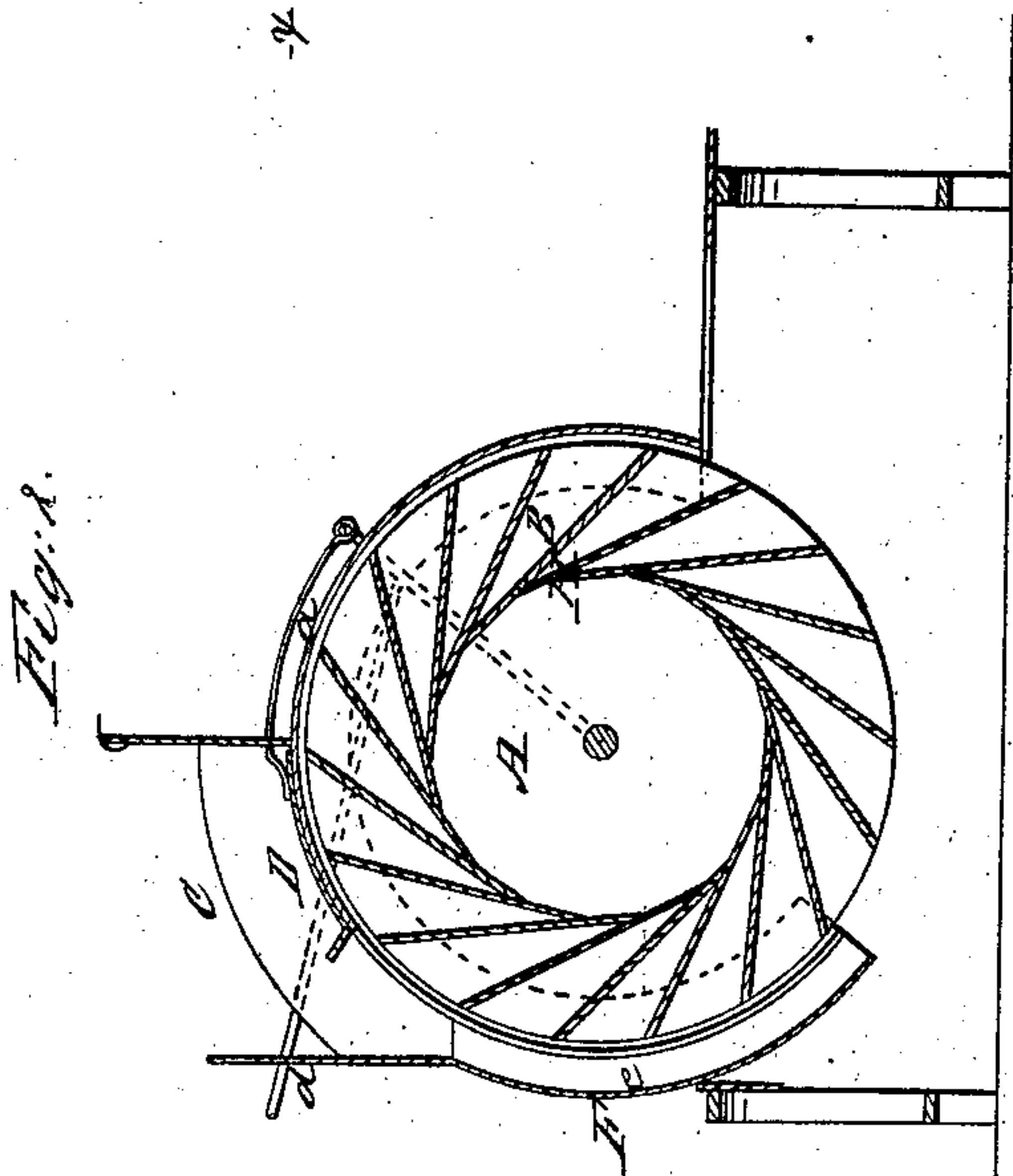
