(No Model.)

# W. C. ROSSNEY.

## GAS REGULATOR.

No. 344,989. Patented July 6, 1886.

*Fig. 1.*

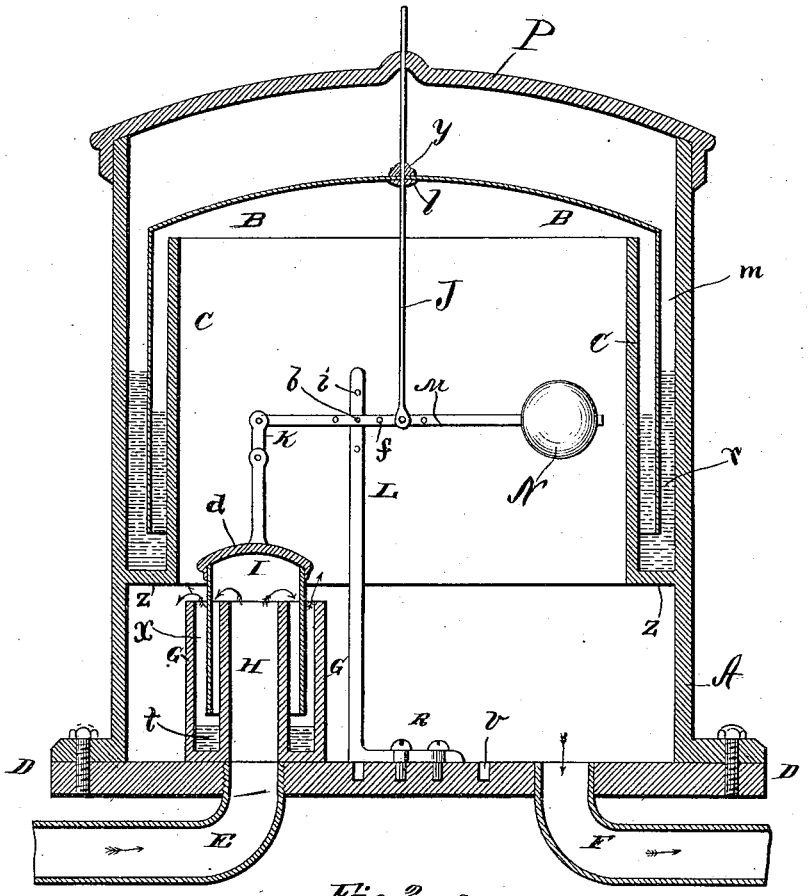
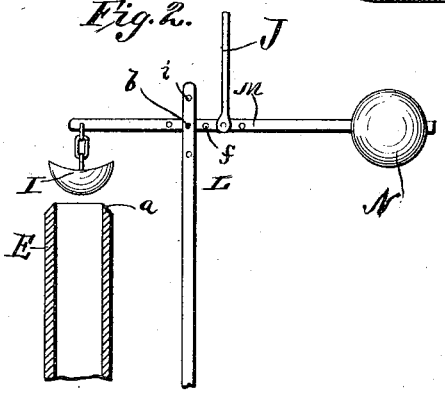



*Fig. 2.*

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# UNITED STATES PATENT OFFICE.

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## GAS-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 344,989, dated July 6, 1886.

Application filed March 9, 1885. Serial No. 158,226. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM C. ROSSNEY, of Hyde Park, in the county of Norfolk, State of Massachusetts, have invented a certain new and useful Improvement in Gas-Regulators, of which the following is a description, sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section of my improved gas-regulator, some of the parts being shown in elevation; and Fig. 2, a diagram showing a modification of the valve.

Like letters of reference indicate corresponding parts in the different figures of the drawings.

My invention relates to that class of gas-regulators which are operated automatically by the pressure of the gas; and it consists in a novel construction, combination, and arrangement of the parts, as hereinafter more fully set forth and claimed, by which a more effective device of this character is produced than is now in ordinary use.

