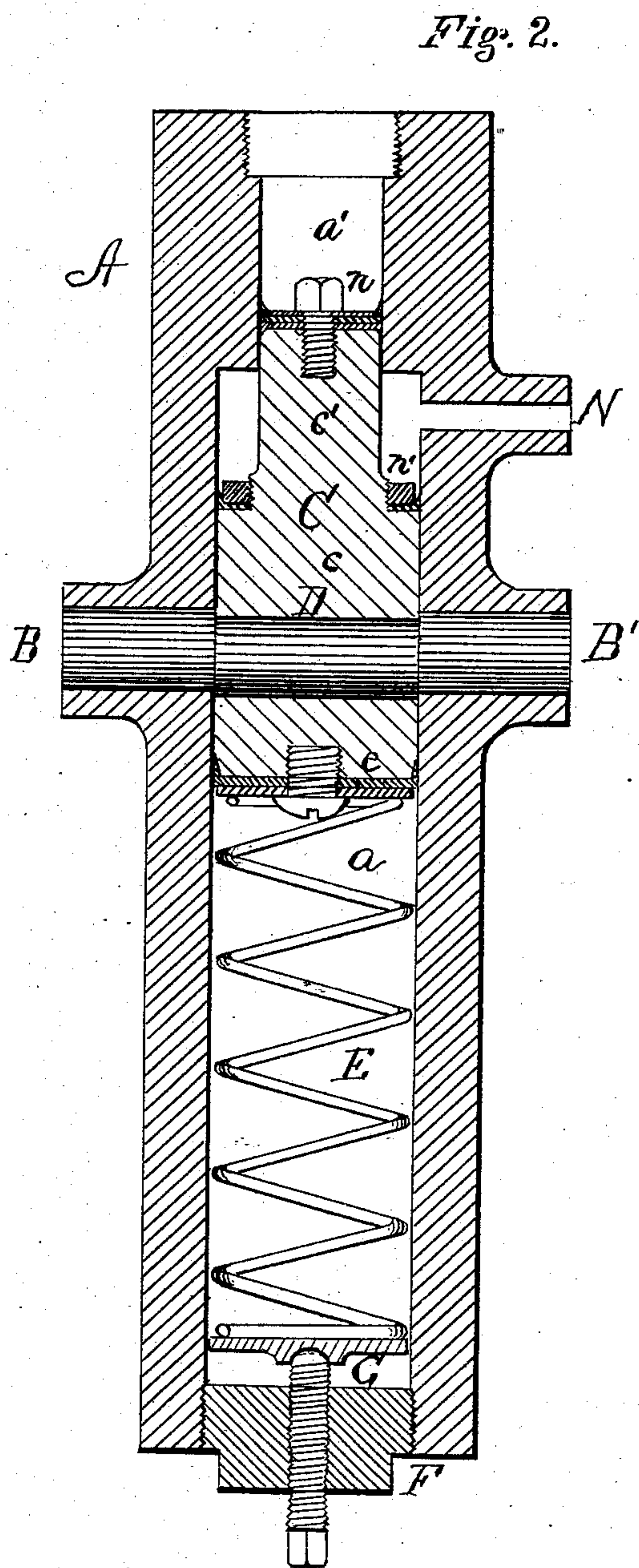
