(No Model.)

J. PINTSCH.

Gas Regulator.

No. 242,555. **Patented June 7, 1881.**

Fig: 1

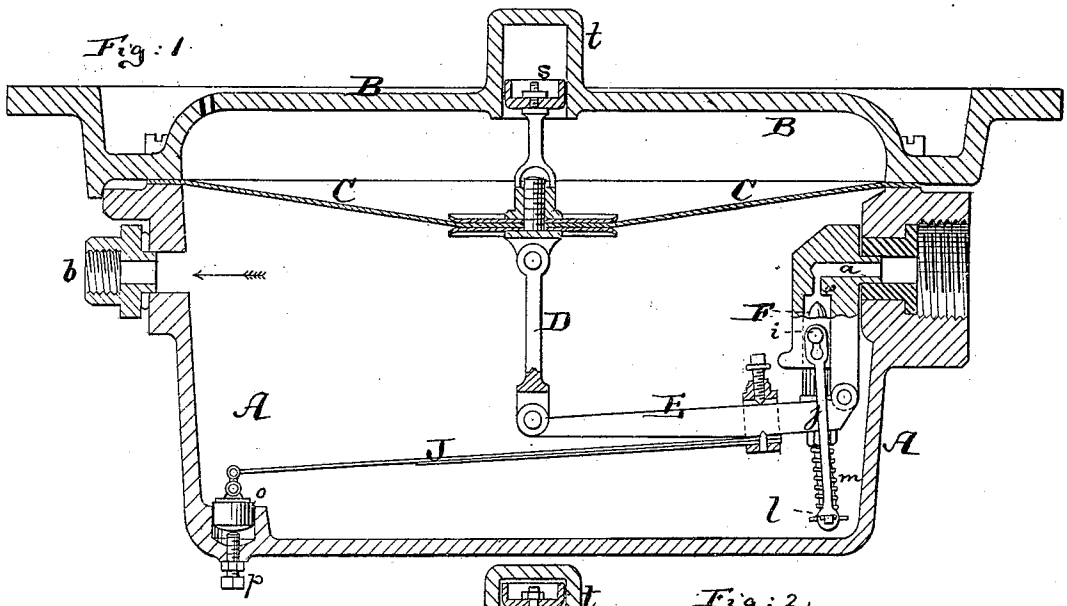


Fig: 2

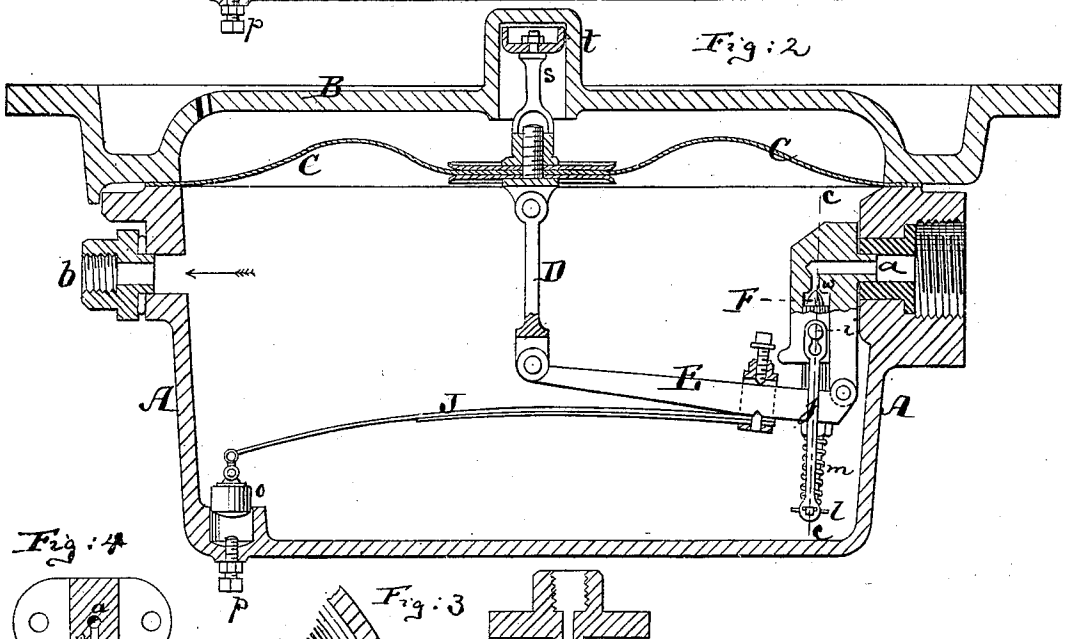


Fig: 4

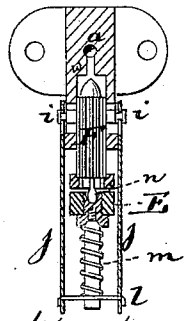
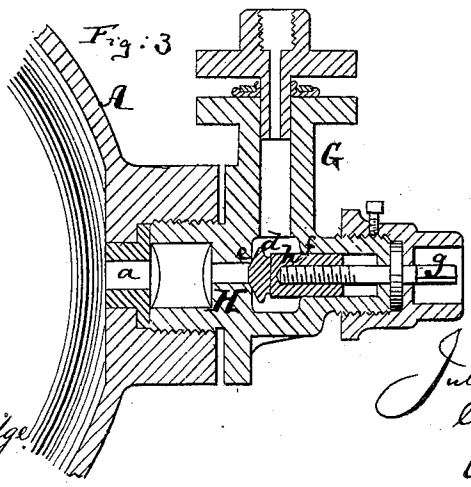


Fig: 3



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UNITED STATES PATENT OFFICE.

JULIUS PINTSCH, OF BERLIN, PRUSSIA, GERMANY.

GAS-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 242,555, dated June 7, 1881.

Application filed March 30, 1881. (No model.) Patented in Germany September 4, 1877, and September 19, 1878.

To all whom it may concern:

Be it known that I, JULIUS PINTSCH, of Berlin, in the Kingdom of Prussia and Empire of Germany, have invented an Improvement in Gas-Regulators, (for which I have obtained German Patents No. 5,426, dated September 19, 1878, and No. 3,968, dated September 4, 1877, each for fifteen years,) of which the following is a specification.

This invention relates to certain improvements on the gas-regulators which are described in Letters Patent of the United States No. 162,946, of May 4, 1875, and in Letters Patent No. 220,170, dated September 30, 1879.

The object of this invention is, first, to improve the adjustment of the valve which regulates the flow of gas into the shell or case containing the diaphragm; also, to improve the manner of supporting the valve, so that it will be moved by positive motion in either direction; and also in a new arrangement of cock for shutting off, if necessary, the supply of gas from the apparatus, all as hereinafter more fully described.

In the accompanying drawings, Figures 1 and 2 represent vertical sections of my improved apparatus, showing the diaphragm respectively lowered and elevated. Fig. 3 is a horizontal section through the supply-pipe of the apparatus, and Fig. 4 is a vertical cross-section on the line *c c*, Fig. 2.

