

J. OSBORN & J. P. LYBARGER.

TURBINE WATER-WHEEL.

No. 189,488.

Patented April 10, 1877.

Fig. 2.

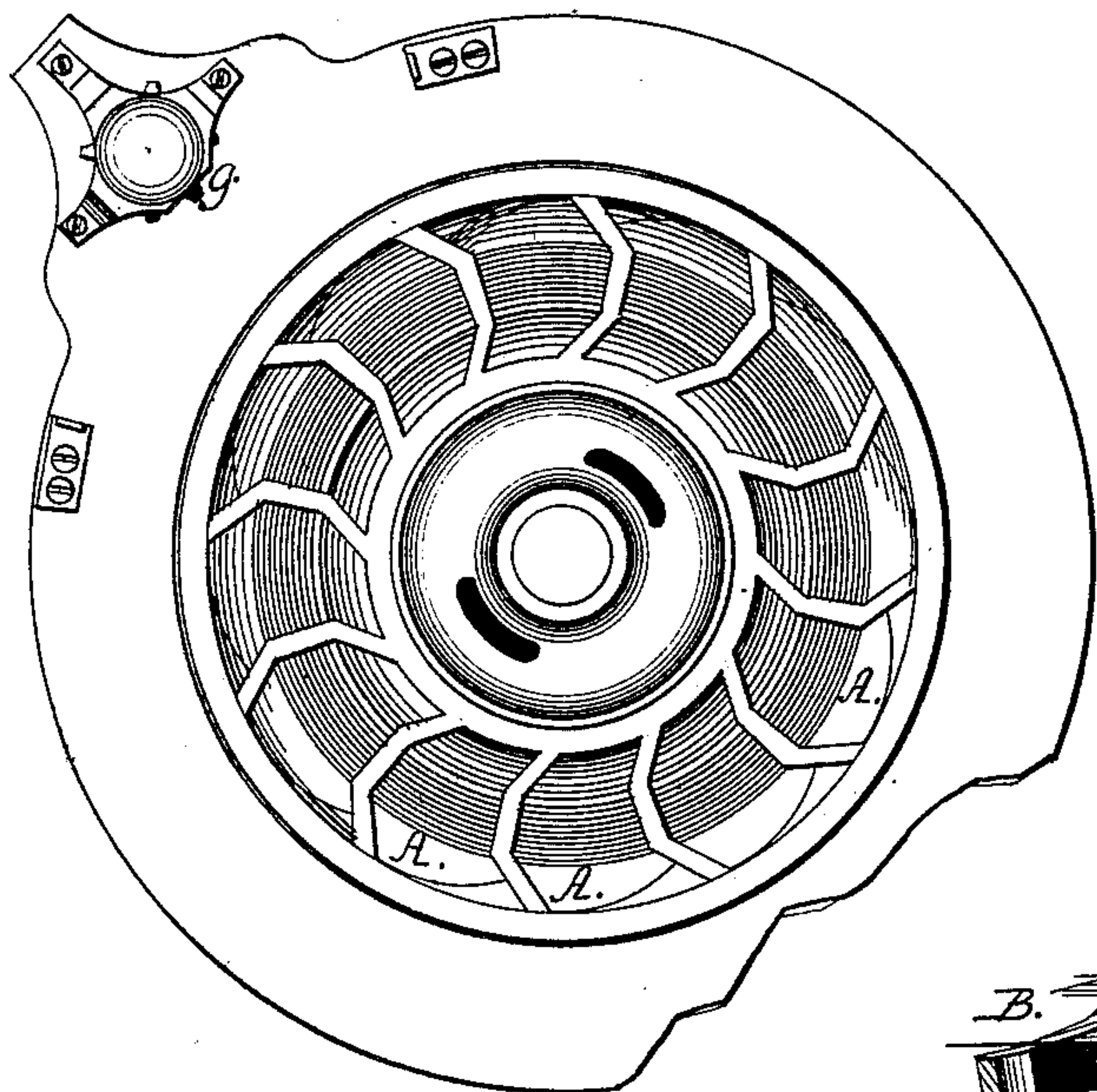


Fig. 3.

