No. 637,611. Patented Nov. 21, 1899.

J. A. HOPEWELL.

MARINE PROPELLER.

(Application filed June 24, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

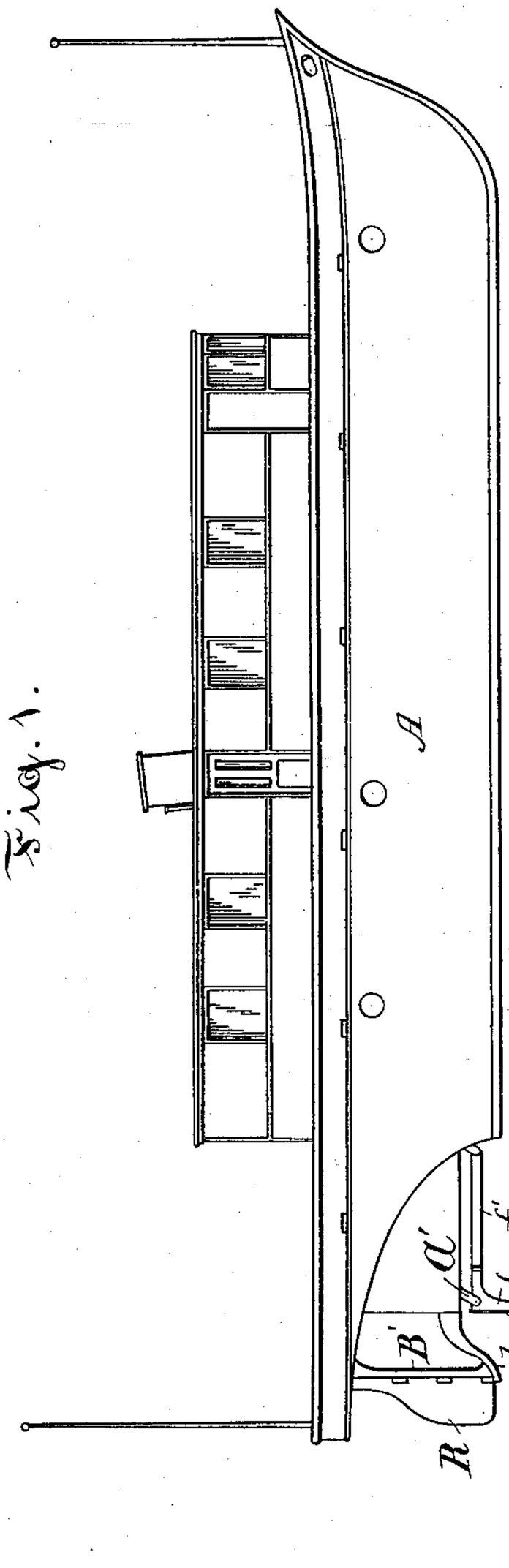


Fig. 5.

