3 Sheets--Sheet 1.

D. SHEETS.

Water-Wheel.

No. 129,601. Patented July 16, 1872.

Fig. 1.

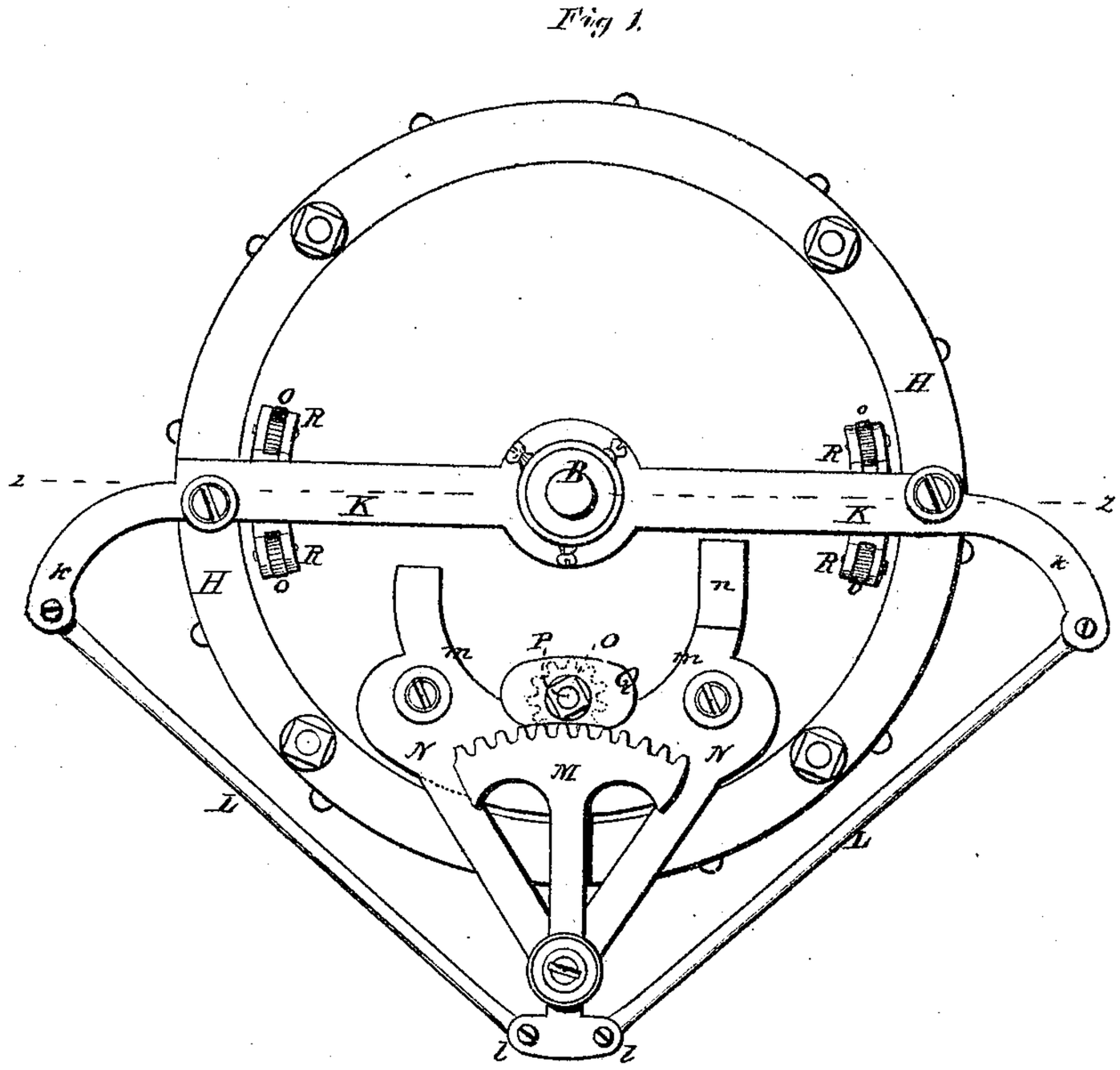
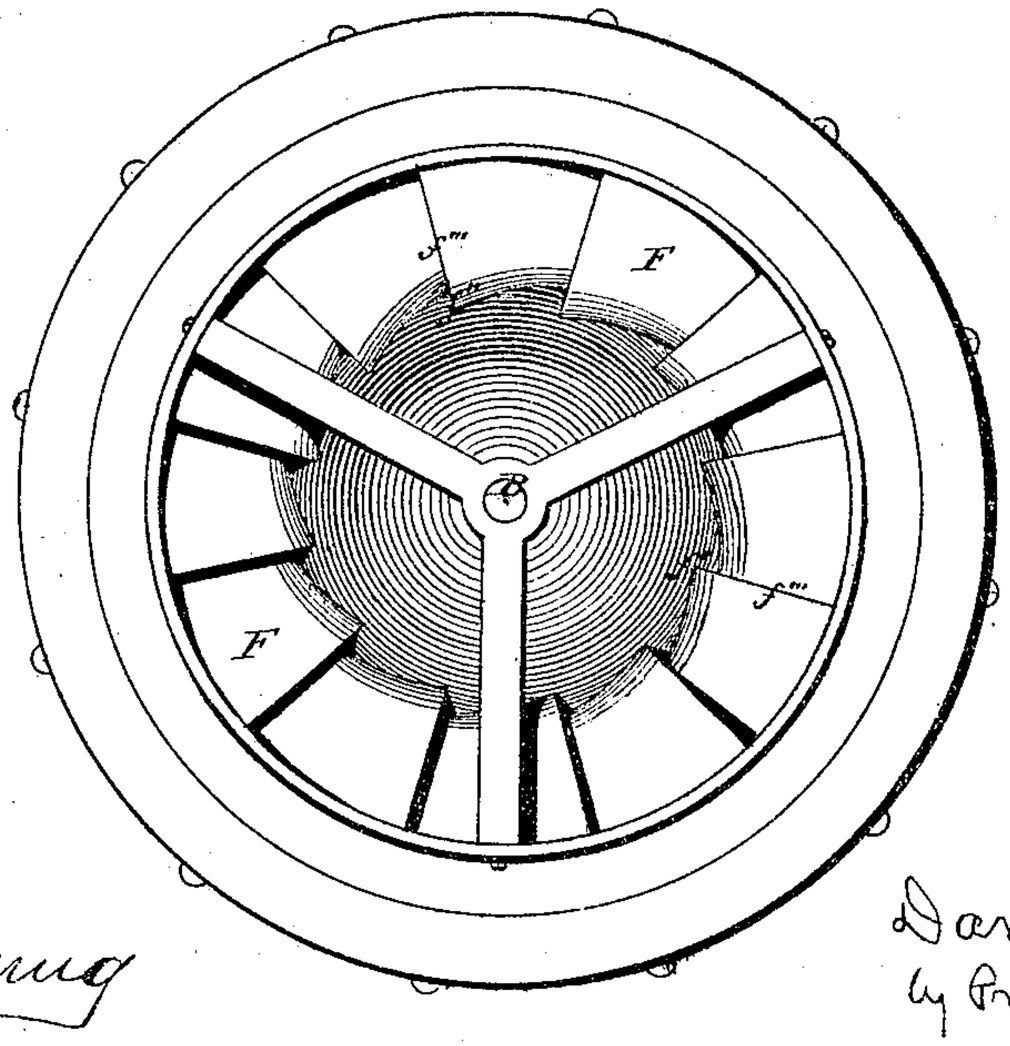


