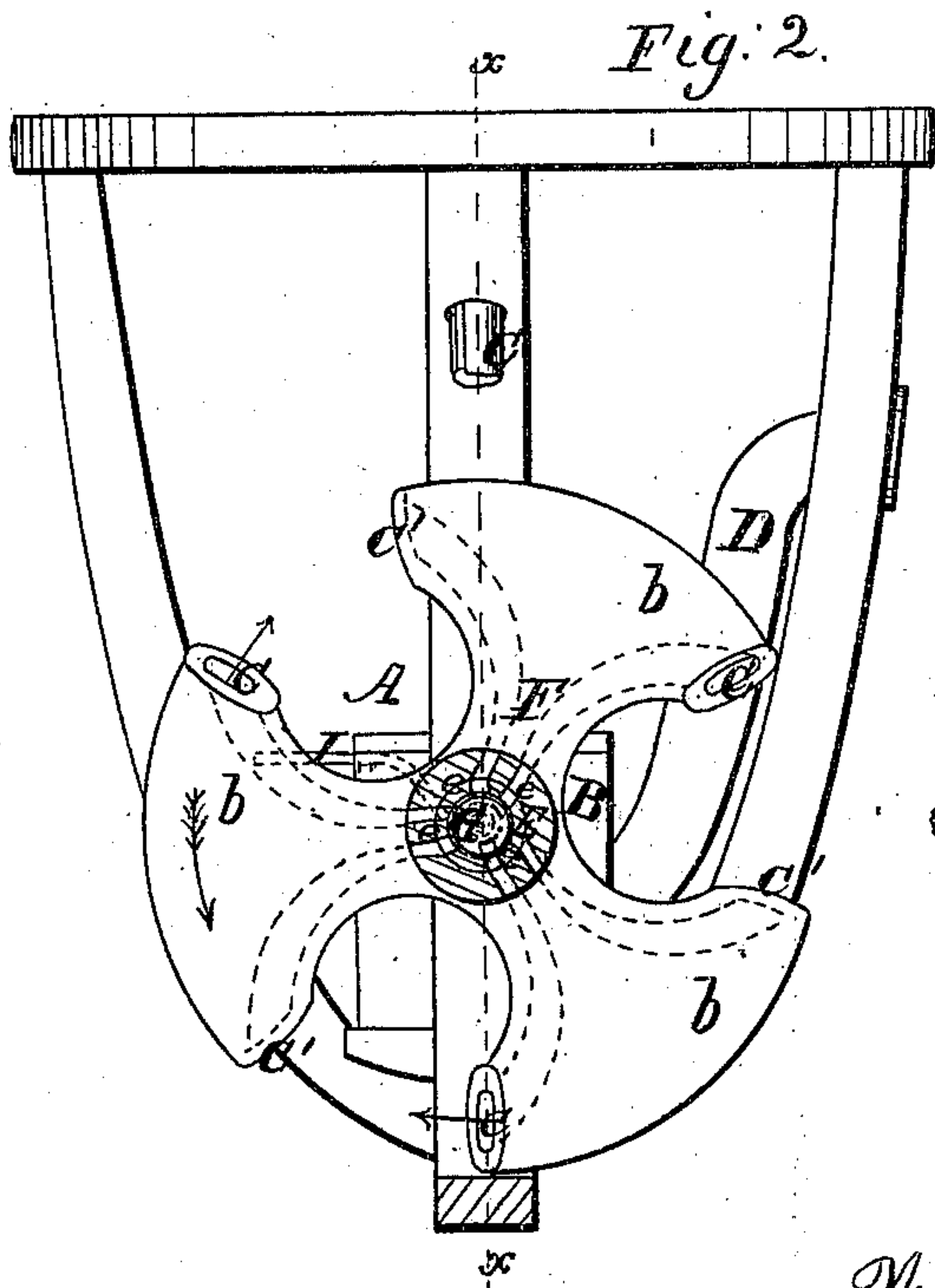
