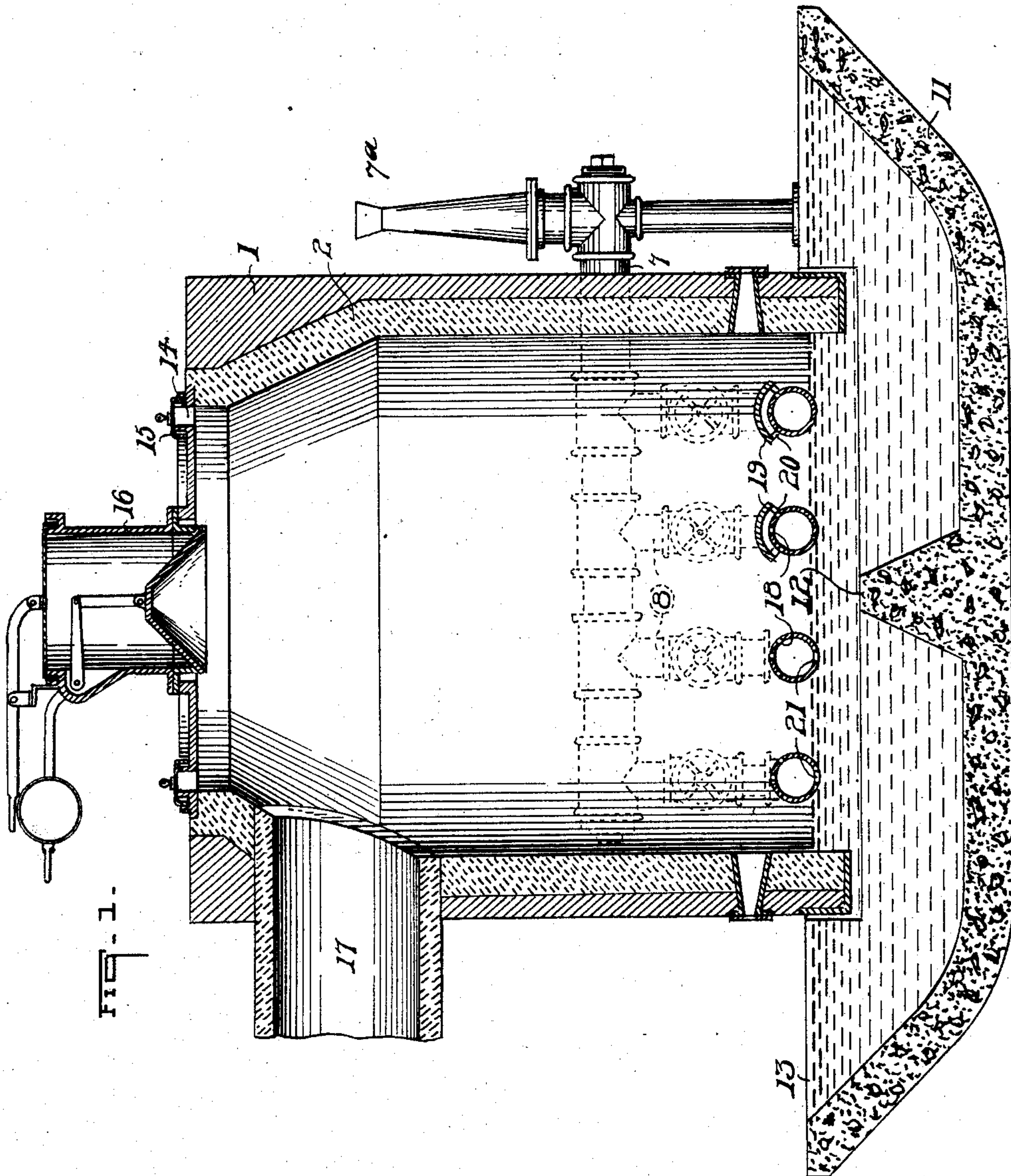


H. E. SMYTHE.  
GAS PRODUCER.  
APPLICATION FILED DEC. 30, 1907.

905,474.

Patented Dec. 1, 1908.

