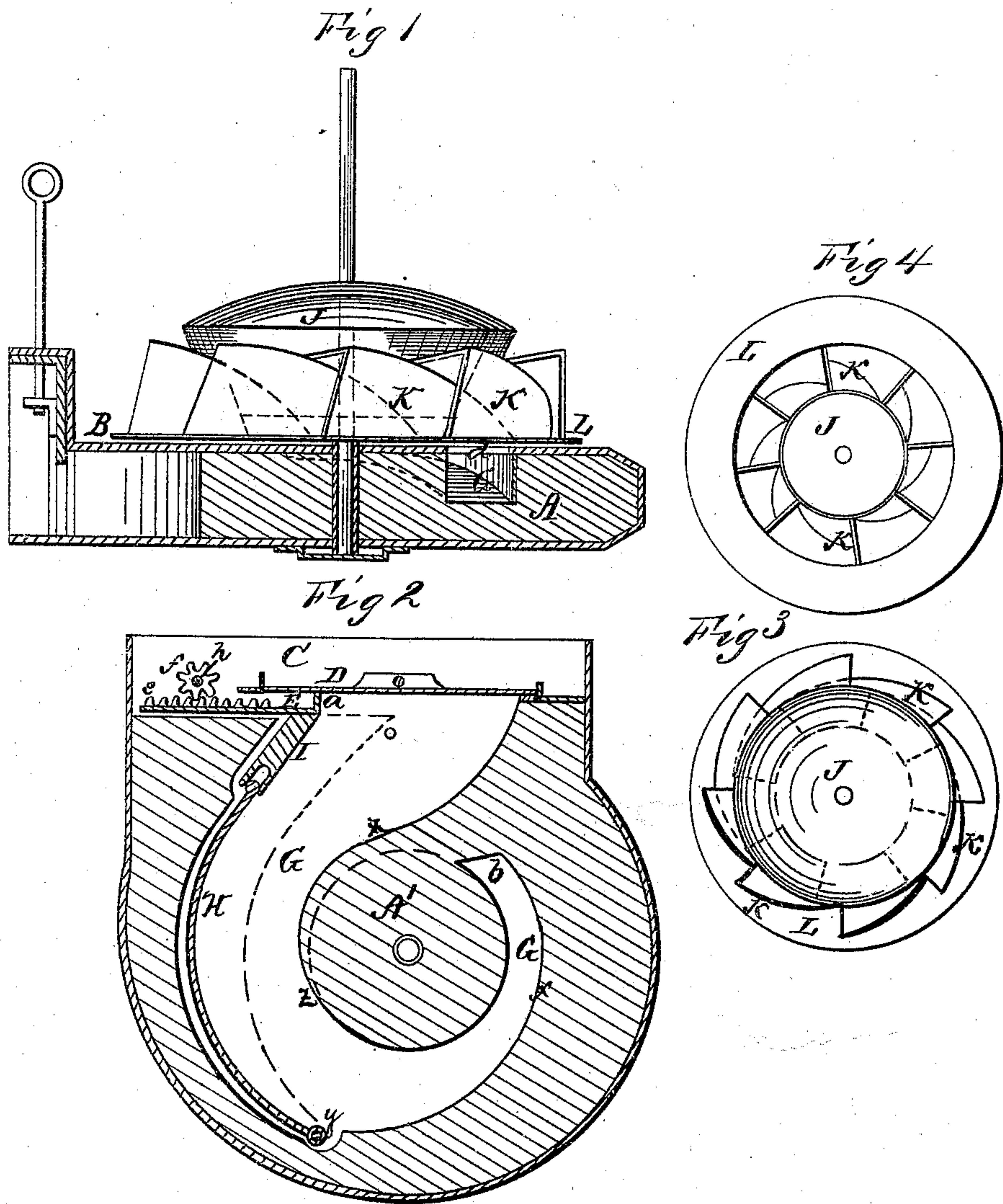


2 Sheets--Sheet 1.

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Water-Wheels.

No. 147,357.

