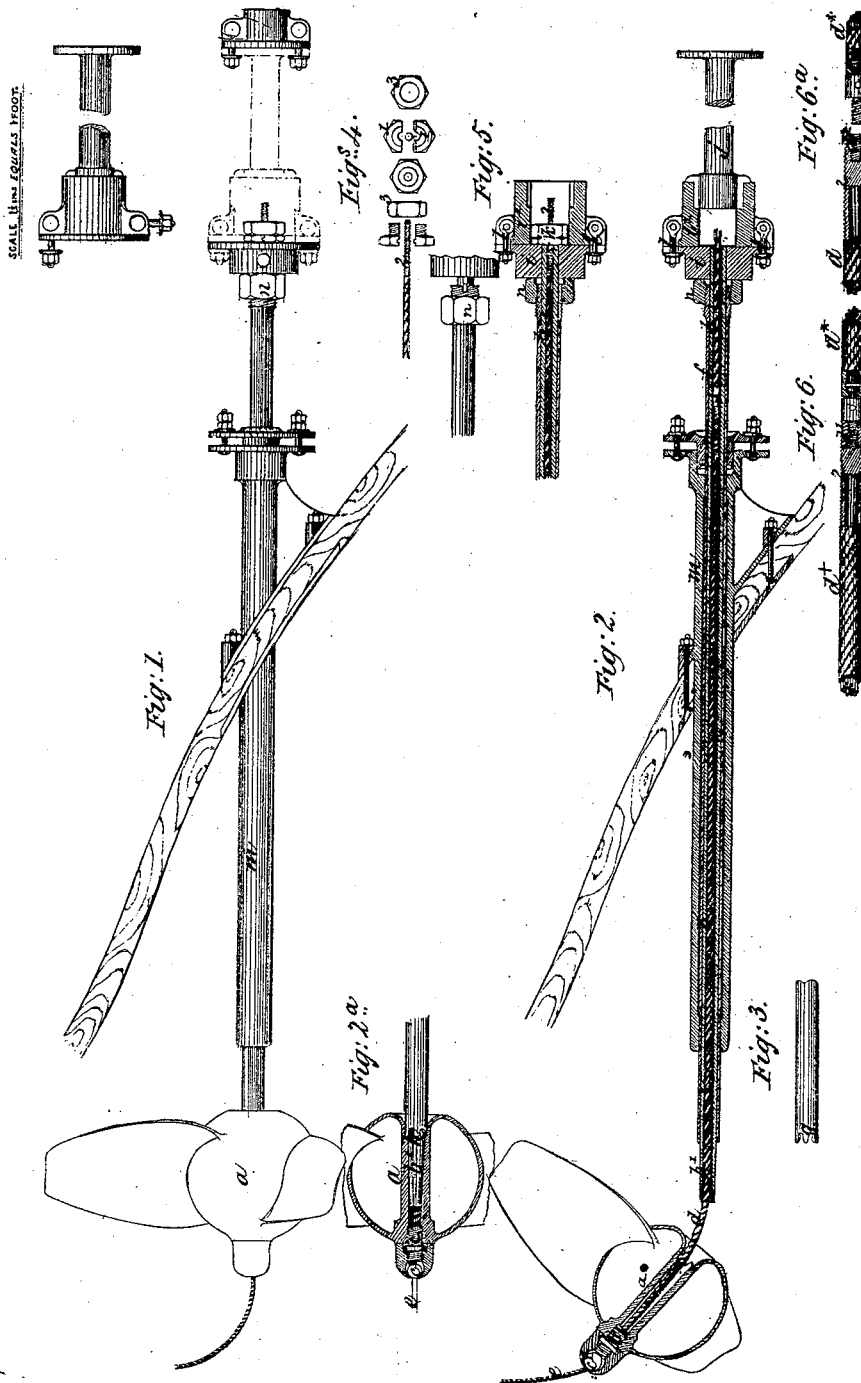


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SHIPPING AND UNSHIPPING SCREW PROPELLERS.

No. 108,800.

Patented Nov. 1, 1870.



