A. J. Marshall,

Ship Propeller.

No. 112,366. Patented Mar. 7, 1871.

Fig. 1.

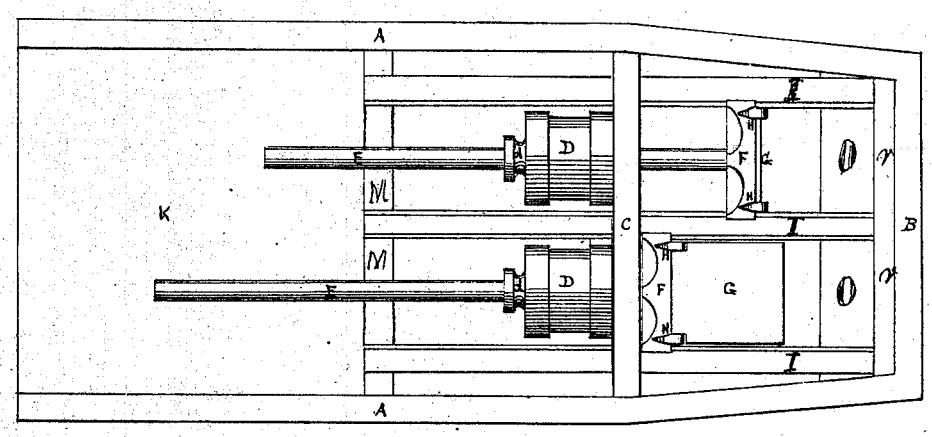


Fig. 2.

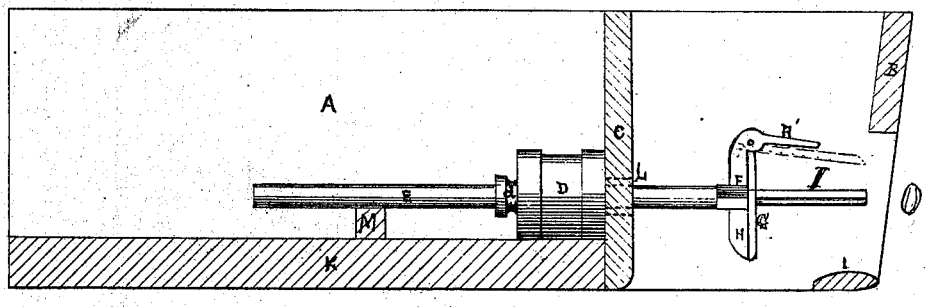
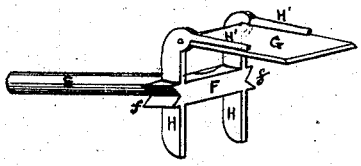


Fig. 3.



Witnesses.
C. F. Hedrick

A. J. Marshall
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ALEXANDER J. MARSHALL, OF WARRENTON, VIRGINIA.

Letters Patent No. 112,366, dated March 7, 1871; antedated March 3, 1871.

IMPROVEMENT IN PROPELLERS.

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

I, ALEXANDER J. MARSHALL, of Warrenton, in the county of Fauquier and State of Virginia, have invented certain Improvements in the Application of Steam-Power to the Propulsion of Boats upon the Waters of Canals as well as upon other waters, of which the following is a specification.

Nature and Objects of the Invention.

The first part of my invention relates to the form, to the mounting, and to the operation of the paddles or propellers of boats, in such a manner that they shall present their flat or concave surfaces, and shall be driven by the force of steam directly in right lines against the water in the rear of the boat, and that they shall be so driven against the water in lines parallel to the surface, and yet so far below it, that it shall not be greatly agitated by their motion, while the water where the propellers do operate will have its power of resistance to them greatly increased by the weight of the water above it; and furthermore, that the propellers shall be driven against the water alternately, so that, while one is driven as aforesaid, the other shall be withdrawn edgewise.

The second part of my invention relates to the construction, location, and arrangement of the steam cylinders in the stern of the boat, in such a manner that the paddles or propellers shall each be hinged upon a frame which shall be fastened upon the outer end of a plunger, which is merely an elongation of the piston, and be driven and withdrawn by it without any intermediate machinery.

Description of the Accompanying Drawing.

Figure 1 is a ground-plan of the rear section of a boat with my improvements shown in it.

Figure 2 is a longitudinal vertical section of the same.

