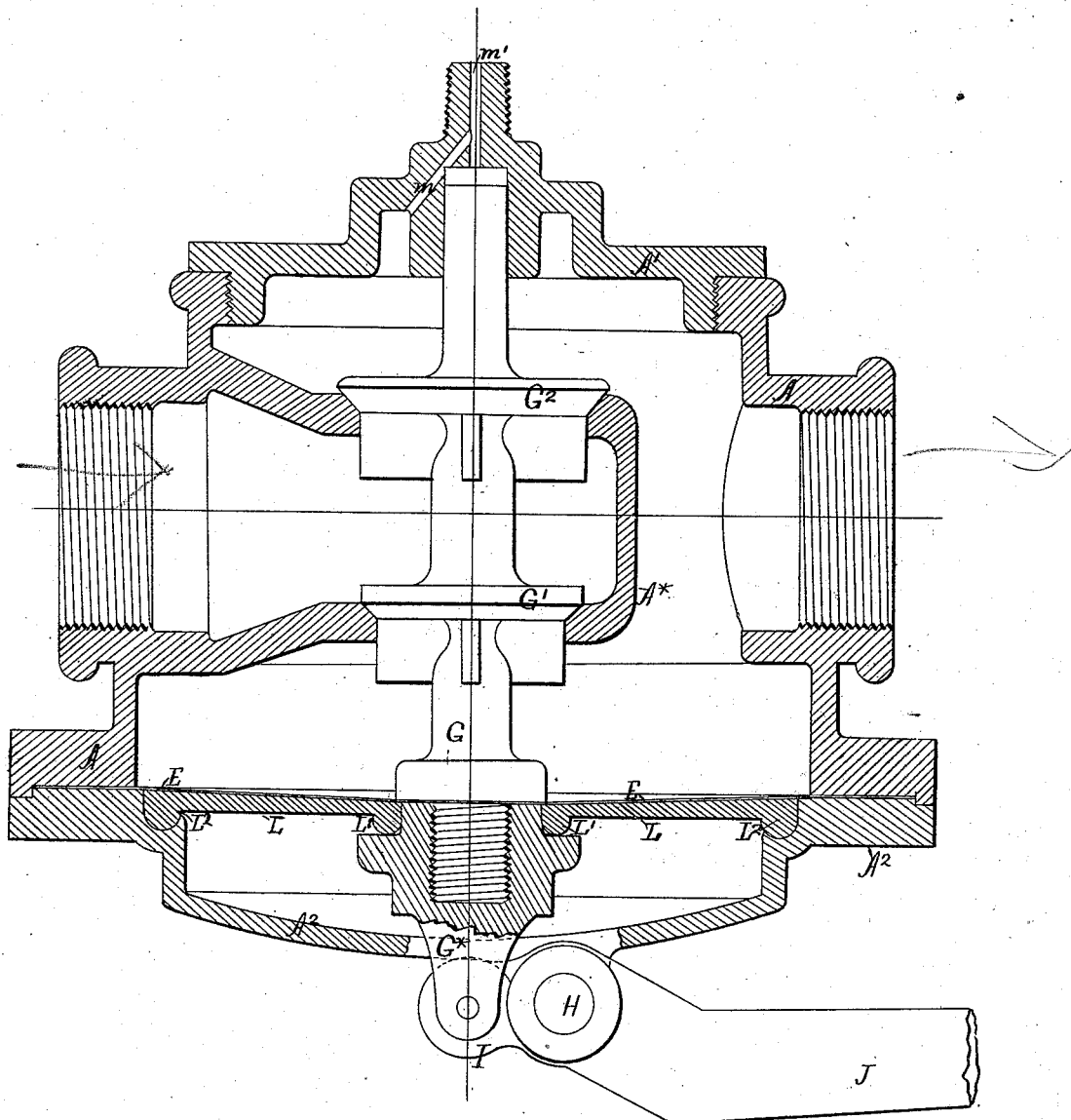


W. D. DICKEY.
Pressure-Regulator.

No. 219,625.

Patented Sept. 16, 1879.



— Witnesses —

E. B. Bolton
Charles C. Stetson

— Inventor —

William D. Dickey,
by atty. Chas. C. Stetson,

UNITED STATES PATENT OFFICE.

WILLIAM D. DICKEY, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF, JOHN W. HANDREN, AND DAVID M. RIPLEY, OF SAME PLACE.

IMPROVEMENT IN PRESSURE-REGULATORS.

Specification forming part of Letters Patent No. **219,625**, dated September 16, 1879; application filed June 7, 1879.

To all whom it may concern:

Be it known that I, WILLIAM D. DICKEY, of New York city, in the State of New York, have invented certain new and useful Improvements relating to Pressure-Regulators, of which the following is a specification.

