(No Model.)

A. PATRICK.

WATER WHEEL.

No. 436,291. Patented Sept. 9, 1890.

Fig. 1.

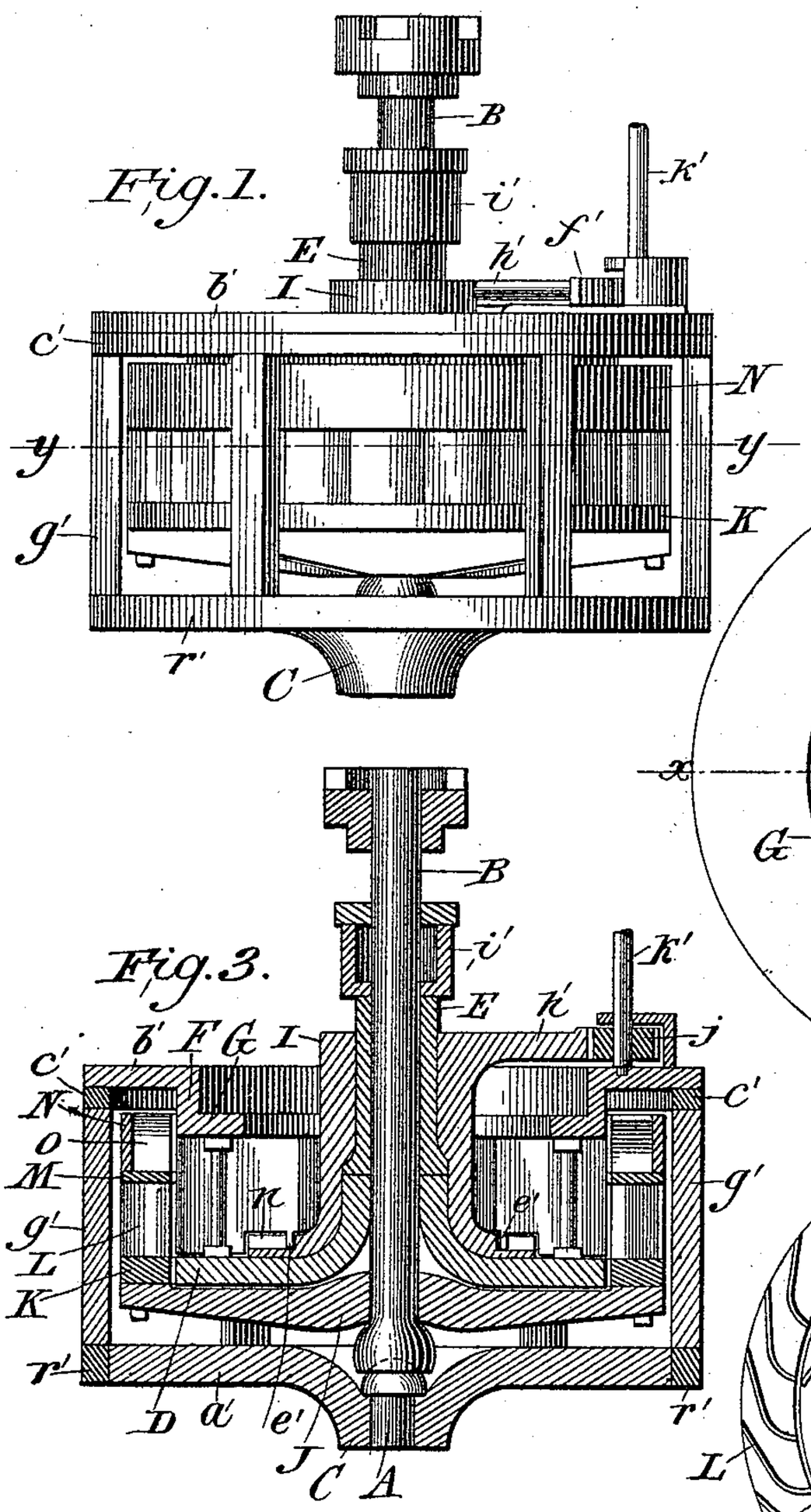


Fig. 2.

