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B. C. SCOTT.

MEANS FOR PROPELLING CANAL BOATS.

No. 518,680. Patented Apr. 24, 1894.

Fig. 1.

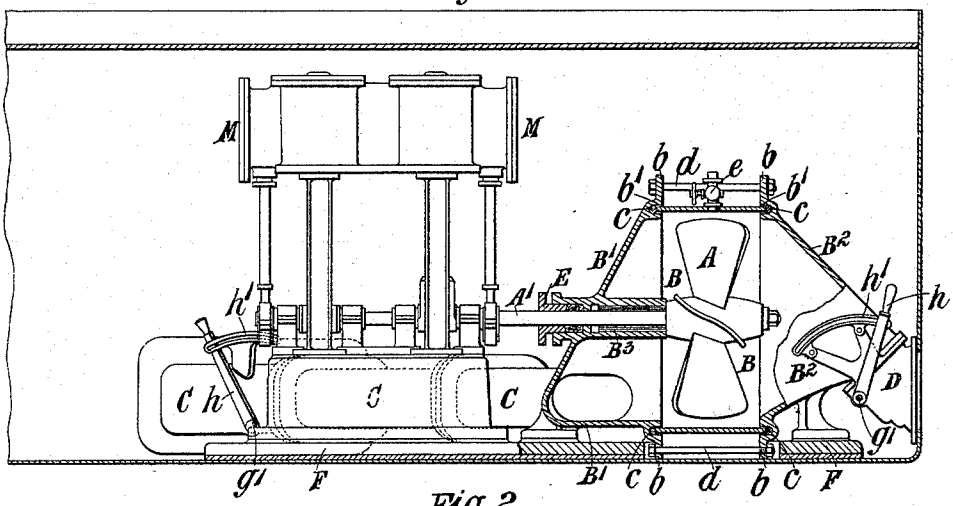

Fig. 2.

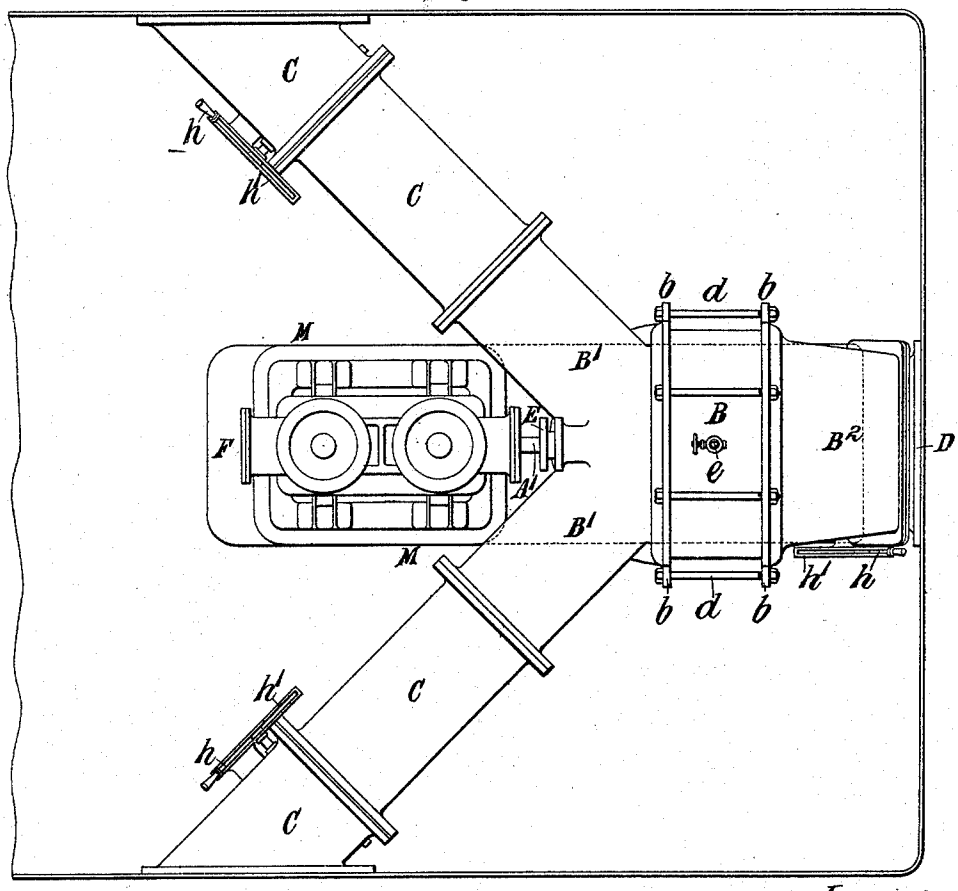

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Fig. 3.

