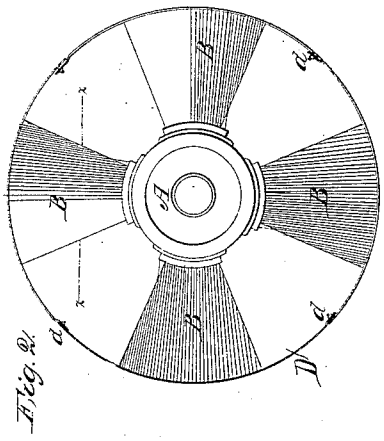
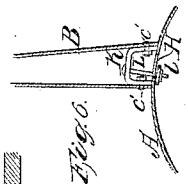
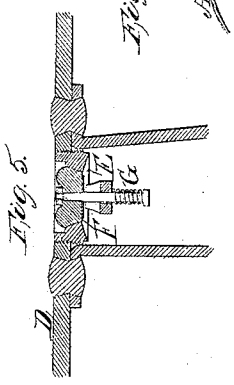
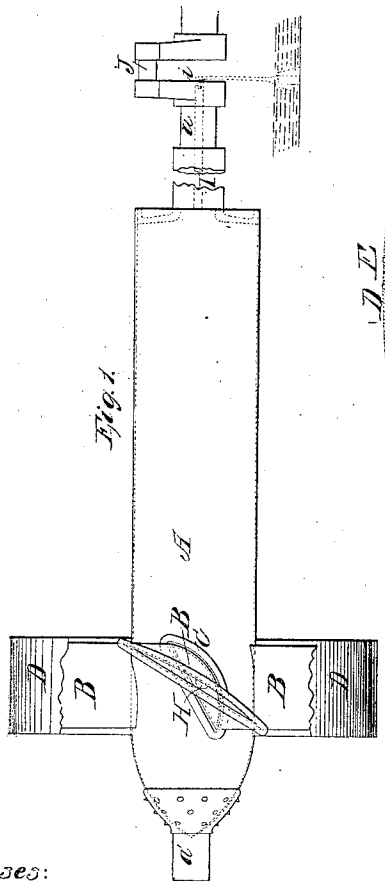
J. MONTGOMERY
SCREW PROPELLER.

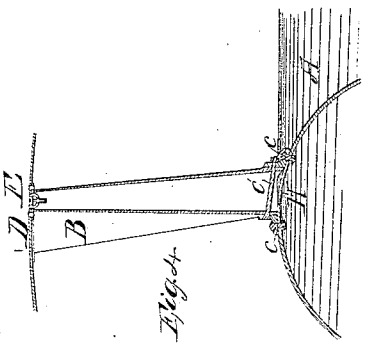
No. 22,373. Patented Dec. 21, 1858.

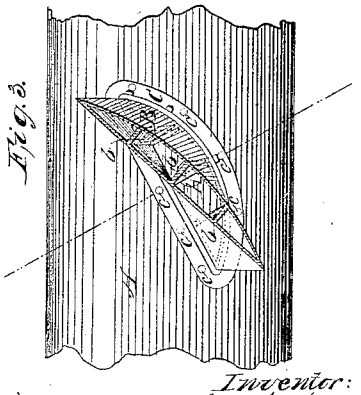












Witnesses:
C. A. Knight
H. Parker Atlee

Inventor:
James Montgomery

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JAMES MONTGOMERY, OF NEW YORK, N. Y.

BUOYANT PROPELLER.

Specification of Letters Patent No. 22,373, dated December 21, 1858.

To all whom it may concern:

Be it known that I, JAMES MONTGOMERY, of the city, county, and State of New York, have invented new and useful Improvements in Screw-Propellers; and I hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, making part of this specification.

The leading features of novelty in the present improvements are as follows: 1st, a combination of hollow blades with a hollow shaft of large size adapted for the attachment of the blades without the intervention of hub or boss. 2nd, a method of securing the flotation of the screw by means of the centrifugal action incident to its use. 3rd, a peculiar manner of attaching the various parts of the screw together to facilitate repairs in the event of any portion receiving injury.

In the accompanying drawings Figure 1 is a side elevation of the shaft and screw with a portion of cylindrical casing removed to exhibit the form of the blade. Fig. 2 is an end elevation of the same viewed from the stern. Fig. 3 is a section (on an enlarged scale) of one blade at x, x Fig. 2. Fig. 4 is a section at y, y, Fig. 3. Fig. 5 is a section on an enlarged scale of the outer end of one of the blades. Fig. 6 is a transverse section of a fragment of the shaft and blade exhibiting a modification in the manner of attaching them together.

