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F. C. TAMBLING & H. CHARLES.

BOAT PROPELLER.

APPLICATION FILED AUG. 17, 1905.

Fig. 5.

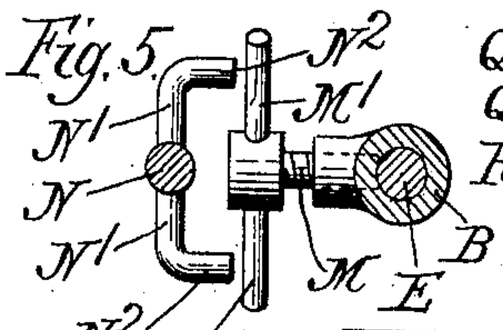


Fig. 6.

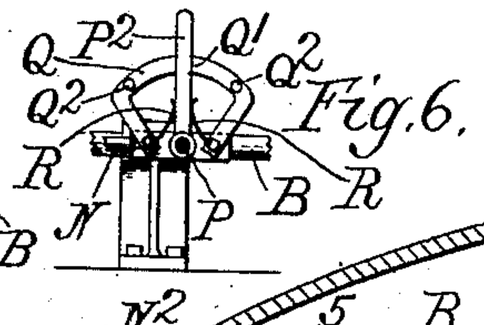


Fig. 1.

Fig. 3.

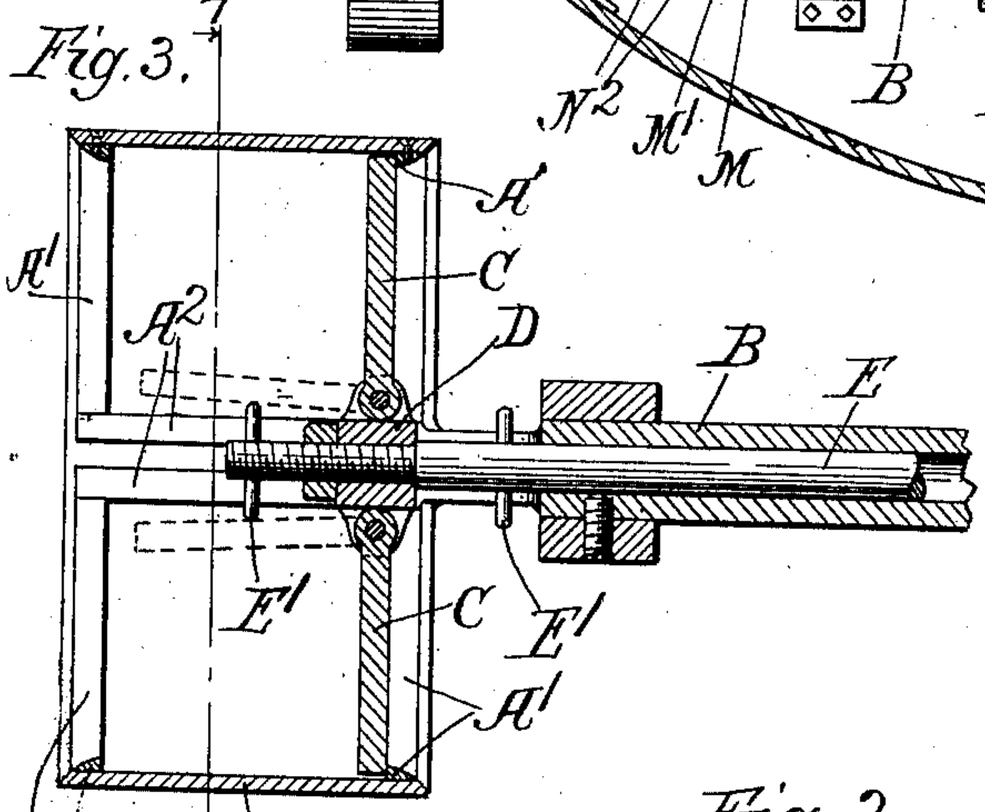


Fig. 4.

