

# F. Hoyt. Water Wheel.

N<sup>o</sup> 96592.

Patented Nov. 9. 1869.

Fig. 2

Fig. 1

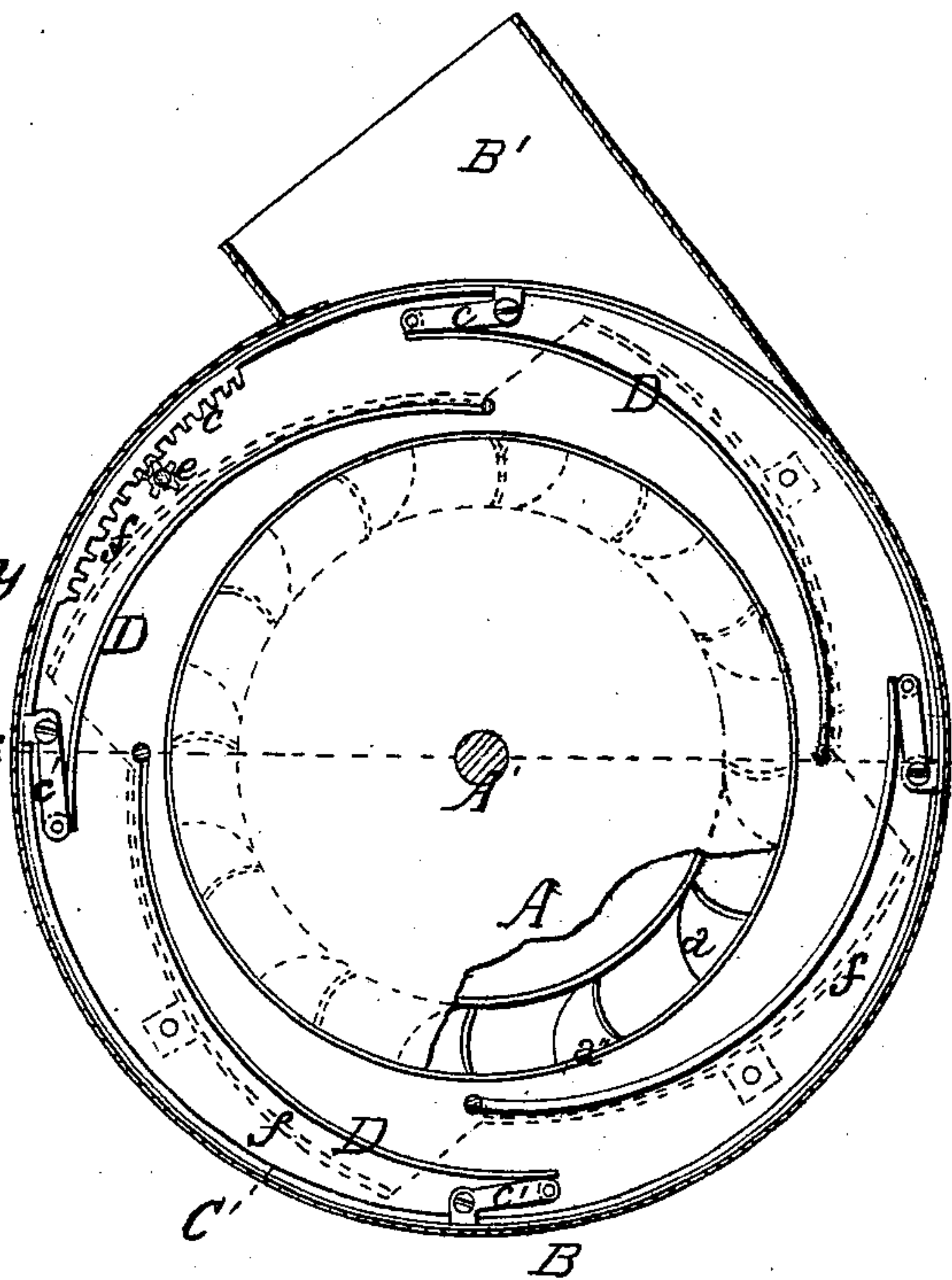
