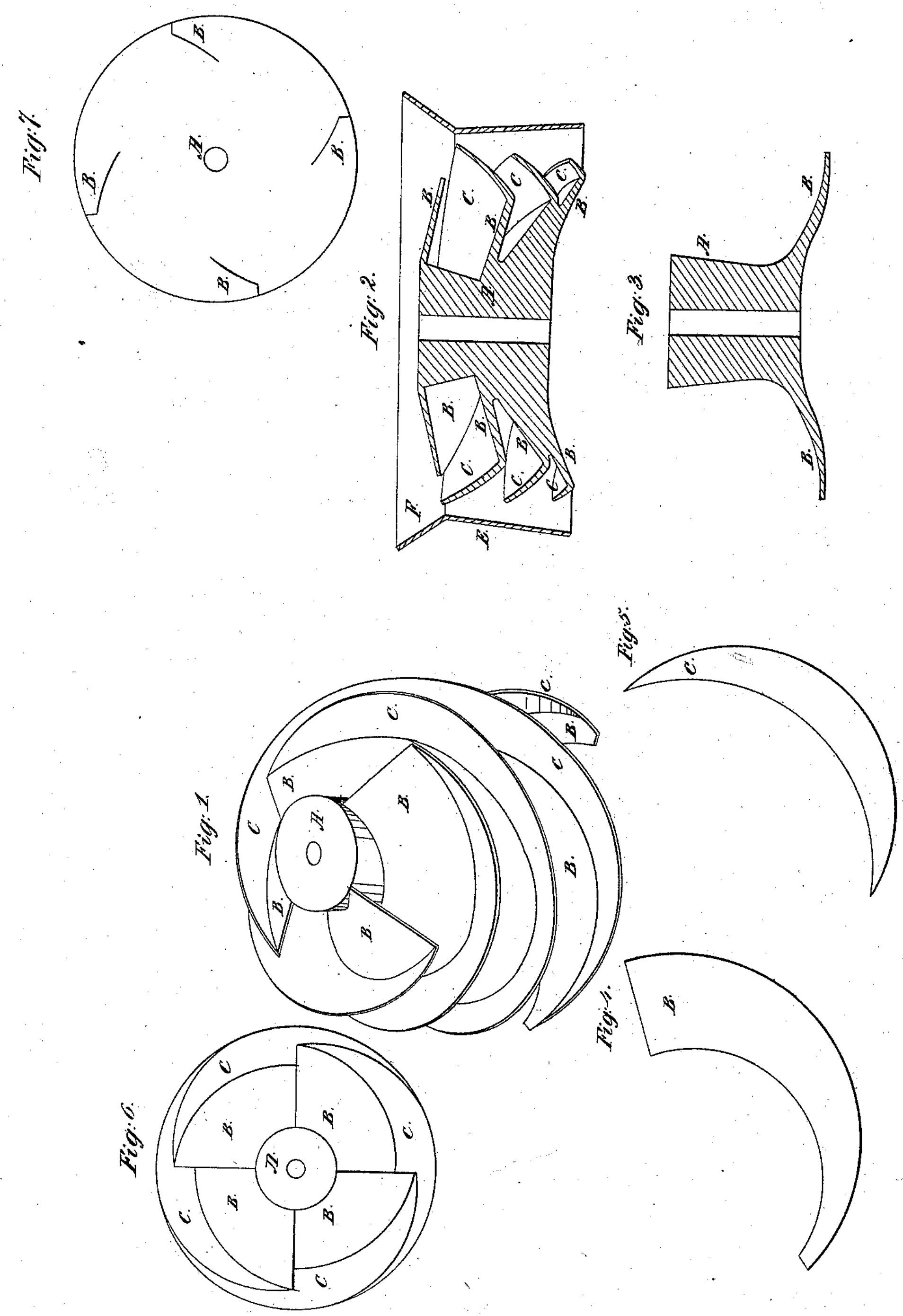
A. B. Beckwith,

Water Wheel.

No. 2,702. Patented July 2 1842.



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UNITED STATES PATENT OFFICE.

AMASA B. BECKWITH, OF BATH, NEW YORK.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. **2,702**, dated July 2, 1842.

To all whom it may concern:

Be it known that I, AMASA B. BECKWITH, of Bath, Steuben county, State of New York, have invented a new and useful Improvement in Water-Wheels, called "Beckwith's Dished Spiral Bucket Water-Wheel," which is described as follows, reference being had to the annexed drawings of the same, making part of this specification:

Figure 1 is a perspective view of the wheel. Fig. 2 is a vertical section of the wheel with the cylindrical gate arranged for stopping the wheel; Fig. 3, a vertical section of the bell-shaped hub; Fig. 4, a view of the bottom of one of the buckets; Fig. 5, dished spiral side of the bucket. Fig. 6 is a top view of the wheel. Fig. 7 is a view of the under side of the wheel.

