

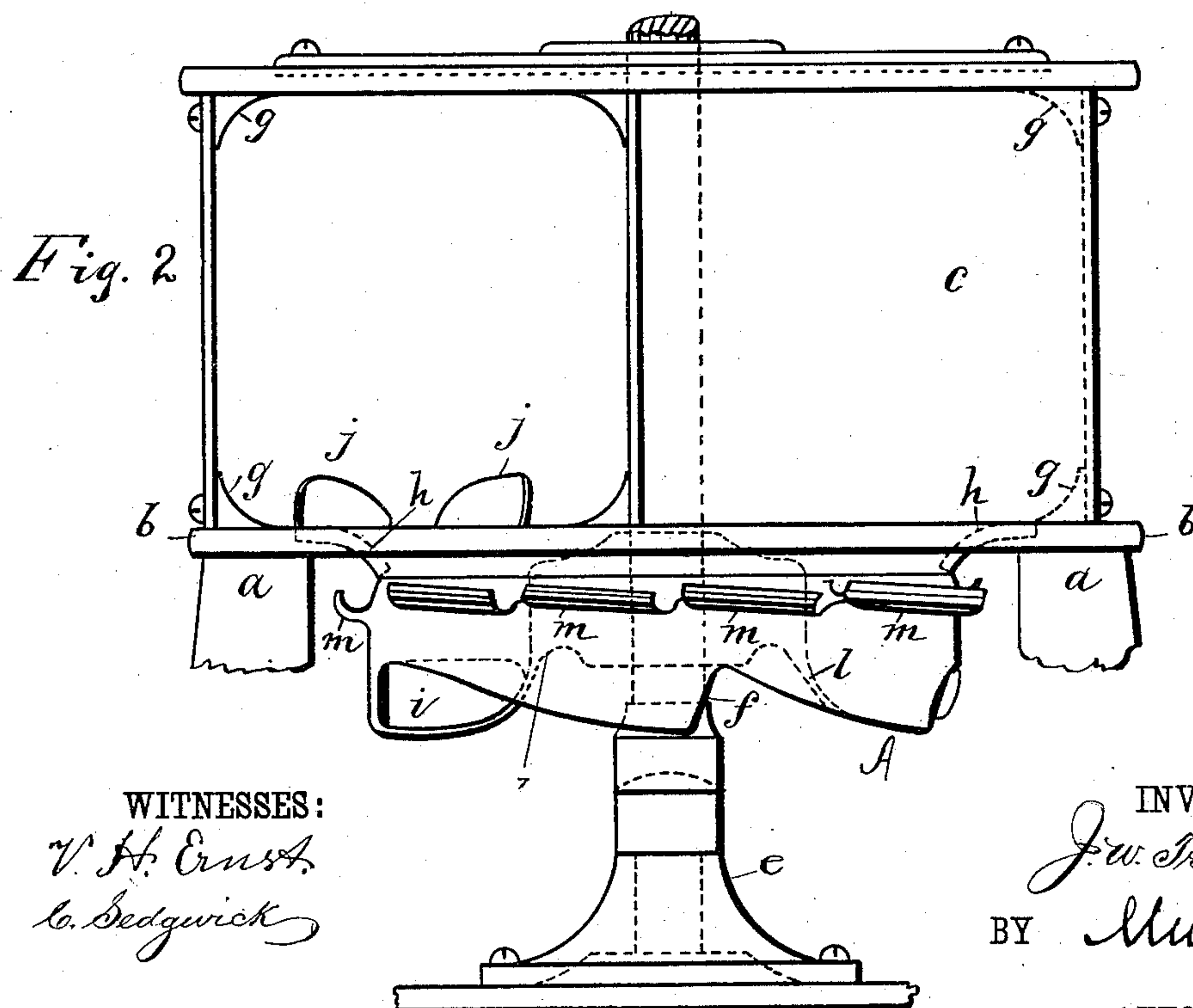
