

(No Model.)

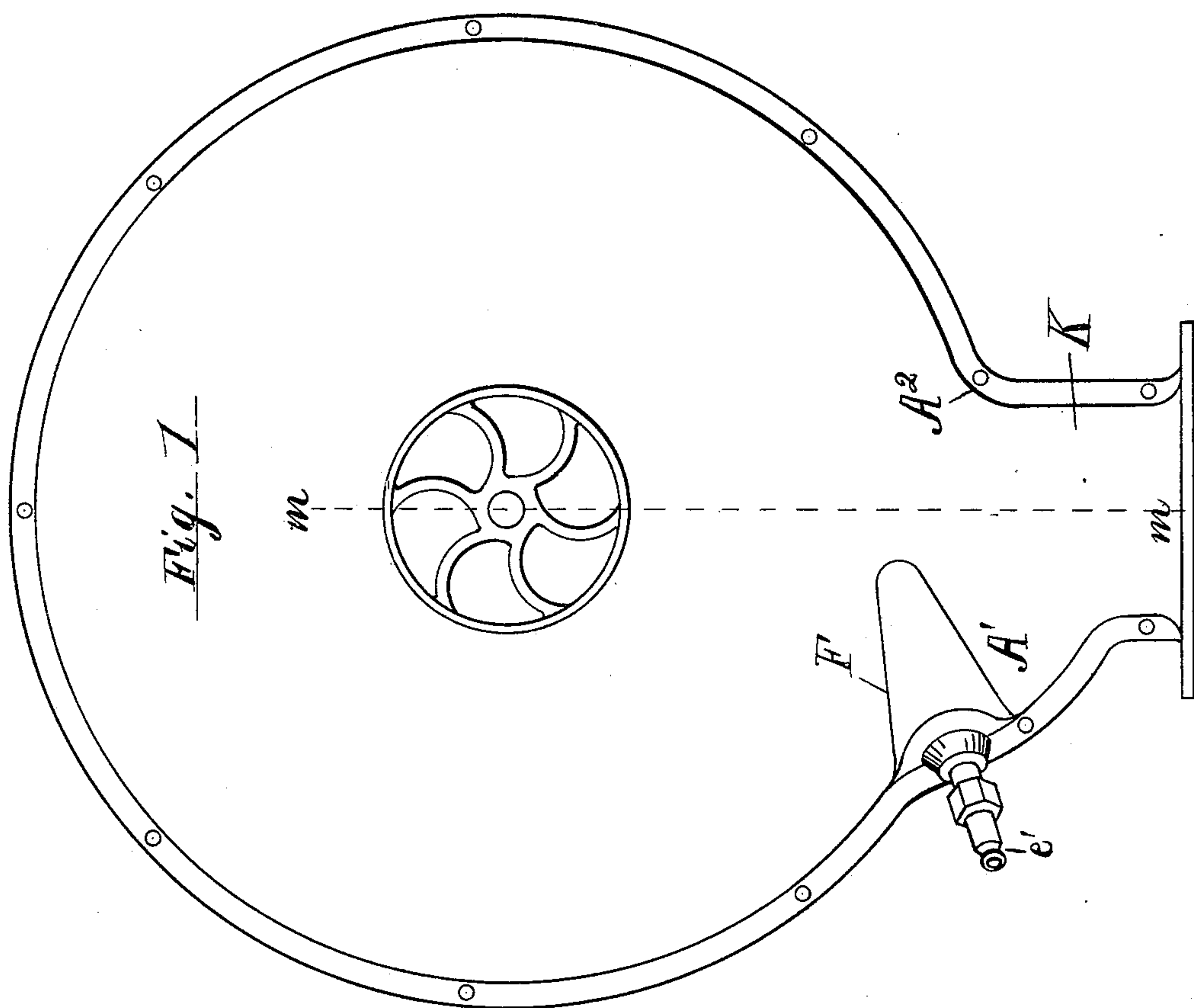
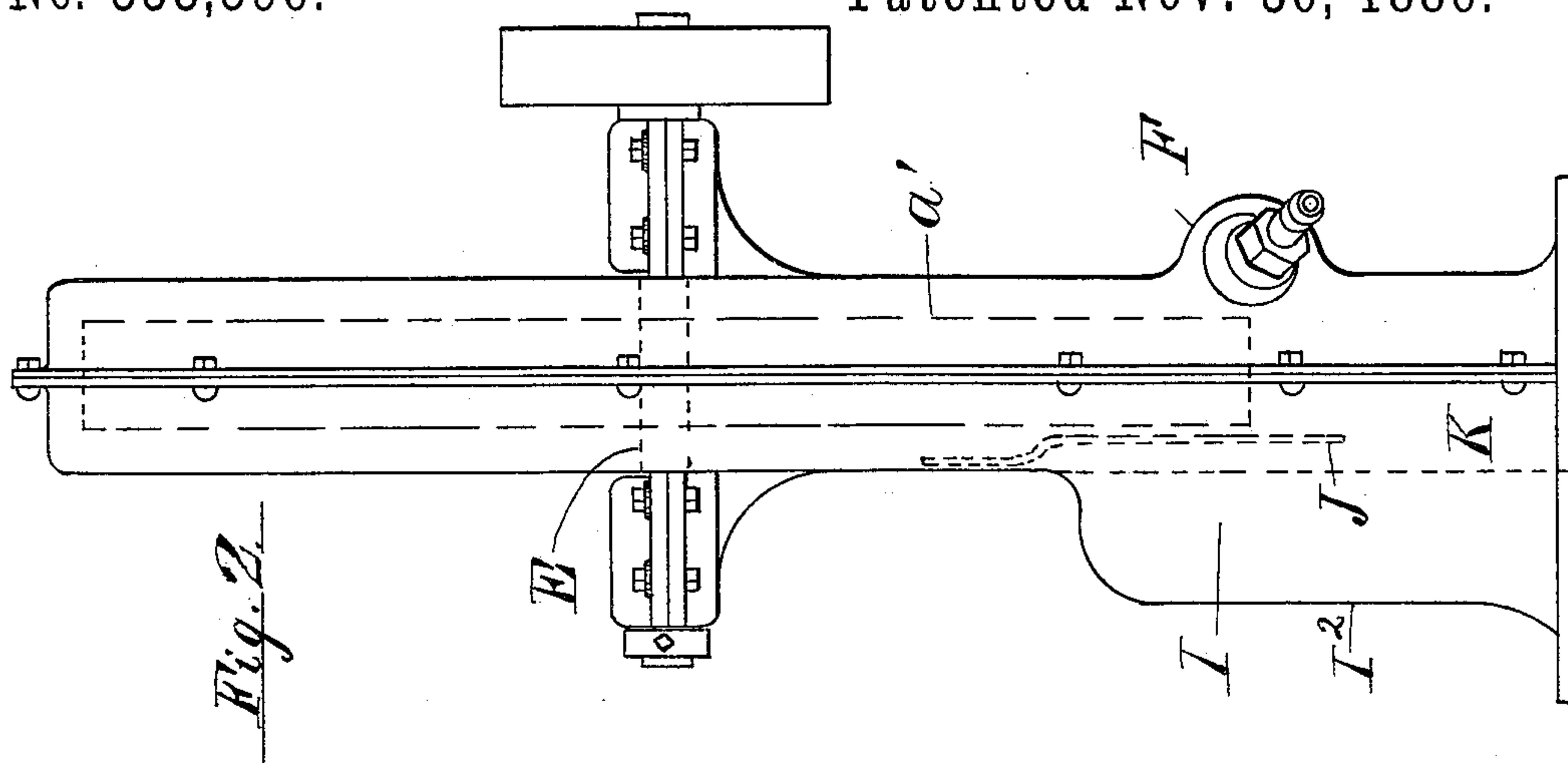
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J. M. SEYMOUR, Jr.

