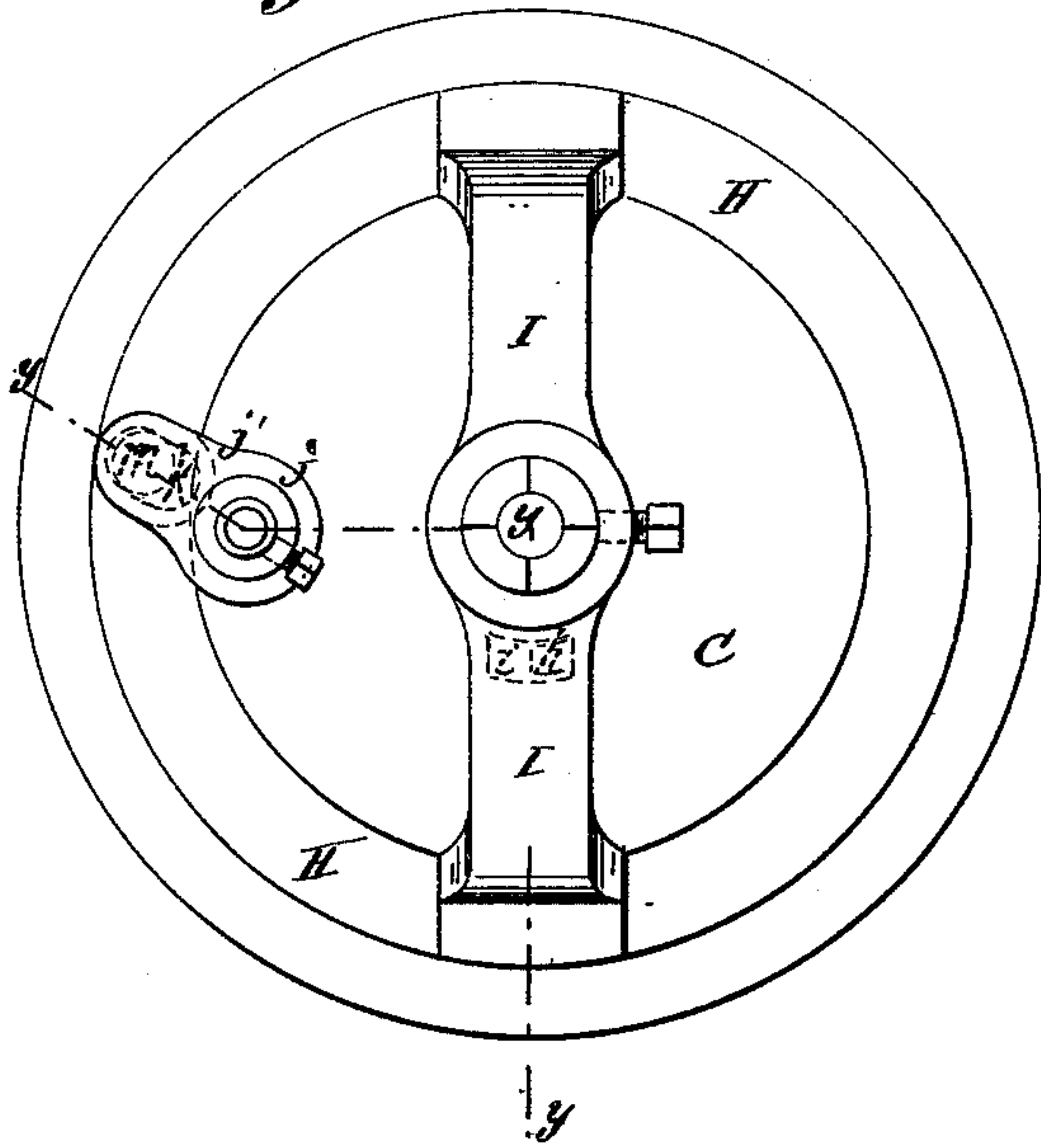


I. MALLERY.
Turbine Water-Wheel.

No. 218,295.
