



Propeller.

No. 12,190.

Patented Jan. 9, 1855.

Fig. 2.

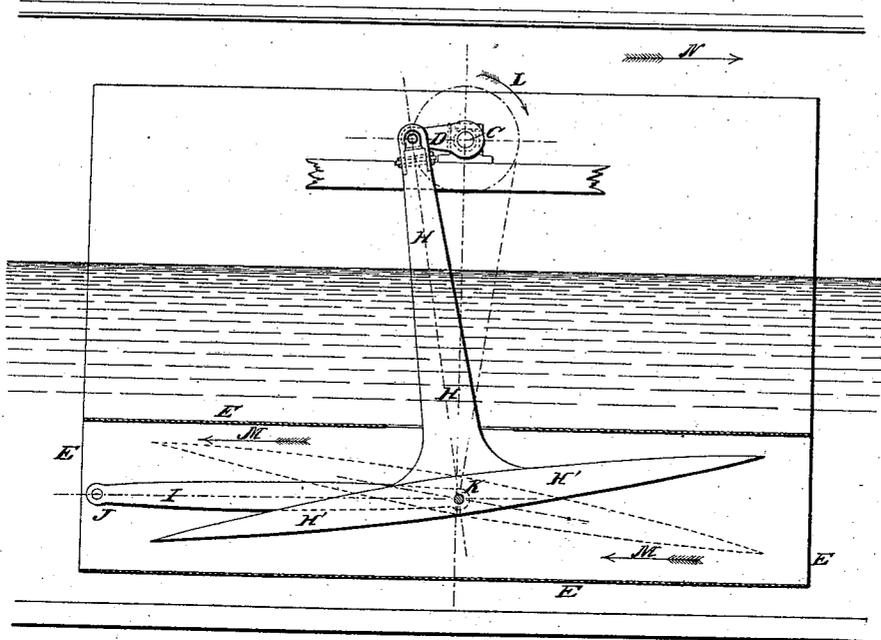
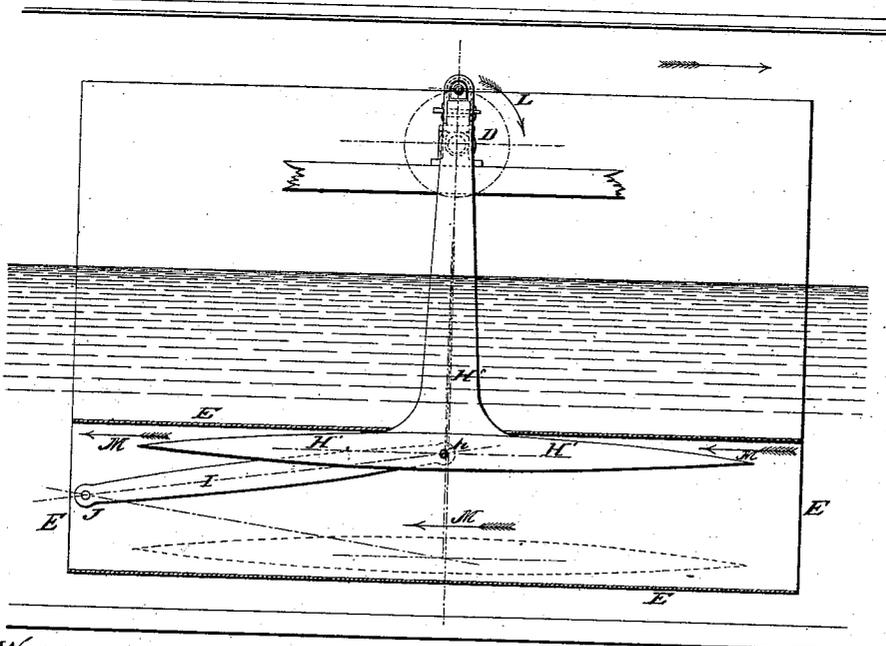


Fig. 3.



Witnesses:

*J. H.*

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# UNITED STATES PATENT OFFICE.

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## IMPROVED PROPELLER.

Specification forming part of Letters Patent No. 12,190, dated January 9, 1855.