It is well known that in nearly all gas-regulators provided with valves which are opened and closed by the pressure of the gas in such a manner as to automatically control the supply delivered to the burners much difficulty is experienced from the clogging of said valves by gas-tar, or by the carbonaceous deposits from the gas, while others are so constructed as to be less sensitive in their operations than is necessary to produce the best results.

My invention is designed to obviate these difficulties or objections; and to that end I make use of means which will be readily understood by all conversant with such matters from the following explanation.

In the drawings, A represents the body of the regulator, B the gas-holder, C the cylinder, and D the base, these parts being preferably composed of cast-iron, and the base properly constituting a part of the body.

The body A is cylindrical in form, but may be made of any other suitable shape, and should be about six inches in diameter and eight in height in a regulator for use with a one-inch induction-pipe.

A cover, P, is fitted to the top of the body A in such a manner as to permit the air to pass into the chamber above the holder B. Projecting horizontally and inwardly from the walls of the body A, about two inches from the base D, there is an annular flange, *z*, on which is erected a cylinder, C, concentric with said body and open at either end, the body A, flange *z*, and cylinder C being preferably cast integral, or in one piece, and when not so formed they are united by gas-tight joints. The base D is also united to the body A by a gas-tight joint, and provided on its upper side, within said body, with a vertically-arranged cylindrical hub or projection, G, which is preferably cast integral with the base, and when not so cast it is united thereto by a gas-tight joint. An annular chamber, *x*, open at its top, is formed in said hub, which is also provided with a vertical opening or passage, H, extending centrally through it from top to bottom. A downwardly-closing cup-valve, I, is disposed in the chamber *x*, said valve being jointed or connected at K to a counterbalancing-lever, M, which is provided with a movable counterbalance or weight, N. A vertically-arranged standard or fulcrum, L, provided with a series of holes, *i*, is secured to the upper side of the base D, within the body A, by the screws R, said fulcrum being made laterally adjustable thereon by said screws and the holes *v*.

The lever M is provided with a series of holes, *f*, and is pivoted, by means of a pin or fulcrum proper, *b*, in the upper portion of the standard L, between the weight N and joint K, being made vertically adjustable in said standard by the holes *i* and said pin. A rod, J, having its lower end detachably jointed to the lever M, between the fulcrum or standard L and weight N, is connected, by means of the lock-nuts *l y*, with the top of the gas-holder B, at or near its center, said rod being preferably secured in the top of the holder in such a manner as to be adjusted vertically therein, and yet so packed as to form a gas-tight joint therewith. The rod is elongated at its upper end, and passes loosely through the cover P, thus enabling the long arm of the lever M to

be depressed by pushing said rod down, and the valve I opened to permit a free flow of gas through the regulator, if at any time the same should be required.

An induction-pipe, E, opens upwardly through the base D beneath the hub G into the passage H, and there is also an induction-pipe, F, opening downwardly through said base. The latter pipe may, however, lead outwardly through the side of the body A at any point below the flange *z*, if preferred, instead of through the base, as shown.

An annular chamber, *m*, is formed between the cylinder C and walls of the body A, the top of said chamber being open. A quantity of some suitable liquid, *r*, preferably quicksilver or mercury, is placed in the chamber *m* for packing the holder B, the lower edge of said holder being immersed in said liquid when the holder is in use. A small quantity of quicksilver or mercury, *t*, is also placed in the chamber *x* of the hub G, to form a liquid seat for the valve I, the lower edge of said valve being immersed in the quicksilver when the valve is closed.

All of the operative parts above mentioned are inclosed within the body A, whereby they are protected from interference by domestics or children, who might meddle with the regulator and interrupt its successful operation.

