E. LAWRENZ.

GAS PRODUCER.

APPLICATION FILED DEC. 26, 1906.

912,580.

Patented Feb. 16, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

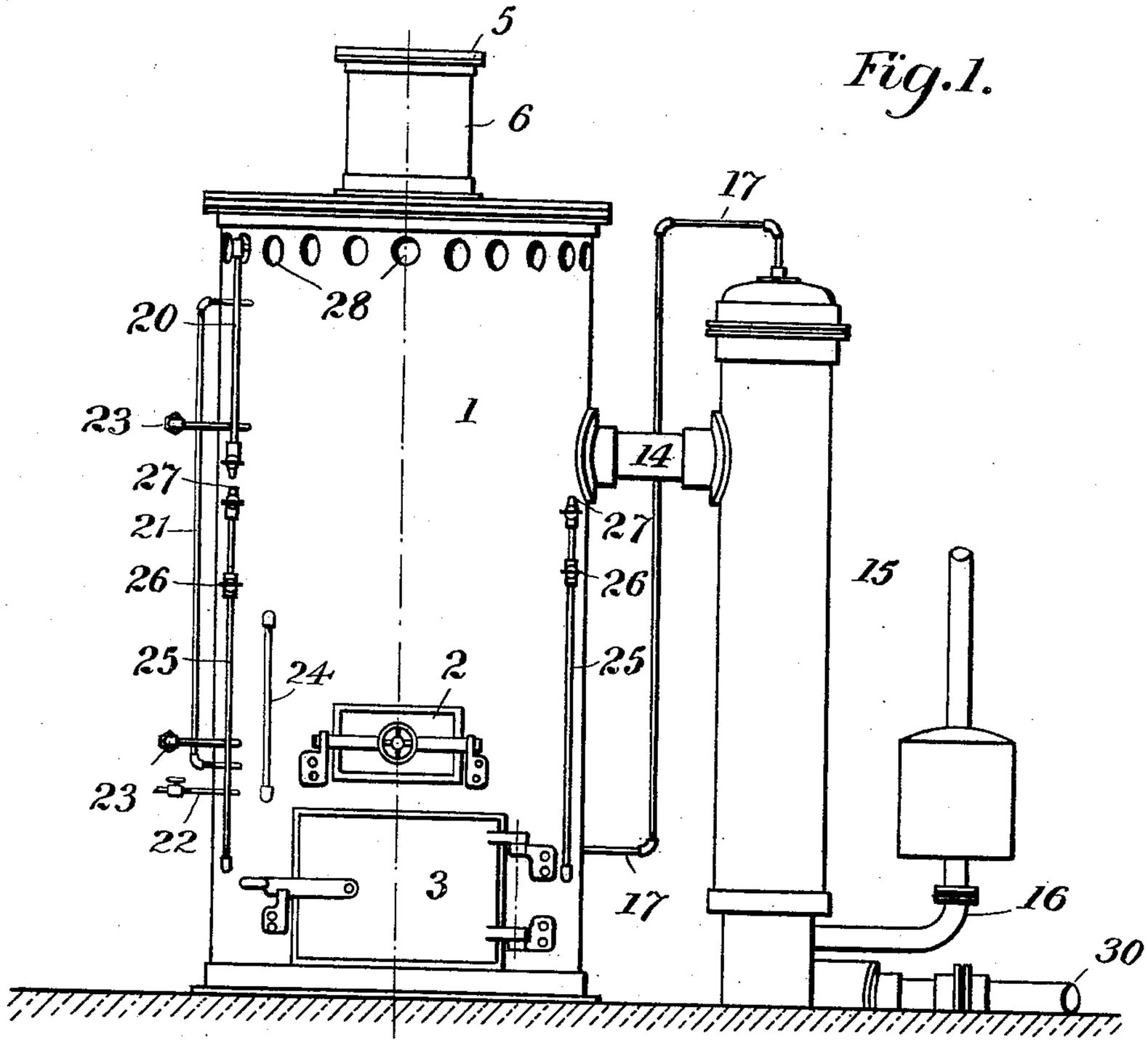
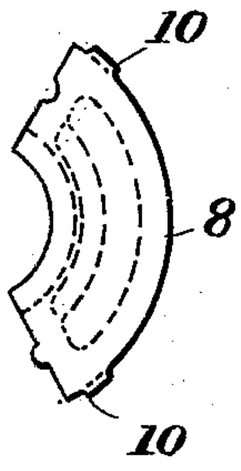


Fig. 4.



