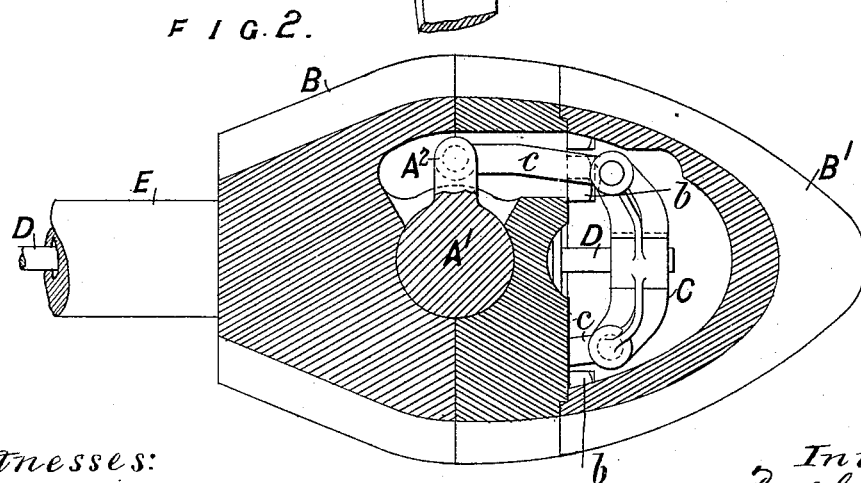
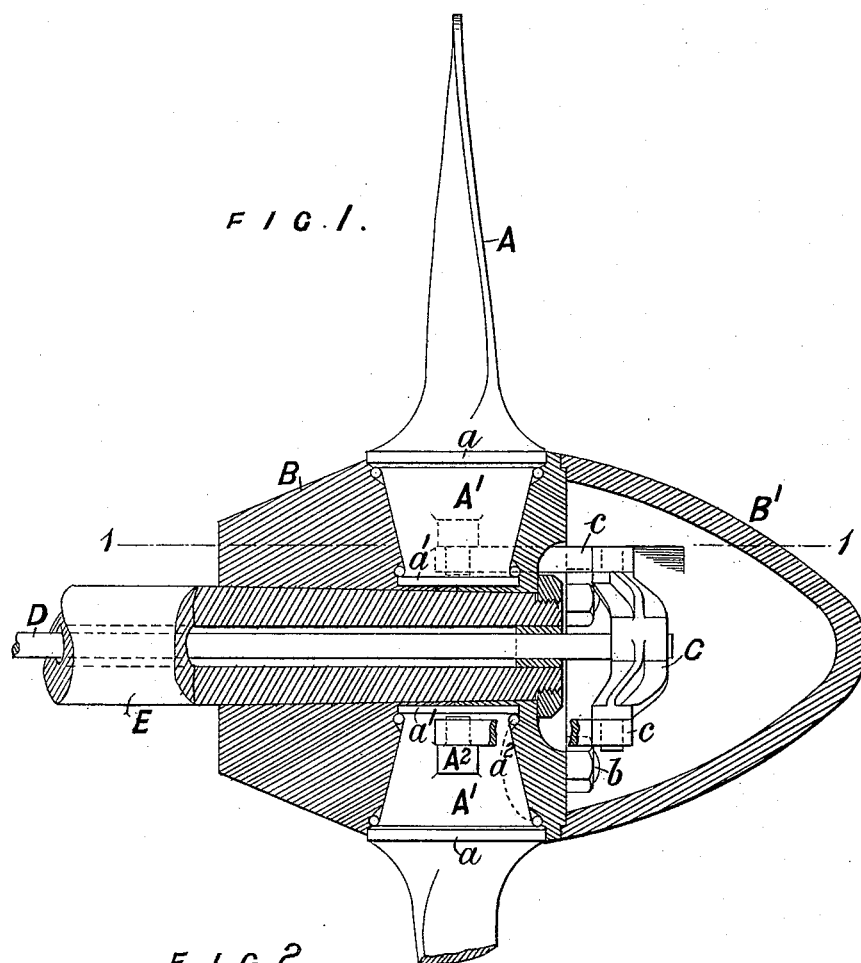


R. McGLASSON.  
SCREW PROPELLER.

No. 494,014.