In the use of my improvement the gas is let into the regulator through the induction-pipe E and opening H, passing into the valve I, and thence downwardly under said valve into the chamber *x*, from which it next enters the body of the regulator and holder B, and thence passes out through the eduction-pipe F. The gas having been let into the regulator, as described, if now any undue pressure is caused therein--as, for instance, by turning down a portion of the lights—the gas-holder B will be raised, thereby drawing up the rod J, depressing the valve I, and shutting off the supply of gas to the pipe F, in a manner which will be readily obvious to all conversant with such matters without a more explicit description. It will also be obvious that whenever the pressure of the gas is decreased in the pipe F—as, for instance, by turning on more lights—the holder B will fall correspondingly, thereby raising the valve I, and increasing the flow of gas through the regulator.

The lever M and fulcrum L should be so adjusted with respect to the holder B and valve I that said valve will be closed, or its lower edge immersed in the quicksilver *t*, when the lights are all turned off or the pipe F closed.

The form and arrangement of the cup-valve I is such that it prevents the gathering of gas-tar to interfere with its proper working; but should a slight quantity of tar at any time be deposited on its lower edge it will be removed by the quicksilver when the valve is immersed, as described, and blown against the outer walls of the chamber *x* by the inflowing gas when the valve is raised. It is immaterial, however, whether the tar is removed from the lower edge of the valve by the quicksilver or not, as it will be obvious that it will not cause it to stick to its liquid seat, and hence the working of the valve would not be interfered with thereby. Moreover, if the tar should gather at the edge of the valve in considerable quantities, and thereby partially close the space between the valve and the quicksilver, it would not affect the proper working of the regulator, as the pressure on the holder B would thereby be reduced and the valve opened correspondingly.

As the inflowing gas is discharged directly into the cup of the valve I, the force of the gas is utilized in assisting to raise said valve, thereby enabling the parts with which the valve is connected to be so adjusted as to render the regulator much more sensitive than it would otherwise be.

Of course, it will be understood that the valve is to be so adjusted that it will open sufficiently to supply the smallest number of burners which may be used when the gas is let on, and be closed when all of the lights are turned out.

Instead of the valve I, with its liquid seat, as hereinbefore described, I sometimes employ a valve constructed substantially as shown in Fig. 2, which will answer the purpose very well, more especially with large pipes and gas-mains.

In Fig. 2 the valve I is hemispherical and suspended to the lever M, said lever being supported by a fulcrum, L, and provided with a movable counter-balance, N, as in Fig. 1.

The pipe E is elongated and passes through the base D, its upper end, *a*, being beveled to form a knife-edge seat for the valve, and thereby prevent the valve from sticking to it readily, should gas-tar be deposited thereon.

The top *d* of the valve I (see Fig. 1) is formed thicker than its sides, to give said valve sufficient weight to counterbalance in part the weight of the holder B, thus enabling said holder to be made of heavier materials than would otherwise be practicable.

The weight N is merely auxiliary in its function; but it enables the valve to be balanced or adjusted with much greater nicety than would perhaps be possible without its use.

The object of making the fulcrum of the lever M adjustable vertically is to regulate to a certain extent the vertical movements of the valve I; and the object in making said fulcrum adjustable laterally is to enable said valve to be properly counterbalanced.

I do not confine myself to constructing the base D and body A separately, as they may be cast integral, or in one piece, if desired. Neither do I confine myself to the use of a movable weight, N, on the lever M, as said lever may be so constructed as to act as a counter-balance to the valve; nor to the use of the standard L as a fulcrum for the lever M, as any suitable fulcrum may be employed; nor to elongating the rod J to pass through the cover P, as said rod may terminate at the top of the holder B, with which it is connected,

and an additional rod be employed above said top; nor to making the fulcrum for the lever M adjustable, as the movable weight N, when used, obviates to a great extent the necessity of such adjustability; nor to weighting the lever M when its fulcrum is made adjustable, as the use of an adjustable fulcrum for said lever renders it possible to dispense with weighting it, although I deem it preferable to weight the lever and provide it with an adjustable fulcrum.

Having thus explained my invention, what I claim is—

1. In a gas-regulator, the combination of a liquid valve-seat, a cup-valve therein, and a counterbalancing weighted lever connected to said cup-valve, the fulcrum of said lever being adjustable laterally, substantially as described.

