S. D. Carpenter.

Hydraulic Propeller.

No. 85,789. Patented Jan. 12, 1869.

Fig: 1.

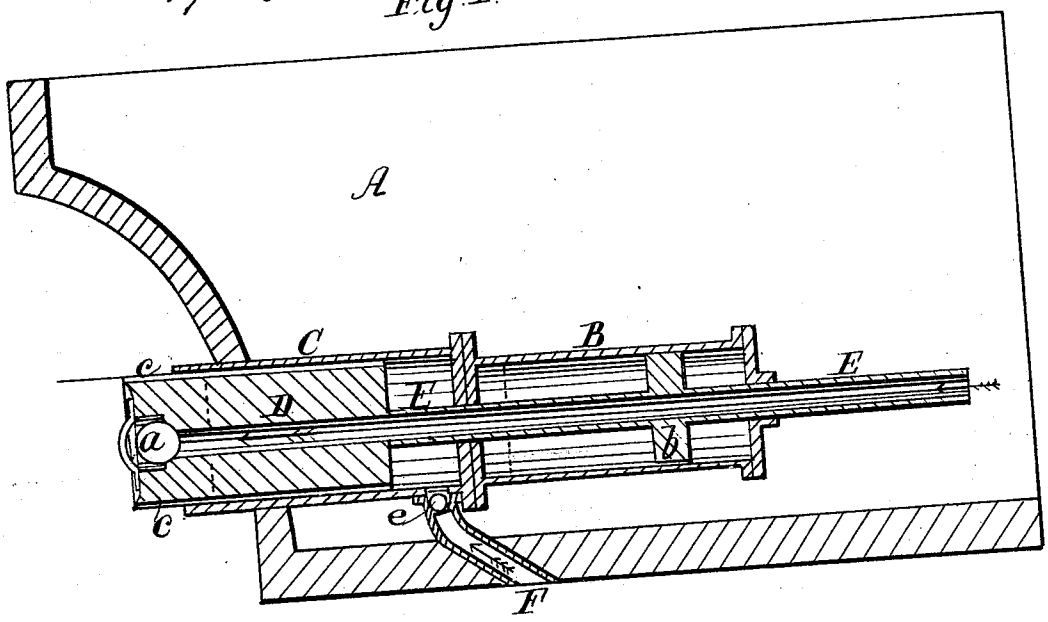
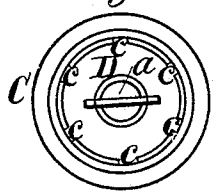


Fig: 2.



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S. D CARPENTER, OF MADISON, WISCONSIN.

Letters Patent No. 85,789, *dated January* 12, 1869.

IMPROVEMENT IN PROPELLING-APPARATUS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, S. D. CARPENTER, of Madison, in the county of Dane, and State of Wisconsin, have invented certain new and useful Improvements in Devices for Propelling and Ventilating Vessels; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, and to the letters of reference marked thereon, like letters indicating like parts wherever they occur.

To enable others skilled in the art to construct and use my invention, I will proceed to describe it.

My invention relates to an improved method of applying power to the propulsion of vessels, whereby the power is applied more directly to the water, and the use of wheels, and all the intermediate machinery for operating the same, is dispensed with, as hereinafter more fully explained.

Figure 1 is a longitudinal vertical section of a portion of a vessel, with my improvement applied thereto.

Figure 2 is an end view of a portion of the propelling-device detached.

It is well known that in the ordinary method of propelling steam-vessels, by means of paddle-wheels or by screws, a large amount of machinery is used to transmit the power from the cylinder of the steam-engine to the wheel or screw, as the one or the other is used. This not only necessitates great expense, but is objectionable for the reasons, also, that the machinery adds greatly to the weight of the vessel, reduces its carrying and stowing-capacities, and because, also, a very large percentage of the power of the engine is absorbed by the friction of the various parts of the machinery.

