

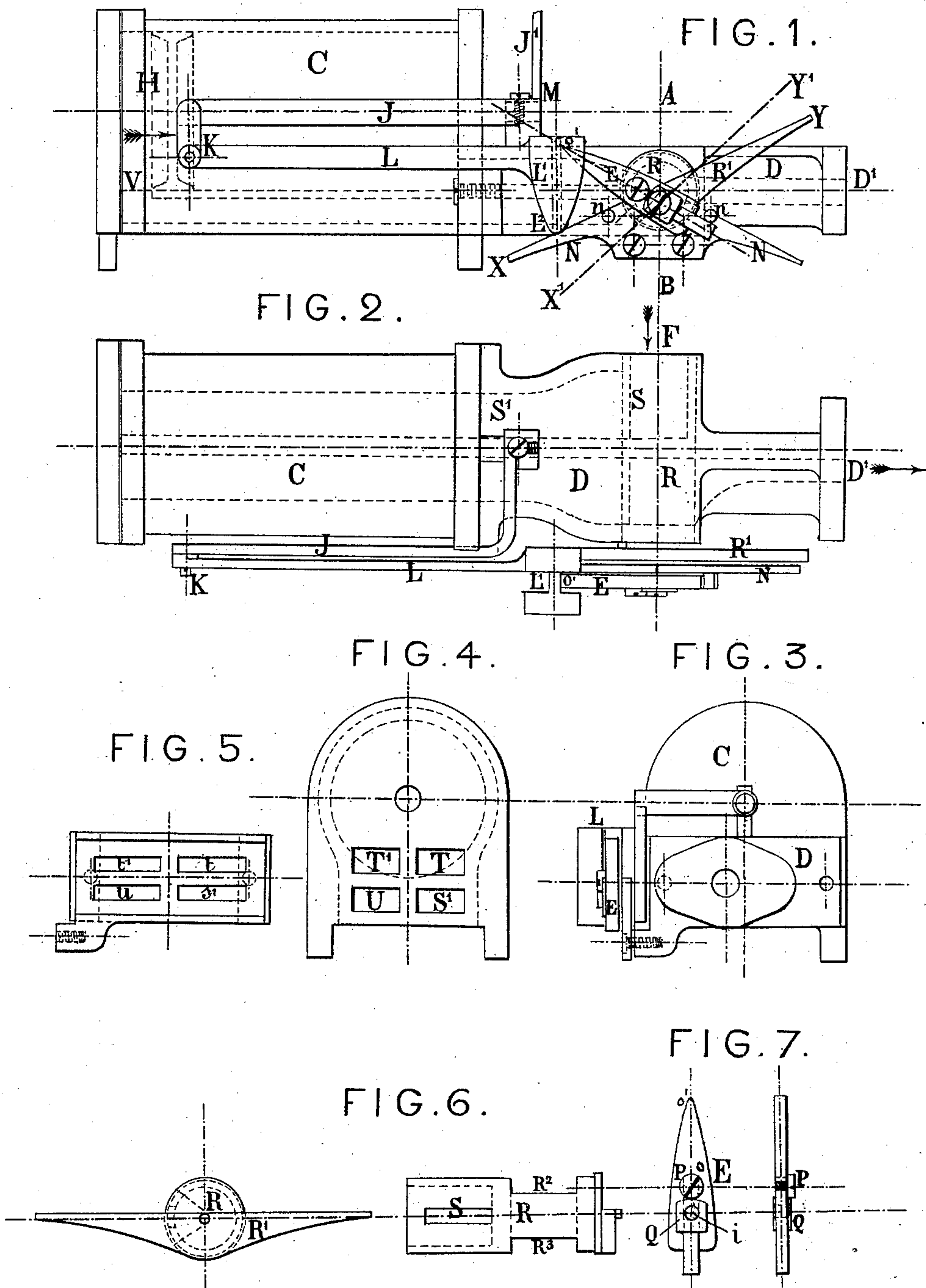
(Model.)

2 Sheets—Sheet 1.

P. BERTHON & A. DEBENOIT.
PISTON WATER METER.

No. 338,243.

