# E. S. Barnes.

## Vibrating Propeller.

No. 82,787. Patented Oct. 6, 1868.

Fig. 1.

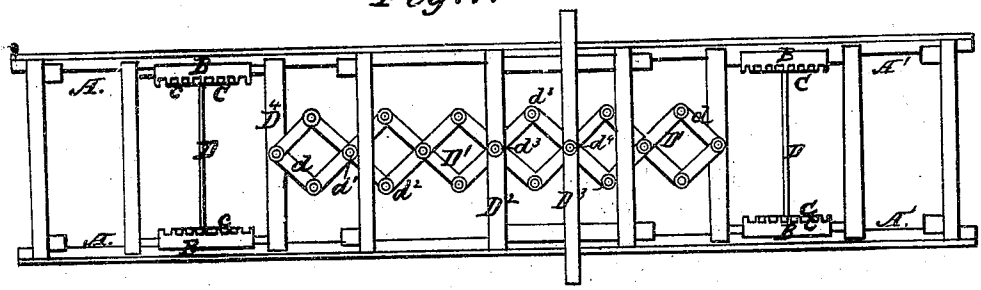


Fig 2.

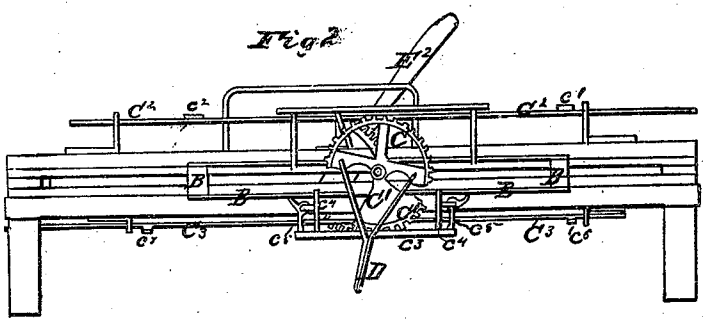


Fig 3.

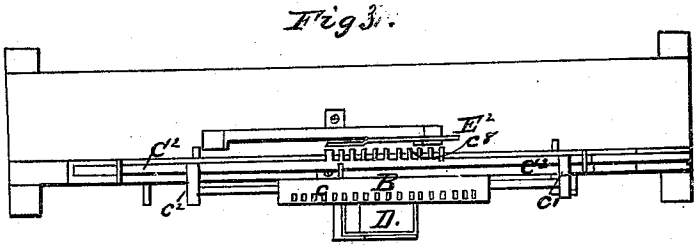
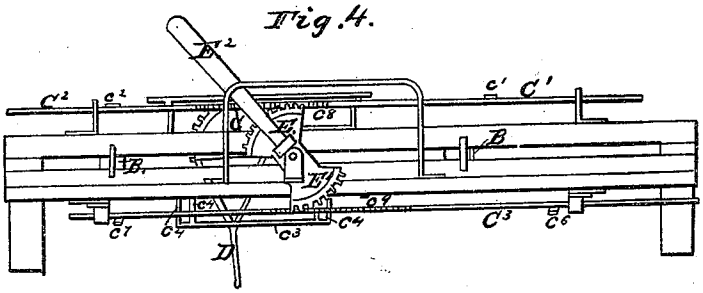


Fig. 4.



Witnesses.
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*Letters Patent No.* 82,787, *dated October* 6, 1868.

## IMPROVEMENT IN PROPELLING-APPARATUS.

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, E. S. BARNES, of Nebraska City, in the county of Otoe, and State of Nebraska, have made certain new and useful Improvements in Propelling-Apparatus for vessels and other purposes; and I do hereby declare that the following is a full and clear description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention has two general features, the first of which relates to a device for transmitting reciprocating motion, and the other to a device for feathering the paddles, the latter being susceptible of a reversing-attachment.

To enable those skilled in the art to make and use my improved apparatus, I will proceed to describe its construction and operation.

Figure 1, of the drawings, is a general plan of the apparatus. This view being designed more especially to illustrate the general features of the invention, the reversing-apparatus is not shown.

Figure 2 is an enlarged elevation of one end of the propelling-machine, showing the feathering-apparatus in detail.

Figure 3 is a top plan of the same parts shown in fig. 2.

