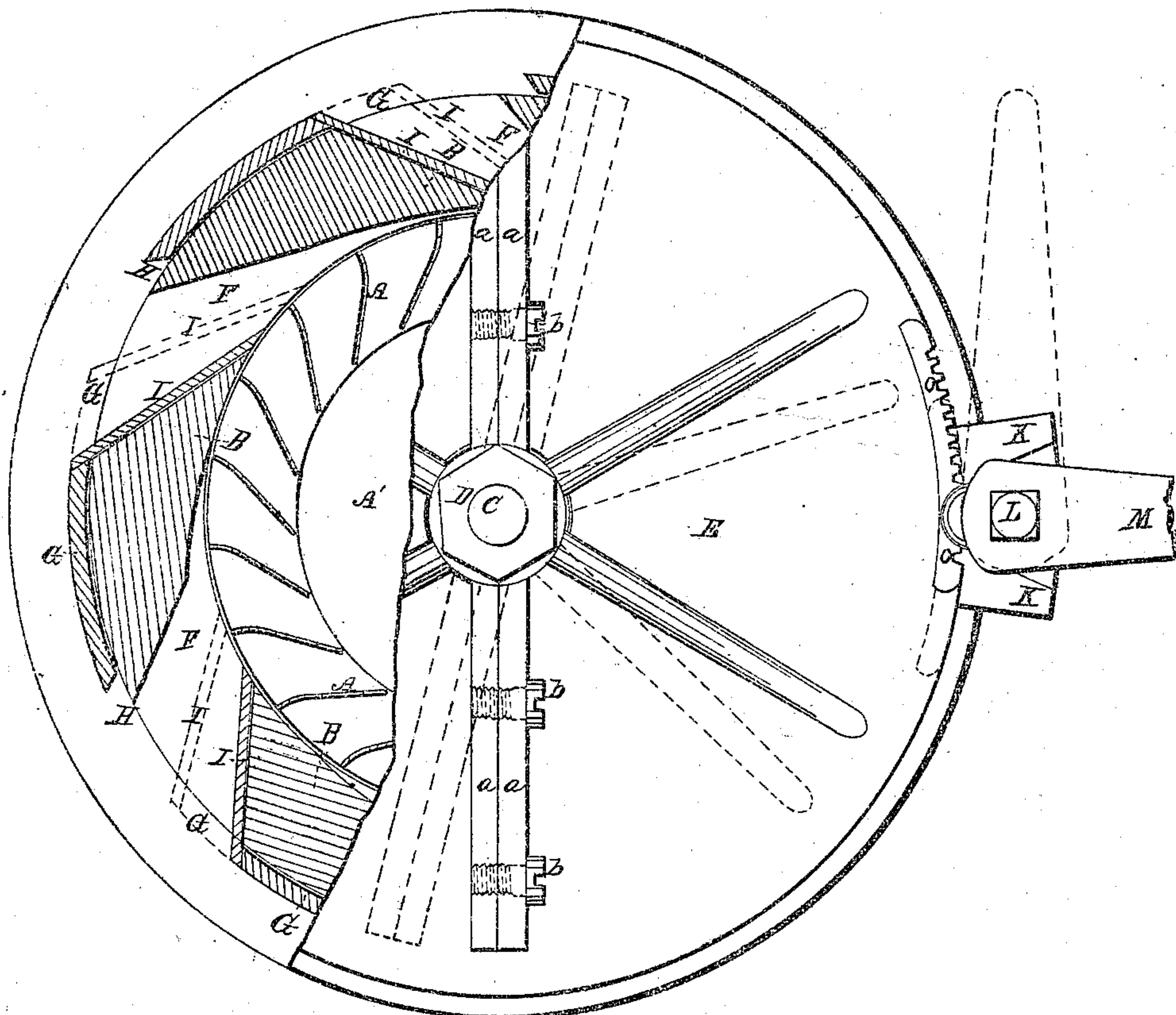


*J. Todd.*  
*Water Wheel.*

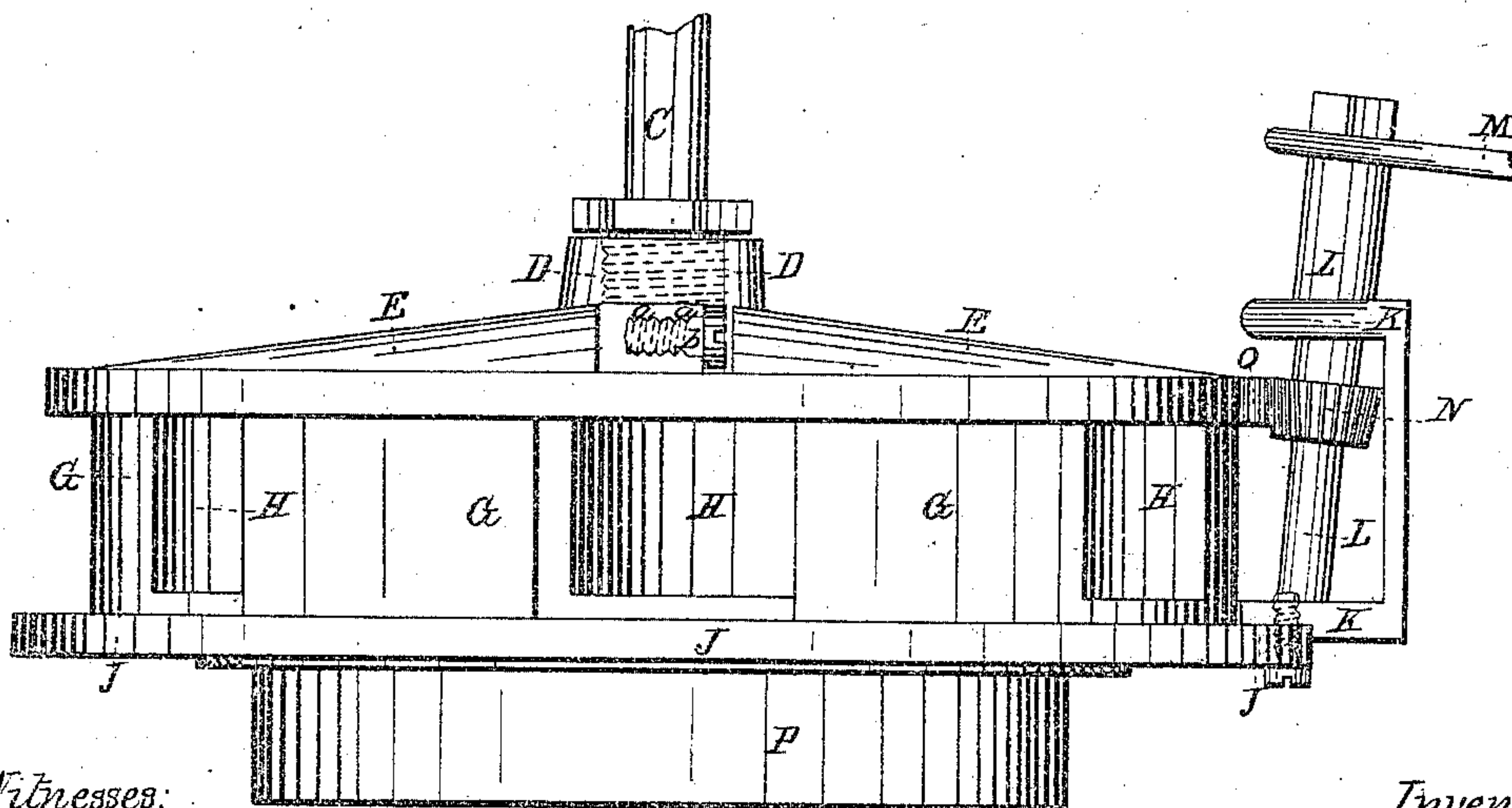
*No 66,651.*

*Patented July 9. 1867.*

*Fig. 1.*



*Fig. 2.*



*Witnesses:*

*S. S. Connolly*  
*Alex Mahon*

*Inventor:*

*John Todd,*  
*By atty A. B. Stoughton.*



# United States Patent Office.

JOHN TODD, OF BELLEFONTE, PENNSYLVANIA.