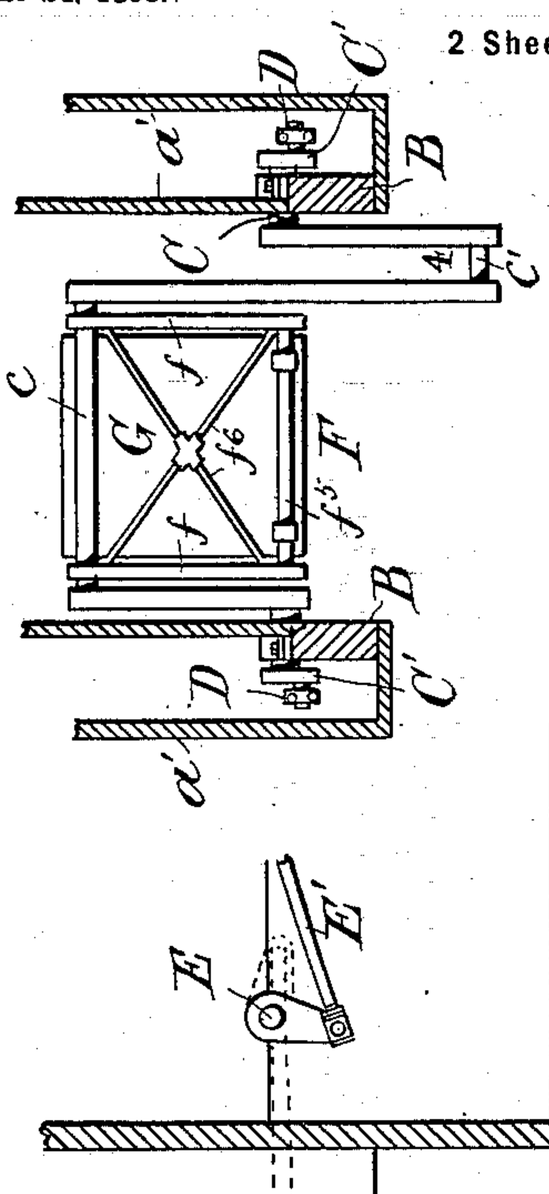
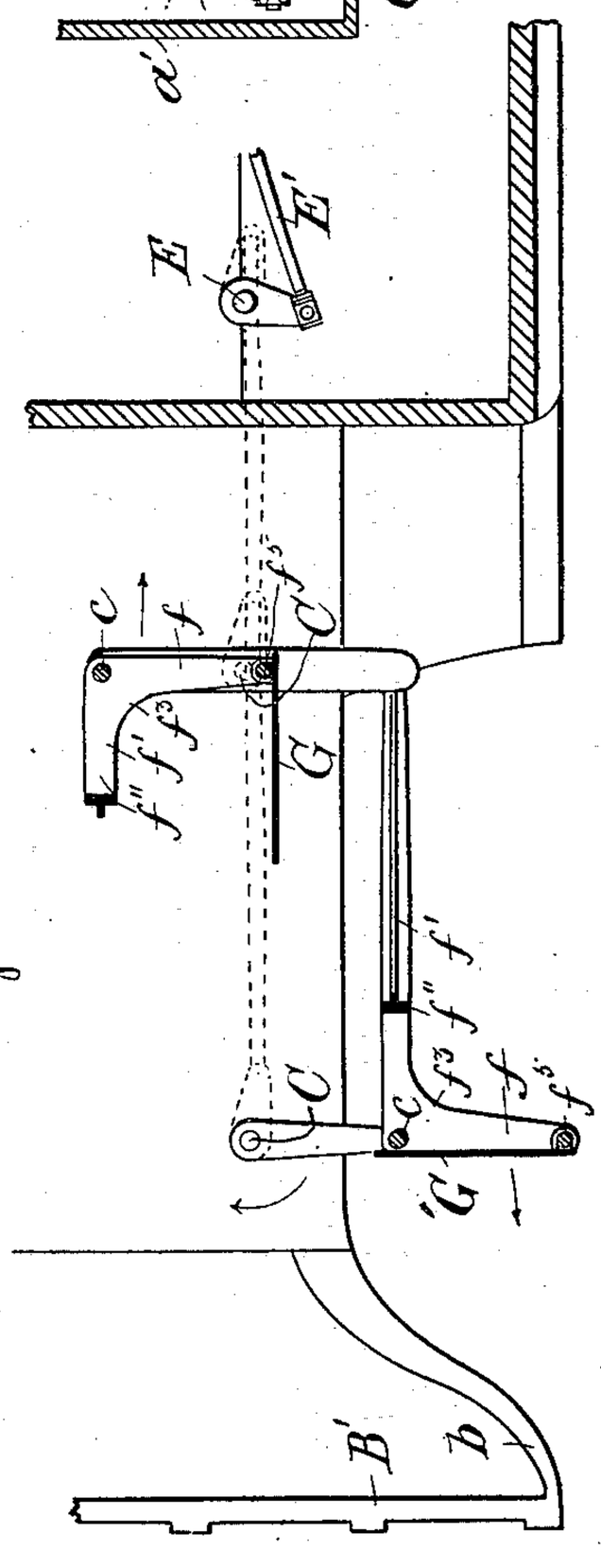


Fig. 4.



