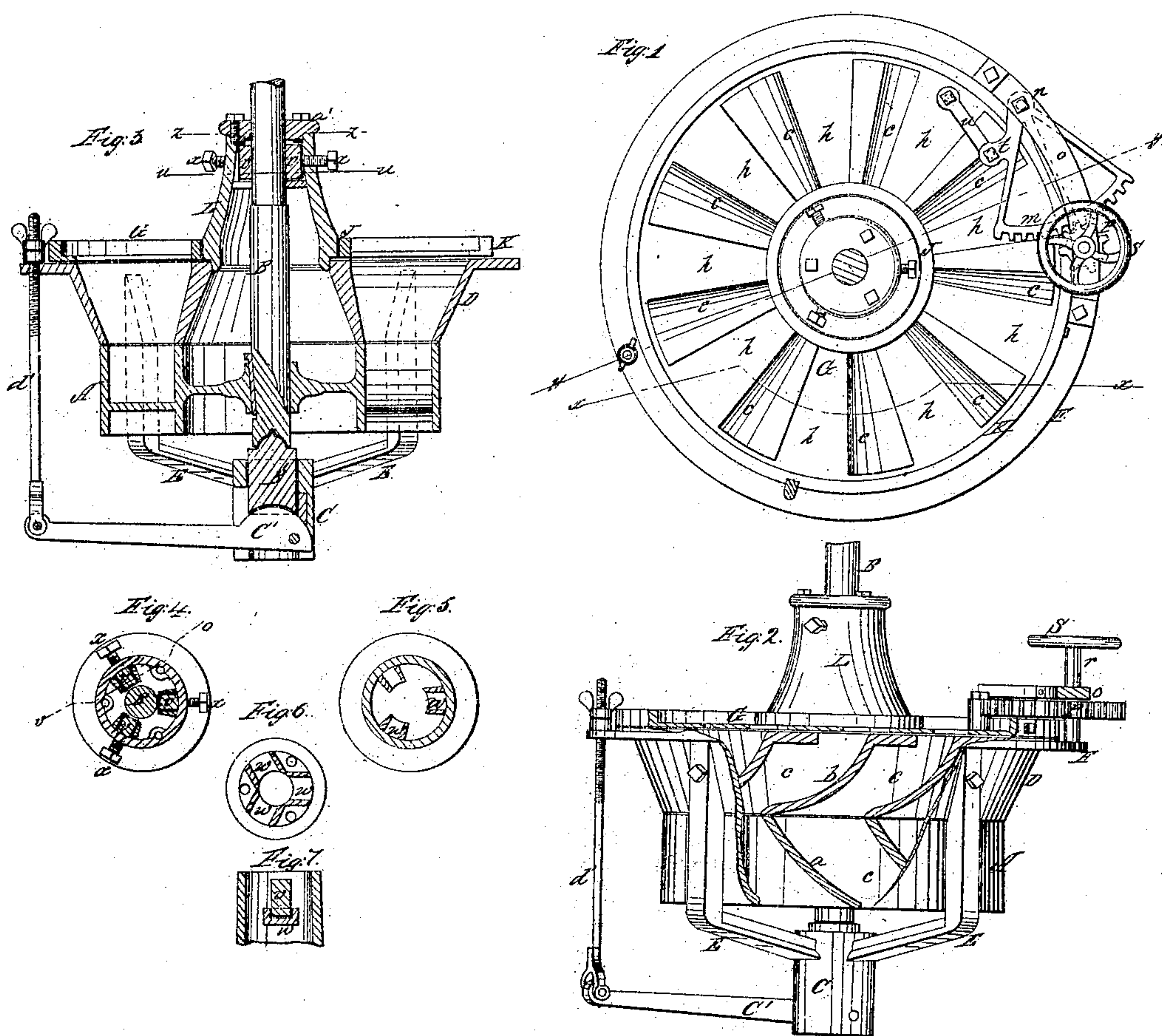


Bodine & Hill,

Water Wheel,

N^o 78,510.

Patented June 2, 1868.



Witnesses:

A. C. Ashpott
J. A. Fraser

Inventor:
J. H. Bodine
F. A. Hill
per Munnifg
attorneys

United States Patent Office.

JOSEPH H. BODINE AND TRUMAN A. HILL, OF MOUNT MORRIS, NEW YORK.

Letters Patent No. 78,510, dated June 2, 1868.

IMPROVED DEVICE FOR OPERATING WATER-WHEEL GATES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that we, JOSEPH H. BODINE and TRUMAN A. HILL, of Mount Morris, in the county of Livingston, and State of New York, have invented a new and improved Water-Wheel; and we 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.

This invention relates to an improvement in water-wheels; and the invention consists in the manner in which the gate is operated.