4 SHEETS—SHEET 1.



WITNESSES:

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*Elva Stanick*

INVENTOR

*H. E. Smythe*  
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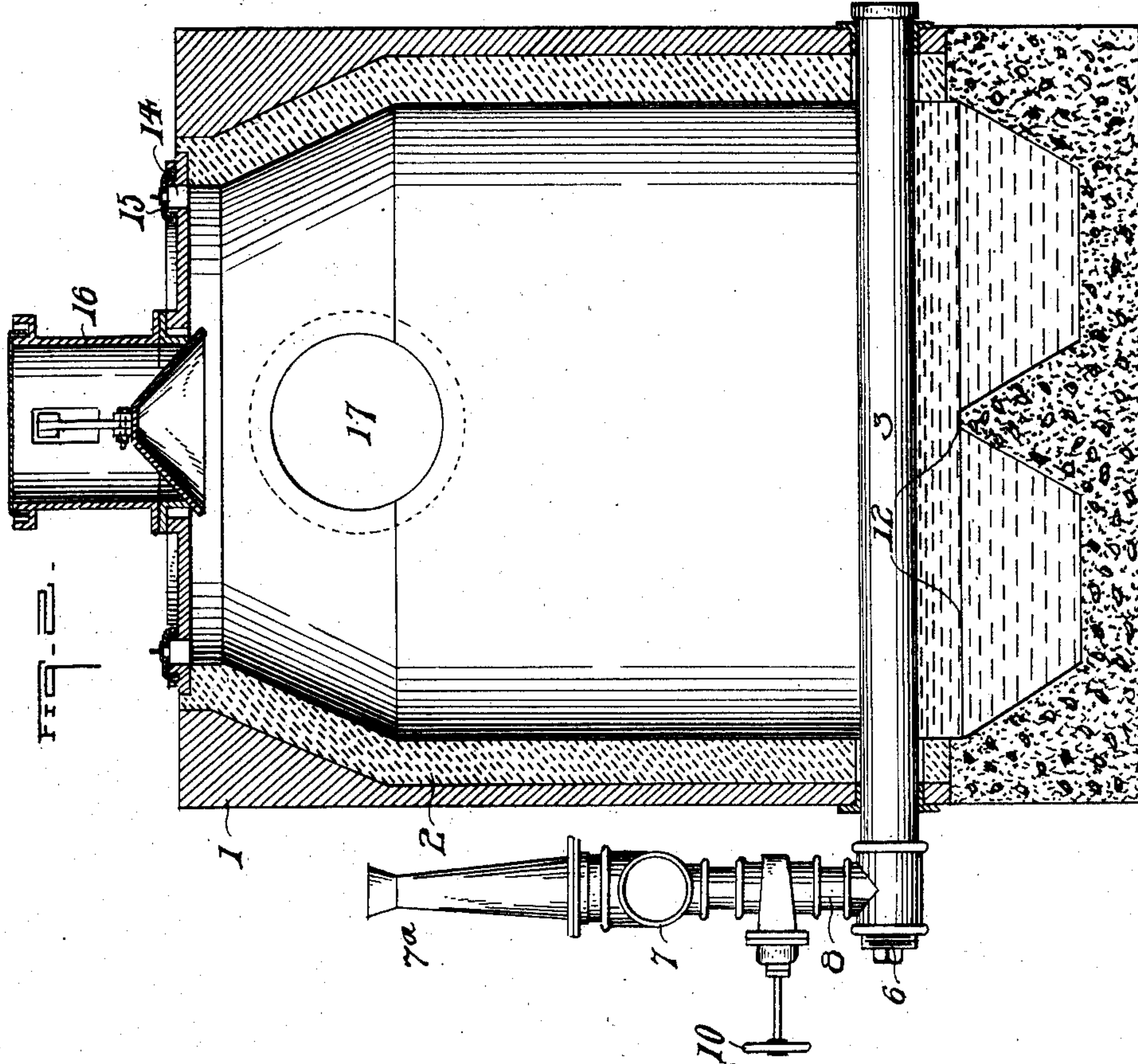
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4 SHEETS—SHEET 2.



