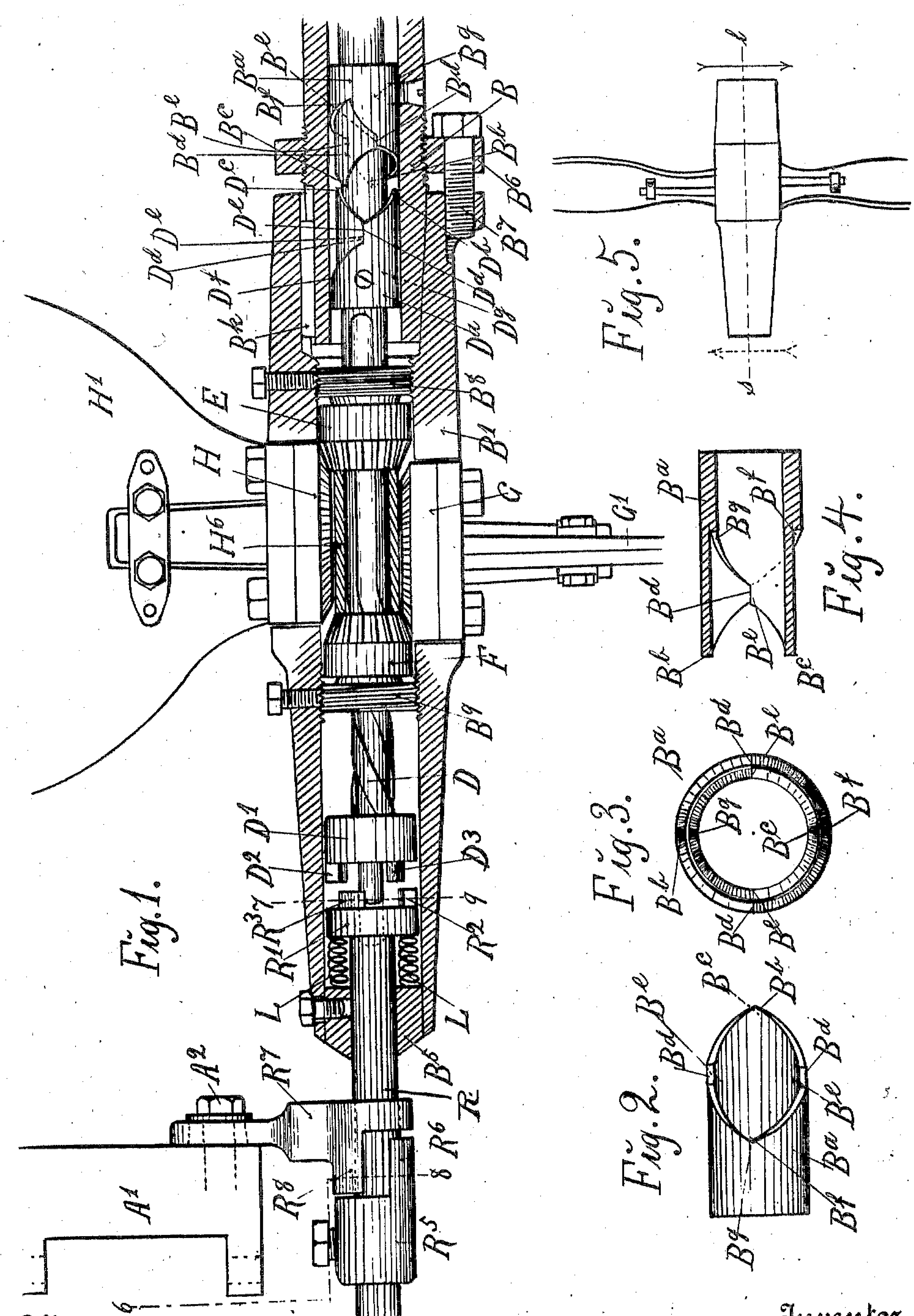
No. 817,091. PATENTED APR. 3, 1906.

D. W. RANTINE.

PROPELLING MECHANISM.

APPLICATION FILED FEB. 11, 1905.

