W. R. JENKINS, Jr.

TURBINE WATER-WHEELS.

No. 190,595. Patented May 8, 1877.

Fig. 1.

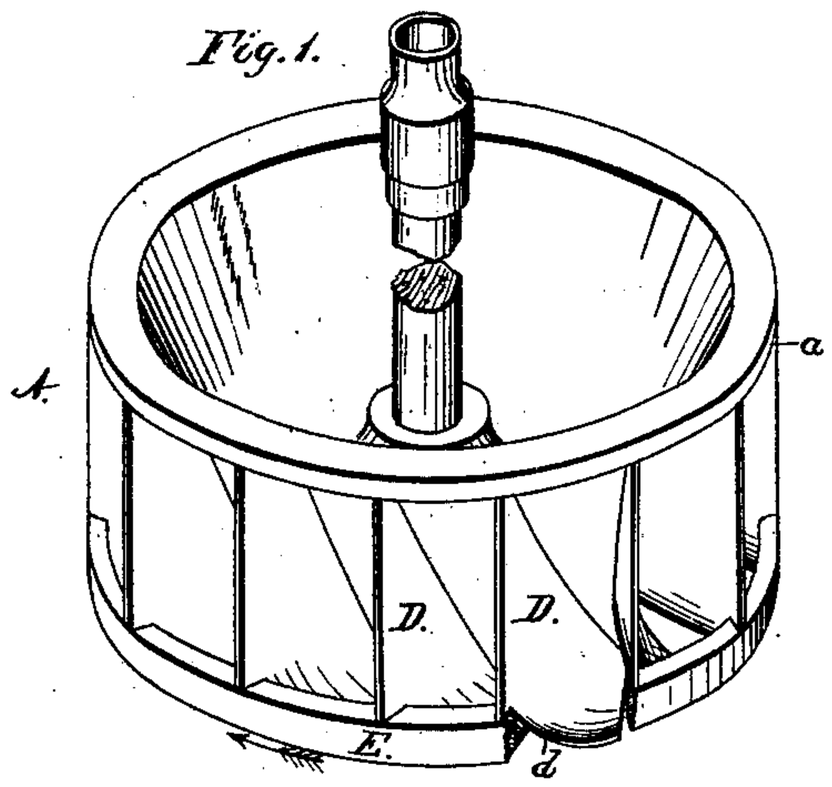



Fig. 3.

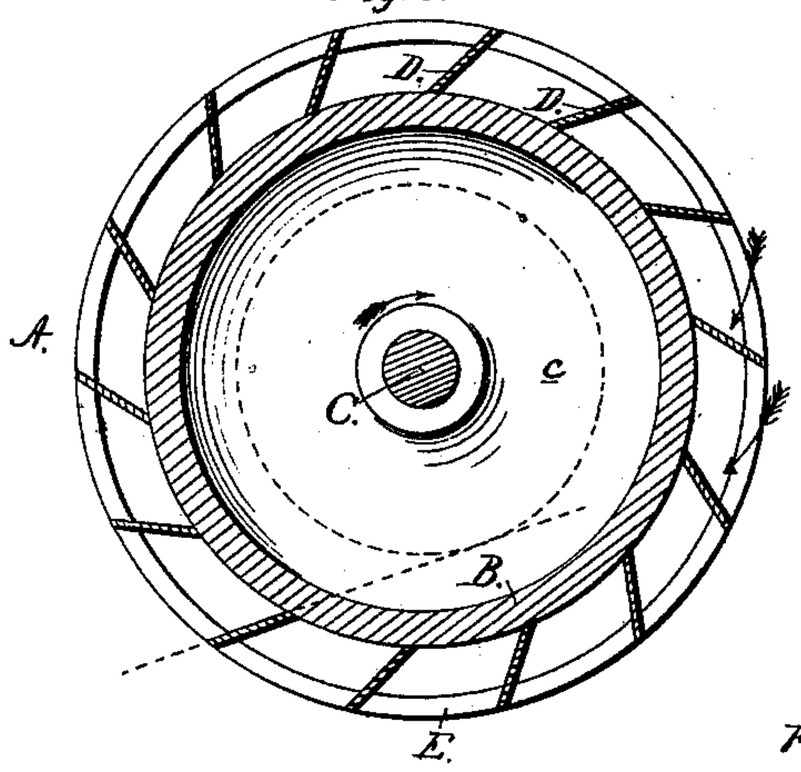



Fig. 4.

