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WILLIAM RICHARDS, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN PROPULSION OF VESSELS.

Specification forming part of Letters Patent No. 131,118, dated September 3, 1872.

Specification describing certain Improvements in Apparatus for Propelling Boats and Vessels, invented by WILLIAM RICHARDS, of the city of Rochester, in the county of Monroe and State of New York.

My invention consists of an apparatus attached to the bottom or sides of a boat or vessel, constructed, arranged, and operating as hereinafter described.

In the drawing, Figure 1 is a bottom view of a boat with my improvement applied thereto; Fig. 2, a longitudinal-vertical section; Fig. 3, a perspective view of one of the paddle-gates or frames and its paddles; Fig. 4, a section of the hinged bar that operates the paddles; Fig. 5, a view of the rudder arrangement.

A is a canal-boat of ordinary form and construction. B is a trough or water-way at the bottom of the boat. It is made open at the ends and bottom, leaving a free passage through from end to end. It is formed of vertical side plates or flanges B' B' having horizontal flanges *a a*, which are bolted or screwed fast to the bottom of the boat. At the ends are converging bars C C, which inclose and form the bearings for the rudders D D, and guard them and the paddles from being broken or injured by any obstruction. Each of the side plates B' is formed with a horizontal way or groove, *b*, in which slide the bearings *c c* of the paddle-gates or frames E E. Two or more of these frames are used according to the width of the bottom of the boat or other vessel, each bearing paddles G G, which are hinged at *d d*, to open and close. The action of the paddles is such that in going against the water they open, as shown at the right in Fig. 1, while in returning for a new stroke they close, as shown at the left in the same figure; and they alternate in action, one being open or acting upon the water while the other is closed or returning to the point of starting. The paddle-gates are connected with a double crank, H, by means of connecting-rods I I.

In order to accomplish the proper opening and closing of the paddles, I employ the following arrangement: The upper edges of the paddles are hinged to longitudinal bars K, one bar to each gate. Each bar is provided with two hinged ends, *f f*, which drop downward.

Beneath the bar is a slide, *g*, which rests in loops *h h*. This slide slides endwise across the joint, so as to raise and stiffen one end, when it releases and lowers the other. Its ends are to be of spring-steel to operate properly and adapt itself to place. It has slots, *i i*, to allow it to slide; and it is operated at any time by means of an upright, *k*, which extends up through the boat within reach of the operator, and to be operated by lever or otherwise. On top of the end pieces of the paddle-gates are stops *l l*, against which the hinged ends *f f* strike when free to fall.

The operation is as follows: One of the hinged ends *f*, being free, as shown at the right in Fig. 3, will fall and engage with its stop *l* in the back motion of the bar K. This it does at the moment the paddles have been turned to the vertical position to act upon the water. The further motion of the crank will then force the gate, with its open paddles, bodily back to react upon the water. At the commencement of the return stroke the stiff end *f*, being elevated, will slide over its stop, so as not to form any impediment. The same result is produced on the paddles of the opposite gate, only alternating with those of the other. When it is desired to change the motion of the boat or go in the opposite direction, it is only necessary to slip the slide *g* by means of the upright K, which is worked by lever or other method, so as to disengage and lower the end *f* of the slide that was raised and stiffened before, and engage and raise that one which was lowered before, which produces a reversion of the action of the paddles. This arrangement of the hinged bar K, slide *g*, and the alternating reciprocating and folding paddles I believe to be new. It will be noticed that at each movement the bar K performs a double action—first, it operates the paddles so as to open and close them at the proper time in accordance as the boat is moving ahead or astern in the water; and, second, it moves the gate with the paddles to apply the power on the water. The paddles may be arranged in somewhat different manner, but embodying the same principle—for instance, they may be made to stand angularly, pivoted at the center to the sliding bar and open and close like an umbrella; and in order to act

both ways they may be made in pairs, which are reversed in position, one set being secured in place while the other is acting.

It will be seen that these side plates act, first, as a protection for the paddles, and, second, subserve the purpose of a keel for the boat. The entire machinery being on the bottom acts as a ballast, keeping the boat always steady; and then there is the advantage of the propelling instrument being in dense water by reason of the weight of water above it; therefore it acts with more propulsive force, and raises little or no commotion or swell.

To render the action of the two reciprocating gates effective I employ two rudders, D D, one attached to each end of the boat. These rudders have vertical shafts *m m* with cross-heads *n n*. The ends of the respective cross-heads are connected by cross-rods or chains, *p p*, which cross each other in the middle, as shown in Fig. 5; but such I do not claim.

This apparatus, being of portable form, can

be applied to old boats already in use, as well as to new ones. It is only necessary to bolt the flanges to the bottom and apply the operating parts, which is easily done. I would also say that the attachment could be applied to the sides of the boat, instead of to the bottom, with a similar effect.

What I claim, and desire to secure by Letters Patent, is—

The hinged bars K K, slides *g g*, and stops *l l*, when combined with the turning paddles G G and the frame E E, the whole resting in the open water-way B, constructed of side plates B' B', substantially as shown and described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

WILLIAM RICHARDS.

Witnesses:

R. F. OSGOOD,
ARCHIE BAINE.