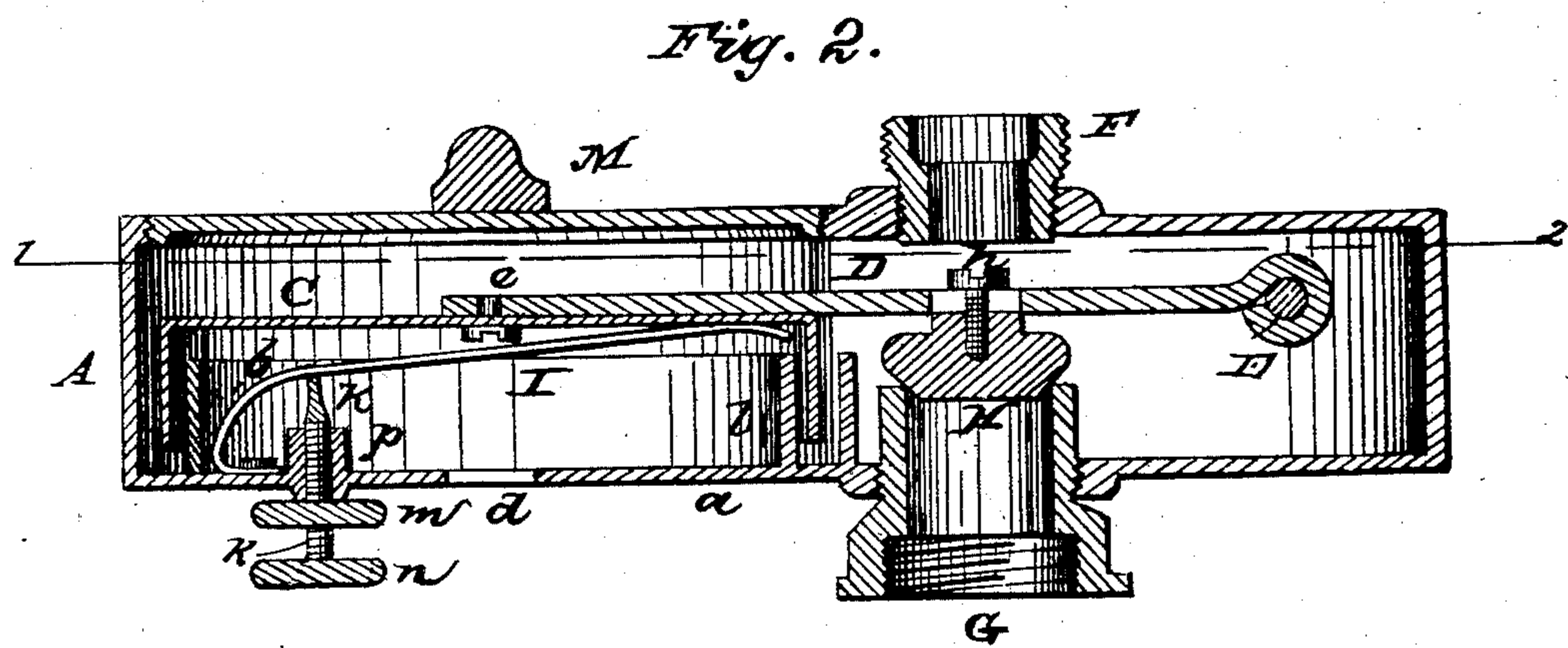
