

No. 762,687.

PATENTED JUNE 14, 1904.

W. COCHRANE.  
MEANS FOR PROPELLING SHIPS.

APPLICATION FILED MAY 28, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

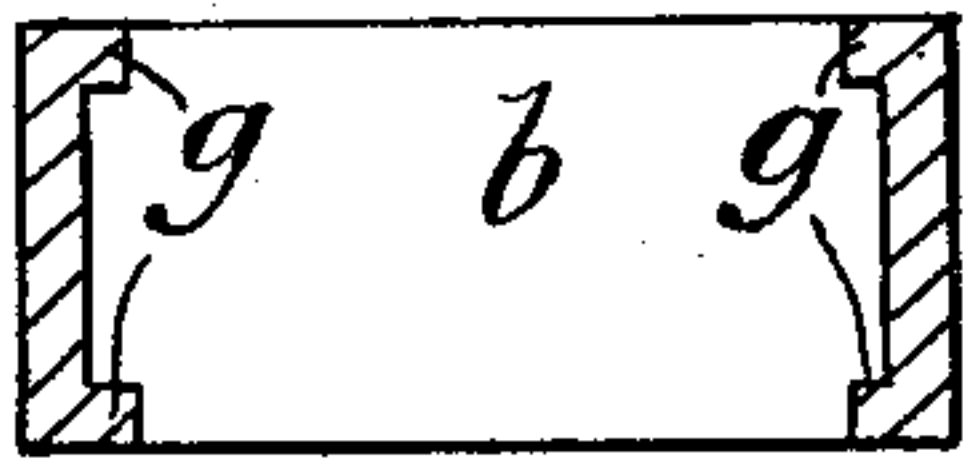


Fig. 4.

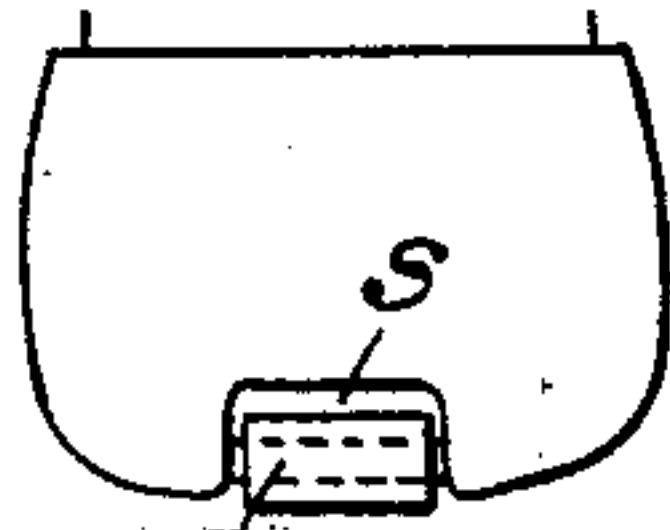


Fig. 8.