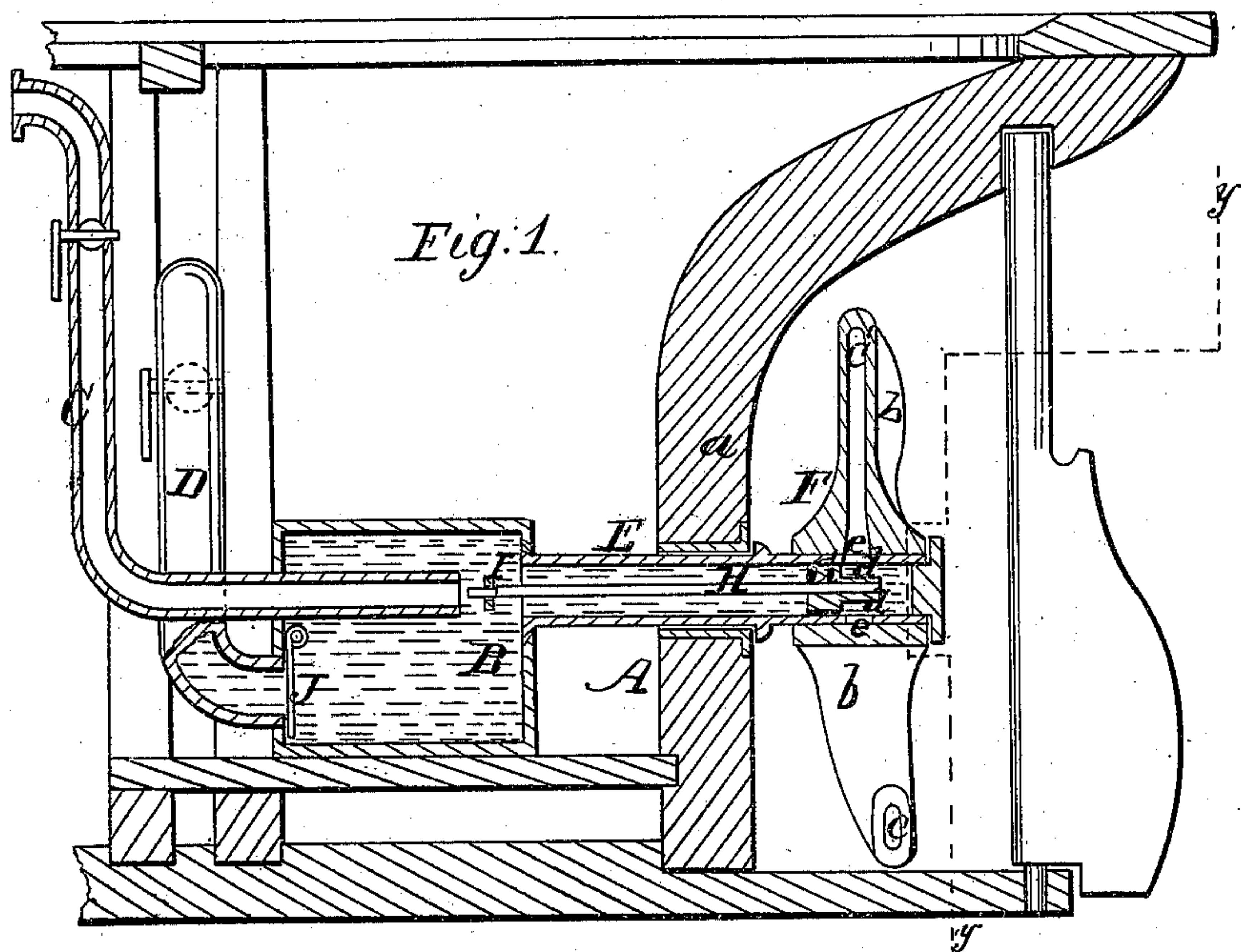