2 SHEETS—SHEET 1.



Witnesses

[signature]

[signature]

Inventor

Daniel W. Rantine

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2 SHEETS—SHEET 2.

Fig. 10.

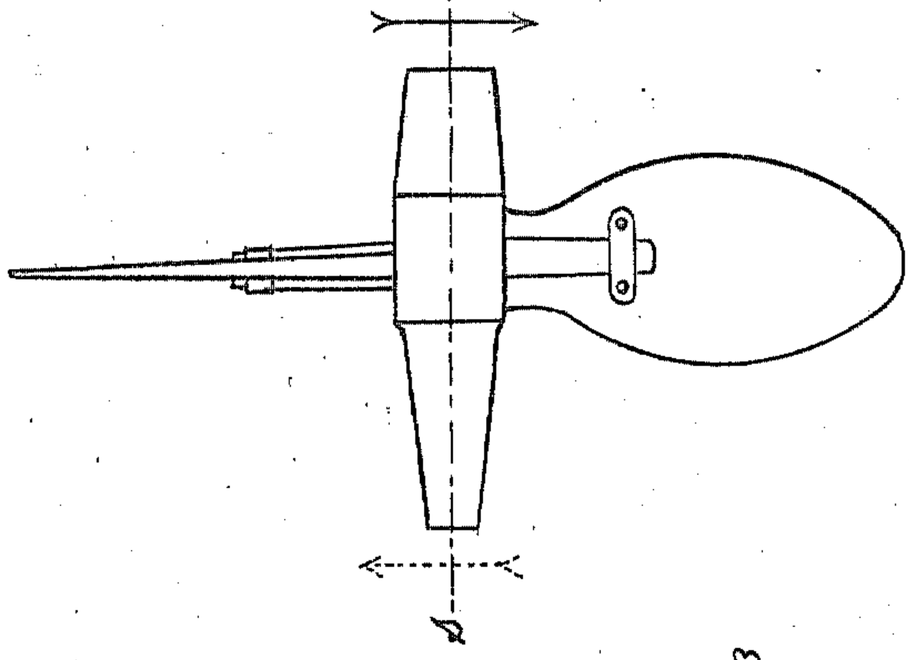


Fig. 8.

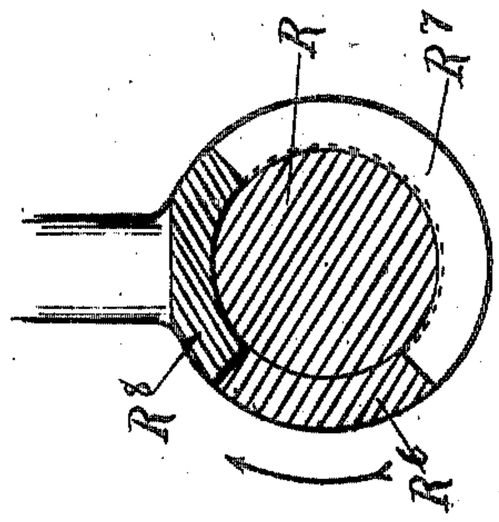


Fig. 9.

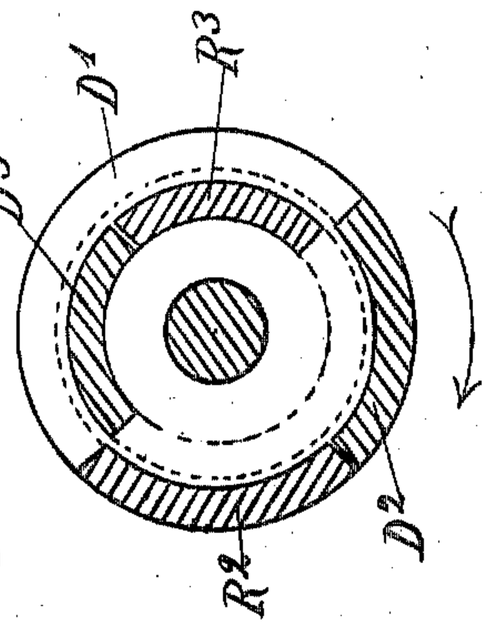


Fig. 6.