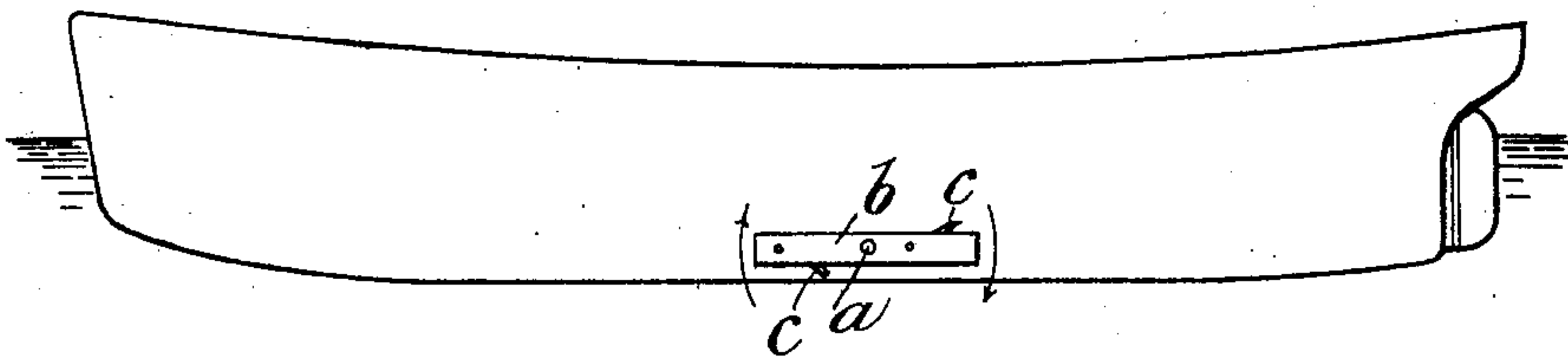


Fig. 1.

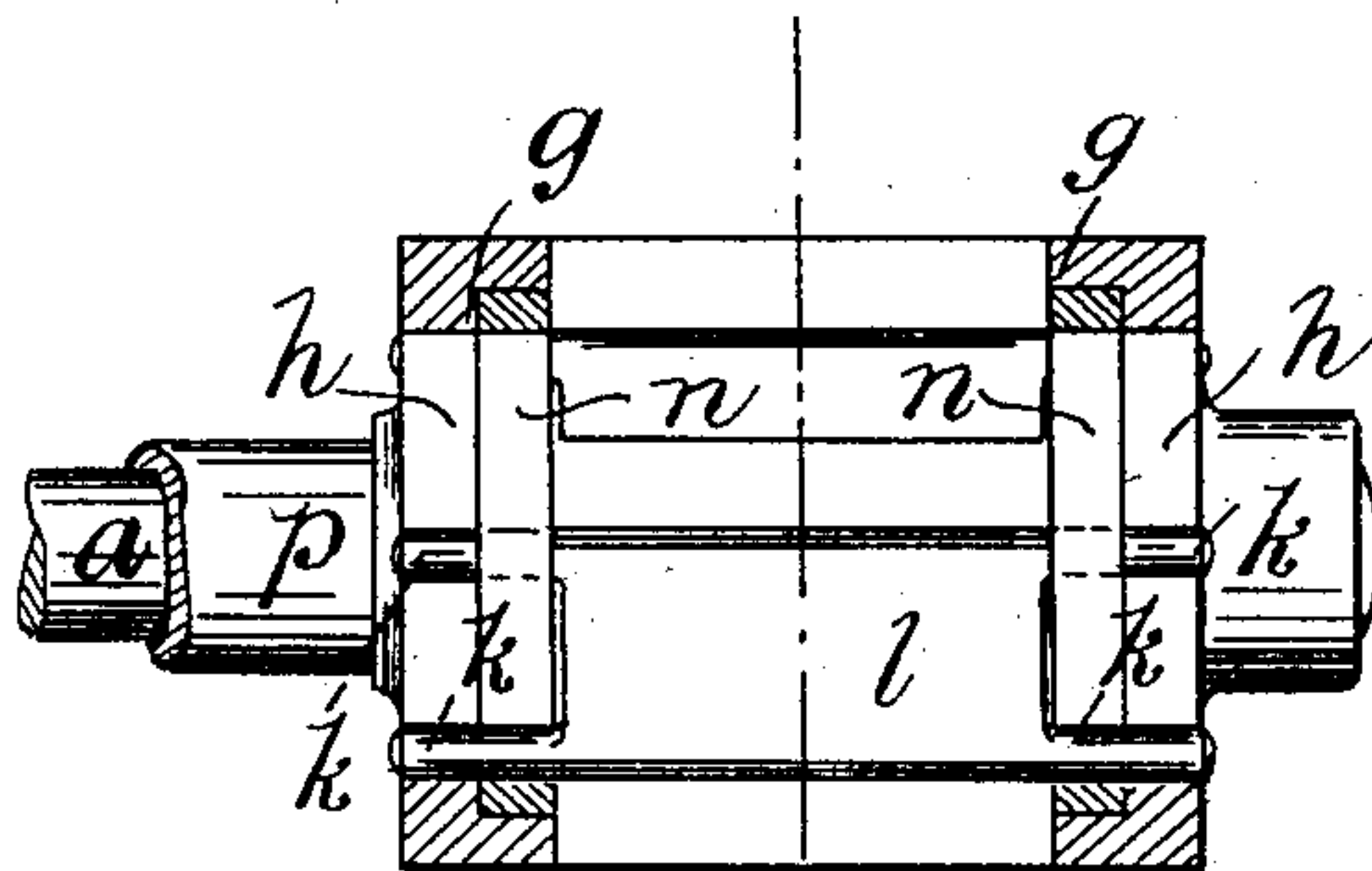


Fig. 6.

