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(82.)

Water Meter.

No. 122,174.

Patented Dec. 26, 1871.

Fig. 1.

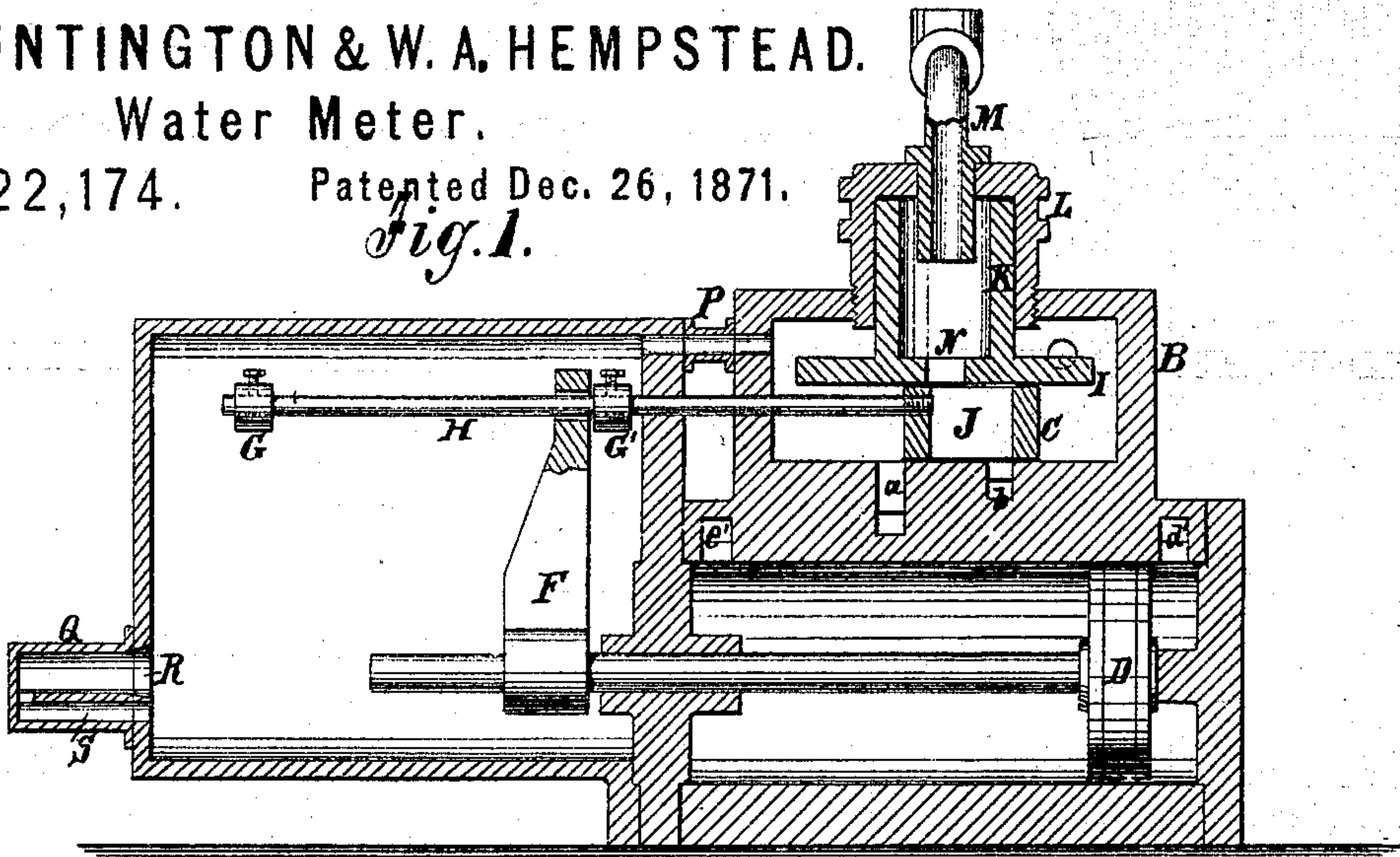


Fig. 2.

