

(No Model.)

4 Sheets—Sheet 1.

A. D. MOORE.
WATER MOTOR.

No. 559,740.

Patented May 5, 1896.

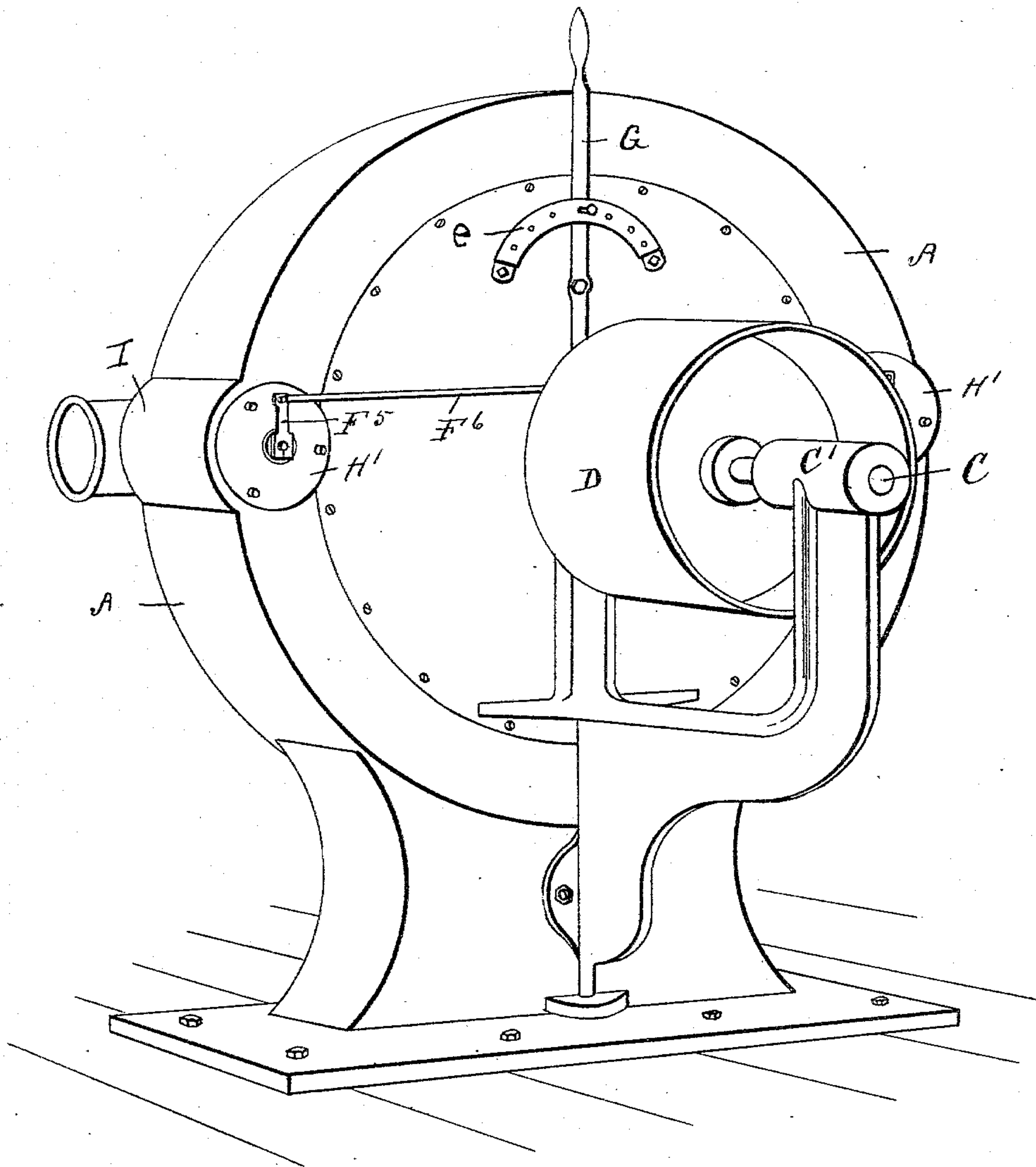


Fig. 1.

Witnesses

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Inventor

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By his Attorney.

Refus D. Fowler.

