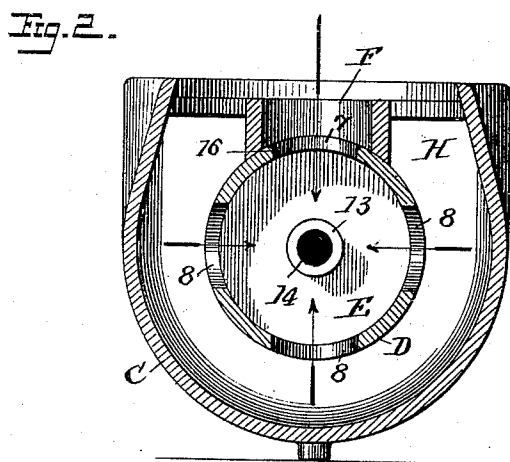
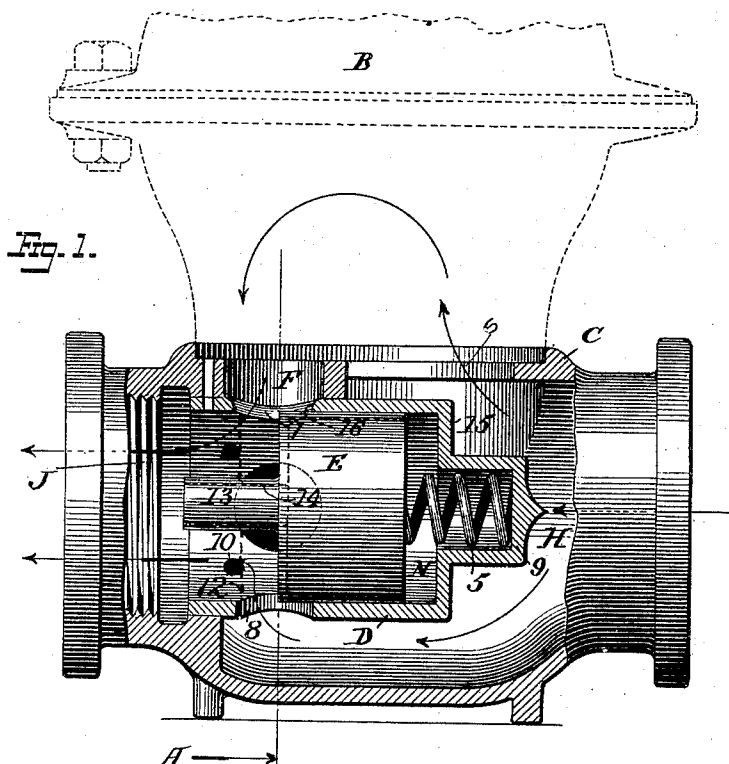


(No Model.)

J. THOMSON.
PROPORTIONAL WATER METER.

No. 476,104.

Patented May 31, 1892.



Witnesses
Prof. Hinkel
G. P. Kramer

Inventor
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UNITED STATES PATENT OFFICE.

JOHN THOMSON, OF BROOKLYN, NEW YORK.

PROPORTIONAL WATER-METER.

SPECIFICATION forming part of Letters Patent No. 476,104, dated May 31, 1892.

Application filed February 19, 1892. Serial No. 422,110. (No model.)

To all whom it may concern:

Be it known that I, JOHN THOMSON, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Proportional Water-Meters, of which the following is a specification.

This is an invention in proportional water-meters, the object of which is to inferentially indicate a large quantity of fluid by measuring an aliquot part thereof.

In the accompanying drawings, Figure 1 is a vertical center section and elevation, and Fig. 2 is a transverse section on the line A.