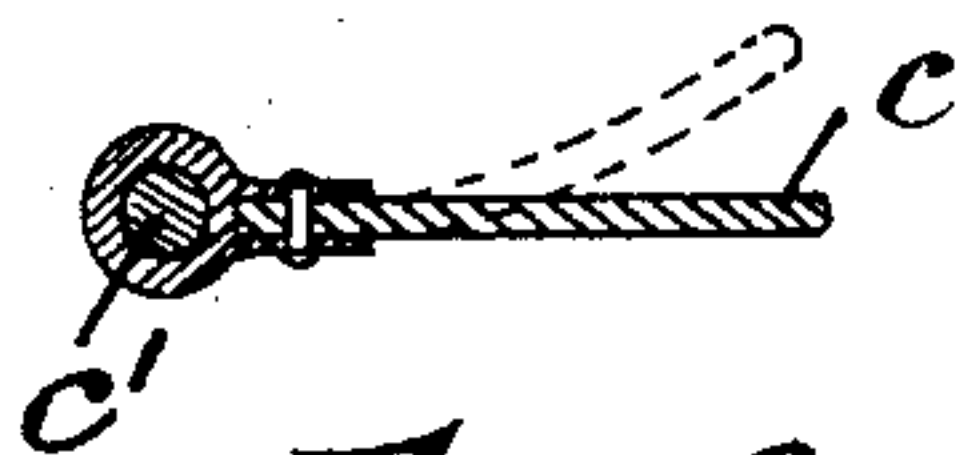


Fig. 9.