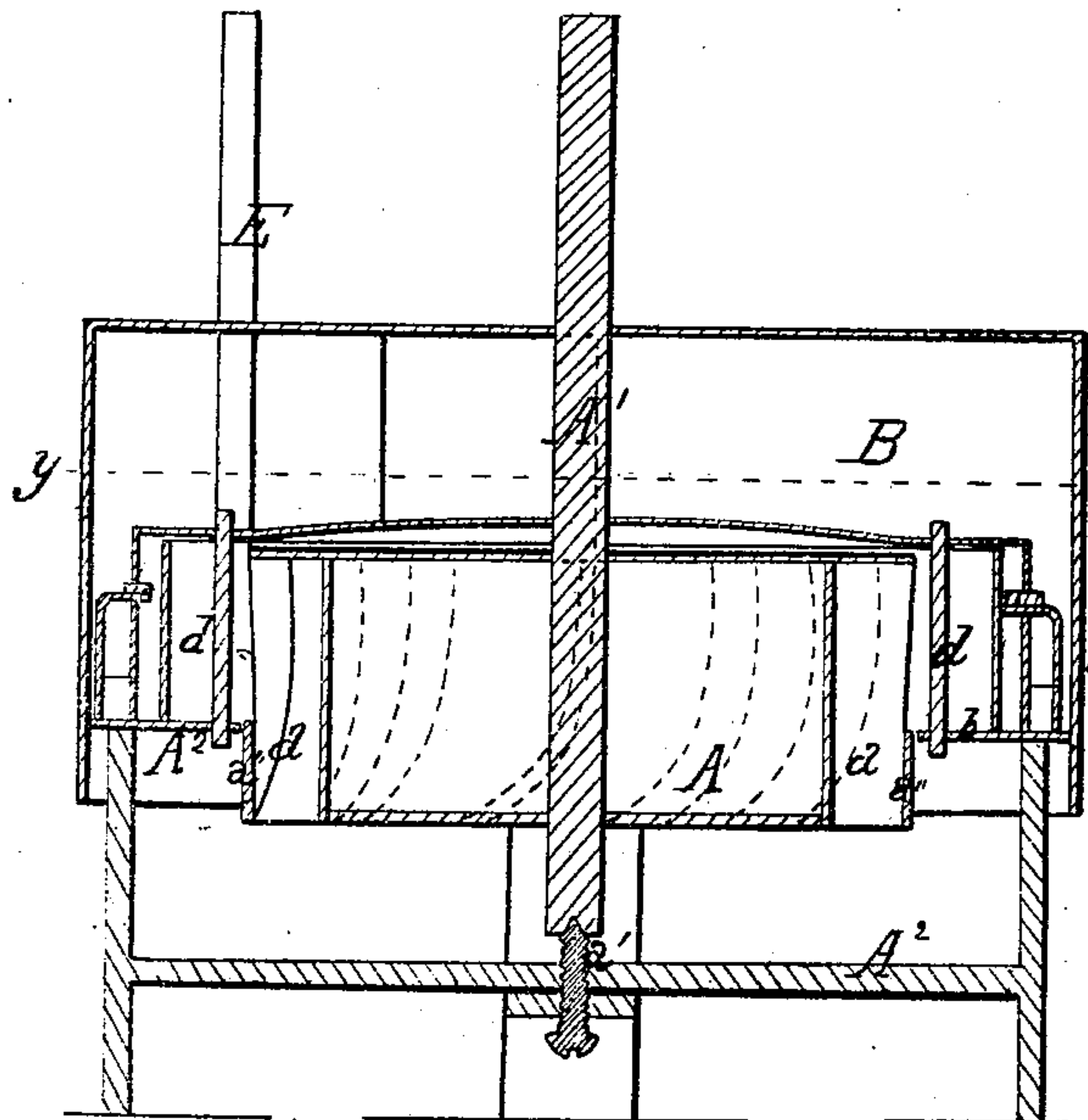
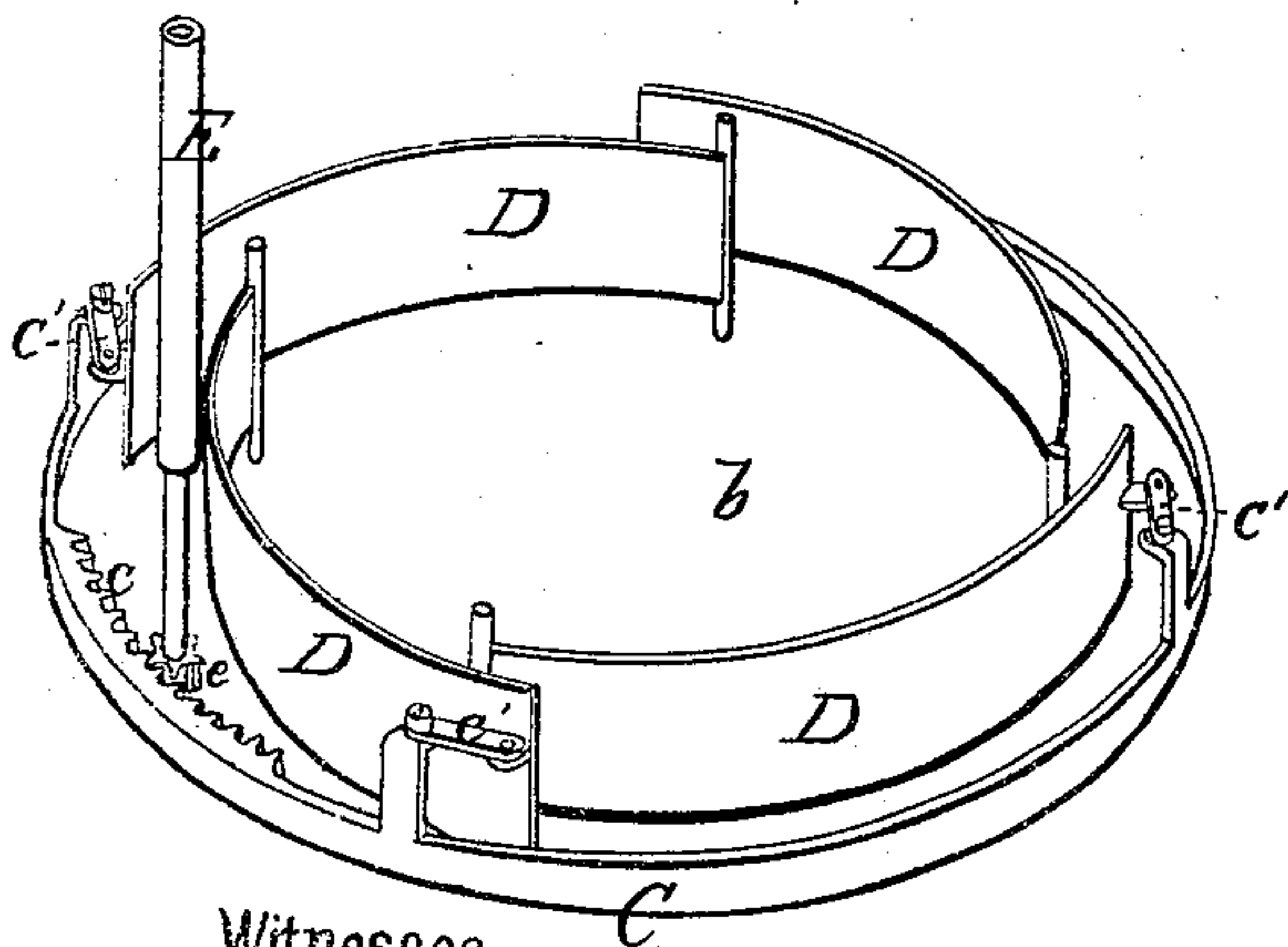


