

(No Model.)

2 Sheets—Sheet 1.

M. L. HALLENBECK.  
Turbine Wheel.

No. 231,164.

Patented Aug. 17, 1880.

Fig. 1.

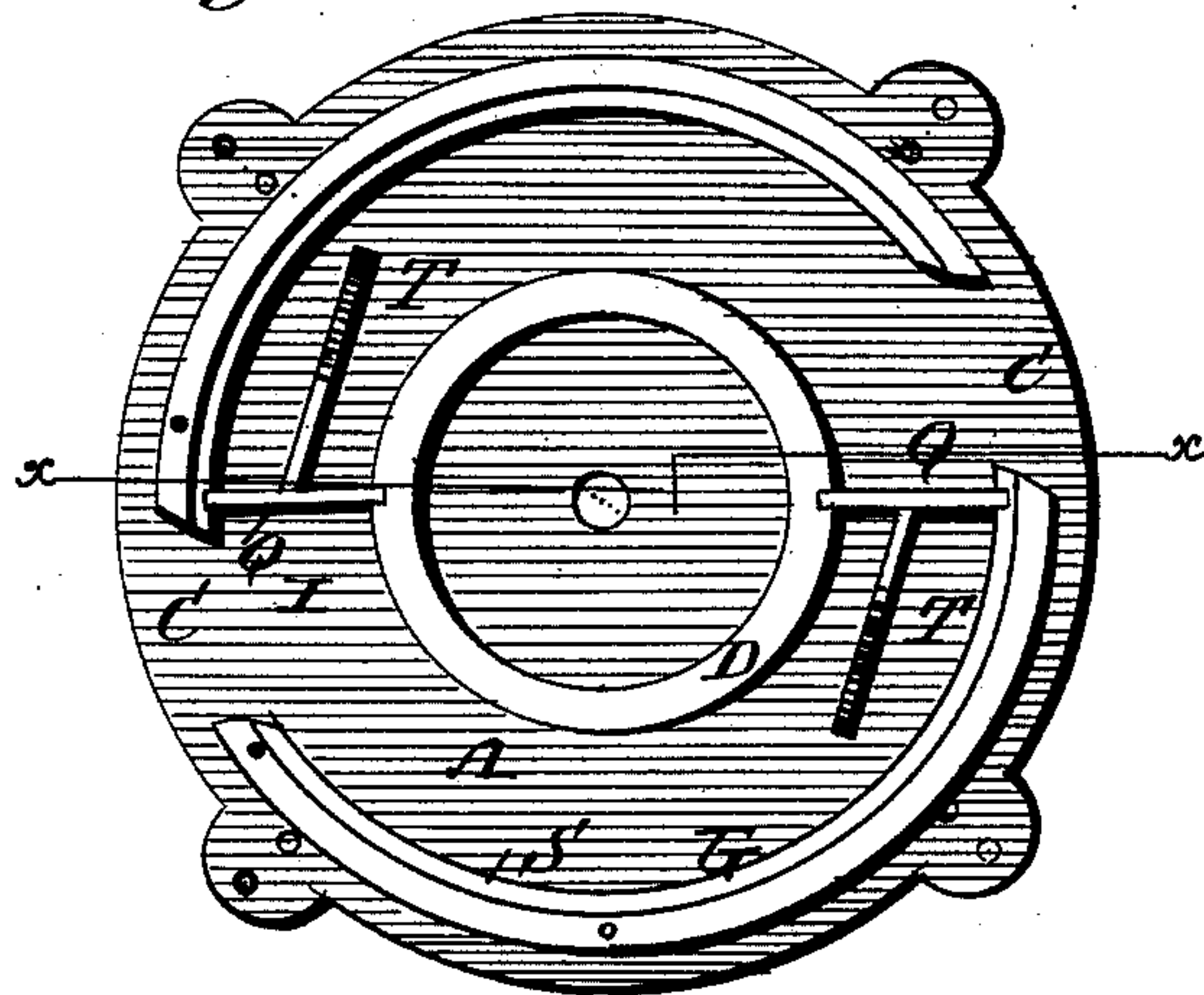


Fig. 2.

