J. G. Boyland & G. Buchanan,
Water Wheel.

Sheet. 1.

Fig. 1.

PATENTED JUN 27 1871

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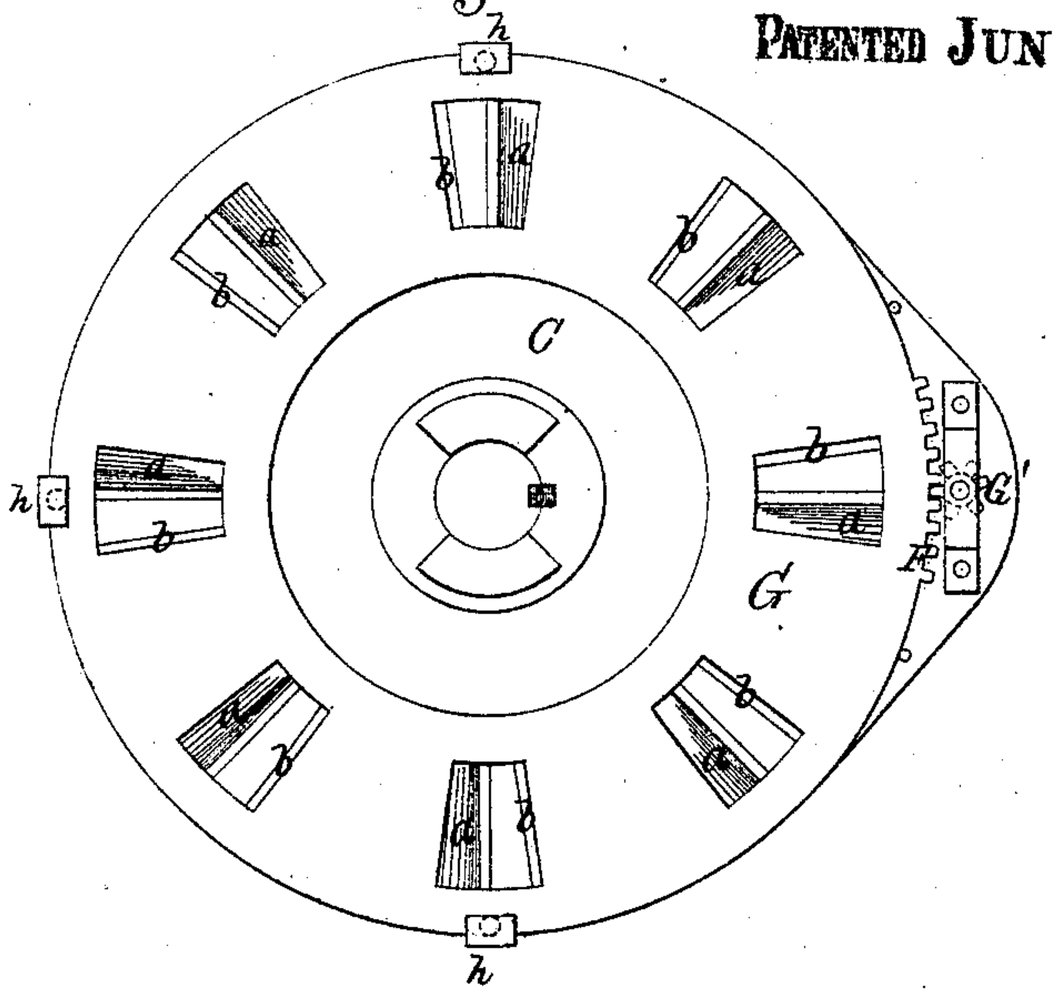


Fig. 3.