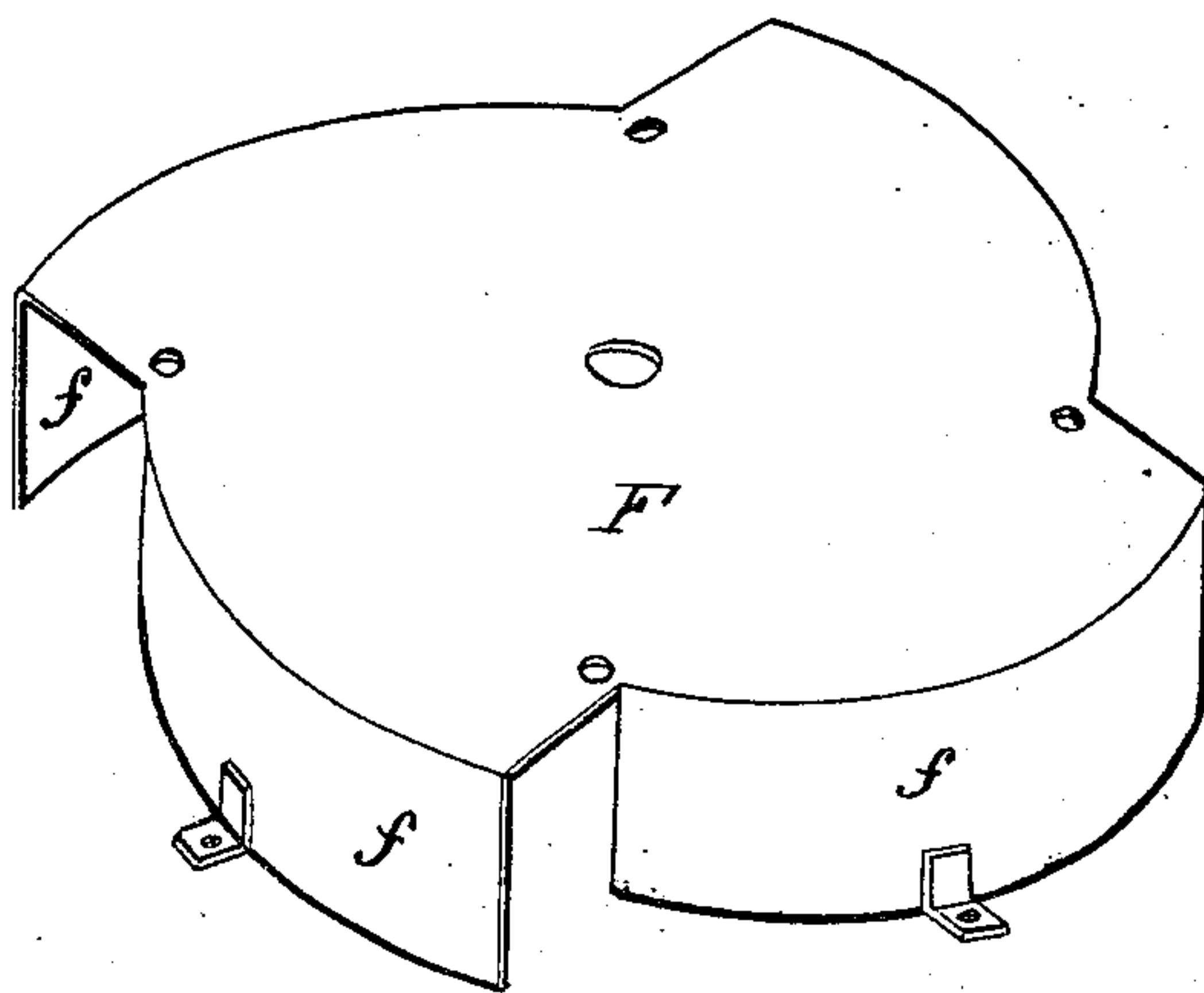
Fig. 3



Witnesses

*A. J. Cladbaugh*  
*J. E. Brown*

Fig. 4



Inventor

*Franklin Hoyt*  
*Per McLean, Grant & Co*  
*Attys*



# United States Patent Office.

FRANKLIN HOYT, OF MONTPELIER, VERMONT.

