

S. L. DENNEY.

Turbine Water-Wheel Buckets.

No. 135,412.

Patented Feb. 4, 1873.

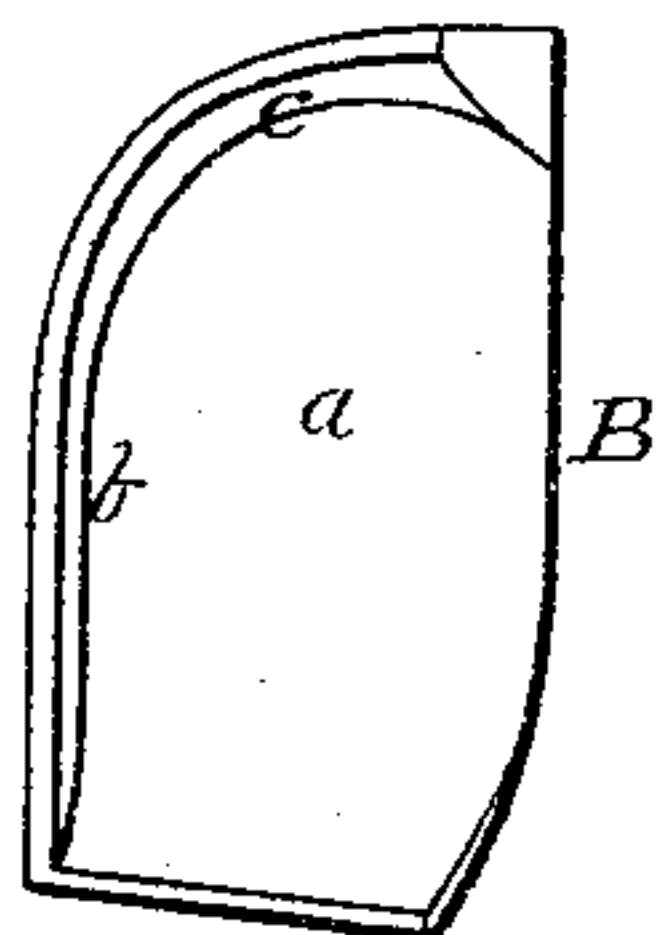


Fig. 2.

