

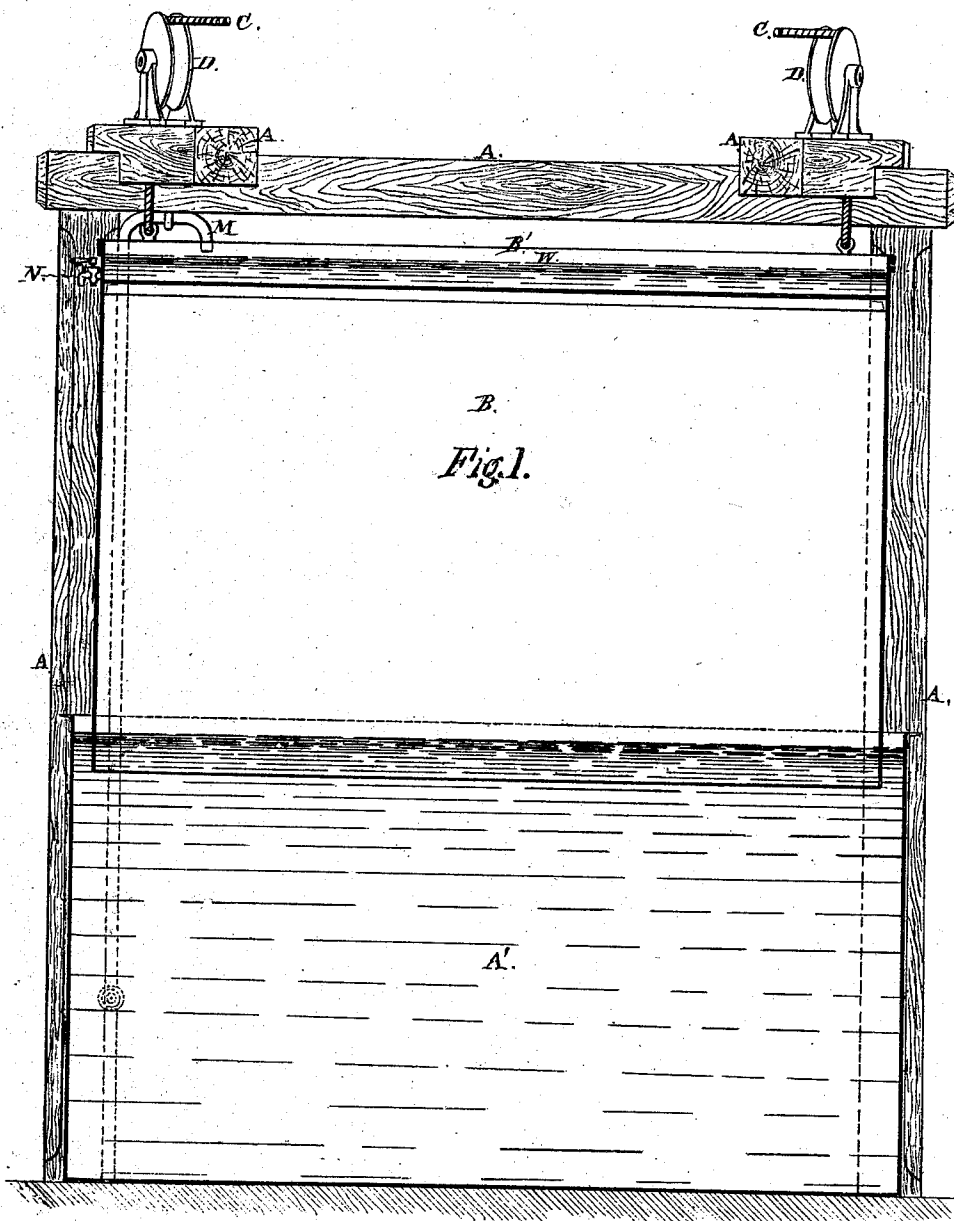
T. F. Rowland,

2. Sheets, Sheet 1.

Gas Holder.

No. 100559.

Patented Mar. 3. 1870.



