

O. SPRECHER.
GAS PRESSURE REGULATOR.
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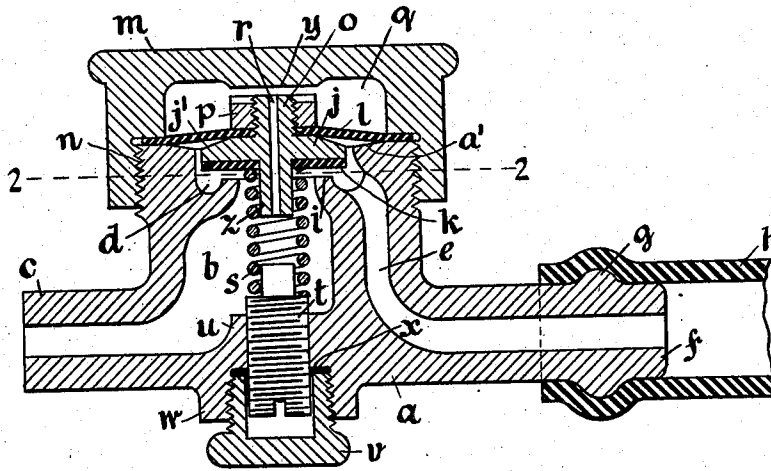


Fig. 1

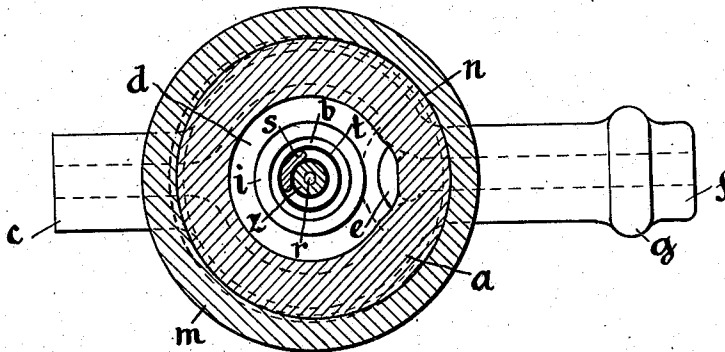


Fig. 2

Orville Sprecher, Inventor

Witnesses
A. Y. Andrews

Wilhelmine D. Schenkein

By *Leopold Morell* Attorney

UNITED STATES PATENT OFFICE.

ORVILLE SPRECHER, OF MILWAUKEE, WISCONSIN.

GAS-PRESSURE REGULATOR.

942,112.

Specification of Letters Patent.

Patented Dec. 7, 1909.

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To all whom it may concern:

Be it known that I, ORVILLE SPRECHER, of Milwaukee, Wisconsin, have invented a Gas-Pressure Regulator, of which the following is a specification.

This invention relates to pressure-regulating devices especially intended for use in pressure-tank systems wherein the gas is stored in a tank under a high degree of compression and drawn off from there to a burner which burns under a comparatively low pressure, so that some reducing or wire-drawing device must be installed in the duct between tank and burner. As is well understood in such cases the pressure in the tank varies and is continually decreasing as the gas is drawn off therefrom, while the pressure at the burner must be constant.

The object of my invention is to provide an automatic pressure-regulating device which will maintain a constant pressure at the burner under varying pressures in the tank, and to provide such a device of a maximum simplicity and a minimum weight and cost, the device being especially adaptable to use in automobiles where small size and light weight are very desirable features.

The construction of my invention is best understood from a consideration of the accompanying drawings wherein I have shown the most improved form of my invention.

In these drawings, Figure 1 is a longitudinal central section through the device; and Fig. 2 is a plan section thereof taken on the plane 2 of Fig. 1.

In these drawings every reference letter refers always to the same part.

The device comprises a body-member *a* having a central high-pressure gas-chamber *b* with which communicates a pipe nozzle *c* at one end of the member *a*, and a low-pressure gas-chamber *d* with which communicates a passageway *e* ending in a second pipe-nozzle *f* at the other end of said member. The first said nozzle *c* is adapted for direct connection with the gas tank and the second nozzle may have an annular boss *g* adapted for the attachment of a flexible rubber-hose *h* thereto. Said chambers *b* and *d* are separated by an annular valve-seat *i* which is closed by a plug *j* preferably provided with a washer *k* of leather or rubber, which acts to seal the opening more perfectly when the plug is pressed against the seat. Said plug fits loosely within the chamber *d*, which latter is closed on top by a

flexible diaphragm *l* of rubber or other suitable like substance. The edge, of the diaphragm is clamped down upon the margin of the member *a* by means of a cap-screw *m* which engages screw-threads *n* on the sides of the member *a*. The plug *j* has a screw-stem *o* which passes through a hole in the middle of the diaphragm *l* and the latter is clamped thereto by a nut *p* which is screwed on over said stem in the manner shown. Thus a regulating-chamber *q* is formed above the diaphragm *l*, to which the high-pressure gas is admitted from the chamber *b* by a tubular passageway *r* in the plug *j*, the lower end of which opens at the bottom of a tubular extension *z* some distance below the valve-seat so as to prevent the pressure in the chamber *q* from being influenced by the escaping gas.

