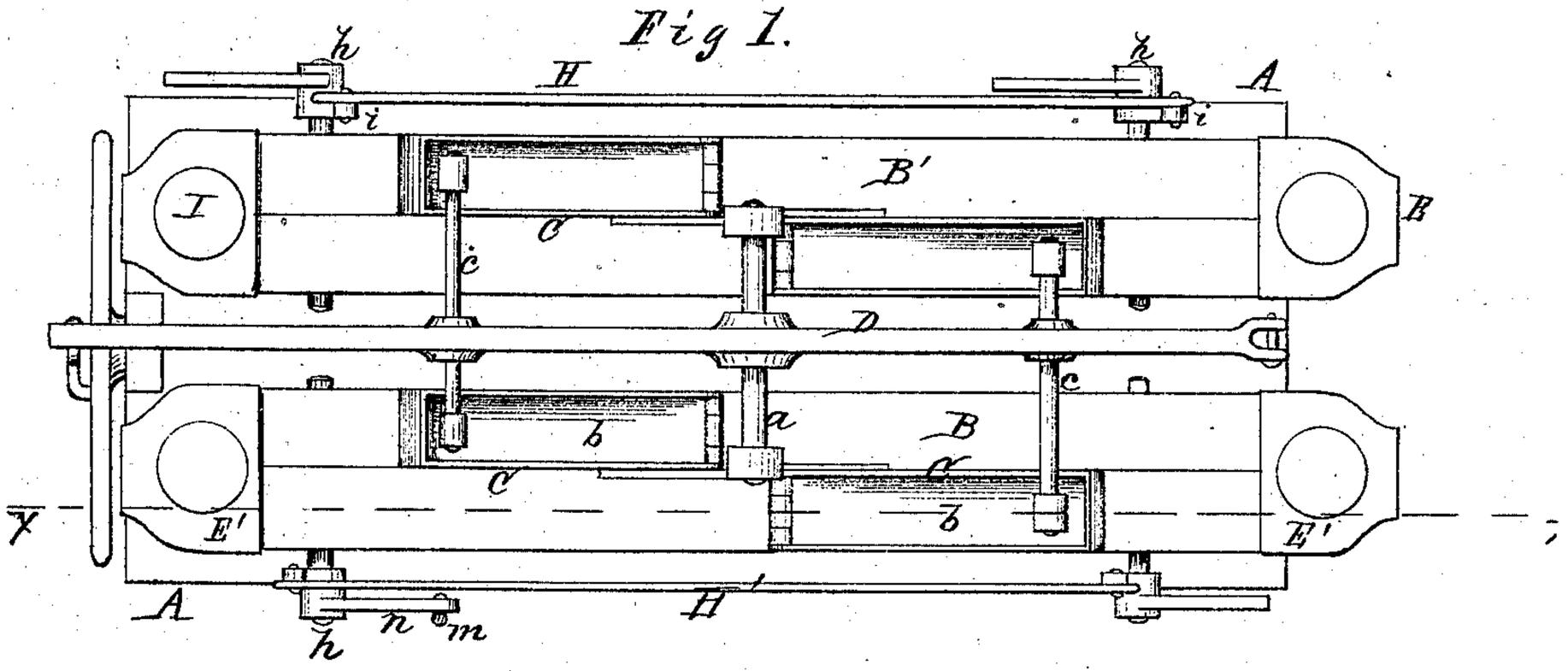


Fig 2.

