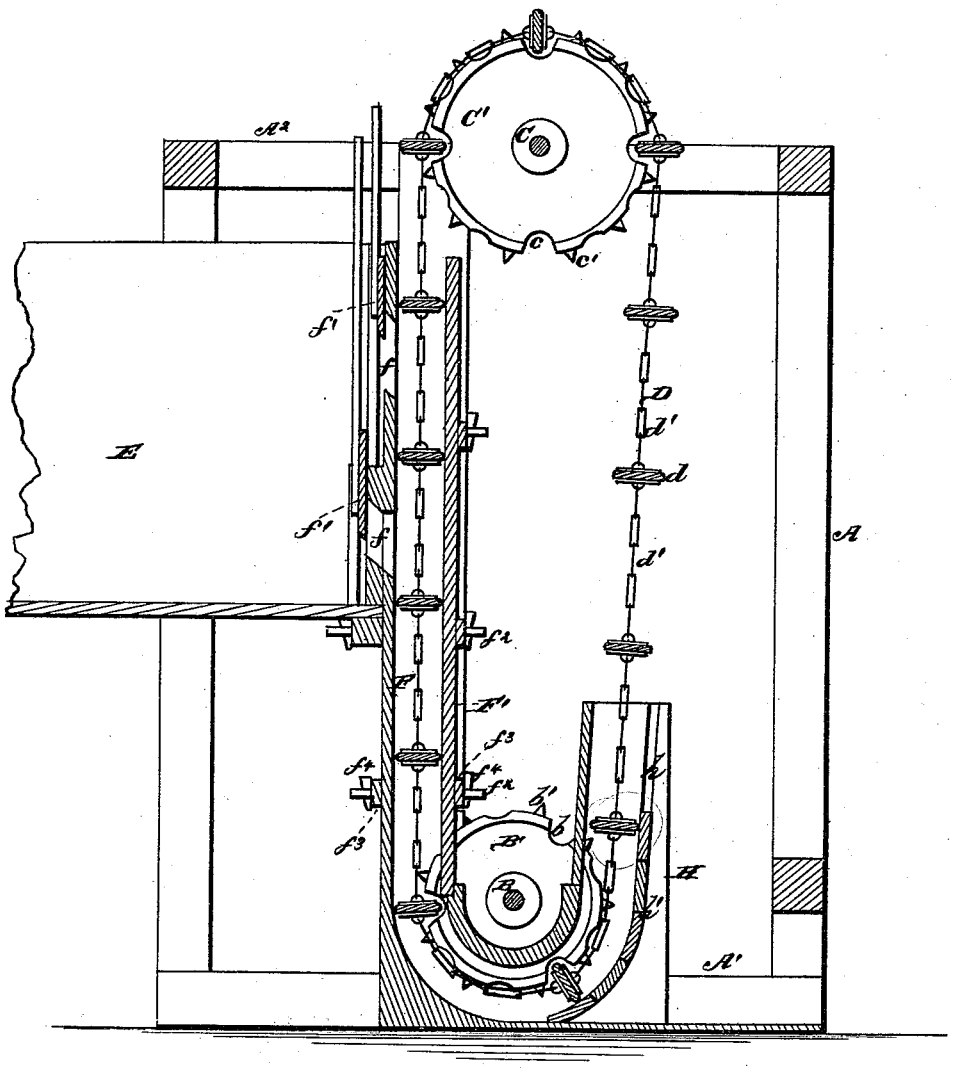
A. BURWELL.
Water-Wheels.

No. 212,186. Patented Feb. 11, 1879.



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UNITED STATES PATENT OFFICE.

ARMISTEAD BURWELL, OF MECKLENBURG COUNTY, VIRGINIA.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. **212,186**, dated February 11, 1879; application filed November 16, 1878.

To all whom it may concern:

Be it known that I, ARMISTEAD BURWELL, of the county of Mecklenburg and State of Virginia, have invented a new and valuable Improvement in Water-Wheels; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing, making a part of this specification, and to the letters and figures of reference marked thereon.

