

# Wilson & Houghton. Water-Wheel.

N<sup>o</sup> 73150

Patented Jan. 7, 1868.

Fig: 5.

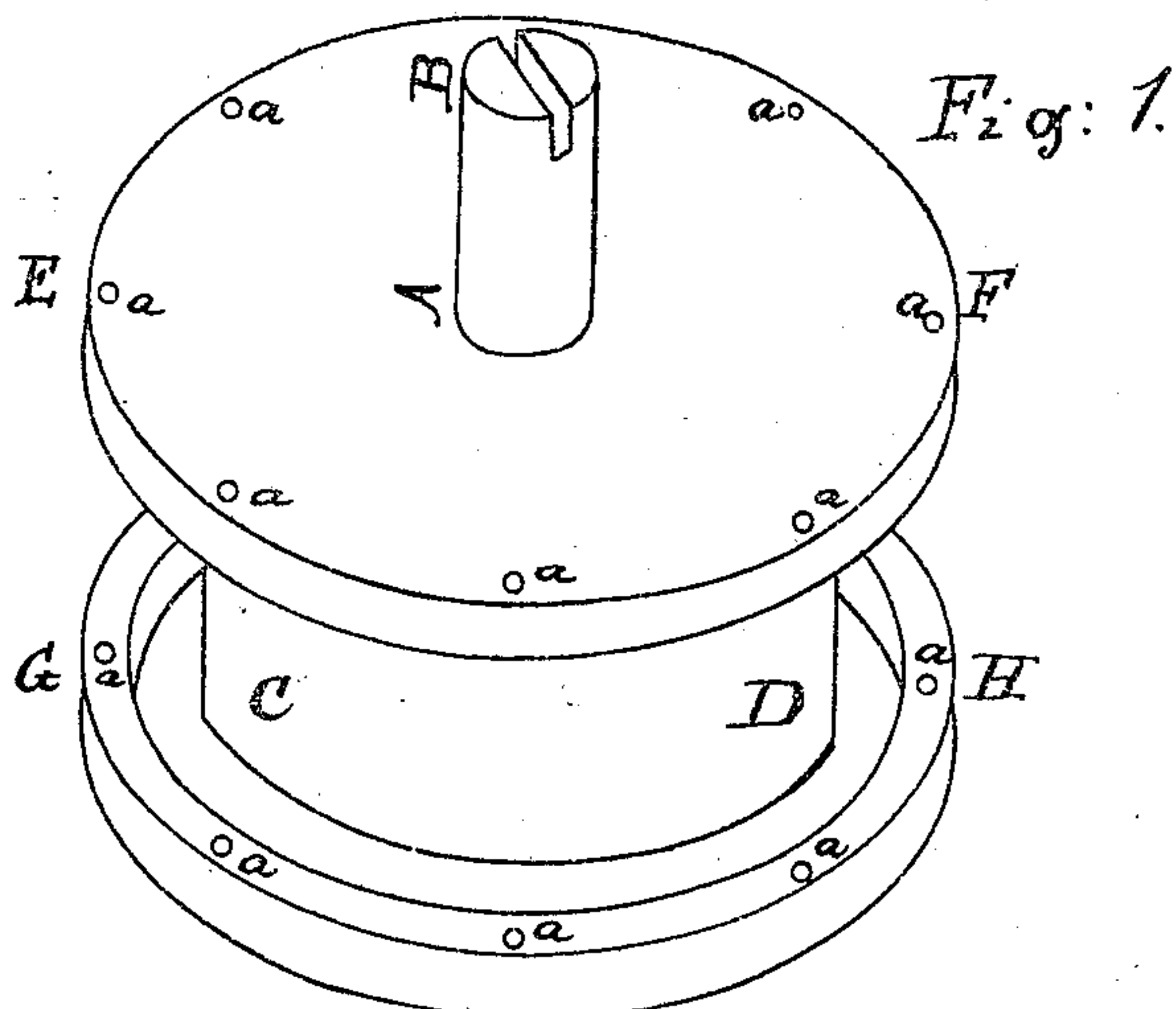