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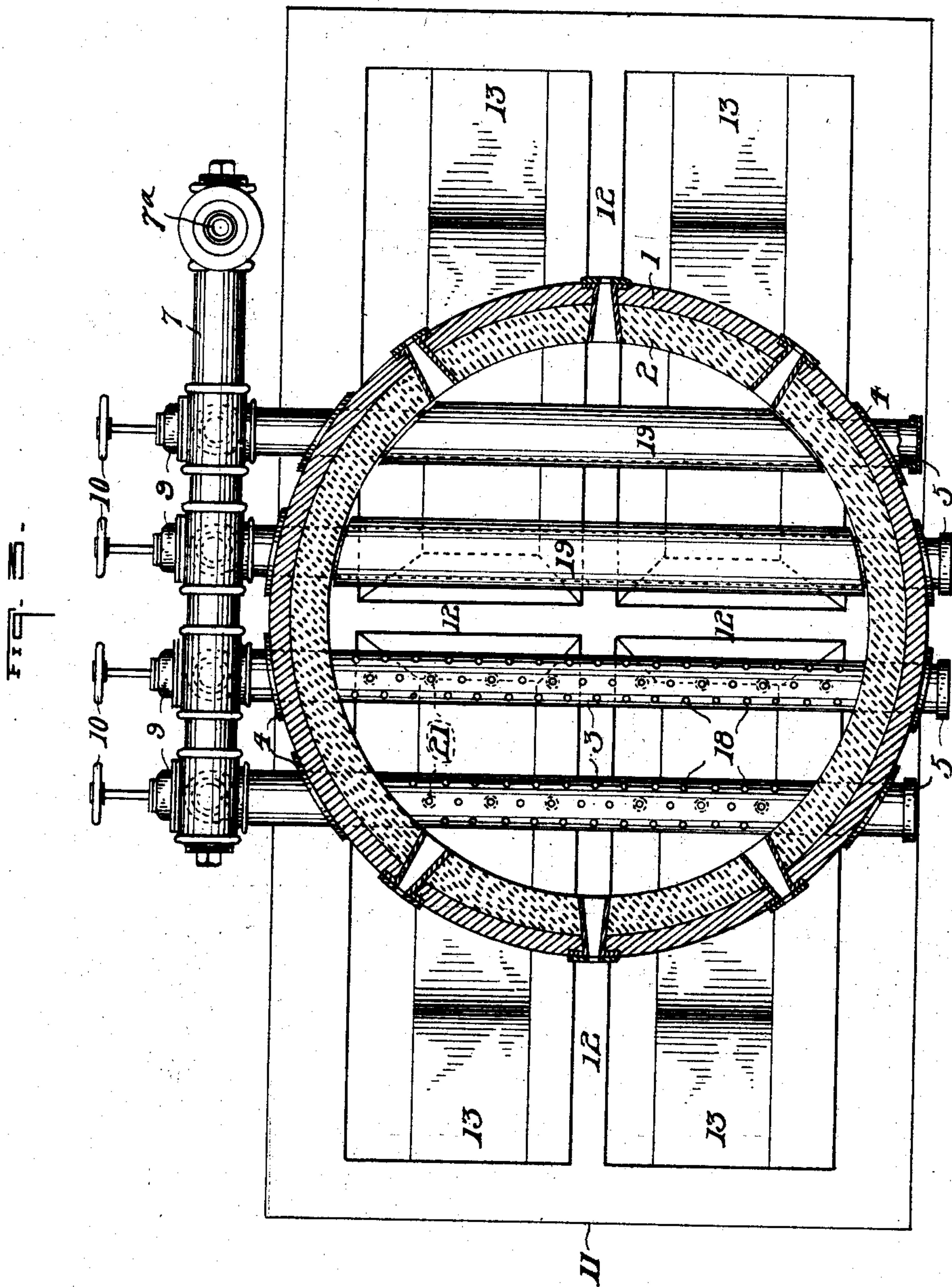
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4 SHEETS—SHEET 3.