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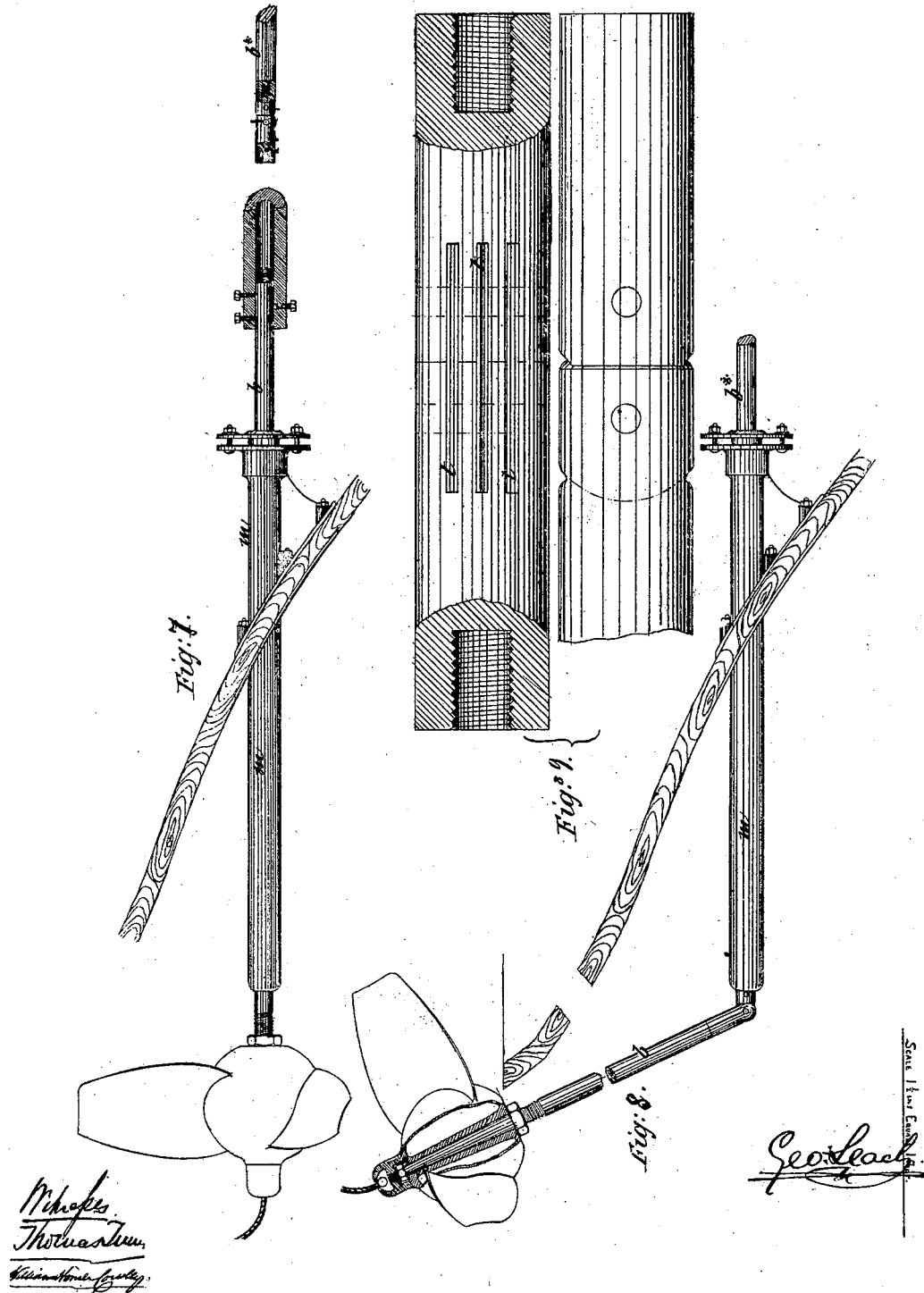
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# United States Patent Office.

GEORGE LEACH, OF LEEDS, ENGLAND.

Letters Patent No. 108,800, dated November 1, 1870.

## IMPROVEMENT IN SHIPPING AND UNSHIPPING SCREW-PROPELLERS.

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern:*

Be it known that I, GEORGE LEACH, of Leeds, in the county of York, England, have invented new and useful Improvements in the Mode of and Apparatus for Shipping and Unshipping Auxiliary Screw-Propellers while in deep water; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of my specification.

The object of this invention is to facilitate the shipping and unshipping of the auxiliary screw-propellers used with or adapted to sailing-ships, for the purpose of assisting them in calms and other occasions when their sailing-gear is either useless or insufficient.

Heretofore the auxiliary screw-propellers adapted to sailing-ships could only be shipped and unshipped with difficulty, great labor, and loss of time, accompanied with some danger to the crew of the vessel while carrying on the operation.

This unshipping operation is absolutely necessary when there is a fair wind, as auxiliary propellers under such circumstances are not required to be used, and they would then be an incumbrance.

It is of importance, therefore, on the one hand, that auxiliary propellers should be capable of being removed easily and quickly when not wanted for use, so as not to interfere with the sailing qualities of the ship, and it is, on the other hand, important that they should be so arranged as to be available for use, without difficulty or much loss of time, when required.

In carrying out my invention, I prefer to employ twin propellers, or one propeller under each quarter, and I adapt and secure the propeller to the shaft in such a manner that it can be easily detached therefrom, and brought on board, and stowed away until again required.

