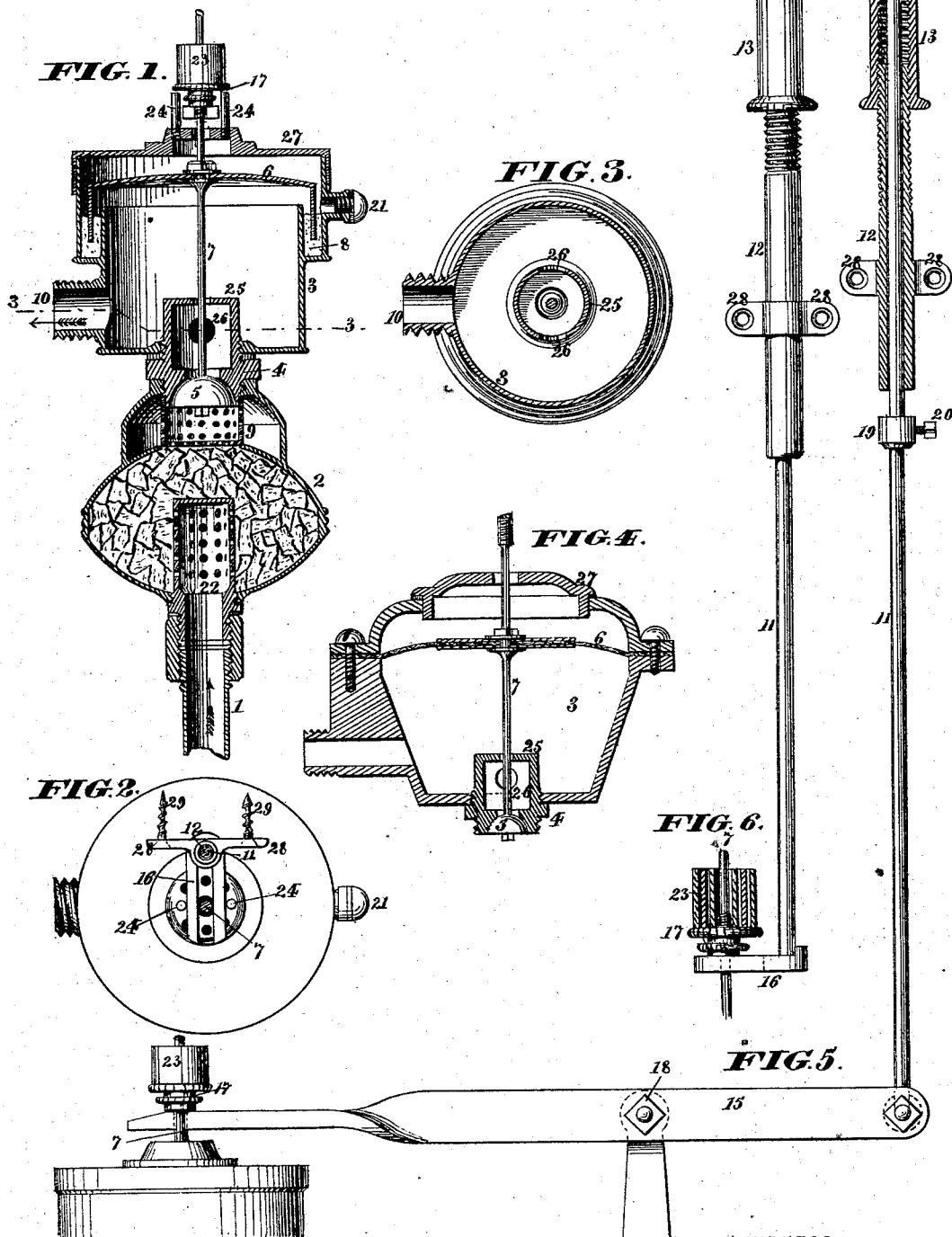


I. SIMMONS. Gas-Regulators.

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WITNESSES

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IMPROVEMENT IN GAS-REGULATORS.

Specification forming part of Letters Patent No. **157,879**, dated December 15, 1874; application filed August 21, 1874.

