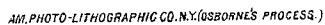


No. 133,039.

Fig. 3.



UNITED STATES PATENT OFFICE.

JOSEPH A. KYLE, OF CEDARVILLE, OHIO.

IMPROVEMENT IN TURBINE WATER-WHEELS.

Specification forming part of Letters Patent No. 132,039, dated November 12, 1872.

To all whom it may concern:

Be it known that I, JOSEPH A. KYLE, of Cedarville, Greene county, Ohio, have invented a new and useful Turbine, of which the following is a specification:

Nature and Objects of my Invention.

This is an improved form of those turbines which both receive and discharge at their periphery; and my invention consists in, first, an improved form of sluice-gate and of mechanism for the simultaneous opening and closing to any desired extent of the gates; secondly, in an improved form of "bucket."

General Description.

A turbine embodying my invention is represented in Figure 1 by a side elevation of one-half and an axial section of the other half of such turbine; and in Fig. 2 by a top view and horizontal section of the respective halves; Fig. 3 is a side elevation of a portion of the wheel, a part of the wheel-curb being broken away; Fig. 4 is a horizontal section through the lower part of two consecutive buckets; and Figs. 5 and 6 represent, respectively, a sluice-gate and the incline for operating it, detached.

A is a cylindrical curb, surmounted by a flange or brim, B, from which rise vertically a series of sluice-walls, C, in circular arcs, which extend from near the outer to the inner periphery of the flange B, so as to form a succession of conveying-inlets or gateways, *c*, simultaneously closable, more or less, as required, by the gates D, attached to chute-plates E, of the represented curved triangular contour, and having a flange, *e*, on their edges nearest the walls C, and a hinged connection, F, with said walls at their ends most remote from the gate proper. Except a central aperture, *g*, for the wheel-shaft H, the entire area included within the sluice-walls C is closed by a cap, G, provided with the customary bushing I for the said shaft. The cap G has a guide, *g'*, and stops *g'' g'''* for an annular plate, J, from which project a series of inclined planes, K, whose edges, entering slots *d* in the gates D, enable the simultaneous elevation of said gates by the simple sliding of the said plate J in the line of its arc. At the top of each incline K is a stop, *k*. A segmental rack, L,

on plate J receives a pinion, M, at foot of a handle, N, accessible to the miller, and who is thus enabled to regulate at any moment the simultaneous opening or closing the sluice-ways. The series of inclines not only enable the easy and simultaneous manipulation of the gates, but serve to hold them to any specific adjustment without further care of the miller, and without the necessity of pawls or other extraneous appliances. Secured to the lower part of the curb is a bridge-tree, O, having an adjustable pivot, P, upon which rests the shaft H of the wheel Q, which wheel is formed as follows: Secured to shaft H, by hub R and arms S, is the annular crown T, which crown is horizontal at its periphery, and thence shelving downward and inward, as shown. Depending from crown T is a series of buckets, U, of the form represented—that is to say, having their advancing sides *u* concave, both in horizontal and vertical section, and at right angles or nearly so to the entering jets of water, and their following sides being on vertical planes parallel with the path of said jets. The upper fourth of said buckets is open on the side of the wheel periphery, and the lower portion on that side is closed by a cylindrical wall or curb, V, having vertical outlets *w* formed by lips W, in direction tangential to the wheels' periphery and opposite to its rotation.

Operation.

The gates being sufficiently elevated by means of handle a jet of water will enter under each gate and be, by the regularly-converging walls, directed inward so as to strike nearly at right angles the upper concave surface of the bucket, and thence act by gravity and acquired impetus on the remaining concave surface of the bucket, until, having expended its force, it reaches the ventage *w* and escapes without disturbance or loss of power at the periphery of the wheel, whose peripheral portion moving rapidly away leaves the thus-discharged water practically nearly quiescent in the tail-way, and without appreciable deduction from the power of the wheel. The water while within the wheel takes a curved gradually descending and finally backward path in a plane substantially tangential to

the wheel, and consequently coincident with the most effective application of the motive power; the centrifugal force necessarily generated in the escaping water being, at the same time, rendered available for its escape the instant its effective energies have become expended.

I claim herein as new and of my invention—

1. The described arrangement of flanged curb A B, converging sluice-walls C, having each a hinged chute-gate, D E e F, and a series of simultaneously-acting inclines K k, substantially as and for the purpose set forth.

2. The wheel or turbine proper, consisting of crown T, buckets U u, and the curb V having vertical outlets w, formed by lips W, tangential to the wheel, as and for the purpose set forth.

In testimony of which invention I hereunto set my hand.

J. A. KYLE.

Witnesses:

GEO. H. KNIGHT,
JAMES H. LAYMAN.