(No Model.) 3 Sheets—Sheet 1.

J. FLEISCHER.

SAFETY GAS PRESSURE REGULATOR.

No. 498,253. Patented May 30, 1893.

Fig. 1.

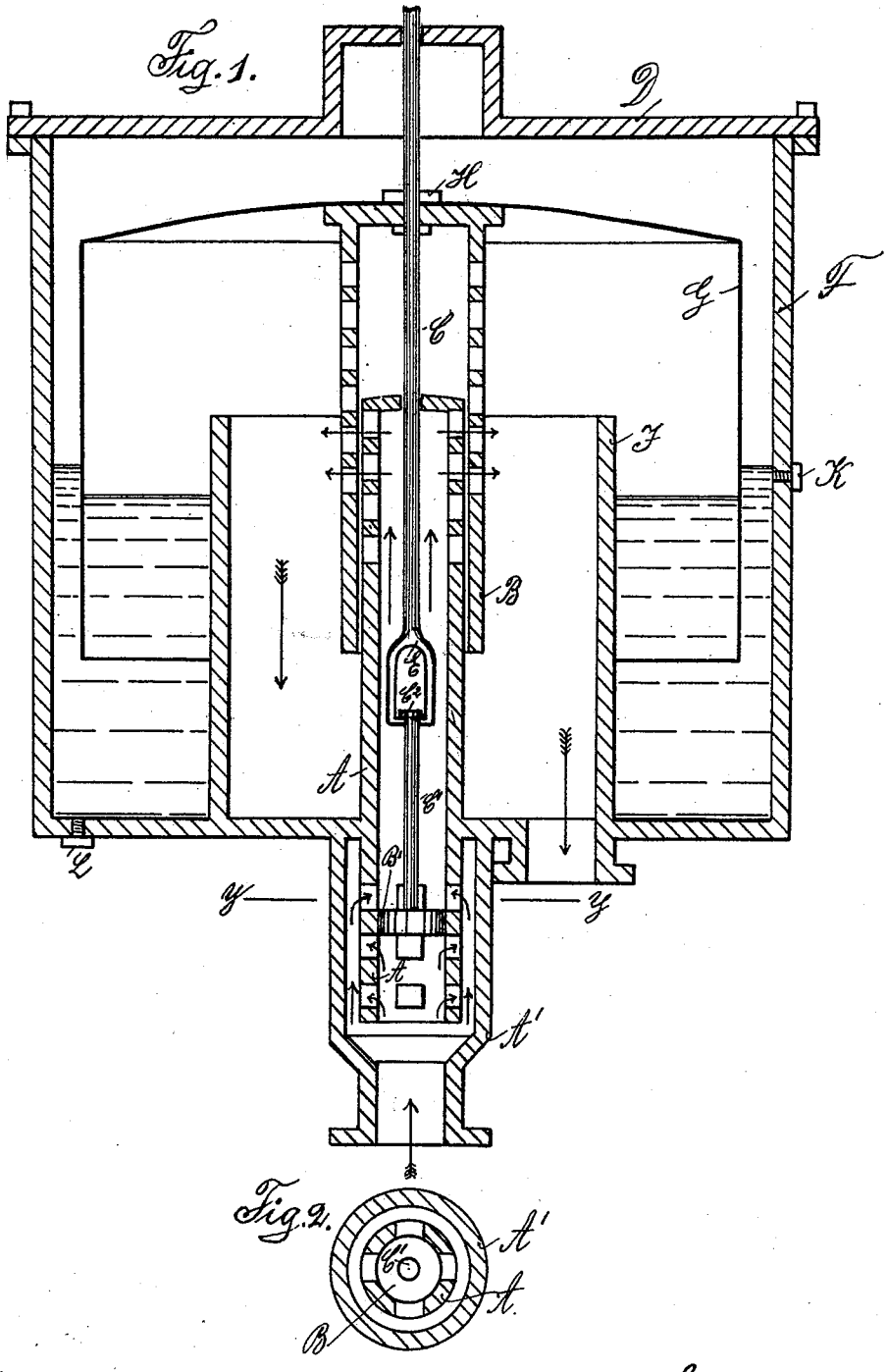

Fig. 2.

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Fig. 3.