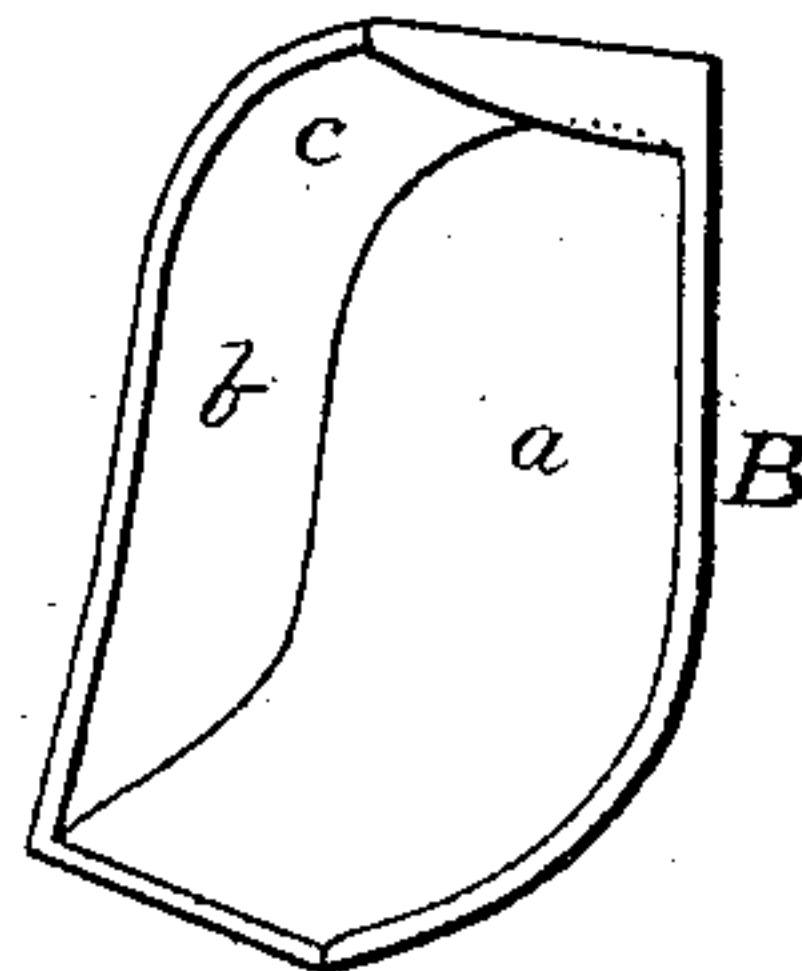


Fig. 3.

