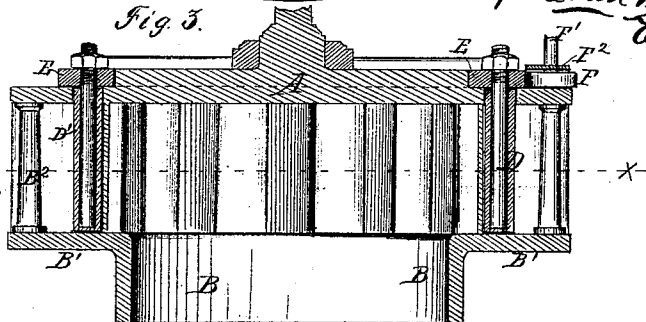
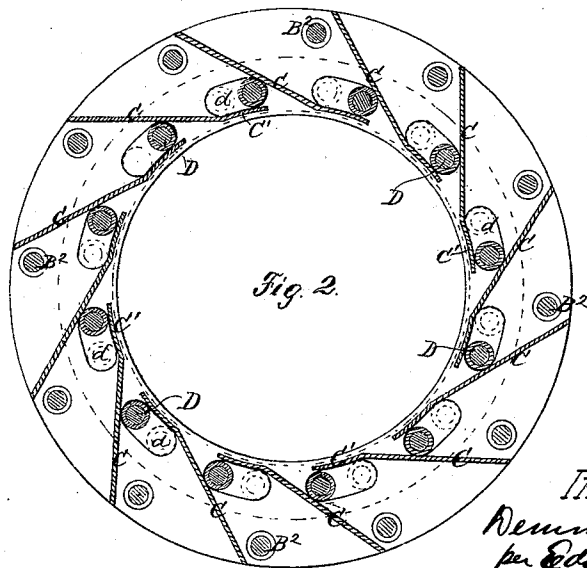
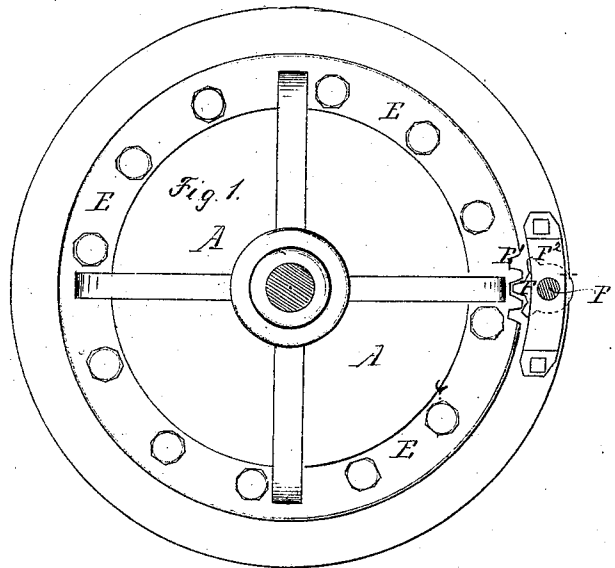


*J. Reynolds,*

*Water Wheel.*

*No. 109664.*

*Patented Nov. 29. 1870.*



*Witnesses:*  
*C. C. Clausen*  
*A. Ruppert*

*Inventor:*  
*Reuben Reynolds*  
*per Edson B. Smith*  
*Attorney*

# United States Patent Office.

DEMMON REYNOLDS, OF NAPANOCK, NEW YORK.

Letters Patent No. 109,664, dated November 29, 1870.

## IMPROVEMENT IN WATER-WHEELS.

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, DEMMON REYNOLDS, of Napanock, in the county of Ulster and State of New York, have invented certain Improvements in Water-Wheels; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the annexed drawing making part of this specification, in which—

Figure 1 is a plan view of the casing of a turbine water-wheel.

Figure 2 is a horizontal section on line *x x* of fig. 3.

Figure 3 is an axial section.

The same letters are employed in all the figures in the designation of identical parts.

This invention relates to turbine water-wheels; and

My improvements consist in the construction of the gates, and in their combination with other parts of the wheel, as will be more specifically set forth in the following description and claim.

The wheel (not shown in the annexed drawing, as it forms no part of this invention) is to be inclosed in a casing formed by a crown-plate, A, and a horizontal flange, B', of the discharge-tube B, with intermediate ports and gates.

The said crown-plate is supported upon and secured to the flange B' by shouldered bolts B<sup>2</sup> in the manner shown, and is to be provided with a central aperture to form a passage and bearing for the wheel-shaft.

The ports to direct the water upon the buckets of the wheel are formed by guide-plates C C', so arranged that the water passing between them will strike the buckets in a line about tangential to the periphery of the wheel.

Each guide-plate has a flange, C', curved backward around the opening for the wheel, the rear edge of such flange being such distance from the guide-plate in rear of it as to leave a throat or port, for the passage of the water, of the proper size.

The ports are controlled by a series of gates, D, which I propose to make of a cylindrical form, as shown, and secure them to a concentric ring, E, fitted upon the crown-plate around a hub or shoulder thereon.

These cylindrical gates pass through elongated slots, *d*, in the crown-plate, down to the upper surface of the flange B', and are operated simultaneously in opening and closing the ports by means of a pinion, F, meshing into a cogged segment, E', on the ring E.

The power for operating the gates is applied to the vertical spindle F<sup>1</sup>, upon which the pinion F is secured, and which rests in a step upon the crown-plate, and

is further supported in a bridge, F<sup>2</sup>, spanning the pinion, and bolted to said crown-plate.

The ring E has a central hub, with an aperture neatly fitting the hub of the crown-plate on which it turns, said ring being connected to its hub by a series of radial arms, as shown.

In order to insure simultaneousness in the closing of the ports by the gates, I propose to secure the latter to their common ring E in the following manner:

The required number of holes is bored in the ring for the reception of the upper reduced end of the gates, the holes being made somewhat larger than such portions of the gates.

Each gate having been passed through its slot in the crown-plate, and having been made to bear firmly against the guide-plates so as to close the ports, as shown in fig. 2, they are firmly fixed in that position in any suitable manner.

The ring is then slipped over them, their upper ends passing through the holes, which, being somewhat larger, will readily admit them even though they be slightly out of the center.

Into these holes, the bottom of which is formed by the shoulder on the gates, molten Babbitt metal is poured around the reduced ends of the gates, which, after the metal has set, are further secured by nuts, as shown, when the temporary fastenings of the gates are removed.

In operating the gates they slide along the back of the flanges C' on the guide-plates, and it will be found that long use only enhances their effectiveness.

In some cases I propose to cover the gates by a cylinder, D, of India rubber, which, by reason of its elasticity, will permit all the gates to be shut even though some be slightly out of position.

Having thus described my invention,

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

The combination of the crown-plate A, flange B, guide-plates C C', gates D, ring E E', and pinion F<sup>1</sup>, all constructed, arranged, and operated substantially as shown and described.

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

DEMMON REYNOLDS.

Witnesses:

GEO. G. KEELER,  
NEIL FOWLER.