Fig. 1



Patented Aug. 5, 1879.
Fig. 2

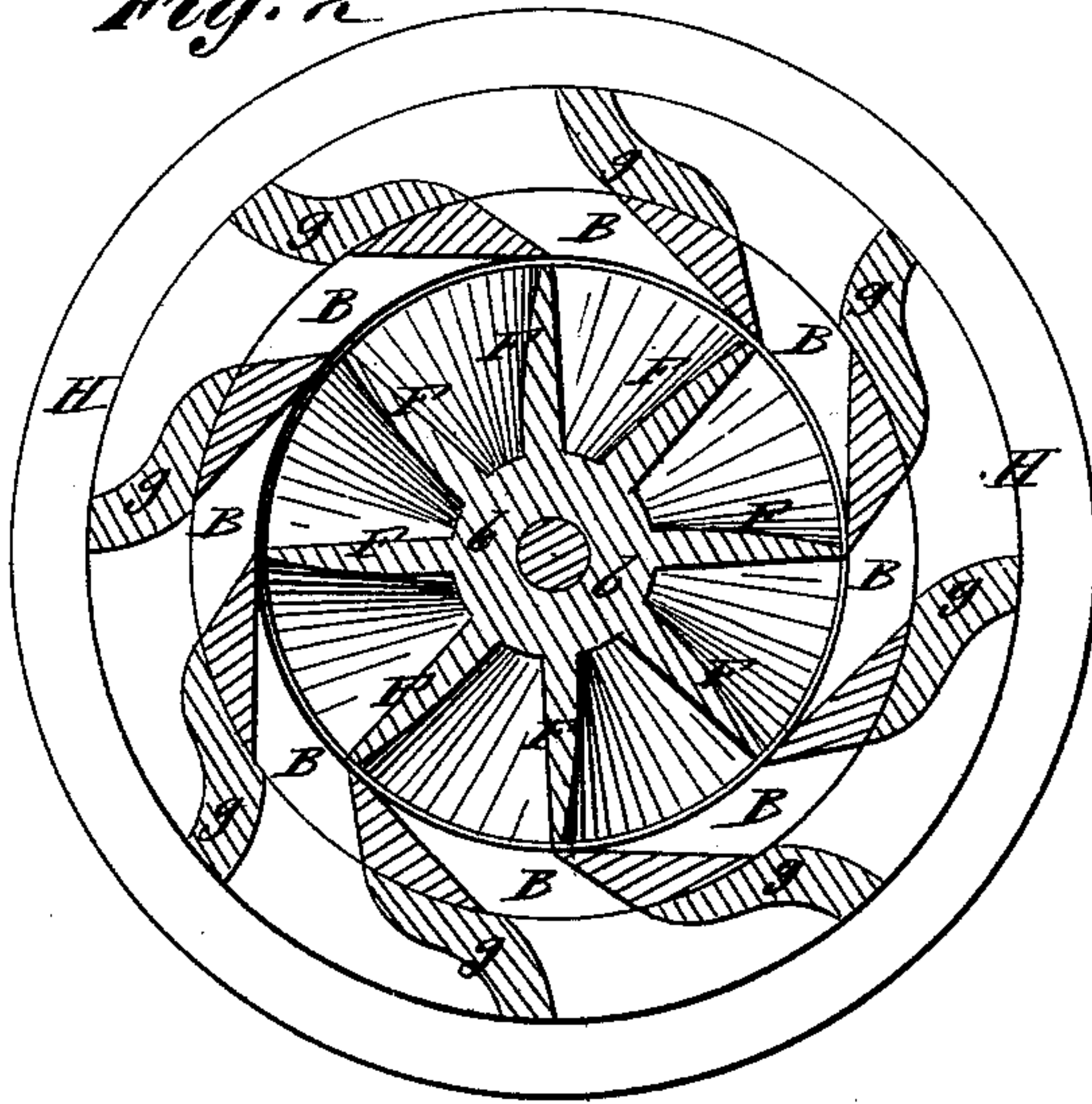