Similar letters refer to corresponding parts.

The hub, core, or center of the wheel A, Fig. 1, is bell-shaped on the outside, concave on the bottom, flat on the top, and perforated through the center for the insertion of the shaft, (vertical or horizontal.) The exterior of said hub, when arranged vertically, forms at the top the inner side of each spiral bucket or cavity for the water, presently to be described, and at its greatest diameter it forms the bottom of the bucket, the said bell-shaped hub and the bottom of the bucket being merged into one at or near the periphery of the hub. Four spiral buckets (more or less) are formed on the outside of the hub, having each an entrance for the water at the upper or small end of the hub and a discharge at the periphery of the lower or larger end made as follows:

The bottom of each bucket B, Figs. 1, 2, 3, 4, 6, and 7, is of a spherical triangular form, and winds around the hub from top to bottom, forming part thereof, as it approaches the bottom, the outer edge being dropped below the inner edge next the hub, so as to make the upper surface of the bottom of the bucket stand at an angle of about ten or fifteen degrees with a horizontal plane for the purpose of throwing the water from the hub to the outer edge of the bottom of the bucket and against the inner face of the dished side, hereinafter described.

The side C, Figs. 1, 2, 3, 5, and 6, of the bucket is made dish-shaped and spiral and is tapered to a point from the middle toward each end, and is joined to the outer edge of the bottom of the bucket and rises therefrom at an angle of about seventy or eighty degrees and is of sufficient width at the middle to overlap the bucket next to it. The aforesaid side of the bucket is made concave on the inner surface for holding the water and convex on the outer or exterior surface. Its smaller or tapered end joins the upper outer corner of the bottom of the bucket. Its lower tapered end joins against the outer corner of the lower or tapered end of the bottom or merges into the rim or edge of the bell-shaped hub.

The buckets overlap each other about half their length.

The wheel when finished tapers slightly from bottom to top. It is surrounded by a cylindrical gate E, which is raised for venting the water and lowered for stopping its escape. Its interior corresponds with the exterior of the wheel.

The gate may be raised or lowered by a lever and chains or rods or in any convenient manner. It may have a funnel-shaped rim around its upper end, as represented at F in Fig. 2, or it may be without said rim.

The wheel is arranged on a vertical or horizontal shaft in a penstock, flume, or trunk of the usual form and in the usual manner, as in the use of the reaction water-wheel, and when a horizontal shaft is used several vertical wheels may be combined with it, turning with said shaft. The funnel-shaped mouth or conic flange F closes no part of the buckets.

The method of using the cylindrical gate is as follows: The wheel is placed below the decking in the bottom of the flume, and the cylindrical gate E shuts down around the bottom, back, or bell-circle closely, which prevents the escape of water by closing the discharges, and the wheel is put in motion by hoisting the gate and letting the water out of the wheel. The great advantage of this method of governing the water is that the full head of water in the flume stands on the wheel and the wheel receives its weight without any hinderance or impediment whatever. Water applied to wheels in chutes is always more or less impeded by coming in contact with timbers or projections, creating friction from being turned from its natural course, &c. The same difficulties attend wheels standing in penstocks, where the water is let into

the penstock by a gate, as commonly used for all spiral and reacting water-wheels heretofore in use.

Another advantage of my wheel in connection with a cylindrical gate is that the wheel may be made to discharge any quantity of water desired by graduating it with this gate, and what water is discharged is discharged under the full head of water in the flume. By this method the quantity of water vented can be accommodated to every stage of the stream. When the stream is high and backwater over the wheel and the head low by hoisting the cylindrical gate sufficiently enough water can be vented to keep the power good.

The cylindrical gate E is not used to keep the water on the buckets, but to govern the discharges, accommodating the wheel to backwater, &c. The side planes C of the buckets form a sufficient curb of themselves, and it is preferred, when the site will justify, to use the cylinder E as a gate only and have it hoist entirely above the discharges.

What I claim as my invention, and not previously known, and which I desire to secure by Letters Patent, is—

Constructing a water-wheel in the manner above described with any desirable number of concave or dished spiral buckets of wood or metal and combining them with a shaft, each spiral having a separate entrance for water at the face of the wheel and discharging it at the sides, using it with or without the conic flange F and the cylindrical gate E, the gate E being so constructed that by raising or lowering it the quantity of water necessary may be vented at pleasure.

AMASA B. BECKWITH.

Witnesses:
HIRAM HUGHES,
CHESTER WHITAKER.