

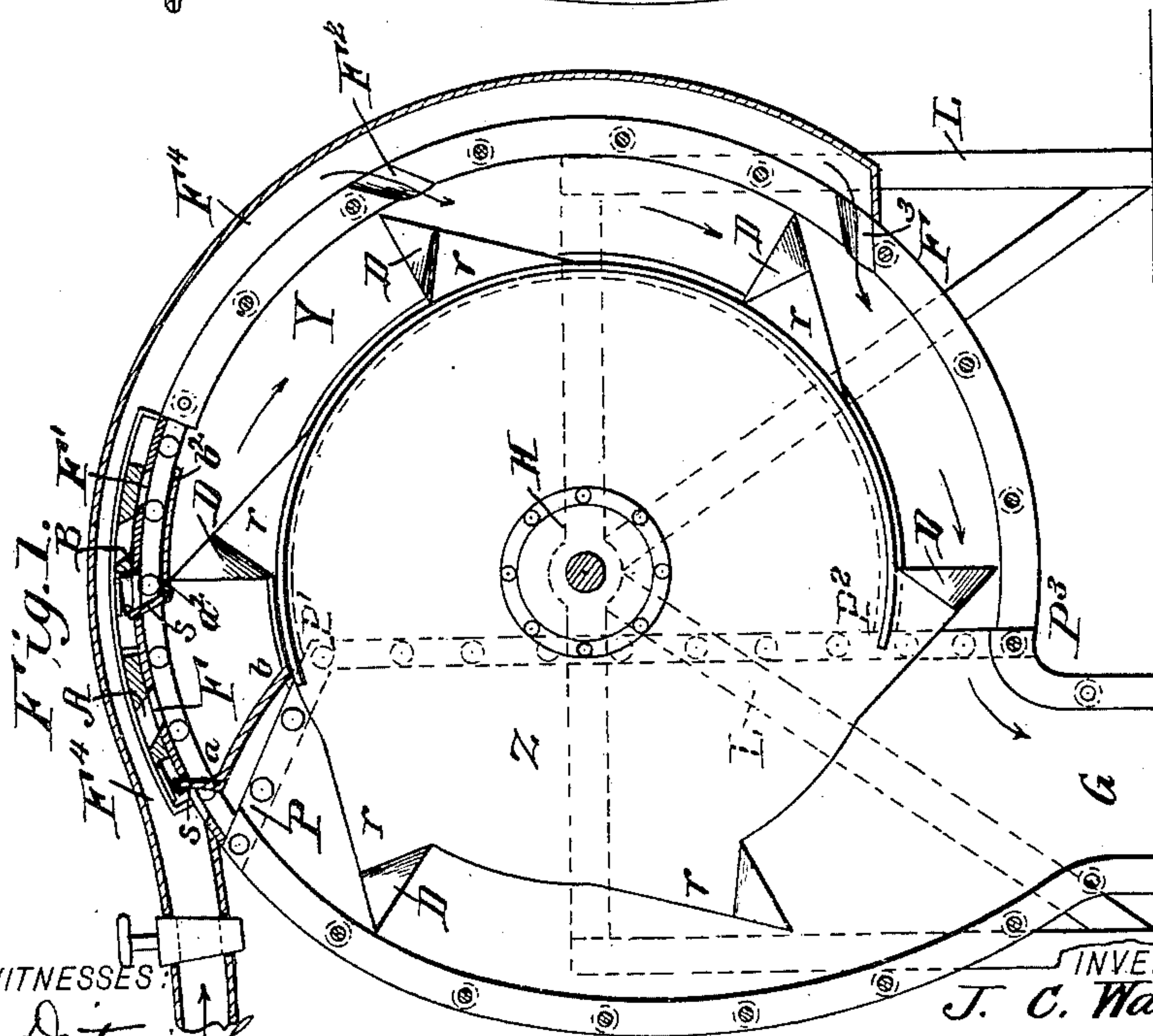