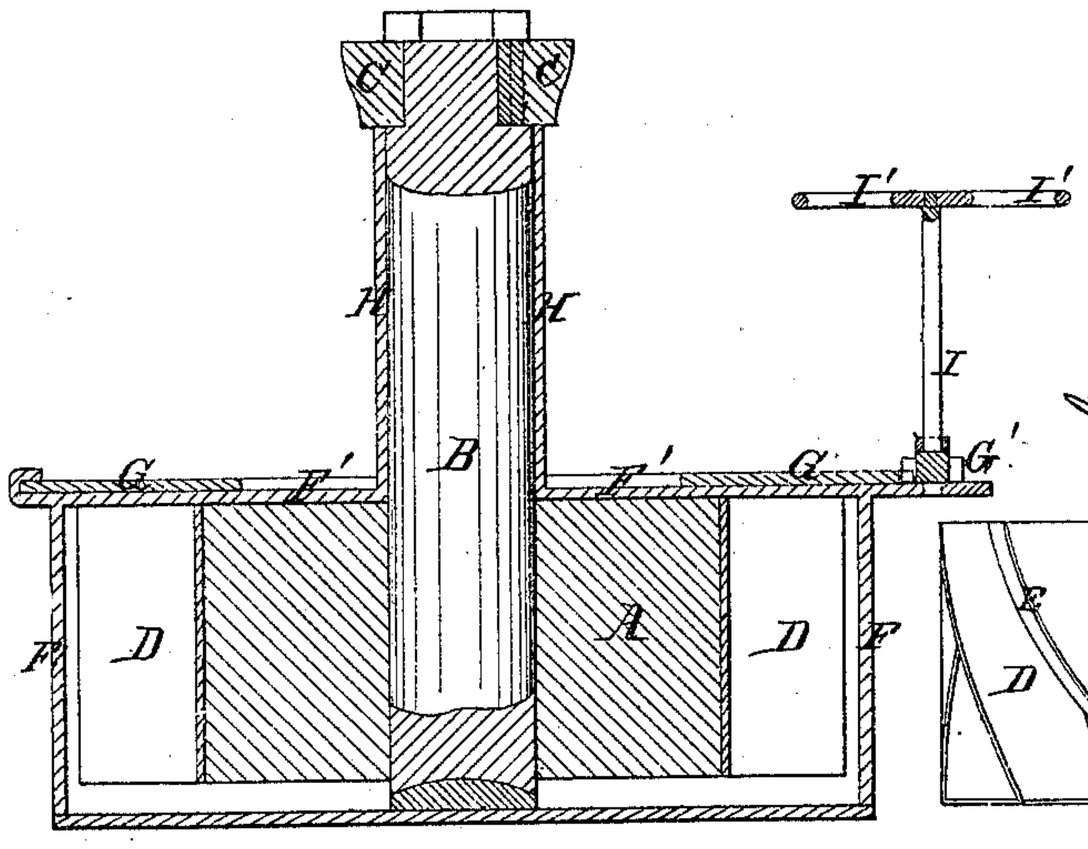
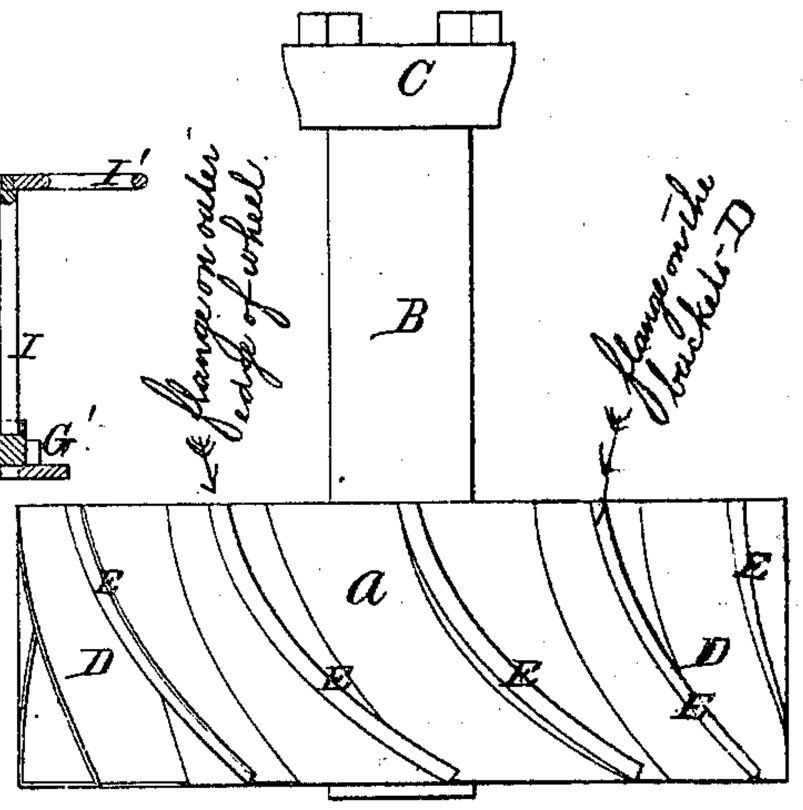


Fig. 2.



Witnesses.

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Jno. D. Patten

Inventors.

Leptha G. Boyland.

George Buchanan.