2. In a gas-regulator, the combination of a liquid valve-seat, a cup-valve therein, and a counterbalancing weighted lever connected to said cup-valve, the fulcrum of said lever being adjustable vertically, substantially as described.

3. In a gas-regulator, the combination of a liquid valve-seat, a cup-valve therein, and a counterbalancing weighted lever connected to said cup-valve, the fulcrum of said lever being adjustable laterally and vertically, substantially as described.

4. In a gas-regulator, the combination of a liquid valve-seat, a cup-valve therein, a counterbalancing weighted lever connected to said cup-valve, a vertically-movable gas-holder in a liquid seat, and a rod connecting said gas-holder to the counterbalancing-arm of said lever, substantially as described.

5. In a gas-regulator, the combination of a liquid valve-seat, a cup-valve therein, a counterbalancing weighted lever connected to said cup-valve, a vertically-movable gas-holder in a liquid seat, and a rod connecting said gas-holder to the counterbalancing-arm of said lever, the fulcrum of said lever being adjustable laterally, substantially as described.

6. In a gas-regulator, the combination of a liquid valve-seat, a cup-valve therein, a counterbalancing weighted lever connected to said cup-valve, a vertically-movable gas-holder in a liquid seat, and a rod connecting said gas-holder to the counterbalancing-arm of said lever, the fulcrum of said lever being adjustable laterally and vertically, substantially as described.

7. In a gas-regulator, the combination of a body, a liquid valve-seat, a cup-valve adapted to be seated therein, and a counterbalancing weighted lever connected to said valve, said valve-seat, valve, and lever being disposed within said body, substantially as described.

8. In a gas-regulator, the combination of a body, a liquid valve-seat, a cup-valve adapted to be seated therein, a counterbalancing weighted lever connected to said valve, and a fulcrum for said lever, said fulcrum being adjustable laterally, and said valve-seat, valve, lever, and fulcrum disposed within said body, substantially as described.

9. In a gas-regulator, the combination of a body, a liquid valve-seat, a cup-valve adapted to be seated therein, a counterbalancing weighted lever connected to said valve, and a fulcrum for said lever, said fulcrum being adjustable vertically, and said valve-seat, valve, lever, and fulcrum disposed within said body, substantially as described.

10. In a gas-regulator, the combination of a body, a liquid valve-seat, a cup-valve adapted to be seated therein, a counterbalancing weighted lever connected to said valve, and a fulcrum for said lever, said fulcrum being adjustable laterally and vertically, and said valve-seat, valve, lever, and fulcrum disposed within said body, substantially as described.

11. In a gas-regulator, the combination of a body, a liquid valve-seat, a cup-valve adapted to be seated therein, a counterbalancing weighted lever connected to said valve, a fulcrum for said lever, a vertically-movable gas-holder in a liquid seat, and a rod connecting said gas-holder to the counterbalancing-arm of said lever, said valve-seat, valve, lever, fulcrum, and gas-holder being disposed within said body, substantially as described.

12. In a gas-regulator, the combination of a body, a liquid valve-seat, a cup-valve adapted to be seated therein, a counterbalancing weighted lever connected to said valve, a fulcrum for said lever, a vertically-movable gas-holder in a liquid seat, and a rod connecting said gas-holder to the counterbalancing-arm of said lever, said fulcrum being adjustable laterally, and said valve-seat, valve, lever, fulcrum, and gas-holder disposed within said body, substantially as described.

13. In a gas-regulator, the combination of a body, a liquid valve-seat, a cup-valve adapted to be seated therein, a counterbalancing weighted lever connected to said valve, a fulcrum for said lever, a vertically-movable gas-holder in a liquid seat, and a rod connecting said gas-holder to the counterbalancing-arm of said lever, said fulcrum being adjustable laterally and vertically, and said valve-seat, valve, lever, fulcrum, and gas-holder disposed within said body, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 5th day of March, A. D. 1885.

WILLIAM C. ROSSNEY.

Witnesses:
WM. H. HUNT,
GEO. WHELDEN.