WATER MOTOR.

No. 353,596.

Patented Nov. 30, 1886.



Attest;

L. Lee.

Henry J. Theberath.

Inventor.

James M. Seymour, Jr.
per. Crane & Millitt.

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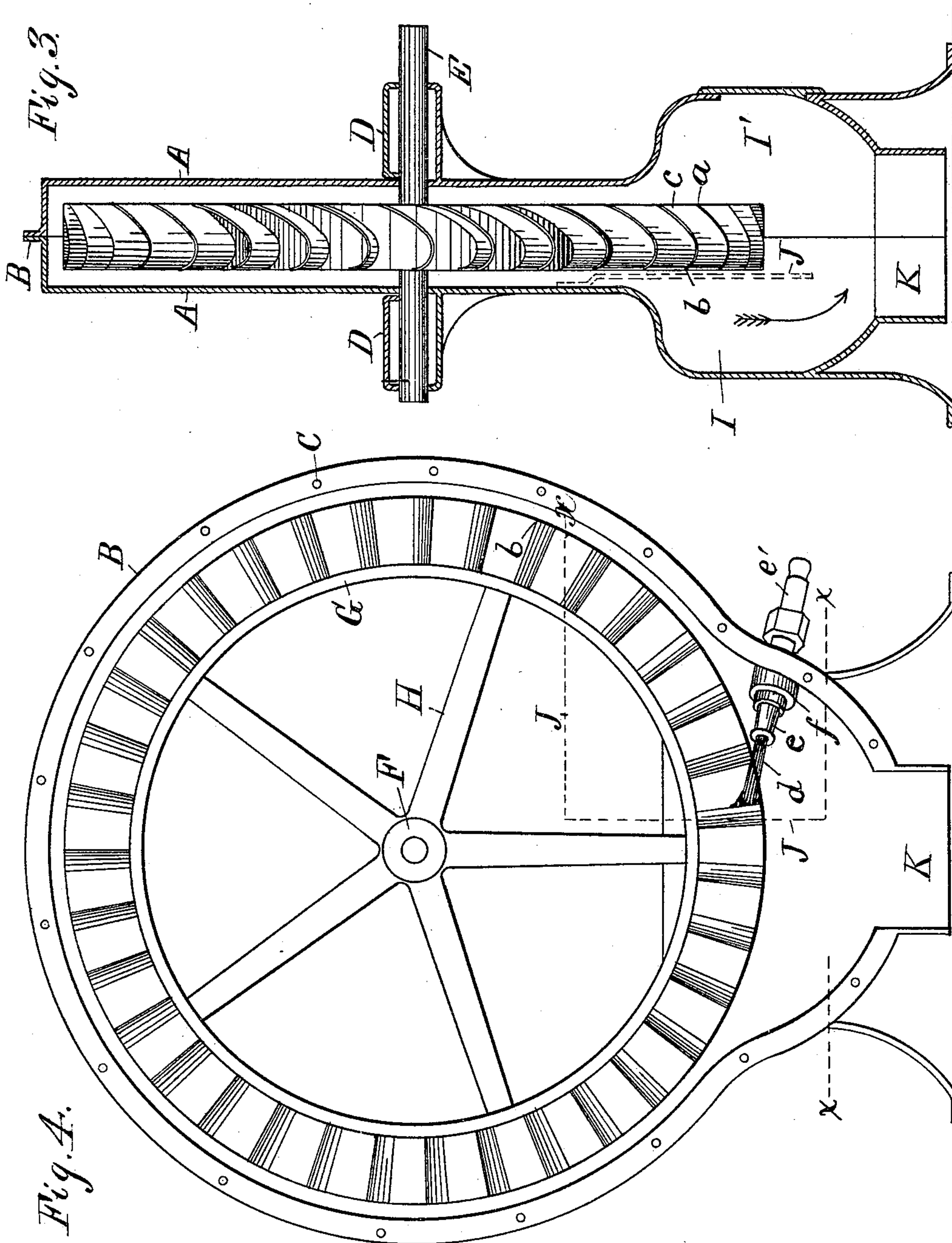
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Fig. 5.

