

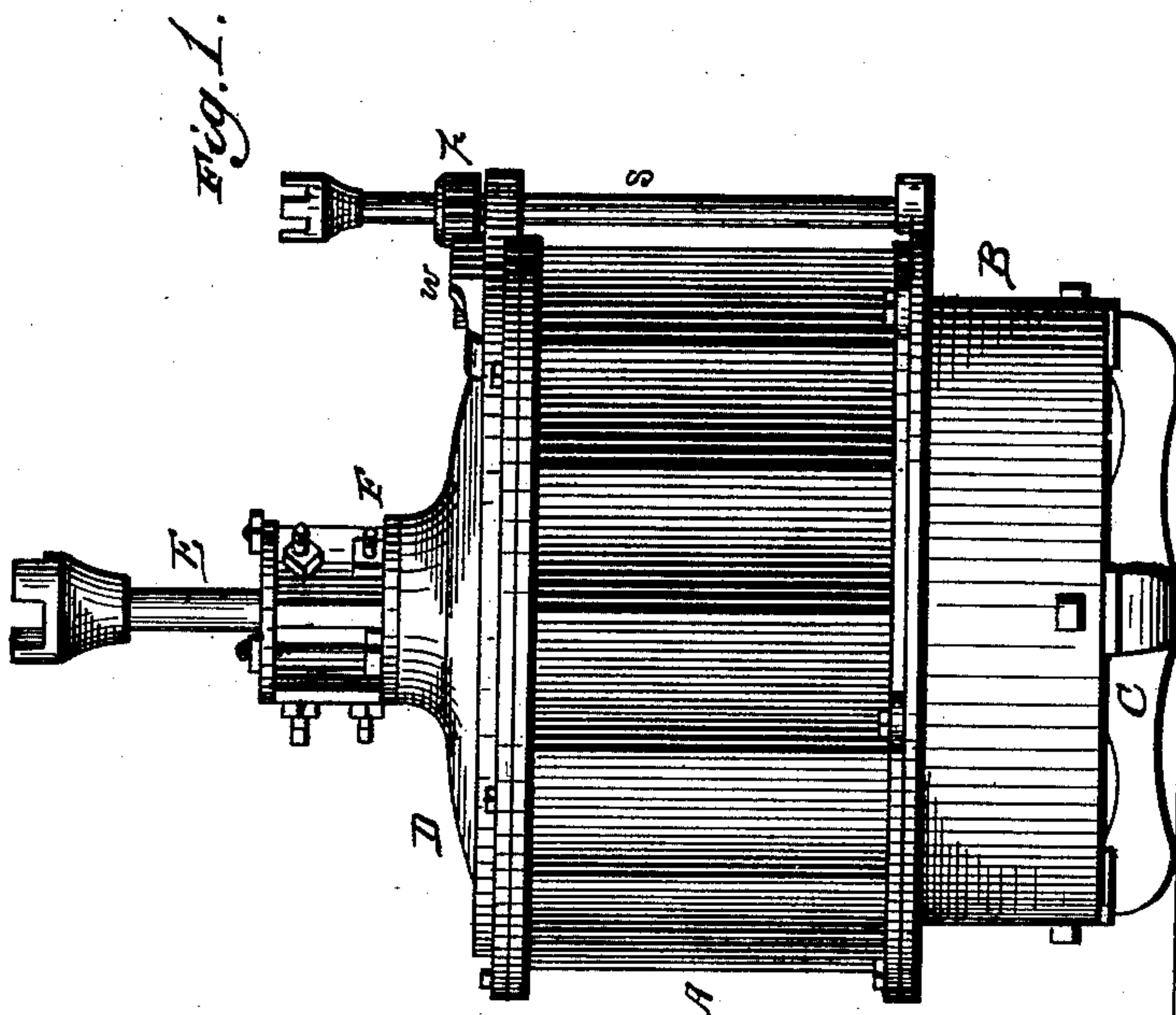
