T. H. Risdon,

Water Wheel.

No. 107,627. Patented Sep. 20. 1870.

Fig: 1.

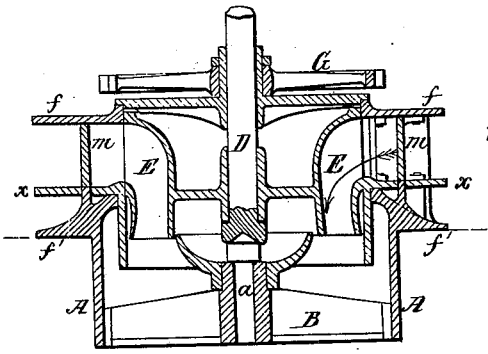
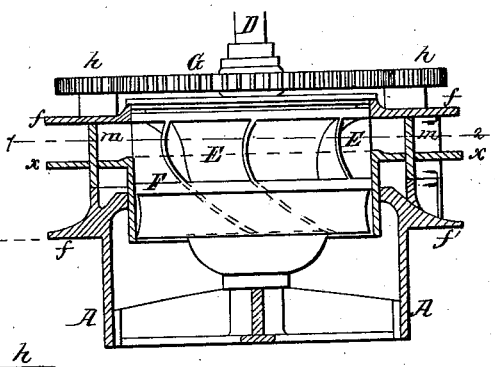


Fig: 2.



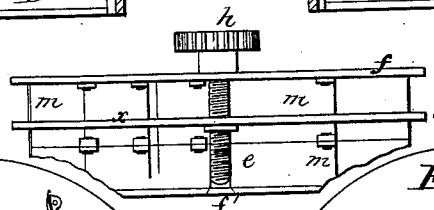


Fig: 3.

Fig: 5.

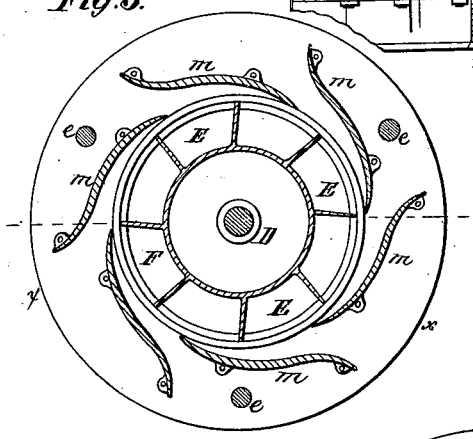


Fig: 4.

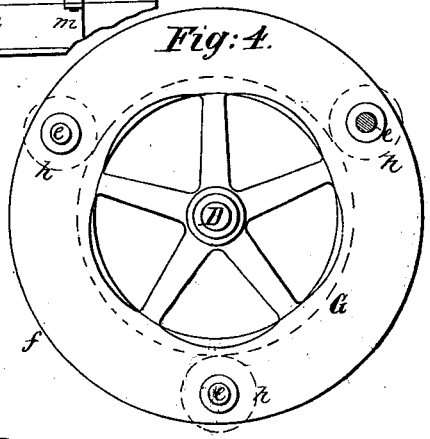
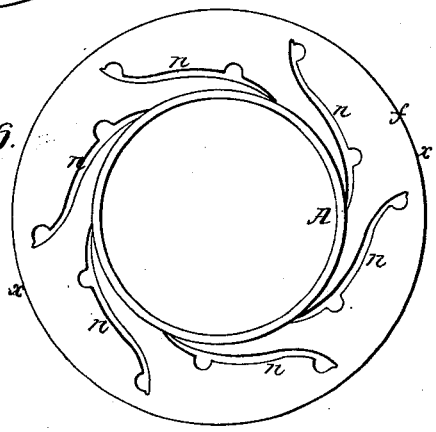


Fig: 6.



Witnesses:
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Thos. McElvain

Inventor:
T. H. Risdon
By his Atty
Howson & Sons

UNITED STATES PATENT OFFICE.

THEODORE H. RISDON, OF MOUNT HOLLY, NEW JERSEY.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. **107,627**, dated September 20, 1870.

I, THEODORE H. RISDON, of Mount Holly, county of Burlington, State of New Jersey, have invented an Improvement in Turbine Wheels, of which the following is a specification:

Nature and Object of the Invention.