Sheet. 2.

Boyland & Buchanan.

Water-Wheel.

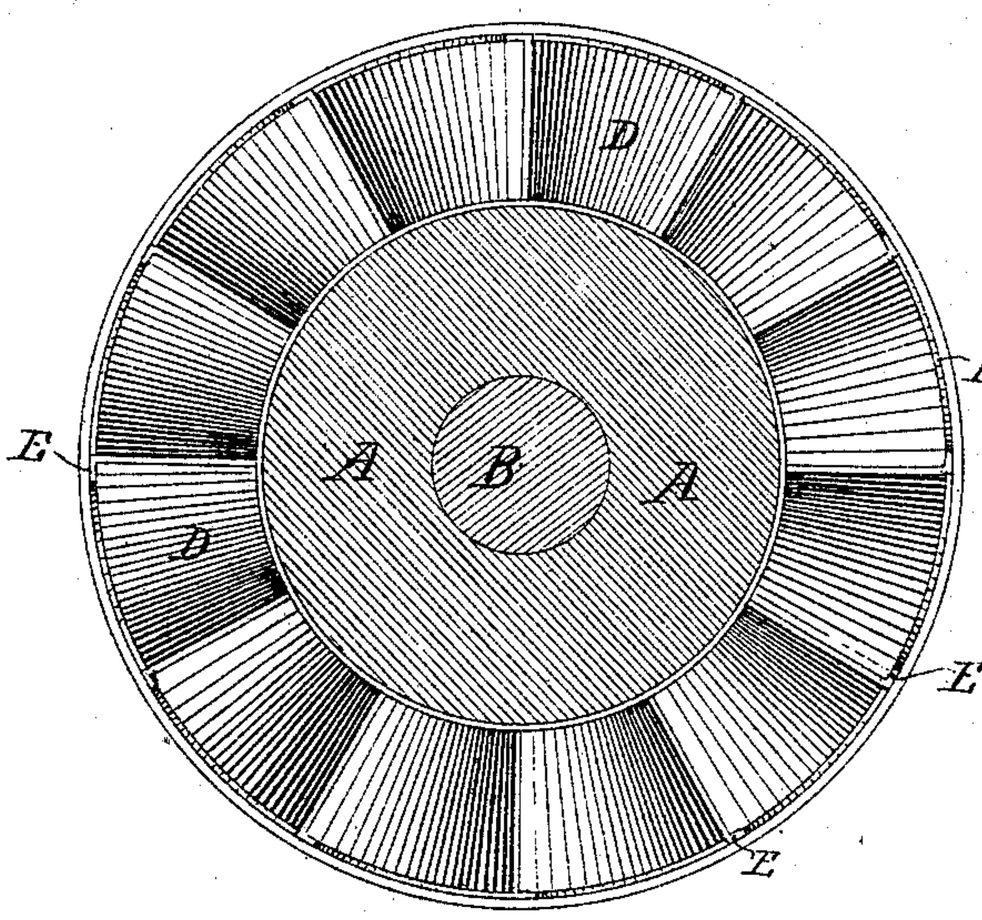

Fig. 4

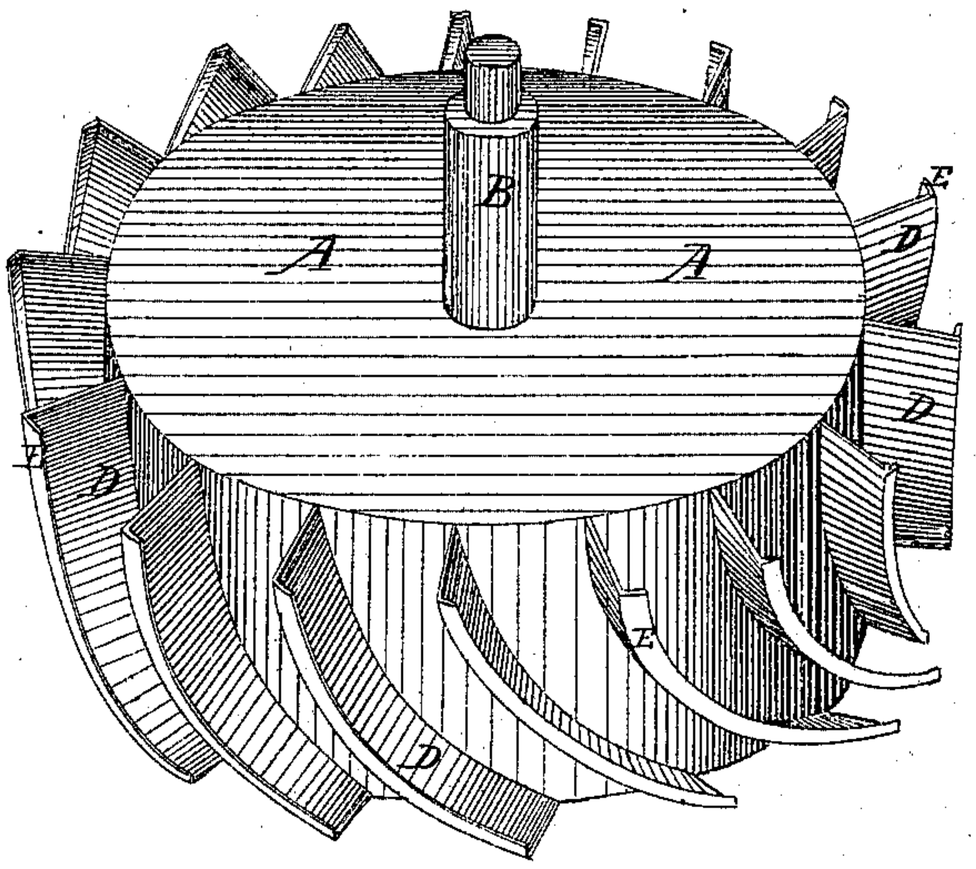

Fig. 5

UNITED STATES PATENT OFFICE.

JEPTHA G. BOYLAND AND GEORGE BUCHANAN, OF CRAWFORDSVILLE, INDIANA.

IMPROVEMENT IN TURBINE WATER-WHEELS.

Specification forming part of Letters Patent No. 116,405, dated June 27, 1871.

To all whom it may concern:

Be it known that we, JEPTHA G. BOYLAND and GEORGE BUCHANAN, of Crawfordsville, in the county of Montgomery and State of Indiana, have invented a new and useful Improvement in Water-Wheels; and we 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. Fig. 2 is an elevation of the wheel and its shaft detached from the casing. Fig. 3 is a vertical section of the wheel complete. Fig. 4 is a horizontal section. Fig. 5 is a perspective view of the wheel detached.

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

This invention relates to that class of turbine water-wheels which receives and discharges the water vertically; and the improvement consists in providing the buckets on the outer edge with a flange standing at about right angles to the face of the bucket, to utilize the force of the water, which, without these flanges, is expended upon the casing of the wheel.

To enable those skilled in the art to make and use our invention, we will proceed to describe its construction and operation.

The wheel A is inclosed in a casing, F, covered by the crown-plate F′. The wheel is firmly secured to the vertical shaft B, which rests on a step in the casing or house, and, passing up through a hub or tube, H, thereof, receives at its upper end the ordinary coupling C. D D refer to the buckets of the wheel, which are secured to the periphery of the body thereof, and, extending