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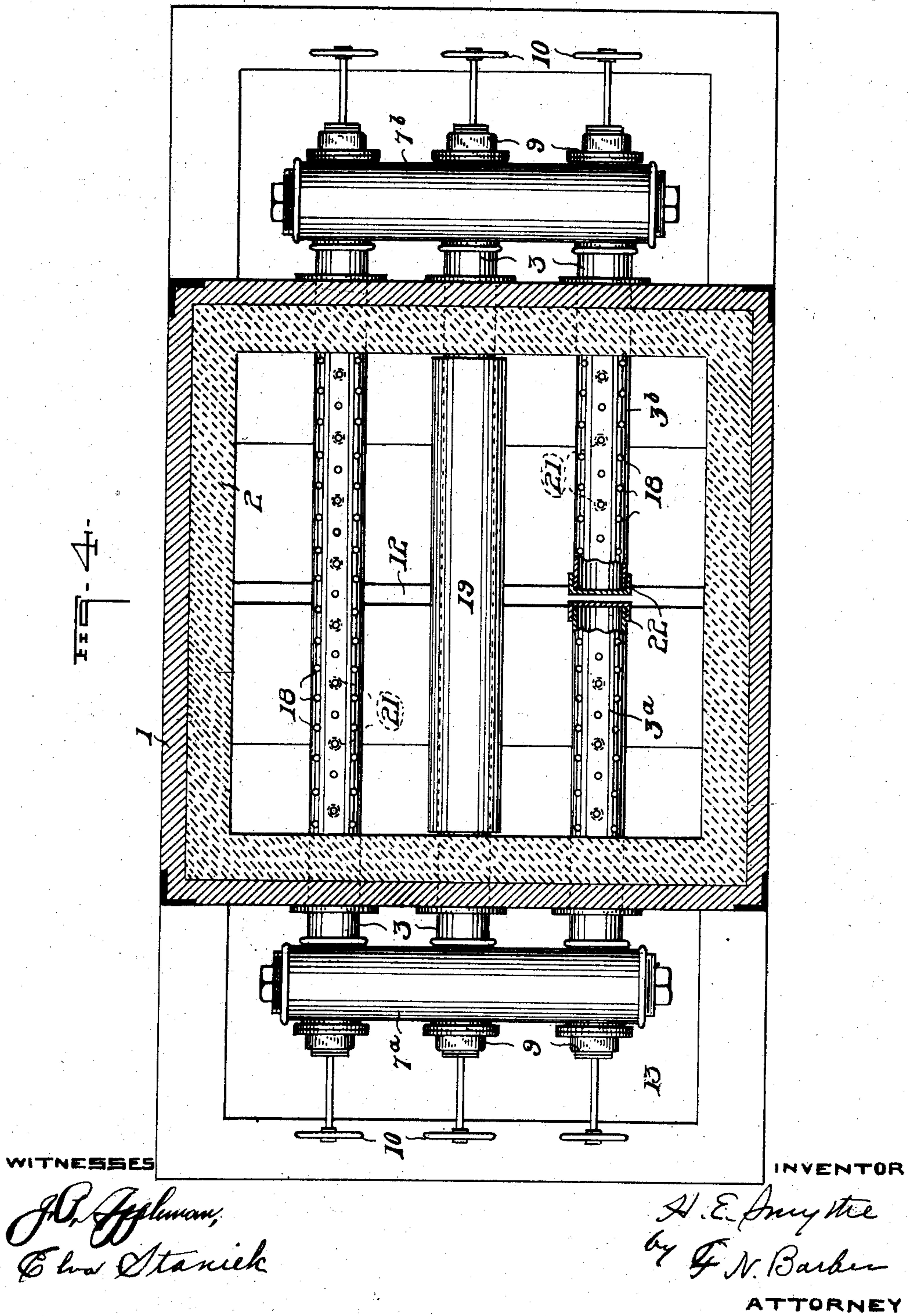
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4 SHEETS—SHEET 4.





# UNITED STATES PATENT OFFICE.

HORACE E. SMYTHE, OF OAKMONT, PENNSYLVANIA, ASSIGNOR TO THE S. R. SMYTHE COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF WEST VIRGINIA.

## GAS-PRODUCER.

No. 905,474.

Specification of Letters Patent.

Patented Dec. 1, 1908.

Application filed December 30, 1907. Serial No. 408,490.

*To all whom it may concern:*

Be it known that I, HORACE E. SMYTHE, a citizen of the United States, residing at Oakmont, in the county of Allegheny and State of Pennsylvania, have invented or discovered new and useful Improvements in Gas-  
5 Producers, of which the following is a specification.

My invention relates to improvements in  
10 gas producers of the water-seal type and its object is to simplify and otherwise improve the construction of gas producers so that the blast gases will be thoroughly atomized and distributed in the coal; so that the fire-bed  
15 shall be of uniform and maximum depth throughout; so that the water pan can be cleaned readily and thoroughly without any waste of time; so that the blowers will not readily accumulate ashes in their interior;  
20 so that any accumulation of ashes in the blowers may be quickly removed; and so that there shall not be a necessity of renewing the water pan at regular intervals.

Referring to the drawings accompanying  
25 this specification, Figure 1 is a vertical section of a round gas producer embodying my improvement; Fig. 2, a vertical section at a right angle to Fig. 1; Fig. 3, a horizontal section; and Fig. 4, a horizontal section of a  
30 producer having a rectangular form.

Referring first to Figs. 1 to 4, the producer body is composed of the circular shell 1 and the usual refractory lining 2. I have shown four distinct or independent tubular  
35 blast pipes or grates 3 extending through the producer and preferably supported by the flanged rings 4, which encircle the pipes or grates 3 closely and fit gas tight in lateral openings in the producer body, as shown in  
40 Fig. 2. The flanges of the rings lie against the outer face of the shell 1. The ends of the pipes or grates 3 are closed by the screw caps 5 or the screw plugs 6, which may be removed for the introduction of a tool for  
45 cleaning the blowers.