Fig. 2.



Witnesses.

H. Poole.

John R. Young

Inventor:

Daniel Sheets.

by Prindle & Dyer.

his attys.

3 Sheets--Sheet 2.

D. SHEETS.

Water-Wheel.

No. 129,601.

Patented July 16, 1872.

Fig. 3.

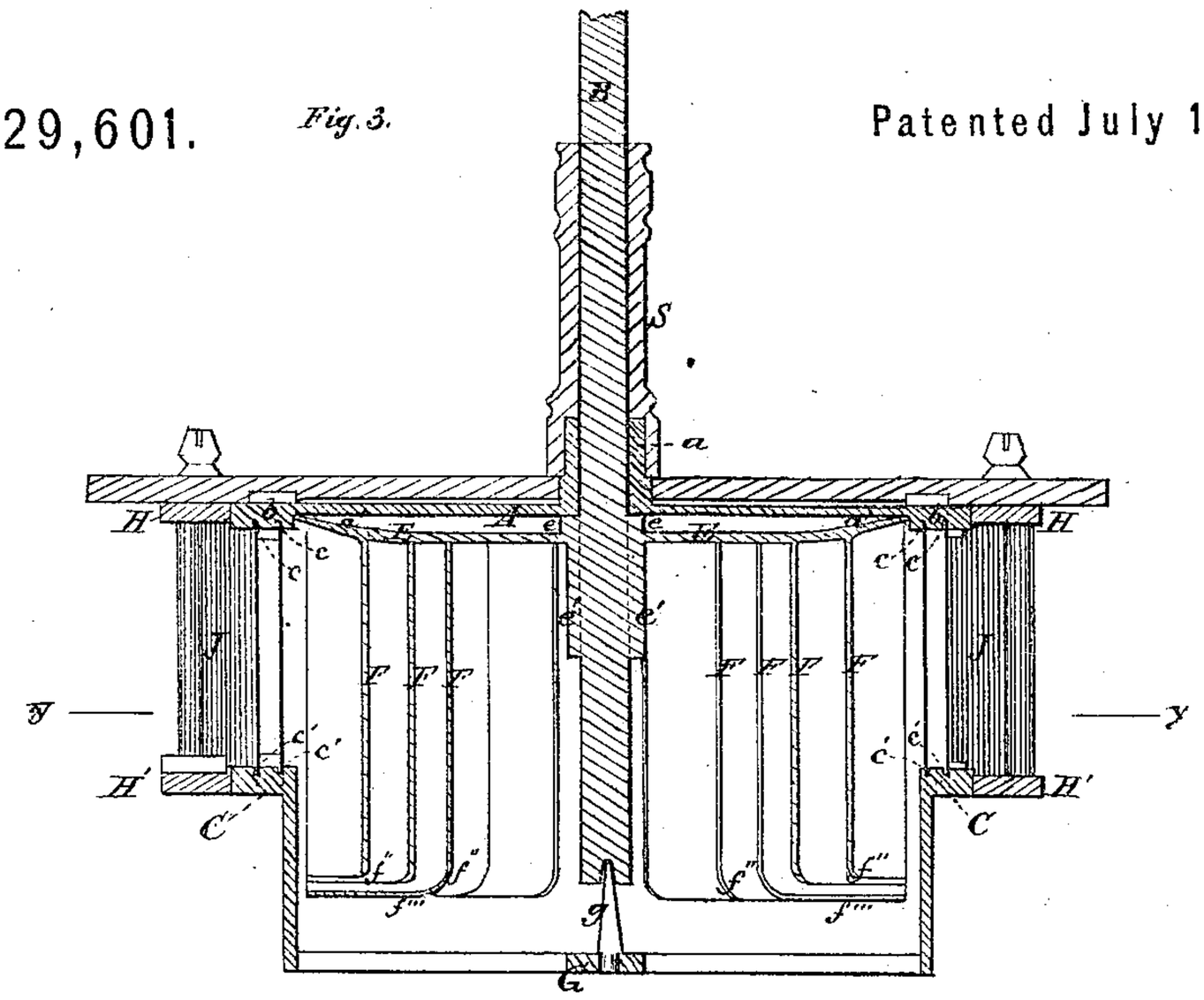


Fig. 4.

