G. A. KEENE.

Improvement in Feathering Paddle-Wheels.

No. 132,012. Patented Oct. 8, 1872.

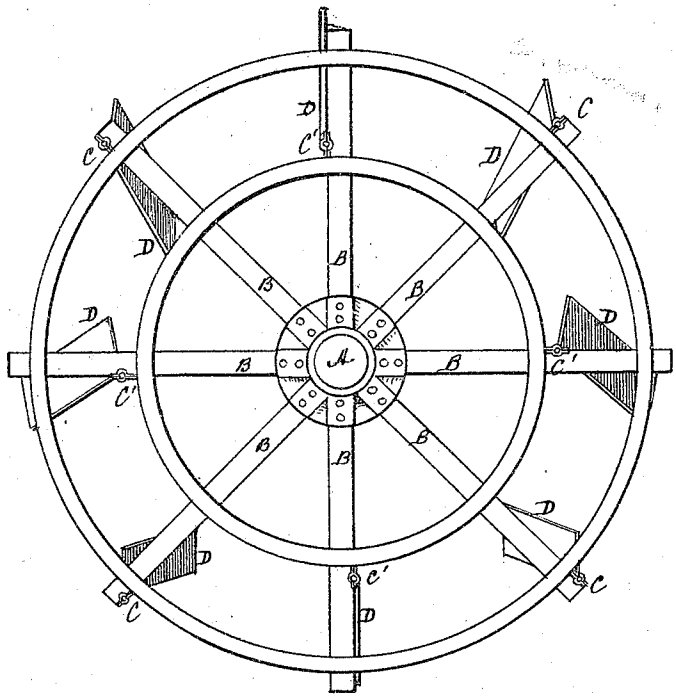

Fig. 1.

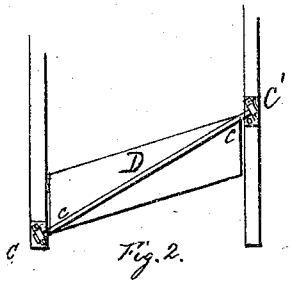

Fig. 2.

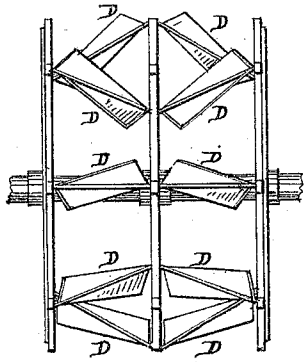

Fig. 4.

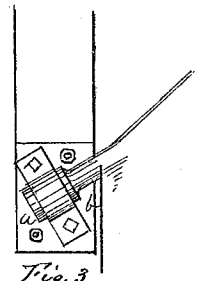

Fig. 3.

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} WITNESSES.

UNITED STATES PATENT OFFICE.

GEORGE A. KEENE, OF LYNN, MASSACHUSETTS.

IMPROVEMENT IN FEATHERING PADDLE-WHEELS.

Specification forming part of Letters Patent No. **132,012**, dated October 8, 1872.

To all whom it may concern:

Be it known that I, GEORGE AUGUSTUS KEENE, of Lynn, Massachusetts, have invented an Improved Feathering Paddle-Wheel, of which the following is a specification:

This invention belongs to that class of wheels originally devised by Galloway, and operating without "dip-and-lift" action on the water. It consists in shaping and pivoting paddles designed to be vertically feathering, without "dip-and-lift" action on the water, in such manner that equal or nearly equal areas on either side of the pivot-line shall be immersed together at all stages of the immersion and in the arrangement of the details of the wheel to effectuate this object.

The drawing represents this improvement. Figure 1 is a side elevation. Fig. 2 is the float detached, and illustrates the shape and method of pivoting. Fig. 3 shows the form of box and journal which I prefer. Fig. 4 shows the construction of a double float-wheel on my plan.

A is the shaft. B B B B are radial arms extended from the shaft. There may be two, three, or more parallel series of these. Boxes are fixed on these arms at C and C′, those at C being twice the width of the float further from the center than those at C′. I make these boxes, like the ordinary journal-boxes, of shafting, with cap squares as shown, Fig. 3, and have the pivots of the float, about to be described, made with a button, *a*, and shoulder *b* at each end, so as to serve in lieu of one of the braces of the arms displaced by using this arrangement. The float is shaped as an oblique parallelogram, as seen in Fig. 2 at D, and a diagonal shaft runs across it, as at *c c*, with pivots projecting at each end. The area of the float on either side of this diagonal, it will be seen, must be equal, for this is a mathematical property of the parallelogram that the diagonal divides it into two equal similar triangles. The pivots are at the acute angles of the parallelogram. One side of the float is weighted, so that on revolution of the wheel it shall preserve the vertical. The acute angle of the weighted side is placed downward or rather furthest out on the radial arm of the wheel. The other acute angle is pivoted to the adjacent opposite radial arm at a point nearer the shaft than the pivot of the weighted side by about twice the width of the float. This makes the short diagonal a horizontal line practically parallel with the water-line. Every line drawn across the oblique parallelogram, parallel to the short diagonal, will leave practically equal areas on either side of the long diagonal, so that immersion of the float in the revolution of the wheel will encounter equal displacements on either side of the pivot-line; but as the acute angle will be arranged in arranging the depth of immersion to enter in advance of the obtuse angle, the wheel never being immersed enough to produce the opposite effect, it will follow that the acute angle, being pivoted further out from the shaft than the distance of the obtuse angles from the same, is drawn over a longer space in the same time, and therefore moves faster through the water, thus producing a sculling motion or rowing motion.

The principles of this invention, and on which it is based, are that by weighting a float containing equal areas on either side of the pivot-line, on one side of the line the paddle will be kept vertical, the weighted side down; that by giving equal areas of immersion on either side of the pivot-line the float will have little or no tendency to cant while moved through the water; that it is desirable to enter a paddle-float pointwise and edgewise, in order to feather well, and this does both—pointwise at the acute angle: edgewise vertically and diagonally to the plane of the wheel. As shown in Fig. 1, with one series of buckets I place them alternately, successively, at crossing angles, or pivoted on opposite inclinations. This principle I adopt, as shown, Fig. 4, when using a double series, placing the adjacent buckets of the two series with such alternating pivoting; but I do not confine myself to these ways of construction.

The inclination of the parallelogram can be determined as follows: Fix the width of the bucket and the distance between the two sides of the wheel. Make the long diagonal the hypotenuse of a triangle, whose base is the distance between the two sides, and whose height is twice the width of the bucket. Make the short diagonal the distance between the two sides. Allow for clearance of the arms.

I claim as my invention in feathering paddle-wheels—

1. The pivoted float D, shaped as an oblique parallelogram of an inclination equal to its width, and pivoted to the arms of the wheel at its acute angles, substantially as and for the purpose described.

2. The said float, when pivoted at alternate opposite angles to the radial arms at points differing from each other in radial distance by twice the width of the float, substantially as and for the purpose described.

GEO. A. KEENE.

Witnesses:

THOS. WM. CLARKE,

WILLIAM EDSON.