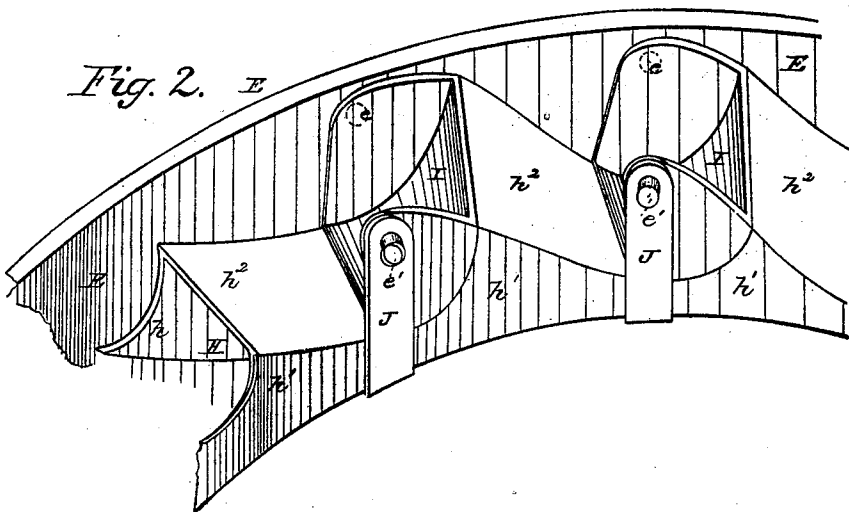
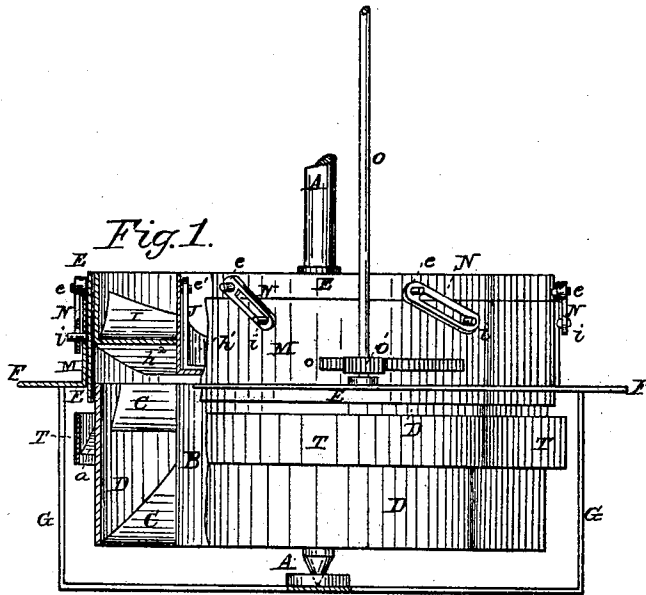


P. O. Palmer,

Turbine Wheel.

No. 90,952.

Patented Nov. 10, 1869.



Witnesses.
A. A. Pettit
J. C. Heyman

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United States Patent Office.

PHILIP O. PALMER, OF SWOOPE'S DEPOT, VIRGINIA.

Letters Patent No. 96,952, dated November 16, 1869.

IMPROVEMENT IN WATER-WHEELS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, PHILIP O. PALMER, of Swoope's Depot, in the county of Augusta, and State of Virginia, have invented a new and improved Turbine Water-Wheel; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side view, a portion of the curb and wheel having been removed to show the internal construction thereof, and

Figure 2 is a detached perspective view, representing the construction and arrangement of the chutes and gates.

The object of this invention is to save the water, and to improve the construction of the gates, so that they can be more easily operated and adjusted than heretofore.

The first object is attained by the employment of an auxiliary set of buckets to catch and utilize the water of leakage; and the second, by the use of pivoted curved gates operating against the mouths of the cycloidal chutes, in the manner hereinafter more particularly set forth.

In the drawings—

A represents the vertical shaft.

B, the hub.

C C, the main buckets, arranged between the hub and the outside rim, D, of the wheel, as seen in fig. 1.

E, the curb, fitting down over the upper edge of the rim D.

F, a horizontal flange around the lower edge of the curb, connected to the spindle-step by means of curved standards G G, which support the weight of the curb, chutes, and gates.

H H, a series of cycloidal chutes, arranged around the inner side of the vertical walls of the chute, as seen in fig. 2, each chute being composed of the two vertical walls $h h^1$, in connection with the two curved inclined floor-plates $h^2 h^2$, constructed as shown in said fig. 2.

I I, curved gates, pivoted upon trunnions $e e^1$ to the curb E, and to standards J, and adapted to turn on said pivots, so as to open or close the mouth of the chutes to any required degree.

M, a horizontally-sliding ring or hoop, extending entirely around the curb, and connected to the trunnions $e e$ by means of slotted arms or links N, rigidly affixed to the trunnions.

$i i$, pins, projecting from the sides of the ring M into the slots of the arms or links.

o , a rack on the ring M; and

O, a spindle, having a pinion, o^1 , at its lower end, by which to slide the ring in one direction or the other, and thereby to turn the gates on their trunnions, for the purpose of letting on or shutting off the water.

$a a$, a set of supplementary buckets, similar in form to the main buckets C C, but much smaller, arranged around the outside of the rim D, directly under the joint between the parts D E, for the purpose of intercepting and utilizing any water that may leak through between the curb and the wheel; and

T, a narrow rim or hoop, attached to the outer edges of said auxiliary buckets, and constituting their outer wall, as represented in fig. 1.

For the purpose of controlling the extent to which any given movement of the ring M will open the gates, the arms N N may be made adjustable at different angles on the trunnions, and where the available quantity of water is very small, by removing any number of said arms, or by withdrawing the pins $i i$, throwing the ends of the links off of the pins, or disconnecting the upper end of the links from the trunnions, any number of gates may readily be put out of connection with the ring, so that its movement will not open them, and the flow of water will thereafter be confined to the other gates.

In this manner, the quantity of water available for the purpose of operating the wheel, may vary considerably, and yet the wheel can be adjusted to it, so as to work perfectly.

Having thus described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. The curved gates I I, hung on trunnions $e e^1$, in connection with the slotted arms N, the pins i , the sliding ring M, and the rack and pinions $o o^1$ O, all constructed to operate substantially as and for the purposes set forth.

2. The supplemental buckets $a a$, on the outside of wheel D, when arranged with reference to the joint between the wheel and the curb, substantially as and for the purposes specified.

The above specification of my invention signed by me, this 8th day of April, 1869.

P. O. PALMER.

Witnesses:

CHAS. A. PETTIT,
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