Patented Mar. 23, 1886.



Witnesses:
M. Pruningu.
A. Ostermeyer.

Inventors:
Pierre Berthon and Auguste Debenoit.
By William Meyer.
Attorney.

(Model.)

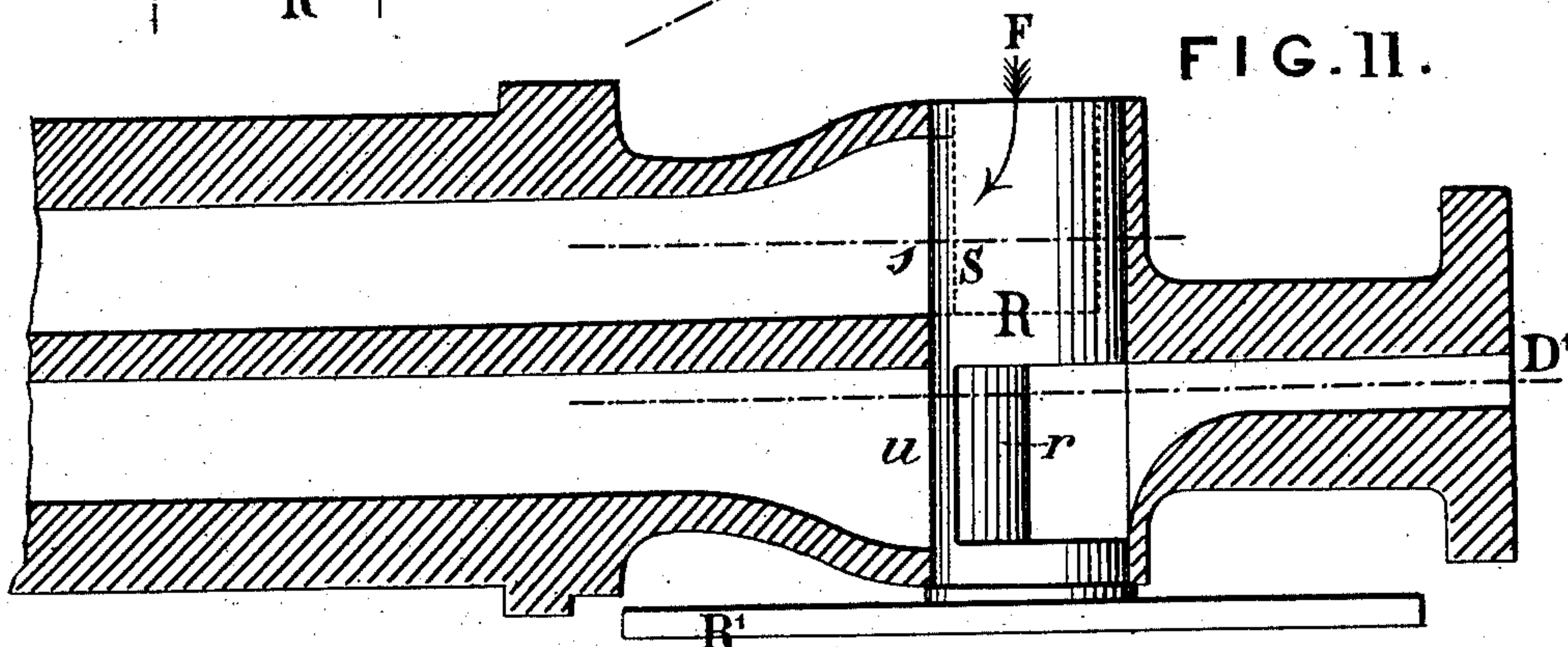
