

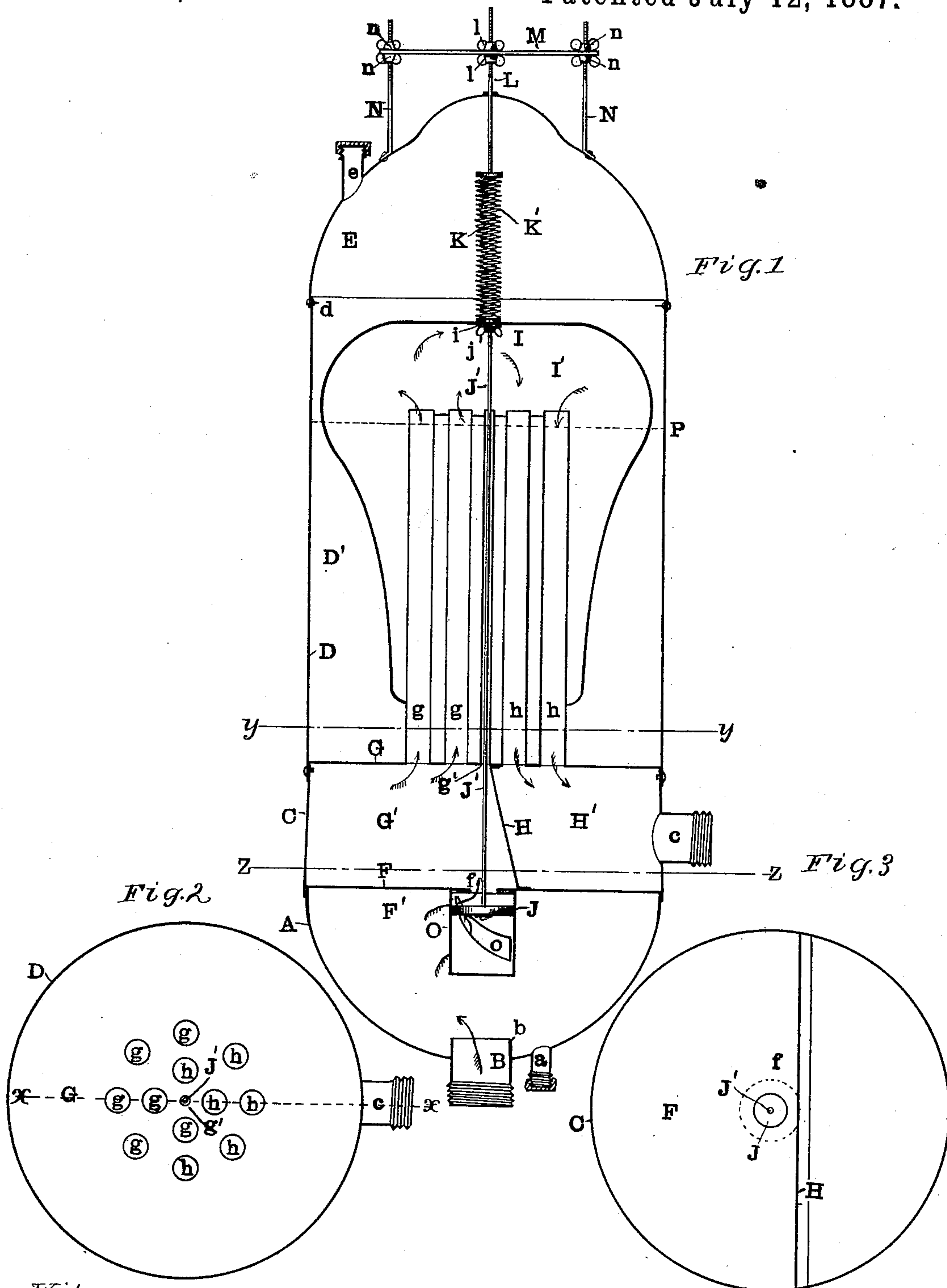
(No Model.)

B. F. FERTICK.

GAS REGULATOR.

No. 366,622.

Patented July 12, 1887.



Witnesses:  
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Inventor:  
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# UNITED STATES PATENT OFFICE.

BENJAMIN F. FERTICK, OF COLUMBUS, OHIO, ASSIGNOR TO JOSEPH A. JEFFREY, OF SAME PLACE.

## GAS-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 366,622, dated July 12, 1887.

Application filed February 9, 1887. Serial No. 227,042. (No model.)