Patented Feb. 10, 1874.



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Fig 5

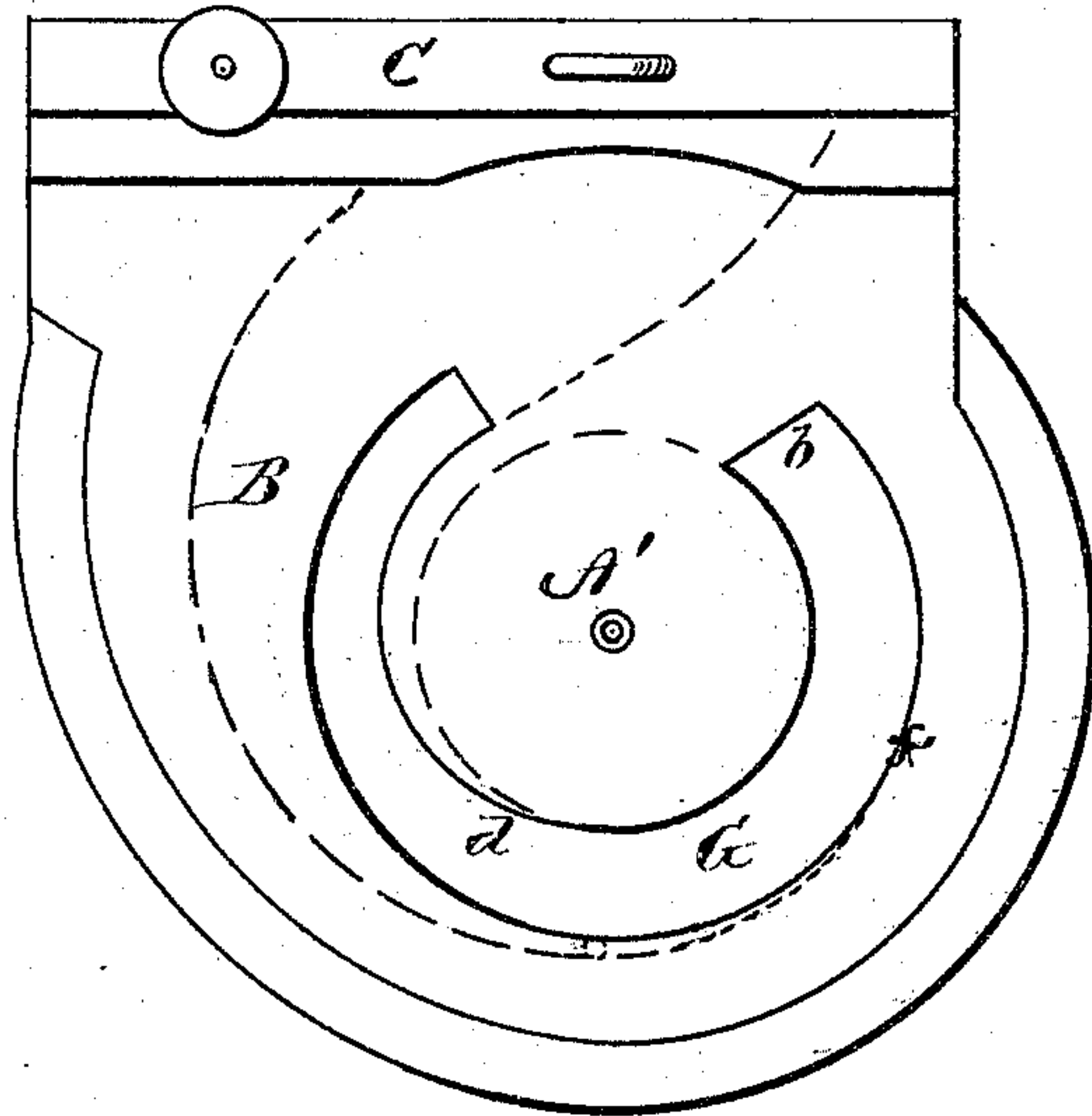
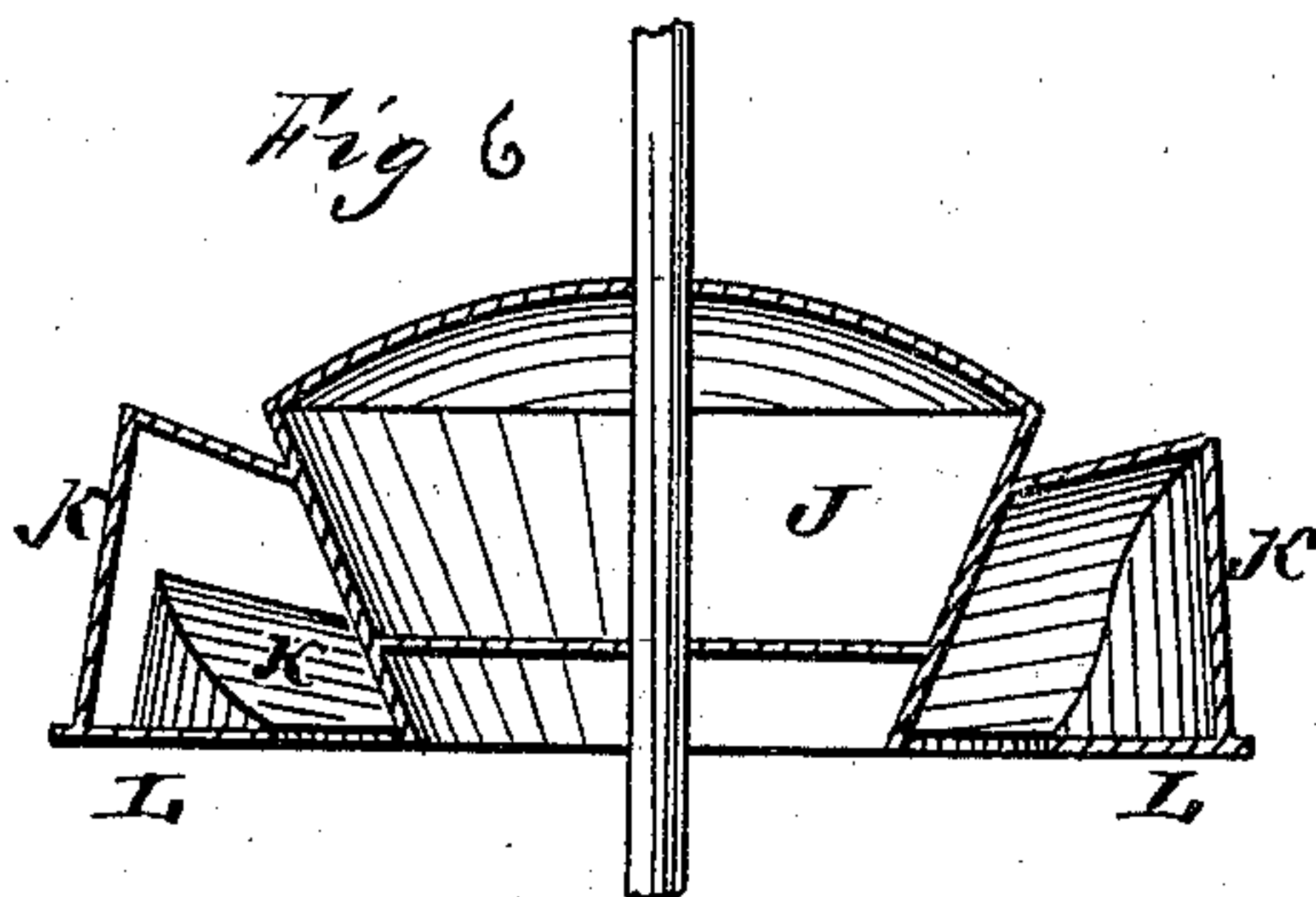