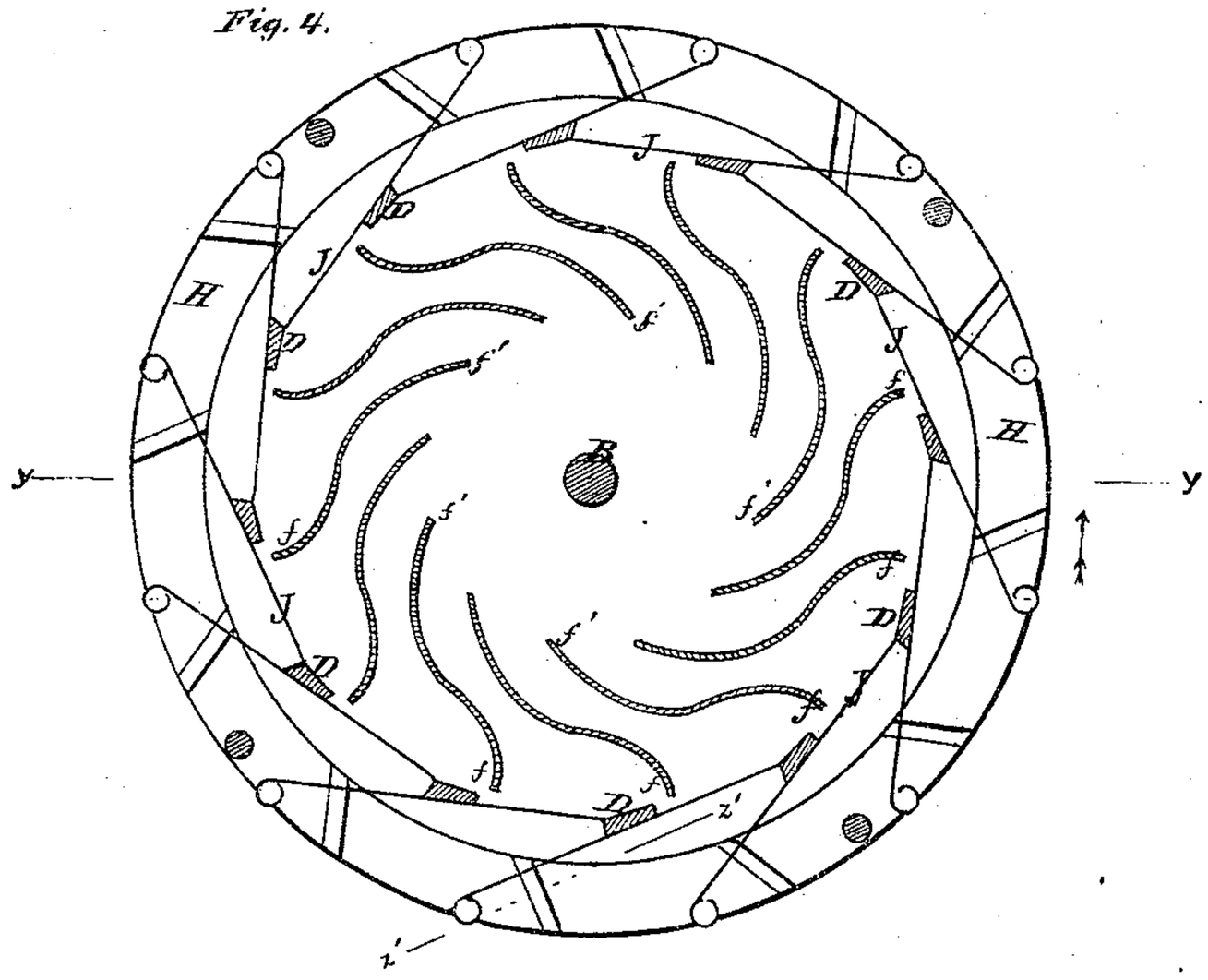
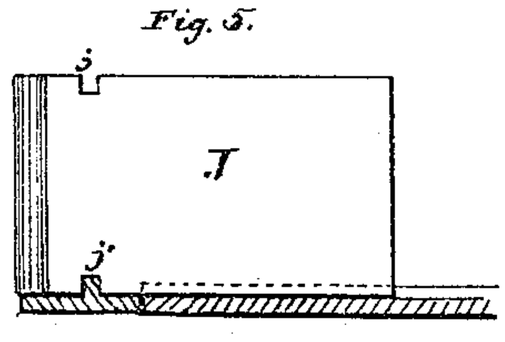


Fig. 5.



Witnesses.

C. A. Poole

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3 Sheets--Sheet 3.

D. SHEETS.

Water-Wheel.

No. 129,601. Patented July 16, 1872.