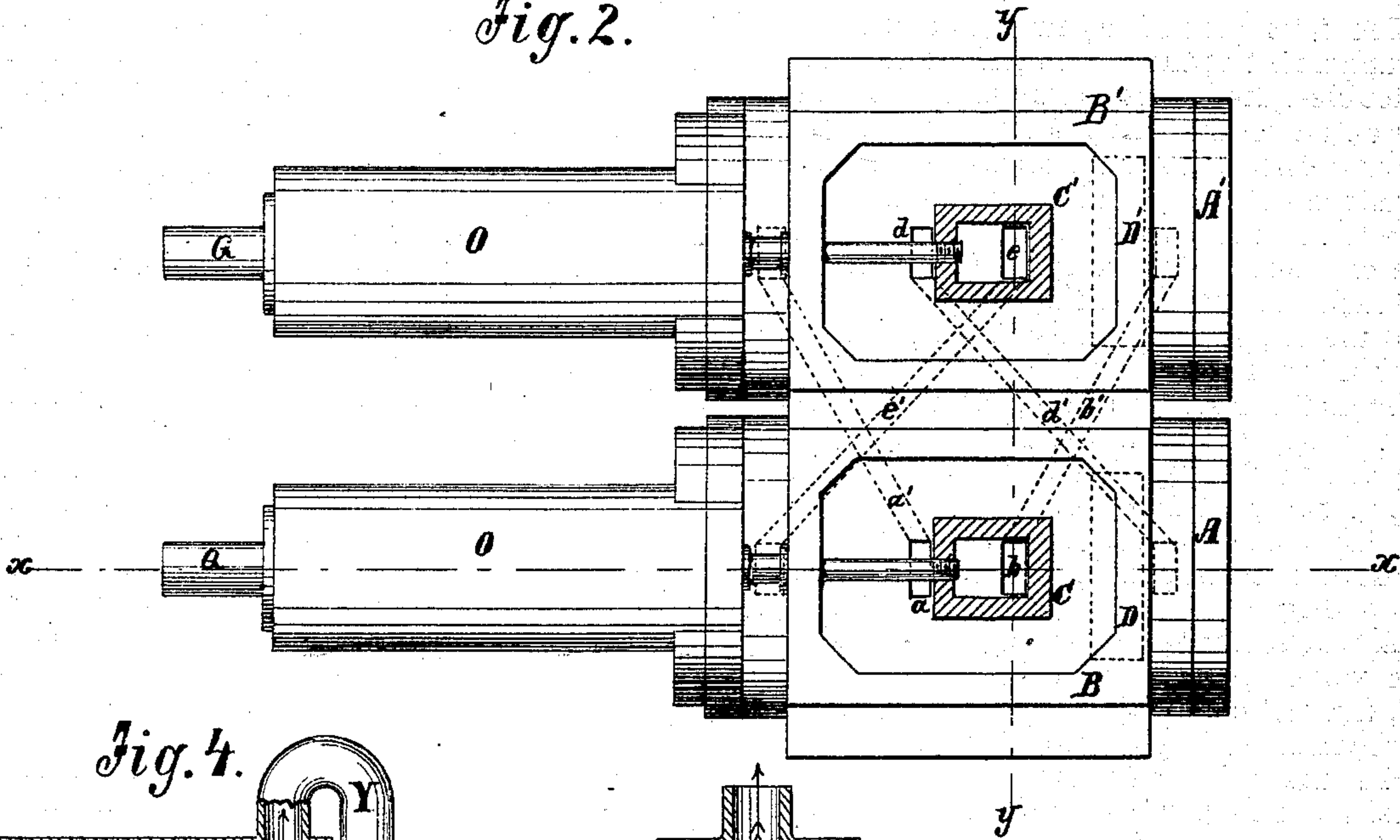


Fig. 4.