Witnesses:
Chas. Raley.
M Piotrzkowsky

John A Hopewell
Inventor
by A. B. Harvey
his Attorneys

No. 637,611.

Patented Nov. 21, 1899.

J. A. HOPEWELL.

MARINE PROPELLER.

(Application filed June 24, 1899.)

(No Model.)

2 Sheets—Sheet 2.

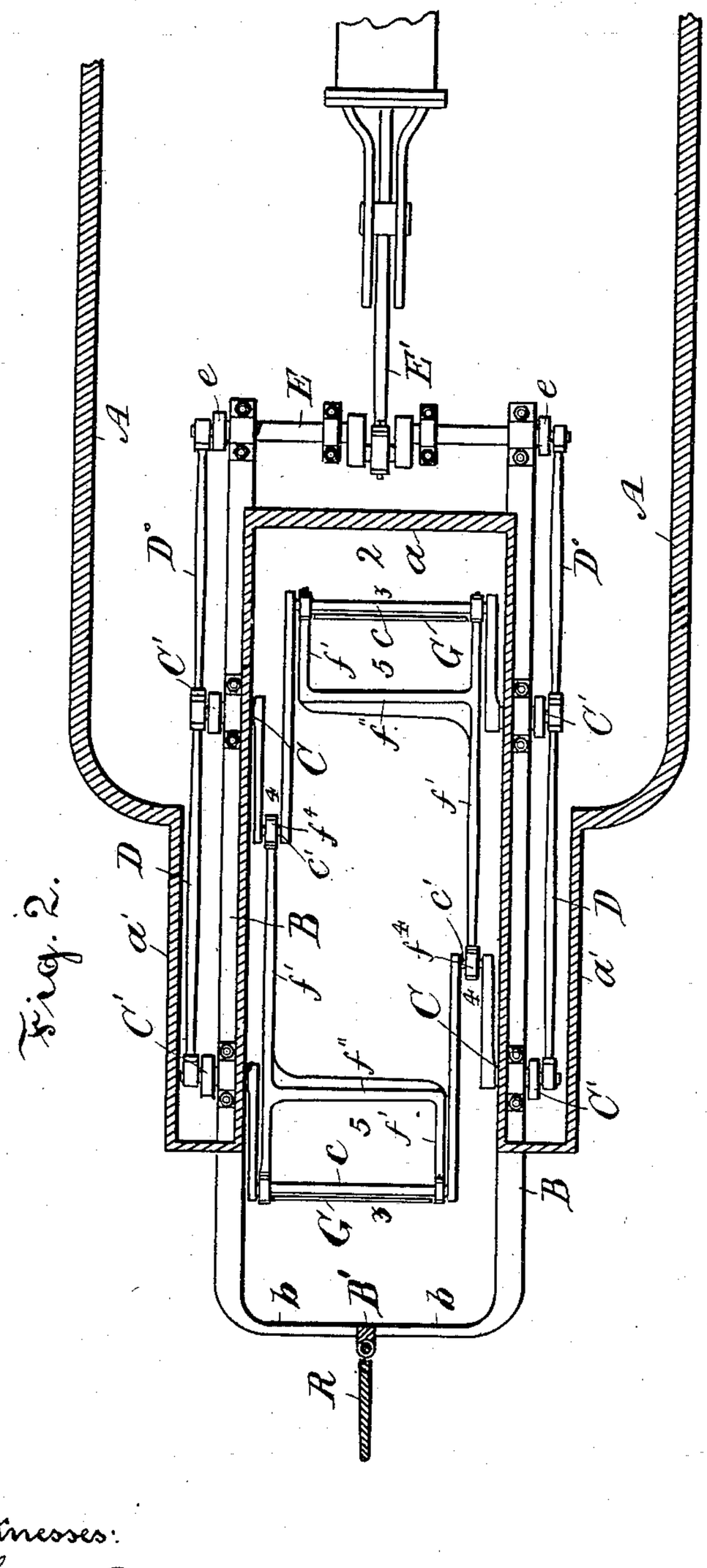


Fig. 2.

