

No. 666,033.

Patented Jan. 15, 1901.

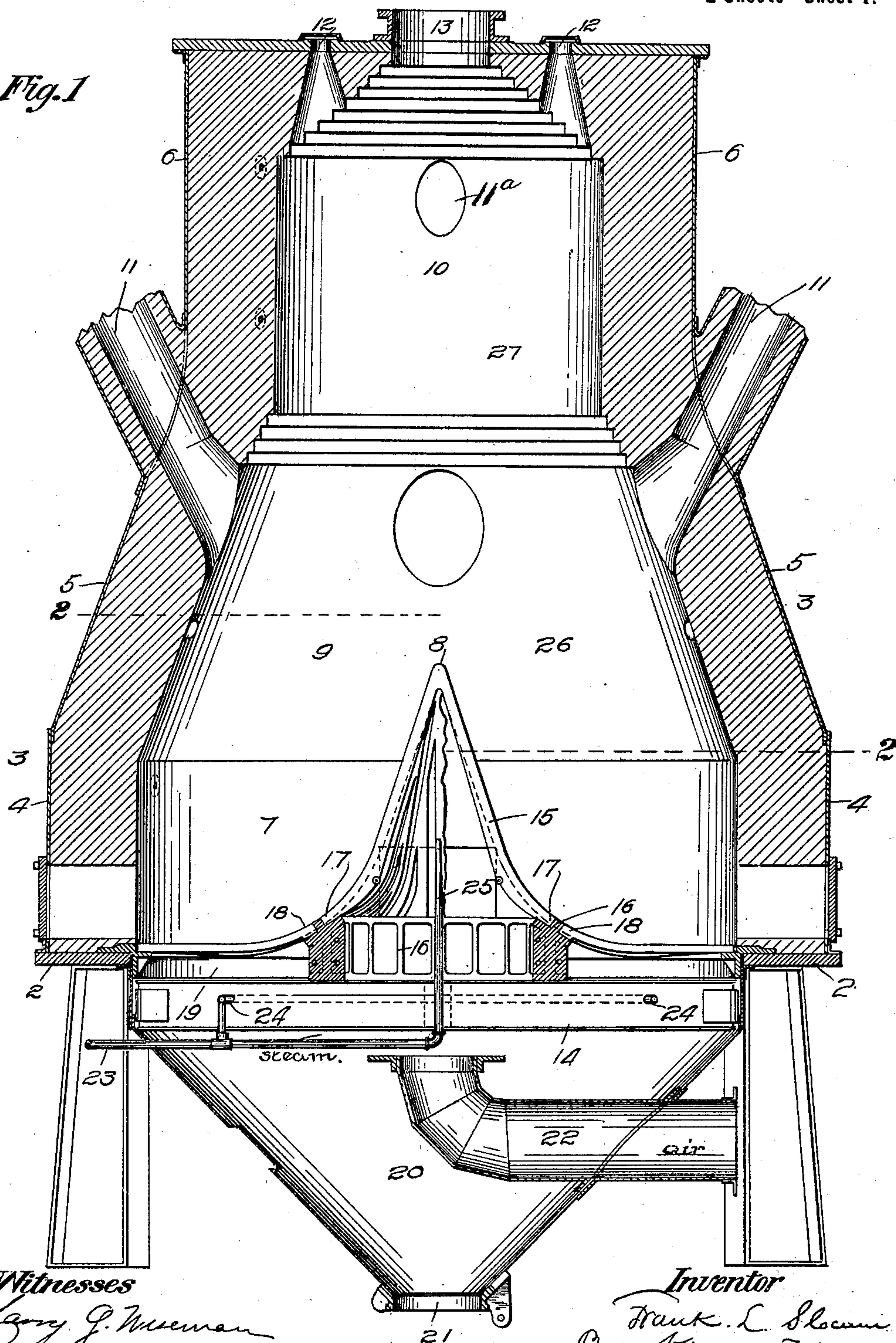
F. L. SLOCUM.  
GAS GENERATOR.