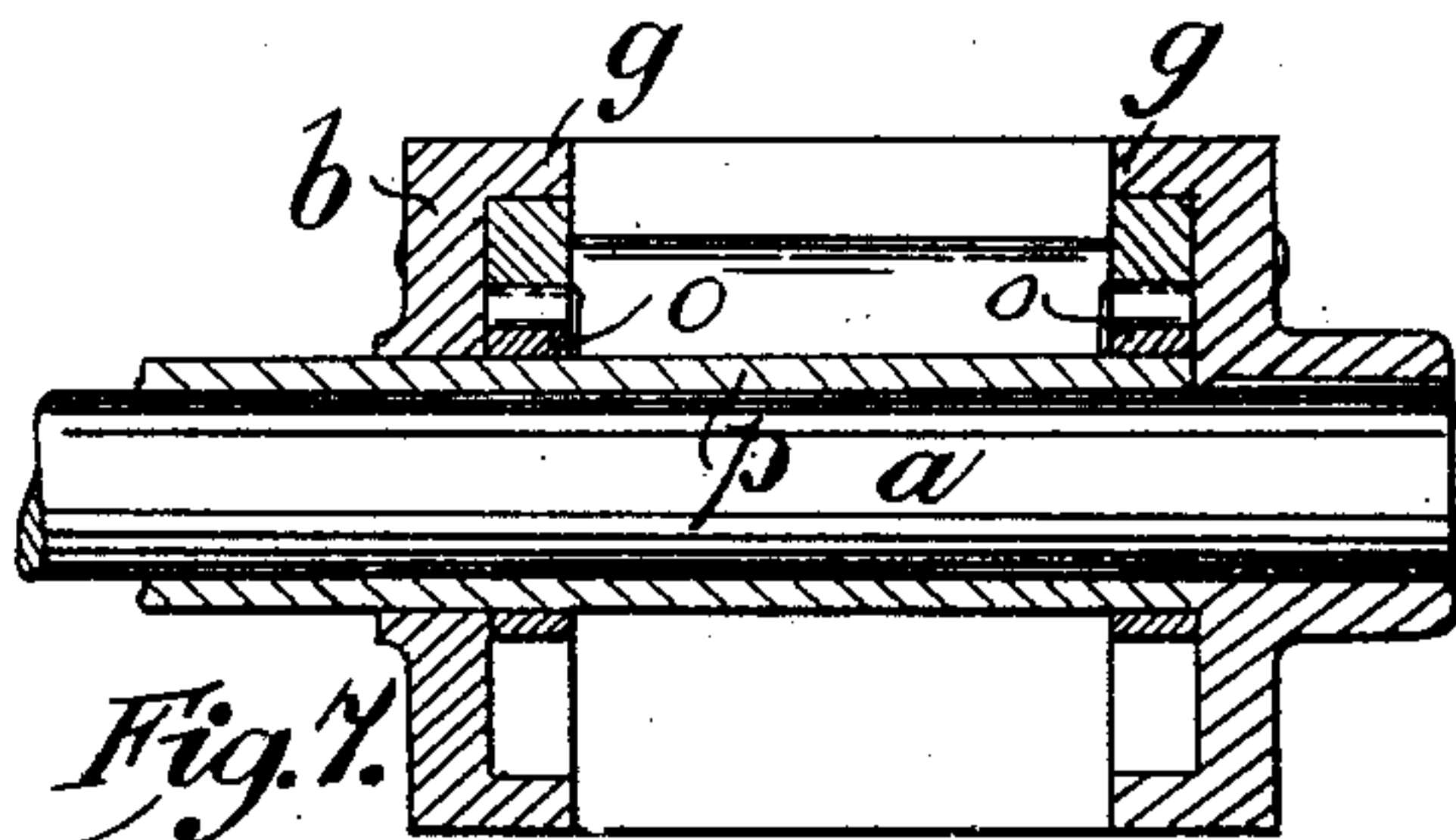


Fig. 7.

Witnesses:  
H. E. Dod  
R. Smith

Inventor:  
William Cochrane

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2 SHEETS—SHEET 2.

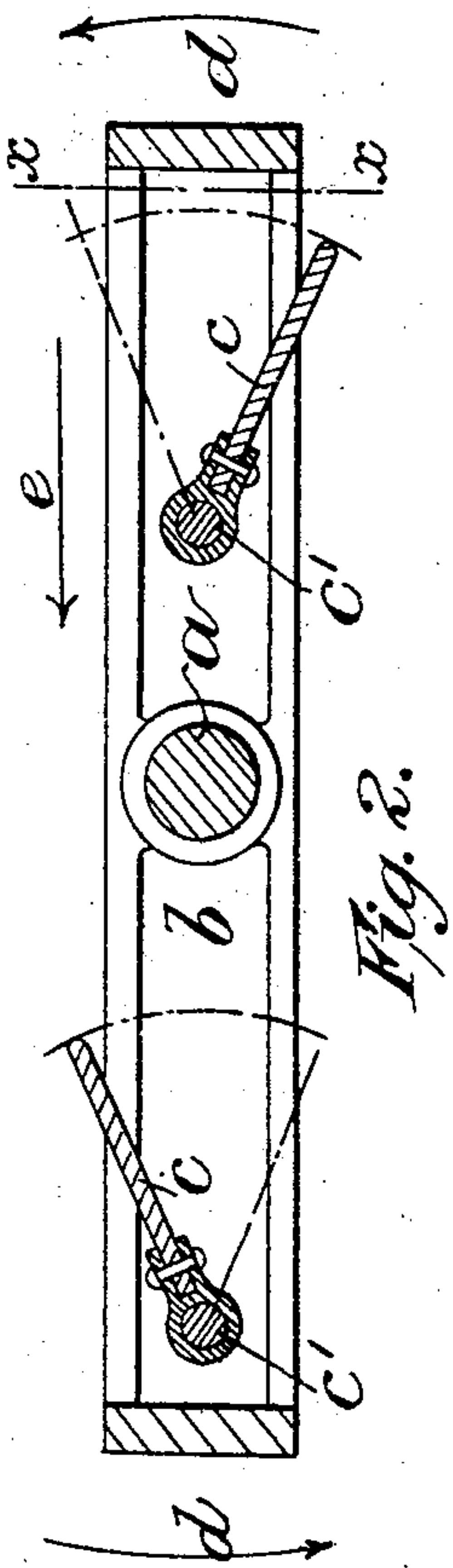


Fig. 2.