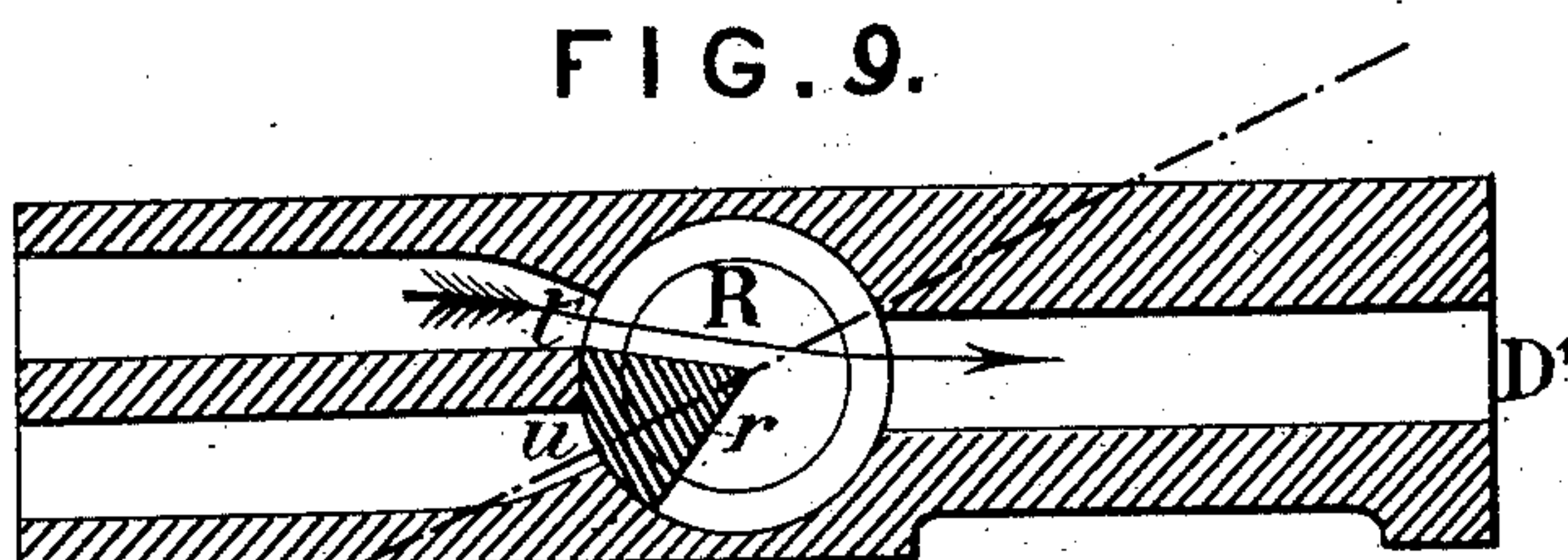
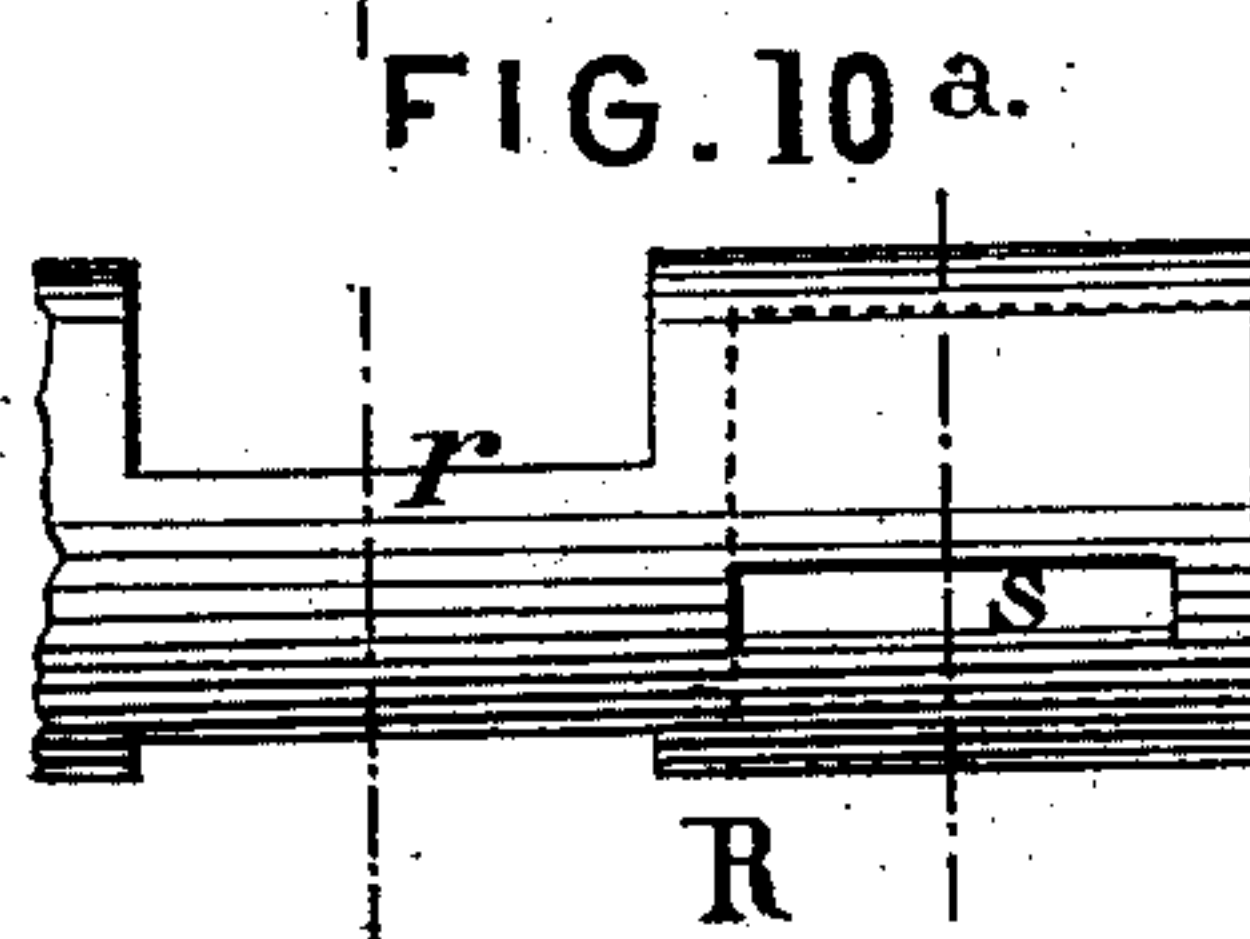