7 represents a horizontal pipe connected to the well known air and steam mixing chamber 7<sup>a</sup> and having the separate tubular connections 8 with the respective blast pipes.  
50 Each connection 8 is provided with a distinct valve-9, by which the passage of fluid therein can be regulated. The valves are actuated by the usual hand wheels 10. Thus I provide a single mixer for air and steam  
55 and lead them through a common conduit

to the several valves which control their respective blast tubes.

11 is the water-pan constructed of concrete, thus dispensing with the steel-plate pan which, owing to rust, has to be replaced  
60 at regular intervals. The concrete pan is almost indestructible and furnishes a solid durable foundation for the producer body, as shown in Fig. 2. The pan is divided into preferably four sections by means of the  
65 four division walls 12, all tapered upwardly, so that the ashes will gravitate to the bottom of the sections, from which the ashes may be readily removed by shovels or other tools. The walls 12 also constitute abutments for  
70 confining the ashes to definite localities during the operation of the removing of the ashes. Without these walls the ashes would be pushed about so as to make it difficult to get them on the shovels. It is not necessary  
75 for the attendant to inspect the pan to ascertain whether he has removed all the ashes, because they are confined to definite localities from which they can all be removed with certainty by the use of shovels or scrapers.  
80

As the producer body has its bottom below the top of the pan, the walls 12 are reduced in height within the area occupied by the said body, as shown in Figs. 1 and 2. The outer walls of the pan are inclined  
85 downwardly and inwardly so as to direct the ashes to the bottom of the pan sections and each section has one end open upwardly and extending beyond the producer body for the removal of the ashes as shown at 13.  
90

The top of the producer is provided with several poke-holes 14 having the covers 15 and with one or more charging devices 16 of the bell type. It is to be understood,  
95 however, that I do not confine myself to the type of poke-holes and charging devices shown.

17 represents the off-take pipe for the producer gas.

The blast pipes 3 are arranged sufficiently  
100 close together to form grate-bars, which are easy of access for inspection, cleaning, and repair, as the water pan sections are not obstructed in any manner. There is also ample room between the blast pipes 3 for the  
105 removal of clinkers and ashes.

The blast pipes 3 have top perforations 18 for the exit of the air or steam or both. These perforations may be uncovered as shown at the left-hand side of Fig. 1, or  
110



they may be covered, as shown at the right-hand side thereof. The covers 19 for the perforations 18 have ports 20 below their edges for the passage of the blast gases. In case the cover 19 is not used, it is desirable that the blast pipes be provided in their lower sides with the large holes 21, through which ashes entering by way of the perforations 18 may drop into the pan.

The blast pipes can be placed at any level in the producer and will operate efficiently within a foot of the water line in the pan. In fact, the water may be permitted in the bottom of the blast pipes, if desired. Therefore, my improved blast pipes permit a fire-bed of uniform thickness and maximum depth, thus accomplishing a complete and economical combustion of the coal. Inasmuch as each blast pipe can be independently regulated by its respective valve 9, the action of the producer may be made uniform throughout, thus producing a proper distillation and combination of the gases without wasting or consuming the same.

In Fig. 5, I have shown the producer with a square body, but it may have any other form desired. In Fig. 5, I have shown two air and steam inlet pipes 7<sup>a</sup> and 7<sup>b</sup>, corresponding to the pipe 7 shown in Figs. 1, 2, and 3. I may provide each of the blast pipes with a valve 9 at each end. In order to equalize the blast more efficiently, I may make the blast pipes in sections 3<sup>a</sup> and 3<sup>b</sup> as shown at the lower side of Fig. 5, so that each valve can control the supply to one-half of the blower. I have shown these sections composed of abutting pipes with caps 22 upon the ends. This special equalization

may be necessary in very large producers and may be desirable in smaller ones, according to circumstances.

It is clear that the blast pipes or hollow grates need not be straight, as they may be made in any design to effect a perfect distribution and regulation of the air or steam, or both.

In case the blast pipes require cleaning, this may be accomplished readily after removing the caps 5 or the plugs 6.

I do not limit myself to the elements and combinations described and shown, but desire protection on all modifications which come within the spirit of my invention.

I claim—

1. In a gas producer, a plurality of blast pipes constituting hollow grates extending across the producer and through the burden therein, a blast mixing chamber, means for leading the mixed blast to the said blast pipes, or grates, and means for regulating the supply of said mixed blast to each of said blast pipes, or grates.

2. In a gas producer, a tubular blast pipe constituting a grate bar and having blast exits at its upper side, and a cover for said blast exits extending longitudinally of the blast pipe, there being blast exits between the outer edges of the cover and the upper surface of the blast tubes.

Signed at Pittsburg, Pa., this 24th day of December 1907.

HORACE E. SMYTHE.

Witnesses:

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F. N. BARBER.