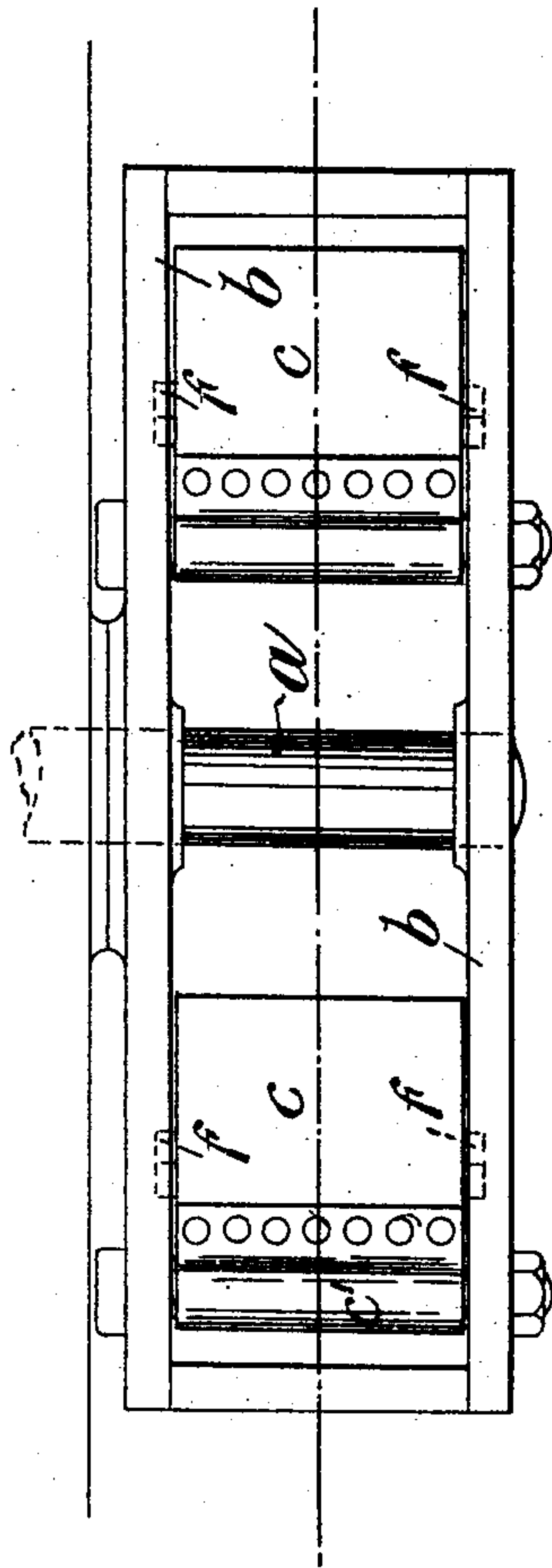


Fig. 3.

