J. A. HERRICK.

GAS PRODUCER.

APPLICATION FILED JULY 24, 1908.

999,784.

Patented Aug. 8, 1911.

2 SHEETS—SHEET 1.

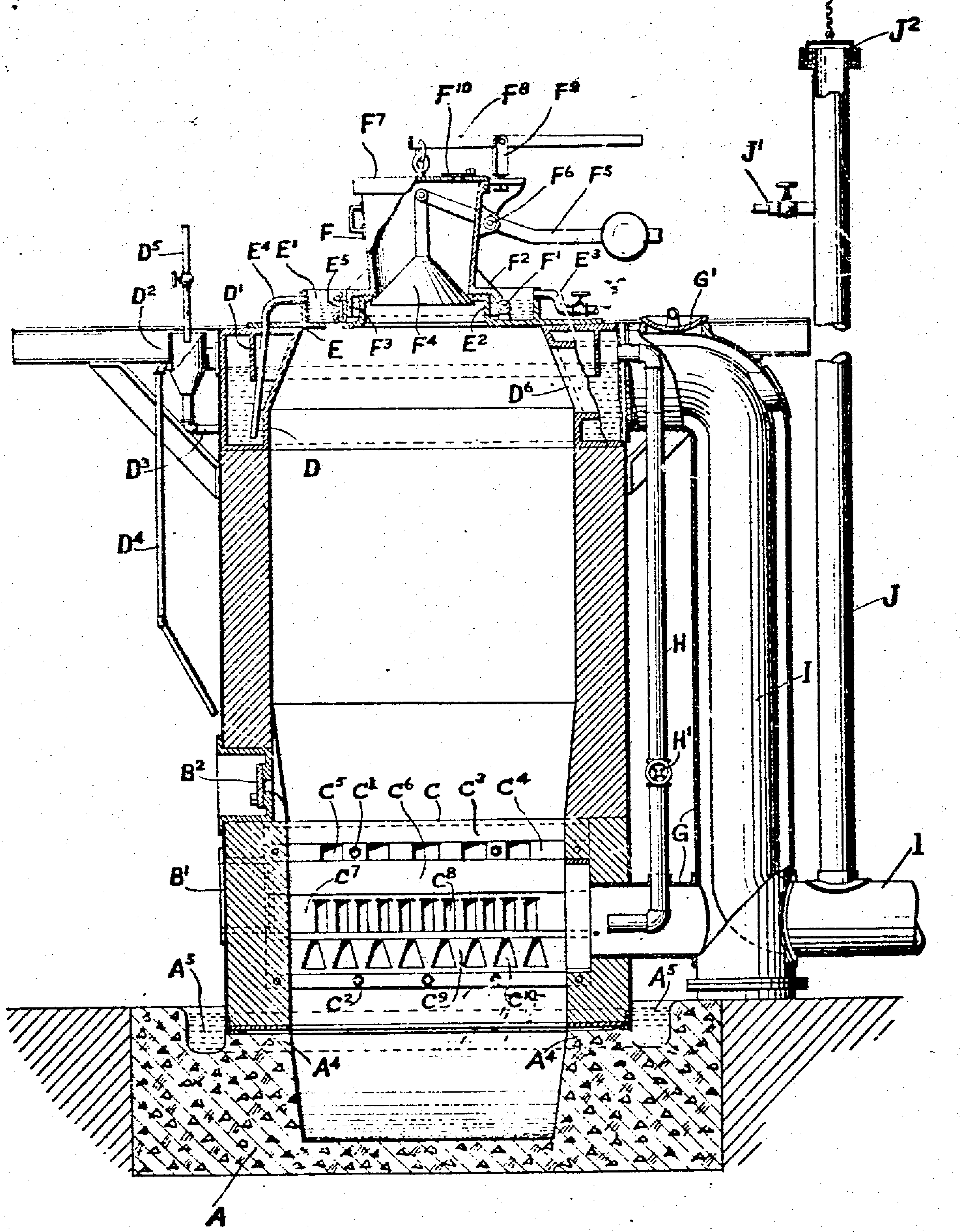

FIG. 1.