Figure 4 is a rear elevation of the same parts shown in figs. 2 and 3.

A and A′ are two sliding ways, one of which may be attached to the side of the hull of a vessel, and the other may be secured to the outriggers, as in the case of a bridge-tree. On each end of these sliding ways are placed sliding heads, B B, the inner faces of these sliding heads being cogged, for the reception of the cogs of the sectors C, and to these cogged sectors are attached the paddles, D. The two sliding heads are connected together by means of the reciprocating jointed connecting-rods or bars $D^1$. These rods or bars are formed of short pieces, *d*, which are united in pairs by means of the central pins $d^1$, and the several pairs of them are connected together by means of the outer pins $d^2$. About midway of this jointed connecting-rod it is secured, by means of a fixed pivot-pin, $d^3$, to the transverse bar $D^2$, which is firmly secured to the side-ways A A′. The connecting-rod of the engine, or other motive-power, is to be attached to the joint $d^4$ by means of the bar $D^3$, or by some other suitable attachment.

The central joint $d^3$ being fixed, it is evident that, as the joint-pin $d^4$ is moved forward and backward, the sliding heads B B will be operated in a reciprocating manner, being alternately drawn toward and pushed from the centre-pin $d^3$. As the paddles D are attached to and moved with the sliding heads B B, as will hereinafter more fully appear, and as both of these said sliding heads are drawn toward and pushed from the centre-pin $d^3$ simultaneously, it is evident that one of the said paddles will be moving forward at the same time that the other one is moving backward, and, therefore, one of the said paddles will be acting upon the water to propel the vessel forward, while the other paddle is returning in a feathered position for a new hold in the water, as will be hereinafter more fully described.

As is clearly shown in fig. 2, there are two cogged sectors, C $C^1$, attached to the central part of the sliding head B. To the upper one of these sectors, C, the paddle D is firmly secured. This sector gears into the cogged rack *c*, which, as the sliding head is moved forward and backward, as it nears the end of each stroke, is engaged by the tappets $c^1$ $c^2$ on the sliding rod $C^2$, and thereby the said rack is moved back, the sector is turned partly over, and the paddle D is either feathered or turned down for a hold in the water, as the case may be. The sector C forms a semicircle, and at each end of the stroke it makes a quarter turn, as above described.

The sector $C^1$ forms a quarter circle, and it is placed directly below the sector C, so that the straight face of the latter may rest on the former, and hold it rigidly during the forward motion of the paddle. This sector $C^1$ may be turned over, so as to form a rest for the sector C, on either side, by means of the cogged rack $c^3$. This rack $c^3$ is attached to the side of the sliding head B by means of the pendants $c^4$, and the spring-hooks $c^5$ secure the said rack to the said sliding head at either end, as may be desired for a forward or a backward stroke of the paddle. The hooks $c^5$ will hold the rack $c^3$ in whichever position they may be placed, until they strike one of the tappets $c^6$ $c^7$ on the rod $C^3$.

This sliding rod and its tappets may be moved to either end, as hereafter described, even while the machinery is under full headway, and the sliding rack will, by coming in contact with the said tappets, be moved in accordance with the adjustment thereof, and the sector C, and its paddle D, will, in compliance with the said adjustment of the sector $C^1$, be feathered, either for a forward or a backward stroke.

As is clearly shown in fig. 4, the sliding rods $C^2$ $C^3$ have short cogged sections $c^8$ $c^9$, which are engaged by the cogged sectors E $E^1$, which are attached to the operating-lever $E^2$. This lever may have a rope or chain attached to its outer end, and the said rope or chain conducted to the pilot-house, or other convenient portion of a vessel, where the proper officer may turn the lever to either side, at pleasure, and thereby shift the positions of the rods $C^2$ $C^3$ and their tappets, thereby changing the positions of the sectors C $C^1$, as above described, and setting the paddle D, so as to feather in either direction, for a forward or a backward stroke.

Having described my invention, what I claim, is—

1. The cogged sectors C $C^1$, in combination with the paddle D, when arranged and operated substantially as set forth.

2. The combination of the reversing-sectors E $E^1$ and their operating-bar $E^2$, when acting to operate the bar $C^3$ and rack $c^3$, for feathering the paddles at either end of stroke, and reversing the same, substantially as set forth.

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Witnesses:

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