(No Model.) 2 Sheets—Sheet 1.

M. V. SMITH.

GAS PRODUCER.

No. 346,781. Patented Aug. 3, 1886.

Fig. 1.

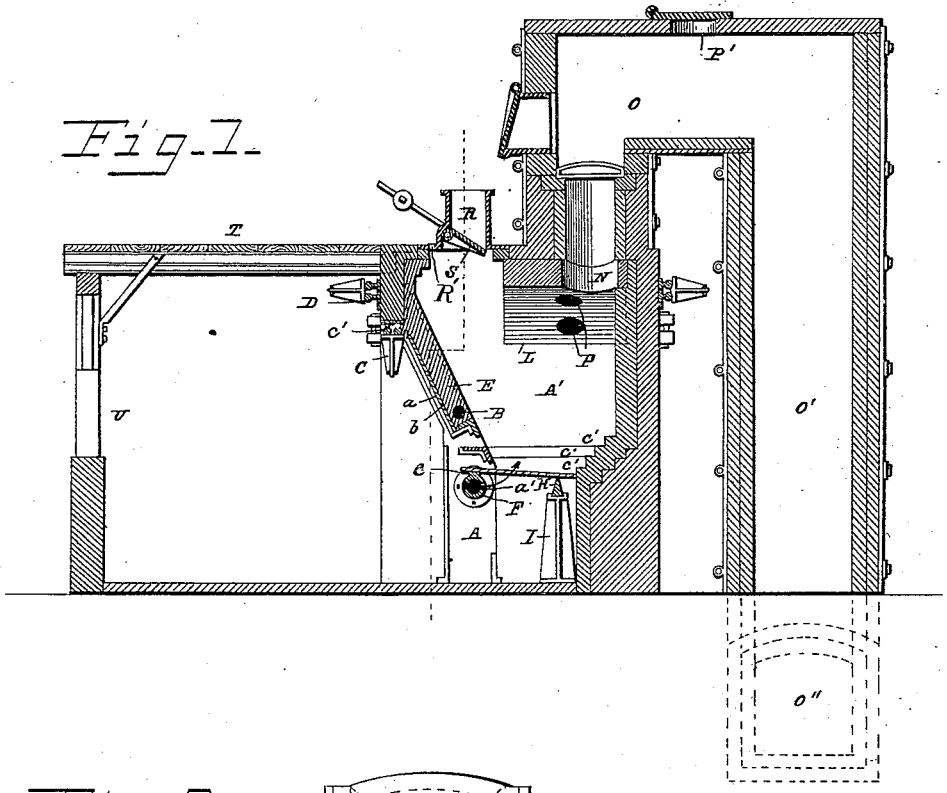
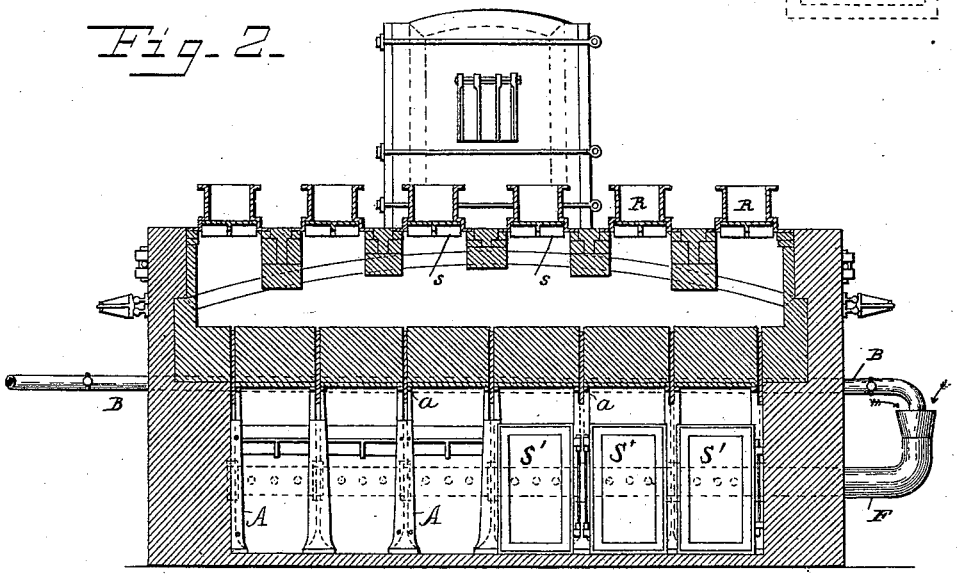


