

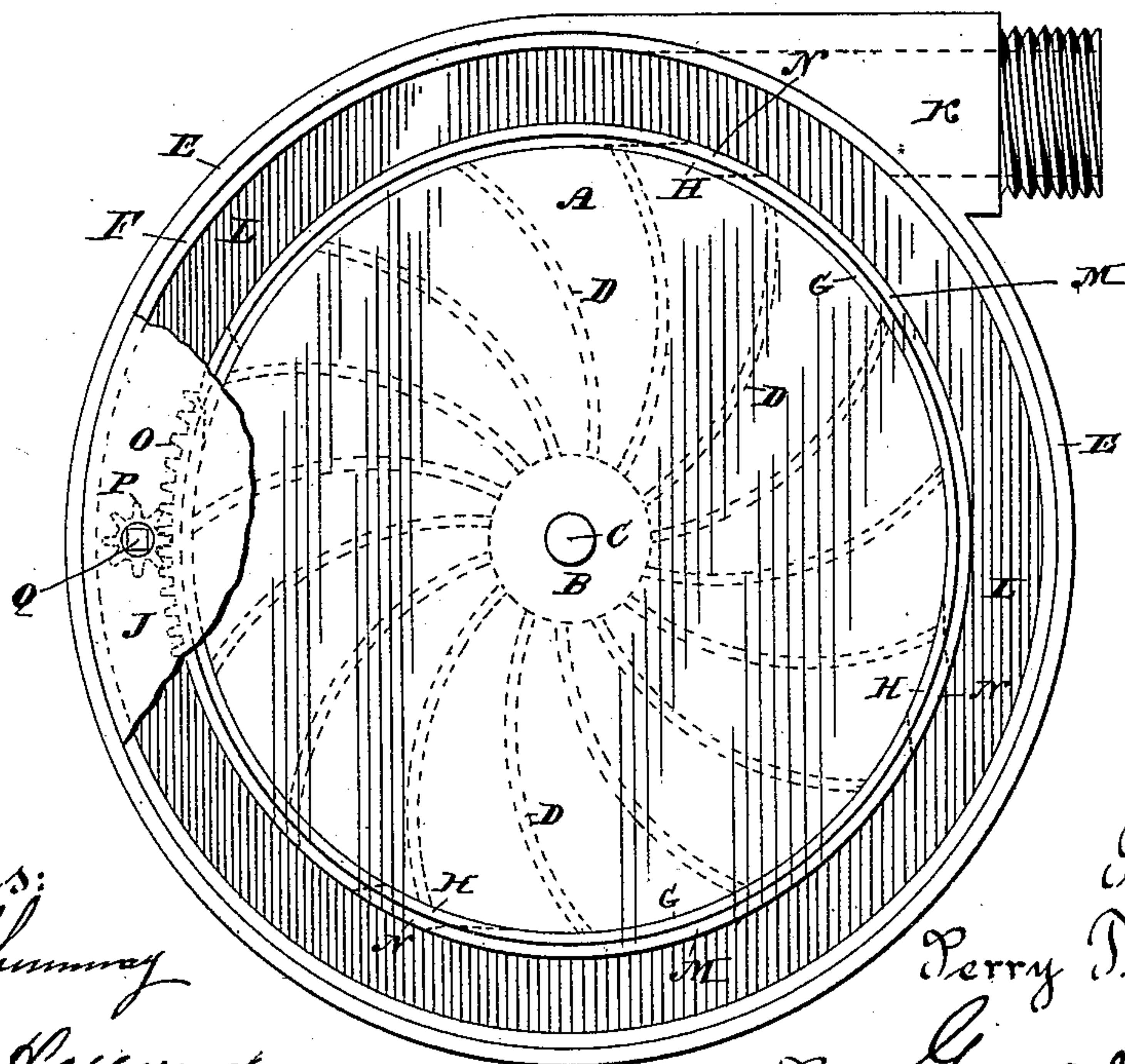