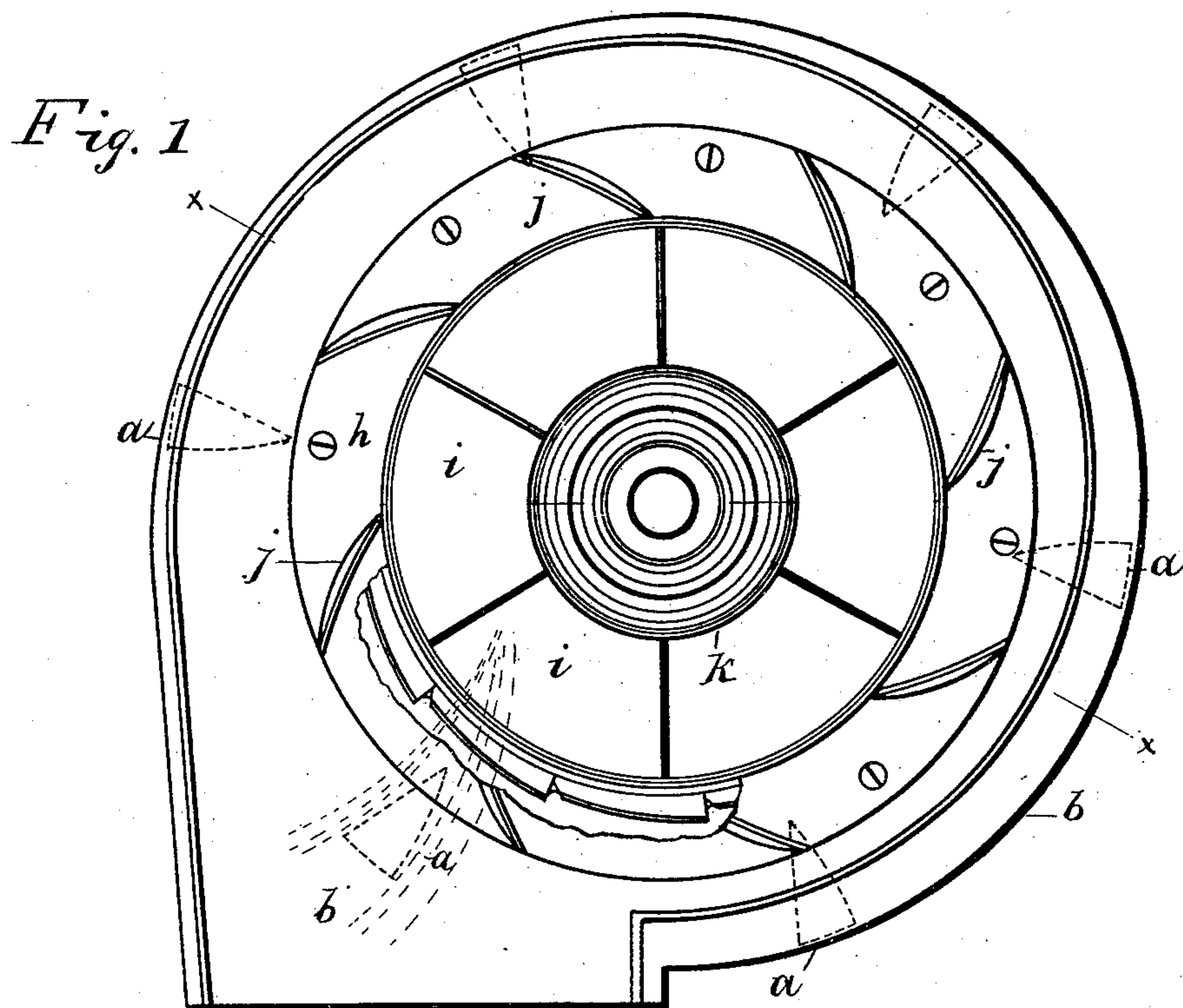
(Model.)

