2 Sheets--Sheet 1.

W. H. ELMER.

Water-Wheels.

No. 137,666. Patented April 8, 1873.

Fig. 1.

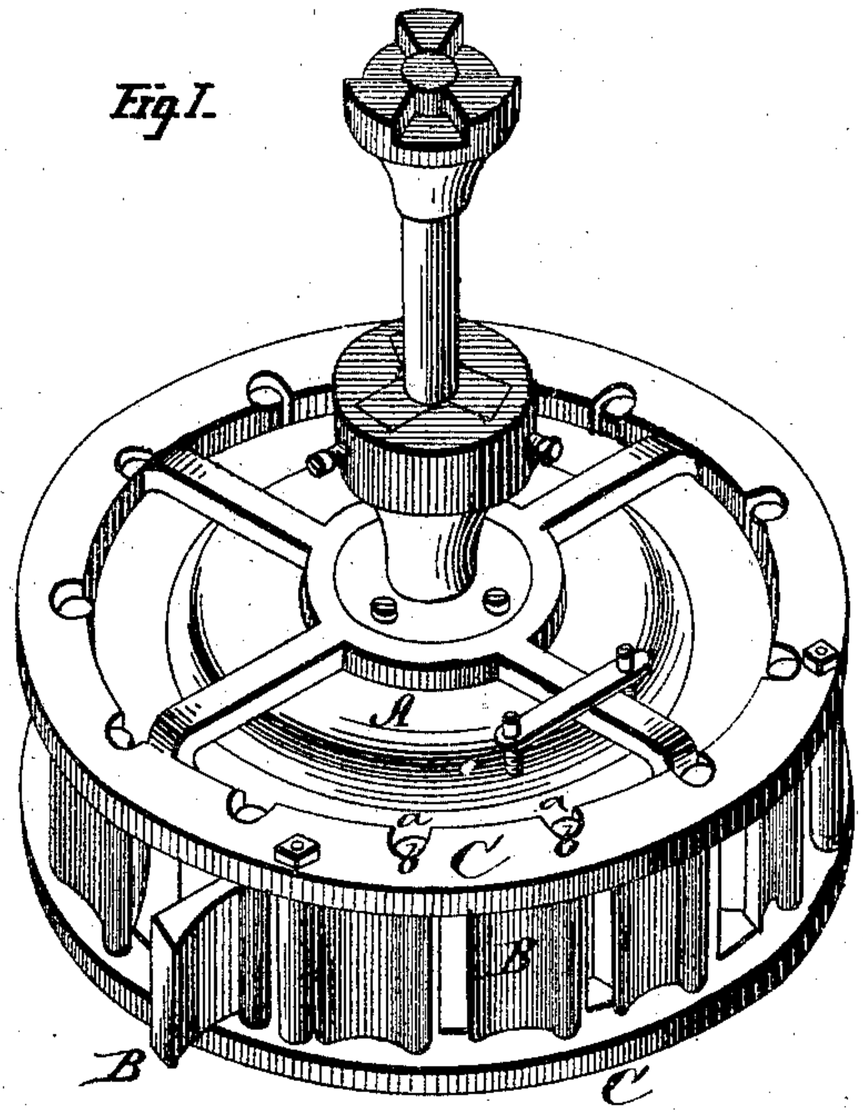
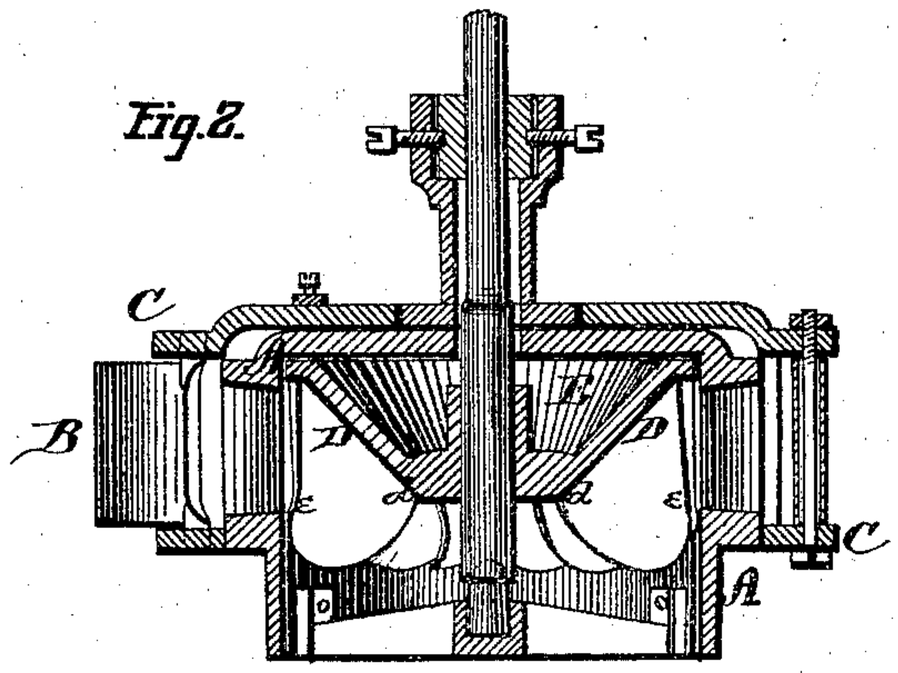


