

R. STINSON.
WATER WHEEL.

No. 110,169.

Patented Dec. 13, 1870.

Fig. 1.

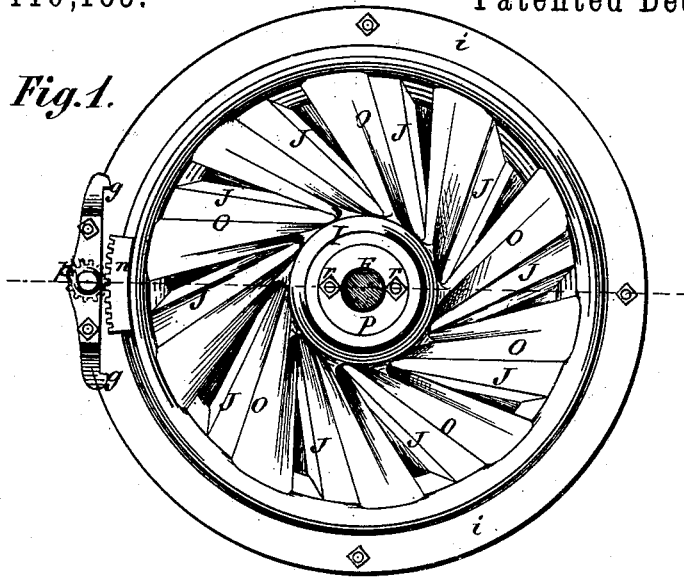


Fig. 2.

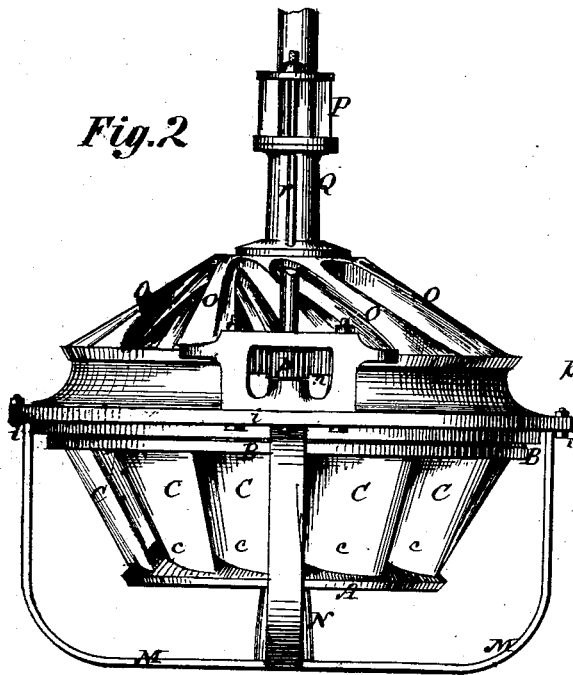
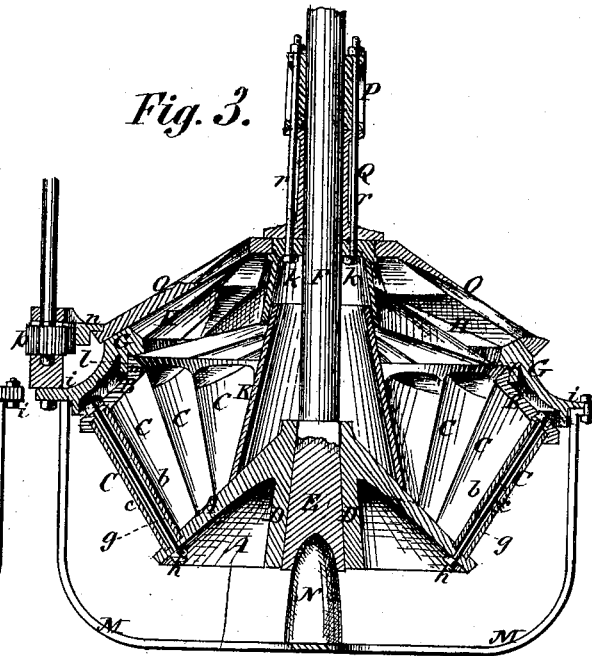


Fig. 3.



Witnesses

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Fig. 4. Patented Dec. 13, 1870.



Fig. 5.

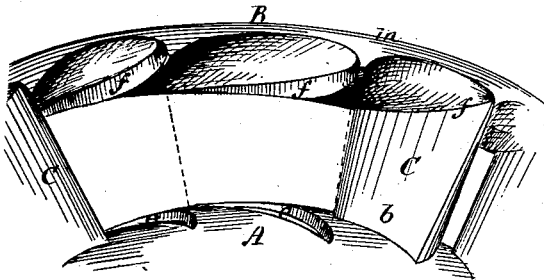


Fig. 6.

