W. H. MALLORY.

Steering Propeller.

No. 162,396. Patented April 20, 1875.

fig. 1

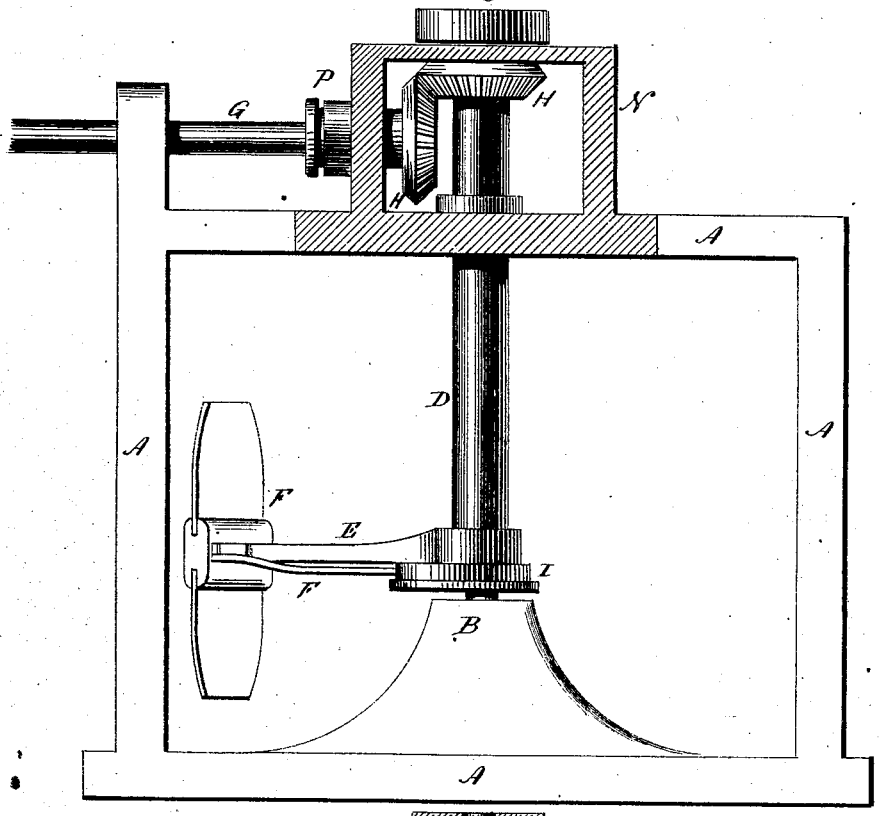

fig. 2.

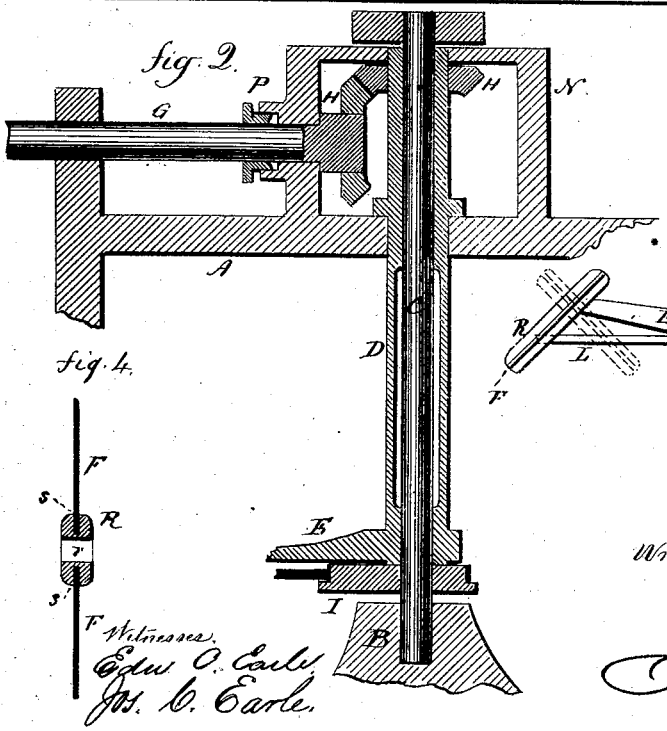

fig. 3.

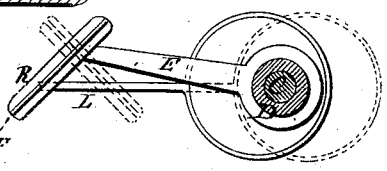

fig. 4.

Witnesses.
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WILLIAM H. MALLORY, OF BRIDGEPORT, CONNECTICUT.

IMPROVEMENT IN STEERING-PROPELLERS.

Specification forming part of Letters Patent No. **162,396**, dated April 20, 1875; application filed March 9, 1875.

To all whom it may concern:

Be it known that I, WILLIAM H. MALLORY, of Bridgeport, in the county of Fairfield and State of Connecticut, have invented a new Steering-Propeller; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a sectional side view; Fig. 2, vertical central section; Figs. 3 and 4, detached views.

