

(No Model.)

2 Sheets—Sheet 1.

C. BARNHART.
TURBINE WATER WHEEL.

No. 279,519.

Patented June 19, 1883.

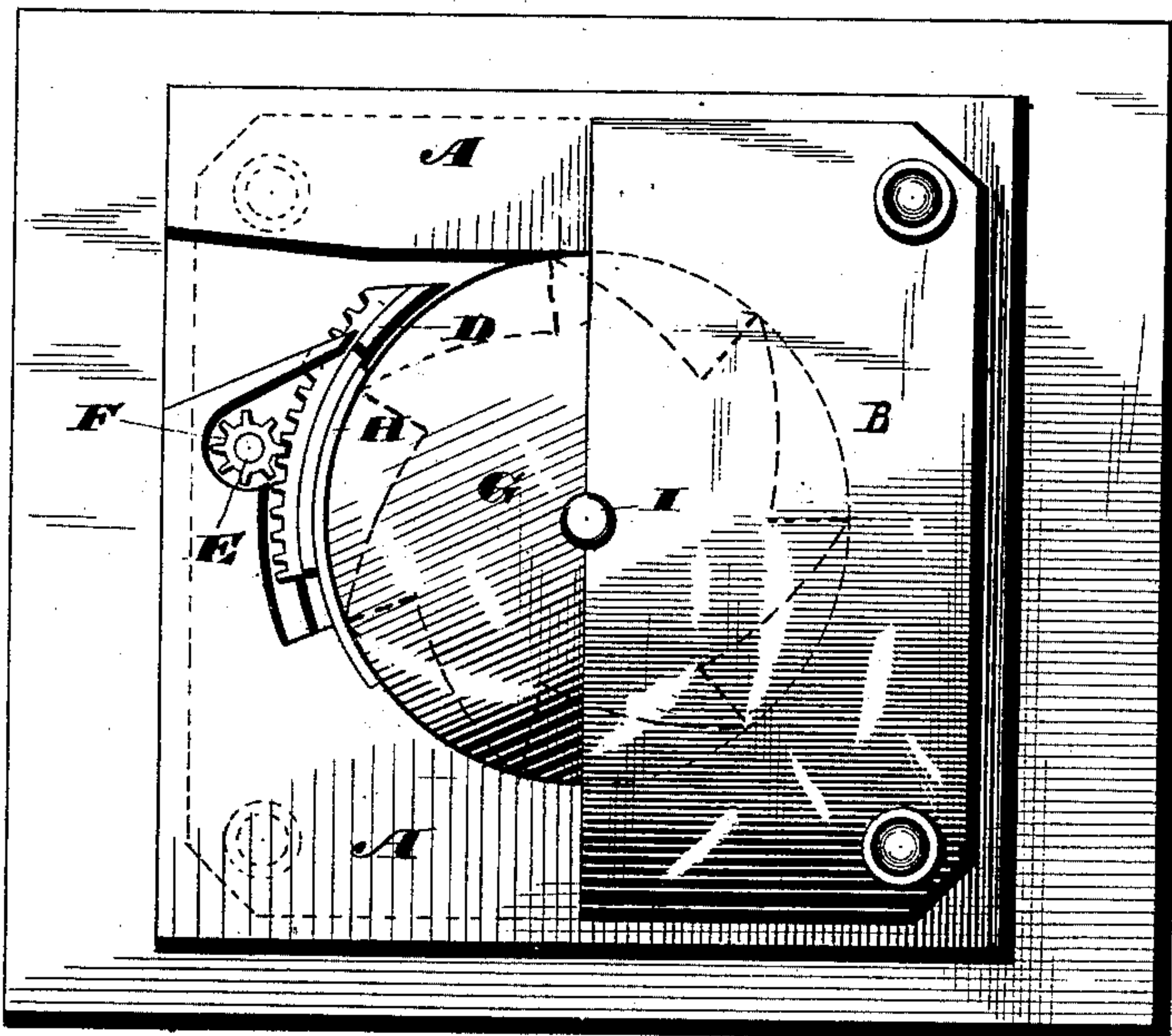
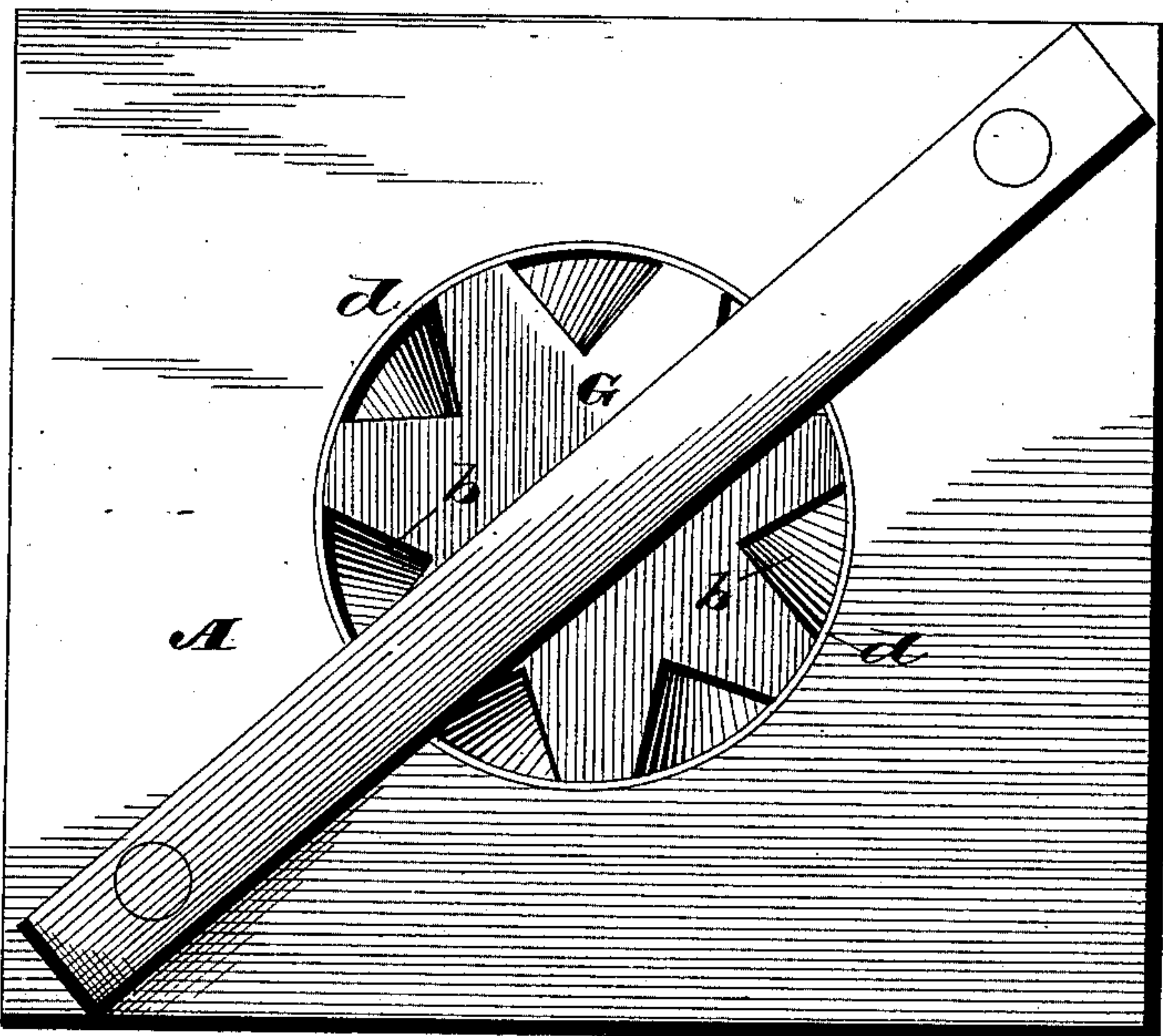


