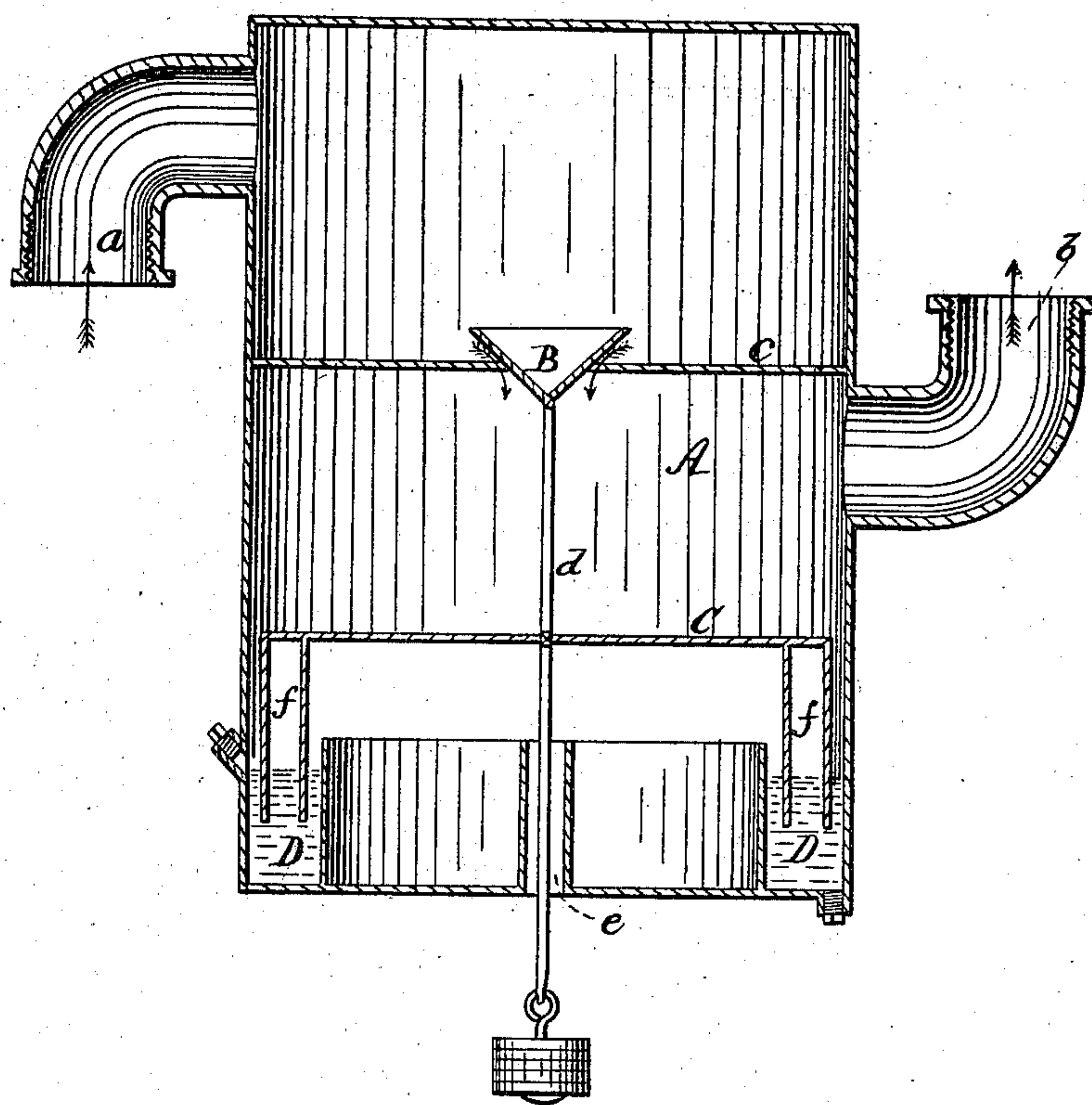


J. W. HOARD.  
Gas Regulator.

No. 12,509.

Patented March 13, 1855.





# UNITED STATES PATENT OFFICE.

I. W. HOARD, OF PROVIDENCE, RHODE ISLAND.

## GAS-REGULATOR.

Specification of Letters Patent No. 12,509, dated March 13, 1855.

*To all whom it may concern:*

Be it known that I, I. W. HOARD, of the city and county of Providence and State of Rhode Island, have invented a new and useful Improvement 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, which forms a part of this specification and represents a vertical central section of a regulator constructed according to my invention.

My invention consists in a certain arrangement of an inverted floating cup upon which the gas acts to control the opening of the induction or regulating valve, combined with the application to the said cup of an air spring or its equivalent for the purpose of increasing or diminishing the resistance of the said cup to the pressure of the gas as the pressure in the pipe increases or diminishes by reason of a less or greater consumption or otherwise, whereby a desirable and uniform pressure on the burners is at all times maintained.

A is the regulating chamber placed in the supply pipe, which may consist of an upright cylindrical or other formed vessel made of tin plate or other light metal, *a*, is the inlet, and *b*, the outlet of the pipe to and from the said chamber.

*c* is a diaphragm placed between the inlet and outlet to receive the induction or regulating valve B, which is of the form of an inverted cone.

C, is the inverted cup which floats in quicksilver or other fluid contained in an annular formed well D, in the bottom of the chamber A, and is connected directly to the bottom of the valve by a stem *d*, which is continued through the bottom of the chamber for the purpose of being weighted to graduate the pressure in the pipe. The interior or under side of the cup is exposed to the atmosphere which has free access through the opening *e*, in the bottom of the chamber and only the upper side is exposed to the pressure of the gas. The sides of the cup are made double, in order that a quan-

tity of air may be confined in the annular space *f* within them and above the surface of the quicksilver. The air thus confined in *f* serves as a spring to counterbalance the pressure of the gas and gives the requisite buoyancy to the cup, its force increasing or diminishing as it becomes compressed or is allowed to expand by any increase or diminution of the pressure of the gas in the chamber acting above the cup until the valve is balanced in the position necessary to allow of the passage of so much gas as is necessary to sustain the desired pressure at the outlet *b*.

It may be well to mention that I consider as equivalents to the air spring *f*, a spiral or other spring applied to partly suspend the valve and cup from the top of the chamber A, or a float of wood or some buoyant material applied to or forming the sides of the cup.

I consider this regulator to possess advantages over others in common use, in its extreme simplicity and small cost of construction while it is as effective as the best. This regulator produces a perfectly steady light, no flickering whatever being visible and in this respect is superior to all others known to me.

I am aware that the inverted cup has been and is employed by Kidder and others and therefore I disclaim it, irrespectively of the peculiar arrangement and combination herein described. And

What I claim as my invention and desire to secure by Letters Patent, is—

The arrangement of the inverted cup so that only the upper side or exterior is exposed to the pressure of the gas, and the under side or interior is exposed to the atmosphere, when this is combined with the application to the said cup of the air spring *f* or its equivalent substantially as and for the purposes herein set forth.

I. W. HOARD.

Witnesses:

H. C. GARDINER,  
J. B. KIMBALL.