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B. W. Tuttle,

Water Wheel.

No. 96,168. Patented Oct. 26. 1869

Fig 1.

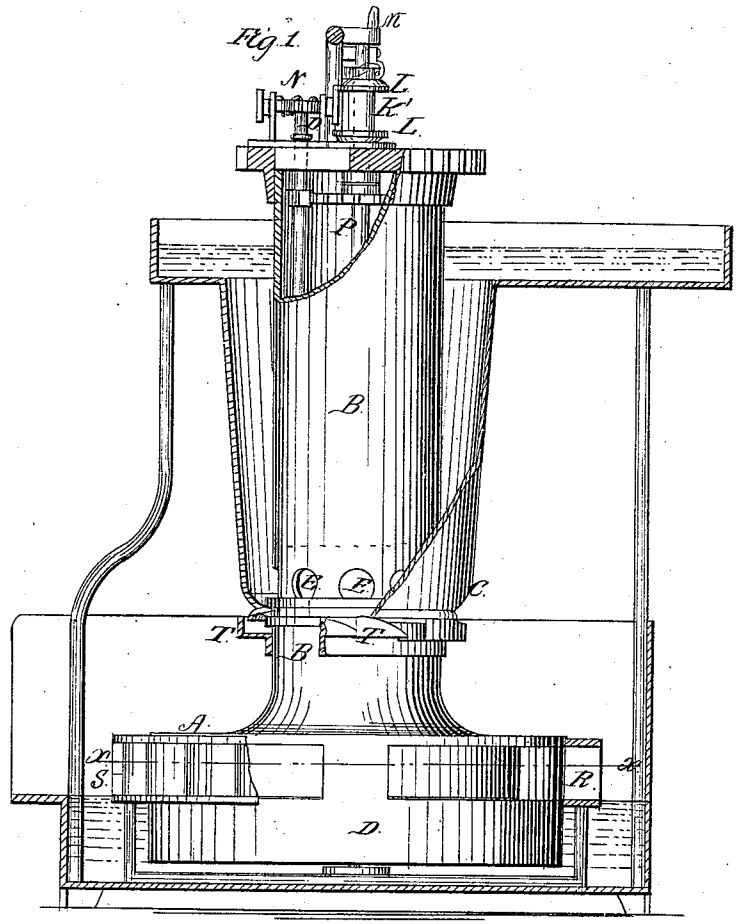
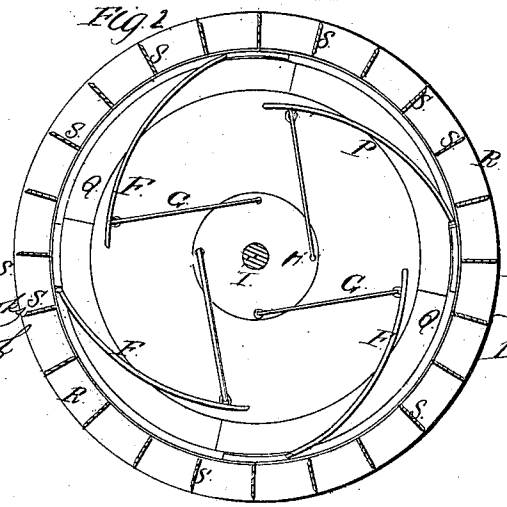


Fig 2.



Witnesses.
John F. Brooks
Wm. H. Clark

Inventor.
B. W. Tuttle
per Munn & Co
Attorneys.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

2. Sheets. Sheet. 2.

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Fig. 3.

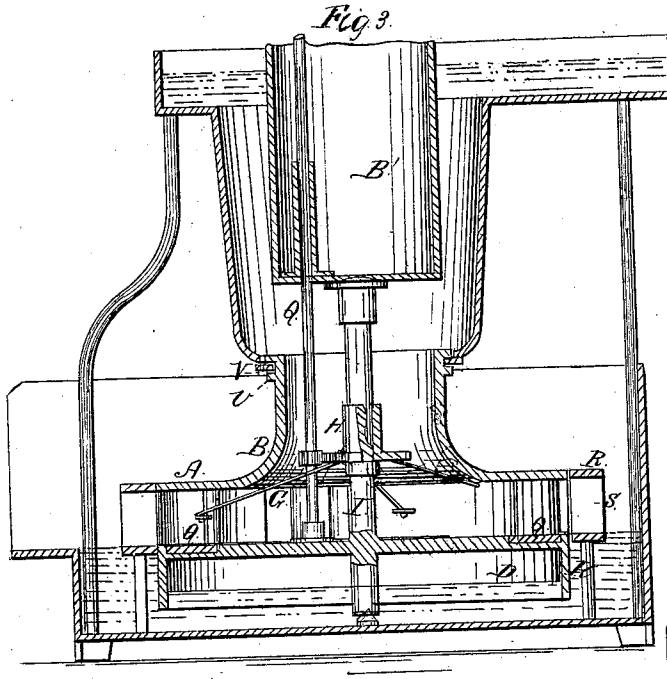


Fig. 6.