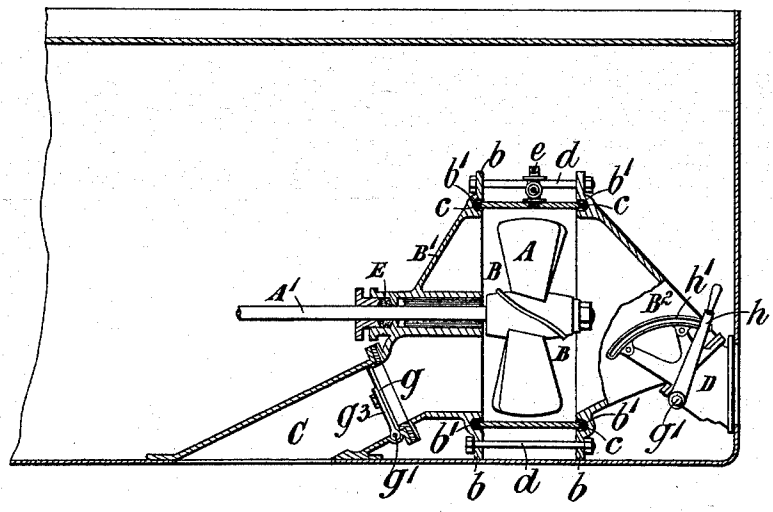

Fig. 4.

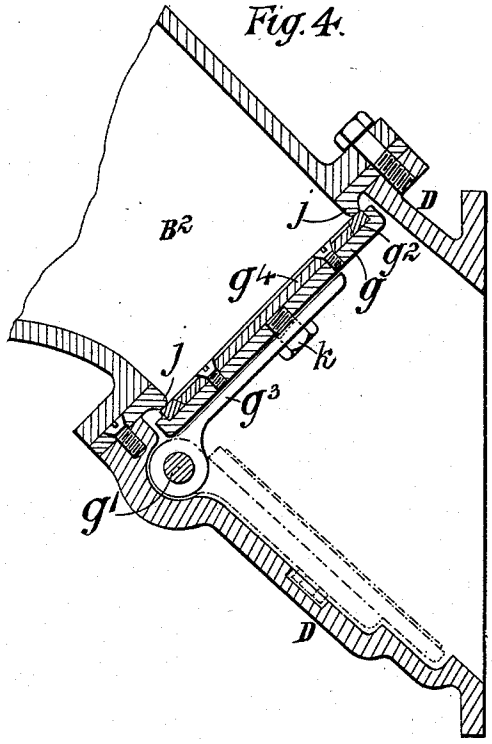

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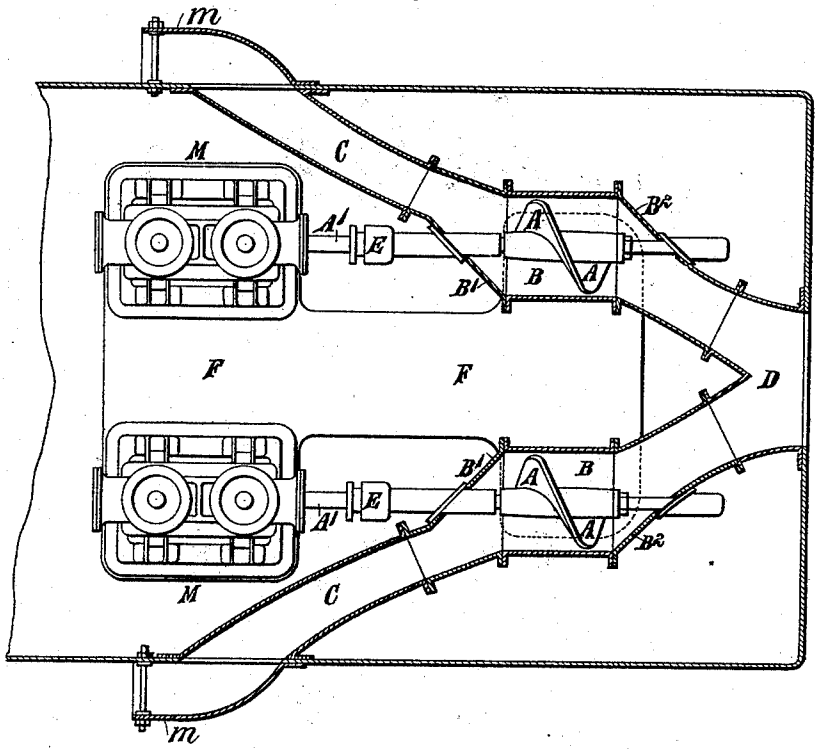
Fig. 5.