Against the lower side of the plug *j* acts a coiled compression-spring *s*, which surrounds and is guided by the extension *z* and is seated on the end of an adjusting-screw *t* engaging threads in a boss *u* on the side of the member *a* opposite and in axial line with the plug. The head of the screw *t* is covered by a screw-cap *v*, engaging a screw-boss *w* surrounding it, and sealed by a packing-gasket *x*. The gas-pressure in the chamber *d*, being on the low-pressure side, will of course be constant, but the pressure in the chamber *q* is necessarily the same as that in the tank, and it will therefore be variable. The strength of the spring is such that when the gas-pressure in the tank is a maximum it will very nearly close the plug *j* and seal the opening between the two chambers, thus allowing very little gas to pass, but as the pressure diminishes, the pressure on the diaphragm being diminished in proportion, the spring *s* gradually raises the plug and provides an increased opening as desired. The necessary force of the spring to accomplish this effect is regulated by adjusting the screw *t*, and the upper surfaces *a'*, *j'*, of the members *a* and *j* respectively may be so formed as not only to support the diaphragm and prevent it from being pulled out or broken in case of a very excessive pressure, but also to take a part of the force off the plug *j* in such case. The inner side of the cap *n* is preferably provided with a projecting boss *y* which may be faced so as to properly limit the upward movement of the plug.

Various changes and modifications in the

constructions as herein shown may be made without departing from the spirit of my invention, and I wish it understood therefore that the latter is not otherwise limited than by the reasonable scope of my claims.

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

1. A gas pressure-regulator comprising, in combination with the high and low-pressure chambers separated by a valve-seat, a reciprocating-plug covering said valve-seat on the upper side thereof and acting to open the valve in rising, a high-pressure regulating-chamber above said valve-seat, a member connected with said plug and exposed to the downward pressure of said regulating-chamber, and a spring acting to raise said plug from the seat in opposition to the pressure on said member.

2. A gas-pressure regulator comprising, in combination with the high and low-pressure chambers separated by a valve-seat, a reciprocating-plug covering said valve-seat, a high-pressure regulating-chamber above said valve-seat, a spring acting to raise said plug from the seat; said plug being provided with a tubular passageway connecting said high-pressure chamber with said regulating-chamber.

3. A gas-pressure regulator comprising, in combination, a high-pressure chamber, a low-pressure chamber, an apertured partition separating said chambers and having an annular valve-seat surrounding the aperture; a reciprocating valve-plug covering said seat and located in the low-pressure chamber and opening by a movement away from said high-pressure chamber; a flexible diaphragm closing the open side of said low-pressure chamber and secured centrally to said plug, a cap-piece secured over said diaphragm and clamping the edges thereof and leaving a regulating-chamber in said cap-piece above said diaphragm, and means resiliently raising said plug against the pressure upon said diaphragm, there being a passageway connecting said regulating-chamber with the source of high-pressure.

4. A gas-pressure regulator comprising, in combination, a high-pressure chamber, a low-pressure chamber, an apertured partition separating said chambers and having an annular valve-seat surrounding the aperture, a reciprocating valve-plug covering said seat and located in the low-pressure chamber and opening by a movement away from said high-pressure chamber; a flexible diaphragm closing the open side of said low-pressure chamber, and secured centrally to said plug, a cap-piece secured over said diaphragm and clamping the edges thereof and leaving a regulating-chamber in said cap-piece above said diaphragm, and means resiliently raising said plug against the

pressure upon said diaphragm; said plug having a tubular passageway connecting the inner or high-pressure chamber with said regulating-chamber.

5. A gas-pressure regulator comprising, in combination, a high-pressure chamber, a low-pressure chamber, an apertured partition separating said chambers and having an annular valve-seat surrounding the aperture; a reciprocating valve-plug covering said seat and located in the low-pressure chamber and opening by a movement away from said high-pressure chamber; a flexible diaphragm closing the open side of said low-pressure chamber and secured centrally to said plug, a cap-piece secured over said diaphragm and clamping the edges thereof, leaving a regulating-chamber in said cap-piece above said diaphragm, a coiled compression-spring pressing against the inner face of said plug, an adjustable abutment for the end of said spring opposite said plug, and a passageway connecting said regulating-chamber with the source of high pressure.