Fig. 2.



WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

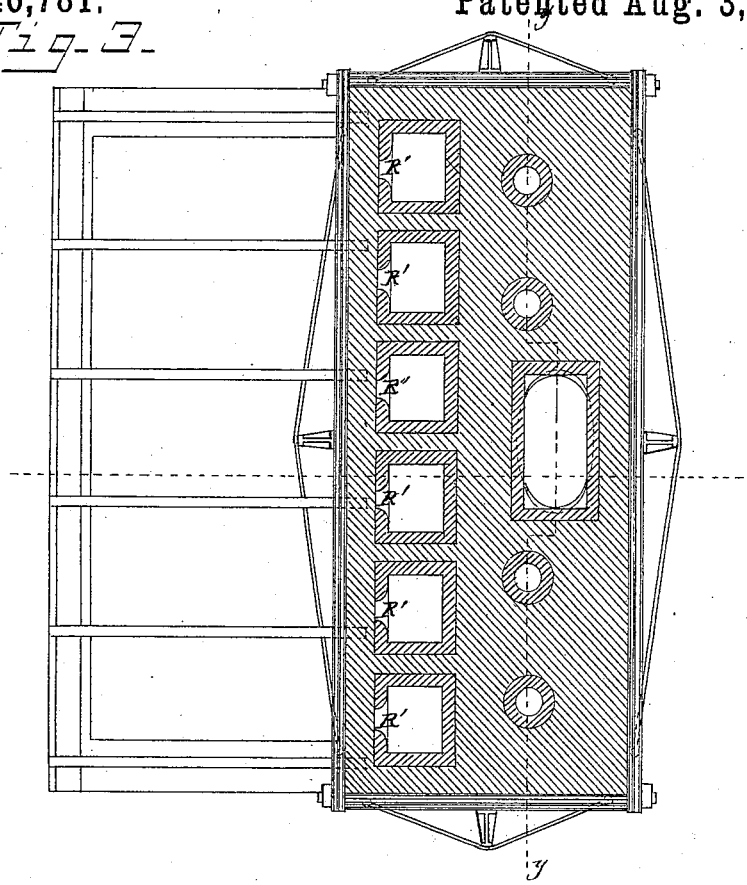
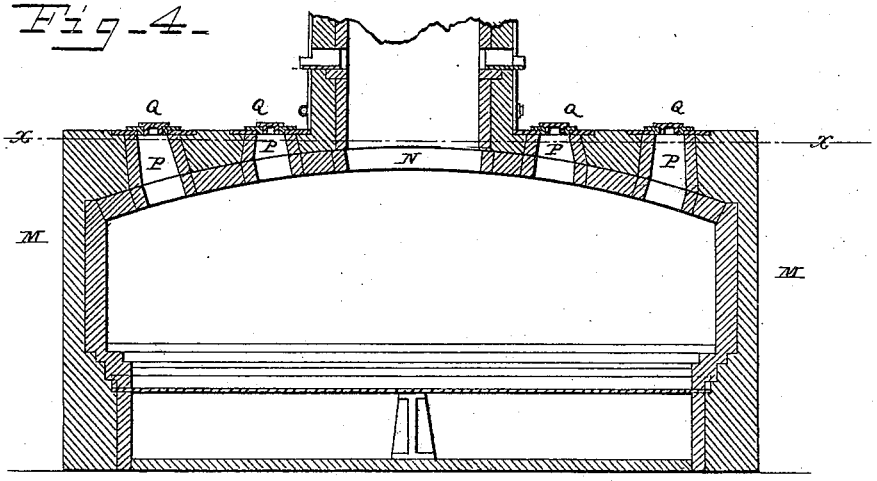


Fig. 4.



