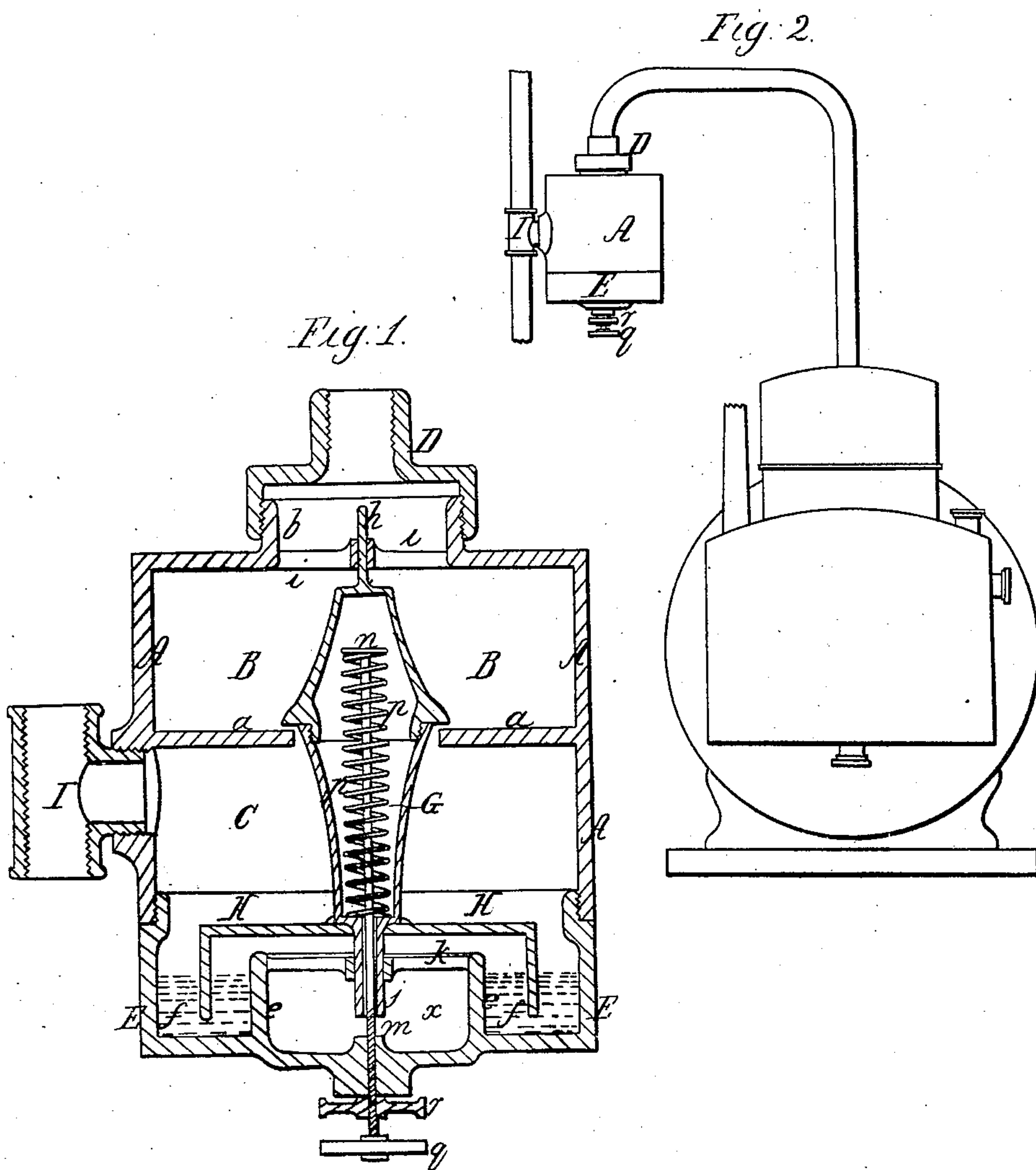


No. 16,639.

PATENTED FEB. 17, 1857.

J. H. COOPER.  
GAS REGULATOR.



# UNITED STATES PATENT OFFICE.

JOHN H. COOPER, OF PHILADELPHIA, PENNSYLVANIA.

