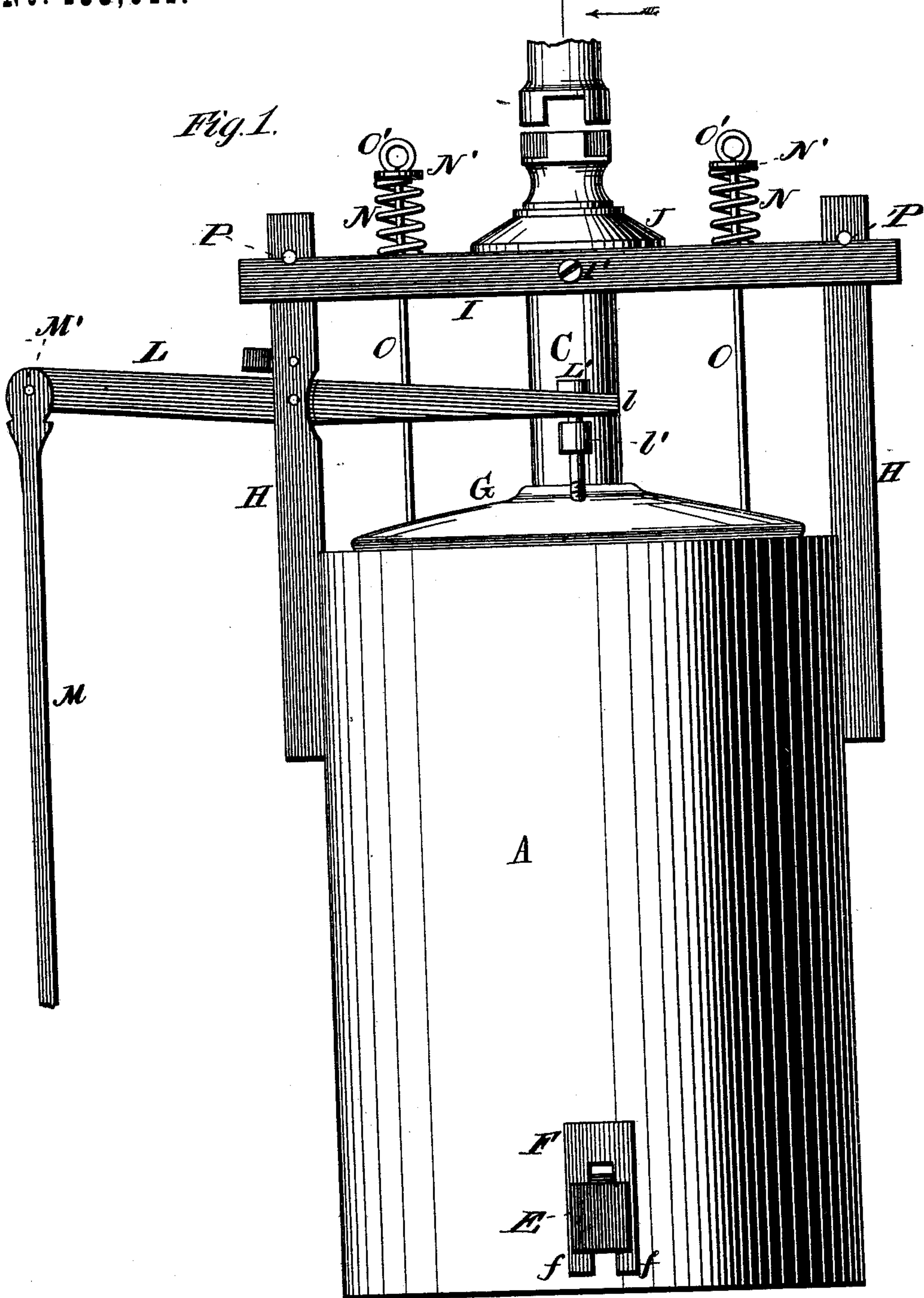


S. C. HUMPHREYS.
WATER-WHEEL.

No. 188,911.

Patented March 27, 1877.



