

No. 734,993.

PATENTED JULY 28, 1903.

J. C. STEWART.
PRESSURE REGULATOR.
APPLICATION FILED MAY 6, 1903.

NO MODEL.

Fig. 1.

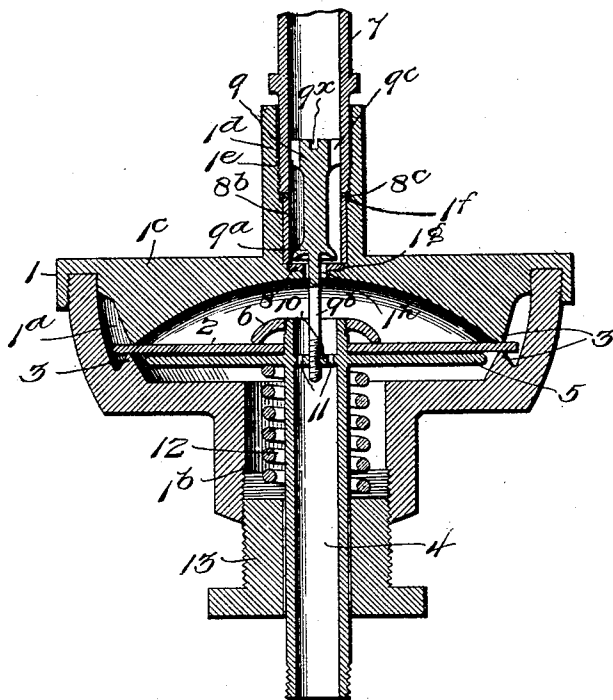
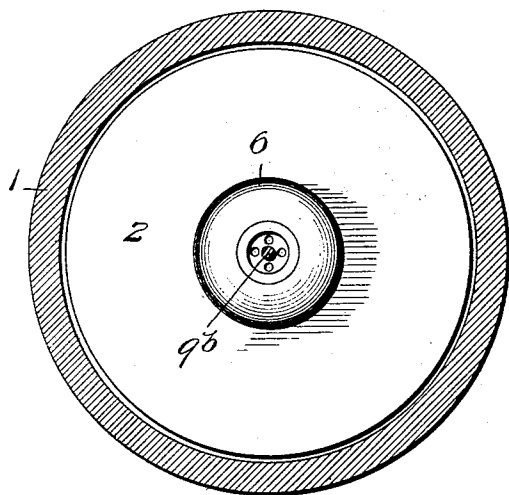


Fig. 2.



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PRESSURE-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 734,993, dated July 28, 1903.

Application filed May 6, 1903. Serial No. 155,931. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. STEWART, a citizen of the United States, residing at Fort Myer, in the county of Alexandria and State of Virginia, have invented certain new and useful Improvements in Pressure-Regulators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain improvements in what may be termed "pressure-regulators;" and it has for its object to provide for simplicity of construction, facility of operation, and ready practical application thereof in the use of the same.

Said invention consists, among other features, of a regulator comprising in its construction generally a valve, a flexible diaphragm, and a closure or chamber, said parts being adapted by the action of preferably air-pressure to automatically regulate the flow of a liquid or fuel for maintaining a constant, uniform, or regular forcing-pressure, also of the general construction and arrangement of parts, substantially as hereinafter more fully disclosed, and specifically pointed out by the claims.

In the accompanying drawings, illustrating the preferred embodiment of my invention, Figure 1 is a sectional elevation, and Fig. 2 is a horizontal section, thereof.

It will be understood that I do not limit myself as to details as herein shown, as they may be changed as circumstances suggest without departing from the spirit of my invention and the same remain intact and be protected.

