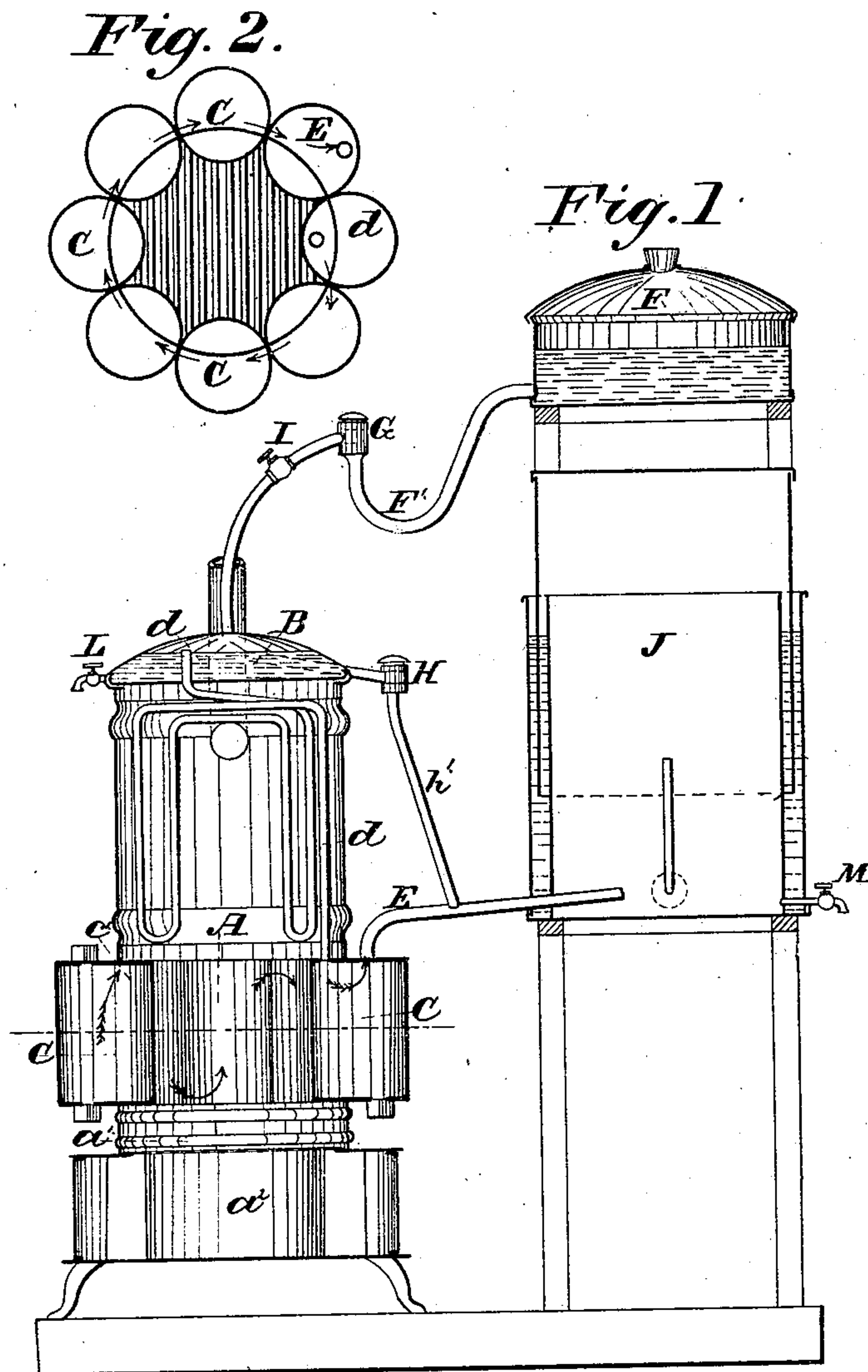


W. M. SLOANE.

PORTABLE GAS GENERATING FURNACE.

No. 70,477.

Patented Nov. 5, 1867.



Witnesses:

B. H. Muehle  
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# UNITED STATES PATENT OFFICE.

WILLIAM M. SLOANE, OF BUFFALO, NEW YORK.

## IMPROVED PORTABLE GAS-GENERATING FURNACE.

Specification forming part of Letters Patent No. 70,477, dated November 5, 1867.

*To all whom it may concern:*

Be it known that I, WILLIAM M. SLOANE, of the city of Buffalo, county of Erie, and State of New York, have invented a certain new and Improved Portable Gas-Generating Furnace; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure I is a vertical section of my improved apparatus. Fig. II is a horizontal section of the furnace.

The nature of this invention consists, first, in the combination and arrangement of a vaporizing-chamber with a common heating furnace or stove; second, in surrounding the fire-chamber of a common heating furnace or stove (wholly or partly) with a number of gas-retorts; third, in the combination and arrangement of a vaporizing-chamber and a number of gas-retorts with a common heating furnace or stove; fourth, in the application and use of an automatic valve for regulating the supply of the hydrocarbon fluid from a supply-tank to the vaporizing-chamber; fifth, in the application and use of an automatic valve for discharging the surplus gas generated in the vaporizing-chamber and retorts into the smoke-flue of the furnace; sixth, in the combination of a gasometer with the vaporizing-chamber, retorts, and regulating-valve.

