

J. J. Kimball

Water Wheel,

N^o 44,201.

Patented Sep. 13, 1864.

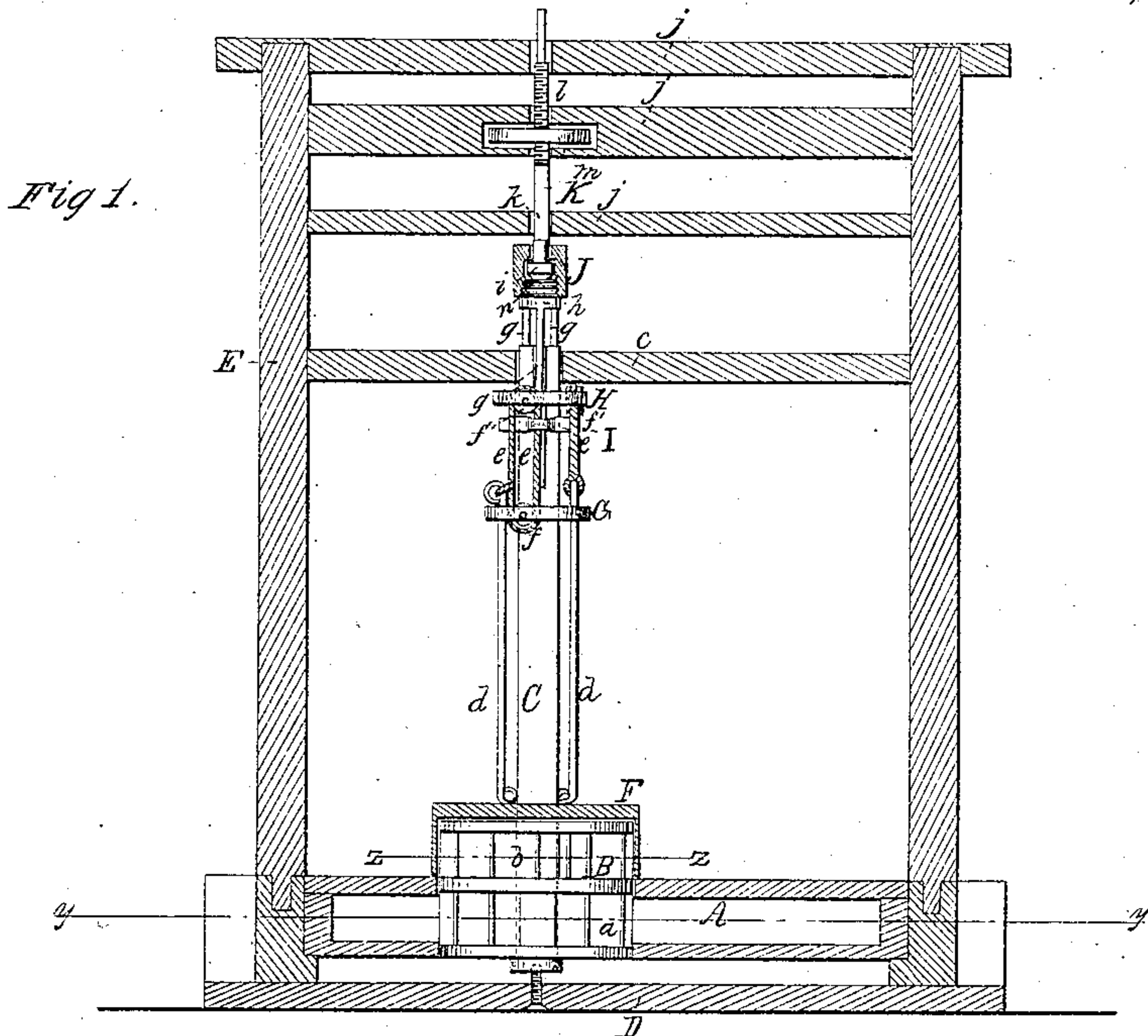


Fig 3.