The figure of the drawing is a representation of a vertical central section of my water-wheel.

My invention relates to a water-wheel which, being neither an overshot wheel nor a turbine, combines the advantages of both; and the novelty consists in the construction and arrangement of parts, as will be more fully hereinafter set forth.

In my invention I employ a suitable frame in which is journaled, above the level of head-water, a shaft, on which shaft hang one or more wheels of peculiar construction and form; and beneath the level of the water when at its lowest is journaled another shaft, upon which hang one or more wheels of similar configuration, but of smaller size, if desired.

Over these wheels operate one or more endless chains, carrying buckets at regular and suitable intervals. Two or more of the chain-links between each bucket operate over pins, studs, or lugs on the wheels, and recesses on the wheel-periphery receive the inner projecting portion of the buckets.

It will be observed that in my invention the upper wheel is out of and above the level of head-water, and that the buckets are separate and detached from the wheel, and that they do not move in a circle, but in a right line.

As water naturally moves in straight lines, it is obvious that a wheel the buckets of which move in a circle cannot develop the full force of the momentum and gravity of the water, for the reason that, first, as in the case of a wheel propelled by the momentum of the water, the buckets, changing their direction at every point, necessarily change the angle formed by the line of impact and the radius of the wheel, and so can receive the full force of the column of water flowing through a chute at but one point in their journey past that chute; and, second, as in the case of a wheel moved by the gravity or weight of the water, as the overshot wheel, but one bucket at a time can have advantage of the leverage due to the radius of the wheel—viz., that bucket which is at the junction of the plane horizontal with the axis and the vertical plane of the periphery of the wheel on the chute side.

In my invention the entire power of the water is effected, as the buckets move in a vertical line, receive the water at the top of the head, and only part with it at "tail-water."

I employ adjustable gates near the top of the chute or feeder, and provide means of adjustability to prevent trouble from backwater at the tail. I also employ means by which I can adjust the sides of the vertical chute to compensate for wear of the buckets, &c.

Referring to the drawing, A represents the frame, having base A^1 and sill A^2. In the base A^1 is journaled the shaft B, upon which is hung one or more wheels, B^1, having recesses *b* and pins *b'*, or their equivalents.

In the sill A^2 is journaled a shaft, C, which is adapted to be connected to any suitable machinery, upon which shaft C is hung one or more wheels, C', having recesses *c* and pins *c'*, or their equivalents. The construction of the wheels C' and B' is similar; but the wheel C' is usually of greater diameter than the wheel B'. The peripheries of these wheels on the feed side are on a vertical plane, which makes an inclined plane upon the tail peripheries.

D represents one or more endless chains, or their equivalent, having buckets *d* and links *d'*. The buckets operate in the recesses *b c*, and the links operate over the pins *b' c'*, as shown.

E represents the flume which leads to the vertical chute F, having feed-apertures *f*, governed by two or more gates, *f'*, arranged one above the other, so as to accommodate the level of head-water. The vertical chute F has one movable or adjustable side, F', and by means of ears f^2, bars f^3, and wedges f^4, or their equivalents, it may be adjusted to compensate for the wear of buckets, &c., at will.

H represents a frame, having guideways *h*, to receive removable boards, &c., *h'*. It is removable, and is used only in case of trouble from backwater, and is adapted to inclose

the buckets on their return from the lower to the upper wheels to a height corresponding with the height of backwater.

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

1. In a water-wheel, the combination of the endless chain D, composed of links d', provided with buckets d, wheels B′ C′, having recesses b c, and pins b' c', with the vertical chute F and flume E, having gates f^1 f^1, substantially as and for the purpose set forth.

2. The vertical chute F, having adjustable side F′, ears f^1, bars f^3, and wedges f^4, and series of apertures f, or their equivalents, in combination with flume E and gates f^1, one above the other, as and for the purpose set forth.

3. The frame H, having guides h and movable boards h', in combination with the chute F and endless chain D, having buckets d, as and for the purpose set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

ARMISTEAD BURWELL.

Witnesses:

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