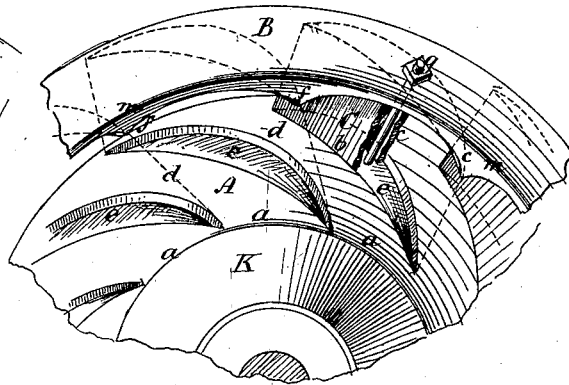
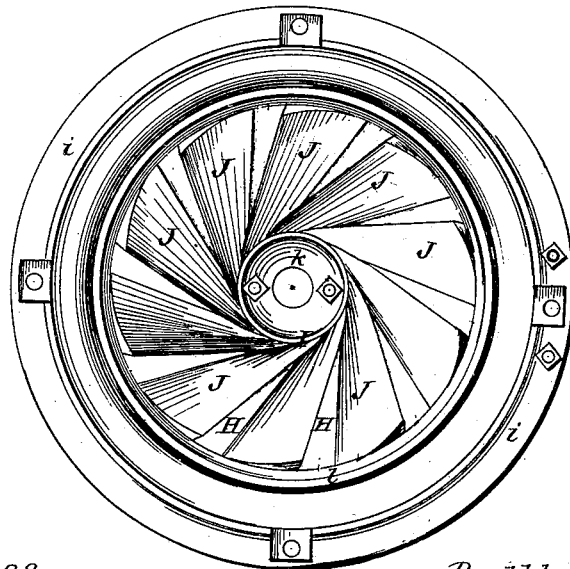


Fig. 7.



Witnesses

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United States Patent Office.

RALPH STINSON, OF WHITESVILLE, MISSOURI.

Letters Patent No. 110,169, dated December 13, 1870.

IMPROVEMENT IN 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, RALPH STINSON, of Whitesville, in the county of Andrew and State of Missouri, have invented certain new and useful Improvements in Water-Wheels; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing of the same which makes part of this specification, and in which—

Figure 1 represents a top view of a water-wheel embracing my improvements;

Figure 2 represents a side elevation of the same;

Figure 3 represents a vertical section;

Figure 4 represents a horizontal section of one of the buckets;

Figure 5 represents a portion of the under side of the upper rim, showing the recesses and shoulders for the buckets;

Figure 6 represents a top view of a portion of the upper rim and base plate of the wheel, showing the recesses in the base-plate into which the buckets are secured; and

Figure 7 represents an inverted view of the feeder.

In the accompanying drawing the wheel consists of a central base-plate, A, and an upper annular rim, B, cast in separate pieces, between and to which the buckets C are bolted.

The base-plate A is a hollow cone, having a hub, D, projecting from its under side within which a square opening is formed, tapering from the bottom to the top of the cone to receive the correspondingly-shaped end E of a vertical supporting-shaft, F, and thus form a self-locking suspending seat for the wheel, the weight of the latter tending constantly to render its connection with the shaft firm without any fastening, as it cannot descend below the wedge-shaped end thereof.

The upper annular rim B is of greater diameter than the base-plate and has the same inclination, and the buckets C are therefore secured between them so as to incline upward and outward and expose their inner concave sides to the direct action of the water within the annular rim.

The buckets C are arranged in curved lines upon the sides of the cone A, so that the spaces *a* between their inner ends shall be greater than their outlets.

Their inner concave faces, *b*, have a regular curve with a radius about equal to the circle which bounds their lower ends, while their outer sides, *c*, have an oval shape, so as to bulge outward at its back for several purposes, viz, to diminish the discharge-opening *d* at the back of each bucket, and to terminate their ends in sharp edges, as shown in figs. 4 and 6, to facilitate the entrance and discharge of the water from the buckets.

The buckets are cast separate and secured between

the cone A and the annular rim B in the following manner:

The cone is cast with a series of curved recesses or grooves, *e*, corresponding in form to the cross-section of the buckets, into which their lower ends are fitted so as to lock and hold them in place, as shown in fig. 6; and the under side of the annular rim B is cast with a series of shoulders, *f*, against which the upper oval sides *c* of the buckets are placed, and in these positions they are locked by screw-bolts *g* passing through the annular rim, the thickest part of the buckets, and the cone A, to the under side of which they are secured by screw-nuts *h*, as shown in figs. 3, 5, and 6.

The wheel thus constructed is surmounted by a conical feeder, G, supported by a flange, *i*, upon the floor of the flume.