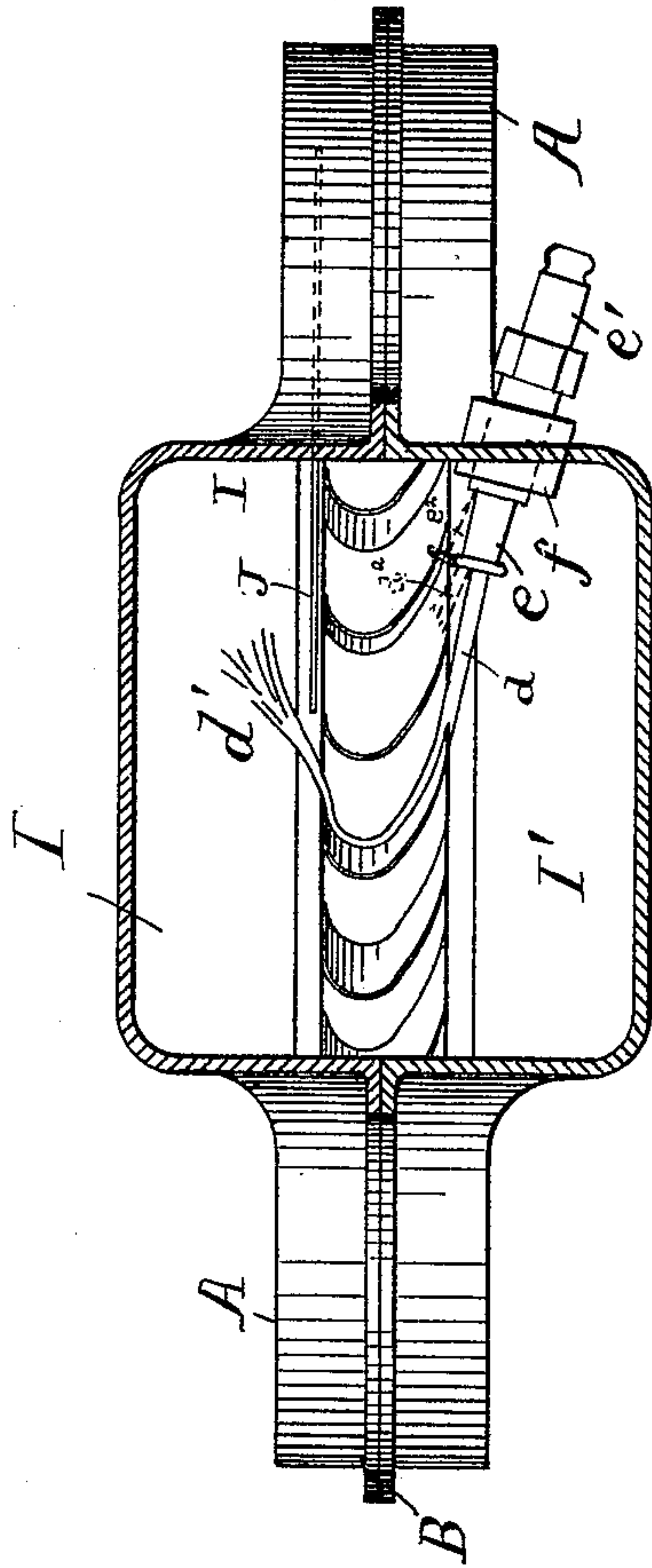
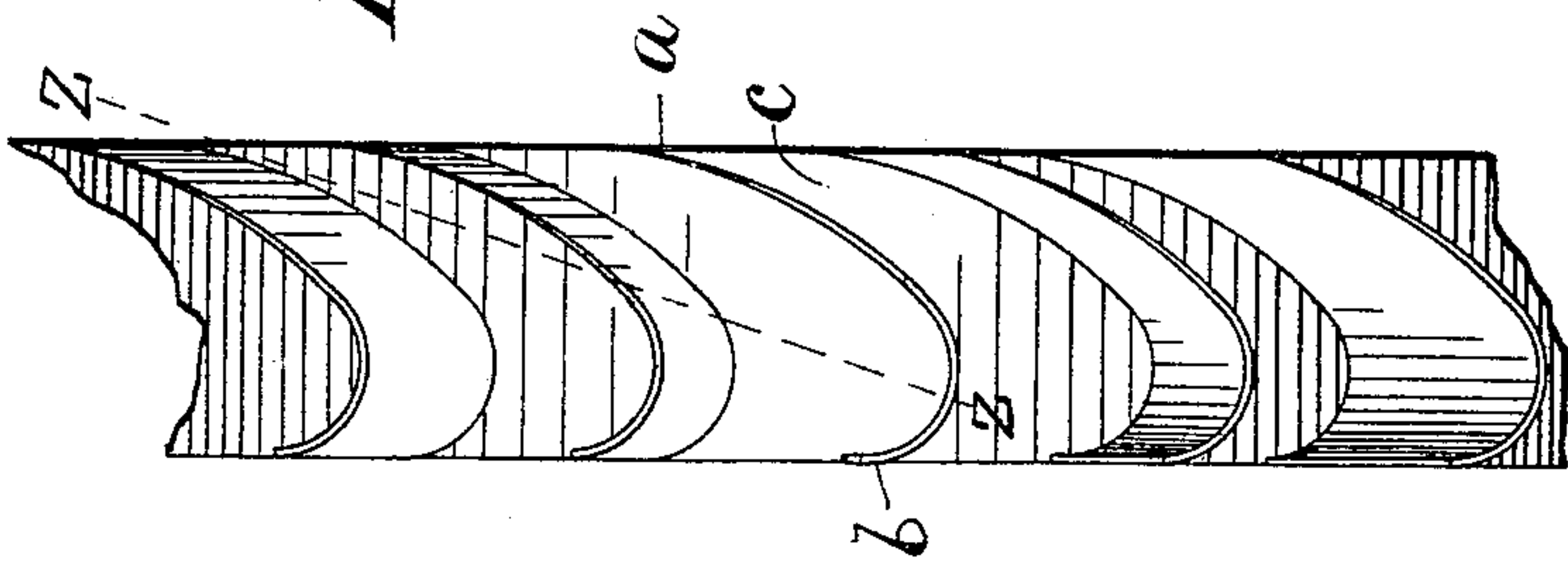