6. A gas-pressure regulator comprising, in combination, a body-member having a high-pressure chamber and a duct connecting therewith, an annular valve-seat at one side thereof, a low-pressure annular chamber surrounding said valve-seat and a duct leading from said low-pressure chamber; a reciprocating-valve plug covering said seat and located in the low-pressure chamber and opening by a movement away from said high-pressure chamber; a flexible diaphragm closing the open side of said low-pressure chamber and secured centrally to said plug, a cap-piece secured to said body-member over said diaphragm and clamping the edges thereof between it and said body-member and leaving a regulating-chamber in said cap-piece above said diaphragm, a coiled compression-spring pressing against said plug and acting to open it against the pressure of said regulating-chamber, and a screw mounted in a threaded boss in said body-member opposite said plug and having an abutment upon which the opposite end of said spring rests, said screw being rotatable from the outer side of said body-member; there being a passageway connecting said regulating-chamber with the source of high-pressure.

7. A gas-pressure regulator comprising, in combination, a body-member having a high-pressure chamber and a duct connecting therewith, an annular valve-seat at one side thereof a low-pressure annular chamber surrounding said valve-seat and a duct leading from said low-pressure chamber; a reciprocating-valve plug covering said seat and located in the low-pressure chamber and opening by a movement away from said high-pressure chamber; a flexible diaphragm clos-

ing the open side of said low-pressure chamber and secured centrally to said plug, a cap-piece secured to said body-member over said diaphragm and clamping the edges thereof
 5 between it and said body-member and leaving a regulating-chamber in said cap-piece above said diaphragm; a coiled compression-spring pressing against said plug and acting to open it against the pressure of said regulating-chamber, a screw mounted in a threaded boss in said body-member opposite said plug and having an abutment upon which the opposite end of said spring rests, said screw being rotatable from the outer side of
 10 said body-member, there being a passageway connecting said regulating-chamber with the source of high pressure; and a screw-cap engaging a threaded socket in said body-member around the head of said
 15 screw and covering the latter.

8. A gas-pressure regulator comprising, in combination, a body-member having a high-pressure and a low-pressure chamber therein separated by an annular valve-seat and
 25 each having a duct; a flexible diaphragm covering the open side of said low-pressure chamber, a screw-cap engaging threads on said member and clamping the edges of the diaphragm thereto and providing a closed
 30 regulating-chamber on the upper side of said diaphragm; a valve-plug mounted to reciprocate over said valve-seat to close the latter and having a screw-threaded boss on its upper end passing through a central hole
 35 in said diaphragm and a tubular boss on its lower end projecting through said seat and a central tubular passageway extending from the upper end of said threaded boss to the lower end of said tubular boss; a nut
 40 mounted on said threaded boss and clamping the edges of said diaphragm to said plug; a screw mounted in a threaded socket in said body-member coaxially with and opposite said plug, the head of said screw extending outside said body-member and being
 45 adjustable from without; a cap-member

covering and sealing the head of said screw; and a coiled compression-spring abutting at one end on said screw and at the other end on said plug, surrounding said tubular boss
 50 on the latter and acting to open said plug.

9. A gas-pressure regulator comprising, in combination, a body-member having a high-pressure and a low-pressure chamber therein separated by an annular valve-seat and each
 55 having a duct; a flexible diaphragm covering the open side of said low-pressure chamber, a screw-cap engaging threads on said chamber and clamping the edges of the diaphragm thereto and providing a closed regulating-chamber on the upper side of said
 60 diaphragm; a valve-plug mounted to reciprocate over said valve-seat to close the latter and having a screw-threaded boss on its upper end passing through a central hole in
 65 said diaphragm and a tubular boss on its lower end projecting through said seat and a central tubular passageway extending from the upper end of said threaded boss to the lower end of said tubular boss; a nut
 70 mounted on said threaded boss and clamping the edges of said diaphragm to said plug; a screw mounted in a threaded socket in said body-member coaxially with and opposite said plug, the head of said screw extending
 75 outside said body-member and being adjustable from without; a cap-member covering and sealing the head of said screw; and a coiled compression-spring abutting at one end on said screw and at the other end on
 80 said plug, surrounding said tubular boss on the latter and acting to open said plug, said cap-member having an abutment-surface on its inner face adapted to limit the outward movement of said plug.
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In witness whereof I have hereunto set my hand this first day of March, 1909.

ORVILLE SPRECHER.

Witnesses:

GEORGE W. COLLES,
 WILHELMINA D. SCHIENHEIN.