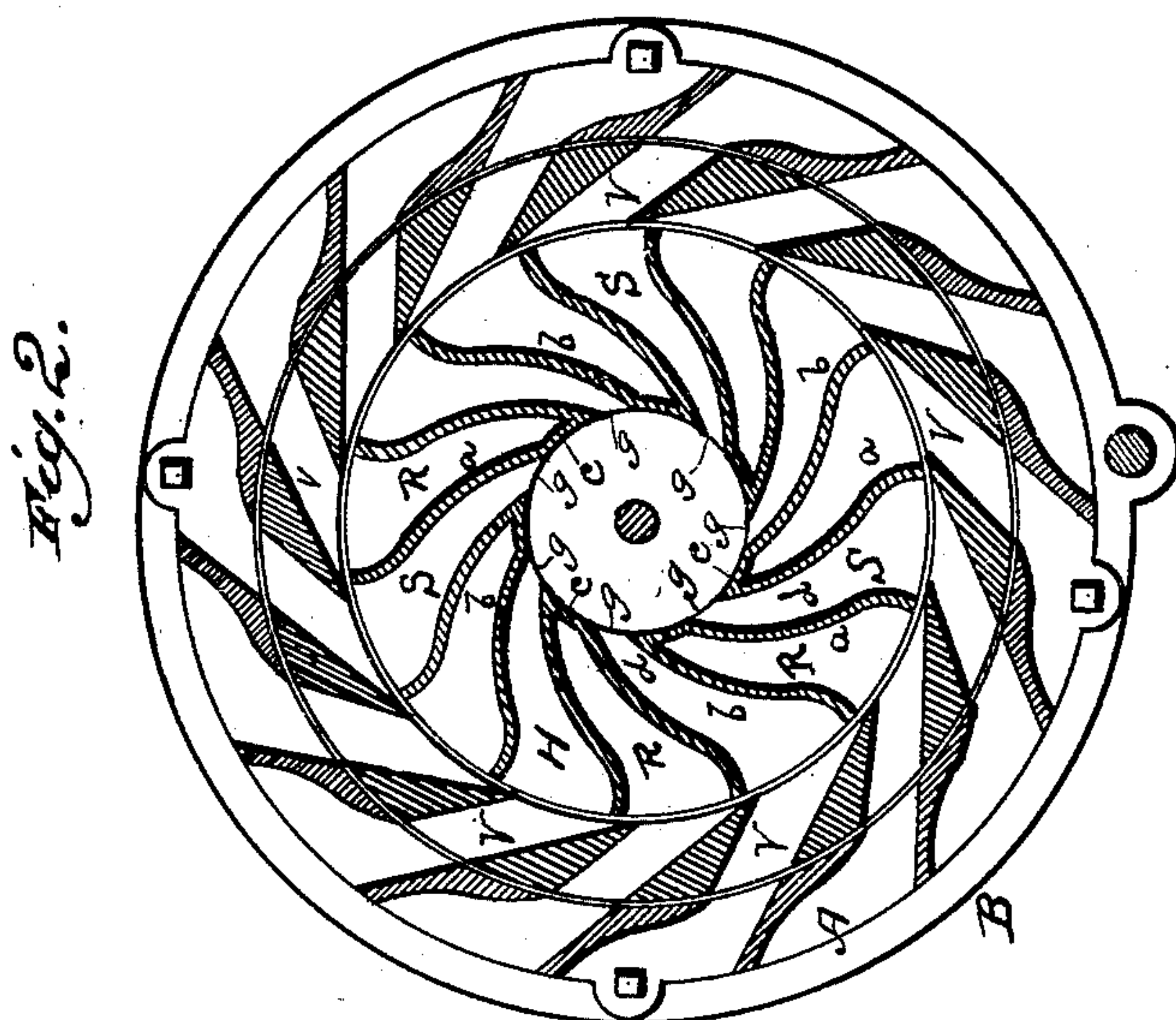
(No Model.)