Fig. 1.

Fig. 2.



WITNESSES
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Geo. F. Downing.

INVENTOR
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Attorney

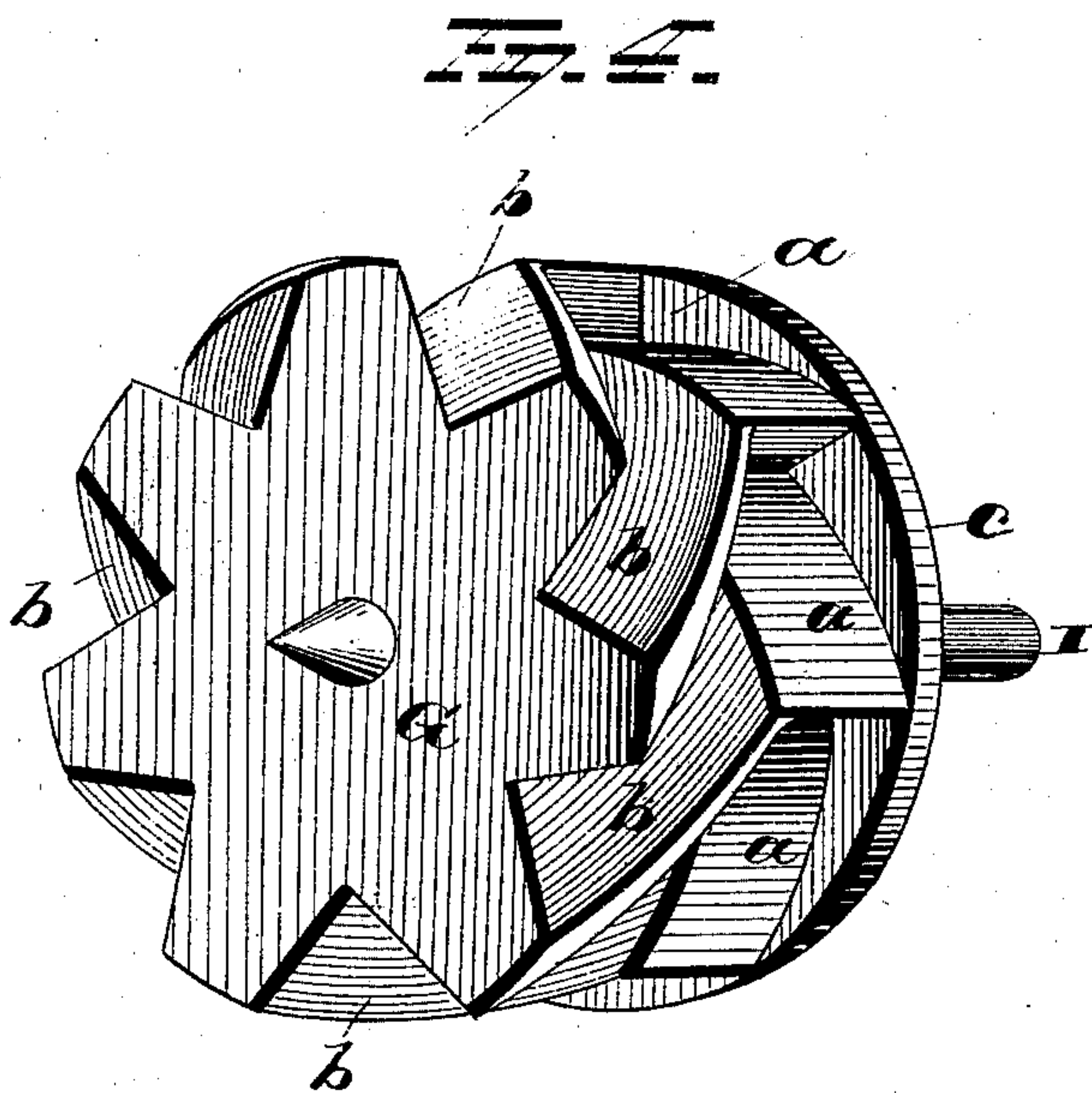
