

I. TRUE.
WATER WHEEL.

No 10,839.

Patented Apr. 25, 1854.

Fig: 1

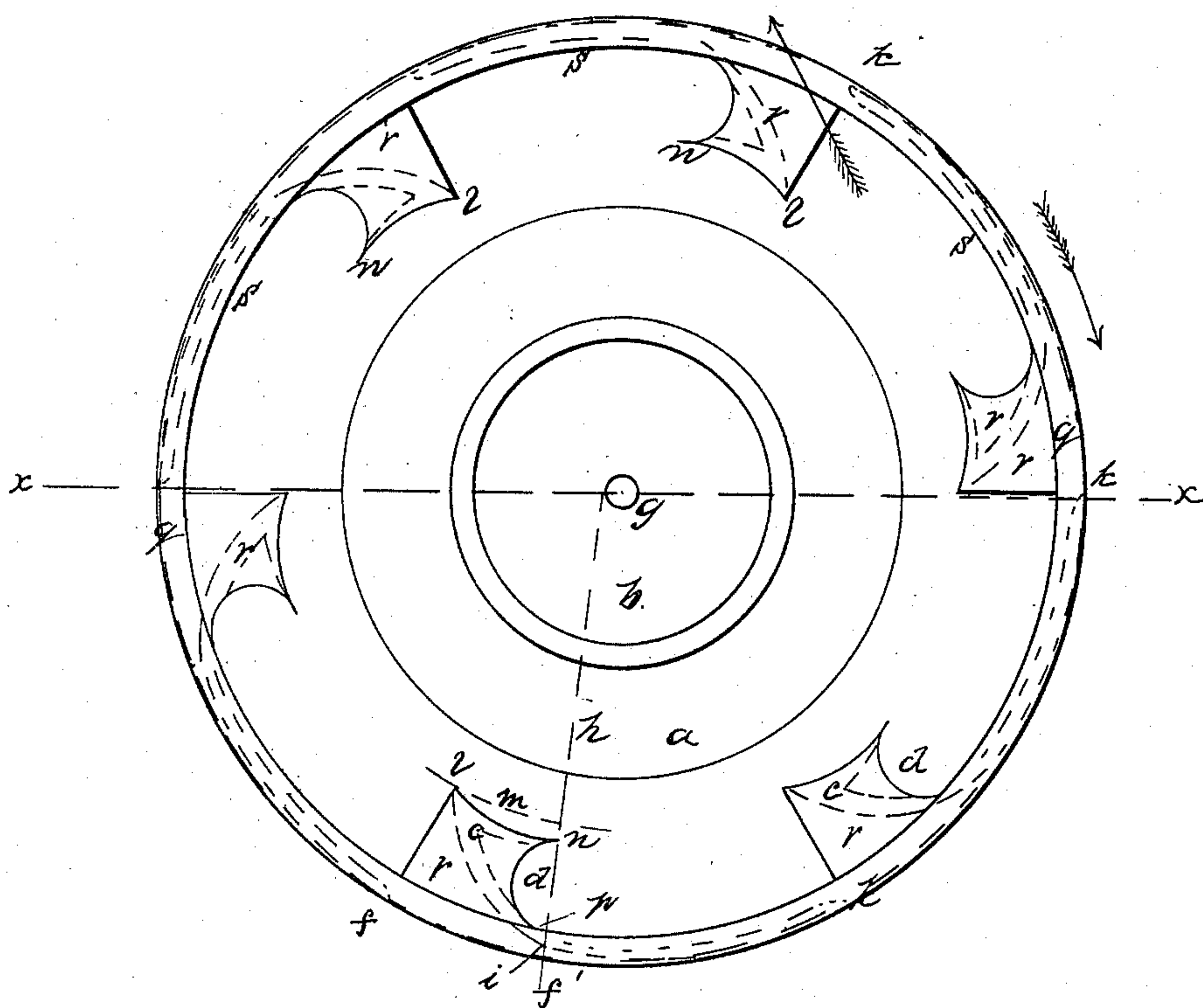
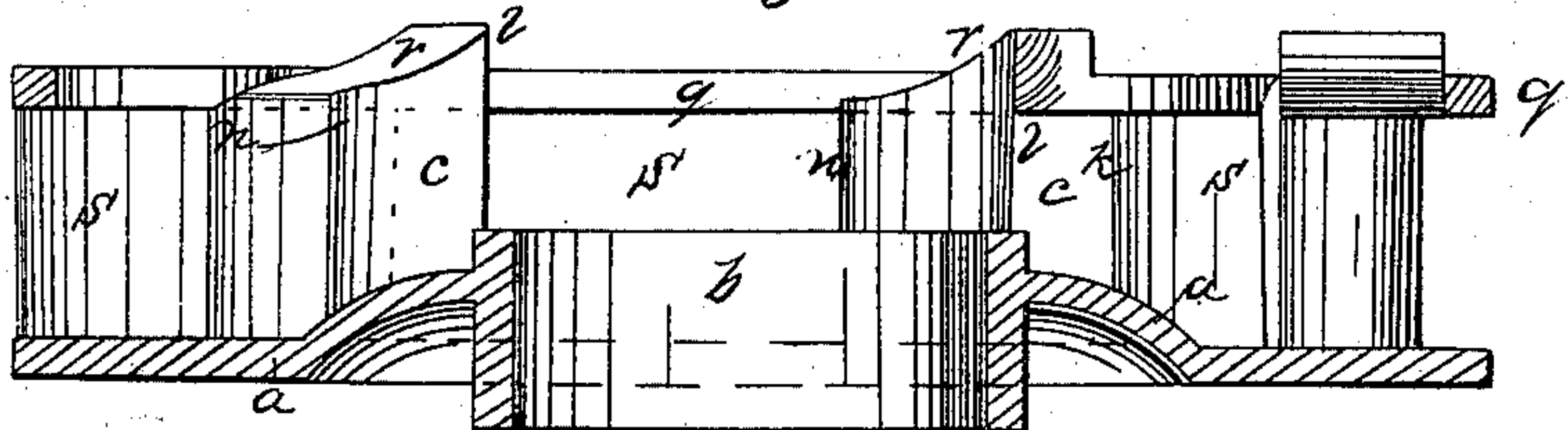


