(No Model.)

C. L. PHILLIPS & J. J. RICKETTS.

GAS REGULATOR.

No. 322,002. Patented July 14, 1885.

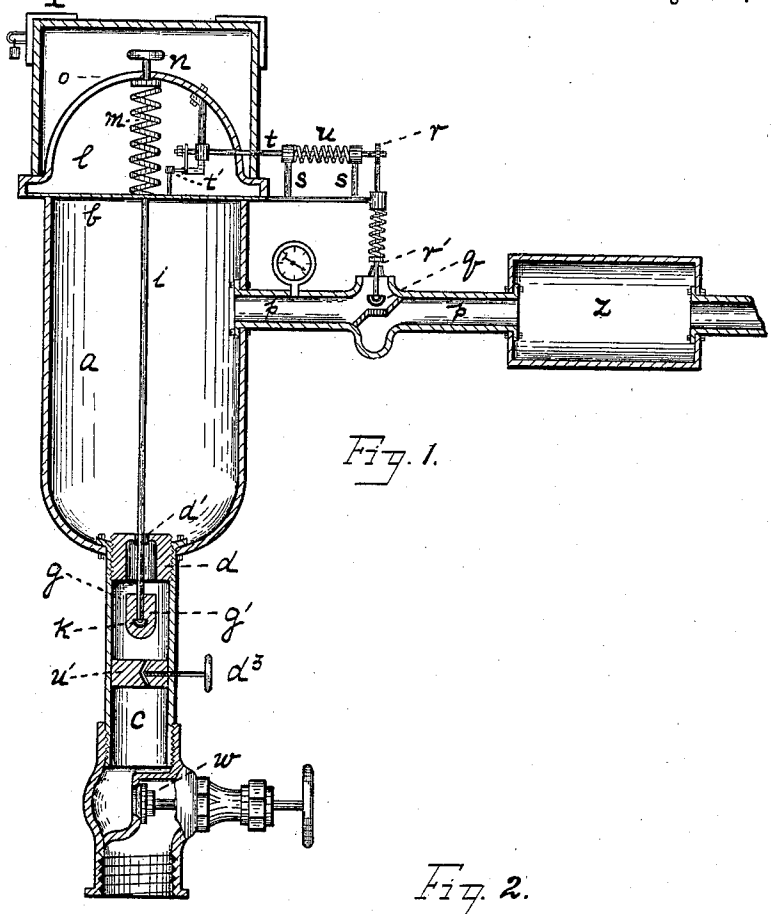
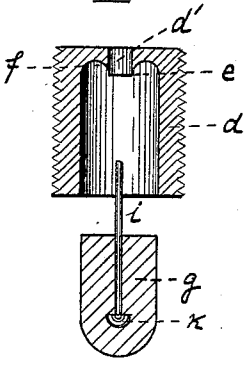


Fig. 1.

Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES L. PHILLIPS AND JAMES J. RICKETTS, OF PITTSBURG, PENNSYLVANIA; SAID RICKETTS ASSIGNOR OF ONE-THIRD TO JOHN R. McGINLEY, OF SAME PLACE.

GAS-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 322,002, dated July 14, 1885.

Application filed August 11, 1884. (No model.)

To all whom it may concern:

Be it known that we, CHARLES L. PHILLIPS and JAMES J. RICKETTS, both of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Gas-Regulators; and we do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical sectional view of my improved gas-regulator. Fig. 2 is a like view of the valve detached.

Like letters of reference indicate like parts wherever they occur.

It is well known that natural gas passes from the well at a high pressure, which is dangerous, on account of the penetrating and explosive character of the gas and leaks in the pipes caused by excessive pressure.

The object of our invention is an improvement in governors or regulators whereby the gas shall be delivered to the service-pipe under any pressure that is desired, and whereby any certain pressure may be determined and the amount of supply thereby regulated.

We will now describe our invention, so that others skilled in the art may manufacture and use the same.

In the drawings, *a* represents a tank or case formed of metal or other suitable material. Extending horizontally across the same, preferably at the top, is a copper or other suitable diaphragm, which is formed, preferably, of thin sheet metal, so as to be raised or lowered slightly at its center, according to the amount of pressure of gas in the case *a*. This diaphragm is preferably disk-shaped. Secured to the bottom of the case *a* by a suitable screw-thread is a pipe, *c*, by which the natural gas is supplied to the chamber *a*.

In the mouth of the pipe *c*, suitably secured by screw-threads or otherwise, is a valve-seat, *d*, which is cylindrical in shape, open at the bottom, and provided with a smaller annular opening, *d'*, at the top, around which annular opening is formed a valve-seat, *e*, having a V-shaped downwardly-projecting annular ridge, *f*.

Within the valve-chamber *d* is the valve *g*, which is composed of a rubber button, *g'*, cylindrical in form, so as to correspond with the interior of the valve-chamber *d*, and having a flat upper surface, which seats against the valve-seat *e*, while the lower end is preferably rounded, as shown in the drawings.

Secured to the valve is a rod, *i*, which extends through the annular opening *d'* in the top of the valve-chamber *d*, and passes thence to the center of the diaphragm *b*, to which it is secured.

