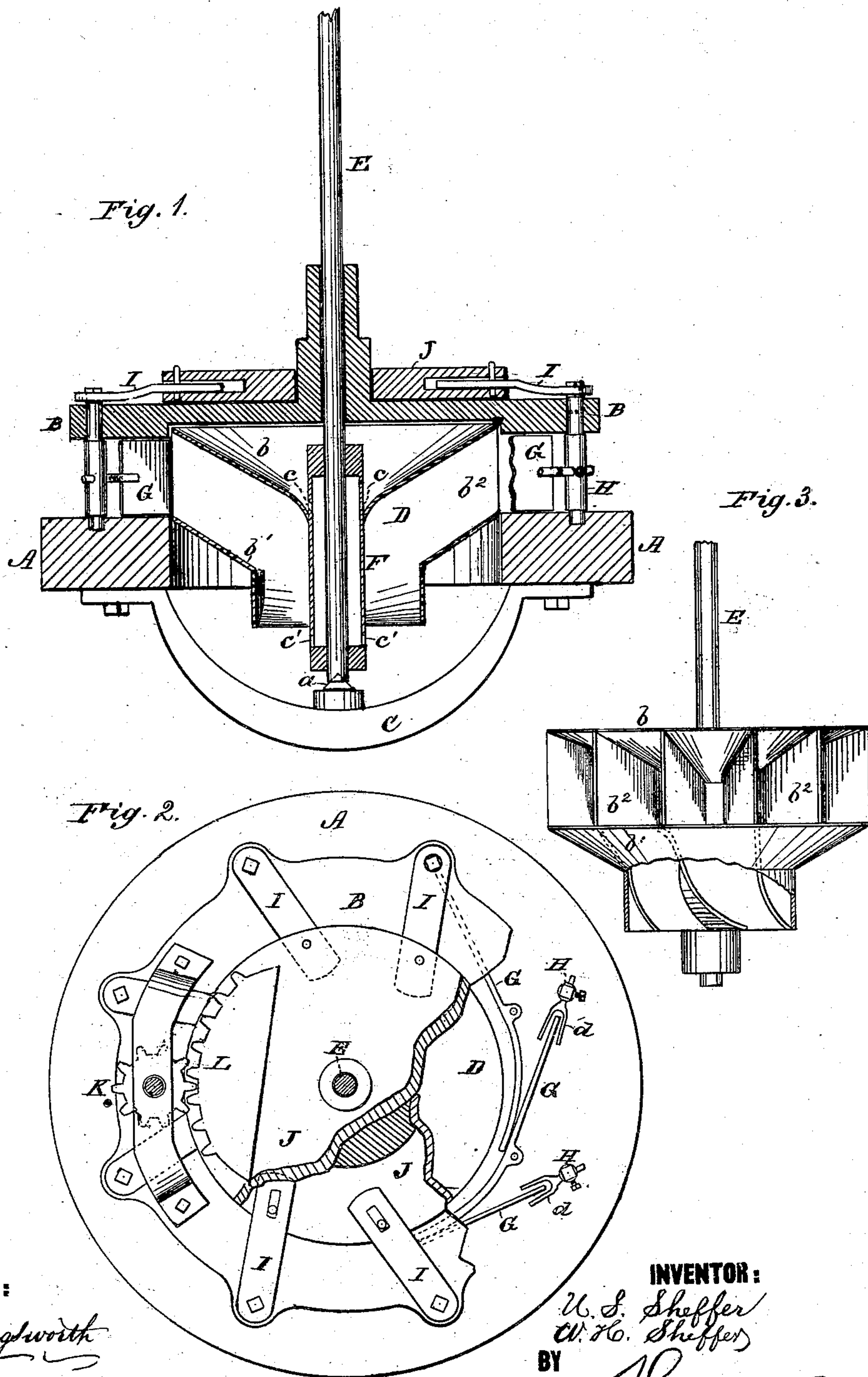


U. S. & W. H. SHEFFER.  
Turbine-Wheel and Gate Operating Mechanism.  
No. 207,076. Patented Aug. 13, 1878.



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

URIAH S. SHEFFER AND WILLIAM H. SHEFFER, OF YORK, PENNSYLVANIA.

