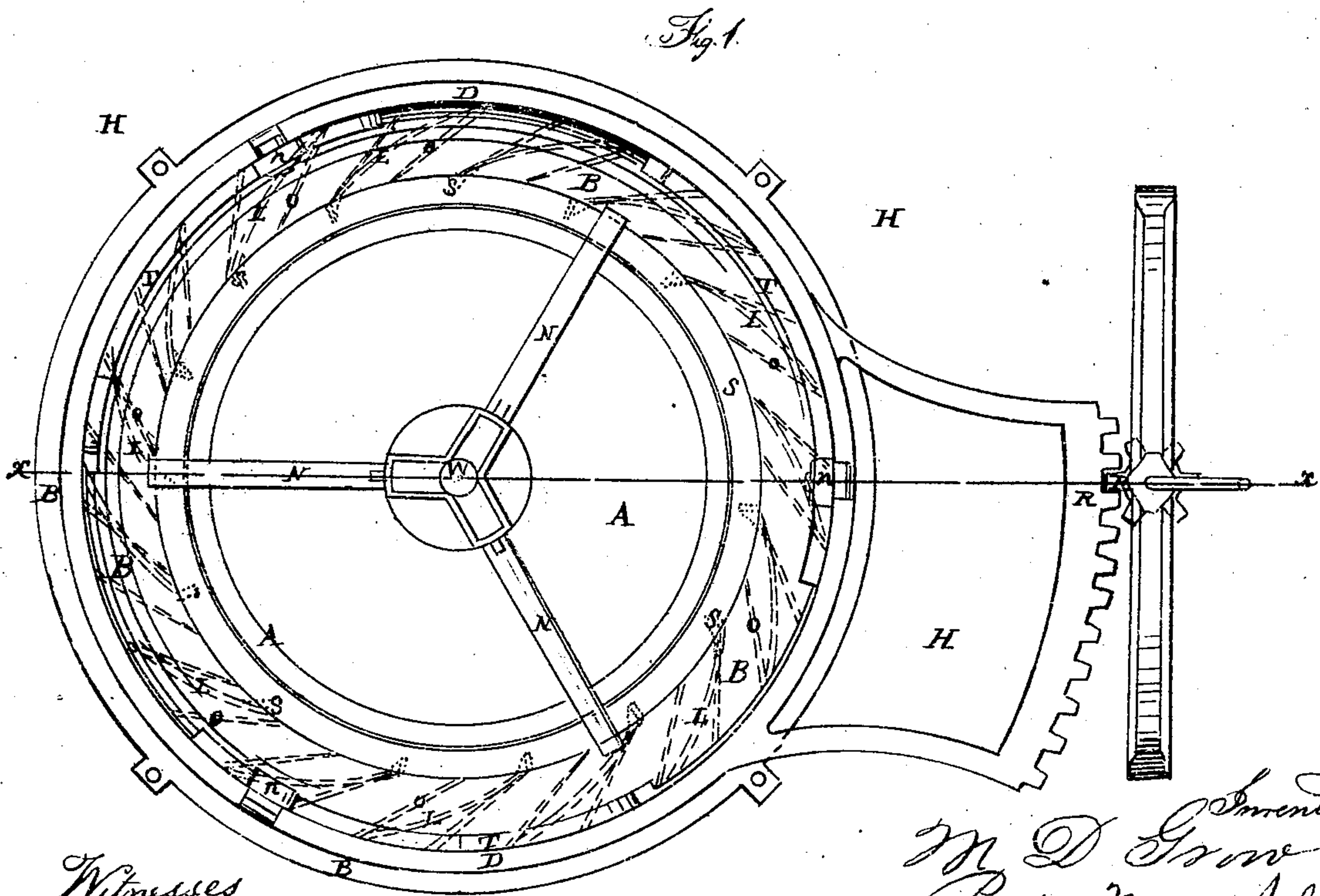
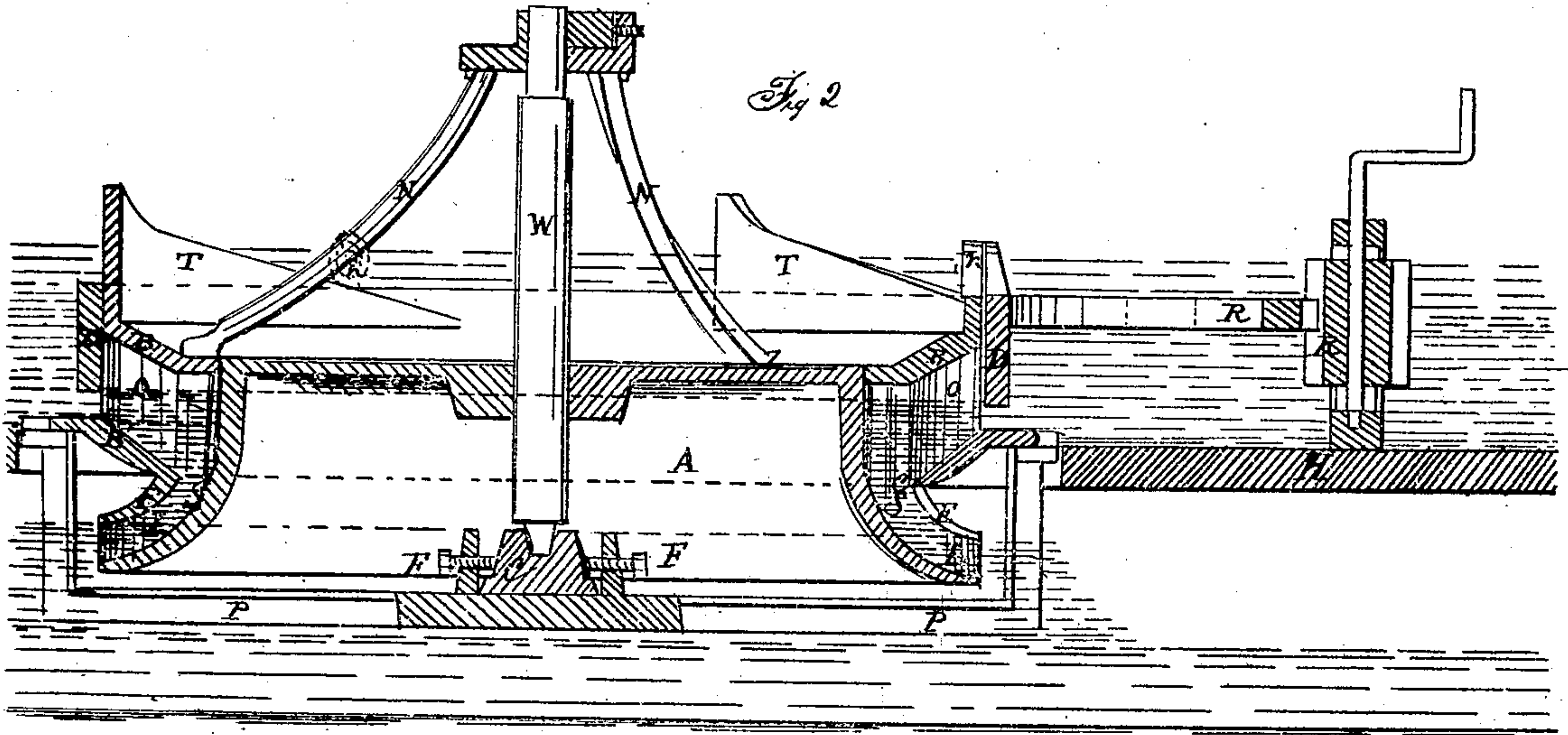


