C. H. FOWLER.

PROPULSION OF VESSELS.

APPLICATION FILED JUNE 30, 1914.

1,163,075. Patented Dec. 7, 1915.

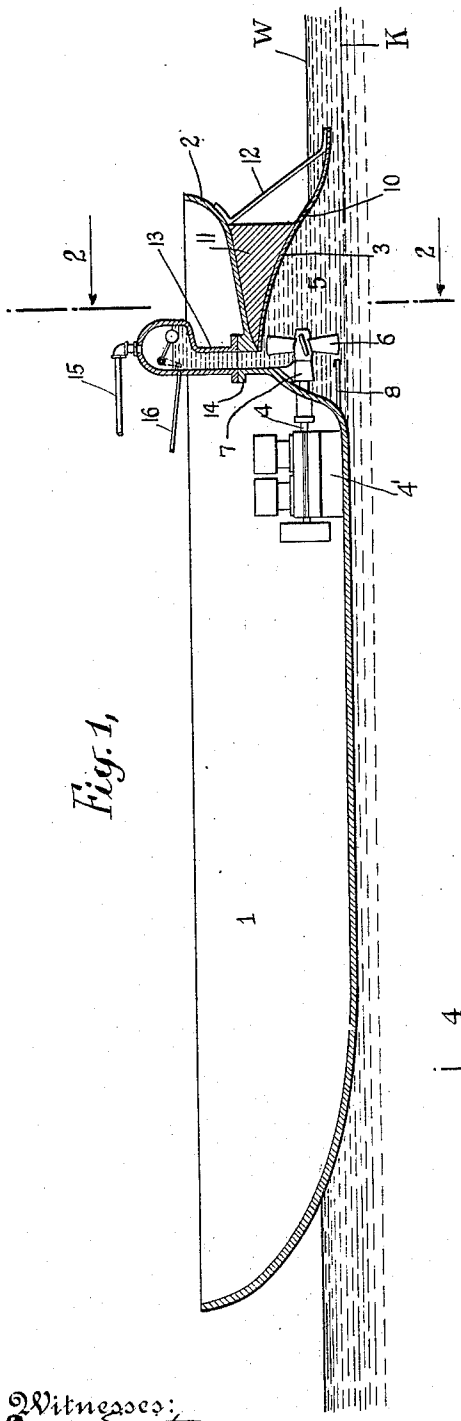


Fig. 1.

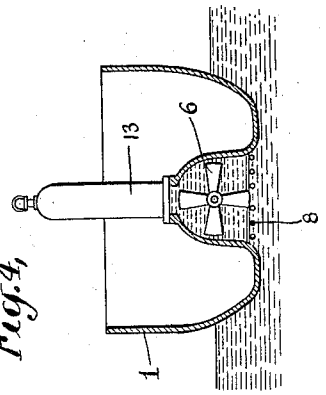


Fig. 4.

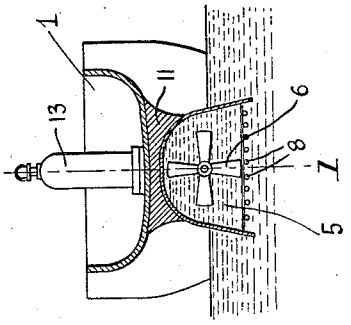


Fig. 2.

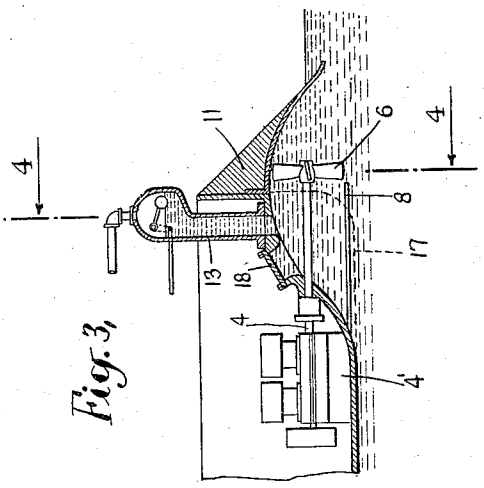


Fig. 3.

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PROPULSION OF VESSELS.

1,163,075. Specification of Letters Patent. Patented Dec. 7, 1915.

Application filed June 30, 1914. Serial No. 848,127.

To all whom it may concern:

Be it known that I, CARL H. FOWLER, a citizen of the United States, residing in the city, county, and State of New York, have invented a certain new and useful Improvement in Propulsion of Vessels, of which the following is a specification.

My invention relates to boats and is particularly directed to the provision of means whereby a boat may be adapted to be propelled through shallow water at a fair rate of speed.

Especially is my invention directed to the provision of means whereby a light draft boat of ordinary construction may readily be modified to permit its propulsion by a screw propeller, the blade diameter of which is greater than the depth of water through which the vessel may safely navigate.

