(No Model.)

A. COOPER.

PROPELLER FOR STEAM VESSELS.

No. 421,818. Patented Feb. 18, 1890.

Fig. 2.

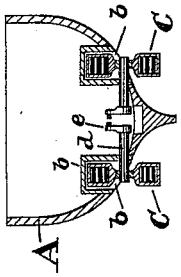


Fig. 4.

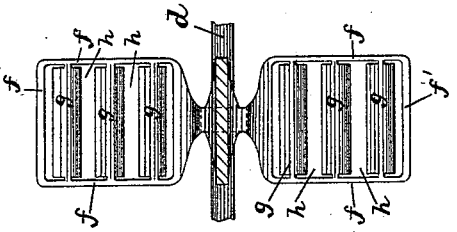


Fig. 1.

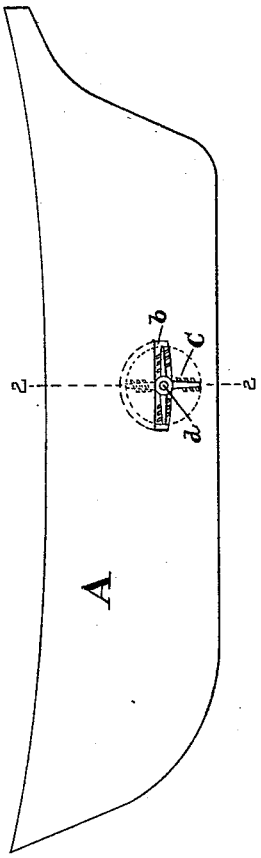
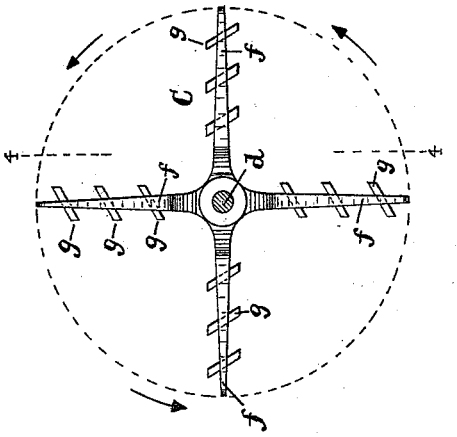


Fig. 3.



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UNITED STATES PATENT OFFICE.

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PROPELLER FOR STEAM-VESSELS.

SPECIFICATION forming part of Letters Patent No. 421,818, dated February 18, 1890.

Application filed November 22, 1889. Serial No. 331,149. (No model.)

To all whom it may concern:

Be it known that I, ALFRED COOPER, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Propellers for Steam-Vessels, of which the following is a specification.

This invention relates to an improved propeller for steam-vessels, and is illustrated in the drawings, in which—

Figure 1 is a side view of the hull of a vessel having my propeller. Fig. 2 is a vertical cross-section of the hull, showing the position of the side propellers in the chambers. Figs. 3 and 4 are separate views of the propeller.

The letter A designates the hull, which has at each side an outside cavity or chamber *b* for the revoluble propeller C. The shaft *d* projects through the hull side, and the propeller C is mounted thereon, so that the upper part of the propeller will be housed in the chamber *b*. The two propellers may be on one shaft, or, as here shown, each one may be on a different shaft. The shafts are provided with cranks *e* or other equivalent means to be driven by engines.

The propellers C are an improved construction. They have in the present instance four radial frames or pairs of arms *f*, though obviously a greater or less number may be used. Each pair of arms carry several blades or buckets *g*. These blades are arranged at an oblique angle to the radial frames, all the blades being inclined in the same direction, as shown in Fig. 3 of the drawings. In the present instance the side arms *f* are united by a cross-bar *f'* and form a frame. It will be seen the blades are substantially flat and have position between the two radial arms *f*, and each end of the blade is rigidly attached to one of the arms. The blades are separated, an open space *h* being between one blade and the next one on the same arm.

The construction, as described, of this propeller is well calculated to operate effectively without counter-resistance. At the moment the blades on each arm have done their effective work on the water the arm rises and enters the chamber *b* and is carried up over the shaft, and then comes down again with the diagonal blades in the position to be most effective.

It is obvious that a vessel may have, in addition to these two side propellers, an ordinary stern propeller, whereby the propulsive force will be increased.

The propellers may be made of wood or metal, and the parts may have any desired proportion. Slight changes in the construction may be made without departing from my invention.

Having described my invention, I claim—

The combination, with the hull of a vessel having at each side a chamber *b*, of a shaft *d*, having a crank midway between its ends, and the propeller-wheels secured to said shaft and having inclined radial frames *f*, carrying rigid blades arranged all in the same direction and at an oblique angle to the radial frames, the upper part of each propeller-wheel being housed in one of the chambers, substantially as specified.

In testimony whereof I affix my signature in the presence of two witnesses.

ALFRED COOPER.

Witnesses:

JOHN E. MORRIS,

JNO. T. MADDOX.