(No Model.)

J. T. SOLLENBERGER & H. G. WOODY.

GAS PRESSURE REGULATOR AND CUT-OFF.

No. 359,822. Patented Mar. 22, 1887.

Fig. 1.

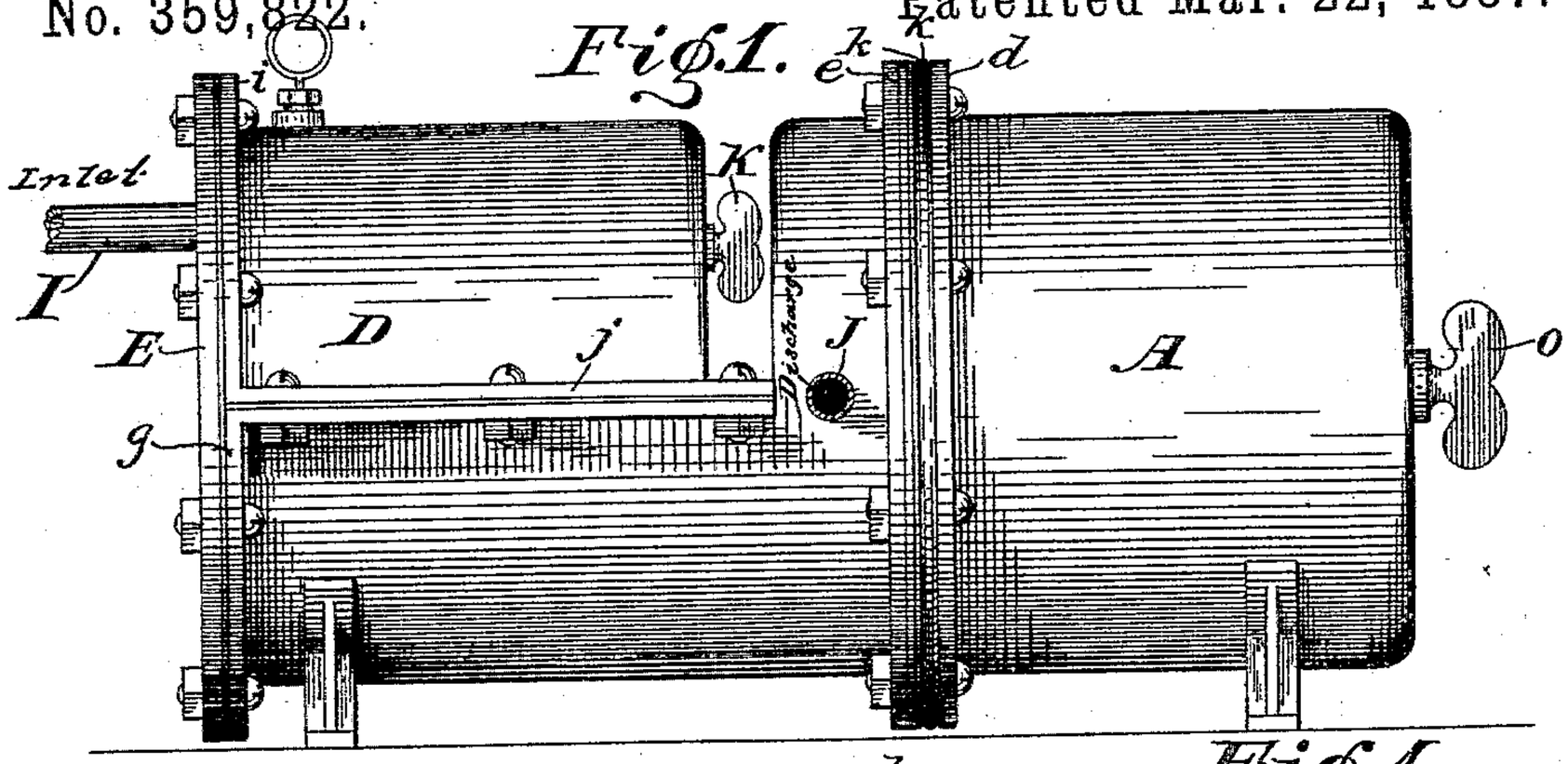


Fig. 2.

