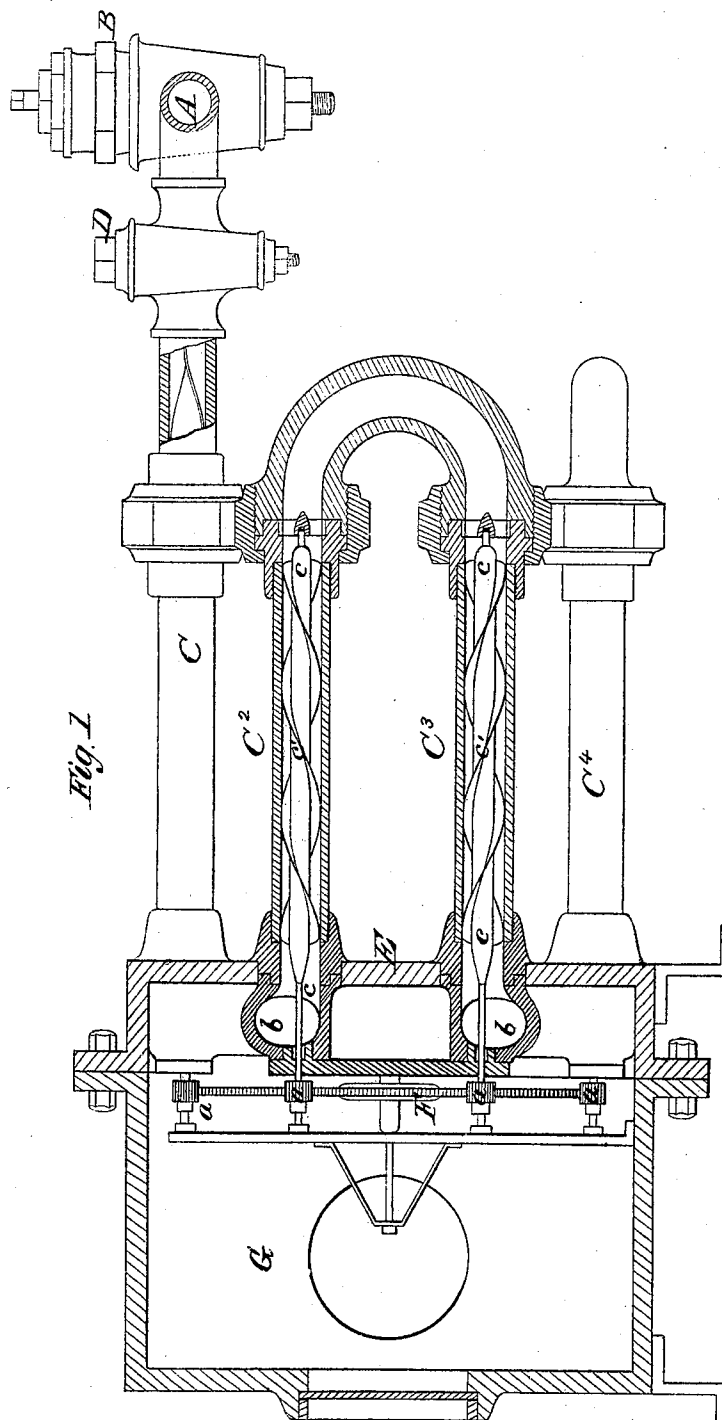


E. MILLER.
Fluid-Meters.

No. 150,344.

Patented April 28, 1874.



WITNESSES

George E. Upham.
E. H. Bates.

B₁₁

INVENTOR

Ezra Miller
Chipman & Osburn & Co.
ATTORNEYS.

E. MILLER.
Fluid-Meters.

No. 150,344.

Patented April 28, 1874.