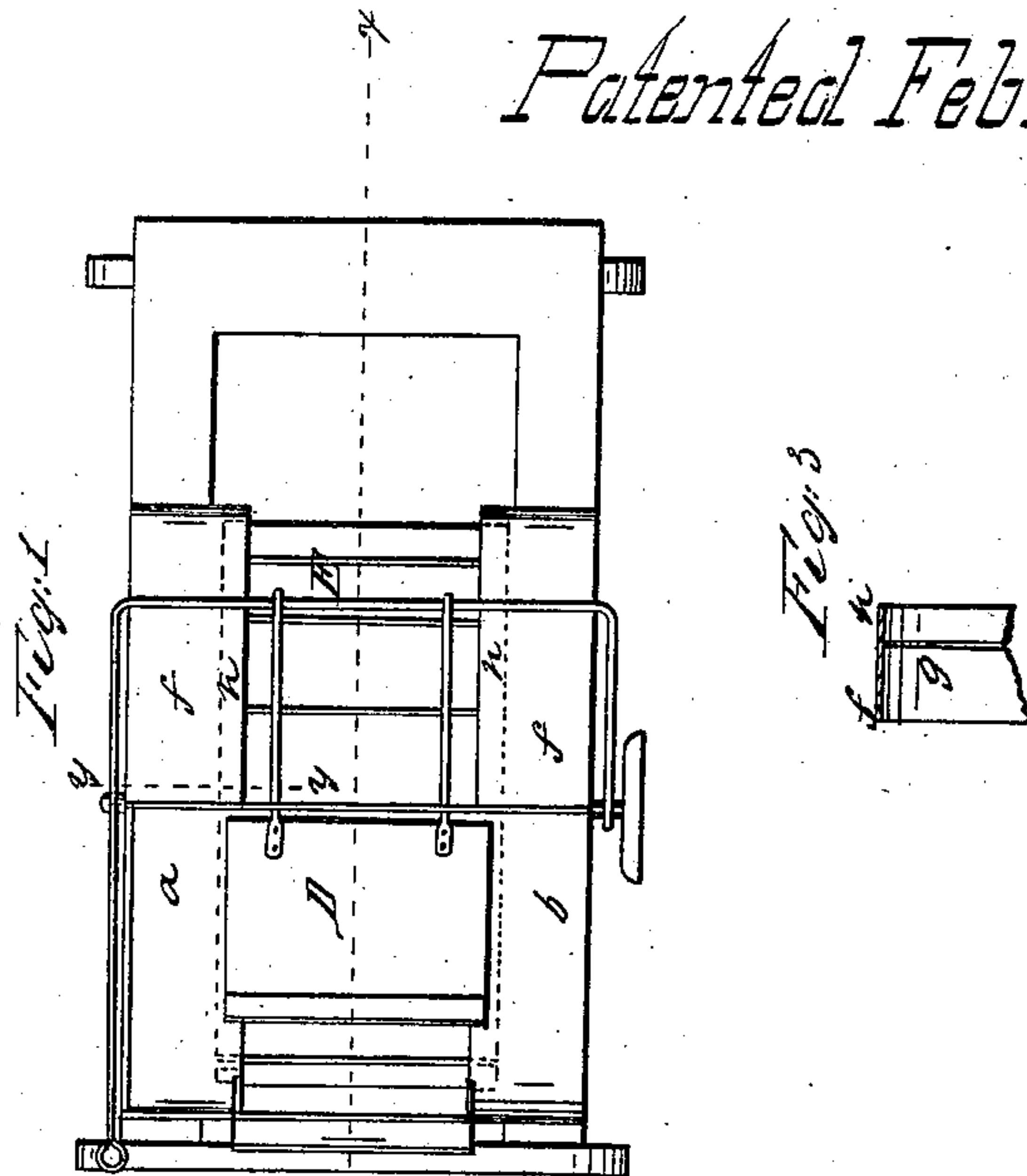


