(No Model.)

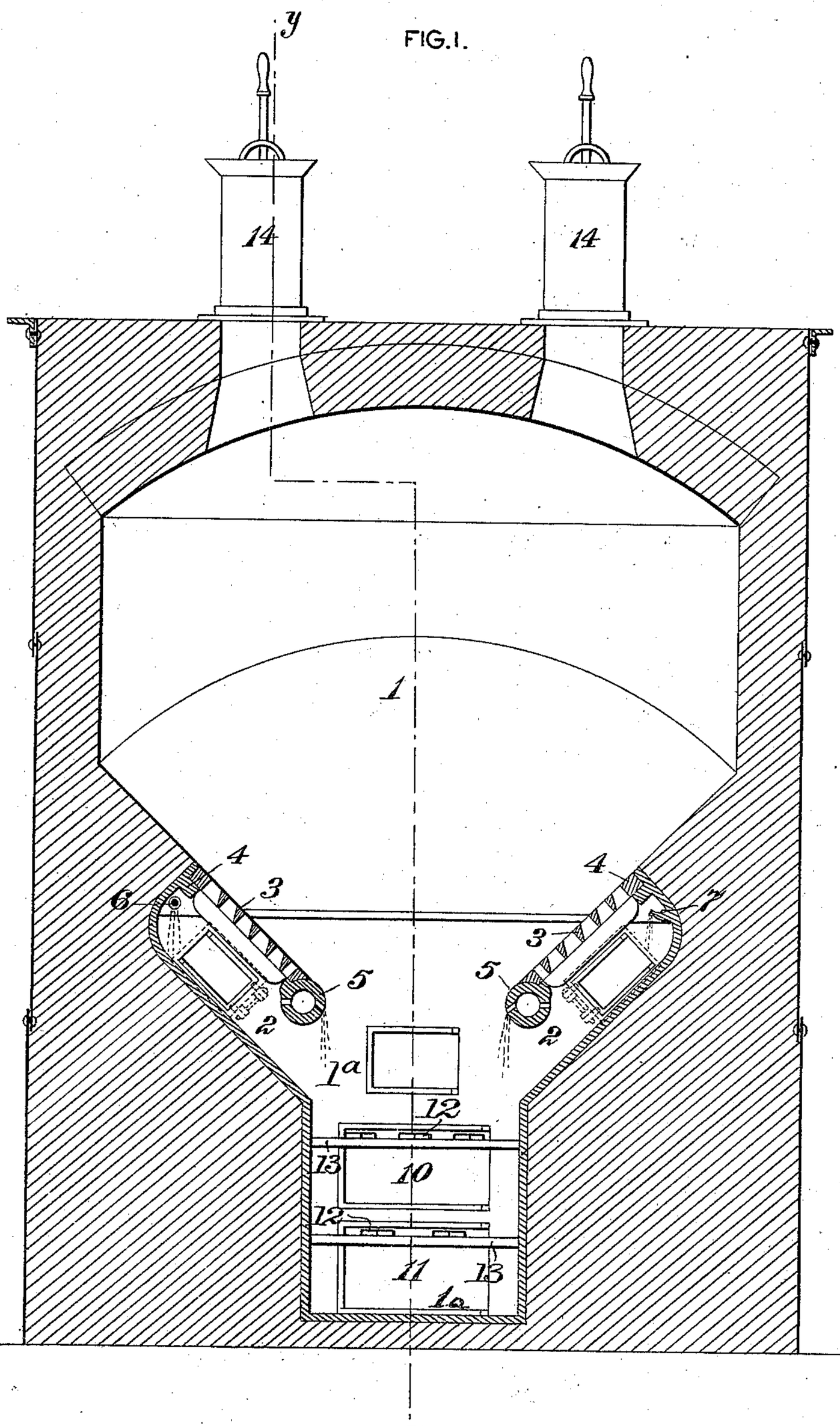
3 Sheets—Sheet 1.

W. & J. C. SWINDELL.

GAS PRODUCER.

