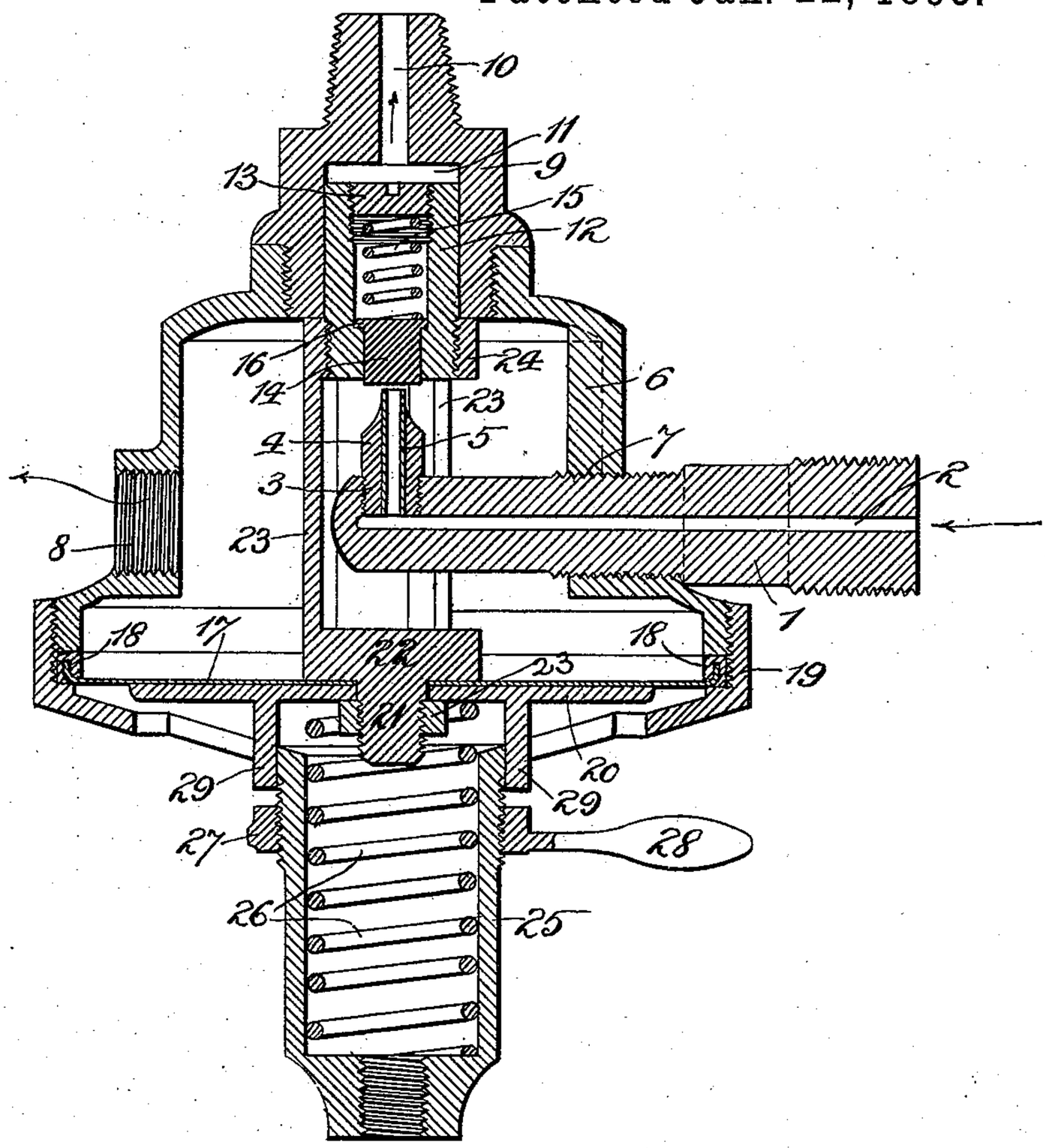
(No Model.)

