F. W. Harris.

Wheels in Channels.

No. 39,394. Patented Aug. 4, 1863.

Fig. 1.

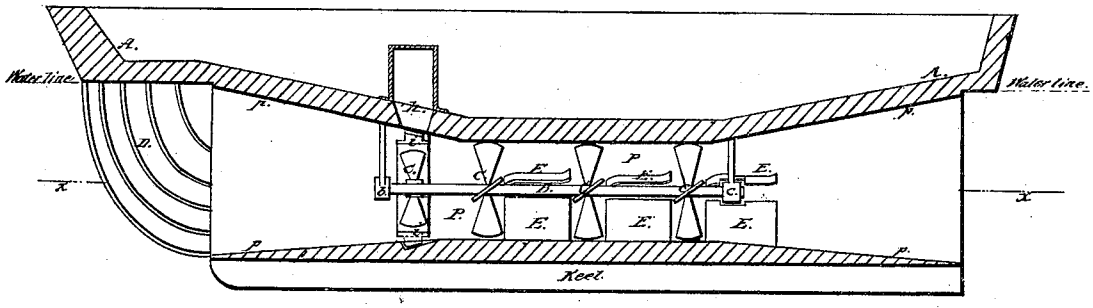


Fig. 2.

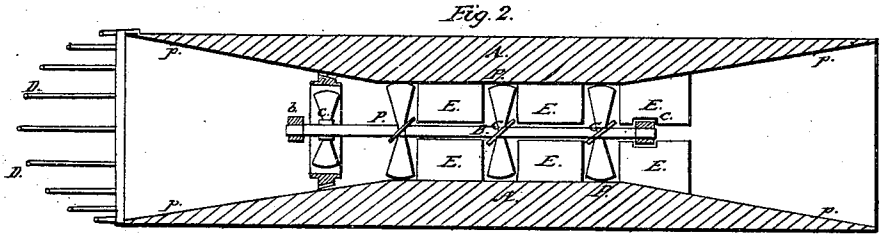


Fig. 3.

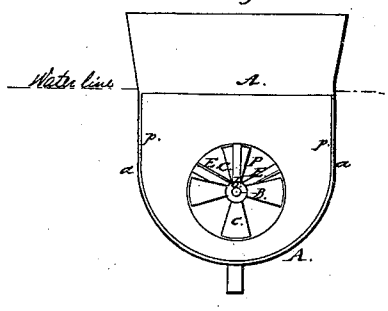
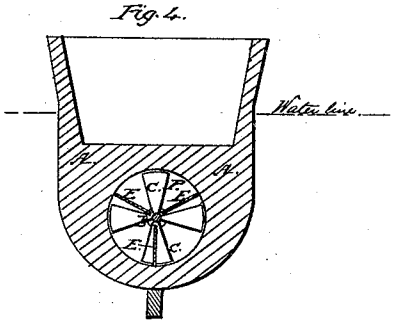


Fig. 4.



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UNITED STATES PATENT OFFICE.

FREDERICK W. HARRIS, OF MONTREAL, CANADA.

IMPROVED APPARATUS FOR MARINE PROPULSION.

Specification forming part of Letters Patent No. **39,394**, dated August 4, 1863.

To all whom it may concern:

Be it known that I, FREDERICK W. HARRIS, a citizen of the United States, at present residing at Montreal, in the Province of Canada, have invented certain new and useful Improvements in the Propulsion of Vessels; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a central longitudinal vertical section of a vessel illustrating the application of the invention. Fig. 2 is a horizontal section of the same in the plane indicated by the line *x x*, Fig. 1. Fig. 3 is a front end view of the same without the grating which protects the propellers. Fig. 4 is a transverse vertical section of the same.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to the placing of one or more screw-propellers in a passage or tube extending longitudinally through a vessel below the water-line.

The first part of my invention consists in the gradual enlargement of portions of the said passage or tube next the ends of the vessel in funnel shape and in such manner that the mouth of the said passage or tube at either end of the vessel presents an area of opening equal or approximating to the whole area of the greatest submerged transverse section of the vessel at an average draft, so that the propeller or propellers working in the said passage or tube may draw from the front of the vessel through the said passage or tube a column of water the area of whose transverse section is equal or approximating to the area of the greatest submerged transverse section of the vessel. To carry out this feature of my invention, the submerged portion of the vessel is made with its sides and bottom straight, or nearly so, and its sides parallel, or nearly so, so that its transverse sectional profile is of the same form, or does not vary in any considerable degree, from end to end, and the funnel-mouths of the passage or tube which extends through the vessel are made to conform to the said profile, and combine therewith to make the ends of the vessel present as sharp edges as possible, so that as little resistance as possible may be offered to the passage of the vessel through the water. The vessel thus constructed and provided with propellers is not forced through the water by dividing and displacing it in a lateral and downward direction, but displaces the water from in front of it by drawing it through its central passage and discharges it astern.