No. 544,798. Patented Aug. 20, 1895.

FIG. 1.



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(No Model.) 3 Sheets—Sheet 2.

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FIG. 2.

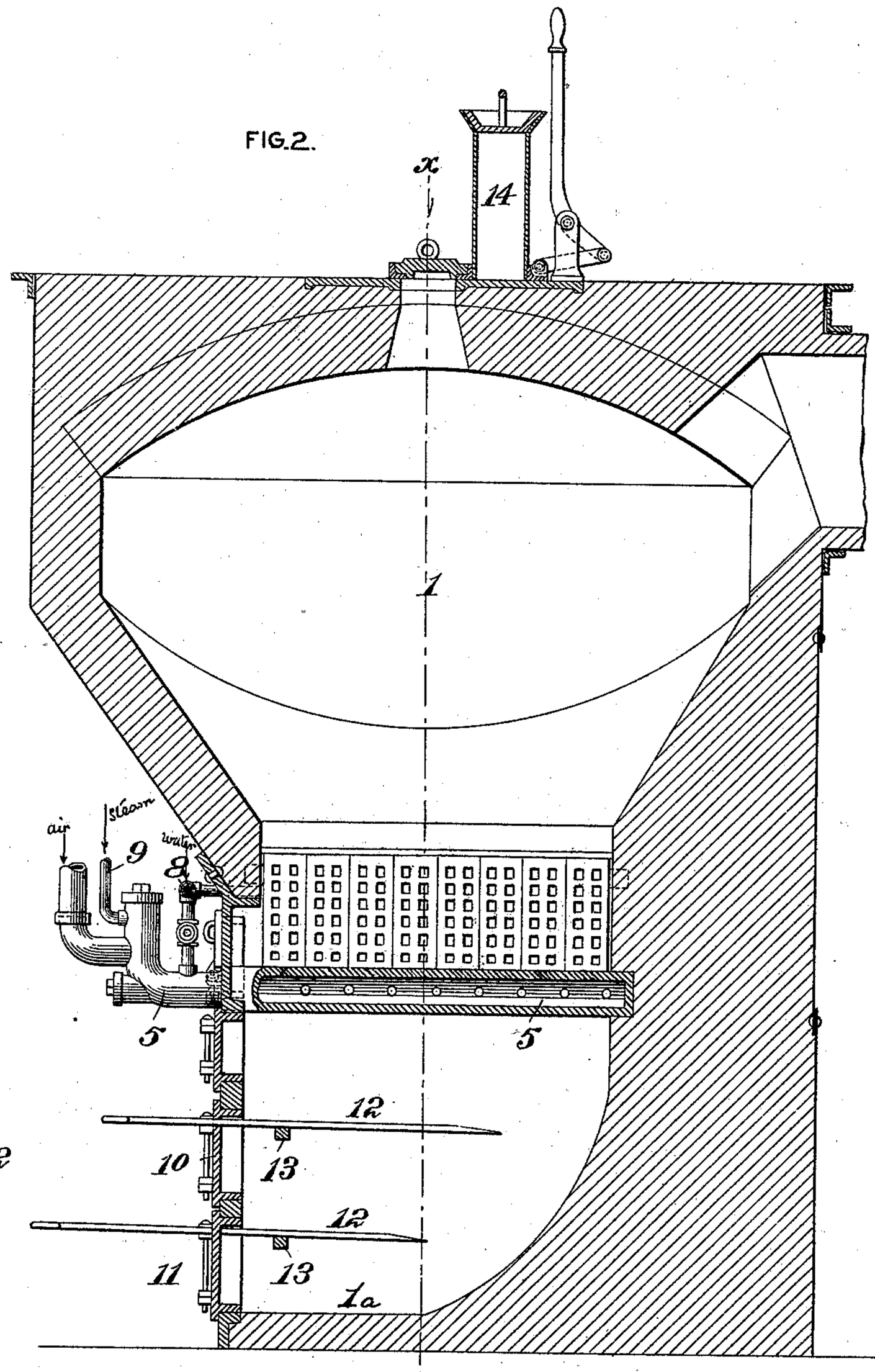
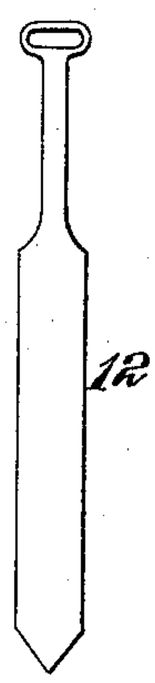


FIG. 4.



