

No. 639,011.

Patented Dec. 12, 1899.

R. M. BLACKMER.  
WATER MOTOR.

(Application filed Apr. 18, 1899.)

(No Model.)

2 Sheets—Sheet 1.

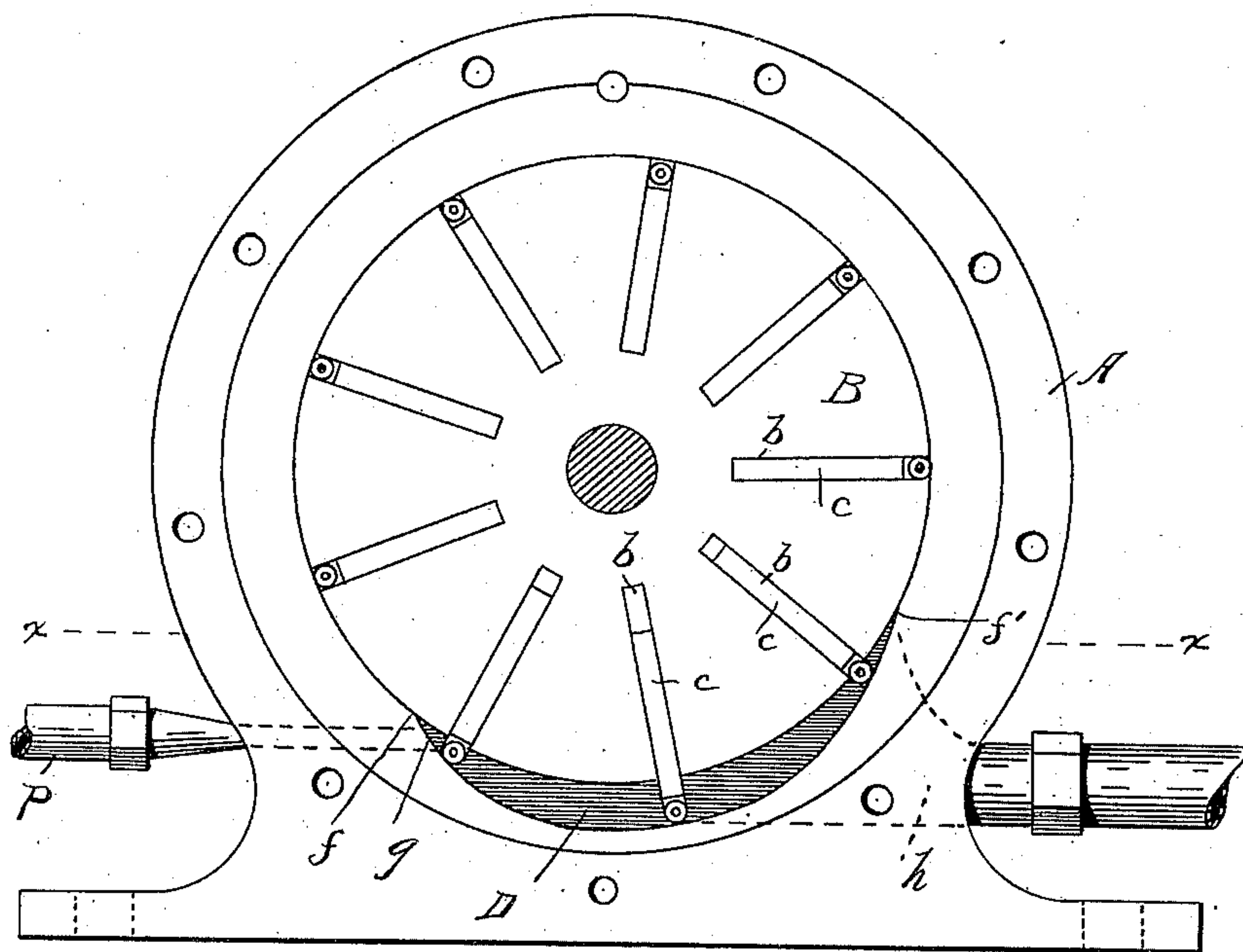


