

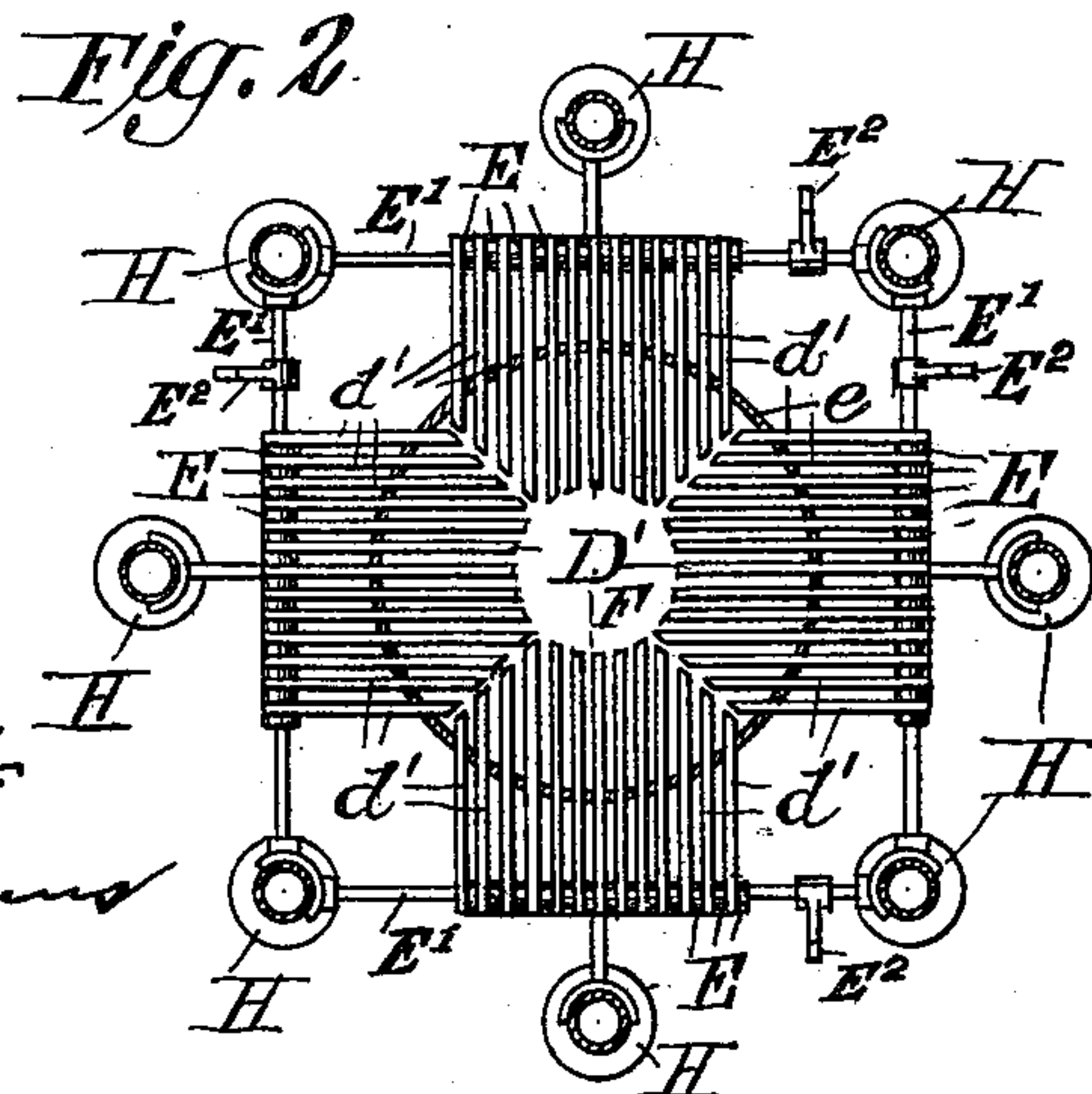
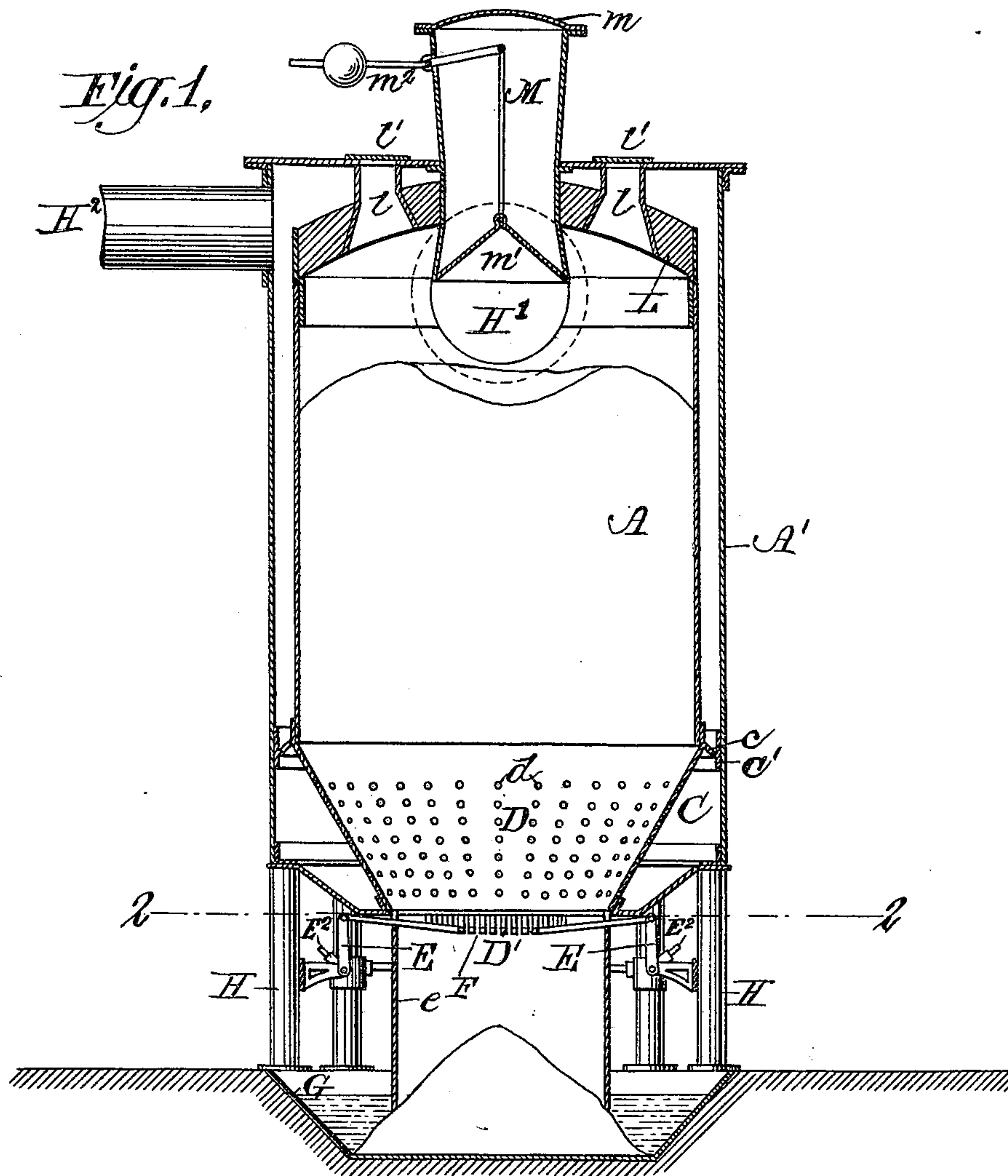
No. 675,359.