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UNITED STATES PATENT OFFICE.

BERTIE CHARLES SCOTT, OF BRUGES, BELGIUM.

MEANS FOR PROPELLING CANAL-BOATS.

SPECIFICATION forming part of Letters Patent No. 518,680, dated April 24, 1894.

Application filed February 21, 1893. Serial No. 463,227. (No model.) Patented in France July 7, 1892, No. 222,856, and in Belgium July 7, 1892, No. 100,411.

To all whom it may concern:

Be it known that I, BERTIE CHARLES SCOTT, a subject of the Queen of Great Britain, residing at Bassin, Bruges, in the Kingdom of Belgium, have invented new and useful Improved Means for Propelling Canal-Boats or Flats or other Vessels, (for which I have obtained a patent in France, No. 222,856, dated July 7, 1892, and in Belgium, No. 100,411, dated July 7, 1892,) of which the following is a specification.

In the accompanying drawings, Figure 1 is a vertical central section, and Fig. 2 a plan showing my improved apparatus, constructed with two ingress apertures situated one at each side of the vessel. Fig. 3 is a vertical central section, showing my improved apparatus constructed with one ingress aperture in the bottom of the vessel, the valve in the ingress tube being shown in its closed position. Fig. 4 is a vertical central section, showing one form of door or sluice-valve for closing the ingress and egress apertures when necessary. Fig. 5 is a horizontal section illustrating another modification of my improved apparatus in which twin screw-propellers are employed.

The chief object of my invention is to provide improved means for propelling canal-boats or flats and similar vessels of shallow draft, or vessels whose draft varies greatly, say from a few inches to several feet.

My said invention consists partly in providing in the stern of the boat or vessel, a chamber or tube in which is arranged a screw-propeller and which has inclined walls to give the proper direction to the water on its way to and from the propeller, the said propeller being mounted on a shaft which extends through a stuffing-box in one of the said end walls. This chamber is open at its rear end and is connected at its forward end with one or more tubes through which water can enter the said chamber freely from the bottom or sides of the ship or vessel. These parts are so constructed and arranged that the water entering the said chamber from the bottom or side of the boat or vessel, will be discharged through the stern of the said boat or vessel by the screw-propeller. I make the said chamber and the ingress tube or tubes as short as possible and construct the same in such a manner that, while the said tubes are of sufficient area in transverse section to permit the water to very freely enter the chamber, the egress end of the said chamber is contracted so that it is just sufficient to permit the discharge of the water without undue resistance when the propeller is rotating at its maximum velocity. By making the chamber and ingress tube or tubes as short as is practicable, I avoid unnecessary friction therein and obviate the carrying of an unnecessarily heavy load of water. And by contracting the egress aperture I insure the discharge of the water in a more solid or compact column than would otherwise be practicable. The egress aperture at the rear end of the chamber is made oval or oblong and is so arranged that, even when the boat or vessel is light, the said aperture will be below the level of the water. When the ingress apertures are at the sides of the boat or vessel, these apertures are also preferably made oval or oblong and are so arranged that they will at all times be below the level of the water.

My improvements are also applicable to ordinary sea-going vessels provided that the ingress openings are placed so far forward that they will not be lifted out of the water when the vessel pitches, thus obviating the liability to racing of the engines, as, in the rolling of the vessel, one or the other of the ingress openings will always be submerged.