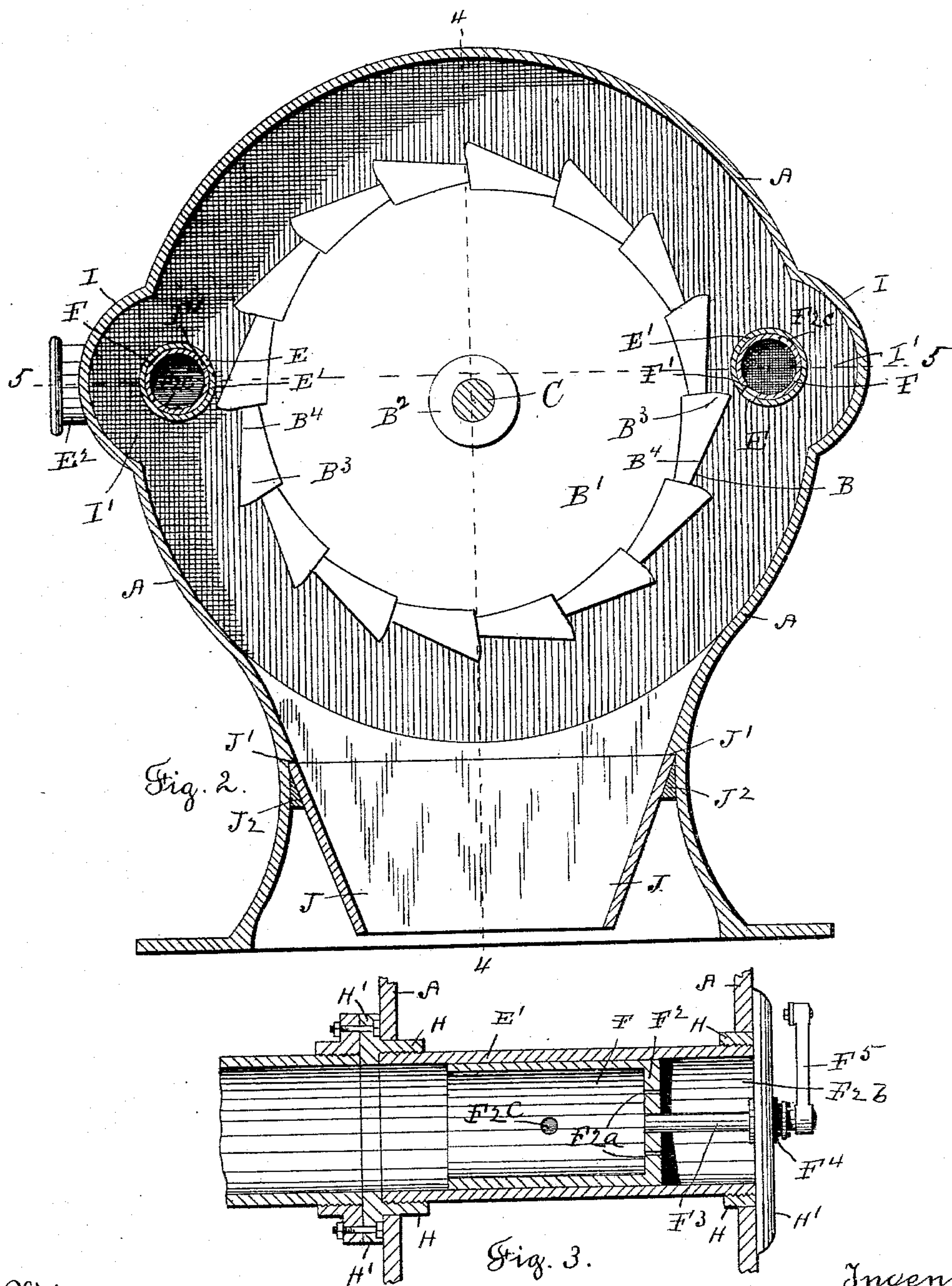
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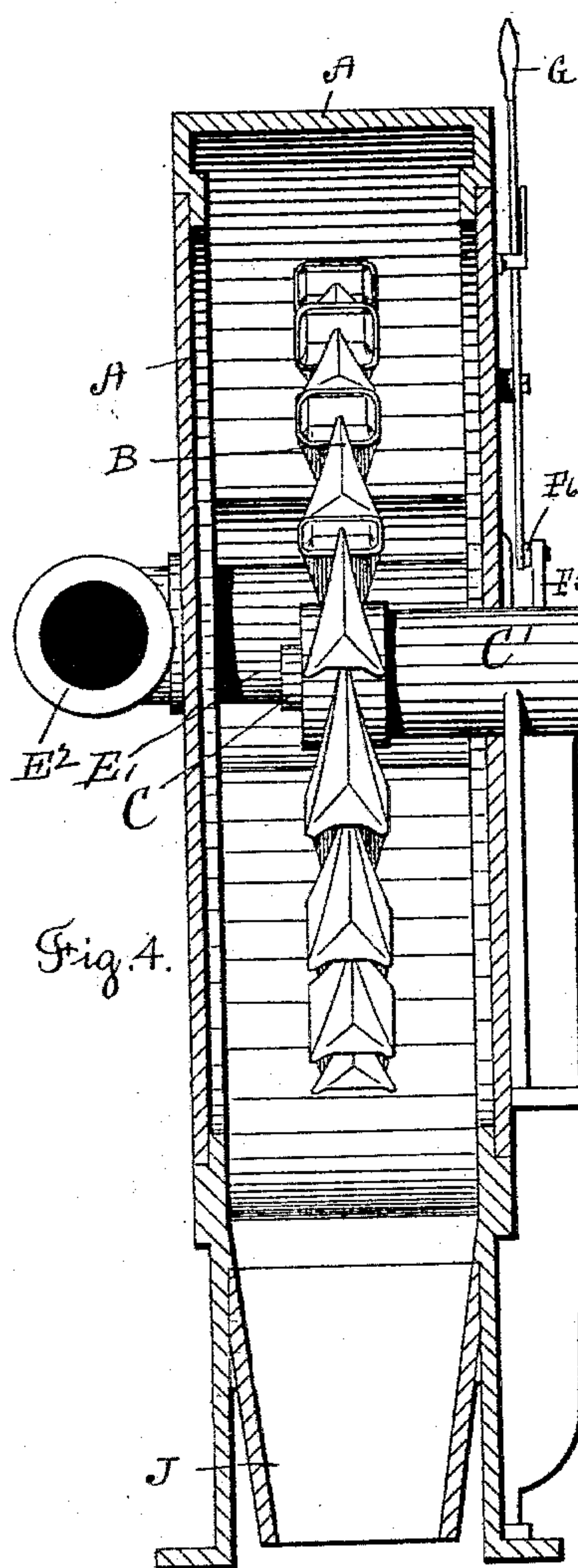


Fig. 4.

