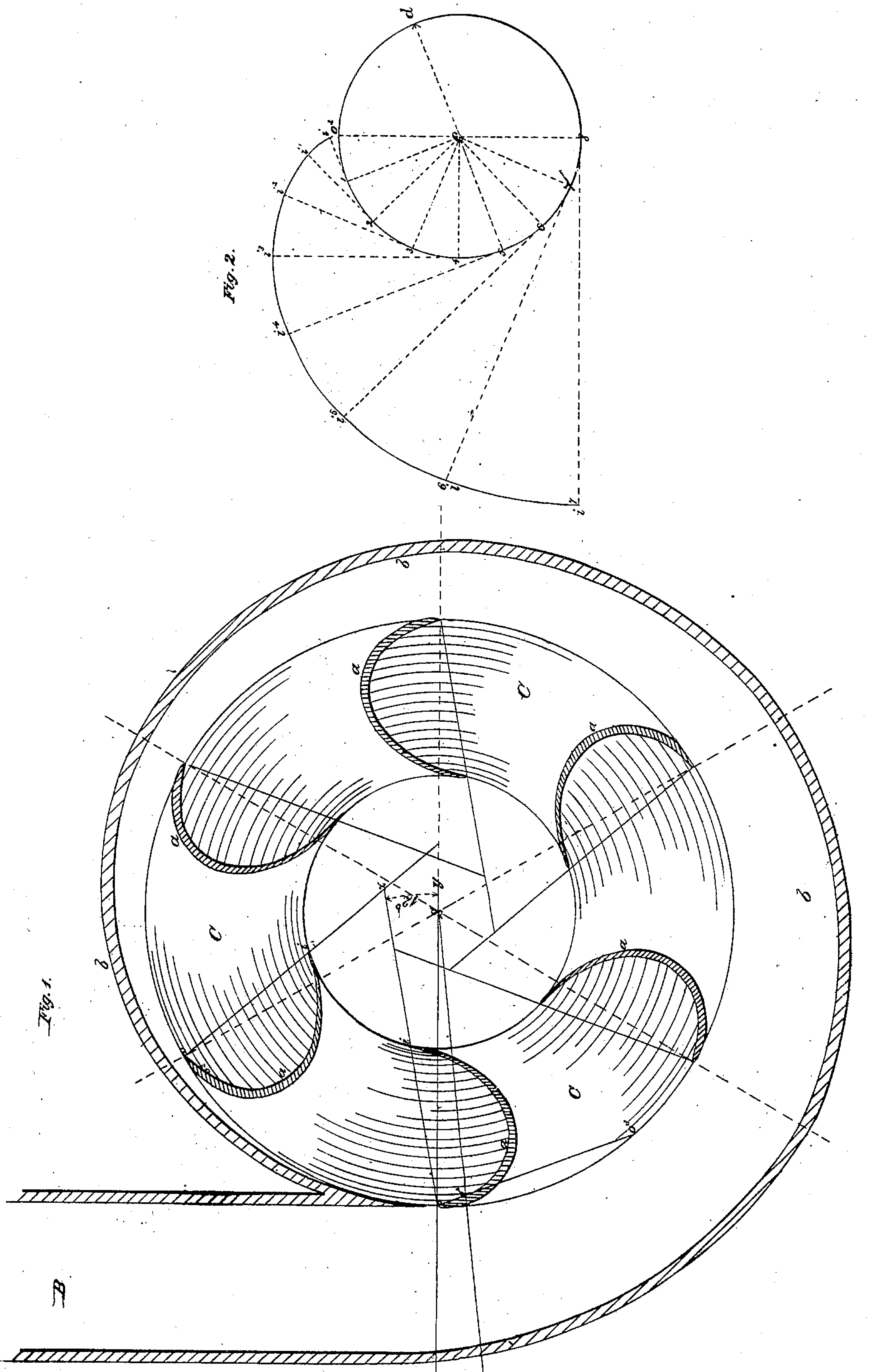
No. 27,448. PATENTED MAR. 13, 1860.

W. W. HORTON.

WATER WHEEL BUCKET.

Fig. 2.

Fig. 1.



Witnesses.

Aaron Kime

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W. W. HORTON, OF SCHUYLERS LAKE, NEW YORK, ASSIGNOR TO HIMSELF AND LUCIUS O. VEBBER.