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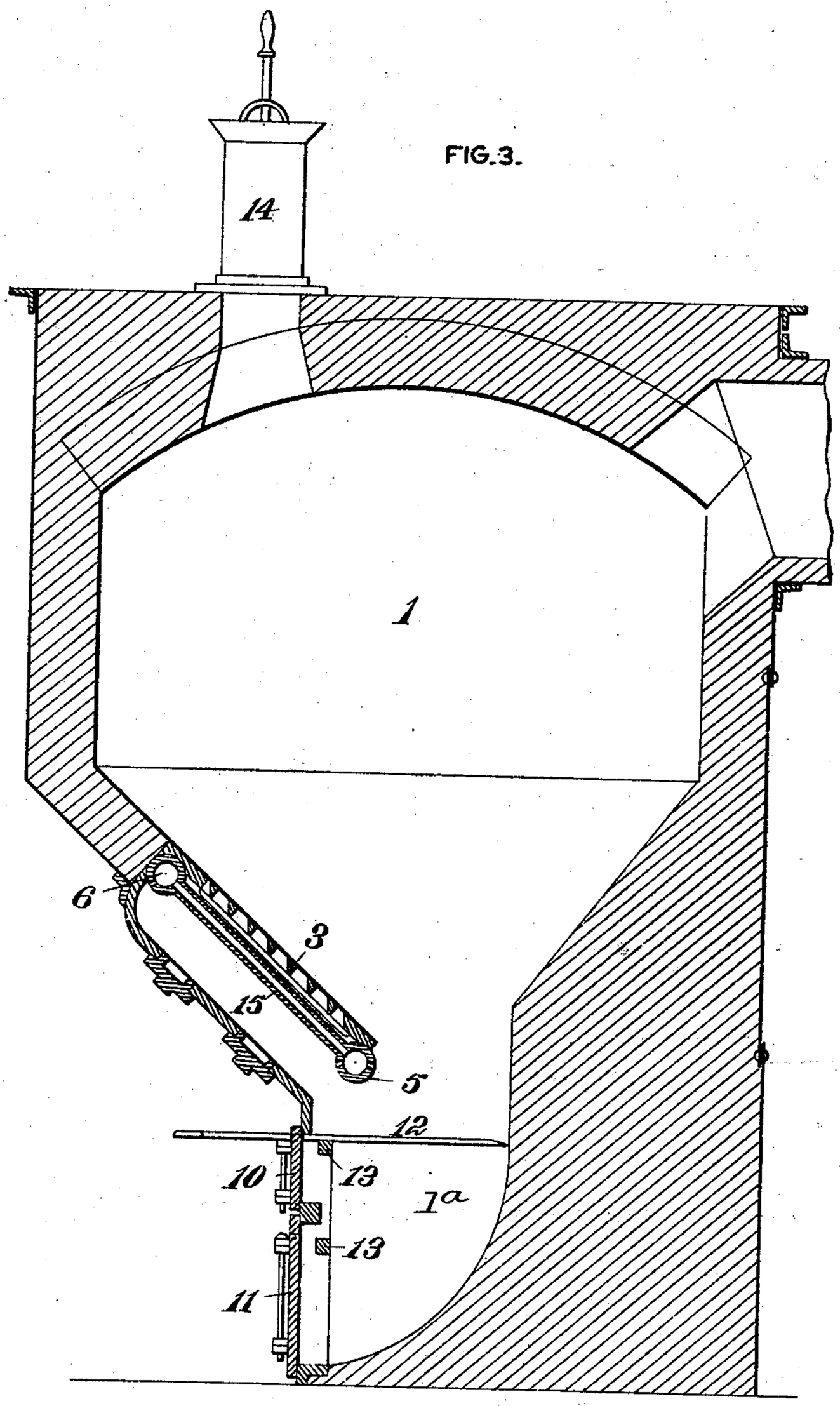
3 Sheets—Sheet 3.