Fig. 6.



Attest:

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Henry J. Sheberath.

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UNITED STATES PATENT OFFICE.

JAMES M. SEYMOUR, JR., OF NEWARK, NEW JERSEY.

WATER-MOTOR.

SPECIFICATION forming part of Letters Patent No. 353,596, dated November 30, 1886.

Application filed April 1, 1886. Serial No. 197,388. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. SEYMOUR, Jr., a citizen of the United States, residing in Newark, Essex county, New Jersey, have invented certain new and useful Improvements in Water-Motors, fully described and represented in the following specification, and the accompanying drawings, forming a part of the same.

10 This invention consists in an improved construction for the buckets and casing of a water-motor wheel.

In the annexed drawings I have shown my invention applied to a wheel with two different forms of casings, Figures 1 and 2 representing a side view and an edge view of the casing with the waste-water chamber at one side of the same, and Figs. 3, 4, and 5 representing a casing with such chamber formed at both sides as an alternative construction, to facilitate the process of manufacture. Fig. 3 shows the casing in transverse section, with the wheel and its sustaining-shaft supported therein. Fig. 4 is a side view of the casing with one half removed, and containing the motor-wheel and water-nozzle. Fig. 5 is a bottom view of the casing, the view being taken in section on line *xx* in Fig. 4, to expose the motor-wheel, the water-nozzle, and the guard. Fig. 6 is an edge view of a portion of the wheel's periphery enlarged, to display the construction and arrangement of the buckets more clearly, Figs. 3, 4, and 5 being in section to show the construction and arrangement of the wheel and its water-nozzle most clearly in relation to the casing, and will therefore first be described.