Figure 3 is a detached view, in perspective, of a piston, paddle, and the frame in which it is mounted.

General Description.

The letters A A indicate the sides and C the stern-proper of the boat, and K the bottom, and the partition C and the sides A A extended, together with B, constitute a second or false stern, which is provided merely to protect the paddles or propellers from injury or obstruction such as may be caused by drift or by coming in contact with the banks, the gates of locks, and the like. This false stern is planked up from below the surface of the water, so as to appear to be the true stern, and should be sufficiently strong to serve the purpose designed.

The guides I I I have their forward ends bolted down upon the cross-timbers M M after passing through the partition C, and are thus held rigidly in position, and extend to the openings *r r*, between the end piece B, and O O the brace for the sides of the outer stern.

The outside guides are provided with beveled edges on their inner sides, and the middle guide is provided with like edges on both its sides to fit the grooves *f f* in the cross-heads F F. These guides and cross-heads should be made of metal of sufficient hardness and smoothness, so that, when well constructed, the frame in which the propeller swings will slide evenly to and fro with as little friction as possible.

The plungers E E should be strongly fixed in the cross-heads F F, exactly midway between their extremities, and the paddle-braces H H should be let into the cross-head or cast together with it in one piece, so that their outer surfaces shall be flush with each other, to the end that when the paddles G G are driven against the water there shall be an equal pressure against both, and the center of each paddle should abut against the center of each plunger.

The uprights H H should have the form shown in figs. 2 and 3. The parts H′ H′ act as stops to prevent the lower ends of the paddles from being thrown by the action of the water, or otherwise, quite as high as the upper ends; for if the lower edges were to be raised higher than the upper, it might be thrown upward instead of downward when its plunger was forced outward against the water.

The paddles should be made of metal, of the form, or about the form, shown in the drawing. The pins upon which the paddles turn in the upper parts of the braces may be in one piece with the paddle itself, or otherwise.

In fig. 2, G is the paddle in position to be driven against the water, and in fig. 3 the same letter indicates the paddle as being withdrawn edgewise by the plunger.

As a certain means of inducing the outer end of the paddle to be thrown down instead of up, the lower and outer edge might be in the beveled form shown in fig. 3. Its own weight, however, will always tend to give it a downward inclination.

The steam-cylinders D D may be imbedded in timbers, in any suitable manner, in the boat.

As to the location of the boiler in which the steam is to be generated, and the mechanical contrivances by which the steam is to be so applied as to draw out and draw in the pistons E E alternately, these things may be done in many different ways, and I do not herein make any claim for any of them.

In the drawing the pistons are provided with stuffing-boxes where they pass through the partition or bulkhead C, as shown at L, fig. 2, to prevent the admission of water into the boat.

It will appear in the drawing that the steam-cylinders are placed with their back ends against the par-

tition C, and it is obvious, therefore, that when a piston is driven out against the water a portion of it will be in contact with and be cooled in some degree by the water, and that, when again it enters its cylinder, it will condense the steam therein to some extent. That result may be easily avoided by placing the cylinder so much further forward in the boat that no portion of the piston which will come in contact with the water will reach it.

I have not attempted in this specification to give the dimensions or the proportions of the various parts to each other. They should, of course, be varied according to the conditions and circumstances existing when and where my improvements are used.

I will suggest, however, that the lower edges of the paddles should, in the outward push against the water, move in a line but a few inches above that of the bottom of the boat, for the reason that the further they operate below the surface the greater will be the resistance of the water and the less will it be thrown into waves upon the surface, and the less will be the injury done to the banks of canals and other bodies of water.

These improvements are especially designed for the propulsion of boats upon the waters of canals, but it is believed that their use will be found expedient upon lakes and rivers also.

It is obvious that my propellers or paddles may be operated by animal or other power as well as that of steam, and that any number of them may be used to propel a single boat.

I do not claim to be the first inventor of a propeller to be driven back in a right line with the line of direction of the boat to be propelled against the water in the rear of the same, nor of the described mode of connecting the propeller immediately with the piston of a steam-cylinder located in the boat; but

I do claim—

The paddle G, formed and hinged as shown, and its cross-head F, the uprights H H, with their projections H′ H′ and their grooves *f f*, when each is constructed and all are arranged and combined substantially as and for the purpose described.

A. J. MARSHALL.

Witnesses:

C. J. HEDRICK,

A. M. STOUT, Jr.