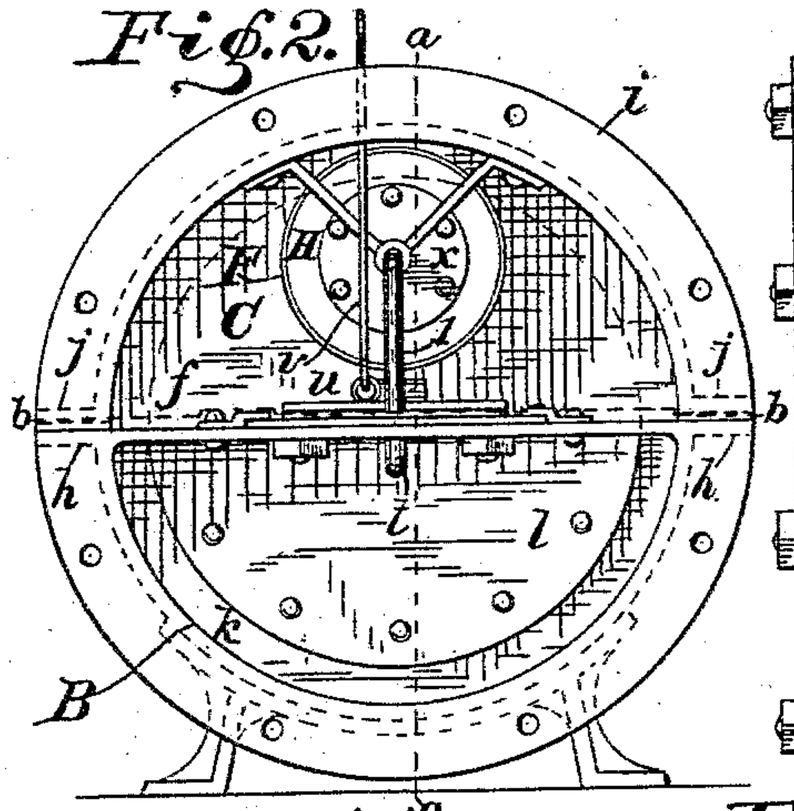


Fig. 4.