Fig. 1

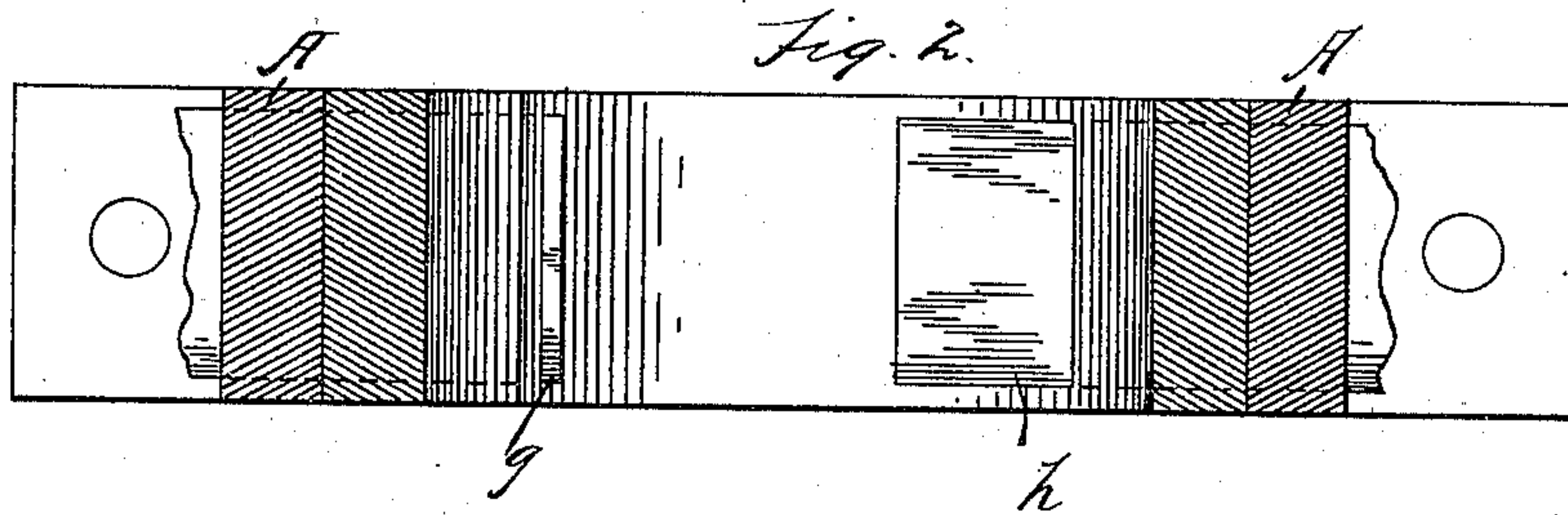


Fig. 2.

WITNESSES

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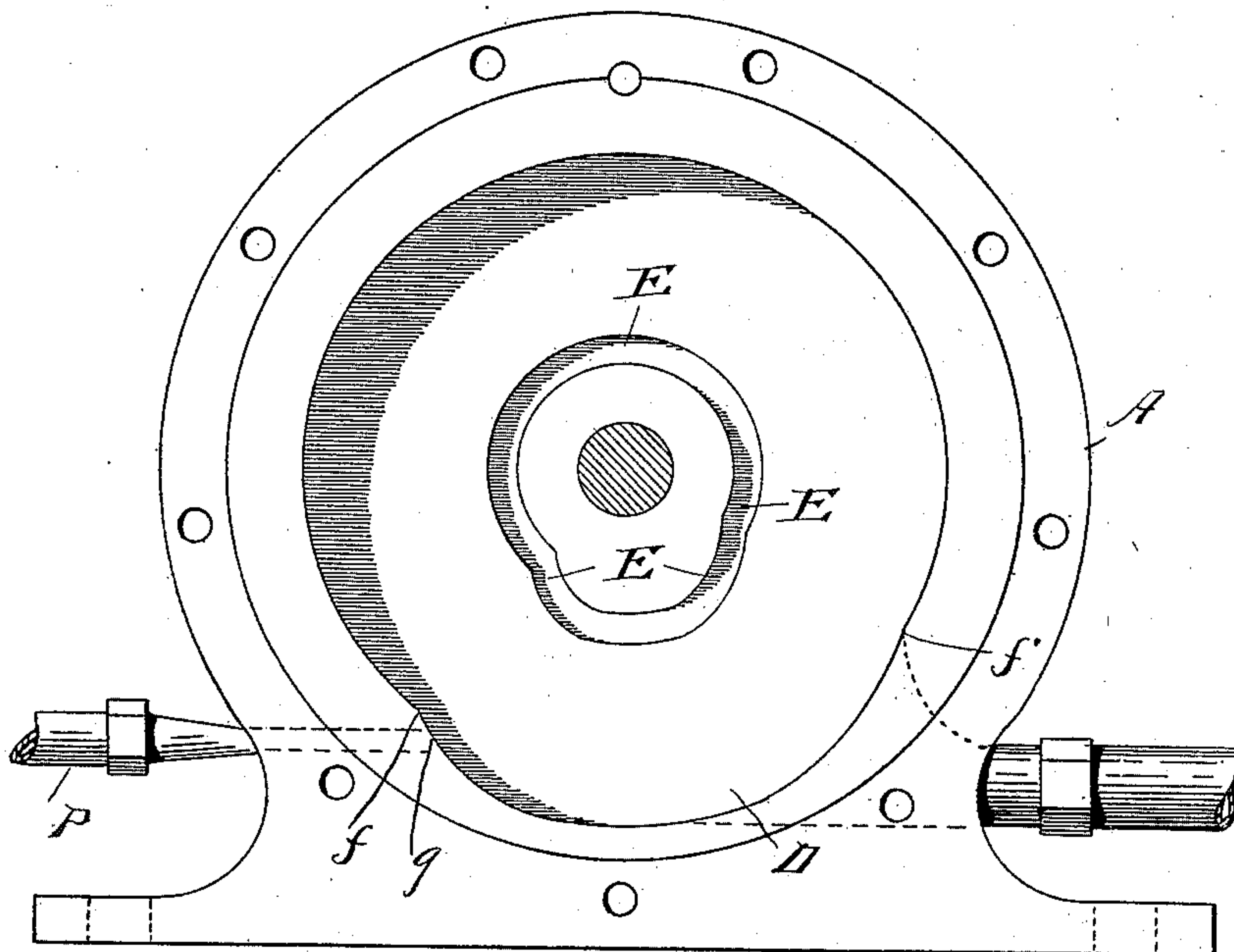