Letters Patent No. 96,592, dated November 9, 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, FRANKLIN HOYT, of Montpelier, in the county of Washington, and State of Vermont, have invented certain new and useful Improvements in Water-Wheels, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which make part of this specification, and in which—

Figure 1 represents a vertical section of my improved water-wheel at the line  $x x$  of fig. 2.

Figure 2, a horizontal section of the same, at the line  $y y$  of fig. 1.

Figure 3, a view in perspective of the gates, and the mechanism by which they are moved, detached, and

Figure 4, a similar view of the chutes, detached.

The object of my invention is to provide a water-wheel which shall possess the combined advantages of a turbine and a breast-wheel, as well as to afford an improved means of regulating and stopping the supply of water thereto; to which ends,

My improvements consist,

First, in constructing the buckets of curved form, both vertically and laterally, whereby the entering water acts upon them first by impact, as in ordinary breast, and afterward by gravity, as in turbine wheels, as hereinafter described.

Second, in a series of curved gates attached by pivoted arms to a ring which encircles them, and which is rotated by gearing in such manner as to diminish or close at pleasure the openings through which the water is admitted to the chutes.

In the accompanying drawings, which show a convenient arrangement of parts for carrying out the objects of my invention, A represents the wheel which rotates in a casing or penstock, B, to which the water is conducted through the head-race B'.

A<sup>1</sup> represents the wheel-shaft, which bears on a step,  $a$ , on the frame A<sup>2</sup>.

The buckets  $a$  of the wheel are curved radially thereto, as in turbines of ordinary construction, and are, likewise, curved vertically for a portion of their length toward their lower ends, which extend below the bottom plate  $b$  of the casing B, and are surrounded, for this portion of their length, by a band,  $a''$ , connecting their outer edges, and extending upward from the plane of their lower edges to the upper face of the bottom plate  $b$  of the casing B, and forming a running-water joint therewith, as shown in fig. 1.

By this construction, the water is prevented from flying off centrifugally from the buckets after acting upon them by impact, and is retained until all that is let into the wheel shall have descended the whole length of the bucket in the space between the band  $a''$  and the hub-cylinder of the wheel, to be discharged at the bottom of the buckets without waste, after producing an effect due to both the impact and gravity of the fluid.

The water is directed to the buckets by the curved chutes  $ff$  which are united at top by a plate, F, through which the shaft A<sup>1</sup> passes, and secured at bottom to the casing B, the chutes being inclined toward the wheel, as shown in red lines in fig. 2, to properly direct the currents of water thereto.

Curved gates, D, are placed within the chutes  $f$ , being secured at one end to pivots,  $d$ , mounted in bearings in the casing B, and connected at their opposite ends, by pivoted links,  $c'$ , to a ring, C, which encircles them, and rests upon the bottom of the casing.

By imparting rotary movement to the ring C, by means of the pinion  $e$ , on the vertical shaft E, gearing into teeth,  $e$ , on the inner surface of the ring, the gates D can be moved so as to increase, diminish, or shut off entirely the supply of water to the wheel, according as each gate is moved from or toward the pivot of the adjacent gate, thus enabling the supply to be regulated at pleasure.

Having thus fully described my invention,

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

1. The wheel A, constructed substantially as described, with laterally and vertically-curved buckets  $a$ , and the band  $a''$ , in combination with the bottom plate  $b$  of the casing B, as and for the purpose specified.

2. The gates D D, in combination with the chutes  $ff$ , pivoted links  $c' c'$ , and ring C, the whole arranged and operating substantially as and for the purpose described.

In testimony that I claim the foregoing as my invention, I have hereunto set my hand and seal, this 6th day of March, 1869.

FRANKLIN HOYT. [L. S.]

Witnesses:

ORAMEL H. SMITH,  
H. D. CROOKS.