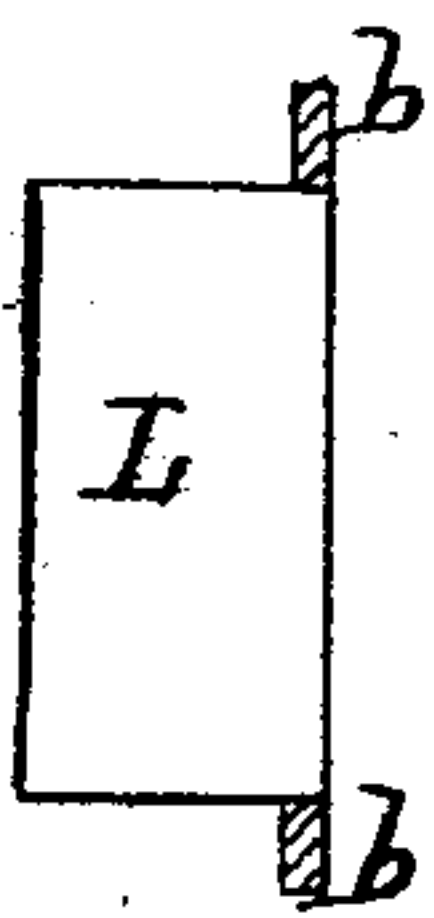
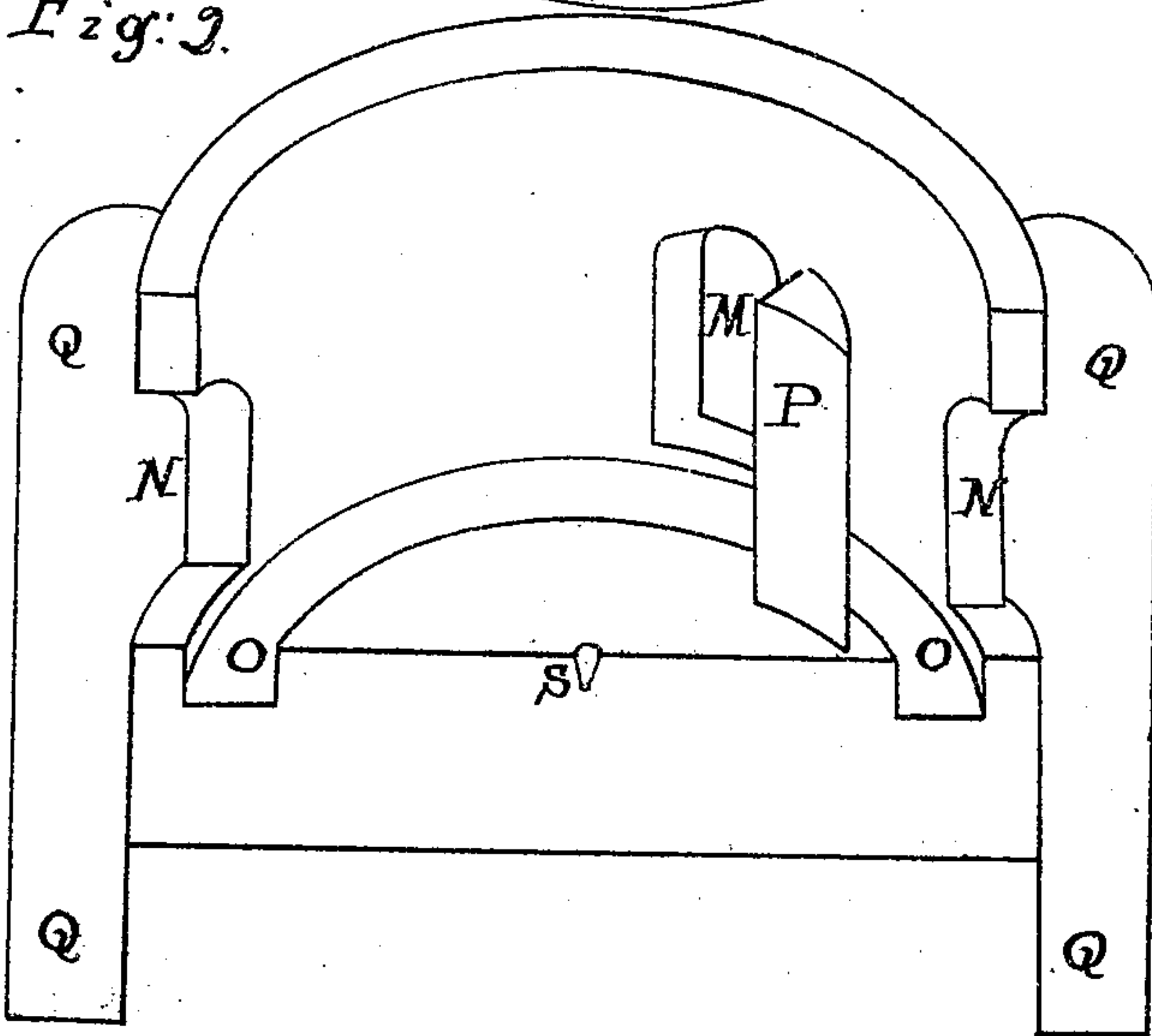


Fig: 1.