A, represents a hollow shaft of large size, constructed of either cast or plate metal and running on journals a, a', the forward one of which (a) is enveloped in the customary stuffing box to exclude the water from the interior of the vessel.

B, B, are hollow helical blades convex on their rear sides and provided with segmental flanges C, fitting the cylinder A, and secured thereto by screw bolts c. The blades B, may be attached at their peripheries to a cylindrical casing D, similar to the inner casing or cylinder described in my patent of August 7th 1847, with this difference that the present cylinder is constructed in segments connected by screw bolts at d, to admit of a portion being detached with the blade to which it is connected.

E, is the port through which water escapes from the interior of the blade through the cylindrical casing D, its return being prevented by a valve F, opening outward and kept to its seat when at rest by an easy spring G.

H, is a hole through which water flows from the interior of the shaft into the blade.

I, is a passage from the interior of the vessel to the interior of the shaft which passage is guarded by a valve i, to prevent the return of water.

J, is the crank by means of which the propeller is rotated.

The blades B, may be constructed of sheet or plate metal, or if preferred may be cast, in which latter case they are furnished with internal longitudinal ribs b, which admit of the metal being run very thin and light, while the requisite degree of strength is preserved.

The flanges C, may be permanently attached to the blades or may be connected therewith by screw bolts c', the bolt heads in this case being counter-sunk into the leading or plane side of the blade and nuts placed on the convex side. If desired for additional security to the blades B, metallic bands may be shrunk onto the shaft, encircling the flanges C, or the bands may be made flaring and driven or pressed over the flanges and secured by bolts.

Another modification in the manner of attaching the blades is shown in Fig. 6. The flanges C, are here dispensed with, the transverse bolts c', passing through metallic plates K, of U form which plates are attached to the shaft by radial bolts L confined by washers and nuts l, within the shaft.

The cylindrical casing D, is not essential to the present invention and may be dispensed with if preferred, but I prefer to retain it as affording protection and mutual support to the blades B, and arresting the tangential motion of the water technically known as "slip." For the former reason the said casing is of especial importance to a screw with hollow blades and admits of the blades being made much lighter than would otherwise be practicable.

I do not of course desire to be understood as confining myself to any specific number of blades and it will be apparent that a shaft constructed on my plan may be adapted for the attachment of blades at any part of its circumference so that the number may be varied in the same shaft.

Various plans have been heretofore devised to relieve vessels from the enormous weight of the solid screw propeller and its

appendages now in common use; but they have failed to afford a practical remedy for the difficulty, from causes which I believe to admit of ready explanation on philosophical principles. It is well known that neither metallic joints nor metal itself, are entirely impervious to water when immersed for a long period and it is therefore found that hollow blades without a provision for the free ejection of the water are disadvantageous in their operation. They invariably become charged with water to some extent which destroys their buoyant property and results also in a tremor which in addition to its unpleasant effect is highly injurious to the machinery and vessel. To accomplish the results attained in the present improvement the shaft also must be made hollow to combine lightness with strength and thus is subject to like difficulty with the blades from the ingress of water. In the case of the shaft the centrifugal force would be entirely insufficient to clear it; but provision is made for the flow of water by gravity from the shaft into the hollow arms from whence it is successfully ejected by the centrifugal action referred to. By this means the vessel is not only relieved from the serious weight of the propelling apparatus but a positive buoyancy may be generated in the screw and shaft equal to one fourth of their weight.

For reasons above explained it will be seen that hollow blades without a provision for ejecting water therefrom fail to operate with proper effect and some provision is also necessary for the removal of water from the interior of the shaft. The present improvements are therefore believed to constitute the most practical and successful buoyant propeller yet produced.

This invention affords an efficient means of ejecting bilge water, for which purpose a vertical tube may be employed as represented in red in Fig. 1. This tube should be flattened to keep it clear of the pitman and at its upper end formed to fit closely over the mouth of the aperture I, with which it is kept in contact by the spring of the tube so as by the grinding action caused by the rotation of the shaft to preserve a tight joint.

Having thus fully described my invention the following is what I claim as new therein and desire to secure by Letters Patent:

1. The described or substantially equivalent means of securing the flotation of a screw propeller by ejecting water therefrom by centrifugal action.

2. The detachable hollow blades B, in the described combination with the shaft A, for the purposes set forth.

3. The application of the valve *i* arranged as described in the forward end of the hollow shaft A for the purpose explained.

In testimony of which invention, I hereunto set my hand.

JAMES MONTGOMERY.

Witnesses:

O. N. KNIGHT,

W. YORKE AT LEE.