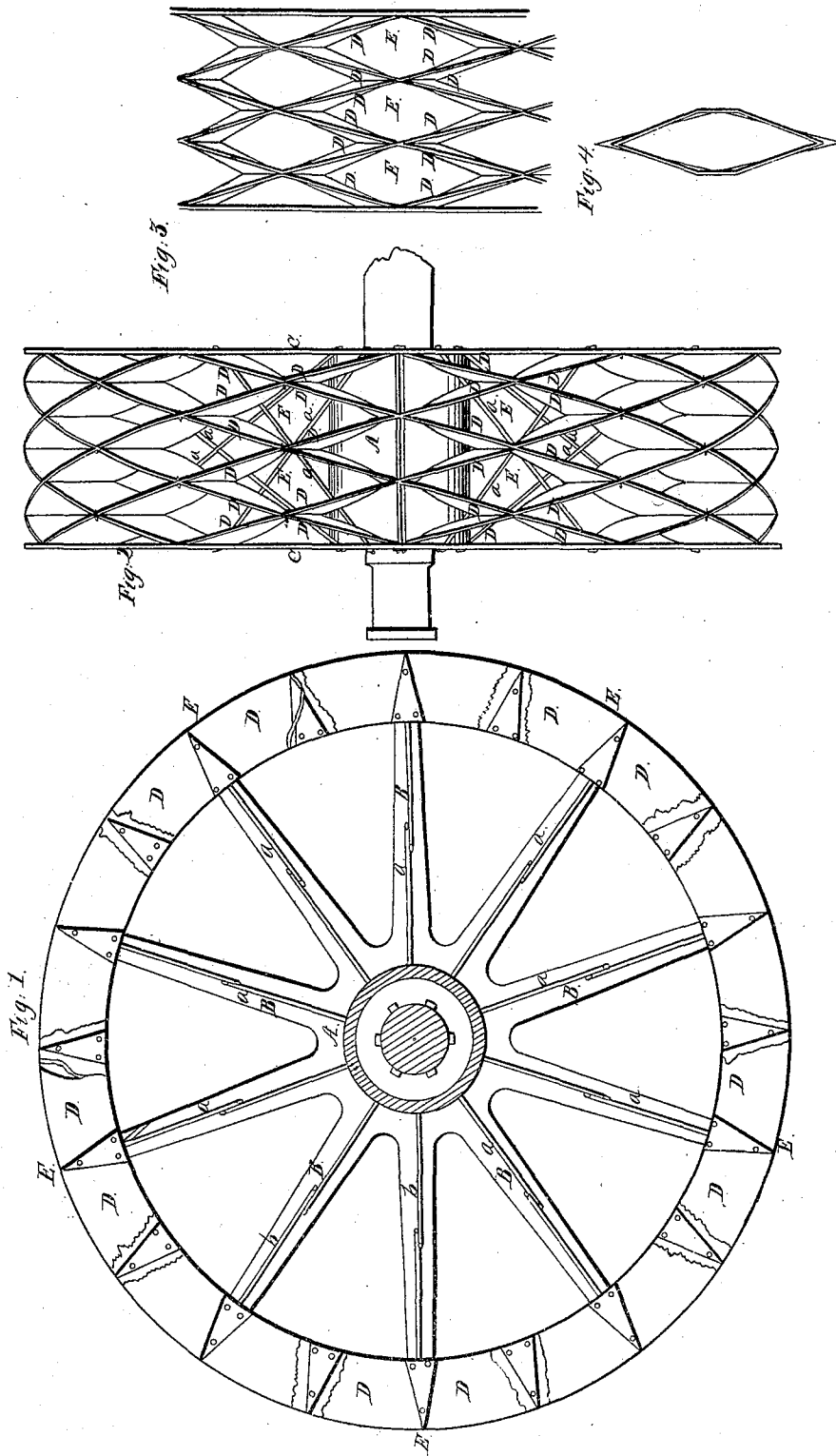


*B. Irving.*  
*Paddle Wheel.*

*N<sup>o</sup> 10,000.*

*Patented Sep. 6. 1853.*



N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

BENJAMIN IRVING, OF GREEN POINT, NEW YORK.

## IMPROVED PADDLE-WHEEL.

Specification forming part of Letters Patent No. **10,000**, dated September 6, 1853.

*To all whom it may concern:*

Be it known that I, BENJAMIN IRVING, of Green Point, in the county of Kings and State of New York, have invented a new and useful Improvement in Paddle-Wheels for Propelling Vessels; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a section in a plane perpendicular to the axis of a paddle-wheel constructed according to my invention. Fig. 2 is a front view of the same. Fig. 3 shows a number of floats detached from the wheel for the purpose of exhibiting their form more clearly. Fig. 4 represents one of the buckets as seen from the inside of the wheel.

Similar letters of reference indicate corresponding parts in the several figures.

The nature of this invention consists in arranging and combining the floats in such a manner that they form a continuous series of rhomb-shaped buckets all round the wheel.

The object of this mode of arranging and combining the floats is to prevent violent concussions when they strike the water and to hold the water upon which they act in an unbroken body, and thereby to render their action more effective than that of the floats as commonly arranged.

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

The frame of the wheel, consisting of the hub A, arms BB, and rings CC, may be constructed in the usual manner, and strengthened by oblique stays *aa*. It will be better to make the rings CC of a width equal to the whole depth of the floats. The floats D are arranged with their outer edges in lines running spirally round the wheel in opposite directions at angles of about seventy-five degrees to the axis, the crossing of the said lines forming a number of rhomb-shaped buckets EE, which have no openings except toward and from the center of the wheel. The inner openings of the buckets are contracted endwise (see Fig. 1) for the purpose of giving the front angle such a form as to prevent back-lift in rising from the water, which makes the said inner opening depart from

the rhombic form, inasmuch as the side angles are cut off, and the figure is made six-sided, as shown in Fig. 4. The best material for the floats is sheet-iron, and the several floats may be united together and to the rings CC by bolts or rivets. The number of buckets will depend upon the width of the wheel. The width of the wheel shown includes three buckets, which I consider to be about the proper number, though it may be varied. A number of half-buckets of triangular form will be formed unavoidably close inside the rings, if rings are used, which may not be absolutely necessary, as the wheel could be made of sufficient strength by uniting the floats and arms. I do not confine myself to the angle above stated for the floats, but have merely given that which I at present consider to be best. This wheel acts upon the water with a constant succession of floats united to form the letter V. It is true that other wheels have floats united to produce this form; but the peculiarity of this arrangement is that while every float acts upon the water with propulsive effect it is at the same time effective in holding together in a solid body the water upon which the float which immediately succeeds it acts. In other words, the peculiarity may be said to consist in a combination of successive series of rhomb-shaped close buckets, of which the two front sides of the rhomb give a propulsive effect, while the two back sides prevent the breaking up of the water upon which they act and the consequent loss of their effect, the said back sides also forming the front sides or propelling parts of succeeding buckets.

The operation of this wheel is the same in whichever direction it turns, and therefore it will propel backward as well as forward. It can be made of great strength, as it is self-bracing.

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

Arranging and combining the floats so as to form a series of buckets of rhombic or substantially similar form, as and for the purpose herein set forth.

BENJAMIN IRVING.

Witnesses:

S. H. WALES,  
EL. POLHAMUS.