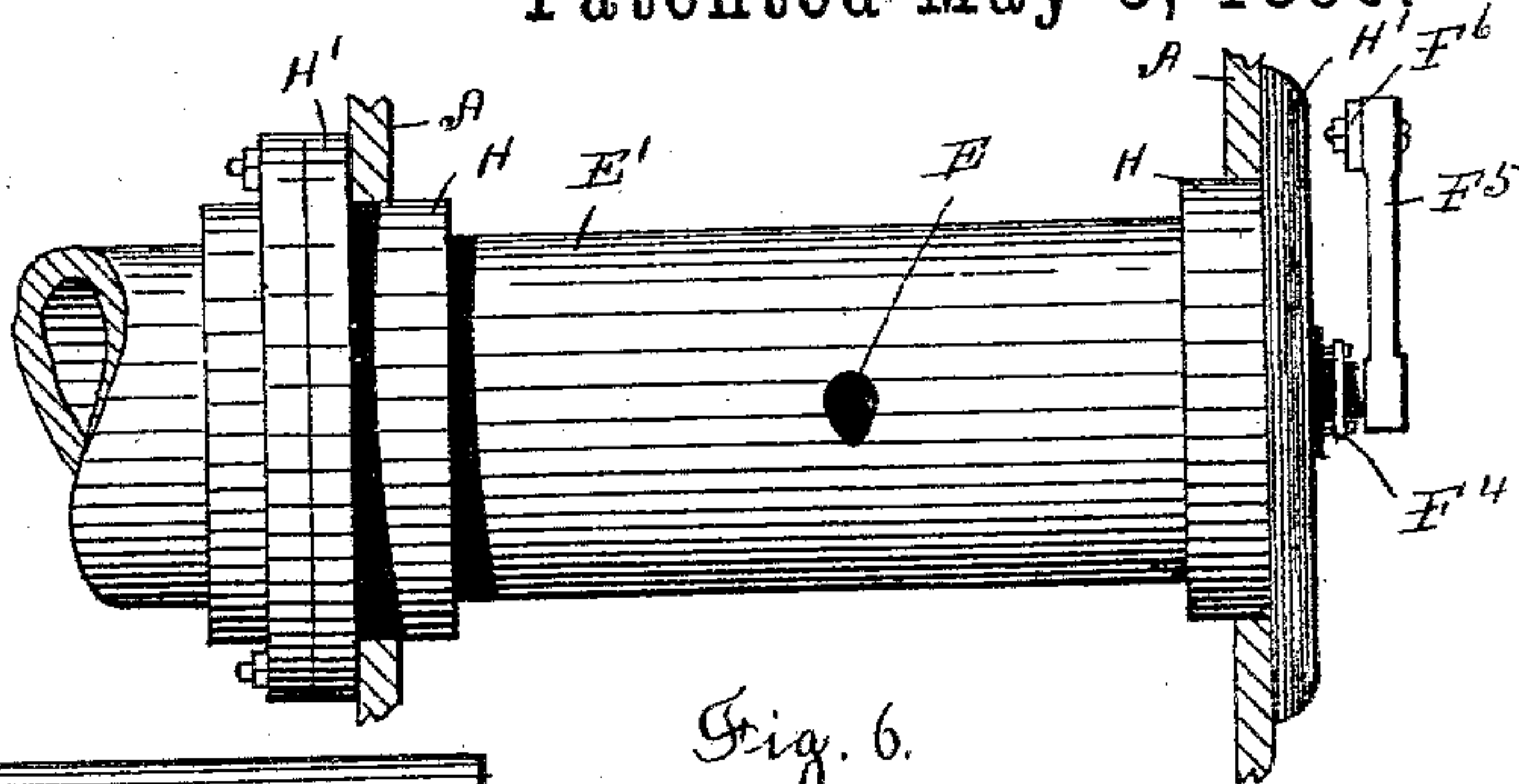


Fig. 6.

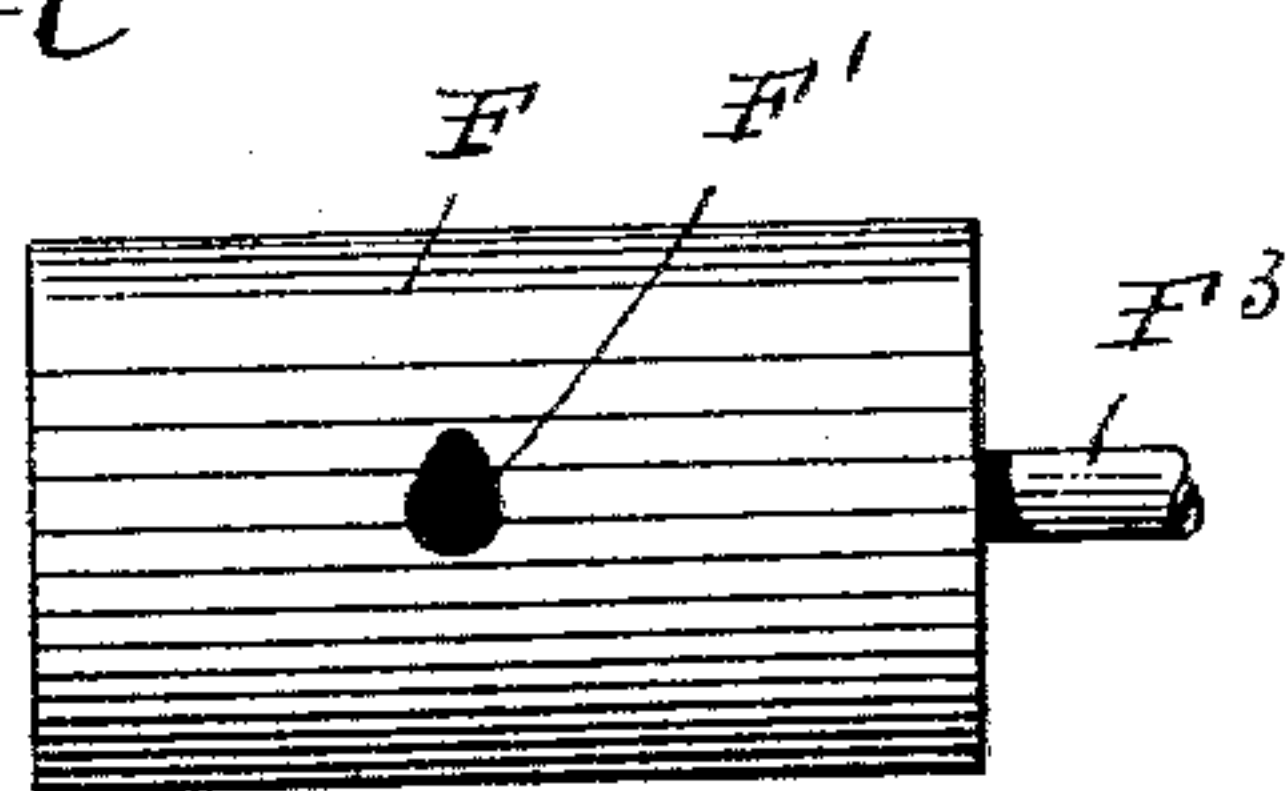


Fig. 7.

