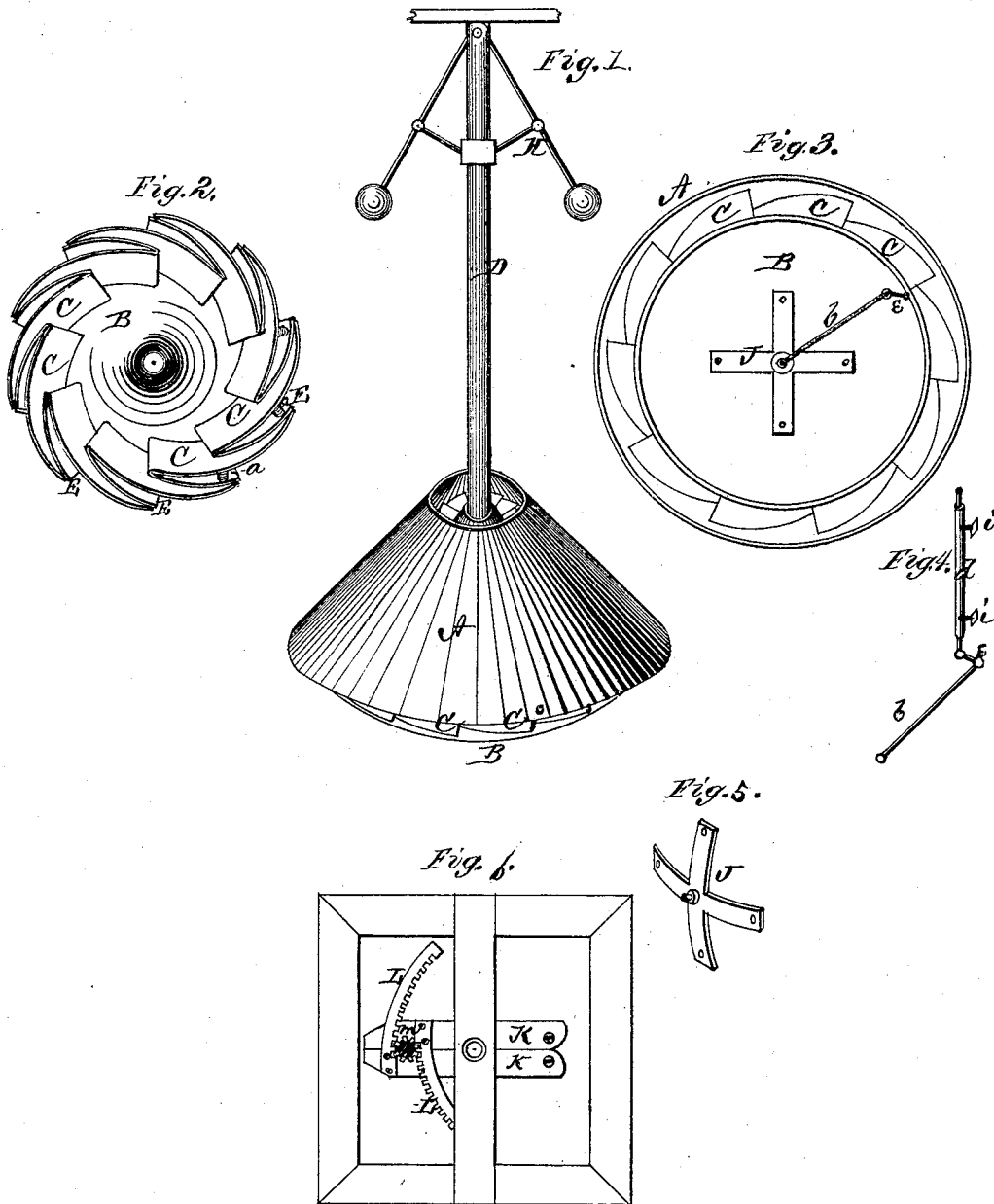


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Improvement in Water-Wheels.

No. 132,383.

Patented Oct. 22, 1872.