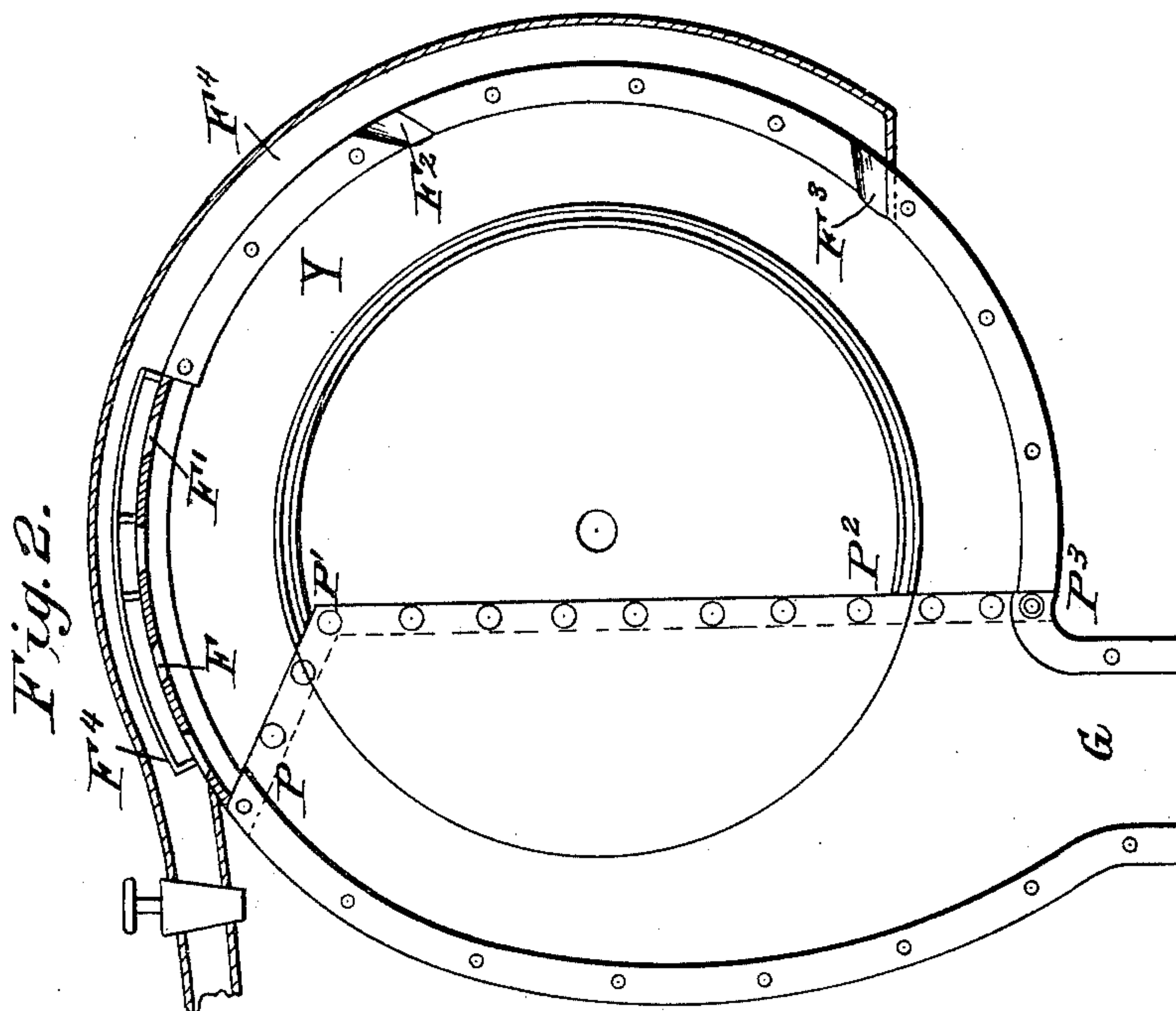
(No Model.)