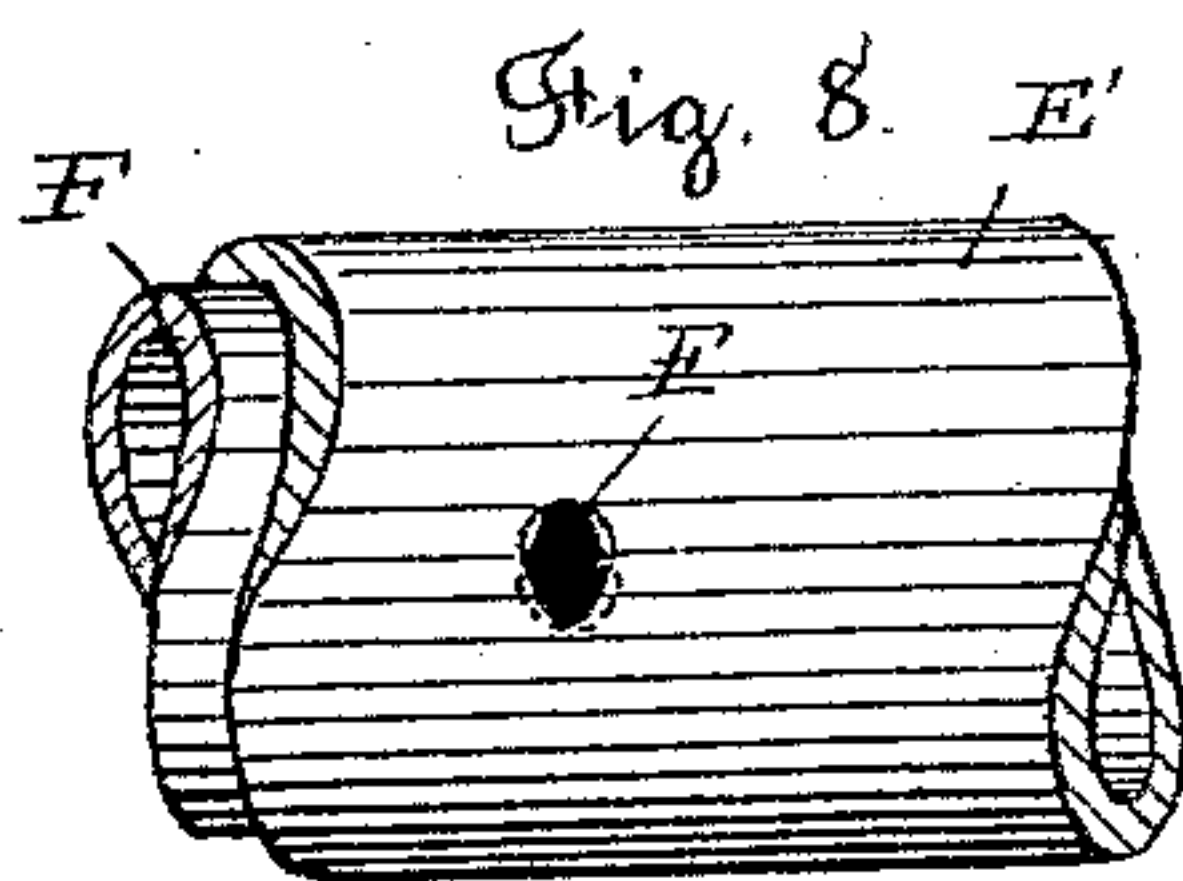


Fig. 8.