2 Sheets—Sheet 1.

I. F. DAVIS.
TURBINE WATER WHEEL.

No. 267,162.

Patented Nov. 7, 1882.



WITNESSES

Emory H. Bates
Philip C. Massi.

INVENTOR

Isaac F. Davis
by Anderson & Smith
his ATTORNEYS

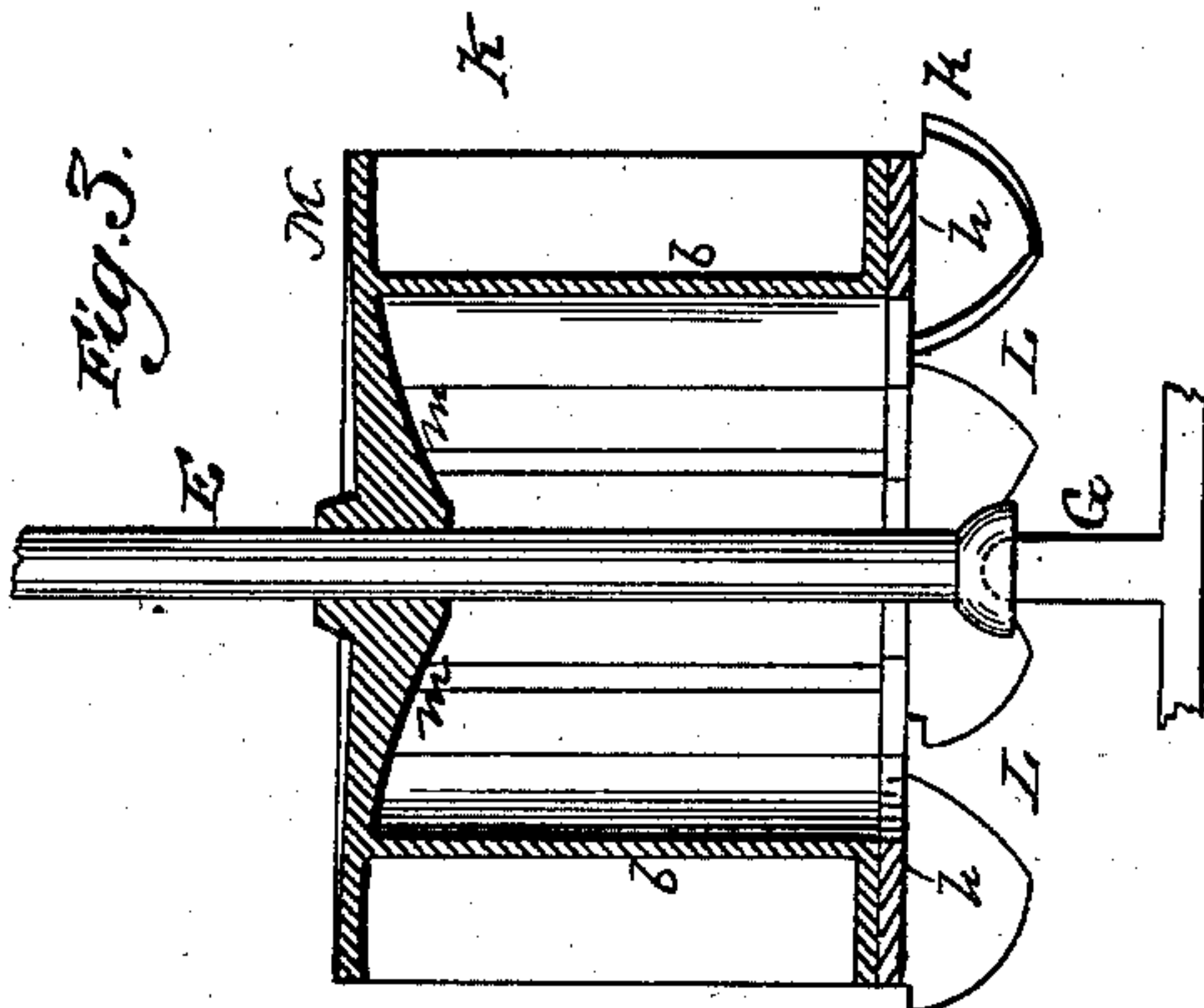