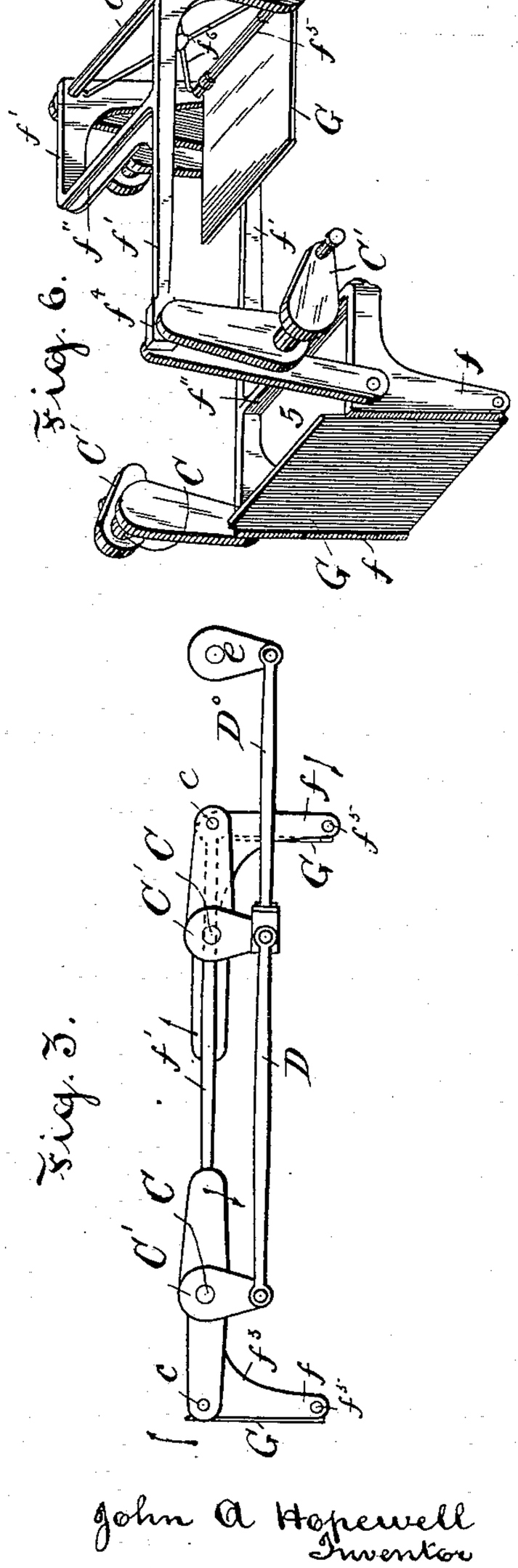


Fig. 3.

Fig. 6.

Witnesses:
Chas. Raley.
M. Piotrzkowsky

John A Hopewell
Inventor
by A. B. Harvey.
his Attorneys.

UNITED STATES PATENT OFFICE.

JOHN ANDERSON HOPEWELL, OF ARNPRIOR, CANADA, ASSIGNOR OF ONE-THIRD TO WILLIAM BARCLAY CRAIG, OF SAME PLACE.

MARINE PROPELLER.

SPECIFICATION forming part of Letters Patent No. 637,611, dated November 21, 1899.

Application filed June 24, 1899. Serial No. 721,747. (No model.)

To all whom it may concern:

Be it known that I, JOHN ANDERSON HOPEWELL, of Arnprior, in the county of Renfrew, Province of Ontario, and Dominion of Canada, have invented certain new and useful Improvements in Marine Propellers; 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 a part hereof.

My invention, which will be hereinafter fully set forth and claimed, relates to propellers for ships and boats.

The object of my invention is a propeller acting upon the water as near as may be direct in the line of movement of the vessel and presenting on its return movement a reduced resistance-surface.