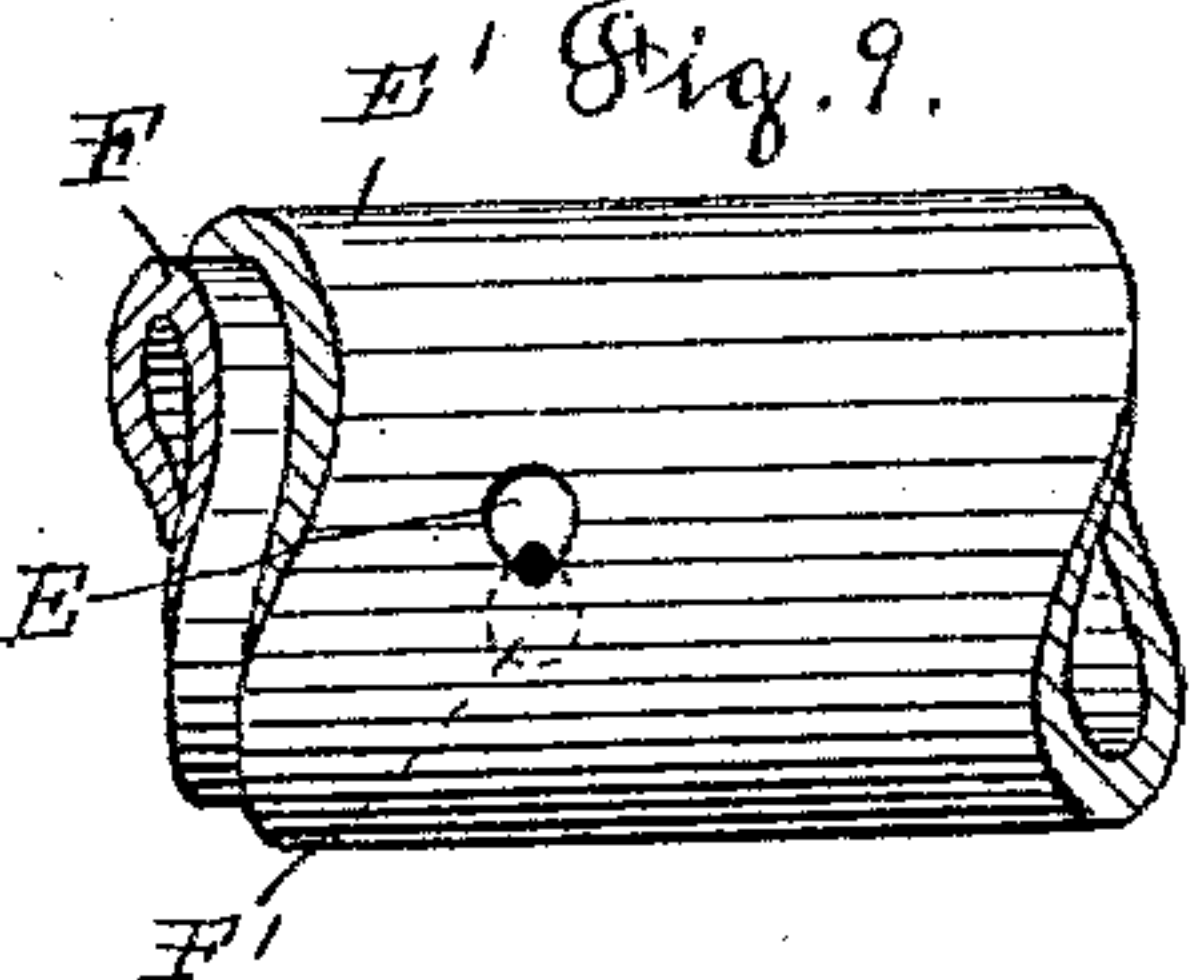


Fig. 9.

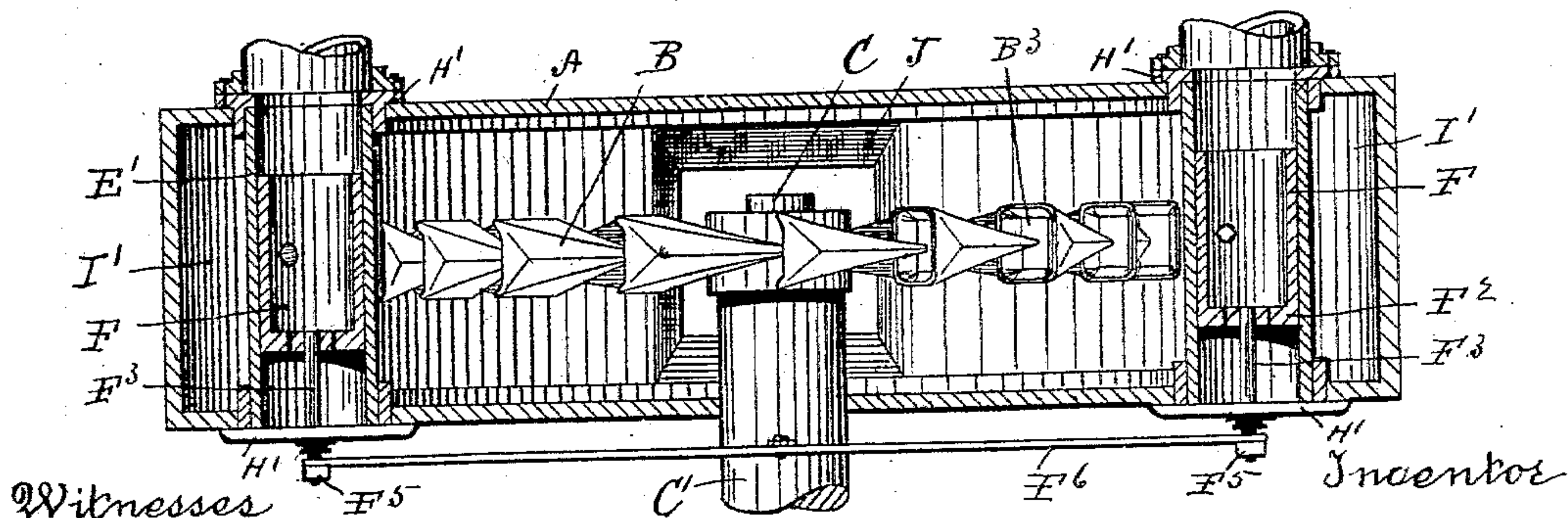


Fig. 5.