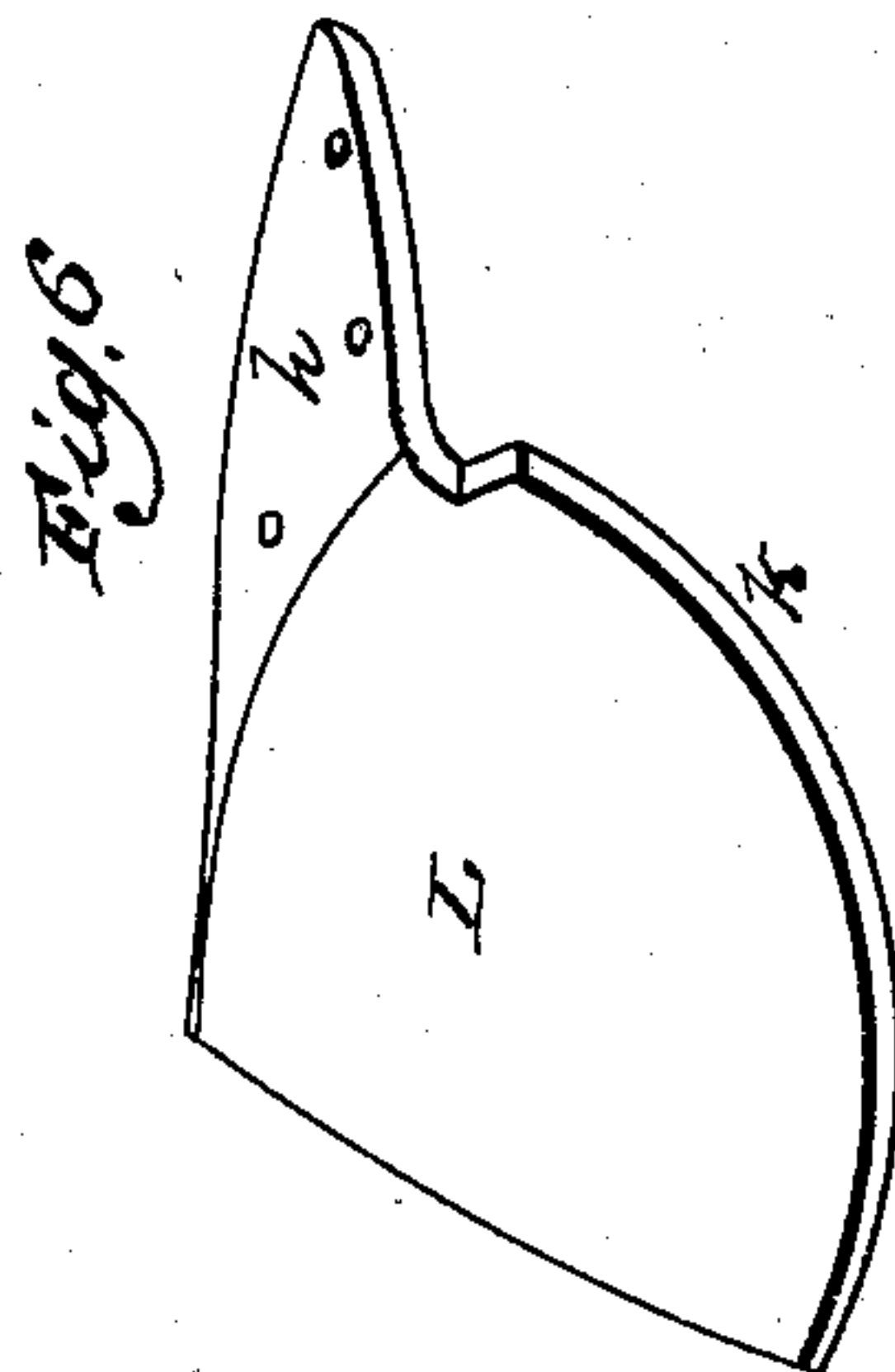
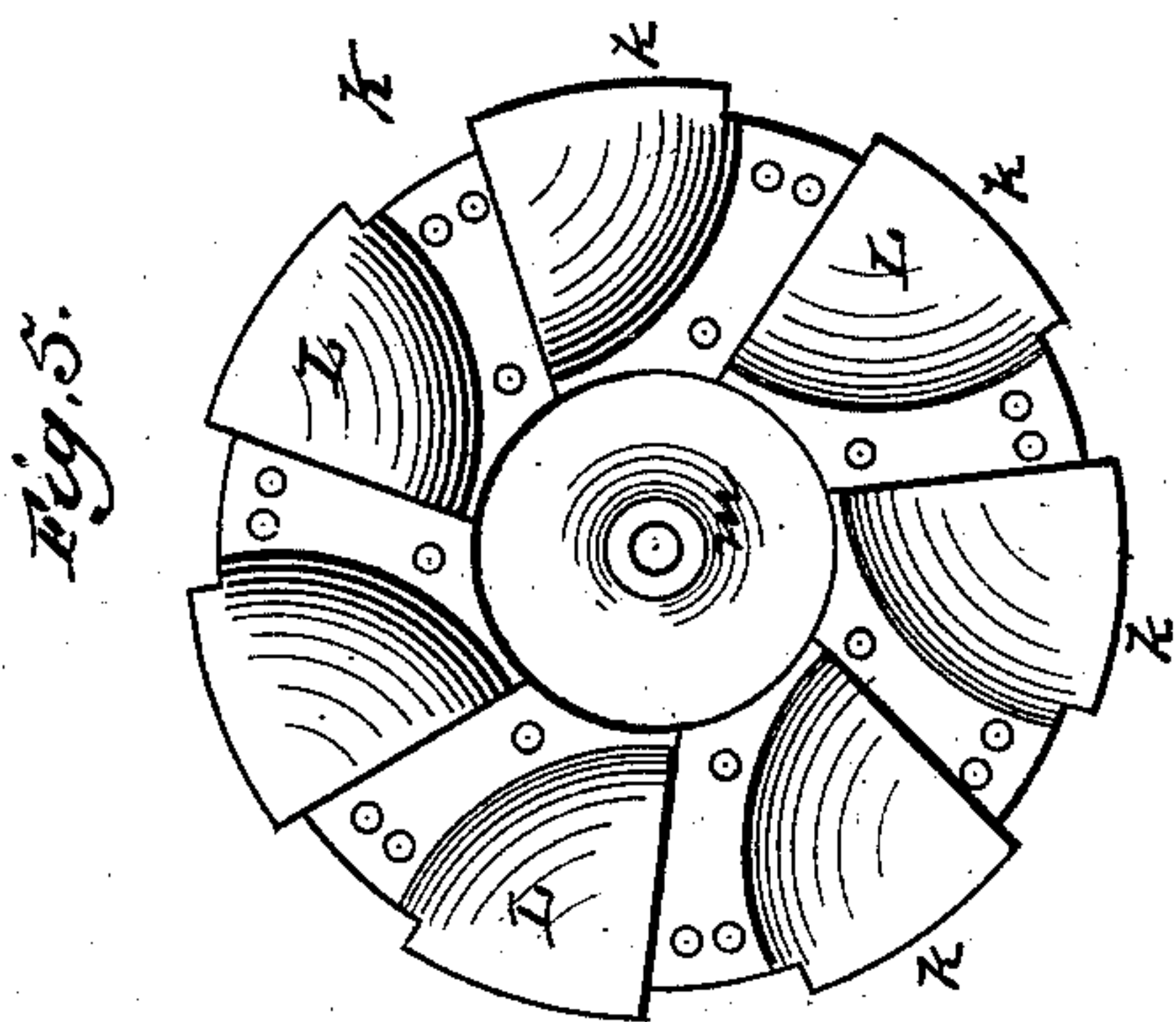
