



# UNITED STATES PATENT OFFICE,

JOHN H. DIXON, OF MARIETTA, OHIO.

## METER.

SPECIFICATION forming part of Letters Patent No. 572,414, dated December 1, 1896.

Application filed November 21, 1895. Serial No. 569,636. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN H. DIXON, of Marietta, in the county of Washington and State of Ohio, have invented a new and Improved Meter, of which the following is a full, clear, and exact description.

The invention relates to meters having flexible diaphragms and valves controlling the inflow and outflow of the fluid.

The object of the invention is to provide a meter of this general character which shall be simple and durable in construction, very accurate in operation, not liable to get out of order, and arranged to measure gas, water, or other fluid passing through the meter, no matter in what position the meter may be.

The invention consists principally of a flexible diaphragm operating in a measuring-chamber provided with inlets and outlets and a duplex valve controlling the inflow and outflow of the fluid to the said chamber, the valve being controlled from the diaphragm by a special mechanism.

The invention also consists of certain parts and details and combinations of the same, all as will be fully described hereinafter and then pointed out in the claim.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in both the figures.

Figure 1 is a sectional side elevation of the improvement, and Fig. 2 is a similar view of the same with the parts in a different position.

The improved meter is provided with a casing A of any desired form and containing a measuring-chamber B, in which operates a diaphragm C, preferably provided with a rigid center piece C' and a flexible margin C<sup>2</sup>, connected with the sides of the chamber B at or near the middle thereof. In one end of the chamber B and near the upper and lower ends thereof are arranged the ports *a* and *b*, opening into a cylinder D, connected at its middle with a supply-pipe E, and opening at its opposite ends into a chamber F, surrounding the chamber B and connected with an outlet-pipe G.

In the cylinder D is arranged a duplex piston-valve H, having the pistons H' and H<sup>2</sup> secured on a common valve stem or rod H<sup>3</sup>, extending through a stuffing-box I, held on a

partition J', separating the upper portion of the chamber F from a chamber J, containing the working mechanism and the registering device, as plainly shown in the drawings. The pistons H<sup>2</sup> and H' are adapted to operate over the ports *a* and *b*, respectively, in such a manner that when the duplex piston-valve is in the position shown in Fig. 1 then the cylinder D is connected by the port *b* with the interior of the measuring-chamber B at the lower end thereof, while the upper portion of said chamber is connected by the port *a* and the upper end of the cylinder D with the outlet-chamber F, leading to the outlet-pipe G. Now when the valve H changes position, as hereinafter more fully described and as shown in Fig. 2, then the cylinder D is connected by the port *a* with the interior of the upper portion of the measuring-chamber B, while the lower end thereof is connected by the port *b* and the lower end of the cylinder D with the outlet-chamber F.

The duplex piston-valve H is controlled from the diaphragm C, and for this purpose the following device is provided: The upper end of the piston-rod H<sup>3</sup> carries two nuts H<sup>4</sup> and H<sup>5</sup>, between which engages one end of a lever K, fulcrumed on a bracket K', held in the chamber J. The inner end of the lever K is provided with a slot K<sup>2</sup>, engaged by a pin L', held on a lever L, fulcrumed on a bracket L<sup>2</sup>, likewise arranged in the chamber J. On this lever L is pivoted the upper section C<sup>4</sup> of the telescoping diaphragm-rod C<sup>3</sup>, rigidly connected with the center piece C' of the diaphragm, the upper section C<sup>4</sup> being fitted to slide in a stuffing-box I', as shown in the drawings. The extreme upper end of the section C<sup>4</sup> is connected with a lever N, forming part of a registering device O, of any approved construction, and located in the chamber J. The free end L<sup>3</sup> of the lever L is made pointed or spear-shaped, and the inclined sides thereof are adapted to engage a friction-roller P, held on an arm P', fulcrumed at P<sup>2</sup> on the partition J'. The arm P' is connected by a rod Q with a spring R, attached at its outer end to a post R', secured on the partition J'.

The operation is as follows: When the several parts are in the position shown in Fig. 1, then the fluid from the supply-pipe E passes through the cylinder D and port *b* into the

lower part of the measuring-chamber B to press on the diaphragm C and cause said diaphragm to rise and the members of its stem C<sup>3</sup> to telescope. The gas in the upper part of the chamber B passes into and through the port *a* and chamber F to the outlet-pipe G, leading to the service-pipes. When the diaphragm C moves into an uppermost position, then the sections of the telescoping stem C<sup>3</sup> and the last member C<sup>4</sup> of the said stem are pushed upward to cause the spear-shaped end L<sup>3</sup> of the lever L to swing the arm P' backward in the direction of the arrow *a'*, whereby a pull is exerted by the rod Q on the spring R to increase the tension of the latter. When the point of the spear-shaped end L<sup>3</sup> finally passes the friction-roller P, then the spring R, by pulling on the arm P', causes the latter to suddenly swing forward in the inverse direction of the arrow *a'*, so that the friction-roller P in engaging the lower arm of the spear-shaped end of the lever L causes the latter to suddenly swing into the position shown in Fig. 2, whereby the free end of the lever K is caused to swing downward and the duplex valve H is drawn upward. As soon as the pistons H' and H<sup>2</sup> are thus shifted into the position shown in Fig. 2, then gas from the supply-pipe E can pass into the upper part of the measuring-chamber B to act on the diaphragm C, so as to press the latter downward, thereby expelling the gas in the lower part of the measuring-chamber B through the port *b* into the chamber F, from which it can flow to the outlet-pipe G to the service-pipes. The diaphragm C in moving downward draws out the members of the telescoping stem C<sup>3</sup>, and when the members are drawn out and the center piece C' is nearing its lowermost position then the last member C<sup>4</sup> is pulled downward to cause the spear-

shaped end L<sup>3</sup> of the lever L to again swing the arm P' rearwardly until finally the point of the spear-shaped end passes the friction-roller P to permit the spring R to push the arm P' back on the top arm of the spear-shaped end L<sup>3</sup>. The arm P' in thus acting on the lever L imparts a swinging motion to the latter to shift the lever K and the duplex valve H back to the former position shown in Fig. 1. The above-described operation is then repeated. Now it will be seen that by the up-and-down movement of the stem C<sup>3</sup> the lever N is set in motion to actuate the registering device O and indicate the amount of gas discharged from the chamber B, the size of the latter being in proper relation to the registering mechanism. It will be seen that this device is very simple and durable in construction, not liable to get out of order, and will work no matter in what position the casing A is put.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

A meter comprising a measuring-chamber, a diaphragm secured therein, a valve for controlling the inflow and outflow of the fluid to and from said chamber, a telescoping stem connected with said diaphragm, a lever pivotally connected with a member of the said telescoping stem, and provided with a spear-shaped end, a spring-pressed arm engaged by the spear-shaped end of the said lever, and a connection between said lever and the valve-rod of said valve, substantially as shown and described.

JOHN H. DIXON.

Witnesses:

S. J. HATHAWAY,  
E. M. BOOTH.