T. H. RISDON & W. W. TYLER.

Turbine Water-Wheels.

No. 135,367. Patented Jan. 28, 1873.

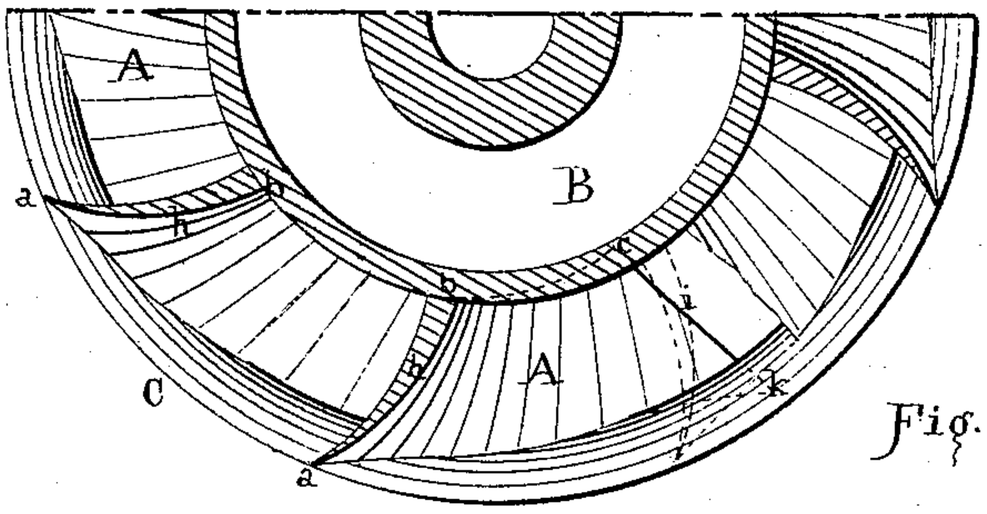

Fig. 1.

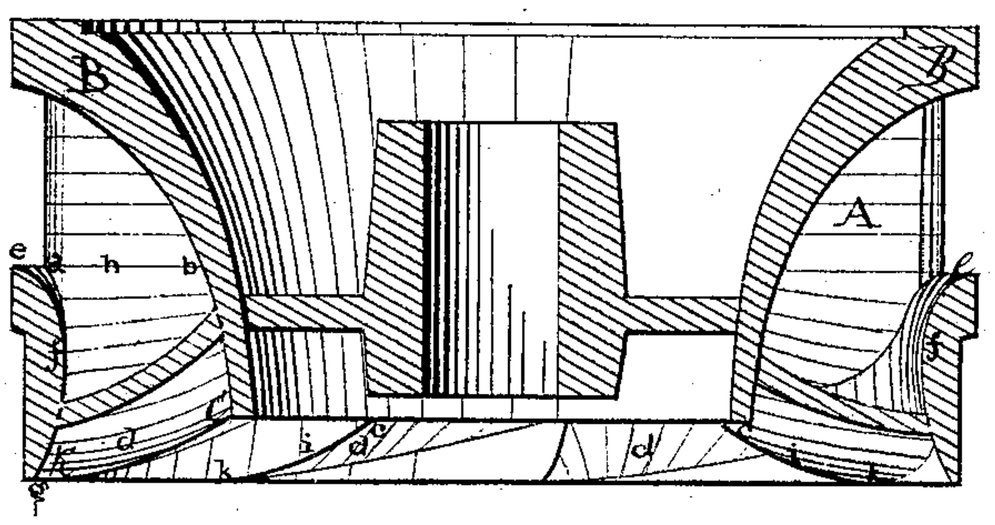

Fig. 2.