Fig. 6.

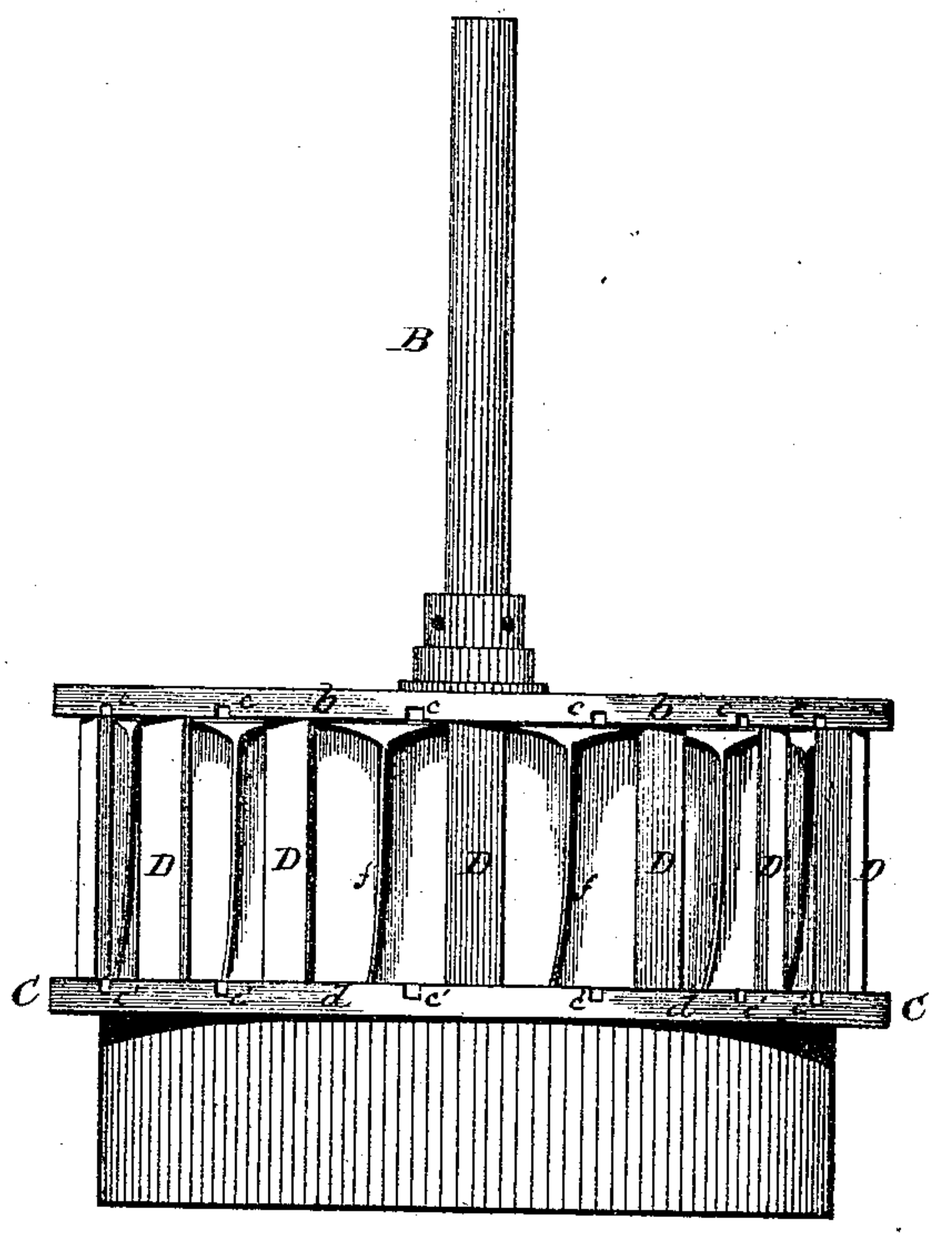
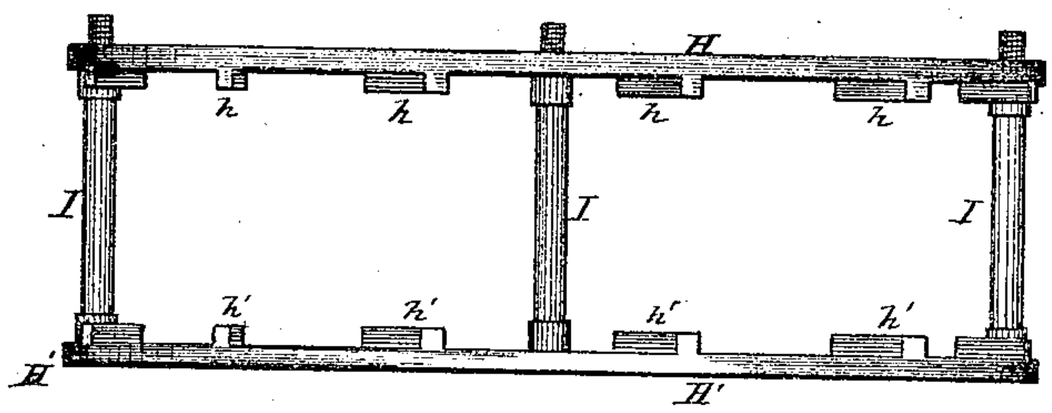


