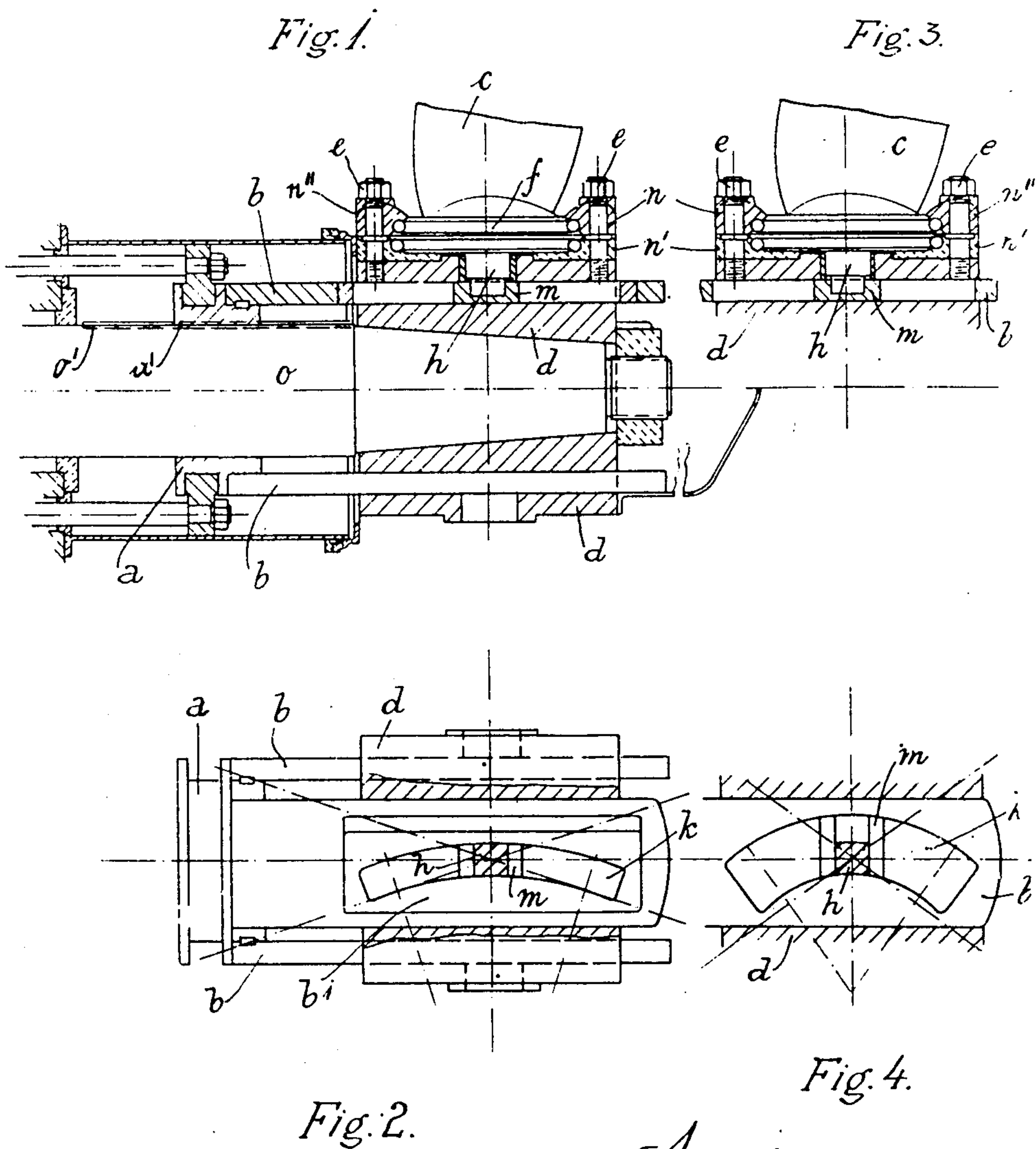


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REVERSIBLE PROPELLER.
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954,539.

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HUGO PAWLIK, OF UJ-PEST, AUSTRIA-HUNGARY.

REVERSIBLE PROPELLER.

954,539.

Specification of Letters Patent.

Patented Apr. 12, 1910.

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To all whom it may concern:

Be it known that I, HUGO PAWLIK, a subject of the King of Hungary, and resident of Uj-Pest, in the Kingdom of Austria-Hungary, have invented certain new and useful Improvements in Reversible Propellers, of which the following is a specification.

The present invention relates to improvements in propellers for vessels, the blades of which may be quickly and conveniently adjusted at any angle best adapted to special conditions of use, and in which the blades are connected to be readily and conveniently shifted for propelling the vessel backward or forward without the necessity of reversing or stopping the engine.

Numerous attempts have been made to construct devices of the character specified, but, as far as known, all of these devices have very serious defects. There are, for instance, known propellers, the blades of which are provided with spindles, which are slidably arranged in the hub of the propeller wheel, and are, for this reason, of comparatively small cross sections, whereby that cross section of the blades, on which usually the maximum stress is applied, is too weak. Other devices have been constructed, in which the oscillatable blades are connected to the shifting means by means of a plurality of levers, whereby a bulky and unreliable structure is obtained.

