(Model.)

A. DAVIDSON.

FEATHERING PADDLE WHEEL.

No. 246,730. Patented Sept. 6, 1881.

Fig. 1.

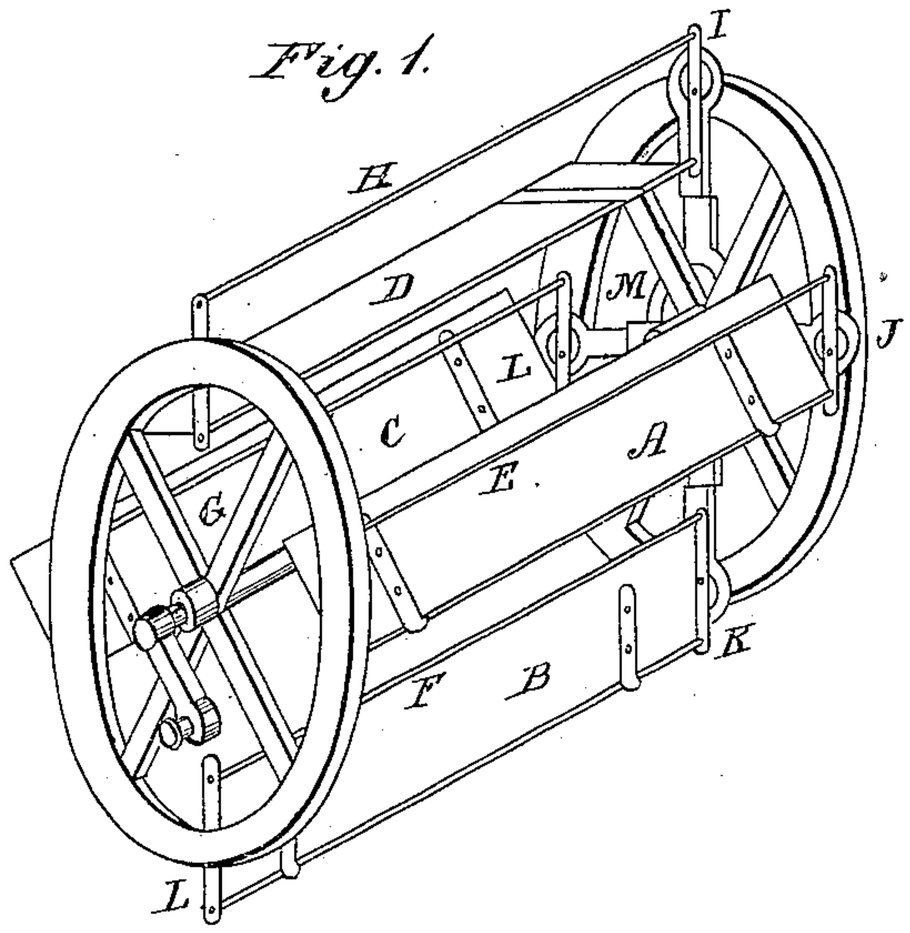


Fig. 2.

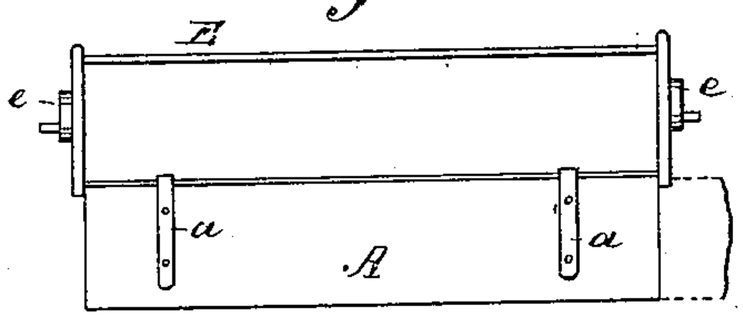


Fig. 3.

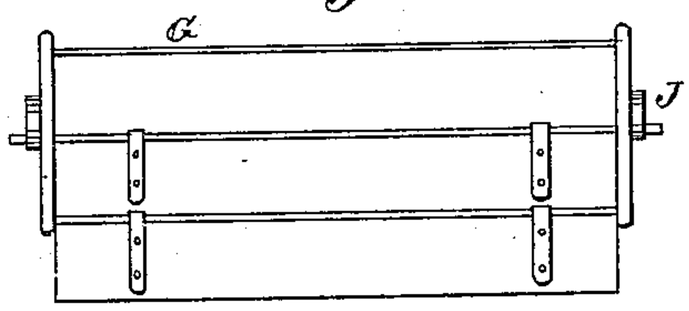


Fig. 5.

