ROBERT STEEL.

Improvement in Propelling Boats.

No. 128,258. Patented June 25, 1872.

FIG. 1

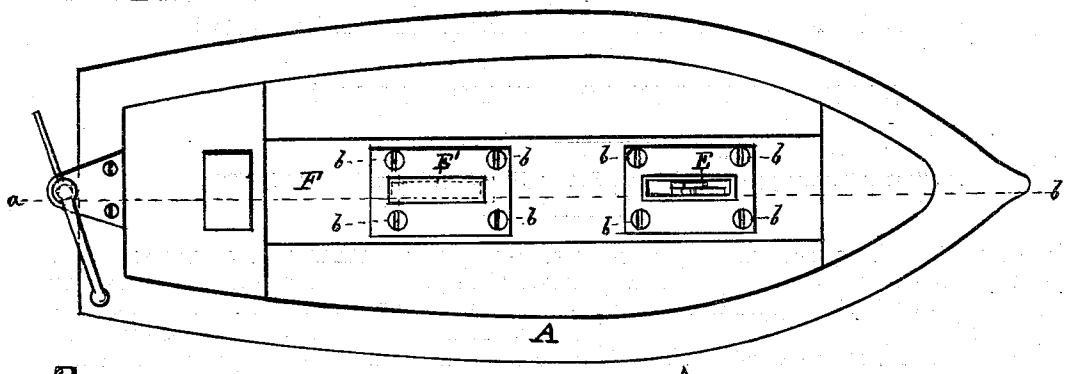


FIG. 2

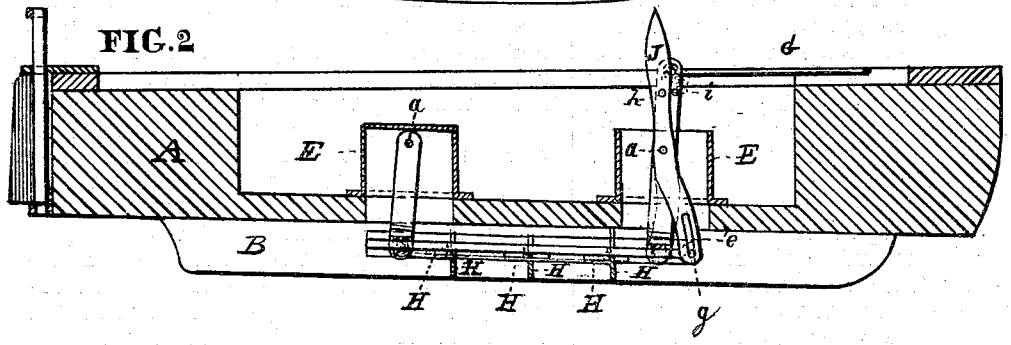


FIG. 3

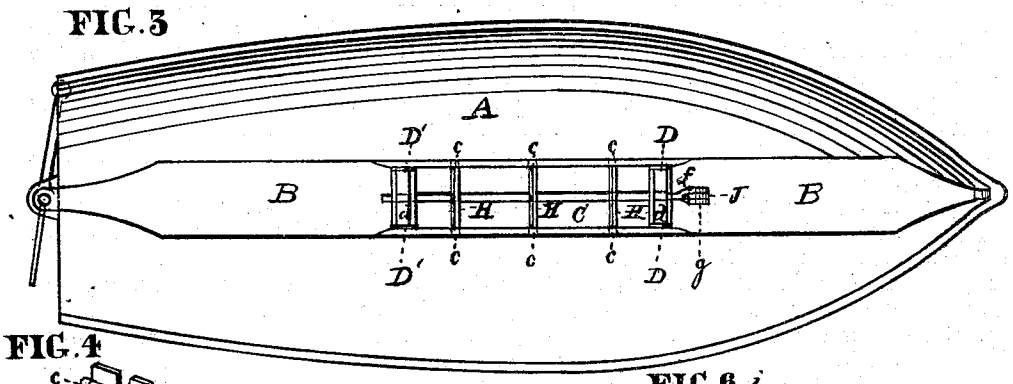


FIG. 4

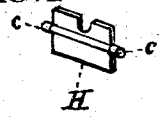


FIG. 5

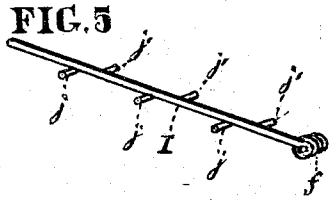


FIG. 6

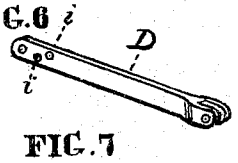
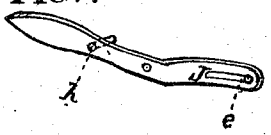


FIG. 7



WITNESSES.