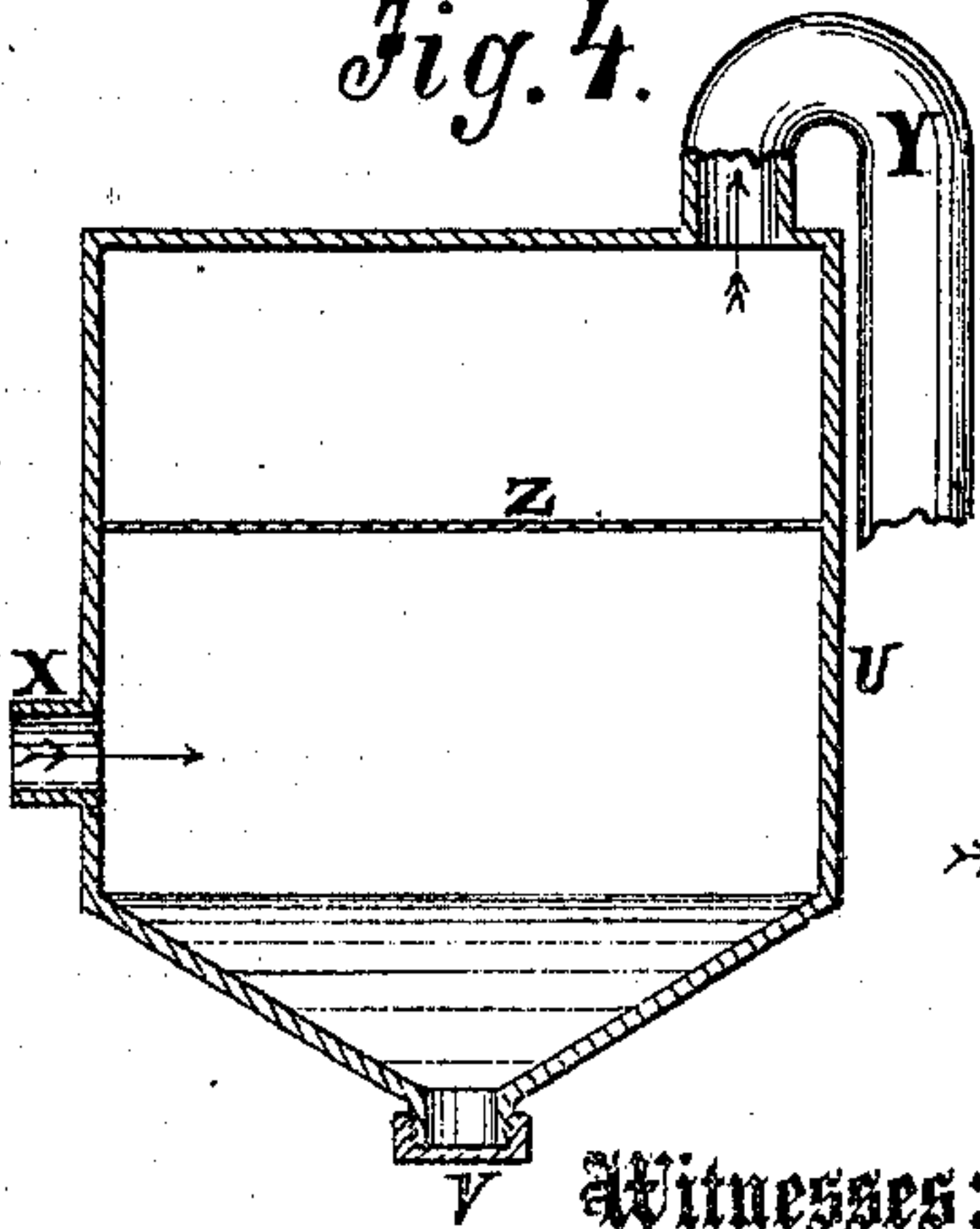
