

H. W. Shipley. Water Wheel.

N^o 71335

Patented Nov. 26, 1867.

Fig. 1.

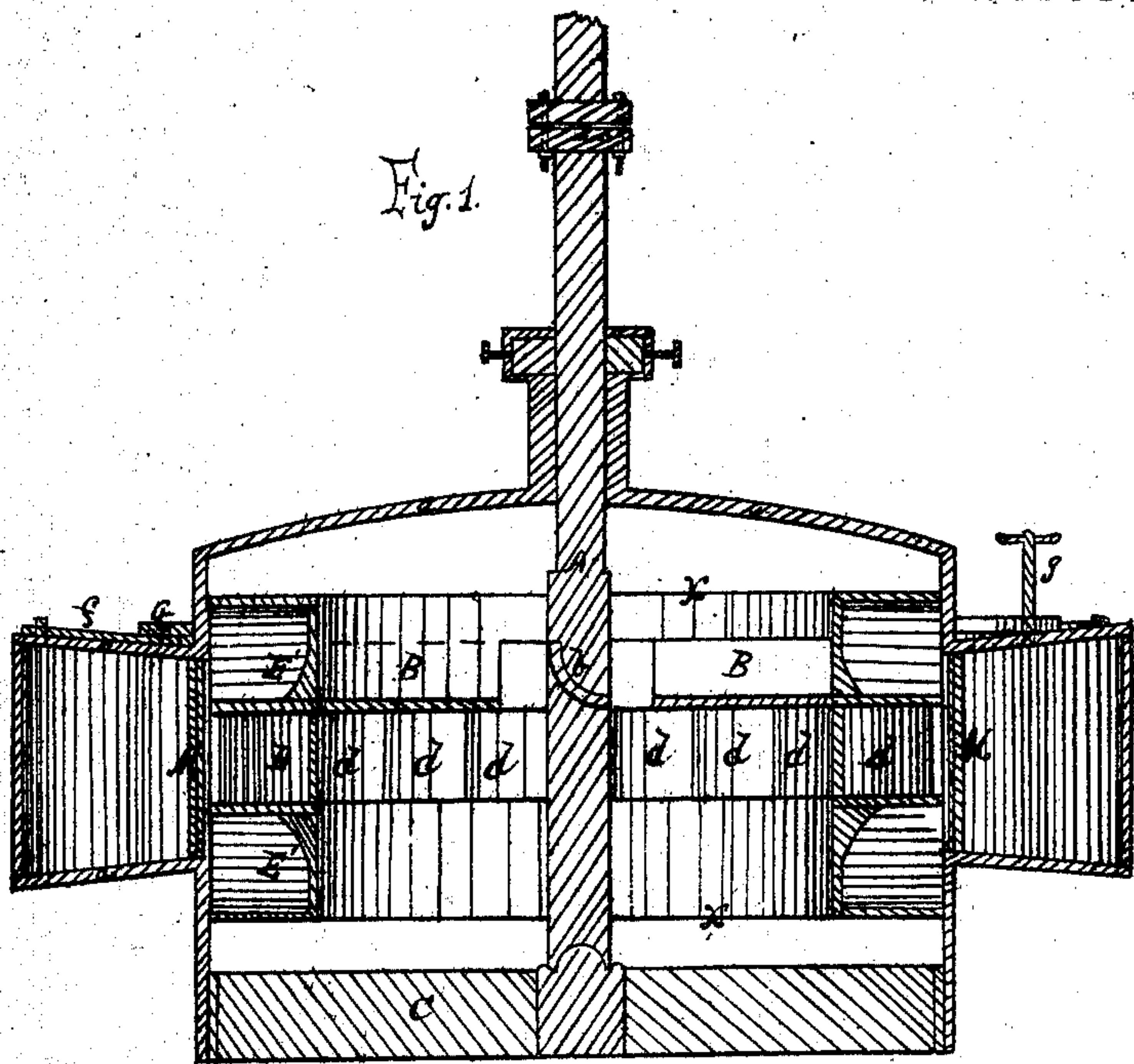


Fig. 2.