Fig. 2

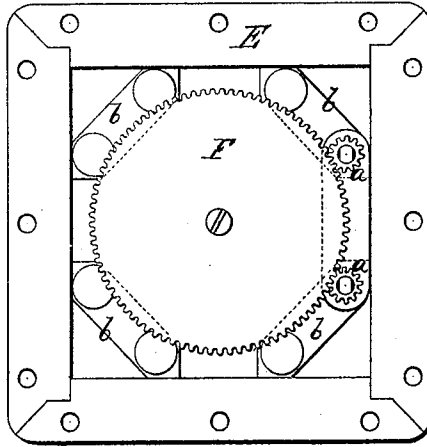
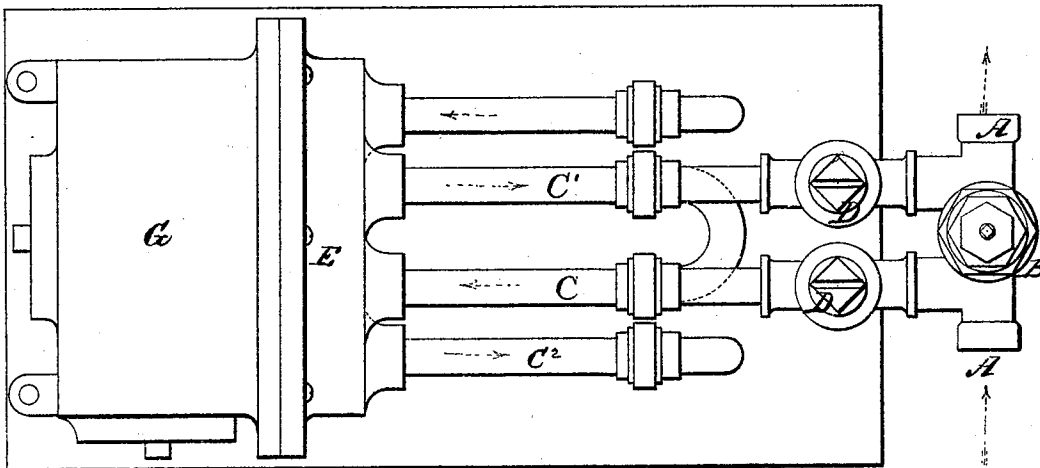


Fig. 3



WITNESSES

George E. Upham.
E. H. Bates. By

INVENTOR

Esra Miller
Chipman and Fossum & Co.
ATTORNEYS.

E. MILLER.
Fluid-Meters.

No.150,344.

Patented April 28, 1874.

