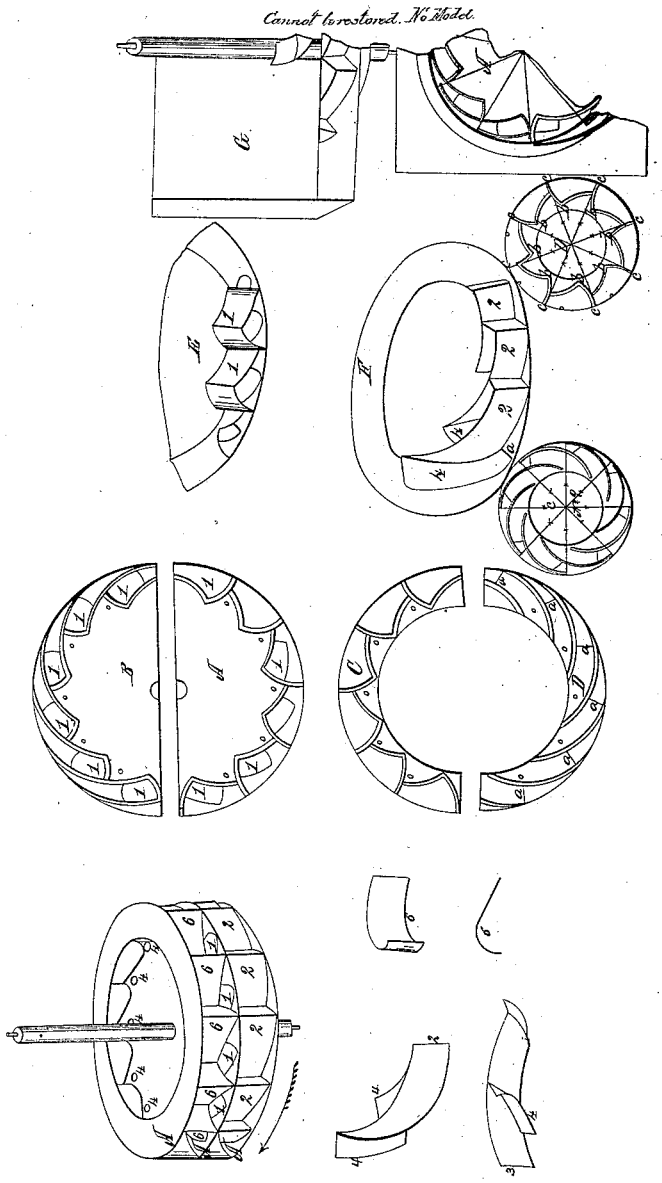
W. C. Bishop,

Turbine Water Wheel.

No. 1,314. Patented Sep. 5, 1839.



UNITED STATES PATENT OFFICE.

WILLIAM C. BISHOP, OF OVID, NEW YORK.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. 1,314, dated September 5, 1839.

To all whom it may concern:

Be it known that I, WILLIAM C. BISHOP, of Ovid, in the county of Seneca and State of New York, have invented a new and useful Improvement on Water-Wheels; and I do hereby declare that the following is a full and exact description thereof.

The wheel I denominate the "Direct Inclined-Plane Reaction-Bucket Water-Wheel."