Fig. 2.



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2 Sheets--Sheet 2.

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Fig. 3.

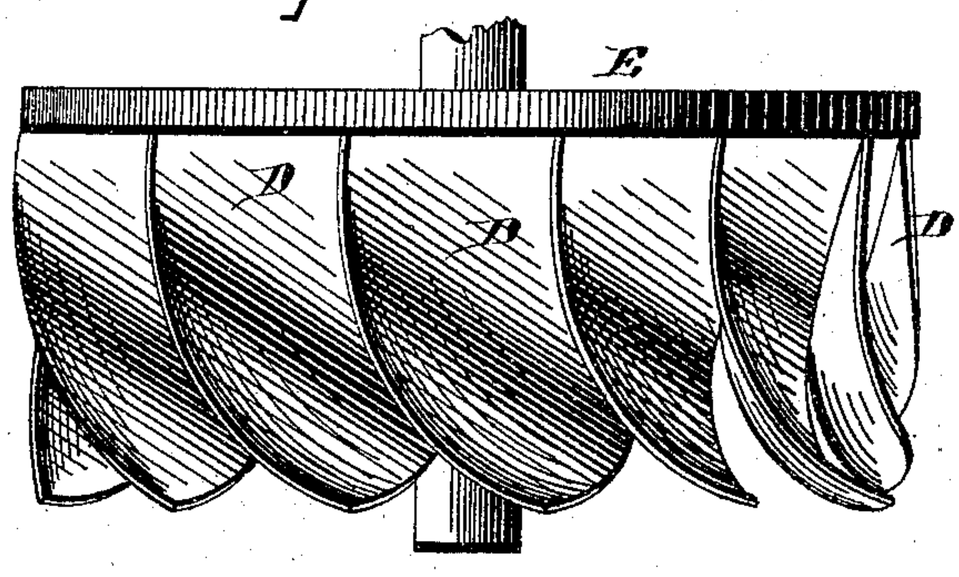


Fig. 5.

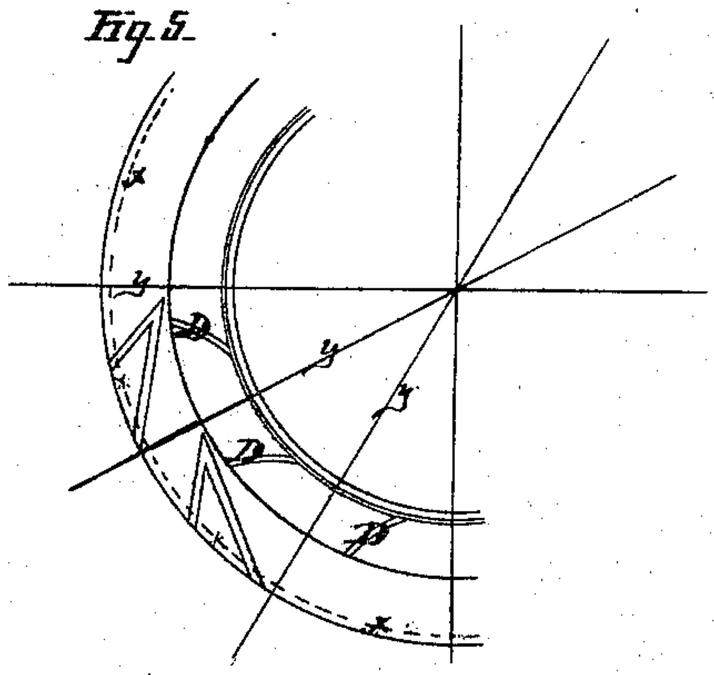


Fig. 4.

