

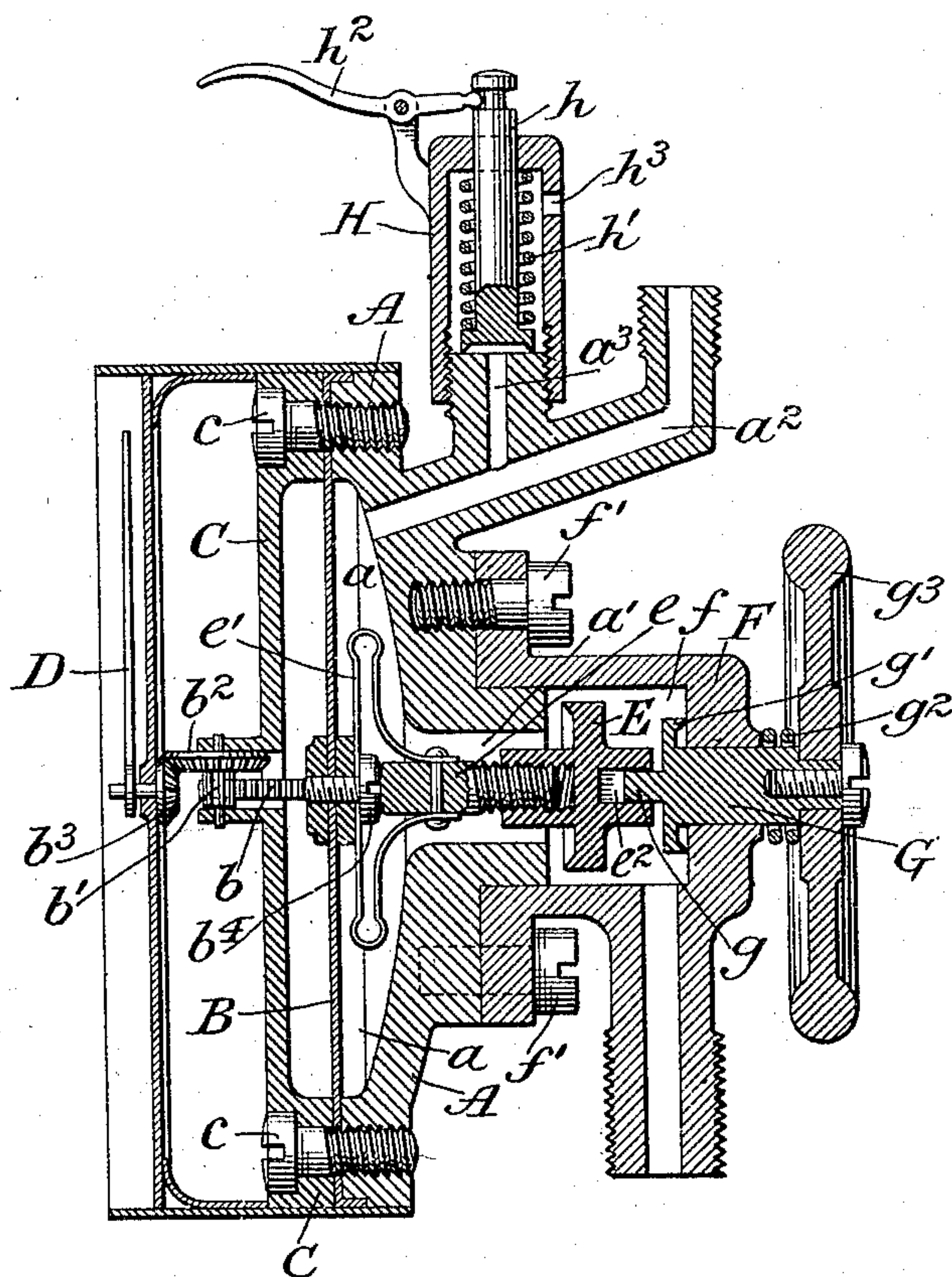
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A. KLEINFELDT.
PRESSURE REGULATOR.