*To all whom it may concern:*

Be it known that I, BENJAMIN F. FERTICK, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Gas-Regulators, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a central vertical section taken on line *xx*, Fig. 2. Fig. 2 is a horizontal section on line *yy*, Fig. 1. Fig. 3 is a horizontal section on line *zz*, Fig. 1.

A is the lower part of the body.

B is the induction pipe or tube through which gas is admitted.

C is the intermediate part of the body.

D is the upper part of the body, and E is the cap or top.

For convenience in putting the regulator together I usually prefer to make the parts A and C in separate pieces, which overlap and may be conveniently soldered to each other. So, also, with regard to the sections C D; and as the cap may fit loosely upon the section D, I prefer to have these parts overlap such distance that they may be conveniently secured to each other by means of pins *d d*, thrust through from the outside, the metal being suitably perforated to receive them.

*a* is an outlet-pipe for the discharge of such material as may be deposited or accumulate at that point.

*e* is a filling-tube.

F is a transverse partition or diaphragm, below which is a receiving-chamber, F'.

*f* is an opening in partition F for the passage of gas. G is a similar partition or diaphragm.

H is a transverse partition, extending across the body and dividing the space between the partitions F G into two chambers, G' H'.

*g g* are a series of small tubes mounted in the partition G and opening at their lower ends into the chamber G'. *h h* are a series of similar tubes mounted in the partition G and opening at their lower ends into the chamber H'. The upper ends of all these tubes are open.

I is a gasometer or buoy made of thin sheet metal and open at its lower end, which is, by

preference, somewhat contracted, so as to fit closely the outer surfaces of the tubes *g h*, which thereby serve as guides, as will be hereinafter explained.

J is a valve connected to the lower end of a valve-rod, J', which passes thence upward through a tube, *j'*, mounted in the partition G wholly at one side of the partition H. This valve-rod passes through the upper end of the gasometer I, to which it is secured, preferably, by means of a nut, *j*, below the top of the gasometer, and a similar nut above the gasometer, together with a packing-washer, *i*, or other contrivance, whereby leakage at this point is prevented; or the parts may be soldered together at this point.

K K' is a spring interposed between the valve-rod J and a rod, L, which forms practically an extension of the valve-rod. By preference I make this extensible spring-connection between these two rods of a double spiral spring, the convolutions of the outer one, K, being of so much greater diameter in horizontal section that one spring can be placed within the other and the two operate together without coming in contact with each other.

I have found that by this construction I can secure the desired tension, with at the same time great flexibility, elasticity, and freedom of movement.

M is a supporting-bar, through which the rod L passes centrally, and to which it is attached by nuts *ll*, one on either side of the bar.

N N are posts rising from the cap E, and screw-threaded at their upper ends, where they pass through the ends of the supporting-bar M, upon which the rod L is adjustably supported, as has been explained.

In operating my invention I propose to fill the space in the chamber D' between the gasometer I and the section D with glycerine or some other suitable liquid up to, say, the point indicated by the dotted line P, or thereabout, part of the liquid of course rising up through the lower open end of the gasometer.

Of course the buoyancy of the gas within the gasometer will close or tend to close the valve J, which, however, can be so regulated by means of the adjusting-nuts *ll n n* that the



valve will under ordinary circumstances remain some distance below the upper end of the V-shaped slot *o* in the valve-tube *O*, so that gas will flow in through the induction pipe or tube, thence through the V-shaped slot, thence through the opening *f* in the partition *F*, through the tubes *g g*, down through the tubes *h h* into the chamber *H'*, and out through the eduction or discharge tube *e*.

As will be readily understood, the pressure of the gas within the gasometer will tend to lift said gasometer and close or partially close the valve, thus reducing the size of the passage-way for gas through the V-shaped slot, the position of the valve being determined with a good deal of accuracy by such gas-pressure, modified, of course, to some extent by the depth of the liquid within the chamber *D'* and the gasometer, together with the tension of the springs *K K'*, which may be determined with great accuracy by means of the adjusting-nuts.

The filling or partial filling of the chamber *D'* with liquid may be effected by either removing the top *E* or by pouring through the filling-tube *e*.

Of course many modifications in details of construction may be made by any one skilled in the art of gas-regulators without departing from the spirit of my invention, although I have shown that which I believe to be the best way now known to me of carrying out my improvement.