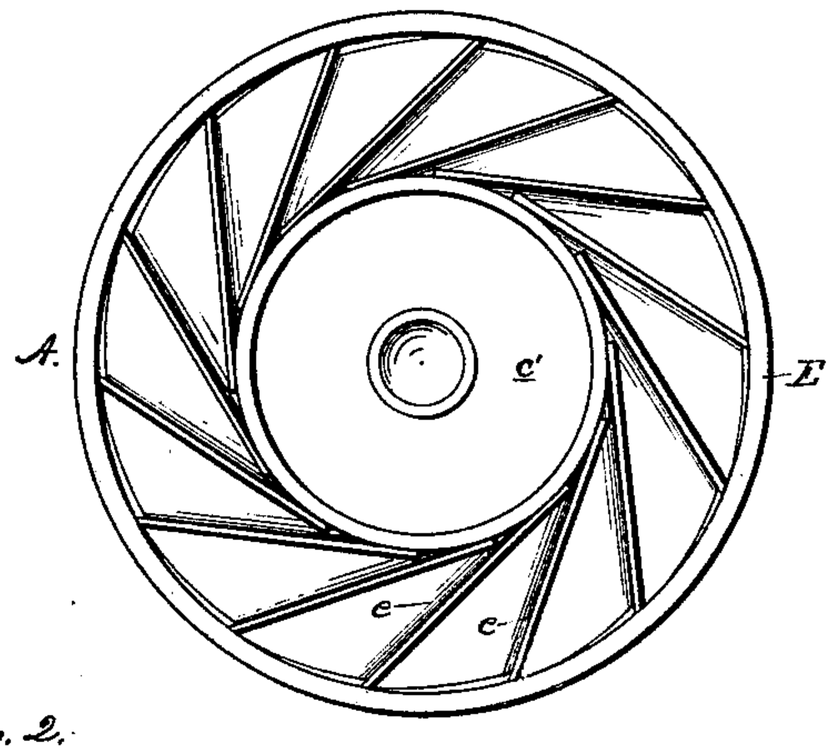



Fig. 2.

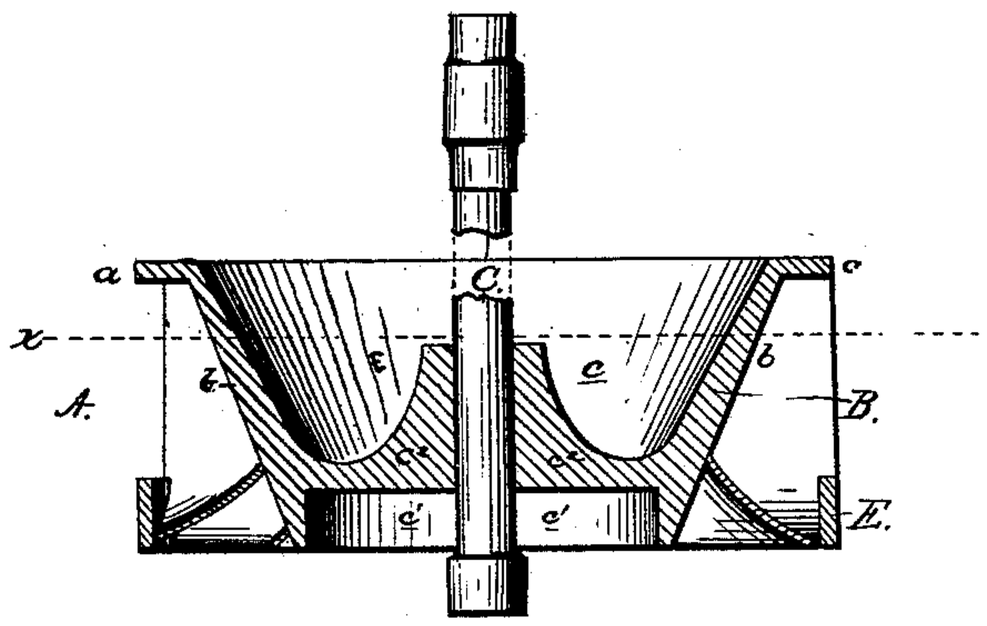
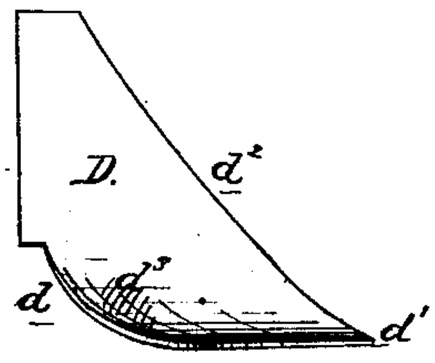



Fig. 5.




Attest;
C. T. Dyer.
S. M. Seely.

Inventor:
William R. Jenkins Jr.
by George Dyer & Co.
Attys.

# UNITED STATES PATENT OFFICE.

WILLIAM R. JENKINS, JR., OF BELLEFONTE, PENNSYLVANIA.

## IMPROVEMENT IN TURBINE WATER-WHEELS.

Specification forming part of Letters Patent No. **190,595,** dated May 8, 1877; application filed April 9, 1877.