## GAS-REGULATOR.

Specification of Letters Patent No. 16,639, dated February 17, 1857.

*To all whom it may concern:*

Be it known that I, JOHN H. COOPER, of the city of Philadelphia 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 same, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

My invention relates to improvements in that class of gas regulators, in which a valve, spring, and inverted cup, are used in conjunction with an upper and lower chamber, and my improvements consist in so constructing the valves of such regulators, that the springs may be contained within the same, free from contact with the gas, which in former regulators has been the means of injuring the material of which the springs are composed, and destroying that sensitiveness so necessary to the proper working of the instruments.

In order to enable others skilled in the art to make and use my invention I will now proceed to describe its construction and operation.

On reference to the drawing which forms a part of this specification, Figure 1 is a sectional elevation of a gas regulator showing my improvements. Fig. 2, exhibits the regulator as attached to the meter.

A is the body or casing of the regulator having a partition *a* which divides the interior into an upper chamber B, and lower chamber C, which communicate with each other through an opening in said partition. On the top of the casing is an orifice *b* surrounded by a flange to which is screwed or otherwise secured the cap D. To the latter is attached the exit pipe from the meter as seen in Fig. 2. To the bottom of the casing A, and communicating with the chamber C is screwed another casing E in the interior of which, is a recess *x* open to the atmosphere, and surrounded by a flange *e*, which forms, with the casing, an annular reservoir *f* for the reception of mercury or other suitable fluid.

G is the valve formed of two hollow pieces screwed together. This valve has its seat on the edge of the opening which forms the communication between the upper and lower chambers, and is guided at the top by its projection *h* passing through the cross bar *i* in the opening *b*, and at the bottom by

its projection *j* passing through the cross bar *k* on the recess *x*. A rod *m* passes through the projection *j* into the interior of the valve, and bears with its point against the underside of the disk *n*, to which is attached one end of the wire which is coiled around the rod, and forms the spiral spring *p* the other end of the latter being connected to the bottom of the valve. The lower end of the rod *m* is screwed, and its screwed portion passes through the bottom of the casing E, on the outside of which the rod is furnished with an adjusting wheel *q* and tightening nut *r*. To the bottom of the valve is secured the inverted cup H the flanges of which dip into the fluid contained in the reservoir. A branch I is screwed to the casing, and to this branch are connected two pipes, the upper one leading to the burners, and the lower one to any suitable receptacle for collecting the refuse water.

Operation: The rod *m* is in the first instance so turned around as to raise or lower the disk *n* and thereby extend or contract the spiral spring so as to increase or diminish its elasticity and balance the valve according to the pressure of gas to be used.

When any sudden excessive pressure of gas occurs in the inlet pipe, it takes effect on the upper surface of the inverted cup, depressing the latter, extending the spiral spring, and causing the valve to approach its seat, and contract the opening between the two chambers to an amount commensurate with the excess of pressure which is thus prevented from communicating with the exit pipe and burners. When the pressure in the inlet pipe, and consequently that on the surface of the inverted cup H is diminished, the spiral spring recoils, causing the cup and valve to rise, thereby increasing the size of the opening between the two chambers, and causing a greater quantity of gas to communicate to the lower chamber, and to the burners.

It will now be seen that no diminution or excess of pressure in the inlet can be communicated to the burners, the light from which must be not only constantly regular and free from flickering, but an unnecessary waste of gas is prevented, at the same time by the peculiar construction of the valve, and the disposal within the same of the spring, the latter is preserved from the effects of the gas, which deteriorates the springs of other gas regulators to such an



extent, as to deprive them of the required sensitiveness.

I do not desire to make a general claim to the combination of valve, spring, and inverted cup, with the upper and lower chambers, the same having been in use for some years, but

I do claim—

Placing the spring regulating the valve within the latter made hollow for the pur-

pose, in order to prevent the contact of the gas with the spring, in the manner and for the purpose, substantially, as specified.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

JOHN H. COOPER.

Witnesses:

HENRY HOWSON,

WILLIAM E. WALTON.