In carrying into effect my invention I employ, preferably, a casing or cylinder 1, with its chamber 1^a opening out through the bottom into tubular form, as at 1^b, and provided with a screw-threaded connected-up closure or cap 1^c. Arranged within said chamber is a flexible diaphragm 2, of rubber, leather, &c., clamped or held in place near its margin between annular knife-edged ribs or projections 3, formed upon the bottom of said chamber and upon the under side of said closure or cap, respectively. Said diaphragm or parti-

tion is slipped or fitted centrally upon the upper end of a pressure-delivery-pipe section 4, it being held thereto by means of a plate or disk 5, preferably integral with said pipe-section and upon which it rests, and by means of a nut 6, preferably concavo-convex and screwing upon the extreme upper end of said pipe-section and engaging or bearing upon said diaphragm. Said plate or disk is of course of less diameter or area than said diaphragm to not interfere with the flexing or yielding action of said diaphragm interiorly of the clamping or securing knife-edged point between said diaphragm and the inclosing casing. Said cap or closure 1^c has produced centrally therein a bore or passage 1^d of varying diameters or stepped at different points in its length, as at 1^e, 1^f, and 1^g, respectively, the same finally terminating at its lower end into a contracted extension or port 1^h, opening into the chamber 1^a.

A pressure-supply-pipe section 7 is screwed into the step 1^e of the bore or passage 1^d, previous to which, however, a washer 8, of suitable material—as rubber, leather, &c.—is inserted into the step or recess 1^f of said bore or passage. Above said washer is introduced into the step 1^f of said passage a thimble 8^b, with its lower end partially resting or encroaching upon said washer to retain it in place against displacement by the valve, presently referred to, when it is actuated. A pressure-tight packing-ring 8^c is finally interposed between said thimble and said supply-pipe section. The further purpose of said thimble is to prevent contact of the lower end of the pipe-section 7 with the flexible washer 8; otherwise as said pipe-section was being screwed or turned "home" such action or movement of said pipe-section would buckle or pucker said washer.

Within the pressure-supply-pipe section 7 is inserted a valve 9, preferably of the construction disclosed. Said valve, having its extreme upper end fitting the bore or interior of the pipe-section 7 and provided with a screw-driver-receiving slot 9^x for its ready insertion in place and removal, has its face or downwardly-presented enlargement 9^a of greater area than the port or aperture 1^h to

provide for encompassing or closing said aperture or port, as presently explained, said valve-face or enlargement standing, however, initially removed from said port. Said valve 9 has a diametrically-reduced downward extension or stem 9^b, with its lower end screwed into or otherwise preferably detachably connected to a partition 10, integral with and arranged below the upper end of the pipe-section 4, ports 11 being produced in said partition laterally of said stem for the passage of the pressure therethrough for delivery via said pipe-section. Produced laterally in the upper end enlargement of the valve 9 are pressure-inlet ports 9^c.

Applied to the pipe-section 4 is a spring 12, with its ends bearing against the plate or disk 5, integral with said pipe-section, and against a nut 13, fitting upon said pipe-section and screwing into a screw-threaded portion of the opening in the casing receiving said pipe-section, said spring having a predetermined tension and adapted to hold the valve 9 normally open to deliver the pressure into the chamber of said casing, said pressure passing therefrom through the ports 11, as above noted. By suitably manipulating said nut the tension of said spring can be readily compensated as occasion may make such necessary, as is obvious. It will therefore be observed that pressure (compressed air) being supplied via the pipe-section 7, said pressure will pass through the ports 9^c laterally of the valve 9 and past the last-named, thence through the port 1^b into the chamber 1^a, and therefrom through the ports 11 into and be delivered via the pipe-section 4 to the desired point, as for utilization. Excess of pressure will be neutralized by the backing of the pressure into the casing-chamber through the ports 11 and its action upon the diaphragm 2, flexing it after having overcome the tension or stress of the spring 12, which will effect the seating of the valve 9, thus exhausting or cutting off the pressure-supply to the casing-chamber and its further delivery. Of course as the pressure is reduced at the point of consumption the valve 8 will unseat and permit the further supply of pressure in the manner above pointed out.

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

1. A pressure-regulator comprising a chamber, a flexible diaphragm arranged in said chamber, a pressure-delivery pipe having a partition provided with ports, and a valve, with its stem, said stem connecting with said partition, and said valve controlling the delivery of pressure to said chamber.

2. A pressure-regulator embracing a chamber having a pressure-supply pipe and a pressure-delivery pipe, a flexible diaphragm arranged in said chamber, a pressure-supply-controlling valve, and a pressure-delivery pipe connecting with said diaphragm, and

means effecting connection between said valve and said delivery-pipe, said connecting means including a ported partition fixed in said pressure-delivery pipe.