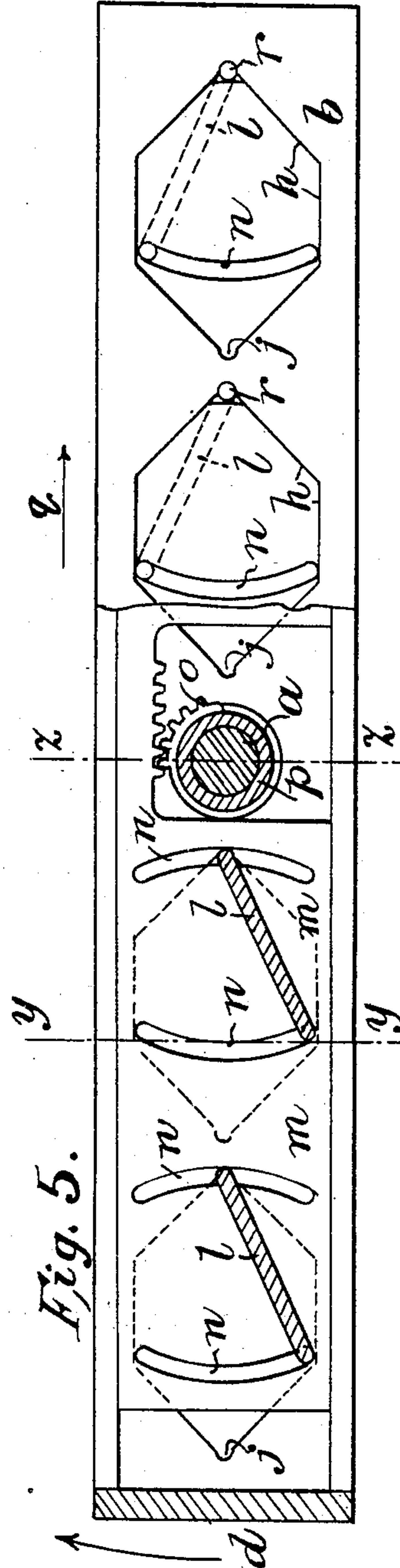


Fig. 5.

Witnesses:  
H. E. Wood.  
R. Smith.

Inventor:  
William Cochrane



# UNITED STATES PATENT OFFICE.

WILLIAM COCHRANE, OF LONDON, ENGLAND.

## MEANS FOR PROPELLING SHIPS.

SPECIFICATION forming part of Letters Patent No. 762,687, dated June 14, 1904.

Application filed May 28, 1903. Serial No. 159,212. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM COCHRANE, valet, a subject of the King of Great Britain and Ireland, residing at 11 King street, St. Jamesstreet, London, England, have invented certain new and useful Improvements in Means for Propelling Ships and Boats, Including Those of the Submarine Type, (for which I have made application for patent in Great Britain, No. 746, dated January 12, 1903,) of which the following is a specification.

This invention relates to means for propelling ships and boats, including those of the submarine type.

The object of the invention is to secure greater efficiency, to prevent racing of the ship's engines, and to destroy all tendency toward cavitation as it exists in screw-propellers now used.

The improved propelling means are shown in the accompanying drawings, in which—

Figure 1 shows an elevation of the hull of a ship fitted with the improved propeller. Fig. 2 shows an enlarged longitudinal section of the propeller; Fig. 3, a plan, and Fig. 4 a transverse section, on line X X, Fig. 2. Fig. 5 shows an elevation, partly in section, of a propeller which is capable of being reversed. Fig. 6 shows a transverse section on the line  $y y$ , Fig. 5. Fig. 7 shows a similar section on the line  $z z$ . Figs. 8 and 9 show modifications to be hereinafter described.

Referring to Figs. 1 to 4, the main shaft  $a$  is caused to oscillate by engines in the ship. The ends of the shaft project beyond the sides of the ship and carry at each end rectangular open frames  $b$ , suspended centrally from the shaft  $a$ . Within the two side members of the frames are pivoted at  $c'$  vanes or flaps  $c$ , preferably one on each side of the shaft  $a$ . As the frames oscillate the vanes  $c$  will assume alternate oblique positions, as shown by dotted lines, Fig. 2, by impact with the water, thereby causing the ship to be propelled forward. In Fig. 2 the arrows  $d$  indicate the direction of oscillation and the arrow  $e$  the direction in which the ship will be moved by such oscillation. To limit the movements of the vanes, they are each provided with projecting lugs

$f$ , which engage at the end of each stroke with the under surfaces of overhanging beads or ledges  $g$ , Fig. 4, upon the side members of the frames  $b$ .