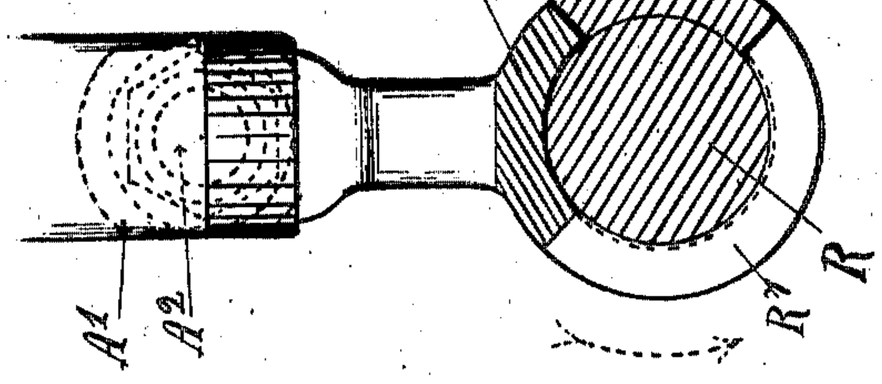
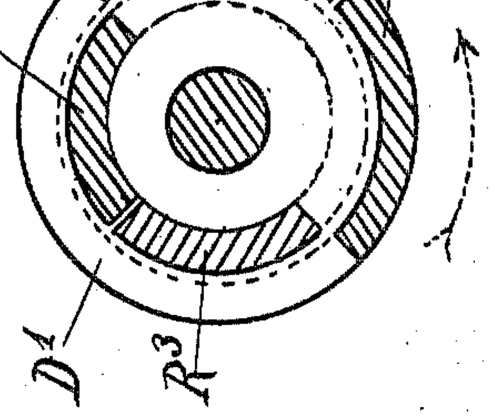


Fig. 7.



Witnesses
Thomas Drew Stetson
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UNITED STATES PATENT OFFICE.

DANIEL W. RANTINE, OF NEW YORK, N. Y.

PROPELLING MECHANISM.

No. 817,091. Specification of Letters Patent. Patented April 3, 1906.

Application filed February 11, 1905. Serial No. 245,282.

To all whom it may concern:

Be it known that I, DANIEL W. RANTINE, a citizen of the United States, residing in Brooklyn, in the city, county, and State of New York, have invented certain new and useful Improvements Relating to Propelling Mechanism, of which the following is a specification.

This invention relates to that class of propelling mechanism in which a tubular propeller-head with reversible blades is fixed on a tubular main or propeller-shaft having a supplemental threaded inner shaft within the said propeller-head and the main shaft. My invention allows a reversible motion for the main shaft.

My object is, first, for the operation of the said threaded inner shaft to provide a double constructed durable main lock by which this said threaded inner shaft may be at times safely coupled to the main shaft.

A further feature of the improvement is the construction of the stern-lock which involves a lock-shaft partly carried within the rear end of the propeller-head and other devices and parts which sustain this said lock-shaft arranged to slide and turn partly while coming into coöperation with the threaded inner shaft, for purposes which will be fully described below.

I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation, partly in longitudinal section, of the entire propeller, a part of the tubular main shaft, and lower end of the rudder-post, which latter carries or helps to carry the rear end. The construction of the stern-lock is also shown in the same figure. Figs. 2, 3, 4, 6, 7, 8, and 9 are on a much larger scale than Fig. 1. Fig. 2 is a longitudinal top view of one of the main lock-bushings. Fig. 3 is a front end view of one of the main lock-bushings, showing the diametrical difference of the teeth or points in this said lock-bushing. Fig. 4 is a longitudinal section of one of the main lock-bushings. In Fig. 5 is shown how the propeller-blades are set for ahead or for back propelling. Fig. 6 is in the line 6 and 8 in Fig. 1, showing a rear view of the lower end of the rudder-post and section of the locking teeth or laps on the stern-lock shaft when the stern-lock shaft is connected to the threaded inner shaft and the propeller is turned or revolved in the direction shown by the dotted arrows. Fig. 7 is a sectional part of the locking teeth or laps on the line 7 and 9 on Fig. 1, assumed to be at a time when the locking-faces of the stern-lock shaft and the opposite lock-face on the rear end of the threaded inner shaft are close together, the shaded parts being the locking-teeth as they are set while effecting side propelling to turn the vessel to the right. The revolving direction of the propeller is as shown by the dotted arrow. Fig. 8 is similar to Fig. 6, but showing only in section the action of the locking points or laps while the propeller is turned in the direction as indicated by the arrow. Fig. 9 is the same as Fig. 7, but showing the action of the locking teeth or laps while the propeller is turning in the direction shown by the arrow for propelling to turn the vessel to the left. In Fig. 10 is seen the relative standing of the propeller-blades to the vessel while thus acting in the lateral propelling. The dotted arrow shows the revolving direction for the right and the strong line arrows for the left turning.