Fig. 7.



Witnesses.

C. H. Poole.

John R. Young

Inventor.

Daniel Sheets,
by Prindle & Dyer,
his attys.

129,601

UNITED STATES PATENT OFFICE.

DANIEL SHEETS, OF DAYTON, OHIO, ASSIGNOR OF ONE-HALF HIS RIGHT TO ANDREW SHEETS, OF SAME PLACE.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. 129,601, dated July 16, 1872.

To all whom it may concern:

Be it known that I, DANIEL SHEETS, of Dayton, in the county of Montgomery and in the State of Ohio, have invented certain new and useful Improvements in Turbines; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which—

Figure 1 is a top-plan view of my wheel; Fig. 2, a bottom-plan view of the same; Fig. 3, a central vertical section of the same on the line *z z* in Fig. 4; Fig. 4, a horizontal cross-section of the same on the line *y y* in Fig. 3; Fig. 5, a separate view of one of the shutters on the line *z' z'* of Fig. 4; Fig. 6, an elevation of the wheel with the movable rings and shutters removed; and Fig. 7, an elevation of the movable rings when detached from the wheel.

Like letters of like kinds denote corresponding parts in each figure.

The object of my invention is to obtain in a turbine-wheel more operative power, and to regulate more conveniently the flow of water to the buckets; and it consists in the peculiar form of the buckets and their arrangement upon a revolving disk; in the means employed to communicate motion to the shutters; in the means by which the shutters are moved back and forth; and in the combination and arrangements of its principal parts, all constructed as hereinafter more fully described.

In the drawing, A represents a circular plate or disk, with a central boss, *a*, through an opening in which the spindle B passes vertically. This disk has a circular recess, *a'*, on its under side, by reason of the thickness of the rim *b;* and in this rim, and on the under side thereof, are provided grooves *c* for the shutters running across it, as shown in Fig. 4. The disk A is connected with the bottom piece or shell C of the wheel by means of standards D, which reach from the inner line of the rim *b* to a similar portion of the rim *d*, which constitutes the upper portion of said bottom piece. Upon this rim are shutter-grooves *c'*, corresponding in all respects with the grooves *c*. These standards just mentioned are four-sided in section, as shown in Fig. 4, and each has its longest side agreeing with the center of one of the shutter-grooves, and the side having an obtuse angle meeting the inner end of one of said grooves. Beneath the disk A is another disk, E, which is centrally secured to the spindle and turns with it, and has a central boss, *e*, upon its upper surface extending upward, and a similar boss, *e'*, dependent from its lower side. This disk reaches on its outer edges up into the recess in the under part of the disk A, and is hollowed down on all parts of its upper sides toward the center, so as to give a bearing of the top of the boss *e* against the under side of said disk A. Cast upon or with this disk E, or otherwise properly secured to it, are the buckets F, which are not attached to or connected in any way except by their tops, and depend vertically from the under side of said disk. The buckets are shown in section of their upper halves in Fig. 4, arranged concentrically, with an inner curve near the outer edge *f*, and then an outer curve toward the inner edge *f'*, both of these curves lessening gradually toward the bottom of the bucket at the point *f''*, where the bucket is bent at nearly right angles with its bottom *f'''*, sloping down a little so as to bring the outer edge of each bucket below the next succeeding one, and the inner edge a little above the bucket next before. This opening between adjoining buckets at all points gradually diminishes from the outside to the inside. A bearing, G, secured in the bottom of the shell C has upon it a pintle, *g*, upon which the bottom of the spindle turns, and enables the buckets to revolve within said shell. A flat ring, H, fits closely around the periphery of the disk A, and has upon and diagonally across its under side rectangular guides *h*, arranged as shown in Fig. 4, and a similar ring, H', fits in like manner around the periphery of the rim *d*, provided with similar guides *h'*, and both are connected together and kept in position by means of the standards I, which penetrate the ring H, and are secured by proper nuts upon the same. The shutters J, which are of the form shown in Fig. 5, and provided with rectangular slots *j* and *j'* on their upper and lower edges corresponding with the guides *h* and *h'*, are arranged in the grooves *c* and *c'* in position in regard to the standards D, as before described and as shown in Fig. 4, with the slots over the guides. A yoke, K, with its center enlarged, and provided with an open-

