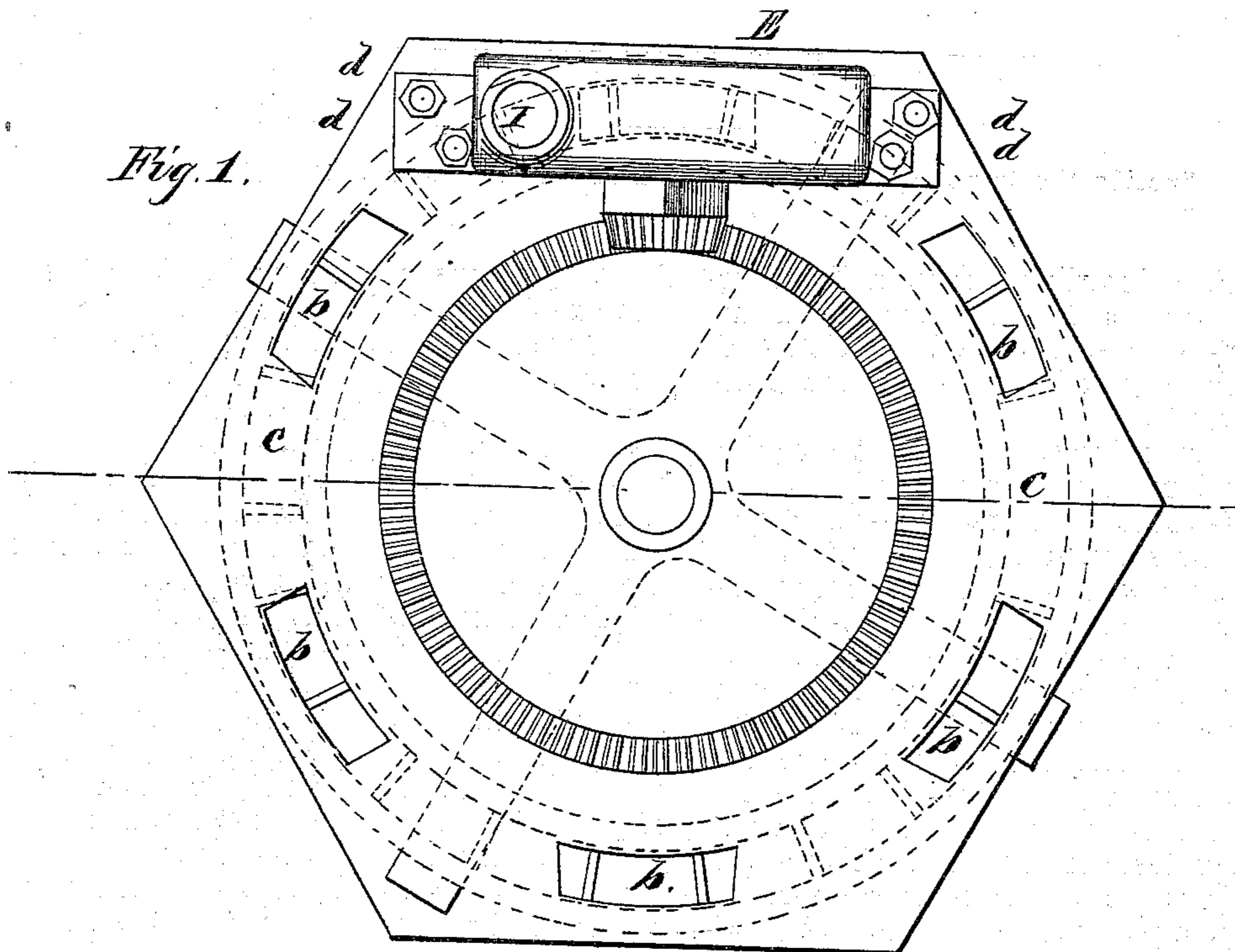


JOHN C. CLIME.