To all whom it may concern:

Be it known that I, ISAAC SIMMONS, of the city of Baltimore, in the State of Maryland, have invented new and useful Improvements in Gas-Regulators, of which the following is a specification:

My invention relates to regulators in which the flow of gas is controlled by valves, whether operated by hand or automatically by the pressure of the gas itself. My improvements consist, first, in combining with a valved regulator a chamber containing any suitable purifying material and screens, which, while permitting the free flow of gas, confine the purifying material within the chamber, and prevent its interference with the valve or valves. My improvements consist, second, in the combination with a valved regulator of a device, hereinafter described, for setting the regulating-valve by hand. My improvements consist, third, in the combination, with a valved regulator and the hand setting device above referred to, of a gage to limit the movement of said hand setting device. My improvements consist, fourth, in the combination, with a valved regulator and a hand setting device, of adjustable guide-pins, to facilitate the connection of the said parts under variations in their relative positions.

Figure 1 is a vertical section of an apparatus illustrating my invention. Fig. 2 is a plan view of the same. Fig. 3 is a horizontal section on the line 3 3, Fig. 1. Fig. 4 is a vertical section, illustrating a modification in the construction of the automatic regulator. Fig. 5 is an elevation, partly in section, of a device for operating or regulating the valve by hand. Fig. 6 is an elevation of the said hand regulating apparatus under a modified form.

1 represents the gas-supply pipe from the meter, attached in any suitable manner to a vessel or chamber, 2, containing material adapted to purify and improve the gas. The contents of the chamber 2 consist chiefly of porous material, such, for example, as pumice-stone in fragments, which will have the effect of arresting and absorbing the surplus water of condensation and tarry or gummy matter held in suspension by or thrown off from the gas. Fragments of iron or certain kinds of iron ore, or other material adapted by its

chemical effect to arrest sulphurous or other impurities in the gas, may be advantageously interposed among the fragments of porous material, or they may be placed in a separate vessel. The vessel 2 is applied to an automatic regulator, 3, which latter is provided with a cap or cover, 27, and is formed at its lower part with a threaded socket for the reception of the combined valve-seat 4 and dome 25, the latter having lateral openings 26, through which the gas is deflected. 5 is a valve closing upon the valve-seat 4, and operated by pressure of the gas on an inverted cap, diaphragm, or other device, through the medium of the valve-rod 7, in customary manner.

In Fig. 1 I have represented an inverted cup, 6, with its margin working in a mercury-seal, 8.

In Fig. 4 I have shown a flexible diaphragm, 6. As each of these devices is operated by the pressure of the gas in a similar and usual manner, and as novelty is not claimed in either in itself, they may be regarded as equivalents one of the other. Between the chamber 2, containing absorbent material, and the valve-seat 4 I interpose a perforated guard, 9, which permits the passage of the gas, but prevents any of the solid matter within the chamber 2 being carried into the valve-chamber.

For use in connection with a mercury-seal, 8, as illustrated in Fig. 1, I prefer to construct the inverted cup 6 of spun copper plated with nickel, to protect it from the action of the quicksilver.

I prefer to make the outer shell of the automatic regulator and the chamber containing porous material of cast-iron. 21 represents a plug, which serves as a gage in pouring in the quicksilver, the plug being opened when the quicksilver-seal 8 is to be charged. The quicksilver poured in from the top of the chamber falls upon the convex top of the cup 6, and flows over the margin of the same into the annular groove 8, which is formed to receive it, until it rises to the height of the plug 21, which shows that a sufficient quantity of quicksilver has been introduced.

In practice I construct the box or vessel 2 and its attachment in such a manner as to admit of readily removing the porous or other material therein contained, and replacing it

with new material whenever it may be necessary. 22 represents a guard, the sides being perforated, but the top not perforated, at the bottom of the box 2, permitting the inflow of gas, while retaining the porous material within the chamber.

The operation of the automatic regulating mechanism above described will be clear to any one familiar with this class of inventions.

It will be seen that, as the gas passes upward in the direction of the arrow, from the inlet at 1 to the outlet at 10, whence it is conveyed to the burners, any excess of pressure within the chamber of the regulator 3, acting beneath the inverted cup or the diaphragm 6, as the case may be, will tend to close the valve 5 upon its seat 4, thus reducing the flow of gas.

By my improvement, in combining with an automatic regulator of this general character a chamber for absorbent material, I am enabled to obviate the main difficulty heretofore experienced in the use of this class of regulators, more especially in warm climates, from the presence of injurious vapors, moisture, and gummy matter; and I am also enabled by the same combination to insert in the chamber containing the porous material other material adapted to arrest certain impurities in gas, and so to improve the light.