To this end I affix to the outer or after end of the boss of the propeller a ball-and-socket joint, and I attach to the ball of the socket a rope or chain, whereby the propeller, when detached from the shaft, may be hauled up on board.

In the accompanying drawing—

Figure 1, sheet 1, represents a side view of the propeller in place ready for use.

Figure 2 is a longitudinal section of the same, representing the propeller unshipped, and being hauled up on board by means of the rope *e*.

Figure 2<sup>a</sup> is a sectional side view of the propeller, showing it on the shaft.

Figure 3 is a detached view of the end of sleeve-shaft *f*, showing clutch *g*.

Figure 4 is a detail side and face view of the compound jam-nut *k*.

Figure 5 is a detail sectional view of the front part of hollow shaft and wire rope.

Figures 6 and 6<sup>a</sup> are detail sectional side views of the wire rope *d*.

Figures 7 and 8, sheet 2, are side views of a modification of my invention, showing the parts in different positions.

Figure 9 is a top and side view, on an enlarged scale, of the knuckle-joint used in the modification.

Similar letters of reference indicate corresponding parts.

The boss *a* of the propeller, and also the propeller-shaft, are shown in section in fig. 2, and also in some of the detached figures.

Through the central part of the propeller-boss *a* a taper hole is formed, as shown in fig. 2, to correspond with the taper end *b'* of the hollow shaft *b*, on which the propeller is intended to be mounted when in use.

This taper hole is enlarged and extended, at the front or leading end of the boss, into a trumpet-mouthed shape, for the purpose of facilitating the entrance of the taper end *b'* of the shaft *b*, and guiding it into the boss *a*.

In the after or outer end of this taper hole there is a socket, into which is screwed a plug, *c*, to which a wire rope, *d*, or other equivalent device, is secured, and passes out through the trumpet-mouth, and through the hollow shaft *b*, into the vessel.

Another rope, *e*, is attached to a ball, *c'*, which works in a spherical socket in a screw secured over the back end of the boss, so that, when the propeller is detached from the shaft *b*, it may be suspended by the two ropes *d* and *e*.

The rope *d*, on issuing from the trumpet-mouth end of the boss *a*, passes, through the hollow shaft *b*, to the inside of the vessel, and is secured there, in the manner hereafter explained, so that, by hauling upon this rope *d*, the propeller may be drawn upon the taper end of the hollow shaft *b*, and securely held there, and afterward jammed up tight by the screws or nuts *h*, or other mechanical devices, placed inside the vessel, as hereafter explained.

The tightening of the rope *d* is effected, as before mentioned, by means of the compound jam-nut *k*, shown detached and in pieces in fig. 4.

This nut is composed of a split nut, 1 1, which fits on and screws onto a screw, 2, at the inner end of the rope *d*.

The split nut 1 1 is also threaded externally, to receive the nut 3, which, when screwed onto it, holds the parts 1 1 together, and causes the inner threads of the nut to fit and work on the screw at the end of the rope *d*. Then, by screwing up the compound nut *k*, as shown in the detached view, fig. 5, the rope *d* is drawn in and tightened, and the boss *a* of

the propeller is held securely on the end of the hollow shaft *b*.

The propeller-shaft *b*, when in place, requires to be connected with the driving-shaft *j* of the engine, in order to work or rotate the propeller.

To this end the hollow shaft *b* is permanently fixed in the part *i* of a coupling, *i i'*, shown detached at fig. 5, and, when these parts *i i'* are secured in place by the bolts *l l'*, the propeller-shaft will be connected to and made to rotate with the driving-shaft *j*.

The wire rope *d* is made nearly to fit the hollow propeller-shaft *b* by being "served" or coated in the ordinary way, or otherwise covered, so that little or no water will be admitted, through the hollow shaft *b*, into the vessel.

The propeller-shaft *b* is inclosed within a sleeve-shaft, *f*, and the two shafts pass through and are supported by the long tubular bearing *m*, which passes from the inside to the outside of the vessel.

In order to prevent the propeller from slipping upon the taper end of the inner hollow shaft *b* when the shaft is being rotated, the outer end of the sleeve-shaft *f* is provided with a clutch-piece, *g*, formed as shown in fig. 3, which is a detached view of the end of this shaft.

This clutch *g* fits into a corresponding clutch, *n*, in the propeller-boss, as seen in fig. 2.

The end of this same outer or sleeve-shaft *f* is coupled with the driving-shaft *j*, inside the vessel, by means of the coupling *i i'*, and it revolves simultaneously with the inner hollow shaft *b*, and thus insures the rotation of the propeller without allowing the latter to slip on the taper end of the inner shaft.

When it is desired to unship the propeller, the strain upon the hauling-rope *e* must be relieved, and the outer shaft *f* driven out against the boss *a* of the propeller, so as to ease off the boss *a* from the tapered extremity of the inner shaft *b*.