Witnesses  
Hiram E. Hill  
Wm. C. Day

Inventor  
Thos. F. Rowland

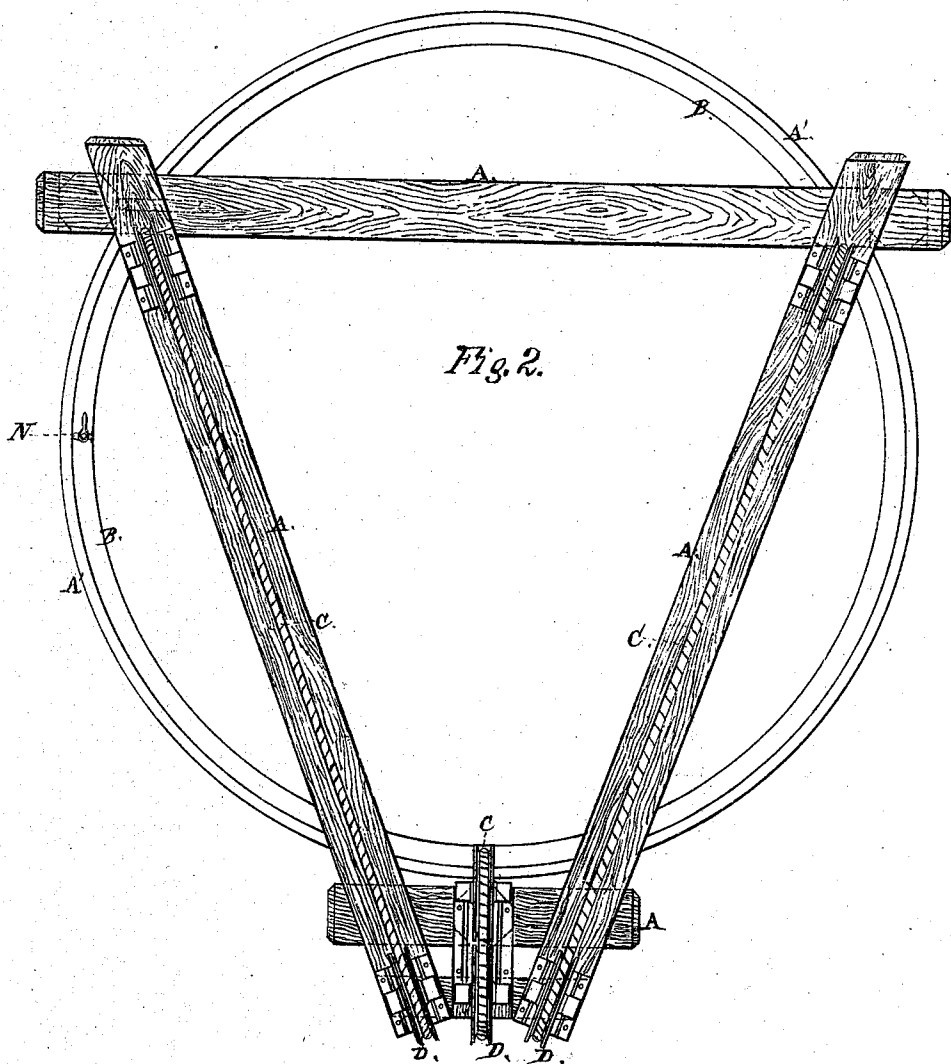
T. F. Rowland,

2, Sheets, Sheet 2.

Gas Holder.

No. 100,559.

Patented Mar. 8, 1870.



Witnesses

Harvey E. Hill

Wm. C. Day

*[Signature]*

Inventor

Thos. F. Rowland

# United States Patent Office.

THOMAS F. ROWLAND, OF GREEN POINT, NEW YORK.

Letters Patent No. 100,559, dated March 8, 1870.

## IMPROVEMENT IN GASOMETERS.

The Schedule referred to in these Letters Patent and making part of the same.

### To all whom it may concern.

Be it known that I, T. F. ROWLAND, of Green Point, Brooklyn, in the county of Kings, and State of New York, have invented certain new and useful Improvements in Gas-Holders, or Gasometers, by which I mean the capacious reservoirs, made usually of light material, in which gaseous matter is received and stored for use; and I do hereby declare that the following is a full and exact description thereof.

My invention is intended partly for use in connection with the several varieties of small gas apparatus used for dwellings, hotels, manufactories, and the like, and partly to serve important ends in connection with gas from street-mains

All gas-holders require to be counterweighted to that extent which will allow gas of a given pressure to raise them and fill them to their capacity, and when raised to return or discharge the gas through the distributing-pipes at a certain pressure.

The pressure is variable within narrow limits, and is generally represented by inches and decimal parts of inches of water. Now supposing a gas-holder to be fed by the gas of a street-main at a pressure of 1.0 inch of water, and that it is required to be delivered at a pressure of 3.0 inches of water for any special use. It is necessary to change the conditions under which the mass of material in the gas-holder is balanced. It is necessary to attach weights sufficient to nearly balance the gas-holder while it is filling, and then to remove a portion or the whole of the counterbalancing-weights after it is filled, so as to obtain the requisite pressure. This involves much labor in handling and raising the weights.

Common or street-gas is requisite in many cases to be mixed with other gas. This is done in many instances for special purposes, but particularly with oxygen, by recent processes, for mechanical and illuminating purposes. Now, to effect this mixing with facility, and so as to be reliable in its proportions, it is necessary to know very exactly the pressure under which the gas is to be received in the mixing apparatus; and as the pressure in the street-mains varies according to the different conditions imposed thereon at the gas-works at different hours, and according to the variations in the consumption of the gas, either in the entire city or in connection with the particular main with which our apparatus is connected, the value of a reservoir in the cellar, or in some other convenient position in which all the gas to be used for a given period may be received at any pressure, and then discharged at an exactly-determined pressure, will be readily appreciated.

My invention provides for operating such a gas-holder, or a gas-holder connected with private works, with very little labor.