*To all whom it may concern:*

Be it known that I, CHARLES DE BERGUE, engineer, of No. 9 Dowgate Hill, in the city of London, in England, have invented an apparatus applicable to the propelling of vessels, to the forcing or displacing of water or other fluids, or as a first mover to transmit power from a stream; and I do hereby declare that the following is a full, clear, and exact description of the principle or character which distinguishes it from all other things before known and of the usual manner of making, modifying, and using the same, reference being had to the drawings hereunto annexed and to the letters and figures marked thereon—that is to say:

My said invention consists of a body or apparatus so rocking in the water or other fluid on a center or axis worked to and fro that each of its opposite sides shall alternately present a moving inclined face or surface to the fluid on which it acts, (or conversely which acts upon it), so as to force, displace, or propel the same or the body floating thereon, such apparatus working or rocking within a case or chamber through which the fluid acted upon is thereby caused to pass.

Having thus set forth the nature of my said invention, I will proceed to describe the manner in which it is to be performed, reference being had to the annexed drawings, in which—

Figure 1 is a transverse section of a vessel having one of my propellers on each side in place of the ordinary paddle-wheels. Figs. 2 and 3 are side elevations of the propeller, parts being in section, so as to show the rocking body in various positions during one revolution of the crank. Fig. 4 shows both the two propellers, the one on the left in plan viewed from above the chamber and the one on the right in horizontal section partly through the chamber and partly through the part H hereinafter referred to.

A, Fig. 1, represents in section the hull of the vessel; B, the deck; C, the iron shaft receiving its motion from a steam-engine as in ordinary paddle-wheel steamers. The opposite extremities of this shaft project over a little on each side, respectively, of the vessel and are firmly supported in suitable bearings and furnished with cranks D and D', which

serve to transmit the motion to the propellers.

E represents the chamber open at each end and placed longitudinally with regard to the vessel and so as to be entirely submerged below the surface of the water. This case is constructed in a substantial manner and firmly fixed and secured to the hull of the vessel, so as in a manner to form a part of it. The outer side of the chamber is further supported and strengthened by the side E', which is attached at its upper part to the beams or cross-timbers of the vessel or in any other suitable manner. Two slots are formed in the upper part of the case to allow the passage and free action of the arms or connecting-rod of the rocking body. Provision should also be made in the construction of the upper part of the case, so that a part of it may be displaced for the convenience of inserting or removing the blade and connecting-rod hereinafter described.

H and H' represent the moving and principal part of the apparatus. The part H' is the rocking body or apparatus, being, in fact, a working-blade which acts upon or against the water and the fluid and the forked place or part H, which is of one piece with or firmly attached to the blade H' and serves as a connecting-rod or arm to communicate the motion from the crank D to the said blade, the latter being guided by two parallelogram arms I, placed in the interior of the chamber, one on each side of the blade H', but not so as to impede its action. These arms vibrate at one of their extremities, each on one of the studs or pivots J J, fixed to the sides of the chamber E, and the other end of each arm is firmly secured to each extremity of the small shaft K, (shown in section in Figs. 2 and 3 and in dotted lines in Fig. 4,) and which works freely in the blade H', and it is this shaft which constitutes the center or axis on which the rocking motion of the blade takes place. It may be well to mention that this shaft and all the working parts which cannot be lubricated on account of their working under water should be properly bushed with brass or gun-metal. I prefer to construct the case or chamber E (particularly its upper or top side) so as in length rather to exceed that of the blade H' and of such capacity and form as to allow the

to-and-fro and rocking motion of the blade, (without the blade getting in actual contact with any part of the inner surface of the chamber,) and yet only slightly to exceed the space traversed over by the blade during its action.