WITNESSES:

Robt R. Kitchel

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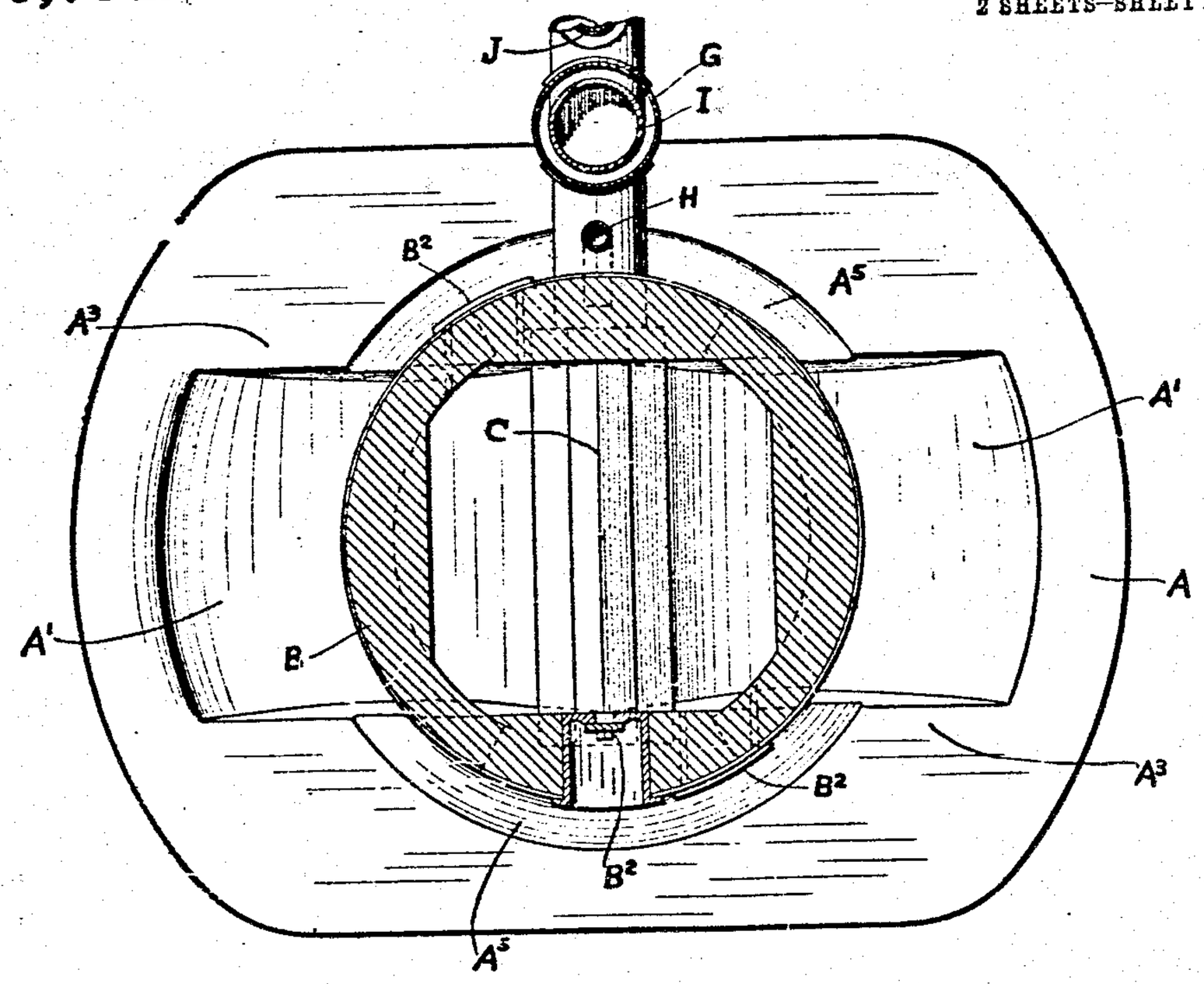

FIG. 2.