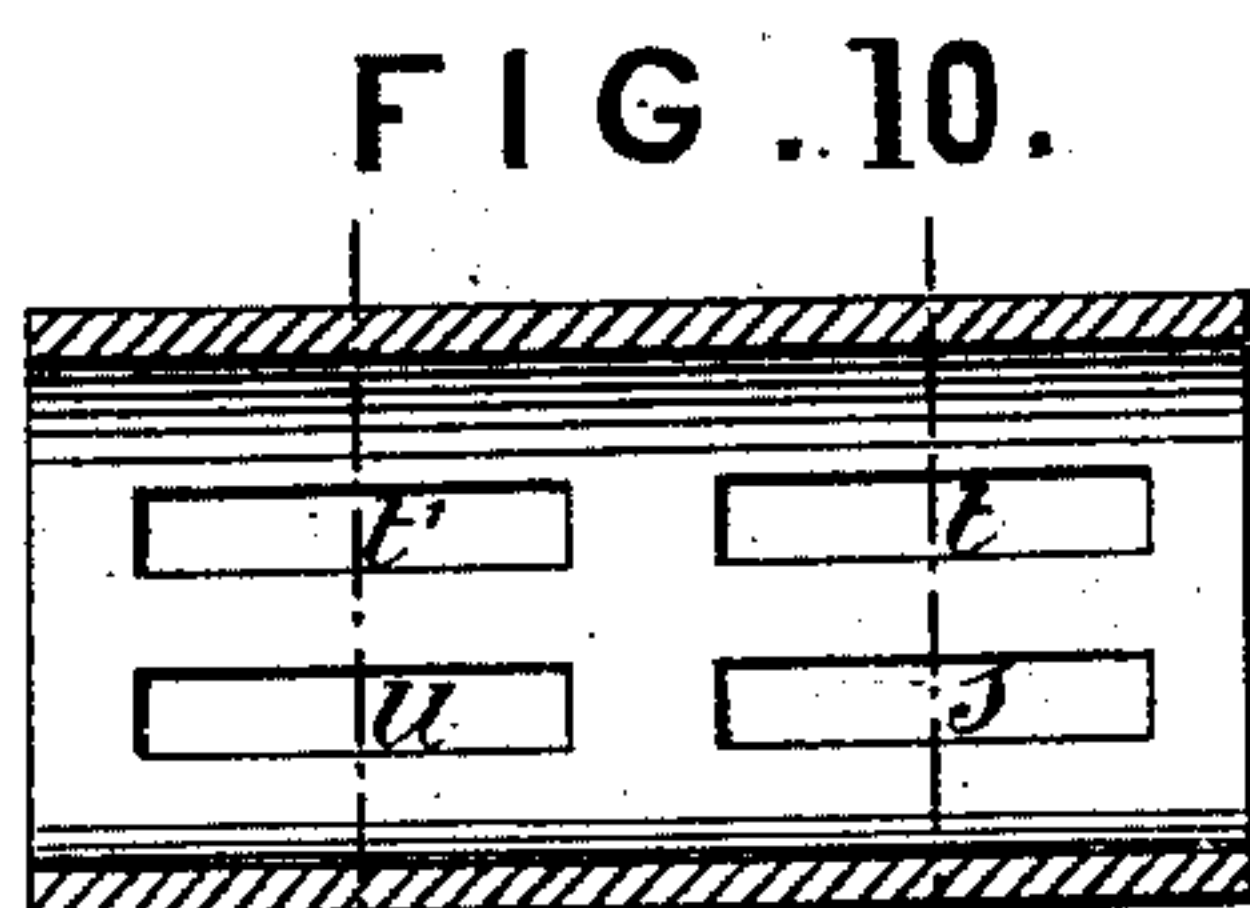
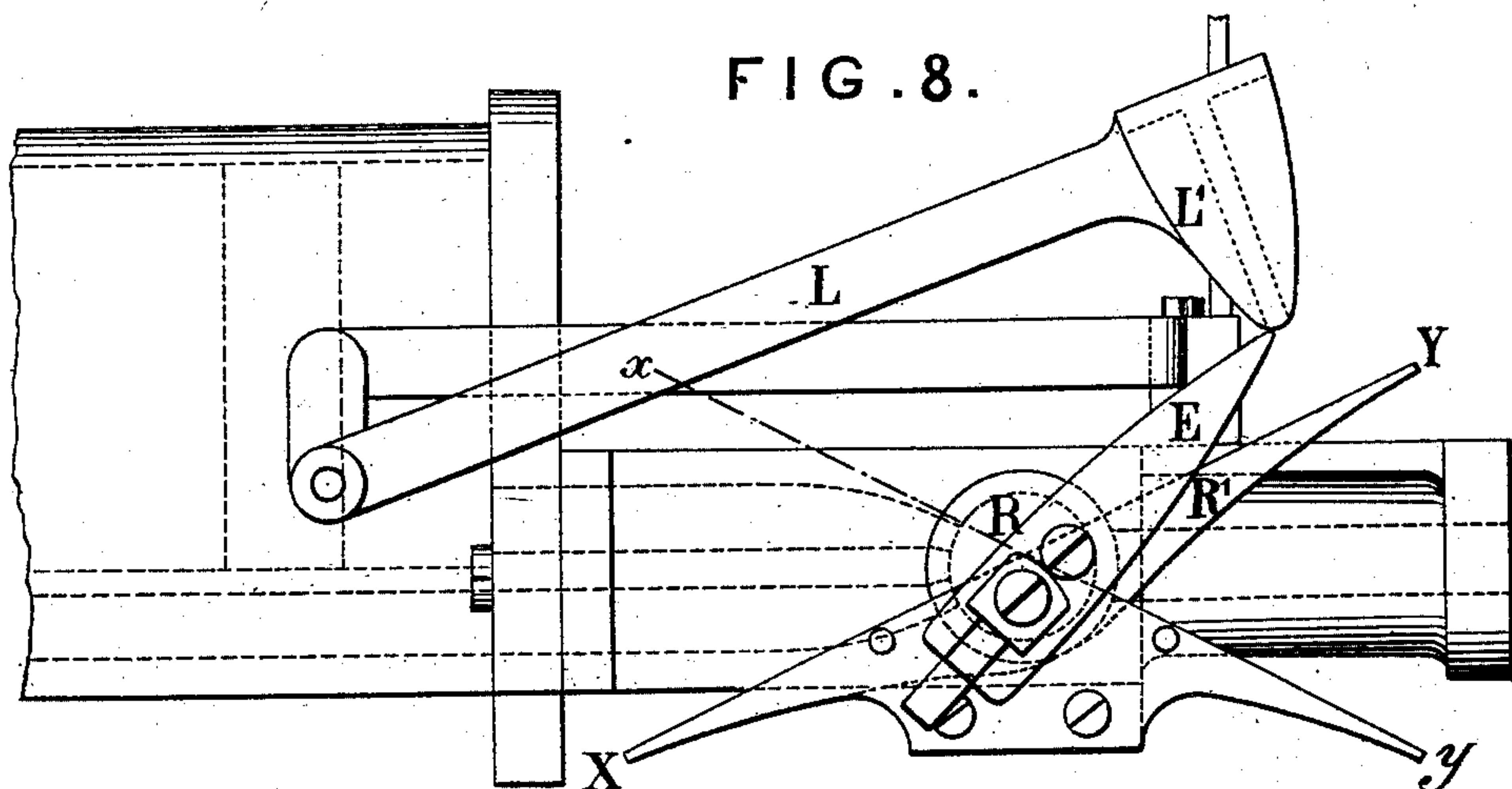
2 Sheets—Sheet 2.