(Application filed Mar. 6, 1899.)

(No Model.)



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UNITED STATES PATENT OFFICE.

ARTHUR KLEINFELDT, OF NEW YORK, N. Y.

PRESSURE-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 638,251, dated December 5, 1899.

Application filed March 6, 1899. Serial No. 707,844. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR KLEINFELDT, of the borough of Manhattan, in the city and State of New York, have invented certain new and useful Improvements in Pressure-Regulators, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

This invention relates to the construction of pressure regulating or controlling devices, such as are commonly employed in the handling of liquefied carbonic-acid gas.

One object of the invention is to produce a valve of this general character, although not of necessity limited to the particular use referred to, in which a pressure indicator or gage and the pressure-regulating valve shall both be operated from or by a single diaphragm, thereby producing an instrument which shall combine the functions of two separate instruments and shall cost less to manufacture than the two separate instruments.

Another object is to provide such a yielding connection between the diaphragm and the controlling or regulating valve that the former shall be capable of continuing its movement after the valve has reached its seat, whereby any increase of pressure due to leakage will be indicated. Improved means are also provided for effecting adjustment of the valve, and the construction and arrangement of the parts are such that the liability of valves or regulating devices of this character to be rendered useless by freezing under the intense cold developed by the rapid expansion of the compressed gas is reduced to a minimum. A combined safety-valve and blow-off cock is added to the structure to cooperate with the regulating and indicating devices and prevent injury thereto by excessive pressure.

The several features of improvement are illustrated in a convenient and desirable form in the accompanying drawing, which represents the improved indicating and regulating device in vertical central section.

The main body A, to which the other parts are secured, is recessed, as at a , to form with the diaphragm B a chamber within which the pressure of the gas is exerted against the diaphragm, the position of the latter and of the parts connected therewith changing with variations in the pressure. Gas is admitted to

the chamber through a central port a' , through which also passes the valve-stem, as herein-after described, and an outlet from the chamber is provided at a^2 .

The diaphragm B is clamped upon the body A in the usual manner by a cap C and screws c , the cap also affording bearing for a portion of the transmission mechanism (indicated by the rack b) secured to the diaphragm, pinion b' , and bevel-gears b^2b^3 , between the diaphragm and the indicator D, the bevel-gear b^3 being shown as secured to the shaft of the indicator. The precise character of the transmission devices is obviously immaterial, and any ordinary form of such devices may be adopted in place of that shown.

The valve E is arranged to close the mouth of the port or passage a' and is inclosed within a chamber f of comparatively restricted capacity, formed within a connection-piece F, which is secured by bolts or screws f' to the body A and has an inlet for the gas. The valve is preferably mounted adjustably upon its screw-threaded stem e , so as to be capable of adjustment toward or from its seat by rotation upon the stem. The latter is not connected rigidly to the diaphragm B, as is usual in devices of this general character, but is yieldingly connected thereto, so that the diaphragm shall be capable of movement after the valve has reached its seat in order that it may yield to an increase of pressure occasioned by a leak or otherwise and cause the indicator to respond to such increase of pressure. For this purpose the connection between the diaphragm B and the valve-stem e is effected by means of a spring, such as that shown at e' , which permits the diaphragm to move away from the end of the valve-stem when the valve has reached its seat. The spring may be secured to the diaphragm in any suitable manner, as by means of the screw b^4 .

