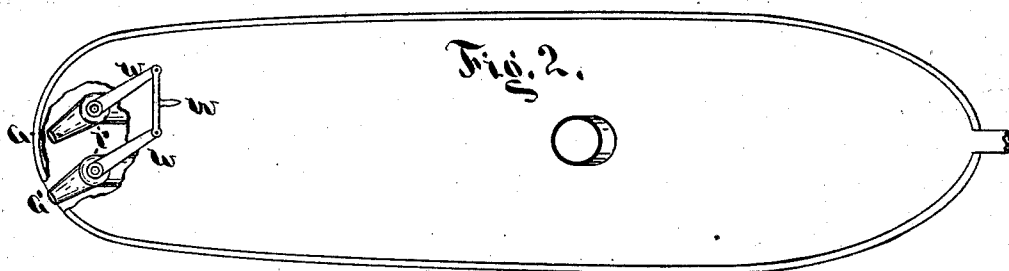
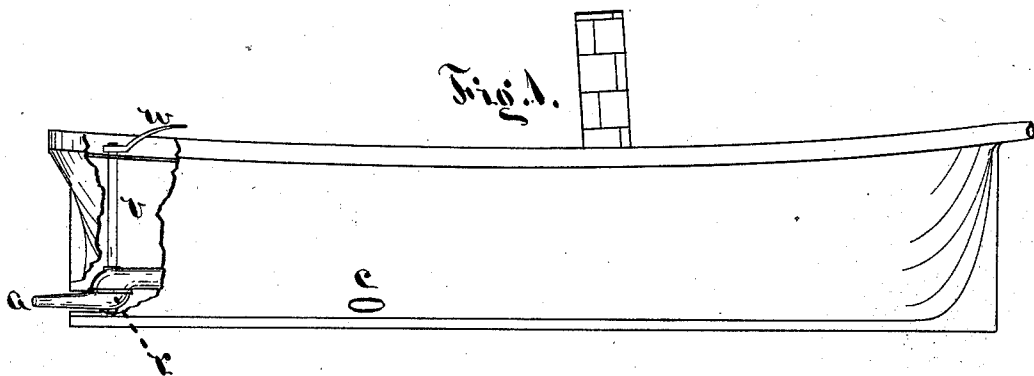


B. B. BREWER & B. B. WARD.
Hydraulic-Propeller.

No. 216,140.

Patented June 3, 1879.



Witnesses,
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UNITED STATES PATENT OFFICE.

BENJAMIN B. BREWER AND BARTON B. WARD, OF SACRAMENTO, CAL.

IMPROVEMENT IN HYDRAULIC PROPELLERS.

Specification forming part of Letters Patent No. **216,140**, dated June 3, 1879; application filed May 16, 1878.

To all whom it may concern:

Be it known that we, BENJAMIN B. BREWER and BARTON B. WARD, both of the city and county of Sacramento, State of California, have invented a new and useful Hydraulic Propeller, of which the following is a specification.

This invention relates to that class of propelling performed by pumping or drawing water in the vessel from one direction and forcibly ejecting it in the direction opposite to the course in which the vessel is to be propelled; and consists more particularly in providing the nozzle or pipe through which the water is to be ejected with a turning joint so arranged that the direction of the water or nozzle can be changed or turned while the water is being ejected, so that the vessel can be turned, backed, or propelled forward by changing the direction of the nozzle through which the water is being forced.

Referring to the accompanying drawings, Figure 1 shows an elevation of a vessel with sides cut away, showing the part of the mechanism embodying our invention. Fig. 2 shows a plan of another form of the same.

Fig. 1 presents a side elevation of a vessel with side cut away, showing the nozzle-pipe *a*, out of which water is to be forcibly ejected by means of suitable pumps and engines, which are not shown, the method of working or propelling the vessel being to draw water through the opening or openings *c*, which are generally placed ahead of the pumps, so that by the use of suitable pumps and engines the water can be drawn up through *c* and forcibly ejected through the nozzle *a*, as shown in Fig. 1. The nozzle-pipe *a* is provided with a turning joint, *r*, which allows the nozzle to be swung either to the left or right, for the purpose of changing the course of the vessel.

As the vessel is propelled by ejecting the water in a direction opposite to the course of the vessel, it is evident that when the direction of the nozzle or course of the water is changed the course of the vessel which it propels is changed accordingly; so in order to propel the vessel forward the nozzle is turned directly sternward, and by turning it to right

or left the course of the vessel will change accordingly; so by turning the nozzle nearly at right angle to the vessel it will cause it to turn around on its center without changing its location; also, by turning the nozzle so as to eject the water toward the bow it will cause the vessel to move sternward. In this case we control the direction of the nozzle-pipe *a* by means of the tiller-post *v*, which is attached to the nozzle-pipe *a* and the tiller *w*, or by other equivalent devices; or the direction of the water may be changed by having the nozzle fixed immovably, and changing the course of the water ejected from the nozzle by means of movable side plates or grooved arms, that may be attached near the nozzle from which the water escapes.

Fig. 2 shows a plan of the same as Fig. 1, with the exception of having two nozzles or pipes, *a* and *a'*, the same being worked as above described, and controlled by suitable tiller-posts and tiller, or otherwise.

In construction the turning joint *r* can be formed of two semi-spherical parts, connected together by a turn-bolt, so that the nozzle-pipe half can readily be turned on the other part; or the joint may be formed on any equivalent plan, so that the nozzle can be readily turned while the water is being forced through it.

When required, several of these turning nozzles may be used on the same vessel, or where a vessel is propelled by means of a screw or paddle-wheels these nozzles may be used as auxiliary propellers, or for the purpose of steering or controlling the course of the vessel.

What we claim as new is—

The taper-nozzle *a* and the water-pipe, connected by means of the horizontal joint *r*, provided with a tiller-post, *v*, holding the nozzle *a* and the water-pipe together and turning the nozzle, all in combination, substantially as and for the purpose set forth.

BENJAMIN B. BREWER.
BARTON B. WARD.

Witnesses:

H. A. MARVIN,
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