Briefly, I provide a propeller chamber by securing an arched hood to the stern of the vessel so as to form what is virtually a tunnel external to the hull but attached thereto. This construction can be made in the simplest form where the stern of the vessel is of under-cut or overhanging construction to which the arched hood can be conveniently secured. Where the vessel has little or no overhanging stern I provide an approach to the propeller chamber by making a slight modification of the hull so as to give an easy approach for the water used by the propeller in the propeller chamber. In such case a propeller chamber practically constitutes a tunnel of which the forward part is within the lines of the hull and the after part is within the arched hood or tunnel external to the hull. This arched hood is approximately air tight, rises above the normal water line of the boat, and usually to a height above the keel line of the boat slightly greater than the diameter of the propeller. The lower edges of the hood are below the water line of the boat at its minimum draft and usually a little above the keel line. Within the chamber or tunnel thus formed the propeller is rotated, the chamber being kept filled with water by the means herein described. The air may with some types of propellers and engines be entirely exhausted from the propeller chamber by the rotation of the screw alone, and thus a solid body of water secured within the propeller chamber and thereafter maintained there by atmospheric pressure. Preferably, however, I provide a vacuum chamber within the hull of the boat and connect the same by a passage through the stern with the propeller chamber, the air being either wholly or partially exhausted from the vacuum chamber by means of a vacuum pump or other device whereby the propeller chamber and at least part if not all of the vacuum chamber above the same are kept constantly filled with water, and the propeller is thus given a solid resisting medium in which to operate. By these means many boats of ordinary construction and which cannot now operate efficiently in shallow waters or when running in light draft, can be given the practical benefits of a tunnel system without re-modeling the hull of the boats, and by the means described these boats can always be given a solid body of water of practically any desired density within the propeller chamber and under all conditions of load or water line or depth of water. By means of the vacuum chamber a column of water of any desired height can be maintained by atmospheric pressure over the propeller chamber and thus give the propeller operating at the surface or even above the surface of the surrounding river or lake, water of the same character that the propeller would have if placed the same number of feet below the surface of the river or lake or other body of water. The boat is thus adapted to operate through waters of a depth only slightly greater than the draft of the boat and at the same time be driven by a propeller of comparatively large diameter which may be greater than the depth of water in which the boat operates, the propeller being at all times provided with a substantially solid body of water in the chamber in which it rotates. This construction enables the propeller to all times operate efficiently and without the loss of power which is always experienced when the propeller ordinarily located at the stern of a boat rotates in surface waters. It prevents splashing and churning of the waters into foam and also the racing of the engine, as the propeller can thus always be given water of uniform solid character in which to operate.

The object of my invention is accordingly to provide means for adapting a boat of the usual construction to enable the same to have the advantageous functions above referred to.

In order that my invention may be more clearly understood, attention is hereby directed to the accompanying drawings form-

ing part of the specifications and illustrating a preferred embodiment of my invention.

In the drawings, Figure 1 represents a vertical longitudinal section through the boat taken on line 1—1 of Fig. 2 and Fig. 2 represents a transverse section taken on line 2—2 of Fig. 1. Fig. 3 represents a vertical longitudinal section through a boat which does not have an overhanging stern and consequently a modification of the hull is made so that it contains a short tunnel within the hull to make an approach for the water used by the propeller. Fig. 4 represents a cross-section of the hull, taken on line 4—4 of Fig. 3.

Referring to the drawings, boat 1 is of a usual light draft construction, being, for example, a flat bottomed canal boat. The overhanging stern 2 of the boat has secured thereto the hood 3 which may be of an arched construction as shown in Fig. 2. Propeller shaft 4 rotated by engine 4' within the hull of the boat extends through the stern of the boat into the chamber 5 formed by hood 3. Propeller 6 is secured to the end of shaft 4 within chamber 5 by the walls of which it is entirely inclosed. The overhanging end of shaft 4 may, if desired, be supported from the stern of the boat in any suitable manner, as by means of a bracket 7.

A series of deflecting bars 8, closely spaced together, are preferably provided at the bottom of chamber 5 in advance of propeller 6 to protect the latter from injury from floating sticks or roots or branches of trees and the like, or an equivalent device may be used. As illustrated, bars 8 are approximately horizontal and extend from the stern of the boat at approximately the keel-line to a point adjacent to the lower edge of propeller 6, these bars being supported in any suitable manner.

