W. D. DICKEY.

Pressure-Regulating Valve.

No. 213,398. Patented Mar. 18, 1879.

FIG. 1.

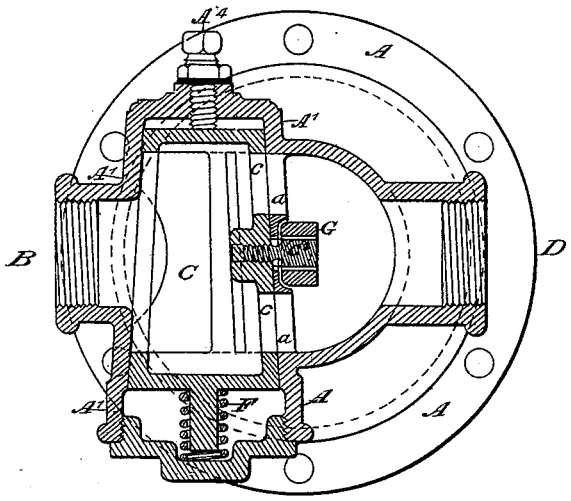
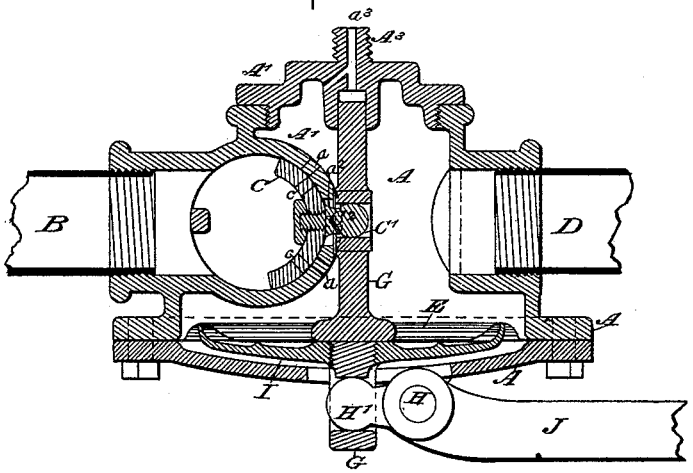


FIG. 2.



WITNESSES:—

Chas. C. Stetson
E. B. Bolton

—INVENTOR:—

William D. Dickey
by his attorney Thomas D. 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-REGULATING VALVES.

Specification forming part of Letters Patent No. **213,398**, dated March 18, 1879; application filed December 30, 1878.

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-Regulating Valves, of which the following is a specification:

I will describe the fluid as steam; but it will be understood that other fluids may be worked in the same manner.

The invention is intended to serve in connection with steam-heating and other apparatus where a uniform low pressure is required in the apparatus; but the steam comes from a boiler where the pressure is higher.

My invention causes the fluid to be delivered at a practically-uniform pressure, however much the boiler-pressure may be in excess or may vary.

The pressure-regulating valve set forth in my patent dated April 30, 1878, No. 203,124, was intended for the same purpose. It is useful; but there are series difficulties connected with its use which my present invention is intended to overcome. My previous device, operating by a puppet-valve, was liable to catch solid matter in the narrow joint or opening through which the steam issued under the valve, and when solid matter thus intervened it would prevent the closing, and defeat the object of the invention.

My present device works with a sliding valve—what may be called a "rotary sliding valve"—acting on the principle of a stop-cock. I can employ the same lever and diaphragm as were used with the other. By taking hold of a short arm extending from the plug or valve proper, and traversing in a slot in the casing, I can inclose the operating means in the interior of the apparatus, and avoid the necessity for any stuffing-boxes. My experiments indicate that the device will be every way free from objection, and that the regulation may be almost absolutely uniform, as well as entirely reliable.

I have devised means for adjusting the plug endwise in its case with great delicacy.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is a horizontal section, and Fig. 2 a vertical section.

Similar letters of reference indicate like parts in both figures.