Witnesses  
John A. Ellis.  
Wm K. Ellis

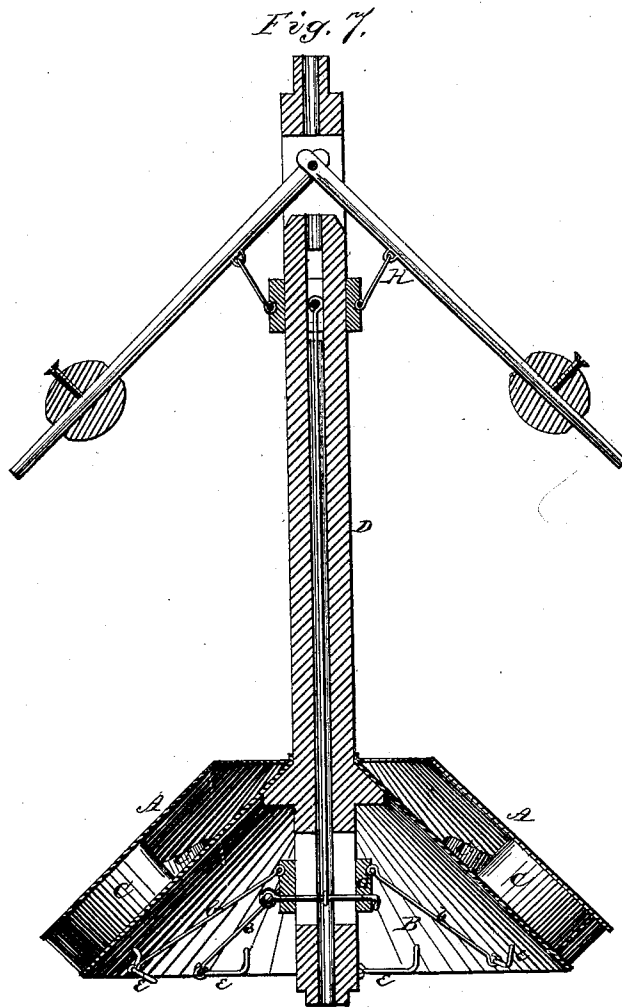
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# UNITED STATES PATENT OFFICE.

DAVID BOWLES, OF MARYVILLE, TENNESSEE.

## IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. **132,383**, dated October 22, 1872.

*To all whom it may concern:*

Be it known that I, DAVID BOWLES, of Maryville, in the county of Blount and State of Tennessee, have invented certain new and useful Improvements in Water-Wheels; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon which form a part of this specification.

The nature of my invention consists in the construction and arrangement of a turbine water-wheel, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a perspective view of the wheel; Fig. 2 is a plan view of the same with the upper cone removed; Fig. 3 is a bottom view of the entire wheel; Figs. 4, 5, and 6 represent certain parts belonging to my water-wheel; and Fig. 7 is a vertical section of the wheel-shaft, &c.

The wheel is composed of an upper hollow cone, A, and a lower hollow cone, B, between which the buckets C C are attached and the whole secured on a central shaft, D. Each bucket C is provided with a valve, E, which is formed by a curved extension of the bucket, behind which is a spring, *a*, to close the valve when the water is shut off. The pressure of the water opens the valves by overcoming the pressure of the springs—that is, when the water is let on. The shaft D is made hollow, when the following arrangement, connected with an arms-and-weight governor, H, is used: Around the lower end of the shaft is a collar, G, connected, by a rod passing up through the hollow shaft D, with the governor. To this collar a stirrup-rod, *b*, for each bucket, is jointed. This stirrup-rod articulates with the end of a crank, *e*, which crank has for its axis the rod *d*, shown in Fig. 4, said rod passing through both the upper and lower cones behind the valve E. The rod *d* is provided with projections *i i* for the purpose of closing the valve, as the rod *d* may be turned on its axis by the increased speed of the wheel through the action of the governor on the collar G.

Though I have only shown in Fig. 3 one of the stirrup-rods *b*, it must be understood that there should be one of them, with a crank, *e*, and rod *d*, for each bucket.

The valves E are to be constructed of spring-steel, and by their own elasticity will sustain and regulate the greater part of the pressure of the water.

The governor, with the device connected therewith, is to be used only in case the springs *a*, or any spring produced by the elasticity of the valve, or the application of a spring of any kind in any manner, does not prove efficient.

The wheel being cone-shaped admits of the construction of a longer and more efficient bucket. The peculiar set of the buckets, as shown in Fig. 2, and shape of the inside surface of the upper cone cause, by the relative motion of the water upon said inside surface, a projection of the water downward, thus saving and utilizing power that would otherwise be lost. The self-adjusting issue by either spring or governor, or both, will save a large percentage of the power of the water, by closing the issues and allowing the wheel, by this means, to run "full" when but a small amount of power is, for the time being, used.

J, Fig. 5, represents a spider and step-gudgeon to be bolted on the bottom of the wheel.

In Fig. 6 I have shown a plan view of the chute-box, in which are two pivoted gates, K K, provided each with a cogged segment, L, and both of said segments are operated at the same time by one pinion, *m*, to let on or shut off the water, as the case may be.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The valve E, when constructed as a part of the bucket C and used in combination with the spring *a*, the parts being arranged substantially as and for the purpose set forth.

2. In combination with the hollow shaft D and valves E of a water-wheel, a governor, H, collar G, stirrup-rods *b*, cranks *e*, and rods *d* with projections *i*, substantially as and for the purposes herein set forth.

3. The arrangement in the chute-box of a water-wheel of the pivoted gates K K, cogged segments L L, and pinion *m*, substantially as herein set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

DAVID BOWLES.

Witnesses:

J. M. BROWN,  
MINA McTEER.