A is the propeller which is arranged in a chamber B in the stern of the vessel.

C, C are the ingress tubes.

D is the egress or discharge-tube, the rear end of which is secured around an opening in the stern of the vessel. The passage through the said tube D is, as above stated, contracted so that it is of just sufficient transverse sectional area to permit the discharge of the water without undue resistance.

I sometimes make the propeller-chamber of a steel cylinder B the ends of which fit into annular recesses b' in the flanges b of two end-pieces or castings B', B^2. These end-pieces are more or less tapered toward the ingress or egress tubes, and their end surfaces are inclined as shown to facilitate the flow of the water to and from the propeller, and to

avoid the carrying of an unnecessary quantity of water. The end-piece B′ carries a suitable bearing B^3 in which the propeller-shaft A′ rotates, the said bearing being made fluid-tight by means of the gland and stuffing-box E. In the said recesses b' are placed rings c of india-rubber or other suitable material for the purpose of making fluid-tight joints, the flanges b being secured together, with the said cylinder between them, by means of suitable bolts d. I can, however, construct the chamber in any other convenient manner.

I provide the openings for the ingress and egress of the water to and from the chamber B, with doors or sluice-valves g, Figs. 3 and 4, whereby they may be tightly closed, and I provide a pump for withdrawing the water from the said chamber when the said openings are closed, so as to permit the inspection of the propeller or the replacing of the same or of the propeller-shaft while the vessel is in the water, and also to permit the removal of the chamber if necessary while the vessel is in the water. Or I can remove the water from the said chamber by admitting or forcing air into the same and thus expelling the water therefrom, the said openings being then closed to prevent the entrance of water.

The valve g, which is shown more clearly in Fig. 4, is pivoted at g' and is provided with an operating lever h sliding on a quadrant h', and with a strip or ring g^2 of india-rubber or other suitable material held in place by a plate g^4 which is secured to the body of the valve in such a manner that it can be readily taken off to permit the removal of a worn strip or ring g^2 and the substitution of a new strip or ring therefor. The said strip or ring, when the valve is closed, bears against a valve-seat j. The body of the said valve is loosely secured by a bolt or screw k to the yoke g^3 in such a manner that it will adapt itself to the valve-seat j when pressed against the same by the water. It is evident that, if desired, the strip or ring g^2 and plate g^4 may be secured to the valve-seat instead of to the valve, in which case the said plate must be so shaped as to fit the valve-seat. I connect the end-pieces B′, B^2, with the ingress and egress tubes C, C, D in such a manner that the chamber B and the said end-pieces B′, B^2 can be readily detached and removed when necessary.

I find it advantageous to mount the engine or motor M for driving the propeller and also the said chamber B and end-pieces B′, B^2 upon a single bed-plate or base F so that they can be removed together. With this arrangement, the whole apparatus can, when desired, be at once transferred from one boat to another, providing the latter be fitted with similar tubes, apertures and valves. Several boats can thus be worked by one engine, propeller and chamber; for instance, while some boats are loading and discharging, another can be traveling, and, when the latter arrives in port, the valves can be closed and the water pumped from the chamber and the engine the propeller and the chamber can then be at once transferred to the loaded boat ready to start, and so on. This is an important feature of the invention and is the main object in providing the valves in the ingress and egress tubes. A further advantage gained by this arrangement is that, in the event of any accident to the engine or propeller such as would necessitate long repairs, the engine, propeller and chamber can be removed without taking the boat out of the water and can be replaced by another engine, propeller and chamber, thus avoiding a long detention of the boat.

When the ingress apertures are at the sides of the vessel, I sometimes provide adjustable tubes in case the boats should vary in beam and other respects. The fixed tubes could all be worked up to standard measurements, which would be the safest and best arrangement; but, if desired, I provide telescopic tubes working through stuffing-boxes or the like, for the purpose of adjustment where the standard measurements have not been followed.