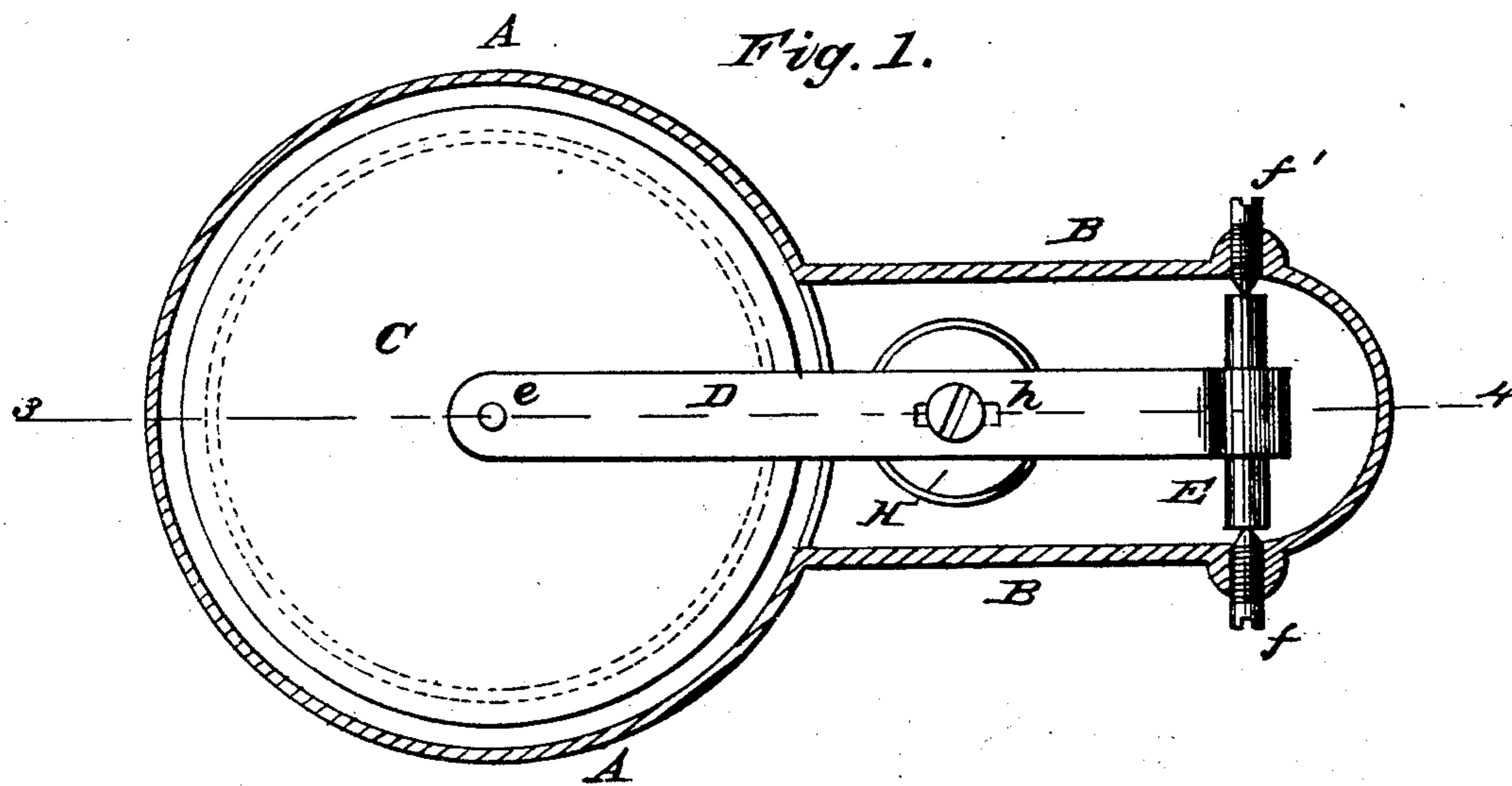


