

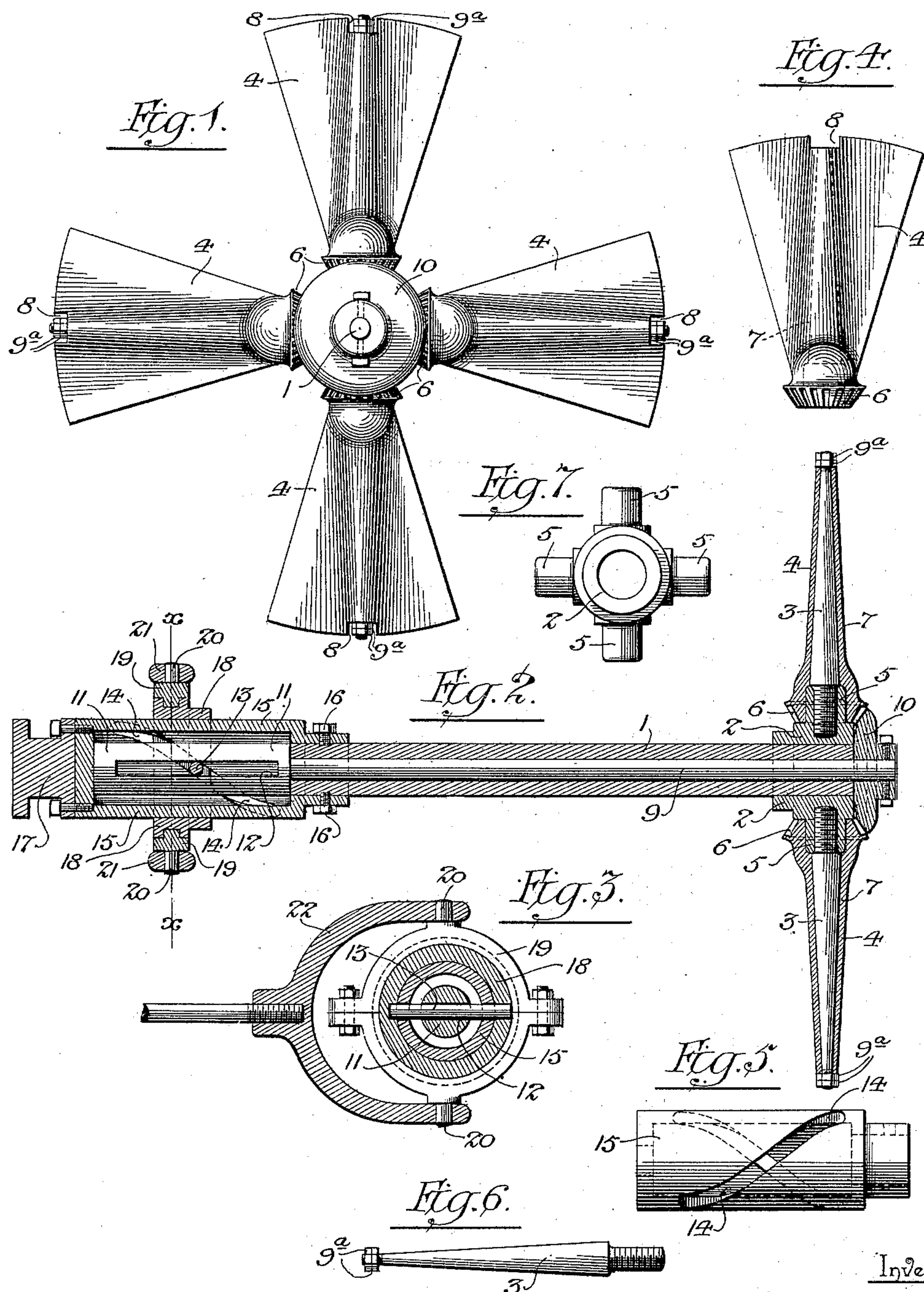
No. 612,511.

Patented Oct. 18, 1898.

E. S. BECK.
PROPELLER.

(Application filed Dec. 31, 1897.)

(No Model.)



Witnesses:-
Louis M. Whitelaw
U. B. Hillyard.

