J. J. BOURGEOIS.

WATER-WHEEL.

No. 192,671. Patented July 3, 1877.

Fig. 1.

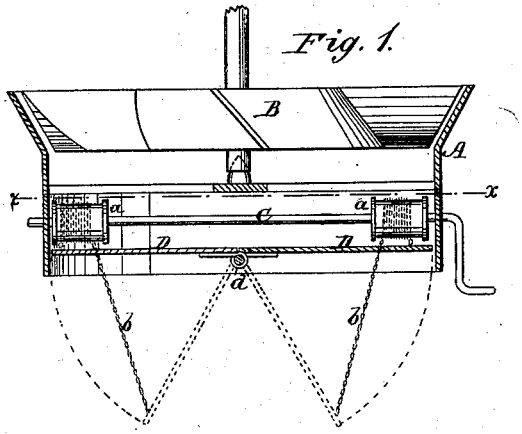


Fig. 2.

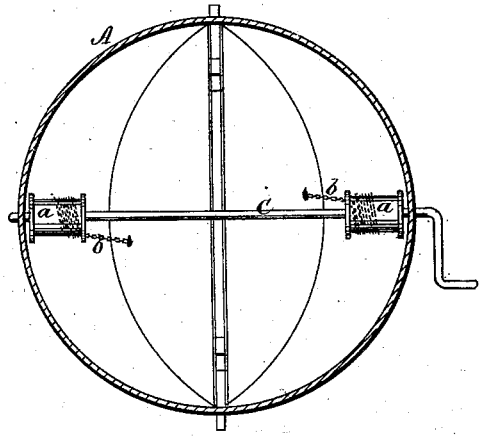


Fig. 3.

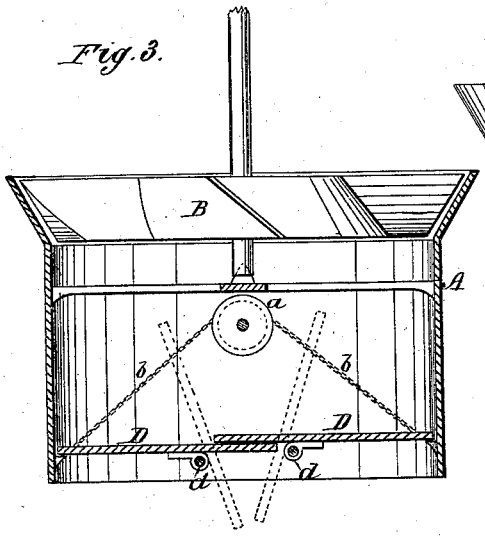
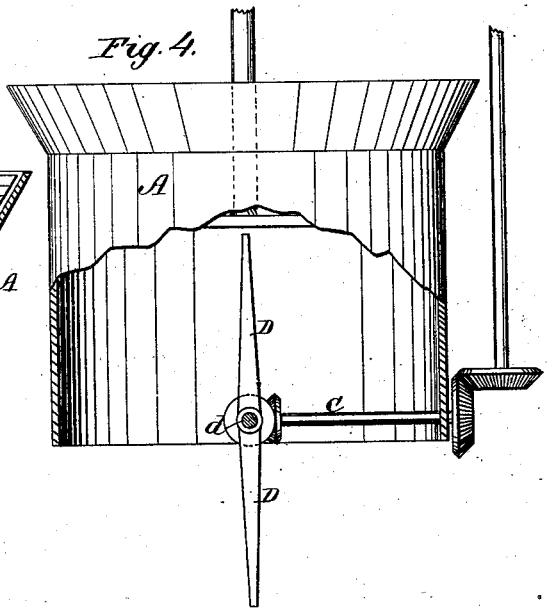


Fig. 4.



WITNESSES:

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JAMES J. BOURGEOIS, OF ST. CLOUD, MINNESOTA.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. **192,671**, dated July 3, 1877; application filed May 8, 1877.

To all whom it may concern:

Be it known that I, JAMES J. BOURGEOIS, of St. Cloud, in the county of Stearns and State of Minnesota, have invented a new and useful Improvement in Water-Wheels; and I do hereby declare that the following is a full, clear, and exact description of the same.

My present invention relates to an improvement upon that for which I received Letters Patent of the United States, No. 171,088, dated December 14, 1875.

In the former invention, horizontally-sliding gates are arranged over the wheel to regulate and cut off the flow of water to the wheel. When there is a full head of water, the vertical pressure on the gates causes so much friction that it is difficult to operate them. To avoid this result I have devised a two-part hinged gate, and arranged it beneath the wheel, together with a shaft and chains for operating it, as hereinafter fully described.

In the accompanying drawing, forming part of this specification, Figure 1 is a sectional elevation of a wheel-casing and gate, the latter being shown closed by full lines, and open by dotted lines. Fig. 2 is a cross-section of the wheel-casing on line *x x*, Fig. 1, representing the gate open. Fig. 3 represents a modification.

In the several figures, A indicates the casing or part of the flume in which the turbine wheel B is placed. C is a rotating shaft, arranged horizontally beneath the wheel, and having its bearings in the casing A. This shaft is provided with pulleys or chain-wheels *a a*, on which are wound the chains *b*, for raising and lowering the hinged parts of the gate.

In Figs. 1 and 2 the gate is shown formed of two semicircular parts, D, hinged on a central rod, *d*. A gate of this construction is most suitable for use where there is little fall, the hinged parts D opening downward in a hole in the bed of the stream, in order to give as much fall as possible.

In Fig. 3 I show a modification best adapted for heavy streams with a good fall, the parts D of the gate being attached to separate parallel rods *d*, their inner ends overlapping, and their outer ends resting on shoulders or brackets attached to the inner side of the casing. In this case said parts D fold upward, when opening, to allow the discharge of water from the wheel.

My improved construction and arrangement of gate enables it to be easily operated for closing the discharge-opening of the wheel, or regulating the flow of water for increasing or diminishing the rapidity of rotation of the wheel.

What I claim is—

The gate made in two semicircular parts, D, hinged on a rod or rods beneath the wheel B, the shaft C, having pulleys *a* attached, and the chains *b*, all constructed as shown and described.

JAMES J. BOURGEOIS.

Witnesses:
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