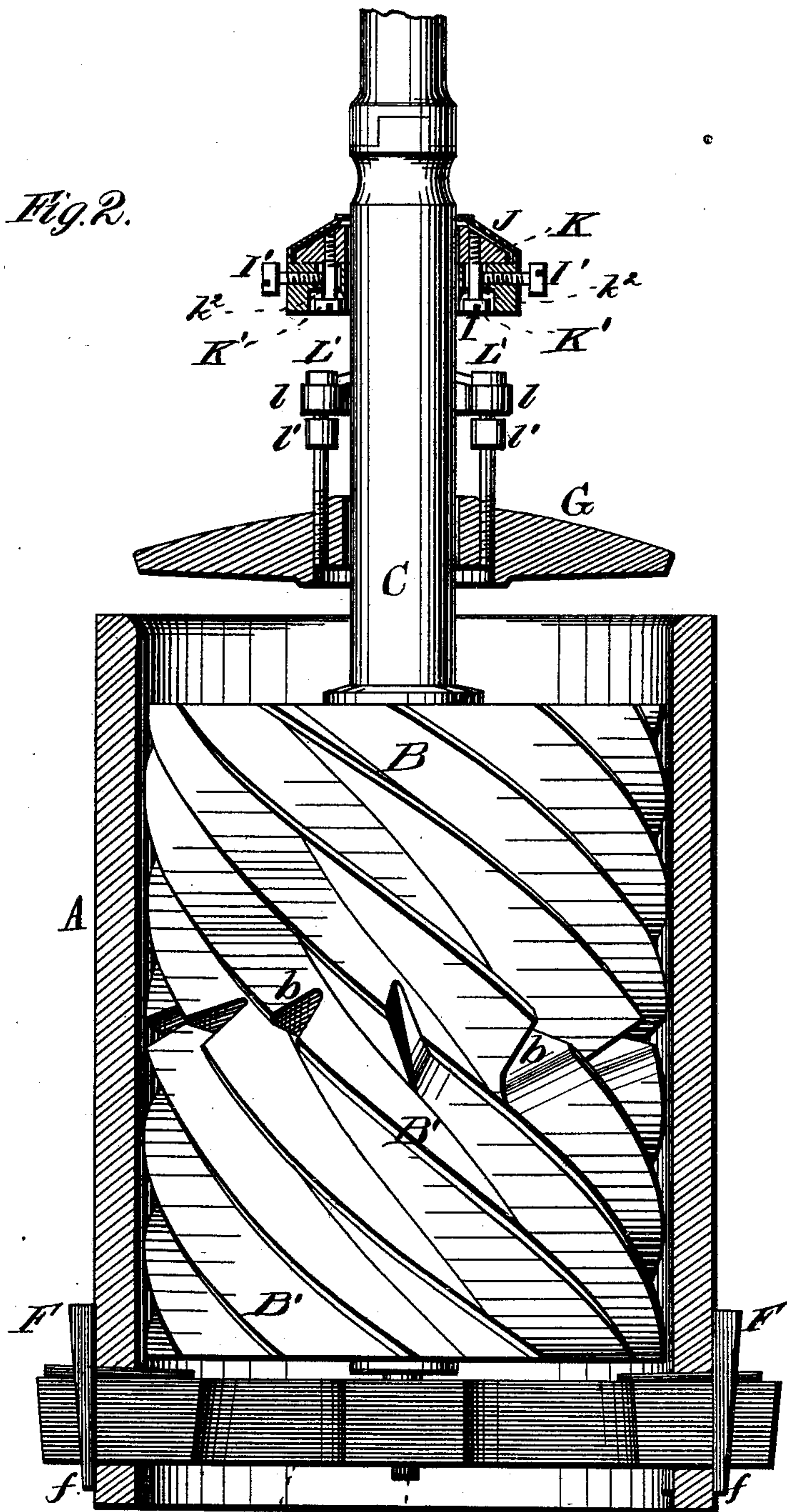
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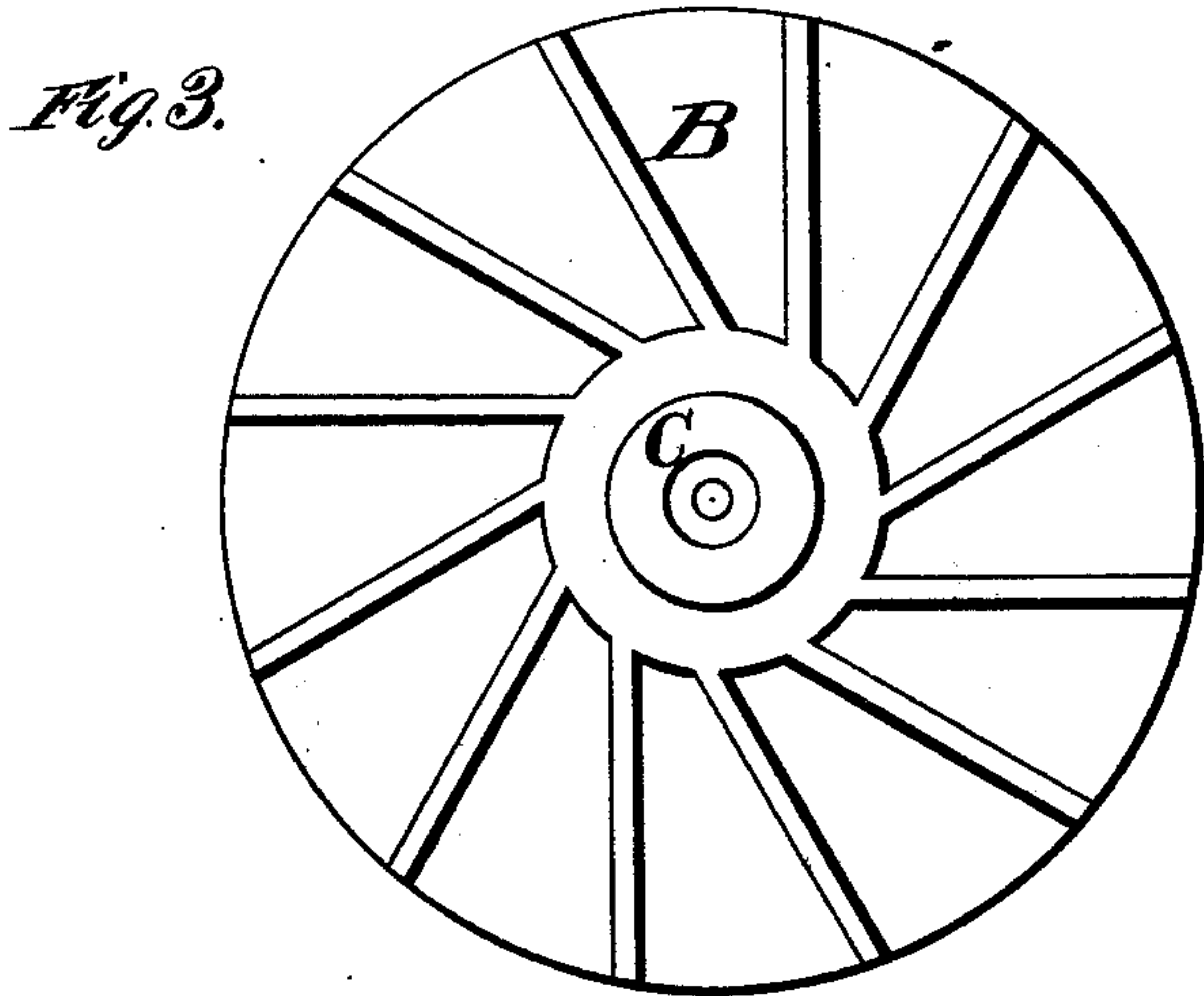


