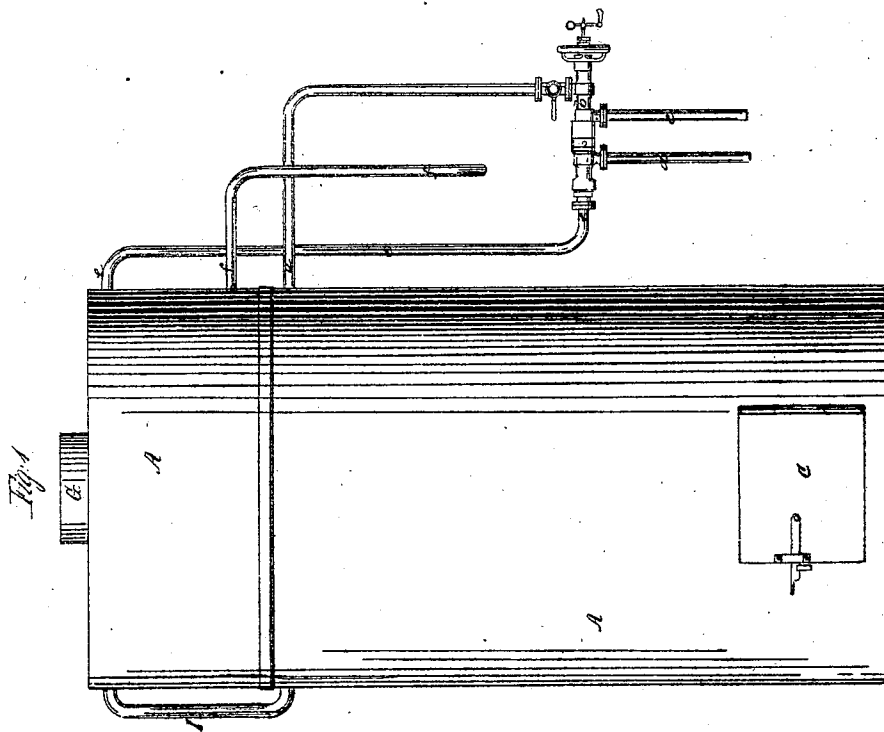
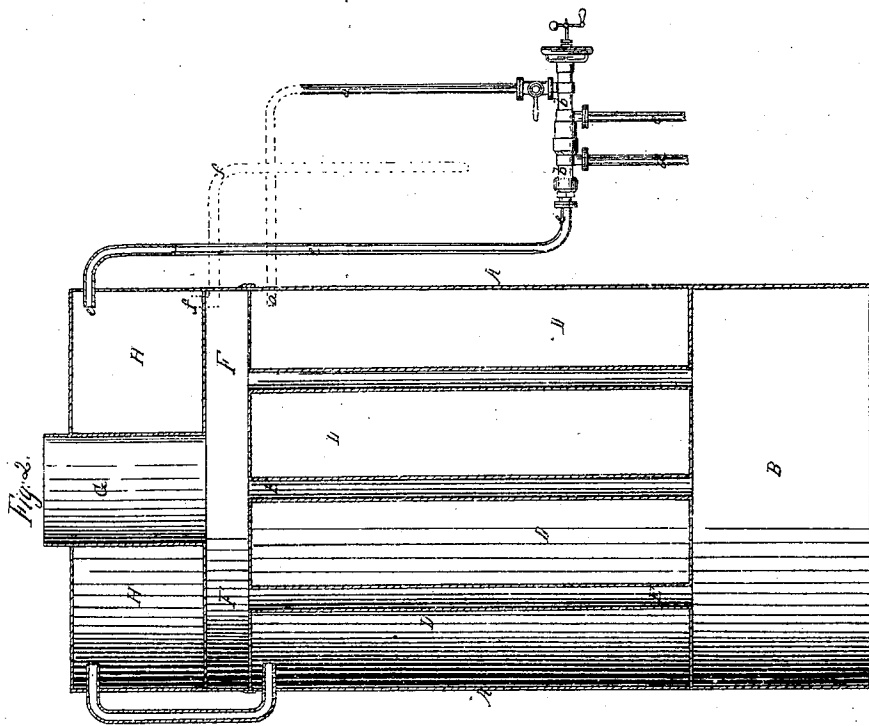


L. Stevens.

Making Illuminating Gas.

N<sup>o</sup> 73057

Patented Jan. 7, 1868.



Witnesses

J. P. D. Patten  
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# UNITED STATES PATENT OFFICE.

LEVI STEVENS, OF WASHINGTON, DISTRICT OF COLUMBIA.

## IMPROVEMENT IN THE MANUFACTURE OF ILLUMINATING-GAS.

Specification forming part of Letters Patent No. 73,057, dated January 7, 1868.

