A. D. COLE.

TURBINE WATER-WHEEL.

No. 183,490. Patented Oct. 24, 1876.

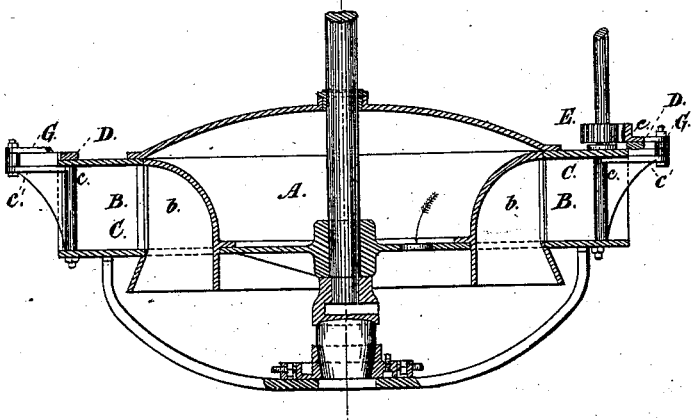

Fig. 1.

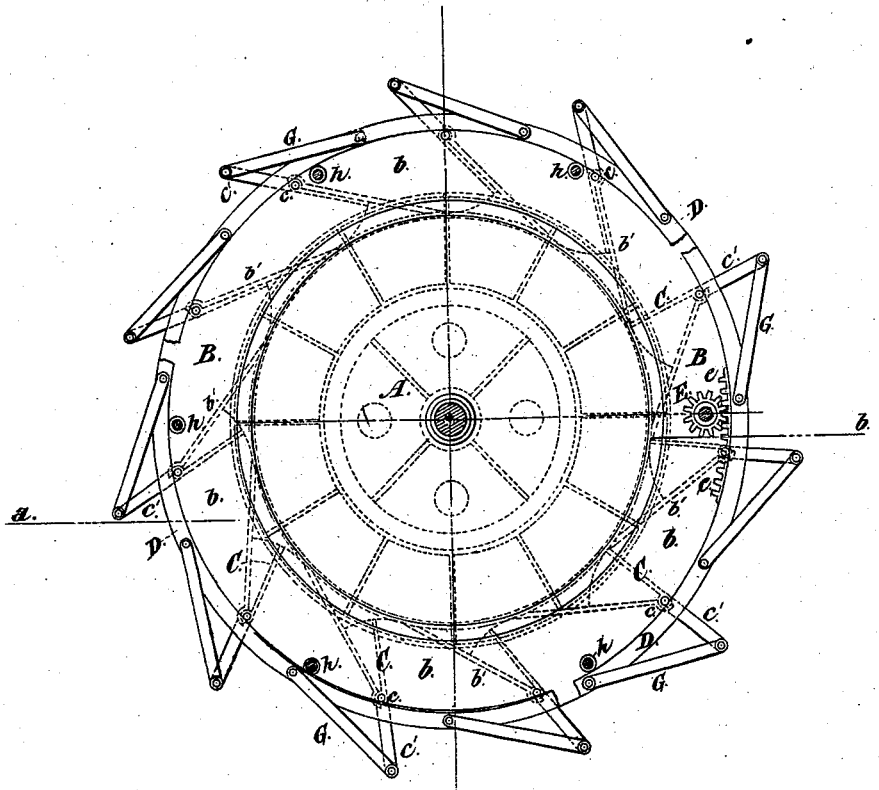

Fig. 2.

Witnesses:

Geo. A. Aird

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Inventor:

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per D. D. Ridout & Co.

Att'ys

UNITED STATES PATENT OFFICE.

ASHLEY DODGE COLE, OF TORONTO, ONTARIO, CANADA.

IMPROVEMENT IN TURBINE WATER-WHEELS.

Specification forming part of Letters Patent No. **183,490**, dated October 24, 1876; application filed July 22, 1876.

To all whom it may concern:

Be it known that I, ASHLEY DODGE COLE, of the city of Toronto, Province of Ontario, Canada, have invented new and useful Improvements in Turbine Water-Wheels, of which the following is a specification:

My invention has reference to improvements in the annular chute-wheel of turbine water-wheels; and it consists of hinged gates placed within the water-passage of the chute-wheel, acting in connection with the stationary chute-partitions, and connected by levers with a movable ring operated by rack and pinion, the object being to regulate the supply of water in proportion to the amount of work required from the wheel at different times, and also to deliver the water to the wheel at all times at the most available angle.

In the accompanying drawings, Figure 1 is a section of my improved turbine water-wheel on the line *a b*. Fig. 2 is a plan of the same, showing the water-passages fully open, partially open, and completely closed.

A is the wheel, placed and made in the ordinary way. B is the annular chute-wheel surrounding the same, in which are cast or fitted the partitions *b'*, forming the several water-passages *b* to the wheel. Working within these passages, and hinged at *c* to the outer end of the partitions *b'*, are the hinged gates C, manipulated by projecting arms *c'*, connected by the links G to the movable rings D. The ring D has attached the toothed rack *e*, and is revolved by the pinion E, fastened to an upright shaft. The ring D is kept in position, and bears against the rollers *h*, which are flanged for the purpose of keeping the ring to its horizontal bearing. The hinge of the gate C works and fits in a socket, *c*, cast at the outer end of the partitions *b*, as shown.

It will be seen that the whole pressure of the water is taken off the hinge-pin and transferred to the socket, giving a firmer bearing for the gates, and preventing the wear of the pins. The peculiar feature of my invention is not only that the feed of water can be regulated more perfectly, according to the work required from the wheel, but that the water is directed on the wheel always at the angle which gives the best results possible for the quantity of water used. Mill owners complain that they do not obtain a proportionate value in work from their wheels for the quantity of water used in the present adjusting feed-water chutes when they partially close the gates, and they are forced to use a greater quantity of water than is really necessary for the work required to be done. The reason for this loss of power is, that the adjustable feed-water gates in use at present, when they are partially closed, direct the water in the delivery away from the wheel, and much of its force is lost before coming in contact with the wheel. In my wheel the gates are so arranged that when fully open they deliver the water at the most available angle, and in proportion as they are closed the water is directed near the center, delivering it at once with full force into the buckets.

I claim as my invention—

In a turbine water-wheel, the series of partitions *b'*, having the sockets *c* at their outer extremities, the series of gates C, hinged in the said sockets, arms *c'*, links G, and circumferentially-adjustable ring D, all combined and operating substantially as herein specified, for the purpose set forth.

A. D. COLE.

Witnesses:
GEO. A. AIRD,
HUGH AIRD.