P. BERTHON & A. DEBENOIT.

PISTON WATER METER.

No. 338,243.

Patented Mar. 23, 1886.



Witnesses

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UNITED STATES PATENT OFFICE.

PIERRE BERTHON AND AUGUSTE DEBENOIT, OF ST. ETIENNE, DEPARTMENT
OF LOIRE, FRANCE.

PISTON WATER-METER.

SPECIFICATION forming part of Letters Patent No. 338,243, dated March 23, 1886.

Application filed April 17, 1884. Serial No. 128,333. (Model.)

To all whom it may concern:

Be it known that we, PIERRE BERTHON and AUGUSTE DEBENOIT, both citizens of the French Republic, and residents of St. Etienne, in the Department of Loire and French Republic, have invented certain new and useful Improvements in Water-Meters, of which the following is a specification.

Our invention relates to improvements in water-meters in which the quantity of liquid passing the apparatus is measured and registered by means of a reciprocating piston; and the objects of our improvements are, first, to reverse instantaneously the motion of the piston, and, second, to regulate the capacity of the apparatus. We attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation, Fig. 2 a plan, and Fig. 3 a front elevation, of our improved water-meter. Fig. 4 is a front view of the measuring-cylinder, and Fig. 5 a vertical section at the line A B. Figs. 6, 7, 8, 9, 9^a, 10, 10^a, and 11 show details, the latter six figures on an enlarged scale.

Similar letters refer to similar parts throughout the several views.

The apparatus is composed of three main parts: first, the measuring-cylinder C, provided with inlets S' and T and outlets T' and U, Fig. 4; second, the distributing-box D, provided with four openings, s', t, t', and u, Fig. 5, which correspond with the above-mentioned inlets and outlets of the cylinder, and are opened and closed instantaneously by the cock R; third, the lever E of the adjustable length, Fig. 7, which allows the capacity of the apparatus to be regulated by limiting the length of the stroke of the piston.

Beside and parallel to the cylinder C is arranged a bar, J, which is fastened to the cross-head of the piston-rod, and consequently it follows the to-and-fro motion of the latter.