Patented May 28, 1901.

G. A. ORROK.  
GAS PRODUCER.

(Application filed Apr. 19, 1900.)

(No Model.)



WITNESSES:

*Robert L. Mills.*  
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# UNITED STATES PATENT OFFICE.

GEORGE A. ORROK, OF BROOKLYN, NEW YORK, ASSIGNOR TO FUEL ECONOMY AND ENGINEERING COMPANY, OF NEW JERSEY.

## GAS-PRODUCER.

SPECIFICATION forming part of Letters Patent No. 675,359, dated May 28, 1901.

Application filed April 19, 1900. Serial No. 13,432. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE A. ORROK, of Brooklyn, New York, have invented a certain new and useful Improvement in Gas-Producers, of which the following is a specification.

This invention relates to that class of apparatus designed for the production of a combustible gas from air or air and steam forced through a mass of incandescent fuel, the so-called "producer-gas."

The invention embodies an arrangement and relation of parts particularly directed toward facilitating the ready working of the apparatus to effecting a preheating of the air or the air and steam before passing the same through the incandescent material or a superheating of the same, or both, and various other features and combinations, all of which are set forth with the aid of the accompanying drawings in the following specification.

The novelty of the invention will be more particularly described in the claims appended hereto.

In the drawings above referred to, Figure 1 represents a central vertical section through a gas-producer embodying my invention, and Fig. 2 a transverse section thereof taken on the plane of the line 2 2.

Similar letters of reference designate corresponding parts in both figures.

A designates the body of the producer, preferably cylindrical in form and surrounded by an annular shell A'. These two parts are of such relative diameters as to form an intermediate annular space or jacket through which the air or air and steam passes prior to its delivery to the lower portion of the mass of incandescent fuel. In this chamber a preheating of the air or air and steam is effected. This preheating-space is shown to extend from the top and above the body A to the bottom of the same, and at its bottom it delivers the air or air and steam into the blast-chamber or twyer-box C through perforations c in the fixture C', connecting the body and the surrounding shell.

In the apparatus illustrated the blast-chamber C is annular in form and surrounds the downwardly-tapering conical bosh-plate D, perforated with a multiplicity of twyers d. These latter are preferably distributed sub-

stantially uniformly throughout the entire area of the bosh-plate for the purpose of obtaining an equable and uniform air-current over the entire horizontal cross-sectional area of the overlying fuel.

