W. T. Duvall,

Water Wheel.

No. 103,162. Patented May 17, 1870.

Fig. 1.

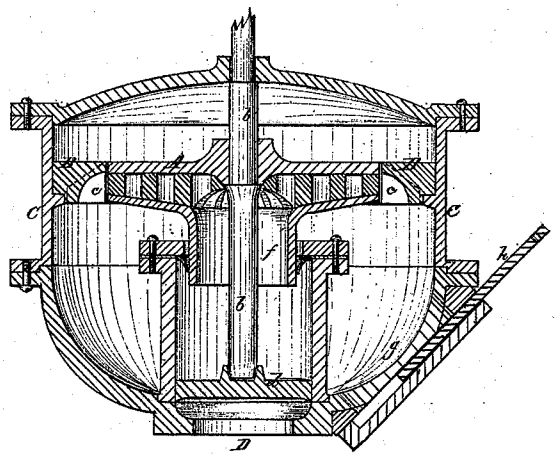
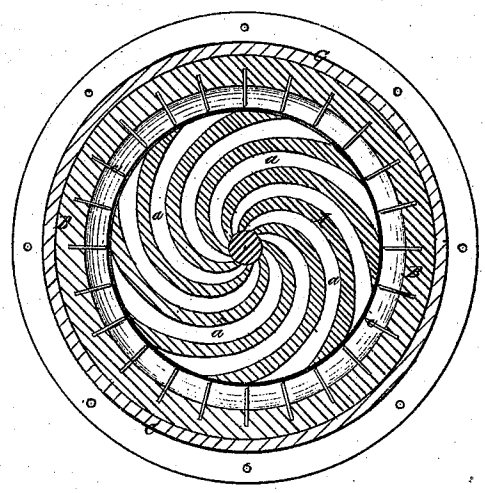


Fig. 2.



Witnesses.

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WILLIAM T. DUVALL, OF GEORGETOWN, DISTRICT OF COLUMBIA.

Letters Patent No. 103,162, *dated May* 17, 1870.

IMPROVEMENT IN WATER-WHEEL.

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, WILLIAM T. DUVALL, of Georgetown, in the county of Washington and District of Columbia, have invented a new and useful Improvement in "Water-Wheels," which may be called a "battery water-pressure wheel;" and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents a central vertical section of my wheel and its housing.

Figure 2 is a horizontal section, taken on line *z z* on fig. 1.

My invention relates to that class of wheels in which the water is supplied under pressure through close tubular connections from aqueducts, or similar sources; and

It consists—

First, in a combination with the reaction or centrifugal wheel of Barker or Whitlaw, of a series of stationary abutments for the discharging water to impinge upon, and thereby increase its reactive effect when under pressure.

Secondly, in such an arrangement of the wheel within its housing as that the pressure applied from below shall counterbalance, or nearly so, the weight of the wheel, its shaft, and connections or gearing thereon.

Thirdly, in the arrangement in relation to a pressure-wheel, of a regulating-valve or gate at the eduction-aperture, whereby all available pressure is obtained, and water economized.

Fourthly, in the arrangement of a hollow neck on the under side of the wheel, for forming connection with the induction-pipe by hydraulic packing, as hereinafter more particularly described.

Referring to the drawing—

A represents the reaction wheel, having two or more curved water-ways, *a*, which should be arranged to discharge an equal quantity of water on opposite sides of the axis, to avoid lateral strain.

B is an annular rim, firmly secured in the housing C around the periphery of the wheel A, and which is formed, at its inner under side or edge, concave, in which concave is arranged a series of plates or divisions, *c*, which extend radially nearly in contact with the periphery of the wheel A, and downward about to the level of its under side.

The housing C may be constructed in any convenient number of parts, to facilitate the fitting and introduction of the working parts therein, and is provided with an induction-passage, D, in which is a cross-bar, *d*, with a step, to receive the toe of the shaft *b* of the wheel A.

The upper end of this passage D is suitably fitted to form a water-packing around the neck *f* of the wheel, and to its lower end is attached the water-main or supply-pipe.

g is the egress-passage, which is fitted with any suitable valve or gate, *h*, by which the consumption of water and consequent velocity and power of the wheel may be regulated either by hand, or automatically, by a governor. The housing C is also inclosed or covered in at top, and may be provided with a stuffing-box around the shaft *b*, if desired.

The operation of the wheel will then be as follows:

The water being turned on at the induction-passage D, fills the wheel and the discharge-chamber beneath it. The gate *h* is then to be withdrawn gradually until the required velocity of the wheel is attained, the water flowing through the curved ways *a*, under pressure, discharges from the periphery of the wheel A against the abutments, which increase its reaction, whilst the curved portion of the rim between these abutments aids in the same by deflecting the water from its direct course into the discharge-chamber, and thence it escapes through the egress-opening *g*.

It will thus appear that, by the introduction of the water under pressure to the under side of the wheel, the weight of the latter is counterbalanced, and the friction of its bearings is much reduced; also, that by the arrangement and combination of the abutments with the wheel, the greatest amount of reaction is obtained, and, by regulating the discharge-aperture instead of the induction, the full force of all the water used is developed, less, only, that consumed in friction.

Having thus described my invention,

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

1. The abutment-rim B, in combination with the reaction wheel A, all constructed and operating substantially as shown and described.

2. The induction of the water on the under side of the wheel, in such manner that the weight of the latter is sustained by the pressure of the water, substantially as shown and described.

3. The combination of the neck *f*, arranged on the under side of the wheel, with the upward extension of the supply-pipe D, provided with hydraulic packing, substantially as described.

WM. T. DUVALL.

Witnesses:

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