Thomas J. Bewley.

Harry C. Benners

INVENTOR

Robert Steel

By his Attorney

Stephen Ustick

UNITED STATES PATENT OFFICE.

ROBERT STEEL, OF PHILADELPHIA, PA., ASSIGNOR TO HIMSELF, STACY L. ROBERTS, AND PETER C. FULWEILER, OF SAME PLACE.

IMPROVEMENT IN PROPELLING BOATS.

Specification forming part of Letters Patent No. 128,258, dated June 25, 1872.

Specification describing certain Improvements in Boat-Propellers, invented by ROBERT STEEL, of the city of Philadelphia and State of Pennsylvania.

My invention relates to the combination of a reciprocating frame, provided with paddles, with a longitudinal recess in the bottom of the boat, the paddles—which have a pivoted connection to the frame—being so constructed and arranged in relation to the same that, by coming against suitable stops of an adjustable rod in connection with said frame, they are caused to retain a perpendicular position during their action upon the water for the propulsion of the boat, and, in the return motion which releases them from the stops, to be turned by the action of the water upon them so as to float in the water to the end of the stroke, the adjustment of said rod being effected by means of a lever, as hereinafter described.

The invention is intended chiefly for canal navigation, the paddles being at all times submerged and moving in a straight line, not producing any disturbance of the water to wash the banks of the canal.

Figure 1 is a plan view of a boat, A, with the improvements attached. Fig. 2 is a longitudinal section at the line *a b* of Fig. 1. Fig. 3 is a reversed plan of the boat. Figs. 4, 5, 6, and 7 are respectively perspective views of one of the paddles H, the shifting-rod I, vertical rod D, and lever J.

Like letters in all the figures indicate the same parts.

A is the boat. B is the longitudinal recess, which extends throughout the whole length of the boat, in which recess the rectangular frame C has a reciprocating movement, being hung by means of the rods D D′, which are connected at their upper ends with the pins *a a′* in the hollow standards E and E′ that are confined, by means of screws *b* or otherwise, to the bed-plate F. The lower ends of the rods are bifurcated, as seen in Fig. 6, and connected with the cross-bars *c c* at the ends of the frame C, and turn freely therein to suit the oscillating movements of the rods. The upper end of the rod D projects above the pin *a*, and is jointed to one end of the connecting-rod G, by means of which a reciprocating movement is imparted to the frame C by a steam-engine or other motive power. The frame C is provided with paddles H, one of which is shown in detail in Fig. 4. The paddles, by means of their pivots *c*, are connected with the sides of the frame C, so as to admit of a vertical position during their action upon the water, as shown by full lines in Fig. 2, and a floating position during the return motion of frame C, as shown by dotted lines. I is a central rod, shown in detail in Fig. 5, which is connected with the cross-bars *d d* of the frame C, so as to move freely therein in its longitudinal adjustment, which is effected by means of the lever J, seen in detail in Fig. 7. The lever is hung on the pin *a* in the standard E. The lower end of the lever is connected to the rod by means of the vertical slot *e*, the slot *f* in the front end of the rod, and the pin *g*. The lever, at its upper end, has an adjustable connection with the upper end of the front oscillating-rod D by means of the pin *h*, which projects from one side, and the holes *i i* in the rod. The said rod I is provided with radial pins *j* on one side, and with like pins, *j′*, on the other side.

When the boat is moving in the direction of the arrows, and the pin *h* of the lever is connected with the hole *i*, as seen in Fig. 2, the paddles at their upper edge bear against the pins *j* of the rod I, so as to be held in their perpendicular position during the forward movement of the frame C, and thus impart their whole force against the water. In the return motion of the frame the paddles, being released from their connection with the pins *j*, are turned on their pivots *c* by the force of the water against them, so as to be caused to float in the water, as shown by dotted lines, until the commencement of the forward stroke of the frame.

When it is desired to reverse the motion of the boat the pin *h* of the lever J is disconnected from the hole *i* of the rod D, and connected with the hole *i*, so as to change the longitudinal position of the rod I with the paddle-frame C, and thus take the pins *j* out of the way of the paddles H and bring the pins *j′* into connection therewith, so that a like action of the pins *j′* will take place in holding the paddles in their perpendicular position, as described above.

It will be seen that the paddles H are at all times submerged in the water, so that the whole force of the power expended for the propulsion of the boat is exerted by the action of the paddles in their forward movement.

I claim as my invention—

The combination of the reciprocating frame C, having movable paddles H, with the vertical rods D and D′, lever J, and the adjustable shifting-rod I, the said parts being constructed, arranged, and operating substantially in the manner and for the purpose set forth.

ROBERT STEEL.

Witnesses:

STEPHEN USTICK,

THOMAS J. BEWLEY.