(No Model.)

H. J. HYAMS.

GAS PRESSURE REGULATOR AND CUT-OFF.

No. 359,787. Patented Mar. 22, 1887.

FIG. 1.

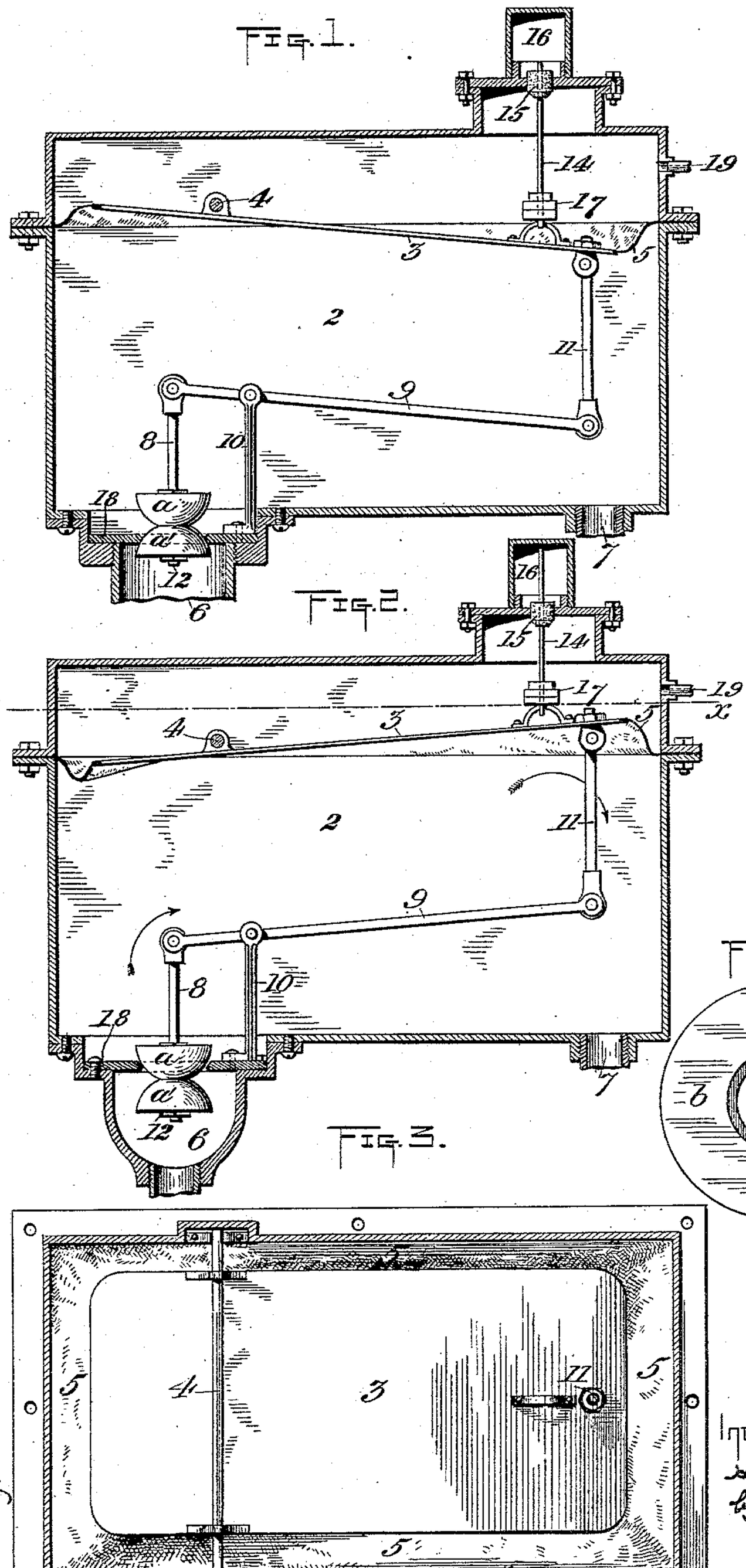


FIG. 2.

FIG. 3.

FIG. 4.

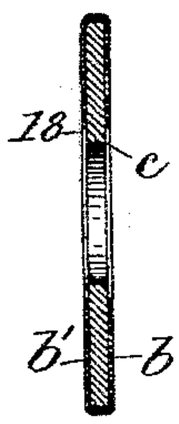
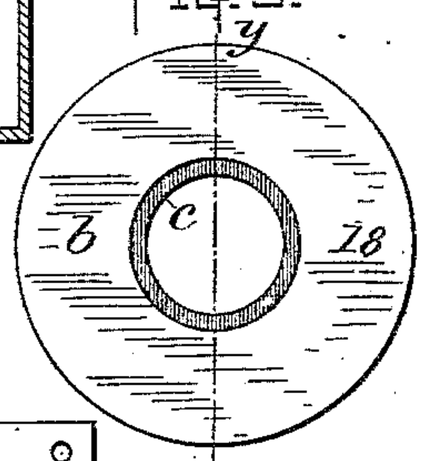


FIG. 5.



Witnesses:-
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UNITED STATES PATENT OFFICE.

HYAM J. HYAMS, OF PITTSBURG, PENNSYLVANIA.

GAS-PRESSURE REGULATOR AND CUT-OFF.

SPECIFICATION forming part of Letters Patent No. 359,787, dated March 22, 1887.

Application filed February 5, 1887. Serial No. 226,657. (No model.)