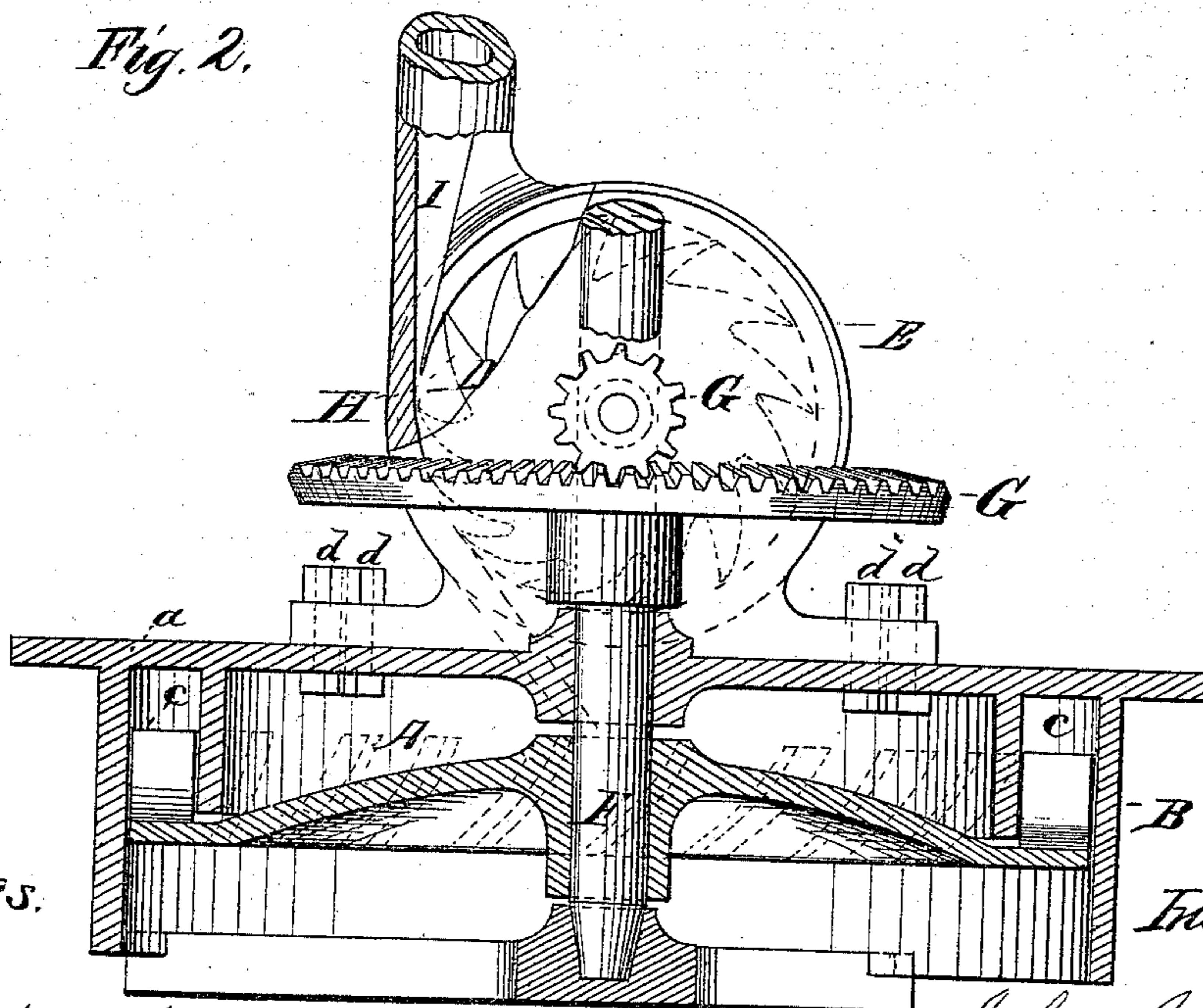
Water-Wheels.

No. 125,662

Patented April 16, 1872.



*Fig. 2.*



Witnesses.

July Kershaw  
Thomas J. Bewley

Inventor.

John C. Clime  
By His Attorney  
Stephen H. H. H.

# UNITED STATES PATENT OFFICE.

JOHN C. CLIME, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF,  
JOHN A. SEEDS, AND ALLEN MIDDLETON, JR., OF SAME PLACE.

## IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. 125,662, dated April 16, 1872.

Specification describing certain Improvements in Combined Direct-Action and Reaction Water-Wheels, invented by JOHN C. CLIME, of the city of Philadelphia and State of Pennsylvania.

My invention relates, in the first place, to the combination of two or more vertical direct-action water-wheels with a reaction-wheel, connected by means of gearing. The pinions of the direct-action wheels are of diameter in relation to the diameter of the reaction-wheel in proportion to the respective powers of the said direct-action and reaction wheels. The invention, in the second place, consists of a novel mode of the construction and arrangement of the chute connected with each direct-action wheel and the bucket of the same, so as to utilize the greatest percentage of the force and weight of the water, as hereinafter described.

Figure 1 is a plan view of the combined direct-action and reaction wheels, one direct-action wheel, D, only being shown. Fig. 2 is a vertical section at the line *a b* of Fig. 1, a part of the case E of the wheel D being broken away to exhibit the construction and arrangement of the buckets H and chute I in relation to each other.

Like letters in both figures indicate the same parts.

A is the reaction-wheel, and B the case in which it revolves. The top plate *a* of the case is provided with six openings, *b*, for the passage of water into the annular space *c*, into which the buckets C of the wheel A project. D is a vertical direct-action wheel in the case E, placed over one of the openings *c* and con-

finied, by means of screw-bolts *d*, to the top plate *a* of the case B. On the center shaft F of the wheel A is confined the bevel-wheel G, into which all the pinions G' of the direct-action wheels D gear. The wheel and pinion, as before stated, are of proportionate sizes to the respective powers of the wheels. The buckets H are pointed and of similar form to saw-teeth, the back of each bucket connecting with the front of the contiguous bucket, as seen in Fig. 2. The chute I of the case E is diminished from the inner side toward its outer edge, as seen in Fig. 2, so as to direct the water onto the buckets H at the extreme diameter of the wheel, and, when they have nearly reached a horizontal position, to get the greatest amount of power practicable and prevent, as much as possible, back action on the buckets.

The chute is curved out a little at the point *x* so as to direct the water from the point of the bucket that has nearly reached a horizontal position to the bucket beneath it.

I claim as my invention—

1. The combination of a vertical direct-action wheel, D, with the reaction wheel A, substantially in the manner above described.

2. The chute I and buckets H, as constructed and arranged, so that the descending current shall strike the outer extremities of the buckets along the whole range of its impact, substantially as above described.

JOHN C. CLIME.

Witnesses:

STEPHEN USTICK,  
THOMAS J. BEWLEY.