

E. L. SMALL.

Improvement in Water-Wheels.

No. 114,211.

Patented April 25, 1871.

Fig. 1.

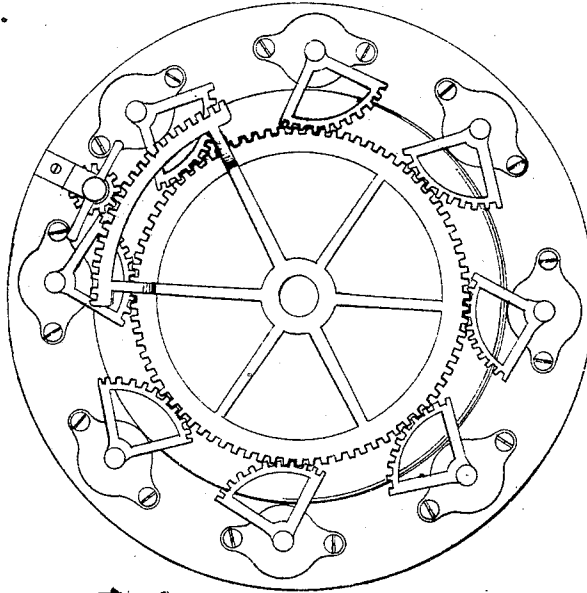
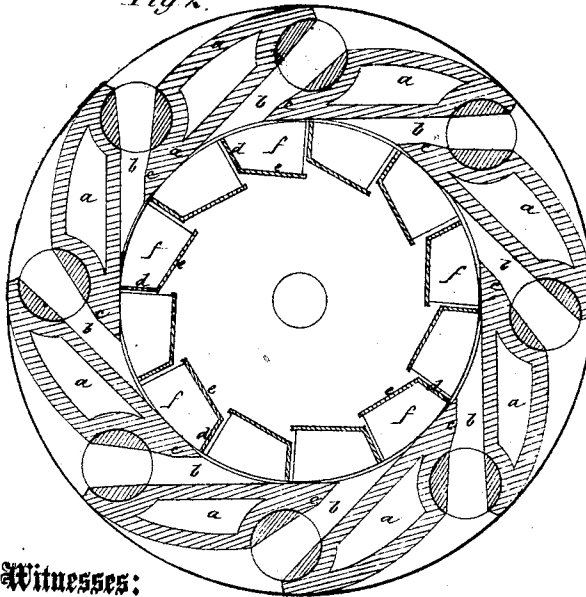


Fig 2.



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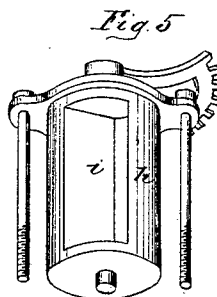
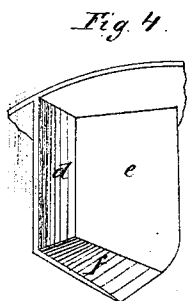
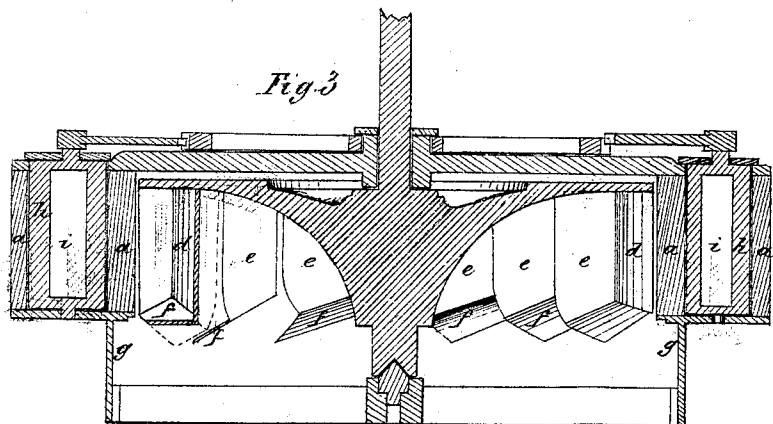
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EPHRAIM L. SMALL, OF URBANA, OHIO.