By *Fis.* Attorneys,

C. A. Snow & Co.

Inventor:-
Edwin S. Beck

UNITED STATES PATENT OFFICE.

EDWIN S. BECK, OF DUNCANNON, PENNSYLVANIA.

PROPELLER.

SPECIFICATION forming part of Letters Patent No. 612,511, dated October 18, 1898.

Application filed December 31, 1897. Serial No. 665,007. (No model.)

To all whom it may concern:

Be it known that I, EDWIN S. BECK, a citizen of the United States, residing at Duncannon, in the county of Perry and State of Pennsylvania, have invented a new and useful Propeller, of which the following is a specification.

This invention relates to propelling mechanism for craft such as boats, and is primarily intended to provide a propeller by means of which the speed of the craft can be varied without requiring the cutting off or the supplying of a greater quantity of steam or other motive medium to the engine and which will admit of the direction of motion of the craft being changed without reversing the engine. These results are attained by having the blades of the propeller loosely mounted, so as to be changed from a right to a left pitch, or vice versa, or to any point intermediate of the extreme adjustments, according to the required speed. The blades are connected so as to be operated simultaneously, and in the event of any one of the blades becoming crippled or disabled for further service it can be easily replaced without necessitating the substitution of a new propeller.

For a full understanding of the merits and advantages of the invention reference is to be had to the accompanying drawings and the following description.

The improvement is susceptible of various changes in the form, proportion, and the minor details of construction without departing from the principle or sacrificing any of the advantages thereof, and to a full disclosure of the invention an adaptation thereof is shown in the accompanying drawings, in which—

Figure 1 is a view in elevation of the propeller-wheel. Fig. 2 is a vertical longitudinal section of the propeller-wheel, the shafts, and adjunctive parts. Fig. 3 is a transverse section on the line X X of Fig. 2. Fig. 4 is an elevation of a blade. Fig. 5 is a detail view of the shifting-sleeve. Fig. 6 is a detail view of an arm, forming a support for a blade. Fig. 7 is a view in elevation of the hub.

Corresponding and like parts are referred to in the following description and indicated in the several views of the drawings by the same reference characters.

The propeller-wheel is secured upon the

outer end of a hollow or tubular shaft 1, and comprises a hub 2, arms 3, and blades 4. The arms 3 are firmly attached at their inner ends to the hub 2, preferably by means of a screw-thread connection, so as to be replaced should they become unfitted for service from any cause, and these arms are of tapering form, gradually decreasing in thickness toward their outer ends, thereby making their inner ends the heavier and stronger, so as to resist the strain and load imposed thereon when the propeller is in operation. The number of the arms and blades will depend upon the size of the propeller and will vary according to the make or style of construction. The hub 2 has radial sockets 5, into which the inner ends of the arms 3 are fitted and secured and upon which the bevel-gears 6 at the inner ends of the blades 4 are mounted, thereby relieving the arms 3 of the strain occasioned when shifting the position of the blades to attain the desired result.

The blades 4 are substantially straight or flat and of segmental form and have longitudinal openings 7, forming bearings to receive the arms 3, upon which the blades are mounted loosely, so as to turn. These longitudinal openings or bearings 7 are formed midway of the longitudinal edges of the blades and taper to conform to the arms 3, whereby a close joint is had between said blades and the arms upon which they are journaled, so as to obviate any wobbling or lost motion. The bevel-gears 6 are applied to the inner ends of the blades and are preferably cast therewith, and these blades have notches 8 in their outer ends opposite the bearings 7, so as to receive the jam-nuts 9^a, mounted upon the threaded extremities of the arms 3, and by means of which the blades are retained in place. The inner ends of the bearings 7 are enlarged slightly to receive the sockets 5 and overlap the joint formed between said sockets and the arms 3, thereby securing a substantial and lasting construction.

A shaft 9 is located within the tubular shaft 1, and a master-gear 10 is applied to its outer end and intermeshes with the several bevel-gears 6, whereby the latter and the attached blades are adjusted. The inner end of the shaft 9 is enlarged, as shown at 11, and formed

with a longitudinal slot 12, through which passes transversely a pin 13, whose ends extend through spiral or cam grooves 14 in the sides of a shifting-sleeve 15, secured to the inner end of the shaft 1, and by means of which the shaft 9 is relatively turned, so as to change the relation of the blades to vary or alter their pitch, as required.