To obviate these objections is the object of my invention, and to accomplish so desirable a result, I construct my propelling-apparatus as follows:

I locate in the hold, near the stern of the vessel A, a steam-cylinder, B, having a piston, *b*, with a hollow stem or piston-rod, E, this rod extending through the rear end of the cylinder B, into another cylinder C, placed immediately at its rear, as shown in fig. 1, this rear cylinder C having its rear end flush with the stern of the vessel, or protruding slightly therefrom.

In this rear cylinder C, I place a piston or plunger, D, which is attached to the rear end of the piston-rod E, as shown, the plunger D having a hole extending lengthwise through its centre, and forming a continuation of the orifice through the tubular piston-rod E.

At the rear end of the plunger D, I make a small recess or chamber, in which I place a valve, *a*, so arranged that when the plunger is thrust out into the water, as shown in red, the valve *a* will close the opening passing through the plunger D, but will open it as the plunger D is drawn in.

I propose also to extend one or more tubes from the front end of cylinder C, through the shell of the vessel, to the water outside, said tube extending forward, and either downward, as shown in fig. 1, or laterally, as may be found most expedient.

These I provide with a check-valve, *e*, arranged to let the water flow in through the tube to the cylinder, but prevent it from returning by the same channel.

In constructing the cylinder C, and its plunger or piston D, I so make them, as, that while the latter has a good bearing in the former, there shall still be left between them a space of greater or less capacity, extending most of the way around the plunger.

In the drawings, I have represented this as being effected by making the plunger D with a series of longitudinal ribs, *c*, projecting radially from its sides, as represented more clearly in fig. 2. These ribs are turned or planed off, to present a true and smooth bearing-surface, they thus serving as guides for keeping the plunger concentric with the cylinder, and leaving spaces or passages between the plunger and cylinder.

It is obvious that the ribs *c* may be made on the inner surface of the cylinder C, with the same effect.

With an apparatus thus constructed, it will be seen that when steam is applied in the usual way to the cylinder B, so as to drive the plunger D out of its cylinder, the plunger will act direct against the water, and thus exert the full power of the steam (minus only the friction of these two parts) to propel the vessel forward. As the plunger D is shoved out, the space behind it in the cylinder C is filled by water entering through the pipe or tubes F, and, as the plunger D is drawn in by the return stroke of the piston *b*, the valve *e* closes, and the water in the cylinder C will be driven out through the spaces or passages between the ribs *c* with great force and rapidity, and thus also assist to propel the vessel.

At the same time, if the speed of the plunger D, on its return stroke, together with the forward motion of the vessel, should be sufficient to create a vacuum behind the plunger in the water, this is instantly filled, or, rather, prevented by air flowing from the interior of the vessel through the tubular piston-rod E, the valve *a* permitting the air to pass out through the plunger, but preventing water from entering through the same. This will also thus effect a thorough expulsion of all the foul air or gases from the hold, and thus thoroughly ventilate the same—an object of great importance.

In some cases, where ventilation may not be so essential, I propose to extend a tube from the bow of the vessel backward, and connect it, by any suitable means, with the tubular piston-rod E, and thus permit water instead of air to pass out through the plunger D.

By these means, I obtain an extremely simple and efficient means of propelling vessels, doing away with the great bulk of the machinery ordinarily used, and

thereby decreasing the weight, and, at the same time, increasing the carrying-capacity of the vessel and the amount of the power utilized.

I also, at the same time, obviate the tendency to a loss of power by the forming of a vacuum behind the plunger, and, by the same operation, effect a thorough ventilation of the vessel.

Having thus fully described my invention,

What I claim, is—

1. The plunger D, arranged to project from its cylinder or case C through the shell of the vessel, and act direct upon the water, substantially as and for the purpose set forth.

2. The construction of the plunger D and its case C, whereby the spaces, for the escape of the water between them, are formed, substantially as described.

3. The combination of the plunger D and its case C with the inlet-tube F, with its check-valve *e*, arranged to operate as set forth.

4. The combination of the plunger D with its valve *a*, and the steam-cylinder B with the tubular piston-rod E, all arranged to operate substantially as and for the purpose set forth.

S. D. CARPENTER.

Witnesses:

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