J. White,

Water Wheel,

No. 45,305. Fig. 1. Patented Nov. 29 1864.

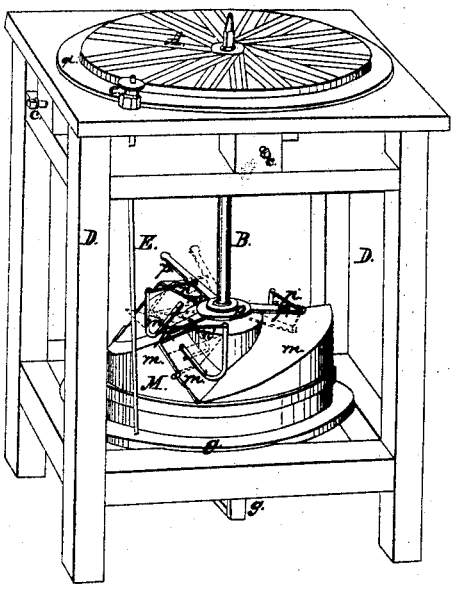


Fig. 5.

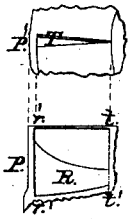


Fig. 2.

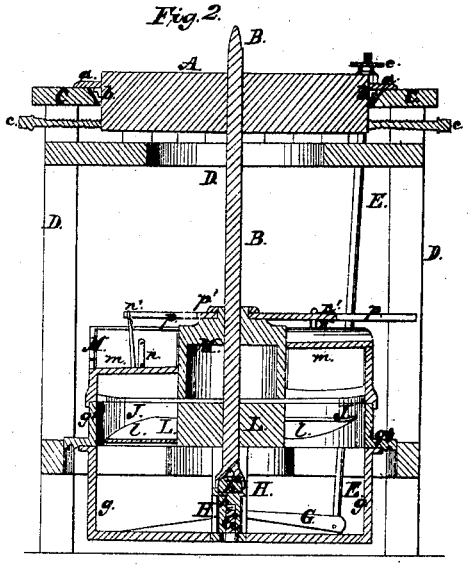


Fig. 4.

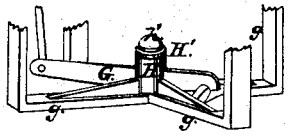
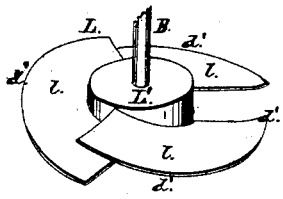


Fig. 3.



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UNITED STATES PATENT OFFICE

JAMES WHITE, OF CLEVELAND, OHIO, ASSIGNOR TO HIMSELF, W. F. HOSKINS, AND G. H. RUSSEL.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. **45,305**, dated November 29, 1864.

To all whom it may concern:

Be it known that I, JAMES WHITE, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Water-Wheels; and I do hereby declare that the following is a full and complete description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view. Fig. 2 is a vertical section. Figs. 3, 4, and 5 are views that will be referred to in the description.

Like letters of reference refer to like parts in the different views.

My improvement relates to the combination and arrangement of devices for adjusting millstones and for regulating the power of a water-wheel in connection with the use of millstones so adjusted.

In Figs. 1 and 2, A represents a millstone, supported in the platform C by means of a metallic hoop, *b*, around the stone, which is secured to a flange or rim, *a*, that rests on the platform, and on which it can be adjusted. On each side of the frame and stone there is a tram-screw, *c*, by which the stone is trammed or set in the desired position. The upper or running millstone is connected to the shaft or spindle B in the ordinary manner. The shaft B extends from the water-wheel through the center of the stone A.

E is a lighter screw, passing through the platform C, on the top of which is a thumb-screw, *e*, and the lower end is connected to a lever, G, as seen in Figs. 2 and 4. This lever extends through a slotted opening in the socket H, and the end is notched and rests on a cross-piece, *d*, as represented in Fig. 4.