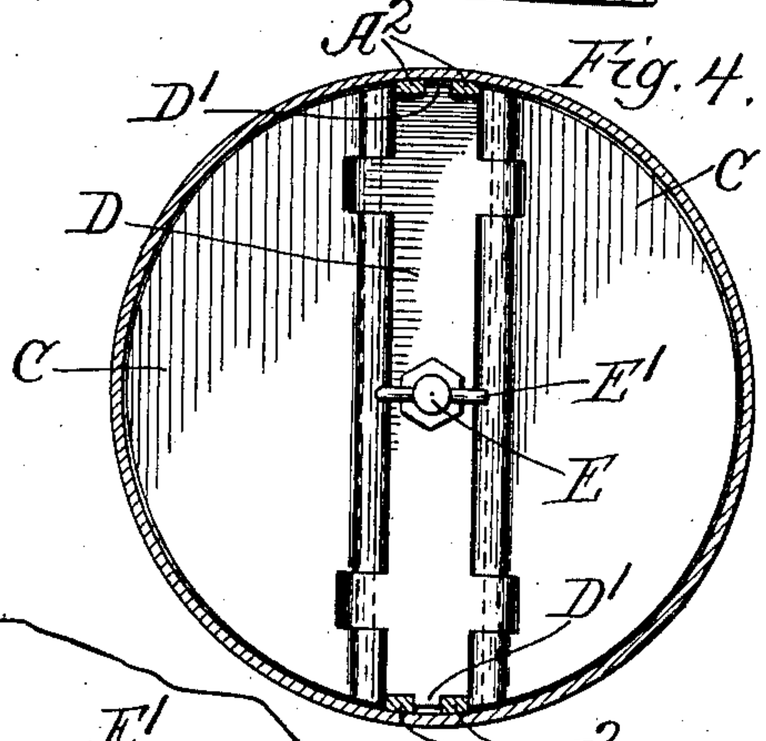
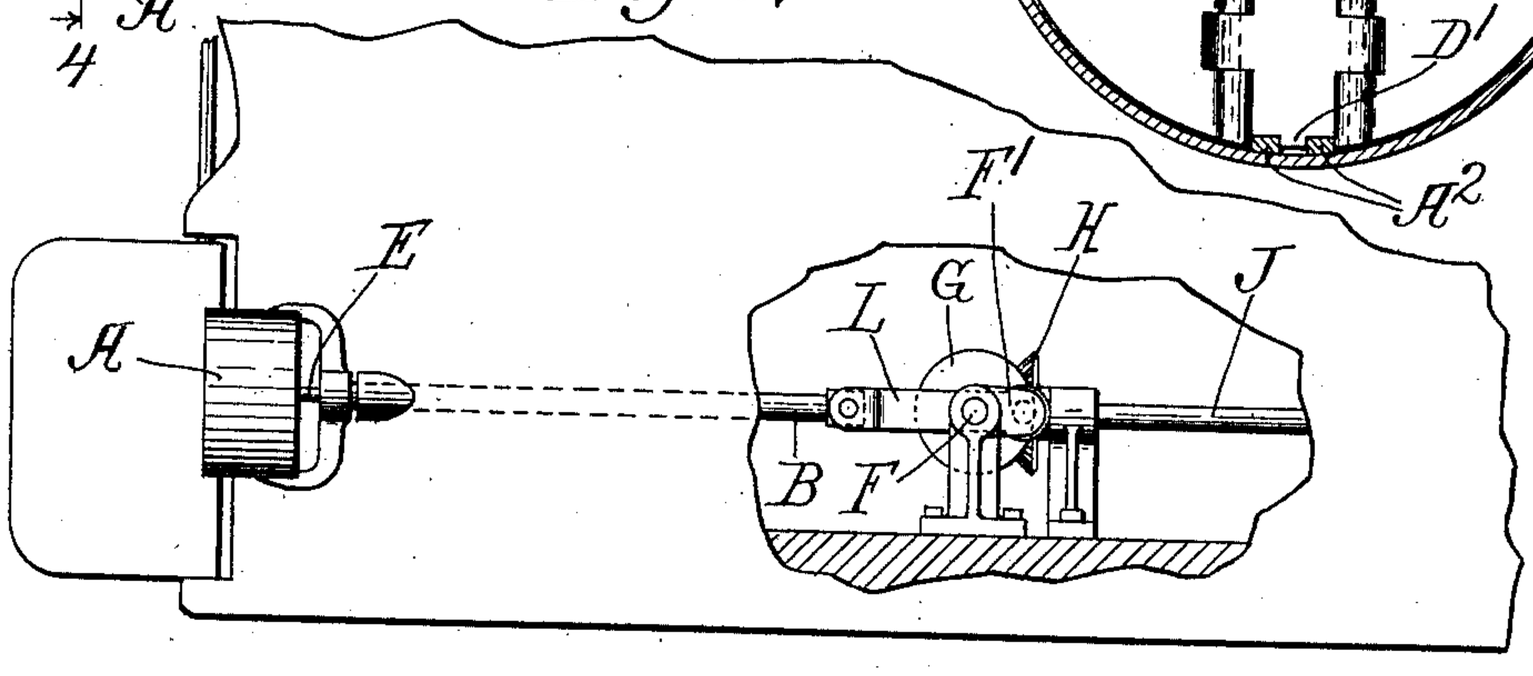


