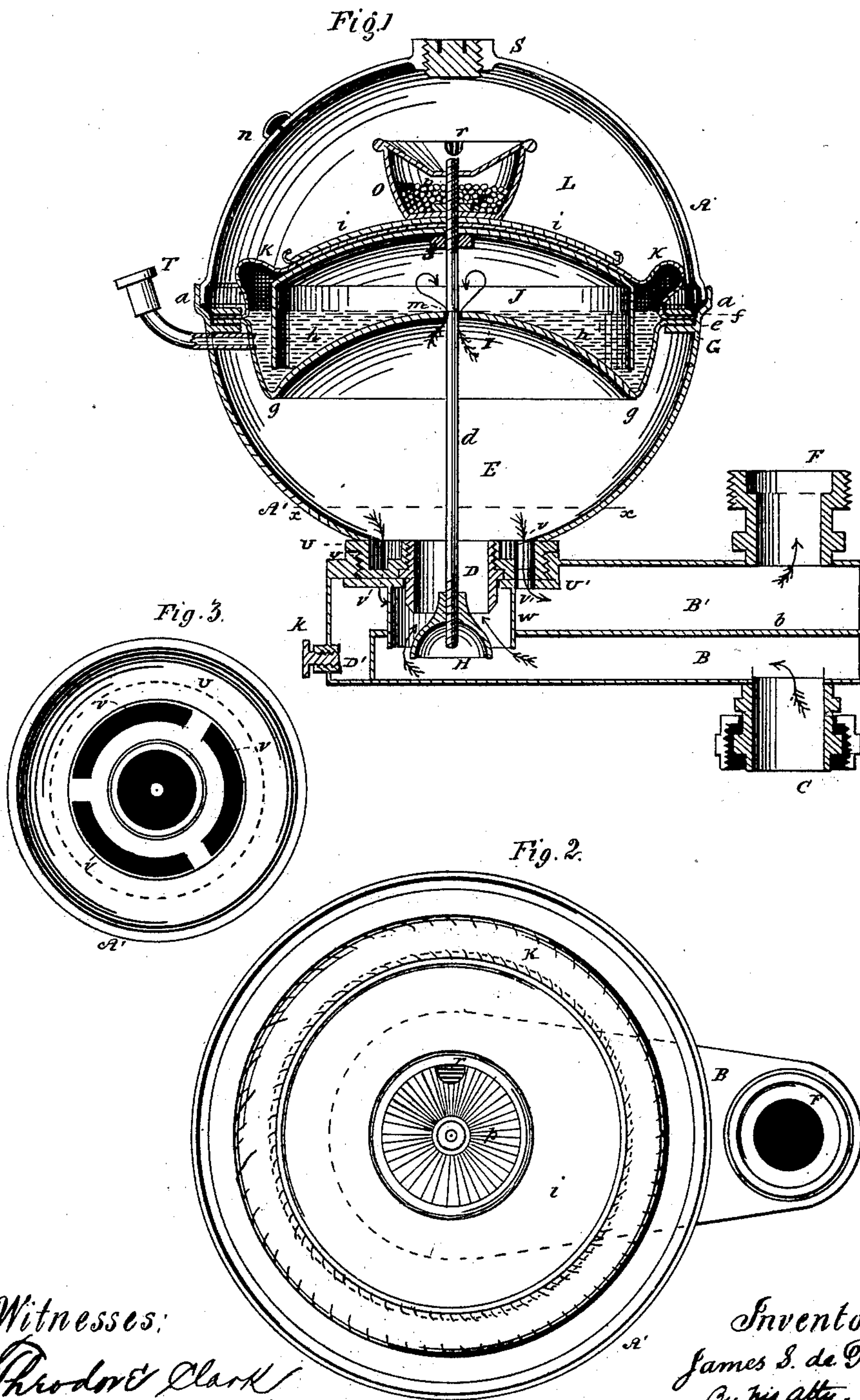


J. S. de PALOS.
Gas-Regulators.

No. 223,064.

Patented Dec. 30, 1879.



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IMPROVEMENT IN GAS-REGULATORS.

Specification forming part of Letters Patent No. **223,064**, dated December 30, 1879; application filed December 6, 1878.

To all whom it may concern:

Be it known that I, JAMES S. DE PALOS, of the city of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Gas-Regulators; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification.