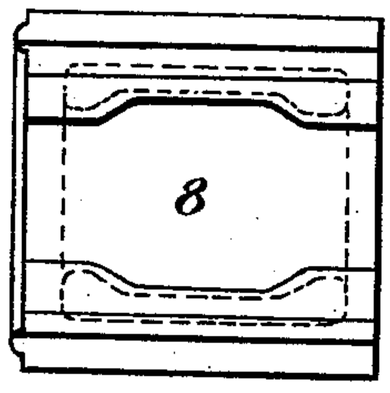


Fig. 5.

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2 SHEETS—SHEET 2.

Fig. 2.

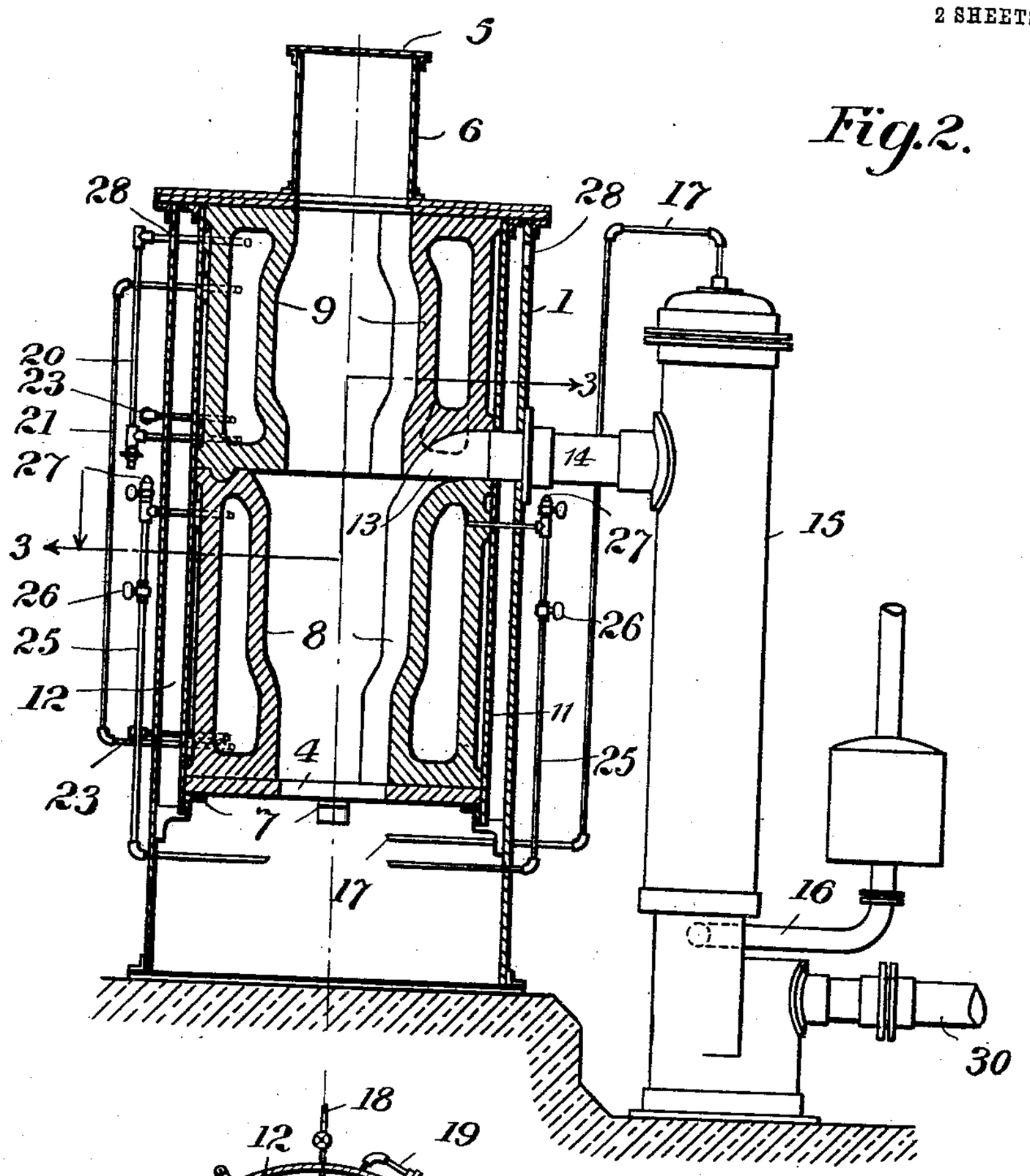
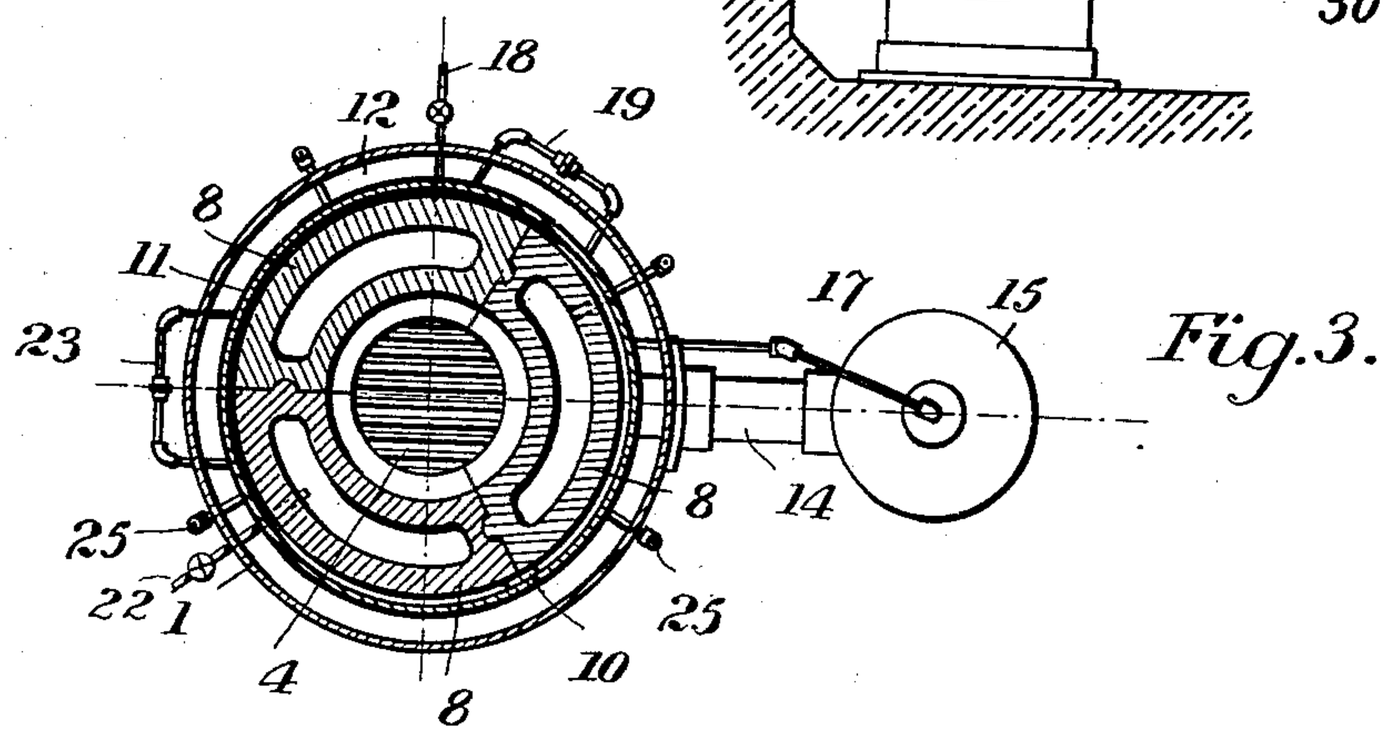