2 Sheets—Sheet 1.

J. C. WALKER.  
WATER WHEEL.

No. 467,840.

Patented Jan. 26, 1892.



WITNESSES:

*Fred G. Dietrich*  
*Edw. W. Byrne.*

INVENTOR:

*J. C. Walker.*

BY

*Munn & Co.*

ATTORNEYS

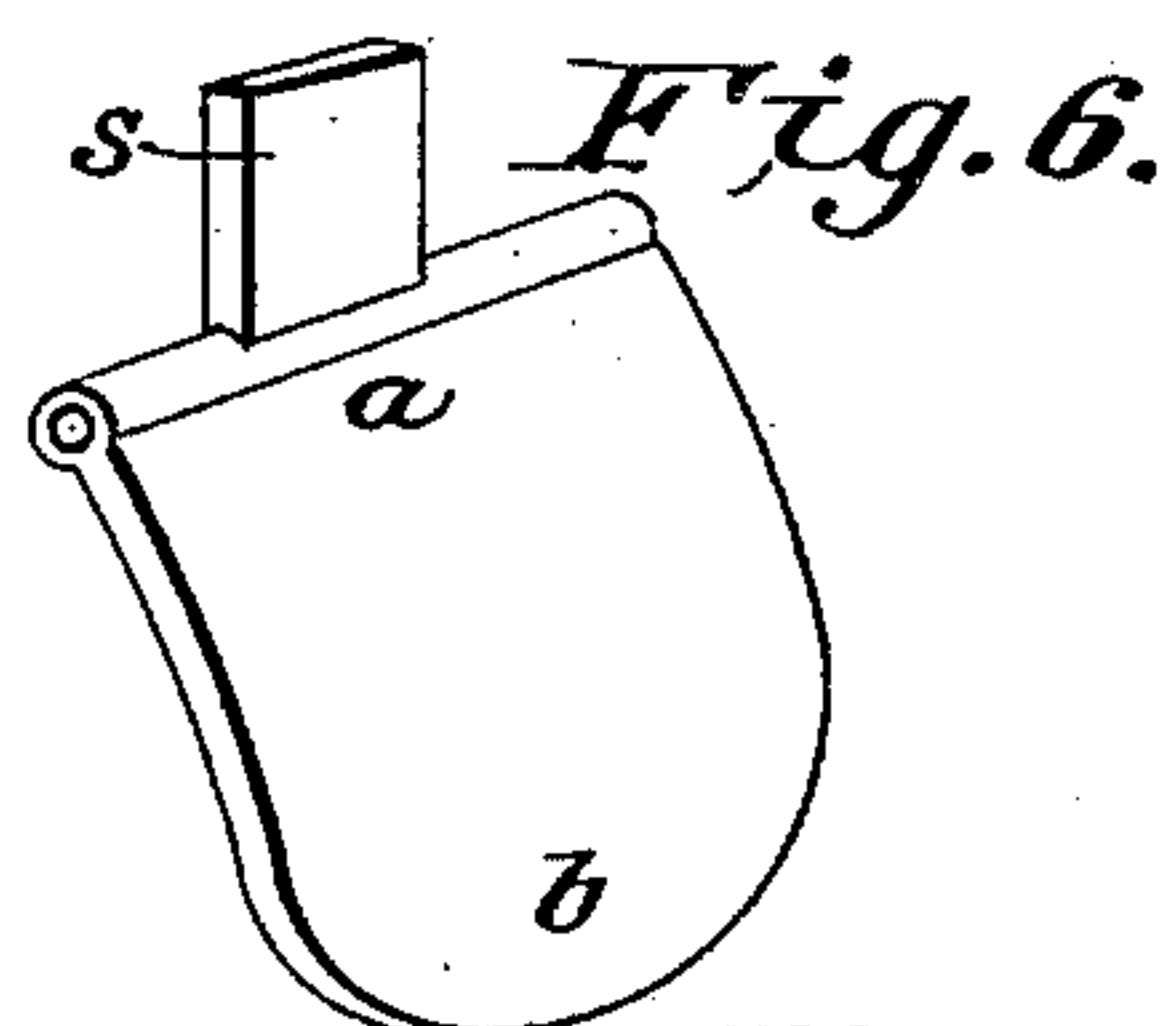