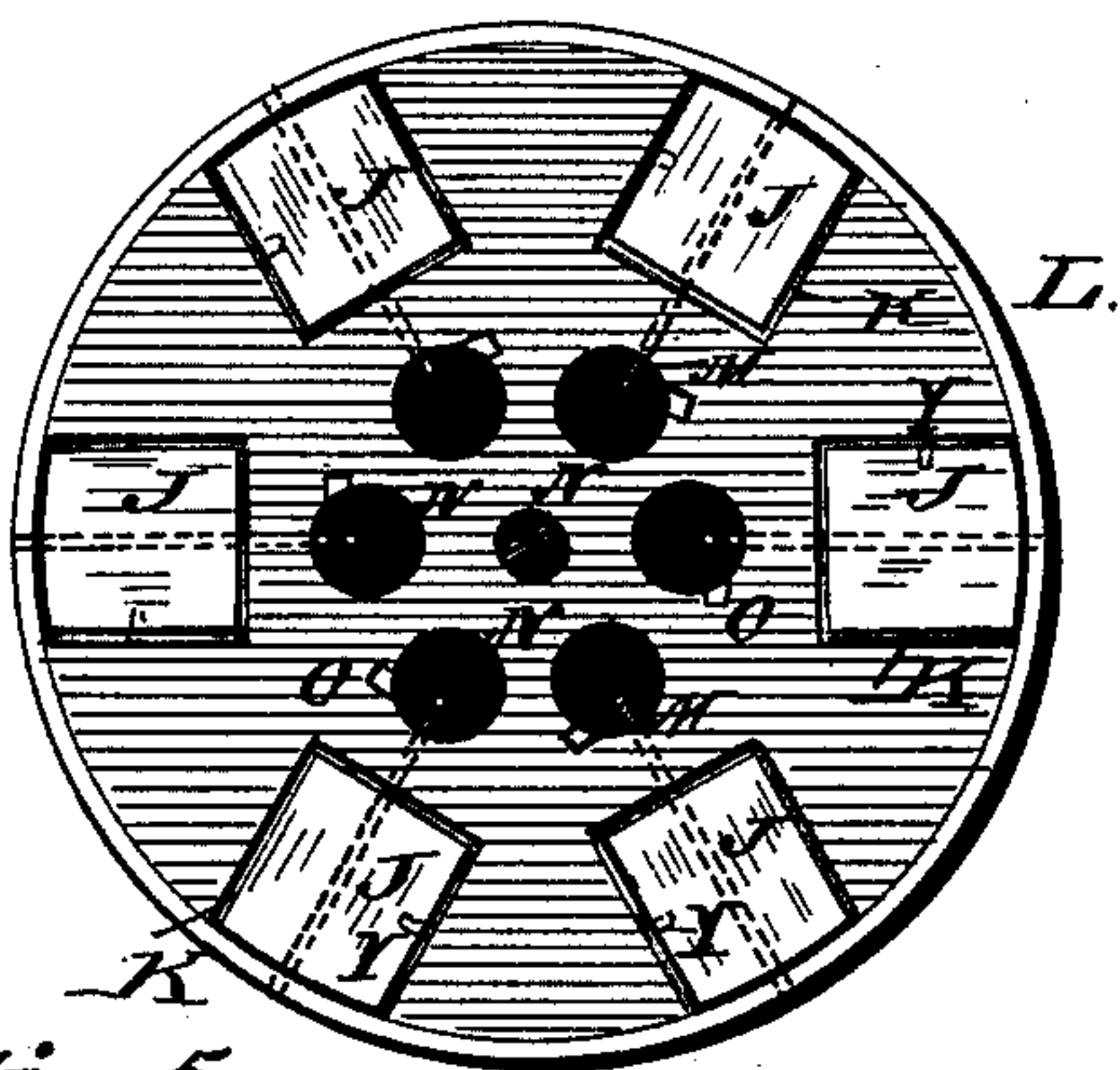


Fig. 3.