Fig. 4

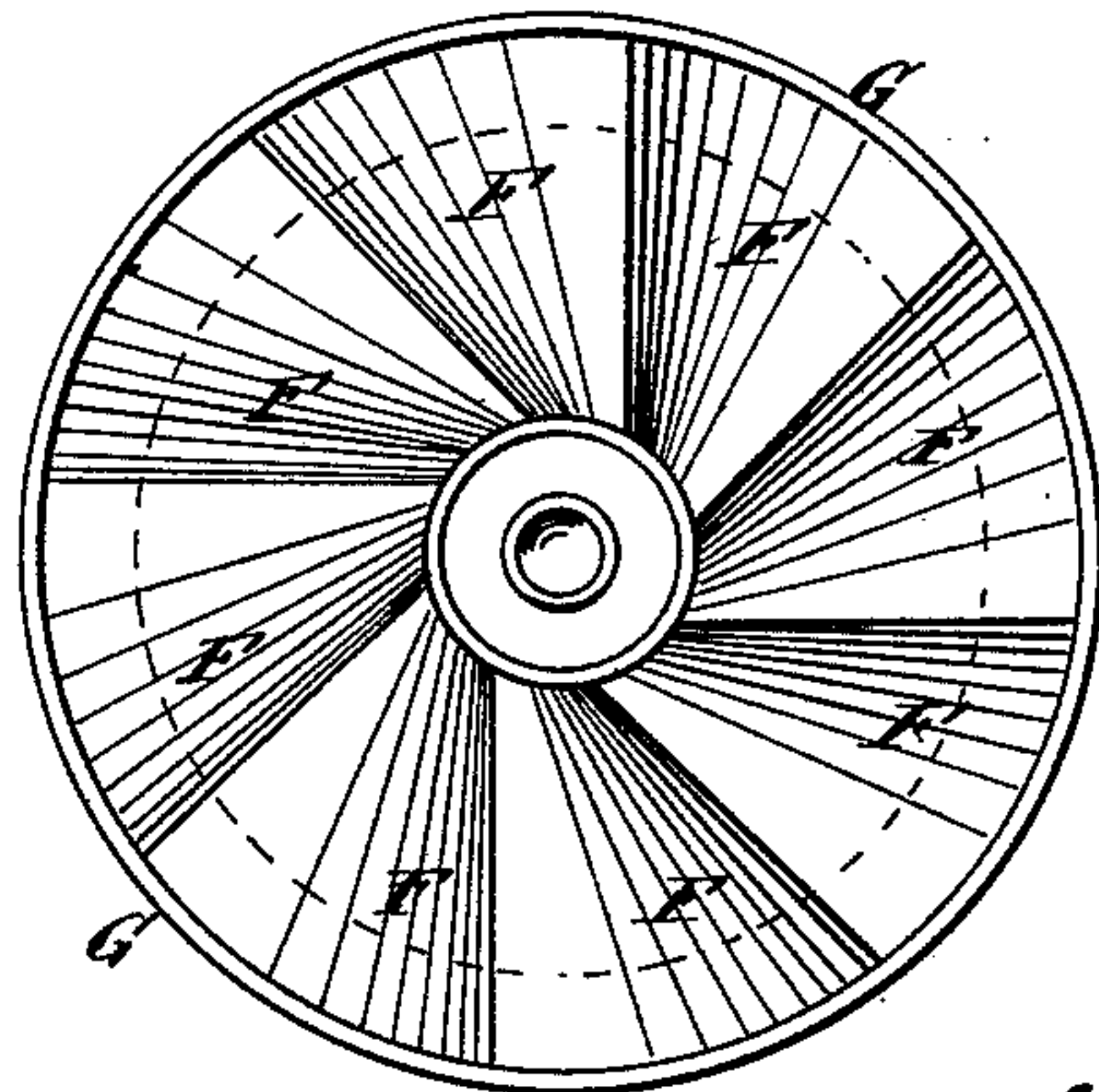


Fig. 5

