G. W. EARL.
Water-Wheels.

No. 196,344. Patented Oct. 23, 1877.

Fig. 1.

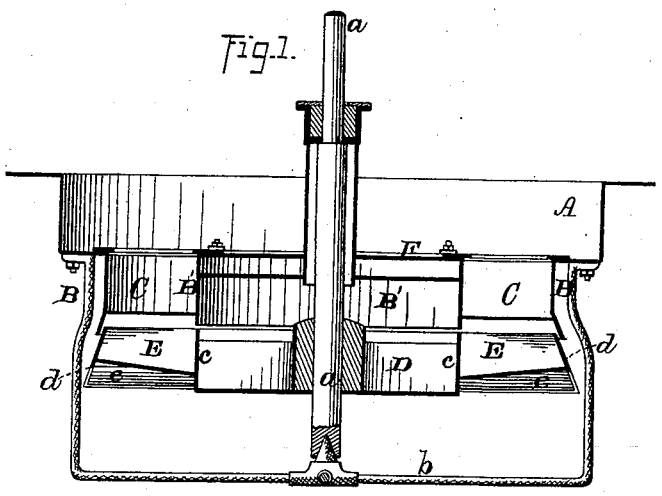


Fig. 2.

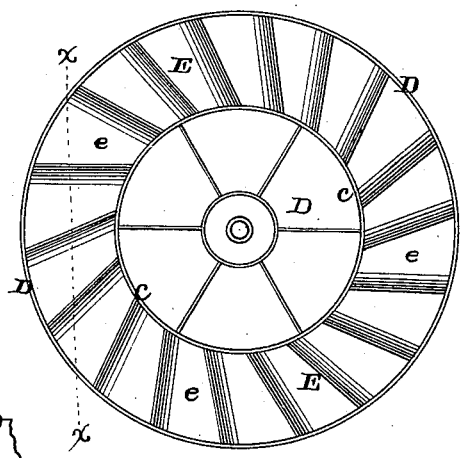
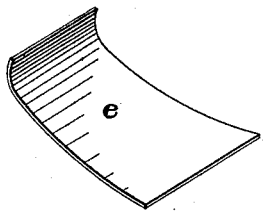


Fig. 4.

Fig. 3.



WITNESSES
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GEORGE W. EARL, OF DES MOINES, IOWA.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. **196,344**, dated October 23, 1877; application filed July 10, 1877.

To all whom it may concern:

Be it known that I, GEORGE W. EARL, of Des Moines, State of Iowa, 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, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification, and in which—

Figure 1 is a vertical section of my improved water-wheel. Fig. 2 is a plan view of the wheel proper detached. Fig. 3 is a detached perspective view of the bottom of one of the buckets. Fig. 4 is a section through the dotted line *x x* of Fig. 2.

Corresponding parts in the several figures are denoted by like letters.

This invention relates to a certain improvement in that class of water-wheels known as turbine water-wheels; and it consists, mainly, in the peculiar construction of the buckets thereof, substantially as hereinafter more fully set forth.

In the annexed drawing, A refers to a receptacle or inclosure which receives the falling water to be fed to the wheel, from the bottom of which depends the outer flange or rim B, as does also the inner rim B′ of the conduits C C. The conduits C C are arranged in an oblique radii with the center of the wheel, and discharge downwardly into the buckets of the wheel proper. D is the wheel proper, suitably fastened upon the shaft *a*, centrally journaled in the wheel, and bearing in a frame or support, *b*. The wheel D is provided with a series of buckets, E E, which radiate obliquely from a ring or center, *c*, and also discharge downwardly. The outer ring or rim *d* of the wheel is flaring or conical in form, so as to expand or enlarge the sides of the buckets toward their bottoms, and its inner rim stands perpendicularly to its horizontal axis, in order to increase the discharge of the buckets, and to throw the water as it is discharged beyond the line of the wheel's rotation, lessening friction and increasing the speed of the wheel. Where the inner rim or wall of the wheel or its buckets is inclined in the direction of the outward slope of the outer rim, as developed by the state of the art, the discharge is not increased, and, consequently, minus the increase of momentum or speed obtained by my construction of wheel. The bottoms *e e* of the buckets E E slope from a point at about two-thirds of the height of the buckets. From that point they are curved upwardly the remaining third of the height of the buckets.

From this construction it will be seen that the water from the conduits C C, as it enters the buckets, will first strike the upper curved portions of their bottoms, and impart motion to the wheel, and then flow down the inclines of the said bottoms, and accelerate the momentum of the wheel, and be discharged.

F is a horizontal perforated slide or gate sliding over and opening and closing the entrances of the conduits C C. This slide or gate rests in the bottom of the inclosure or case A against frictional rollers, and is provided with a rack engaged by a pinion attached to said shaft, by turning which the gate will be opened or closed according to the direction given the said shaft.

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

1. The wheel D, having the buckets E E, the outer rim of which is expanded or spread outwardly toward its lower edge, and its inner rim stands perpendicularly to its horizontal axis, substantially as and for the purpose set forth.

2. In combination with the wheel D, having the buckets E E, the outer rim thereof being outwardly expanded toward its bottom, and the inner rim standing perpendicularly to its horizontal axis, the chutes C C, case A, and gate F, substantially as and for the purpose set forth.

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

GEORGE W. EARL.

Witnesses:

EDWD. R. MUNK,

C. W. GIRSCH.