In the case of boats or vessels for use in shallow canals or rivers where the vessels cannot be made to draw sufficient water to cover the screw-propeller, I combine, with the propeller-chamber, suitable means, such as an air-pump, for drawing the air out of the said chamber from a point situated at or near its highest part (for example through the cock e) and thus forming a vacuum or partial vacuum therein, so that the water within the said chamber will rise above the level of the water outside the vessel, and will consequently cover the screw-propeller. Or I may close the valves of the ingress and egress tubes and pump water into the said chamber, allowing the air to escape at the top of the chamber, as, for instance, through the cock e. This cock is then closed and the valves of the ingress and egress tubes are opened. The screw-propeller will, therefore, work efficiently notwithstanding the small draft of the vessel, and a larger screw-propeller can be used than would otherwise be practicable in a vessel of shallow draft. When the vessel is loaded, the cock e may be opened to allow the air to escape and the water to enter and cover the screw-propeller in the chamber provided that the level of the water outside the boat is as high or higher than the top of the chamber. The cock e should be in communication with a tube the end of which should always be above the level of the water. It is evident that, when my invention is applied in this manner, the chamber or tube in which the propeller works must be air-tight when the vessel is in the water.

I sometimes employ, in combination with the ingress aperture or apertures, suitable directing or deflecting plates m as shown in Fig. 5, for the purpose of directing the water into the said chamber in the most effective

manner for the propulsion of the vessel. In some cases I use a directing or deflecting plate in combination with the egress aperture or apertures.

In some instances, I use propellers of the kind now in common use. In other instances, I use a propeller having a single blade which extends nearly or completely around the boss or hub as shown in Fig. 5. In this case I prefer that the internal diameter of the chamber B should be but very slightly greater than the outside diameter of the propeller, as shown in Fig. 5, and the propeller, in this case, may be of smaller diameter than would be necessary with propellers such as are ordinarily employed. Further, with this kind of propeller, the air-pump might be dispensed with, as the screw would itself draw in the water required to cover it.

I sometimes make the chamber B with two egress apertures one on each side of the stern-post. In some instances I arrange twin screw-propellers in the manner above mentioned, in separate chambers B, as shown in Fig. 5. These chambers are connected with a single egress tube D; or they may be connected with separate egress apertures. The ingress and egress tubes may, if desired, be provided with valves or doors as above set forth.

In addition to the advantages above mentioned, my invention affords the following important advantages, viz:—The screw-propeller, when inclosed as above described, does not produce waves like the screw-propellers as usually employed; therefore, when my system of propulsion is used in a canal or river, no damage is done to the banks of the canal or river such as is usually occasioned by vessels driven by screw-propellers. The screw-propeller in my improved vessel will work efficiently whether the vessel is loaded or light; this is a very important feature in vessels for use in shallow waters. Moreover, a larger propeller can be used in a vessel of shallow draft than can be done with the system of propulsion hitherto generally adopted; therefore the speed and the wear and tear of the engines will be reduced without diminution of the speed of progression. And it is evident that my invention affords very convenient means for propelling canal boats and the like by means of steam or other motive power instead of by animal haulage or for propelling tug-boats for use in canals or rivers. Furthermore my improved boats can, with advantage, be used in place of the stern-wheel river-steamers now in use.

What I claim is—

1. In an apparatus for the propulsion of canal boats or flats or other vessels, the combination of a propeller chamber having ingress and egress apertures, a propeller working in the said chamber, a motor for driving the said propeller, and a base or foundation plate on which the said chamber, the propeller and the motor are mounted, and which is removable therewith from the boat or vessel for the purposes above specified.

2. In an apparatus for the propulsion of canal boats or flats or other vessels, the combination of a propeller chamber having ingress and egress apertures, tubes connecting the said ingress and egress apertures with the shell of the vessel, valves in the said tubes whereby the ingress and egress passages may be closed, a propeller working in said chamber, a motor for driving the said propeller, and a base or foundation plate on which the said chamber, the propeller and the motor are mounted, and which is removable therewith from the boat or vessel, substantially as and for the purpose above specified.

3. In an apparatus for the propulsion of canal boats or flats or other vessels, a propeller chamber consisting of a hollow metal cylinder B, end pieces having inclined walls B', B^2, and having ingress and egress apertures respectively, packing rings c in grooves b' in the said end pieces and bearing against the ends of said cylinder, and means for securing these said end pieces together, with the said cylinder between them, substantially as and for the purposes set forth.

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