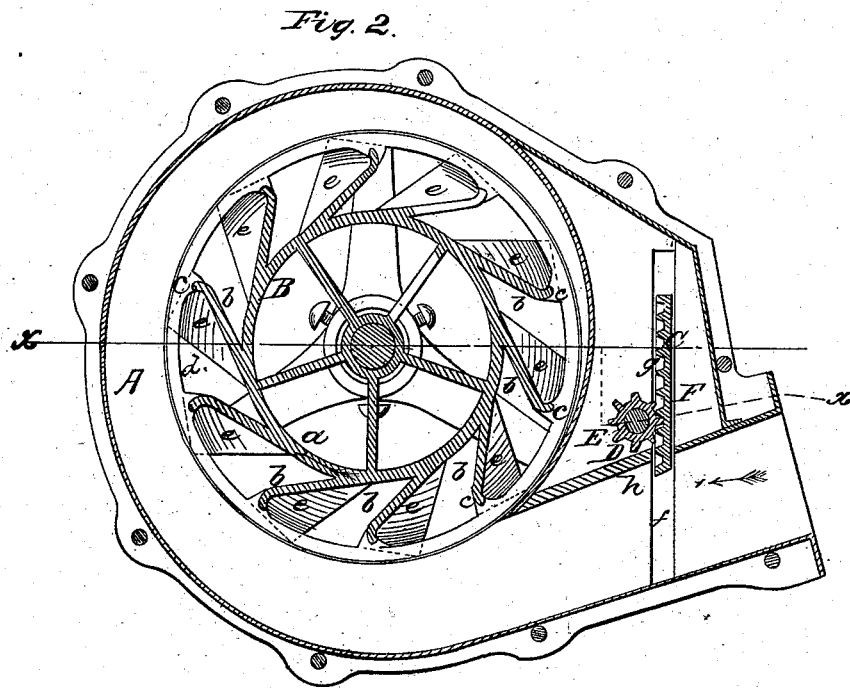
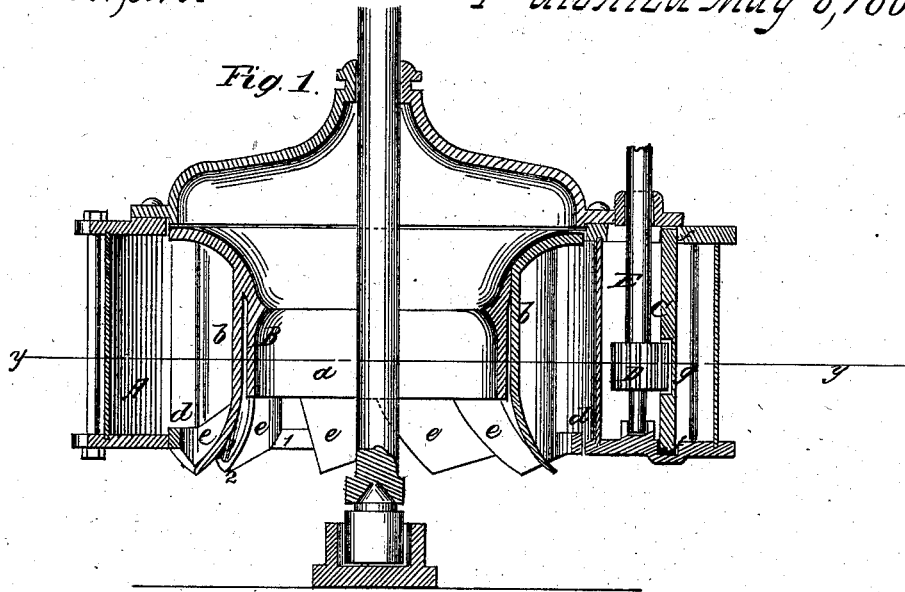


J. A. Hanson,

Water Wheel.

N^o 54,645.

Patented May 8, 1866.



Witnesses

*Wm. Freese
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Inventor

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UNITED STATES PATENT OFFICE.

J. A. HANSON, OF AMSTERDAM, ASSIGNOR TO HIMSELF, H. S. McELWAIN,
OF AMSTERDAM, NEW YORK, AND H. K. KENT, OF PITTSFIELD, MASS.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. 54,645, dated May 8, 1866.

