M. FLANIGAN.

Improvement in Water-Wheels.

No. 114,659. Patented May 9, 1871.

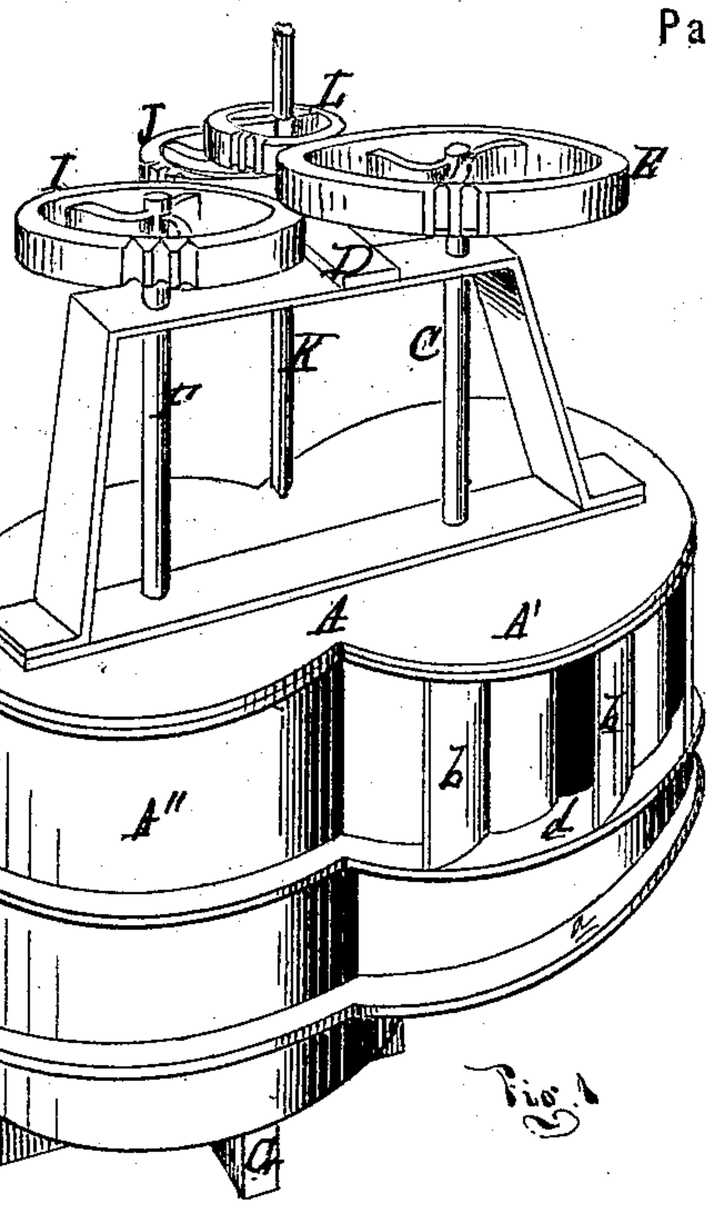

Fig. 1

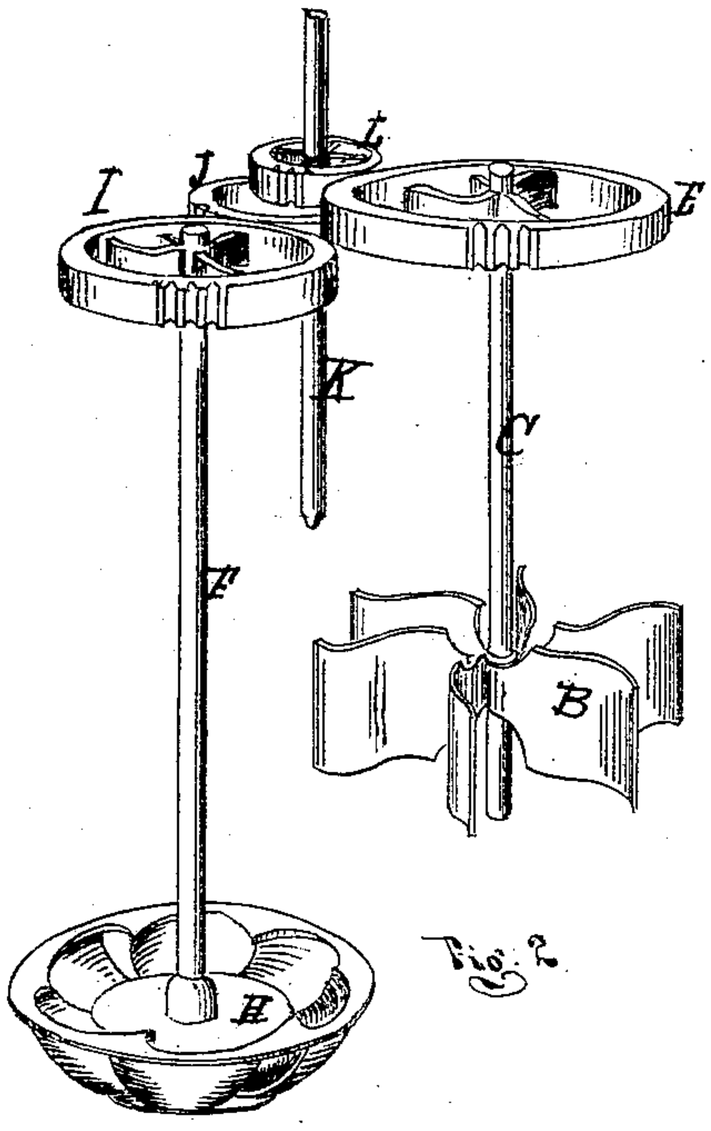

Fig. 2

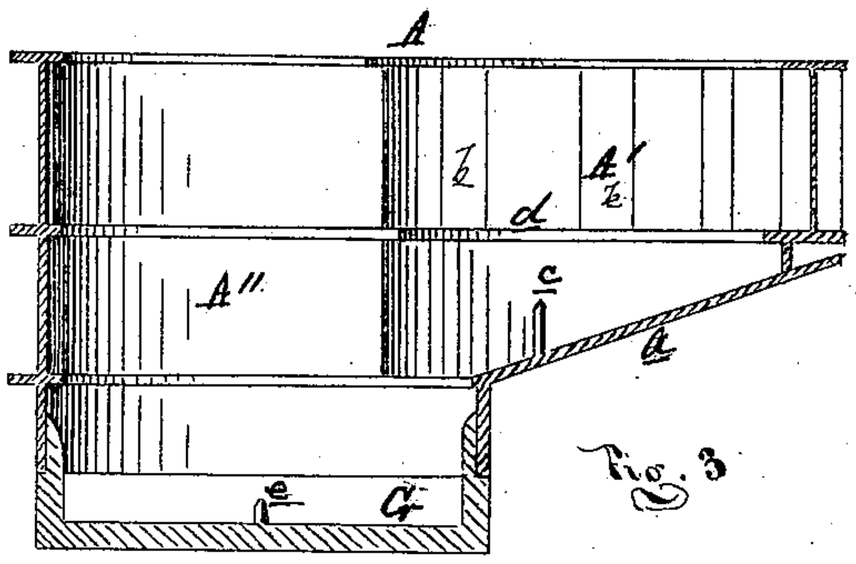

Fig. 3

ATTEST.
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United States Patent Office.

MARK FLANIGAN, OF DETROIT, MICHIGAN.

Letters Patent No. 114,659, dated May 9, 1871.

IMPROVEMENT IN WATER-WHEELS.