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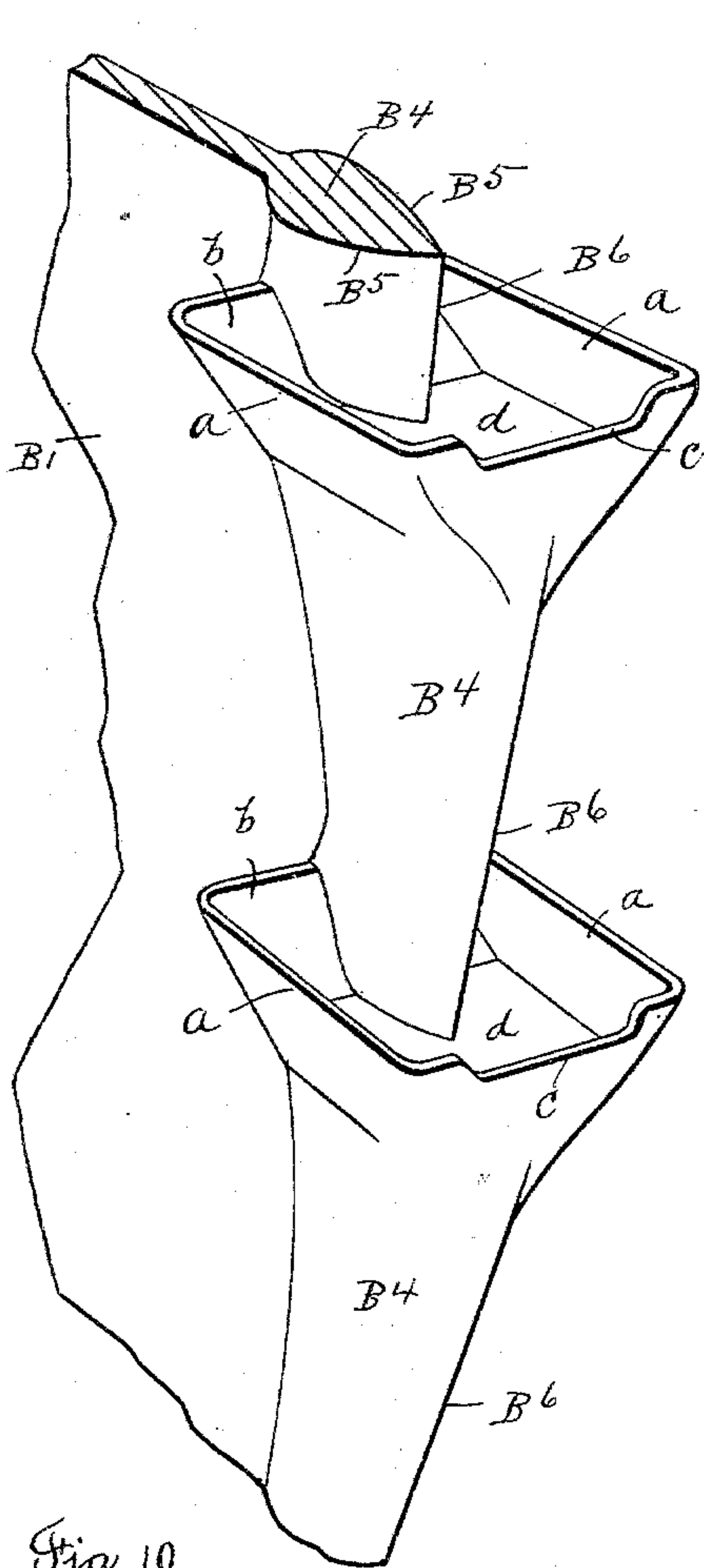


Fig. 10.

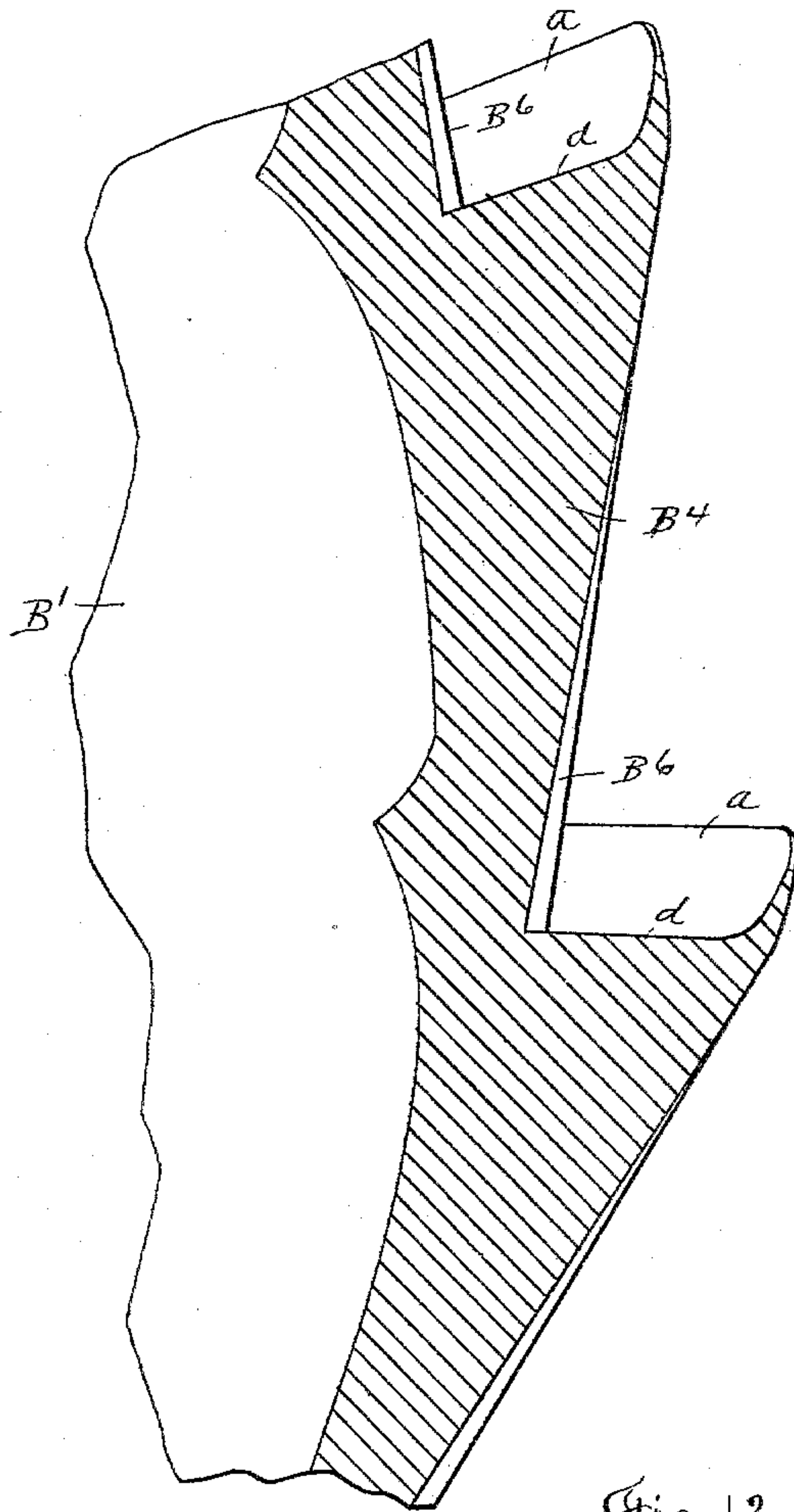


Fig. 12.