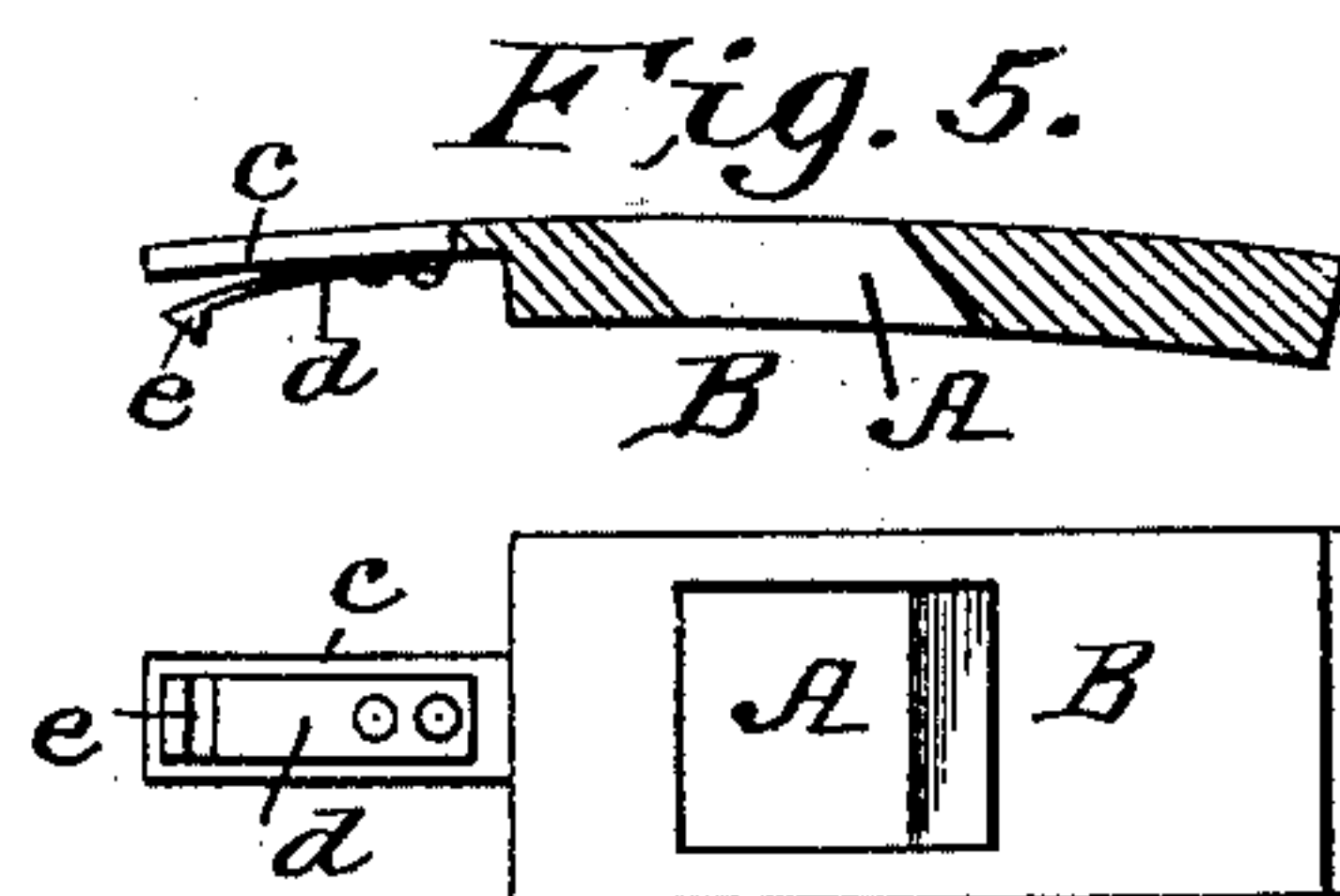
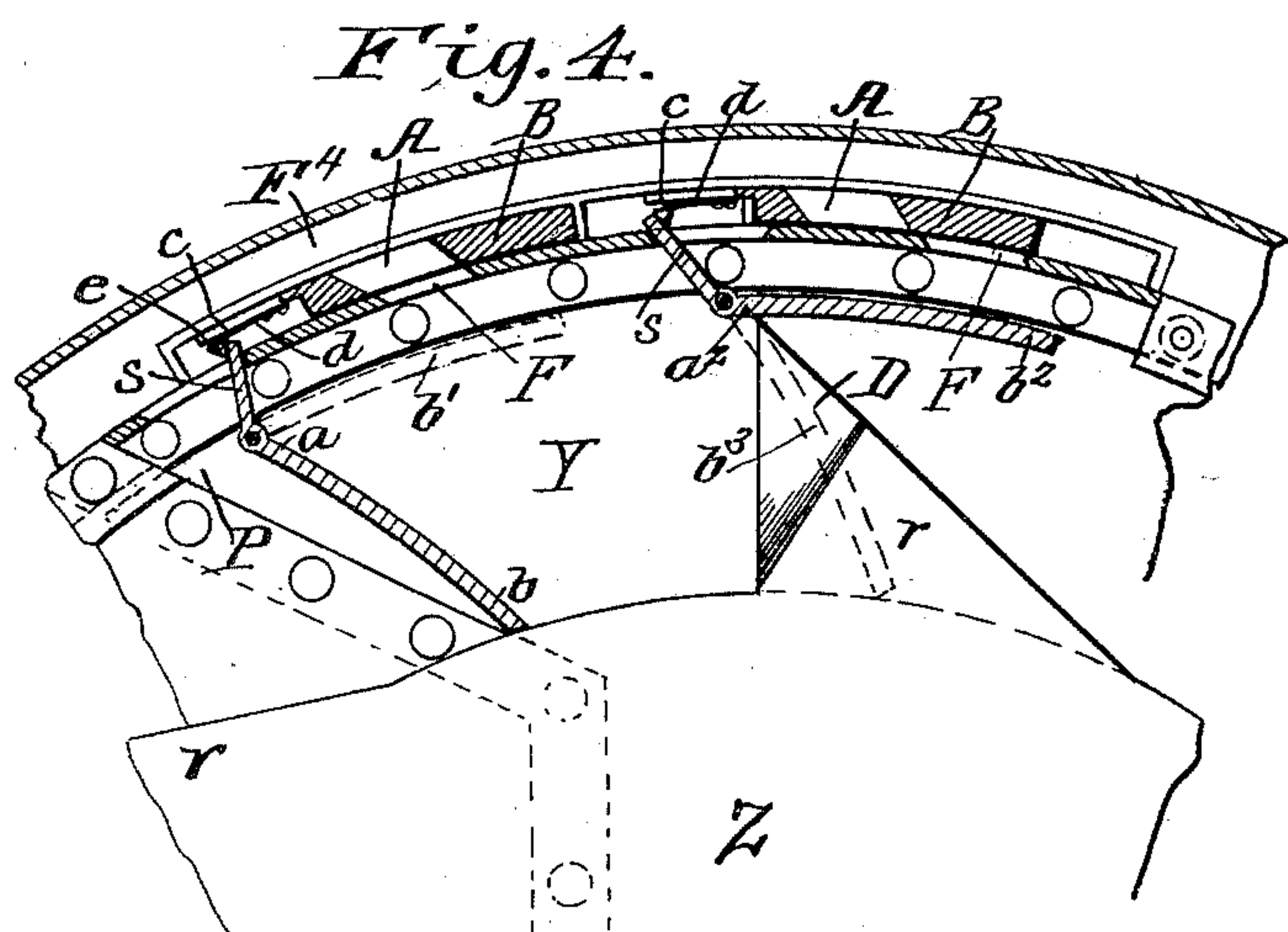
