

J. Green,

Gas Furnace.

No. 86,529.

Patented Feb. 2, 1869.

Fig. 1.

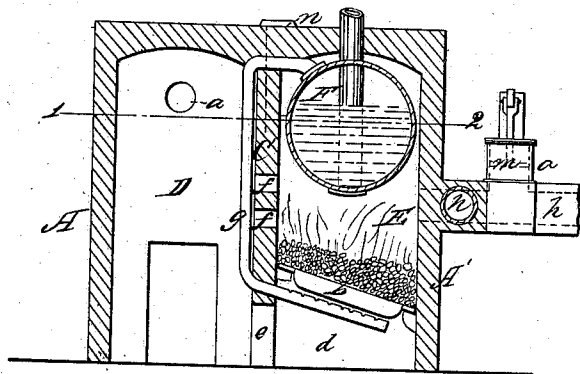


Fig. 2.

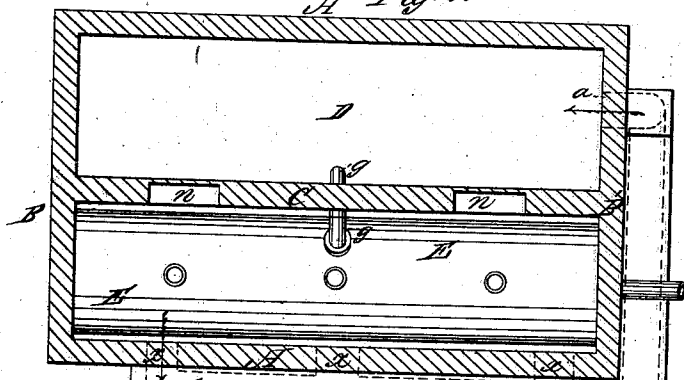
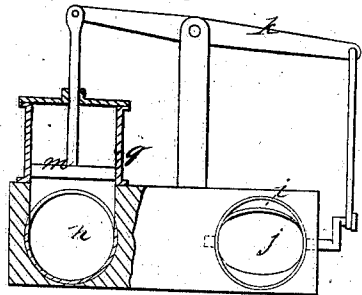


Fig. 3.



Witnesses:

John Parker

Inventor:

J. Green

United States Patent Office.

JACOB GREEN, OF NORRISTOWN, PENNSYLVANIA.

Letters Patent No. 86,529, dated February 2, 1869.

IMPROVED GAS-PRODUCING APPARATUS FOR USE IN METALLURGY, GLASS-MAKING, AND FOR OTHER PURPOSES.

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, JACOB GREEN, of Norristown, Montgomery county, Pennsylvania, have invented certain Improvements in Gas-Producers; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to apparatus for producing inflammable gases, to be used in furnaces situated at a distance from the producer, and my invention consists—

First, in combining with a gas-generating chamber a compressed air-chamber, communicating with the said generating-chamber below the grate, all substantially as described hereafter, so that the supply of air under pressure, for supporting combustion, may be uniformly distributed beneath the said grate.

Secondly, in admitting the air at or near the top of the compressed-air chamber, and permitting it to escape, at or near the bottom of the same, into the ash-pit, as described hereafter, so that the attendants, whose duty it is to manipulate the fire, may not be exposed to deleterious gases.

Thirdly, the combination, substantially as described, of a steam-boiler with a gas-producing chamber, so that an economical supply of steam or water may be discharged below the grate.

Fourthly, causing the compressed gases, after leaving the generator, to control the supply of air to the compressed-air chamber, by the devices hereinafter described, or any equivalents thereto.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation, reference being had to the accompanying drawing, which forms a part of this specification, and in which—

Figure 1 is a transverse section of my improved gas-producer;

Figure 2, a sectional plan on the line 1-2, fig. 1; and Figure 3, a vertical section on the line 3-4, fig. 2.

Similar letters refer to similar parts throughout the several views.

The structure used in the present instance, for carrying out my invention, consists of the side walls A and A', the end walls B and B', and the partition-wall C, the whole being properly roofed, and arranged so as to enclose the two chambers, D and E, the former being the compressed-air chamber, and the latter the fire or gas-producing chamber.

In the air-chamber D, near the roof, is an opening, *a*, through which to force a supply of air, and in the chamber E is a grate, *b*, (inclined in the present instance,) for receiving the fuel.

