C. E. MARSHALL.
Water-Wheel.

No. 212,960. Patented Mar. 4, 1879.

Fig 1

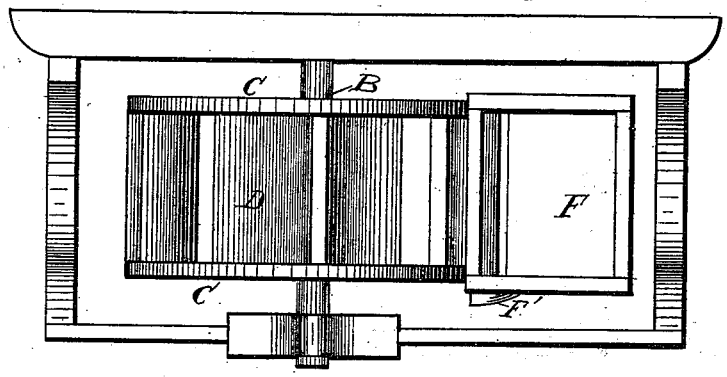


Fig 2

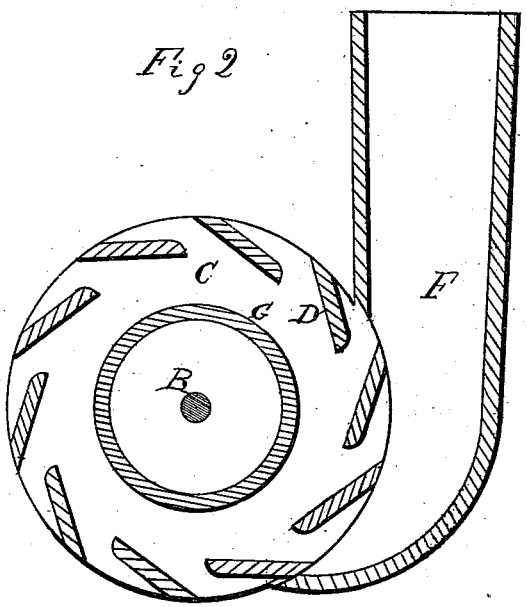
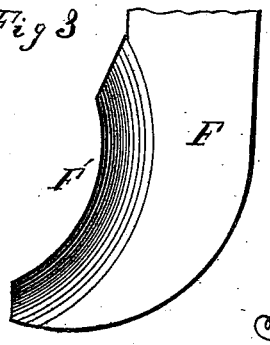


Fig 3



WITNESSES
C. L. Event.
Frank H. Duffy

INVENTOR
C. E. Marshall
per
T. P. Alexander & Elliott

UNITED STATES PATENT OFFICE.

CHARLES E. MARSHALL, OF AFTON, NEW YORK, ASSIGNOR TO HIMSELF AND LYMAN R. FERGUSON.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. **212,960,** dated March 4, 1879; application filed July 10, 1878.

To all whom it may concern:

Be it known that I, C. E. MARSHALL, of Afton, in the county of Chenango and State of New York, 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

The nature of my invention consists in the construction and arrangement of a water-wheel with scroll for conducting the water to the 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 drawings, in which—

Figure 1 is a front elevation of my water-wheel. Fig. 2 is a horizontal section of the same. Fig. 3 is a plan view of a part of the scroll.

A represents any suitable kind of frame-work, forming bearings for the upright shaft B, upon which the wheel is secured.

The water-wheel consists of two horizontal disks, C C, between which the buckets D D are secured. These buckets are arranged substantially in the manner shown in Fig. 2—that is to say, extending on straight lines from the periphery at an angle from radial lines. The wheel is constructed to use the water first as a direct-action wheel, and it receives the water on the outside of the wheel from a partial scroll, F, which covers a number of the straight buckets.

It will be noticed from Fig. 2 of the drawings that these buckets stand as near in a line with the water at the time they first come into position to take the water from the scroll as is possible and not strike flat against the stream.

In a full-sized water-wheel I propose to fasten the buckets D in the wheel between the two plates or disks C C by means of two pins cast on each end of each bucket, and said pins fitting in holes in the disks, and a bolt passing through the plates and fitting in a groove in the back side of the bucket, to hold the parts firmly together.

The rapid motion of the wheel will make it necessary, under very high heads, to use a large wheel reduced in capacity, so as to vent an amount of water equal to that commonly used by a wheel very much smaller. This will make necessary a change in the number and width of the buckets and size of the tube G in the center of the wheel.

The usual number of buckets would be thirteen. The spaces between the buckets covered by the scroll, measured at the narrowest point, should give as much space for the water to pass into the wheel as there is space for the water to come into the scroll.

The tube G in the center of the wheel holds the water against the buckets, the space between the tube and buckets being about three-eighths of the space from the center tube to the outside of the wheel. The width of the scroll-vent should be about three-fourths as wide as the space from the tube to the outside of the wheel.

As the water passes through the buckets into the wheel it will shoot from one bucket to another until the space becomes full, and then as it is forced through the buckets it operates like a reaction-wheel, and would labor even though the water were moving slower than the wheel.

The portion of the scroll F adjacent to the wheel is provided at the top with a flange, F′, which overlaps the wheel to prevent the escape of the water above the wheel.

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

1. A water-wheel constructed of the plates or disks C C, buckets D D, extending on straight lines from the periphery at an angle from radial lines, and central tube, G, substantially as and for the purposes herein set forth.

2. The combination of the water-wheel composed of the disks C C, buckets D, and tube G, and the scroll F, with flange F′, all constructed substantially as and for the purposes herein set forth.

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

C. E. MARSHALL.

Witnesses:
L. R. FERGUSON,
E. E. MCKINSTRY.