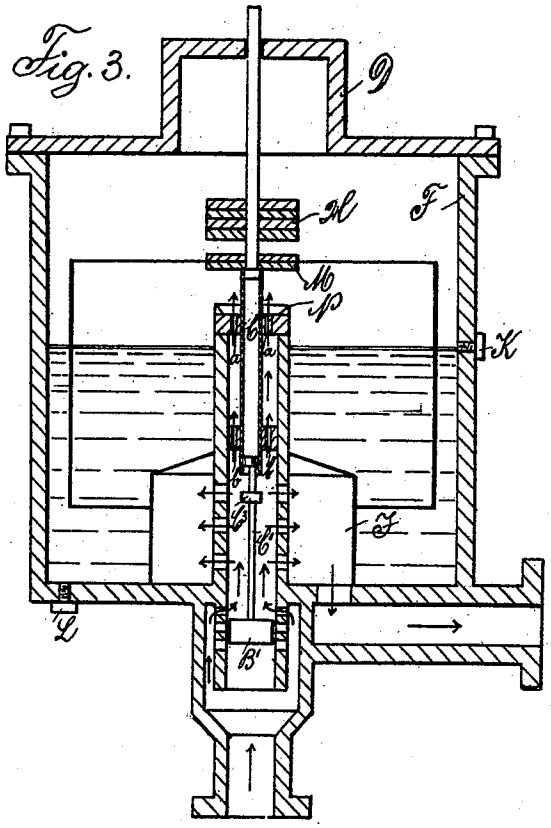
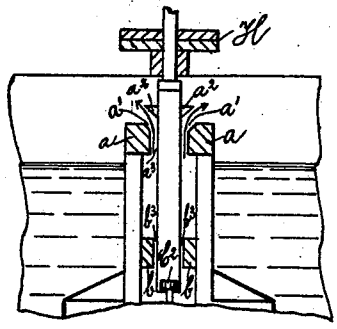


Fig. 4.



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(No Model.) 3 Sheets—Sheet 3.

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SAFETY GAS PRESSURE REGULATOR.

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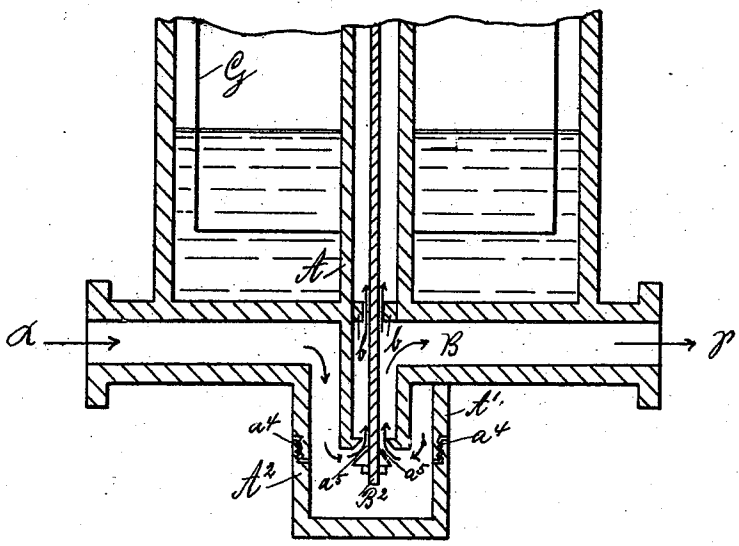
Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHANNES FLEISCHER, OF FRANKFORT-ON-THE-MAIN, GERMANY.

SAFETY GAS-PRESSURE REGULATOR.

SPECIFICATION forming part of Letters Patent No. 498,253, dated May 30, 1893.

Application filed November 17, 1891. Serial No. 412,243. (No model.)

To all whom it may concern:

Be it known that I, JOHANNES FLEISCHER, a subject of the German Emperor, and a resident of Frankfort-on-the-Main, Germany, have invented a certain new and Improved Gas-Pressure Regulator, of which the following is a full, clear, and exact description.

The object of this my present invention is to construct a gas regulator, in which the disadvantages accruing from the accidental sinking of the fluid level in the regulator, are obviated. These disadvantages are as follows:—first, gas can escape into the room in which the regulator is standing; second, the gas flames are entirely or partially extinguished; third, in the case of gas motors, stoppage is often caused owing to the gas feed being cut off; fourth, the regulator fluid is often sucked out into the service. I have succeeded in obviating these disadvantages by means of the apparatus hereinafter described and illustrated in the accompanying drawings in which similar letters denote similar parts throughout the several views.

Figure 1 is a vertical section through the apparatus. Fig. 2 shows a section on line *y y* in Fig. 1. Fig. 3 is a vertical section showing a modification of the apparatus. Fig. 4 shows another modified form in part section and Fig. 5 is a partial section showing a constructive detail.

Referring to Fig. 1: F is the exterior casing of the regulator, into which the fluid is placed and which is provided with the interior cylindrical part I and cover D.

G is the regulator bell, having attached thereto the perforated tube B sliding on the interior perforated tube A which is preferably cast in one piece with the outer regulator casing. The interior tube A of the regulator is provided at its lower and upper end with perforations, while the lower end of tube B is full, its upper end having similar perforations to those of tube A. The two tubes A and B also serve to vertically guide the regulator bell. Inside A, a piston valve B′ is arranged to slide vertically by means of its rod C′ jointed to the upper rod C which is attached to the bell G. The two rods C C′ are so jointed as to allow a certain amount of play, C′ being provided with a button C^2, embraced by the fork or stirrup E of rod C, which latter extends through the cover D. The bell may be weighted by means of weights H.