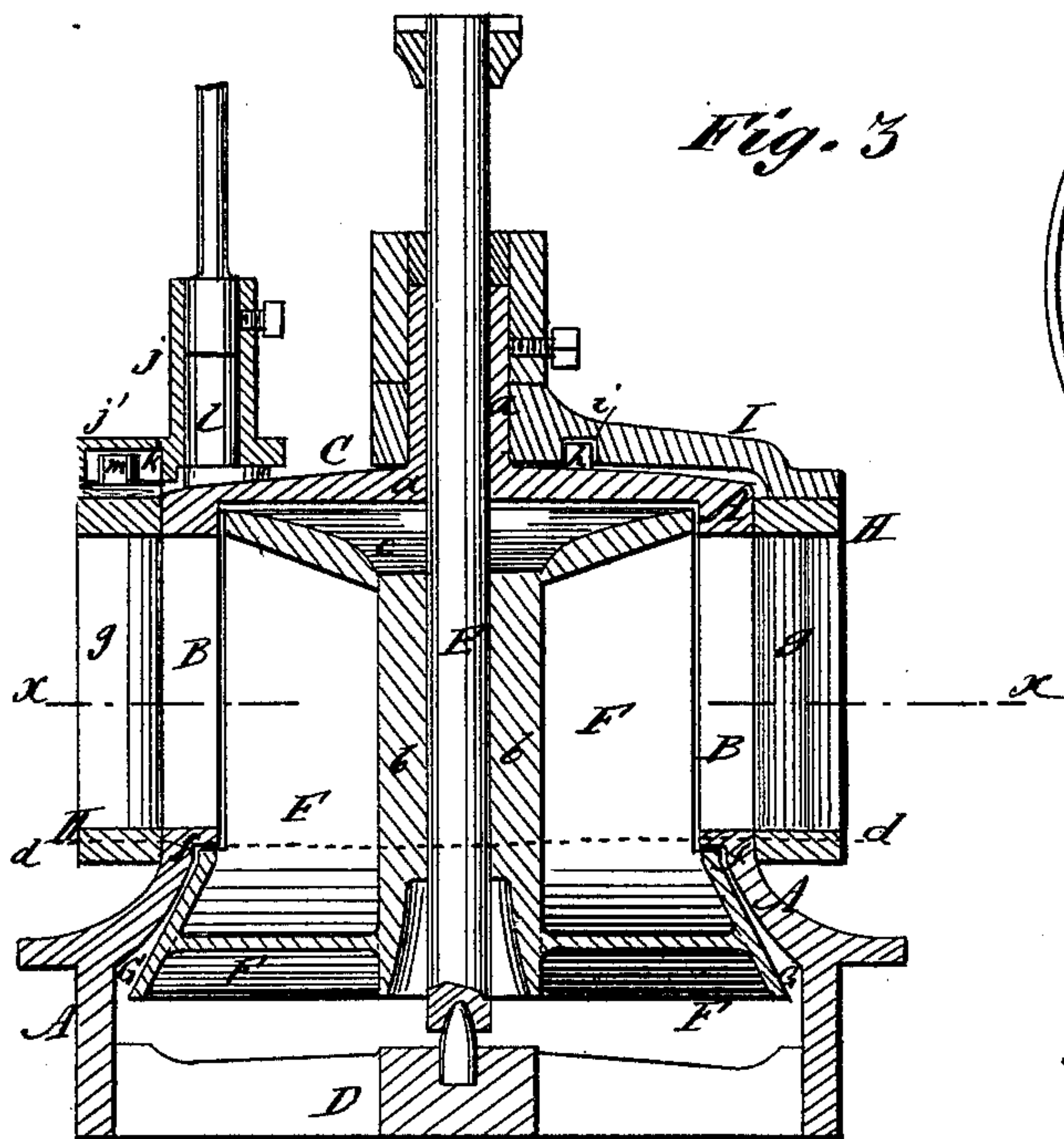
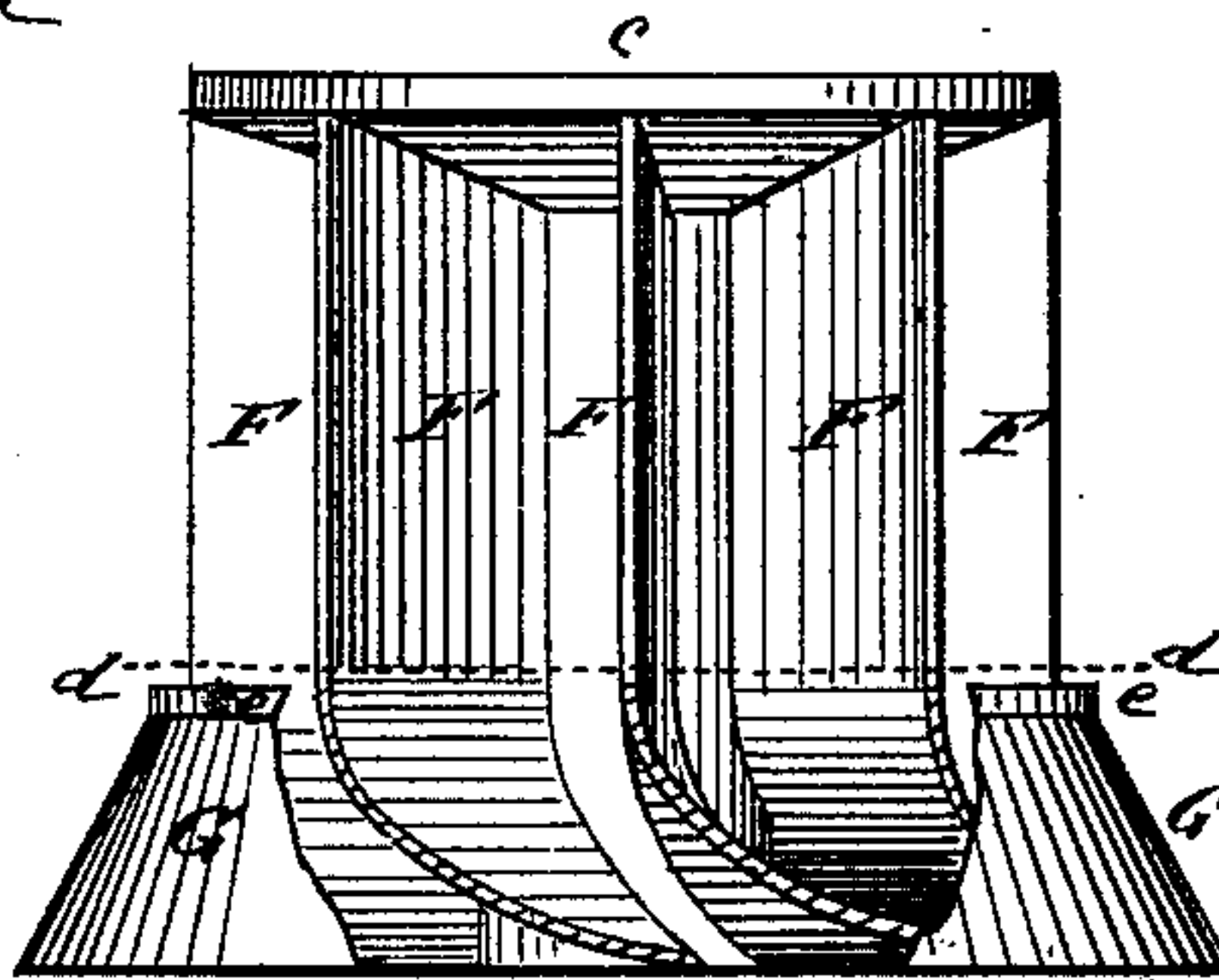


Fig. 3

WITNESSES:

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UNITED STATES PATENT OFFICE.