Figure 1 is an elevation of a boat fitted with my improved propeller. Fig. 2 is a top view of the propeller on a larger scale, with adjacent parts of hull and rudder, shown at the end of the rearward stroke of the rear float. Fig. 3 is a side elevation of the propeller with the incasing parts removed. Fig. 4 is a longitudinal section of the propeller, shown at the half-stroke. Fig. 5 is an end view of the propeller, and Fig. 6 is a perspective view of the same.

A, Figs. 1 and 2, is the hull of a vessel, at the stern of which a well 2 is formed to provide room for the forward part of the propeller by the transverse part a and the water-tight side boxings a', the latter affording room for the coupling-rods and being open to the hold of the vessel. Two beams B are firmly bedded and secured a distance apart in the stern at one end, projecting rearward beyond the propeller. Their rear ends b are bent down and in toward each other and joined (or formed in one piece) and connected to the stern-post B′, to which the rudder R may be hung in the usual way. The boxings a' are secured to the outer parts of the beams B.

Upon the beams B are journaled a pair of two-throw crank-axles C C, mounted in reverse order and each provided at its overhanging ends with crank-arms C′, set at a different angle to the main cranks, and the wrists of these are connected by coupling-rods D. Actuating motion is applied to the forward crank-axle in any desired manner, one mode being shown in Figs. 2 and 4, in which the coupling-rods D are extended (D^0) to a crank-arm e on the main crank-axle E, turned by the connecting-rod E′ of a steam-engine or other motor.

Each of the two-throw crank-axles C has one wide crank-space 3—*i. e.*, a comparatively long crank-pin c—and a narrow one 4, immediately adjoining, with a short pin c', each being of course what is known as a "double" crank, and the cranks are set at an angle of one hundred and eighty degrees—*i. e.*, in a straight line opposite each other. As stated, the crank-axles are mounted in reverse order, so that on one the narrow crank 4 is on one side of the wide crank 3 and on the other axle on the other side; also, the wide cranks 3 point and move in opposite directions, while each pair of opposite cranks—*i. e.*, a wide crank on the one axle and a narrow one on the other—move in unison.

Upon each long crank-pin c is journaled the upper end of a vertical frame F, extending in width the full length of the pin c, but swinging clear of the crank-arms and having its sides f connected by cross-braces f^6, Fig. 5, to stiffen it. The sides f are at their upper ends turned at a right angle or nearly so and continued horizontally or nearly so (f') toward the short crank-pin c' of the other axle, and then one of them is bent over at a right angle to form a cross-arm f'', which is joined to the other or main arm, which is then continued in a straight line to and is journaled upon the short crank-pin c' of the other crank-axle by a journal f^4.

To the lower side or cross-piece f^5 of the frame F is pivotally hung a float G wide enough to fill the space between the frame sides f and to swing clear of them. When turned up, as in Fig. 5, or when turned up from the other side, it will abut and rest against the frame F. The space 5, formed between the crank-pin c and the cross-arm f'' of the frame-arm f', will be made long enough to allow the float G to swing clear of the arm f''. Braces, gussets, or ribs f^3 are formed in the angles of the vertical frame sides f and horizontal extensions f', and the angles

formed by the cross-arm f'' with the arms f' are also made sufficiently strong to prevent undue warping of the frame.

The device operates as follows: Motion being applied to the crank-arms C′, transmitted by the coupling-rods D, the crank-axles C are put in rotary motion. Assuming, for example, that this motion is in the direction of the arrows in Figs. 3 and 4 and starting from the position shown in Fig. 4, the float G at the rear crank being elevated and abutting against the supporting-frame F is being pushed with its full face direct against the water in the opposite direction in which the boat is to move or is moving, having of course at the same time a gradual rising motion until the cranks reach a horizontal position. This pressure must move the vessel forward. At the same time the main crank 3 of the forward crank-axle is being swung forward with its frame F, and the current of the water pressing against the float will open it and swing it rearward, the latter thus offering no resistance in its forward passage through the water. When the downward motion of this crank commences, the float will be slightly lifted, forming an angle of less than ninety degrees with its frame, and as soon as the crank commences its rearward stroke the float will close and be fully lifted and abut with its free end against its frame, thus forming a solid resistance against the water. Thus when the position shown in Fig. 3 is reached the forward float exerts its strongest action, while the rearward one is about to open and commence its return stroke.