The apparatus works in the following manner:—Gas enters at the inlet A′ and passes in the direction of the arrows through the lower perforations of tube A into the same, rising in the same and passing out through the perforations of A and B into the interior of the bell G and thence to the outlet. If now the pressure in the bell G increases, the latter will be raised and as the lower part of the tube B is not perforated the gas inlet will be gradually closed. The gas in the bell G can be used up however to a certain small extent, without varying the inlet owing to the play of the button C^2 in the stirrup E since the piston B′ fits sufficiently tightly in the tube A that it will not fall of its own weight immediately on being released by the said stirrup. This arrangement has the additional advantage that by means of the same sudden variations in the pressure in the service, and consequent jumping and bobbing of the gas flames, are avoided. As soon as the consumption of gas, however, increases for any length of time, the bell sinks increasing the gas inlets through tubes A and B, owing to the depression of the piston B′ opening up more of the lower perforations of tube A. This arrangement of the perforated tubes A and B and piston B′ effects a very sensitive regulation of the gas pressure. The sensitiveness may be still more increased by means of the device illustrated in Fig. 3. Instead of the guide rod C and stirrup E, a tube $C^\times$ is substituted, in which the button C^2 of the rod C′ slides, the latter however being provided with a collar C^3 against which the lower end of the tube $C^\times$ comes. The piston B′ should also fit sufficiently tightly in the tube $C^\times$ to prevent it falling in the same, of its own weight. The tubular slide B is also omitted in this case, the tube $C^\times$ sliding in two glands *a* and *b*. These glands are provided with holes which allow sufficient gas to pass, to lift the bell G, the main gas current passing through the perforations of the tube A into the lower annular space which is separated from the liquid of the regulator by a bell shaped sheet or other metal casing *y*, and thence to the outlet. The upper gland *a* is provided with an upwardly projecting rim N

while a felt or faced metallic disk M is arranged inside at the top of the bell and closes tight on to the top of the tube $C^{\times}$. If now the fluid level sinks for any reason, the bell G, which is weighted at H will sink too when the disk M will close onto the rim N. This closure, however will take place before the fluid level has sunk sufficiently to allow gas to escape underneath the bell. Any escape of gas is thus effectually avoided nor can the liquid in the regulator be sucked out of the same by the engine, as in this case the bell would be depressed and the closure take place. In neither case however is the gas supply interrupted as the same can pass freely to the service, but the pressure will not be regulated, as the regulating valve is opened entirely. This will become noticeable in gas lighting by the flames blowing and flaring and in motors by a jerking of the ignition flame. In this case it is simply necessary to refill the regulator when it will immediately function properly again.

Instead of the above described device, that shown in Fig. 4 may also be employed. Here, instead of a felt or faced metallic disk M, a conical valve a^2 is employed, the rim N on the upper gland a being omitted and the latter bored out at a' to fit the valve. In this case, it is advantageous to bore the glands larger round the rod at a^3 and b^3, to allow the gas to pass, instead of perforating them as previously described.

This apparatus works in exactly the same manner as the one shown in Fig. 3. It entirely prevents any escape of gas whatever and also prevents stoppage in gas motors owing to the gas supply being cut off, and the extinguishing of the igniting flame is also impossible. It also obviates the necessity of the so called feed valves in gas motors, which valves can only be regulated or weighted in the gas room itself and consequently without the aid of a light.

The herein before described device can also be employed with dry regulators, and in this case operates in the same manner. As soon as the membrane of the regulator becomes leaky, the disk M will close on to the rim N preventing any escape of gas, while the gas supply takes place directly instead of through the regulator.

Where the gas employed to drive the motor is not thoroughly purified, the valve of the regulator is preferably made easily accessible as it often, in such cases, gets clogged up with tar. In order to meet this case, I arrange the valve as shown in Fig. 5. The gas enters the regulator at x. The central tube A is not perforated being prolonged downward to about the same length as the outer casing A'. This latter is provided with a thread a^4 and cap A^2 screwed onto same. The valve B^2 is arranged at the lower end of rod C' and is preferably conical closing onto its seat a^5 in the end of tube A. The other parts of the regulator remain the same as previously described. The operation is so evident as to need no further description, the gas passing from x through valve B^2 to the outlet P and at b to the regulator bell. The valve B^2 can be cleaned at any time, being easily accessible.

Having now particularly described my invention and the operation thereof, what I claim is—

1. In a gas regulator, the combination of the casing having inlet and outlet openings, and provided with a tube A perforated near its upper and lower ends, of the movable bell within said casing, the piston valve B working in said tube A, and loosely jointed connections between said piston and said bell, substantially as described.

2. In a gas regulator the combination of the casing, having inlet and outlet openings and having a tube A perforated near its upper and lower ends and a bell shaped casing I, of a bell G, a piston B', telescopically connected to said bell by a tube $C^{\times}$, perforated glands in tube A and in which tube $C^{\times}$ slides and a disk or valve M moving with the bell and adapted to close onto the top of the tube A substantially as described.

In witness whereof I hereunto set my hand in presence of two witnesses.

JOHANNES FLEISCHER.

Witnesses:
JOS. GIMONIS,
ALVESTO S. HOGUE.