E. M. HALE.

TURBINE-WHEEL.

No. 192,648. Patented July 3, 1877.

Fig. I.

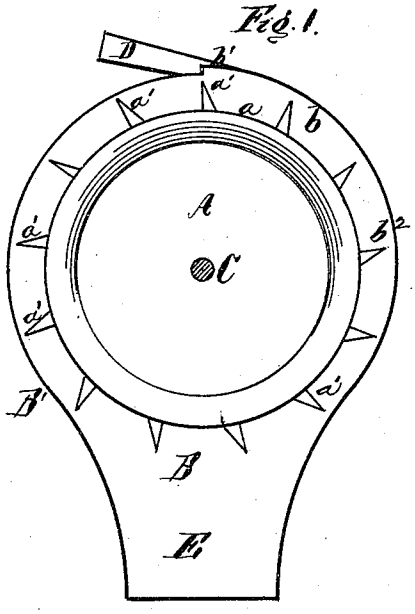
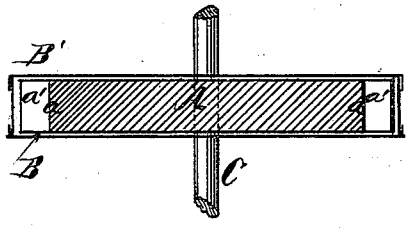


Fig. II.



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UNITED STATES PATENT OFFICE.

EZRA M. HALE, OF KANSAS CITY, MISSOURI, ASSIGNOR TO JAMES TALLEY, JR., OF SAME PLACE.

IMPROVEMENT IN TURBINE WHEELS.

Specification forming part of Letters Patent No. **192,648**, dated July 3, 1877; application filed May 24, 1877.

To all whom it may concern:

Be it known that I, EZRA M. HALE, of Kansas City, in the county of Jackson and State of Missouri, have invented a new and useful Improvement in Turbine Wheels, of which the following is a specification:

This invention has for its object the construction of a turbine wheel, in which the buckets shall be arranged around the periphery of a solid center piece, and set at an angle of, say, thirty degrees, more or less, with the radial lines of the wheel, and arranged within the surrounding case or housing, so that two or more of the said buckets shall simultaneously receive the force of the incoming water from the induction-pipe, the case being constructed so that this distribution of the water upon the wheel is possible.

The invention will be readily understood by reference to the accompanying drawings, of which—

Figure 1 is a sectional elevation of the improved turbine wheel, taken in a plane perpendicular to the driving-shaft. Fig. 2 is a sectional elevation of the same, taken through the longitudinal axis of the driving-shaft.

The center part of the wheel A is a solid drum, which has a periphery-rim, *a*, of the full width of the thickness of the chamber B, in which it revolves.

The chamber B is formed inside of the casing B′, the construction of which will be presently more fully described.

The wheel A is mounted on the driving-shaft C, which passes through the sides of the casing, and suitable bearings should be provided on the outsides of the case for the supports of the said shaft.

The periphery of the wheel A is studded with buckets *a′* at short intervals, and these buckets have their working-faces formed in straight lines, and set at angles of about thirty degrees, more or less, with radial lines which would cut the base of them.

The chamber B, except at the inlet and outlet, is cylindrical in form, and is concentric with the wheel A.

The inlet-pipe D is connected with the periphery of the casing B′, and delivers the water into an eccentrically-formed cavity, *b*, of the chamber B, as shown in Fig. 1.

The chamber *b* extends from the inlet-point b^1 to b^2, a distance of about one-quarter, more or less, of the circumference of the wheel A. The width of the chamber *b* at the point b^1 is about equal to one-eighth or one-quarter of the width of the buckets, more or less, and from this wide end b^1 it is gradually contracted in width toward b^2, at which point it forms a tangent with the circular line of the cavity of the chamber B, as is clearly shown in Fig. 1.

The effect of this construction of the case A is to allow the incoming water from D to pass along into the cavity or chamber *b*, from which it will be forced to impinge upon two or more of the buckets *a′* simultaneously, thereby expending upon the wheel a larger amount of force than could be derived from its discharge upon a single bucket.

The outlet E is formed in the part of the case B′ opposite to the inlet-pipe D, and should be sufficiently large to permit the free flow of any water that may be admitted from D. A considerable excess in the size of the outlet E is preferable.

Having thus described my invention, I claim—

1. The case B′, constructed with an eccentrically-enlarged inlet-chamber, *b*, tangentially connected with the chamber B at b^2, and thence gradually enlarged to the point of inlet at b^1, as and for the purpose set forth.

2. The wheel A, having sloping peripheral buckets *a′* and the casing B B′, having the tapering inlet-chamber *b*, combined and arranged as described and set forth.

E. M. HALE.

Witnesses:
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