W. & J. C. SWINDELL.

GAS PRODUCER.

No. 544,798. Patented Aug. 20, 1895.

FIG. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM SWINDELL AND JOHN C. SWINDELL, OF ALLEGHENY, PENNSYLVANIA.

GAS-PRODUCER.

SPECIFICATION forming part of Letters Patent No. 544,798, dated August 20, 1895.

Application filed October 1, 1894. Serial No. 524,602. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM SWINDELL and JOHN C. SWINDELL, citizens of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Gas-Producers, of which improvements the following is a specification.

The invention described herein relates to certain improvements in gas-producers, and has for its object a construction of producer wherein the burden of the charge is supported by a bed of ashes and cinders, and whereby the wetting and consequent deadening of the ashes and cinders may be controlled as required.

In general terms the invention consists in the construction and combination substantially as hereinafter described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a sectional elevation, the plane of section being indicated by the line *x x*, Fig. 2. Fig. 2 is a similar view, the plane of section being indicated by the line *y y*, Fig. 1. Fig. 3 is a view similar to Fig. 1 of a modification of the producer, and Fig. 4 is a detail view of one of the supporting-blades.

In the practice of our invention the generating-chamber 1 of the producer is constructed in the usual manner with inwardly-sloping boshes or side walls, so that the fuel is caused to move toward the lower middle portion of the producer, where the ash-pit 1^a is located. As shown in Fig. 1, two opposite side walls of the producer, are recessed, forming blast-chambers 2, which communicate at their lower ends with the generating-chamber and ash-pit at the junction thereof, and are covered by grates 3, whose upper surfaces are flush with the surfaces of the side walls, so that the fuel will slip freely over them. The grates are supported along their outer edges by ribs 4, formed on the iron lining of the blast-chambers and ash-pit, while their inner edges are supported by the blast-pipes 5, which extend horizontally through the upper portion of the ash-pit, as shown. Water is introduced into the blast-chambers either by means of a pipe 6, located near the upper outer corners of the chambers, as shown at the left of Fig. 1, or by means of a trough 7, formed on the lining of the chambers, as shown at the right of Fig. 1, the pipe 6 or trough 7 being connected to a suitable source of supply by a pipe 8. The water flows down along the floors of the blast-chambers, deadening any ashes which may drop thereon through the grates, and thence into the body of ashes which descend between the blast-pipes.

The blast-pipes 5 are provided with two substantially opposite rows of openings or perforations, so as to direct a series of jets of air into the body of fuel between the blast-pipes and another series of jets of air into each of the blast-chambers, from which the air passes up through the grates into the superincumbent fuel, this distribution of the air-supply serving to thoroughly aerate the entire body of fuel. If desired, water may be injected into the blast-pipes simultaneously with the air, it being understood that only sufficient water is to be admitted into the blast-pipes to partially fill them, so that the air-supply shall not be interfered with. The blast-pipes being located in position to be highly heated by the charge, the water admitted is rapidly vaporized and the steam which is generated passes with the air into the charge. As shown in Fig. 2, a steam-supply pipe 9 is connected to the blast-pipes so that an additional volume of steam may be injected, thereby permitting of the generation of considerable quantities of water-gas as well as producer-gas.

