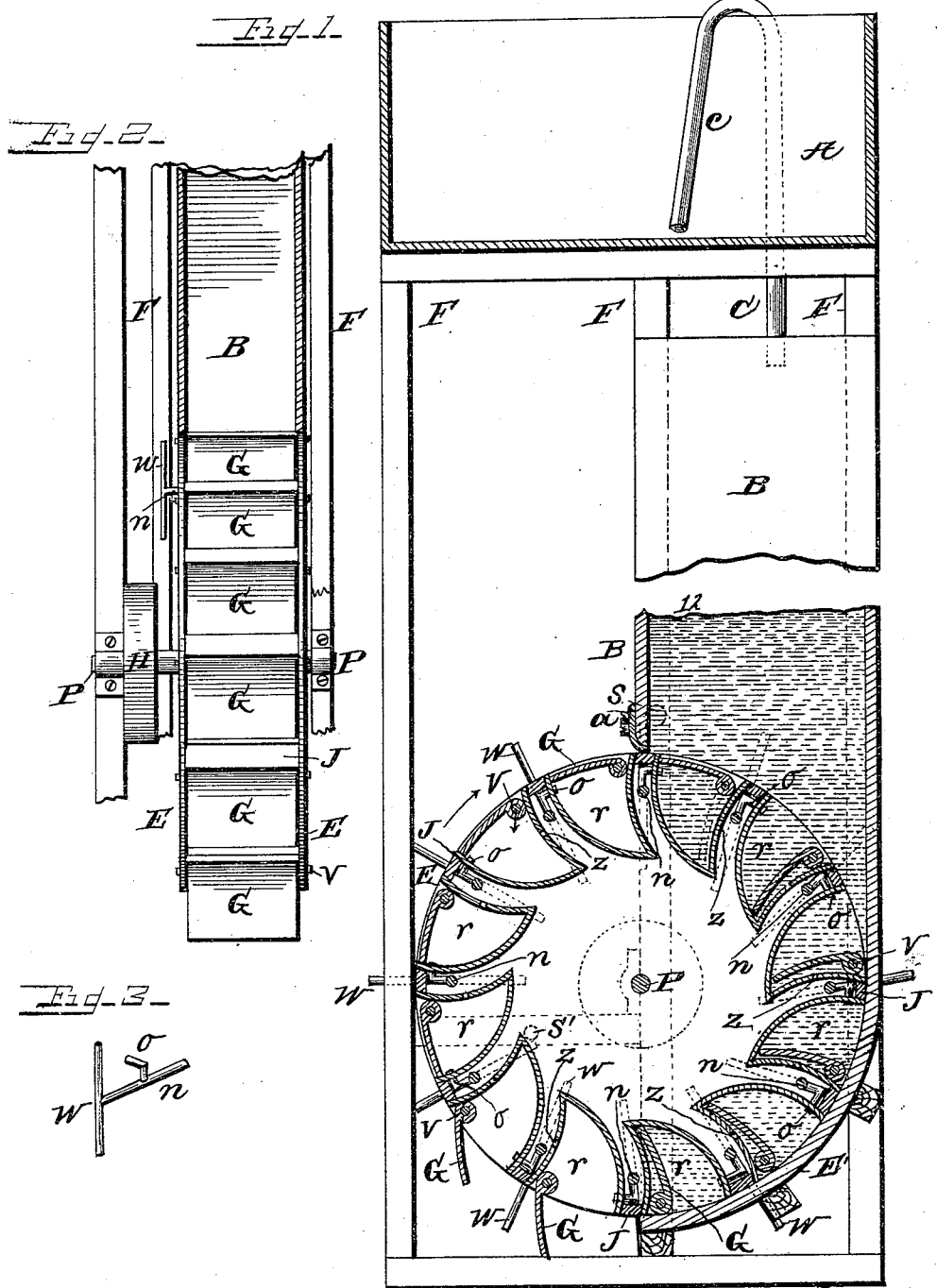


(No Model.)

F. LUNDBERG.  
WATER WHEEL.

No. 457,825.

Patented Aug. 18, 1891.



Witnesses  
J. A. Tauberschmidt,  
J. D. Kingberg.

Inventor  
Fred Lundberg  
By Thos. H. Hutchins  
Attorney

# UNITED STATES PATENT OFFICE.

FRED. LUNDBERG, OF TACOMA, WASHINGTON.

## WATER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 457,825, dated August 18, 1891.

Application filed November 10, 1890. Serial No. 370,994. (No model.)

*To all whom it may concern:*

Be it known that I, FRED. LUNDBERG, a citizen of the United States of America, residing at Tacoma, in the county of Pierce and State of Washington, have invented certain new and useful Improvements in Water-Wheels, of which the following is a specification, reference being had therein to the accompanying drawings and the letters of reference thereon, forming a part of this specification, in which—

Figure 1 is a central vertical sectional view of the water-wheel and of part of the flume and the water-tank above the flume, and a side view of the upper part of the flume and of part of the frame. Fig. 2 is a front view of the wheel and vertical section of the lower end of the flume, taken on line 2 of Fig. 1; and Fig. 3 is a perspective view of the latch for holding the gates.

