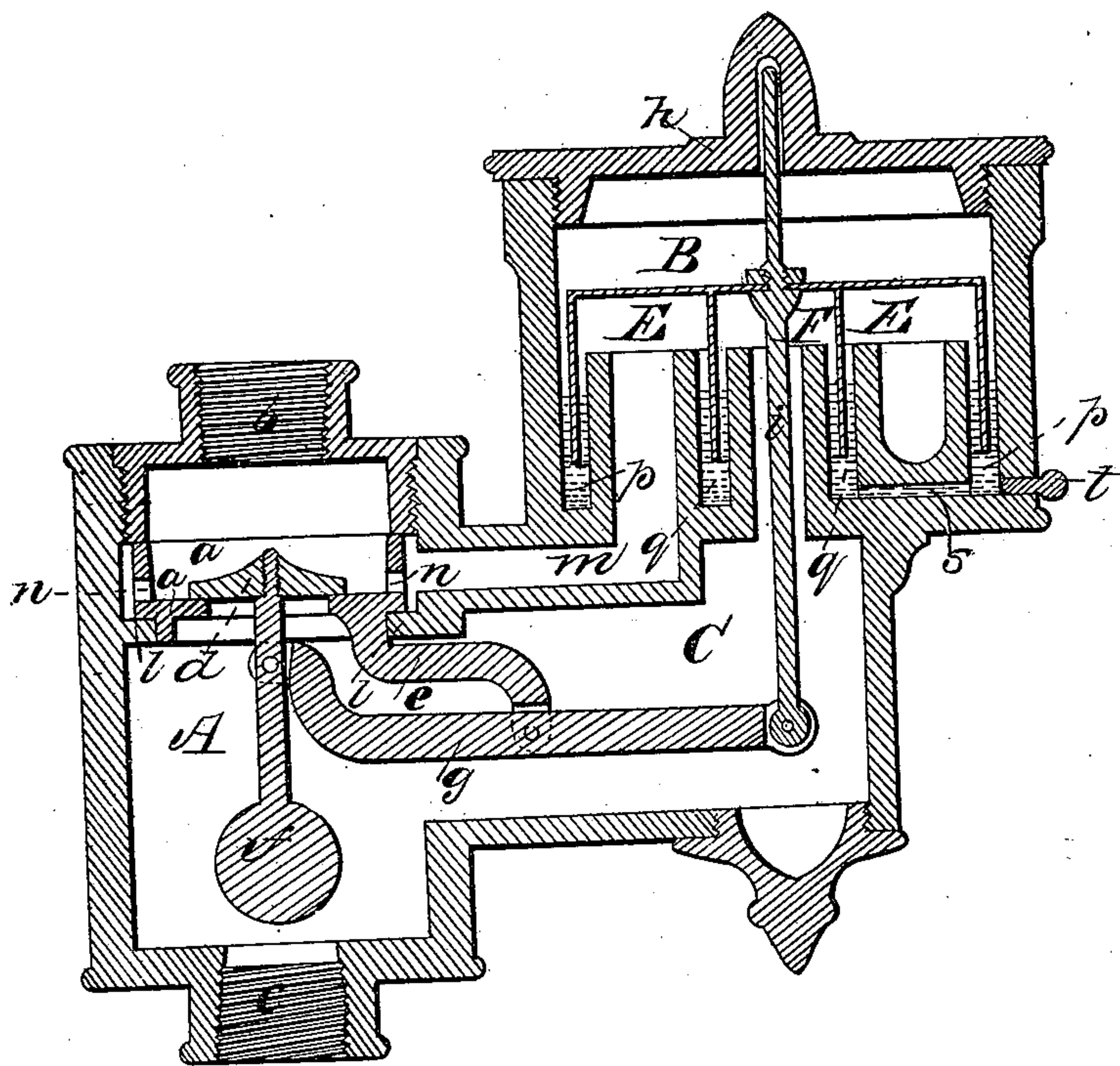


No. 9,326.

PATENTED OCT. 12, 1852.

W. KIDDER.
GAS ECONOMIZING REGULATOR.



UNITED STATES PATENT OFFICE.

WALTER KIDDER, OF LOWELL, MASSACHUSETTS.

GAS-REGULATOR.

Specification of Letters Patent No. 9,326, dated October 12, 1852.

To all whom it may concern:

Be it known that I, WALTER KIDDER, of Lowell, in the county of Middlesex and State of Massachusetts, have invented a new and
5 Improved Gas-Economizing Regulator; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing, making part of this specification.

