

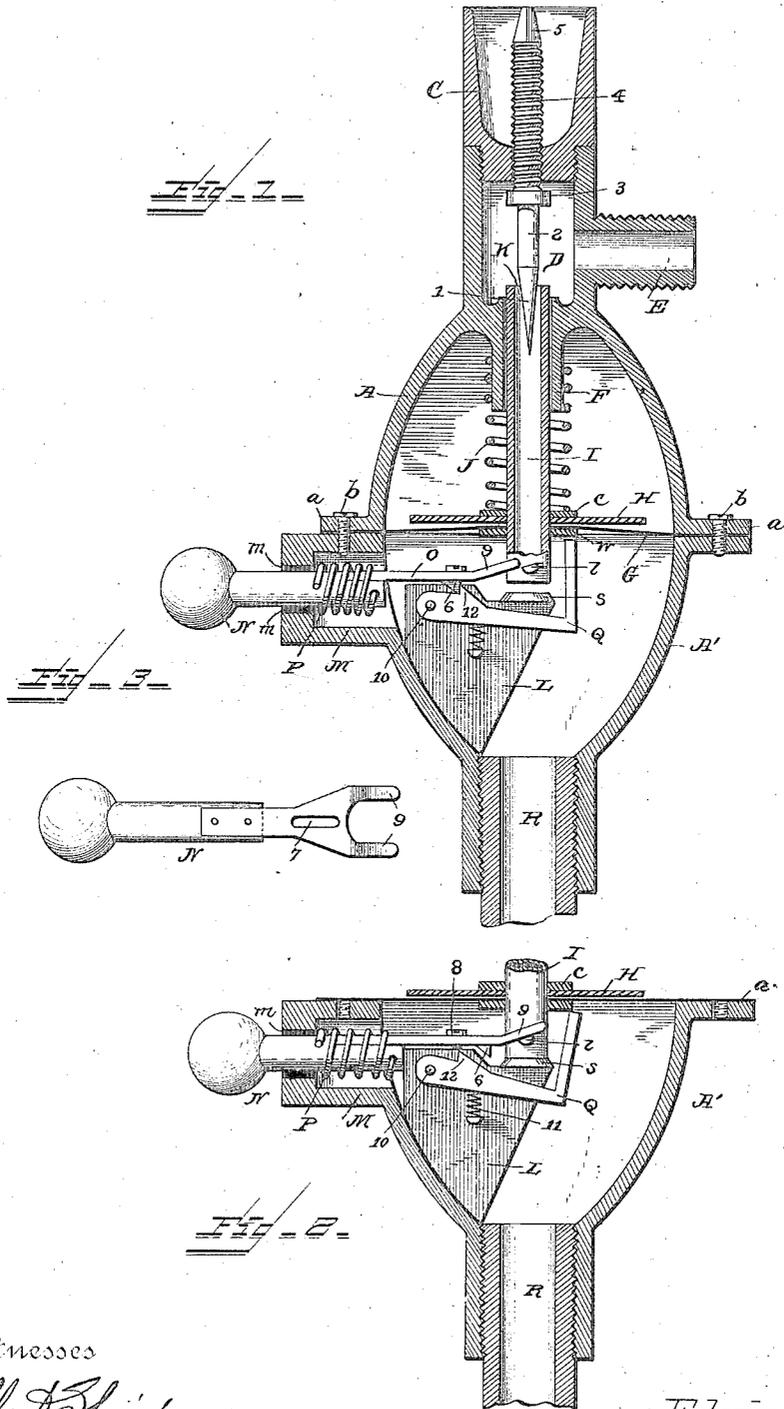
(No Model.)

E. H. FORD.

AUTOMATIC GAS REGULATOR AND CUT-OFF.

No. 395,387.

Patented Jan. 1, 1889.



Witnesses
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UNITED STATES PATENT OFFICE.

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AUTOMATIC GAS REGULATOR AND CUT-OFF.

SPECIFICATION forming part of Letters Patent No. 395,387, dated January 1, 1889.

Application filed February 27, 1888. Serial No. 265,503. (No model.)

To all whom it may concern:

Be it known that I, EDWIN H. FORD, a citizen of the United States of America, residing at Hartford City, in the county of Blackford and State of Indiana, have invented certain new and useful Improvements in Automatic Gas Regulators and Cut-Offs, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to mechanism for automatically regulating and cutting off the flow of gas between the source of supply and the place of consumption, as in furnaces, stoves, illuminating-fixtures, and the like.

It is well known that the pressure of gas in a given gas-well will vary considerably at times, and also that very often the pressure is so great that it must be reduced before the gas can be used with safety. Furthermore, it is well known that where there is a large number of users from the same well it sometimes happens that the pressure becomes so low that the fires and lights are put out by sudden puffs, when the gas will escape into the room. Under these circumstances, if the room is closed and left unoccupied for some time, there will be imminent danger of an explosion on entry with a light.

To provide an automatic apparatus which will effectually govern the pressure of the gas delivered to the points of consumption, and which will also cut off the gas entirely when the pressure becomes so low as to endanger the extinguishment of the fire or lights in the manner above stated, is the object of my invention, which will first be described in connection with the accompanying drawings, and then clearly pointed out in the claims.

In the drawings, Figure 1 is a longitudinal section of my apparatus, showing the regulator under pressure and the cut-off out of operative position. Fig. 2 is a like section of so much of the apparatus as is necessary to show the regulator relieved of pressure and the cut-off in operative position. Fig. 3 is a detail plan view of the cut-off arm.