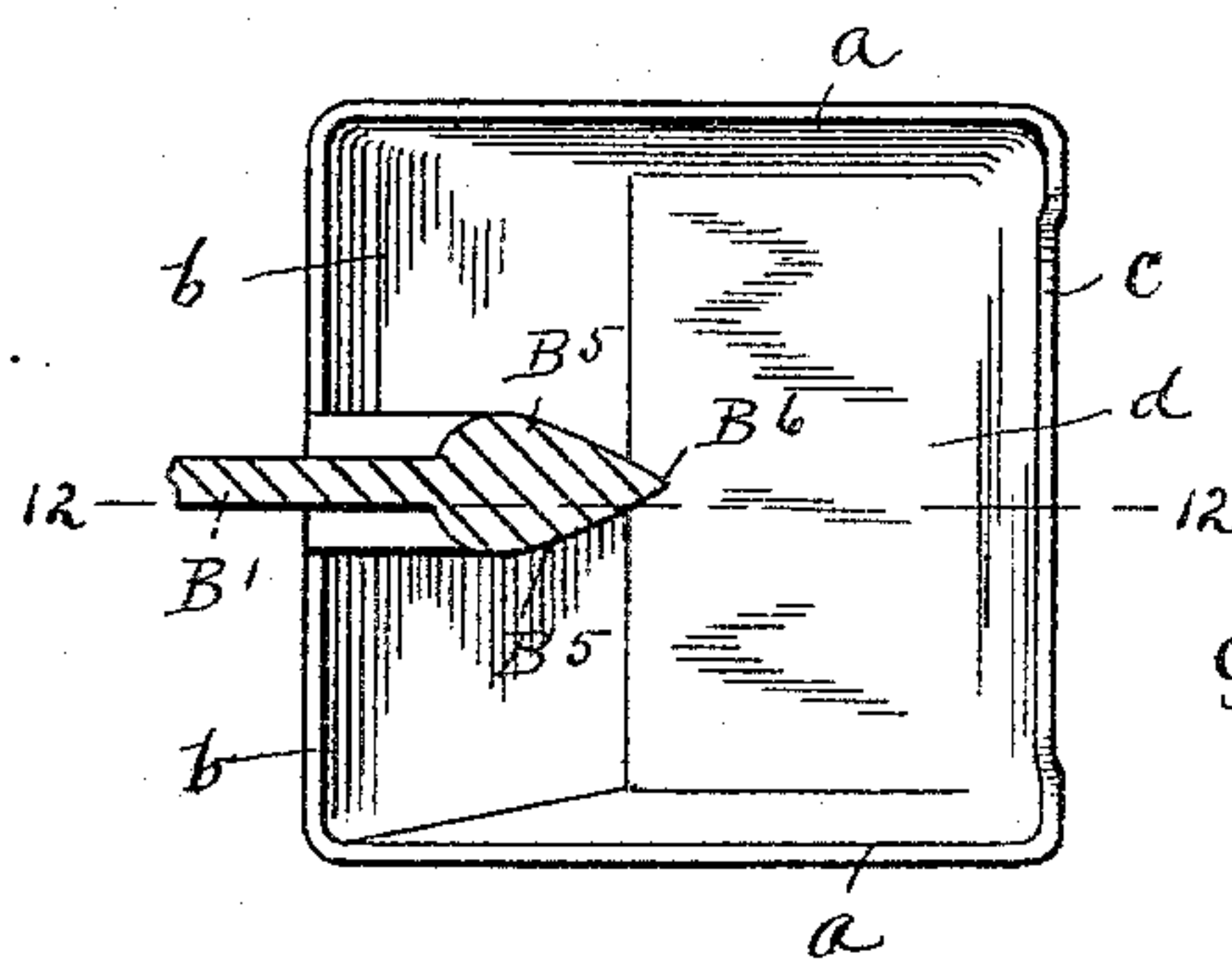


Fig. 11.

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UNITED STATES PATENT OFFICE.

ALLEN D. MOORE, OF MONTPELIER, VERMONT.

WATER-MOTOR.

SPECIFICATION forming part of Letters Patent No. 559,740, dated May 5, 1896.

Application filed August 4, 1892. Serial No. 442,188. (No model.)

To all whom it may concern:

Be it known that I, ALLEN D. MOORE, a citizen of the United States, residing at Montpelier, in the county of Washington and State of Vermont, have invented a new and useful Improvement in Water-Motors, of which the following is a specification, reference being had to the accompanying drawings, representing a water-motor embodying my invention, in which—

Figure 1 represents a perspective view of the motor. Fig. 2 is a central vertical sectional view through the inclosing case. Fig. 3 is a central sectional view of the tube forming the water-chamber and of the oscillating valve-cylinder inclosed therein. Fig. 4 represents the water-motor, with the inclosing case shown in transverse sectional view, in a vertical plane passing through the center of the case on line 4 4, Fig. 2. Fig. 5 is a transverse sectional view of the inclosing case on a horizontal plane passing centrally through the case and through the tubes forming the water-chambers on the line 5 5, Fig. 2. Fig. 6 is a view of the tube forming the water-chamber. Fig. 7 represents the oscillating cylinder forming one of the valves. Fig. 8 represents a portion of a valve-cylinder with its inclosing tube with the port open. Fig. 9 is a view of the same with the port nearly closed. Fig. 10 shows a portion of the revolving bucket-wheel with two of its buckets shown in perspective view. Fig. 11 is a top view of one of the buckets, and Fig. 12 is a sectional view of the bucket on the line 12 12, Fig. 11.

Similar letters refer to similar parts in the different figures.

