W. W. CLEAVELAND.

Current Water-Wheel.

No. 166,187. Patented Aug. 3, 1875.

Fig. 1.

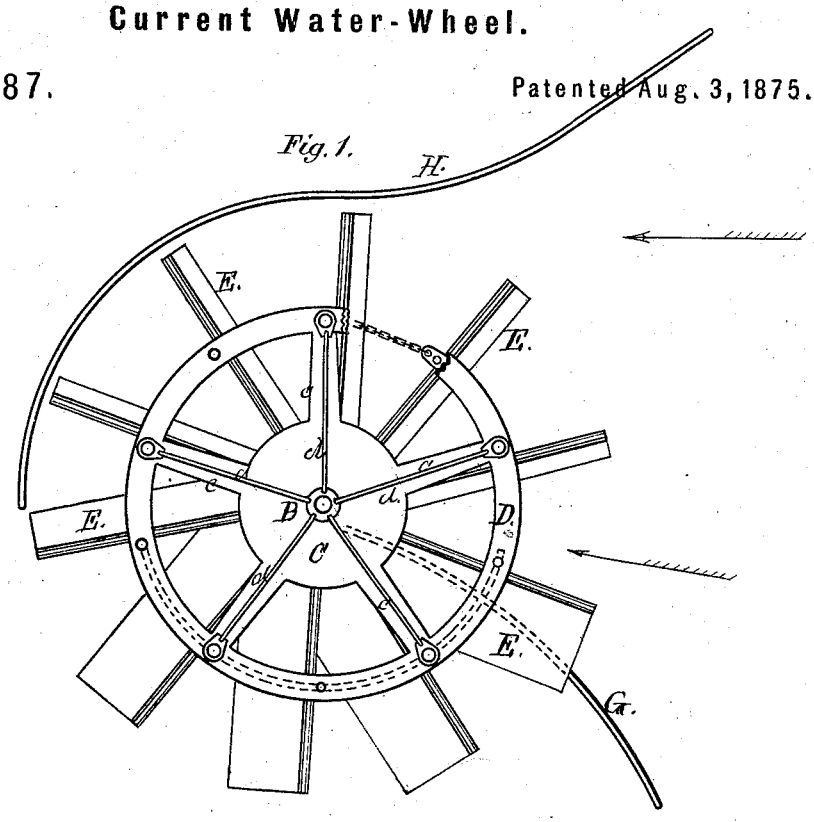


Fig. 2.

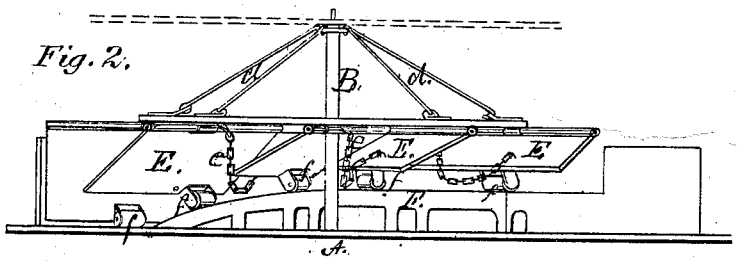
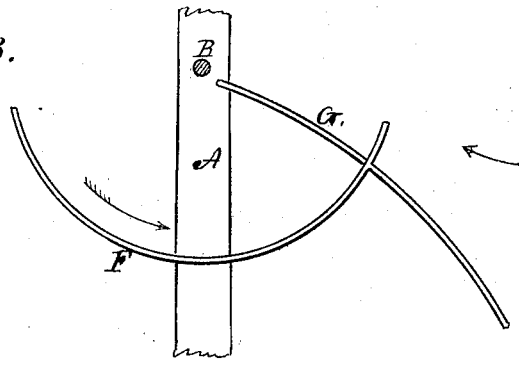


Fig. 3.



WITNESSES

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WALLACE W. CLEAVELAND, OF COLDWATER, MICHIGAN.

IMPROVEMENT IN CURRENT WATER-WHEELS.