*Letters Patent, No. 66,651, dated July 9, 1867.*

## 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, JOHN TODD, of Bellefonte, in the county of Centre, and State of Pennsylvania, have invented certain new and useful Improvements in Water-Wheels; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a top plan, partially in section, to show the interior of the wheel.

Figure 2 represents an external elevation of the wheel.

Similar letters of reference, where they occur in the separate figures, denote like parts in both of the drawings.

My invention consists in the particular manner in which I construct and operate the gates in the chutes, by a band around the perimeter of the curb, so that the water-ways may be contracted or enlarged to suit the quantity of water, without varying the inclination of the water-way or the shape of its cross-section; or, in other words, contracting or enlarging the water-ways to the wheel without changing the angle at which the water strikes the wheel.

To enable others skilled in the art to make and use my invention I will proceed to describe the same with reference to the drawings.

A represents a water-wheel, of any of the usual well-known kinds, placed and supported within a curb, B, and C represents the wheel-shaft, which extends up through a suitable packing-box, D, in or on the deck E. The deck E I make of two pieces, it being divided centrally, and unite these segments or sections by means of flanges *a a* cast upon them, and screws *b b* passing through said flanges. By thus dividing the deck it can be removed at any time, so as to gain access to the wheel, without disturbing the curb. The central portion A' of the wheel I cast separate from the outer portion, and bolt the two together, the interior or central portion having a sleeve or hub on it that slips on to the shaft, and by which the wheel and shaft are united. The curb B has a series of chutes, F, or water-ways made through it, which lead and direct the water on to the wheel at such angle as to give it its most effective force thereon. On the deck E is cast or otherwise formed a flange, G, through which openings H are made to correspond with the openings into the chutes; and to this flange is secured, one at each opening, gates I, which form one side of its immediate chute, and projects into and through the curb and in close proximity to the perimeter of the wheel A. Upon the lower stationary flange J there is secured a bracket, K, or other suitable support, in which a shaft, L, is placed in proper bearings, so as to be turned by a lever or hand-wheel, M. Upon this shaft L there is a pinion, N, that takes into a circular rack, O, made or united to the rim of the deck E, so that by turning the shaft L the whole deck and its attached parts may be moved in either direction to an extent sufficient to attain the object aimed at.

It will be observed, as seen by the parts as shown by sectional lines in fig. 1, that when the chutes or water-ways are wide open to their full extent they show the same mathematical figure, area, or cross-section in shape that they do when contracted to one-half of that area, as seen by the red lines in the same figure. When the deck is moved every gate in every chute moves with it. These gates I form one of the vertical sides of each chute, and the flange G to which they are attached forms, under certain circumstances, a portion of the circumferential covering of the chutes, and when moved they contract or enlarge the water-ways, without changing their inclination or their shape vertically, the flange and gate at each chute maintaining always the same relative position with regard to the wheel, but varying the area of the chute or water-way, as may be desirable.

I am aware that gates have been pivoted or hinged in the chutes or water-ways of water-wheels, for the purpose of enlarging or contracting said water-ways, but such gates, whether hinged in their centres or at their ends, by every movement vary the shape, size, form, area, and direction of the water, as the portion at and around the pivot or centre of motion practically does not change position, whilst every part from the centre to the end or ends moves at an increased and increasing distance, so that the shape of the chute is constantly varying. Such is not the case in my construction of gates, which are not hinged, though movable around the perimeter of the wheel.

I have described the gates as made a part of or attached to the deck of the wheel. This is not actually necessary, as the deck may be stationary and a ring or band used, to which the gates may be united, said ring or band being moved by gearing, such as above described. And instead of the band or ring and gearing being

placed above the chutes, they may be placed on the under flange J that projects from the cylinder P, in which cylinder and at its interior under part the bridge-tree that supports the wheel is placed. But if even the deck be stationary, I propose to make it in two sections, so as to take it off to gain access to the wheel.

Having thus fully described my invention—

I claim, in combination with a water-wheel and a curb arranged concentrically around the outside of it, and furnished with chutes leading to the wheel, as represented, a band, G, placed around the outer circumference of the curb and furnished with gates I, operated to change the areas of the chutes or water-ways, as described and represented.

JOHN TODD.

Witnesses:

WM. P. DUNCAN,

GEO. LIVINGSTON.