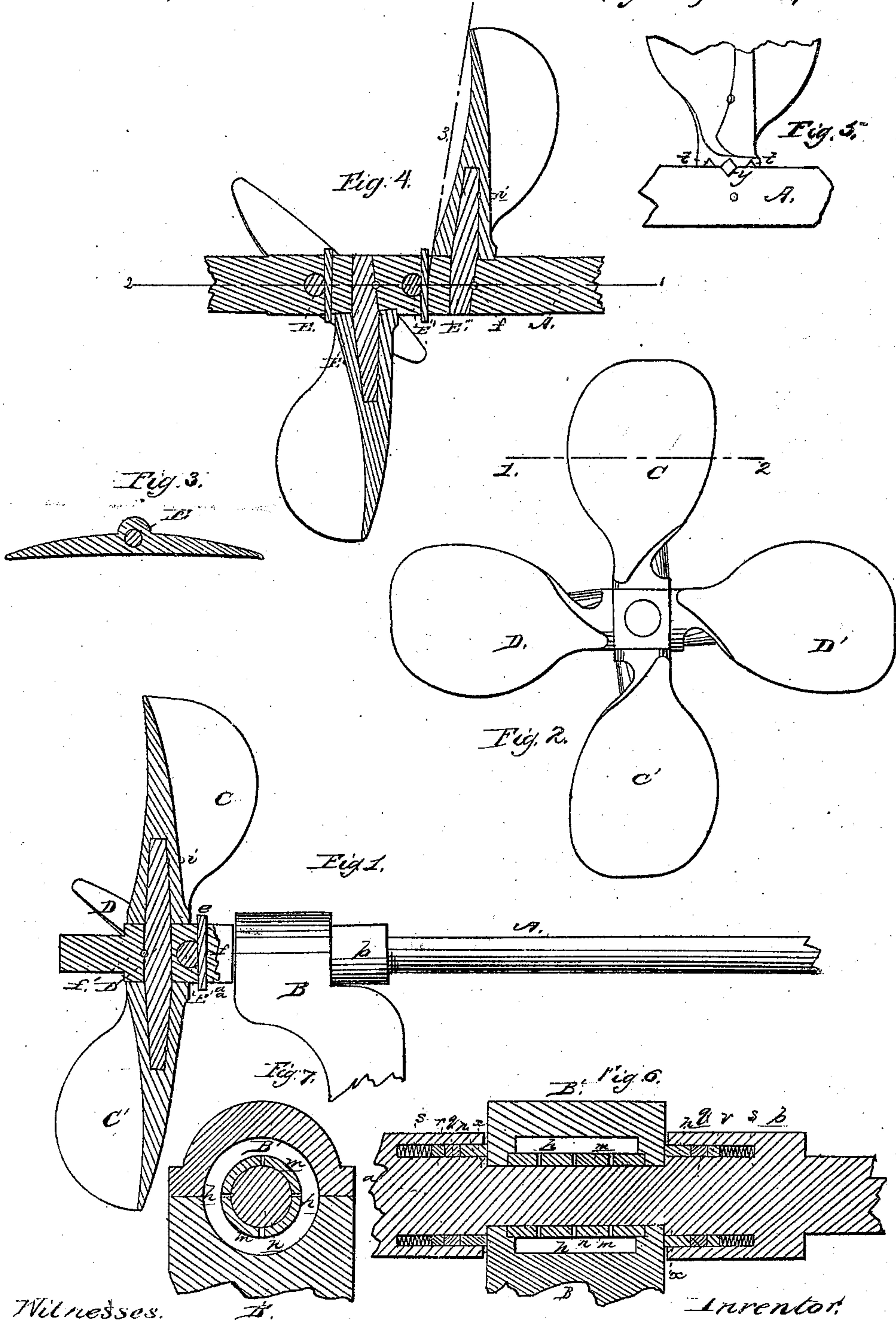


I. B. Flanders.
Screw Propeller.
N^o 43,842. Patented Aug. 16, 1864.



Witnesses.
W. Albert Steel,
C. Howard.

Inventor.
I. B. Flanders
Attest J. B. Flanders

UNITED STATES PATENT OFFICE.

L. B. FLANDERS, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVED MEANS OF AFFIXING PROPELLER-BLADES TO THE SHAFT.

Specification forming part of Letters Patent No. 43,842, dated August 16, 1864; antedated August 5, 1864.

To all whom it may concern:

Be it known that I, L. B. FLANDERS, of Philadelphia, Pennsylvania, have invented certain Improvements in the Construction of Propellers, Propeller-Shafts, and Bearings for the same; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists: First, in a propeller composed of blades fitted on and secured directly to the propeller-shaft by pins passing through or fitting in the said shaft, and arranged apart from each other, all as described hereinafter, so as to avoid the massive and cumbersome hubs of propellers of the usual construction, and so that one or more of the blades, if damaged, can be readily replaced without disturbing those which remain entire; secondly, in a bearing of the peculiar construction described hereinafter, whereby the lubricating-oil is always maintained in contact with the journal, and access to the latter of water, mud, sand, &c., prevented.

In order to enable others skilled in the art to make and apply my invention, I will now proceed to describe its construction and operation.