Fig. 4

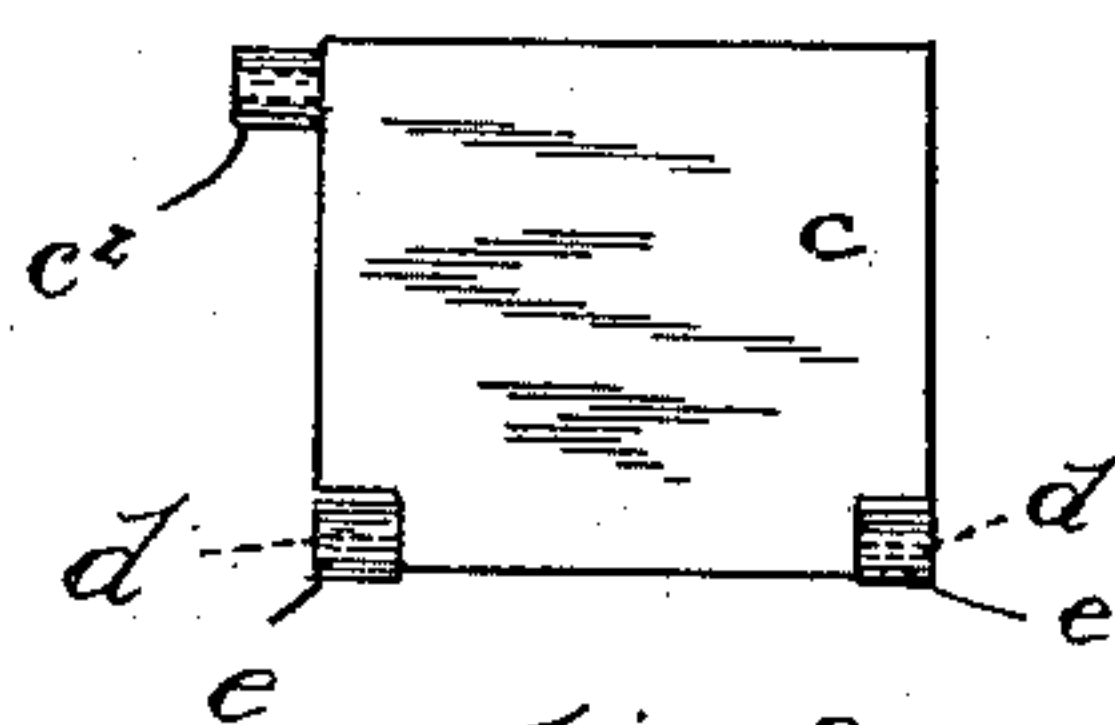


Fig. 3.

WITNESSES

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# UNITED STATES PATENT OFFICE.

ROBERT M. BLACKMER, OF WARDNER, IDAHO.

## WATER-MOTOR.

SPECIFICATION forming part of Letters Patent No. 639,011, dated December 12, 1899.