Letters Patent No. 114,211, dated April 25, 1871.

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, EPHRAIM L. SMALL, of Urbana, in the county of Champaign and State of Ohio, have invented a new and improved Direct-Action Triple-Vent Water-Wheel; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing making a part of this specification, in which—

Figure 1 is a top view of the case;

Figure 2 is a horizontal section through the case and wheel;

Figure 3 is a sectional central elevation;

Figure 4 is a rear elevation of the bucket; and

Figure 5 is a perspective view of the gate.

This invention relates to a water-wheel constructed on the theory that all the effect produced by the water is due to its direct action on the buckets, the idea that there is a reactive force being a mistaken one, the fact being that, after its direct action has ceased, the water is simply a dead weight on the wheel, and should be gotten rid of as quickly as possible.

The invention therefore consists in such a construction of the gates, chutes, wheel, and case as facilitates, to the greatest extent, both the direct action of the water and its escape from the wheel after the direct action has ceased.

Referring to the drawing—

a, figs. 2 and 3, are the stationary blocks placed between the upper and lower plates of the case, and having between them the chutes *b*.

The longer sides of the chutes are tangential to the wheel, and, consequently, conduct the water square against the buckets.

The shorter sides of the chutes are inclined toward the longer sides as they approach the wheel up to the points *c*, from which points the shorter sides are parallel with the longer ones, and at a distance therefrom equal to the width of the front flanges of the buckets.

This construction brings the point of compression in each chute next to the wheel, and therefore causes the water to be delivered in a solid body to the bucket without spreading; and in a condition to produce the best effect. Friction is also confined chiefly to the parallel sides of the chutes.

The buckets are constructed with a vertical front flange, *d*, a vertical side flange, *e*, and an inclined bottom flange, *f*.

The front flanges *d* are of the same width as the inner mouths of the chutes, and stand in radial lines relatively to the wheel, and, consequently, they stand at right angles to the line of entrance of the water;

or, in other words, receive the impact of the latter squarely.

The side and bottom flanges *e f* serve to hold the water long enough in contact with the front flanges to cause it to expend its force thereupon without spreading or flying off.

The side flanges stand at an angle equal to one-half the width of the front flanges, so as to give the water vent toward the center of the wheel when necessary, and the bottom flanges are inclined downward both longitudinally and transversely, so as to give ample vent at the bottom.

The measure of the longitudinal pitch of the bottom flanges is one-half the width of the side flanges, and the measure of their transverse pitch is one-half the width of the front flanges.

The lower ring, *g*, stands off from the inner edge of the bottom plate a distance equal to the width of the front flanges *d*, so as to allow the water that falls from the bottom flanges, under the centrifugal action of the wheel, a sufficient opportunity for escape.

The gates *h*, figs. 2, 3, and 5, are cylindrical blocks, with tapering openings *i* located between the blocks *a*, and having their seats in said blocks and in the upper and lower plates.

The gates *h* are made to rotate on their trunnions by any suitable means. When closing they do not displace the water, nor are they at all liable to be affected in their movements by the water operating entirely independent thereof. As long as they are in any degree open the gates direct the water against the tangential sides of the chutes.

Having thus described my invention,

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

1. The chutes *b*, having their longer sides tangential to the wheel and the parallel parts of their shorter sides at a distance from the longer sides equal to the width of the front flanges *d*, and their narrowest parts or points of compression next to the wheel, as specified.

2. The bucket, composed of the vertical flanges *d e* standing at angles to each other, the former standing in lines radial to the wheel, and the bottom flange *f* inclined downward and outward, both longitudinally and transversely, as described.

3. The gate *h*, provided with the tapering opening *i*, and placed between the blocks *a*, as explained.

Witnesses:

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