If a separate vessel is used to hold the mineral matter employed to arrest impurities by chemical action, I prefer placing it in connection with the outlet of the valved gas-regulator. The vessel or vessels containing the porous and mineral matter may be connected mediately or immediately with the valved gas-regulator.

In order that the flow of gas may be placed under control of the consumer, or may be conveniently stopped whenever desired, I have also combined, with the automatic gas-regulator, a device to be operated by hand, which adapts the said regulator to operate also as a main stop or cut-off when desired, and also to be employed to limit the maximum flow of gas at any desirable point. This device consists, essentially, of a rod, 11, working through a stationary sleeve, 12, within which it is supported and vertically adjusted by a screw-thimble, 13, connected to and bearing on a shoulder on the rod 11, a nut, 14, being placed on the rod above said thimble, which permits the free rotation of said thimble 13 upon the rod. The sleeve 12, thimble 13, and nut 14 are shown in elevation, in connection with the rod in Fig. 6, and in section in Fig. 5, that construction under either modification being similar.

Fig. 5 shows the mode of applying the invention in cases where the relative locations of the automatic regulator, and the point from which it is to be operated or controlled by hand, necessitate the interposition of a horizontal lever to transmit the movement.

Fig. 6 shows the arrangement where the point from which the valve is to be operated or controlled is located directly above the said valve. In this illustration the valve 5 is closed partially or entirely at the will of the operator, by a backward rotation of the screw-thimble 13, which tends to draw the rod 11 upward within the sleeve 12, and, by the elbow 16 engaging beneath a suitable collar, 17, near the upper end of the valve-rod 7, draws the valve upward to the same extent.

In the illustration shown in Fig. 5 the lever 15 is fulcrumed at 18, perforated or forked to fit over the valve-rod 7, and engaging beneath the collar 17. As the lever reverses the movement, it will appear that in the illustration given in Fig. 5 a forward turn of the screw-thimble 13, tending to move the rod 11 downward within the sleeve 12, will operate to close the valve, while a backward movement of the screw-thimble 13, drawing the rod 11 upward within the sleeve 12, will permit the valve to open. In order to gage the movement last described, so that the opening of the valve may be limited at any desirable point, I employ an adjustable collar, 19, secured to the rod 11 at any point by means of a set-screw, 20, so that the said collar may be set closer to or farther from the lower extremity of the fixed sleeve, or in the application of said collar to rod 11, Fig. 6, so that it may be set closer to or farther from a lug fastened, by screws or other device, to a fixed object, and encompassing or spanning said rod below the sleeve 12.

In order partially to counteract the pressure of the gas a series of annular weights, 23, may be applied to the top of the valve-rod 7, resting upon the collar 17, as shown more clearly in section in Fig. 5. The automatic regulator may be placed anywhere between the meter and the burners, but is preferably located near the meter.

In order to adapt the connections 15 16 of the hand regulating mechanism to work freely in connection with the rod 7 of the automatic valve, and to leave the latter free to move when not controlled by the hand regulator, I apply guide-pins 24, set in any opposite two of the holes shown in plan view, Fig. 2, in the top of or above the regulator-chamber 3. These pins serve to prevent any frictional contact between the lever 15 or lug 16 (as the case may be) with the valve-rod 7, and by the use of a number of pairs of holes, as shown, I am enabled to apply the said lever or lug to the valve-rod in any position which the relative location of the automatic regulator and the device for manipulating the same may require.

The stationary sleeve 12 may be fastened in any suitable position, by lugs 28 and screws 29, or other means, to a wall, joist, or any fixed object.

The following is claimed as new:

1. The purifying-chamber 2, provided with the dome-shaped induction-screen 22 and the induction-screen 9, the whole combined with a valved gas-regulator, substantially as herein set forth.

2. The combination, with a valved regulator, of the hand regulating-nut 13, sleeve 12, and rod 11, substantially as set forth.

3. The combination, with a valved regu-

lator, of the setting-rod 11, sleeve 12, set-nut 13, and gage 19, as set forth.

4. The adjustable guide-pins, in combination with the valve-stem and elevating device.

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Witnesses:

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