Application filed April 18, 1899. Serial No. 713,510. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT M. BLACKMER, a citizen of the United States, residing at Wardner, county of Soshone, State of Idaho, have invented a certain new and useful Improvement in Water-Motors; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to water-motors, and has for its object an improved form of motor which utilizes all the force or weight of the water passing through it, the buckets being so arranged that the entire weight of the column of water rests on and presses forward the buckets successively.

Another feature of the invention is found in the fact that bits of gravel or sand that may accidentally get into the water are carried through and discharged without in any way interfering with the action of the motor or its buckets.

In the drawings, Figure 1 shows the motor in elevation. One side casing is removed and the shaft is in section. Fig. 2 is a horizontal section at the line  $xx$  of Fig. 1. Fig. 3 shows a bucket. Fig. 4 is a side elevation, the bucket-wheel and buckets being removed.

A indicates the casing, in which there is a cylindrical chamber for the reception of a round rotating bucket-wheel B. Said casing consists of a central annular or cylindrical part and two disks adapted to be bolted to the central part concentric therewith to close said chamber. In one or both of the flat ends inclosing said chamber is a cam-groove E. The peripheral wall inclosing said chamber curves outward from  $f$  to  $f'$  with a shorter radius of curvature than the remainder of said wall, thus forming an enlargement D of said chamber. Said enlargement extends over about one-quarter of the periphery of said chamber.

B is the cylindrical wheel, having a circular periphery of such diameter as to fit into the circular part of the chamber in the casing A.  $b\ b\ b$  indicate radial slots extending inward from the periphery of the wheel B. In each of said slots is a flat plate  $c$ , having the cross-

section of and adapted to fit closely and slide radially in said slots. At each outer corner of each of the plates  $c$  is a pin  $d$ , projecting from said plate, and upon each of said pins is a roller  $e$ . Said rollers serve as friction-rollers merely and rest against the walls of the cylinder as the buckets are urged out by centrifugal force. At an inner corner of each of the plates  $c$ , projecting laterally from said plate, is a roller  $c^2$ , which enters the cam-groove E and acts in conjunction therewith to hold said plates out against the peripheral walls of the cylindrical chamber in the casing A.

The periphery of the wheel B is circular and smooth, except for the slots  $b$ , which are filled by the plates  $c$ .

The inlet and the outlet for water lead into and out from the enlarged portion D. The inlet is a narrow slot-shaped ajutage  $g$ , extending with its long axis parallel with the axis of the cylinder, and its short axis is contracted as much as possible, being only large enough to allow the passage into the chamber D of the water flowing through the pipe P. The outlet-passage  $h$  leads from the opposite side of the chamber D and is large. It extends toward the pipe P as far as possible, leaving between the inlet and the edge of the outlet  $h$  a distance only slightly greater than the distance between consecutive buckets in the bucket-wheel. The end of one bucket  $c$  should just have passed the inlet-ajutage  $g$  at the time when the next preceding bucket just begins to open the outlet-passage  $h$ , and the outlet-passage  $h$  remains open in front of the oncoming bucket until the bucket has been entirely retracted into the receptacle B. Thus there is no back pressure against the bucket, and the bucket being forced out against the wall of the chamber D permits no water to pass by it, but is pushed forward by the entire weight of the water.

The inlet-passage is just at the commencement of and at the top of the enlargement D and is so located as to make the entering stream keep close to the periphery of the cylinder B, so that said stream will strike the buckets  $c$  at the top and will be turned back thereby, along the bottom of the enlargement D, so that said wheel shall act both as a reaction and as a pressure wheel, and the entering stream will be kept together, so that its

*vis viva* shall not be lost in eddies before said stream shall strike the buckets and so that a minimum amount of the stored power of said stream shall be lost in friction.

5 What I claim is—

In a water-motor, the combination of a casing provided with a cylindrical chamber expanded on one side, a cylindrical wheel in said chamber provided with radial slots at its  
10 periphery, and plates, *c*, filling and adapted to slide in said slots, the periphery of said wheel being circular and unbroken except for said slots and plates, means for keeping said plates against the outer wall of said chamber,

a narrow water-inlet at one end of said ex- 15  
pansion, so located that it shall deliver the stream of water in a direction that forms an angle with the radius of said wheel at the point of delivery, slightly greater than a right angle, and an outlet for the water at the other 20  
end of said expansion to that of the inlet, substantially as shown and described.

In testimony whereof I sign this specification in the presence of two witnesses.

ROBERT M. BLACKMER.

Witnesses:

CHARLES F. BURTON,  
JOHN N. GOODRICH.