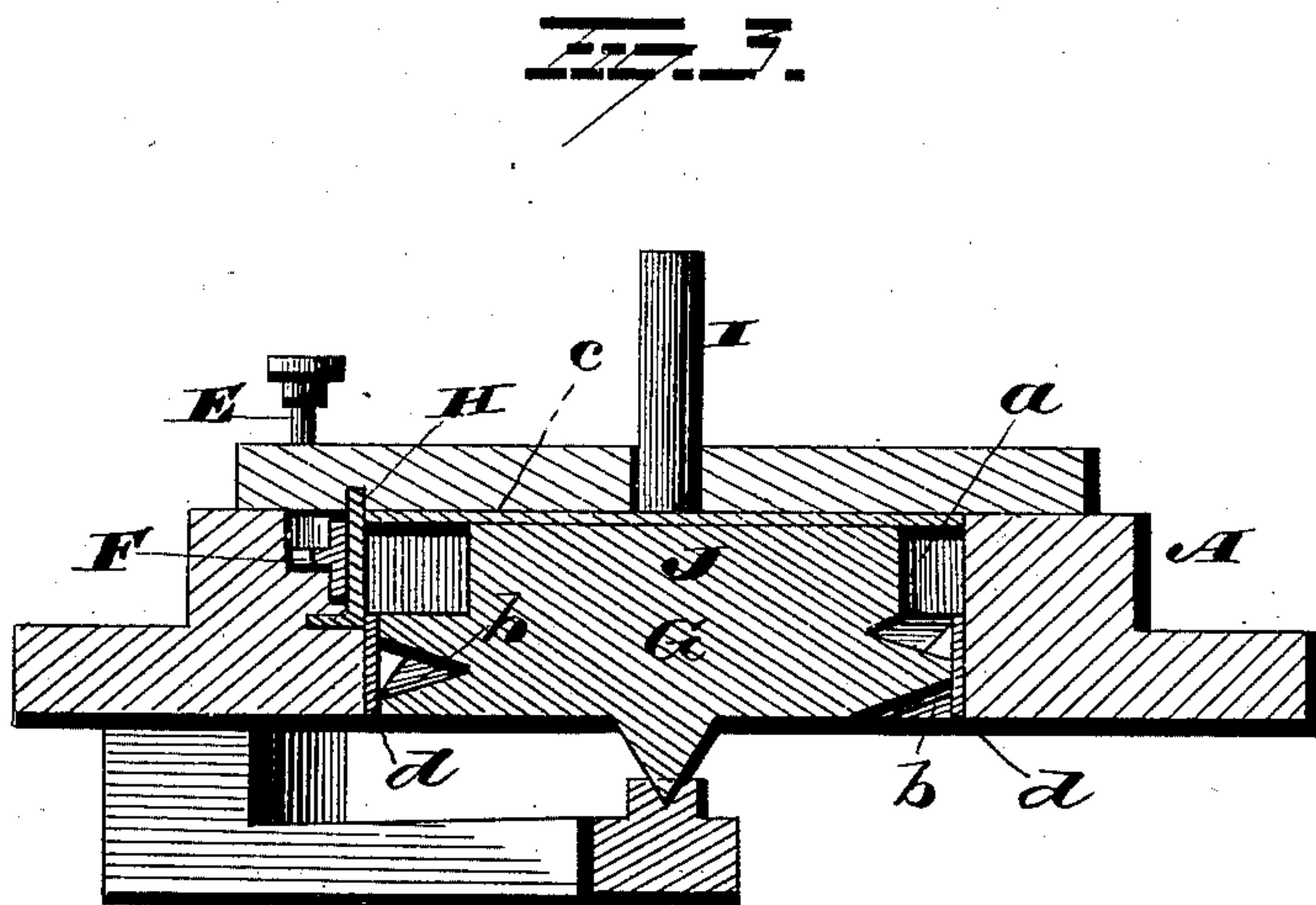
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WITNESSES
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Geo. F. Downing.