*W. Spaulding*  
*Pneumatic Propeller*  
*No. 79,695.*      *Patented Jul. 7, 1868.*



*Witnesses.*

*Wm. Brown*  
*J. Blum & Fraser.*

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*Wm. Spaulding*  
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# UNITED STATES PATENT OFFICE.

WILLIAM SPALDING, OF PORT CLINTON, OHIO.

## IMPROVED APPLICATION OF STEAM TO A PROPELLER.

Specification forming part of Letters Patent No. 79,695, dated July 7, 1868; antedated June 18, 1868.

*To all whom it may concern:*

Be it known that I, WILLIAM SPALDING, of Port Clinton, in the county of Ottawa and State of Ohio, have invented a new and Improved Application of Steam as a Motor; and I do hereby declare that the following description, taken in connection with the accompanying drawings, hereinafter referred to, forms a full and exact specification of the same, wherein I have set forth the nature and principles of my said improvements, by which my invention may be distinguished from all others of a similar class, together with such parts as I claim and desire to have secured to me by Letters Patent.

This invention relates to a new and improved application of steam as a motor, whereby an engine and all complicated mechanism are dispensed with and the steam used in the most direct manner possible.

In the accompanying sheet of drawings, Figure 1 is a side sectional view of the stern of a vessel having my improvements applied to it, *x x*, Fig. 2, showing the line of section; Fig. 2, a rear sectional view of the same, taken in the line *y y*, Fig. 1; Fig. 3, a detached side view of a valve pertaining to the same; Fig. 4, an enlarged detached front or end view of the valve.

Similar letters of reference indicate like parts.

A represents the stern portion of a vessel, and B is a tight box, which is placed in the lower parts of the stern, and has two pipes, C D, communicating with it, one, C, being a steam-pipe, which communicates with a steam-boiler placed in any convenient part of the vessel, and the other, D, being a water-supply pipe, which extends through the side of the vessel below the water-line and admits water into the box B.

E is a hollow or tubular shaft, which leads from the box B and passes through the stern of the vessel, having its bearing in the stern-post *a* thereof, as shown clearly in Fig. 1.

The propeller F may be of the usual screw form, provided with three blades, *b*, each blade having two passages, *c c'*, made in it, the inner ends of which communicate with the interior of the shaft E, and the outer ends have their orifices at opposite ends of the blades *b*, as will be understood by referring to Fig. 2.

The steam-pipe C enters the box B about in line with the tubular shaft E, and extends within the box within a short distance of shaft E,

the latter being fitted in the side of the box opposite to that through which the steam-pipe C enters it.

G is a valve fitted within the tubular shaft E, and having a rod, H, attached, which extends within the box B, and is connected to a hand-lever, I, which extends beyond the side of the box B. This valve G is composed of a cylinder having spiral grooves *d* made in it. (Shown more particularly in Fig. 3.) This valve is designed to reverse the direction of the rotation of the propeller, as by adjusting it either of the passages *c* or *c'* in the blades *b* may be made to communicate with the interior of the shaft E, the latter having holes *e* made in it in line with the inner orifices of said passages *c c'*. (See Figs. 1 and 2.)

At the inner end of the water-pipe D, within the box B, there is a valve, J, opening inward.

The operation will be readily seen. Water enters the box B through the pipe D, it being recollected that the upper end of the same is below the water-level, and the steam rushing into box B through pipe C will force the water through the tubular shaft E and through the passages *c* or *c'* in the blades *b* of the propeller, rotating the latter in either direction, according to which passages it is forced through, and, as previously alluded to, it may be forced through either, according as the valve G is adjusted. As the steam is forced from the boiler into the box B, a vacuum is formed in said box immediately in front of the pipe G by the condensation of a portion of the steam, while the impetus given to such water by the pressure of the steam as it first leaves the pipe G is in a line with the tubular shaft, and forces the water, upon the principle of the Giffard injector, into and through the propeller. This force entirely overcomes the pressure of the water from the outside of the propeller, and prevents its rushing in through the tubular shaft to fill the vacuum in the box B. This vacuum must therefore be filled by the water rushing through the pipe D and lifting the valve J by its pressure. It is more easily effected by reason of the pipe D being of much larger diameter than the tubular shaft.

It will of course be seen that it is necessary to have the outer end of the tubular shaft E closed, to prevent the escape of water therefrom.

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

1. The arrangement of the water-reservoir B, perforated rotating shaft E, water-supply pipe D, steam-pipe c, valve-rod H, reversing-lever I, valve G, having spiral grooves *d*, and propeller F, as herein set forth, for the purpose specified.

2. The valve G, when constructed as described, with spiral grooves *d d*, as herein shown and described, for the purpose specified.

WM. SPALDING.

Witnesses:

WM. F. McNAMARA,  
ALEX. F. ROBERTS.