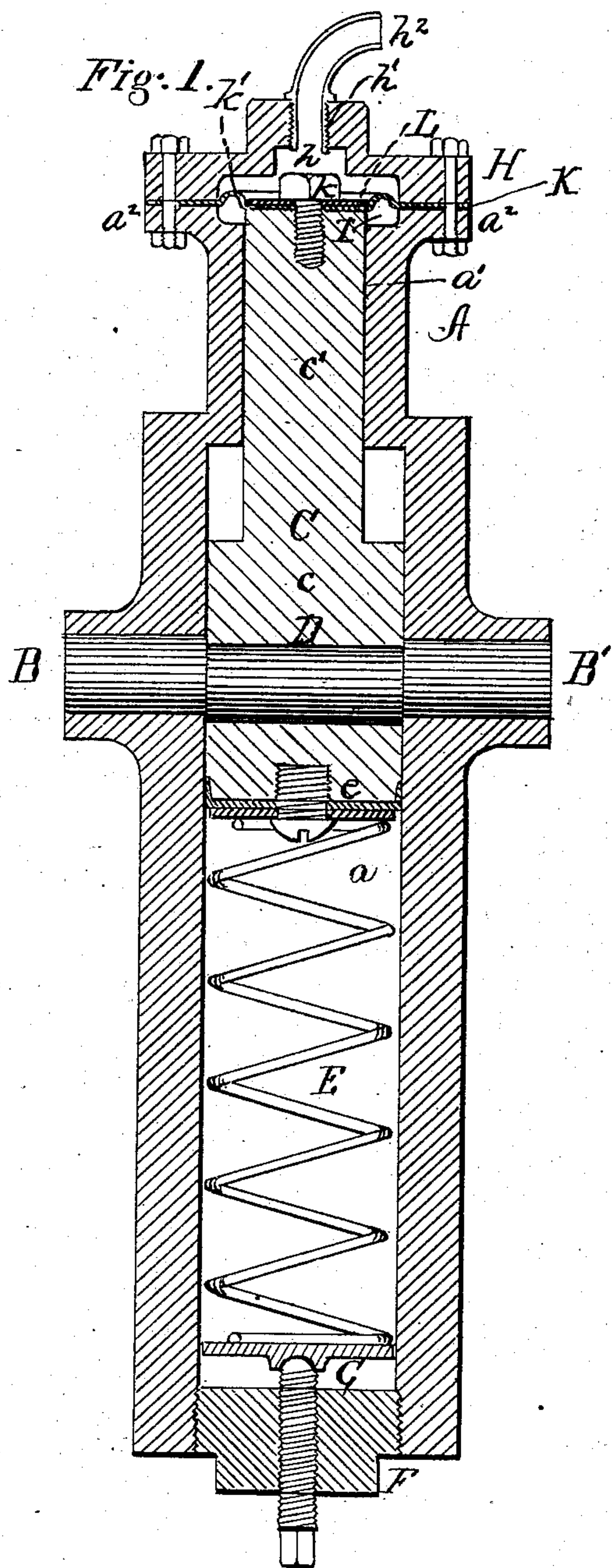