C. L. BASTIAN.

FLUID PRESSURE REGULATOR.

No. 532,752. Patented Jan. 22, 1895.



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FLUID-PRESSURE REGULATOR.

SPECIFICATION forming part of Letters Patent No. 532,752, dated January 22, 1895.

Application filed March 3, 1894. Serial No. 502,248. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. BASTIAN, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Fluid-Pressure Regulators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to appliances for regulating the pressure of gaseous and liquid fluids while in transit between the reservoir and the place of use or discharge; my invention being capable of use in various situations or kinds of work, but being more particularly adapted for use in connection with bottling-works.

Among the primary objects of my invention is included that of producing a fluid-pressure regulator the main valve of which shall be yieldingly mounted so as to be proof against such excessively forcible contact with the discharge end of the vent-tube as will injure or destroy said valve.

The above-mentioned object, and also such others as may appear from the ensuing description, are attained by the device shown in the accompanying drawing, illustrating a central longitudinal section of a fluid-pressure regulator embodying my invention.

Referring to the drawing, 1 designates the inlet-pipe of the regulator, this pipe being designed either for direct or indirect connection with a cylinder or reservoir for fluid under pressure, or with a suitable conduit therefrom. The channel 2 of this pipe is shown as extending from the outer end thereof toward but not entirely to the inner end of the pipe; the inner extremity of the pipe being shown as closed, and the inner end of the channel being shown as communicating with a lateral opening 3 in the upper side of the pipe 1, near its inner end. Into this opening 3 is screwed, or secured in any desirable manner, a discharge-nozzle 4 protruding upwardly from the pipe 1, and containing usually a non-corrodible lining 5.

The inner part of the inlet-pipe 1 extends laterally or horizontally within a pressure-chamber casing 6, the pipe being screwed, or securely and tightly inserted in any desirable way, in an opening 7 in one side of the casing or shell 6. Through the side of this shell or casing 6, either opposite the opening 7 or elsewhere as desired, is formed an opening 8 into which is threaded or otherwise tightly secured a pipe or tubular connection of any desirable kind leading either directly or indirectly to the machine or apparatus for utilizing the fluid under pressure, such, for example, as a bottling-machine.

Into the top of the shell 6 is screwed, or tightly secured in any desired manner, a nipple 9 to which is intended to be connected a suitable pressure-gage. The outer part of this nipple or plug 9 is formed with a longitudinal channel 10 to permit the passage of fluid to the gage, and at the inner part of said nipple this channel is enlarged diametrically, as at 11, to form a socket for a sliding plug or valve-carrier 12; said plug or carrier working closely but smoothly within the socket. This plug or carrier 12 is hollow or tubular, its upper end being closed either by a screw-plug 13 or in any other desirable manner, and its lower end carrying the cut-off valve 14. This cut-off valve 14 is usually of hard rubber, or it may be of any similarly rigid and non-corrodible material, and said valve is fitted closely but movably into the lower or inner end of the plug or carrier 12. A spiral spring 15 is located within the carrier 12, the upper end of said spring abutting against the under side of the plug 13, and the lower end of the spring pressing downwardly upon the upper end of the cut-off valve 14. The upper end of this cut-off valve is shown as externally shouldered as at 16, so as to prevent the spring 15 from forcing the valve too far downward.

The bottom of the regulator-shell 6 is tightly closed by a flexible diaphragm 17, either of metal or of any other suitably strong and flexible material; the margin of this diaphragm being strongly secured in a ring 18 which lies closely against the lower edge of the shell 6. The lower part of this shell is externally screw-threaded to receive an internally screw-threaded nut or gland 19 which embraces the under part of the shell 6 and is so formed as to retain the ring 18 securely in position.

To the central part of the outer surface of the flexible diaphragm 17 is suitably secured a backing-plate 20, and through the middle of this plate and also of the flexible diaphragm

extends a downward prolongation 21 of a base-plate 22. A nut 23^a is tightly screwed upon the extension 21 so as to firmly draw the base 22 against the upper surface of the center of the diaphragm 17 and thus prevent leakage at this point. A suitable number of parallel connecting-arms 23 connect the base 22 with a ring 24 which is screwed to the lower end of the valve-carrier 12; the discharge jet 5 and the inner end-portion of the inlet-pipe 1 being situated between the connecting-arms 23.

