

No. 866,369.

PATENTED SEPT. 17, 1907.

A. W. LEARNARD.

PROPELLER.

APPLICATION FILED FEB. 23, 1907.

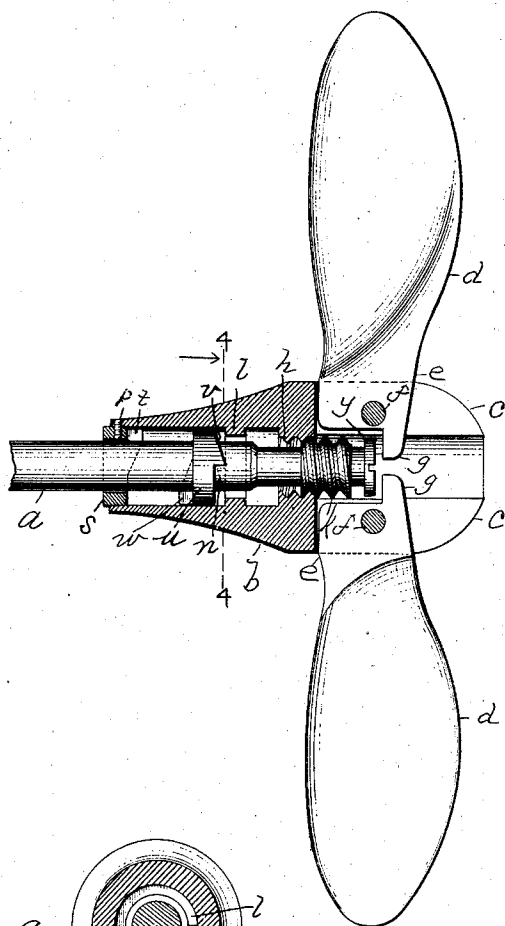


FIG. 1.

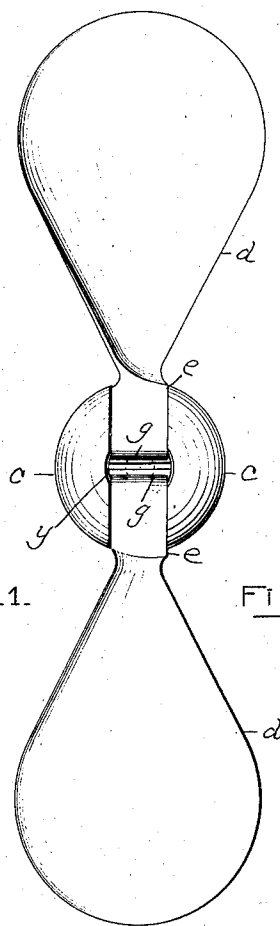


FIG. 2.

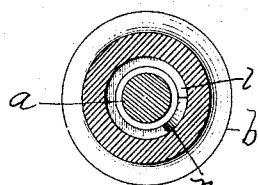


FIG. 4.

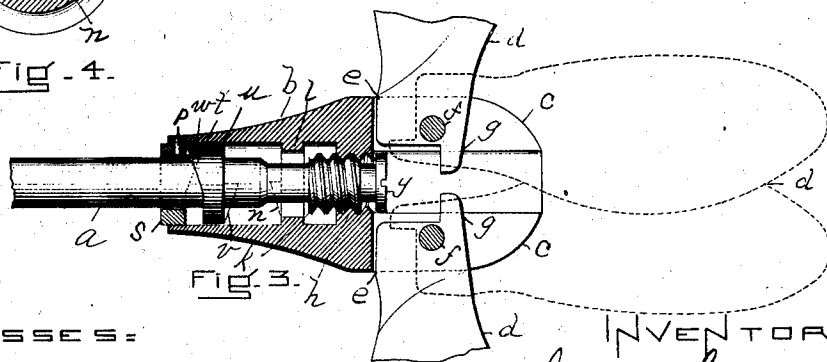


FIG. 3.

WITNESSES:

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# UNITED STATES PATENT OFFICE.

ARTHUR W. LEARNARD, OF BOSTON, MASSACHUSETTS.

## PROPELLER.

No. 866,369.

Specification of Letters Patent.

Patented Sept. 17, 1907.

Application filed February 23, 1907. Serial No. 358,992.

To all whom it may concern:

Be it known that I, ARTHUR W. LEARNARD, a citizen of the United States, residing in Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Propellers, of which the following is a specification.

This invention relates particularly to propellers adapted for use in yachts and other vessels where both steam and sail-power are employed and to propellers designed for motor boats; but it may be employed in the construction of propellers for any style of vessels to which it is applicable.

The invention belongs to the general class or style of propellers as that described and illustrated in Letters Patent of the United States, No. 725,097, and granted to me April 14, 1903, and is intended to be an improvement on or over that illustrated in the said Letters Patent; the object of the present invention being to produce a propeller which will close when the vessel is under sail-power or any power which is independent of the propeller-shaft, as in the said Letters Patent, and which will open and become operative when the propeller-shaft is rotated in either direction by the engine. In other words, in this invention the propeller operates when the engine is reversed as well as when it is driving the engine forward.

The nature of the invention is fully described below, and illustrated in the accompanying drawings, in which:—

Figure 1 is a view in side elevation of the propeller and shaft, the hub or head being illustrated in section, with the parts in the position assumed when the shaft is reversed and the engine is backing the vessel. Fig. 2 is an elevation of the outer end when the blades are spread or open, as in Fig. 1. Fig. 3 is a view partly in elevation and partly in section, with the parts in the position assumed when the engine is driving the vessel forward—portions of the blades being broken off. Dotted lines in the same figure represent the position of the blades when closed, as when the vessel is being propelled by sail-power. Fig. 4 is a section taken on line 4—4, Fig. 1.