My invention relates to improvements in gas-regulators for regulating the pressure of the gas supplied to gas-burners in which a diaphragm is used, and which are usually attached to the gas-meter; and the several objects of my invention are to provide improved means for preserving the diaphragm from being injured and becoming inoperative by reason of the action of the gas thereon; to utilize the condensation-fluids of the gas, for the purpose of lubricating the diaphragm; to construct the apparatus in such a manner that, by the use of a fluid for sealing it, the gas shall not come directly in contact with the diaphragm; to prevent the vibratory movements which have hitherto been common to all diaphragm-regulators, and which cause a flickering of the flame; to arrange the parts so that neither the sealing-fluid nor the weights used for loading the diaphragm can accidentally become displaced; and to construct and arrange the parts so that ready and easy access may be had to the valve without disarranging the other parts.

My invention consists, first, in the combination of a diaphragm, a sealing-fluid, and an inverted cup forming a gas-chamber, for the purpose of preventing the gas from coming into direct contact with the diaphragm; also, in the combination, with the said inverted cup, of a plate of peculiar construction, by means of which the condensation-fluid is mingled with the glycerine and the excess thereof is carried off; and it further consists in improved constructions and arrangements of parts, as hereinafter particularly set forth.

In the accompanying drawings, Figure 1 represents a longitudinal vertical section of my improved gas-regulator, taken through its center; Fig. 2, a plan view of the interior, the

cover or upper case being removed; and Fig. 3, a transverse section on the line *x x*.

Similar letters of reference indicate the same parts in all the several figures.

A A' represent two hemispherical cases of sheet metal, which together form the body or shell of the apparatus, and which are soldered together at *a*.

To the lower case, A', is connected a horizontal extension, divided into two separate compartments, B B', by a longitudinal partition, *b*, the lower compartment, B, forming an inlet for the gas, and being provided at one end thereof with a tube and coupling, C, by which the regulator is attached to the gas-meter, and connecting at its other end with the valve-seat D, and the other compartment, B', forming an outlet, and being connected with the gas-chamber E at one end, and provided near its other end with an exit-pipe, F, which is connected with the service-pipe leading to the burners. The improved mode of attaching this extension to the body of the instrument is hereinafter described.

G is a flange extending around the interior of the case A' and below the seam *a*. H is the valve, and *d* the valve-rod. The valve-seat D is made detachable, as hereinafter explained.

It is well known that in all diaphragm-regulators the leather of which the diaphragm is made is affected by the gas, so that it becomes dried and shriveled, and gradually becomes inoperative; and this is more especially the case when petroleum and its products are used in the manufacture of the gas. To counteract this effect, and to render the diaphragm impervious to gas, various expedients have been employed—as, for instance, the leather has been treated with glycerine and other fluids; but all the fluids heretofore used have an affinity for the oils contained in the gas and the products of condensation of gas, and hence they soon lose their efficacy in preserving the leather.

To obviate this difficulty I saturate the leather with castor-oil, which has the effect of both rendering it impervious to gas and also of rendering it permanently proof against the

effects of the gas; and in addition to this I employ a reservoir of glycerine, *h*, into which the products of condensation are received, and into which the diaphragm dips, and is thereby lubricated, as hereinafter explained.

I is a curved plate of metal having a surrounding flange, *e*, which is clamped between the flange *G* and the ring *f*, the center of the said plate being dome-shaped, and its lower edges, *g*, being U-shaped. This plate forms a well or reservoir, *h*, which I fill with glycerine.

J is an inverted cup, the lower edges of which descend into the glycerine in the well *h*, and the top of which is convex, and between it and a metal plate, *i*, is clamped by the screw-nuts *j j*, a sheet of leather, *K*, saturated, as above described, with castor-oil, and clamped at its edges between the flange *G* and ring *f* above the flanges of the plate *I*. This sheet of leather is of larger diameter than the ring *f*, so that an annular portion thereof bulges out between the edges of the plate *i* and ring *f*, and permits the cup *J* freely to rise and fall as it is acted upon by the varying pressure of the gas entering the same, and thereby to close and open the valve.