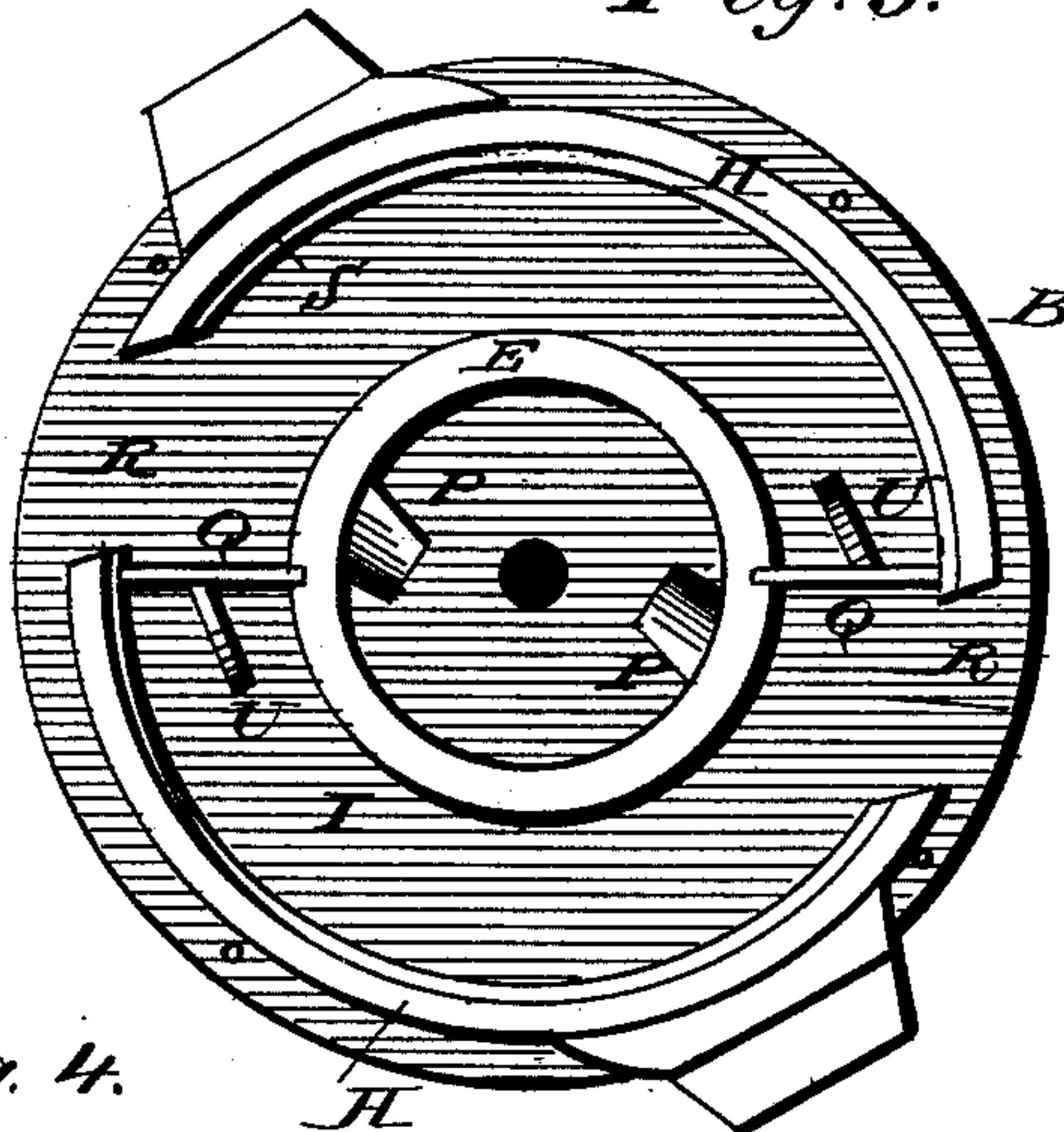


Fig. 5.