I use a loaded lever, the load on which may be adjusted in the same manner and with the same general effect as in my patent dated April 30, 1878.

I use a double puppet-valve opening upward and a diaphragm, with peculiar means for fortifying the diaphragm. The double-puppet form of the valve, allowing the pressure on one to partially balance the pressure on the other, and providing two passages for the fluid instead of one, makes the apparatus successful with a diaphragm of moderate size and slight motion. I use a metal diaphragm and fortify it by a series of radial levers or loose sectors. I allow the pressure in the steam-space to be felt on the upper end of the valve-stem. A slender channel extends up in line with the center of the valve-stem through a threaded boss in the center of the cover, which forms a convenient point for the attachment of a gage.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawing forms a part of this specification, and is a vertical section through the center of the apparatus.

Referring to the drawing, A is a main casing, and A¹ a cap or removable top piece therefor. A² is a removable bottom piece, the latter being formed with a hole and lugs for the introduction of a lever, J, turning on a shaft, H, and a short portion of said J, (shown at I,) which, being actuated by the loaded lever J, carrying an adjustable weight, (not represented,) lifts with the required constant force on the nut G*, which forms the bottom of the valve-stem G. This valve-stem has rigidly attached the two valves G¹ G², ground into their respective seats in the internal portion, A*, of the casing A.

E is a diaphragm of thin brass clamped tightly at the edges between the parts A and A², and at the center between the nut G* and a fixed collar on the stem G. L L are sector-

shaped radial loose pieces of rigid metal formed with a smoothly-rounded lip at or near the outer edge and a similar lip at the inner edge, both on the lower face. The lip L² is received in a corresponding pocket formed on the adjacent surface A², and the lip L¹ rests upon the plane surface of a collar of G*.

The pressure of the fluid received on the diaphragm E tends to depress or bag the diaphragm downward; but the levers L L² support the under face of the diaphragm, and, rocking freely on their rounded lips L¹ L², constitute a strong and nearly frictionless means of supporting the working surface of the diaphragm. An oblique hole or passage (marked *m*) allows the pressure of the fluid in the receiving-chamber to be always felt on the upper end of the valve-stem G.

I provide a hole, *m'*, adapted to allow the communication of the pressure therefrom to a pressure-gage of any ordinary or suitable construction (not shown) affixed to the top of A¹.

The importance of my levers or sectors L L¹ L² will be readily appreciated. They prevent the diaphragm from bagging or being sunk downward. For light uses, as for controlling gas from street-mains and low-pressure steam, I can make these levers of stout sheet metal, simply bending down the ends and rounding the bearing-surfaces.

By reason of the fact that the valves G¹ G² are of unequal area and arranged, as shown, so that the pressure of the difference of area tends to open the valves, which tendency is restrained by the pressure after the fluid has passed the valves acting on the diaphragm E, I am able to regulate very exactly, and at the same time not only to hold the valves open when no pressure is on, ready to allow the free flow of fluid at low pressure, but also to insure that the valves shall not be closed by any increase of pressure, however suddenly it may be received. The valves will never close except when the pressure which has passed the valve is sufficient to induce the movement by its action on the diaphragm.

By reason of the fact that the inner end, L¹, of each of the pieces L rests on a square shoulder or the plane face of a collar on G*, so that it is free to slide radially, while the outer lip,

L^2 , sits in a groove or pocket, I effect the control of the position radially by means of the outer end, and consequently of the widest end. This is the end on which the greatest load is borne. The narrow inner end, L^1 , can slip easily outward and inward to accommodate the pieces to the changing positions as the diaphragm rises and sinks.

I can dispense with the weighted lever J by substituting any suitable spring or the like. I propose in some cases to work the device the other side up and apply weights directly upon the valve-stem G. I consider any such device equivalent to my lever J.

I claim as my invention—

1. In a pressure-regulating device having a diaphragm and double valves rigidly connected, the valves G^1 G^2 and diaphragm E, arranged as shown, the valve with largest area

being farthest from the diaphragm, so that the force of fluid on the difference of area of the valves is exerted in the direction opposite to that on the diaphragm, substantially as and for the purposes set forth.

2. In a pressure-regulating device, the freely-turning pieces L L^1 L^2 , socketed at their outer and sliding radially at their inner ends, in combination with the metallic diaphragm E, a weight or a loaded lever, J, and a valve or valves, G^1 G^2 , as herein specified.

In testimony whereof I have hereunto set my hand this 5th day of June, 1879, in the presence of two subscribing witnesses.

WILLIAM D. DICKEY.

Witnesses:

E. B. BOLTON,

CHARLES C. STETSON.