2 Sheets—Sheet 1.

J. W. TRUAX.
TURBINE WATER WHEEL.

No. 318,223.

Patented May 19, 1885.



WITNESSES:
V. H. Ernst
C. Sedgwick

INVENTOR:
J. W. Truax
BY *Munn & Co.*
ATTORNEYS.

(Model.)

2 Sheets—Sheet 2.

J. W. TRUAX.
TURBINE WATER WHEEL.

No. 318,223.

Patented May 19, 1885.

Fig. 3.

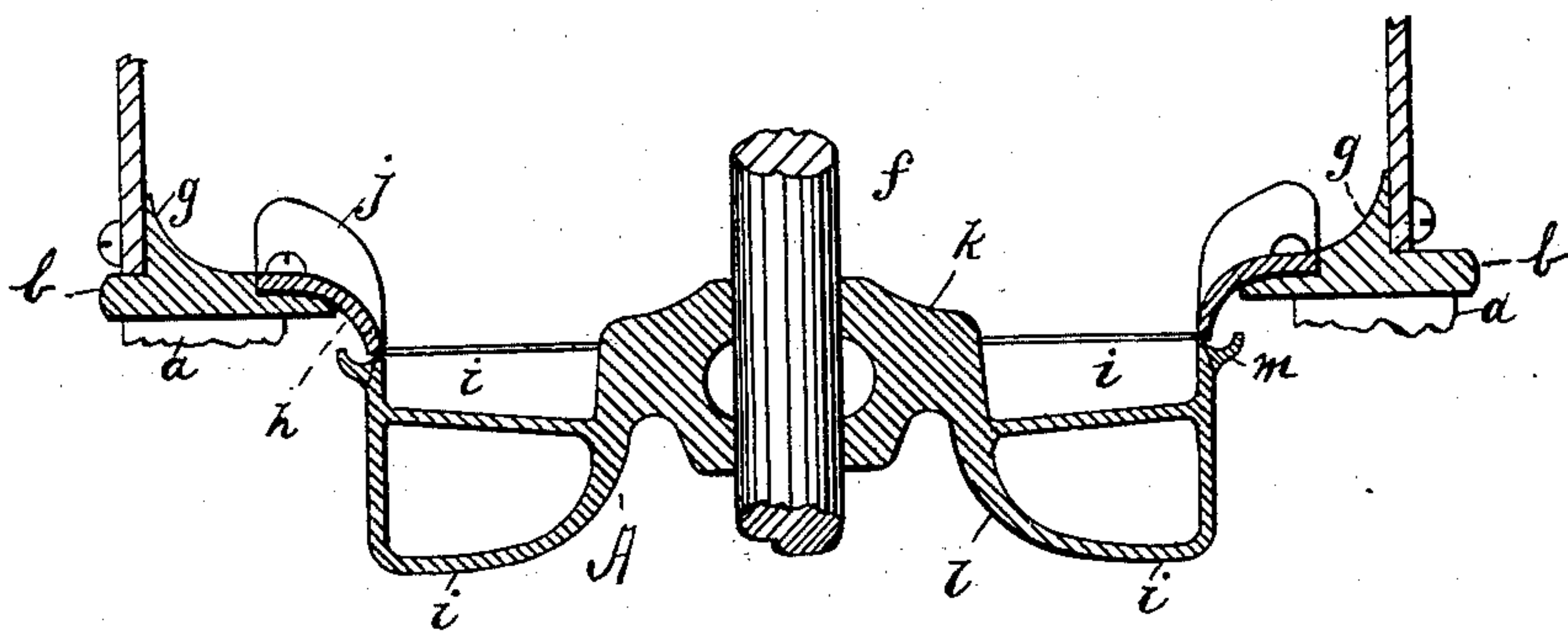
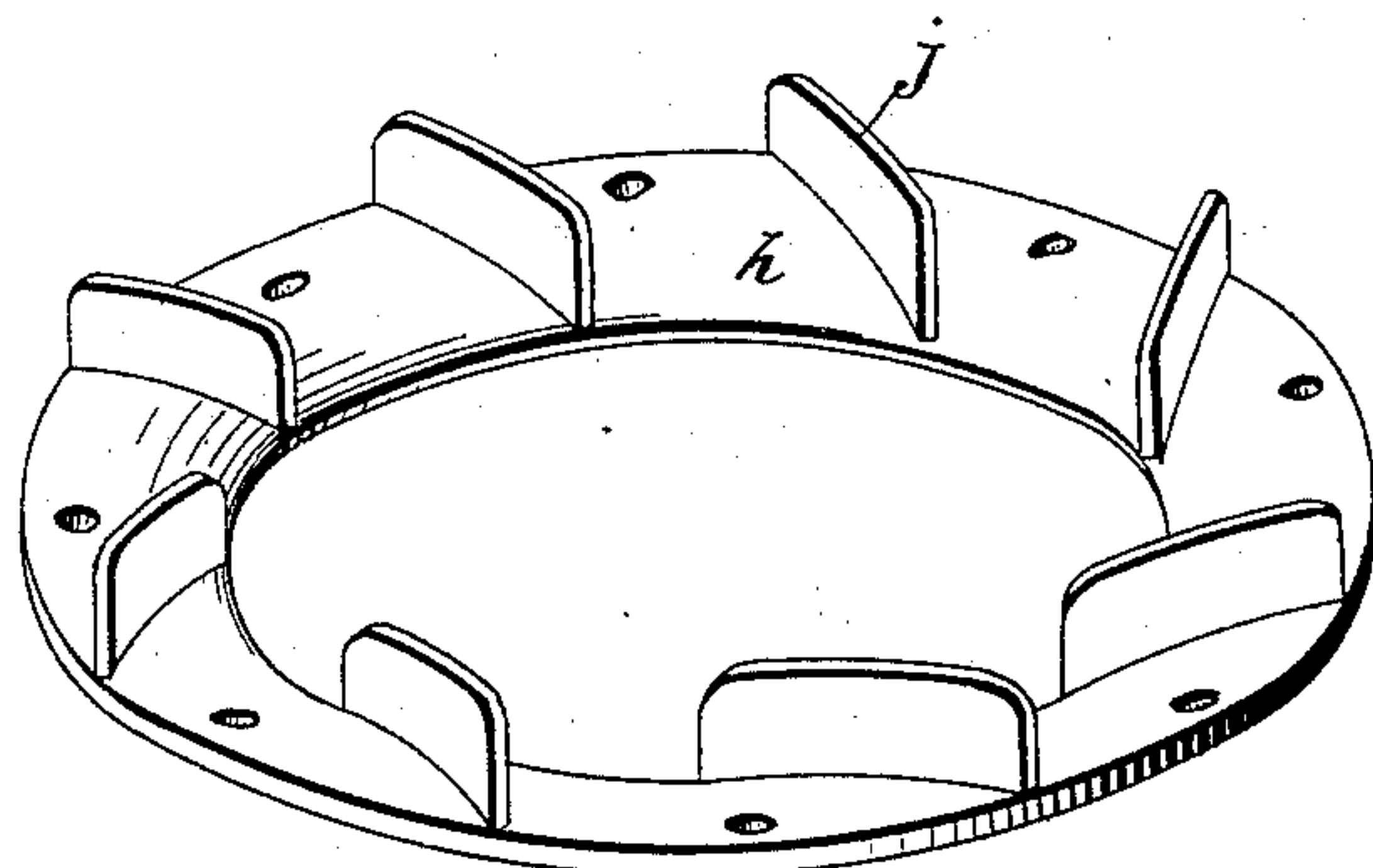