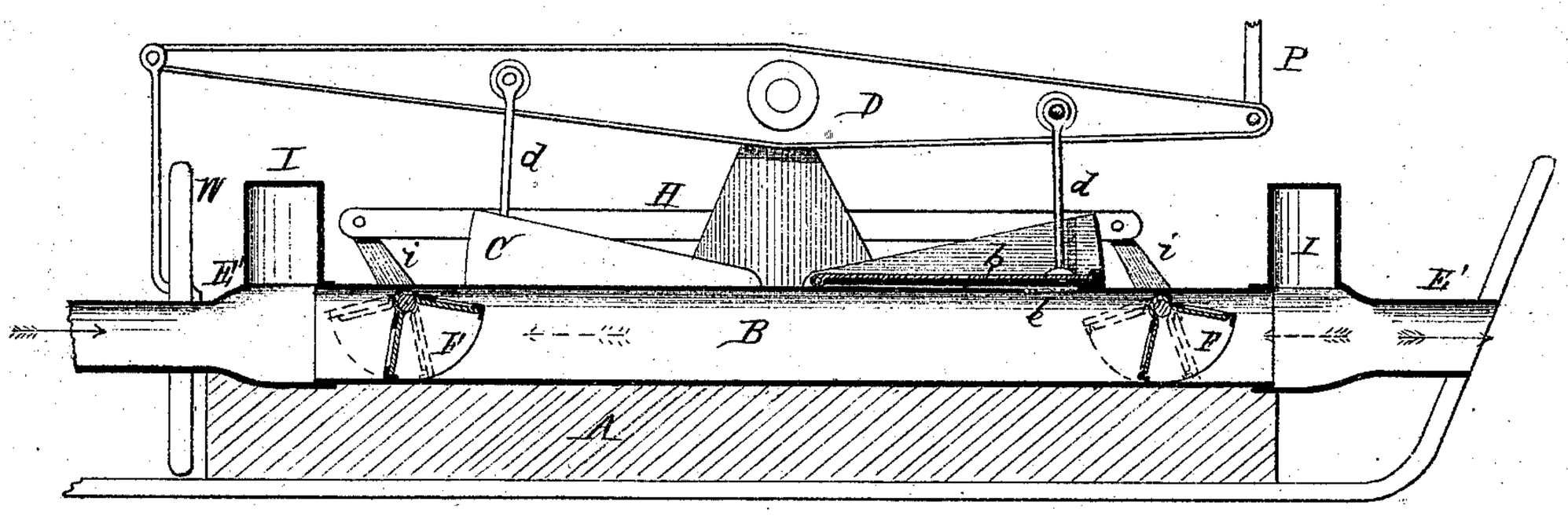
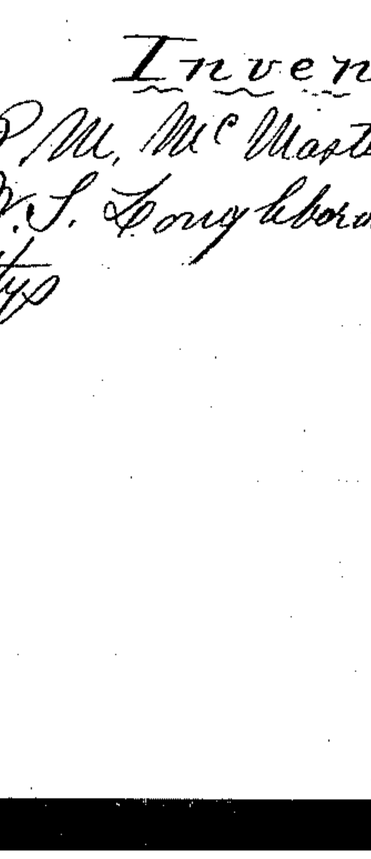


Fig 3.

Fig 4.

Fig 5.



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120,823

UNITED STATES PATENT OFFICE.

JOSEPH M. McMASTER, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN PROPULSION OF CANAL-BOATS.

Specification forming part of Letters Patent No. 120,823, dated November 14, 1871.

To all whom it may concern:

Be it known that I, JOSEPH M. McMASTER, of Rochester, in the county of Monroe, and State of New York, have invented certain Improvements in Apparatus for Propelling Vessels, of which the following is a specification:

My invention relates to that class of propellers in which the water is drawn into a pipe or pipes at the bow and forced out at the stern of the vessel by suitable propeller-pistons, and it consists, more especially, in a novel and advantageous arrangement of the propeller-pistons and the valves and other parts of the apparatus.