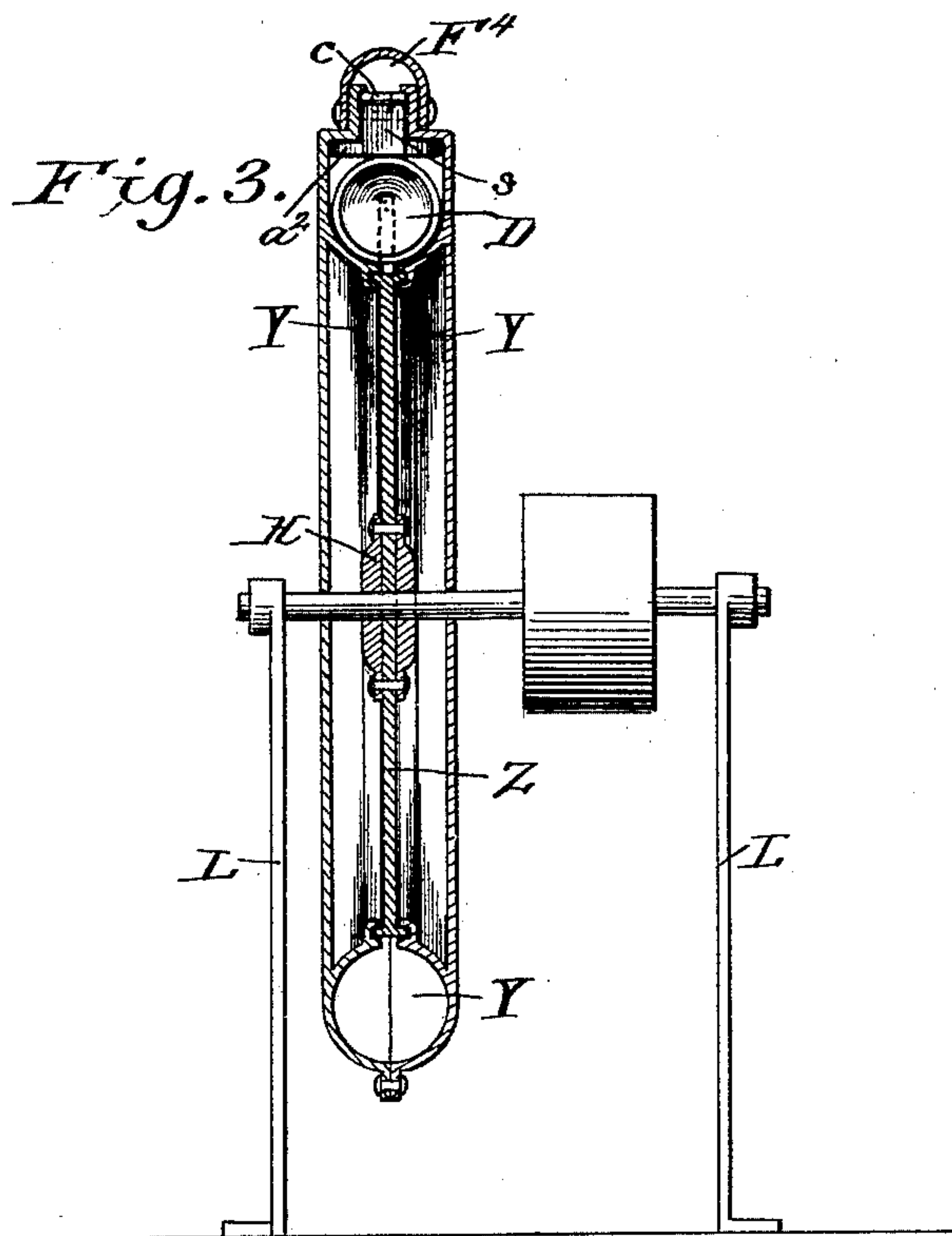
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# UNITED STATES PATENT OFFICE.