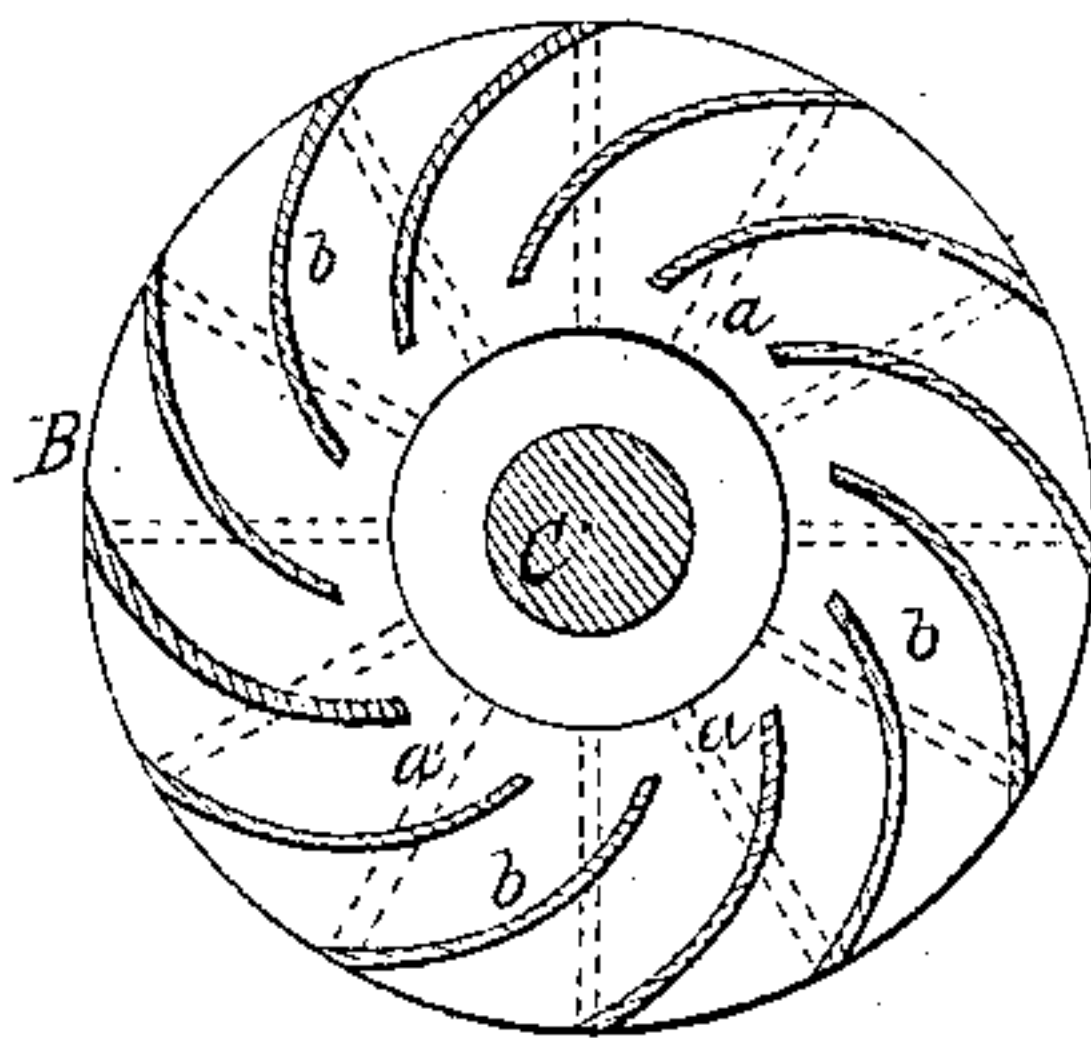