Letters of like name and kind refer to like parts in each of the figures.

A represents the fire-chamber of a heating furnace or stove of any common construction.  $a^1$  represents the grate, and  $a^2$  the ash-pit, of the same. B represents a vaporizing-chamber, which is located above the fire-chamber of the stove, and is made air and water tight. C C represent a number of retorts which are arranged around the fire-chamber A. They consist of upright cylinders, which may be cast in one piece, and are erected upon the outer edge of the fire-grate in such manner that a portion of their surface forms the wall of the furnace.

A tube,  $d$ , leads from near the top of the vaporizing-chamber down through the furnace into one of the retorts, for the purpose of conducting the vapor which arises from the hydrocarbon fluid in the chamber B down into

one of the retorts where the gas is generated. Communication between the retorts is established by means of openings  $c'$ , made in the partitions or contiguous walls thereof, one near the top and the next near the bottom, and so on alternately. Thus the gas accumulating in the first retort will be forced into the second, and all the others successively, being perfected in its passage until it arrives in the last retort, from which it is conducted by means of the main gas-pipe E. The number and heating-surface of these retorts determine the amount of gas which can be produced and the time in which it can be made, so that the capacity of my gas apparatus may be increased or diminished by increasing or diminishing the number or size of the retorts.

F represents the supply-tank, from which the hydrocarbon fluid is supplied and conducted to the vaporizing-chamber through the pipe F'. G represents a valve for regulating the feed of the hydrocarbon to the chamber B.

The supply-tank F is located at a sufficient elevation above the chamber B to allow the fluid to descend from the former through the valve to the latter. As long as the pressure of the fluid in the pipe downwardly is sufficient to keep the valve open a steady feed will be insured; but as soon as the gas is generated in sufficient quantity to produce a counter-pressure within the feed-pipe F the force of the descending column of fluid will be overcome and the valve closed. The valve is for this purpose weighted, so as to close at a certain given pressure of the gas, and a perfectly automatic feed of the hydrocarbon fluid is obtained.

H represents another automatic valve located within a waste-pipe,  $h'$ , branching off from the main gas-pipe E, and connecting with the smoke-flue of the furnace or stove. This valve is weighted heavier than the valve G, so that it will remain closed until gas is generated so quickly and in such quantity as to force it open and permit the escape of the surplus gas into the smoke-flue. As soon as the gas is again reduced to below a certain pressure the valve will close automatically. The importance of this valve will be understood when, for instance, large numbers of jets of gas, supplied by this apparatus, are turned off



at once. The feed, of course, will be stopped instantaneously, the valve G being closed by the slightest counter-pressure of the gas from within the generator; but there must necessarily be a large quantity of hydrocarbon in the vaporizing-chamber, from which gas will be generated in consequence of the heat of the furnace. This gas will expand and seek an outlet, and when its pressure exceeds that of the weight on the valve H the same will open and allow the surplus gas to escape into the chimney. This occasions from time to time a considerable loss of good and valuable gas; and in order to prevent this waste of gas, I use, in combination with my improved gas-generating furnace, a gasometer, J, of any convenient size, which is connected by means of the gas-pipe E with the retorts, and is constructed in a common manner. It is placed within a frame-work, which prevents the rising of the inverted cylinder above a certain point. This gasometer will in some degree serve the same purpose as the valve H; but instead of allowing the surplus gas to escape and waste, it will connect it and save it for a time when it may be needed and made useful. In large halls, where a large number of lights are often turned off at once, it will be found best to use both the gasometer J and the waste-valve H.

I represents a stop-cock in the pipe F' for stopping and starting the generating of the gas, whenever required, without disturbing the operation and efficacy of the furnace or stove as a heater. L is a stop-cock, placed in the bottom of the vaporizing-chamber B, by means of which the refuse of the hydrocarbon fluid

which might collect there may be drawn off from time to time. M represents a stop-cock passing through both the cylinders of the gasometer, for drawing off any hydrocarbon that may collect in the bottom produced by condensation or otherwise.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination and arrangement of the vaporizing-chamber B with a common heating furnace or stove, A  $a^1 a^2$ , for the purpose and substantially as described.

2. The combination and arrangement of the retorts C C with the fire-chamber of a common heating furnace or stove, for the purpose and substantially as herein described.

3. The combination and arrangement of the furnace or stove A  $a^1 a^2$ , vaporizing-chamber B, retorts C C, and conducting-pipe d, in the manner and for the purpose substantially as set forth.

4. The valve G, for automatically regulating the supply of the hydrocarbon fluid to the vaporizing-chamber B, substantially as described.

5. The valve H, for automatically removing or conducting the surplus gas into the smoke-flue of the furnace, substantially as described.

6. The combination of the gasometer J, gas-pipe E, branch pipe h', and waste-valve H, for operating in the manner and for the purpose substantially as herein described.

WM. M. SLOANE.

Witnesses:

B. H. MUEHLE,  
EDW. WILHELM.