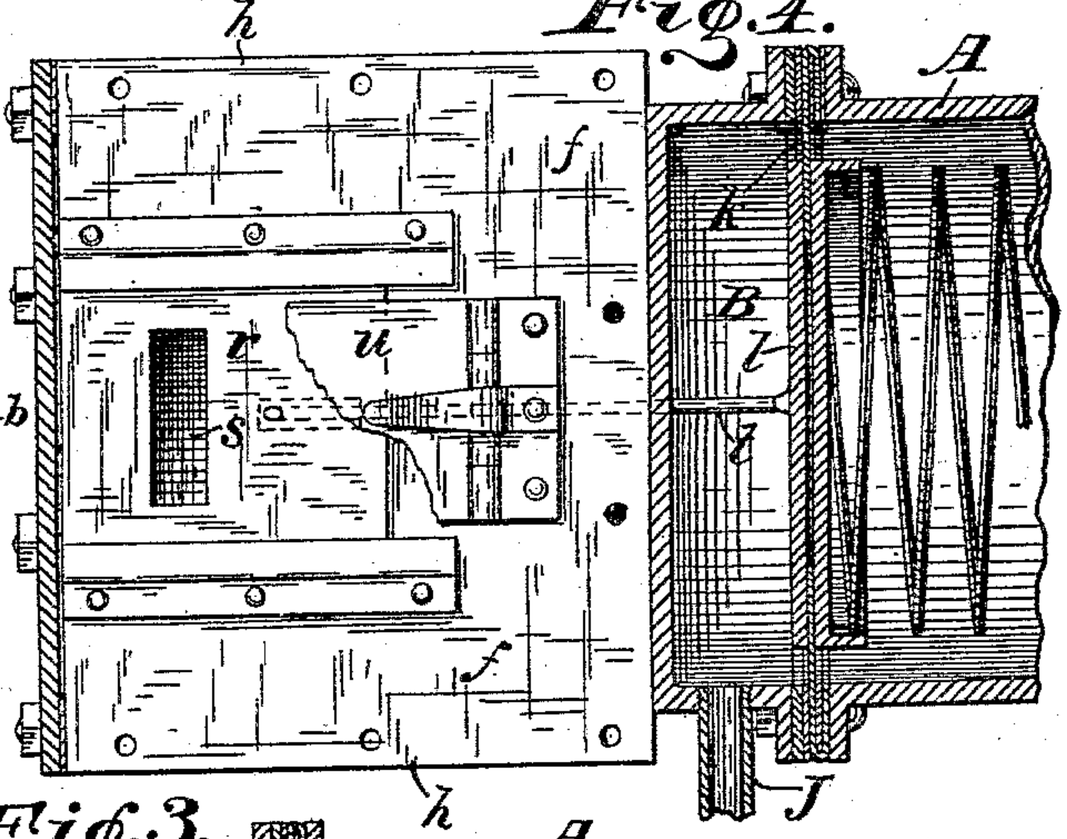
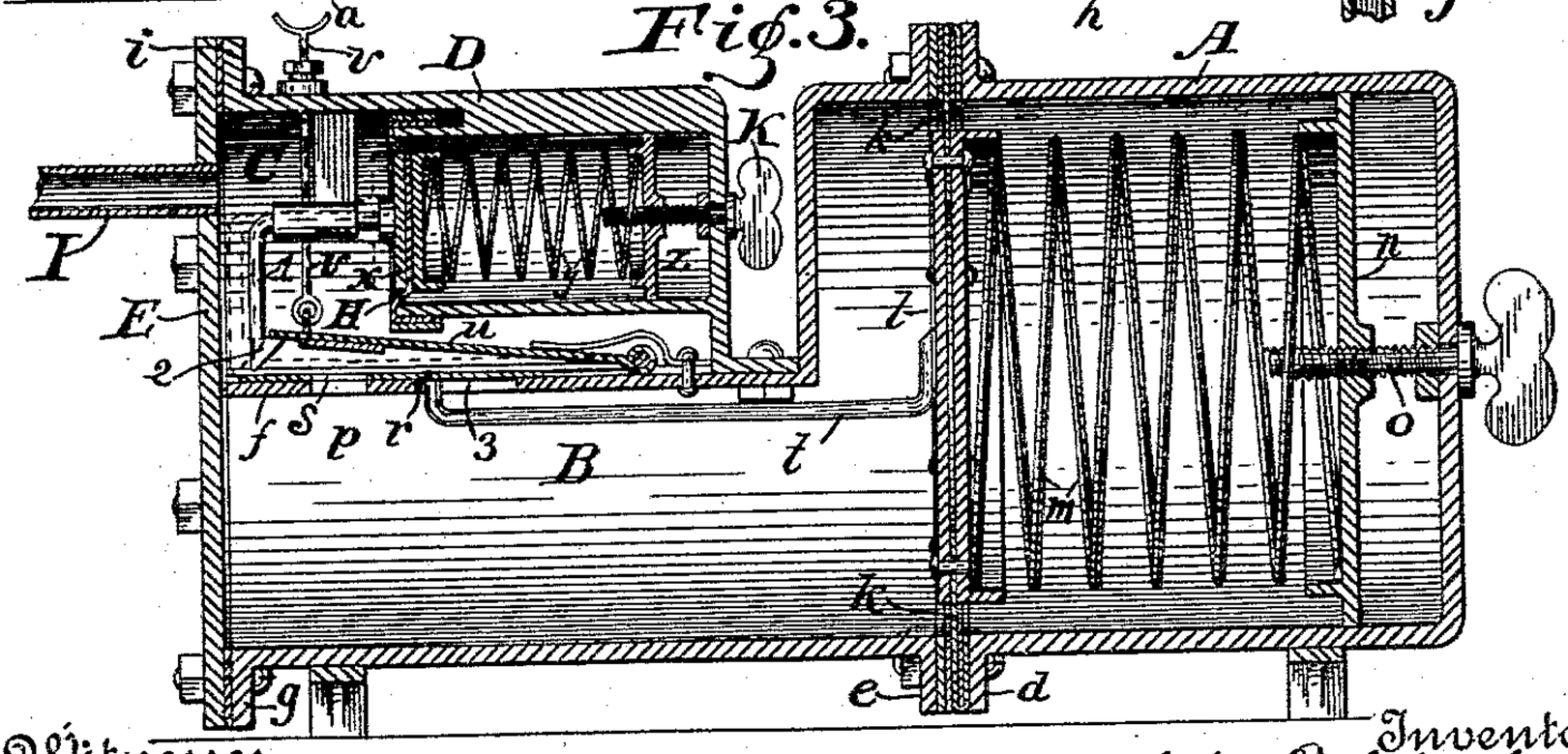