Similar letters of reference refer to similar parts throughout the entire drawings.

In practice the propeller-head B′ is fastened over the tapered end of the tubular main shaft B by the key B^k and with the aid of the threaded ring B^6 and the bolts B^7. Preferably three are used; but only one is shown in Fig. 1. The propeller-head has the means shown for carrying the blade-gears H and G and the blades H′ and G′, secured to the said blade-gears H. The driving or operation of the blade-gears is done by two small driving-gears E and F, slidably feathered, one on each of the two different threads on the threaded inner shaft D. The gear E has an ordinary single feather running in an ordinary straight sphere groove in the inner shaft. The gear F has a helical feather running in the helical groove shown. These gears are held in their respective places within the propeller-head B′ by the two threaded stop-rings B^8 and B^9. A piece of tubing H^6 is also set between the said gears to keep them the proper distance apart.

The inner shaft D in operation is directed and slided endwise by any well-known means or device (not shown) from inside of the vessel. Two places are set for the inner shaft to stay. They are far in and far out. When the inner shaft is far in, the main lock is closed, and the propelling-blades are set for

ahead or back propelling. Thrusting the inner shaft far out the main lock is opened and the stern-lock device is set in action and the propeller-blades are operated to effect the side or lateral propelling.

It remains now to describe the construction and action of the main lock and also of the stern-lock.