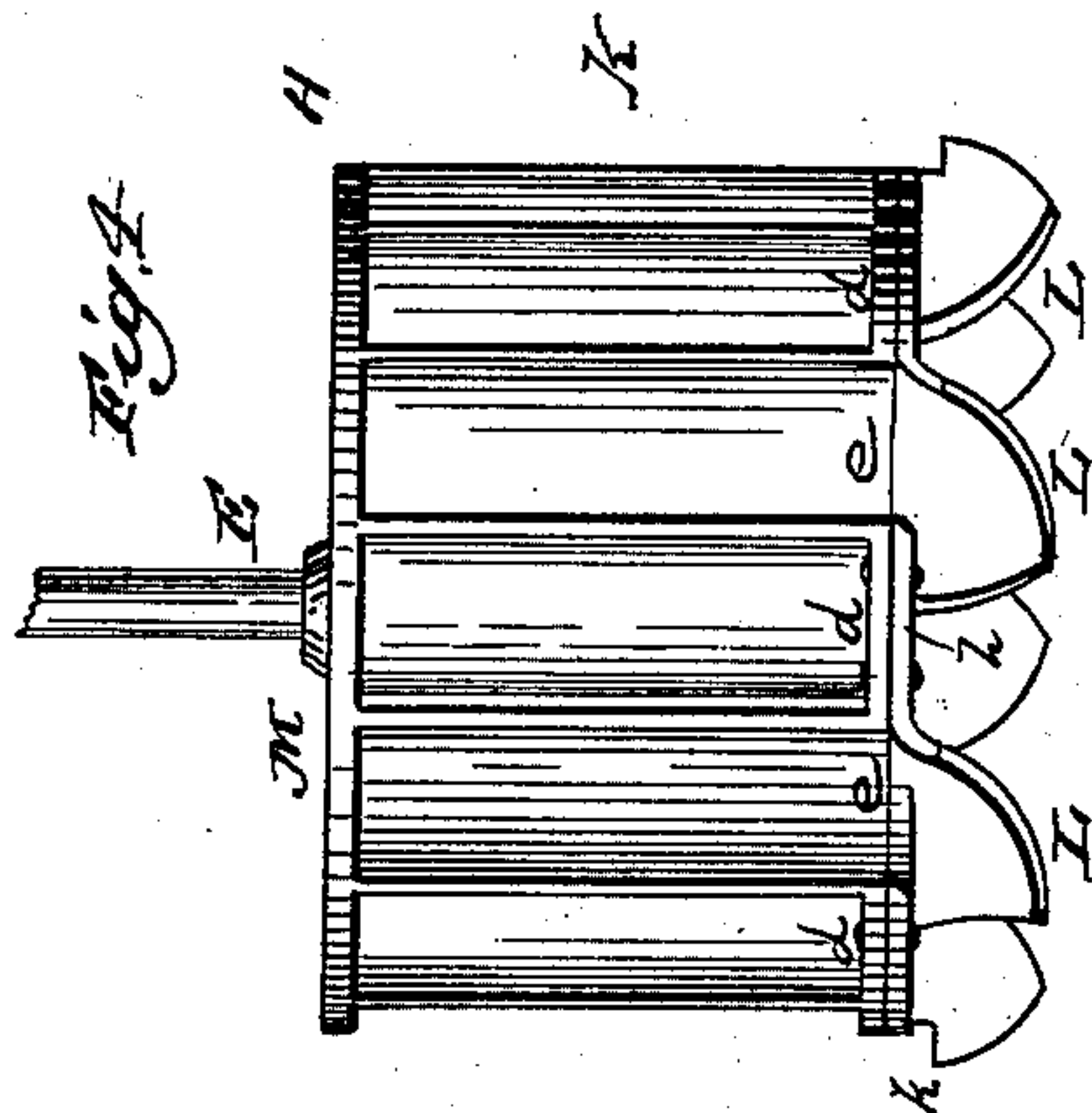
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UNITED STATES PATENT OFFICE.

