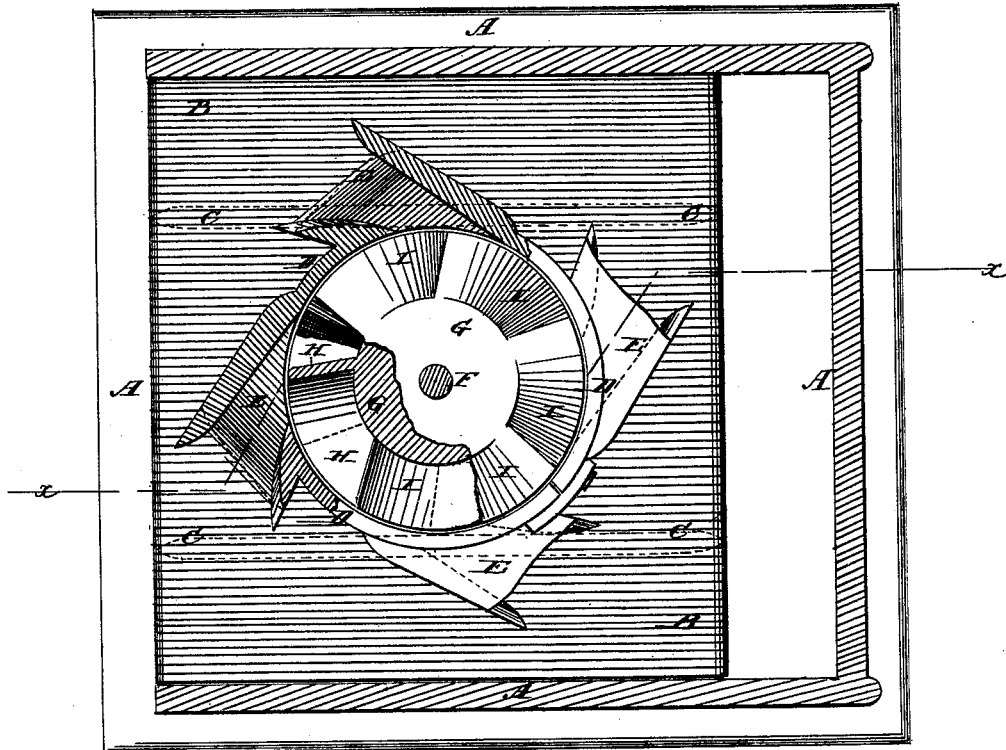


J. McLUCAS.  
Turbine Water-Wheel.

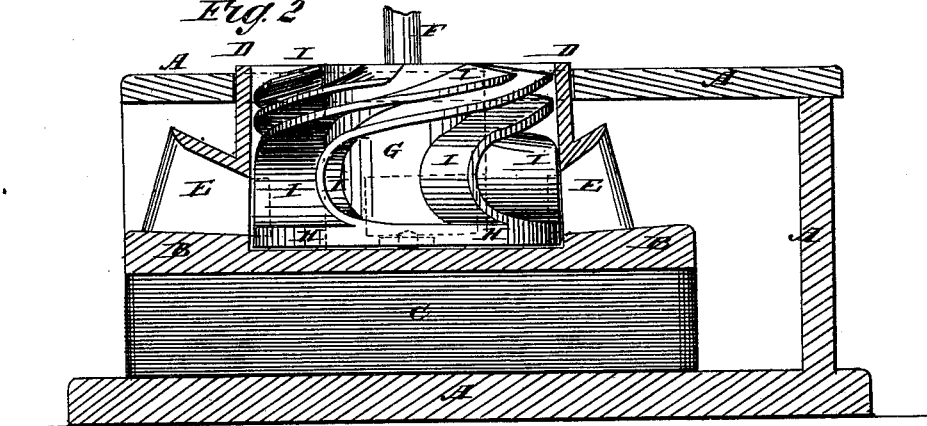
No. 213,921.

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*Fig. 1.*



*Fig. 2.*



WITNESSES:

*Francis McArdle.*  
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# UNITED STATES PATENT OFFICE.

JOHN McLUCAS, OF REDFIELD, IOWA.