Fig 6



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# UNITED STATES PATENT OFFICE.

JOHN L. BEERS, OF COCOLAMUS, PENNSYLVANIA.

## IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. 147,357, dated February 10, 1874; application filed December 20, 1873.

*To all whom it may concern:*

Be it known that I, JOHN L. BEERS, of Cocolamus, in the county of Juniata and in the State of Pennsylvania, have invented certain new and useful Improvements in Water-Wheels; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon, making a part of this specification.

The nature of my invention consists in the construction and arrangement of a water-wheel and scroll, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawings, in which—

Figure 1 is a vertical section of the scroll, with a side view of the wheel. Fig. 2 is a horizontal section of the scroll. Fig. 3 is a plan view, and Fig. 4 a bottom view, of the wheel. Fig. 5 is a plan view of the scroll. Fig. 6 is a longitudinal section of the wheel.

A represents the body of the scroll, which may be made of wood or metal, as desired; but I prefer to use wood, and in that case the upper surface is covered by a metal plate, B. At the rear of the scroll A is a frame, C, within which is a vertically-sliding gate, D, for closing the entrance to the scroll. This gate bears at one end against the body of the scroll, and at the other end against a flange, *a*, projecting from a slide, E. The slide E is moved out and in, as will be hereinafter described, and its flange *a*, at all times, forms a bearing for the gate D, so that the pressure of the water will keep the gate tight. The water-passage G in the scroll gradually diminishes in width from the entrance to its extreme end, and is gradually ascending to said end *b*, the water acting upon all the buckets of the wheel, but one, at all times. This water-passage is partially covered by the plate B, in which is a curved opening, *d*, allowing the water to pass from the scroll to the wheel. This opening *d* is constructed as shown in Fig. 5, to increase in width in the same direction as the water-

passage diminishes, so that at or about the point *x* the two become equal. By this construction of the water-passage and opening through which the water enters the wheel, the force of the water is perfectly equalized from one end of the scroll-passage G to the other. H represents a gate within the water-passage G, hinged at *y*, and its other end inserted in a forked arm, I, attached to the inner side of the slide E at or near its inner end. The gate H moves under the plate B at all times, and is operated by the slide E, to contract or enlarge the entrance to and a part of the water-passage G, thereby regulating the amount of water passing in according to the speed desired, or the amount of machinery to be driven. The slide E is, on its outer side, provided with a rack-bar, *e*, into which gears a pinion, *f*, on a vertical shaft, *h*, and this shaft is to be connected with an ordinary governor, so as to regulate the slide E and gate H automatically. By means of the arm I, which forms the connection between the slide E and the gate H, the end of the gate H can be moved to a certain point without moving the slide any greater distance, and hence the entrance to the scroll-passage G can be made considerably less in width than if the gate was attached directly to the slide. The center part A' of the scroll is not made on a true circle, but has a swell or eccentric from *z* to *z*, as shown in Fig. 2. The wheel is composed of a hub, J, a series of buckets, K K, and a rim, L. The hub J is in the form of an inverted cone, to the sides of which the buckets are attached. The buckets are curved, as shown, at the top and outside, the smaller lower end of each bucket passing into the larger front or upper end of the next bucket, and the outer curved sides of the buckets resting upon the rim L. The hub J and rim L are of such relative size that the upper edge of the hub will be perpendicularly above and on a line with the inner edge of the rim, whereby a proper curvature of the bucket is obtained, so that the water will form a perfect percussion, and act both against the top and side of the bucket, its entire force being spent and exerted on the bucket before it is discharged from the same.

Having thus fully described my invention,

what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the scroll A, with gradually-diminishing water-passage G, the covering-plate B, with gradually-increasing aperture *d*, and the gate H within the water-passage and under the covering-plate, all substantially as and for the purposes herein set forth.

2. The slide E, provided with the flange *a*,

in combination with the gate D, as and for the purposes described.

In testimony that I claim the foregoing I have hereunto set my hand this 20th day of December, 1873.

JOHN L. BEERS.

Witnesses:

C. L. EVERT,

A. N. MARR.