At the downwardly-bent arm on the rear end of the bar J is connected a weighted arm, L, pivoted on the pin K of the arm. The front end of the arm L is provided with a heart-shaped weight, L', which is adapted to turn an incline, E, and to reverse the distributing-cock R at a certain moment, as will be described

hereinafter. This cock R is cylindrically shaped, and is partly hollow and partly solid. The circumference of the solid portion is partly cut out, so as to form passages R² R³ for the eduction of the water, while the hollow part F, communicating with the induction-pipe, is provided with a slot, S, for the induction of the water to the cylinder.

The reversing-gear, which is actuated by the weighted arm L, consists of the stationary guide-piece N, the oscillating incline E, and the reversing-beam R', which is fastened to the key of the distributing-cock R. The roof-shaped guide-piece N serves to support and to elevate the heart-shaped weight L' on the arm L during a certain part of the stroke of the piston, while the incline E is induced to swing around its pivot i. The distance of the point o' of the incline E may be varied to govern the length of the piston-stroke and the quantity of water to be measured, as the part o is provided with a slit engaging over the square bushing Q of the bolt i and the set-screw P. The point o' of this regulating-incline is guided in a notch of the weighted hammer L', thus maintaining the arm L in an elevated position until the weight or hammer L' has traveled up the incline E and passed the point o' thereof, when the hammer L' falls, striking the beam R', and thereby causes the reversing of the cock R. This oscillation of the incline E is limited by the stops n and n.

When the reversing of the water-meter is in a position as illustrated by Figs. 1, 2, and 3, the apparatus works as follows: The liquid enters into the apparatus through the opening F of the cock R, passes the slot S, the openings s' and S', and the channel H behind the piston, thus causing the latter to move in the direction as indicated by the arrow. This motion of the piston-rod induces a corresponding motion of the arm L, which, being loose on its pivot K, is raised in consequence of the inclined surface X Y of the guide-piece N, and the tongue E is turned into the position X' Y'. In this position the weight L' of the arm L travels up the incline E till it reaches the point o', and then, dropping down, it turns the reversing-beam R' and the cock R, thus causing the reversing of the apparatus. At this in-

stant the slot S of the cock R has arrived at the induction-port *t* T. The eduction-port *t'* T' being closed and *u* U opened, the liquid quits the apparatus through the eduction-pipe 5 D' of the box D. This motion of the piston is used to actuate the reversing-gear and to regulate automatically its reciprocating motion. The disposition of the four openings in the cylinder and the four corresponding ones in 10 the distributing-box, arranged by pairs above each other and communicating, respectively, with the induction and eduction pipe, is to overcome the inconvenience arising from the same ports being used alternately as outlet and in- 15 let ports.

Fig. 8 of the drawings shows the position of the cock R, as it is represented in Fig. 1—viz., when the reversing-beam R' is in the inclination along X Y; but with the difference that 20 the arm L after doing its work has brought the regulating-incline E to swing, the point of which supports the hammer L', which will drop down during the advancing motion of the piston upon the arm of the reversing-beam R', 25 thus causing the latter to go into the position X Y, and thereby to turn the distributing-cock R, in order to reverse the motion of the piston. When the cock is turned to the inclination X Y, the opening S is in communication 30 with the channel *t*, and the channel *s'* is closed,

while the triangular piece *r* bars the channel *t'* and leaves open the channel *u*.

Having thus fully described our invention, what we desire to claim and secure by Letters Patent is—

1. In water-meters, the combination of the 35 arm L, reciprocated by the motion of the piston, hammer L', regulating-incline E, and roof-shaped guide-piece N, with the reversing-beam R' and distributing-cock R, substantially as 40 set forth.

2. In combination with a water-meter having separated ports for induction and eduction, the cylindrical distributing-cock R, composed 45 of a hollow part with the slot S to form the communication of the cylinder with the induction-pipe, and a solid part with the passages R² R³, arranged to form the communication of the cylinder with the eduction-pipe within the 50 box D, substantially as and for the purpose specified.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of two witnesses, this 4th day of March, 1884.

PIERRE BERTHON.
AUGUSTE DEBENOIT.

Witnesses:

EDMOND DELORME,
EUGÈNE ROYET.