*M D GROW*

*Water Wheel*

*No. 75009*

*Patented March 3 1868*



*Witnesses*  
*Theo Troche*  
*John Fraser*

*Invented*  
*M D Grow*  
*Per Munn & Co*  
*Attorneys*

# United States Patent Office.

M. D. GROW, OF FORT DODGE, IOWA.

*Letters Patent No. 75,009, dated March 3, 1868.*

## 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, M. D. Grow, of Fort Dodge, in the county of Webster, and State of Iowa, have invented a new and improved Water-Wheel; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to an improved turbine water-wheel. It consists in a wheel, having a bell-shaped form or body, carrying spiral-shaped buckets on the outside of its mouth, surmounted by a guide-band, which guides the water to the buckets beneath the flume, from the chute, (set in said flume,) in which the wheel is concentrically disposed. The gate surrounding the chute is opened by means of gearing, which, in turning, causes friction-rollers, attached to the top edge of the gate, to ascend inclined roller-ways. The dish or bevel of the chute conforms to the pitch-line of the water entering the wheel. The pressure of the water is exerted equally in all directions upon the chute, and the gate is opened by less gearing than in any other system. A spiral direction is given to the water round the wheel, being the direction which will be naturally assumed under like circumstances, as seen in whirlpools, and may be artificially produced by pouring water through an opening in the bottom of a vessel containing water, and by thus following the natural direction the water would take, the largest possible percentage of the water-power is utilized. In the accompanying drawings—

Figure 1 is a top view of my improved water-wheel, and

Figure 2 is a vertical section thereof, at line *x x* of fig. 1.

Similar letters of reference indicate corresponding parts.

A is the bell-shaped body of the wheel, having the buckets S L disposed around it, on the outside thereof, and the guide-band E bolted or otherwise secured to their upper edge. The buckets are arranged with the upper portions, S, nearly vertical, while the remainder of the bucket L is curved spirally downward to the lower edge of the wheel. The dish or bevel of the chute O conforms to the pitch-line of the water entering the wheel. The gate D, surrounding the chute O, is provided at its top edge with friction-rollers *n n*, and as the gear R is operated, these roll up or down the inclined roller-ways T, opening or closing the gate. N N N are the top and P P the lower spiders. The step C is adjustable by means of the set-screws F. The roller-ways T rest upon the annular plate B, which is inclined inward, forming the upper sides of the chutes, and surrounding the upper edge of the wheel. A similar annular plate, B', forms the bottom of the chutes, and is inclined inward and downward, its lower edge coming nearly in contact with the upper edge of the guide-band E.

I claim as new, and desire to secure by Letters Patent—

The bell-shaped wheel A, provided with the spiral buckets S L, and having its upper edge and guide-band E arranged in relation to the annular chute-plates B B', substantially as herein shown and described.

M. D. GROW.

Witnesses:

H. BEECHER,  
E. N. WILSON,