Referring to the drawings, A A' represent the shell of the apparatus, cast of any suitable metal, and united together by bolts b, passing through lugs a, cast at intervals. The upper portion, A, of this shell (assuming,

for the purpose of convenient description, the shell to be in a vertical position) has a hollow extension, B, in the upper end of which is screwed a cup-shaped plug, C, leaving a chamber, D, in the extension, and a nipple, E, on which to attach the pipe for conveying the gas to the place of use, communicates with this chamber in the manner shown. This nipple I prefer to cast integral with the shell; but it is evident it may be separate and screwed therein. The portion A of the shell has also a hollow neck, F, extending from the lower end of chamber D down into the body of the shell some distance, for a purpose which will presently appear.

G represents a diaphragm, composed of rubber, oiled silk, or other like flexible material impervious to gas, which is firmly secured between the portions A and A' of the shell, and on top of this diaphragm there is a light metallic supporting-plate, H, both the diaphragm and plate being clamped between a collar, c, on the regulator-tube and a washer, w, made fast to said tube in any suitable manner.

I represents the regulator-tube, provided near its lower end with lugs i on two of its opposite sides. This tube is of such size as to fit and reciprocate neatly in the neck F, its lower end extending below the diaphragm. A spiral spring, J, surrounds this tube, one of its ends resting on the collar c and its other end engaging with the upper part of the neck F, the function of this spring being to hold the regulator-tube normally down on its seat.

K represents the regulator-valve for engagement with the outlet end of tube I for the purpose of governing the flow of gas through said tube. The valve is made conical at its inner end, as at 1, and above the conical portion it is cylindrical, as at 2, the diameter of this latter portion being slightly less than the bore of the regulator-tube. It is provided with a collar, 3, for limiting its upward movement when in place, the valve being screw-threaded for a portion of its length, as at 4, and squared at its outer end, as at 5, for the reception of a wrench, the screw-threaded portion passing through the screw-plug C, the walls of which protect the projecting portion of the valve from injury. In the lower portion, A', of the shell there is cast a bracket,

1, upon which is formed a seat, *s*, for the lower end of the tube I.

M represents a lateral projection cast on one side of the part A' of the shell, through a packed opening, *m*, in which passes a handle, N, to which is secured an arm, O, having an abutment, 6, on its under side, a slot, 7, through which passes a screw, 8, that takes into the bracket L, and upwardly-inclined fingers 9, adapted, when the arm is thrown forward, to ride over lugs *l* on tube I and carry the latter down onto its seat *s*. A coil-spring, P, one end of which is attached to the handle, while its other end bears against the end of projection M, serves to thus throw the arm forward.

Q represents a right-angular lever pivoted at 10, and pressed upward by a spring, 11, attached to the bracket L. The free end of this lever rests normally in the same plane with the diaphragm when the latter is not under pressure, but is directly under the washer *w*. The lever is also provided with a catch, 12, which, when the handle is drawn out, so as to disengage the fingers 9 from the lugs on the tube, engages with the abutment 6 and holds the arm O in a retracted position.

R is the supply-pipe, screwed into the shell.

The operation of my apparatus is as follows: The valve is first set to pass the desired volume of gas. Then, as the pressure on the diaphragm increases, the regulator-tube is carried upward over the conical valve, and the farther it passes over it the less gas is admitted to chamber D and thence to the burners, so that if the pressure is too heavy but a comparatively small quantity of gas will pass the valve, and the pressure of that which does pass will be greatly reduced when it reaches the chamber. On the contrary, if the pressure is no greater than is necessary to unseat the tube, the gas will go through the regulator at about its original pressure, dependent, of course, on the setting of the valve. Now, if after the valve is set to deliver a small quantity of gas, the pressure should materially decrease, the flame in the stove or burner would very probably be extinguished by the sudden puffs of gas which often occur, and unless immediately relighted the gas would escape into the room. Here,

however, the cut-off plays its part, for as soon as the pressure is so far reduced as to allow the diaphragm to assume a horizontal position, as seen in Fig. 2, the washer *w* will bear on the end of lever Q, depressing it and causing catch 12 to be withdrawn from engagement with the abutment 6 on arm O, when the latter will spring forward and bear the tube I down onto its seat, thus shutting off the gas entirely. To reset the cut-off it is only necessary to draw out the handle until the catch on the lever engages with the abutment on the arm, as will be manifest from Fig. 2.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a shell provided with inlet and outlet pipes for the gas; and a tube-seat, as described, of a flexible diaphragm, a spring-pressed reciprocating tube secured to the diaphragm, an adjustable valve with which said tube coacts, a reciprocating spring-actuated arm, and a spring-pressed lever adapted to hold said arm out of contact with the tube while pressure is on the diaphragm, and also to release it and allow it to engage with the tube and seat it when pressure is off, substantially as set forth.

2. In an automatic regulator and cut-off, as described, the combination, with the adjustable valve, the flexible diaphragm, the spring-pressed reciprocating tube attached to the diaphragm, a collar and lugs on said tube, a supporting-plate between the collar and diaphragm, a washer below the diaphragm and secured to the tube, and a tube-seat, of a reciprocating spring-actuated arm having upwardly-inclined fingers for engaging with the lugs on the tube to press the tube to its seat, and a spring-pressed lever for holding the arm out of contact with the tube when pressure is on the diaphragm, and also for releasing the arm when pressure is off, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

EDWIN H. FORD.

Witnesses:

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