3. A pressure-regulator comprising a chamber containing a flexible diaphragm, a valve with its stem, means connecting said stem to said diaphragm, and a pressure-supply pipe for said chamber, said valve being seated in said pipe and having in its upper end lateral ports, said diaphragm adapted to effect the closing and opening of said valve under the action of the pressure.

4. A pressure-regulator comprising a chamber containing a flexible diaphragm, held between knife-edged projections of said chamber, a valve, a pressure-supply pipe connected to said chamber and containing said valve, a pressure-delivery pipe having a ported partition, said valve having a diametrically-contracted extension connected to said ported partition.

5. A pressure-regulator comprising a chamber containing a flexible diaphragm, held between knife-edged projections of said chamber, a valve, a pressure-supply pipe connected to said chamber and containing said valve, a pressure-delivery pipe having a ported partition, said valve having a diametrically-contracted extension connected to said ported partition, said pressure-delivery pipe having an integral disk or plate and a nut effecting the connection of said diaphragm to said pipe.

6. In a pressure-regulator, the combination of a chamber having a flexible diaphragm, a pressure-supply pipe, a valve, means connecting said valve to said diaphragm, a flexible washer serving as a seat for said valve and a thimble adapted to prevent contact of said pipe with said washer.

7. In a pressure-regulator, the combination of a chamber having a flexible diaphragm, the closure of said chamber having a serially-stepped passage or bore, a pressure-supply pipe, a valve, means connecting said valve to said diaphragm, a flexible washer serving as a seat for said valve and a thimble adapted to prevent contact of said pipe with said washer, said washer, thimble and pressure-supply pipe being seated into the different steps of said bore or passage, successively.

8. A pressure-regulator, embracing a chamber, a flexible diaphragm arranged in said chamber, a pressure-supply-controlling valve, pressure-delivery means connecting with said diaphragm and having ports adapted to continuously deliver the pressure from said chamber, and means connecting said pressure-supply-controlling valve with said pressure-delivery means.

9. A pressure-regulator embracing a chamber, a flexible diaphragm arranged in said chamber, a pressure-supply-controlling valve, with its stem, pressure-delivery means movable with said diaphragm and having a ported partition adapted to continuously deliver the

pressure from said chamber, said stem of valve connecting with said partition centrally of the ports thereof.

10. In a pressure-regulator, the combination
5 of a chamber, a flexible diaphragm arranged in said chamber, a delivery-pipe connected to said diaphragm, a spring supporting said delivery-pipe and diaphragm normally in position, and a valve arranged in the pressure-
10 supply pipe of said chamber and connected to said delivery-pipe.

11. In a pressure-regulator, the combination
of a chamber having a pressure-supply pipe, a valve arranged in said pipe, a flexible diaphragm arranged in said chamber, a delivery-
15 pipe having a lateral extension applied to said diaphragm upon one side, and having its upper end secured to the opposite side of said diaphragm, means for supporting said delivery-
20 pipe, together with said diaphragm, yieldingly in normal position, said valve being connected to said delivery-pipe.

12. In a pressure-regulator, the combination
of a chamber having a pressure-supply pipe, a valve arranged in said pressure-supply pipe,
25 a flexible diaphragm arranged in said chamber, a delivery-pipe having a lateral disk-like

extension applied to one side of said diaphragm, said pipe having its upper or one end held to the opposite side of said diaphragm, a
30 spring supporting said delivery-pipe, together with said diaphragm, yieldingly in normal position, said valve being connected to said delivery-pipe.

13. In a pressure-regulator, the combination
35 of a chamber having a pressure-supply pipe, a valve arranged in said pipe, a flexible diaphragm arranged in said chamber, a delivery-pipe having a lateral disk-like extension applied to one side of said diaphragm, said pipe
40 having its upper or one end held by a nut to the opposite side of said diaphragm and provided within with a partition having ports, a spring supporting said delivery-pipe, together with said diaphragm, yieldingly in normal
45 position, said valve having its stem connected to said partition.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN C. STEWART.

Witnesses:

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