R. PINTSCH, J. SCHÜLKE & R. GOTTHEIL.

Gas-Regulator.

No. 220,170. Patented Sept. 30, 1879.

FIG: 2.

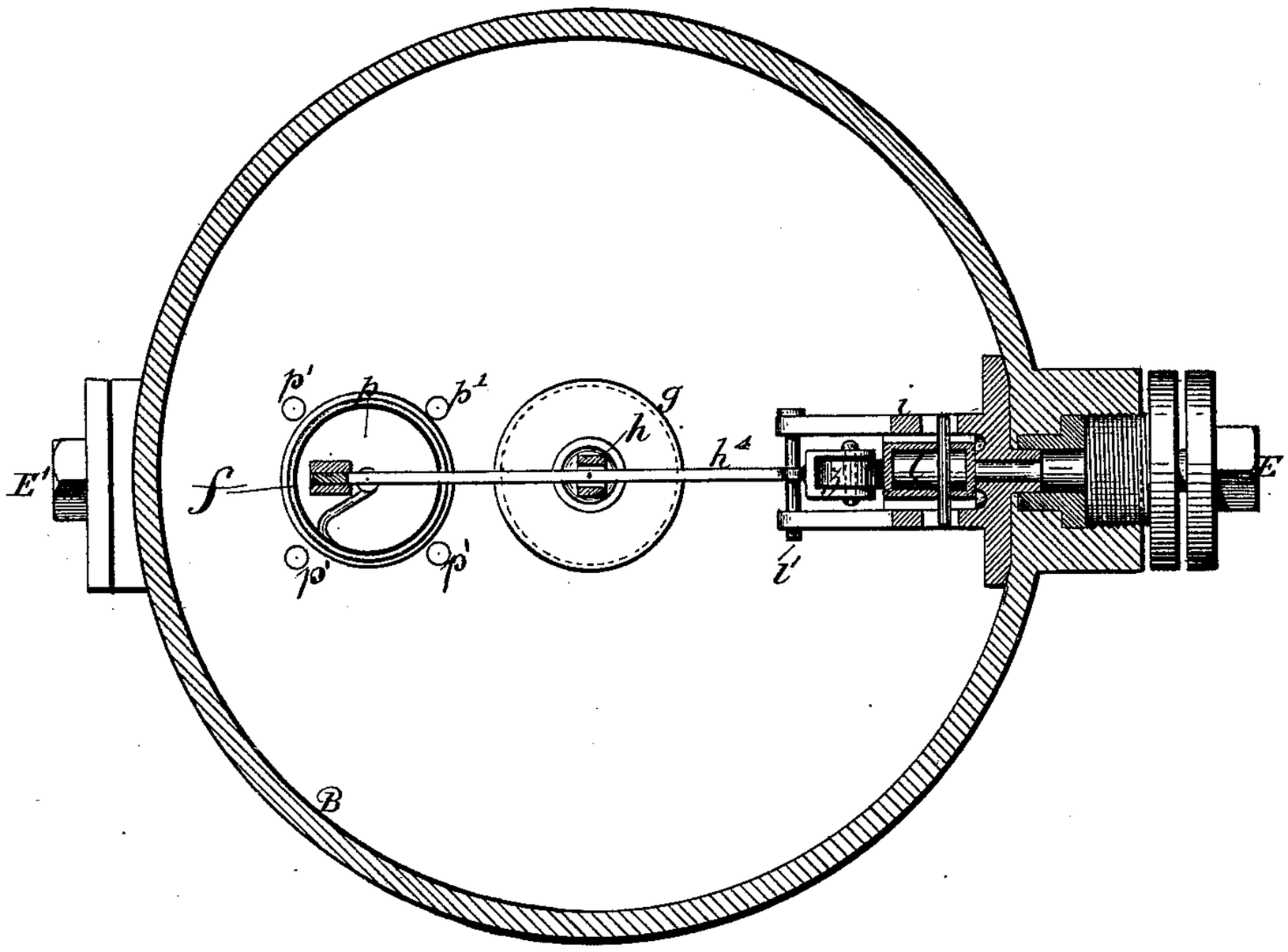
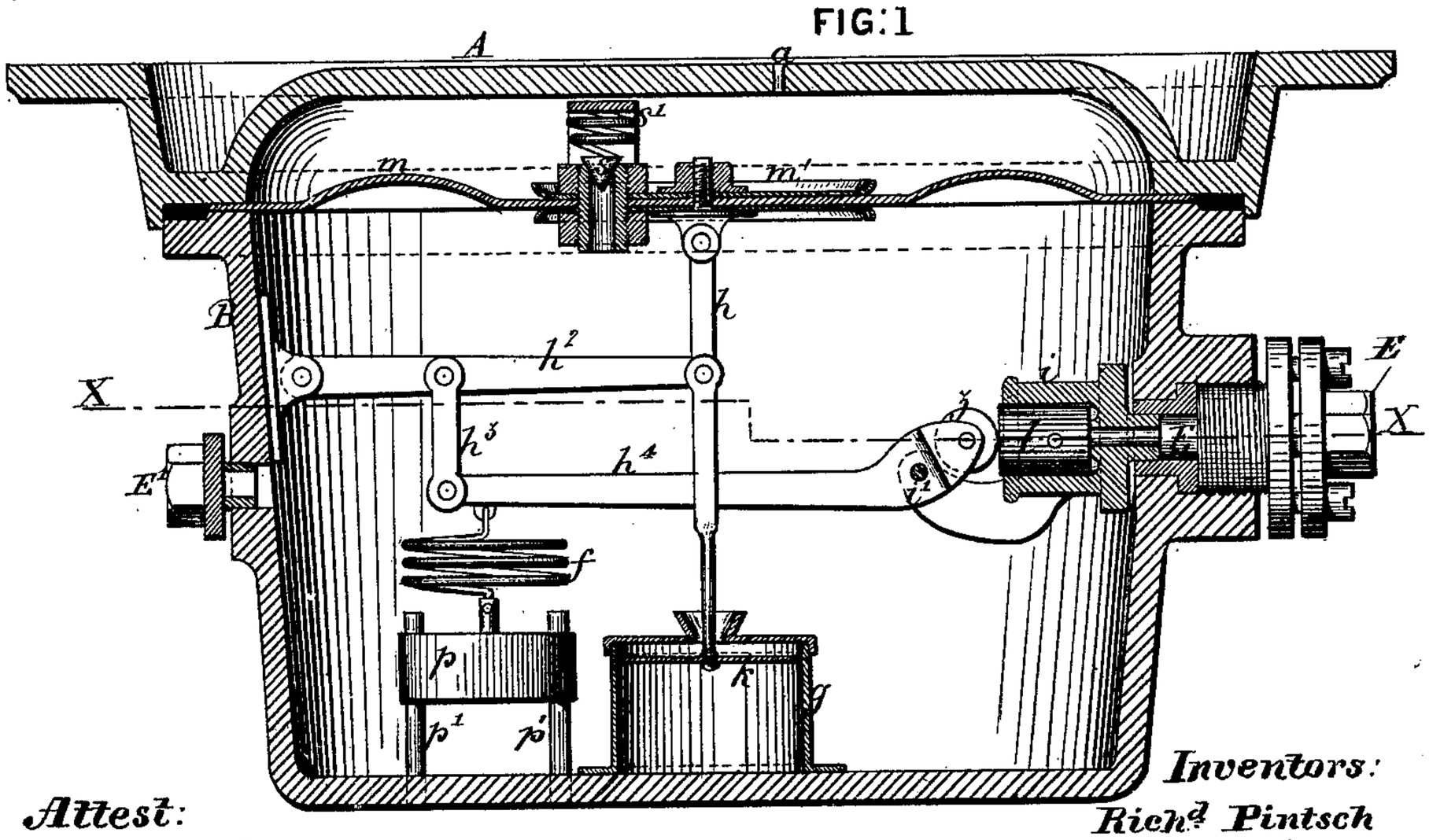