Fig. 4.



WITNESSES:

C. Sedgwick
A. H. Davis

INVENTOR:

J. W. Truax
BY *Munn & Co*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

JACOB WARREN TRUAX, OF ESSEX JUNCTION, VERMONT.

TURBINE WATER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 318,223, dated May 19, 1885.

Application filed May 16, 1884. (Model.)

To all whom it may concern:

Be it known that I, JACOB WARREN TRUAX, of Essex Junction, in the county of Chittenden and State of Vermont, have invented certain new and useful Improvements in Turbine Water-Wheels, of which the following is a full, clear, and exact description.

My invention consists in certain improvements in the water-wheel for which Letters Patent No. 29,333 were granted me on the 24th day of July, 1860, as will be hereinafter fully described and claimed, reference being had to the accompanying drawings, forming part of this application, in which—

Figure 1 is a plan view of the top of my improved water-wheel with the top of the case removed and with a part of the funnel-bottom broken away. Fig. 2 is a side elevation. Fig. 3 is a sectional elevation of the wheel and its case on the line *xx* of Fig. 1, and Fig. 4 is a perspective view of the funnel-bottom removed from the case.

Similar letters refer to similar parts throughout the several views.

c is the case, which is provided with a top, a bottom ring, *b*, and a side opening, through which the water may enter. The case *c* is supported on pillars *a*, which are made wedge shape in cross-section, so as to give the least resistance possible to the outflowing water, and thus prevent back-pressure of the water against the wheel. The apex of the smallest angles of these pillars faces inward. To further prevent the back-pressure above referred to, I curve the step *e*, that supports the wheel-shaft. In the angles within the case *c*, between the side, top, and the bottom ring, *b*, are fitted concave fillets *g*. These fillets prevent the forming of eddies in said angles, and allow the water to flow naturally in an unbroken volume.