Patented Mar. 21, 1893.



Witnesses:

L. Sedgwick  
C. M. Clark

Inventor  
R. McGlasson  
by *Murray*  
Attorneys.

(No Model.)

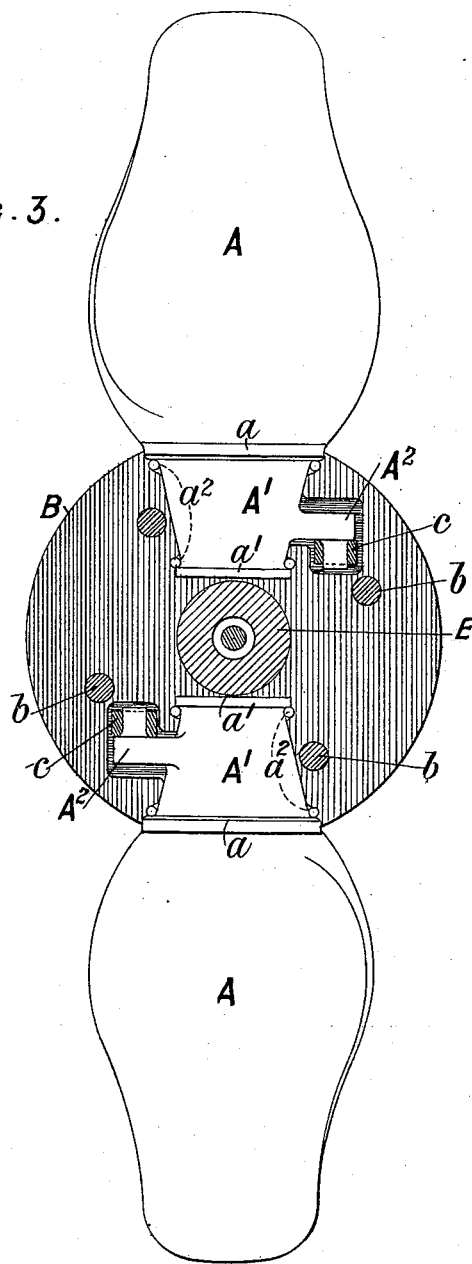
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FIG. 3.



Witnesses  
C. Sedgwick  
G. M. Clark

Inventor  
R. McGlasson  
by *[Signature]*  
Attorneys.