FIG: 1



Attest:

J. Henry Kaiser.

James McWright

Inventors:

Richd Pintsch

Jules Schülke and

Robert Gottheil.

By James L. Norris

Atty.

UNITED STATES PATENT OFFICE.

RICHARD PINTSCH, JULIUS SCHÜLKE, AND ROBERT GOTTHEIL, OF BERLIN, GERMANY.

IMPROVEMENT IN GAS-REGULATORS.

Specification forming part of Letters Patent No. **220,170**, dated September 30, 1879; application filed August 20, 1879.

To all whom it may concern:

Be it known that we, RICHARD PINTSCH, JULIUS SCHÜLKE, and ROBERT GOTTHEIL, all of Berlin, in the Empire of Germany, have invented an Improved Gas-Regulator; and do hereby declare that the following description, taken in connection with the accompanying drawings, hereinafter referred to, forms a full and exact specification of the same, wherein we have set forth the nature and principles of our said improvement, by which our invention may be distinguished from others of a similar class, together with such parts as we claim and desire to secure by Letters Patent—that is to say—

Our invention relates to the construction of gas-regulator for which Letters Patent were granted to JULIUS PINTSCH on the 4th May, 1875, No. 162,946, whereby the supply of gas issuing from a reservoir under considerable pressure was so regulated that it was delivered to the burners at the requisite uniform low pressure.

