J. C. MONTGOMERY.
Water Wheel and Gate.

No. 219,291. Patented Sept. 2, 1879.

Fig. 1.

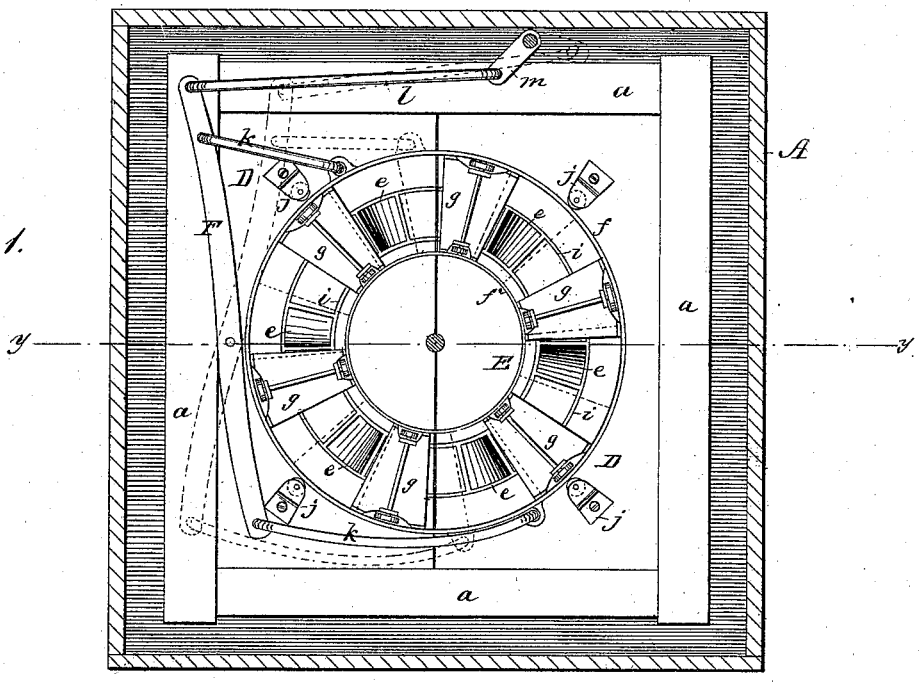
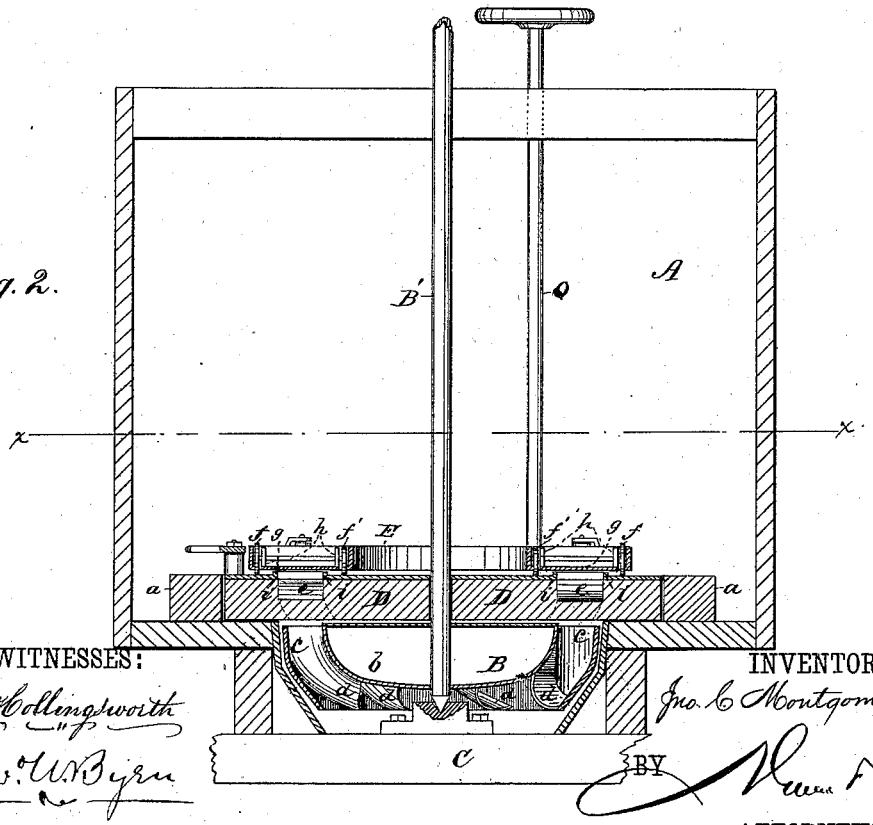


Fig. 2.