This invention relates to certain improvements in water-wheels, which improvements are fully set forth and explained in the following specification and claims.

Referring to the drawings, and in the first instance to the parts forming the wheel, E E are a pair of disks or circular plates arranged a short distance apart and secured on shaft P, which is a drive-shaft having secured thereon a drive-pulley H. The disks E are connected at their peripheries at regular intervals or spaces apart with the cross-bars J.

r are buckets arranged between the cross-bars J and extending from the peripheries of said disks toward their center and formed as shown in Fig. 1.

G are gates for opening and closing the entrance to said buckets. One side of said gates is hinged on the cross-rods V, located across the mouth of the buckets at the forward side with relation to the rotation of the wheel. The rear or opposite end of said gates are intended to rest on the latches o when the gates close the buckets. The latch for operating with said gates is shown in perspective in Fig. 3, and only one of said latches is shown in Fig. 2. This latch consists of the shaft n, having on its outer end the T-arm W, and having at about its center the arm o, having its outer end bent at right angles and extending into the bucket r through an ori-

fice in the rear side of the bucket and extending under the free end of the gate.

S and S' are pins or projections secured to some part of the frame, and are for the purpose of being engaged by arm W of the latch to move it in and out of the bucket.

B is the flume for conducting water to the wheel. The rear wall or side of the flume extends around under the wheel to a line perpendicular with its central shaft P and to the line of the front side of the flume, so that the water will not discharge until carried beyond said perpendicular line. The wheel turns in the direction of the arrow, and as it turns the buckets pass into the flume to be filled. The gates G are for the purpose of preventing water from filling the buckets until the bucket is entirely within the flume. Looking at Fig. 1 a bucket is shown as having just entered the flume. It is intended that when the said bucket is entering the flume its gate will be held up so as to close the mouth of the bucket by means of the latch o, so that water cannot enter the bucket until the gate falls down to the position shown by the broken lines. This is accomplished by means of the outer-extending end of arm W coming in contact with the projecting pin S just at the instant the bucket has entered the flume, so that all the bucket is within the flume. Such contact of arm W with pin S will partially rotate shaft n and draw latch B from under the gate and cause it to fall, so that the bucket may fill with water. Openings or perforations Z are made in the side of the bucket under the gate, so that the air in the bucket may quickly escape when the gate is falling within the bucket. A strip of leather a or other suitable substance is secured to the forward side of the flume and extends under and between it and the wheel, as shown, to prevent escape of water between the flume and wheel at that place. After the gate falls within the bucket and the bucket fills with water, as stated, the water is retained within the bucket until the bucket passes the lower end of the curved floor E', and the gate retains its position within the bucket until it passes said point, when the rotation of the wheel causes the gate to turn on its hinge and fall out of the bucket, immediately following which the inner

end of arm W engages the projecting pin S' and moves latch into the bucket and supports the free end of the gate until released again by means of the outer end of arm W, being engaged by pin S and withdrawing said latch, as before described. By such construction it becomes possible to pass the buckets into the flume without waste of water at the point of entering the flume, and one-half of the buckets are kept full of water, so that the wheel is assisted in its revolution by the weight of water filling its buckets on one side, as well as by the weight of water in the flume.

It is intended that the wheel shall fit the flume close enough to practically make an airtight joint between them, so that when the wheel is in operation water cannot escape between the wheel and flume.

The wheel is of course adapted to any use to which any such wheel may be applied, and forms a very cheap, durable, and effective wheel for the purpose.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows, to wit:

1. The water-wheel shown and described, consisting of the combination of the disks E E, forming the sides of the wheel, shaft P, passing centrally through said disks, buckets r, arranged between said disks near their peripheries and having vent-holes Z, gates G

for closing said buckets, and latches W o n for operating said gates, all arranged to operate substantially as and for the purpose set forth.

2. The combination of the water-wheel having the peripheral buckets r, gates G for closing said buckets, latches W o n for operating said gates, the flume B, having the curved portion E', for partially inclosing the periphery of the wheel, and the pins S S' for alternately engaging said latches, substantially as and for the purpose set forth.

3. In a water-wheel, the combination of the buckets r, having the vent-holes Z, gates G for closing said buckets, and latches W o n for operating said buckets, substantially as and for the purpose set forth.

4. The combination, with the flume B, having the curved portion or bottom E' for partially inclosing the periphery of the wheel, the jacking-strip a, arranged between the flume and wheel, the wheel having the peripheral buckets r, the gates G for closing said buckets, and the latches W o n for operating said gates, substantially as and for the purpose set forth.

FRED. LUNDBERG.

Witnesses:

A. C. ARNTSON,  
J. M. ARNTSON.