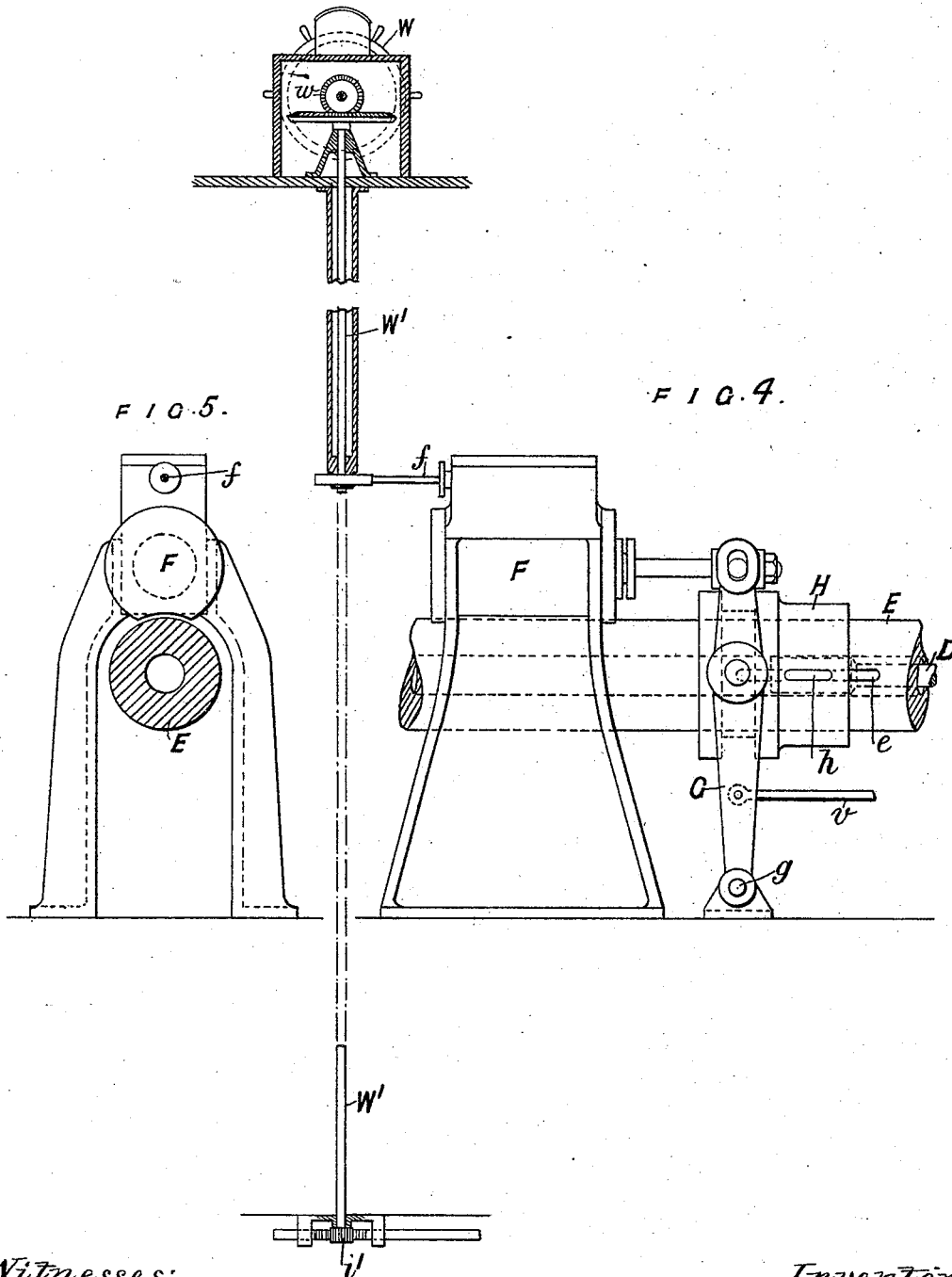
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Witnesses:  
C. Sedgwick  
C. M. Clark

Inventor  
R. McGlasson  
by  
Attorney

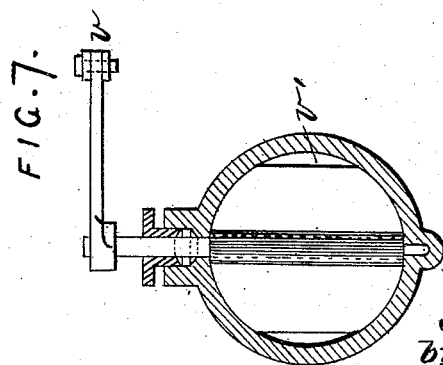
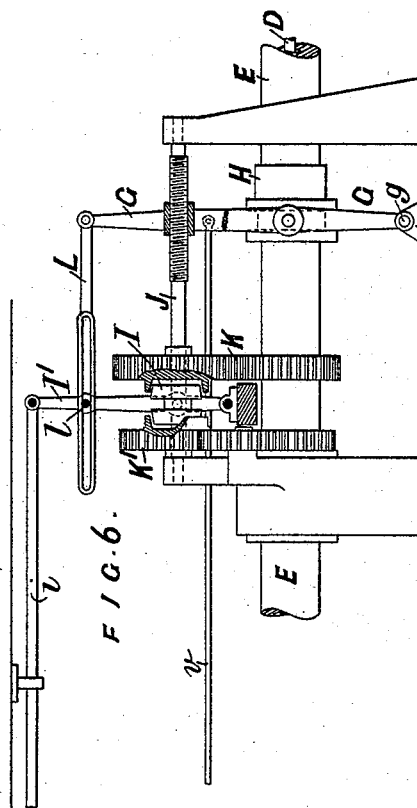
(No Model.)