WATER-WHEEL.

Specification of Letters Patent No. 27,448, dated March 13, 1860.

To all whom it may concern:

Be it known that I, W. W. HORTON, of Schuylers Lake, county of Otsego, in the State of New York, have invented a new and useful Design for Water-Wheel Buckets; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

The nature of my invention consists, in a novel formation or design of the bucket of a direct action center vent water wheel.

To enable those skilled to make and use my invention I will proceed to describe its construction and operation.

In the accompanying drawings forming a part of this application Figure 1 illustrates in horizontal section a water wheel embracing my improvements, and Fig. 2 illustrates the construction of the curve employed in the formation of my improved bucket.

In Fig. 1, *b* is the scroll or case of the wheel. B, is the chute. C, the plate of the wheel and *a*, the buckets.

Since my invention lies in the peculiar form of the bucket (and the form of the bucket must practically be considered in connection with its arrangement, or relative position with the other portions of the wheel and the line of the operating charge of water) it is not necessary here, to describe any of the other details of construction in a water wheel. The extreme diameter of the wheel being determined, the circumference of the circle is divided into a given number of equal parts to determine the location of the outer edge of each bucket as illustrated by the radii in Fig. 1 and lines drawn from each of said points toward the interior of the wheel at an angle of twelve degrees, with said radii to determine the location of the inner edges of said bucket as seen at Fig. 1, the line *o*, *i*, *x* being drawn at an angle of twelve degrees with the radius *o*, *s*, a radius S, R, is now drawn at an angle of 5° with radius S, A, and from the point O is drawn a line *o*, o^2, o^3, making the angle *x*, *o*, o^3 equal to about 80° and intersecting the radius S, R, at o^2 the portion from *o* to o^2 of this line forms the first portion of the bucket; from the point o^2 the bucket is formed of the involute of a circle running until it comes in contact with the line *o*, *i*, *x*, which point of contact is the inner edge of the bucket; the back surface of the bucket is formed of such shape as to impart the proper degree of strength to the bucket at all points. The (relative) diameter of the circle, the involute of which is adopted, should be about equal to $\frac{3}{4}$ of the distance intended to be between the inner and outer edges of the bucket, but may be varied to suit the constructor as experiment may prove expedient.

I will now explain the construction of the curve employed between the points o^2 and *i* reference being had to Fig. 1 of the drawing. To lay off the curve desired, strike a circle of the determined diameter, divide the circumference of said circle into any number of equal parts (so small that the parts included between each division shall very nearly approximate to a straight line) draw radii from the points of division o^2 1, 2, 3, 4—8 to the center C and then draw tangents to the points where the radii touch the circumference: On the tangent 1 *i* lay off a distance equal to the arc 1—o^2 on the tangent 2, *i'* lay off a distance equal to the arc 2, o^2 or twice the length of the first and so, on all the tangents illustrated. Through the points marked on the tangents (by measuring off the lengths of the arcs) draw a curve o^2, *i'*, i^2, i^7 which will be involute of the circle and the curve employed in my bucket. The point o^2 being placed to coincide with the point o^2 Fig. 1 and the curve run until it intersects the line *o*, *i*, *x* (at the point *i* for instance Fig. 1.)

It will now be understood that my improved bucket consists of a straight line making an angle of about 80° with the line *o*, *i*, *x* from *o* to o^2 and of an involute of a circle from the point o^2 to the point *i*. It will be understood that this point *i* though it must come in the line *o*, *i*, *x* may vary in position according to the circle employed in the laying off of the involute, and the internal circle of the wheel, or the center discharge opening determined to suit.

I do not wish to limit myself to the exact diameter of the circle (the involute of which I employ) shown, nor do I wish to be understood as laying any claim to the mathematical problem which enters as an element in the construction of my improved bucket, but

What I do claim as my invention and desire to secure by Letters Patent is

The specific construction of bucket herein-before described; embodying a straight line, in combination with an involute of a circle the straight line and involute being relatively arranged to each other and the face of the wheel as herein set forth.

In testimony whereof I have hereunto set my hand and affixed my seal this twelfth day of December 1859.

WM. W. HORTON.

Witnesses:
HIRAM KINNE,
WILLARD W. VEBER.