It is obvious that a single spiral spring or other form of spring might be substituted for the double spring *K K'*, and the different sections of the body might be screw-threaded together to facilitate taking them apart.

While I prefer to employ the closed valve-tube *O*, provided with slot *o*, for effecting an accurate regulation of the gas-pressure, yet I do not wish to be limited thereby, because under some circumstances and conditions the tube might be dispensed with.

I am aware of the fact that floats, broadly considered, have been employed in gas-regulators in conjunction with valves operated by the said floats, and that with each float there has been combined a spring; but so far as I know it has always been customary to have the spring bear loosely against the float for the mere purpose of holding the latter down, the float being formed with air-compartments to act by buoyancy to cause the float to tend to rise. In my construction the spring is so connected with the float that the latter is suspended thereon, the adjustment being such that the position of the float can be accurately regulated by means of the spring or springs.

I do not herein claim any of the combinations set forth in the claims appearing in my other application pending herewith, No. 232,923, filed March 30, 1887, preferring to claim herein the matter which is common to both constructions, and in said other application the matter specifically incident thereto.

What I claim is—

1. In a gas-regulator, the combination, with the casing or body having within it a liquid-chamber, of a float within said liquid-chamber, the duct for leading gas into the interior of the float, a duct for leading gas from the interior of the float to the outlet-passage, the valve-tube having a passage-way for the gas through its wall, and the valve within the tube, connected with the float arranged to move up and down by said passage-way, substantially as set forth.

2. In a gas-regulator, the combination of the casing or body having a gas-receiving chamber, a valve-tube connecting with said chamber, said tube having a passage-way in the wall thereof with its upper edge inclined, the liquid-chamber, the float in the liquid-chamber, the duct for leading the gas directly to the interior of the float, a duct for leading the gas from the interior of the float to the outlet, a valve fitted tightly within the aforesaid valve-tube and connected with the float, and the adjustable springs, substantially as set forth.

3. In a gas-regulator, the combination of the liquid-chamber, the float therein, the induction-pipe, the valve-tube having a tapering inlet-passage through its wall, the valve in said tube, a passage-way which leads all of the gas directly to the interior of the float, a passage-way which leads all of the gas from the float to the eduction-pipe, and means connecting the float with the valve, substantially as set forth.

4. In a gas-regulator, the combination of chamber *F'*, valve-tube *O*, with tapering aperture *o*, valve *J*, fitting therein, the float, the passage *G' g*, extending to the interior of the float, passage *H' h*, valve *J*, connected to the float, spring *K*, and adjusting devices, substantially as set forth.

5. In a gas-regulator, the combination of the liquid-chamber, the float therein, the passage closed by the valve, and the means connecting the valve with the float, and a spring rigidly secured to the float, substantially as set forth, whereby the float is vertically suspended thereon, as described.

6. In a gas-regulator, the combination, with the valve, the liquid-chamber, and the float which carries the valve, of the two concentric springs, both rigidly connected with the float, and means for adjusting it, substantially as set forth.

7. In a gas-regulator, the combination of the body having the lower gas-receiving chamber, the upper liquid-chamber, and an intermediate chamber formed by horizontal diaphragms *F* and *G*, extending from side to side of the body or casing, the vertical diaphragm *H*, dividing the said intermediate chamber into two horizontal parts, the float in the liquid-chamber, the passage-way for connecting one of the compartments of the said intermediate chamber with the interior of the float, the passage-way whereby gas is admitted to



the said compartment of the intermediate chamber, a passage which connects the interior of the float with the other of said compartments of the intermediate chamber, an exhaust-duct  
5 also connected therewith, and a valve to regulate the flow of gas into the intermediate chamber and connected with the float, substantially as set forth.

8. In a gas-regulator, the combination, with  
10 the inlet-pipe and the outlet-pipe of the regulator body or casing, of the horizontal diaphragm F, having a chamber, F', below it and chamber G' above it, a horizontal diaphragm, G, above the chamber G', the liquid-chamber  
15 above the diaphragm G, the vertical diaphragm

H, with outlet-chamber H' between the afore-said diaphragms F and G, the rising and falling float in the liquid-chamber, the ducts leading upwardly from the chamber G' to the interior of the float, the ducts leading upward from the  
20 interior of the float to the chamber H', the passage-way from chamber F' to chamber G', and the valve closing said passage-way connected with the float, substantially as set forth.

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

BENJAMIN F. FERTICK.

Witnesses:

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W. F. GARRETT.