Similar letters of reference indicate corresponding parts.

*a* represents the propeller-shaft, and *b* is the hub or head which receives the rear end of said shaft, said head being provided at its outer end with extensions *c*, whose inner adjacent faces are parallel, as illustrated. *d* represents blades or paddles whose flattened shanks *e* are pivotally secured in the space between said faces by pins or pivots *f*; the arrangement of the blades (which

are bent or twisted until the plane of the outer edges is at an angle of say, 45 to 75 degrees with the plane of the shank) and head being substantially the same as that illustrated in the Letters Patent above referred to. In the present invention the inner ends of the shanks of the blades are provided with extensions *g*. The other end of the main portion of the hub is internally screwthreaded at *h*, and the propeller-shaft *a* is provided near its outer end with a screw *k* which is adapted to fit into the thread *h*. The hub is moreover provided internally with an annular flange *l*, said flange being formed on its inner edge with a ratchet-shaped tooth *n*, as illustrated in Figs. 1, 3 and 4. The inner end of the hub has secured to it by a suitable screw or bolt *p* an internal ring *s* of size to receive the propeller-shaft. This ring is provided on its outer face with a ratchet-shaped tooth *t* which faces in the opposite direction from the tooth *n*, said teeth *n* and *t* facing each other between the flange *l* and ring *s*. Rigid on the propeller-shaft is a ring or collar *u* which is provided on its opposite sides or edges with reverse teeth *v* and *w*, the said teeth being adapted respectively to engage the teeth *n* and *t* above described. The outer end of the propeller-shaft *a* is provided with an annular flange or disk *y*, which may be integral with the shaft, said flange being provided with a suitable screw-slot whereby the screw *k* may be set into proper engagement with the thread *h*.

In operation, when the engine and propeller-shaft are reversed so that the vessel is being backed, the parts are in the position indicated in Fig. 1, and the tooth *v* rotates the hub and the blades by engaging the tooth *n* which is integral with the said hub; and during such rotation the blades are prevented from folding by the extreme outward position of the propeller-shaft. In this position the ring or collar *u* is moved out to engage the tooth *n*, the screwthread is in engagement with the extreme outer end of the thread *h*, and the flanged outer end *y* of the shaft operates as a stop to prevent the pivoted blades *d* from folding—the extensions *g* bringing up against said stop and keeping the blades expanded.

When the propeller-shaft is driven in the ordinary direction to drive the vessel forward, it screws into the hub until the ring *u* brings up against the ring *s*, thus causing the tooth *w* to engage the tooth *t*, and the blades are held in an extended position, indicated in full lines in Fig. 3, by their shape and drive the vessel forward.

When the vessel is under sail-power, the blades fall automatically into the position indicated by dotted lines in Fig. 3. This is true when the vessel is propelled by any power other than her engine, and in motor-

boats advantage is taken to free the blades from weeds, etc. by propelling the boat by oars or by its own momentum after the power is shut off.

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

1. In a propeller of the character described, a propeller shaft; a hub or head on said shaft; means intermediate of the shaft and hub or head whereby the rotation of the shaft in opposite directions imparts relative longitudinal movement to the shaft; mechanism intermediate of the shaft and hub or head for imparting rotation to said hub or head in opposite directions at different points in the said longitudinal movement of the shaft; blades pivotally secured at their inner ends to the hub or head and adapted by their shape to spread or swing outward and act as propeller-blades when the shaft is driven in the ordinary direction and to fold when the vessel is drawn through the water by sail or other power not connected with the propeller-shaft; and means for holding the blades in a spread or expanded position when the shaft is reversed.
2. In a propeller of the character described, a propeller-shaft; a hub or head on said shaft and in engagement therewith by means of a screwthread; reverse-shaped teeth extending from two points in the hub; a ring or collar on the shaft between said reverse teeth and provided with two teeth respectively adapted to engage said reverse teeth and thus rotating the hub in opposite directions; means intermediate of the shaft and hub or head whereby the rotation of the shaft in opposite directions imparts relative longitudinal movement to the shaft; blades pivotally secured at their inner ends to the hub or head and adapted by their shape to spread or swing out-

ward and act as propeller-blades when the shaft is driven in the ordinary direction and to fold when the vessel is drawn through the water by sail or other power not connected with the propeller-shaft; and means for holding the blades in a spread or expanded position when the shaft is reversed.

3. In a propeller of the character described, a propeller-shaft; a hub or head on said shaft and in engagement therewith by means of a screwthread; reverse-shaped teeth extending from two points in the hub; a ring or collar on the shaft between said reverse teeth and provided with two teeth respectively adapted to engage said reverse teeth and thus rotate the hub in opposite directions; means intermediate of the shaft and hub or head whereby the rotation of the shaft in opposite directions imparts relative longitudinal movement to the shaft; a flange or ring on the outer end of the shaft; blades pivotally secured at their inner ends to the hub or head and adapted by their shape to spread or swing outward and act as propeller-blades when the shaft is driven in the ordinary direction and to fold when the vessel is drawn through the water by sail or other power not connected with the propeller-shaft; and extensions at the inner ends of the shanks of the blades projecting into the path of the said flange or ring as the shaft is moved outward whereby the blades are held in an expanded position when the shaft is reversed.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARTHUR W. LEARNARD.

Witnesses:

HENRY W. WILLIAMS,  
A. M. TAIT.