N. L. GREENE.

WATER-WHEEL.

No. 187,004 Patented Feb. 6, 1877.

Fig: 1.

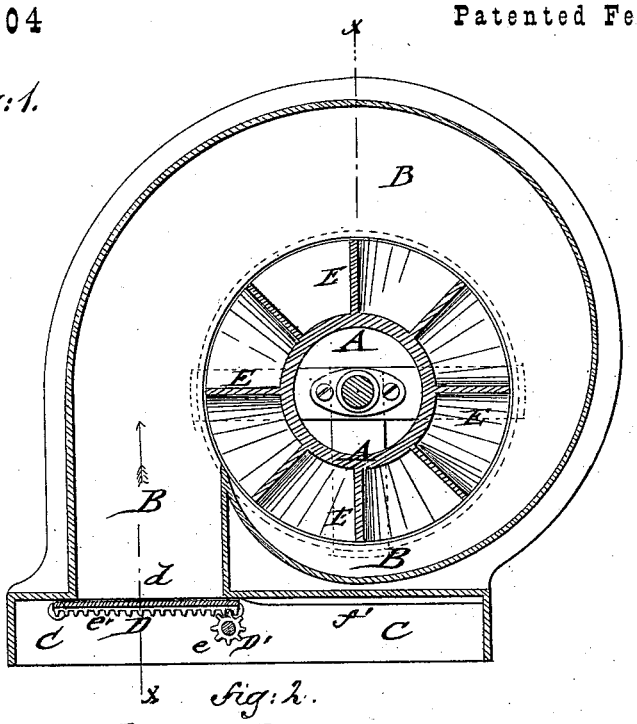


Fig: 2.

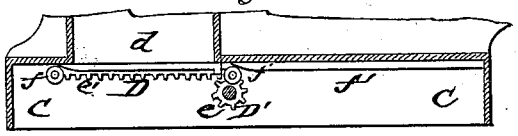
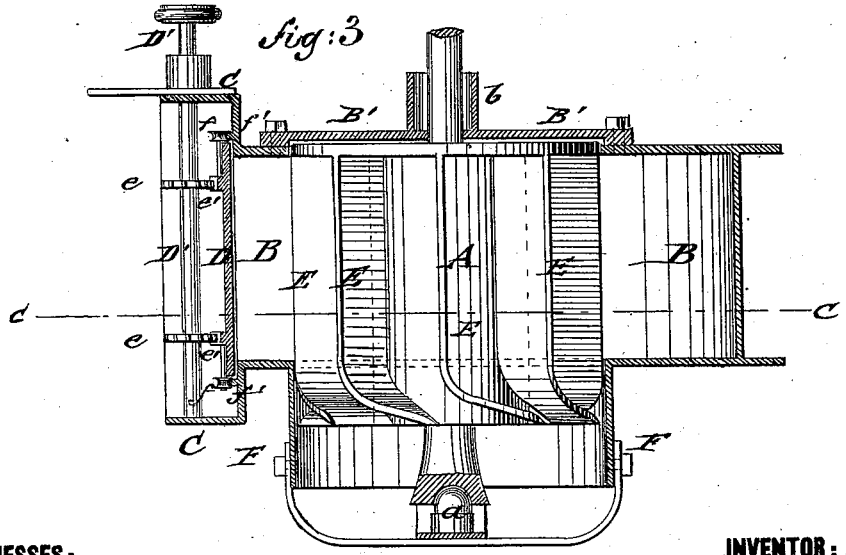


Fig: 3



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NELSON L. GREENE, OF EDMESTON, NEW YORK.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. **187,004**, dated February 6, 1877 ; application filed December 23, 1876.

To all whom it may concern:

Be it known that I, NELSON L. GREENE, of Edmeston, in the county of Otsego and State of New York, have invented a new and Improved Water-Wheel, of which the following is a specification:

In the accompanying drawing, Figure 1 represents a horizontal section of my improved water-wheel, on line *c c*, Fig. 2; Fig. 2, a top view of the horizontally-movable gate; and Fig. 3, a vertical transverse section of wheel and casing, on line *x x*, Fig. 1.

Similar letters of reference indicate corresponding parts.

The invention has reference to improvements in water-wheels, by which a body of water of varying cross-section may be thrown without obstruction or diminution of power on the wheel, the escape of water at the top of the casing prevented, and a full utilization of the reaction of the water at the lower part of the wheel obtained.

The invention will first be described in connection with the drawing, and then pointed out in the claims.

In the drawing, A represents a water-wheel, whose vertical shaft turns on a bottom step or bearing, *a*, and in a stuffing-box, *b*, of the top plate of a scroll-shaped casing, B, that encircles the wheel, and diminishes gradually in width from the entrance-opening *d* and gate at one point of the wheel, and around the wheel to the narrowest part, where the scroll meets the wheel. The flume terminates in a metallic frame, C, of the scroll-casing B, and supplies the water to the entrance-opening *d* of the same, which is of smaller size than the flume, to keep up a full supply of water. The entrance-opening *d* is opened or closed by a horizontally-moving gate, D, that is operated by an upright shaft, D′, with pinions *e*, gearing with two or more rack-bars, *e′*, of the gate, to keep the same steadily in position in its forward and return motion.

The gate D moves, by top and bottom rollers *f*, on parallel guide-rails *f′*, which are inclined or recessed at both sides of the entrance-opening *d* of the casing, so that the gate, when seated in the inclined parts of the rails, will tightly and firmly close the opening, and prevent thereby any water from entering into the casing.

The gate is moved from the side of the entrance-opening, adjoining the wheel, forward to the outermost wall of the casing, so as to gradually diminish the width of the entrance-opening, and reduce the cross-section of the body of water.

The water sweeps, whenever the gate is partially closed, along the outer circumference of the scroll-casing, and acts with full force on the buckets of the wheel from the point of attack, where the casing is of equal width with the inlet, without being weakened or obstructed by the intermediate buckets between the entrance and point of attack. This forms an important advantage of my gate, as the full power of the water may be utilized with a full or partial gate.

The top of the casing B is closed tightly by a disk-plate, B′, which is attached by screws, and fitted, by the stuffing-box *b*, around the shaft. The buckets E of the wheel A radiate from the center or core of the same, and are straight from the top part downward throughout the full height of the casing, and then abruptly curved below the casing to form discharge-openings of diminished width, for utilizing thereby the full power of the reaction.

An encircling cylinder or casing, F, extends from the bottom of the casing to suitable distance below the wheel, and assists the curved parts of the buckets to receive the full effect of the reaction of the water at the tail of the wheel. The water in the scroll-casing acts directly on the upper straight parts of the buckets, while the water leaving the wheel reacts on the curved lower ends of the buckets, so that a large percentage of the water-power is utilized, and an effective water-wheel obtained.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A water-wheel whose buckets E are radial to its axis, where the water impinges upon them, and below this curved, as shown and described.

2. The combination, with buckets E, curved at the lower end, as specified, of the subsidi-

ary casing F, arranged to assist in utilizing the full reaction of water at the tail of wheel, as set forth.

3. The combination of the horizontally-moving gate, operated by suitable gearing, and running on top and bottom rollers, with guide-rails having inclined portions at both sides of the entrance-opening of the scroll-casing, to lock gate firmly in closed position, as described.

4. The combination of a scroll-shaped casing, with closed top part and cylindrical extension below bottom of casing, with a wheel having radial buckets, straight at the part within the scroll-casing, and curved at the lower part within the bottom casing, substantially in the manner and for the purpose specified.

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Witnesses:
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