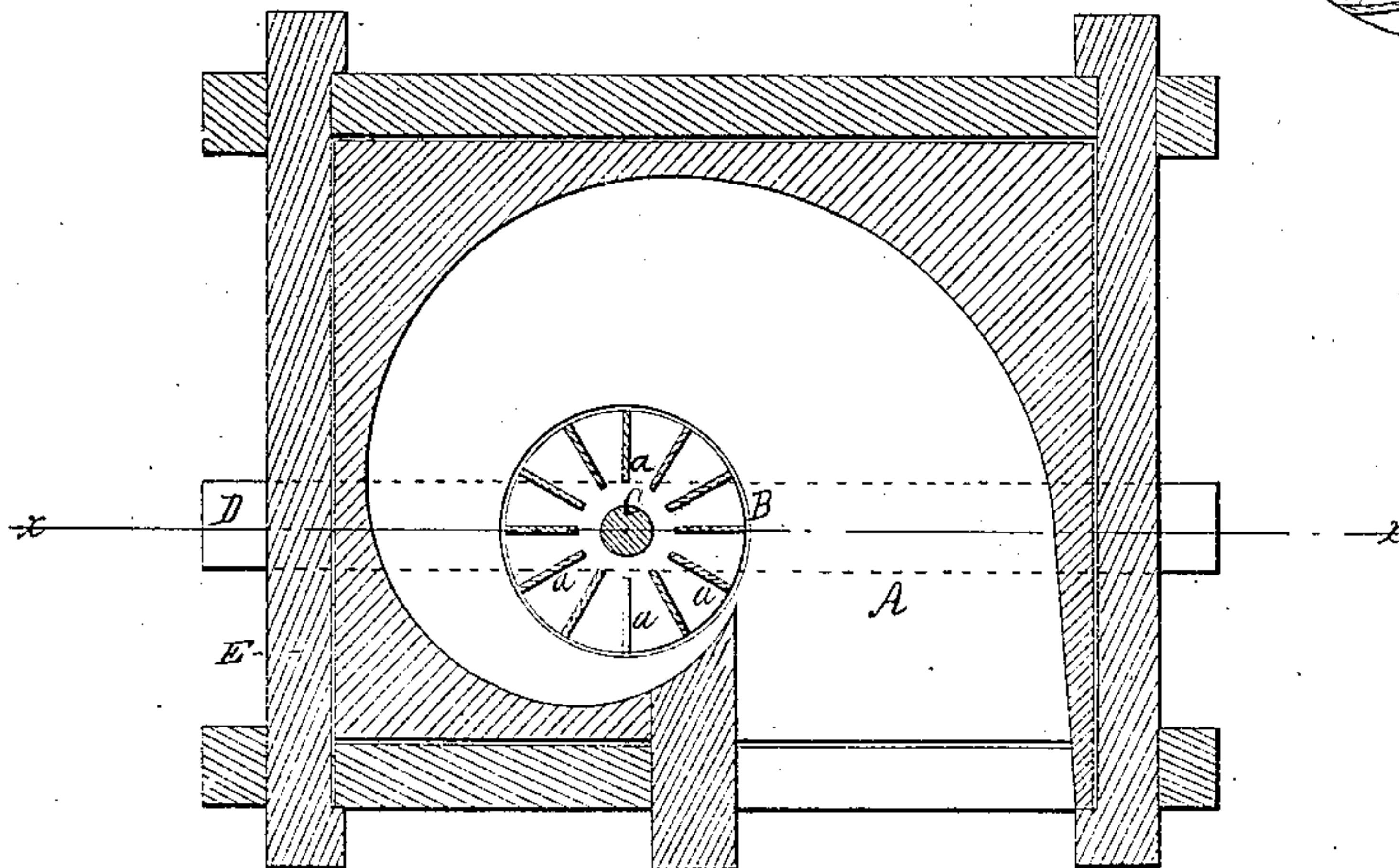