In these figures, A is the casing formed in two halves, to cover the opposite sides of the wheel, and united by peripheral flanges B and bolts C.

D are bearings formed upon the opposite halves of the casing for the shaft E, and F is the hub of the motor-wheel secured thereto, and sustaining a cylindrical rim, G, by arms H. The rim is shown provided with radially-projecting buckets *ab*, between which are open spaces *c* in the side of the wheel, to receive a jet of water, *d*, from a nozzle, *e*.

The casing is shown enlarged or widened near its base, to form a chamber, I, to receive

the waste water. The buckets are curved, in shape, across the cylindrical rim of the wheel with the edges projecting backward, the edge *a* being much longer than the edge *b*, and nearly tangential to the side of the wheel.

The nozzle *e* is projected into one side of the casing at an acute angle with the side of the wheel, and is adjusted to throw the water into the openings *c*, between the edges *a* of the successive buckets. Such adjustment throws the water tangentially into the curve of the bucket, whose shape then effects a complete recurving of the water-jet and discharges it upon the opposite side of the wheel nearly in a state of rest after it has expended all its direct and reactionary force upon the walls of the bucket.

The curve of the buckets across the rim G is the curve at each side of the vertex of a parabola, the axis of the parabola extending, as is shown by the line *zz* in Fig. 6, obliquely across the face of the wheel substantially parallel with the axis of the water-nozzle. With such a construction for the buckets, the water operates independently of its weight, and need not be retained therein to operate by gravity. For this reason the water-jet is applied to the lower edge of the wheel, and the wheel is mounted in a casing having abundant space for the free discharge of water, and preferably provided with an enlarged chamber, where it receives and discharges the water.

To prevent the recurved jet from contact with the rear side of the buckets, and thus interfering with the wheel's motion, I provide a guard, J, within the chamber I, close to the rim of the wheel and projected to or near the point where the recurved jet leaves the bucket, as shown in Fig. 5. Such guard is indicated by dotted lines in Figs. 3 and 4, because it would be removed from such part of the casing as has been displaced to show the internal construction; but its position, if all the parts were present, is clearly indicated by the dotted lines.

The guard is attached to the casing by its rear edge and projects forward between the wheel and the chamber I to the point where the water leaves the wheel, as shown in Fig. 5, the guard extending radially over the side of the wheel enough to cover the buckets and

to protect the same from the splash of the water after it enters the chamber.

From the chamber I the water flows downward to the outlet K, finding a free vent past the vertical edge of the guard, and also escaping past its bottom edge when the latter is not extended to the bottom of the casing, as shown in the drawings at Figs. 3 and 4.

As the water is discharged from the wheel wholly upon one side, it is obvious that the chamber I may be limited exclusively to one side of the casing, as in Figs. 1 and 2, a socket, F, being provided upon the opposite side of the casing to admit the jet of the water obliquely to the buckets *a b*, and the casing being widened only at I², opposite to the point lettered A' in Fig. 1, so as to form the body of the chamber I upon the opposite side of the casing.

The enlargement I² for the chamber I may thus be confined not only to one side of the casing, but also to one edge of the same as regarded from a straight line, *m m*, drawn through the shaft of the wheel and the discharge-outlet K. The rim of the wheel and its shaft are indicated in Fig. 2 by dotted lines *a'* and E, and the guard J is similarly represented by dotted lines between the rim of the wheel and the chamber I.

It will be noticed that in Fig. 1 the casing is formed concentric with and close to the rim of the wheel on one side all the way to the point A², where it intersects the outlet K upon the side opposite the nozzle *e'*, and that the casing is enlarged radially only upon the side where the nozzle is inserted, such radial enlargement A' being thereby restricted to one side only of the axial line *m m*.