In the accompanying drawings, the letter A represents the casing, and B the cover thereof, having secured between them the membrane or diaphragm C, into the chamber below which the gas at high pressure enters through the supply-opening *a*, and from which chamber it escapes at *b*. The membrane or diaphragm C is connected with a rod, D, that joins a lever, E, which carries the valve F in manner hereinafter more fully described, all the parts being arranged so that when the pressure of gas within the shell A is excessive the membrane will be elevated, and with it the lever E and valve F, thereby reducing the inlet-orifice *a*, and preventing the further excessive influx of gas so long as the pressure remains too great in the shell. The gas reaches the shell A through a suitable supply-pipe, G, which is more clearly shown in Fig. 3, and which joins at right angles the elbow-pipe H that enters the shell A in line with the hole or channel *a*.

Into the angle of the junction of the pipes G and H is fitted a conical valve, *d*, whose valve portion proper is made of a soft, yielding metal or alloy, and which is conical both on its face and at its back, so that it may either close and fit against the valve-seat *e* in closing the gas-supply, as shown in Fig. 3, or against the valve-seat *f* in opening the same. These two valve-seats are made of a harder metal than the valve, so that the latter will be embedded when drawn and pressed against its seat, and fit the seat tightly, preventing all leakage, without necessitating the use of such packing. No stuffing-box is required.

The valve *d* is moved by means of a suitable screw, *g*, entering a projecting socket, *h*, on said valve, as shown.