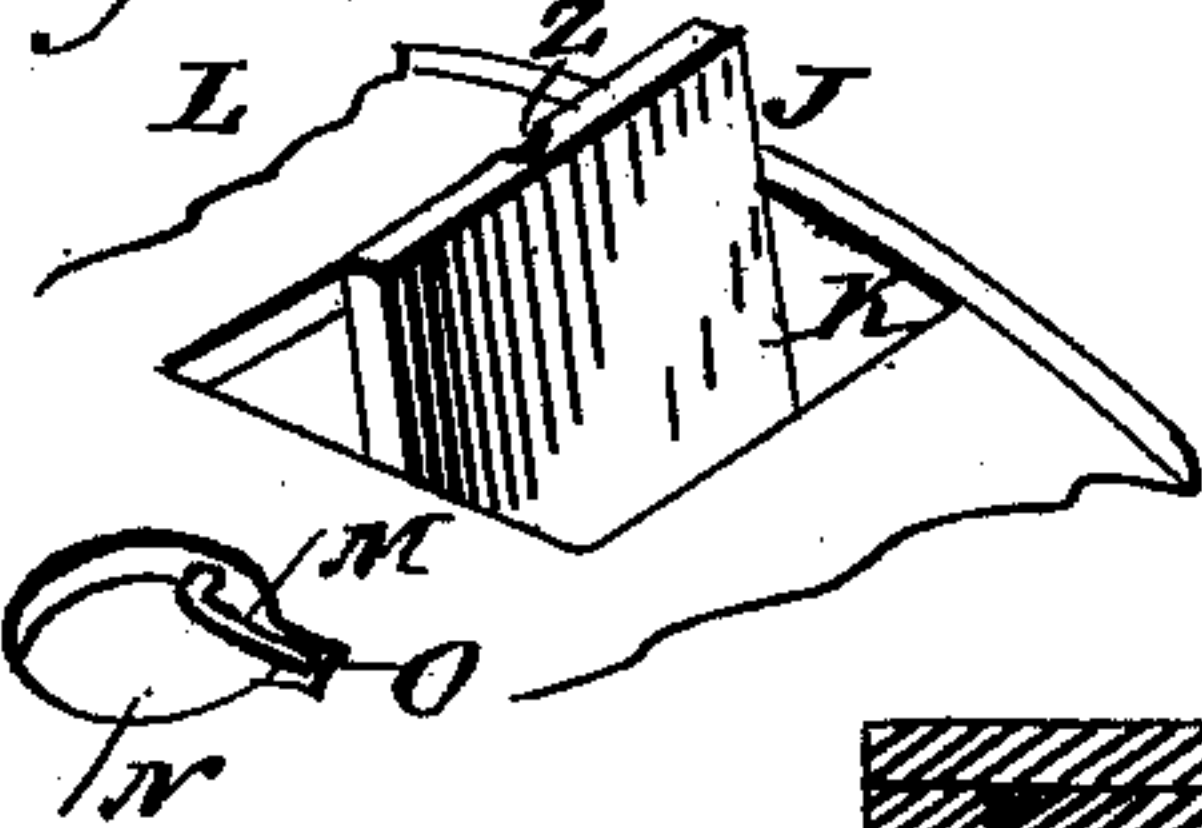