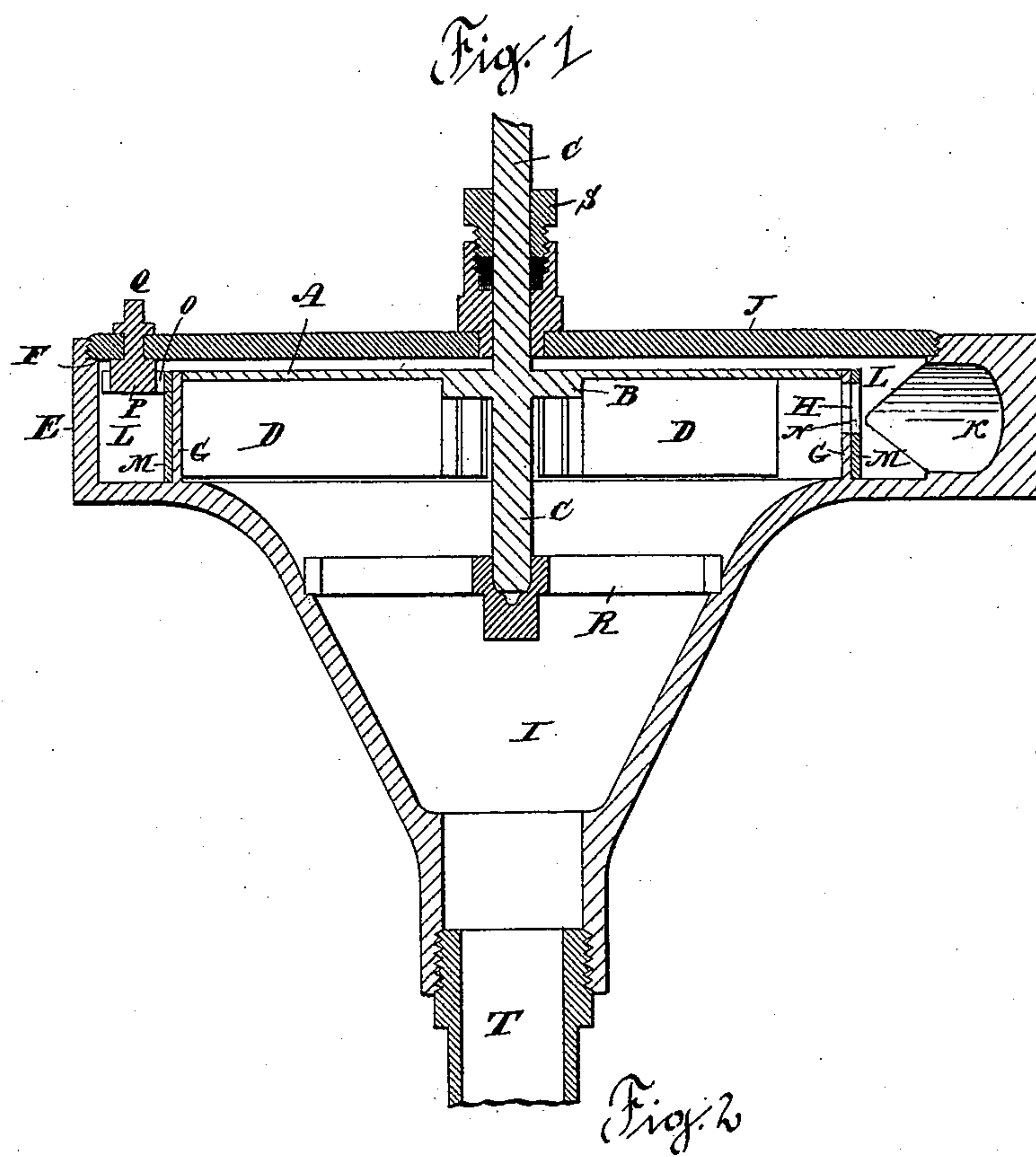
(No Model.)