*To all whom it may concern:*

Be it known that I, LEVI STEVENS, of Washington city, in the District of Columbia, have invented or discovered a new and useful Improvement in the Manufacture of Illuminating-Gas; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 represents the exterior of an apparatus in which the gas or vapors may be prepared or mixed preparatory to their being retorted to put them into a fixed gas. Fig. 2 represents a vertical section through the apparatus.

Similar letters of reference where they occur in the separate figures denote like parts of the apparatus in both of them.

My invention consists in the use of a hydrocarbon and of hydro-oxygen or steam introduced into a close chamber under heat and pressure, for the purpose of preparing or mixing the gas or vapors, which are afterward to be retorted for making a fixed gas for illuminating purposes; and my invention consists, further, in the use of a self-acting or Giffard injector for the purpose of forcing the hydrocarbon into the preparing, mixing, or vaporizing chamber against the pressure of the steam therein, as will be explained.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

A represents an exterior jacket or shell, within which, at the bottom thereof, is arranged the fire box or chamber B, which may be supplied with fuel through the door C. Over the fire-chamber B is placed a steam-boiler, D, through which the flues E from the fire-chamber may pass. Above the boiler or steam-generator there is a flue-space, F, in which the flue-pipes or tubes E terminate; and from this flue-space F the exit pipe or passage G leads to the chimney, stack, or other smoke-escape. Above the flue-space F, and around the exit-pipe G, there is a close chamber, H, which is connected with the interior of the steam-generator D by a steam-pipe, I, so that the pressure in the chamber H will be the same as in the boiler D, and said chamber acts as a steam-dome, or for containing the steam generated

in the boiler, and passing through the steam-pipe I. Into the chamber H is forced (against the pressure of the steam therein) a hydrocarbon, through the pipe J, by an apparatus like that of the Giffard injector, as shown in the drawings; and this hydrocarbon may be thus forced in in a heated condition, if so preferred, and without the use of pumps or power machinery of any kind, which very much simplifies the process of making the gas, and peculiarly adapts the apparatus and the process to private houses, as it requires no machinery to drive it, and no mechanical skill to operate it. The steam-generator may be supplied with water by another similar injector, as is now quite common with steam-boilers.

The chamber H being supplied with steam under the same pressure and heat as that in the generator D the hydrocarbon is forced into said chamber, and is mixed with the steam or hydro-oxygen therein, and this mixture of gases or vapors as taken from the chamber will burn with an intense heat and light, but it is not a fixed gas, and from the chamber I take these mixed vapors or gases to and through a retort filled with coke, iron parings, or any of the usual materials used in retorts to radiate heat and prevent their getting clogged up. In the preparation of the mixed vapors or gases in the heating-chamber I find that the oxygen if not liberated from the hydrogen is at least in condition to promote heat in the retort, as the moment the gases or vapors are introduced into the retort (filled or furnished with coke by preference) it becomes intensely hot without increasing the external heat in the furnace. The hydrocarbon and the hydro-oxygen seem to have more affinity for each other under pressure and heat than the constituents of the water from which the steam is made have, and when converted into a fixed gas by retorting it I find as the result a highly-illuminating and exceedingly cheap gas.

The injector is arranged as follows: *a* is a steam-pipe leading from the top of the generator D and attached to the body *b* of the injecting apparatus, which, in its construction and interior arrangement, is like the injector known as the Giffard, and which, being well known, need not be minutely described here. *c* is the waste-pipe of the injector, and *d* the pipe through which the hydrocarbon is drawn,

by the force of the escaping steam, from its reservoir, and by the same force is driven through the pipe *e* into the heating or vaporizing and mixing chamber H. The mixed vapors or gases are taken from the chamber H through the pipe *f* to and through the retort, filled, as before stated, with coke (by preference) or other material used in retorts when making gas for illuminating purposes, and thence to the gasometer or gas-main.

The steam in the heating and mixing chamber H, in addition to the heat and pressure it has from the generator, may be further heated or dried by its position over the flue-chamber F, where it is in direct contact with the heated products of combustion from the furnace, and the heated state or condition of the mixed hydrocarbon and hydro-oxygen gas or vapors materially promotes and economizes the after conversion of these mixed vapors or gases into a fixed gas in the retorting process.

Having thus fully described the nature, object, and purpose of my invention, what I claim therein as new, and desire to secure by Letters Patent, is—

1. The use of a close chamber for mixing a hydrocarbon and hydro-oxygen under heat and pressure, which mixture is to be afterward retorted to convert it into a fixed gas for illuminating purposes, as described.

2. In combination with the close heating or mixing chamber, an injecting apparatus worked by a volume of escaping steam to force the hydrocarbon into said chamber against the pressure of steam therein, substantially as described.

LEVI STEVENS.

Witnesses:

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EDM. F. BROWN.