The object of the present invention now is to provide a propeller of the character, hereinbefore specified, which obviates the defects, hereinbefore mentioned, and which is simple of construction, comparatively inexpensive of production, efficient in operation, and in which the blades are adapted to be readily and conveniently shifted for propelling the vessel backward or forward without the necessity of reversing or stopping the engine, and while rotating the propeller shaft.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section of a propeller, constructed according to the present invention, and Fig. 2 a plan view of the same, partly in section. Fig. 3 is a vertical section of a modification of the device, and Fig. 4 a plan view of this modification.

Referring now more particularly to the drawings, the propeller shaft is indicated at *o*, upon which is slidably mounted a sleeve *a*, provided with a keyseat *a'*, engaging the

key *o'*, carried by the propeller shaft *o*. To this sleeve *a* are secured the proper adjusting and reversing means, which comprise in this case plates *b*, *b*, corresponding in number to the number of blades of the propeller, and slidably arranged in the recesses of the hub *d*, fixedly secured upon the end of the propeller shaft. Each of these plates *b* is provided with an arc-shaped slot *k*, engaging substantially square blocks *m*, which in turn engage the square ends of the spindles *h*, fixedly secured to the blades *c*. The propeller blades *c* are oscillatably secured to the hub *d* by means of caps *n*, which engage the enlarged sections *f* of the propeller blades and form, preferably, roller bearings for the same.

The caps *n* are made of two parts, that is the inner section *n'* and the outer section *n''*, united with the hub *d* by means of screw-bolts *e*. The section *n''* of the cap *n* is preferably cast integral with the enlarged portion of the blade *c*, milled together with said blade and its enlarged portion *f*, and then separated therefrom in any suitable manner, whereby a proper coöperation between the cap section *n''* and the enlarged portion *f* of the propeller blade will be assured. It is obvious that when the cap *n''* is made of two halves, it must be divided diametrically and the halves united in any suitable manner. It is obvious that the inner cap sections *n'* may be done away with by journaling the enlarged portion *f* of the blade in the hub *d*.

By shifting the sleeve *a* and the plate *b*, secured thereto, the angular relation of the square blocks *m* will be changed relative to the axis of the propeller shaft *o*, and thus the relative angular position of the propeller blades *c* varied. Owing to the arc-shaped construction of the slots *k*, the square blocks *m* are compelled to move slightly at right angles to the direction of motion of the plates *b*. For this purpose the grooves *k* may be formed in plates *b'*, slidably arranged in the plates *b*, as shown in Figs. 1 and 2 of the drawings, or the square blocks *m* may be slidably arranged relative to the square spindles *h* of the propeller blades *c*, as shown in Figs. 3 and 4 of the drawings.

The operation of the device is obvious from the foregoing description. In shifting the plates *b*, the relative angular position of the square blocks *m* is changed owing to the arc-shaped construction of the slots *k*, and,

since the spindle h of the blades are also squared, the relative angular position of the blades will in a similar manner be varied.

What I claim is:

5 1. In a reversible propeller, the combination with a propeller shaft, of a hub secured thereto, a plurality of blades oscillatably mounted thereon, a corresponding plurality of shiftable plates slidably arranged in and
10 inclosed by said hub and having arc-shaped slots, square spindles centrally arranged on said propeller blades and engaging said slots, and means for shifting said plates to vary the relative angular position of said
15 blades at will.

2. In a reversible propeller, the combination with a propeller shaft, of a hub secured thereto, a plurality of propeller blades, a corresponding plurality of caps made of
20 two superimposed sections forming ball bearings for securing said blades oscillatably to said hub, a plurality of shiftable plates slidably arranged in and inclosed by said hub and having arc-shaped slots, squared
25 spindles centrally arranged on said propeller blades and engaging said slots, and means for shifting said plates to vary the relative angular position of said blades at will.

30 3. In a reversible propeller, the combination with a propeller shaft, of a hub secured thereto, a plurality of propeller blades, a

corresponding plurality of shiftable members arranged in and inclosed by said hub, plates arranged in said shiftable members 35 having arc-shaped slots and adapted to move at right angles to the axis of said propeller shaft, square spindles centrally arranged on said propeller blades and engaging said slots, whereby on moving said shiftable 40 members in the direction of the longitudinal axis of the propeller shaft the relative angular position of said blades is varied, at will.

4. In a reversible propeller, the combination with a propeller shaft, of a hub secured 45 thereto, a plurality of propeller blades, a corresponding plurality of shiftable members arranged in and inclosed by said hub, square spindles centrally arranged on said propeller blades and engaging said shiftable 50 members so as to allow of a relative movement in the direction at right angles to the axis of said propeller shaft between said spindles and said shiftable members, whereby on shifting the latter in the direction of 55 the axis of the propeller shaft the angular position of said blades is varied, at will.

Signed at Budapest, in the Kingdom of Hungary, this eleventh day of August, A. D. 1908.

HUGO PAWLIK.

Witnesses:

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