On reference to the accompanying drawings, which form a part of this specification, figure 1 is a side view, partly in section, illustrating my improvement in propellers, propeller-shafts, and bearings for the same; Fig. 2, an end view of the propeller; Fig. 3, a transverse section of one of the blades; Fig. 4, a modification of the propeller; Fig. 5, a detached explanatory view; Fig. 6, an enlarged sectional view of the bearing, and Fig. 7 a transverse sectional view of the same.

Similar letters refer to similar parts throughout the several views.

A represents a portion of the propeller-shaft, and B the bearing secured to the stern of the vessel, on the outside of which the portion *a* of the shaft is enlarged and made square, the shaft on the inside of the bearing being provided with a collar, *b*. In the present instance the propeller has the four blades C and C' and D and D', which are secured to the shaft in the following manner: The base *e* of each blade is fitted accurately to one of the surfaces of

the square portion *a* of the shaft A, and from the base upward a part of each blade is made of sufficient thickness (see Fig. 3) to admit one of the tapered portions of a substantial pin, E, which is firmly secured to the square portion of the shaft by a suitable key, *f*. Two pins, E and E', are fitted and firmly secured to the square portion of the shaft, the former for carrying the blades C and C' and the latter for carrying the blades D and D', each tapering projecting portion of each pin being accurately fitted to a tapering orifice in one of the blades, and secured thereto by a key, *i*, the driving of which tight insures the binding of the blade tightly to the shaft, and at the same time prevents the blade from being twisted from the desired angle to which it has been adjusted.

In the modification shown in Fig. 4 my invention is applied to the construction of side propellers used in the manner described in my patent of September 18, 1860. In this case A represents a longitudinal shaft made square for the reception of the bases of the blades, four substantial pins being secured to the shaft at the desired distance apart from each other, and each pin carrying one of the blades. In some instances I secure the blades more rigidly to the shaft by square pins *y*, as seen in Fig. 5, one half of the pin entering the shaft and the other half entering the base of the blade, which may have several notches, *t*, to receive half of the pin, so that the angle of the blade can be changed at pleasure.

The peculiar construction of the bearing for the propeller-shaft will be best observed on reference to Figs. 5 and 6. The cast-iron bracket B, which is secured to the stern of the vessel, as well as the cap B', are recessed, so that oil chambers *h h* may intervene between the brass steps *m m*, in which the journal *n* of the propeller-shaft turns, and the end of the recesses, these steps being fitted into the bracket and cap in the manner illustrated in Fig. 5. Two permanent collars, *x x*, are formed on the shaft, one bearing against one end and the other against the other end of the bracket and cap, and thus preventing any longitudinal play of the shaft. An annular recess is formed in the square portion of the shaft for receiving the metal ring *p*, the ring *q* of gum-elastic, or other like material, a second ring, *r*, and the

spiral springs. A similar annular recess is formed in the collar *b* for the reception of similar rings and springs.

One of the great objections to ordinary propellers cast in one piece is the necessarily massive hub, which takes up much of the space which in its absence might be devoted to an extension of the blades toward the center of the propeller. It will be observed that I dispense with this hub and increase the size of the shaft at the point where the blades are secured, the holes for the reception of the pins being arranged apart from each other, so that the weakening of the shaft caused by these holes is amply compensated for by a slight increase in the size of the shaft.

Another advantage of my improvement is the facility with which one or more of the blades which may have been accidentally damaged can be removed and replaced with new ones without disturbing the blades which remain entire.

On reference to the blue lines 2 and 3, Fig. 4, it will be observed that each blade, instead of presenting a face at right angles to the center of the shaft, leans in the direction of the motion of the vessel, the shaft or the base of each blade being so formed as to insure this inclination, which I prefer, for the reason that the action of the propeller will be free from the usual unnecessary agitation of the water, and will insure greater speed.

It is important that the outside bearings of propeller shafts should be at all times properly lubricated; hence the chambers *h h* of the bearing for containing the oil, which can be fed to the journal by means of the usual wicks steeped in the oil, and passing through openings in the lower step, *m*. The rings *p* are maintained in constant contact with the bearing—one on one side and one on the other—

by the spiral springs *s* and gum-elastic ring *q*, thereby serving to retain the oil in the chambers, and preventing the access of water, mud, sand, &c., to the journal.

The spiral springs may be dispensed with, and reliance placed on the gum-elastic ring only for retaining the rings *p* against the bearing; or the gum-elastic rings may be dispensed with and the spiral springs only used. I prefer, however, the use of both elastic mediums.

It will be evident that when three blades only have to be secured to the shaft the enlarged portion of the latter must be three or six sided.

I am aware that blades have been secured to the hubs of propellers by means of pins fitting into and secured to both hub and blades. I therefore do not desire to claim, broadly, such a mode of securing blades; but,

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

1. A propeller composed of blades fitted on and secured directly to an enlarged portion of a propeller-shaft by pins passing through or fitting in the said shaft, and arranged apart from each other, all as set forth.

2. The combination of the journal *n*, shoulders *x*, chambered bearing *B*, and the rings *p*, to which a constant pressure is imparted through the elastic mediums described, or their equivalents, all being constructed substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

L. B. FLANDERS.

Witnesses:

HENRY HOWSON,
CHARLES HOWSON.