Fig 2.



Witnesses.

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*Att'y**

UNITED STATES PATENT OFFICE.

JOHN J. KIMBALL, OF NAPERVILLE, ILLINOIS.

IMPROVED WATER-WHEEL.

Specification forming part of Letters Patent No. 44,201, dated September 13, 1864; antedated April 15, 1864.

To all whom it may concern:

Be it known that I, JOHN J. KIMBALL, of Naperville, in the county of Du Page and State of Illinois, have invented a new and Improved Water-Wheel; and I do hereby declare that the following is full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a vertical section of my invention, taken in the line $x x$, Fig. 2; Fig. 2, a horizontal section of the same, taken in line $y y$, Fig. 1; Fig. 3, an enlarged horizontal section of the wheel, taken in the line $z z$, Fig. 1.

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

This invention relates to certain improvements in that class of water-wheels which are placed on vertical shafts, and are commonly termed "horizontal water-wheels."

The invention consists in a novel construction of the wheel, the same being provided with two sets of buckets, one set being straight and having a radial position in the wheel, and the other set being curved, and using in connection with the wheel thus constructed a scroll peculiarly arranged and a gate operated in a novel way, as hereinafter fully set forth, whereby it is believed that several advantages are obtained over the ordinary horizontal wheels in use.

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

A represents the scroll of the wheel, which gradually decreases in width from its outer end or orifice to its inner end, and which completely encircles the wheel B, as shown in Fig. 2. The wheel B is quite small in diameter, compared with the width and capacity of the scroll, so much so as to admit of the wheel being encompassed by a considerable volume of water. The wheel B is provided with two sets of buckets, $a b$, the lower set, a , being straight, having a radial position, and extending upward about one half the height of the wheel, the other set, b , being curved and placed directly over the straight radial buckets a . This will be fully understood by referring to Fig. 3, in which the straight radial buckets a are indicated by dotted lines, and

the curved buckets indicated in blue tint. The lower buckets, a , are fitted within the scroll A, the buckets b being above it, as shown in Fig. 1. The shaft C has its lower end stepped in a bridge-tree, D, underneath the scroll A, and the upper end of said shaft has its bearing in a cross-bar, e , of a framing, E.

F represents the gate of the wheel, which is of cylindrical form and encompasses the upper part of the wheel above the scroll A. This gate has three rods, d , attached to it near the shaft C, and these rods extend up through a plate, G, attached to the shaft C, and are each connected at their upper ends to a cord or chain, e . These cords e pass around pulleys $f f'$, the pulleys f being in the plate G, and the pulleys f' being in a similar plate, H, attached to the shaft C some distance above the plate G. The cords e are attached to a plate, I, which is allowed to slide freely on shaft C, and has three rods, g , attached to it, which are fitted in grooves in the shaft C, and are connected at their upper ends to a hub, h , which is screwed into the lower end of a collar, J, which serves as an oil-cup and rests on a shoulder or boss, i , at the lower part of a rod, K, the latter passing through cross-bars $j j j$ in the framing E, and having its lower part, k , square, to prevent its turning in the framing E, and its upper part has a screw, l , cut upon it, on which a nut, m , is fitted. The lower end of the rod K is made of pointed or conical form, and is fitted in the hub h , as shown at n in Fig. 1.

The operation is as follows: The water enters the scroll A, and acts against the buckets a , spending its direct force upon said buckets, and it then reacts against the buckets b in the upper part of the wheel, and passes off uninterruptedly over the top of the scroll A. By this arrangement the wheel is operated under the full and entire head of water for the lower half. The buckets a are inclosed against the surrounding tail-water, and when the tail or back water is just to the height of the lower edges of the upper buckets, b , then the wheel has just the full head of the water, and if the wheel be set lower into the tail-water it in effect neither gains nor loses head, for the back-water in that case would be compensated for by the increased head; and hence, to prevent freezing,

the wheel and scroll may be set to any desired depth in the tail-water or tail-race. The wheel, it will be seen, will give out power in proportion only to the amount of water discharged through the upper buckets, *b*, and hence the advantage of the gate *F*, the whole power of the wheel being under its control, and always giving power in proportion to the amount of water discharged, and when working under much back-water enough more head-water may be used to compensate for the difference in the effective head, and when there is no back-water, and the head is full, a less amount of water will yield the desired power; hence, also, the wheel may be used to drive more or less machinery, and when a variable power is required may be readily managed and controlled through the medium of the gate *F*, when the wheel is in motion.

The gate *F*, arranged as shown and described, causes by its own weight the hub *h* to bear against the point or lower end of the rod *K*, and as the rod *K* is stepped in the collar or oil-cup *J* the former will always be kept properly lubricated, and by turning the nut *m* the rod *K* is carried up or down, and with it the collar or oil-cup *J*, connecting rods *d*, and gate *F*. If the cords or chains *e* and pulleys *f f'* were not employed and arranged as shown, and the rods *d* attached directly to the hub *h*, the shoulder or boss *i*

on rod *K* would sustain the whole weight of the gate, and it would soon be worn away, and if only the upper set of pulleys, *f'*, were used, they would carry the gate upward, but not back, but with the two sets of pulleys *f f'*, arranged as shown, with the cords or chains *e*, rods *d*, plate *I*, and rods *g* the gate will be carried both up and down.

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

1. The wheel *B*, provided with two sets of buckets, *a b*, the former, *a*, being straight and at the lower part of the wheel, and having a radial position, and the buckets *b* being curved and directly over the buckets *a*, in connection with the scroll *A*, extending upward so as to inclose the lower buckets, *a*, of the wheel, substantially as and for the purpose set forth.

2. Operating the cylindrical gate *F* through the medium of the rods *d*, plates *G H*, pulleys *f f'*, cords or chains *e*, plate *I*, rods *g*, collar or oil-cup *J*, and the rod *K* and nut *m*, or their equivalents, all arranged as set forth.

JOHN J. KIMBALL.

Witnesses:

W. M. SIMMONS,
JAMES SIMMONS,
JOHN POWERS.