Fig. 4.



Fig. 5.

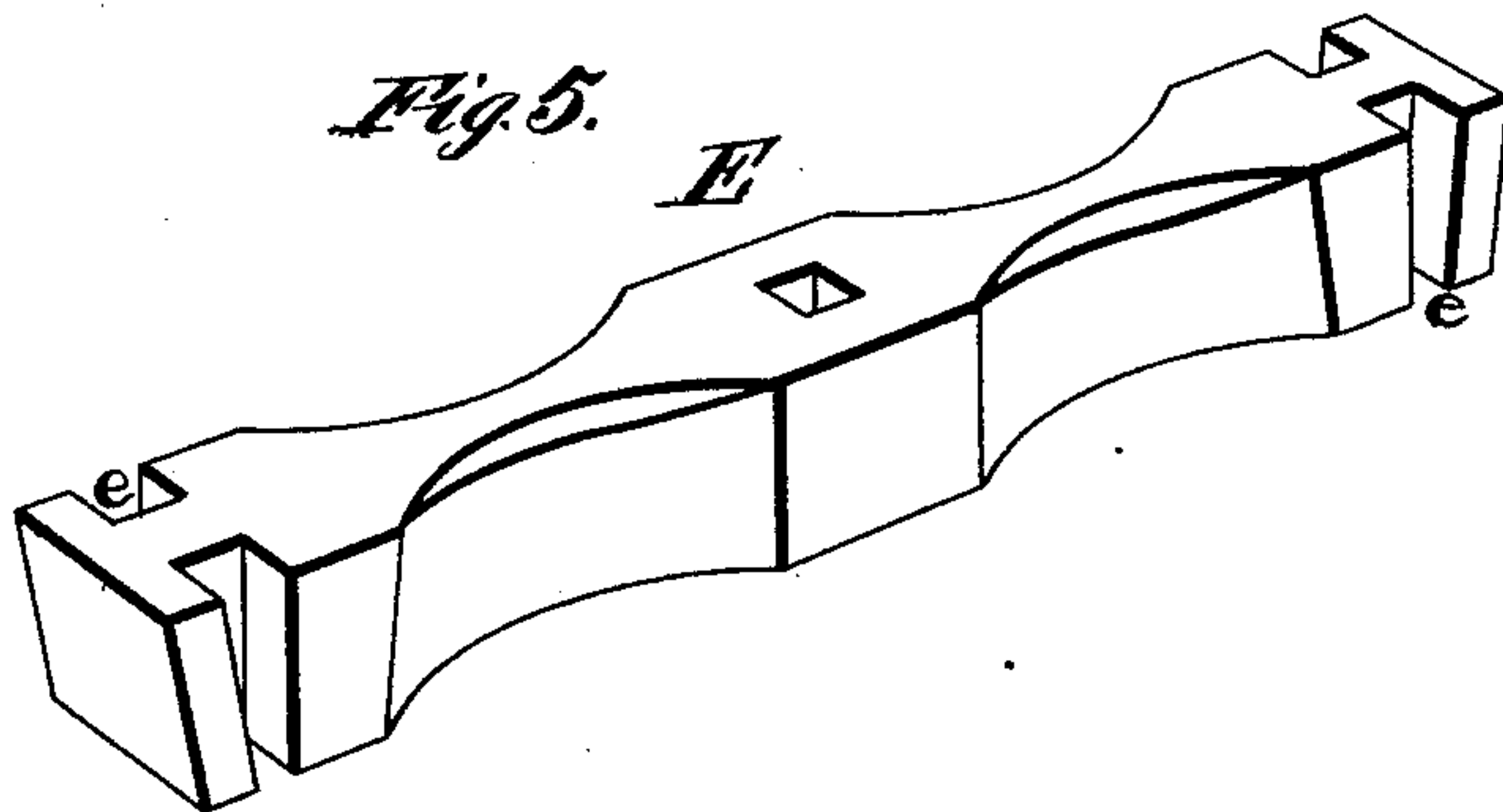
