J. Zimmerman.

Tide Water Wheel.

No. 99,272. Patented Jan. 25, 1870.

Fig. 1.

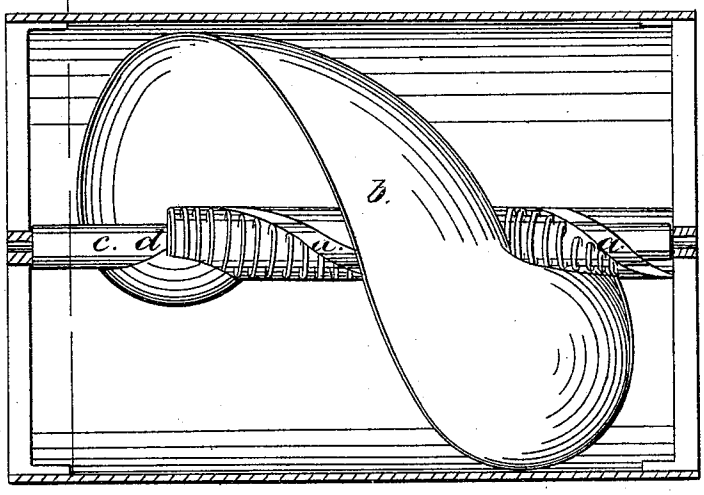
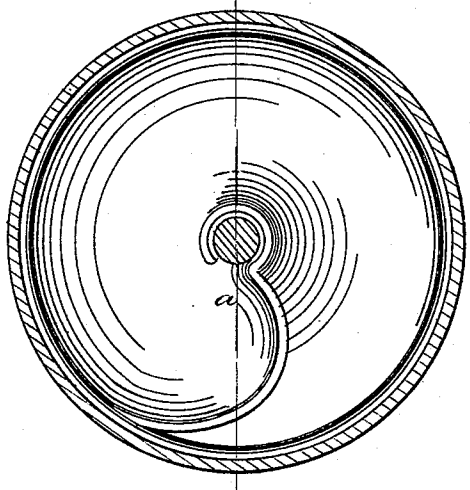


Fig 2.



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JOHN ZIMMERMAN, OF OWATONNA, MINNESOTA.

Letters Patent No. 99,272, *dated January* 25, 1870.

IMPROVEMENT IN SPIRAL-CURRENT WATER-WHEELS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JOHN ZIMMERMAN, of Owatonna, in the county of Steele, and State of Minnesota, have invented a new and useful Improvement in Water-Wheels; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to improvements in that class of water-wheels consisting of spiral vanes attached to a shaft, and working in a hollow cylinder.

The invention consists in an improved form of the said spiral vane, and mode of attaching it to the shaft.

Figure 1 represents a longitudinal section of the cylindrical case and side view of the wheel, and

Figure 2 represents an end view of the wheel.

Similar letters of reference indicate corresponding parts.

The distinguishing feature of the form of the vane of my improved wheel lies in the concavity of the same, which, to obtain the best results from the pressure of the water, as I have ascertained by practical experiment, should be such as to prevent, as much as possible, any centrifugal tendency of the water toward the inner surface of the cylinder, which is the case to a considerable degree in other wheels having little or no concavity of the said vanes.

My invention further consists in connecting these vanes to the shaft, by winding around the same about two-thirds the distance, leaving a space or channel between the termination of the vane and the base of the concave face, whereon the water acts, as at A, thereby increasing the area of the effective surface, while preserving a sufficient degree of strength to the shaft.

b represents the vane, and

c, the shaft.

This wheel is well adapted for use as a current-wheel, and may be made of any size, to pass large volumes of water at a slow rate. It is also well adapted to be used under a fall.

It will be perceived, from inspection of fig. 1, that the concavity of my bucket is outward, and at the greatest practicable distance from the axis of the wheel. The object of this construction is to cause the water to impinge upon and exercise its continuous force, until it passes from the wheel, at the greatest radial distance from the shaft. Of course, the longer the radius or distance of the point of impingement of the water from the said shaft, the greater the leverage obtained, and the greater the percentage of "current"-force utilized.

Now, spiral wheels to work under a head, and spiral wheels to work in a current, have been used for a great many years, but they have never been constructed with concavities, so as to concentrate the force of the water on the buckets at the greatest radial distance from the shaft. On the contrary, the water has been received at the hub, and, by the centrifugal force imparted to it in its rotation, has created an enormous friction, which necessitated a very great loss of power.

My object is to remove this retarding effect of the centrifugal action, and to apply the power of the water at the greatest leverage.

Having thus described my invention,

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

1. A current water-wheel, having a spiral bucket, whose concavity is outward, and mainly at the greatest practicable distance from the shaft, as shown and described.

2. A bucket, attached to its shaft by winding a portion thereof spirally about the same, but leaving an open channel, *a*, as and for the purpose specified.

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