

2 Sheets—Sheet 1.

No. 269,208.

Patented Dec. 19, 1882.

Fig. 1.

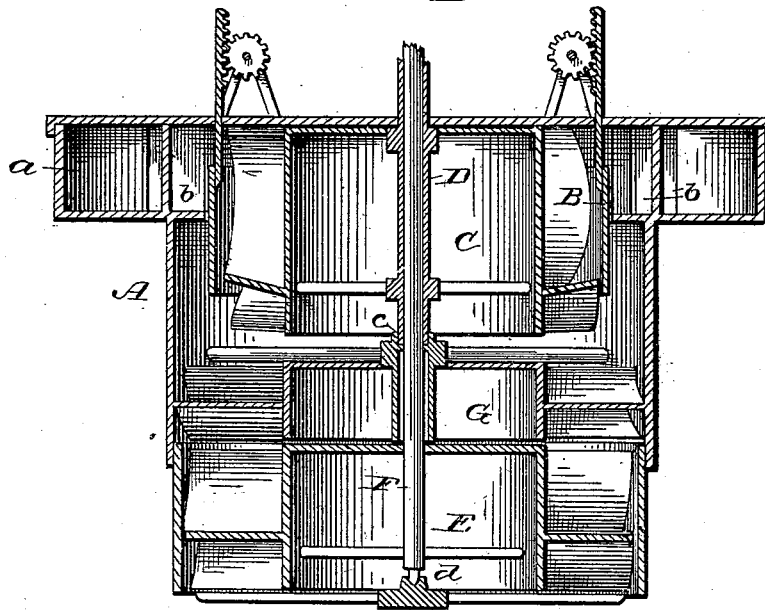
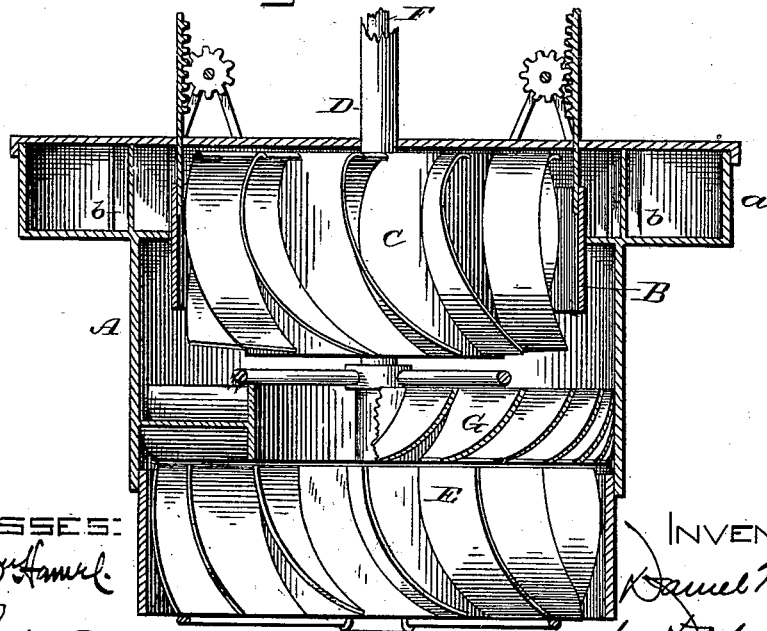


Fig. 22



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(No Model.)

2 Sheets—Sheet 2.

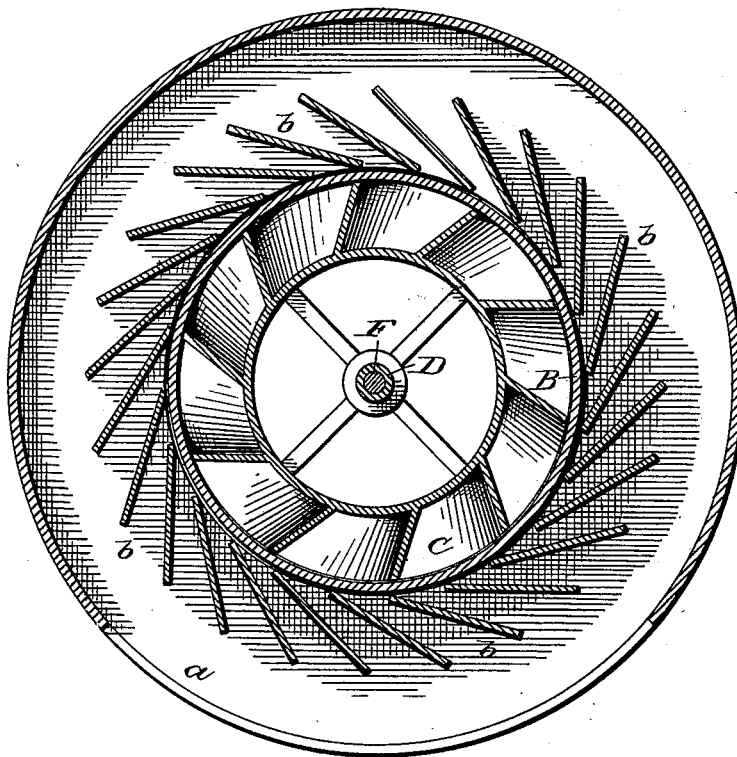
D. M. HOOK.

