E. E. COLEMAN.

Turbine Water-Wheel.

No. 112,324. Patented Mar. 7, 1871.

Fig I

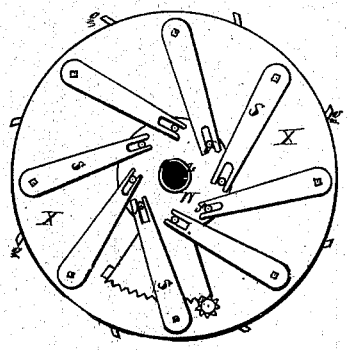
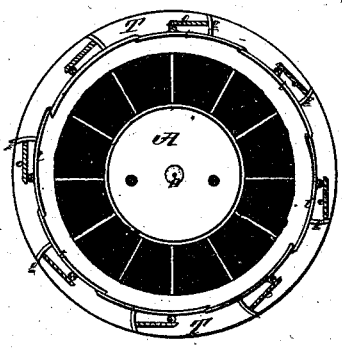


Fig II



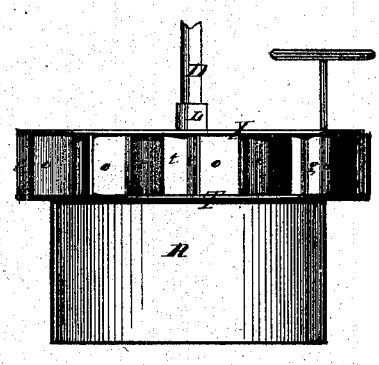


Fig III

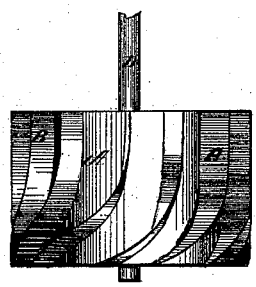


Fig IV

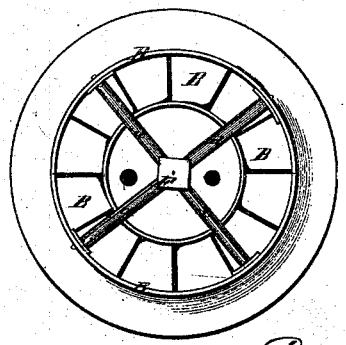


Fig V.

Witnesses.

George H. Graves

E. Dudley Chapin.

Inventor.

Edward E. Coleman

by his Attorneys

Gardiner Hyde & Co.

United States Patent Office.

EDWARD E. COLEMAN, OF WEST CUMMINGTON, MASSACHUSETTS.

Letters Patent No. 112,324, dated March 7, 1871.

IMPROVEMENT IN WATER-WHEELS.

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

I, EDWARD E. COLEMAN, of West Cummington, Hampshire county, Commonwealth of Massachusetts, have invented an Improved Turbine Water-Wheel, of which the following is a specification.

Nature and Objects of the Invention.

My invention relates to a wheel so constructed that the largest per cent. of force is utilized by direct action of the head of water against the floats, together with the reaction of the escaping water from the wheel, and to the construction and arrangement of the gates, with the mechanism for opening and shutting the same, so as to regulate the flow of water through the wheel.

Description of the Accompanying Drawing.

Figure I is a plan view of the top of one of my wheels;

Figure II is also a plan view, with the top removed, exposing the ends of the gates and floats;

Figure III is a side view;

Figure IV is a side view of the cylinder with the floats; and

Figure V is an end view of the bottom of my wheel.

General Description.

A is the cylinder, from which project the floats B B, &c.

Through the center of the cylinder runs the shaft D, which passes through a sleeve, L, in the top of the wheel, and has a bearing, F, at the lower part of the wheel, upon cross-pieces *d*, securely bolted at their ends to the case R of the wheel.

The floats are arranged around the outside surface of the cylinder, spirally.

Each float commences at the top of the cylinder radially to the shaft, and winds around the cylinder, forming a curve, of which the center would be on a line with the top of the cylinder, and to which the bottom end of the cylinder forms a line nearly a tangent.

The capacity of the space between the upper ends of the floats is at least twice as great as at their lower ends, so that the reaction of the water leaving the wheel bears a direct proportion to its momentum, which had been greatly increased by being confined.

The water is admitted to the floats through gates hinged between the flange T of the case R and the top piece X of the wheel, the flange T and top piece X being firmly joined by side pieces *o o*, &c., which hold them securely together, and enable them to afford good arbors to the rods upon which the gates are fastened.

These pieces, *o o*, &c., correspond in number to the gates *t t*, &c, which have the rods to which they are attached against the side and at the end of each piece *o*, so that when the gates, which are segments of a circle and slightly overlap at their ends, are closed, a space would be left between the side piece *o* and gate *t*.

This is seen in Fig. II, where it is shown, also, that the gates are not hinged at their centers; if they were so hinged, in order to have the pressure of the head of water balanced upon each side of the center, so that there would be no pressure to oppose their being opened when once shut, it would be necessary, in a wheel with many floats, to have the circle formed by the closed gates much larger, to enable enough water to be let on and at the same time have the ends of the gates swing clear of the edges of the floats.

I avoid this necessity by fastening them to the rods, about one-third of their length from the end that swings inward, and then to prevent the water from pressing in between the gate and piece *o*, I form on the gate the shield *g*, opposite the end of the piece *o*, and at a point on the gate half way between the rod and the end that swings out.

The effect of this arrangement is, that while the gates can be opened to a desired width, the pressure of water on them when closed does not operate in the least to prevent them from being opened.

The ends of the rods pass through the top X, and are rigidly attached to arms S, as shown in Fig. I.

These arms radiate from the shaft when the gates are half open, having pins *f* running through slots in their ends, which pins are placed upon the circumference of a float-wheel, W, resting upon the top X, and revolving upon the sleeve L, and by means of a fan-shaped projection extending from the wheel in a plane with it, and provided with teeth which mesh with a pinion upon a thumb-screw or other convenient handle.

The gates are opened or closed by a few revolutions of the pinions.

In Fig. I the gates are wide open, the ends of the shields *g* projecting beyond the top X and flange T.

The construction and arrangement of my floats B upon the cylinder A is materially and substantially different from any in use, in that the floats are arranged upon the outside of the cylinder, in a curve, unbroken from end to end, and in a curve constantly increasing from their tops to their lower ends, so that the compression of the stream of water between them is in equal ratio with its divergence from the perpendicular.

Claims.

I claim as my invention—

1. The cylinder A, having the floats B B arranged upon the outside, in a curve, unbroken from end to end, and in a curve constantly increasing from their tops to their lower ends, forming a wheel, to receive the water at its top, the parts being all constructed and arranged substantially as shown and described.

2. The arrangement and construction of the gates *t*, hinged at one side of their centers, and at the ends of the pieces *a a*, &c., and having the shields *g*, the whole being constructed and arranged as shown and described.

EDWARD E. COLEMAN.

Witnesses:

FORDYCE WHITMARSH,

E. A. WHITMARSH.