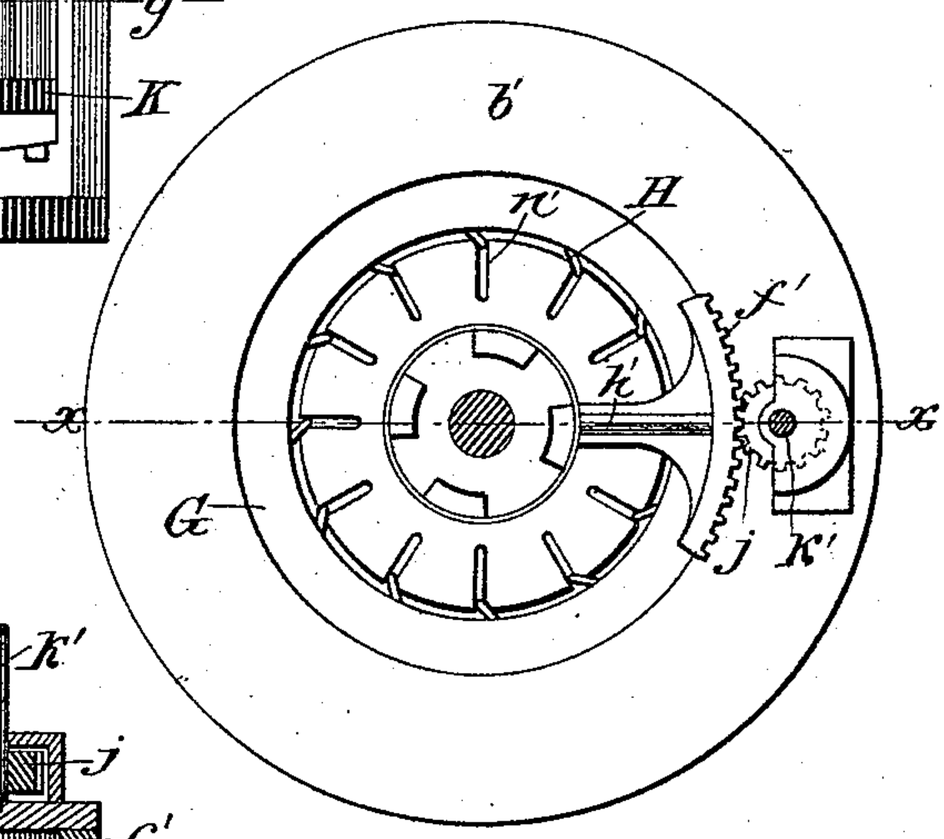
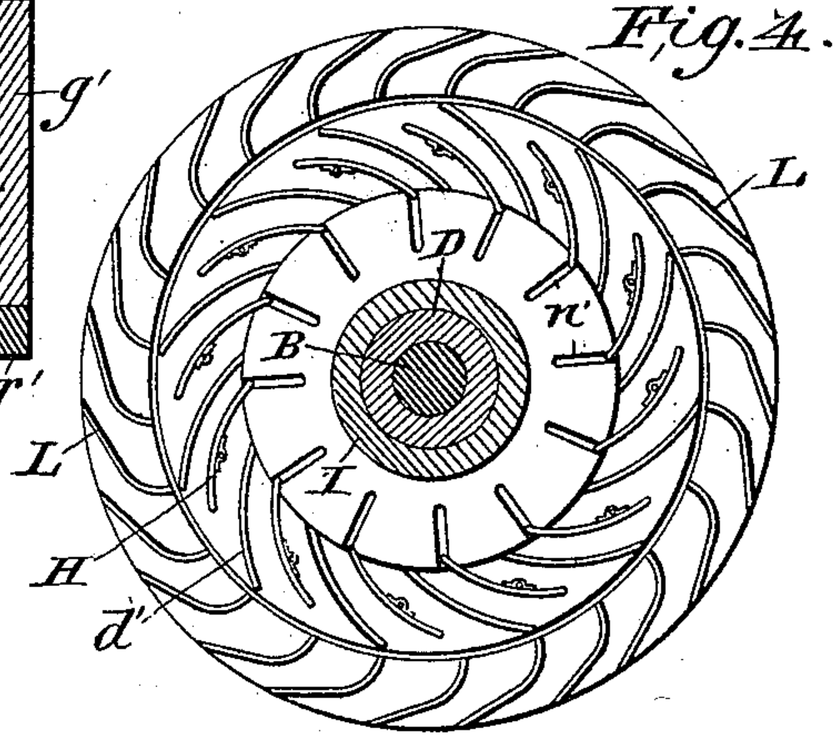


Fig. 3.

Fig. 4.



Witnesses:

Geo. Pepin

J. M. Hall

Inventor:

Adolphe Patrick

per J. A. Grenier

His Attorney in fact.

UNITED STATES PATENT OFFICE.

ADOLPHE PATRICK, OF MASKINONGÉ, CANADA.

WATER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 436,291, dated September 9, 1890.

Application filed April 14, 1890. Serial No. 347,913. (No model.) Patented in Canada June 7, 1887, No. 26,904.

To all whom it may concern:

Be it known that I, ADOLPHE PATRICK, a citizen of Canada, residing at Maskinongé, in the county of Maskinongé and Province of Quebec, have invented certain new and useful Improvements in Water-Wheels, (for which I have obtained a patent in Canada, No. 26,904, bearing date June 7, 1887,) of which the following is a specification.

My invention relates to improvements in turbine water-wheels in which a horizontally-revolving wheel rotates on a vertical axis; and the objects of my invention are, first, to secure the largest possible percentage of power by regulating the flow of the water in such a manner as to utilize all its volume and its greatest obtainable force, and, second, to produce at a comparatively small cost a wheel that will be simple in construction, not liable to easily get out of order, and at the same time economical in the use of water. I attain these objects by means of the wheel illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the wheel and case complete. Fig. 2 is a plan view of the same. Fig. 3 is a vertical section on the line *x x*, and Fig. 4 is a horizontal section on the line *y y*.