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R. McGLASSON.  
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No. 494,014.

Patented Mar. 21, 1893.



Witnesses:  
C. Sedgwick  
E. M. Clark

Inventor  
R. McGlasson  
by *Munn & Co.*  
Attorneys.

# UNITED STATES PATENT OFFICE.

ROBERT MCGLASSON, OF SELHURST, ENGLAND.

## SCREW-PROPELLER.

SPECIFICATION forming part of Letters Patent No. 494,014, dated March 21, 1893.

Application filed May 21, 1891. Renewed February 9, 1893. Serial No. 461,684. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT MCGLASSON, engineer, of 39 Dagnall Park, Selhurst, in the county of Surrey, England, have invented or discovered new and useful Improvements in Screw-Propellers and Apparatus Connected Therewith; and I do hereby declare the nature of the said invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement thereof—that is to say:

My invention relates to means for operating the blades of reversible screw propellers, and of preventing the "racing" of the engines during the operation, whereby the pitch of the screw may be varied or while it is revolving so as to reverse the direction of propulsion without reversing the engines.

The invention comprises mechanism, whereby by the rotation of the blades, each on its own axis, for the purpose of altering the angle of the blade as above mentioned, is effected either by the main engines or by auxiliary steam, hydraulic, or other engines or motors, the performance of this operation being in any case brought about and controlled from the deck or captain's bridge or other convenient point inboard without the necessity of first communicating with the engine-room, the said mechanism being combined with means whereby the "racing" of the main engines during the operation of reversal will be prevented and the engines will be kept running at, practically, the same speed with only the necessary expenditure of steam, at whatever angle the blades may be placed.

Reference is to be had to the accompanying drawings, forming part of this specification, wherein I have illustrated the method of carrying my invention into effect.

Figure 1 is a central vertical section of a screw, the blades of which are capable of being reversed or of being varied in pitch when going either "ahead" or "astern," the blades and their operating gear being, for the sake of simplicity, supposed to be in a mid-position between full forward and full backward pitch. Fig. 2 is a section of the same on line 1, 1, Fig. 1. Fig. 3 is an axial cross section in the plane on which the boss is supposed to be divided. Fig. 4 is a side elevation, and Fig. 5 an end view of a direct acting steam or hy-

draulic gear for effecting the reversal of the screw. Fig. 6 is a side sectional elevation of mechanism, whereby the reversal of the screw is effected from the screw shaft itself by the power of the main engines, both of these being controlled from the bridge or deck or any suitable part of the vessel. Fig. 7 illustrates an example of the special throttle valve here- in referred to.

The same letters of reference denote like parts in all the figures.

Each blade A of the screw is fitted to rotate on its own axis in the boss B, the blade, for this purpose, springing from a circular base or flange *a*, taking a circumferential bearing upon a corresponding seat in the boss, and having a shank or journal A', fitting in a corresponding socket in the boss and terminating in a flange *a'*; steel or other balls *a*<sup>2</sup> (or it may be rollers mounted in loose carrying rings) being introduced between the base and flange *a a'* and their respective seats in the boss to reduce the friction and so enable the blade to be rotated upon its axis with greater facility. The boss is constructed in halves, bolted together by bolts *b*, after the blade shanks have been placed in their seats in the boss.