The downward movement of the charge other than that due to combustion and the consequent settling or compacting together, is regulated by the removal of the ashes and cinders through either or both of the doors 10 and 11 of the ash-pit. In order to retain the charge in position during the removal of ashes, we provide flat supporting-blades 12, which are inserted through openings in the front of the ash-pit and pushed into the column of ashes, the bars resting upon transverse bars 13, fixed to the walls of the ash-pit. In the instance shown two series of supporting-blades 12, one above the other, are employed, and the column or body of ashes in the ash-pit is thereby so divided that portions

below the blades may be successively removed by the withdrawal of one or the other series of supporting-blades without interfering with the support of the charge.

It is characteristic of our improvement that movable grate-bars are not necessary for supporting the charge, and hence the labor necessary in the usual forms of producers of removing and replacing the bars when the grate becomes clogged with cinder is entirely avoided; and, further, as the ashes form, especially when wet, a more dense and compact body than the fuel, it is not necessary to stop the blast while the ashes are being removed, the body of ashes above the supporting-blades always presenting a greater resistance than the charge above the blast-pipes. It will be observed that the feed-hoppers 14 are arranged in line or approximately in line with the grates covering the blast-chambers, so that there will not be any liability of blowing holes in the charge.

As shown in Fig. 3, the producer may be constructed with only one blast-chamber, in which case said chamber is preferably located in the front side of the producer. In lieu of connecting the blast-pipe and water-supply pipe outside of the producer, as shown in Figs. 1 and 2, the blast-pipe may be connected to the pipe 6 by one or more transverse pipes 15, which may be perforated on their upper surfaces, so as to permit air to escape up through the grates, or may be made in the form of troughs.

As the water-supply pipes are provided with suitable valves, the amount of water admitted may be so regulated as to either slightly dampen the ashes or to thoroughly saturate them, as required, whereas in producers having a water-seal the ashes are always thoroughly saturated and render it difficult to increase the temperature in the producer. By so regulating the flow of water that the ashes will only be slightly dampened considerable quantities of steam will be generated by the heat from the ashes, and this steam will pass, with the air-blast, up through the charge and being decomposed water-gas will be formed.

It is further characteristic of our improvement that either producer-gas or water-gas or a combination of the two may be manufactured, as desired, by the opening or closing of valves in the air, steam, and water pipes. This is an important advantage, as, in making high-carbon steel, either by the crucible or open-hearth furnace, water-gas cannot be advantageously employed on account of its high oxidizing action, while, on the other hand, water-gas, by reason of its high heating properties, is preferred in other metallurgical operations.

We claim as our invention and desire to secure by Letters Patent—

1. In a gas producer, the combination, substantially as set forth, of a generating chamber, an ash pit open at top thereto, a blast chamber at or near the junction of the generating chamber and ash pit, and communicating therewith at its lower end, a grate dividing the blast chamber from the generating chamber, and a blast pipe located at or near the lower end of the blast chamber, in position to be heated by the charge, and having a series of perforations for discharge into the ash pit, and an opposite series of perforations for discharge into the blast chamber.

2. In a gas producer, the combination, substantially as set forth, of a generating chamber, an ash pit open at top thereto, a blast chamber at or near the junction of the generating chamber and ash pit, and communicating therewith at its lower end, a grate dividing the blast chamber from the generating chamber, a blast pipe located at or near the lower end of the blast chamber, in position to be heated by the charge, and having a series of perforations for discharge into the ash pit, and an opposite series of perforations for discharge into the blast chamber, and a water supply pipe leading into the blast pipe.

3. In a gas producer, the combination, substantially as set forth, of a generating chamber, an ash pit open at top thereto, a blast chamber at or near the junction of the generating chamber and ash pit, and communicating therewith at its lower end, a grate dividing the blast chamber from the generating chamber, a blast pipe located at or near the lower end of the blast chamber, in position to be heated by the charge, and having a series of perforations for discharge into the ash pit and an opposite series of perforations for discharge into the blast chamber, and a water supply pipe leading into the blast chamber for generation of steam from the heat of the ashes.

In testimony whereof we have hereunto set our hands.

WILLIAM SWINDELL.
JOHN C. SWINDELL.

Witnesses:
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F. E. GAITHER.