ing corresponding with the boss *a*, over which it is fitted, and upon which it has a rotary movement, is secured to the top of the ring H by suitable screws, and to its curved outer arms *k* are pivoted links L, the opposite end of which is in turn pivoted to the outer ears *l* of the anchor-shaped rack M, which again is pivoted to the outer arm of the triangular frame N, the base *m* of which is secured upon the top of the disk A by suitable means. One arm, *n*, of the frame is made purposely thick, so as to serve as a stop for the yoke K, and prevent the shutters from being drawn out too far in the operation of the yoke. A pinion, O, secured upon a proper shaft, P, the top of which is squared for convenient use of a wrench, and revolving within a shell, Q, is provided with teeth, which mesh into those upon the rack M. Carriages R, provided with suitable rollers *o*, are placed on either side under the yoke K, and facilitate its operation. One or more thimbles, S, fit down over the spindle B, and are secured to the boss *a*.

In the operation of my device the flow of water to the buckets is regulated by the turning of the shaft P, which, acting through its pinion, connecting-rack, and yoke, partially rotates the rings H and H′, in the movement of which the shutters J are gradually forced in or out, diminishing or enlarging, as the movement may have been, the opening between the inner ends of said shutters and the sides of the standards D next to them. This movement of the shutters is effected by the motion of the guides *h* and *h′* within the slots *j* and *j′* of the shutters, by which movement said shutters are impelled back and forth in their respective grooves, and in the same operation slide out or in upon such guides. The water entering the openings, as described, strikes upon the buckets, and, from their peculiar form, has a constantly-propelling power upon them throughout their entire length, without any period of inertia in such action.

The advantages of my construction consist in the simplicity of parts, and the construction and arrangement of parts by which friction is avoided, and there results but little loss of the absolute water-power.

Having thus described my device and its manner of operation and some of its advantages, what I claim as new therein and my own invention is—

1. The buckets F gradually converging at their overlapping parts from their upper ends to the extremities of their outward curved faces, and secured to a revolving disk by their upper ends alone, and arranged and operating substantially as described and shown.

2. The combination of the yoke K, the links L, the rack M, the frame N, the pinion O, the shaft P, with the rings H and H′, substantially as described and shown, for the purpose of giving motion to said rings.

3. The combination of the grooves *c* and *c′* and the guides *h* and *h′* with the shutters J and the rings H and H′, substantially as described and shown, for the purpose of giving motion to said shutters, as set forth.

4. The combination of the disk E provided with the bosses *e* and *e′*, the spindle B, and the disk A, all constructed, arranged, and operating substantially as described and shown.

5. The guide and stop standards D, constructed substantially as described and shown, in combination with the shutters J, as and for the purposes set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 9th day of December, 1871.

DANIEL SHEETS.

Witnesses:

JOHN SCOTT,

URIAH C. HARTRANFT.