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN T. SOLLENBERGER AND HORACE G. WOODY, OF KOKOMO, INDIANA.

GAS-PRESSURE REGULATOR AND CUT-OFF.

SPECIFICATION forming part of Letters Patent No. 359,822, dated March 22, 1887.

Application filed January 24, 1887. Serial No. 225,270. (No model.)

To all whom it may concern:

Be it known that we, JOHN T. SOLLENBERGER and HORACE G. WOODY, citizens of the United States, residing at Kokomo, in the county of Howard and State of Indiana, have invented a new and useful Improvement in Gas-Pressure Regulators and Cut-Offs, of which the following is a specification.

Our invention relates to an improved gas-regulator, designed more particularly to be used in connection with natural-gas systems.

The objects of our improvement are, first, to so control the flow of gas from the mains to the consumer's system pipes that a uniform pressure will be maintained therein, and, second, to automatically shut off the supply of gas when the pressure, on account of a checked flow at the well or from any other reason, falls below the point necessary to sustain combustion, thereby preventing the flooding of houses and factories with gas when the normal flow is resumed.

The accompanying drawings illustrate our invention.

Figure 1 represents an exterior side elevation. Fig. 2 is a front elevation having the front cylinder-head removed. Fig. 3 is a vertical longitudinal section at *a*, Fig. 2. Fig. 4 is a section at *b*, Fig. 2.

The case of our regulator consists of three principal parts, viz: the cylinder A, the low-pressure chamber B, and the high-pressure chamber C.

Cylinder A is closed at one end, and the opposite end is provided with an outwardly-projecting annular flange, *d*. The low-pressure chamber B is, throughout most of its length, a semi-cylinder having a flange, *g*, and terminating in a cylindrical portion which is provided with a flange, *e*, corresponding to the flange *d* on cylinder A. The flat portion of the semi-cylinder is closed by a plate, *f*, which extends beyond each side to form flanges *h h*, and the half end of the cylindrical portion above plate *f* is also closed. The high-pressure chamber is formed of a semi-cylindrical shell, D, closed at one end, and having an annular flange, *i*, at the opposite end, and straight flanges *j j j*.

Chamber B is joined to cylinder A by bolts passing through flanges *d* and *e*, and chamber C is secured to chamber B by bolts passing through flanges *j* and *h*. The open ends of chambers B and C are closed by a removable head, E. Secured between flanges *d* and *e* is an annular elastic diaphragm, *k*, to which is secured a piston, *l*, which loosely fits cylinder A. Piston *l* is forced normally outward by a spiral spring, *m*, resting between the piston and a follower, *n*, arranged to slide easily within cylinder A. The tension of spring *m* is adjusted by means of a screw, *o*, passing through the closed end of the cylinder.