radially therefrom, come with their outer edges nearly in contact with the shell of the casing F. The buckets are arranged spirally on the body of the wheel in the ordinary manner. Each is constructed with a flange, E, at its outer edge, which is turned toward the incoming column or current of water, and stands at about right angles to the face of the bucket so as to prevent the water, to an extent proportional to the width of the flange, from impinging against the casing, as is the case in the ordinary wheels, where the buckets are without these flanges. In this manner a large percentage of the power of the water is utilized which heretofore was expended and wasted against the casing. The width of the flanges varies with the size of the wheel. Over the buckets of the wheel is a concentric series of ports, *a a*, in the crown-plate of the casing, which ports are controlled by a circular horizontal gate or wicket, G, provided with an equal number of apertures, *b b*, and snugly fitted on the crown-plate. The gate is constructed with a number of cogs on a segment of its periphery, and is rotated to open and close the ports *a a* by means of a pinion, G′, which is keyed to a vertical shaft I. The latter is mounted on a projecting shelf of the casing, and provided at its upper end with a suitable hand-wheel, I′, by which to operate it. The gate moves on suitable anti-friction rollers *h*.

What we claim as our invention, and desire to secure by Letters Patent, is—

A water-wheel, substantially such as described, in which each bucket D is constructed at its outer edge with a flange, E, running from the top to the bottom of the bucket, substantially as and for the purpose set forth.

JEPTHA G. BOYLAND.
GEORGE BUCHANAN.

Witnesses:
WM. H. LYNN,
T. N. MYERS.