It is evident that a gas-holder weighing five hundred pounds, balanced by counter-weights of five hundred pounds, is in equilibrium; and, friction aside, will either rise or fall by the force of a single pound in either direction. In practice it is easy to allow for friction. My apparatus can receive the gas at a high pressure, and discharge at a low, or can receive, as will more frequently be the case, at a low, and discharge at a high pressure; or it can receive the gas at a variable or indeterminate, and discharge it always at a positively determined and reliable degree of pressure.

I use water as the means for counter-weighting. There is usually a street aqueduct in any village where gas is employed, but in case there is not I can pump or otherwise raise the water in a suitable reservoir in sufficient quantities to vary the pressure on my gas-holder to the required extent. The water moves itself with the simple turning on or off of cocks.

The accompanying drawings form a part of this specification, and represent the form in which I prefer to carry out the invention when on a very small scale. The proportions may be modified with advantage when the scale of the apparatus is greatly increased.

Figure 1 is a vertical section through the center of the apparatus.

Figure 2 is a plan view.

Similar letters of reference indicate like parts in both the figures.

A' is a tank or vessel filled with water, and

B is the gas-holder, which is adapted to rise and sink therein as the gas is received and discharged.

Three cords, C, are provided, leading up from equidistant points on the upper edge of the gas-holder B, and passing over pulleys D, are attached by suitable connections to one common weight, E.

The pulleys are supported, and the weight may be guided if necessary, by a suitable skeleton or framework, A.

It will be understood that in case my gas-holder is of considerable size, and is in an exposed situation out of doors, all the ordinary appliances may be provided for internal bracing for guiding or guarding against the disturbing effects of gales of wind, and the like; and that any of the means now in use may be provided for caging or otherwise protecting the weights, pulleys, &c., and also that the tank A' may be set down in the ground.

The top of the gas-holder B is provided with the rim B', extending up around its entire periphery. This is water-tight, and is adapted to retain a considerable layer or stratum of water on the top of the gas-holder to add its gravity to that of the gas-holder B when required. This water is represented by W in fig. 1.

I have represented a pipe, M, rising by the side of

one of the posts of the framing A, and bending inward at its upper end at such height as to be always above the upper edge of the rim B'. The end or discharging-nozzle of this pipe M points directly downward, so that the stream will descend vertically, whatever may be its force. In case it is an exposed situation out of doors, it may be necessary to provide a telescopic pipe, or a suitable flexible pipe, to protect the descending stream from the force of the wind, but in-doors, such a provision can be safely dispensed with.

An ordinary hose will in most cases serve as an efficient means for raising the water and discharging it into the space within the rim B' at the top of the gas-holder B.

It will be of course understood that this water-connection has a stop-cock or valve which allows it to be controlled at will.

N is a cock for allowing the water to be discharged from the top of the gas-holder at will.

Now it will be readily understood that to receive the gas at a lower pressure in the street-mains, or in an independent or domestic apparatus which generates the gas at a low tension, it is simply necessary to open the cock N and discharge the whole or a sufficient quantity of the water W, and then to close the cock N.

When the gasometer is sufficiently filled, water is again supplied through the pipe M to the top of the gasometer, and the water there distributed by increasing the gravity, again restores the apparatus to the condition required for discharging the gas at an increased and absolutely uniform pressure until the whole is consumed.

In case the pressure is to be made less, the operation is reversed.

By introducing two or more of these gas-holders to receive and discharge alternately, the gas may be consumed at a uniform pressure in a large manufactory or theatre during any long period, where the pressure in the street may fluctuate, and for certain theatrical effects the pressure may be increased or diminished within very wide limits, and the extent of the variation may be determined with absolute certainty beforehand by simply gauging and marking the depth of water required.

Where the gasometer is liable to disturbance, it may be well to provide cross-plates or checks on the upper surfaces to prevent the water W from swashing or surging to one side or the other, but I have not found such provisions necessary in my experiments.

Where a single weight, E, can be made available to operate all the cords C, the cords may be attached directly to a single hook or point upon the weight, and provided with screw-connections, or equivalent delicate adjustments, which will allow the length of each to be adjusted with nicety to compensate for variations in their stretch, or any settlement or change of position of the pulleys.

By this and other obvious means the tendency of the gasometer B to tilt in one direction or the other, or rather the tendency of the mobile weight on the top thereof to aggravate such tilting by flowing to the lower side, may be effectually counteracted.

I can provide the top of the counter-weight E with a similar rim, and with suitable provisions, M N, for receiving and discharging water; or I can make the entire counter-weight E a capacious hollow vessel, of little weight in itself, but adapted to contain a sufficient quantity of water for the maximum counter-weighting purposes. I prefer, however, the distribution of the water on the top of the gas-holder, as represented in the figure.

Many obvious modifications may be made in this respect; thus, for example, a series of reservoirs may be made around the sides of the gas-holder, either on the interior or exterior, or a single reservoir may be made in the center of the top of the gas-holder.

I claim—

The means, substantially as herein described, for controlling the pressure of gas discharged from a gas-holder by supplying and discharging water, as herein specified.

In testimony whereof, I have hereunto set my name in presence of two subscribing witnesses.

THOS. F. ROWLAND.

Witnesses:

WARREN E. HILL,  
WM. C. DEY.