

(No Model.)

W. C. DOWNWARD.
GAS REGULATOR.

No. 546,131.

Patented Sept. 10, 1895.

Fig. 1.

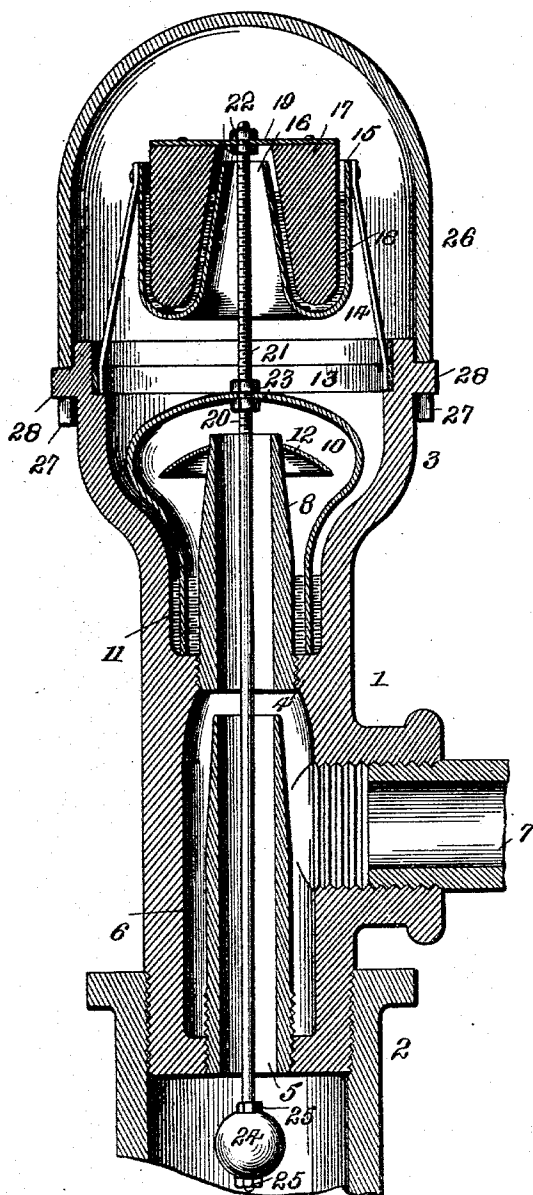


Fig. 2.

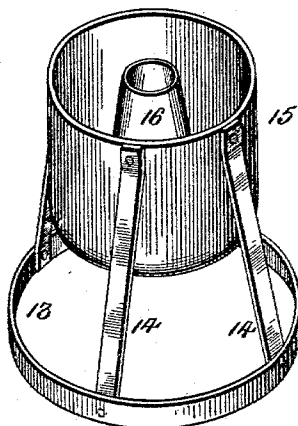


Fig. 3.

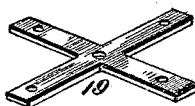
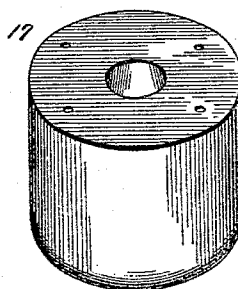


Fig. 41.



Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM C. DOWNWARD, OF WILMINGTON, DELAWARE, ASSIGNOR OF ONE-HALF TO ALFRED DOWNWARD, OF SAME PLACE.

GAS-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 546,131, dated September 10, 1895.

Application filed July 13, 1895. Serial No. 555,876. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. DOWNWARD, a citizen of the United States, residing at Wilmington, in the county of New Castle and State of Delaware, have invented certain new and useful Improvements in Gas-Regulators; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to an improvement in gas-regulators, the purpose of which is to regulate or govern the supply of gas under pressure.

The object of my invention is to produce a construction which will afford great steadiness in the action of the valve, whereby a uniform pressure of gas is attained throughout the entire system and one which will automatically shut off the gas when the pressure becomes too great.

The invention consists in the construction and combination of parts as hereinafter fully described, and pointed out in the claims.

In the drawings, Figure 1 is a central vertical section of my improved device, and Figs. 2, 3, and 4 are detail views of parts of the same.

Referring to the drawings, the numeral 1 represents the casing which is secured to the end of the supply-pipe or gas-main 2 and has its upper end flared or enlarged, as shown at 3. Rising within the casing is a tube 5, which is secured in the lower end of the same and terminates just below an internal annular flange 4 of the casing. The external diameter of the tube is less than the internal diameter of the casing, so that a chamber 6 is provided for the free circulation of gas from the tube through the outlet-pipe 7, extending from the side of the casing below the flange 4 and the end of the tube 5. A pipe or nozzle 8 is screwed into the opening in the flange 4, and its upper end projects into the flared portion of the casing. Within the flared portion of the casing is a reservoir-float 10, the

upper end of which extends over the end of the nozzle and the lower end of which is open and contracted and extends downward between the tube and the casing. Mercury or its equivalent is poured in the chamber formed around the lower end of the pipe 8, as clearly shown at 11, and forms a liquid seal around the lower end of the float, providing an absolutely air-tight joint.