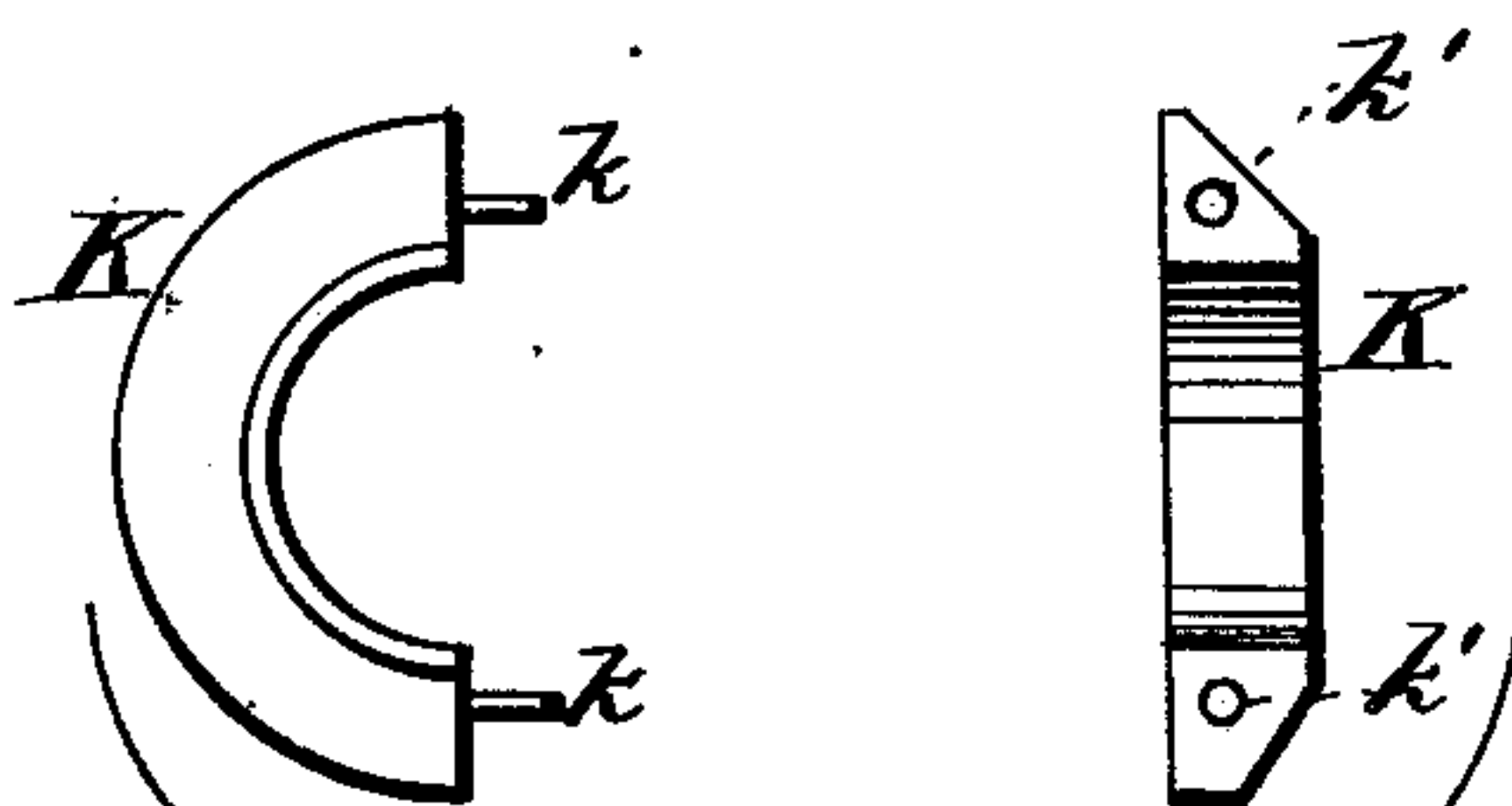