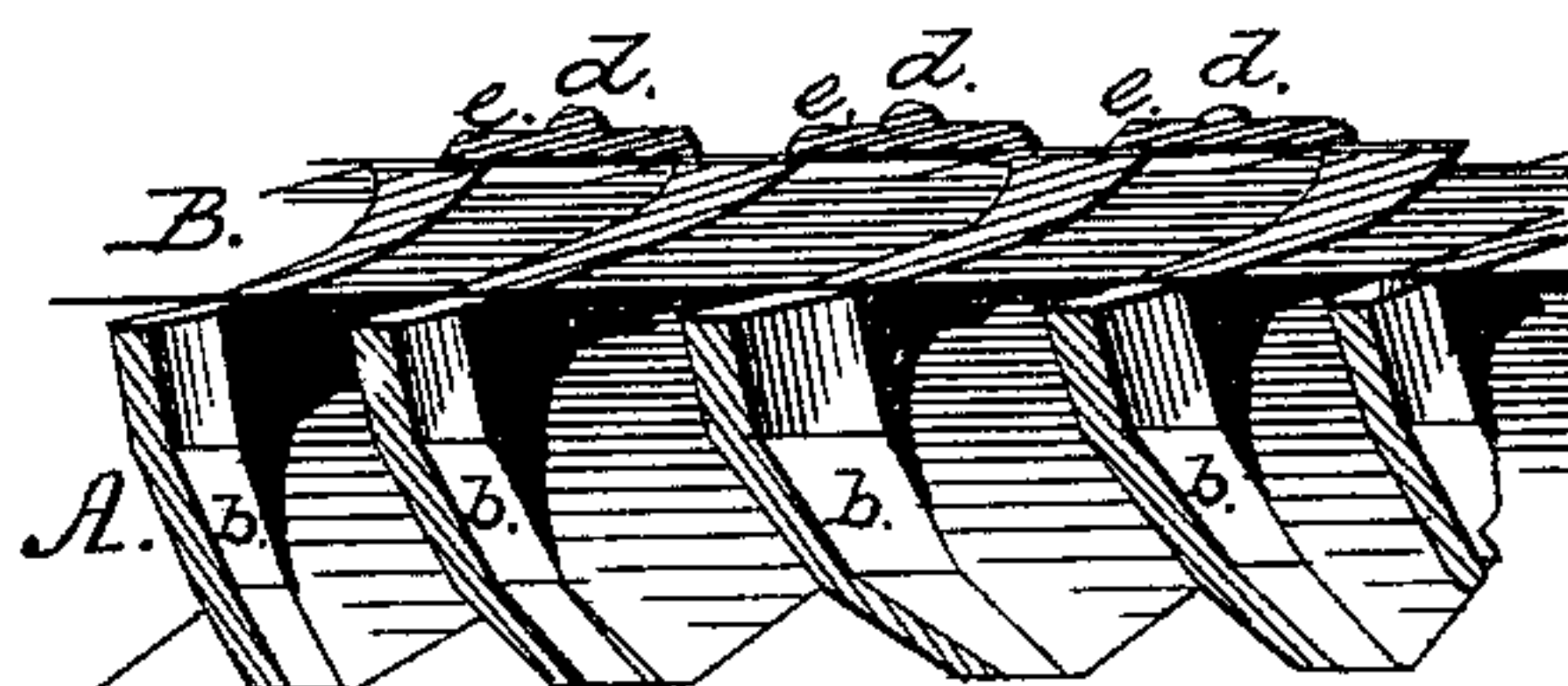