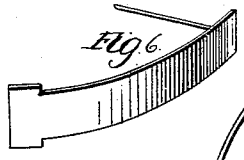


Fig. 4.

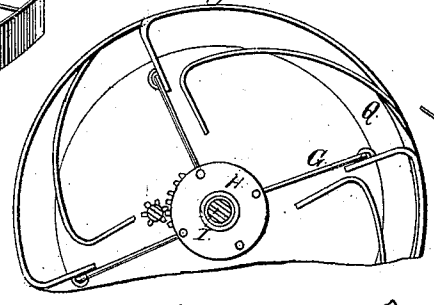


Fig. 8.

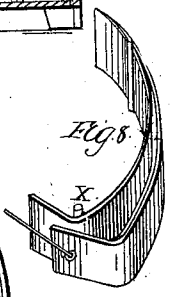
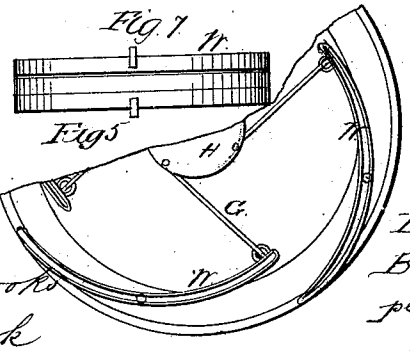


Fig. 7



Witnesses.
John F. Brooks
Wm. F. Clark

Inventor
B. W. Tuttle
per Munn & Co
Attorneys

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

United States Patent Office.

B. W. TUTTLE, OF GALENA, ILLINOIS.

Letters Patent No. 96,168, *dated October* 26, 1869.

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, B. W. TUTTLE, of Galena, in the county of Jo Daviess, and State of Illinois, 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 drawing, forming part of this specification.

This invention relates to improvements in the "Baker mill" and other similar wheels, designed to improve the efficiency of the same; and

It consists in the application thereto of an improved method of supplying the water, also an improved arrangement of a hollow shaft, for transmitting the motion, and for employment as an air-chamber for buoying the wheel.

Also, in the arrangement of an air-chamber at the bottom of the wheel for buoying it, operating as a float to support a portion of the weight of the wheel upon the tail-water.

Also, in an arrangement of adjustable buckets and mechanism, supported upon the shaft, whereby the buckets may be adjusted while the wheel is in motion.

Also, in an arrangement of detachable plates or rings in the top and bottom plates of the wheel, over which the adjustable buckets work, and which may be replaced when worn, to prevent loss of water.

Also, in a modified arrangement of the hollow penstock and shaft, relatively to each other.

Also, in a fixed wheel surrounding the operative one, to prevent the rapid escape of water when the moving wheel runs slowly, or is standing still.

Also, in an arrangement of secondary buckets, whereon the leak-water may act, and thereby be utilized.

Also, in an improved arrangement of packing-apparatus at the joint of the hollow shaft, and the bottom of the penstock.

Figure 1 represents an elevation of a wheel constructed according to my improvements, partly in section.

Figure 2 represents a horizontal section of the same, slightly modified.

Figures 4, 5, 6, 7, and 8, are detached views of different forms of buckets which may be used in my wheel.

Similar letters of reference indicate corresponding parts.

A, in fig. 1, represents the top of the wheel, which takes the form of a large tube, B, through which the water, entering at E, passes downward into the wheel.

The said tube B rises through the bottom of the penstock C, and above the water therein, which is delivered through the side openings E into the tube B.

Above the said openings the tube is closed by a diaphragm, indicated in dotted lines in fig. 1, Sheet I, between which, and the top of the tube B, an air-space is formed, whereby the wheel is considerably buoyed up by the water, and the weight measurably supported.

The top of the tube is provided with a gear-wheel, for transmitting the motion of the wheel.

D represents a recess, formed at the bottom of the wheel, by a flange or rim, K, projecting downward, wherein an air-cushion may be formed, and the weight of the wheel thereby supported to some extent, and the friction reduced. The outer edge of the rim K is made smooth and true, to prevent, as much as possible, the friction of the water in contact with the same.