(Application filed Jan. 10, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1



Witnesses

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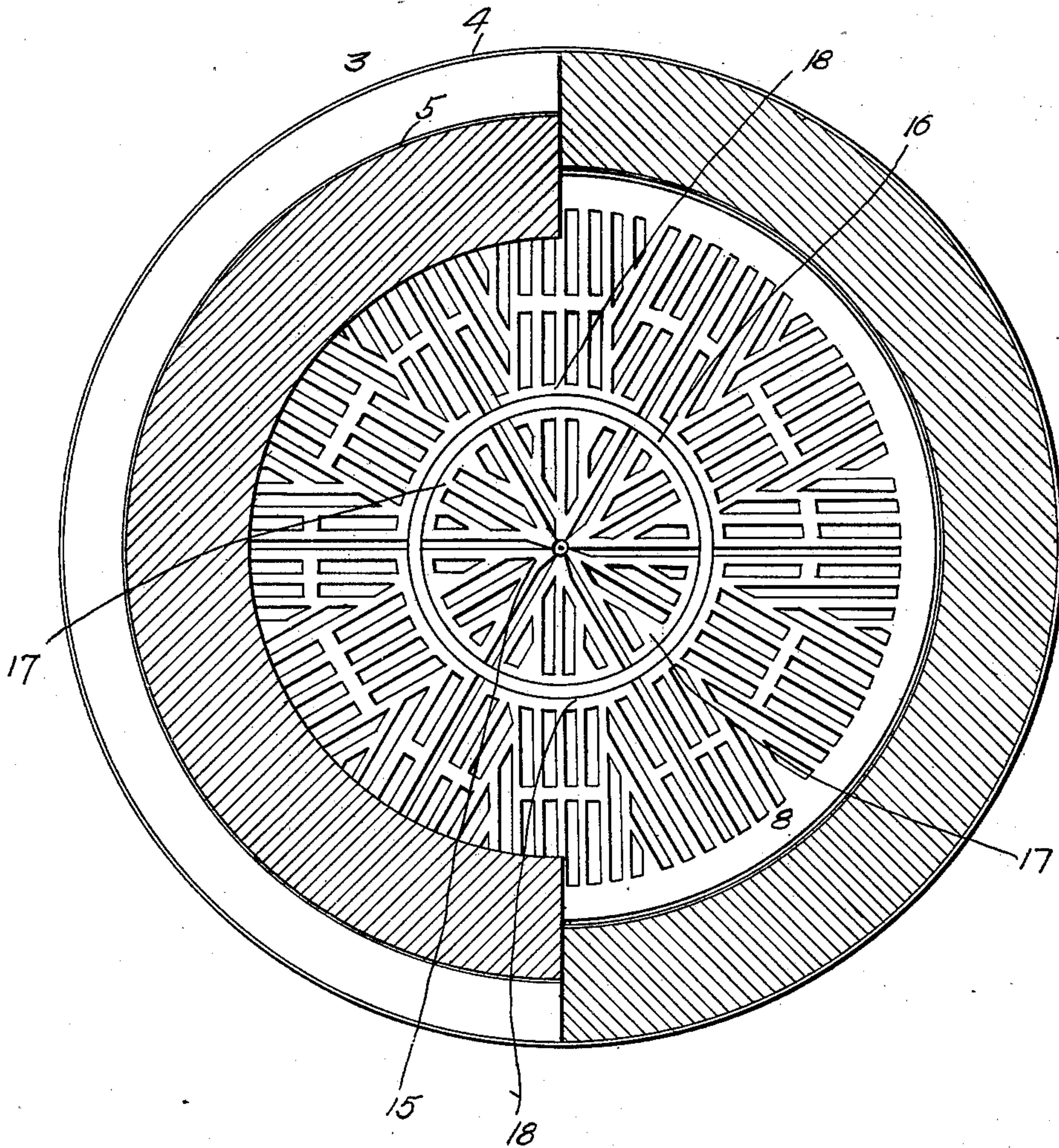
F. L. SLOCUM.  
GAS GENERATOR.

(Application filed Jan. 10, 1900.)

(No Model.)

2 Sheets—Sheet 2.

*Fig. 2*



*Witnesses*

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# UNITED STATES PATENT OFFICE.

