

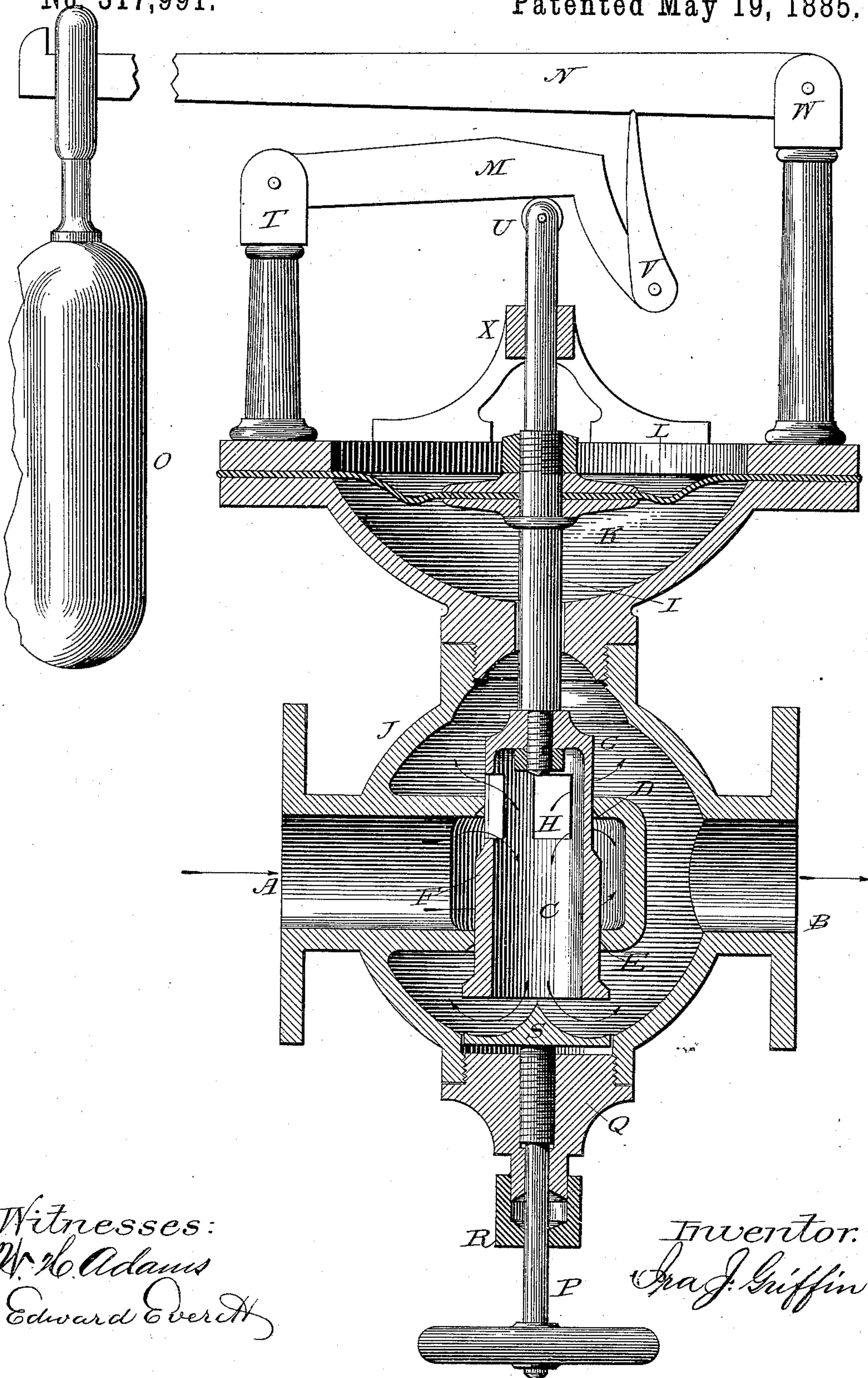
(No Model.)

I. J. GRIFFIN.

FLUID PRESSURE REGULATOR.

No. 317,991.

Patented May 19, 1885.



Witnesses:
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FLUID-PRESSURE REGULATOR.

SPECIFICATION forming part of Letters Patent No. 317,991, dated May 19, 1885.

Application filed November 5, 1884. (No model.)

To all whom it may concern:

Be it known that I, IRA J. GRIFFIN, a citizen of the United States, residing at Sing Sing, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Automatic Fluid-Pressure Regulators, of which the following is a specification.

In places of a comparatively low level lying within a district which is supplied with water from a high-level reservoir, and also in places where the pressure of the water is liable at times, as in case of fire, to be suddenly increased to an excessive amount above what is ordinarily necessary for the supply required, thereby creating a liability to bursting of pipes and fittings and an increase of leakage, besides involving the expense of heavier pipes and stronger joints than would be otherwise required, there is a necessity for some means of controlling the flow, so as to restrain the pressure within limits which will obviate the difficulties alluded to.