On the top of the socket H is a rim, H′, from which extends down inside of the socket a stem, *h*, with a slotted opening, through which the lever passes. In the rim H′ is secured a wooden point, *h′*, on which the lower end of the shaft B rests, as shown in Fig. 2, forming a point and step at the lower end of the shaft. This shaft forms a mill-spindle as well as a shaft for the water-wheel. The socket H′ is secured at the center of the cross-arms *g*, the arms being fastened to the under side of the flange *g′*. This flange is supported by the frame-work and extends up, forming a curb, J, around the water-wheel L.

On the top of the curb rests a cap, M, as shown in Fig. 2. This cap is formed with a hub, M′, around the shaft B and chutes *m*, having curved inclined planes on the top, as represented in Fig. 1, with gates *m′*, by which the throats of the chutes are opened or closed, turning the water on or off from the wheel. The gates are opened or closed by means of arms *n*, secured to the gates, curved upward, and connected by rods *n′* to levers or arms *p*, that extend out from a circular piece, *p′*, on the upper part of the hub. When they are open, the gates and levers are in the position indicated by the dotted lines in Fig. 1.

Fig. 3 is a perspective view of the wheel, representing its form and construction, having wings *l* curved diagonally around the hub L′, which overlap each other at the ends, and the outer edges, *d′*, are curved upward, forming a slight flange. The wheel is secured to the shaft B, which passes through the center of the hub L′, and the wings sweep round inside of the curb J, below the cap M. The water as it flows in through the chutes is impinged on the wings operating the wheel.

Owing to the flange-shaped form of the wings at the edges, the whole of the impinging force of the water is applied directly to the wings, and hence a less part of it is spent against the curb, for if the edges were not curved, but in the plane of the wings, the water would glance off from the surface of the wings more or less onto; the curb but the flange retains the whole percussive force of the water on the surface of the wings.

As the wheel moves with a greater velocity at the periphery than at the center, or around the hub, a greater force or volume of water should be applied at the periphery, and decrease gradually toward the center. This is accomplished by means of the capacity of the throats or openings R, through which the water passes onto the wheel. In Fig. 5, P is a front view of the throat, with the gate removed, and P′ is a top veiw. It will be observed that the distance from *r* to *r′*, at the periphery of the cap, is greater than from *t* to *t′*, at the hub, widening the opening R vertically, and in looking down upon it the circu-

lar inclined planes above and below the throat are inclined outward from the hub, causing the opening R to gradually widen out from the hub to the periphery, as at T, thus increasing the capacity of the opening transversely, as well as vertically. By this means a gradual increased volume of water impinges on the wheel from the hub to the periphery, by which together with the flange-shaped edges of the wings, the wheel is operated in the most perfect manner. In addition to the percussion of the water on the wheel, the superincumbent weight of the water also acts with it, in proportion to the width of the opening T horizontally from the hub to the periphery.

When the same volume of water strikes the wheel around the hub as at the outside, by having the throats of the same capacity from the hub outward, the water is unequally admitted upon the wheel in proportion to its discharge; hence its impinging force is in the same proportion lost in operating the wheel. As the object is to have the opening equal in proportion to the discharge from the center outward, it follows, in case the openings are of the same capacity, that the volume of water admitted upon the wheel is not in proportion to the velocity with which the wheel travels from the center outward.

What I claim as my improvement, and desire to secure by Letters Patent, is—

1. The combination of the stone with the hoop *b*, supported by a rim, *a*, and the tram-screws *c*, for the purpose of adjusting the position of the bed-stone with reference to the shaft, substantially as shown and described.

2. The arrangement of the levers *p*, extending from the circular piece *p'*, the arms *n*, rods *n'*, and the gates *m'*, which, when moved, causes the openings through which the water passes to the wheel to be larger at the periphery than at the inner portion of said gates, whereby to use the water with economy and regulate the power to suit the work to be done by the stones, as herein shown and described.

JAMES WHITE.

Witnesses:
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