To all whom it may concern:

Be it known that I, J. A. HANSON, of Amsterdam, in the county of Montgomery and State of New York, have invented a new and Improved Water-Wheel; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical central section of my invention, taken in the line *x x*, Fig. 2; Fig. 2, a horizontal section of the same, taken in the line *y y*, Fig. 1.

Similar letters of reference indicate corresponding parts.

This invention relates to a new and improved water-wheel of that class which are placed on vertical shafts and are commonly termed "turbine" wheels; and it consists in a novel construction of the buckets of the wheel, whereby a greater effect than usual is obtained from the water as it leaves the wheel.

The invention further consists in a novel construction or arrangement of the means for operating the gate, whereby much friction is avoided and the gate rendered capable of being opened and closed with far greater facility than hitherto.

A represents the scroll in which the wheel B is placed. This scroll may be constructed in the usual manner.

The wheel B is constructed with a hollow hub, *a*, the upper part of which is curved outward, forming an arched rim and a concave top for the spaces between the buckets. These buckets have their main portions *b* in a vertical position and tangential with the hub *a* of the wheel, as shown in Fig. 2. The outer edges of the parts *b* of the buckets are provided with a lip, *c*. The inner edges of the parts *b* extend down to the lower edge of the hub *a*; but the outer edges extend down below *a*, and are connected with a rim, *d*, which is about in a vertical line with the outer edge of the concave top of the hub, and at the lower edge of each part *b* there is what may be termed a "supplemental portion," *e*, which extends from the lower inner edge of *b* downward and outward from *b* to a point below the rim *d*, and then extends upward to the rim, the outer or

discharge end of the portion *e* being below the outer lower end of *b*, as shown clearly in Fig. 1, 1 representing the inner end of *e*; 2, the outer discharge end, and 3 the part curved upward to meet the rim *d*. The water acts first by impact against the parts *b* of the buckets, and then descends and acts by gravity upon the parts *e*, the water, owing to centrifugal force, having a tendency to pass down and toward the outer parts of *e*.

By this arrangement the water is not allowed to act as a drag upon the wheel, but escapes, after acting by impact against the parts *b*, as rapidly as is necessary over the portions *e*, so that the wheel will not carry the water. The chief point to be observed in a combined, direct, and reaction water-wheel is to avoid the retention of the water in the wheel and allow it to escape as freely as possible after the greatest effective force has been obtained from it. This end, I believe, is fully attained by my arrangement of buckets.

C represents a sliding gate, which is fitted in grooves *f*, near the mouth or orifice of the scroll, so as to work across the latter, as will be understood by referring to Fig. 2. This gate C has a sunken rack, *g*, made in its inner surface, in which a pinion, D, on a vertical shaft, E, works. By turning the shaft E the gate will be opened and closed, and it will be seen that in consequence of having the rack *g* sunken it cannot interfere at all with the working of the gate snugly through the partition *h* of a box, F, which receives the gate when open. A projecting rack would cause considerable difficulty in this respect.

By having the rack and pinion at the inner side of the gate, the tendency of the pinion in opening the gate being to press the latter toward the water, there will be a bearing in the direction indicated by arrow 1. This greatly relieves friction and admits of the gate being opened and closed with facility. Gates have been arranged with pinions to work in projecting racks at the outer side of them; but the pressure of the water against the gate in connection with the pressure of the pinion against the latter in the same direction in opening the same causes them to operate very hard.

My improvement obviates this difficulty, for the pressure of the pinion against the gate is at the side opposite to that against which

the water presses, and hence the former, in a measure, neutralizes the latter.

I do not claim, broadly, vertical tangential buckets with an arched or concave top or surface to the hub from which the buckets spring, for that has been previously used; neither do I claim, broadly, the opening and closing of the gate of the wheel by a rack and pinion, for that is an old device, although having been formerly applied to the outer side of the gate.

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

1. The buckets with the part *b*, as described, lip *c*, rim *d*, and supplementary portion *e*, in combination with the hollow hub *a* of the wheel B, arranged and operating in the manner and for the purpose herein described.

2. The arrangement of the gate C, sunken rack *g*, pinion D, and box F, operating in the manner and for the purpose herein described.

JOHN A. HANSON.

Witnesses:

AUGUSTUS MCELWAIN,
JOHN A. SPORE.