

C. E. LOETZER.
SECTIONAL PROPELLER.
APPLICATION FILED DEC. 13, 1910.

1,010,929.

Patented Dec. 5, 1911.

FIG. 1.

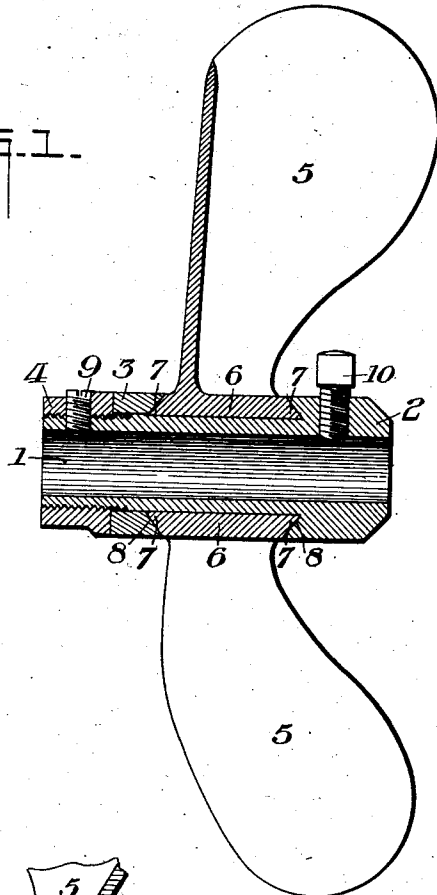


FIG. 2.

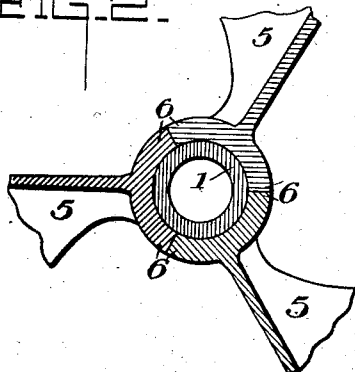


FIG. 3.

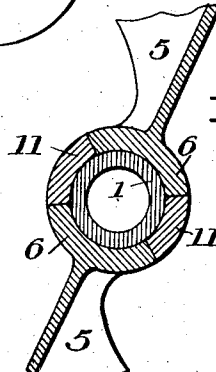
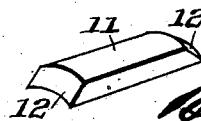


FIG. 4.



Witnesses
Donald Stewart
E. V. Webster

Inventor
Christian E. Loetzer
By *Dowell Howell*
his Attorneys

UNITED STATES PATENT OFFICE.

CHRISTIAN E. LOETZER, OF SAYRE, PENNSYLVANIA.

SECTIONAL PROPELLER.

1,010,929.

Specification of Letters Patent.

Patented Dec. 5, 1911.

Application filed December 13, 1910. Serial No. 597,173.

To all whom it may concern:

Be it known that I, CHRISTIAN E. LOETZER, a citizen of the United States, residing at Sayre, in the county of Bradford and State of Pennsylvania, have invented certain new and useful Improvements in Sectional Propellers, of which the following is a specification.

Propellers for motor boats are customarily made in one piece, the hub and blades being cast integrally in accordance with a pattern provided for that purpose. Such integral propellers are more or less imperfect in pitch, spacing and balance, resulting in loss of efficiency. Owing to the irregular shape, surface, dimensions and thickness of the blades, it is practically impossible for even the most skilled mechanic to make the several blades exact duplicates in the pattern. The consequent variations in shape, thickness surface and spacing, however trifling they may exist in the pattern, become quite apparent and objectionable in the finished propeller wheel in service, reducing its propelling power, and, on account of variations in weight, throwing it out of balance and causing vibration.

The improved propeller of my present invention, while made as a unitary structure adapted to be affixed upon the propeller shaft as an integral propeller, is composed of separate parts, comprising a hub with clamping means and individual detachable blades, each a separate part. These blades are all made after one and the same pattern and are therefore exactly uniform in shape, surface, dimensions, thickness and weight, and consequently the assembled wheel is absolutely true in pitch and perfect in balance. It will therefore be seen that a propeller wheel constructed in this manner embodies perfect efficiency and will run true and smooth and furnish satisfactory service and speed in the highest degree.

Another important advantage is that the blades are quickly and easily attachable and detachable to and from the hub and are interchangeable, so that in case of accident a damaged blade or blades can be replaced without discarding the entire wheel, thus saving time and expense; and, moreover, by the provision of emergency pieces as herein-after described, after removal of a damaged blade the remaining blades can easily be rearranged on the hub so as to convert a three-blade wheel into a two-blade wheel,

or a four-blade propeller into one of two or three blades, and thus form practically a new propeller of perfect spacing, pitch and balance.