This invention relates to an improvement in that class of propellers in which the axis is vertical and the propeller works in a horizontal plane, and in which the blades are arranged so as to be feathered or adjusted to any angle, for the purpose of giving to the vessel both the propulsion and direction.

In the usual construction of this class of propellers the vertical driving-shaft has been supported in a step at the bottom and a bearing near the top, with arms extending from the said shaft to the blades, the feathering of the blades produced through an eccentric or cam, loose upon the shaft above the arms, the said eccentric having connection with the helm, so that the helmsman may cause the said eccentric to turn, and thereby change the angle of the blades, and give to the vessel a corresponding change of direction. In such construction the thrust upon the revolving driving-shaft is very great, sometimes causing it to spring between its upper and lower bearings. The revolution of the shaft is rapid, and the thrust upon the shaft causes great and unequal friction upon the step or lower bearing, and a corresponding wear at that point, which is inaccessible except when the vessel is taken from the water.

The object of this invention is to overcome these difficulties; and it consists in a hollow vertical shaft, carrying the propeller-blades, combined with an internal shaft, carrying the feathering cam or eccentric, below the propeller-arms, the said internal shaft supported in a step at the bottom, and constituting the bearing around which the driving-shaft revolves; also, in other details of construction, as more fully hereinafter set forth.

A A represent the framing of the stern-posts; B, the step at the bottom. C is a vertical shaft, taking its bearing in the step B at the bottom. Over this shaft C the hollow driving-shaft D is set, fitting the internal shaft throughout its extent, or at different points, so as to be revolved freely on the said internal shaft, the points of contact between the two shafts forming the bearing for the shaft D. On the shaft D the propeller-arms E are arranged, more or less in number, and so as to revolve with the driving-shaft. To these arms the blades are hinged.

The blades and arms may be more or less in number, one only being shown in the illustration, which is sufficient for a clear understanding of the invention.

Power is communicated from the engine to the driving-shaft through the shaft G and bevel-gears H H. Below the arms E an eccentric, I, is attached to the internal shaft C. From this eccentric a rod, L, extends to the blade F, at a point in advance or in rear of the hinge or connection between the blade and its driving-arm, as seen in Fig. 3, so that by turning the said shaft C the eccentric is correspondingly turned, and in so turning changes the angle of the blade, as denoted in Fig. 3, the two positions being the two extremes. This change of angle changes the action of the blade to give different direction, substantially as in the usual feathering-propellers.

The shaft C extends up to the desired height above the driving-shaft, so as to make a convenient connection with the helm. By this construction the shaft C in the step B is substantially stationary, only turning when a change of direction is desirable; hence the wear at the step is very slight. Again, the driving-shaft, being hollow, is much stronger than would be the same weight as a solid shaft, and may be much lighter than could be a solid shaft of the same strength, and, taking its bearing, as it does, upon the internal shaft, it is impossible to spring the shaft by any thrust which may be brought upon it.

This construction affords a simple and easy

method for lubricating the bearings of the driving-shaft, as the lubricating material may be introduced between the two shafts, thence conducted down to the lowest point of bearing, the little use at the step not requiring lubrication. The hollow shaft may be carried up to any desired height, but should be above the water-line, and above this the attachment to the internal shaft for steering purposes.

The driving-gears H H necessarily come below the water-line, and are exposed to many obstructions. To avoid the difficulty occasioned by such obstructions I inclose that portion of the shaft where the gears are located in a tight casing, N, and provide a stuffing-box, P, through which the shaft G enters. This prevents the admission of the water to the gears, so that a lubricating material placed within the casing will remain there, and all danger of interference with the driving-gears is avoided.

The blade for the propeller is formed with a head, R, to which the arm E and rod L are hinged, preferably in a slot, *r*, in said head. In the upper and lower edge of the head a groove, *s*, is formed, and into these grooves the parts F of the blade are inserted. These parts are formed from sheet metal of the requisite strength, and after they are inserted in their respective grooves the metal of the head is struck down onto the parts F, so as to firmly secure those parts to the head; or they may be riveted to the head, if desired. This very much cheapens the construction over the usual method of forging the head and blades complete in one piece.

I claim—

1. The combination of the internal shaft C, supported in the step B at its lower end, the external shaft D, carrying the arms E, hinged to their respective blades, and the eccentric or cam I on the said shaft C below the arms E, with a connection from the said eccentric to each of the blades, substantially as described.

2. In combination with the internal shaft C, supported in the step B at its lower end, the external shaft D, carrying the arms E, hinged to their respective blades, and the eccentric or cam I on the said shaft C below the arms E, with a connection from the said eccentric to each of the blades, the case N inclosing the driving-gears H H, substantially as and for the purpose described.

3. The herein-described propeller-blade, consisting of the head R, slotted for connection to the arm and eccentric rod, and the parts F F, inserted in grooves *r* in the said head, substantially as set forth.

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Witnesses:

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