Specification forming part of Letters Patent No. **166,187**, dated August 3, 1875; application filed July 8, 1875.

To all whom it may concern:

Be it known that I, WALLACE W. CLEAVELAND, of Coldwater, in the county of Branch and State of Michigan, have invented certain new and useful Improvements in Current Water-Wheels; and the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 represents a plan or top view of my improved water-wheel. Fig. 2 shows a side view of the same. Fig. 3 shows a top view of the curved bridge or rail for the friction-rollers to run on, to lift the buckets and change their position on the upward movement side of the wheel.

My invention is of that class of which water-power is utilized for driving machinery by the current in the stream; and it consists in the combination of the hinged buckets or wings with their chain braces or supports, and friction-rollers on their rear or under sides, to change their position and bring them edgewise to the current when the water rises in the stream so as to overflow its channel and submerge the wheel.

In many of the smaller rivers and streams in the western country there are rapids, and a good supply of water for mechanical purposes and for mills, which hitherto has not been utilized, and cannot be, economically, for the reason that the soil is such that dams cannot be built to remain, the spring floods carrying them away, and the only resort to make such water-power available is to use current water-wheels placed in the rapids, subject to the continuous flow; and then there is a difficulty during the season of high water, and at times of sudden rise, when the channel overflows and submerges the water-wheel by the water operating against the buckets on both sides of the shaft, blocking the rotary movement, and endangering the washing out, undermining, and carrying away the wheel.

It is to remedy the above difficulties that I have constructed and tested the improvements in current water-wheels hereinafter more fully described.

In any convenient or suitable place in the bed of the stream, usually near one side, I place, and secure as permanently as possible, a mud-sill, A, in which is secured the point or gudgeon of the vertical shaft B of the horizontal water-wheel, which I construct in the following manner: The shaft B may be made of wood, with the gudgeons firmly secured in both ends, or of iron, which is preferable. At a suitable distance from the lower end, according to the depth of the ordinary flow of the current of water, I secure a flange-wheel, C, provided with arms *c c c*, and an outer circle or rim, D, of any desired size or diameter, according to the width of the stream or the power wanted, the rim D being supported by angular rod-braces *d d*, connecting it with the upper portion of the shaft B. To the under side of the rim D are hinged the series of wings or buckets E, so that they will fold up flat against the flange or rim D, to which are attached chain-braces *e e*, to hold them in a vertical position, and impart to them the necessary strength when acted on by the current in the stream to drive the machinery attached. To the rear or under side of the buckets E are secured friction-rollers *f f*, and a semicircular curved bridge or rail, F, is placed in the proper position under the side of the wheel, away from the current of the stream, so that, as the wheel revolves, the lower edge of the buckets E are gradually lifted up and carried back out of the reach of the water ordinarily; but when the stream rises, so as to overflow the bulkhead or guide G for the water in the ordinary channel, and submerges the whole wheel, the buckets on the side over the bridge F will be in position to pass edgewise through the water, and consequently present but very little obstruction to the power or movement of the wheel, thus enabling the mill or factory to be run both with the ordinary flow of the current and at times of high water without interruption. In places where there is not always a full supply of water the action may be improved by putting in the stream a bulkhead or guide, H, to concentrate and give a curve to the current corresponding with the diameter of the wheel, as seen in Fig. 1.

It is now being demonstrated that much water-power may be utilized, where it is also

much needed, by my improved current water-wheel, without the great expense of building dams and the risk of their being washed away and carried off by spring freshets and floods from any cause or at any time.

Having thus fully described my improvements in current water-wheels, what I claim as my invention, and desire to secure by Letters Patent, is—

The hinged wings or buckets E, provided with chain-supports *e* and friction-rollers *f*, in combination with the curved bridge or track F, operating substantially in the manner as herein shown and described, for the purpose specified.

In testimony whereof, I hereunto subscribe my name to the above specification.

WALLACE W. CLEAVELAND.

Witnesses:

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