Our present improved construction embraces improved devices for controlling the motion of the regulating-membrane, so that it shall not be affected by the jolting or vibration of the railway or other carriage to which it is attached, nor by any sudden increase of pressure that may occur in the regulator on first admitting the gas, and also for more effectually controlling the opening and closing of the valve that regulates the inflow of the gas into or its outflow from the regulator. For these purposes, instead of connecting the one end of the spring that controls the motion of the lever or rod actuated by the membrane rigidly to the regulator-casing, as in the original construction, we connect it to a weight guided and suspended so that on any more or less violent oscillations of the regulator-casing occurring, such weight, intending by its inertia to maintain its position independently of such oscillations, will prevent the membrane from being affected by the latter; secondly, in order to prevent the membrane from too rapidly changing its position, owing either to oscillations, as above stated, or to sudden increase or decrease of the pressure of the entering gas, whereby the regulating-valve would be opened or closed to a too great extent, we connect the membrane or the lever thereof to a piston working loosely in a cylinder or dash-pot which may be either filled with a liquid or gas that passes from the one side of the piston to the other through restricted passages when this moves to and fro in the cylinder, and thus prevents the piston, and consequently the membrane, from moving beyond a certain uniform speed; thirdly, in order to prevent any too sudden increase of pressure in the regulating-chamber from injuriously straining the membrane, we provide the latter with a small safety-valve kept on its seat by a spring with a pressure regulated to the maximum pressure that the membrane is intended to bear, so that on this pressure being exceeded the valve will open and allow the gas to escape; fourthly, in order to give the membrane greater power over the admission or emission valve, the lever through which it acts on the latter has its fulcrum near the valve, in such a position that it operates with a wedge-like action on the valve to close it.

On the accompanying drawings, Figure 1 shows a vertical section, and Fig. 2 a sectional plan on line X X, of the before-described improved gas-regulator.

The casing B and cover A have secured between them the membrane *m*, into the chamber below which the gas at high pressure enters at E, and from which the gas issues at E′. The space between the membrane and the cover A is inclosed, with the exception of the small hole *a*, through which, as the membrane rises and falls, the air contained in the space has to issue and enter, so that if any sudden outward motion of the membrane takes place quicker than the air can escape through the hole *a*, the membrane will be cushioned by the confined air. The membrane is secured by disks *m′* to a rod, *h*, the lower end of which enters the cylinder or dash-pot *g*, where it carries a disk or piston, *k*, fitting the cylinder loosely, so that any sudden motion of the membrane is controlled by the action of the piston *k*, which, in moving up and down in the cylinder, has to cause the liquid or gas contained therein to flow from the one side to the other thereof through the narrow space between the piston and the sides of the cylinder.

The membrane *m* carries a small seat having a safety-valve, *s*, kept down by a spring, *s′*, of

such strength that when the gas-pressure in the regulator exceeds a certain degree it will force open the valve and escape, and thus prevent the membrane from being unduly strained. The rod h is connected by lever h^2 and link h^3 to lever h^4, which is pivoted at i' to the valve-seating i, within which is a valve, l, that is pressed against its seat by the roller z at the end of the lever h^4. The valve l has ribs by which it is guided in the seating, and past which the gas issues into the regulator.

It will be seen that, owing to the proportions of the levers h^2 and h^4, and the position of the fulcrum i' of the latter relative to the point of contact between its roller and the valve whereby it exerts a wedging action on the latter, the diaphragm, in being moved upward by an increase of pressure, exerts a great power for closing the valve l more or less, so as to restrict the passage of the high-pressure gas entering through the inlet E.

To the lever h^4 is connected the one end of a spiral spring, f, to the other end of which is suspended a weight, p, working freely between guides p'. Thus the weight p exerts through the spring f an elastic downward pull on the lever h^4, against the upward pull of the membrane, whereby the steadiness of the action of the latter is insured, notwithstanding the joltings or vibrations to which the regulator may be subjected.

It will be readily understood that any one or more of the above-described devices may be employed, in combination with the said gas-regulator, without of necessity employing the whole thereof.

Having thus described the nature of our said invention, and in what manner the same is to be performed, we claim—

1. In a gas-regulator, the combination of the membrane m, levers h h^2 h^3 h^4, spring f, and weight p, substantially as and for the purposes herein described.

2. In a gas-regulator, the combination of the membrane m, rod h, and dash-pot g, with piston k, substantially as and for the purposes set forth.

3. The combination, with the membrane of a gas-regulator, of a safety-valve for preventing the membrane from being subjected to too great a pressure, substantially as described.

4. The combination, with the membrane of a gas-regulator, of a lever, h^4, having its fulcrum almost in line with its point of contact with the regulating-valve, so that it operates with a wedging action to force the latter forward longitudinally and close it, substantially as herein described.

5. In a gas-regulator, the combination of the membrane m, valve s, dash-pot g, piston k, levers h h^2 h^3 h^4, spring f, weight p, and valve l, arranged and operating substantially as herein set forth.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

RICHARD PINTSCH.
JULIUS SCHÜLKE.
ROBERT GOTTHEIL.

Witnesses:
BERTHOLD ROI,
EDWARD P. MCLEAN.