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JOHN C. MONTGOMERY, OF PALMETTO, TENNESSEE, ASSIGNOR TO HIMSELF AND ROBERT S. MONTGOMERY, OF SAME PLACE.

IMPROVEMENT IN WATER WHEELS AND GATES.

Specification forming part of Letters Patent No. **219,291**, dated September 2, 1879; application filed July 10, 1879.

To all whom it may concern:

Be it known that I, JOHN C. MONTGOMERY, of Palmetto, in the county of Bedford and State of Tennessee, have invented a new and Improved Water Wheel and Gate; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a horizontal section through line *x x*, Fig. 2, looking down upon the chute-plates and gate. Fig. 2 is a vertical central section through line *y y* of Fig. 1.

My invention consists in a water-wheel composed of a hub having a flat upper side, a convex lower side, a peripheral ring, made of greater depth than the hub and curving under the same, so as to be of less diameter at the bottom than at the top, and a series of interposed curved buckets, which receive water at the top and discharge the same downwardly and inwardly to the center of the wheel.

The invention also consists in the combination, with said wheel, of a pair of horizontal and detachable chute-plates having chutes therein, through which the water gains access to the wheel, which chutes are faced at their upper edges, together with a horizontal rotary gate having a series of face-plates fitting over the said chutes and adapted to be turned to regulate the amount of water to be admitted to the wheel, as hereinafter more fully described.

In the drawings, A represents the pen-stock, in the bottom of which are arranged strips *a*, forming a rectangular recess for the chute-plates, and in the center of which is formed a circular opening for the wheel. B is the wheel, which is rigidly attached to the vertical shaft B′, which extends upwardly, and is provided with a gear-wheel adapted to connect with the mechanism to be driven. The wheel B is mounted upon a step on the cross-bar C, and it is constructed with a hub, *b*, having a plain flat upper surface and a convex lower surface, a peripheral rim, *c*, which is curved under the wheel, so as to make the wheel of greater diameter at the top than it is at the bottom, and a series of buckets, *d*, which are arranged between the peripheral rim and the hub, and are curved, as shown, so as to direct the discharge toward the center of the wheel.

By thus constructing the wheel with a hub of less depth than the outer rim, and making the bottom of the hub convex, and curving the ring thereunder, it will be seen that free clearance for a central discharge of the water is provided.

The upper surface of the wheel rests in the same plane with the bottom of the recess between the strips *a*, and just above the same are disposed the two detachable chute-plates D D. These are made of a thickness about equal to that of the strip *a*, and are made in two parts, which connect with each other at the center line of the wheel. In these plates are formed the chutes or water-ways *e*, which are curved in a circular line in the reverse direction to the curve of the buckets of the wheel, and just above the same, so that the water issuing from the chutes strikes the buckets with its full effective power to impart rotary motion to the same.

E is the horizontal rotary gate. This consists of two rings, *f f′*, connected by face-plates *g*, each of which is provided with a pair of friction-rollers, *h h*, that extend through slots in the face-plates and bear upon the chute-plates. These face-plates *g* form doors or gates, that slide across the openings at the tops of the chutes to more or less close the same. To make a tight joint in closing over these openings, a raised margin, *i*, is formed around the edges of the openings, which raised lip or flange is extended upon two of the sides of the openings in the form of a circular track, which prevents the face-plates from being obstructed by the raised edge of the openings in sliding back and forth over the same.

For holding the rotary gate in concentric position above the chutes, four (more or less) guide-rollers, *j*, are arranged upon vertical axes, and bear against the periphery of the rotary gate.

For imparting the necessary motion to the gate in adjusting the same, two connecting-

rods, *k k*, are loosely coupled to opposite sides of the gate at one end, and at their other ends are attached to the opposite ends of lever F, fulcrumed to one of the chute-plates. This lever is turned by means of a connecting-rod, *l*, and crank-arm *m*, attached to a vertical shaft, *o*, extending to the top of the pen-stock, where it is provided with a hand-wheel for operating the same.

Having thus described my invention, what I claim as new is—

1. The wheel B, consisting of a central hub, *b*, having a flat upper surface and a convex lower surface, a peripheral ring, *c*, of greater depth than the hub, and curved inwardly beneath the same, together with a set of interposed buckets, *d*, curved, as shown, so as to discharge inwardly, substantially as and for the purpose described.

2. The combination, with the wheel, of the pen-stock or case, having strips *a*, forming a recess, the detachable chute-plates D D, connecting with each other across the center line of the wheel, and having chutes *e*, opening in a circular row through the same, the horizontal and rotary sliding gate E, and means for operating the same, substantially as described.

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Witnesses:
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