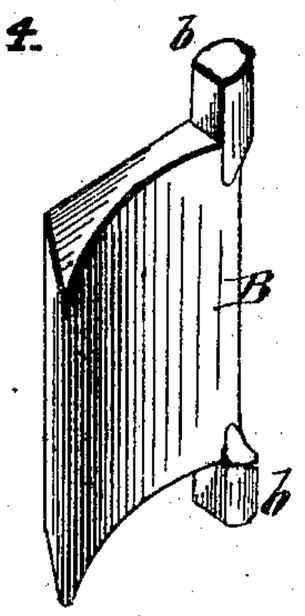
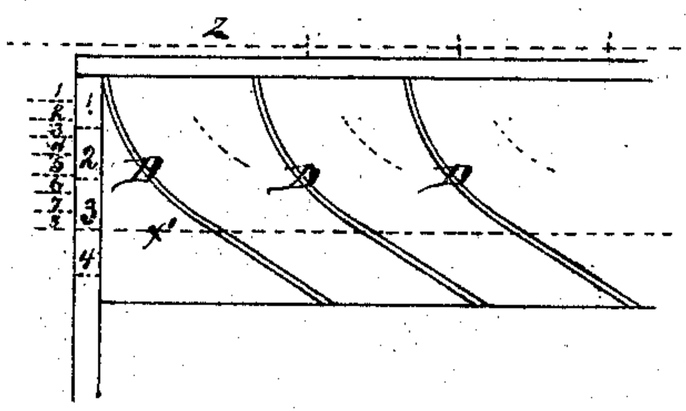


Fig. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM H. ELMER, OF BERLIN, WISCONSIN.

IMPROVEMENT IN TURBINE WATER-WHEELS.

Specification forming part of Letters Patent No. **137,666**, dated April 8, 1873; application filed January 13, 1873.

To all whom it may concern:

Be it known that I, WILLIAM H. ELMER, of Berlin, in the county of Green Lake and in the State of Wisconsin, have invented certain new and useful Improvements in Water-Wheels; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon making a part of this specification.

The nature of my invention consists in the construction and arrangement of a water-wheel, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a perspective view, and Fig. 2 is a longitudinal section, of my entire water-wheel. Fig. 3 is an enlarged side elevation of the wheel proper. Fig. 4 is an enlarged perspective view of one of the gates, and Figs. 5 and 6 are diagrams showing the mode of "laying out" the buckets.

A represents the case of my water-wheel, which case is constructed in the same manner as described in the Letters Patent granted to me in December, 1869. B B represent the gates, which are arranged to slide around the wheel, and are held in place and operated by two annular rings, C C, one at the top and the other at the bottom. These rings are made with cut-outs or notches *a a* in their inner circumference, at equal distances apart, in which horns or lugs *b b* on the gates B B are placed. These gates hang loose in the rings C C so that the water will hold them tight against the wheel; and in case an obstruction gets into one of the gates it will open out away from the wheel and allow all the others to shut, which is a very essential point, as it often happens that something obstructs a wheel, and before it can be stopped it will do a great deal of damage; but in this case a gate cannot be clogged to do any damage, as it cannot prevent the other gates from shutting, and the pressure of the water holds the gates up to the wheel, so that they are perfectly tight. D D represent the buckets, which are made half an inch deep, to the center of the top, for every five inches of the diameter of the wheel. The buckets are formed on the face side, as shown by the diagram, Fig. 5, by drawing a circle, *x*, three inches from the center, (in a wheel of five inches in diameter,) and dividing the same into twelve equal parts by lines *y y* through the center. Then spread the compasses one inch and place one point on the circle *x* where the line *y* passes; the other point will describe the top of the bucket. E represents the hub of the wheel, to which the buckets D D are attached. This hub is made tapering, so that the bucket is as wide at the bottom of the hub, from *d* to *e*, as the chute in the case is high, as shown in Fig. 2, to allow a free discharge of the water. The outside circle of the buckets is made as shown in the diagram, Fig. 6, by taking the height of the chute and adding one-third, which makes the radius; then, above the upper end of the buckets, draw a line, *z*, one-eighth the height of the chute, and on this line place one point of the compasses, spread as above, and with the other draw the circle of the bucket down to the line *x'*, which is the bottom of the case. From there the angle is twenty-two and one-half degrees to the line of the bottom of the buckets.

The back edge of the buckets next to the hub is made by a circle having the same center as the circumference of the bucket, and a radius seven-eighths the height of the chute.

By means of this construction of the bucket the wheel will run about eighty-six per cent. the actual velocity of the water when at work, and very steady, as the incline of the bucket out keeps the water on the verge of the wheel.

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

1. The gates B B pivoted or hinged between and sliding with the rings C C, and working independent of each other upon their pivots, as and for the purpose set forth.

2. The buckets D D, constructed as described, and laid out according to the forms, in the manner, and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 6th day of December, 1872.

WILLIAM H. ELMER.

Witnesses:

GEO. D. WARING,

M. A. HURLEY.