Sectional propellers with detachable blades have been previously known, but these have been objectionable for various reasons; for example, certain of such construction are unadapted for small size wheels, and also unadapted for the three-blade propellers which are very commonly used in motor boats, and they usually lack the strength and permanent rigidity which is essential for a practicable propeller wheel; others are not capable of attachment to or detachment from the propeller shaft as a unit and can be assembled only upon the shaft, so that in case of accident it is practically impossible to remove the wheel from the shaft, if under water, without losing some of the parts, and equally difficult to affix a new propeller. Special shaft constructions are also costly and, in the smaller size craft, tend by shaft reductions to weaken the shaft to such extent that they are altogether impracticable. For such reasons it has been customary, as previously stated, to construct propellers for motor boats, and particularly for the smaller craft, with the hub and blades in one integral piece.

The above-mentioned objections are overcome by my improved propeller which is a unit-assembled device of practicable construction adapted for the smallest as well as other sizes of propeller wheels, having any desired number of blades, and which is adapted to be affixed in the same manner as an ordinary integral propeller upon the standard form of propeller shaft of uniform diameter. I obtain these results by means substantially as illustrated in the accompanying drawings, in which:

Figure 1 is a central longitudinal section of a three-blade propeller embodying my invention. Fig. 2 is a cross-section through the hub portion thereof. Fig. 3 is a view similar to Fig. 2 showing the propeller converted into one of two blades. Fig. 4 is a detail perspective view of one of the emergency pieces.

The propeller comprises a central sleeve 1 which constitutes its hub and is bored to the full diameter of the propeller shaft on which it is to be secured. Said sleeve-hub 1 has a head or collar 2 fast on one end thereof, a clamp ring 3 loosely fitted thereon, and a nut

4 screwed upon the opposite threaded end of the sleeve-hub adjacent to said clamp ring. The individual or separate propeller blades 5, which are exact duplicates of one another, are formed at their inner ends with segmental hub portions 6 having beveled ends 7. The segmental hub portions 6, which are equal and complementary parts of a full circle, are fitted around the sleeve-hub and their beveled ends 7 are engaged or snugly fitted in beveled or undercut sockets 8 in the confronting faces of the collar 2 and clamp ring 3. By screwing up the nut 4, which may then be locked by any suitable means as a cotter 9, the blades are securely held in place, making a unit-assembled propeller which can be affixed in the usual way, either by a set screw 10 or by means of a spline or key; upon the standard form of propeller shaft, without requiring shaft reductions or any other special form of shaft. Should emergency arise which requires the removal of one or more of the blades, the set screw or key may be loosened and the propeller detached from the shaft as a unit, when it may be taken to a suitable place, work bench or vise, where it can be conveniently taken apart and re-assembled, either by substituting a new blade or respacing the undamaged blades with emergency segments as hereinafter described.

The blades for a three-blade propeller such as illustrated have each a one-third circle fit to the sleeve hub, as shown in Fig. 2, which allows the three blades to be affixed at exactly equal spaces by bringing the edges of the segments together. For a two blade wheel the blades would each have a one-half circle fit, and for a four blade propeller each would have a one-quarter circle fit, as will be obvious.

If in a three blade propeller one blade should become bent or broken, such disabled blade can be removed from the hub and the two remaining good blades can then be arranged at diametrically opposite positions, as shown in Fig. 3, by inserting segmental emergency pieces 11, having beveled ends 12, in the vacant spaces between the segmental hub portions 6 of the blades; thus quickly converting the wheel into a regular two blade propeller and allowing the boat to proceed. If in a four blade propeller one or even two blades become disabled, the pro-

PELLER may similarly be converted into a three blade or a two blade propeller, as the case may be, by inserting such emergency pieces of appropriate size.

I claim as my invention and desire to secure by Letters Patent:

1. A unit-assembled sectional propeller comprising a central sleeve constituting the hub of the propeller and bored to receive the propeller shaft, said sleeve having an enlarged head or collar fast on one end, a clamp ring fitted loosely on the sleeve, the confronting faces of said collar and clamp ring having undercut beveled sockets, separate uniform propeller blades having segmental hub portions fitted around the sleeve between said collar and clamp ring, said segmental hub portions having beveled ends engaged in the undercut sockets of the collar and clamp ring, and a nut screwed upon said sleeve adjacent to said clamp ring and thereby binding the elements of the propeller together.

2. A unit-assembled sectional propeller comprising a central sleeve constituting the hub of the propeller and bored to receive the propeller shaft, said sleeve having an enlarged head or collar fast on one end, a clamp ring fitted loosely on the sleeve, the confronting faces of said collar and clamp ring having undercut beveled sockets, separate uniform propeller blades having segmental hub portions fitted around the sleeve between said collar and clamp ring, said segmental hub portions having beveled ends engaged in the undercut sockets of the collar and clamp ring, and a nut screwed upon said sleeve adjacent to said clamp ring and thereby binding the elements of the propeller together in combination with segmental emergency pieces or spacers having beveled ends and adapted to fit upon said sleeve and be clamped between said collar and clamp ring in the same manner as said hub portions of the blades, said emergency pieces being adapted for spacing the remaining blades of the propeller after detachment of a disabled blade or blades, substantially as and for the purpose described.

In testimony whereof I affix my signature, in presence of two witnesses.

CHRISTIAN E. LOETZER.

Witnesses:

GEO. S. CURTISS,
F. K. HARRIS.