In this wheel the principle of outward horizontal discharge is combined with an upward discharge, and to this end the water is conducted into the inner or central portion of the wheel, whence it flows between fixed partitions and intermediate regulating-gates, by which it is directed against the buckets of the wheel immediately outside of said guides. The wheel is supported by a pivot fixed centrally in the frame, which carries both the wheel-case and the penstock, which is attached to it, all as hereinafter more fully described.

The pivot A, upon which the wheel-shaft stands, is centered in the spider-frame C, the arms *a'* of which extend outwardly to the ring-plate *r'*, upon which stand the arms *g'*, extending upwardly to support another ring-plate *c'*. The two ring-plates *r'* and *c'* are bolted onto the arms *a'* and *g'*. The wheel-case, by its flange *b'*, rests on the ring-plate *c'*. The floor D of the case has a raised central boss, through which an opening is made for the passage of the wheel-shaft B through it. A sleeve E stands on and is secured to this boss by a water-tight joint and extends some distance up around the shaft, where it terminates in the packing-box *i'*, which forms a close-fitting joint around the wheel-shaft and serves to steady the shaft in its upright position. A vertical wall F is formed on the inner edge or as a part of the flange *b'* and forms a circular wall of the wheel-case. The bottom edge of this wall is turned inwardly to form a flange G. The penstock of the wheel is made circular so as to fit well into the wall F, to which it is strongly secured. The water issues from the case to the wheel between the flange G and the case-floor D. Its angular direction is controlled by the partitions *d'*, which are curved in such a manner as to direct the water most advantageously. The regulating-gates H, which are also curved like the partitions *d'*, regulate the flow of the water to the wheel. They are journaled both in the floor D and the flange G, and are operated in the following manner: The lower inside corners of the regulating-gates are provided with downwardly-projecting pins *e'*, which are made to slide in grooves *n'* cut into the lower extremity of a tube I. The tube I is made to turn around the sleeve E, and its lower end opens so as to fit over the central boss of the floor D. On the outer end of an arm *h'*, which is rigidly fixed to the upper part of the tube I, is a segmental rack *f'*, which is moved by a pinion *j'* on a shaft *k'* passing up to the mill-floor, where it may be turned by means of a crank or hand-wheel, and thus the gates H may be opened or closed at will. This mode of regulating the flow of water onto the buckets of the wheel is simple and avoids all interfering mechanism and gives the way clear to the water from the penstock into the wheel-case, whence it flows out between the partitions and the regulating-gates onto the buckets of the wheel. The wheel itself consists, essentially, of two rings of buckets circulating immediately outside of the ring of partitions *d'* and arranged in the following manner: From the hub J, which is well keyed to the shaft B, radiate arms, which carry the bottom ring K. The upright buckets L are cast on or attached to this ring

and support the middle ring M, on the outer edge of which the outer wall N is formed. The upward discharge-buckets O are secured to or formed on both the middle ring M and the outer wall N. The first impulse of the water on the buckets O is upon that portion of the bucket which is close to the middle ring M, after which the crowding of the water against the sloping wing helps to lift the weight of the wheel off the pivot A. The action of the water on the upright buckets L is first against their inner portions, which are at nearly right angles with the direction of the water coming from the case between the guides d', and afterward by its centrifugal force against the sloping wings of the buckets.

I am aware that water-wheels have been made with wicket-gates devised for the purpose of regulating the flow of the water onto the buckets of the wheel. I therefore do not claim such a combination, broadly; but

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

1. In a turbine water-wheel, the stationary central wheel-case, in combination with the wheel having the series of side discharge-buckets L thereon in communication with the case and the series of upward discharge-buckets O, located above the buckets L and also in communication with the case, and the walls M, separating said series of buckets, whereby the water issuing from the wheel-case has an outward impact on the buckets L to revolve the wheel and an upward impact on the buckets O to assist in sustaining the weight of the wheel.

2. The combination of the central wheel-case provided with partitions for deflecting the water, the wheel having the series of outward discharge-buckets L, closed at the top and bottom, and the series of upward discharge-buckets O, located above the buckets L and closed at the under and outer side, both of said series of buckets surrounding the wheel-case and in communication therewith.

3. In a turbine water-wheel, the combination, with the stationary central wheel-case provided with partitions and intermediate regulating-gates for deflecting the water and in communication therewith, of the gate-regulating tube I, extending downwardly to the bottom of the wheel-case, with grooves n' cut at its lower end to receive the pins e', and at the upper end of which is rigidly fixed the arm h', connected with suitable mechanism for turning said tube when so arranged and constructed as to open or close the regulating-gates A from under by the simple turning of the tube I, as and for the purpose set forth.

Signed at Montreal this 9th day of September, 1889.

his
ADOLPHE × PATRICK.
mark

In presence of—
J. M. HALL,
GEO. PEPIN.