(No Model.)

J. H. LUTHER.  
GAS REGULATOR.

No. 272,282.

Patented Feb. 13, 1883.



Witnesses

Wm. R. Singleton  
J. J. Edwards

Inventor

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# UNITED STATES PATENT OFFICE.

JAMES H. LUTHER, OF KARNES CITY, PENNSYLVANIA.

## GAS-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 272,282, dated February 13, 1883.

Application filed December 9, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES H. LUTHER, of Karnes City, in the county of Butler and State of Pennsylvania, have invented certain new and useful Improvements in Gas-Regulators; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 is a vertical section of the device; Fig. 2, a similar view of a modification.

This invention relates to improvements in gas-regulators or those devices designed to govern the supply of gas to the point of consumption; and it relates more especially to a device of this kind intended for use with boilers. In employing gas for fuel in boilers, particularly where the gas comes from the natural reservoir in the ground, grave danger is liable if the flow is unimpeded. Not only may the pressure be greater than is desired, and it usually is, but if many boilers are served from the same line in case some are shut off others will be under too great a pressure. The object of the present device is to govern the flow so that, no matter what its strength, the pressure can be regulated to any desired degree.

The invention consists in the construction hereinafter set forth.

In the annexed drawings, the letter A indicates the cylinder or regulator-body, having the bore consisting of a larger chamber,  $a$ , and a reduced upper portion,  $a'$ . Leading into the chamber  $a$  are the induction and eduction ports B B'. Fitting snugly within this cylinder is the piston C, consisting of the main portion or body  $c$  and the reduced portion or stem  $c'$ —the former in the chamber  $a$ , the latter in the reduced upper portion,  $a'$ . This piston is furnished with a transverse passage, D, the vertical axis of which is in the same plane with the vertical axes of the ports B B'. Within the cylinder, below the piston, is placed a spring, E, between which and the piston is a suitable packing,  $e$ . This spring is held in by a cap, F, and its tension is regulated by the plate and screw G. To the flange  $a^2$  at the top of the cylinder is bolted the cap H, the upper

part of the cylinder and the under part of the cap being cut away to form a recess, I. Within this recess is placed a diaphragm, K, of rubber or other flexible material. This diaphragm is secured by its edge between the flange  $a^2$  and cap H, and is held at its center to the top of the stem  $c'$  by the screw  $k$ , the under part of the cap H having the recess  $h$  to accommodate the head of the screw. This diaphragm K is made with a circular rib,  $k$ , and within this rib a rigid plate, L, is secured to the diaphragm. The cap H is tapped and screw-threaded at  $h'$  to receive the pipe  $h^2$  from the boiler.

In use this regulator is located at the boiler, the pipe  $h^2$  being connected thereto, so that the pressure on top of the diaphragm is the same as that in the boiler. The induction-port B is connected with the high-pressure supply-pipe and the eduction-port B' with boiler, cocks being placed in the pipes on each side of the regulator. The spring E is given the proper tension to counterbalance the pressure which is desired in the boiler, and the device is ready for use. As the gas flows to the boiler the latter heats up, and the generated steam, expanding, passes into the recess I above the diaphragm K. As soon as the steam-pressure equals the tension of the spring E the piston C will be held in such position that the passage D will present just sufficient openings to the ports to permit the proper flow of gas. If the pressure of the gas should increase and the boiler become hotter, the steam-pressure would increase, and, forcing the piston down against the spring, would tend to close the ports by carrying the passage D farther down. This would diminish the supply of gas and bring it back to the proper amount. In this way, as the pressure of the gas increases, the opening for its supply gets smaller, and as the pressure diminishes the spring forces the piston up, allowing a greater flow, so that the flow is kept constant and at the predetermined amount. As the steam operates on the diaphragm, the rib  $k'$  in the diaphragm allows it to rise and fall without friction, the rib acting as a hinge. The plate L, being rigid, equalizes the pressure and causes the diaphragm to rise and fall evenly.

With this device no packing is needed



around the piston above the ports, for if any gas should pass up it would be stopped by the diaphragm.

5 In Fig. 2 is shown a modification of the device. In this the diaphragm is dispensed with and the steam admitted through the cap H directly on top of the stem *c'* of the piston C; or instead of on the top of the stem *c'* the steam may be admitted through a port, N, on the  
10 side of the cylinder and into the chamber *a* upon the body of the piston.

In either instance the operation of the device is the same as that described in connection with the form shown in Fig. 1. In the  
15 form shown in Fig. 2 packings *n n'* have to be used to make the piston gas-tight.

Having thus described my invention, what I claim is—

20 1. As a gas-regulator, the cylinder A, having the opposite ports, B B', at its sides and a steam-opening at or near one end, in combination with the inclosed piston having the trans-

verse passage D in the same vertical plane with that of the ports B B', the piston closely fitting the cylinder and the steam-passage leading into the latter immediately above the piston, and the regulating-spring E, as set forth. 25

2. As a gas-regulator, the cylinder A, having the opposite ports, B B', at its sides and a steam-opening at one end, and an inclosed  
30 piston having the transverse passage D in the same vertical plane with that of the ports B B', in combination with a diaphragm situated at one end of the cylinder, between the end of the piston and the steam-opening, all arranged as  
35 and for the purpose set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JAMES H. LUTHER.

Witnesses:

GEO. F. GRAHAM,  
WILL A. COULTER.