The body of the nut or gland 19 is of skeleton-form and converges downwardly and inwardly, and the center of this body-portion is formed, or provided in any desirable manner, with a pendent casing 25, said casing being open at its upper end and containing a spiral spring 26. This spring 26 abuts at its lower end against the bottom of the casing 25 and presses at its upper end upward against the plate 20 so as to retain the diaphragm normally in its upward position. A stop-ring 27 is screwed around the upper part of the casing 25, said ring being desirably formed with a handle 28, or with any equivalent attachment which will facilitate turning the ring, in one or the opposite direction, upon the casing 25, for a purpose to be presently explained. Downward from the backing-plate 20 of the diaphragm 17 extend any desired number of parallel stop-arms 29 which desirably embrace the casing 25 and which also come at times into contact with the stop-ring 27, also for a purpose to be presently explained.

During the normal working of the pressure-regulator, the parts occupy the relative positions shown in Fig. 1, the spring 26 holding the diaphragm 17 in its uppermost position so as to maintain the valve 14 out of contact with the discharge-jet 4, and the fluid under pressure flowing freely through pipe 1, out of jet 5, through the shell 6, and out of the opening 8 thereof to the point where the fluid is being utilized. If, for any reason, the pressure in the shell 6 rises above normal, it will force the diaphragm 17 downward until the lower ends of the stop-arms 29 strike against the stop-ring 27, the valve 14 first coming against the discharge-end of the jet-tube 5 with sufficient force to cut off the flow of fluid from said jet; the stop-ring 27 being so set as to insure contact with the stop-arms at the proper time to produce the result described.

In the event of a very extreme of pressure, the valve 14 would, of course, be brought into very violent or forcible contact with the jet 4 and in this manner the valves 14 have been frequently broken and the entire regulator rendered useless until a new valve has been put in place. By virtue of my invention, on the contrary, it is impossible for the valve 14 to become injured because the spring 15 neutralizes all excessive pressure of the valve upon the jet 4 and allows sufficient yielding of the valve to prevent breakage, and yet does not interfere with the effective cutting off of the fluid.

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

1. A fluid-pressure regulator, comprising a pressure-chamber, a fluid-inlet pipe, an elastic diaphragm, a plug fitted in the upper portion of the said pressure-chamber casing, a valve-carrier connected to the diaphragm movable within said plug and having a yielding cut-off acting by contact with the delivery end of the inlet-pipe, substantially as set forth.

2. A fluid-pressure regulator, comprising a pressure-chamber having a fluid-inlet pipe, an elastic diaphragm, a plug fitted in the upper portion of said pressure-chamber casing, a valve-carrier connected to the diaphragm movable within said plug and having a spring-pressed cut-off valve acting by contact with the delivery end of the inlet-pipe, substantially as set forth.

3. A fluid-pressure regulator, comprising a pressure-chamber having an elastic diaphragm moved by the pressure within said chamber, a fluid-inlet pipe, a plug fitted in the upper portion of the pressure-chamber casing, a valve carrier movable within said plug and connected to and movable with the diaphragm, and a cut-off valve yieldingly supported by the carrier and acting by contact with the delivery end of the inlet-pipe, substantially as set forth.

4. A fluid-pressure regulator, comprising a pressure-chamber having a flexible diaphragm moved by pressure within the chamber, an adjustable and spring-pressed stop engaged by the diaphragm to limit certain movements of the latter, a fluid-inlet-pipe delivering into the chamber, a plug fitted in the upper portion of the pressure-chamber casing, a valve carrier movable within said plug and connected to and movable with the diaphragm, and a cut-off valve yieldingly supported by the carrier and acting by contact with the delivery end of the inlet-pipe, substantially as set forth.

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