*To all whom it may concern:*

Be it known that I, WILLIAM R. JENKINS, Jr., of Bellefonte, in the county of Centre and State of Pennsylvania, have invented a new and useful Improvement in Turbine Water-Wheels; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The object I have in view is the production of a turbine water-wheel of that class which receives the force of the water at the side tangentially, and delivers the same beneath, near the periphery of the wheel, which will be simple in construction, durable in use, and will utilize the force of the water to the greatest advantage; and my invention therein consists in the various combinations of the operative parts, as fully hereinafter explained.

To enable others skilled in the art to make and use my invention, I proceed to describe the same, having reference to the drawings, in which—

Figure 1 is a perspective view, with the bottom ring partly broken away to show the form of the buckets; Fig. 2, a central vertical section of the same; Fig. 3, a horizontal section on the line *x x* in Fig. 2; Fig. 4, a bottom view of the wheel, and Fig. 5 a separate view of one of the buckets.

Like letters denote corresponding parts in each figure.

A is a turbine water-wheel, which is set in a case in the usual manner, and is adapted to receive the force of the water tangentially, as shown by arrows in Fig. 3. This wheel has a center, B, extending the entire height of the same, whose exterior form is that of an inverted truncated cone. The upper edge of the center has a narrow horizontal flange, *a*, and from this flange the sides *b* of the center slope inwardly to its bottom.

To lessen the weight of the wheel the center is hollowed out from the top, as shown at *c*, and from the bottom, as shown at $c^1$, leaving a diaphragm, $c^2$, between these hollowed-out portions, through the center of which passes the shaft C. The shaft is mounted on a step, in the usual manner, extends upwardly through the case in which the wheel is inclosed, and is connected at its upper end with suitable gearing.

D are the buckets, which are secured to the sides of the center B at short intervals, and extend from the under side of the flange *a* to the lower end of such center; and E is a ring, passing around the wheel and attached to the outer lower edges of the buckets. The buckets D are of general triangular shape, Fig. 5, with the outer lower corner *d* cut away to fit the ring E, and the upper angle lopped off to allow it to rest against the flange *a*. The corner *d* of each of the buckets is turned up into a nearly-horizontal position, while the inner lower corner $d^1$ remains in line with the oblique side $d^2$ of the bucket, thus forming an angular surface, $d^3$, to receive the downward and outward force of the water. The buckets are set against the sloping sides *b* of the center B, at an angle inclining in the direction of the motion of the wheel, so as to receive the force of the water at right angles, or nearly so. (Arrows, Fig. 3.) The buckets are set at such an angle to the center B as to be also tangential to the circle formed by the lower end of such center, which circle is shown by dotted lines in Fig. 3, both the upper and lower parts of the buckets being tangential to the same circle.

In operation, the water being presented to the wheel as shown by the arrow, the same is received by the buckets perpendicular to their sides, and exerts its full force upon them. Passing inwardly, the water exerts a lateral pressure against the sloping sides of the center, and has a tendency to lift the wheel from its step, and thus greatly reduce the friction caused by the downward pressure of the water on the lower part of the buckets. From thence the water passes downwardly, and, by the centrifugal force of the wheel, is thrown mostly in an outward direction, and is received upon the angular surface $d^3$ of the buckets, where its force is expended, and passes out through the triangular openings *e* between the lower ends of such buckets.

By this construction of the parts a simple and durable wheel is produced; and by hav-

ing the buckets so situated as to receive the force of the water at right angles to their sides, and also by utilizing the lateral pressure to reduce the friction, and expending the centrifugal force upon the lower ends of the buckets, the maximum amount of power is obtained.

Having thus fully described my water-wheel, and explained some of its advantages, what I claim as new therein, and desire to secure by Letters Patent, is—

1. In a turbine water-wheel, the combination of the conical center B, extending the entire height of the wheel, with the buckets D placed at an angle to the said center, and reaching downwardly only to the lower periphery of the said center, substantially as described and shown.

2. In a turbine water-wheel, the combination, with the conical center, of the triangular buckets D, placed at an angle to the said center, inclining in the direction of motion, so that both the top and bottom edges of said buckets are tangential to the circle formed by the lower periphery of such center, substantially as described and shown.

3. In a turbine water-wheel, the buckets D, receiving the force of the water at right angles, having the cut-away portion *d*, the turned-up portion $d^3$, and oblique side $d^2$, constructed and arranged substantially as described and shown.

4. The combination, with the conical center B, extending the entire height of the wheel, of the triangular buckets D, inclined as described, and reaching downwardly only to the lower periphery of the said center, and the ring E, all constructed and arranged substantially as set forth and shown.

This specification signed and witnessed this 30th day of March, 1877.

WILLIAM R. JENKINS, JR.

Witnesses:
J. P. GEPHART,
ISAAC LOSE.