Fig: 6.



Fig: 2.



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Witnesses  
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Fig: 3.

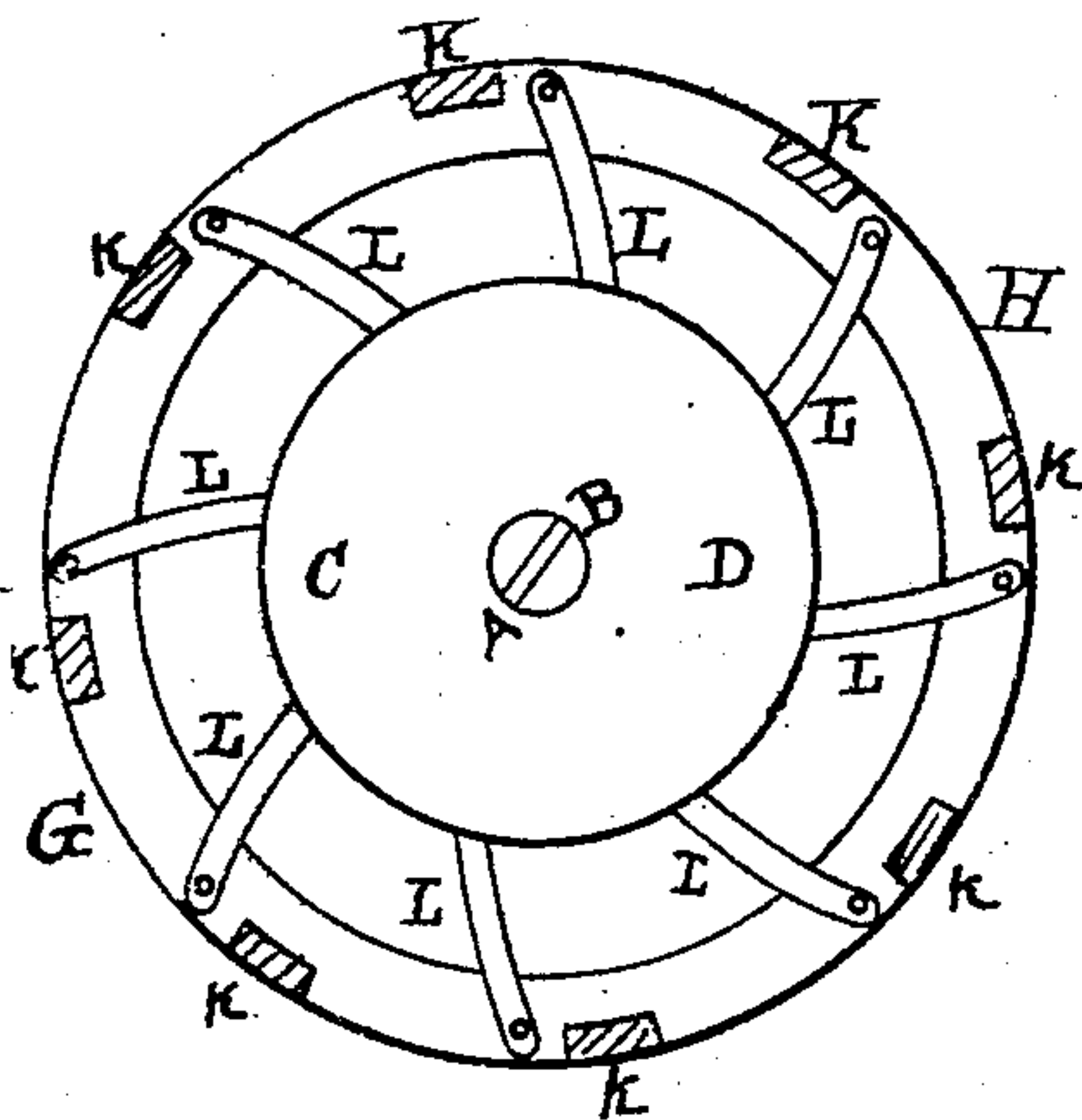
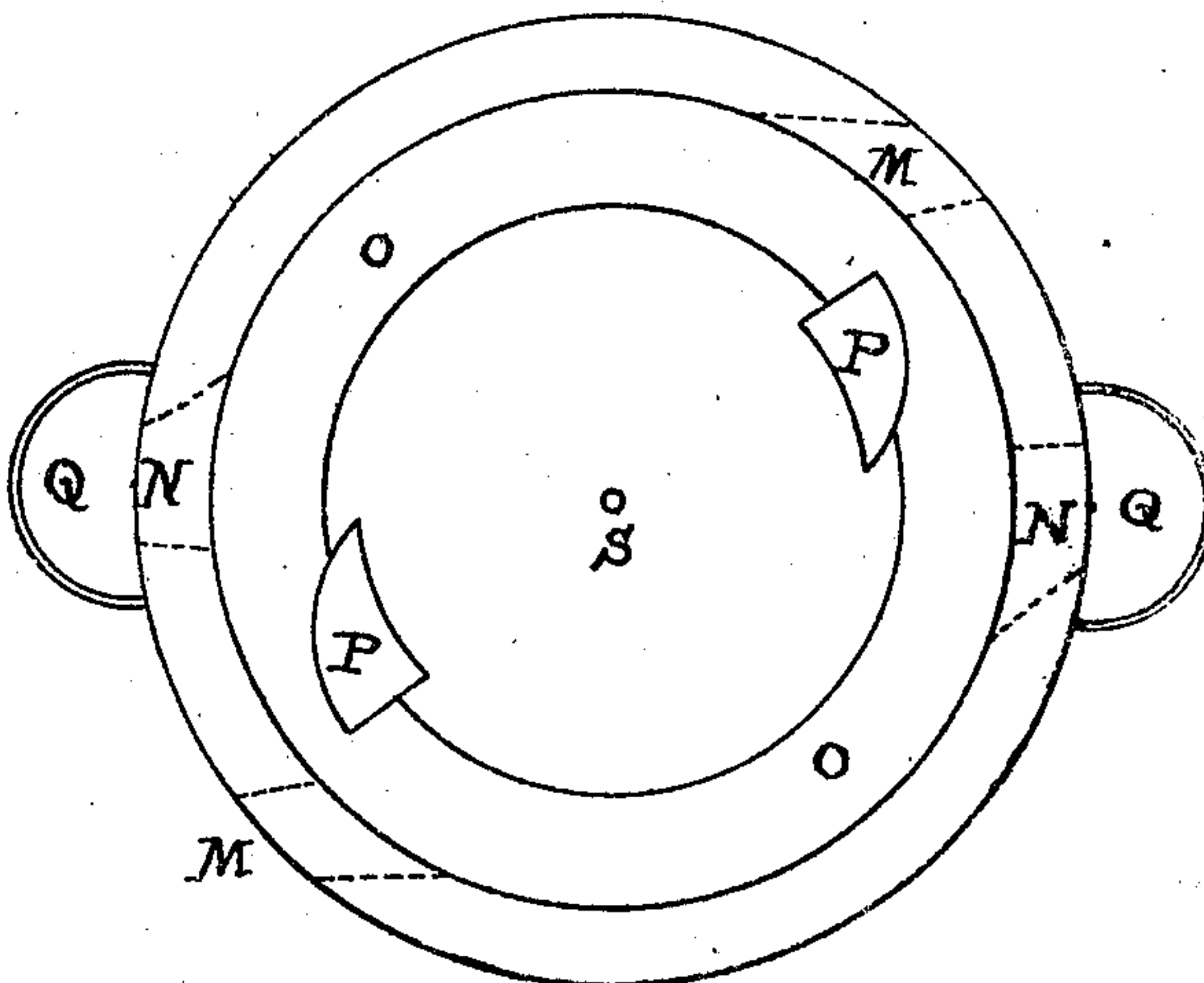