JAMES C. WALKER, OF WACO, TEXAS.

## WATER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 467,840, dated January 26, 1892.

Application filed June 20, 1891. Serial No. 396,999. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES C. WALKER, residing at Waco, in the county of McLennan and State of Texas, have invented a new and Improved Water-Wheel, of which the following is a specification.

The object of my invention is to provide a water-wheel in which the energy of the water shall act upon a series of peripheral buckets on a principle of hydraulic pressure in contradistinction to that of mere impact and momentum; and to this end it consists in the peculiar construction and arrangement of parts, which I will now proceed to fully describe with reference to the drawings, in which—

Figure 1 is a vertical section of the wheel, taken at right angles to its axis. Fig. 2 is an inside view of the case. Fig. 3 is a vertical section of the wheel, taken longitudinally to the axis; and Figs. 4, 5, and 6 are details of the valve mechanism.

In the drawings, Y Y is the outer case, which is sustained upon a suitable base by means of legs or standards L. The right-hand portion of the case, as shown on the drawings, is constructed with a semicircular chamber extending a little more than half-way around, beginning at P P' and extending to P<sup>2</sup> P<sup>3</sup>, the balance of the chamber being open. The inner perimeter of this semicircular chamber P' P<sup>2</sup> of one half-section approaches the same wall of the outer half-section just close enough to leave a slot through which the web of the water-wheel may pass, the joint being made tight at this point by packing laid in a groove in this inner wall and bearing against the web of the wheel. The other portion of the case is open and need not closely fit the wheel, and hence may be made of any desired shape.

F<sup>4</sup> is the inlet-pipe of the wheel, and G is the outlet. The inlet-pipe is cast upon or attached to the case and extends around about two-thirds of the semicircular chamber, and has four inlet-ports F F' F<sup>2</sup> F<sup>3</sup> opening into the same. Within the case there revolves a wheel Z, which consists of a thin disk with a series of cup-shaped or conical buckets D on its periphery, sustained by webs or flanges *r*, having inclined outer edges. As the wheel revolves in the case said wheel receives the water upon its buckets D, the water entering through the ports F F' F<sup>2</sup> F<sup>3</sup>. Gates or abutments *a b* and

*a*<sup>2</sup> *b*<sup>2</sup> prevent the water from escaping backwardly and compel the water to act with a hydraulic pressure upon the buckets of the wheel within the closely-fitting semicircular chamber. These gates are hinged to the outer periphery of the case, and their free ends rest upon the inner periphery of the case and outer edge of the wheel, the inclined flanges or webs *r* of the wheel causing these gates to ride up and over the buckets D as they pass the gates. The gate *a b* is constructed as shown, and fits closely the chamber with a tight joint, so that while in this position no water can flow back of it into the open part of the case. When the bucket D passes one of these gates, the said gate rises into its recess in the upper portion of the case, as shown by the dotted lines *a b'*, (and also as shown by the full line *a*<sup>2</sup> *b*<sup>2</sup>), and when the bucket passes the end of the gate the latter falls back to its place. As soon as this gate is touched by the inclined flange *r* of the bucket, the port F (or F') is closed by a valve mechanism hereinafter described, and when the gate falls back to the position *a b* the same valve mechanism opens the port again and the water fills the space in the chamber between the gate and the receding bucket of the wheel and adds its force to the said bucket, which now raises the second gate to its recess, as shown at *a*<sup>2</sup> *b*<sup>2</sup>. As soon as the bucket passes the end of this gate, the latter falls back to the position indicated by dotted lines *a*<sup>2</sup> *b*<sup>2</sup>, and this gate in this position prevents the backflow of water from port F' and also from ports F<sup>2</sup> F<sup>3</sup>. The practical point aimed at is to have one of these gates in position *a b* or *a*<sup>2</sup> *b*<sup>3</sup> all the time—i. e., as the first gate is raised the second is closed, and before the second gate is reached by the incline of the bucket the first gate falls back to *a b*, thus practically stopping up the upper end of the pressure-chamber, and thereby bringing to bear on the revolving buckets of the wheel the hydraulic force of the water entering through at least three of the ports. In constructing the case of the wheel I may make that portion in which the gate plays square instead of circular and with the top or side removable to permit of access to the gates.