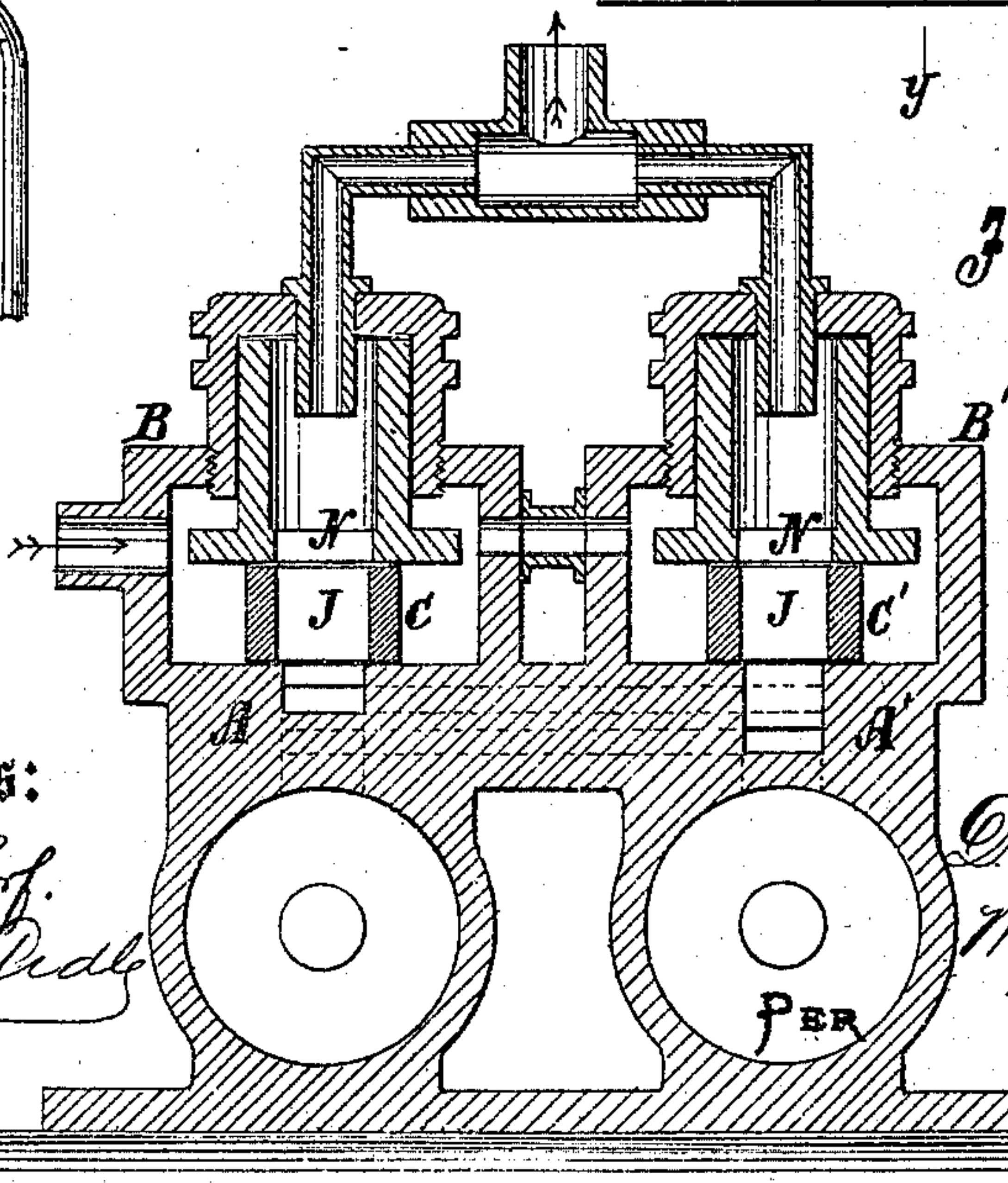