Fig. 3.



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EMIL LAWRENZ, OF LYNN, MASSACHUSETTS.

GAS-PRODUCER.

No. 912,580. Specification of Letters Patent. Patented Feb. 16, 1909.

Application filed December 26, 1906. Serial No. 349,591.

To all whom it may concern:

Be it known that I, EMIL LAWRENZ, a citizen of the United States, and resident of Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Gas-Producers, of which the following is a specification.

This invention relates to a gas producer such as is used for generating gas for use in gas engines, and the object of the invention is to provide a generator which is simple in construction, continuous in operation, and which will produce gas of high thermal capacity.

Another object of the invention is to provide a generator having a lining which will not combine with the refuse from the coal to form clinkers, thus enabling the furnace to be kept clean with a minimum of labor and expense.

Further objects of the invention are to provide apparatus to saturate the product of the producer with hydrogen gas and to utilize to the greatest degree the heat generated in the producer.

The invention will be described in connection with the accompanying drawings, in which,

Figure 1 is a side view of a gas producer embodying my invention; Fig. 2 is a vertical sectional view of the producer, the cooler being shown in side elevation; Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2; Fig. 4 is a plan view and Fig. 5 a side elevation of one of the sections of the lining.

Referring to the drawings, 1 indicates the casing of the producer, 2 a feed door which is used for starting the fire and which may also be used for cleaning out the furnace, 3 an ash door, 4 the grate at the bottom of the furnace, and 5 a lid or cover on top of a dome 6 through which the furnace is charged. Within the casing 1 and supported upon a set of brackets 7 is a hollow lining consisting of a lower tier of hollow segmental lining blocks 8 and an upper tier of hollow segmental lining blocks 9. The lining blocks 8 and 9 are preferably constructed of cast iron and water is circulated through them to keep them from burning out and for the purpose of generating steam to mix with the coal gas. As shown each tier of lining blocks consists of three blocks which together form a full circle. These blocks are provided with tongue-and-groove joints at their meeting edges and also where the upper end of the lower tier meets the lower end of the upper tier. The two tiers of blocks therefore make a substantially continuous lining for the furnace extending from the grate to the top of the casing 1. The blocks are centered in the casing and held in place by means of lugs 10 which, as shown, abut against an inner casing 11 which is separated from the outer casing by an air space 12. The inner casing may be omitted if desired, in which case the lugs 10 would be extended to coöperate with the outer casing in centering the lining.

The gas is drawn off through an opening 13 in the lining and a pipe 14 to the cooler 15 and thence through a pipe 30 and other usual apparatus to the motor. The internal construction of the cooler is not illustrated as it forms no part of the present invention and any ordinary form of cooler may be used. As is customary, water is circulated through the cooler, being introduced through a pipe 16 at the bottom. From this water steam is generated which is carried off by a pipe 17 leading from the top of the cooler to the ash pit below the grate. In order to prevent the lining from burning out and to utilize the heat which is necessarily imparted to the lining by the process of combustion, water is charged into the upper tier of the lining blocks and conducted from the upper tier to the lower tier, in which steam is generated for supplying additional hydrogen to the coal gas. As shown, water is charged into one of the upper tiers of lining blocks through an inlet pipe 18 and thence to the other blocks of the upper tier through connecting pipes 19. The height of the water in the upper tier is shown by a gage glass 20. The water after being heated in the upper tier is conveyed by pipes 21 to the lower tier. Water may also be directly charged into the lower tier of lining blocks through a pipe 22. The blocks of the lower tier are connected by pipes 23 and they are also provided with one or more gage glasses 24. From the upper part of the cavities in the lower tiers of blocks steam pipes 25 lead to the space below the grate. These steam pipes are controlled by valves 26 and they are also provided with valved outlets 27 through which steam may be permitted to discharge into the atmosphere. The upper part of the casing 1 is provided with a series of air inlet openings 28.

It will be understood that in operation the motor acts as a pump to exhaust the gas from the producer through the outlet 14 and

the cooler 15. Water is introduced through the inlet pipe 18 to the upper tier of lining blocks. The water partially heated in the upper tier of blocks overflows to the lower tier through pipes 21, and in the lower tier it is converted into steam and injected into the coal by means of the pipes 25. The air for combustion of the coal is supplied through the openings 28 being drawn down through the space 12 between the linings by the suction created by the motor. It will be seen that the heat imparted to the lining is returned to the gas in the form of highly heated steam, while the small amount of heat escaping through the linings is mostly returned with the air passing through the space 12. As previously stated the inner casing 11 may be omitted, in which case the air will travel in direct contact with the lining. The air passes into the space below the grate between the brackets 7 which support the grate and the lining. By arranging the air inlets around the upper part of the casing the cool air is uniformly distributed around the lining and travels downward on all sides thereof and a maximum amount of heat is thus imparted to the air and returned to the furnace through the grate.

It will be seen that the two tiers of blocks form a substantially continuous water jacketed lining for the producer.

A producer constructed as herein described can be operated continuously and will last indefinitely without repair, as the linings are prevented from burning out and are not affected by the coal, which passes through the producer without forming an excess of clinkers.

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

1. In a gas producer, the combination with a casing, of a hollow lining therefor arranged in a plurality of tiers, means for charging the upper tier with water, means for charging the heated water from the upper tier into a lower tier, and means for charging steam from the lower tier into the furnace of the producer.

2. In a gas producer, the combination with a casing, of a hollow lining comprising a plurality of tiers of hollow segmental blocks, the blocks of the upper tier having connections through which water may be circulated to the several blocks, and the blocks of the lower tier having like connections, means for introducing water into the upper tier of blocks, means for charging water from the upper tier to a lower tier of blocks, and means for charging steam from the lower tier of blocks into the furnace of the producer.

3. In a gas producer, the combination with a casing, of a lining comprising a plurality of tiers of hollow segmental iron blocks, means for circulating water through the upper tier of blocks, means for charging heated water from the upper blocks to the blocks of the lower tier, means for charging steam from the lower tier of blocks into the furnace chamber of the producer, and a passage between the casing and the lining through which air passes to the producer furnace.

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

EMIL LAWRENZ.

Witnesses:
W. L. VENNARD,
LEO LAPIERRE.