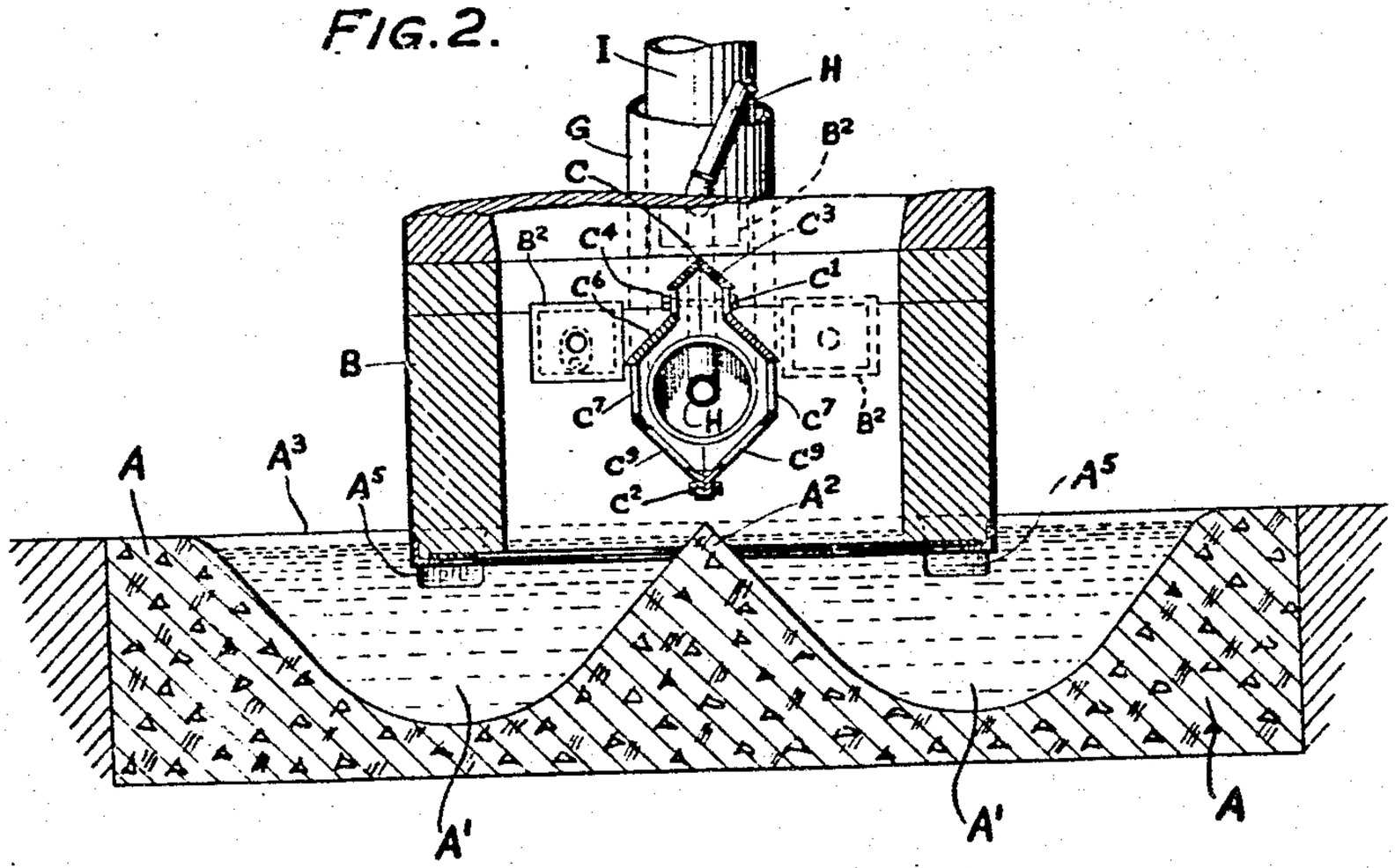

FIG. 3.

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UNITED STATES PATENT OFFICE.

JAMES A. HERRICK, OF NEW YORK, N. Y.

GAS-PRODUCER.

999,784. Specification of Letters Patent. Patented Aug. 8, 1911.