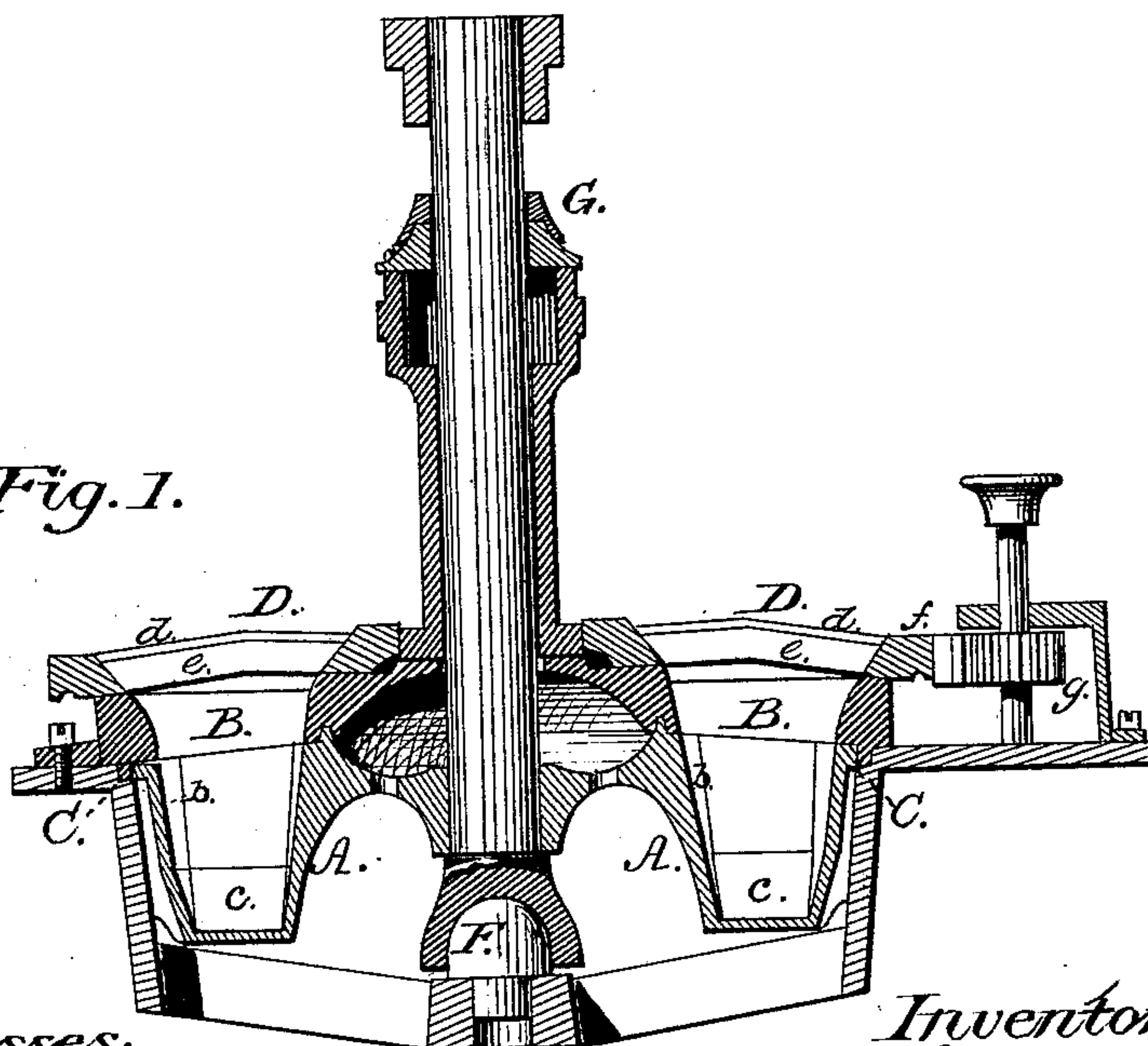