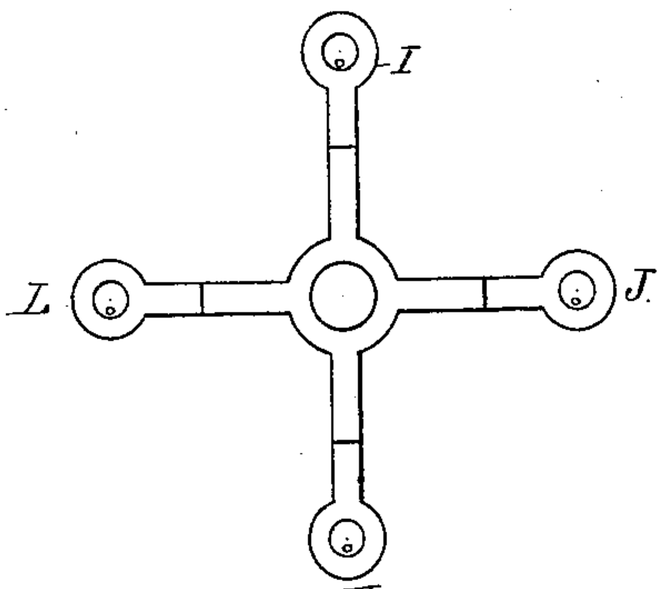
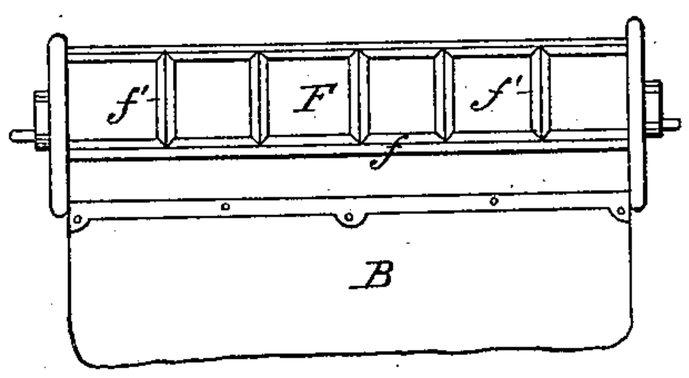


Fig. 4.



WITNESSES:

A. S. Lyne

John A. Kennon

INVENTOR:

Alex. Davidson

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

ALEXANDER DAVIDSON, OF SPRINGFIELD, ILLINOIS.

FEATHERING PADDLE-WHEEL.

SPECIFICATION forming part of Letters Patent No. 246,730, dated September 6, 1881.

Application filed October 5, 1880. (Model.)

To all whom it may concern:

Be it known that I, ALEX. DAVIDSON, of Springfield, in the county of Sangamon and State of Illinois, have invented a new and useful Improvement in Feathering Propellers, of which the following is the specification.

In the accompanying drawings the same letters relate to like parts of the machinery.

Figure 1 is a perspective view of the propeller, in which A, B, C, and D are buckets. That at A is feathered for entering the water. That at B has taken the position for propulsion. At C it exhibits the inclination assumed in emerging from the water, and at D its horizontal progression through the atmosphere. E, F, G, and H are frames, to which the buckets are attached; and I, J, K, and L, eccentrics which, connected by yokes to a fixed one, M, at the center of the wheel, keep the bucket-frames in position. Both the buckets and their frames require a diversity of construction corresponding to the varying stages of water and other conditions in which they are used.

Fig. 2 is a detached view of the construction adapted to either deep water or complete submersion. The frame E, having the form of a rectangle, is provided with attachments *e* for connecting with the eccentrics, and made open to avoid the resistance of the water. One edge of the bucket A is left free and the other hinged to the lower side of the frame by strengthening cross-bars *a*, so that whether entering into, emerging from, the water, or passing through the atmosphere it may move edgewise, and thus meet with the least resistance. In the act of propulsion it is forced against the frame, which, keeping it perpendicular to the line of advancement, avoids oblique action on the water. In retrograde motion the bucket, being free to oscillate, is thrown against the opposite side of the frame. The curve in it, coinciding with the line of rotation, is of great advantage in continued propulsion; but if frequent backward movements are necessary it is equally a disadvantage, and a plane surface should be substituted. The inclination of the bucket when feathered is a medium angle, resulting in part from the centrifugal force, which tends to throw it in a radial line and partly from the resistance of the water and atmosphere, which tend to give it that of a tangent. In deep water the latter force sufficiently counteracts the former to secure correct feathering; but in shallow drafts the atmosphere is the principal resisting medium, and the bucket must be made correspondingly light. The construction in Fig. 4 is intended to secure this object. The bucket B may be made of any flexible substance of sufficient strength and lightness, and the frame F is furnished with a supporting-bar, *f*, near its center, and connected to the upper post of said frame by vertical cross-bars *f'*, to enable it to resist the pressure of water. To afford additional strength and protection, the forward edge is inserted between the opposite plates of the hinge, having supporting-arms, which extend to the adjacent transverse bar of the frame.

When great propelling power is required two buckets may be inserted in one frame, as shown in Fig. 3. The space filled by the lower bucket must be made sufficiently wide for the upper one to fall through it in reverse action.

Fig. 5 exhibits the eccentrics and their connecting-yokes. That at M, through which the axle of the wheel passes, is fixed to the side of the vessel, and, as the wheel revolves by means of the yokes, controlling the eccentrics I, J, K, and L, attached to the sides of the bucket-frames, the latter are kept in a perpendicular position.

Cranks may be substituted for eccentrics, and either may be used on the inside or outside of the wheel, on one or both ends of the buckets. If the wheel is placed in a vertical position one system of eccentrics at the upper end is sufficient; but if operating horizontally two will give increased strength.

What I claim as original, and desire to secure by Letters Patent, is—

1. In a paddle-wheel, the pivoted oscillating rectangular bucket-frame F, having a longitudinal supporting-bar, *f*, near its center, which is connected to the upper part of said frame by vertical cross-bars *f'*, in combination with an oscillating bucket, substantially as shown and described.

2. In combination with the main frame of a paddle-wheel, the bucket-frames E F G H, held in position by the eccentrics I J K L, respectively, and supporting each an oscillating bucket, said bucket having its leading edge hinged to the forward part of its frame and its rear edge left free to vibrate, substantially as shown and described, whereby the buckets may be made to assume the position of least resistance in feathering, and in propelling may be held at right angles to the line of progression.

ALEX. DAVIDSON.

Witnesses:
W. D. CLARK,
ALLEN ENOS.