The shifting-sleeve 15 is secured at one end to the shaft 1 in any manner desired, and, as shown, binding-screws 16 are the fastening means, and this sleeve and shaft 1 rotate as one part. The coupling 17, by means of which the propeller is connected with the engine-shaft, is secured to the inner end of the sleeve 15, and is of ordinary construction.

A ring or band 18 is loosely mounted upon the shifting-sleeve 15 and is slidable thereon, and is peripherally grooved to receive the inner ribs of straps 19, fitted thereto and having outwardly-extending journals 20, which receive the members of a fork 21, applied to a shipper-lever 22, by means of which the straps and band 18 are moved longitudinally upon the shifting-sleeve 15 when it is required to alter the pitch of the propeller-blades. The pin 13 has its ends let into the ring or band 18 and moves therewith, and by reason of the spiral or cam grooves 14, through which the end portions of the pin 13 pass, the said pin in its movements with the band 18 is turned and causes a corresponding turning of the shaft 9 and the blades 4 through the intermeshing gearing 6 and 10.

Having thus described the invention, what is claimed as new is—

1. In a propeller-wheel, the combination of a hub having radial extensions or sockets, arms independent of and secured at their inner ends within said radial extensions, blades rotatably mounted upon the arms and having their inner ends externally toothed and fitted over the said extensions of the hub and overlapping the joints between said extensions and arms, a shaft journaled within the hub and passing therethrough, a master-gear at one end of the shaft and secured thereto and intermeshing with the cog-teeth of the blades, and means for turning the shaft, as and for the purpose described.

2. In a propeller-wheel, the combination of a hub having radial extensions formed with internally-threaded openings, arms having their inner ends making screw-thread connection with said radial extensions, blades mounted midway of their edges upon the arms and having their inner ends toothed and fitted over the said radial extensions, and having their outer ends notched, clamp-nuts placed upon the projecting ends of the arms and coming within the notches formed at the outer ends of the blades so as to be readily accessi-

ble and avoid resistance when the propeller is in operation, a shaft concentric with the hub and passing therethrough, a master-gear secured to the projecting end of the shaft and intermeshing with the cog-teeth at the inner ends of the blades, and means for turning the shaft independently of the hub, substantially as set forth.

3. In a propeller-wheel, the combination of concentric shafts, means for turning the shafts independently of each other, a hub secured to a terminal portion of the outer shaft and provided with radial extensions having internally-threaded openings, tapering arms having screw-thread connection with said radial extensions, blades mounted intermediate of their edges upon said arms and having their inner ends provided with cog-teeth and constructed to receive the aforesaid radial extensions, and a master-gear secured to the projecting end of the inner shaft and meshing with the cog-teeth at the inner ends of the blades, substantially as set forth.

4. In a propeller-wheel, the combination of blades mounted to be turned to vary or reverse their pitch, concentric shafts, the one carrying the propeller-wheel and the other having connection with the blades, a shifting-sleeve having spiral or cam grooves and secured to the shaft carrying the propeller-wheel, a pin passing through the cam-grooves and through a longitudinal slot of the shaft having connection with the blades, a band or ring mounted upon the shifting-sleeve and having the end portions of the said pins secured thereto, and means for moving the band to relatively turn the shafts, whereby the blades have their pitch reversed or altered, substantially as described.

5. In combination, a tubular shaft having a sleeve provided with spiral or cam grooves, a propeller-wheel secured to the shaft and provided with movable blades having gears at their inner ends, a shaft mounted within the tubular shaft and having an enlarged portion longitudinally slotted and coming within the aforesaid sleeve, a master-gear secured to the inner shaft and intermeshing with the gears of the blades, a band mounted to move upon the aforesaid sleeve, a pin passing through the longitudinal and cam slots and having its end portions secured to the band, and a shipper-lever for moving the band, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

EDWIN S. BECK.

Witnesses:

GEORGE SUMNER,

MAME J. FAHNESTOCK.