ISAAC MALLERY, OF DRYDEN, NEW YORK.

IMPROVEMENT IN TURBINE WATER-WHEELS.

Specification forming part of Letters Patent No. **218,295**, dated August 5, 1879; application filed April 23, 1879.

To all whom it may concern:

Be it known that I, ISAAC MALLERY, of Dryden, in the county of Tompkins and State of New York, have invented an Improved Turbine Water-Wheel, of which the following is a specification.

My invention relates to improvements in the buckets of the wheel and the devices for operating the gate-ring and governing its movement, the objects whereof are to increase the power and durability of the wheel and simplify its construction.

The invention will be first described generally in connection with the drawings, and then specifically pointed out in the claim.

In the accompanying drawings, Figure 1 is a top plan of the wheel. Fig. 2 is a horizontal section on line *x x* of Fig. 3. Fig. 3 is a vertical section on line *y y* of Fig. 1. Fig. 4 is a bottom view of the buckets, and Fig. 5 is a side elevation of the buckets with the band partly cut away.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A is the casing of the wheel, the sides whereof are provided with the ports B for the admission of the water to the buckets. C is the deck of the casing. In the enlarged bottom part of the casing is placed diametrically a bar, D, in the center whereof is a pivot, furnishing a bearing for the lower end of the shaft E, which is passed down through a socket, *a*, rising from the center of the deck C.

The buckets are designated by the letter F. They radiate from the core *b*, fixed to the shaft E, and are vertical from the head-ring *c* to the line *d d*, from whence they are curved backward and widened outward to the bottom. This enlarged part of the buckets is inclosed by a conoidal band, G, cast on the edges of the buckets, and having at the top a straight portion, *e*, which fits in an annular right-angular recess, *f*, in the casing, forming a water-joint that prevents waste. By casting the band on the outside of the buckets the thickness of the band around the wheel is saved

for water-space through the buckets, and thus the whole surface of the buckets is within the band, while by flaring the buckets at the bottom the same number of square inches of surface is retained for the buckets through the wheel.

H is the gate-ring placed over the straight part of the casing, with its lower portion resting against the curved part of the case, while its upper portion is flush with the deck C.

A bar, I, is passed diametrically across the deck, over the socket-piece *a*, and has its ends fastened to the top edge of the ring. This bar bears upon the part of the deck immediately surrounding the socket-piece *a*, and thus holds the ring up, at the same time, however, allowing it to revolve around, so that the gates *g* will close and unclosed the ports B. This movement is limited by a stop, *h*, projecting upward from the deck into a slot, *i*, in the under side of the bar I, so that the gates are just moved sufficiently to cover and uncover the ports.

The device for operating the gate-ring consists of a crank with a hollow vertical arm, *j*, and the horizontal arm *j'*, provided with an elongated recess, *k*.

The hollow arm is placed over a shaft, *l*, projecting upward from the deck C, while the recess *k* is placed over a stud, *m*, projecting upward from the top of the ring H. By turning the crank on the shaft *l* the ring is moved on its axis, and thus caused to open and close the ports.

By making the crank in this way, with the socket and recess opening downward, no harbor is afforded for gravel, sand, &c., and thus the bearings are kept clear of such accumulations, making the device more durable and easier to work.

The turbine wheel thus constructed will be found to possess numerous advantages over those heretofore made.

The arrangement of the buckets greatly increases its power, while the device for operating the gate-ring and the stop for limiting the movement thereof are simple and efficient in their construction and operation.

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

The crank for operating the gate-ring, composed of the hollow arm *j* and arm *j'*, with recess *k*, in combination with the stud *m* on the gate-ring, entered into recess *k*, and shaft *l* on deck C, entered into arm *j*, said crank serv-

ing to operate the gate-ring, and having its socket and recess opening downward, so as to avoid retaining sand, gravel, &c., substantially as described.

ISAAC MALLERY.

Witnesses:

ABRAM M. FORD,

L. D. MALLERY.