Several forms of regulators have been designed for the above-named purpose, but have proved faulty for various reasons. Among these faults is that of "chattering," a term applied to a peculiar vibration imparted to valves when delicately balanced by a regulating-diaphragm. The cause of this action it is difficult to define, but it is presumed to be a consequence of conflicting currents under great pressure struggling to escape by a narrow annular aperture between a valve and its seat, colliding and interfering with each other. Particularly is this the case when such valves approach the form of flat disks, the edges of which divide or split the flowing current and create eddies and opposing currents on either side.

The object of my invention is to provide a means of automatically regulating the pressure of the water on the consumer's side to a constant and even pressure, whatever the variations on the side from which the supply comes may be, and to effect this purpose by modifications of the apparatus which shall eliminate the liability to chattering or interference of the currents above spoken of, and cause a steady and even flow through the valve, whether in large or small quantity.

The apparatus, which is shown in section in

the accompanying drawing, takes the form of an ordinary globe-valve, with its inlet A and outlet B horizontally in line with the pipes. The water entering at A is cut off by the hollow cylindrical valve C, the same having conical seats closing, when raised, their respective openings D and E in the partition of the valve-chamber. The cylindrical body of the valve at F fills with an easy fit the opening E of the lower seat, thereby preventing the escape of but an inconsiderable quantity of the water in that direction when the valve is opened. The upward continuation of the valve-piece at G is also cylindrical, and also fits easily the opening in the upper valve-seat, D, thus serving as a guide for its vertical motion. Portions of this part of the valve are cut away, forming openings or ports H, through which only the water enters to the interior of the valve-piece when the same is lowered or open. The main portion of the water passes downward and through the open mouth of the valve-piece into the interior of the globe, and thence to the outlet B. Another portion passes upward and escapes either by the top openings around the attachment of the valve-stem I, or by such parts of the ports H as may be above the valve-seat, from thence joining the rest of the flow to the outlet.

It will be perceived that the water does not pass in contact with the surfaces of either valve-seat, except in such inconsiderable quantities that its effect may be neglected. Neither does the flow impinge upon any valve edge, as is the case with disk-valves, thus obviating the principal cause of chattering, above alluded to.

The cylindrical form of the valve-piece C also occupies those spaces usually found between the disks of balanced valves in which conflicting eddies impeding the legitimate flow are created, giving rise to vibration, which is imparted to the valve, causing it to chatter.

The regulation of the valve is effected as follows: On the top of the valve-chamber J is the diaphragm-chamber K, having a flexible diaphragm, L, the center plates of which are connected to the valve by the stem I. The passage between the valve and diaphragm chambers admits the pressure of the water on the consumer's side to act on the under side of the diaphragm L, which is loaded by means of the

compound levers M and N and weight O, so as to descend when the pressure on the under side of the diaphragm is less than that it is desired to maintain, thereby opening the valve for the admission of a larger supply. When, however, the pressure exceeds the load on the diaphragm, it rises, together with the valve, shutting off the supply either entirely or so far closing the ports H in the valve-piece as to admit only so much water to the consumer's side as will maintain the desired pressure.

In case of needed repairs or for other reasons it may be necessary to close off the water-supply, to obviate the employment of a stop-cock especially for this purpose, I attach the following-described device to the valve: The cap Q, closing the lower opening in the valve-chamber, is provided with a screw, P, passing upward through its center. The screw works in the piece Q and carries on its upper end a cross-bar or disk, S, as shown, molded so as to direct outward the flow of the water impinging upon it. This, when screwed up by turning the wheel below, comes in contact with the lower edges of the valve-piece C and holds it firmly to its seats, thus taking the place of a stop-valve, by which the water may be instantly shut off in case of emergency or for permitting of repairs to the diaphragm, pipes, &c. A gland, R, keeps the stem of the screw P water-tight.

In connection with the automatic valve above described I employ an improved form of compound levers by which the weight applied is caused to act with increased force on the diaphragm without involving excessive length of lever. It consists of the short lever M, having its fulcrum pivoted to the standard T. It rests on the upper end of the valve and diaphragm stem I, where a small wheel, U, may be used to

obviate the effect of oblique action. The end of the lever M is bent obliquely downward where it is jointed to the piece V, the upper end of which is chisel-shaped and fits into a notch on the under side of the lever N, which is pivoted at its fulcrum in the head of the standard W. On the prolongation of the lever N is hung at a suitable distance the weight O, which is so proportioned to the power of the levers and size of diaphragm as to apply the desired pressure per square inch. A bridged guide, X, confines the stem I to a perpendicular movement.

I do not claim, broadly, a balanced valve regulated in its movements by a weighted diaphragm, as several forms of such valves are known; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The double-seated valve-piece C, regulated by and in combination with the flexible diaphragm L, whose motions are controlled by the variations of the outflowing pressure against that of the atmosphere and loaded levers, as described, said valve-piece having the cylindrical parts above each valve-seat filling the annular openings in the casing in which they work respectively, and having ports H, through which the water flows to the interior of the valve and from thence to the outlet, substantially as described, and for the purposes set forth.

2. In fluid-pressure regulators, the system of compound levers consisting of the short bent lever M, the connecting-piece V, and the long lever N, in combination with the weight, diaphragm, and valve, as described.

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Witnesses:

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