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

I construct my wheel with three rims or plates—upper, middle, and lower plates—with direct-action buckets between the upper and middle plates, inclined-plane and reaction-buckets between the middle and lower plates. The middle plate is cast solid with the eye, excepting the diameter of the wheel is so great as to endanger its breaking by contraction, in which case the eye is separate, as is more fully shown in the written references accompanying the specification. I cast grooves on the upper and under side of the middle plate, and grooves on the under side of the upper and upper side of the under plates. The grooves on the upper side of the middle plate are those in which the bottom part of the direct-action buckets set, and are drafted by a sweep of one-third the diameter of the wheel, and are drawn by one foot of the dividers sitting on the line running from the outside of the plate to the center. The lines from which the curves are taken are found by spacing off for the buckets and drawn from the outside to the center of plate or rim, and their number by the number of buckets designed for the wheel. That part of the groove which is described by a sweep of one-third the diameter of the wheel I denominate the "inside groove," and the point from which it is swept is found by placing one foot of the dividers on the line at the outer edge of the wheel. The other on the line toward the center gives the point, and is swept to the right-hand from the second to the third line spaced off for the buckets. The grooves running from the termination of the above-named grooves near the third line to the outer edge of the plate I denominate the "outside grooves," and are drafted by a sweep of one-fourth the diameter of the wheel. The point from which they are drawn is found by placing one foot of the dividers at the termination of the line on the outer edge of the plate. The other backward to the left hand on the out edge will give the point to sweep from, and is swept toward the center until it meets the termination of the before-named inside groove. The grooves on the under side of the middle plate receive the upper part of the reaction-buckets and also the upper part of the inclined plane. The points from which they are described are found precisely in the same manner as those for the upper or direct-action part, and are swept to the left from the first to the third line, and are denominated "grooves for the reaction-buckets." Those for the upper part of the inclined plane are drawn from the termination of the groove near the third line across to the groove for the next reaction bucket, and is drawn from a point found in the same manner as before described for the outside grooves of the direct-action buckets. The points are found for drafting the grooves for the under side of the upper plate in the same manner as those before described for the upper part of the middle plate, and only differ by one being swept to the right and the other to the left hand, and are denominated the "grooves for the upper part of the direct-action buckets." The points for drafting the grooves for the upper part of the lower or bottom plate are found in the same manner as those in the under side of the middle plate for the reaction-buckets, and only differ from those in the under side of the middle by one being drawn to the right and the other to the left hand. The apertures in the middle plate occupy all the space in width between the reaction-buckets excepting the little space occupied by the groove running along the side of the aperture, and in length so much as would admit a sufficient quantity of water—say one-third more in the measurement of its opening than the opening between the reaction buckets at their discharging-point. The direct-action buckets are curved in the same manner as before described for the grooves; the width as circumstances may require; length agreeing with the grooves for the same. The reaction-buckets are made on a curve agreeing with the curve of the grooves, as before described, and agree in width with the direct-action buckets, and in length agreeing with the length of the grooves for the same.

The inclined plane in width fills the space between the reaction-buckets, and in length to extend from the middle plate, inclining downward to the bottom plate sufficient to prevent the water from passing through without a full action upon it.

I will next proceed to connect the parts together.

A in the sectional drawings represents the upper side of one-half the middle plate, the curved lines, the grooves which receive the bottom part of the direct-action buckets. Fig. 1 are the apertures.

B is a view of the under side of one-half the middle plate. The curved lines represent the grooves which support the upper side of the reaction-buckets. The short curved lines from the groove of one reaction-bucket to the other represent the grooves which support the upper part of the inclined plane; Figs. 1, the apertures.

C represents the under side of one-half the upper rim, with grooves, as before described, to receive the upper part of the direct-action buckets.

D represents the upper side of one-half the bottom plate, the curved lines, the grooves in which the bottom part of the reaction-buckets sit. The short black lines are grooves against which the bottom or lower end of the inclined plane rests, as at letters *a a*.

E is a section of the middle plate with two buckets in their order of connection.

F is a representation of the upper side of a section of the bottom plate with three reaction-buckets in their order of connection.

Figs. 4 are the inclined planes in their order, and are supported in their places by the grooves. The whole, being placed in the grooves prepared to receive them, are kept together by screw-bolts passing through all the plates at the back part of each bucket. The places for the bolt-holes are represented by ciphers on plates A B C D.

I will next proceed to describe its operation and construction of the case. The wheel is designed to be placed on a vertical shaft, but may be placed on a horizontal, and runs in a case closely fitted over the top, (or around the rim, as may be most convenient,) and also round the middle plate the water is admitted on the wheel through spouts or chutes, the opening of which should be about one-fourth more than the opening of the reaction-buckets at their discharging-point.

A wheel built agreeably to the above specification will discharge about one-third less than would discharge through an aperture meeting with the resistance common to other wheels, and is therefore necessary to admit no more water on the direct-action buckets than can be discharged with a velocity exceeding the velocity of the wheel while under labor.

G represents a section of the case, closing at the top one-half the wheel, the bottom fitting closely to the edge of the middle plate.

Fig. 1 represents the plank which forms the chutes through which the water is admitted to the wheel. The chutes are curved by a sweep equal to the diameter of the wheel, and are set in a rabbet cut in the plank of the case. The case when completed extends all around the wheel and is closed in every part but that in which the water passes from the flume. The first admission of the water is against the direct-action buckets. It then passes through the apertures on the inclined plane into the reaction-buckets and discharges with reaction.

In some cases I propose to discharge the water upward, in which case the wheel will be reversed and the case fitted to the bottom instead of the top; and in some cases double the wheel, and discharge the water both upward and downward, in which case it would be necessary to fit the case to the two middle plates.

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

The arrangement of the upper, middle, and lower plates, with direct-action buckets between the middle and upper plates, with the inclined plane and reaction-buckets between the middle and lower plates, the whole being constructed and operating as herein described.

WILLIAM C. BISHOP.

Witnesses:

WM. H. GIBBS,

THEO. M. BISHOP.