(No Model.)

D. H. WELCH & J. L. LOVELL.

PROPELLER.

No. 524,624. Patented Aug. 14, 1894.

Fig 1

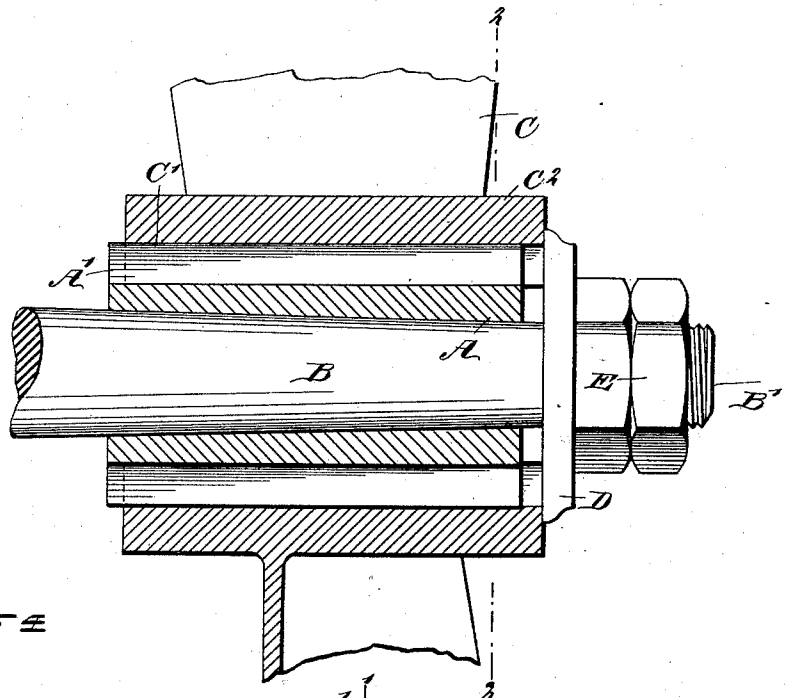


Fig 4

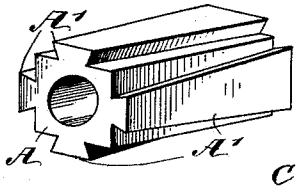


Fig 2

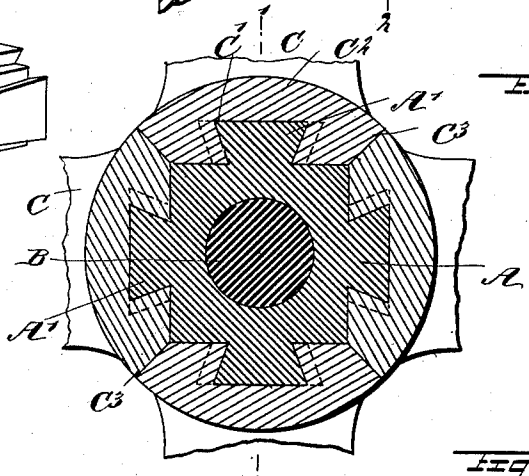
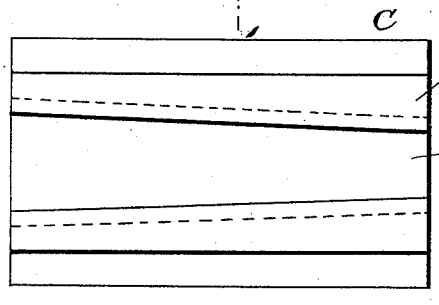


Fig 3



WITNESSES:

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UNITED STATES PATENT OFFICE.

DANIEL H. WELCH AND JAMES L. LOVELL, OF ASTORIA, OREGON.

PROPELLER.

SPECIFICATION forming part of Letters Patent No. 524,624, dated August 14, 1894.

Application filed July 20, 1893. Serial No. 481,030. (No model.)

To all whom it may concern:

Be it known that we, DANIEL H. WELCH and JAMES L. LOVELL, both of Astoria, in the county of Clatsop and State of Oregon, have invented a new and Improved Propeller, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved propeller, which is simple and durable in construction and arranged to conveniently assemble the several parts to secure the same in position without the use of bolts, and to permit of removing any one individual blade without disturbing the other.

The invention is more particularly an improvement in the class of propellers whose blades are made separate from each other and secured to a hub by means of dovetail ribs and sockets.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement on the line 1—1 of Fig. 2. Fig. 2 is a cross section of the same on the line 2—2 of Fig. 1. Fig. 3 is an inverted face view of one of the propeller blades; and Fig. 4 is a perspective view of the hub.

The improved propeller is provided with a hub A made polygonal in cross section, the polygon having as many sides as there are blades for the propeller. As illustrated in the drawings, the hub A is made square in cross section and is intended for a propeller having four blades. The hub is formed with a central tapering bore engaging a correspondingly-shaped shaft B mounted to rotate in the usual manner. On each of the sides of the hub A is formed a longitudinally-extending dovetail tongue A′, which increases in width from one end to the other, as will be readily understood by reference to Fig. 4.

Each dovetail tongue A′ is adapted to be engaged by a correspondingly-shaped dovetail groove C′ formed on the face of the base C^2 of a propeller blade C, it being understood that the said blade fits with its inner face, on the corresponding side of the hub, and is placed thereon lengthwise, with the large end of the dovetail groove first engaging the small end of the dovetail tongue. The adjacent sides of two bases C^2 of the adjacent propeller blades unite at a miter joint C^3 as plainly illustrated in Fig. 2, so that when the several blades are in position on the hub, the said bases form a continuous sleeve around the hub A.

Against the outer ends of the bases C^2 presses a washer D held on the shaft B and forced up against the said bases by nuts E screwing on the outer threaded end B′ of the shaft B. Thus, when the nuts E are screwed up the washer D presses the bases C^2 of the several blades simultaneously inward along the dovetail tongues A′, so as to firmly fasten the bases in position on the dovetail tongues of the sides of the hub A. Instead of nuts E other suitable means may be employed to force the bases into position on the hub, and the latter may be secured on the shaft by keys passed through the shaft abaft the washer, or by other means. It will be seen that by this construction no keys, bolts or other similar means are employed to fasten the blades in position on the said hub, and the said blades can be individually removed, whenever desired, from the corresponding polygonal side of the hub without disturbing the other blades.

A propeller constructed in this manner will serve the same purposes as a solid wheel propeller, but allows of removing a blade at any time without interfering with the other blades.

It is understood that the longitudinal tongues may be formed in the under side of the bases of the propeller blades, and the grooves on the polygonal sides of the hub.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

The improvement in propellers substantially as herein described consisting of the shaft having a tapered portion, the hub fitted on said portion and having dovetail seats extending in a direction parallel to the axis of the hub and tapering from end to end en-

larging toward their rear ends, the propeller blades having their base portions provided with longitudinal tapered dovetail seats fitted to those of the hub, the washer fitted on the shaft and bearing against the rear ends of the base portions of the several blades, and devices whereby the said washer is pressed against the said blades and the hub is tightened on the tapering portion of the shaft, substantially as and for the purpose set forth.

DANIEL H. WELCH.
JAMES L. LOVELL.

Witnesses:
P. S. COOK,
ABE HOLMAN.