Referring to Figs. 4, 5, and 6, B represents a slide-valve having an opening A in the same



and a stem *c*. To the under side of this stem is attached a spring *d* with a double inclined or triangular projection *e*.

Both the gates *a b* and *a<sup>2</sup> b<sup>2</sup>* have an elbow extension *s*, which is made to act upon the valves as follows: When the gate rises or is opened by one of the buckets, its extension *s* strikes against the projection *e* and pulls the valve *B* back so that its opening *A* is out of coincidence with the port, and the supply of water cut-off. After this initial movement the yielding character of spring *d* allows the extension *s* to pass to the other side of projection *e*. Then when the gate is forced down again by its gravity and the pressure of the water, its extension *s* forces the projection *e*, spring *d*, and valve *B* forward again and causes its opening *A* to pass into coincidence with its port again, the final movement of the extension *s* causing it to again pass to the other side of the projection *e*. The two gates thus work alternately, one being down while the other is up, and vice versa.

A valve is to be placed in each port or nozzle to regulate the flow of water, and also one in the inlet-pipe.

The case is preferably cast in four pieces, two on each side joined on the lines *P P' P<sup>2</sup> P<sup>3</sup>* by screws or bolts.

The wheel *Z* is a solid steel disk, with buckets *D* attached to the outer edge of the wheel and supported by the inclined webs or flanges *r*.

*H* is a clamp or circular flange by which the wheel is attached to its shaft. The inclines or flanges *r* are preferably made a part of the wheel itself and adapted to receive the buckets *D*, which are of conical shape and detachably fitted thereto. These buckets at their

outer edges fit closely the chamber of the outer case with a water-tight joint, like so many pistons, and for this purpose packing may be fitted to their edges in the usual manner.

Having thus described my invention, what I claim is—

1. The combination of the case having a semicircular chamber *P P'* and *P<sup>2</sup> P<sup>3</sup>*, with packing at its inner perimeter *P' P<sup>2</sup>*, a wheel having a body portion passing through the inner edge of said chamber and provided with buckets with inclined outer edges fitting the semicircular chamber, a series of ports *F F'* *F<sup>2</sup> F<sup>3</sup>*, and the two alternately-acting hinged gates *a b* and *a<sup>2</sup> b<sup>2</sup>*, substantially as shown and described.

2. The combination, with the case having an inlet-port, of a wheel with buckets and inclines, as described, and a gate hinged to the outer periphery of the case and provided with extension *s*, the slide-valve *B*, with opening *A*, registering with the port, and stem *C*, with spring and projection *d e*, acted upon by the extension of the gate, substantially as shown and described.

3. The combination, in a water-wheel, of a case having two inlet-ports arranged side by side and opening into the same inlet-pipe, two hinged gates with valves for opening the ports alternately by the action of the gates, and a wheel having inclines on its periphery for acting upon the gates, substantially as shown and described.

JAMES C. WALKER.

Witnesses:

SOLON C. KEMON,  
EDWD. W. BYRN.