FRANK L. SLOCUM, OF PITTSBURG, PENNSYLVANIA.

## GAS-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 666,033, dated January 15, 1901.

Application filed January 10, 1900. Serial No. 932. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK L. SLOCUM, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Manufacturing Gas; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to apparatus for the manufacture of water-gas, its object being to provide for the manufacture of such water-gas by the quick blasting up of the fuel, coal, or coke and the production of carbonic acid in large proportions in such blasting operation, so as to raise the fuel to a higher heat by shorter blasting periods and provide for longer runs of gas-making.

My invention comprises, generally stated, a water-gas generator having a wide lower combustion-chamber gradually converging upwardly and having several waste-product openings at its upper end and above the same a coal-chamber narrower than the combustion-chamber and having a feeding-opening and a gas-outlet passage at its upper end and an extended grate-surface below the combustion-chamber, preferably provided with a conoidal central portion rising above the main body of the grate, so providing for the rapid supply of large bodies of air to the mass of ignited fuel and, through the central conoidal portion of the grate combined with the converging side walls of the combustion-chamber, for the travel of the air and products of combustion but a short distance through the mass, leading to extremely-rapid heating of the mass, the formation of a large proportion of carbonic acid, and the withdrawal of the products of combustion before they can absorb much carbon from the mass.

It consists in certain other improvements hereinafter more particularly set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a longitudinal central section of a gas-generator embodying the invention;

and Fig. 2 is a cross-section on the line 2 2, 50 Fig. 1.

The apparatus illustrated in the drawings is specially applicable to the practice of the method described in an application of even date herewith, Serial No. 931, in providing a wide shallow body of ignited fuel superposed by a narrow body of unignited fuel, through which the air is passed in upward and diagonal outward courses through the body of ignited fuel in such quantities as to insure the production of a major portion of carbonic acid, while the steam passes in an upward course through the ignited fuel and the gas is passed upwardly through the unignited fuel, as fully set forth in said application.

The apparatus as illustrated in the drawings and showing the preferred form of the invention is constructed practically as follows: The generator-body is supported on suitable standards 1, which support the bed-plate 2, on which the shell 3 and the brickwork of the generator are supported. The shell 3, as shown, is provided with the vertical portion 4, the upwardly-converging portion 5, and the vertical portion 6, and the lining of the brickwork of the generator is arranged practically on the same lines, having the vertical portion 7 extending up a short distance above the grate 8 and the upwardly-converging or downwardly-flaring portion 9 leading up into the narrow vertical fuel-feeding portion 10. At or near the top of the converging portion 9 are the blast-outlets 11, there being several of such blast-outlets, the drawings showing three of the four used in the type of generator disclosed, the number depending upon the size of the generator, and these outlets are arranged around the generator, so as to give free exit to the products of combustion from the wide body of fuel in the lower part of the generator. In the upper part of the generator is the gas-outlet 11<sup>a</sup>, and in the top of the generator are the poke-holes 12 and the fuel-entrance 13, which are of course closed in any suitable way. In the lower part of the generator is arranged the extended grate 8 above referred to, which is supported on the cross-beams 14 and has a



wide grate expanse, as illustrated, having a conoidal grate portion 15 extending up centrally of the generator, so as to increase the grate-surface and provide for the distribution of the air throughout the mass of coal in the wide shallow base of the generator. As illustrated, this conoidal grate portion 15 rests on a ring 16, supported on the beams 14, said ring 16 giving support to the lower ends of the grate-bars 17, forming the conoidal central portion 15, and to the inner ends of the grate-bars 18, which extend from said ring to the ring 19, supported on the bed-plate 2 of the outer wall of said generator. The lower portion of the generator has a closed ash-pan 20, with a discharge-door 21 and the entrance-pipe 22 for the air-blast. The steam-pipe 23 enters through the ash-pit 20, and in order to distribute the steam quickly to the incandescent fuel in the lower part of the generator I employ the perforated ring-pipe 24, extending around about midway of the grate-bars 18, and also the central steam-pipe 25, rising within the conical grate 15, it being found that by such construction the steam is discharged from the steam-pipes close to the fuel and rises quickly, so as to pass into the same.

