O. S. HAZARD.

WATER-WHEEL AND GATE.

No. 171,223. Patented Dec. 21, 1875.

Fig. 1.

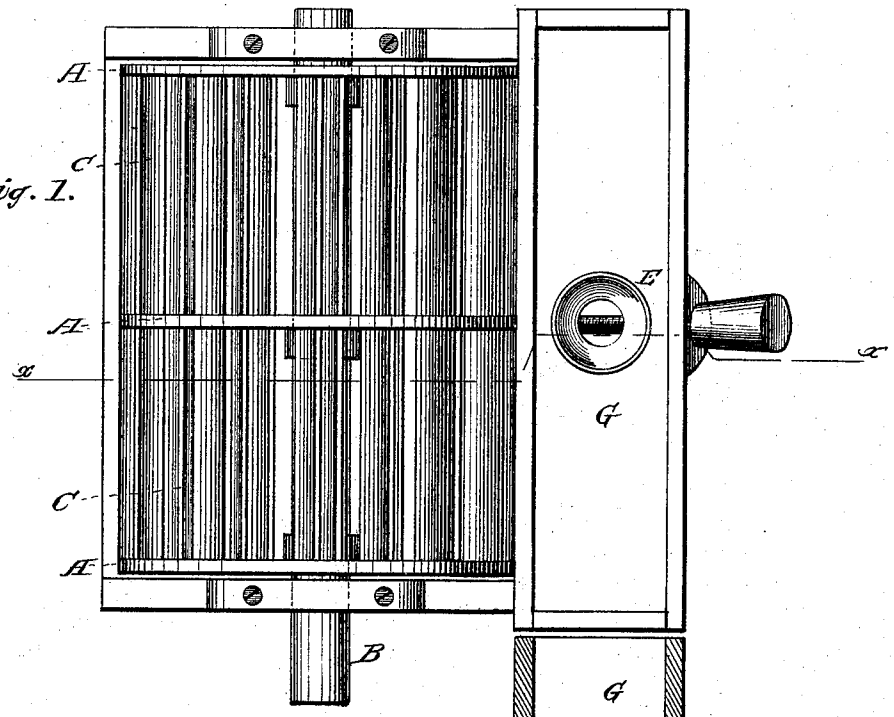
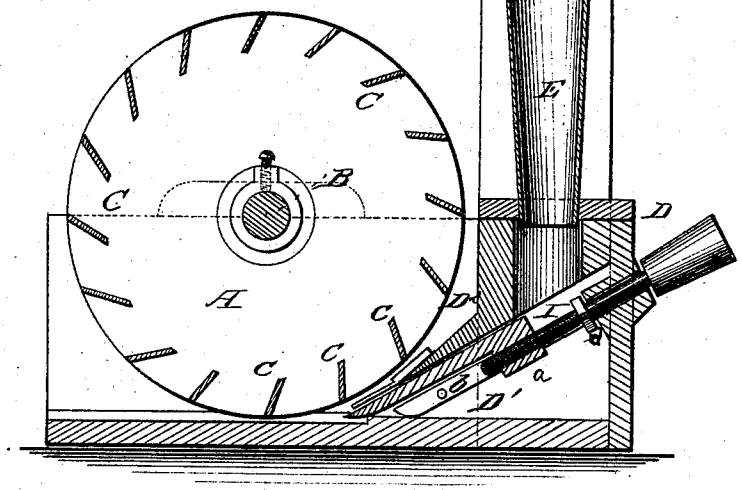


Fig. 2.



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OLIVER S. HAZARD, OF COVENTRY, RHODE ISLAND.

IMPROVEMENT IN WATER-WHEELS AND GATES.

Specification forming part of Letters Patent No. **171,223**, dated December 21, 1875; application filed July 8, 1875.

To all whom it may concern:

Be it known that I, OLIVER S. HAZARD, of Coventry, in the county of Kent and State of Rhode Island, have invented certain new and useful Improvements in Water-Wheels and Gates; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The nature of my invention consists in arranging and placing an intermediate chest between the wheel and head or flume, and conducting the water into it through pipes, and discharging it through the gate of the chest against the floats of an under-shot water-wheel; and in setting the floats at an angle with the stream proportioned to the size of the wheel and depth of water, contracting the floats in such position that the wheel can be run to the speed of the water, and permit the stream to follow up and act against the back side of the floats, all as hereinafter more fully set forth.

In the annexed drawing, Figure 1 is a plan view of my invention. Fig. 2 is a longitudinal vertical section of the same through the line *x x*, Fig. 1.

The wheel is composed of a series of disks, A A, secured on a shaft, B, at suitable distances apart, and connected by means of inclined floats C C. These floats are pitched at an angle which must be proportioned by the size of the wheel and depth of water acting against the floats, so that their edges will come square down into the stream, and their back surfaces present their faces for the water to press against while both are running at the same speed. D represents the intermediate chest, connected by pipes E with the head or flume G, and provided with gates I. The chest D is made in sections, in order to arrange the gate I in slides, and is bolted together after the gate is put in place. The chest is, on the front, provided with an incline, *a*, which extends any desired distance to the opening for the gate, and is a resting-place for the upper surface thereof. Below, at a proper distance, parallel with this incline, are bolted ribs *b*, forming grooves, in which the gate slides. The gate I is made of proper width, with arms projecting from each end, to guide it in place, and extends across the chest, so that its ends and arms move in the slot formed by the ribs and incline of the chest. Upon the under side of the gate is formed a projection, *a*, through which is made a hole with female screw-threads. A rod, *b*, with thread on its inner end, is screwed into said projection, and the outer end of said rod passes through the back of the chest until the shoulder of the rod comes in contact with its inner side. Upon the rod *b*, close to the outside of the chest, is fixed a collar, *d*, so that the rod can be turned, but cannot move endwise.

By turning the rod one way the gate will be drawn up, and vice versa, because of the rods being fixed in place, and the gate made subject to it through the screw.

The lip of the gate extends to near the center of the wheel, thereby permitting the water to discharge in full force and density against the floats of the wheel, by means of which arrangement small wheels can be used under high heads, and sometimes act in place of turbines.

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

1. The combination, with an under-shot water-wheel, A B C, and flume G, of the intermediate chest D, gate I, and pipe E, substantially as and for the purposes herein set forth.

2. The combination of the chest D, gate I, and wheel A B C, the wheel having floats set at an incline, as shown and described, all as and for the purpose specified.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

OLIVER S. HAZARD.

Witnesses:

JOHN MATTESON,

HENRY MATTESON.