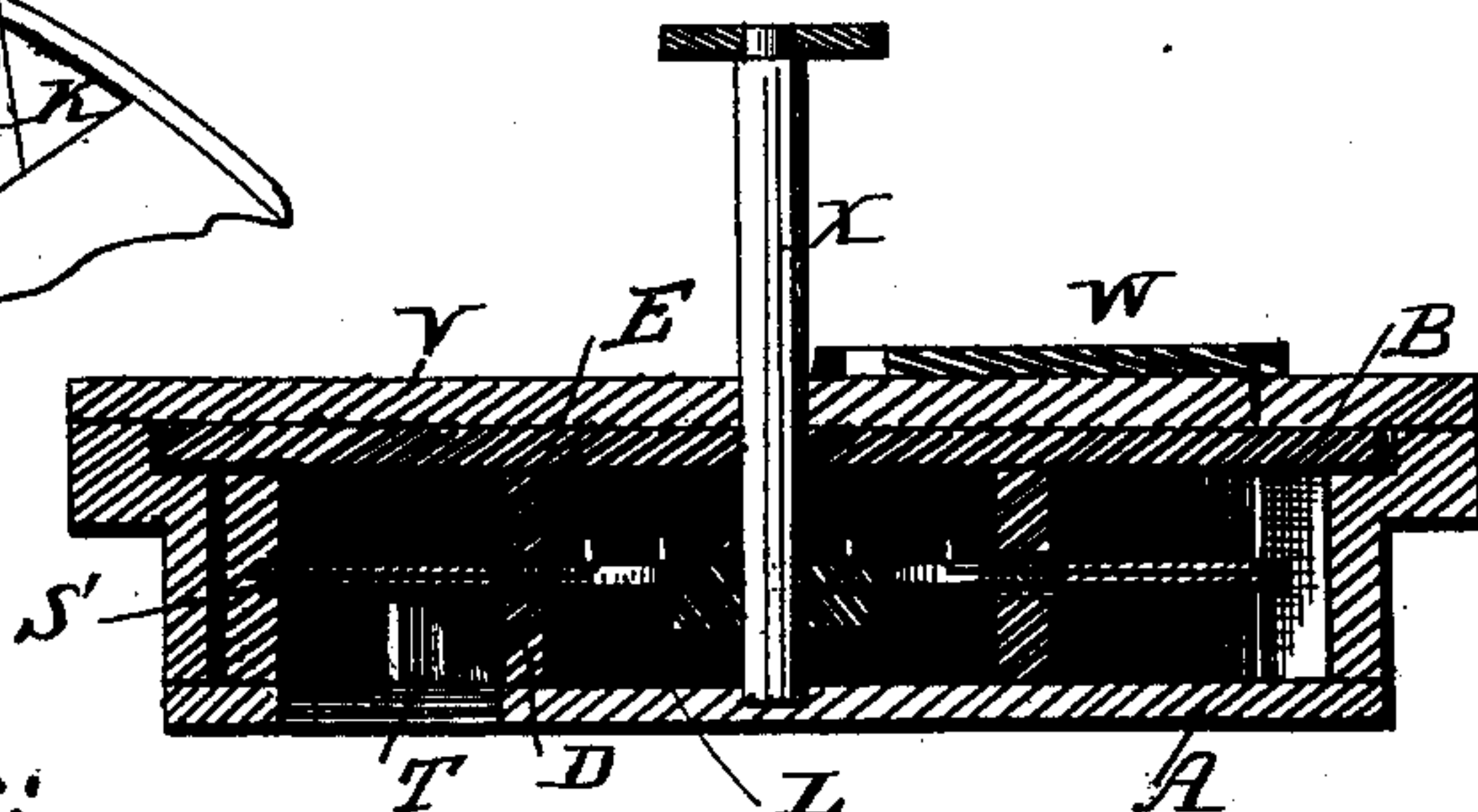