INVENTOR
Cornelius Barnhart.
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Attorney

UNITED STATES PATENT OFFICE.

CORNELIUS BARNHART, OF WALKER VALLEY, NEW YORK.

TURBINE WATER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 279,519, dated June 19, 1883.

Application filed November 21, 1882. (No model.)

To all whom it may concern:

Be it known that I, CORNELIUS BARNHART, of Walker Valley, in the county of Ulster and State of New York, have invented certain new and useful Improvements in Turbine Water-Wheels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to an improvement in water-wheels, the object of the same being to provide a wheel closely fitting within a case, and adapted by its peculiar construction to utilize the entire force of the head of water applied to it by impact and reaction combined.

In the accompanying drawings, Figure 1 is a plan view of my improvement with a portion of the casing broken away. Fig. 2 is a bottom plan view. Fig. 3 is a sectional view through the casing and wheel, and Fig. 4 is a perspective view of the wheel with the band removed.

A represents the casing, of any desired size and shape, provided with a cover, B, adapted to rest immediately over the wheel, and prevent, as far as possible, the egress of water between the cover and wheel. The casing A is provided with one or more chutes so situated as to deliver the water at or nearly at right angles to the buckets, the base or bases of the said chute or chutes, as the case may be, being in the same horizontal plane with the line which divides the buckets from the blades. Each chute is provided with a gate, D, curved to conform to the contour of the wheel and operated by the vertical shaft E, having a pinion, F, thereon, which latter meshes with a rack-bar secured to or formed integral with the gate. By turning the shaft E in the proper direction the gate D is moved so as to cover partly or wholly the small end or ends of the chute or chutes, thereby shutting off the supply of water, and consequently stopping or slowing the revolution of the wheel. The gate D is prevented from engaging with the wheel G by the metallic plate H, which latter is also curved to conform to the contour of the wheel, and is secured to the casing in any desired manner. The wheel G fits closely within the casing, and is

mounted on a vertical shaft, I, which latter is supported in the usual manner. This wheel is provided with a series of vertical buckets, *a*, radiating from the large hub J, and a series of inclined blades, *b*, connected to the said buckets. Any suitable number of blades and buckets can be employed, and I prefer to cast them integral with the hub; but the number employed on a wheel is largely dependent upon the size of the wheel. These buckets *a* radiate from the hub of the wheel, can be plane, concave, or convex, as desired, and are adapted to receive the full impact of the head of water. By means of this construction and the construction of the casing the water is admitted through a small opening and fills but one bucket at a time, and is carried around therein until it has made at least one revolution before it is finally discharged through the bottom of the wheel, thereby using a small quantity of water, utilizing it a long time, and finally discharging it in a manner to be described. The wheel G is also provided with a crown-plate, *c*, secured thereto for the purpose of preventing water from passing from one bucket into another. After the force of the water is spent against the buckets it falls by gravity onto the inclined blades *b*, and from thence through the bottom of the wheel, and by its reaction assists in turning the wheel. Each bucket *a* is provided with a blade, *b*, which latter is gradually inclined downward, and also outward, so as to conduct the water to and discharge it as near the periphery of the wheel as possible. These blades *b* are surrounded by a peripheral band, *d*, which latter prevents the water from leaving the wheel until it has traversed the entire length of the blades. In my improved device the water is received upon the very rim of the wheel and retained until discharged by gravitation.

A great objection to the use of the majority of wheels as now constructed is that the scroll or case is made much larger than the wheel, and the water is enabled to pass through from one bucket to another without interference. This form of wheel requires a much greater quantity of water to run it than mine, and is consequently much larger.

It is evident that numerous slight changes in the shapes of the buckets and blades, and

also in the construction of the wheel, might be resorted to without departing from the spirit of my invention; and hence I would have it understood that I do not limit myself to the exact construction of parts shown and described, but consider myself at liberty to make such changes and alterations therein as fairly fall within the spirit and scope of my invention.

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

1. In a turbine water-wheel, the combination, with a casing having a chute, of a wheel 15 closely fitting within said casing, and provided with vertical buckets radiating from the hub of the wheel, and inclined blades provided with a peripheral band, substantially as set forth.

2. In a turbine water-wheel, the combination, with a casing having a chute and a gate 20 for wholly or partially closing the chute, of a wheel closely fitting within said casing, and provided with buckets arranged perpendicularly to the hub, adapted to receive the impact from the head of water, and to prevent the 25 passage of the latter from one bucket to another, and blades inclined diagonally and inwardly to discharge the water through the lower central opening of the casing, substantially as set forth.

3. In a turbine water-wheel, the combination, with a casing, of a wheel having a circular crown-plate, and buckets curved or inclined 30 relative to the periphery of said plate;

and blades extending from said buckets downwardly and inwardly, substantially as set forth. 35

4. In a turbine water-wheel, the combination, with the casing having a chute, a gate for closing the chute, a rock-bar secured to the gate, and a pinion and shaft for operating the gate, of a wheel fitting closely within said casing and provided with a circular crown-plate, 40 and buckets curved or inclined relative to the periphery thereof, and blades so constructed as to discharge the water from the underside of the casing, substantially as set forth. 45

5. The combination, with a case provided with a gate so situated as to direct the water against the periphery of the wheel, of a wheel 50 closely fitting within the case, and provided with buckets and blades for respectively retaining and discharging the water upon the periphery of the wheel, the said wheel being provided with a circular crown-plate, and so constructed as to receive and discharge the 55 water in a direct line of its motion without backlash or cross-currents of the water at any time while passing through the wheel, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing 60 witnesses.

CORNELIUS BARNHART.

Witnesses:

FRED PALMER,
EGBERT CROOKSTON.