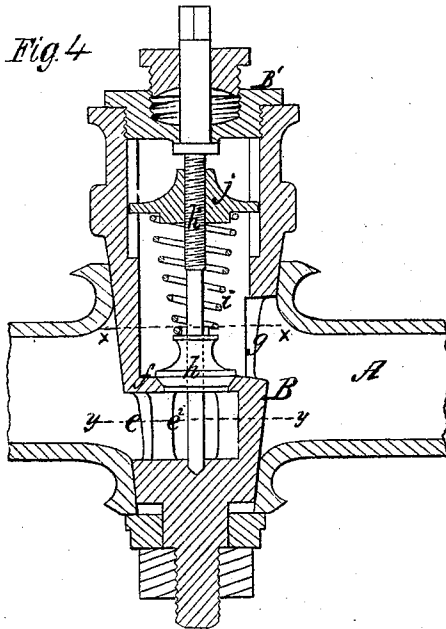


Fig. 4

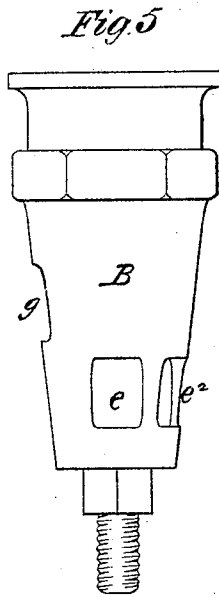


Fig. 5

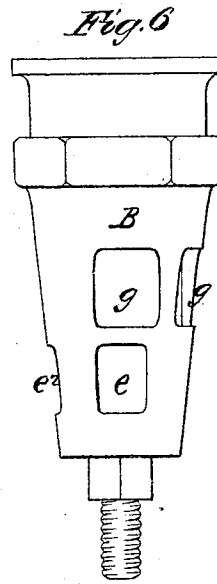


Fig. 6

Fig. 7

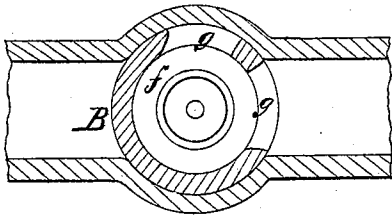


Fig. 8

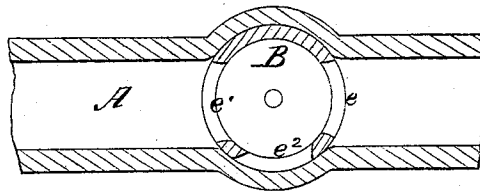
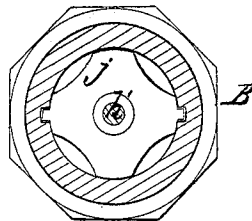


Fig. 9



WITNESSES

George E. Upham.
E. H. Bates.

By

INVENTOR

Esra Miller
Chipman & Sonner & Co.
ATTORNEYS.

UNITED STATES PATENT OFFICE.

EZRA MILLER, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN FLUID-METERS.

Specification forming part of Letters Patent No. **150,344**, dated April 28, 1874; application filed January 3, 1874.

To all whom it may concern:

Be it known that I, EZRA MILLER, of Brooklyn, in the county of Kings and State of New York, have invented a new and valuable Improvement in Water-Registers; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings making a part of this specification and to the letters and figures of reference marked thereon.

Figure 1 of the drawing is a representation of a longitudinal vertical section of my water-register. Fig. 2 is an end, and Fig. 3 a plan, view of the same. Figs. 4, 5, 6, 7, 8, and 9 are detail views.

This invention relates to contrivances which are designed for registering the consumption and waste of water which is supplied to cities for public use. The nature of my invention consists, essentially, in taking or diverting from a main pipe a small percentage of the water which flows through it, and utilizing this small quantity of water for operating mechanism which will approximately register the amount consumed. The invention consists in a novel construction of a valve or cock for regulating the flow of water through the registering mechanism, whereby any sudden check or variation in the force of water in the main will be prevented from materially influencing the said registering mechanism, as will be hereinafter explained. The invention furthermore consists in a novel arrangement whereby a very small amount of water is made to repeatedly act on a single master-wheel of the registering mechanism during the passage of the water from the main pipe and back again into this pipe, as will be hereinafter explained.

The following is a description of my invention.

In the annexed drawings, A represents the main pipe, in which is applied a cock-plug, B. On opposite sides of this plug B are two branch pipes, C, C', which are provided with cocks D, D', for cutting off the flow of water through the register. E represents a flanged cap, which is chambered to receive wheels F, *a*, and which is constructed with water-ways *b*, for a purpose hereinafter explained. This

cap E is bolted and packed water-tight to a chest, G, in which any suitable registering mechanism may be applied. The chest G will be provided with windows tightly packed, and it will be filled with clear water, for the purpose of affording a water-packing to the contained mechanism. The pipe C leading from the main A communicates with one branch, C², of a U-shaped pipe, by means of one of the water-ways *b*, the other branch C³ of which pipe communicates with a branch, C⁴, of another U-shaped pipe, by means of a second water-way, *b*, and so on the water passes back and forth through a cluster of U-shaped pipes; and finally it is conducted back into the main pipe A, on the opposite side of the plug B, to the pipe C. Inside of each one of the cluster of pipes above referred to is a shaft, *c*, which may be solid or hollow, and which is surrounded by a spiral flange, *c'*. Those ends of the flanged shafts *c* which extend into the chamber of cap E, have the pinions *a* keyed on them, all of which pinions engage with the teeth of the master-wheel F, and operate to turn this wheel when water is caused to circulate through the apparatus. Each flanged shaft *c* is suitably supported at both ends, but has only one end bearing, which bearing is located at that end of the pipe opposite the end into which the water enters, and such bearing may be made by flattening the end of the shaft and giving it a hardened steel abutment. The spiral flanges of the shafts *c* are so arranged relatively to the directions the currents of water take while passing back and forth through the cluster of pipes that the currents of water in the pipes are alternately rotated while all the shafts turn one way, all turning alike to turn the master-wheel. This rotating of the water adds very much to the power used to turn the registering machinery. To gain this extra power for the first shaft, I place a fixed spiral in pipe C, as shown in the drawings. This additional fixed spiral equalizes the power among the shafts, so that each gives to the master-wheel the same amount of power.