Figure 1 represents a top view of the wheel, showing the gate, and the manner in which it is operated.

Figure 2 is a vertical section of fig. 1 through the line *x x*.

Figure 3 is a vertical section of fig. 1 through the line *y y*.

Figure 4 is a horizontal section through *z z* of fig. 3.

Figure 5 is a horizontal section through *u u* of fig. 3.

Figure 6 is another section through *z z* of fig. 3.

Figure 7 is a section of fig. 4 through the line *v v*.

Similar letters of reference indicate corresponding parts.

A represents the wheel, which is attached to an upright shaft.

B is the shaft, which is revolved on a step fixed in a stationary block or base, marked C.

D is a stationary shell placed above the wheel, and supported by its flange upon the flume. In this shell are formed chutes for conducting the water to the wheel.

E are angular arms, pendent from the shell D, and supporting the step C, and the shaft B bearing the wheel. The buckets in the wheel are placed, as regards position, similarly to those of the ordinary turbine water-wheel, and it will be seen that the water is conducted to the buckets in a similar manner to that wheel.

The angle and curve of the buckets, as well as of the chutes, are seen in the sectional fig. 2.

a is the bucket,

b is the chute, and

c is the water-way.

It will be seen that the water strikes the bucket at an angle best calculated to insure the greatest percentage of power.

In applying this wheel to a head of water, the flange F of the shell D rests upon the bottom of the flume, an aperture being made through the bottom sufficiently large to admit the wheel, so that the body or head of water rests upon the gate and directly over the wheel.

G represents the gate. This gate is formed of a circular disk-plate, with apertures through it, which correspond in number with the water-ways between the chutes of the shell D.

The arms or bars *h* thus formed between the apertures in the gate, radiate from a central ring or collar, J, to the rim K.

The collar J surrounds the central cone, L, around which, and on the face of the shell D, the gate is partially rotated or operated, so that when the gate is closed, the arms cover the water-ways *c* in the shell, operating after the manner of a heat-register.

The method of operating the gate is seen in fig. 1.

m is a sector, formed by three radiating arms and the arc of a circle, which has its centre on the flange F at *n*. This sector turns on a central pivot at *n*, which is supported by a horizontal bracket, *o*.

The arc of this sector is a cogged rack, as seen in the drawing.

P is a pinion, which engages with this rack, which is attached to an upright shaft or spindle, *r*; and S is a hand-wheel on this shaft, for turning the pinion, and operating the gate.

To connect the sector with the gate there is a lug, *t*, cast on one side of it.

u is a bar, which is attached to this lug at one end, and to the gate at the other, as seen in the drawing.

The result of this arrangement is that the gate may be turned in either direction with the greatest ease, and it will stay in any desired position.

By attaching the lever to the sector at a proper distance from the pivot of the latter, the amount of power required to operate the gate can be changed as the case may require.

The central cone L is attached to the shell D, through both of which the shaft B passes. The upper portion of this hollow cone contains a bridge-tree, which supports the shaft.

Different views of this support are seen in the figs. 4, 5, 6, and 7.

v represents guide-blocks of wood or other suitable material, which are confined by flanges in the bridge-tree, as seen in the figures referred to.

w represents the recesses in which these blocks are confined. The position of these blocks in their recesses is controlled by set-screws, *x*, through the sides of the cone, as seen, so that the shaft may be accurately adjusted at any time.

a' represents a cap on the top of the cone. The bottom end of the shaft may be concave, revolving on a wooden conical step, B', as seen in the drawing, or any other suitable step may be employed.

All kinds of steps, or steps and points, are very liable to wear, and consequently the shaft is liable to settle, and thereby disarrange the wheel and the machinery connected therewith.

For the purpose of providing a remedy for this difficulty, I support the conical step on a cam-lever, C', with the lever extending outward, so as to be connected with the rim or flange, F, of the shell D.

d' is a rod, which connects the lever with the flange. On the upper portion of this rod there is a screw-thread, with a nut on it above the flange, so that in case the shaft settles, this nut may be screwed down, which draws up the end of the lever, and consequently raises the shaft.

Any slight settling of the shaft is thus compensated for, and the wheel, by this arrangement, and the bridge-tree blocks in the cone L, may be adjusted to the shell with the greatest nicety.

Having thus described our invention, we claim as new, and desire to secure by Letters Patent—

The arrangement of the pivoted sector *m*, pinion P, and hand-wheel S, and pivoted connecting-rod *u*, with relation to the circular register-gate G, whereby said gate is operated horizontally to open and close all the water-ways at once, as herein shown and described.

TRUMAN A. HILL,
JOSEPH H. BODINE.

Witnesses:

P. J. RUNYAN,
HATHNER BUEL.