I have shown the boss split transversely but it will be understood that it may be split longitudinally if preferred.

The connection between the blades and their operating mechanism consists of oppositely directed arms A<sup>2</sup> on the blade-journals A' coupled by links *c* to a crosshead C on the end of a rod D passing through the propeller shaft E, which is made tubular, the crosshead and links being housed within a cap B' forming part of the boss.

As shown in Figs. 4 and 5, the sliding rod D may be operated by the piston of a steam or hydraulic cylinder F, whose rod is connected to a pair of levers G pivoted at *g* and engaging with a flanged sleeve or collar H free to slide on the propeller shaft E. This collar is connected with the sliding rod D by a cotter *h* passing through longitudinal slots *e* in the shaft E. The distribution of the motive fluid to the cylinder F would be controlled by a valve whose rod *f* is operated by a manual or other power and is manually controlled from any point on the bridge or deck in the

same way as the mechanism next described. If hydraulic power be used, the locking of the water in the cylinder F will hold the propeller blades at whatever angle they may be set, while if steam or other elastic fluid be used, it will also serve as a cushion.

The mechanism shown in Fig. 6, is operated from the propeller shaft E through the medium of a double friction or other clutch I upon a counter-shaft J, the clutch being capable of putting the counter-shaft J into gear with the propeller shaft E through one or other of two sets of oppositely acting spur gear K or K' as the case may be, the one set K gearing the countershaft directly to the propeller shaft, and the other set through an intermediate wheel. This countershaft J is screwthreaded and actuates a nut pivoted on a pair of levers G engaging the collar H connected to the sliding rod D, as before described in reference to Figs. 4 and 5. According as the clutch I is engaged with the one or other set of spur gear, the power of the main engines is applied through the countershaft, screw gear, levers, collar, and sliding rod D, to turn the blades of the screw upon their pivots, that is to say, to alter their pitch or reverse the direction of propulsion, as may be required. It will be obvious that friction band, or other gear may be substituted for the spur gear K K'. The clutch lever I' is operated from a hand wheel W on the bridge or deck, through the medium of connecting rods and levers or shafting and rack, worm, spur, or other gear, whereby the necessary motion may be imparted to the clutch lever, to throw the clutch into gear in the one or other direction, an indicator being provided, as hereinafter described, showing at all times the angle of the screw blades. In this example, the clutch lever I' is connected to a sliding rod i geared by rack and pinion i' with a vertical shaft W' geared by a bevel gear w with the hand wheel W.

In order to prevent over running, the double lever G is connected with the clutch lever I' by a slotted link L engaging with a stud l on the lever I', whereby on the propeller blades reaching the position of full pitch in either direction, the pressure of the clutch lever is relieved by the end of the slotted link L throwing the clutch out of action (so that injury to the screw reversing mechanism is avoided) this action being due to the motion of the lever G in the opposite direction to that in which the lever I' was moved to put the clutch in gear.

In each of the above described arrangements, the double lever G, or some other part of the mechanism, is connected by a rod V or otherwise, to a special throttle valve on the steam pipe to the main engines, and in the case of a compound engine to throttle valves on the pipes between the high pressure intermediate and low pressure cylinders, the said throttle valve or valves being so arranged as to diminish, without entirely shutting off the

supply of steam, so as to slow down the main engines (without however stopping them) or keep them running at the same speed and thus prevent them "racing" when in the operation of reversing the pitch of the screw diminishes, so that they are presented edgewise to the water, the valve opening again as the pitch of the screw increases. For this purpose the valve proper may either fit loosely in the valve casing or it may have a hole or holes through it or be otherwise made incapable of entirely preventing the passage of the steam to the main engine cylinders. By the adjustment of the said throttle valve or valves concurrently with the adjustment of pitch of the screw, the engines will be kept running at practically the same speed with only the necessary expenditure of steam according to the work they are required to perform at whatever angle the blades may be placed.