For the purpose of effecting adjustment of the valve without requiring the casing of the regulator to be opened, the outer face of the valve is formed with a squared or other angular opening e^2 , to be engaged by a similarly-shaped pin or shank g , formed on the end of a spindle G, which is mounted to rotate gas-tight in a suitable bearing in the wall of the connection-piece F in line with

the valve and valve-stem. A flange g' may be formed on the spindle and be held snugly against its seat on the wall of the connection-piece by a spring g^2 , interposed between the
 5 outer face of the connection-piece and the hand-wheel g^3 on the spindle, thus dispensing with a stuffing-box and making the adjustment of the parts easy. The length of the pin or shank g and of the hole e^2 is such that
 10 the necessary longitudinal movement of the valve with respect to the shank or pin is possible without disengagement of the valve from the spindle. It is obvious that the shank or pin might equally well be formed
 15 on the valve to engage a corresponding hole on the spindle. In connection with the gas-outlet a^2 is a combined safety-valve and blow-off cock, comprising a cap H , secured over a port a^3 , a plunger-valve h , normally
 20 held to its seat over the port a^3 by a spring h' , and a lever h^2 , mounted on the cap and engaging the stem of the valve. An outlet from the cap is provided at h^3 . Adjustment of the valve is effected by means of the screw-
 25 threaded engagement of the cap H with the boss, in which the port a^3 is formed, the spring h' being compressed more or less by adjustment of the cap. It is obvious that the valve h will lift at the pressure deter-
 30 mined by the tension of the spring h' , thereby relieving the pressure in the chamber a and preventing injury to the diaphragm or the indicator, and that by means of the lever h^2 the valve h can be lifted whenever it is
 35 desired to blow off.

As already stated, the chamber f is of restricted capacity as compared with the chamber a , so that in handling liquefied carbonic-acid gas, for example, there can be no such
 40 excessive expansion within the chamber F in which the valve E is located as to cause a freezing up of the valve. Furthermore, as the pressure is reduced as the gas passes the valve the cold occasioned by expansion with-
 45 in the chamber a is not sufficient to produce frost therein.

It will be understood that the invention is not to be limited to the precise construction and arrangement of parts shown and de-
 50 scribed herein.

I claim as my invention—

1. In a combined pressure regulator and indicator the combination with a gas-chamber and a diaphragm subject to the pressure of
 55 gas therein, of an indicator mechanically con-

nected to one side of said diaphragm, and a valve to control the admission of gas to said chamber mechanically connected to the other side of said diaphragm, whereby the pressure of gas in said chamber controls both the in- 60 dicator and the valve substantially as shown and described.

2. In a pressure-regulator, the combination with a gas-chamber and a diaphragm subject to the pressure of gas therein, of a valve to 65 control the admission of gas to said chamber, and a yielding connection between said valve and said diaphragm, whereby the valve is moved with the diaphragm in both directions but the diaphragm is permitted to continue 70 its movement away from the valve after the latter has reached its seat, substantially as shown and described.

3. In a pressure-regulator, the combination with a gas-chamber and a diaphragm subject to the pressure of gas therein, of a valve to 75 control the admission of gas to said chamber, and a spring connecting said diaphragm to said valve whereby the valve is moved with the diaphragm in both directions but the dia- 80 phragm may continue its movement away from the valve after the latter has reached its seat, substantially as shown and described.

4. The combination with a gas-chamber and a diaphragm subject to the pressure of gas 85 therein, of an indicator connected to one side of said diaphragm, a valve to control the admission of gas to said chamber, and a yielding connection between said valve and said diaphragm, substantially as shown and de- 90 scribed.

5. In a pressure-regulator, the combination with a gas-chamber and a diaphragm subject to the pressure of gas therein, of a threaded valve-stem connected to said diaphragm, a 95 valve to control the admission of gas to said chamber and threaded upon said stem, and a rotatable spindle mounted in the wall of the regulator and engaging said valve to rotate the same while permitting longitudinal move- 100 ment of the valve with respect to the spindle, said spindle having a flange to bear against its seat on said wall, substantially as shown and described.

This specification signed and witnessed this 105 31st day of January, A. D. 1899.

ARTHUR KLEINFELDT.

In presence of—

A. N. JESBERA,

F. M. EGGLESTON.