To prevent the mercury entering the pipe 8 in case the regulator should receive a shock or jar, I provide an annular guard or shield 12 around the upper end of the pipe, which will retain the liquid in place under such circumstances. An internal annular shoulder is formed at the upper end of the casing and is designed to accommodate a ring or support 13, to which I secure the upwardly-projecting arms or supports 14, the upper ends of which are secured to the upper edge of a cup 15, provided with a hollow central cone-shaped boss 16. An annular cork float 17, about the same shape and somewhat smaller than the cup, is seated within the cup and floats in the mercury 18, placed therein, as shown. A cross-head 19 is secured to the upper side of the cork float and has a central perforation, through which a valve-rod 20 is passed. The rod is screw-threaded, as at 21, and nuts 22 are placed one above and one below the cross-head to adjustably secure the float on the rod. The rod passes downward through the cone-shaped boss 16, the float 10, and the tubes 8 and 5, and is secured to the said float 10 by nuts 23, one above and one below the top of the same. To the lower end of the rod is secured a ball-valve 24 by adjusting-nuts 25, which is adapted to fit against the lower end of the tube 5 and close the same in the operation of the device. A dome or cover 26 is placed over the upper portion of the regulator and is provided with slots or notches 27, adapted to fit over lugs 28 on the sides of the casing, and thereby hold the cover in position.

The operation of the device will be readily understood. Under normal conditions the gas passes from the main or supply pipe up through the pipe 5 and thence out through the outlet-pipe to the burners; but should the

supply be too great, and thus create a back-pressure, the reservoir-float will be forced upward and with it the valve-rod, bringing the valve against the seat 29 and cutting off the flow of gas until the pressure is reduced to the proper point. As the pressure is reduced, the reservoir-float returns to its former position.

Heretofore great difficulty has been experienced in arranging a gas-regulator wherein the valve-rod is free from friction. By having the upper end of the rod secured to a governor-float, as described, I am enabled to provide a device which reduces the friction to the lowest possible degree, and at the same time I provide a construction which will retain the working parts directly in alignment. It will be seen that I have provided a gas-regulator which is very inexpensive and simple in its construction and one that is not liable to get out of order.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a gas regulator, the combination of a substantially cylindrical casing having a receiving chamber in its lower portion provided with an outlet on its side, internal annular flanges at the upper and lower ends of the receiving chamber, a pipe rising from the lower flange within the receiving chamber and extending beyond the outlet, a pipe rising from the upper flange, a valve stem passing through the said pipes and provided at its lower end with a valve adapted to close the lower end of the lower pipe, and a float adjustably secured to the valve stem, extending over the upper end of the upper pipe and having its lower end immersed in a liquid seal between the said pipe and the casing.

2. In a gas regulator, having upper and lower chambers, the upper chamber accommodating the gas reservoir or float and being provided with a liquid seal around the lower end of the float, a pipe projecting from the lower to the upper chamber a guard secured around said pipe just below its upper end, said pipe and guard fitting within the gas reservoir or float, the float secured to the

valve rod, and means for retaining the valve rod centrally within the gas regulator.

3. In a gas regulator, the casing having an annular flange at its lower end, and an inner annular flange about midway its length, a receiving chamber between said flanges, an outlet in the side of the casing, a pipe projecting upwardly from the lower flange, a pipe projecting upwardly from the upper flange and provided at its upper end with a concave guard, said pipe and guard fitting within a gas reservoir float, the lower portion of which is seated on the upper flange and surrounded by a liquid seal, and a valve rod adjustably secured to the reservoir float and having a valve at its lower end, and means for retaining the valve rod centrally within the regulator when operated by the pressure of gas.

4. The combination of the casing having an internal annular flange at its upper end, supporting arms resting on and rising from said flange, a cup secured to the upper ends of the said arms, a guiding float in said cup, a rod secured to and depending from said guiding float and provided at its lower end with a valve adapted to close the inlet to the casing, and a reservoir float adjustably secured to an intermediate point of said rod.

5. In a gas regulator the combination with a casing having upper and lower chambers, a pipe projecting into the lower chamber, an outlet pipe, a pipe projecting upwardly from an annular flange midway the casing into the upper chamber and having an annular concavo-convex guard near its upper end, said pipe fitting within a gas reservoir float, a valve rod having a valve at its lower end, the reservoir float adjustably secured to said rod and a governor float secured to the upper end of said rod and floating a cup supported by braces projecting from an annular shoulder at the upper end of the casing.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM C. DOWNWARD.

Witnesses:

J. JACKSON PEIRCE,
GEO. B. MCCLEES.