## IMPROVEMENT IN TURBINE WHEELS AND GATE-OPERATING MECHANISM.

Specification forming part of Letters Patent No. 207,076, dated August 13, 1878; application filed June 26, 1878.

*To all whom it may concern:*

Be it known that we, URIAH S. SHEFFER and WILLIAM H. SHEFFER, of the city and county of York, and State of Pennsylvania, have invented a new and Improved Turbine Water Wheel and Gate; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is a vertical central section. Fig. 2 is a plan view with a part of the rotary disk and crown-plate broken away. Fig. 3 is a side view of the wheel with the lower ring broken away to show the curved buckets.

The invention consists in constructing the wheel with a conical upper plate, a conical lower plate, and radial partitions forming buckets converging downwardly and toward the center of the wheel, the said partitions being extended downwardly to form curved buckets at the point of discharge, as hereinafter more fully described.

The invention also consists in combining with the vertically-pivoted gates short vertical rock-shafts carrying rigid forks that embrace the gates at one end, which rock-shafts are oscillated by rigid arms above the crown-plate loosely connected with a rotary moving disk operated by a pinion and toothed segment, so that when the rock-shafts are turned axially by the rotary disk the gates are moved upon their vertical pivots to shut off or admit the water to the wheel.

The invention further consists in surrounding the shaft of the wheel by a hollow hub or boss, which constitutes a discharge-conduit for the escape of water which may collect on the dishing upper surface of the wheel.

In the drawing, A represents the base-plate, and B the crown-plate, forming the case of the wheel. C is the spider or supporting-frame for the step *a*, and D the wheel, secured firmly to the vertical shaft E mounted upon said step. This wheel is constructed with a conical upper plate, *b*, a conical lower plate, *b*<sup>1</sup>, and radial partition *b*<sup>2</sup>, arranged between said plates, and forming therewith converging buckets,

which dip downwardly toward the center of the wheel. The lower plate, *b*<sup>1</sup>, of the wheel terminates at the bottom in a ring, between which and the central shaft the partitions extend downwardly, and are curved to one side, as shown in Fig. 3. F is a tubular case, constituting the boss or hub of the wheel and surrounding the vertical shaft. This hollow hub is provided with perforations *c* at the top and *c*<sup>1</sup> at the bottom, and serves as a conduit to carry away leakage which may collect in the dishing upper surface of the wheel. G are the gates of the wheel, which gates are arranged loosely upon vertical pivots between the crown-plate and base-plate. These gates are arranged to constitute water-ways to the wheel when their outer ends are swung farther from the center, and when swung inwardly serve to shut off the water from the wheel.

To operate these gates we pivot short rock-shafts H near the outer ends of the gates, and to the same rigidly attach forks *d*, adjustably fixed by set-screws, as shown, and arranged to loosely embrace the outer ends of the gates. These rock-shafts are made to project through and above the crown-plate, and to their squared upper ends are rigidly attached arms I, which extend into a circumferential slot in the edge of a disk, J, and are loosely pivoted thereto. This disk J is made to swivel or rotate upon the boss or hub of the crown-plate, and is operated through a shaft by a pinion, K, engaging with a segmental gear, L, upon the periphery of the disk. Now, it will be seen that as the disk J is turned by the gears the arms I are deflected, the rock-shafts H turned axially, and the attached forks embracing the gates are made to swing said gates in or out upon their pivots to open or close the same.

Having thus described our invention, what we claim as new is—

1. The wheel consisting of the upper conical plate, *b*, the lower conical plate, *b*<sup>1</sup>, terminating in a ring, and radial partitions *b*<sup>2</sup>, curved in the ring portion, as shown, and arranged to form converging buckets with a curved downward discharge, as shown and described.

2. The combination, with the wheel consist-

ing of conical plates  $b\ b^1$  and partition  $b^2$ , of the shaft E and the interposed tubular case F, having openings above and below the wheel, as and for the purpose described.

3. The combination, with the vertically-pivoted gates, of the vertical rock-shafts, having a loose forked connection with said gates, and rigid arms above loosely connected with a circularly-adjustable disk, substantially as described.

The above specification of our invention signed by us this 20th day of June, A. D. 1878.

URIAH S. SHEFFER.  
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Witnesses:

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