The feeding-openings H are tangent to a hub, I, and the arms J, between which they are made, are inclined on their under sides toward the inner end of each bucket, as seen in fig. 7, for the purpose of imparting to the water a whirling motion within the flume, and causing it to impinge, by the combined action of the tangent arms J and the inclination of their under sides, upon the wheel in the direction of its motion, and thus gain greater power of the water and steadiness of motion of the wheel than if the water were directed through radial openings vertically. Moreover, the whirling motion of the water in the flume produced by the tangent feeders, increases its velocity, and, consequently, the force of its passage through the openings, and this arrangement has been found to possess advantages which the radial feeders cannot produce.

A frustum of a cone, K, is secured in any suitable manner upon the upper side of conical base A, the upper end of which fits into a collar or sleeve, *k*, in the hub I of the feeder, for the purpose of forming a guard to prevent the water from entering round the shaft and to deflect it outward against the buckets; the insulation of the shaft is therefore effected by the same device which imparts an interior centrifugal action of the water against the buckets.

The feeder is provided on its under side at the circumference of the feeding-openings H, with an annular rim, *l*, which encircles a rim, *m*, on the annular cap-plate B of the buckets, for the purpose of inclosing the connection of the wheel with the feeder, and prevent the waste of water by the wearing down of the step of the driving-shaft.

The bridge-tree consists of a frame of four arms, M, bolted to the rim or flange *i* of the feeder, and its bearing-point, N, is stepped in the lower angular end of the driving-shaft.

A conical register is arranged upon the feeder, hav-

ing tangential openings and arms O, corresponding to those of the feeder, for the purpose of regulating the quantity of water to the wheel and cutting it off when desired.

The upper sides of these arms O are rounded so as to direct the water into the openings between them in the direction of the motion of the wheel, and thus form, in connection with the feeding-openings H, oblique tangential chutes directly above the buckets of the wheel.

It is provided with a cogged segment, *n*, on its circumference, into which a pinion, *p*, matches, by which the register is opened and closed, as desired.

The pinion is mounted in bearings in a frame secured upon the flange *i* of the feeder, and the range of motion of the register is limited by the stops *g*, fig. 1, against which the ends of the segment strike.

By being arranged in tangents to the hub of the register, the arms O also prevent more effectually the entrance of chunks of ice or drift-wood into the wheel.

The driving-shaft passes through the feeder, and its upper bearing is formed in a box, P, supported upon a flanged sleeve, Q, which rests upon the hub I of the feeder, to which the box and the sleeve are secured by screw-bolts, *r*, passing through their flanges, and clamped securely by screw-nuts on top of the box, by which they may be tightened, and thus obtain a bearing-box secured directly upon the hub of the feeder, so that the shaft passes through the latter and the inclosing-sleeve without touching them.

The object of the double bucket is to close the outlet-openings *d*, and bring the bearing of each bucket directly before the water.

The feeder conducts the water without any breakage so as to bring its full force directly upon the buckets, thus avoiding friction against the inner and outer rims, and holding it in a body for action.

Having described my invention,
I claim—

1. The buckets O, forming the outline of the wheel in the form of a frustum of a cone inverted, said buckets being secured to the base-plate A and annular rim B by means of the recessed seats *e* and the curved shoulders *f*, in the manner described.

2. The inclined buckets, having their outer sides of curves of a radius about half that of the inner sides, and arranged so that the sides having the least radius will form, with its contiguous bucket, enlarged openings at their receiving-ends and narrow outlets, in the manner and for the purpose described.

3. The hub D of the cone A, made with an angular tapering seat, and the end of the driving-shaft F of corresponding shape, for the purpose of suspending the wheel upon a self-locking and supporting seat without fastening, as herein shown and described.

4. The arrangement of the cone K so as to form a continuation of the base-plate A, and be inclosed by the hub I of the feeder, to produce a centrifugal action of the water upon the buckets and to insulate the vertical shaft from the water, as described.

5. The feeding-openings H, arranged tangent to the hub I of the feeder, in the manner and for the purpose described.

6. The register, having tangent openings, in combination with the tangent openings of the feeder, in the manner and for the purpose described.

7. The arms of the tangent openings and the arms of the feeder, inclined in the same direction on one of their sides only, so as to direct the water into the wheel and upon the buckets, in the manner described.

8. The buckets O, arranged upon a conical base-plate A, substantially as described, with a feeder constructed with tangent openings arranged within the diameter of the upper ends of said buckets, as described.

9. The combination and arrangement of the conical base-plate A, the annular rim B, buckets O, the angular suspending and locking-seat E of the wheel, the frustum of a cone, K, the feeder and register, with their tangent openings, the several parts being constructed, arranged, and operating in the manner herein described.

In testimony whereof I have hereunto signed my name.

RALPH STINSON.

Witnesses:

HARVEY CLINE,
NAPOLEON B. BROWN.