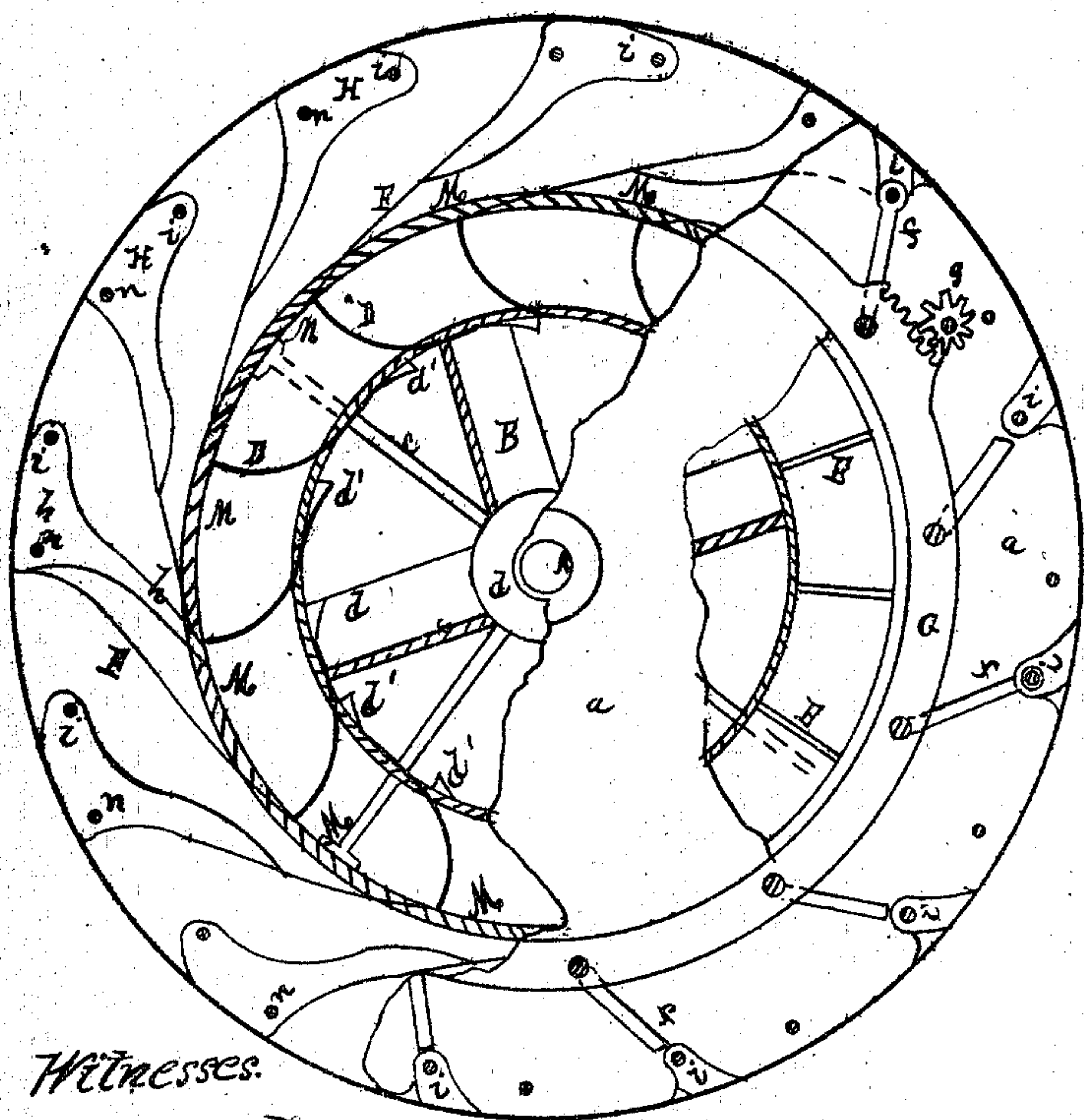
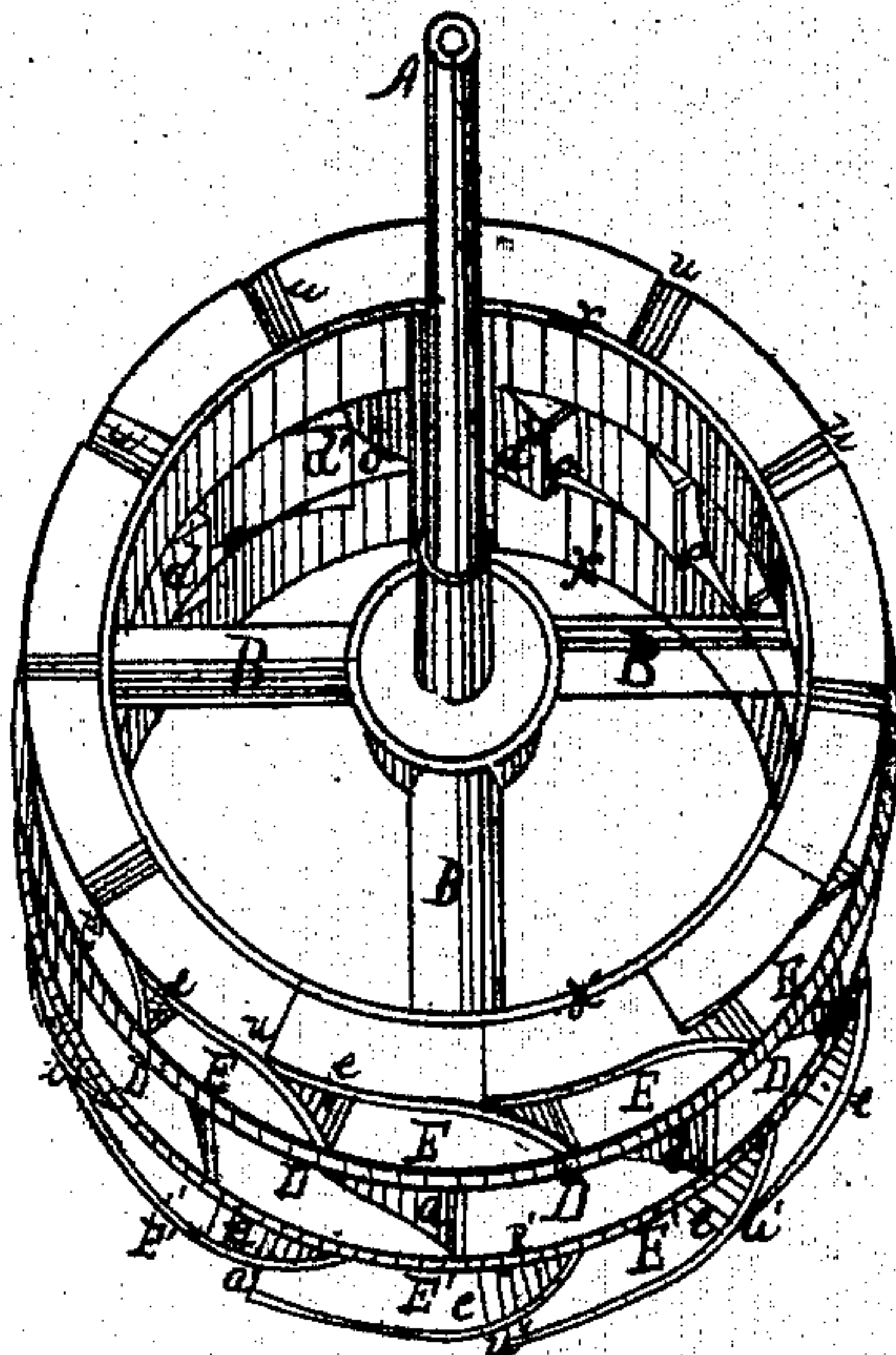