No special means for reversing the ship's movement is shown in Figs. 1 to 4; but it might be reversed by turning the frames over or through a half-revolution by any suitable mechanism from the interior of the ship. This method of reversing would, however, prove cumbersome on a ship, and therefore another means for reversing is shown in Figs. 5 to 7. A similar rectangular frame  $b$  to that above described is used, but of somewhat greater depth. The side members are provided with hexagonal slots  $h$ , each provided with two semicircular seatings  $j$ , adapted to receive the projecting pins  $k$ , formed on each corner of the vanes  $l$ , four of which are shown in this modification. Sliding between the overhanging beads  $g$  on each side member is a plate  $m$ , provided with curved slots  $n$ , the curve being struck from the centers of the seatings  $j$ . The plates  $m$  are actuated for the purpose of illustration by toothed sectors  $o$ , formed upon a sleeve  $p$ , placed around the main oscillating shaft  $a$ , which sectors gear with toothed racks formed on the plates  $m$ . The vanes  $l$ , as described, are fitted with four projecting pins  $k$ . The two pins on each side will engage with adjacent curved slots  $n$  and are made long enough to pass right through them and engage the edges of the hexagonal slots  $h$  in the plate behind. The length of the curved slots  $n$  will be the limit of travel of the vanes.

The action is as follows: As shown in Fig. 5, the ship is supposed to be traveling in the direction of arrow  $q$ , the direction of oscillation being shown by arrows  $d$ . The vanes will pivot about the centers  $r$ , their other ends moving in the curved slots  $n$ . When the action is to be reversed, the side plates  $m$  are moved longitudinally by the rack and sector-gear. The free ends of the vanes will now be forced to take up stationary central position, the projecting pins  $k$  on the vanes being caused to ride up or down the V-shaped end surfaces of the hexagonal slots  $h$ . Thus the



ends of the vanes which were free will now be stationary and the ends which were stationary will now be free.

It will be understood that my invention is  
 5 capable of many modifications without departing from the principle of my invention. Thus the propellers may be fitted to the stern of the ship instead of the waist. In Fig. 8 the propeller is shown diagrammatically as  
 10 working in a tunnel *s*, running centrally and longitudinally of the ship. The number of vanes is immaterial. Finally, the propeller instead of oscillating in a vertical plane or parallel with the side of the ship might oscil-  
 15 late in a horizontal plane at right angles to the sides of the ship. Steering may also be effected with this propeller by causing the frames on one side of the ship to remain stationary while the other frame is oscillated, or  
 20 the frames might be both oscillated; but propelling in different directions the ship would thus turn upon its own axis.

Instead of the vanes being pivoted as above described they may be made of thin flexible  
 25 metal, as shown in Fig. 9, the socket being fixed while the vane swings free, as shown in dotted lines.

Having now described my invention, what I claim as new, and desire to secure by Letters  
 30 Patent, is—

1. Means for propelling ships and boats consisting in combination of an open frame suspended at each side of the ship upon, and oscillated by, a propeller-shaft; flaps or vanes  
 35 pivoted at the ends of the oscillated frames, the vanes at one end being pivoted at the side nearest to, and those at the other end being pivoted at the side remote from, the propeller-shaft, limiting-stops upon said vanes and limit-

ing-stops upon the oscillated frames for engaging those upon the vanes, substantially as described. 40

2. Means for propelling ships and boats consisting in combination of an open frame suspended at each side of the ship upon, and oscillated by, a propeller-shaft; hexagonal slots in the sides of said open frames; seats formed at each end of the hexagonal slots; plates housed within projecting beads upon the sides of the oscillated frames; curved radius-slots  
 45 formed in said plates; flaps or vanes working in the oscillated frames; projecting pins upon each corner of the said vanes, for engaging the hexagonal slots in the sides of the oscillated frames, and also engaging the radius-  
 50 slots in the plates housed within overhanging beads upon the sides of the oscillated frames; and means for sliding the said plates for the purpose of changing the pivotal points of the flaps or vanes from one side to the other for  
 55 the purpose of reversing their action, substantially as described. 60

3. Means for propelling ships and boats consisting in combination of an open frame suspended at each side of the vessel upon, and oscillated by, a propeller-shaft, flexible flaps or vanes mounted in rigid sockets at the ends of said oscillated frames, the sockets at one end being fitted at that side of the flap nearest to, and those at the other end being fitted to that  
 65 side of the flap remote from, the propeller-shaft, substantially as described. 70

In witness whereof I have hereunto set my hand in presence of two witnesses.

WILLIAM COCHRANE.

Witnesses:

H. D. JAMESON,  
 A. NUTTING.