The invention further consists in placing within the aforesaid passage or tube extending through the vessel a series of stationary feathers or wings so arranged that, without interfering with the movements of the screw-propellers, they will prevent the whirling motion of the water within the said passage or tube which would otherwise be produced by the revolution of the propeller or propellers, or check in a very great degree any whirling motion that might be produced, thereby greatly aiding the propeller or propellers by causing them to draw and force the water in or nearly in direct lines right through the passage or tube.

To enable others skilled in the art to make and use my invention, I will proceed to describe it with reference to the drawings.

A represents the hull of the vessel, made with its sides and bottom straight and its sides parallel, and P is the passage extending longitudinally through the submerged portion thereof. This passage is made of cylindrical form for a certain portion of its length, but the enlarged or funnel-like portion of the said passage, next the ends of the vessel, gradually assume in their transverse section the form of the transverse section of the submerged portion of the hull, so that the mouths of the said passage at the ends of the said vessel conform to the profile of the vessel and make the sides and bottom of the vessel terminate nearly in a sharp edge, as shown in Fig. 2, and by the double line *a a* in Fig. 3. The upper portion of the mouths of the passage are straight and horizontal, and should preferably be at such height that they will always be submerged. As the area of the greatest submerged transverse section of the vessel has to be calculated minus the area of the transverse section of the cylindrical portion of the passage A, the mouths of the passage may have an area equal to the actual

area of the greatest submerged section of the vessel, though their upper edges be submerged some distance.

B is the propeller-shaft arranged concentrically within the cylindrical portion of the passage P in suitable bearings, *b c*, and driven by a steam-engine geared through a suitably-protected opening, *h*, in the top of the passage P, with a suitable cog-wheel, *i*, or its equivalent, on the said shaft. This shaft may carry a single screw-propeller, or two or more, C C, as represented, the diameter of such propeller or propellers being as large as is admissible within the passage A. The mouth in the front end or bow of the vessel, and that at the rear end or stern also, if desired, is to be protected by a grating or guard, D, of open iron-work, as shown in Fig. 1, to prevent the entrance into the passage P of any driftwood, weeds, or other bodies that would interfere with the operation of the propeller or propellers.

The propeller or propellers working within the passage P draw from the front of the vessel through the said passage and discharge in the rear of the vessel a column of water the area of whose transverse section may, if the mouths of the passage are of proper area, be equal to the whole area of the greatest submerged transverse section of the vessel, and in this manner a way is provided for the vessel through the water and the vessel is forced into the said way by the discharge of the water in an unbroken column at its stern.

E E are the stationary ribs or feathers, arranged within the passage P, to prevent or check the revolution or whirling of the water therein, which would otherwise be produced by the rotary motion of the propellers. These ribs or feathers may be made of sheet-iron, and bolted or otherwise secured to the interior of the passage P. The transverse section of the said ribs may be radial to the said passage, and their width such that they may reach nearly to the propeller-shaft. The said ribs may be straight and parallel with the propeller-shaft, or arranged spirally thereto or curved in any suitable form; but I have represented them in Fig. 1 as straight and parallel with the shaft, except a small portion at each end, which is slightly curved, the curvature at the front end serving to cut off the water from the propeller in front of it, and that at the rear end serving to deliver the water better to the propeller in rear of it. The length of the said ribs or feathers may be such that, when arranged between two propellers, the propeller-blades will just clear their ends in their revolution, or that when arranged between the propeller or propellers and the ends of the passage P they will not interfere with the revolution of the propeller-blades. These ribs or feathers, it is obvious, must constitute obstructions to the revolution or whirling motion of the water in the passage P, and thereby cause the water to pass more directly through and delivered more directly and in a more solid column from the said passage, and thus make the application of propellers within such a passage more effective in the propulsion of the vessel.

I do not claim, broadly, the arrangement of a screw-propeller in a passage or tube extending longitudinally through a vessel; but

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

1. The enlargement of the passage or tube which contains the propeller or propellers in a funnel form toward the ends of the vessel in such a manner that its mouth at either end of the vessel presents an area of opening equal or approximating to the whole area of the greatest submerged section of the vessel, substantially as and for the purpose herein set forth.

2. The funnel-mouthed passage or tube, in combination with the straight and parallel sides and straight bottom of the vessel, substantially as herein described, for the purpose set forth.

3. Making the mouths of the tube conform to the transverse profile of the sides and bottom of the vessel, so as to unite therewith in a sharp, or as nearly as practicable a sharp, edge, substantially as herein set forth.

4. The wings or feathers E E, arranged within the tube or passage and in combination with the propeller or propellers, substantially as and for the purpose herein specified.

FRED. W. HARRIS.

Witnesses:

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