Fig. 3.



Witnesses.

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HENRY W. SHIPLEY, OF PORTLAND, OREGON.

Letters Patent No. 71,335, dated November 26, 1867.

IMPROVEMENT IN WATER-WHEELS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, HENRY W. SHIPLEY, of Portland, in the county of Multnomah, and State of Oregon, have invented a new and useful Improvement in Water-Wheels; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, and in which—

Figure 1 is a vertical axial section of my invention.

Figure 2 is a top view of the same, a portion of the enclosing case being removed.

Figure 3 is a perspective view of the wheel detached from the casing.

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

The main feature of this invention consists in constructing the wheel and buckets in such a manner that the water is held as far as possible from the axis during the wheel's revolution, so as to obtain its greatest power. The buckets are made exceedingly shallow, and their capacity is preserved by widening them and increasing the depth of the wheel. There are several rows of buckets on the wheel, and, in connection with them, a new system of gates is employed.

The object of thus constructing a wheel is to utilize, to its fullest extent, the power of the water during dry seasons, and in places where but a small volume of water can be had. The same quantity and head of water, acting on buckets at a distance of seven or eight feet from the axis, will exert double the propelling power that it would if the buckets were only two or three feet from the axis. Where the buckets are made deep, reaching towards the centre of the wheel, there is always a great loss of power in this manner. In any form of construction where the wheel has a narrow rim and only one series of buckets, such loss of power must inevitably occur. A thorough practical trial of my machine has shown that it is admirably adapted to utilize power in this respect, working more efficiently with a small stream than any other wheel hitherto in use.