Fig. 2.



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UNITED STATES PATENT OFFICE.

FRANK C. TAMBLING AND HARLAND CHARLES, OF EAGLE RIVER, WISCONSIN, ASSIGNORS OF ONE-THIRD TO CHARLES A. RUSCO, OF CHICAGO, ILLINOIS.

BOAT-PROPELLER.

No. 829,681. Specification of Letters Patent. Patented Aug. 28, 1906.

Application filed August 17, 1905. Serial No. 274,548.

To all whom it may concern:

Be it known that we, FRANK C. TAMBLING and HARLAND CHARLES, citizens of the United States, residing at Eagle River, in the county of Vilas and State of Wisconsin, have invented new and useful Improvements in Boat-Propellers, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved means for applying power to the propulsion of boats adapted to be substituted for the more familiar forms of screw propulsion. It consists of the elements and devices of construction set out in the claims.

In the drawings, Figure 1 is a horizontal section of the stern portion of a boat, showing the mechanism constituting our invention in plan view. Fig. 2 is a detail side elevation of the lower stern portion of the hull of a boat having said invention, the hull being partly broken away to show certain parts of the mechanism in side elevation. Fig. 3 is an axial section of one of the propelling devices and its bearing. Fig. 4 is a section at the line 4 4 on Fig. 3. Fig. 5 is a detail section at the line 5 5 on Fig. 1, showing devices for reversing movement on an enlarged scale. Fig. 6 is a detail view on the line 6 6 of Fig. 1.

The propelling device, hereinafter sometimes called the "propeller," which constitutes the leading feature of our invention, is a hollow cylinder A, mounted rigidly at the end of a thrust rod or shaft B. This cylinder is open from end to end, except as to the obstructing gates or valves hereinafter mentioned, and it is mounted so as to be thrust longitudinally parallel to the longitudinal axis of the boat at the stern of the latter. Its longitudinal cavity or waterway is obstructed by two gates or valves C C, which are hung pivotally upon opposite sides of a cross-bar D, which constitutes a carrier for the gates, and the latter are adapted to be stopped at their closed position—that is, extending transversely with respect to the cylinder A, by an annular stop-shoulder A′, projecting from the inner surface of the cylinder just back of the end. Such an annular shoulder is provided at each end of the cylinder, as shown in Fig. 3, and the carrier D, with the gates C C hung upon it, is adapted to be moved from one end to the other of the cylinder, as hereinafter more particularly explained, and the gates being adapted to swing about their pivots either way from the position at which they obstruct the water-passage through the cylinder will be stopped at their obstructing position against the shoulder A′ at whichever end of the cylinder the carrier D and gates may stand at a given time, the gates being adapted to swing inward from such obstructed position shown in Fig. 3 to the position shown in dotted line in that figure.