## IMPROVEMENT IN TURBINE WATER-WHEELS.

Specification forming part of Letters Patent No. **213,921**, dated April 1, 1879; application filed December 5, 1878.

### *To all whom it may concern:*

Be it known that I, JOHN McLUCAS, of Redfield, in the county of Dallas and State of Iowa, have invented a new and useful Improvement in Water-Wheels, of which the following is a specification:

Figure 1 is a top view of my improved wheel, the cover of the wheel-box being removed, and parts being broken away to show the construction. Fig. 2 is a detail section of the same, taken through the broken line *x x*, Fig. 1.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish an improved water-wheel which shall be so constructed as to utilize the full force of the water, and may be arranged with a vertical or horizontal shaft, as may be desired.

The invention consists in an improved water-wheel formed by the combination of the wheel-box, the base provided with the case and the chutes, the shaft, and the wheel consisting of the hub provided with the circular plate or flange, and the buckets having their inner parts curved upon the arc of a circle, and having their outer parts inclined outward at the same angle that the water enters the wheel, but in the opposite direction, as hereinafter fully described.

A represents the wheel-box, which is designed to be placed outside of the fore-bay, and connected with it by an addition or extension provided with a wicket or wickets, so that the water may be readily controlled. Within the box A is placed the wheel-base B, which is supported from the bottom of the wheel-box A by two or more planks or plates, C, placed edgewise.

The base B is made shorter than the box A, to allow the water to have ready access to all sides of the wheel. Around the middle part of the base B is formed a ring-case, D, within which the wheel works, and which extends up through and fits into a hole in the top of the box A.

Upon the base B, around the lower part of the case D, are formed, or to it are attached, four (more or less) chutes, E, which pass in through the said lower part of the case D, to conduct the water to the wheel.

Upon a pivot or in a step in the center of the base B revolves the lower end of the shaft F, to the lower part of which is attached the hub G of the wheel. To the lower end of the hub G is attached a circular plate, H, which projects around the said hub as a ring-flange. To the flange or plate H are attached, or upon it are formed, the lower ends of the buckets I. The lower parts of the buckets I are curved upon the arcs of circles, and their upper parts extend up at an angle of eighty degrees, ( $80^{\circ}$ ), or at the same angle upward and outward at which the water entered the wheel downward and inward, but in the opposite direction.

With this construction the water enters the wheel, passes around the semicircular curve of the buckets I, and passes up and back between the upper parts of the said buckets, so that the wheel will receive the full force of the motion of the water and of its rebound or weight.

The wheel may be inverted, or have its discharge below, in which case it discharges the water downward at the same angle that it enters upward.

If desired two wheels may be attached to a horizontal shaft, in which case the discharges of both wheels should be outward, and their chutes inward.

With this construction the wheel may be entirely submerged, or, in other words, its discharge may be below the surface of the water without affecting its efficiency.

With this construction, when the wheel is arranged to discharge at the top, the water should be put on at an angle of eighty degrees ( $80^{\circ}$ ) with the axis of the hub, and discharged at an angle of from eighty to forty-five degrees, ( $80^{\circ}$  to  $45^{\circ}$ .) When the amount of water is small, it may be discharged at an angle of eighty degrees, ( $80^{\circ}$ ;) but when the amount is very large, it should be discharged at an angle of forty-five degrees, ( $45^{\circ}$ .)

When the wheel is arranged to discharge at the bottom, it should receive the water at an angle of one hundred degrees ( $100^{\circ}$ ) with the axis of the hub, and discharge it at an angle of from one hundred degrees ( $100^{\circ}$ ) to one hundred and thirty-five degrees ( $135^{\circ}$ ) inclusive.

Having thus described my invention, I claim

as new and desire to secure by Letters Patent—

An improved water-wheel formed by the combination of the wheel-box A, the base B, provided with the case D and the chutes E, the shaft F, and the wheel consisting of the hub G, provided with the plate or flange H, and the buckets I, having their inner parts curved upon the arcs of circles, and having their outer parts

inclined outward at the same angle that the water enters the wheel, but in the opposite direction, substantially as herein shown and described.

JOHN McLUCAS.

Witnesses:

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M. S. THOMAS.