2 Sheets—Sheet 1:

P. T. SANFORD.  
TURBINE WATER MOTOR.

No. 404,869.

Patented June 11, 1889.



Witnesses;

Chas. B. Shumway

William Harrison

Inventor

Perry T. Sanford

By Geo. O. Seymour

Qty.

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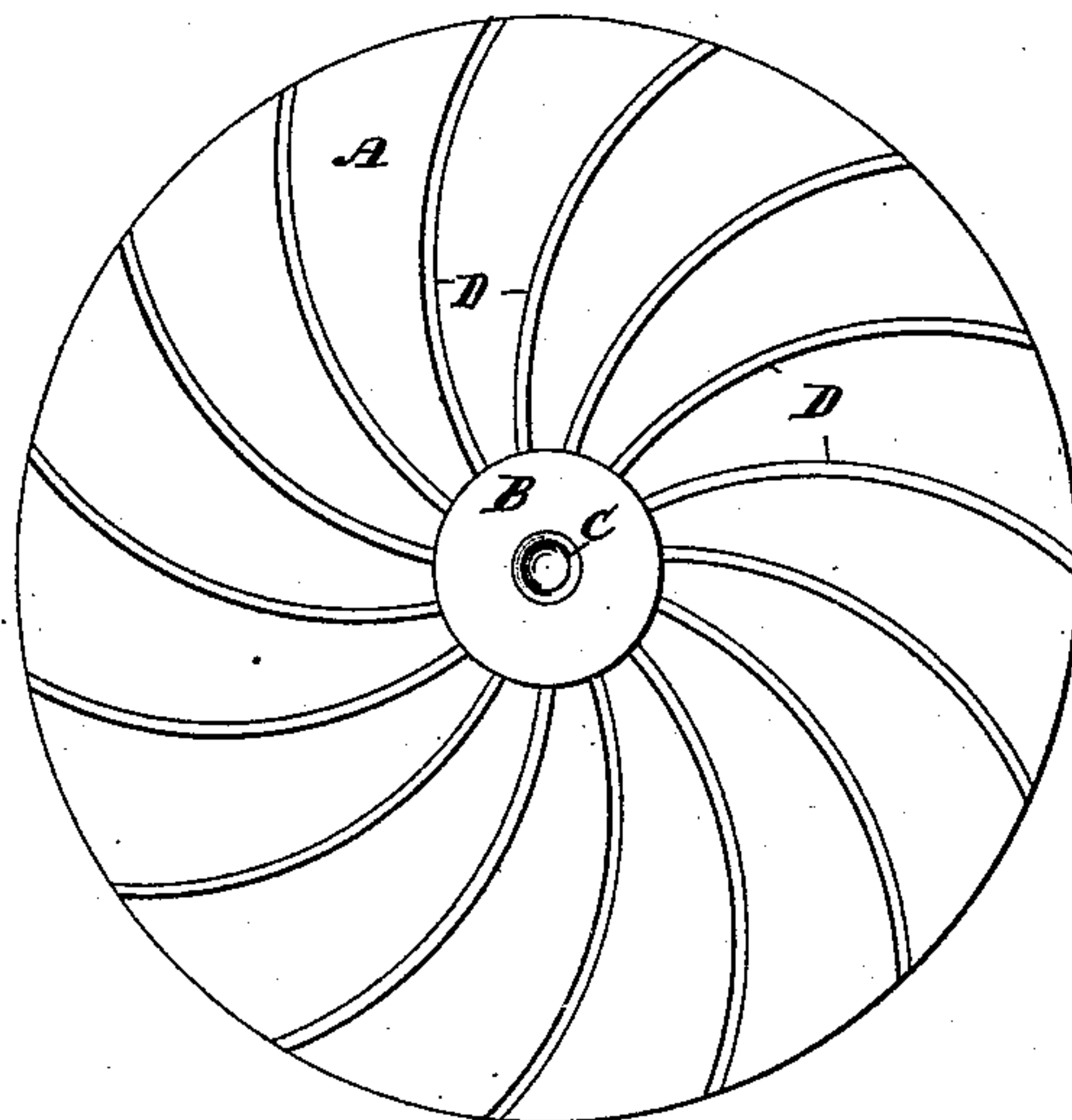
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*Fig 3*



Witnesses:

*Chas. B. Shumway*  
*William Harrison*

Inventor

*Perry T. Sanford*

*By George O. Seymour.*  
*Atty.*



# UNITED STATES PATENT OFFICE.

PERRY T. SANFORD, OF NEW HAVEN, CONNECTICUT.