WATER WHEEL.

No. 269,208.

Patented Dec. 19, 1882.

Fig. 3.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

DANIEL M. HOOK, OF COLUMBIA, SOUTH CAROLINA.

## WATER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 269,208, dated December 19, 1882.

Application filed August 29, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, DANIEL M. HOOK, of Columbia, in the county of Richland and State of South Carolina, have invented certain Improvements in Water-Wheels, of which the following is a specification.

My invention relates to water-wheels; and it consists in arranging two turbine wheels one below the other, with a stationary water-way between them, the wheels being carried by independent shafts one encircling the other.

The invention further consists in other features and details hereinafter fully explained.

In the accompanying drawings, Figure 1 represents a vertical central section of my improved double wheel and casing; Fig. 2, a side elevation of the same with the casing in section; Fig. 3, a top plan view of the casing with the top removed to show the arrangement of the water-inlets and the gate.

The object of my invention is to more fully utilize the power of the water; and to this end it consists in placing one wheel below another in a common casing, and providing an intermediate water-way to direct the water from the first to the second wheel in the proper direction to render its force most available.

Referring again to the drawings, A represents the casing within which the wheels are mounted, said casing being formed with a water-inlet at the top, and a water chamber or channel, *a*, preferably narrowing as it extends around the gate B, which consists of an annular rim or cylinder arranged to move vertically within a series of tangential guides or directing-plates, *b*, between which the water passes to the upper wheel, C, the guides or plates causing the water to strike the blades or buckets of the wheel near the top and well out toward their outer edges, where they afford the greatest leverage. The impact or percussion being thus utilized, the weight and the reaction of the water are utilized as the water glides down the inclined buckets in the ordinary and well-known manner.

The wheel C is carried by a tubular shaft, D, stepped at *c*, and a second wheel, E, is placed some distance below the first and carried by a shaft, F, which passes centrally through shaft D, and is stepped in a block, *d*, as shown in Fig. 1. The wheel E is driven by

the waste or discharge water from wheel C; but as the water is likely to fall straight downward from the first wheel, especially if said wheel is so formed as to utilize to the best advantage the force of the water, I provide a stationary water-way, G, between the two wheels, inclining the water-passages at such an angle as to cause the water to strike the buckets of the second wheel near the top, and substantially at right angles to their face, the wheel being constructed in all respects like the wheel C, except that it is larger in diameter. This increase in diameter is made to afford a free discharge for the water, which, having in a measure lost its force or been checked in acting upon wheel C, might otherwise back up and interfere with the free action of the first or upper wheel.

The shafts of the two wheels may be geared together by differential or compensating gear; or they may be independently connected with different machinery, as found desirable.

I am aware that it is not new to place one wheel below another, so that the lower one shall be driven by the water escaping or discharged from the upper and smaller wheel, said wheels being mounted upon independent shafts; but such wheels have always, so far as I am aware, been arranged to run in reverse directions, and have not been furnished with an intermediate water-way.

I am also aware that two or more wheels have been secured to the same shaft at intervals with intermediate water-ways; but since the first wheel turns or naturally would turn faster than the others, because of having the first and full force of the water, it follows that the other wheel or wheels will turn in dead water, and thus retard instead of assisting the first wheel.

The gate B consists simply of a ring or hollow cylinder, arranged to rise and fall between the wheel C and the guides or plates *b*, being raised and lowered by rack and pinion or other suitable gear. Being within the guides, it cuts off the water close to the wheel and stops the wheel quickly and with little or no waste. The guides or plates also serve to support and guide the cylinder in its vertical movement, and to sustain it against lateral pressure at any point.

It will be observed that the wheel C extends somewhat above the bottom of the surrounding water chamber or inlet *a*, so that the water entering between the directing-plates or guides is caused to strike the outer edges of the blades or buckets and to act in the direction of rotation of said wheel, after which it falls, and, acting upon the backwardly-inclined buckets, gives still further power or effect in turning said wheel, thus utilizing the power both of direct action and reaction in the highest possible degree. The gate or cut-off, being within the guides or plates *b*, and between them and the wheel C, effectually cuts off the delivery to the wheel and prevents the waste of any water whatever.

By my improved construction and arrangement I am enabled to utilize to the fullest extent the power of the water both by direct action and by reaction.

Having thus described my invention, what I claim is—

1. The combination of two turbine water-wheels, mounted upon independent shafts, one

above the other, and an intermediate water-way to give direction to the water escaping from the first wheel and to insure its proper delivery to the second wheel, substantially as explained.

2. The combination of two water-wheels, one placed beneath the other, and mounted upon independent shafts, the upper wheel being smaller than the lower, and an intermediate stationary water-way, arranged to deliver the water at the proper angle from the upper to the lower wheel, substantially as shown and described.

3. In combination with the casing A, having guides or directing-plates *b*, a vertically-moving annular gate, B, arranged within said guides, substantially as shown, whereby they are caused to guide and sustain the gate, as explained.

DANIEL M. HOOK.

Witnesses:

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J. W. MULLER.