While the chamber C has been defined as a blast-chamber or twyer-box in that it is from this chamber the air or mixed air and steam issues through the bosh-plate, it performs a further function. Lying adjacent to the zone of the fuel of the highest temperature, the contained air or air and steam is subjected to a further heating before its exit, which may be more properly defined as a superheating of the air or air and steam, the blast-chamber or twyer-box constituting additionally, therefore, a superheating-chamber.

Much difficulty is experienced in the practical operation of a producer in freeing the material from clinker. If this is allowed to accumulate to any considerable degree, its presence interferes seriously with the satisfactory feed of the carbonaceous material through the producer, besides exerting an injurious effect upon the quality of the gas produced, &c. An absolute essential to a satisfactory producer is some effective device for breaking up and removing the clinker. This result is attained with a minimum outlay of labor by embodying in the producer, in combination with the bosh, a positively-operating grate which shall be capable of stirring up the mass of clinker and breaking the same up into pieces small enough to be removed. I prefer a form of grate which shall accomplish this result according to this mode, as distinguished from a form of grate in which the clinker is ground out, on account of the much greater labor involved in the use of a grinding-grate.

It is true if a bosh is used composed of bars that poke-bars may be inserted through the spaces between the former bars and the clinker broken up; but it is an object of this invention to obviate as much as possible the necessity for the manual employment of poke-bars by combining with a bosh of the form described a grate whose function and results attain the same end by a much less expenditure of manual labor. This grate will now be described.



Below the bosh-plate is arranged the grate D', which in the form here represented comprises a number of sets of bars  $\bar{d}'$ , the bars in each set being substantially parallel to each other. As here shown, there are four sets of these bars, and the various sets are combined with a device or devices to facilitate the shaking of the grate and the removal of clinkers. The device represented may be adopted. Each bar  $\bar{d}'$  at its outer extremity is hinged to a lever E, secured to a rocking bar E', journaled in a suitable manner. Intermediate of its ends each bar  $\bar{d}'$  is supported vertically in a manner to permit of its free lengthwise movement, as well as allowing it to rock freely upon its support. For instance, it may rest in a slot formed in the water-seal cylinder e, projecting downwardly from the bosh-plate. To the rocking bar E' is secured an arm E<sup>2</sup>, which is fashioned to receive the end of a manually-operated shaking-bar. The relation of the grate-bar, its support, and its connection are such as to cause the withdrawal of the bars from their position and the elevation of their inner ends when the rocking bar is moved in its supports. This action will assist in freeing the grate of any clinkers during the shaking down of the ashes. A center opening F through the grate is left for the passage of the ashes. The ashes accumulate in the water-seal tank G, being drawn out by hand from under the cylindrical projection e, before referred to.

Any appropriate construction for supporting the apparatus may be adopted, that here shown comprising the supporting-columns H.

A common arrangement and construction of the parts are shown at the upper portion of the apparatus, as these features constitute no part of my present invention. These parts comprise a fire-brick or other heat-resisting arch L, through which extend poke-holes  $\bar{l}$ , one or more in number, closed by covers  $\bar{l}'$ . The feeding-hopper is shown at M closed at the top by the removable cover  $m$  and at the bottom during the charging of the hopper by the spreading-cone  $m'$ , held up in place by the weighted lever  $m^2$ .

H' is the gas-outlet leading to the gas-main,

(not shown,) and H<sup>2</sup> the inlet for air entering the preheating-chamber.

Having described my invention, what I consider as new, and desire to secure by Letters Patent, is—

1. A gas-producer comprising in combination, a cylindrical body having an annular, surrounding preheating-chamber, a lower conical bosh-plate provided with openings or holes forming twyers, and a grate below the bosh-plate embodying means for raising the mass of clinker and breaking the same up.

2. A gas-producer comprising in combination, a cylindrical body having an annular, surrounding preheating-chamber, a blast-chamber or twyer-box, a lower conical bosh-plate provided with openings or holes forming twyers and constituting one wall of the blast-chamber or twyer-box, and a grate below the bosh-plate embodying means for raising the mass of clinker and breaking the same up.

3. A gas-producer comprising in combination, a cylindrical body having an annular, surrounding preheating-chamber extending above the body, a blast-chamber or twyer-box, a lower conical bosh-plate provided with openings or holes forming twyers, and a grate below the bosh-plate embodying means for raising the mass of clinker and breaking the same up.

4. A gas-producer comprising in combination, a cylindrical body having an annular, surrounding preheating-chamber extending above the body, a blast-chamber or twyer-box, a fixture between the said preheating-chamber and the blast-chamber through which the air passes from the former to the latter, a lower conical bosh-plate provided with openings or holes forming twyers, and a grate below the bosh-plate embodying means for raising the mass of clinker and breaking the same up.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

GEORGE A. ORROK.

Witnesses:

JOHN H. BROWNE,  
PIERSON L. WELLS.