F, fig. 2, represents the buckets, which act as gates also.

They are hinged at one end, at the outer portion or rim of the wheel, between the top and bottom thereof, and are connected at their other ends by the links G to a disk, H, supported on a vertical shaft, I, which extends upward through the axis of the wheel to the top of the tube B, where it is supported in suitable bearings, and provided with a sleeve, K', capable of sliding vertically thereon, and having disks, L, at both ends.

A forked hand-lever, M, arranged upon a fixed support, convenient to be taken hold of by the hand, is provided for sliding the sleeve up or down, and prevents the sleeve from revolving.

A screw-shaft, N, supported radially upon the top of the tube, and gearing with a vertical shaft, O, which connects by a pinion, near its lower end, with a spur-wheel, P, on the shaft I, is the means of opening and closing the buckets through the medium of said shaft I, and is rotated in either direction by the said sleeve K, the disks of which may be brought to bear on a friction-wheel on the inner end of the said shaft N, to turn it in either direction by the hand-lever M.

The sleeve K' being stationary, the shaft N, in travelling around, operates through the medium of the shaft O and its described connections, to open or close the gates, according as the upper or lower disk is in contact with the friction-wheel on the inner end of the shaft N.

If the wheel be standing still, the shaft N may be rotated by a hand-wheel on the outer end of it.

Figure 3 of the drawing represents a modification of my invention, in which that formation of the tube B, between the diaphragm and point of junction with the penstock, is removed, and the tube supported upon the top of the shaft I, a short distance above the bottom of the penstock, thereby providing an unobstructed passage for the water.

In this latter case, the mechanism for opening and

closing the gates is the same as in the original form, excepting that the spur-wheels are arranged lower upon the shafts O and I.

By this arrangement, the buckets may be opened to any desired extent, and adjusted to the volume of water used, by which the best results may be obtained, whether the volume of water be great or small.

A governor may be attached to the lever M, if preferred, and the motion of the wheel be thereby automatically regulated.

Q represents detachable rings, arranged in grooves in the faces of the top and bottom plates of the wheels, over which the buckets work in opening and closing, designed to be removed for the substitution of others when worn, to prevent leakage under the buckets.

The said rings may be made in segments, or whole, if preferred.

The penstock C is made circular, to embrace the hollow cylinder on all sides, and thereby form a water-bearing for the same, and measurably relieve the framing, which supports the top, from the strain of the wheel.

R represents an outer curb, in the form of a fixed wheel, surrounding the wheel A, and provided with radial divisions S.

The object of this device is to arrest the velocity of the water to some extent, especially when the wheel is moving slowly, and thereby impart a greater measure of power to it.

It is believed that the water discharged from the wheel, and striking against the sides of the divisions S, whereby its course is diverted and speed arrested, will, to some extent, accomplish this object.

The said curb R may be so attached as to be removed and applied when required.

T represents a set of secondary buckets, attached to the wheel immediately below the bottom of the penstock, and arranged to receive the water which escapes at the joint of the tube B with the penstock, and thereby utilize the same.

For packing the joint between the penstock and the tube B, I provide adjustable rings, U and V, which may be made either whole or in segments, and arranged to be adjusted by means of screws closely to, and maintained in contact with the bottom of the penstock.

There may, if desired, be holes in the sides of the inverted cup or tube, that may be provided with plugs for regulating the amount of air to be retained in the said cup.

It is expected that the space will be filled with air from bubbles that are caused from running water.

Having thus described my invention,

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

1. The penstock C and tubular extension B, provided with the lateral openings E, and extending above the water, when arranged as specified.

2. The combination, with the wheel A, of a tubular extension, when provided with an air-chamber, and arranged as and for the purpose specified.

3. The air-chamber D, formed in the bottom of the wheel, substantially as specified.

4. The combination, with the buckets, of the shaft I, disk-sleeve K′, worm-shaft N, shaft O, gearing with the shaft I, all substantially as specified.

5. The detachable rings Q, let into the top and bottom plates of the wheel, substantially as and for the purpose specified.

6. The penstock C and tubular extension B, when arranged substantially as represented.

7. The combination, with the wheel A, of the fixed wheel R, substantially as specified.

8. The combination, with the wheel A, of the secondary buckets T, substantially as specified.

9. The arrangement of the packing-rings U and V, tubular extension B, and penstock C, all substantially as specified.

B. W. TUTTLE.

Witnesses:

A. L. CUMMINGS,

C. E. HAILE.