A number of openings, *c*, in the partition-wall C, afford communication between the air-chamber D and the ash-pit *d*, beneath the grate, and above these openings, and in the same partition-wall, is a series of holes, *f*, which are provided with detachable stoppers, and the use of which will be rendered apparent hereafter.

In the chamber E is built a boiler, F, from which steam is permitted to pass, through a pipe or pipes, *g*, into the ash-pit, immediately below the grate.

The steam may be here discharged, in jets or volumes, by any suitable arrangement of pipes, or water may be discharged upwards in jets to the grate-bars, when it is quickly converted into the desired steam.

The steam decomposed, by passing through the fuel, unites with the products of combustion, and the combined gases are permitted to pass from the fire-chamber E, through openings *x* in the side wall A, into the main gas-flue *h*, adjacent to which is arranged the compressed-air passage *i*, and in the latter is a throttle-valve, *j*, connected to one end of a beam, *k*, to the opposite end of which is connected a piston, *m*, closed at the top, but communicating below with the main gas-flue *h*.

There are one or more doorways in the side or end walls of the chamber D, through which access can be gained to the latter, and from which the ashes may be withdrawn, the doorways, however, being in all cases furnished with tightly-fitting doors.

The fuel may be deposited on the grate, through vertical passages *n* in the partition C, or the boiler may be provided with vertical tubes, through which the fuel can be dropped on to the grate.

It is not essential that there should be a boiler above the fire, as steam or water under pressure may be conveyed from any adjacent boiler or reservoir to the ash-pit; but where there is no such boiler, it is advisable, on the score of economy, to place it in the fire-chamber, as described. Moreover, the location of a boiler at this point tends to absorb the heat and cool the gas, thereby rendering it more dense.

The gas that is the products of combustion, combined with the decomposed steam, is forced from the fire-chamber, through the passage *i*, to the furnace, where it has to be consumed.

Should the volume and pressure of gas in the flue *h* increase, the piston *m* will rise in the cylinder *g*, and operate the throttle-valve *j*, so as to diminish the area of the air-passage, while a diminution of the pressure of gas will insure a corresponding increase of the area of the air-passage. The result of this is a comparatively uniform discharge of gas, and the beam *k* can be so weighted as to insure uniformity of action.

It will be evident, however, that it is not necessary to adhere to the regulating-apparatus illustrated and described in carrying out this feature of my invention, as other devices, equally efficient, may be employed as media for causing the gases to regulate the supply of air.

The fuel may be manipulated by suitable instruments, inserted through the openings *f f* in the partition-wall C, and the grates may be cleaned from time to time from below, through the openings *e*. As the presence of attendants is necessary in the compressed-

air chamber for performing these duties, it is important that the fresh air should be admitted at the top, thereby maintaining the chamber in a condition free from deleterious gases. The air, too, admitted at the top into a large chamber, insures an uniform distribution of the compressed air to the ash-pit.

The maintenance of the gas under pressure within the fire-chamber has this beneficial effect, among others: slight leakages are readily detected, and are as easily repaired, whereas, in the absence of the pressure, the outward air would have a tendency to find its way, without being observed, into the gas-flue, and to there consume the gases at a point where the consumption is equivalent to a waste of fuel. Moreover, the consumption of the gases in the flues by the admission of air, resulting from the absence of internal pressure, causes the rapid destruction of the flues themselves, if not made of very refractory and expensive material.

Without confining myself to the exact form of structure, or to the precise arrangement of parts described, I claim as my invention, and desire to secure by Letters Patent—

1. The combination, with a gas-generating chamber, of a compressed-air chamber, communicating with the said generating-chamber below the grate, all substantially as and for the purpose herein set forth.

2. The said compressed-air chamber, having an opening, or openings, at or near the top, for the admission of air under pressure, and discharge-openings below, into the ash-pit, as and for the purpose specified.

3. The combination, substantially as described, of a steam-boiler with a gas-generating chamber.

4. Causing the compressed gases, after leaving the generator, to control the supply of air to the compressed-air chamber, through the medium of the devices herein described, or any equivalent to the same.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JACOB GREEN.

Witnesses:

JOHN WHITE,
HARRY SMITH.