Hood 3 is of sufficient height to inclose the propeller 6 which preferably is located entirely above the keel line of the boat, although it may, of course, extend somewhat below the keel-line, in which case a somewhat greater depth of water would be required for the passage of the boat. The lower edges of the hood extend sufficiently far below the water line to effectively seal chamber 5, except possibly in the case of an unusually heavy lurch of the boat. As shown the lower rear edges of the hood extend to a point below the minimum water line W, and preferably to a point between the same and the keel-line K of the boat. The forward and side edges of the hood likewise extend below the minimum water line. The forward walls of the hood are protected by the stern of the vessel to which they are secured and accordingly do not need to be braced. The rear wall 10 of the chamber has to withstand the pressure of the stream of water discharged by the propeller and accordingly should be of sufficient strength to withstand the same and be effectively braced. As illustrated, a rigid member or members 11 may be interposed between the overhanging part of the stern and the upper part of the rear wall 10 of the hood, the lower and rear end of the hood being supported and braced by a member or members 12 secured to the stern of the boat. The rear wall of the chamber is inclined rearwardly and downwardly so as to interpose as little resistance to the water in chamber 5 as is practical and to direct the stream from the propeller at a downward angle.

Where the boat does not have an overhanging stern as shown in Fig. 1, but has a stern which is more nearly perpendicular, or has but a small amount of overhang to the stern, then a modification of the hull is desirable so as to secure an easier approach for the water used by the propeller. Such a proposed arrangement is shown in Fig. 3, in which the dotted line 17 shows the regular line of the hull at the stern, which for a short distance is cut away to form a roof or arched chamber for the tunnel as shown by line 18. Fig. 4 shows the cross-section through the hull at line 4—4 of Fig. 3, showing the construction of that part of the tunnel or propeller chamber which in this form of my invention, lies within the hull of the boat.

The boat is preferably provided with a vacuum chamber 13 which is mounted at a higher level than propeller chamber 5 and preferably is directly above the same as illustrated. This may be provided for by making a suitable opening in the stern of the boat, as illustrated, communicating with chamber 5 and mounting chamber 13 above the same upon a base member 14 secured to the inside of the stern surrounding the opening referred to. Air may be exhausted from chamber 13 by suitable means through connection 15, and the level of the water within chamber 13 may be automatically regulated by means of a pivoted float and link connection 16 which extends to a device (not illustrated) for automatically controlling the operation of a vacuum pump whereby the vacuum chamber is exhausted. This latter feature is not claimed herein, but is described and claimed in my copending application entitled "Improved shallow water boat", Serial No. 848,126, filed on June 30, 1914. If, as is within the scope of my invention, vacuum chamber 13 is not provided, chamber 5 should have a connection to a vacuum pump whereby the air within chamber 5 may initially be partially exhausted and may subsequently be further exhausted if too much air collects in the propeller chamber.

Having now particularly described my invention, what I claim and desire to protect by Letters Patent is as follows:—

1. In a vessel, the combination of a hull having a longitudinally extending chamber formed in the after part of the bottom of the same, open at the bottom and extending at an inclination upwardly from the bottom of the vessel to the stern and extending through the stern of the vessel, and a hood secured to the stern of the vessel, and extending downwardly at an inclination to the rear, from the stern, to form together with the chamber in the bottom of the hull a substantially air-tight continuous propeller chamber having an upwardly rearwardly sloping front wall within the hull and a downwardly, rearwardly sloping rear wall external to the hull, said combined chamber extending above the normal water line of the vessel and at its lower edges below the minimum water line of the vessel, a propeller shaft extending into said chamber and a propeller thereon within said chamber, substantially as set forth.

2. In a vessel, the combination of a hull having a longitudinally extending chamber formed in the after part of the bottom of the same, open at the bottom and extending upwardly at an inclination from the bottom of the vessel and extending through the stern of the vessel, and a hood secured fixedly to the stern of the vessel to form together with the chamber in the bottom of the hull a substantially air-tight continuous propeller chamber, the front wall of which is formed within the hull and the downwardly sloping rear wall of which is formed by the said hood, external to the hull and extending rearwardly from the stern, said combined chamber extending above the normal water line of the vessel and at its lower edges below the minimum water line of the vessel, a propeller shaft extending into said chamber, a propeller thereon within said chamber, a vacuum chamber in said vessel communicating with the upper part of said chamber, and means for withdrawing air form said vacuum chamber, substantially as set forth.

3. In a vessel the combination of a hull having a longitudinally extending chamber formed in the after part of the bottom of the same, open at the bottom and extending at an inclination upwardly from the bottom of the vessel toward the stern and extending through the stern of the vessel, and a hood secured fixedly to the stern of the vessel and having surfaces extending downwardly at an inclination to the rear, to form, together with the chamber in the bottom of the hull, a substantially air-tight propeller chamber extending above the normal water line of the vessel and at its lower edges below the minimum water line of the vessel, and a propeller in said propeller chamber, substantially as set forth.

This specification signed and witnessed this 27th day of June, 1914.

CARL H. FOWLER.

Witnesses:
H. R. Brown,
Charles W. Tiffin.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."