My invention relates to certain improvements in water-motors, having for its object to increase the simplicity, durability, and efficiency of the machine, and consisting in the construction and arrangement of the several parts, as hereinafter described, and set forth in the annexed claim.

Referring to the accompanying drawings, A denotes the inclosing shell or case within which rotates the bucket-wheel B, attached to the end of a shaft C, journaled in the bearings C' C², and which is also provided with a belt-pulley D. The wheel B consists of a disk B', having hubs B², by which it is

attached to the shaft C, and provided at its periphery with a series of buckets B³. Preferably formed integrally with the disk B' are a series of equidistant shallow cups projecting radially from the periphery of the disk. Between each bucket and the next adjacent bucket the disk B' is made thicker, forming a triangular rib B⁴, having curved sides B⁵ and a sharp edge B⁶. The base of the triangular rib B⁴ extends radially the entire length of the bucket B³, while the opposite end extends within the shallow cup forming the next bucket.

The wheel B revolves in the center of the shell A, and streams of water are directed tangentially against the buckets upon opposite sides of the wheel through the ports E in the tubes E', held in and extending transversely through the shell A. These tubes E' form water-chambers, from which water under pressure is admitted through the ports E to the rotating wheel B, and these tubes are preferably connected with a common feed-pipe E², communicating with the water-main. The valves by which the ports E are opened and closed consist of oscillating cylinders F, filling the tubes E' and provided with openings F', which are made to correspond with the ports E by the angular motion of the cylinders F. The cylinders F are open at one end to admit water and are provided at the opposite end with a head or disk F², provided with holes F^{2a} to preserve equal water-pressure and attached to a spindle F³, extending through a stuffing-box F⁴, through the shell A to receive a radial arm F⁵. The radial arms F⁵, attached to the spindles F³ upon opposite sides of the shell, are connected by a rod F⁶ to secure the simultaneous rocking motion of the two cylinders F by means of a hand-lever G, pivoted at the side of a shell A and operatively connected with the connecting-rod F⁶. The ports E in the tubes E' and the openings F' in the cylinders F are made of the same size and oval in form, with the narrow extremity of the opening F' placed opposite the narrow extremity of the corresponding port E, so the narrow extremities of the opening and port will be brought together in the operation of closing the port, causing the port to be contracted laterally as it is closed by the angular movement of the

cylinder to maintain a solid and round stream up to the last moment of closing. The head F^2 is provided with holes F^{2a} to admit water to the space F^{2b} in order to equalize the water-pressure upon both sides of the head, and the cylinder F is provided with an opening F^c , diametrically opposite the opening F' , to allow the water-pressure of the stream of water passing through the port when the port is open and to counteract the pressure of water acting through the opening F' against the inner side of the tube E' when the port is closed.

The tubes E' are held in screw-threaded collars H H , provided with flanges H' H' , which overlap the sides of the shell A , making a tight joint, the construction allowing the tubes E' to be rocked, so as to vary the direction of the stream relatively to the rotating bucket-wheel B , so the angle at which the streams of water shall impinge against the buckets can be adjusted.

The stream of water striking against the edge of the wheel, either directly from the ports or as deflected from the buckets, is received upon the acute edges B^6 and deflected laterally away from the wheel, so it will not offer any resistance to the rotation of the wheel, and the triangular rib B^4 being thicker than the disk B' the current of water passing the rib is carried out of contact with the sides of the revolving disk.

The form and arrangement of buckets are shown in Figs. 10, 11, and 12. The lateral sides a a of each bucket are slightly flaring and the rear side b is more flaring, forming an angle with the bottom of the bucket of preferably sixty or seventy degrees.

The front side of the bucket is cut away at c , and the bottom d of the bucket lies in a radial plane. This form of bucket I believe to be new, and it possesses the advantage of allowing the water to be so deflected from the surface of the bucket into the space between the inclosing shell and the revolving bucket-wheel that it will not be brought into contact with the streams issuing from the ports, and will also be carried entirely out of the path of the buckets, in order that the force of the water as deflected from the surface of the bucket shall not offer any resistance either to the revolving bucket-wheel or to the streams of water emerging from the ports.

The wheel B is carried upon the inner end of the shaft C and is provided with hubs B^2

of equal length, which permits the bucket-wheel to be attached to the shaft in the position shown in the accompanying drawings, or turned end for end, when it is desired to reverse its motion. When so turned to run in the opposite direction, the tubes E' are turned in the shell A to throw the streams of water in the opposite direction from that shown in the drawings, and the oscillating valve-cylinders F are adjusted to correspond with the changed position of the tubes E' .

In order to open or close the valves, an angular movement is given to the hand-lever G , causing the valve-cylinders F to be simultaneously rocked within the tubes E' by means of the connecting-rod F^6 and radial arms F^5 , and the hand-lever is locked in position by a pin passing through the lever and one of the holes in the curved rail e , or by any of the well-known methods for accomplishing the purpose. The periphery of the case A is curved concentrically at I I with the tubes E' in order to provide a space I' I' between the case and the tubes to allow the water to flow downward freely and be delivered from the case through the hopper J .

The hopper J is fitted within the case A by bringing its upper and larger end against the projecting shoulder J' and filling the acute corner at J^2 between the hopper and case with molten lead. The hopper J is contracted at its lower end so the water can be discharged from the case A through the hopper into the mouth of a sewer or drain-pipe.

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

In the water-motor, the combination of a case A , bucket-wheel B inclosed in said case, tubes E' , E' , held transversely in said case and upon opposite sides of said bucket-wheel, said tubes being capable of radial adjustment in said case, a common feed-pipe E^2 communicating with said transverse tubes, whereby a common water-pressure is maintained in each of said tubes, concentric oscillating valves held in said tubes, said tubes having openings which are opened and closed by said valves, and said valves being operatively connected so as to move synchronously, substantially as described.

Dated the 28th day of July, 1892.

ALLEN D. MOORE.

Witnesses:

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WILLMARTH A. DREW.