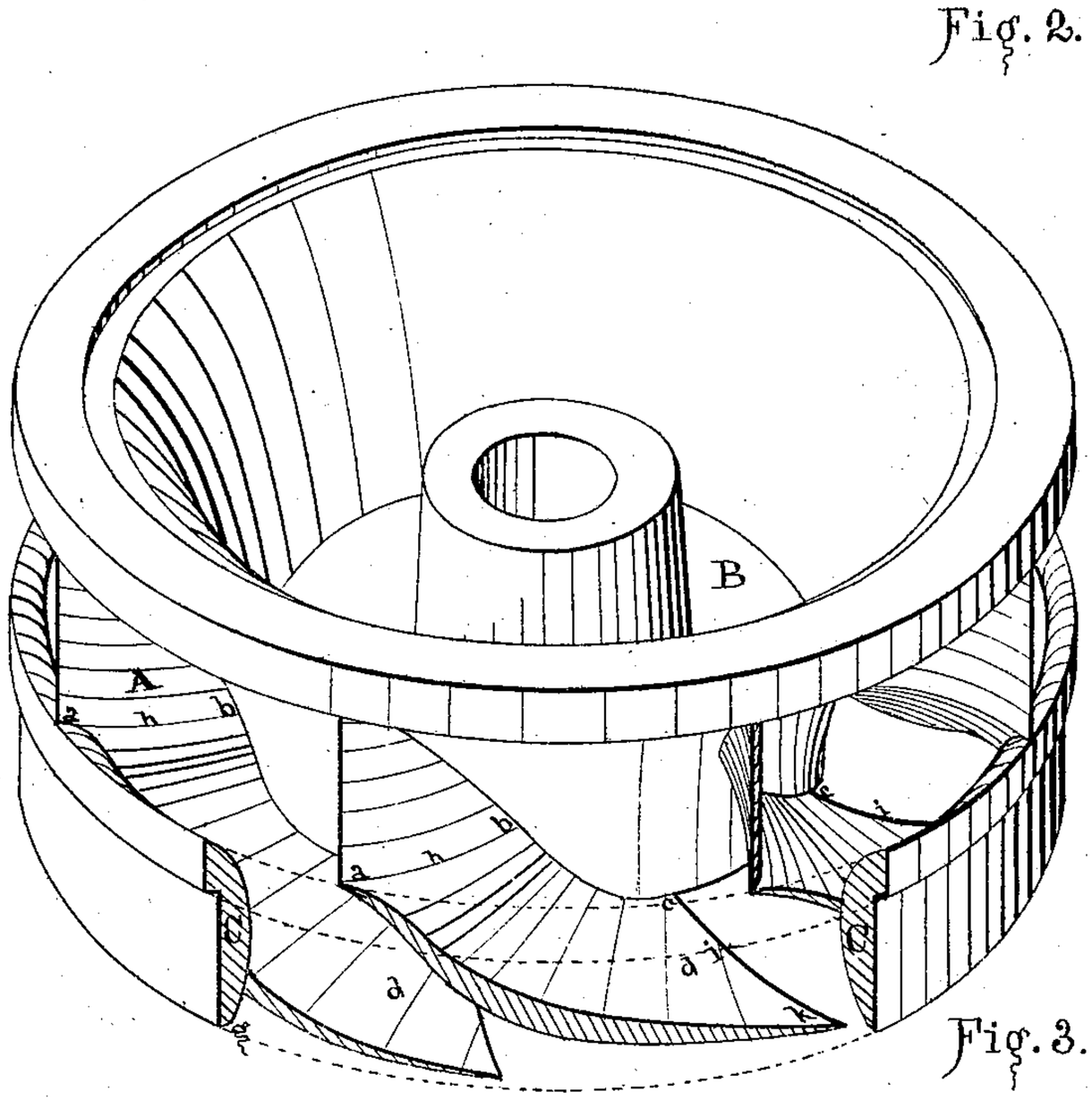

Fig. 3.

Witnesses,
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UNITED STATES PATENT OFFICE.

THEODORE H. RISDON AND WILLIAM W. TYLER, OF MOUNT HOLLY, N. J.

IMPROVEMENT IN TURBINE WATER-WHEELS.

Specification forming part of Letters Patent No. **135,367**, dated January 28, 1873.

To all whom it may concern:

Be it known that we, THEODORE H. RISDON and WILLIAM W. TYLER, both of Mount Holly, in the county of Burlington and State of New Jersey, have invented a new and useful Improvement in Turbine Wheels; and we do hereby declare the following to be a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the said improvement, reference being had to the accompanying drawing which forms a part of this specification, and in which—

Figure 1 is a horizontal section of our improved wheel; Fig. 2, a vertical section thereof; and Fig. 3, a perspective view thereof with the band partly broken away to show the buckets.

The same parts are denoted by the same letters in all the figures.

The said invention is an improvement on that class of turbine wheels to which the water is admitted in a horizontal direction, or nearly so, and which discharge all or most of the water in a vertical or nearly vertical direction; and it consists in the construction of the buckets of such a wheel with their upper edge radial, or nearly so, at the end next the hub, but curved forward outwardly so as to be at the outer end almost a tangent to the periphery of the wheel, the lower edge of said buckets being curved downward outwardly, and the lower portion of the buckets inclosed by an outwardly-flaring band, as hereinafter described, by which construction the water is enabled to enter and issue from the wheel without retarding its velocity, whether the gate be fully open or partly closed.

A A in the drawing represent the buckets, the outer ends of whose upper edges are curved forward in the direction of revolution of the wheel. The inner part of each of these upper edges, or that part which is next the hub, is nearly coincident with the radius of the section of the wheel, as shown at *b*, Fig. 1, while the outer part *h a* of the said edge curves forward so that at its extremity it is almost a tangent to the circumference of the wheel. The lower edge *d d* of each of the said buckets is made with the inner end *c* higher than the outer end *k*, and curving downward, as shown at *c i k*, Fig. 2. The top and bottom curves are so combined that the course of the water through the wheel is nearly an ogee curve. B is the hub of the wheel, curved as shown in Fig. 2, so that the direction of the water in passing through the wheel shall be gradually changed from horizontal to vertical by means of this curved surface. C is the band which incloses the lower portion of the buckets. Its shape is shown in section in Fig. 2, the upper part *e f* of the section of its inner surface being an arc of a circle, or nearly so, while from the point *f* of least diameter the said surface flares out to *g* so as to permit the water to be freely discharged without friction against the band.

What we claim as our invention, and desire to secure by Letters Patent of the United States, is—

A vertical-discharge wheel, the lower portion of whose buckets is inclosed by an outwardly-flaring band, and in which the lower edge of said buckets is curved downward outwardly, and the upper edge thereof is radial, or nearly so, at its inner end, but curved forward into nearly a tangent to the periphery of the wheel, substantially as shown and described.

THEODORE H. RISDON.
WILLIAM W. TYLER.

Witnesses:
MICHAEL H. JOHNSON,
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