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J. H. COOPER.  
Gas Regulator.

No. 17,671.

Patented June 30, 1857.



# UNITED STATES PATENT OFFICE.

JOHN H. COOPER, OF PHILADELPHIA, PENNSYLVANIA.

## GAS-REGULATOR.

Specification of Letters Patent No. 17,671, dated June 30, 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  
5 useful Improvements in Gas-Regulators; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing and to the letters of reference  
10 marked thereon.

My invention relates to improvements in that class of gas regulators in which a valve, spring, and inverted cup are used, and my improvement consists in so connecting the  
15 inverted cup and valve to an arm hinged to the interior of the instrument that its sensitiveness is increased by avoiding the objectionable friction common to ordinary gas regulators.

20 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  
25 a part of this specification, Figure 1 is a sectional plan of my improved gas regulator on the line 1—2 (Fig. 2). Fig. 2, a sectional elevation on the line 3—4 (Fig. 1).

30 A is a circular casing, the interior of which I term the regulating chamber, and from the latter projects another casing B the interior of which I denominate the valve chamber.

On the bottom *a* of the regulating chamber is a circular flange *b* between which and the  
35 exterior casing A intervenes a space termed the well for the reception of mercury or other suitable fluid. The space inclosed by the circular flange *b* communicates through an opening *d* with the atmosphere.

40 C is the inverted cup dipping with its edge a short distance into the fluid in the well. This cup is securely attached to the arm D, which is secured to the shaft E, the latter being allowed to turn on the taper points of  
45 the opposite studs *f* and *f'* which screw into the sides of the projecting casing B. In the top and bottom of this casing are openings, one directly over the other and into the upper opening is screwed the nipple F for receiving  
50 the house branch or distributing pipe to the burners.

Into the under opening is screwed the coupling G and to the latter is connected the  
55 exit pipe from the meter. This coupling projects upward a convenient distance into the interior of the valve chamber and forms

the seat for the conical valve H, which is secured by the screw *h* to the arm D in such a manner as to be readily and nicely adjusted, so as to coincide with the opening of  
60 the coupling G.

To the bottom *a* of the regulating chamber is attached the root of the spring I, the end of which bears against the underside of the inverted cup C. Through a boss *p* passes  
65 the screw K furnished with a handle *n* and tightening nut *m*, the point of the screw bearing against the underside of the spring I so that the latter may, by turning the screw in one direction or the other, be made to bear  
70 with greater or less force against the underside of the inverted cup. The top of the regulating chamber is furnished with a screwed lid M so that access can be easily  
75 gained to the interior.

The spring I is regulated by the screw K so as to furnish the required amount of gas to the burners. Should the pressure of gas become excessive and consequently pass in  
80 excessive quantities through the coupling G from the gas meter that excess of gas has no sooner passed through the annular opening between the valve and seat than it takes effect on the surface of the inverted cup C  
85 depresses the same and also depresses the valve nearer to its seat and thereby contracts the annular opening, retarding the excessive flow of gas and reducing the pressure to the desired standard and this before  
90 the excessive pressure is communicated to the burners.

Should the burners consume more gas than the regulator was adjusted to supply the pressure in the distributing pipe and consequently on the inverted cup becomes  
95 diminished and the cup with the valve rises by the action of the spring I thereby enlarging the opening between the valve and seat and admitting a supply of gas equal in quantity to the excess consumed.  
100

It will be thus seen that a supply of gas uniform in pressure and quantity is furnished to the burners, irrespective of the varying pressure in the street main, or the quantity which passes into the distributing  
105 main.

By securing the inverted cup C and valve H to the arm D, and hanging the latter on the fine points of the studs *f*, and *f'* much more sensitiveness of action is obtained than  
110 in ordinary gas regulators, in which the valve and inverted cup are guided by guards

which produce an amount of friction detrimental to the efficient action of the instrument.

I do not desire to claim the inverted cup, 5 spring, and valve, as such are common to other gas regulators; neither do I desire to claim broadly the hinging of the cup and valve to the interior of the casing, but

What I claim and desire to secure by Letters Patent is—

The combination of the inverted cup C, arm D, and valve H when both valve and

cup are attached directly and permanently to an arm hinged to the interior of the casing substantially in the manner herein set forth, 15 and for the purpose 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.