Fig. 1.



Witnesses:  
*Louis Bagger.*  
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Inventors:  
*Joseph Osborn & John P. Lybarger*  
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# UNITED STATES PATENT OFFICE.

JOSEPH OSBORN AND JOHN P. LYBARGER, OF DELPHOS, OHIO.

## IMPROVEMENT IN TURBINE WATER-WHEELS.

Specification forming part of Letters Patent No. 189,488, dated April 10, 1877; application filed February 26, 1877.

*To all whom it may concern:*

Be it known that we, JOSEPH OSBORN and JOHN P. LYBARGER, both of Delphos, in the county of Van Wert and State of Ohio, have invented certain new and useful Improvements in Turbine Water-Wheels; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Our invention relates to that class of turbine water-wheels in which the water is fed vertically to, and discharged vertically from, the wheel; and it consists in the details of construction and general arrangement of parts, all as will be hereinafter more fully described, and pointed out in the claims.

Referring to the drawings, Figure 1 represents a vertical section of our invention. Fig. 2 represents a plan view of the same, and Fig. 3 a detail view of the buckets.

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

A represents the buckets, formed of three planes, two of the planes forming the inclined sides *b b*, and joining the third plane, forming the bottom or base *c* of the bucket, at an obtuse angle, running from the top of the bucket downward and outward to the discharge-orifice, the opening at the upper part of the buckets being larger than the discharge. The upper edges of the buckets are made concave, and the wheel and buckets formed of one casting. The case B, or chute-rim, is also made in one casting, with the chutes formed in it so that the under side or bottom of the chutes are concaved, as shown in Fig. 3, while the top is convex, thus presenting a convex surface to the concave bucket-rim, thereby offering the greatest strength or resistance in case of any foreign substances being caught or lodged in the bucket and carried around by the back of the same, and in being concave the water is carried to the wheel in a volume, and at an angle best calculated to insure the greatest percentage of power.

The top of the case or chute-rim B is formed in shape similar to an angular arch, having

the outer edge a little lower than the center at the shaft, the conformation being adapted to receive the correspondingly-shaped gate D, as shown in Figs. 1 and 2. The object of this construction is to strengthen the upper part of the gate, so that it will be capable of withstanding sudden strain or breakage from the falling of a chance stone or other foreign substance upon the same when in use, and this construction is further aided and strengthened by casting angular ribs or braces *d* in the center of the angular slides *e*, as shown in Fig. 3. Another advantage of this construction is, that when the gate is closed the rib *d* is directly over the center of the chute, thereby strengthening the slides at that point.

The water-joint is formed of two flanges, C, on the case B, one being horizontal, fitting on top of the base-flange, and the other perpendicular on the under side case, dropping down inside of base-flange, and the wheel-flange fitting against the case-flange, thus forming a most effective and simple water-joint.

A concavity is formed in the base of the wheel-shaft, adapted to fit and revolve upon the conical wooden bearing F, as shown in Fig. 1, while upon the same shaft, under the coupling at the top, is placed a circular flange, G, which drops down over and covers the top of the stand, so as to prevent sand from getting into the working parts.

The gate D is opened and closed by means of a rack, *f*, on one side of the gate-rim, which is operated in either direction by the pinion *g* on the vertical shaft, as shown in Figs. 1 and 2.

By means of our present improvements we are enabled to furnish a turbine water-wheel possessing superior advantages for strength and economy of construction combined with a most efficient and perfect operation.

Having thus described our invention, what we claim as new and useful is—

1. In a turbine water-wheel, the buckets A, formed of the inclined planes *b b* and *c*, comprising the sides and bottom of the said buckets, and cast solid with the wheel, substantially as and for the purpose described.

2. The buckets A, having their upper edges or rims of a concave form, in combination with the convex surface of the chutes, substantially as and for the purpose specified.

3. The gate D, formed of an angular arch, in combination with the case or chute-rim B, substantially as specified.

4. The gate D, formed of an angular arch, and provided with the correspondingly-shaped slides e, having angular ribs or braces d, substantially as and for the purpose described.

In testimony that we claim the foregoing

as our own invention we affix our signatures in presence of two witnesses.

JOSEPH OSBORN.  
JOHN POLK LYBARGER.

Witnesses:

JOHN KING,  
AMZIE S. MOTT.