Fig: 4.





# United States Patent Office.

COURTLAND B. WILSON AND ABNER S. HOUGHTON, OF TRENTON, NEW JERSEY.

*Letters Patent No. 73,150, dated January 7, 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 we, COURTLAND B. WILSON and ABNER S. HOUGHTON, of the city of Trenton, county of Mercer, and State of New Jersey, have invented a new and improved Pressure Water-Wheel; and we do declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 represents a perspective view of the wheel without the adjustable buckets, and separate and independent of the surrounding tub, case, or curb in which it is intended to revolve and work.

Figure 2 is a perspective view, or half section, of the tub, case, or curb in which the wheel is intended to revolve.

Figure 3 represents a horizontal section of the wheel, fig. 1, showing the rim, hub, and movable or self-adjusting buckets, together with the intermediate stays between them.

Figure 4 is a horizontal section of the tub, case, or curb, showing the feeding-inlets and the discharging-outlets in the side of the curb, and also the channel or groove for the rim, and the position of the stops.

In all the figures the same letters of reference indicate similar parts.

In fig. 1, A B represent the shaft or axle of the wheel, fastened to the hub C D, and on which is bolted the top plate E F. The rim G H is fastened and connected with the top plate E F by means of the stays K K, one of which is shown in Figure 6. Between these two pieces E F and G H are fitted the movable or self-adjustable buckets L L L, one of which is shown in Figure 5. The gudgeons on the ends of these buckets *b b* are fitted into the sockets *a a* of the top plate and rim, so as to turn freely thereon.

Fig. 2 represents a vertical section of the tub, case, or curb, in which M is one of the feed or inlet-apertures; N N, the outlet or discharging-apertures; O O, the channel or groove in the bottom of the curb, in which the rim G H is fitted and revolves with the wheel; P P, the stops whereby the water is prevented from flowing backward around the wheel, and against which the pressure of the water reacts while the wheel is in operation. Q Q are the tubes, trunks, or conduits for the discharge of the water from the wheel and curb. These conduits may be carried to any desirable point below the bottom of the forebay, according to the head and fall of the water to be applied.

Fig. 3 represents a section of the wheel, in which C D is the hub, G H the rim, L L the buckets, and K K the stays. The buckets, as here shown, are in the position which they take after passing the feed or inlet-apertures. When they arrive at the outlet or discharging-apertures, the suction of the water thence will tend to draw these buckets around concentric with the rim G H, so as readily to pass the stops P P, and be in a position, after passing the next inlet, to receive a new impulse or pressure from the incoming head of water. In this figure, and the corresponding parts of the drawing, we have shown eight buckets and eight intermediate stays. The number of buckets and stays may be modified to suit the size of the wheel.

Fig. 4 shows the bottom of the tub, case, or curb, in which O O represent the channel or groove wherein the rim G H is fitted and turns. P P are the stationary stops, bolted or screwed fast to the bottom of the curb. These stops are in form somewhat like a triangular prism, having one of its sides radially across the channel O O, near the inlet-aperture, with the opposite acute edge or angle thereon placed towards the contiguous or adjoining outlet-aperture. Hence, for every pair of inlet and outlet-apertures made in the curb, there will be required one of these stops. S represents the step or inlet wherein the pivot or gudgeon of the shaft or hub C D turns. M M represents one of the feed or inlet-apertures, and N N the outlet or discharging-apertures. The feed or inlet-apertures are provided with gates, to be drawn or closed at pleasure, as already mentioned.

We propose to make the wheel, curb, and the appendages thereof of iron or any other suitable material. In putting the parts of our wheel together, we may observe that the rim G H, with the bolts and stays therein fastened, must be placed in the channel or groove O O before the stops P P are fastened down to the bottom of the curb. Two small niches may be cut in the rim, to admit of raising the wheel out from the curb, so as the better to exhibit its construction, although in a practical working wheel these niches are not required. It will be understood that the feeding-apertures are provided with gates on the outside of the curb, whereby the water may be admitted or cut off at pleasure. Also, that the stops are made to fit as closely as practicable to the space between the top plate E F, and rim G H, and the hub C D, and the inner side of the tub or curb, fig. 2.

The operation of our wheel may be described as follows: The wheel and curb, with their appendages, being constructed as above described, and placed in a forebay supplied with water, so as to raise the head or surface thereof above the feeding-inlets, and the discharging-tubes or conduits carried water-tight through the bottom of the forebay, so as to discharge into the tail-race, and the gates of the feed-apertures being opened, the water from the forebay will rush in upon the wheel, pushing the movable buckets before it, until they adjust themselves by abutting against the hub; and as the flow of the water on the wheel is obstructed in one direction by the stops, the pressure thereof acts on the buckets to impel and urge the wheel around towards the discharging-apertures. This operation is renewed and continued as each succeeding bucket passes the feed-apertures. When the buckets reach the discharging-apertures, the water therein flows out, and the suction of the effluent water relieves the buckets from the pressure against them, and thus draws the said buckets around so as to be concentric with the rim, and in a position to freely pass the stops P P to the next feeding-inlet, where the same operation is renewed, and the rotary motion of the wheel continued. When the discharging-tubes or conduits are carried some distance below the bottom of the forebay, the effluent water therein, like water in the longer leg of a siphon, tends to produce a vacuum above it, and thus to increase the pressure of the feed-water in front of the buckets.

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

The combination of the top plate E F and the rim G H with the movable self-adjustable buckets L L, stays K K, the groove or channel O O, and stops or abutments P P, all substantially as above described, and for the purpose set forth.

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Witnesses:

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