My invention relates to turbine wheels to which the water is admitted horizontally, and which have a vertical discharge; and my invention consists, first, of an adjustable cylindrical gate and flange, adapted to the stationary exterior casing of the wheel, to the curved guides of the same, and to the wheel itself, substantially as described hereafter, so that by means of the said gate the supply of water to the wheel may be regulated or entirely cut off at pleasure; second, of the said gate, so arranged that water will be admitted to the wheel on lowering the gate; third, of a peculiar manner, described hereafter, of securing the guides so that they may be readily removed or replaced without disturbing the parts of the machinery; and, fourth, of an inclined or curved flange, by which obstructions, which might otherwise interfere with the adjustment of the gate, may be disposed of.

Description of the Accompanying Drawing.

Figures 1 and 2 are vertical sections of my improved case for turbine wheels; Fig. 3, an exterior view of part of the case; Fig. 4, a plan view; Fig. 5, a sectional plan on the line 1 2, Fig. 2; and Fig. 6, a plan view of part of the case.

General Description.

A is the fixed cylindrical casing of the wheel, and has, at its lower end, a frame, B, consisting of a central hub with radiating arms, and having a central stud or pin, the upper pointed end of which forms the bearing of the vertical shaft D of the turbine wheel E, the latter being of an ordinary construction, and therefore requiring no explanation. F is the adjustable cylindrical casing, arranged to fit snugly but slide freely within the exterior casing, A, and having a horizontal flange, *x*, through threaded holes in which pass screws *e e e*, arranged to turn in the upper and lower flanges, *f* and *f'*, of the said exterior casing, A, each screw being furnished with a pinion, *h*, and each pinion gearing into a central wheel, G, which is arranged to turn freely on and independently of the vertical shaft D, so that by turning this wheel all the screws *e* may be operated simultaneously and the cylindrical gate raised and lowered at pleasure.

Curved guides *m* intervene between the upper and lower flanges, *f* and *f'*, of the casing A, the upper end of each guide having lugs, through which pass bolts or screws into the upper flange, *f*. Each curved guide, however, is not secured directly to the lower flange; but on this flange are cast as many permanent ribs *n*, Fig. 6, as there are guides, the ribs being of the same shape as the guides, and each guide being bolted to one of these ribs. This arrangement constitutes an important feature of my invention, as it enables me to remove and replace with new ones any one or more of the guides which may be damaged. For instance, if the cylindrical gate be lowered to the position shown in Fig. 1, its lowest point (the flange *x*, which has curved slots corresponding with the guides, so as to slide freely on the latter) will be below the point where the lower edges of the guides are secured to the upper edges of the ribs. Hence, after withdrawing its screws or bolts, any one of the guides can be removed laterally from between the flanges *f* and *f'* without being interfered with by the gate.

It will be observed that the upper surface of the flange *f'* is inclined downward. The object of this is to dispose of obstructions which might be carried with the water between the flange *x* of the gate and the flange *f'* of the exterior casing. Should any obstruction be admitted between these flanges, it will, owing to the inclination of the flange *f'*, be forced outward by the flange *x* when the gate is lowered.

The wheel, with its gate and exterior casing, is supposed to be situated within a forebay, so that the water admitted to the latter can have free access at all points to the space between the flange *f* of the exterior casing and the flange *x* of the cylindrical gate, which can be raised or lowered at pleasure, so as to permit more or less water to gain access to the wheel E, or to entirely exclude the water from the same.

By so arranging the gate that it must be lowered to admit water to the wheel, the water, when it enters, will first strike the top of the wheel, and will then pass downward, traversing in a solid body the whole length of the buckets, the full effect of the water being thus obtained, however small the volume admitted may be.

It is important that the water should be directed to the wheel in an undisturbed volume, so that it may have the best effect; and this I accomplish by extending the flange *x* of the cylindrical gate laterally beyond the outer edges of the stationary guides, these guides fitting snugly in slots formed for their reception in the said flange *x*.

Claims.

1. The adjustable cylindrical gate F and its flange *x*, adapted to the exterior casing, A, stationary guides *m*, and to the turbine wheel, substantially in the manner described.

2. The gate F, arranged within the casing, substantially as described, so that water will be admitted to the wheel when the gate is lowered, for the purpose described.

3. The guides *m*, adapted to slots in the flange *x* of the cylindrical gate, and secured to permanent ribs *n*, of a form corresponding to that of the said guides, and adapted to the said slots of the flange *x*.

4. The flange *f'*, having an inclined or curved upper surface, in combination with the gate F and its flange *x*, as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THEODORE H. RISDON.

Witnesses:
J. M. COLGAN,
HARRY SMITH.