Communication between chambers B and C is established through an opening, *p*, in plate *f*. The effective area of said opening *p* is adjusted by means of a sliding plate, *r*, mounted in suitable ways, so as to slide on plate *f*, and having a corresponding opening, *s*. Plate *r* is connected with piston *l* by means of a rod, *t*, one end of which passes through a slot, 3, in plate *f* and is secured to the piston, the arrangement being such that when the piston stands in its normal position the openings *s* and *p* are opposite. Openings *s* and *p* are covered and communication between chambers B and C cut off by a flap-valve, *u*, hinged to plate *f*. Valve *u* is raised by means of a rod, *v*, passing through a stuffing-box, *w*, in shell D.

Mounted within chamber C is a small cylinder, F, having one end closed by an annular diaphragm, H, and piston *x*. Piston *x* is held normally outward by a spiral spring, *y*, resting between the piston and a follower, *z*. The tension of spring *y* is adjusted by means of a screw, K, passing through the end of the chamber. Secured to the front of piston *x* is a bent arm, 1, having a hook, 2, adapted to engage and sustain the front edge of valve *u* when the piston is forced inward.

I is the inlet-pipe which enters the high-pressure chamber C, and J is the discharge-pipe which passes out from chamber B.

The operation of our device is as follows: Valve *u* being closed, gas is admitted to chamber C through the pipe I. The pressure of the gas forces piston *x* inward, thus compressing spring *y* until its resistance is equal to the gas-pressure. Valve *u* is now raised by means of the rod *v*, the front edge of the valve engaging the lower inclined face of hook 2, and piston *x*, yielding slightly, the hook engages the valve and holds it open. The gas now passes through openings *s* and *p* to chamber B, thus

forcing piston *l* into cylinder A, compressing spring *m* and sliding plate *r* backward over plate *f*, thus partially closing the opening *p*, the gas being at the same time discharged to the consumer through pipe J.

It will be understood that the tension of spring *m* being properly adjusted by screw *o*, the pressure in chamber B will be uniform, while the pressure in chamber C will vary with the pressure of the source of supply. So long as there is sufficient pressure in chamber C to overcome the tension of spring *y* and hold piston *x* inward, hook 2 will remain in engagement with the valve *u*, and the valve will thus be held open; but should the pressure at the source of supply fail or be shut off, the piston will move outward, the valve be disengaged and closed, thus cutting off communication with the consumer's pipes, and on a return of the pressure no gas can reach the consumer until some person has again opened the valve.

We claim as our invention—

1. In a gas-pressure regulator, the combination of the cylinder, the piston mounted therein, the spring controlling said piston, means for adjusting the tension of said spring, the low-pressure chamber, the high-pressure chamber, the plate forming a partition between said chambers and having an opening through which communication between the chambers is established, the sliding plate arranged to partially cover said opening, and the arm connecting said sliding plate and piston, all combined and arranged to co-operate in the manner specified.

2. In a gas-pressure regulator and cut-off, the combination, with a chamber in which the gas is first received from the source of supply, an exit from said chamber, and a valve covering said exit, of a cylinder mounted within said chamber, a piston mounted in said cylinder, a spring arranged to force the piston outward, means for adjusting the tension of the spring, and an arm attached to the piston and arranged to engage the valve, whereby the valve is held open when the piston is forced inward and released when the piston is forced outward, substantially as and for the purpose specified.

3. In a gas-pressure regulator and cut-off, the cylinder A, the piston mounted therein, the spring arranged to force said piston outward, the high-pressure chamber C, and low-pressure chamber B, the partition between said chambers having an opening through which communication is established between them, the sliding plate arranged to partially cover said opening and connected to said piston, the valve, the cylinder arranged in the high-pressure chamber, the piston in said cylinder, the spring arranged to force said piston outward, and the hook attached to the piston and arranged to engage the valve, all combined and arranged to co-operate as and for the purpose specified.

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