It will be observed that when the shaft C is set in motion by the engines in the direction of the arrow L, Fig. 2, the cranks D and D' produce on each of the blades H' by means of the connecting-rods H a to-and-fro and also a rocking motion on the center or axis K, as before described, and of which the various positions are shown by lines or dotted lines in Figs. 1, 2, and 3, viz: The first position is represented in Fig. 2, the second position (the crank having made a quarter of a turn in the direction of the arrow L) is represented in Fig. 3 and is also shown in the case on the right-hand side of Fig. 1, the third position (the crank having made another quarter of a turn) is indicated by dotted lines in Fig. 2, and finally the fourth position (the crank having made another quarter of a turn) is represented in dotted lines in Fig. 3 and also in the same position in the case on the left side of Fig. 1. The arrows M, Figs. 2, 3, and 4, show the direction of the current produced by the action of the blade H' in the chambers, and the arrows N show the direction of the motion thereby given to the vessel. It will also be observed that by reversing the motion of the engines and by turning the cranks B and D' in the contrary direction to that indicated by the arrow L the current given to the water by the blade H' will be in the contrary direction. It will likewise be observed by examination of Figs. 1 and 4 that the chamber E and the blade H' are wider at the center than at their extremities. This is for the purpose of increasing the area of the chamber at the center, which otherwise would be more confined than at the extremities by reason of the greater thickness it is necessary to give to the blade H' at the center than at the ends; but to compensate for the increased velocity which it may be necessary to give to the water during its passage through the chambers over and above that at which it enters (in order to the more satisfactory working or efficiency of this propeller) I purpose constructing the chamber and also the blade H' of a uniform width from the front end or mouth of the chamber to the middle of their length and narrowing them only at their opposite ends, whereby the requisite quantity of water will be received in front to compensate for the increased velocity acquired during its passage through the chamber; or this object may be attained by making the chamber and the blade to taper or diminish in width from the front end or mouth of the chamber to the opposite end throughout the entire length and either by a curved or a straight taper, as may be desired. In some cases it may be found advantageous that the under side or bottom of the case or chamber should not continue or extend throughout its entire length, but

should be somewhat shorter at one or both ends.

Although in the drawings the connecting-rod H is represented as forked or with two arms connected with the blade H', it may be made with one arm only at the center or with a greater number of arms. The blade H' and the connecting-rod may be formed of wrought-iron, so connected together as to constitute one firm, strong, and substantial pausing, and the blade may be covered with strong iron plates firmly riveted together and to the framing of the blade, so that the inferior being hollow and made impervious to water the propeller will have a floating tendency and its buoyancy will render it self-supporting, instead of its weight being borne by the vessel, or the blade may be made of wood combined with iron or partly of wrought-iron and partly of cast-iron or other suitable material. The two parallelogram arms I (which guide the blade) may be made to work in a countersunk space or recess formed in the sides of the chamber, in order that the edges or sides of the blade may fit as nearly as possible against the sides of the chamber, or as an equivalent, instead of the parallelogram arms, two grooves or slots may be substituted, placed vertically or otherwise on each side of the chamber, and in its thickness to receive and guide the ends of the shaft K, on which the blade works, or this may be accomplished in any other convenient manner.

The drawings exhibit the application of this propeller as applied to vessels by placing one of them on each side of and exterior thereto, and this may be at or near the middle, as in the case of paddle-wheels; or the apparatus may be placed in various other positions, either under the vessel or toward the stern, one on either side of or behind, or even in the interior of the vessel, and in some cases it may be found particularly advantageous to place it immediately underneath and at the bottom of a vessel, and in some cases for shallow water it may be convenient to dispense with the bottom and parts of the sides of the chamber, or the chamber may be made to slide up and down, so that the vessel could pass over a slight obstacle; but whatever position be considered most advantageous a greater or less number of my said propellers may be applied without altering the principle of my invention. The propeller should always be completely immersed, and generally it will be advisable that the chamber or chambers should be placed longitudinally with regard to the vessel; but when placed near the stern and under the rim of the vessel, instead of being arranged or placed horizontally, they may be placed at a slight inclination, in accordance with the lines of the vessel. The chamber or case and the blade and connecting-rod may also be so arranged by suitably altering the apparatus for moving the working parts as to give the to-and-fro motion either in a horizontal or in-

elined line instead of vertically, as above described.

As regards the second part of my invention—videlicet, the forcing or displacing of water or other fluids—the principle herein described is applicable (with such slight variations of the component parts as will at once suggest themselves to the mechanic) to the displacing of water, as a pump, and in the forcing of air, as in a blower, and, lastly, the principle herein described may be applied to the transmission of power from a stream after the manner of tide-water mills, in which case the blade will be acted upon by the stream.

Having now fully described the nature of my invention and the manner in which it is carried into effect, what I claim is—

An apparatus or blade so oscillating or rocking in water or other fluid on a center or axis worked to and fro that each of its opposite sides shall alternately present a moving inclined face or surface to the fluid on which it acts, so as to force, displace, or propel the same or a body floating thereon, such apparatus or blade working or rocking within a case or chamber, through which the fluid acted upon is thereby caused to pass, or, conversely, in which the fluid in passing may act on the blade, as described.

C. DE BERGUE.

Witnesses:

JOHN HASLAM,  
JOHN AVERN.