To the inner edge of the ring-bottom *b* is secured or formed the inward and downward curved ring *h*. This ring is an essential improvement over the one shown in my former patent, above alluded to, as it is made to curve inward and downward, and is provided with a series of vertical spiral blades, *j*, on its upper curved surface. Between these blades chutes open at their tops and sides are formed, through which the water is guided, so that the full

pressure of its column falls directly on top of the water-wheel, and none of the buckets will be skipped. The outer edge of this funnel is flush with the lower edge of the bottom fillet, *g*, the two curved surfaces being a continuation of each other, so that no obstructing angles will be formed. This wheel *A* is mounted directly under the ring *h* on a vertical shaft, *f*, that passes through the top of the case, and has its lower end supported in the curved step *e*. The hub *k* of the wheel is made in ogee form on its top surface, to facilitate the flow of the water from the center of the space upon the inner ends of the buckets. At the upper end the side of the hub is vertical, and the inner ends of the buckets join the hub at right angles to the vertical line; but downward the size of the hub increases by a concave form, and the buckets, which are straight and horizontal at the upper end, have less downward pitch at the inner than at the outer ends, so that they assume concave forms, which, together with the concave of the hub, diminish the breadth and depth of the issue by contracting the bottoms and inner sides of the same, as shown in Figs. 2 and 3, thereby making an outward inclined concave form of the angles between the buckets and the hub, which gives a centrifugal projection of the issuing jets that is more effective in developing the reaction of the water on the wheel than where the hub is vertical from top to bottom and the buckets are straight or flat on their radial lines. This form also facilitates the molding of the wheel, so that it can be cast with a hollow chamber, *l*, in the under side of the hub. The auxiliary buckets *m* are also provided, as in my former patent, except that they are in concave form instead of angular. As before stated, the wheel is below the funnel *h*, the lower inner edge of which is in a lower plane than the under surface of the bottom ring, *b*.

It will be observed that my ring having the spiral blades and open center does not cause the water to impact against the wheel to operate it, but directs the whole column of water upon the wheel, so that the wheel is operated by direct weight of the column of water and not by impact. No floating débris of any kind can stop up the chutes formed by the blades *j*, as they are open. The upper surfaces of the ring

and the bottom fillet, *g*, form a graceful double curve, which is a material improvement over any prior construction that I have seen, and in connection with the curved top of the hub form a funnel-shaped space leading to the buckets.

What I claim, and desire to secure by Letters Patent, is—

1. The ring *h*, curved inward and downward and provided with vertical spiral blades *j*, forming chutes open at their tops and sides, whereby clogging of the chutes will be prevented, as described.

2. The combination, in a turbine water-wheel, with the ring *h*, curved inward and downward below the bottom of the case, and provided with a series of vertical spiral blades, *j*, forming chutes open at their tops and sides, of the wheel *A*, mounted on shaft *f*, with its outer edge adjacent to the lower inner edge of the ring *h*, the whole upper surface of the wheel being entirely uncovered, substantially as set forth.

3. In a turbine water-wheel of the character set forth, the casing *c*, having an opening in its side, a top, and the ring *b* around its bottom edge, in combination with the vertical shaft provided with the horizontal wheel *A*, having buckets *i*, the upper edges of which

are on a plane below the bottom ring, *b*, and the ring *h*, secured to the inner edge of the ring *b*, curved inward and downward to the outer top edge of the wheel *A*, and provided with the vertical spiral blades *j*, forming chutes open at their tops and sides between them, substantially as set forth.

4. The combination, in a water-wheel of the character described, with the case *c*, having a side opening, a top, and a concave fillet, *g*, around its lower inner edge, of the horizontal water-wheel *A*, the upper surface of which is in a plane below the case, and the ring *h*, having its outer upper surface flush with that of the fillet *g*, and curving inward and downward therefrom to the outer upper edge of the wheel *A*, the said ring being provided on its upper surface with the vertical spiral blades *j*, forming chutes open at their tops and sides, the double curve formed by the fillet and ring serving to direct the entire column of water upon the top of the water-wheel with the least possible resistance to its flow, as set forth.

JACOB WARREN TRUAX.

Witnesses:

MARCELLUS A. BINGHAM,
WARNER B. NICHOLS.