# Beers & Leonard, Water Wheel.

No 34,475.

Patented Feb. 25, 1862.



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# UNITED STATES PATENT OFFICE.

JOHN L. BEERS AND SAMUEL LEONARD, OF OAKLAND MILLS, PENNSYLVANIA.

## IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. 34,475, dated February 25, 1862.

*To all whom it may concern:*

Be it known that we, JOHN L. BEERS and SAMUEL LEONARD, both of Fayette township, in the county of Juniata and State of Pennsylvania, have invented certain new and useful Improvements in Water-Wheels; and we do hereby declare that the following is a description thereof in terms which we now think sufficiently full, clear, and exact, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a top view; Fig. 2, a vertical section in the line *xx* of Fig. 1, and Fig. 3 a transverse section in the line *yy* of Fig. 1.

The nature of our invention consists in providing the wheel with a concentric chute for about one-fourth of its diameter, more or less, and arranging it with reference thereto in such a manner that the water lying dead in the penstock directly over the wheel shall have free and full effect upon the buckets or the solid periphery of the wheel to its center, extent, or width.

To enable others to make and use our invention, we will proceed to describe its construction and operation.

In water-wheels of the class to which ours belongs—viz., water-wheels revolving in vertical planes and having horizontal shafts with the penstocks placed directly over—it has been necessary to use either hinged or sliding buckets, which should come into action after they had entered the penstock, from the fact that it is indispensable that the penstock should fit closely about the wheel. From this it has resulted that a great portion of power has been lost, for it is obvious that although the moment the buckets or valves come into play they commence to receive the full force of the water, yet when any two of them have passed the point where the annular space between the concentric chute and the wheel commences the lower one is entirely relieved from that pressure and assists no further in the revolution of the wheel, except to the extent of the weight of the water contained between the two buckets.

It is the object of our invention to remedy this evil and to provide means whereby the full force of the water in the penstock may be effectively utilized.

To this end our wheel A, which may be made of cast-iron, is provided with cast-iron or steel stationary buckets B, arranged, as represented, tangentially to the cylinder H. These may be deep, as shown in the drawings, or they may be much more shallow. Indeed, buckets of any kind are not necessary in the development of our invention, for we have ascertained from experiment that if the wheel be made solid or with a solid periphery or drum and the buckets entirely omitted a very effective motor is the result when combined with the penstock and concentric chute now to be described, in this case the water acting with all its force wholly by friction.

The penstock C, as already stated, is arranged over or partly over the wheel, and fits closely thereto and to the rims *a b*, which are made alike, so that when the valve-gate D is open the water rests dead upon the wheel. The part *d* of the penstock is extended in a downward direction in the shape of a segment of a circle or of a concave F, and concentrically with the wheel, to a point generally not beyond a line drawn perpendicularly through its axis, leaving an uninterrupted annular space *e* between it and the wheel, which space—in a machine say sixteen inches in diameter and eight inches in length—would be about three-fourths of an inch in depth. From this it will be seen that the water acts upon the wheel with its whole force to the extent of at least one-fourth of its entire diameter, and as the head of water in the penstock is permanently increased to the extent of the width of the concave, and this head is not intermittently diminished by the interposition of buckets in the space *e*, that the power of the wheel is correspondingly increased.

The method of operating the gate will be understood from an examination of the drawings, and as we do not now propose to claim anything therein as novel need not be further described. The part E of the wheel may be covered with a close concave if deemed desirable.

The construction of the rims *a b* of the wheel will be explained by Fig. 3 of the drawings, the part *f* projecting out horizontally over the heads of the wheel, while the part *g*



is a vertical flat ring attached to or cast with the part *f* and lies parallel with and close to the outer surface of the said heads. The part *h* extends inwardly over the wheel.

Having thus described our invention and shown the manner in which it operates, what we claim therein as new, and desire to secure by Letters Patent of the United States, is—

The concave chute *F*, arranged as described, in combination with the superincumbent pen-

stock *C* and the wheel *A*, substantially as and for the purpose forth.

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