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

To whom it may concern:

Be it known that I, MARK FLANIGAN, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Water-Wheels; and I do declare that the following is a true and accurate description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon and being a part of this specification, in which—

Figure 1 is a perspective view of the incased wheels and their gearing;

Figure 2 is a perspective view of the wheels and gearing in their relative positions, with the case removed; and

Figure 3 is a vertical longitudinal section of the case.

Like letters indicate like parts in each figure.

The nature of this invention relates to certain improvements in the construction and method of employing double turbine water-wheels, and consists in the new and peculiar arrangement in a single case of two wheels, the first a direct-action and the second a reaction-wheel, taking and utilizing the discharge-water of the first, and the spur-wheel of each wheel-shaft meshing with a pinion or pinions on a third shaft, whereby the power developed by both wheels is directly communicated to the third shaft, while the water vented is the amount actually used by the direct-action wheel.

The advantage of this arrangement of the wheel is, that, after the direct-action wheel has developed its full per cent. of the spouting power of the water used, the reactive weight-power of the water discharged by the first is utilized by the second wheel, and through proper gearing transmitted to the third shaft for distribution.

In the drawing—

A represents the wheel-case in the form of two cylinders intersecting each other, with their intersecting walls cut away, to form a single chamber, of which—

A is the cover;

A^1, the direct-action chamber; and

A^2, the reaction wheel-chamber, the latter being deeper than the former, as shown.

The chamber A^2 is open at the bottom, and the remainder, with a bottom-plate *a*, inclined toward the lower part of the other chamber.

The direct-action case is provided with gates *b*, of any suitable form, and operated in any convenient manner.

B is a direct-action wheel in the well-known form shown, secured to the shaft C, rotating on the step *c*, rising from the bottom-plate of the chamber A^1.

The shaft C passes up through a frame, D, rising from the top of the case, and carries a spur-wheel, E.

The wheel B rotates in the case A^1 above the encircling flange *d*, discharging its water into the adjoining chamber.

F is the reaction wheel-shaft rotating on the step *e*, on the bridge-tree G, at the bottom of the chamber A^2.

H is a reaction-wheel, dish-shaped, as shown, and secured to the lower part of the shaft F.

The buckets or blades are set at an angle of twenty-two and one-half degrees inclination from the perpendicular, and their width is twice their height.

This wheel receives the water discharged from the first, and its buckets being arranged as above described, while the water passes down, say one foot, the wheel will travel two feet.

I is a spur-wheel at the top of the shaft F, meshing with a pinion, J, on a third shaft, K, stepped on one side of the cover, or conveniently near the case.

On this third shaft is another pinion, L, with which the spur-wheel of the shaft C meshes.

As the reaction-wheel rotates with twice the velocity that the direct-action wheel does, the diameters of the spur-wheels and pinions are so calculated that the gearing of either water-wheel would rotate the third shaft at the same speed.

Thus, neither wheel is a drag on the other; on the contrary, after the full per cent. of the spouting power of the water gated to the direct-action wheel is utilized by it and transmitted to the third shaft, the weight of the discharge-water reacts on the second wheel in passing through it, the sum of the reactive power so developed being also transmitted to the third shaft, to be added to the power developed by the direct-action wheel, less the trifling amount absorbed in the friction of the transmitting gearing; nor does the reaction-wheel act as a contracted issue to the direct-action wheel to lessen its power; on the contrary, the arrangement of its buckets, causing it to rotate with double the speed of the direct-action wheel, vents the water fast enough to keep up a suction from the direct-action wheel.

I broadly disclaim the invention of the wheels, as both are old and in common use; but

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

1. The combination of the direct-action wheel and the reaction-wheel within the case, said wheels carrying gear-wheels of diameters proportioned to their respective powers, said gear-wheels meshing with and impelling a common pinion or pinions upon a common shaft, all substantially as shown and described.

2. The wheel-case A, constructed and arranged for the reception of independent, direct, and reaction-wheels, substantially as described.

Witnesses: MARK FLANIGAN.

MARTHA STEWART,

FREDERICK EBERTS.