Fig. 6.



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UNITED STATES PATENT OFFICE.

SAMUEL C. HUMPHREYS, OF INDIAN CREEK, WEST VIRGINIA.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. 185,911, dated March 27, 1877; application filed December 9, 1876.

To all whom it may concern :

Be it known that I, Dr. SAMUEL C. HUMPHREYS, of Indian Creek, in the county of Monroe and State of West Virginia, have invented a new and valuable Improvement in 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, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a side elevation of my water-wheel, and Fig. 2 is a central vertical sectional view thereof. Fig. 3 is a bottom view of my wheel; and Figs. 4, 5, and 6 are detail views of the same.

This invention relates to water-wheels.

The nature of said invention consists, principally, in the construction of a water-wheel provided with a number of helical flanges which are notched or divided, so as to allow the passage of water vertically from one to another of said flanges, as hereinafter set forth.

It also consists in various auxiliary devices and combinations, hereinafter described.

In the accompanying drawings, A designates a cylindrical casing, within which rotates on a vertical axis a water-wheel, B, the shaft C of which wheel has its lower bearing in a detachable step or ink, D. (Shown in detail in Fig. 4.) Said ink D is supported by means of a bridge, E, which extends across and through casing A, near the lower end thereof. Said bridge, as shown in detail in Fig. 5, is recessed on both sides at *e e*, near both extremities. Said recesses are located outside of said casing A, when said bridge is in position to support shaft C, and they receive the bifurcated lower ends *f f* of wedges or keys F F, which hold said bridge in shape.

