

UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. 48,781, dated July 18, 1865.

To all whom it may concern:

Be it known that we, JASON A. ALLEN and ALANSON ALLEN, of Oakham, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Turbine or Horizontal Water-Wheels; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, in which—

Figure 1 represents a horizontal section through said water-wheel. Fig. 2 represents a vertical central section through the same. Figs. 3 and 4 represent detached views, hereinafter to be referred to.

A represents the shell or case of the wheel, which is supported on the standards B.

C represents the horizontal water-wheel, which has vertical flanges or buckets *a*, of the usual construction, upon which the water in the case A acts, and which, being a well-known operation, is not necessary to describe. The wheel C is keyed on and supported by its center shaft, D, whose step E is supported by the box F of the supporting-frame.

H represents the hub of the wheel. It is secured to the center shaft by means of a key. The position of this wheel has to be well adjusted upon its center shaft to operate well, and to enable the operator to accomplish this with facility I use an adjustable collar, I, on the shaft D and under the hub H. In securing, therefore, the wheel upon its shaft the collar I is first secured thereon in its proper position by means of the screw *b*, and the wheel is then let down upon the collar and secured to its shaft by means of its key. By the application of this collar many difficulties and much labor are obviated, as turbine wheels have frequently to be looked after, chiefly in regard to the wearing down of the step, and the setting and properly adjusting of the wheel are much facilitated, and in case the wheel should need any repair it can be raised on its shaft, can be supported in its raised position by the collar I, and can be repaired without removing it from its shaft.

To the lower side of the case A we secure, by means of bolt *c*, a rim, K. This rim has a vertical flange, *d*, on its inner circumference, which extends into a corresponding groove, *g*, cut into a flange, *f*, on the lower face of the wheel. These several flanges are so arranged that

a space, L, is left on the inner side of the rim K and lower side of the wheel C, into which the water is pressed through the space *x* with the force of the full head, and the column of water thus exerts a pressure upon the part *h* of the lower wheel-face, thus to a great extent counterbalancing the pressure of the wheel upon its step, and thus not only materially reducing the friction thereon, but avoiding the rapid wear of the same, which has always caused so much trouble in the use of turbine wheels. The flange *d* extends a sufficient length into the groove *g* to make a tight water-joint. It also has the advantage of retaining the wheel in its position should pieces of wood, &c., enter the wheel, which frequently throw it from its step if supported and held in its position by said step only. We make the groove *g* of sufficient depth to allow for the wearing down of the step E, so that there will be space for the flange or rim to enter should the step wear down about one inch. If the flange *d* should wear down in use, the rim K can be detached and replaced by a new one.

M represents the neck of the wheel-case A, and N the gate-box. We provide the latter at each of its ends with flanges *m*, by means of which it can be easily secured to the flume and to the case-neck M.

O represents the gate. To obtain a nice fit of the gate upon its seat we make the gate-seat P in a separate piece. (Represented in a perspective view at Fig. 4, and in sections at Figs. 1 and 3.) The sides of said gate-seat are made flaring or tapering, and are made to fit nicely into the recess in the gate-box. The upper side of the gate-seat we provide with two lugs or projections, *n*, which are fitted against the inner face of the gate-box, and prevent the gate-seat from being pressed into its recess beyond a certain depth. By making the gate-seat in a separate piece, as herein described, we are enabled to plane the faces on which the gate O slides very accurately and with great facility, which otherwise would be a difficult job, and we obtain a tight fit of the gate. Should the gate-seat become leaky by use, it can easily be removed and replaced. By making the sides of the gate-seat flaring it can be driven tightly into the gate-box, where it will remain without the aid of other fastenings.

To prevent any water from escaping from

the wheel upward, we use the dome Q, whose circumference is secured to the upper face of the case A, and which adds steadiness to the center shaft, the latter passing through the bearing *p* of said dome.

Z represents a coupling-box, which is secured to the upper end of the wheel-shaft D by means of the screws *z*, or otherwise. It is used for connecting another length of a shaft, Y, to the wheel-shaft. Not constituting part of this present invention, a detailed description thereof is not deemed necessary.

Having thus fully described the nature of our invention, what we claim herein as new, and desire to secure by Letters Patent, is—

1. Providing the lower side the wheel-case with a flanged rim, K, for the purpose of caus-

ing the water to press on the lower side of the wheel, substantially as and for the purposes stated.

2. In combination with the detachable flanged rim K, applied to the lower side of the wheel-case, the grooved flange *g* on the lower side of the wheel, substantially in the manner and for the purposes described.

3. The application to turbine shafts and to the lower face of the turbine wheel of the adjustable supporting-collar I, substantially as and for the purpose described.

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Witnesses:

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