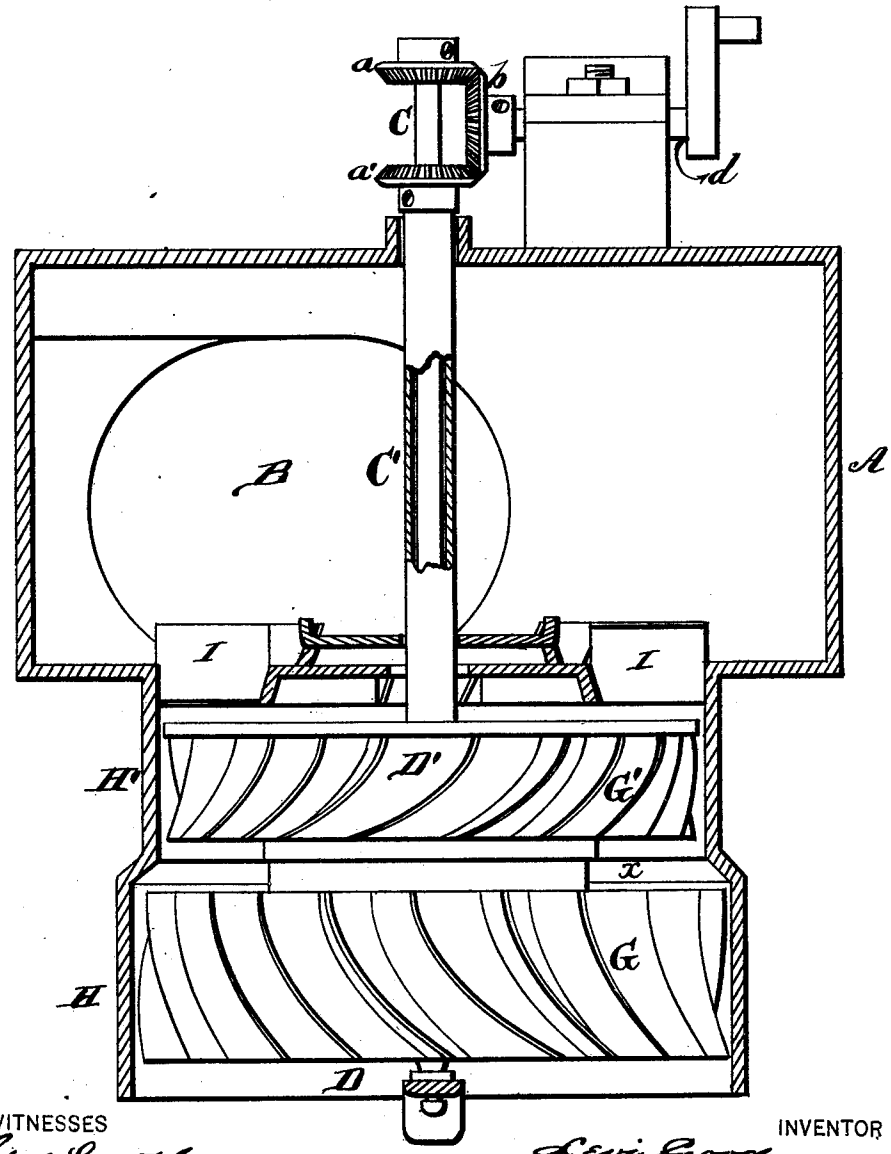
L. GOOD.

WATER-WHEEL.

No. 191,668. Patented June 5, 1877.

Fig. 1.



WITNESSES

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UNITED STATES PATENT OFFICE.

LEVI GOOD, OF SCHUYLER FALLS, NEW YORK, ASSIGNOR OF ONE-THIRD HIS RIGHT TO DE WITT C. BROADWELL, OF SAME PLACE.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. **191,668**, dated June 5, 1877; application filed May 5, 1877.

To all whom it may concern:

Be it known that I, LEVI GOOD, of Schuyler Falls, in the county of Clinton and State of New York, have invented a new and valuable Improvement in Water-Wheels; and I 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 annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of central vertical sectional view of my water-wheel.

This invention relates to that class of water-wheels in which two separate and independent wheels rotate in opposite directions, one being located above the other, and having a common axis; and the nature of my invention consists in the construction of the lower wheel of larger diameter than the upper one; and also in so arranging the two wheels that a space will be left between the lower ends of the upper buckets, and the upper ends of the lower buckets, all as hereinafter more fully set forth.

The annexed drawings, to which reference is made, fully illustrate my invention.

A represents the ordinary curb, into which the water is admitted through the inlet B, as shown, and from the bottom of said curb projects the tube or casing surrounding the water-wheel.

C is the upright center-shaft, on which the lower wheel is secured, and on this shaft is a sleeve or tube, C′, on which the upper wheel is secured. The tube C′ and shaft C are at their upper ends, respectively, provided with gear-wheels *a′ a*, which mesh with a corresponding wheel, *b*, on a horizontal shaft, *d*, connected with the mill or machinery to be driven.

D represents the lower wheel secured on the shaft C, and provided on its periphery with a series of curved inclined buckets, G.

The upper wheel D′, secured on the tube or sleeve C′, is provided on its periphery with similar buckets G′, which are, however, inclined in a direction opposite to that of the lower buckets G.

The lower wheel D, with its buckets, is made of larger diameter than the upper wheel D′, so that the outer edges of the lower buckets G will be beyond the outer edges of the upper buckets G′. This difference in diameter must not be understood as being in the wheels proper—these are of about the same diameter. It is the buckets that are of different width, and, if necessary, of different depth also.

The casing surrounding these wheels is made to correspond—that is to say, the lower part H is of larger diameter than the upper part H′.

In the bottom of the curb A, above the upper wheel D′, is a series of chutes, I I, inclined in the opposite direction from that of the upper buckets G′, so as to direct the water nearly at right angles to said buckets.

The two wheels are so arranged that a suitable space is left between the lower edges of the top buckets G′, and the top edges of the lower bucket G, as shown at *x*.

I am well aware that two water-wheels revolving on a common axis in opposite directions is not new, and, hence, I do not claim such as my invention; but in such cases as known to me the wheels have been of the same diameter, or, if any difference has been made, the lower wheel has been made smaller than the upper, and no space left between the two sets of buckets.

This construction invariably causes the water to back up from the lower wheel and retard the motion of both wheels.

By my invention this difficulty is entirely obvated, as when the water leaves the buckets of the upper wheel it must necessarily expand, and this expansion is provided for by the enlarged surfaces of the buckets of the lower wheel; hence there will be no back water, the movement of the water not retarded, and the motion of the wheels even and regular.

The space *f* between the two sets of buckets gives ample room for the expansion of the water, and causes a solid column of water to

stand between the two wheels, from which column the water passes to the buckets of the lower wheel.

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

1. In a water-wheel, the combination of two separate wheels revolving around a common axis in opposite directions, the lower wheel being made of larger diameter than the upper wheel, for the purposes set forth.

2. The combination of the upper wheel D′ G′, the lower wheel D G of larger diameter, and the surrounding casing made of two parts, H H′, of unequal diameter, substantially as and for the purposes herein set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

LEVI GOOD.

Witnesses:
CLARENCE H. MCEWEN,
EUGENE W. JOHNSON.