Fig. 4.



Witnesses:  
Fred G. Dietrich  
R. Littell,

Inventor:  
M. L. Hallenbeck  
by C. A. Snow & Co. Attys.

(No Model.)

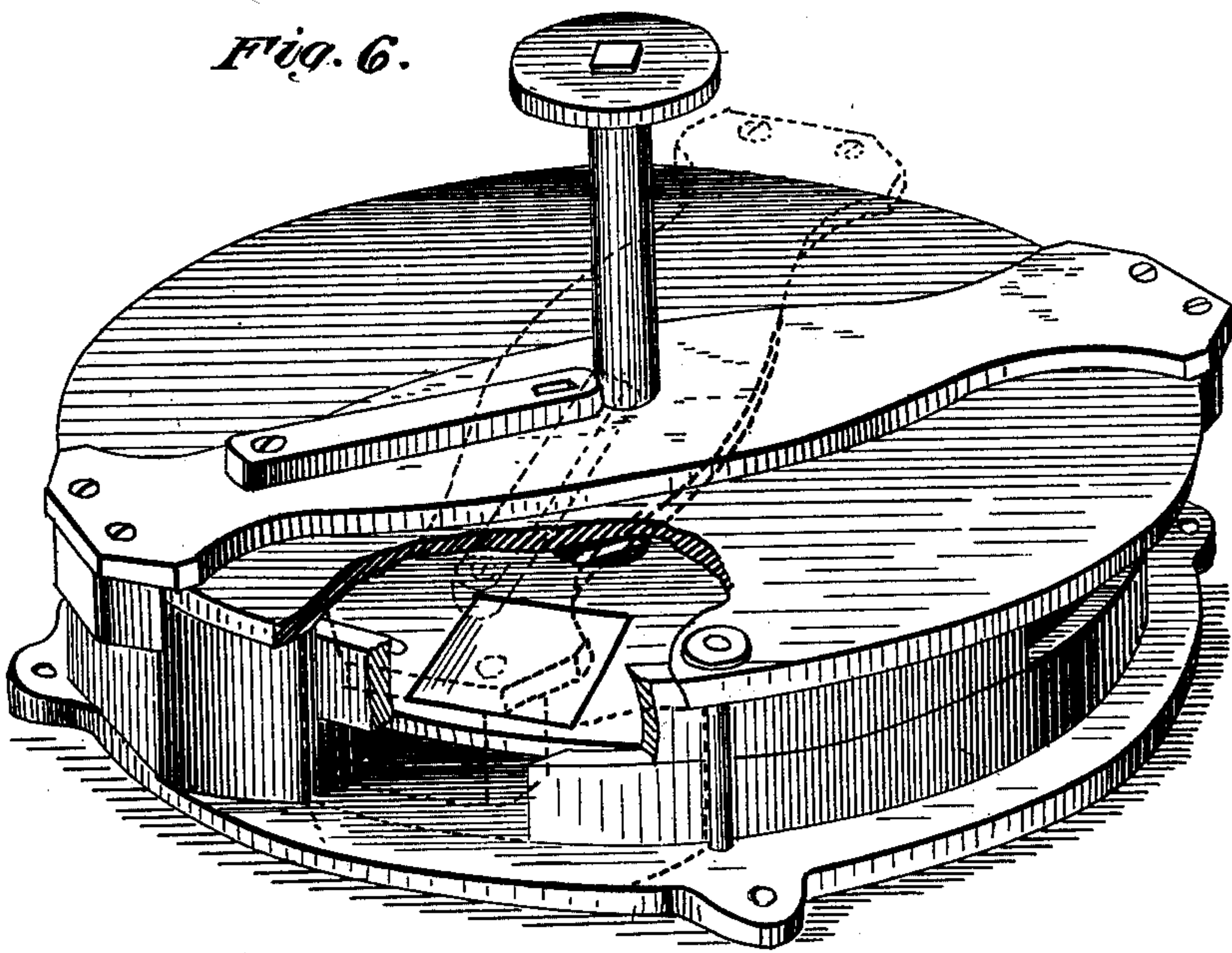
2 Sheets—Sheet 2.

M. L. HALLENBECK.  
Turbine Wheel.

No. 231,164.

Patented Aug. 17, 1880.

Fig. 6.



Witnesses:  
Fred. G. Dietrich  
J. R. Littell,

Inventor:  
M. L. Hallenbeck  
by C. A. Brown & Co.  
Atty's.



# UNITED STATES PATENT OFFICE.

MATTHEW L. HALLENBECK, OF GEORGETOWN, TEXAS.

## TURBINE WHEEL.

SPECIFICATION forming part of Letters Patent No. 231,164, dated August 17, 1880.

Application filed May 19, 1880. (No model.)

*To all whom it may concern:*

Be it known that I, MATTHEW L. HALLENBECK, of Georgetown, in the county of Williamson and State of Texas, have invented certain new and useful Improvements in Turbine Wheels; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

Figure 1 is a plan view of the lower portion of the casing. Fig. 2 is a plan view of the wheel with the upper portion of the casing removed. Fig. 3 is an inverted plan of the upper portion of the casing. Fig. 4 is a vertical sectional view, taken through the gates and their connecting-arm. Fig. 5 is a detail view of one of the buckets, and Fig. 6 is a perspective view of my improved water-wheel.

Similar letters of reference refer to corresponding parts in the several figures of the drawings.