If desired, every alternate shaft *c* in the gang or cluster may be rigidly fixed, in which case such shafts will not be provided with pinion spur-wheels.

The tapered cock-plug B, which is applied in the main pipe A for regulating the amount of water admitted to the register, is constructed with three ports, e e' e'' , below a valve-seat diaphragm, f , and two ports, g g , above this diaphragm. When the two ports e e' are fully in line with the main pipe A water will not flow through the pipes containing the flanged shafts c , but by turning the cock about its axis more or less any desired amount of the water may be diverted from a direct course through the main pipe, and caused to flow through the cluster of pipes above described. When this latter adjustment is made the port e'' will be more or less exposed in line with the main pipe A, and when this port e'' is adjusted fully into line with the main pipe all the water from the latter will flow through the cluster of pipes. Above the diaphragm f the plug B is chambered to receive a valve, h , a spring, i , and an adjustable nut, j , on a threaded valve-stem, h' . The valve h is seated on the diaphragm f , and is held down on its seat by means of the spring i , which is confined between the valve and the nut j . This nut is adjustable up and down by turning the valve-stem, but it is prevented from turning by means of short wings on it, which are received into grooves made vertically into the bore of the plug B. The valve-stem h' passes through the screw-cap B' of plug B and through a packing applied thereto, and has a prismatic head formed on it for receiving a key, by means of which the pressure of the spring s on the valve can be nicely adjusted. The valve h is applied loosely on its stem h' .

The object of the yielding valve is to prevent any sudden increase in the flow of water through the main from reacting to any great degree on the registering devices, for should a sudden shock occur in the main pipe the valve h will rise and allow a quantity of water to pass through the plug B above the diaphragm, and thus modify the shock.

It will be seen, from the above description, first, that I take from the body of water flowing through the main pipe only such a quantity as will give the required force to rotate the

flanged shafts in the pipes composing the cluster; second, that the flanged shafts operate collectively to revolve the master-wheel of the register; third, that the power to move the registering mechanism is augmented by changing the course of the water in the pipes from a direct straight line in the main pipe to right and left spiral twists in the cluster of pipes; fourth, that the flow of water through the register can be regulated to a nicety; and that provision is made by a relief-valve for sudden changes which may occur in the head.

I do not claim, under this application, the construction of the regulating-cock B irrespective of the measuring mechanism, as I have made such a claim in an application filed on the 28th day of January, 1874, and marked "Case B."

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

1. Two or more pipes leading from a main pipe and back again into this pipe, in combination with shafts having spiral flanges around them, substantially as and for the purposes described.
2. Spirally-flanged shafts applied in pipes leading from a main pipe on opposite sides of a regulating-cock, B, in combination with pinions a on said shafts, and with a master-wheel, F, substantially as described.
3. A regulating-cock, B, in the main pipe A between two lateral pipes, C C', which lead into and from the measuring devices, substantially as described.
4. The combination, with the deviating meter-pipe, through which a proportion of the main current passes, of an automatic equalizing-valve, in the main pipe between the ends of the deviating pipe, to equalize this proportion in view of irregularities of the main current.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

EZRA MILLER.

Witnesses:

JOHN BISSELL,
J. F. DUINKERKE.