Application filed July 24, 1908. Serial No. 445,070.

To all whom it may concern:

Be it known that I, JAMES A. HERRICK, a citizen of the United States, residing in the city of New York, county of New York, and State of New York, have invented certain Improvements in Gas-Producers.

This invention is an improved gas producer designed particularly for burning small anthracite coal to produce gas for plants requiring a limited amount of power, but also adapted for producing large volumes of gas either from anthracite coal, or, with slight changes, from bituminous coal.

In the usual gas producers, of the suction type, for burning small anthracite coal, the following serious faults are encountered which it is the object of my improvements to correct. In prior producers of this type the constructions are complex, costly and difficult to operate: leakage of gas and uncontrolled ingress of air are common; viewing, poking and preventing cinders from building up from the sides are difficult so that producers cannot be run continuously; combustion is not regular owing to imperfect means for supplying and distributing air and steam; steam and heated air are supplied at considerable cost both for apparatus and operation, and the producer tops are heated so that they are frequently warped and destroyed.

The characteristic features of my improvements will appear from the following description of the accompanying drawings in illustration thereof.

In the drawings, Figure 1 is a vertical sectional view of a producer embodying my improvements: Fig. 2 is a horizontal sectional view thereof; Fig. 3 is a vertical sectional view of the lower part of the construction taken at right angles to the view shown in Fig. 1.

As shown in the drawings, the base A contains the water seal and ash basins A′ separated by the ridge A^2 which terminates in an angle, the intersecting slopes forming the ridge being inclined so as to throw outward ashes falling thereon. The parallel walls A^3, forming sides for the basins, carry the circular producer body B, the base having below the general level thereof the piers A^4 for supporting the base and the circular channels A^5 communicating with the basins from which they receive water to seal the lower part of the body. Extending across the body above the ridge and parallel thereto is the blast box C which is formed in two similar parts separated on a longitudinal vertical plane and connected together by bolts C′ and C^2 passing through the tops and bottoms thereof. The two parts of the blast box have the inclined tops C^3 which join together to form a sharp ridge, the vertical walls C^4 containing the apertures C^5 immediately beneath the parts C^3, the outwardly inclined walls C^6 immediately beneath the walls C^4, the vertical walls C^7 containing the apertures C^8 immediately beneath the walls C^6, and the inwardly inclined walls C^9 coming together under the ridge and containing the apertures C^{10}. These apertures are placed and proportioned so that they deliver and distribute the blast in the most efficacious manner.

The producer body is provided with a manhole B′ in line with the blast box, by which access is had to its interior through the rear end, and with capped poke holes B^2, by which access is had to the regions above and on either side of the blast box, to break up clinkers tending to form there. A hollow ring D, forming a closed channel having the diaphragm D′ in its top, forms the upper part of the body. A funnel D^2 is connected through its bottom by the pipe D^3 with the lower part of the channel and at a higher level discharges through an overflow pipe D^4 into the channel A^5, water being admitted to the funnel by a pipe D^5 whence it flows into the channel D to the level of the outlet through the pipe D^4. In the ring D, at suitable intervals, are the poke holes D^7 having the cylindrical bearings D^8 for balls D^9 through which passes a closely fitting poker D^{10} into the producer body to stir the fuel, the poker being withdrawn from the balls and the latter turned to close the holes. Further openings D^{11}, passing through the ring at suitable intervals, provide means for viewing. These openings are

provided preferably with short tubes D^{12} having the mica plate diaphragms D^{13} and the caps D^{14} for closing them, the caps being thrown back and a tube D^{15} fitted to a tube D^{12} for the purpose of making an examination. By these arrangements stirring and viewing can be effected without material escape of gas or ingress of air, which are very objectionable. The body is covered by a top E having a channel formed by the flanges or walls E′ and E^2 thereon, the latter also forming the wall of a fuel passage through the top. A pipe E^3 admits water to this channel and a pipe E^4 carries the overflow therefrom into the channel D.