To all whom it may concern:

Be it known that I, HYAM J. HYAMS, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Gas-Pressure Regulators and Cut-Offs; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical central section of my improved regulator, showing the valve as it is when closed by cessation or too great diminution of the gas-pressure. Fig. 2 is a similar view showing the regulator with its valve open. Fig. 3 is a sectional plan view of the regulator, the section being on the line *x x* of Fig. 2. Fig. 4 is a diametrical cross-section on the line *y y* of Fig. 5. Fig. 5 is a plan view of the valve-seat.

Like symbols of reference indicate like parts in each.

In the drawings, 2 represents the regulator case or box. Near the top of the case is the diaphragm 3, which consists of a flat plate of metal transversely and eccentrically pivoted by a horizontal pivot bar or rod, 4, and provided at the edges with a peripheral band, 5, of rubber or some other flexible material, which is tightly secured between flanges of the box 2, as shown in Figs. 1 and 2. This arrangement of the diaphragm 3 permits it to be oscillated freely on the axis 4.

6 is the inlet-port of the regulator, and 7 is the outlet-port. Pipes are screwed to these ports. The inlet-port 6 is controlled by a valve, 12. This is a double-faced valve in the form of two superposed semispheres or truncated cones, *a a'*, mounted on a vertical stem, 8, with their bases outermost. The valve is arranged with reference to its seat 18, as shown in the drawings, the seat being between the parts *a a'*. The stem 8 is pivotally and loosely attached to the end of a horizontal lever, 9, which is fulcrumed to a post, 10. The other end of the lever 9 is connected with the diaphragm 3 by a connecting-rod, 11, pivotally attached to the diaphragm and to the lever.

14 is a rod which projects up from the diaphragm 3, extending through a rubber plug, 15, into a removable cap, 16. Weights 17 are placed on the rod and determine the amount of gas-pressure needed to raise the diaphragm.

19 is the usual escape or leak pipe.

The operation is as follows: When there is no gas-pressure in the pipes, the weights 17 on the diaphragm depress it on its pivot 4, thereby raising the short arm of the lever 9 and raising the face of the part *a'* of the valve into contact with the valve-seat of the inlet-port. (See Fig. 1.) No degree of pressure in the inlet-pipe can now unseat the valve, because the gas cannot find entrance into the case 2 to work the diaphragm. To put the regulator in operation, supposing that there is gas-pressure in the inlet-pipe, the cap 16 is unscrewed, and the rod 14 is drawn up through the plug 15. This depresses the valve 12 and unseats the cone *a'*, admitting gas into the box 2 and through the port 7, Fig. 2. The regulator accommodates itself to variations in the gas-pressure and keeps the outflow constant, for as the pressure rises it will raise the diaphragm on its pivot, thereby bringing the cone *a* nearer to its seat and cutting off the flow through the port 6, and as the pressure falls the counterbalance of the weights 17 will depress the diaphragm and admit more gas into the chamber 2 until an equilibrium is established. When the pressure falls below a certain point, which is determined by the amount of weight on the rod 14 and the degree of eccentricity of the pivot 4, the diaphragm will fall completely, thereby bringing the parts into the position shown in Fig. 1 and automatically cutting off the gas.

The points of invention in the regulator are as follows:

First, the rubber plug 15. The passage of gas through regulators often causes a vibration of the valve and diaphragm, which is audible throughout the building in which the regulator is located, and is therefore unpleasant and alarming. The use of the rubber plug, through which the rod 14 passes, prevents this vibration.

Second, the peculiar arrangement of the valve 12 and its connection with the diaphragm. I am aware that double valves in regulators are not new, and I do not claim them broadly; but I know of no such valve prior to mine which was suspended vertically by a loose connection from a lever, which is operated by the diaphragm. Such valves have heretofore been horizontal,

and have consequently had their stems arranged in tubular guides, to enable them to be seated with accuracy. This increases the friction and cost. By swinging the valve loosely and vertically from the lever 9, it will adjust itself easily to its seat without any such guide.

Third, the construction of the valve-seat 18. Figs. 4 and 5 are detail views of the valve-seat. It consists of two rings, *b* and *b'*, of sheet metal, between which is clamped a flexible ring, *c*. The flexible ring projects within the central hole of the metal rings and affords a soft seat for both faces of the valve to fit against.

I claim—

1. In a gas-regulator, the combination of a diaphragm, a lever, 9, connected with the diaphragm and movable thereby, a valve-seat, and a double-faced regulating-valve having a vertical stem, 8, loosely connected with the lever 9, substantially as and for the purposes described.

2. In a gas-regulator, the combination of an eccentrically-pivoted diaphragm, a lever, 9, connected with the diaphragm and movable thereby, a valve-seat, and a double-faced regulating-valve having a vertical stem, 8, loosely connected with the lever 9, substantially as and for the purposes described.

3. In a gas-regulator, the combination, with a diaphragm movable by variations in the gas-pressure, of a plug, 16, and a rod connected with the diaphragm and passing through the plug, substantially as and for the purposes described.

4. In a gas-regulator, the combination, with a double-faced valve, of the valve-seat 18, interposed between the valve-faces and consisting of two rings, *b* and *b'*, and a flexible ring, *c*, interposed and clamped between the rings *b* and *b'* and projecting beyond the internal peripheries of both thereof, whereby it forms a seat for both valve-faces, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 1st day of February, A. D. 1887.

HYAM J. HYAMS.

Witnesses:
THOMAS W. BAKEWELL,
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