The driving mechanism or mode of applying the motive power is capable of considerable modification. One side or end of the cranks only may be driven, and in that case the coupling-rod on the other side may be dispensed with. Transmission-gear may also be used, so that the propeller-cranks may make one revolution while the motor makes more than one revolution in order to obtain a long stroke of the propeller.

I claim as my invention—

1. In a marine propeller, the combination with the hull of a vessel of a pair of beams having one end secured in the stern of the vessel a distance apart and extending rearwardly and united at their rear ends, a stern-post secured to the rear end of said beams, a water-tight casing at the outer side of each beam open to the hold of the vessel, a pair of two-throw crank-axles journaled upon said beams and having their ends extending into said casings, crank-arms upon the overhanging ends of said crank-axles set at an angle to the two-throw cranks, coupling-rods connecting said outside cranks, means of actuating said crank-axles, each of the latter having a wide crank and a narrow one set at an angle of one hundred and eighty degrees apart and the two axles mounted in reverse order to each other so that a narrow crank is opposite a wide crank adapting a narrow crank and a wide crank to rotate in unison, two frames each consisting of an arm journaled at one end upon a narrow crank and at the other branched out laterally near the wide crank and the branch arm continued parallel with the main arm and both journaled upon the long crank-pin and then turned downward and connected by cross-braces and at the lower end by a cross-bar to form a vertical frame, and a float consisting of a plate hung pivotally upon the lower cross-bar of said vertical frame to swing clear up and down in any direction to a vertical position or nearly so, substantially as set forth.

2. In a marine propeller, the combination of a pair of beams having one end secured in the stern of the vessel and extending parallel rearward and having their ends united and secured to a stern-post, a pair of two-throw crank-axles journaled transversely upon said beams, each of said axles having a wide and a narrow crank at an angle of one hundred and eighty degrees apart and mounted in reverse order to each other so that the narrow crank of one moves in unison with the wide crank of the other, an arm connecting each narrow crank with the opposite wide crank said arm being branched out laterally near the wide crank to form a frame journaled upon the long crank-pin then continued vertically downward and connected at the lower end, and a float consisting of a plate hung pivotally upon the lower cross-bar of said transverse frame and adapted to swing up and down in any direction and abut in its vertical position against its supporting-frame, substantially as set forth.

3. A marine propeller consisting of a pair of two-throw crank-axles journaled at the stern of the vessel upon suitable supports transversely to the center line of the vessel, each axle having a wide crank and a narrow crank adjacent to each other and at an angle of one hundred and eighty degrees apart and said cranks mounted in reverse order to each other, a vertical frame journaled at its upper end upon each long crank-pin said frame having its sides turned at a right angle and extended in the direction of the other crank to form arms, one of said arms extended to the narrow crank-pin and the other arm turned and joined to the long crank-pin, a float consisting of a plate hung pivotally to the lower cross-bar of the vertical frame capable of swinging freely up and down and abutting against the vertical frame when raised, and means of giving a rotary motion to the two crank-axles, substantially as set forth.

4. In a marine propeller, the combination with a pair of parallel supports placed a distance apart, of a pair of two-throw crank-axles journaled upon said supports, said crank-axles having each a wide crank and a narrow crank set at an angle of one hundred and eighty degrees apart and mounted in reverse order so that a narrow crank is opposite a wide crank and may rotate in unison, two frames each

consisting of an arm having one end journaled upon one of the other narrow cranks and having near its other end a branch or cross arm turned and extended parallel to the main arm and both branches journaled upon the crank-pin of a wide crank and then turned downward to form a vertical frame connected by cross-braces and by a cross-pin at the lower end and a plate acting as float hung pivotally to said cross-pin adapting it to swing freely and when raised abut against the vertical supporting-frame, substantially as set forth.

In testimony whereof I hereby affix my signature in the presence of two witnesses.

JOHN ANDERSON HOPEWELL.

Witnesses:

B. HARVEY,

M. PIOTRZKOWSKY.