On the end of the rod *i*, which is secured to the button *g*, is a head, *k*, around which the rubber is cast in forming the valve, so as to obviate the necessity of the opening through which the rod *i* extends passing through both ends of the valve.

Above the diaphragm *b*, in a suitable box or casing, *l*, is a spiral spring, *m*, which bears upon the diaphragm and on a screw-nut, *n*, situate on the rod *o*, which rod is secured to the side of the box *l*. The force of this spiral spring is exerted downward against the diaphragm, and the tension may be increased or lessened by means of the screw-nut *n*.

Extending from the side of the cylinder *a* is a service-pipe, *p*, to which is attached a globe-valve, *q*, the stem *r'* of which extends upward to a level with the box *l*, and at the upper end of which stem is a ring or hook, *r*. Around the stem of the valve is a spiral spring exerting its force downward, so as to close the valve.

Supported by suitable standards, *s*, is a horizontal rod or wire, *t*, connected with a lever, *t'*, which is connected with the diaphragm *b* in the box *l* in such a manner that it shall be moved longitudinally by the up-and-down motion of the diaphragm *b*. A suitable spring, *u*, is arranged on the rod *t*, which causes the return motion of the rod. The end of this rod *t* passes through the hook *r*, so as to hold the valve *q* in an elevated position.

In the pipe *c*, below the valve *g'*, is a partition, *u'*, having an annular opening in the center thereof.

Extending through the partition *u'* horizon-

tally from the exterior of the pipe *c* is a screw-needle, d^3, by which the annular opening in the partition *u'* may be increased or lessened, as desired.

Below the partition *u'* in the pipe *c* is a valve, *w*, by which the gas is either turned on or shut off.

The service-pipe *p* passes from the chamber *a* to a tank, *z*, which is larger than the chamber *a*, and serves as a low-pressure reservoir, the service-pipe leading therefrom to the burners. The purpose of this tank is to prevent the gas at the burners from receiving a sudden check or impulse when the gas is turned off from one or more burners in the building.

The operation is as follows: The natural gas passing through the pipe *c* and open port past the valve *g*, enters the chamber *a*, where the pressure of the gas, overcoming the force of the spring *m*, raises the diaphragm *b* and thereby closes the valve *g*, thereby shutting off the flow of gas in the chamber *a*. When the pressure of the gas in the chamber *a* is lowered so as to be weaker than the force of the spring *m*, the valve *g* is again opened and more gas is admitted to the chamber. By regulating the pressure of the spring *m* any desired pressure of gas may be maintained in the chamber *a*. The lid of the box *l* is provided with a suitable lock or securing device, *x*, so that it may be secured to prevent the pressure of the spring from being changed excepting by the gas-company, and thereby only a certain amount of pressure of gas shall be furnished to the house or building. Should a leak occur in the main gas-pipe, or for other reason the flow of gas be interrupted therein, the diaphragm *b* will fall, owing to the pressure of the spring *m* and the removal of the pressure in the chamber *a*, which will release the valve-stem *r'* of the valve *q* by withdrawing the rod *t* from the ring *r*, so that the valve will then be pressed down by the spiral spring and the service-pipe will be closed, preventing the escape of gas into the house when the flow of gas in the main pipe is renewed. Owing to the cylindrical form of the valve-chamber *d* and the valve *g* the rubber is pressed firmly against the valve-seat, and owing to the pressure is extended laterally so as to press tightly against the sides of the valve-seat.

The advantages of our invention are, first, owing to the peculiar construction of the valve and its seat leakage through the valve, which is so common with ground-valves when used in connection with natural gas, is prevented; second, by means of the box *l* a simple and reliable meter is afforded by which the flow of the gas may be determined.

If desired, a gage may be placed on the service-pipe to determine the pressure.

Instead of the spring *n*, a suitable weight or weights may be employed.

Although we have described our invention as applied to natural gas, it may also be applied to water and gas pipes in the same manner.

We are aware that gas-governors having a weight or spring resting on or against a flexible disk connected with a valve are not new, and we do not desire to claim the same, broadly; but,

Having thus described our improvement, what we claim as our invention, and desire to secure by Letters Patent, is—

1. In a gas-regulator, the combination of the chamber *a*, diaphragm *b*, having a spring or weight, the cylindrical valve-chamber *d*, having a seat at its inner end, and the cylindrical valve *g*, capable of fitting within the valve-chamber *d* and connected with the diaphragm *b*, substantially as and for the purpose specified.

2. In a gas-regulator, the combination of the chamber *a*, diaphragm *b*, valve *g*, and the needle d^3, arranged in a V-shaped port or passage *u'*, substantially as and for the purpose specified.

3. In a gas-regulator, the combination of the diaphragm *b*, spring cut-off valve *q*, and the connecting-rods *t* and *r*, and the lever *t'*, substantially as and for the purpose specified.

4. In a gas-regulator, the combination of the valve-chamber *d*, cylindrical in form and having a seat at its inner end, and the cylindrical valve-button *g*, substantially as and for the purpose specified.

In testimony whereof we have hereunto set our hands this 26th day of July, A. D. 1884.

CHARLES L. PHILLIPS.
JAMES J. RICKETTS.

Witnesses:
THOMAS W. BAKEWELL,
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