Instead of directly coupling the collar H to a piston, as in Figs. 4 and 5, or operating it by the propeller shaft, as in Fig. 6, it may be operated through worm or other gear by a donkey engine or pair of engines or an engine similar to a steam or hydraulic steering engine or any other motor, as will be readily understood without further illustration, provision being made for the prevention of over-running as above described, and the said engine being controlled by gear such as herein referred to, manually operated from the bridge or other distant point.

The lever G, Fig. 6 instead of acting on the friction clutch lever I' might in the case when the reversing of the screw is effected by a donkey engine, be made to act on the reversing shaft of the donkey engine, so as to gradually stop the latter when the screw blades reach full pitch ahead or astern. In this case no friction clutch and toothed or other gear such as referred to in Fig. 6 are necessary, the donkey engine driving the screwed shaft J direct, the clutch lever I' becoming the reversing lever of the donkey engine, which lever is controlled by the officer on bridge deck or elsewhere, by the system of levers and connections shown, so that the motion of the donkey engine may be stopped when the blades have assumed the desired position.

It is to be understood that in all cases where a hand wheel W is referred to for operating the controlling gear from bridge, deck, or elsewhere, such hand wheel may be replaced by a small motor of any suitable kind similarly situated and fulfilling the same functions as the hand wheel.

I am aware that screw propellers have heretofore been made with pivoted blades for the purpose of feathering and placing in position for sailing, and therefore I do not claim the swiveling of the screw blades by manual power.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with a reversible screw propeller, and a reversing mechanism for said blades of a throttle valve or valves placed in the steam supply pipe of the main engines and connected to the blade reversing mechanism and operated thereby to control the steam supply concurrently with and proportionately to the alteration of pitch of the screw, as described.
2. The combination with a reversible screw propeller, its shaft and a lever connected with the propeller blades for reversing them, of mechanism consisting of a nut traveling on a screw threaded countershaft and connected to said lever, sets of reversing gearing, a clutch, whereby the countershaft may be geared through either set with the propeller shaft, and of a throttle valve or valves placed in the steam supply pipe of the main engines and connected to the said blade reversing lever so as to be operated to control the steam supply concurrently with and proportionately to the alteration of pitch of the screw, as described.
3. The combination with a reversible screw propeller, its shaft and a lever for reversing the propeller blades, of mechanism consisting of a nut traveling on a screw threaded countershaft and connected to said lever, sets of reversing gearing, a clutch, whereby the countershaft may be geared through either set with the propeller shaft, and of a slotted link connecting the collar lever with a stud on the clutch operating lever so as to cause the clutch to be automatically thrown out of gear, and of a throttle valve or valves placed in the steam supply pipe of the main engines and

connected to the collar lever so as to be operated to control the steam supply concurrently with and proportionately to the alteration of pitch of the screw as described.

4. The combination with the propeller shaft, its propeller having reversible blades and a lever for reversing the blades, of a screw counter shaft, geared to the propeller shaft and having a nut connected with said lever, and a clutch mechanism connected to the screw shaft, and gearing to rotate the screw shaft in either direction from the propeller shaft, without changing the direction of rotation of said propeller shaft, substantially as set forth.

5. The combination with the propeller shaft, the propeller having reversible blades, and a lever for reversing said blades, of the screw counter shaft, having a traveling nut connected with said lever, two sets of gearing connecting the said two shafts, and a double clutch mechanism for connecting either set of gearing with the screw shaft, a clutch lever, a slotted link pivoted to the blade reversing lever, a pin projecting into said slot from the clutch lever, and means for operating the clutch lever from any suitable point, substantially as set forth.

The foregoing specification of my improvements in screw-propellers and apparatus connected therewith signed by me this 13th day of April, 1891.

ROBT. McGLASSON.

Witnesses:

E. McGLASSON,

M. WALLIS,

Both of 39 Dagnall Park, Selhurst, Surrey, England.