The second part of my invention relates to the new manner of holding the valve F. In Patent No. 162,946 this valve was supported on its lever by means of a short stud, which entered a cavity in the lower part of the valve and another cavity in the upper part of the lever, forming thus a knuckle-joint. The difficulty with this arrangement is that, through jarring motions, or from any other cause, the valve could wedge itself tight in its elevated position, so that it would not drop by its own weight down away from the seat when the pressure within the shell was taken away and the membrane or diaphragm carried farther down. A positive connection for pulling the valve down has suggested itself to me as essential. Such a positive connection for moving the valve outward is not shown in Patent No. 220,170.

According to my present invention the body of the valve F is provided with projecting pins *i i* near its upper part, which pass through slotted rods *j j*, which rods are connected by cross-piece *l* at their lower ends, as clearly shown in Fig. 4, so that by pulling on the cross-bar in a downward direction the valve itself will also be pulled down. Between the cross-piece *l* and the lower side of the lever E is interposed a spring, *m*, which has a tendency to hold the cross-piece *l* down in its lower position. The lower end of the valve-body F has a knuckle-projection, *n*, that is seated into a cavity in the upper side of the lever E. Now, if pressure in the recipient or shell A is strong, the position in Fig. 2 will be assumed and the

valve F elevated toward its seat so as to nearly touch the seat *w;* but if pressure in the recipient is relieved or reduced and the membrane thereby permitted to descend, the lever E will consequently also be swung down, as indicated in Fig. 1. By this movement the spring *m* will be compressed so that it will exert greater pressure upon the cross-piece *l*, and thereby upon the draft-rods *j* and valve-body, so that thus the farther the lever E is depressed the more positively will the valve F be drawn away from the seat *w*, thereby permitting a greater influx of gas.

It is evident that the manner of connecting the lever E positively with the valve F by means of the spring *m* may be varied; also, that, instead of a spiral spring, *m*, any other kind of spring, or even a sleeve or rod, may be used.

The third part of my present invention has reference to the manner of regulating the power of the spring J, which connects with the lever E.

In Patent No. 162,946 the spring was shown to be placed with its free end into a forked bearing, which is immovable in the shell.

According to my present invention I suspend from the free end of the spring J a weight, *o*, which plays during the vibrations of the spring above an adjustable screw, *p*. The gas pressing against the diaphragm would raise it suddenly were it not for the spring J, which, by its resistance, makes the upward motion of the diaphragm gradual. By means of the screw *p* the power of the spring J can be materially regulated.

Instead of having the screw *p* put through the bottom of the shell, as shown in the drawings, which is the most convenient and most readily accessible place, I may have a weight, *o*, arranged to slide on the spring, and have the screw *p* pass through the weight, so as to secure the latter in suitable position upon the spring. Thus, according to the present invention, the weight *o* is in its lowermost position and actually supported as long as the pressure of the gas in the shell or recipient does not exceed a certain degree. When this degree is exceeded, and not until then, will the spring be elevated, and with it the weight *o*, and not until the same is so left will the membrane or diaphragm exert by its movement any effect upon the lever E.

The drawings show a plunger or piston, *s*, projecting upward from the diaphragm into a pot or cylindrical extension, *t*, of the cover B, for the purpose of regulating or graduating the motion of the diaphragm; but I do not here claim said piston *s* and cylinder *t*, as the arrangement thereof is substantially the same as that shown below the diaphragm in Letters Patent No. 220,170.

I claim—

1. The combination, in a gas-pressure regulator constructed substantially as described, of the self-embedding soft-metal valve *d* with one or more hard-metal seats, *e* and *f*, and with mechanism for moving said valve, all arranged so that without the use of a stuffing-box a tight joint will be produced by the hard metal of the seat or seats embedding itself into the soft metal of the valve, substantially as described.

2. In a gas-regulator, the combination of the lever E, which is connected to the diaphragm C, with the valve F, which is on the same side of the lever as the diaphragm, and with the spring *m*, all arranged so that the spring *m* will transmit the downward movement of the lever to the valve, substantially as specified.

3. The combination of the lever E with the valve F, pins *i*, rods *j*, cross-piece *l*, and spring or rod *m*, for operation substantially as specified.

4. The combination of the regulator-shell A with the diaphragm C, rod D, lever E, valve F, with the spring J, and with a weight, *o*, and adjusting-screw *p*, substantially as and for the purpose herein shown and described.

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