## TURBINE WATER-MOTOR.

SPECIFICATION forming part of Letters Patent No. 404,869, dated June 11, 1889.

Application filed October 1, 1888. Serial No. 286,864. (No model.)

*To all whom it may concern:*

Be it known that I, PERRY T. SANFORD, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Turbine Water-Motors; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to an improvement in turbine water-motors, the object being to produce a motor of simple and efficient construction that will operate under back-pressure.

With these ends in view my invention consists in a water-motor having certain other details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claim.

In the accompanying drawings, Figure 1 is a view in vertical central section of a motor embodying my invention. Fig. 2 is a plan view of the motor with the cap broken away, except as to a small portion of it; and Fig. 3 is a reverse plan view of the wheel.

As herein shown, the wheel consists of a plate or disk A, having a circular hub B, offsetting below its lower face, a staff C, extending above and below the plate and secured to the hub, and a number of leaves D, attached at their inner ends to the hub and curved on true involute lines which if projected would intersect the center of the staff. The curves of the wheel-blades are exactly determined on the basis of the diameter of the wheels by well-known methods.

The wheel-case consists in part of a circular outer flange E, provided with an internal shoulder F, and a similar inner flange G, concentric with the outer flange and provided with inlet-ports H. A cone I, located directly below the inner flange and having its smaller end downward, forms a contracted efflux-chamber below the wheel. A cap J, threaded into the upper edge of the outer flange and screwed down upon the shoulder F thereof, closes the upper part of the case. A water-inlet K, tangentially intersecting the outer flange, opens into an annular raceway L, formed between the said flange and a movable ring M, embracing the inner flange and

provided with inlet-ports N, corresponding in arrangement to the ports therein. A segmental rack O, located upon the edge of the ring, is engaged by a pinion T, mounted in the edge of the cap, and having the projecting upper end of its shaft Q squared for the application of a key for turning it, and hence shifting the movable ring, and so virtually enlarging or diminishing the size of the inlet-ports in the inner flange. As herein shown, the inlet-ports are equidistant, provision being made for a constant impact of water upon the wheel by having an uneven number of blades in the same; but the same effect will be secured by arranging the ports at different distances apart and employing an even number of blades in the wheel. A skeleton step R, located within the cone I of the case, supports the lower end of the wheel-staff, the upper end whereof passes centrally through the case-cap, which is provided upon its upper face with a packing-box for it. The wheel itself is located within the inner flange, and hence directly over the contracted efflux-chamber formed by the cone. A removable outlet-pipe T is secured to the lower end of the cone. As shown, this pipe corresponds in discharging capacity to the supplying capacity of the inlet-pipe K.

The raceway, wheel, and conical efflux-chamber, when constructed and combined as described, co-operate to permit the water to flow through them with the minimum of obstruction, friction, and breaking up, and to impart to it a swirling motion, of which the wheel partakes. Even if there is a back-pressure of water, the motor will still operate as long as the water runs through it at all. Of course the more back-pressure there is the slower the speed of the wheel, which may be regulated in its action, if desired, by varying the back-pressure. This may be done by changing the size of the outlet-pipe of the contracted chamber.

The sensibility of my improved motor to a current adapts it to be used to excellent advantage in pipes through which water is passed to fulfill a different purpose than that of driving a motor. Thus the motor might be located in the main water-pipe of a building and employed to create a ventilating or a

furnace draft. When combined with a suitable indicator, my motor might even be employed as a water-meter.

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

A turbine water-motor having an annular raceway, the inner wall whereof is provided with ports, a cone-shaped efflux-chamber located below such raceway, and a wheel located above the said efflux-chamber and having its blades shaped to follow involutes struck from its staff to its periphery, and ar-

ranged so that the water will strike the outer ends of their convex faces, whereby a swirling motion will be imparted to the water in passing through the motor, substantially as set forth. 15

In testimony whereof I have signed this specification in the presence of two subscribing witnesses. 20

PERRY T. SANFORD.

Witnesses:

CHAS. B. SHUMWAY,  
WILLIAM HARRISON.