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UNITED STATES PATENT OFFICE.

MARTIN V. SMITH, OF TYRONE, PENNSYLVANIA.

GAS-PRODUCER.

SPECIFICATION forming part of Letters Patent No. 346,781, dated August 3, 1886.

Application filed June 5, 1885. Serial No. 167,773. (No model.)

To all whom it may concern:

Be it known that I, MARTIN V. SMITH, a citizen of the United States, residing at Tyrone, in the county of Blair and State of Pennsylvania, have invented certain new and useful Improvements in Gas-Producers, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in gas-producers, and belongs more especially to that class known as "gas-generators for regenerator gas-furnaces."

The object of my invention is to provide a gas-producer for regenerator gas-furnaces which will be cheap in construction, simple in its parts, and effective in operation.

My invention consists in constructing the columns or supports separate, so that two, three, or more sections or batteries can be used, as desired, to build producers of different or varying capacities and inclosing the same under one roof or arch.

My invention consists, further, in placing the opening for the egress of gas from the producer in the top of the arch, so that the gas is drawn out at the highest point in the arch.

My invention consists, further, in placing a sectional perforated pipe for the admission of steam and air to the fuel, so as to extend through the legs or supports, and form a support for the front ends of the grate-bars.

My invention consists, further, in passing the steam-supply pipe through the fire-brick in the front wall of the furnace and causing it to discharge the steam in a superheated condition into the perforated pipe which distributes it into the bottom of the furnace.

My invention consists, further, in locating the poke-holes in the front side of the plates or flange or the coal-hoppers.

Other novel and important features of my invention will be described hereinafter and pointed out in the claims.

Referring to the drawings, Figure 1 is a vertical longitudinal sectional view of my producer. Fig. 2 is a transverse sectional view. Fig. 3 is a sectional plan view taken on the line *x x* of Fig. 4. Fig. 4 is a sectional view on the line *y y* of Fig. 3.

A indicates the columns which support the front of the coking-chamber A′ and also the sections of perforated pipe which support the front ends of the grate-bars. The columns or supports A are made angular, as shown, so that the top of said columns project back and rest on the girder C′ or the ends built in with the masonry D, which will hold the tops of said columns securely in position. The columns or supports A are also provided with flanges *a*, cast thereon, which support the metal plates *b*, said metal plates forming the support for the fire-brick or furnace-lining E.

F is a perforated pipe composed of sections which are of the same length as the distance between the columns or supports, the ends of said pipes being flanged and provided with holes to receive bolts, which secure the ends of the pipe together or to the columns or supports A, said columns being provided with openings to permit the steam and air to pass from one section of pipe to another. The pipe-sections F are provided with a ledge or projection, *c*, on top, to support the front end of the grate-bars.

B is a steam-pipe, which passes through the furnace-lining, and is connected at one end with a steam-boiler or other suitable source of supply, while the other end is bent down to enter the flaring or funnel-shaped end of the pipe F, which extends through the side wall of the producer. Two steam-pipes may be arranged to pass through the lining of the furnace and the steam admitted at both ends of the pipe F. In this construction the pipe F is provided with a partition or stop at its center, so that the steam from one supply-pipe will be admitted to one side of the furnace only. This construction is a very desirable feature where large producers are required; but for ordinary work and in small producers one steam-supply pipe will be sufficient. By having the steam-supply pipe or pipes to pass through the lining of the furnace the steam is superheated, and in its passage into the pipe F draws the air in with it, as indicated by the arrows in Fig. 2, and the air and steam is forced through the apertures *a′* into the furnace, thus securing the proper admixture of air and steam. The inner ends of the grate-bars are supported by the triangular bar H, said triangular bar being supported on one or more columns, I, located in the rear of the ash-pit. The back wall of the furnace or coke chamber is provided with a series of ledges or

offsets, c', which serve for the support of the rear end of the slider-bars used in cleaning the fires.