A is the main casing; B, the pipe which brings the steam at varying higher pressures; D, the pipe which conveys away the steam at the required uniform low pressure, and G is a vertically-moving yoke, guided in a steadiment at the top, and engaging with a metallic diaphragm, E, which receives the pressure obtaining in the discharge-pipe D, and which drives the yoke G downward, or allows it to be thrown upward, according as the pressure which it is desired to regulate shall be only a little above or below that desired.

J is a loaded graduated lever, rocking on a shaft, H, and having a short arm or toe, H′, which engages with the yoke G.

So far as has been yet described the apparatus is similar to that described in my aforesaid former patent, and the parts are correspondingly lettered.

Instead of a puppet-valve, I employ a hollow conical valve, operating by a turning motion analogous to the action of the cock, but differing from an ordinary cock in its construction and arrangement.

C is my rotary sliding valve. It is a nearly-cylindrical shell of metal, closed at each end, and having a large opening on the side which is presented toward the pipe B, and a series of narrow openings, *c*, on the opposite or delivering side. Its exterior is finished with a slight taper, and fits within a correspondingly-tapered casing, A^1, constituting a part of the main casing A. A boss, C^1, receives a pin, C^2, having a head, as indicated. A slot, a^2, is formed in the casing A^1, in which the pin C^2 can traverse as the valve C is oscillated.

The yoke G is formed to closely embrace the rounded head of the pin C^2. As the yoke moves upward and downward with the slight variations in the pressure on the diaphragm E, it turns the valve C by means of the pin C^2.

Corresponding to the ports *c* on the delivering side of the valve C are ports *a*, formed in the casing A^1. In the ordinary working of the apparatus these ports *c* and *a* only partially coincide. A rise of the yoke G rolls the valve C in the direction to increase the openings.

The depression of the yoke G, which follows the slightest excess of pressure in the pipe D, rolls the valve C downward, and, by bringing the ports *c* and *a* more out of line, reduces the delivery. It follows that the pressure on the upper side of the diaphragm E, and consequently in the delivering-pipe D, is maintained with practical uniformity. A^4 is a screw, tapped in one end of the casing A, and bearing against the small end of the valve C. It is equipped with an efficient jam-nut, which serves the double function of holding the valve tightly in place, and preventing any escape of steam along the threads of the screw.

A spiral spring, F, is inclosed within the casing A, and presses against the large end of the valve C. The latter is formed with a stem, which serves to steady the spring, as will be obvious. The spring F urges the valve C into a tight contact with the interior of the casing A^1. The screw A^4 guards against its being thus forced too far.

The diaphragm E is formed of elastic metal, preferably hard brass. It is stamped or otherwise formed with one or more circular corrugations, which increase its flexibility near the periphery. It is supported on an extended casting, I, which is tapped to receive the yoke G, and forms an extension thereof. The upper face of the casting I is waved, as shown.

Care should be taken to round the edges of the rigid metal where the diaphragm joins the casing A. The latter is formed in separate pieces, for convenience of constructing and joining the parts, as will be understood. The top of the cover is formed with a threaded projection, A^3, drilled as indicated by a^3. This is a convenient mode of mounting a gage to indicate the pressure. When such is not required it may be plugged or stopped by a blank cap.

Modifications may be made. Some of the advantages of the invention may be realized by the use of a plane sliding valve instead of the circular sliding shown. Such may be operated by an arm from the yoke G in the same manner as is here shown.

I claim as my invention—

1. A rotary valve, in combination with direct connection, as herein described, to a diaphragm and an inclosing-case, connecting-pipes, and means for applying a suitable constant force acting against the pressure on the diaphragm, as herein specified.

2. The conical rotary valve C, spring F, and adjusting-screw A^4, in combination with the casing A A^1 and the connecting-pipes, and with means, C^2 G, for turning the valve, constructed and arranged to operate as herein specified.

3. In a pressure-regulator, the metallic diaphragm F, supporting-casting I, and yoke G, in combination with the casing A A^1 *a*, pipes B D, and connection C^2 C^1 of the circular sliding valve C *c*, as herein specified.

In testimony whereof I have hereunto set my hand this 24th day of December, 1878, in the presence of two subscribing witnesses.

W. D. DICKEY.

Witnesses:
E. B. BOLTON,
CHAS. C. STETSON.