To make the casing symmetrical, and to thus facilitate the process of manufacture by forming its two halves alike, the casing may be made, as shown in Figs. 3, 4, and 5, with a chamber, I', opposite to that which is required to receive the waste water; but such chamber is only essential upon one side of the wheel, to admit the use of a guard and to furnish a free discharge of the water from beyond the same.

The water-nozzle in Fig. 5 is shown provided with a shank, *e'*, secured movably within a boss, *f*, upon the end of the chamber I', and the nozzle is slightly inclined to its shank, so that by turning the latter in the boss the direction of the jet in relation to the edges of the buckets may be slightly varied.

A dotted line is drawn through the center of the nozzle, and also through the center of its shank, to illustrate such inclination, the rotation of the nozzle entirely around in the boss thus serving to direct the jet into a variety of positions, all inclined at the same angle at the axis of the shank, but pointing upward or downward, inward or outward, from the edges of the buckets, as the operator may desire.

The longer edges, *a*, of the buckets are sharp-

ened, as shown in Fig. 6, to avoid obstruction to the water-jet as it passes from one bucket to another in the wheel's rotation, and the shorter edges, *b*, are shown directed nearly tangential to the side of the wheel, although the adhesion of the water to such edges secures the discharge of the water in an outward curve, and thus avoids interference with the back of the succeeding bucket.

The water-jet is shown at *d* in Figs. 4 and 5 with the spent water at *d'* passing beyond the edge of the guard into the chamber I, as described herein.

I do not claim as new the discharge-chute or enlargement of the casing at its base, or as some would call it "a spent-water pocket," as it is an old and well-known device used by Thomas Pattison, of Little York, California, in 1867, and by other makers of water-motors years previous to that time, for the purpose of allowing a free discharge of the water and preventing the drag of back-water and choking of the wheel, which otherwise would follow and adhere to the wheel were it not for the enlargement of the case at the point indicated, which gives the water a chance to free itself from the wheel, and prevents a reaction of the water on the buckets and its being carried up by the buckets into the circular portion of the case. Were the case unprovided with this chamber or pocket, as used by Mr. Pattison and others, to allow a free exit of the water at the discharge-nozzle, it would, as can readily be seen, retard the motion of the wheel.

My invention differs from any previous construction, in actually requiring an enlargement of the casing at one side only to receive the water-discharge from the buckets, as at the chamber I, and in having a thin guard, as at J, applied between the edge of the wheel and said chamber, to confine the water to the latter when discharged therein, and to thereby prevent its contact with the succeeding buckets of the wheel.

The state of the art in this class of invention is shown in United States Patents Nos. 229,736, 249,274, 101,996, 266,922, 116,405, English Patent No. 964 of 1876, and German Patent No. 3,896 of 1878. Such patents show that curved buckets arranged in different relations to the rim of the wheel are not new, and I therefore disclaim the said patents and limit my invention to the particular construction and arrangement of the buckets, and in a subordinate sense to their combination with the chamber I and the guard J.

Having thus set forth the nature of my improvement and distinguished it from others, what I claim herein is—

In a water-motor, the combination, with a motor-wheel having parabolic bucket curved across the rim of the wheel and lateral openings between the bucket to admit a jet of water, of a vertical casing provided at its bottom with an outlet and a nozzle inserted in the casing

and directed obliquely toward such openings
upon one side of the wheel, the water being
discharged backward from the opposite side
of the wheel, and a guard projected forward
5 within the casing adjacent to the wheel upon
such opposite side, to protect the unfilled suc-
ceeding bucket from the recurved jet, substan-
tially as herein shown and described.

In testimony whereof I have hereunto set
my hand in the presence of two subscribing
witnesses.

JAMES M. SEYMOUR, JR.

Witnesses:

HENRY J. MILLER,

HENRY J. THEBERATH.