There is a small aperture, *m*, at the center of the plate *I*, a little larger than is necessary for the allowing free play to the valve-rod *d*, through which the gas enters the cup *J*, and raises the latter in proportion to the degree of pressure under which the gas enters the chamber *E*; and the sides of the said cup, in connection with the glycerine in the well *h*, form a seal and prevent the gas coming directly in contact with the leather, while the latter also serves to prevent the glycerine from being blown out in case of excessive pressure.

The oils or condensations of the gas accumulate on the ceiling and sides of the cup *J* and mingle with the glycerine in the well *h*, thereby being rendered innocuous to the leather, which latter is constantly lubricated by dipping into the glycerine when the cup settles down into the said well.

It will be observed that by reason of the relative position and arrangement of the plate *I*, cup *J*, and leather *K*, the glycerine cannot be emptied from its proper receptacle in whatever position the apparatus is turned.

When the accumulations from the condensation of the gas cause the fluid in the well *h* to rise above the crown of the plate *I*, it drips through the perforation *m* and down the under side of the said plate to its lower edge, *g*, from whence it drops to the bottom of the chamber *E* into the well *D'*, where it remains until removed by means of the drip-screw *k*.

In the upper case, *A*, is a small orifice, *n*, covered by a swivel-cap to prevent dirt or water from entering, through which said orifice the outer air enters and leaves the air-chamber *L*. This orifice is not larger than is sufficient to permit ingress and egress to a sufficient quantity of air to insure the easy operation of the diaphragm, and prevents the air

from being expelled suddenly from the said chamber, thereby forming an air-cushion which balances the pressure of the gas underneath the diaphragm; and the perforation *m* also being small, the two pressures act against each other and effectually prevent unsteady vibrations of the diaphragm and consequent flickering of the flames, and insure a steady light at all times.

O is a cup for holding the weights for loading the diaphragm, (shot being usually employed for that purpose,) which said cup is secured at the center of the plate *i* by a screw-nut, *j*, and is provided with a funnel-shaped cover, *p*, having a small opening, *r*, at one edge, by means of which construction the loading cannot accidentally be removed or displaced, as it can only be removed therefrom when the apparatus is placed in one particular position.

S is the top screw, through which the weights are passed into the cup *O*, and *T* is a small pipe, provided with a screw-cap for convenience in filling and emptying the well *h*.

For the purpose of attaching the extension *B B'* to the body of the regulator in such manner that access can be had to the valve without disarranging the working parts, I employ the following device, viz: *U* is a circular plate of suitable thickness, soldered or otherwise secured to the body of the regulator, (a portion of the latter being cut away to receive it,) provided with a screw-thread on its outer edge, *u*, and with slots or mortises *v*, through which the gas passes from the regulator on its way to the service-pipe. At its center is the tubular valve-seat, made detachable by means of a screw-thread.

Secured to the top of the extension *B B'* is a similar plate, *U'*, having corresponding slots or mortises *v'*, and with a screw-thread which fits onto that on the plate *U*. A leather washer is fitted to the plate *U'*, so that when the parts are secured together a tight joint is obtained.

Between the slots *v* and the valve-seat is a tube, *w*, which extends to or below the partition *b* and cuts off the connection between the chambers *B* and *B'*, so that the gas, on entering the regulator, passes upward through the valve, and on leaving the same passes through the slots *v v'*, and from thence to the service-pipe.

What I claim as my invention is—

1. The combination of the diaphragm *K*, a sealing-fluid, *h*, and an inverted cup, *J*, forming a gas-chamber, as and for the purpose set forth.

2. The combination of the plate *I*, provided with the perforation *m*, the inverted cup *J*, and a reservoir of glycerine, to receive and neutralize the condensation-fluid, as and for the purpose set forth.

3. The combination of the plate *I*, inverted cup *J*, and leather *K*, arranged as shown and described, for the purpose of preventing displacement of the sealing-fluid.

4. The combination of the small orifice n in shell A, the chamber L, inverted cup J, perforation in plate I, and chamber E, as and for the purpose set forth.

5. The cup O, secured upon the plate i , and provided with a funnel-shaped cover, p , having an opening, r , as and for the purpose set forth.

6. In combination with the dome-shaped plate I, having a perforation, m , at its summit, the well D', and drip-screw k , and the in-

verted cup J, as shown and described, for the purpose set forth.

7. The combination of the plates U and U', provided with slots v v' , the valve-seat D, and tube w , as and for the purposes set forth.

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