

J. B. Caldwell, Water Wheel

N^o 32,409.

Patented May 28, 1861.

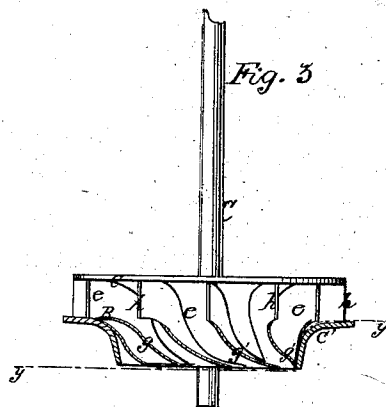
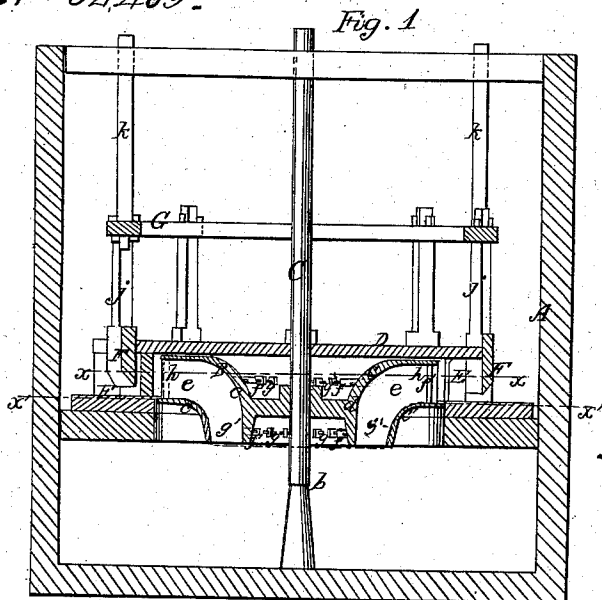


Fig. 2

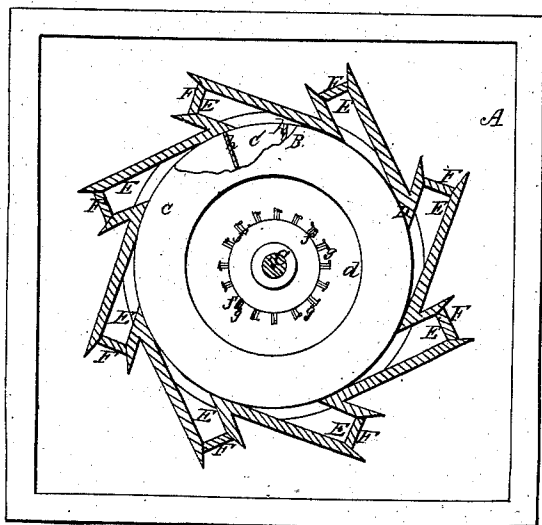
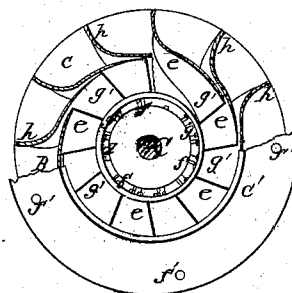


Fig. 4



Witnesses:
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per Munnell
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UNITED STATES PATENT OFFICE.

J. B. CALDWELL, OF CHAMBERSBURG, PENNSYLVANIA.

WATER-WHEEL.

Specification of Letters Patent No. 32,409, dated May 28, 1861.

To all whom it may concern:

Be it known that I, J. B. CALDWELL, of Chambersburg, in the county of Franklin and State of Pennsylvania, have invented
5 a new and Improved Water-Wheel; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in
10 which—

Figure 1— is a vertical central section of my invention. Fig. 2— a horizontal section of the same taken in the line x, x , Fig. 1—
15 Fig. 3— a detached side sectional view of the wheel, x', x' , Fig. 1— indicating the plane of section. Fig. 4— an inverted sectional plane of the same, taken in the line y, y , Fig. 3— and looking upward.

Similar letters of reference indicate corresponding parts in the several figures.

To enable those skilled in the art to fully understand and construct my invention I will proceed to describe it.

A, represents a penstock in which my improved wheel B, is placed said wheel being
25 on a vertical shaft C, the lower end of which is stepped at the bottom of the penstock as shown at b , in Fig. 1.

The wheel B, is formed of two circular
30 curved plates or heads c, c' , the form of which may be seen clearly in Fig. 1.

The central part of the upper head c , forms the hub d , of the wheel its outer surface having the buckets e , attached to it as follows. Each bucket is provided at
35 its inner edge with two tangs f, f , which project horizontally through the hub and have keys or pins g , passing through their inner ends, as shown in Figs. 1 and 2.

The inner surface of the head c' , corresponds in form with the outer surface of the head c , as shown clearly in Fig. 1, and the buckets e , are secured between the two heads, the latter being connected by screw bolts f' .
45 The buckets e , are so curved or formed as to be in contact with the inner surfaces of both heads c, c' , and they also have a spiral twist given them at their lower parts as shown at g' . The upper parts h , of the
50 buckets have a radial or nearly radial position as shown clearly in Fig. 4.

From the above description it will be seen that in case of a bucket being broken or injured it may be readily detached and a

new one inserted in its place, as all that is
55 required to be done is to lower the keys of the injured bucket, detach it from the wheel and insert another in its place. This is an important feature of the invention for
60 usually this class of wheels are constructed of cast-metal and cast entire and when a bucket is broken the wheel is irreparably injured.

The wheel B, is fitted within a box D, which rests on a horizontal partition i , in
65 the penstock. The sides of the box D, are formed of a series of chutes E, which have a tangential position relatively with the wheel B, as shown clearly in Fig. 2. There is a chute E, for each bucket e , and each
70 chute is provided with a gate F, which opens and closes in a vertical plane. The gates F, are connected by rods j , to a band or ring G, which has two uprights k, k , attached to it to which power may be applied
75 by any proper means for the purpose of elevating and lowering the gates F, the latter of course all moving simultaneously. By this arrangement it will be seen that the
80 water is admitted directly to each bucket e , and the water will be much less obstructed in its passage to the wheel than by the use of the ordinary scroll which conducts the
85 water all around the wheel. The water strikes the upper parts h , of the buckets e , at right angles and acts by impact, the reacting force being obtained by the passing
90 down of the water over the lower spiral portions g' .

I do not claim broadly the invention of
90 the tangential chutes and their adjustable gates; nor do I claim, separately, the spiral form of the buckets; but,

Having thus described my invention what I claim as new and desire to secure by Let-
95 ters Patent: is,

The particular arrangement herein shown and described of the two heads c, c' , with each other and with the buckets e , box D, and shaft C, when the said heads and
100 buckets are constructed in the peculiar form and united together in the peculiar manner herein set forth.

J. B. CALDWELL.

Witnesses:

P. HAMMAN,
G. W. BITNER.