A hopper F is connected to the top by a hinge F′, has the laterally extending base F^2 adapted to rest on the flange E^2, and the flange or apron F^3 depending into the channel, a hook E^5 engaging the hopper to its seat on the top. A cone valve F^4 closes the passage from the hopper through the top, being held up against its seat by a weighted lever F^5 connected thereto and supported by the fulcrum F^6 on the hopper. A tightly fitting hood F^7 covers the hopper; in charging, the hood being removed by a lever F^8 connected therewith and fulcrumed on a pivoted post F^9 carried by the hopper. The hood may be detached from the hopper and placed over the flange E^2, for greater convenience of access to the interior and viewing through the capped aperture F^{10}, the hopper having been turned backward on its hinge.

A conduit G extends from the ring D of the top to the inlet end of the blast box C in the bottom of the body, a valve G′ controlling the admission of air to the top of the conduit. A pipe H, containing a valve H′, leads from the interior of the upper and outer part of the ring D into the outlet from the conduit G to the blast box C, and creates suction through the conduit by discharging through its outlet steam or vapor evolved from the water in the channel through the action of the heat in the top of the body. The gas take off pipe I, connected with the interior of the top of the body by the passage D^6 through the ring, is inclosed within the conduit G to the level of the outlet therefrom so that air flowing through this conduit on its way to the blast box is heated by the gas flowing in the pipe and the gas is cooled, the mechanism providing an economic temperature interchanger. It will be understood that flow through the pipe I will be facilitated generally by the suction of an engine or other apparatus (not shown) to which the gas is supplied, and the flow of air through the conduit G facilitated thereby.

A purge pipe J is connected to the pipe I exterior to the conduit G, and is provided with the valved pipe J′ for testing the gas and the sealed cap J^2 for opening the top, the pipe being used when lighting the fires, for carrying off waste gases, as a safety blow-off, and for obtaining gas to be tested.

The foregoing construction is practically leak proof and is satisfactorily cooled where the high temperatures are usually destructive, since the sealing basins are of unusual depth, the bottom of the body is entirely surrounded by water, the top of the body is formed by a hollow ring containing water, the parts of the top or cover in contact with the hot gases are water cooled, the connection of the hopper with the top is sealed and tight, and the passage through the hopper is securely closed by the tightly fitting valve and hood. The interior of the body can be poked and the fire examined very readily through the poke holes and viewing apertures, without egress of gas or ingress of air. The water that cools the top of the producer in so doing absorbs heat by which vapor is produced that is utilized in effecting the desired combustion. The air to be used to carry on combustion is given a desired increase in temperature by absorbing heat from the gas which it is desired to cool, and this air is distributed so that a proper portion thereof reaches all parts of the fuel. The mechanism is simple, inexpensive and not liable to get out of order. The ashes are thrown outward by the ridge into the basins which have their deepest parts beneath the wall of the body so that the ashes can be withdrawn readily.

Having described my invention, I claim:

1. A gas producer provided with a body having therein a blast box comprising an angular ridge, substantially vertical apertured walls beneath said ridge, outwardly inclined walls beneath said apertured walls, substantially vertical walls beneath said inclined walls, and inclined apertured walls beneath said last named apertured walls.

2. A blast box comprising divergent series of stepped inclined imperforate walls, the inclined walls of each series being separated by vertical perforate walls, vertical perforate walls disposed beneath the lowermost of the stepped walls, and inclined perforate walls disposed beneath said last named vertical walls.

3. A blast box having a plurality of pairs of generally sloping imperforate walls, which are interrupted by opposed perforate walls set inwardly of their line of slope, convergent perforate lower walls, and perforate walls interposed between said last named walls and one of said pairs of said sloping imperforate walls.

4. A blast box having a top ridge formed by a pair of divergent imperforate walls, a

bottom ridge formed by a pair of convergent perforate walls, a plurality of pairs of opposed vertical perforate walls between said top and bottom walls, and a pair of opposed divergent imperforate walls interposed between said pairs of perforate walls.

In witness whereof I have hereunto set my name this 11th day of July A. D. 1908, in the presence of the subscribing witnesses.

JAMES A. HERRICK.

Witnesses:
ROBERT JAMES EWING,
JOS. G. DENNY, JR.