The component parts of the device are the measuring mechanism B, indicated in dotted outline, the main casing C, the valve-casing D, the valve E, and the spring 5. The water passes from the main inlet-chamber H in two streams, one up through the opening 6, then through the measuring mechanism to the intermediate chamber F, thence through the port 7, and finally to the main outlet-chamber J. The other stream passes on all sides of the valve-casing direct to and through the ports 8, and thence joins the first stream in the main outlet-chamber. The thrust of the spring is between the end 9 of the valve-casing recess and the inside face of the valve, acting to force the valves toward the main outlet-chamber, which movement is limited by the stop-pins 10. When the valve is thrust fully outward to the stop-pins, dotted line 12, the ports will not be entirely closed thereby, as will be seen. The tube 13, extending outwardly from the center of the valve-face, is to connect by its channel 14 the valve-casing chamber N, formed by the valve end and the inclosing end 15 of the internal casing with the main outlet-chamber.

The operation is as follows: Under the static condition the spring will force the valve forward to the stops. If a draft is then made at a low rate of flow, the delivery will be through the port-openings not covered by the valve and the valve may remain stationary; but upon sufficiently increasing the rate of flow the several radial jets which enter the interior of the valve-casing are forced to abruptly change their direction of flow to a sharp right angle. The consequence of this is that the reaction of the entire volume after it will have

passed the ports is borne by the face of the valve, which when the reactive force is sufficient will be shifted backward, uncovering the ports and compressing the spring until some position of equilibrium between the opposing forces will have been reached. In such action of the valve the water in chamber N is displaced through the channel 14 of the tube 13 to the main outlet-chamber J, and vice versa when the valve is shifted forward. By carrying the end of the tube outwardly, as shown, so that the discharge from the channel 14 is directly into the main outlet-chamber, the reaction of the discharge from the ports is thus not transmitted to chamber N, while the flow past the edge of the tube also tends by induction to keep the valve-casing chamber negative to the main outlet-chamber.

It remains to be pointed out that the object of limiting the forward movement of the valve to expose a portion of the port areas is to insure the starting of the meter, as without this provision should the valve be forced forward sufficiently to entirely lap the ports the meter would be inoperative and the flow entirely stopped.

A peculiar and important condition is obtained in the operation of the valve through the method of actuating it by the reaction of the discharge of the entire volume, which valve may properly be designated as a "reaction" valve. Thus with such a constant fixed rate of flow as would establish the valve in the position shown in the full lines of the drawings assume an obstruction in the measuring mechanism. The consequence of this would be by restricting the flow to produce a still greater difference of pressure between the main inlet-chamber and the main outlet-chamber, yet the total quantity delivered from one chamber to the other would not thereby be increased, but, in fact, would be decreased, resulting in a reduction of the reactive energy of the discharged volume, when the valve would be forced forward by the spring and the ports be throttled until the opposing forces would again be equilibrated to the new condition.

Although the device as here shown is exceedingly simple and will operate accurately between a considerable range in rates of delivery, it may yet be modified in detail—as,

for instance, the valve-casing may be placed vertically, utilizing the weight of the valve in place of the spring; but the present arrangement is preferred, as the meter is thus operative in any position. So, too, the displacement from the chamber N might be effected through channels in the wall of the valve-casing, although this would be more troublesome to manufacture and would not be so effective.

10 What I claim is—

1. In combination, the measuring mechanism, the main casing, the valve-casing having a single series of radial ports, the valve, and the spring, the arrangement and construction
15 being such that the valve is operated against the spring by the reaction of the volume discharged through the ports.

2. The combination, with the measuring mechanism and the main casing, of the valve
20 operated by the reaction of the discharged volume, the spring disposed to resist the said reaction, the valve-casing, and the radial ports,

the flow passing through the ports from outside to inside of the valve-casing.

3. The reaction-valve provided with a channel for permitting the displacement of fluid from its reverse side to the main outlet-chamber, the discharge of said channel being extended outwardly beyond the plane of reaction.

4. The reaction-valve, spring, and valve-casing provided with a series of radial ports disposed in a single transverse plane thereof, in combination with means, as pins 10, for limiting the outward movement of the valve, whereby to prevent the ports from being entirely closed.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN THOMSON.

Witnesses:

HERMAN T. C. KRAUS,
ROBERT S. CHAPPELL.