The main lock has two opposing parts or lock-bushings B^a and D^a. Each of the said lock-bushings is made to have two projecting points and have two internal notches or recesses and four inclined side faces or steps. All the projecting points (seen in Figs. 1, 2, 3, and 4) on this said main lock-bushing are similar, and all notches or recesses are similar to each other, and all the inclined side faces or steps are similar, and therefore the parts not shown on the drawings may be clearly understood from the similar parts illustrated. The lock-bushing B^a has the projecting points B^b and B^c, and the lock-bushing D^a has the projecting points D^b and D^c. The four side steps of the bushing B^a are marked B^d B^d and B^e B^e. The opposing lock-bushings D^a have the side steps D^d D^d and D^e D^e. Of the V-shaped notch or recess the bushing B^a has B^f and B^g, and the bushing D^a has D^f and D^g. The lock-bushing B^a is strictly secured within the tubular main shaft B. The other opposing lock part or bushing D^a is strictly secured on the threaded inner shaft D. The projecting points B^b and D^b are of a larger diameter than the other projecting points of the smaller diameter of the opposing lock-bushing. In closing this main lock the threaded inner shaft is thrown far in and the lock-bushing D^a is closed to the lock-bushing B^a. This will set the projecting points of each of the opposing lock-bushings into the V-shaped recess in the periphery of their opposing lock-bushing. The V-shaped recesses are of the same diameter with the corresponding projecting points of the opposing lock-bushing. The inclined side steps in these lock-bushings are the "stay-there places," which make the coupling of the two lock parts more safe for holding the inner shaft in the position shown in Fig. 5, which sets the propeller-blades for ahead or back propelling. The strong line arrows indicate the direction of the revolving motion for propelling ahead. The dotted arrows show the direction of the revolving motion for back-propelling. The other of the two aforesaid locks is the stern-lock. It includes a locking-shaft R with a toothed face R′ on its inner end and two teeth R^2 and R^3 on this said toothed face. Another opposite lock-face D′ with the teeth D^2 D^3 is fastened on the rear end of the threaded inner shaft D, (seen in Fig. 1,) a step-ring B^5 removably secured in the rear of the propeller-head B′. A spring L is set forward of this stop-ring B^5 against the back of the toothed face R′. This spring L is meant to relieve back and press forward the lock-shaft R in time as the inner shaft D is thrust to engagement with this said lock. On the rear end of this lock-shaft R is fastened a dog R^5, which has a tooth or lap R^6. A subjoined piece or bracket R^7 is held by the screw A^2 on the lower end of the rudder-post A′. The lower end of the bracket R^7 is around the lock-shaft R, and one side of the lower end of this said bracket R^7 is made to a tooth or lap R^8. This lap R^8 is the corresponding lap or tooth against the tooth R^6. The opposing teeth or laps R^6 and R^8 are each exactly one-fourth of a full circle. (Seen in Figs. 6 and 8.) This affords in action for the lock-shaft R a one-half turn of lost motion for reasons which further will be fully described. The aforesaid teeth or laps on the tooth-faces R′ and D′ in this stern-lock are diametrically of two different sets, and while brought to action against each other they will be set as follows: On the tooth-face D′ of the inner shaft D the series of teeth D^2 is of a large diameter and corresponds in the action against the teeth R^2 on the tooth-face R′; but in any event will clear over the tooth R^3. The tooth D^3 on the tooth-face D′ of the inner shaft D is of a smaller diameter and corresponds in action to the tooth R^3 on the tooth-face R′ of the lock-shaft R; but in any event it will clear or pass the tooth R^2 of this said tooth-face R′. Each of these said locking teeth or laps is exactly one-fourth of a full circle. (Seen in Figs. 7 and 9.) This device of the said teeth or laps leaves a one-half turn of free or loose motion for the inner shaft D from its engagement with the stern-lock shaft R each time when the said inner shaft D, with the propeller, is reversed to turn to the opposite direction. This one-half turn or lost motion, with the other before-described one-half turn or lost motion, which is afforded by the teeth or laps of the two subjoined locking-pieces R^6 and R^7 for the stern-lock shaft R, will let or leave a complete turn or loose motion for the inner shaft D. While revolving, the propeller may be in either direction, as the arrows indicate on the drawings, and the blades will act for the right or left in the lateral propelling only below the main shaft-line *s l*, as seen in Fig. 10, and in deep water the result will be more effective.

I am aware that prior to my invention propellers have been made with partly reversible blades and devices for effecting the same, and therefore I do not claim the whole combination; but

What I do claim, and desire to secure by Letters Patent, is—

1. In a universal propeller a tubular propeller-head fixed to a tubular main shaft, a supplemental threaded inner tubular main lock secured within the main shaft, and on the threaded inner shaft having two opposite lock-bushings with two opposite projecting

points of different diameter on the end of each lock-bushing, corresponding V-shaped notch or recesses of a different diameter in the periphery of each said lock-bushing to engage the aforesaid projecting points, the side faces or steps diametrically different on the two opposing sides of each lock-bushing arranged to lock the threaded inner shaft to the tubular main shaft and the threaded stop-rings B^8 and B^9, in combination with each other and with the distance-piece H^6 and with the small bevel-gears E and F all substantially as herein shown and described for purposes specified.

2. In combination a universal propeller of a tubular propeller-head fixed to a tubular main shaft, a supplemental threaded inner shaft, a stern-lock shaft in fixed position partly received within the rear end of the propeller-head a tooth-face or flange on the inner end of this said lock-shaft, two sets of teeth or laps diametrically different on this tooth-face, to receive the engagement of the corresponding teeth of the rear end of the threaded inner shaft, the two adapted parts R^5 and R^7 and the teeth or laps R^6 and R^8 on the rear end of this said lock-shaft all arranged to serve substantially herein shown and described.

Signed at New York city, in the county of New York and State of New York, this 10th day of February, A. D. 1905.

DANIEL W. RANTINE.

Witnesses:
GEO. M. KITTRICK,
B. G. BRADY.