L is the roof or arch of the coke chamber or producer, the ends of which are supported by the end walls, M, the front, rear, and end walls of the coke chamber or producer being bound together by the usual tie rods or clamps.

N is an opening in the crown or highest point of the arch, through which the gas escapes as soon as formed in the producer to the pipe or conduit O, and thence down the flue O′ to the horizontal flue O″, and through the valves to the combustion-chamber of the melting-furnace, or to a suitable holder or storage-chamber. By taking the gas out through the highest point or crown of the arch I am enabled to use all of the chamber A′ for coking and gas-producing purposes, and the capacity of the producer is thereby increased.

P P are openings in the roof or arch of the producer provided with suitable covers, Q. These openings are located at the rear of the coal-hoppers R, and serve as poke-holes, through which the tools are inserted to work the coal back into the coking-chamber after it has been dropped into the hoppers R, said hoppers being provided with the usual gravity doors or valves, S.

T is the floor on which the workmen stand to charge the producer with coal, the front end of said floor being supported by the girders C′ and wall of masonry D, while the rear of said floor is supported by suitable framework, V. The flues leading from the producer are lined with fire-brick, thus dispensing with the usual iron pipes or tubes, thereby increasing the life and usefulness of the producer. The flue O is provided on its upper side with an opening, P′, which is closed by a door, P″, and when it is desired to burn the soot out of the flues the door P″ is opened and the dampers so arranged as to drive the flame out of the opening P′, instead of toward the valves, as heretofore practiced. This is an important feature of my invention, as it prevents the valves which control the supply and direction of the gas and air to the combustion or melting furnace from becoming warped or injured from overheating, as the cold air is brought into contact with the valves, instead of the hot air and flame.

It will be noticed that by casting the supports or columns A with side flanges, and placing them as shown and described I am enabled to make large or small producers to meet the requirements of the trade without having to make special castings for them—*i.e.*, a small producer would require only two or three sections, while a large producer would require five, six, or more sections, as the case may be.

It will be apparent to any one skilled in devices of this class, that by the construction herein shown and described, I am enabled to build a cheap and reliable producer.

R′ are openings in the base-plates in the front side of the coal-hoppers, as shown in Fig. 3, through which the proper tools may be inserted to move the coal back from the upper edge of the front wall of the producer.

S′ are doors hinged to the columns or supports in the usual manner, and serve to close the front of the furnace.

I am aware that a gas-generator having perforated steam-pipes arranged below and extending under the grate has before been used; also, that side plates held by vertical bars, which plates were made removable by loosening the bars have also been used, and such I do not claim; but,

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

1. The supporting-columns provided with the side flanges, *a*, for supporting the plates, as *b*, substantially as described, whereby the columns are interchangeable, and whereby also said columns are adapted for use in constructing furnaces of varying sizes, as set forth.

2. In furnaces for gas-producers, the angular columns A, adapted to be secured at their upper ends to the girders C′ or wall D, and provided with lateral ribs or projections *a*, in combination with the plates or supports *b* and lining E, as set forth.

3. The sectional perforated pipe F, having flanges for connecting them together or to the columns or supports, as described, provided with the rib or flange *c*, for supporting the grate-bars, as set forth.

4. In a gas-producer for gas-furnaces and other purposes, the steam-pipe B, located in and passing through the walls of the furnace, in combination with the perforated pipe F, composed of flanged sections connected as described, and located under the grate-bars, whereby the steam is injected into the furnace in a superheated condition, substantially as set forth.

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

MARTIN V. SMITH.

Witnesses:
N. D. ADAMS,
MARY BARKER.