Said wheel B is provided with a number of helical flanges, blades, or buckets, B' B', the upper edges of which are wedge-shaped or beveled, so as to admit the water from above within said flanges with little resistance. Each one of said flanges or blades is deeply notched or cut at *b*, so as to allow the water, or a portion thereof, to fall through upon the

blade or flange next below at said point, thus giving an additional impulse to the wheel B. These notches or openings *b* are made about the middle of said blades or flanges.

The water is cut off from said wheel B, or let in thereon, by means of a disk-shaped gate, G, which forms the head of said cylindrical casing A when closed. Said gate is perforated in the middle to allow the passage of the upper part of shaft C, on which said head or gate G slides vertically when being opened or closed.

H H designate two vertical standards, secured to the outside of casing A opposite to one another, and rising above the same. Said standards support a cross-beam or cross-bar, I, which is perforated in the middle to allow the passage of shaft C. To said cross-beam I, on the upper side thereof, and around the said middle perforation, is attached an annular upwardly and inwardly inclined metal shell, J, which incloses two semi-annular bearing-blocks, K. (Shown in detail in Fig. 6.) Said blocks K K are secured together by means of dowel-pins *k k* on one of them, and corresponding recesses or sockets *k' k'* on the other. They constitute the upper bearing of said shaft.

L designates a lever of the first kind, which is pivoted to one of said standards H, and is bifurcated at its inner end, so as to form slightly-diverging arms *l l*, which are attached by headed rods or bolts L' L' to the upper side of gate G. On said headed rods or bolts are fixed collars *l' l'*, against which the arms *l l* strike to depress and close said gate. The perforations in said arms *l l*, through which said bolts L' L' pass, are made sufficiently large to prevent binding. Said bolts or rods L' are preferably screw-threaded, so as to be adjustable vertically.

To the outer end of lever L a staff or arm, M, is hung by a flexible joint, M', so that it can be operated conveniently from several points at a greater or less distance from the base of cylindrical casing A.

Gate G is prevented from jarring in its descent by springs N N on the upper side of cross-bar I. On the tops of said springs rest disks or washers N' N', from which two rods, O O, extend down through said springs and

cross-bar to said gate. Said rods are provided at their tops with eyes or enlargements O' O'. Said rods O O may be attached to said disks or washers N', or may work through them, as preferred. These springs N N assist in raising gate G, and prevent it from closing with a jar.

The semi-annular bearing-blocks K K, hereinbefore described, are secured to the top of cross-bar I by means of binding-screws K' K', which pass up through said cross-bar, and enter said blocks K K from below. The holes $k^2 k^2$ in said cross bar I, through which said screws pass, are elongated, so as to allow them to be moved toward or from shaft C by adjusting-screws I' I', which pass through the sides of said cross-bar I, and bear against said binding-screws K' K'. By means of said screws I' I' said semi-annular blocks are adjusted toward one another, so as to take up wear. The dowel-pins $k k$ may both be attached to one block, or both to the other; or one of said pins may be attached to each one of said blocks.

The standards and cross-bar hereinbefore described are attached together by tenons and mortises, and transverse rods or pins P P. Any other known form of suitable fastening may, however, be employed instead.

Various other changes may be made without departing from the spirit of my invention.

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

1. A water-wheel provided with helical flanges or blades, which are notched or cut transversely, so as to allow the water to fall from one flange to another, substantially as set forth.

2. The combination of semi-annular bearing-blocks K K with adjusting-screws I' I', attaching-screws K' K', and cross-bar I, having elongated holes $k^2 k^2$, substantially as set forth.

3. The combination of bearing-blocks K K with shell J and adjusting-screws, substantially as set forth.

4. The combination of loosely-hinged staff or operating-arm M, bifurcated lever L, rods or bolts L' L', and gate G, substantially as set forth.

5. The combination of lever L, having longitudinally-slotted arms $l l$, with headed rods or bolts L' L', having collars $l' l'$, substantially as set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

DR. SAMUEL CABOT HUMPHREYS.

Witnesses:

DANIEL BOON,
JOHN W. FRANCIS.