

W. S. Place,

Water Wheel.

No. 106,958.

Patented Aug. 30. 1870.

Fig. 1.

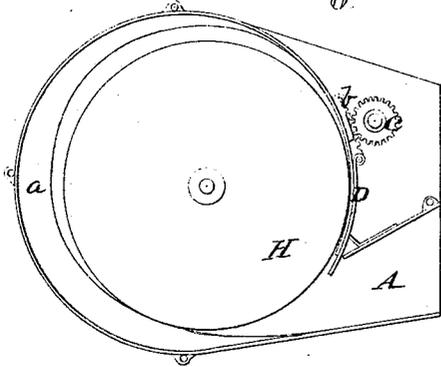


Fig. 2.

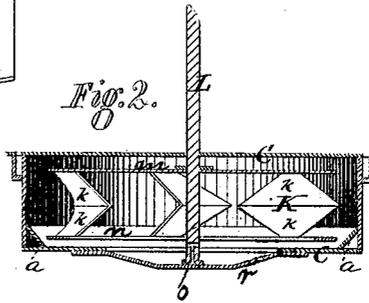


Fig. 3.

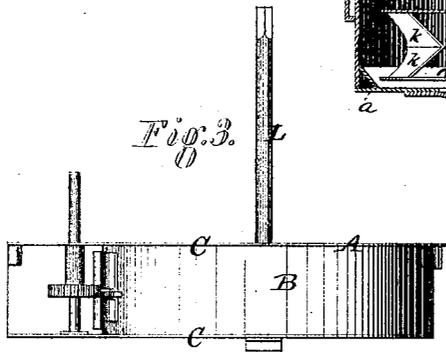


Fig. 5.

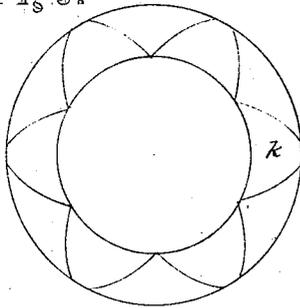
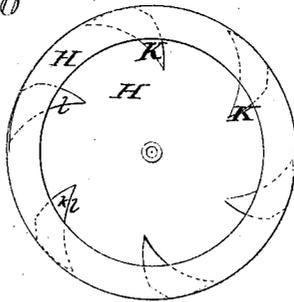


Fig. 4.



Witnesses  
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# United States Patent Office.

WILLIAM S. PLACE, OF CHARLESTON, MAINE.

Letters Patent No. 106,958, dated August 30, 1870.

## IMPROVEMENT IN WATER-WHEELS.

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, WILLIAM S. PLACE, of Charleston, in the county of Penobscot and State of Maine, have invented a new and valuable Improvement in Turbines; 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 top view of my invention, with the upper plate removed.

Figure 2 is a transverse vertical section of the same.

Figure 3 is a side view.

Figure 4 is a bottom view of the wheel.

Figure 5 is a diagram, showing the manner of shaping the buckets.

My invention relates to turbines, and consists in the formation and angular position of the buckets, in filling up the interior angular corners of the case, where the plates thereof join in the scroll, and in the perforated foot of the shaft, whereby the same is prevented from becoming unduly heated.

The letter A of the drawing designates the case of the turbine, consisting of the plates C C, and curved wall or scroll B.

The inner wall of the scroll B is curved, at its upper and lower edges, in such a manner as to fill up the dead angles at *a a*, in the interior of the case, thus forcing the current to the center, where it can act to greatest advantage on the ends of the buckets. At the same time I do not usually fill up the dead angles for more than two-thirds of the circumference, in order to give room for the water to settle in reacting, after its direct force is spent.

The curved plate which fills the dead angle is allowed to become gradually less and less inclined until it merges into the perpendicular wall of the scroll.

D represents the curved gate, corresponding in its bend to the form of the exterior wall of the scroll B, and provided with a ratchet, *b*, attached to its outer surface, and engaging with the operating pinion, *c*.

The gate D slides upon the curved scroll-wall, and between the latter and the short wall *d* of the fore-bay.

H H are the shroudings of the turbine, the upper one being entire, and the lower plate annular, as shown.

K K represent the buckets, curved inward from the

circumference of the wheel, the line of curvature, *l*, of each bucket being an arc of a circle smaller than the circumference of the wheel. This line *l* marks the division between the upper and lower halves, *k*, of the bucket, which are inclined to each other at an angle of ninety degrees.

The chief force of the water is directly concentrated on the central line of the bucket, while its reflected action is from each wing of the bucket against the other, after which the weight of the water reacts upon the lower wing of the bucket.

The patterns of my buckets are thus designed :

An annular disk, of the size of the wheel, is divided into six equal parts. The breadth of the annular plate depends upon the distance between the shroudings of the wheel. The buckets are formed from the annular plate by giving the sides the proper curve, each section consisting of a triangular plate, having two convex and one concave, sides. The concave side is formed by the inner curve of the annular plate, and constitutes the line *l*, along which the wings are joined to form the entire bucket.

In order to prevent the heating of the foot or journal of the shaft L, it is perforated at *e*, and so arranged that a current of water shall flow through the opening, thus keeping the journal and its bearings always moist and cool.

When the slide-gate is partially closed, a comparatively small quantity of water will act with great power upon the ends of the buckets. This is effected by the formation of the bucket and the case, whereby the force of the current is concentrated upon the center and end of each bucket.

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

1. The curved buckets K, consisting of the two wings *k*, at right angles with each other, in combination with the shroudings *m n*, all constructed, arranged and operated as set forth.

2. The case A, having its interior angles fitted up to a tapered point, for the purpose of guiding the current to the center and point of the bucket, as specified.

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

WILLIAM S. PLACE.

Witnesses:

J. PAGE,

A. S. PAGE.