The wheel is constructed to run on a vertical shaft, A, within a circular casing or box, *a a a a*. The rim of the wheel, from the line *x* to the line *x'*, is made very wide, and is provided with three rows of shallow buckets, the central row *D D* receiving the water from the periphery of the box *a a*, and discharging it through openings *o o* into the space at the centre of the wheel, whence it escapes at the bottom, the upper row *E* receiving the water in the same manner, and discharging it at the openings *u u* along the line *x*, whence it flows over the top of the rim and falls into the central space with the other water, escaping at the bottom, and the lower row *E'* receiving the water in the same manner, and discharging it directly into the waste-way, through the openings *u' u'*, along the line *x'*.

The shape and construction of all the buckets are clearly shown in fig. 3. The central row is enclosed between two projecting rings, *r r*, the side rows lying between the rings and the upper and lower edges of the rim, respectively. The central row is constructed of a series of double-curved plates, *d d*, their outer ends being flush with the outer surface of the rings, and their inner ends projecting to some distance inside of the rim, as shown at *d'*. The side buckets are composed of a single-curved plate, *e*, extending from the ring out towards the edge of the rim of the wheel, and thence curving backward along the edge of the rim till they come opposite the centre of the curve of the next bucket, where they terminate, leaving the spaces *u u'*, between their rear end and the convex surface of the curved bucket, behind them, for the water to escape through, as above described. The side buckets are made exceedingly shallow, and are quite narrow, being, in the working wheels which I have been using, only one and a quarter inch in width in a wheel of fifteen inches diameter. Their depth is greatly exaggerated in the drawings, for the purpose of clearness. The bottom of the side buckets may be of any form: curved, as shown in the drawings, or plane—preferably the latter.

Such being the construction of my wheel, it is enclosed within the case *a a a*, as shown, and the water is let upon it through a series of openings, *M M*, around the periphery of the case, and directed upon the buckets *E E' D* by means of curved guides *F F*. The openings *M M* are between the inner ends of these guides. Gates *H H*, provided with arms *i i*, and pivoted at *n n*, are attached in connection with every guide, being pivoted near the outer end of the guide, and extending inward towards the openings *M M*. These gates, when open, lie closely against the guides, being shaped to fit their surface, and offer no obstruction to the inward flow of the water to the openings *M M*. When closed, the outer edge of the gate is held by its pivot against the outer edge of the

guide near it, and its inner end is thrown against the inner end of the next adjacent guide, so that the gate extends entirely across the space between the guides, completely closing the passage. This position is clearly shown at *h*, fig. 2. The gates are opened and closed by a hand-wheel, *g*, a ratchet upon which operates a rack-segment on a ring, *G*, that extends entirely around the top of the case, partially revolving the ring. From different points along the ring, connecting-rods *f f* extend to the arms *i i*, to the ends of which they are jointed. When the ring *G* is moved in one direction, it draws upon the connecting-rods and opens the gates, and when moved in the opposite direction, it pushes upon the rods and closes them.

The passages *M M* are not wide enough to admit the water to the whole width of the outer buckets *E E'* at once, but only to their inner edges, as shown in fig. 1. The water is delivered to the whole width of the central buckets *D*.

In connection with these features of my invention, I use a set of radial arms, *B B b*, fashioned into buckets, as shown in the drawings. The water that flows over the top of the rim, from the upper row of buckets, falls upon these radial buckets, and assists to move the wheel.

Annular guide-plates may be attached to the inner wall of the rim of the wheel, on each side of the projecting ends *d' d'* of the central buckets, in order to confine the water to the buckets, and cause it to exert its force upon them till it is finally discharged from them at their inner extremities. The water-passages, from the outer to the inner ends of the guides, diminish slightly in height for the purpose of directing the current in a better manner upon the buckets.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the parts *D E E'*, when constructed and arranged in relation to each other as shown and described.
2. In combination with the foregoing, the arms or buckets *B*, constructed and arranged as described.
3. The gates *H*, hinged at the outer extremities of the guides *F*, and adapted to close inwardly, and provided with arm *i i*, in combination with the links *f* and ring *G*, when constructed and arranged in the manner and for the purpose specified.
4. In combination with the inwardly-closing gates *H* and guides *F F*, the water-passages between the latter, when constructed so as to diminish in height from their outer to their inner ends, substantially as and for the purpose specified.

H. W. SHIPLEY.

Witnesses:

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