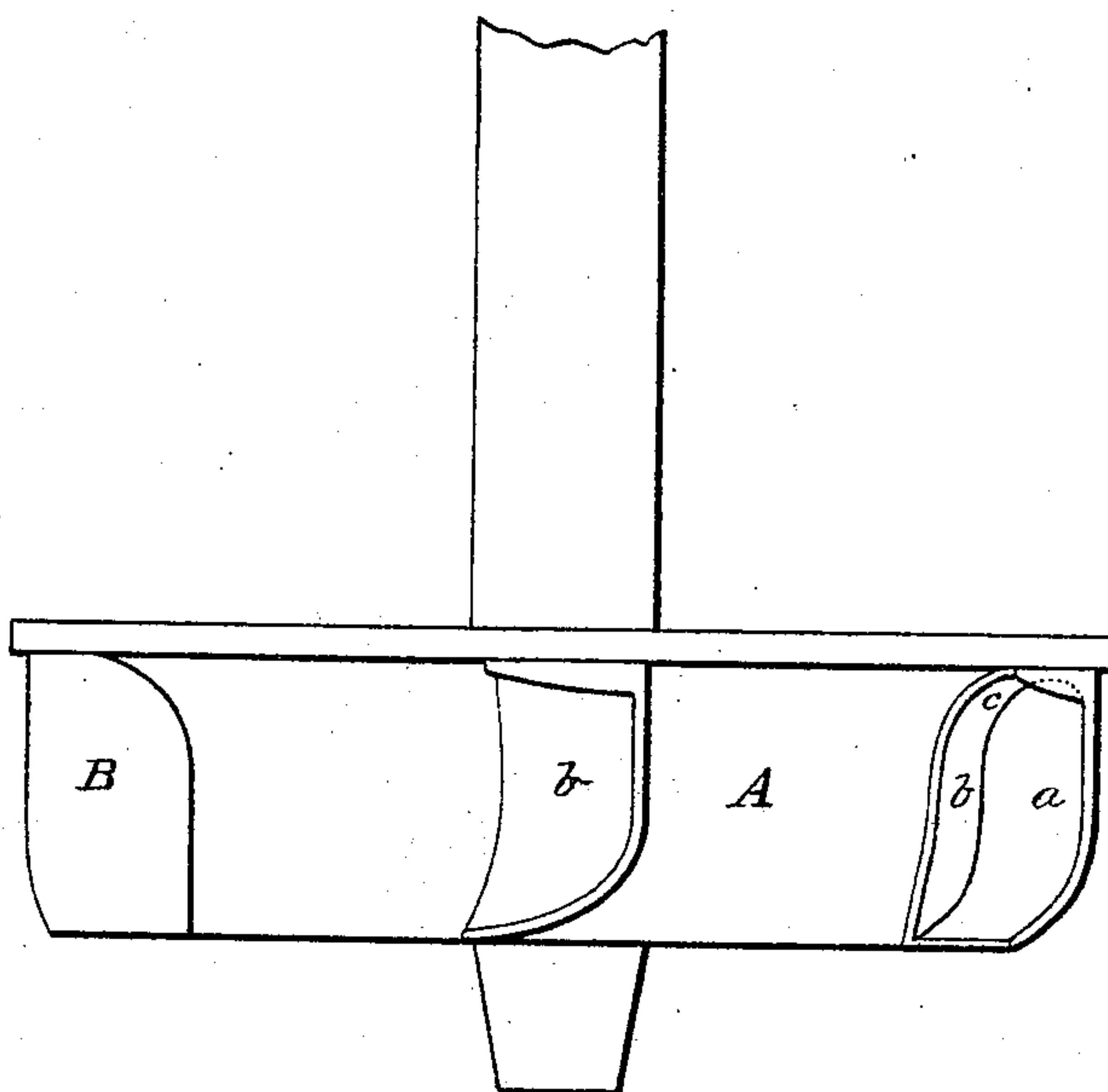


Fig. 1.

WITNESSES.

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# UNITED STATES PATENT OFFICE.

SAMUEL L. DENNEY, OF GAP, PENNSYLVANIA.

## IMPROVEMENT IN TURBINE WATER-WHEEL BUCKETS.

Specification forming part of Letters Patent No. 135,412, dated February 4, 1873.

*To all whom it may concern:*

Be it known that I, SAMUEL L. DENNEY, of Gap, in the county of Lancaster and State of Pennsylvania, have invented a new and valuable Improvement in Turbine Water-Wheels; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawing is a representation of a side view of my wheel. Fig. 2 is a front view of my bucket. Fig. 3 is a perspective view of my bucket.

This invention has relation to turbines; and it consists in construction and novel form of the bucket, and in the graduation of the downward and inward curve, connecting the top with the inner wall of said bucket, according to the head of water and the weight of the entire wheel. The object of this invention is to provide means whereby, during the running of the wheel, its weight will be, in a great measure, sustained by the current, the pivotal friction and wear being lessened in a remarkable degree.

In the accompanying drawing, the letter A designates the hub or core of the wheel, to which the buckets are attached, usually by means of bolts. B indicates the bucket, consisting of two curved walls. The lateral wall *a*, against which the water impinges at the highest angle, is curved downward and rearward to form the bottom of the bucket, while the inner wall *b*, which lies next the hub or core A, is curved outward and upward, forming the top of the bucket. It is in the construction of this latter wall that my improvement is chiefly shown. The curvature of that portion of this wall forming the top and upper part of the inner wall is varied to correspond with the head of water and the size and weight of the wheel. If it be a small wheel, designed to be turned by a current of

high velocity, this curvature will be small, the top and inner side meeting to form a bend, which may be almost angular in its character. If it be a large and heavy wheel, and the head of water under which it is designed to be driven be of low velocity, this curvature, lettered *c* on the drawing, will be large and sweeping in its character. By suitable calculation the curvature may be determined for a wheel of given size and weight, and a given velocity of current for driving the same.

The object of this variation in the construction of this portion of the bucket is to adapt it to ride, as it were, upward on the current, thus relieving the pivot from friction and wear, and securing, in the effective force of the wheel, a valuable increase.

In furtherance of the same object the wall of the top of the bucket is inclined usually somewhat downward and forward, increasing the tendency to ride upward; and the outer edge of the top of the bucket is depressed somewhat, the curvature of the top being carried downward and outward to this edge for the purpose of preventing the current from escaping so readily from this portion of the bucket, and thereby tending to insure the rising effect.

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

The detachable turbine bucket B, consisting of the front wall *a* curved downwardly and rearwardly to form the bottom, and the inner wall *b* curved upwardly and outwardly at *c* to form the top, said curvature *c* being varied according to the weight of the wheel and the head of water, substantially as specified.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

SAMUEL L. DENNEY.

Witnesses:

GEO. E. UPHAM,  
D. D. KANE.