This invention relates to turbine wheels; and it consists in the improvements in the construction of the same, hereinafter fully described, and particularly pointed out in the claims.

The casing of this improved turbine wheel is constructed in two portions, A and B, the portion A of which is provided with the discharge-openings C. I will describe the wheel as used in a horizontal position, although it may be used either horizontally or vertically, as an undershot or overshot wheel, and may be driven equally as well with steam-power as with water-power. The base or lower portion, A, is provided with an internal annular partition or ring, D, which unites with a similar ring, E, depending from the upper portion, B, of the casing, which, together with the circumferential walls G H of the casing, form the space I, which the buckets J traverse when the wheel is in operation. The buckets J are pivoted in rectangular openings K in an annular disk, L, and are provided with arms M at the inner ends of their extended bearings, said arms M being arranged to project upwardly through circular or other openings N in the

disk L when the buckets J are in a closed position, and to rest in recesses O at one side of the openings N when the buckets are open and being acted upon by the driving-power.

Within the ring E, and secured to the lower face of the upper portion, B, of the casing, are cams P, inclined, as shown, against which the arms M of the buckets J strike to open the buckets, so that they may assume a vertical position to receive the full force of the driving-power.

The track or way I, in which the buckets J travel, is divided into two equal parts by partitions Q, located in line with the edges of the discharge-openings C, and nearest to the gates R, through which the water or steam is admitted to the wheel.

The sections of the peripheral wall are recessed at S, to form a groove when united, in which the periphery of the annular disk L travels when driven.

Strips T, having beveled or inclined ends, traverse the discharge-openings C, and are intended to close the buckets J when they arrive at said strips, in order that the water or steam may escape through said discharge-openings.

Inclined strips U are secured to the upper sections of the partitions Q, so as to come directly over the strips T, for the purpose of preventing back action of the driving-power upon the buckets at the point of escape.

The interior of the ring D upon the base A should be provided with holes to permit the escape of any water that may be pressed into the same.

The doors or gates R, which close the ingress-openings, are connected to the ends of an arm, V, provided with a lever, W, and pivoted to the center shaft, X, so that the gates may be entirely closed, or may be adjusted to gage the quantity of water or steam to be admitted to the wheel.

The two sections of the casing are secured together by headed bolts provided with nuts and washers, as shown, and are intended to form a water-tight or steam-tight casing.

Within the rectangular opening in which the buckets work are placed stops Y, which enter recesses Z in the lower front faces of the



buckets, and which are intended to limit the distance to which the buckets may be turned when being closed by the strips T.

5 The bucket, crank, or arm, and the shaft which forms its bearings, may be constructed in one solid piece and applied to the opening in the disk; or it may be otherwise constructed, as occasion may demand.

10 The holes in the bottom of the casing within the ring D or central casing should be provided with valves opening outwardly.

There are numerous advantages in this construction when used as a turbine wheel, among which are, that the power acts in a cylinder  
15 at the circumference of the wheel at all times until discharged; no water presses in toward the center to create water-friction, as the perimeter of the wheel runs in a groove; buckets suspended as shown move easily, and as  
20 there is no pressure on them when closing, and very little when opening, and the buckets make each one revolution for one revolution of the wheel, they will last as long as the shaft will.

25 Having thus fully described my invention, I claim and desire to secure by Letters Patent—

1. In a turbine or other wheel, the casing composed of the sections A and B, provided with the rings D and E, partitions Q, strips T and U, cams P, and discharge-openings C, 30 in combination with the annular disk L, provided with rectangular openings K, in which are pivoted the buckets J upon shafts having arms M, working in openings N, recessed at O, substantially as and for the purposes set forth. 35

2. In a turbine wheel, the annular disk L, carrying the pivoted buckets J, as described, in combination with a casing provided with an internal groove in which the periphery of the 40 annular disk works, substantially as set forth.

3. In a turbine wheel, the arm V, pivoted to the shaft X, in combination with the gates R, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as 45 my own I have hereto affixed my signature in presence of two witnesses.

MATTHEW L. HALLENBECK.

Witnesses:

C. M. LESNEUR,  
J. O. HOLT.