10 I construct a case containing two compartments A, B, communicating with each other by means of a chamber C. The lower end *a*, of the compartment A, is to be attached to the pipe leading from the main; and the up-
15 per end *b*, of the same compartment is attached to the branch pipe, which supplies the burners. The inside of said compartment is finished with a shoulder *l*, upon which rests a valve-seat *a*; which is firmly
20 held thereon by the piece *b*, screwing into the end of the case and pressing firmly upon said valve-seat. An arm *e*, projects from the valve-seat, into the chamber C, from which, as a fulcrum, is suspended a lever *g*,
25 one arm of which is connected, by a hinged joint, to a rod *i*, passing up in the center of the cylindrical chamber B; and the other arm is connected, by a similar joint, with a rod descending from the center of a valve *d*,
30 which plays upon the aforesaid valve-seat.

A weight *f*, is attached to the lower end of the rod descending from the valve *d*, in order to keep said valve poised in a proper position upon the lever *g*. A small aperture
35 *m*, leads from the portion of the compartment A, which is situated above the valve *d*, into the compartment B,—the series of openings *n*, *n*, forming a free communication between the interior of the valve-seat *a*, and
40 the aperture *m*. From the bottom of the compartment B, and concentric with it, rise short tubular projections, so as to form an annular space *q*, around the central space of the compartment, but inside of the aperture
45 *m*; and a similar space *p*, outside of the said aperture *m*. Into these spaces are inserted the air-tight inverted cups E, F, which are firmly attached, one within the other, to the rod *i*. The area of the bottom of the cup F,
50 should be equal to that of the bottom of the valve *d*, when the arms of the lever *g* are equal in length; and, when said arms are unequal in length, the respective areas of the bottoms of the said cup and valve should
55 be inversely proportional to the lengths of the arms, with which they are connected; in

order that the pressure of the gas from the main may have equal effects upon said surfaces, and thus be entirely neutralized in its action on the valve. The area of the bottom
60 of the cup E, which is exposed to the pressure of the gas above the valve, may be indefinite, the greater, the more effective in its operation. Said cups sink into some suitable fluid, which partially fills the spaces
65 *p*, *q*, and forms a sort of packing, which prevents the escape of the gas from below the cups into the space B, above the cups. I usually employ mercury for this purpose, because it is not liable to freeze or waste
70 away by evaporation. A small aperture *s*, may connect the spaces *p*, and *q*, so that the liquid may flow from one into the other. A small orifice, closed by a stopper *t*, may also be made in the side of the case, for drawing
75 off the liquid when it may be desired. A cover *h*, is usually placed over the compartment B, to protect the arrangements inside, but should not prevent a free communication between the interior and exterior air. The
80 rod *i*, is usually extended upward into a corresponding aperture in said cover *h*, for the purpose of keeping the cups E, F, in a proper position.

That arm of the lever *g*, which is connected
85 with the valve *d*, is usually curved upward sufficient to compensate the buoyant power of the mercury in the spaces *p*, *q*, as the valve *d*, rises, and the cups E, F, sink farther into the mercury; which compensation
90 is produced by the end of the lever, thus curved, approaching nearer to the perpendicular line passing through the fulcrum of the lever, than the straight arm, and thereby
95 diminishing its comparative leverage.

The effect of the pressure on the cup F, is (as above described) to counterbalance the pressure of the gas below the valve *d*, thereby rendering the action of said valve
100 entirely independent of the pressure of gas from the main however much it may vary. The pressure of the gas in the branch pipe on the valve *d*, and its pressure under the cup E, act together in closing the valve *d*. Counterweights are put upon the cups E, F,
105 or attached to that arm of the lever *g*, which is connected with the rod *i*, of sufficient amount to keep the valve *d*, open until the requisite pressure in the pipe which supplies the burners is obtained,—when the aggregate
110 pressure under the cup E, and upon the valve *d*, becomes greater than the said

counterweight and closes the valve, or depresses it so as to diminish the supply from the main.

5 It is obvious that the greater the area of the cup E, the faster will be the increase of aggregate pressure acting upon it as the pressure of gas in the branch pipe increases; so that when the pressure of gas therein becomes sufficient to depress the valve, it will
10 more promptly overcome inertia and friction, and depress the valve *d*. By this means my regulator becomes very effective and prompt in its action.

15 Having thus fully described my improved gas economizing regulator, what I claim therein as new and desire to secure by Letters Patent, is:

Producing a uniform pressure of gas in the branch pipe which supplies the burners

—which may not be varied by the number 20 of burners supplied, nor by the variations of pressure in the main—by means of the counterpoising double inverted cups, E, F, the vibratory lever *g*, and the induction valve *d*, so arranged, with reference to the 25 main and the branch pipe that one of the said inverted cups will be acted upon by the gas in the main, and the other by the gas in the branch pipe, as hereinafter represented and described. 30

The above specification of my improved gas economizing regulator, signed this 21st day of June 1852.

WALTER KIDDER.

Witnesses:

J. C. ABBOTT,
T. FLEETWOOD,
R. CHURCHILL.