For guiding the carrier D and its gates in the movement necessary for shifting from one end to the other of the cylinder, guide-ribs A^2 A^2 are formed on the cylinder engaged by a suitable tongue D′ on the carrier D. For moving the carrier D and its gates C the shaft or stem B of the cylinder A is made tubular, as seen in Fig. 3, and the carrier D has a stem E, which extends within the stem B and may be thrust longitudinally therein to move the cross-bar and its gates from one end to the other of the cylinder, as explained. To check the gates when they are swung inward to open position and prevent them from swinging in that direction so far as to stand parallel with each other, the stem E has at each side of the carrier-bar D a cross-pin E′, with which the gates or valves C collide before they reach such parallel position, as shown in dotted line in Fig. 3.

It may be understood from the foregoing description that a device such as above described being mounted in a boat so as to be thrust longitudinally back and forth in the water will operate to propel the boat in one direction or the other, according as the gates or valves C are set, so as to open in one direction or the other. When the carrier D is set as shown in Fig. 3, a rearward thrust of the device will propel the boat forward, the return stroke of the propeller causing the gates to open to dotted-line position, letting the water pass freely through the cylinder A. When the carrier D and its gates are set at the other end of its cylinder, the reciprocation of the whole device will propel the boat in the opposite direction, because the gates in that case will open in the opposite direction and will be closed in the direction in which they were formerly open. Preferably two such propellers may be employed, one at each side

of the vertical mid-plane of the boat and at opposite sides of the rudder in position to leave the latter ample range of movement for steering.

The device may be reciprocated in any suitable manner. In the drawings there is shown a crank-shaft F, rotated by means of intermeshing gears G and H, connecting it with a power-shaft J, a crank F′ being connected by a pitman L with the thrust-rod or shaft B. We do not limit ourselves to any particular means for reciprocating the device.

Whether the boat has one or two such propellers the means for reversing the direction of propulsion obviously consist in means for shifting the carrier and its gates from one end to the other of the cylinder and securing them at the end corresponding to the direction in which the boat is desired to move. A means for this purpose is shown in the drawings, which may be understood from Figs. 1 and 5. The stem E, extending within this stem B, is secured at either limit of its range of adjustment by a set-screw M, which is adapted to be slacked and tightened by not more than a quarter-turn. This set-screw has a cross-head handle M′. Mounted on the bearings of the thrust rod or shaft B is a rock-shaft N, having two cross-arms N′ N′, each terminating at opposite ends in fingers N^2 N^2, projecting toward the longitudinal vertical plane of the shaft B. At what may be called the "normal" position of the rock-shaft N the fingers N^2 are out of the paths of the opposite ends of the cross-bar handle M′ of the set-screw M; but if the shaft is rocked in one direction the upper fingers N^2 will stand in the path of the upper end of the cross-handle M′, and if rocked in the opposite direction the lower fingers N^2 will stand in the path of the lower end of said cross-handle. The position of the fingers N^2 is such that when the shaft is thus rocked out of its normal position the cross-handle M′ will collide with the finger just enough before the end of the stroke of the stem B to cause the screw to receive a quarter-turn in the finishing of the stroke. The screw being set to hold the stem E at one of its proper positions—that is, with the gates C C at one end of the cylinder A—and it being desired to reverse the movement of the boat, the rock-shaft N will be rocked in direction to throw into the path of one end of the cross-handle M′ the finger N^2, which will, upon collision of the cross-handle therewith, cause the screw to be turned in direction for slacking it at the end of the retracting or idle stroke of the propeller. The cross-bar D and its gates C C being thus rendered free to move longitudinally with respect to the stem E and the next stroke in the opposite direction being that in which the gates are swung to closed position by the resistance of the water, said resistance will force the bar D and the gates back with respect to the stem, carrying the gates to the opposite end of the cylinder. In this reverse stroke the same end of the cross-handle M′ which collided with one of the fingers N^2 for relaxing said screw will collide with the corresponding finger N^2 of the other cross-arm N′, and the screw will thereby receive a quarter-turn in the opposite direction and will be set tight, securing the stem E at the opposite limit of its range of adjustment within the stem B, to which it will now have been forced by the resistance of the water on the closed gates during the stroke in which the stem E was loose in the stem B. The next stroke of the propeller, it will be seen, will operate to give the boat reverse movement from that which it had before. Any convenient means for rocking the shaft N to one position or the other will serve at any time to reverse the propelling action.