In the drawing—

Figure 1 is a plan view of my invention. Fig. 2 is a vertical longitudinal section showing those parts above the dotted line *x*, Fig. 1. Figs. 3, 4, 5 are details. A, Figs. 1 and 2, is a bed or sole-plate of a convenient size and form to support the working parts of the apparatus, and it may rest upon the bottom or kelsons of the vessel. B B′ are tubes through which the water is passed, and which are arranged in pairs each side of the longitudinal center line of the vessel. C C are propellers of rectangular outline, one of which is attached to each tube B B′. D is a beam vibrating upon the axis *a*, and arranged to operate the pistons *b* of the propellers C by means of arms *c* and links *d*. The propellers C upon the tubes B are located upon opposite sides of the axis of the beam D, and the double tubes are connected at the extremities by nozzles D′, which extend through the bow and stern of the vessel. Thus one propeller is drawing the water through one of the tubes while the other is forcing it out from the other, and a constant stream is, consequently, passing from the nozzles E′ against the external body of water. The propellers upon the other pair of tubes B′ also act in a similar manner, and by means of the vibrating beam D the parts thus arranged form two double-acting piston-propellers, both sets acting simultaneously in forcing and drawing. Thus the construction of the parts is made very simple, while the action is equal on both sides of the vessel. I have shown the propellers C as being constructed in a rectangular form, the pistons *b* being plates hinged at one extremity to the case and vibrating in the arc of a circle at the other end. The object of this is to obtain a sufficient area of piston without occupying a large amount of room, and the propellers are, therefore, attached directly to the tubes longitudinally. This construction is desirable in canal-boats and smaller vessels, but a common cylindrical pump may be used as the propeller where space is not valuable. Openings *e* are provided from the propeller-chambers into the tubes for the passage of the water, and the necessary valves may be located at convenient points in the tubes upon segmental supports F. The radial-plates *f* of these segments, arranged nearly or quite at right angles to each other, are provided with openings for the passage of water, as indicated in Figs. 3 and 4, which are covered by rubber or other suitable valves *g*. These valves rest upon the inner surfaces of the plates *f*, and consequently open toward each other as indicated by the dotted lines in Fig. 3. The segments F are swung at their axial points upon shafts *h*, which pass through the sides of the tubes B B′ near their upper sides and carry arms *i* upon their outer extremities. These arms are connected by the bar H for the purpose of rendering the adjustment of the segments F simultaneous, and other arms *n* are attached to the shafts from which a rod or rods *m* may extend to the steersman's post to render such adjustment entirely under his control. It will be observed that when the segments F are adjusted as indicated in full lines, Fig. 2, the stream induced by the propeller moves in the direction of the full arrow; while if the segments be given a partial revolution as shown in dotted lines the other valves, heretofore inactive, then open in the opposite direction, and the stream is consequently reversed, as indicated by dotted arrows. Thus it is plain that by shifting the segments F the motion of the water in the tubes, and hence of the vessel, is reversed, the action of the propellers remaining constant; while if the valves in the two sets of pipes B B′ are adjusted to work in opposite directions the vessel may be turned about in a narrow space. Furthermore, when the segments are adjusted at a middle position the water in the tubes is simply agitated by the continual operation of the propellers, no motion being imparted to the vessel. The steersman, therefore, may have perfect control over the propelling apparatus independently of the motion of the engine, by the simple means described. By this arrangement of propellers and valves the water is not compelled to pass through the for-

mer or through any tortuous passages connected therewith, but simply rises in the propeller-chambers and passes out again, the openings *e* being of such dimensions as to prevent friction or choking. Power is conveyed to the beam D at the point P in any suitable or convenient manner, and a fly-wheel, W, is driven by a link from the opposite end of the beam, which equalizes both the motion of the engine and of the propellers, and relieves any jar of the parts. The valves *g* are conveniently formed from straps of heavy rubber, which pass over the shafts *h* and through a slot in the plates *f* to the inner face of the latter. They are thus retained in place, and form a packing between the shaft and side of the tube B. Air-chambers, I, are also located on the tubes B B′, either within or beyond the valves F, the elasticity of the air in them relieving the shock consequent upon the sudden reversal of the streams of water passing through the tubes. I have shown in Fig. 5 another arrangement of the valves which effects the same purpose as the segments F. The valve *l* is hung vertically in the tube, and a grating or seat, L, is provided upon each side of it, as shown, either of which may slide out of the tube and leave the valve to operate for suction or delivery, as desired. The adjustment of the gratings L may be controlled in any convenient manner.

What I claim as my invention is—

1. The oscillating valve-segments F provided with valves *g* and arranged to be adjusted substantially as and for the purposes set forth.

2. The combination of the sets B B′ of double propeller-tubes provided with propellers C, the oscillating valve-segments F and adjusting-arms *i*, arranged and operating substantially as and for the purposes set forth.

JOSEPH M. McMASTER.

Witnesses:

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