In the use of the above apparatus in practicing the method referred to in said companion application fire is built upon the grate, and in the ordinary way the mass of fuel is built up within the generator, the upper portion thereof being confined by the converging portion 9 of the combustion-chamber 26, which gradually leads up into the upper chamber 27, in which is supported the body of unignited fuel. I thus provide a wide shallow body of ignited fuel in the lower part of the generator in position for the passage of the blast through the same in but short course, the principal course being diagonally upward and outward from the central cone portion of the grate toward the outlet-flues 11, so that the fuel in the large shallow body can be rapidly blasted up ready for gas-making by the passage of the air-blast not only into the base of the mass of fuel supported on the horizontal grate portions 8, but from the central portion of the mass in outward and upward courses to the outlet-flues. In this way a very large body of air can be furnished to the combustion-chamber and serve to raise the fuel therein to an extremely high heat in very short blasting periods, while on account of the downwardly-flaring walls all liability of the coal clogging or bridging and being held from descending evenly in the generator is overcome. The air is then turned off, the waste-product outlets closed, the gas-outlet opened, and steam is admitted, this steam rising upwardly through the mass of incandescent fuel in the lower part of the generator, and on account of the wide shallow mass of fuel present as supported upon the extended grate-surfaces and the provision for carrying the steam

in pipes close to the points at which it may enter the incandescent fuel it is possible to provide for the generation of a very large volume of gas. The gas so produced after passing upwardly through the mass of ignited and incandescent fuel rises into the mass of unignited fuel, being directed into the same by the converging side walls of the combustion-chamber and all the gas then passing while at a high heat through the body of unignited fuel in the upper chamber 26, so that the hot water-gas serves to carry off the hydrocarbons contained in the fuel which pass off with the water-gas and serves to enrich the same. In so operating a very short time only is required to blast up the fuel after it has cooled below the temperature proper for making water-gas, while the runs in the making of water-gas can be extended much longer on account of the high heat to which the fuel is brought, and in this way a much greater proportion of gas per ton of coal is produced and the hydrocarbons contained in the fuel, such as found in bituminous coal, are practically all saved in the resultant water-gas, and the fuel superposed above the mass is gradually coked, a large proportion of the same being brought into coke form before it reaches the lower part of the generator, where it is subjected to the air-blast, while all clogging or bridging is prevented.

What I claim as my invention is—

1. A water-gas generator having a wide lower combustion-chamber, an extended grate-surface as wide as the combustion-chamber, the walls of said chamber gradually converging upwardly and having waste-product openings therein arranged around its upper end, a coal-chamber narrower than the combustion-chamber and superimposed above the same and having its lower walls merging into the upper walls of the combustion-chamber above the waste-product outlets, and said coal-chamber having a feeding-opening and a gas-outlet passage at its upper end.

2. A water-gas generator having a wide lower combustion-chamber gradually converging upwardly and having waste-product openings in its walls arranged around its upper end, and above the same a coal-chamber narrower than the combustion-chamber and having a feeding-opening and a gas-outlet passage at its upper end, the combustion-chamber having an extended grate provided with a conoidal central portion rising above the main body of the grate.

3. A water-gas generator having a combustion-chamber provided with cross-beams extending below the same supporting a central ring, a central conoidal grate portion supported on said ring, grate-bars extending from said ring to the side walls of the chamber, a steam-supply pipe provided with a perforated ring portion under the horizontal



portion of the grate, and a central steam-pipe rising within the conoidal portion of the grate and having an outlet at its upper end.

5 4. A water-gas generator having an extended grate-surface below the same provided with a central conoidal portion rising above the main body of the grate, and having a steam-supply pipe provided with a perforated ring portion extending around under the horizon-

tal portion of the grate, and a central steam-pipe rising within the conoidal portion of the grate and having an outlet at its upper end.

In testimony whereof I, the said FRANK L. SLOCUM, have hereunto set my hand.

FRANK L. SLOCUM.

Witnesses:

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ROBERT C. TOTTEN.