Fig: 2.



UNITED STATES PATENT OFFICE.

ISAAC TRUE, OF ROCHESTER, INDIANA.

REACTION WATER-WHEEL.

Specification of Letters Patent No. 10,839, dated April 25, 1854.

To all whom it may concern:

Be it known that I, ISAAC TRUE, of Rochester, in the county of Fulton and State of Indiana, have invented a new and useful
5 Improvement in Percussion and Reaction 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, forming part of this specification, in which—

Figure 1 is a plan of the wheel with my improved buckets. Fig. 2 is a vertical section upon the line $x x$ of Fig. 1.

15 Similar letters of reference on the several figures refer to the same parts of the machine.

The nature of my invention consists in constructing the buckets of percussion and
20 reaction water wheels with projecting hooks on their inner faces, and also with projections or flanges above the rim, so as to afford the most favorable surface for the action of percussion, giving the force a greater arm
25 of lever than is usual, thus increasing in a great degree the efficiency of the wheel, and further, in cutting away a portion of the rim, allowing the water free and unobstructed access to the buckets.

30 In the drawings a is the bottom of the wheel, b the opening for the shaft, and c, c the buckets, each having on its inner face the hook d , and upon its top the curved covering r . In order that the construction of
35 my buckets may be properly understood I will give the several dimensions used in the construction of buckets for a wheel of three feet diameter, which will show the proportions to be observed in the formation of
40 wheels of any size.

The bottom a of the wheel is made thirty-eight inches in diameter, convex at the center, as seen in the drawings, having the eye
45 b sixteen inches in diameter; upon this disk a circumference three feet in diameter is described, which is next divided into six equal parts. Another and concentric circle twenty-nine inches in diameter is then described, this gives the width of the issues after deducting the thickness of the bucket at that
50 point; as a general rule, I give the issues one inch of width for each foot of diameter of the wheel. I then set off upon the verge line, from the points f distances $f f'$ equal to
55 one-third of the former divisions of that line. A small circle g three inches in di-

ameter is next described, and tangents h
drawn to this circle, on the side toward which the wheel moves, through the points
60 f' of the verge line; these lines are the loci of the inner edges of the hooks d . Then upon the line h I set off three-quarters of an inch from the verge line, and mark the point, seen at i in the drawing; and with a
65 radius of eighteen inches I describe a arc of circle connecting the points i and k , after which I connect the points i and l by an arc of the same radius, thus completing the outer face of the bucket. I next upon the
70 line h set off from the circle m one-fourth of an inch and without changing the radius connect the points l and n .

The bucket is made half an inch thick to the point p which forms the second extremity of the hook d . The buckets are
75 then trimmed off as seen in the drawing, so that their several edges shall be as sharp as is consistent with strength, and forming the reëntrant angle of the hook d . The buckets are made with the growth of the
80 wood vertical, and are let into the bottom a sufficient distance to insure strength.

The rim q is constructed of strong oak plank well banded together, and is cut out
85 between the heel k of the bucket and the hook d , and is left at r so as to cover the issues and strengthen that portion of the bucket which receives the percussion, the
90 part r is curved and raised above the other portion of the rim q as seen in Fig. 2, so as to be effective by the percussion of the water falling upon it.

The wheel is fastened together by strong bolts passing through the face rim, hooked
95 portion of the bucket and bottom of the wheel. The height of the buckets are made to suit the amount of water required to be used, which is applied in the same manner as to all other wheels of like nature.

The advantages of the peculiar hooked
100 form of my buckets, are, that they are of the form most favorable, to receive the percussion and give to the force the greatest arm of lever, the surfaces being such that the force applied is so received that its non-effective component is the smallest practicable; and further, that the remaining
105 portion of the bucket is of a form best calculated to accommodate the reactive force of the water in leaving the bucket. The removal of the rim between the heel and hook
110 of the bucket permits the water to impinge

with its full force upon the surfaces constructed to receive it. The curved surface upon the rim, above the issues and the inner surface *l n*, serve as additional hooks or
5 projections for the percussion of the water and add greatly to the facility of moving the wheel.

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

10 The employment of the hooked surfaces *d*, and curved projecting surfaces *l n* and *r* in combination with the indented rim *q*

substantially in the manner specified, in the construction of percussion and reaction water wheels, whereby the effective force of the percussion is greatly increased as herein
15 fully set forth.

In testimony whereof I have hereunto signed my name before two subscribing witnesses.

ISAAC TRUE.

Witnesses:

A. C. WATKINS,
H. F. WILLSON.