This is effected by removing an intermediate shaft which connects the propeller-shaft *b* to the driving-shaft *j*, as shown in a detached part of fig. 1, or by disconnecting the coupling *i i'*, supposing that this couples the two shafts *b* and *j* directly.

The shafts *b* and *f* may then be pushed forward in their long tubular bearing *m*, and access to the tightening-nuts *k*.

It will be seen that the parts *i i'* are connected together by means of the hinged bolts *l l'*, which drop into notches in the flange of the part *i* of the coupling, and are held secure by the tightening-nuts at their ends.

It will only, therefore, be necessary to loosen the nuts of the hinged bolts *l l'*, and throw back the latter, and the two parts *i i'* of the coupling may then be drawn asunder, and access obtained to the inner end of the rope *d*, which is suitably secured in the tubular or bored-out end of a coupling device, *d\**, the other end of which has a screw-hole, *d'*, tapped thereon, as shown in the detached views, figs. 6 and 6'.

By this device an additional length of rope, *d\**, may be temporarily connected to the end of rope *d*.

When the additional rope *d\** is thus connected with the rope *d*, the tightening-nut *k* may be loosened and removed from the rope *d*; then, upon turning the nut *n*, which works upon a screw on the end of the sleeve-shaft *f*, the latter will be moved forward on the shaft *b*, and will ease the boss of the propeller off the taper end of the shaft *b*, and allow it to be hauled up by the rope *e*.

The ball-and-socket rope *e* will then suffice to haul up the propeller on deck, where it may be detached from the rope *d*, which has been drawn through the hollow propeller-shafts *b* from the interior of the vessel.

The end of the rope *d* must then be secured on board, ready to be connected with the propeller again,

when it may be required to reshipe the latter on its shaft.

As a modification of the plan just described, the propeller may be secured, in any convenient manner, to a solid shaft, which is capable of being slid in and out through the stuffing-box or tubular bearing *m*, as shown at figs. 7 and 8, sheet 2.

This solid propeller-shaft *b* must be provided with a knuckle-joint, so constructed that it will not exceed the diameter of the shaft, and may, therefore, be pushed in and out of the stuffing-box or tubular bearing.

This knuckle-joint is shown detached upon an enlarged scale, in sectional elevation and plan view, at fig. 9.

The hinge or point is made of several thin steel plates, *t t'*, which are held in place in the wrought-iron shaft by means of pins or rivets.

The propeller is secured on the end of the shaft by means of a key or collar and a jam-nut on the end, as shown at fig. 8, and over this is screwed the ball-and-socket joint, to which the hauling-rope is secured, as in the former instance.

In order to detach the propeller from the shaft *b*, the latter must be pushed out through the stuffing-box or tubular bearing, for which purpose an added shaft, *b\**, must be screwed into the inner end of the propeller-shaft, which may then be pushed out of the tubular bearing until the knuckle-joint is exposed. The propeller-shaft *b*, with the propeller thereon, may then be turned up on this joint, as shown at fig. 8, in order that the propeller may be lifted out of the water, and detached from the shaft, and stowed away until wanted, when it may be again secured to the shaft, and lowered into its place.

When the propeller has been detached from the end of the shaft *b*, the latter is to be lowered again into its horizontal position by means of the rope *e* and ball-and-socket joint, which, when the propeller has been removed, must be reattached to the end of the propeller-shaft *b*.

The propeller-shaft *b* may then be drawn in board, through the stuffing-box or tubular bearing, by means of the added shaft *b\**, so that nothing may project outside beyond the stuffing-box or tubular bearing, and cause an impediment to the progress of the vessel through the water.

The added shaft *b\** may then be unscrewed and removed from the propeller-shaft, and stowed away until again required for use.

Having now described my invention of "improvements in the mode of and apparatus for shipping and unshipping auxiliary screw-propellers while in deep water," and having explained the manner of carrying the same into effect,

I claim as my invention—

1. The mode, herein set forth, of mounting the propeller on its shaft so that it can be easily detached therefrom and hauled in board, or adapted to the shaft, and secured thereon, as described.

2. The combination of the propeller with the hollow shaft *b*, and the ropes *d* and *e*, and the sleeve-shaft *f*, together with the devices herein set forth, or their equivalents, for holding the propeller securely on the shaft.

3. A propeller provided with a ball-and-socket joint and hauling-rope to the end of a jointed or hinged shaft, which is capable of being moved longitudinally in its bearings, for the purpose of unshipping the propeller, as herein set forth.

In witness whereof, I, the said GEORGE LEACH, have hereunto set my hand the 2d day of August, in the year of our Lord 1870.

Witnesses:

GEORGE LEACH.

THOMAS TURNER,

Solicitor, Leeds.

WILLIAM HOMER COWLEY,

Clerk to Messrs. Richardson & Turner,  
Solicitors, Leeds.