ISAAC F. DAVIS, OF GREENSBOROUGH, NORTH CAROLINA.

TURBINE WATER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 267,162, dated November 7, 1882.

Application filed June 24, 1882. (No model.)

To all whom it may concern:

Be it known that I, ISAAC F. DAVIS, a citizen of the United States, resident of Greensborough, in the county of Guilford and State of North Carolina, have invented a new and valuable Improvement in Turbine 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 side view of my water-wheel. Fig. 2 is a horizontal sectional view. Fig. 3 is a vertical section of the wheel detached from the casing. Fig. 4 is a side view of the wheel detached from the casing. Fig. 5 is a bottom view of the wheel, and Fig. 6 is a perspective view of one of the flanges L detached from the wheel.

This invention has relation to turbine water-wheels; and it consists in the construction and novel arrangement of the circular series of inwardly-discharging buckets and downwardly-discharging buckets alternately with each other—the circular series of buckets alternately close and open toward the center and respectively open and close at the bottom—and the curved directing-flanges extending below the open bottoms; and in the combination, with the series of buckets alternately opening toward the center and toward the bottom, of the inclined curved directing-flanges below and the curved and conical hub at the center or stem, all as hereinafter set forth.

In the accompanying drawings, the letter A designates the chute; B, the tub or case rim below the chute, and C the bridge-tree to which the tub is bolted.

D represents the top of the case, which is bolted to the upper rim of the chute.

E indicates the stem or shaft of the wheel, extending vertically through the bearing F, and having its lower end stepped on the pivot-bearing G of the bridge-tree.

H is the wheel, consisting of a cylindrical-form casting, K, having the directing-flanges L, which may be either cast entire with the part K or secured thereto. The wheel is formed with a solid top, M, the lower portion of which projects downward in curved and conical form,

centrally surrounding the stem E, and forming the hub of the wheel. The cylinder portion or bucket-wall depends from the marginal portion of the top M, and consists of a series of vertical bucket-walls or partitions, *ab*, which curve from the outside inward and backward, forming the buckets R and S. The horizontal curvature of these bucket-walls is wave-like, as shown in the drawings, and the walls are arranged in alternating order, each wall *a* being between two walls, *b*, and connected to the preceding wall *b* by the closed angle *c*, extending vertically at the inside of the bucket, and to the succeeding wall *b* by the bottom connection, *d*. It is therefore so constructed that while the bucket R, which is formed between the walls *a* *b*, has an open bottom, as indicated at *e*, and a closed inside wall, *c*, the alternate bucket, S, which is formed between the walls *b* *a*, has a closed bottom, *d*, and an inside opening between the inner edges of its walls, as at *g*, for its discharge. The water, therefore, which enters the latter bucket is discharged inwardly, or toward the center of the wheel, and the water which enters the bucket R is discharged downwardly.

Below the open bottom of each bucket R is arranged the concave inclined deflecting or directing flange L, which extends outward, downward, and backward from the base of each wall *b*. Usually these flanges are cast separately from the body of the wheel, and are formed with flat portions *h*, which are riveted or bolted to the bottoms *d* of the buckets S. The outer edges, *k*, of the flanges L are designed to work closely to the inside wall of the tub B, so that the water descending from the buckets R will be received fully on the flanges, and will be deflected toward the under side of each succeeding flange, in that manner having a tendency by reaction to lessen the friction on the step. So, also, the water passing through the buckets S and discharging centrally will act on the hub-cone *m*, and in a similar manner tend to lessen the friction on the step. The regular alternation in the direction of the discharge is designed to provide greater vent for a wheel of a given size and to avoid obstructing the discharge of one bucket by that of another. In this manner the full power of the water is designed to be obtained.

The inward discharge of one set of buckets does not obstruct or interfere with the downward discharge of the alternating set; and by dividing the discharging-points in the manner indicated the reacting power of the water discharged centrally as well as downward is utilized to lessen the friction on the step, and also to help in driving the wheel.

V represents the circular gate, arranged preferably within the chute. It is provided with a rack-arm, *w*, and is operated by a pinion, *p*, on the shaft *s*.

Having described this invention, what I claim, and desire to secure by Letters Patent, is—

1. In a turbine, the alternate series of inwardly or centrally discharging buckets S and downwardly-discharging buckets R, substantially as specified.

2. In a turbine, the circular series of buckets R, closed on the inside and opening down-

wardly, the alternating buckets S, closed at the bottom and opening inwardly, and the curved directing-flanges L, extending backward, downward, and outward below the open bottoms of the buckets R, substantially as specified.

3. The turbine consisting of the chute A, tub B, gates V, bridge-tree C, stem E, and wheel having the alternate inwardly-discharging buckets S, downwardly-discharging buckets R, curved flanges L, extending below the latter, and centrally and downwardly projecting hub-cone *m*, substantially as specified.

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

ISAAC F. DAVIS.

Witnesses:

J. J. NELSON,
V. N. BARRINGER.