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN LIQUID-METERS.

Specification forming part of Letters Patent No. 122,174, dated December 26, 1871.

Specification describing an Improved Water-Meter, invented by DAVID W. HUNTINGTON and WILLIAM A. HEMPSTEAD, of South Coventry, in the county of Tolland and State of Connecticut.

The first part of my invention consists in an arrangement of the valves and ports whereby in a double-cylinder meter the piston of one cylinder actuates the valve for the other, and vice versa. The second part consists in an improved arrangement of the valves for balancing them. The third part consists in a device for steadying the piston-rods during the time of their greatest extension from the stuffing-box of the cylinder; and the fourth part consists in the combination, with a water-meter, of a mud and sand trap.

Figure 1 is a longitudinal sectional elevation of our improved water-meter taken on the line *xx* of Fig. 2. Fig. 2 is a top view, the tops of the steam-chest and the devices used for balancing the valves being removed; and Fig. 3 is a transverse sectional elevation taken on the line *yy* of Fig. 2.

A and A' represent the cylinders; B and B', the valve-chests; C and C', the valves; D and D', the pistons; E and E', the piston-rods. The port *a* in chest D communicates with the left-hand end of the cylinder A', as indicated by the dotted lines *a'*. The port *b* in said chest communicates with the right-hand end, as indicated by the dotted lines *b'*, the port *d* of chest C' communicates by the passage *d'*, shown dotted, with the right-hand end of cylinder A, and the port *e* with the left-hand end through the passage *e'*. The valves are provided with large vertical openings J through which the exhaust of the water takes place. They are shifted just previous to the arrival of the pistons at the end of the stroke, by the arms F coming against the stops G or G' on the valve-rods H. In the drawing the piston D' is represented as having just arrived at the end of its movement to the right and shifted the valve C' to admit the water behind piston D at the right, and opened the port at the other end to the exhaust through port *e*. This will set piston D in motion, and piston D' will remain at rest until the arrival of piston D at the end of its movement to the left, when it will shift valve C, which will admit the water behind piston D' through *b b'* and allow it to exhaust through *a a'*, moving piston D' back to the left, while D re-

mains at rest, and so on. For balancing the valves we arrange a plate, I, on them, with a hollow cylinder, K, extending upward into a tubular cavity in the top of the steam-chest, or preferably in a cap, L, screwing into it with a hole in the top into which the exhaust-pipe M fits to receive the water and conduct it away. This plate and tube K rest upon the valve with a pressure due to their weight, and a slight preponderance of downward pressure of the water, and the tube is free to rise and fall in the socketed cap L, although working water tight, as may be required, to keep the joint at the top of the valve water tight. The aforesaid preponderating downward pressure of the water is so slight as not to be raised to any material extent under wide variations of the height of the head of water, and thus the resistance and friction of the valves remain practically the same, insuring great regularity and uniformity in the measuring capacity of the meter. The said plates have an opening, N, through which the water exhausts. Said opening is always covered against the water in the chests by the valve, and it opens into the hollow cylinder K. The piston-rods and valve-rods are inclosed in cases O, which admit of dispensing with packing and stuffing boxes to avoid friction, as they hold the drip escaping through the holes in which the rods work. The said cases are connected with the valve-chests by pipes P, which allow the water to flow back and forth, as the quantity contained in the cases varies by the rods moving out and in. We provide a short tubular extension, Q, on each case at the outer end, exactly opposite the piston-rods, to receive them when near the outermost part of their movements to steady against lateral vibration at the time they are least sustained by the pistons and the cylinder-heads. These socket-guides are bell-mouthed, as shown at R, to insure the entering of the end of the piston-rod, and they are provided with vents S for the escape of the water behind the ends of the rods. As the water to be measured is sometimes charged with sand, mud, and the like, which settles in the cylinders and interferes with their proper action, we propose to employ a mud or sand-trap, U, for receiving these deposits as much as possible before it enters the cylinders. We, therefore, place a case beside the meter and provide it with the necessary pipe connections *x y* for passing the water

through it to the cylinders, taking care to have the pipe *y* leading from it to connect at the top so that the heavy particles which settle to the bottom of the water will thereby be separated from that passing to the meter. We provide the bottom with a cock, V, to draw off the settlings from time to time, and we have a screen, Z, between the receiving and exhaust pipe to prevent the passage of coarse particles thereto.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

The chests B B', provided with valves J N and ports *a a'*, *b b'*, *d d'*, and *e e'*, combined with devices F G H attached to the piston-rods, all constructed and arranged as and for the purpose set forth.

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