When two propellers are employed, as shown in Fig. 1, the two rock-shafts N may be connected by an operating-shaft P, having at its opposite ends beveled gears P′ P′, meshing with beveled gears N^3 N^3 on the corresponding ends of the two shafts N, and a handle P^2 on the shaft P may be arranged to swing through a suitable arc alongside the segment Q, at whose middle point the handle, being erect, may be hinged with a notch Q′ for holding the tripping devices, consisting of the shafts N and their arms and fingers, out of tripping position, the spring R being, preferably, provided to restore the shaft to this position from either limit of its rocking movement, projections Q^2 Q^2 on the segment serving to arrest the handle at the proper limits, and the segment being marked at its opposite ends "back" and "forward," corresponding to the operative movement of the propellers which results from setting said handle at said limits, respectively, and so preventing any erroneous adjustment, and two propellers are represented in the drawings having their corresponding reciprocating movements simultaneous—that is, both being thrust out at the same time and retracting at the same time. For otherwise timing then the next change in the position of the respective operating-cranks will be obvious, and such other changes in the tripping devices as might be necessitated by change in the timing of their strokes will be easily within the skill of any mechanic competent to construct the mechanism shown.

It will be observed that the gates are arranged wholly within the tubular casing of the propeller and also that they operate wholly therein, whether working at the forward or rear end of the casing. Thus said gates are protected or guarded by the casing, and at no time do they project therefrom so as to render them liable to injury by striking against hard objects in the water. It will also be noticed that the propeller consists of a

tubular shell or casing which is open from end to end, the said casing being reciprocated bodily in the open water, and that means are employed in connection with said shell or casing actuated by the pressure of the water for closing that end of the casing which is rearmost in the active stroke of the propeller during such active stroke.

We claim—

1. In combination with a boat-hull, a tubular propeller-casing outside the hull; means by which it is mounted and reciprocated longitudinally on the hull; a gate-carrier mounted for longitudinal movement in the propeller-casing; a gate hinged thereto adapted to swing wholly within the casing from position at which it obstructs the passage therethrough either way to unobstructing position, the propeller-casing having two longitudinally separated stops, and means for moving the gate-carrier to carry the gate at obstructing position to one or the other stop at will.

2. In combination with a boat-hull, a shaft mounted therein for longitudinal reciprocation; a tubular propeller casing carried by the shaft outside the hull; a gate-carrier mounted for longitudinal adjustment within the propeller-casing having a stem sliding with respect to the propeller-shaft; a releasable device for securing it; gates hinged to the gate-carrier within the propeller-casing adapted to swing to position for obstructing the passage through the casing; longitudinally-separated stops on the casing against which the gates may stop at such obstructing position, the gates being between said stops, and means for operating the securing device to release the same at the end of a stroke in which the gates are opened and secure it at the end of the following stroke in the opposite direction.

3. In combination with a boat-hull, a propeller-shaft adapted to be reciprocated longitudinally; a tubular propeller on the shaft outside the hull; a gate-carrier and the gates hinged thereto in the tubular propeller; longitudinally-separated stops on the tubular propeller between which the gates are located, the propeller-shaft being tubular, the gate-carrier having a stem extending within said tubular shaft adapted to be moved longitudinally to bring the gates at closed position against either stop; releasable means for securing the stem to the shaft; a tripping device for operating said releasable means to release and secure the same, comprising a shaft mounted in fixed bearings alongside the path of reciprocation of said securing means on the propeller-shaft, and trip-fingers on said shaft adapted to be moved into said path for encounter with said securing device.

In testimony whereof we have hereunto set our hands, in the presence of two witnesses, at Eagle River, Wisconsin, this 9th day of August, 1905.

FRANK C. TAMBLING.
HARLAND CHARLES.

Witnesses:
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JOSEPH C. ELLIOTT.