

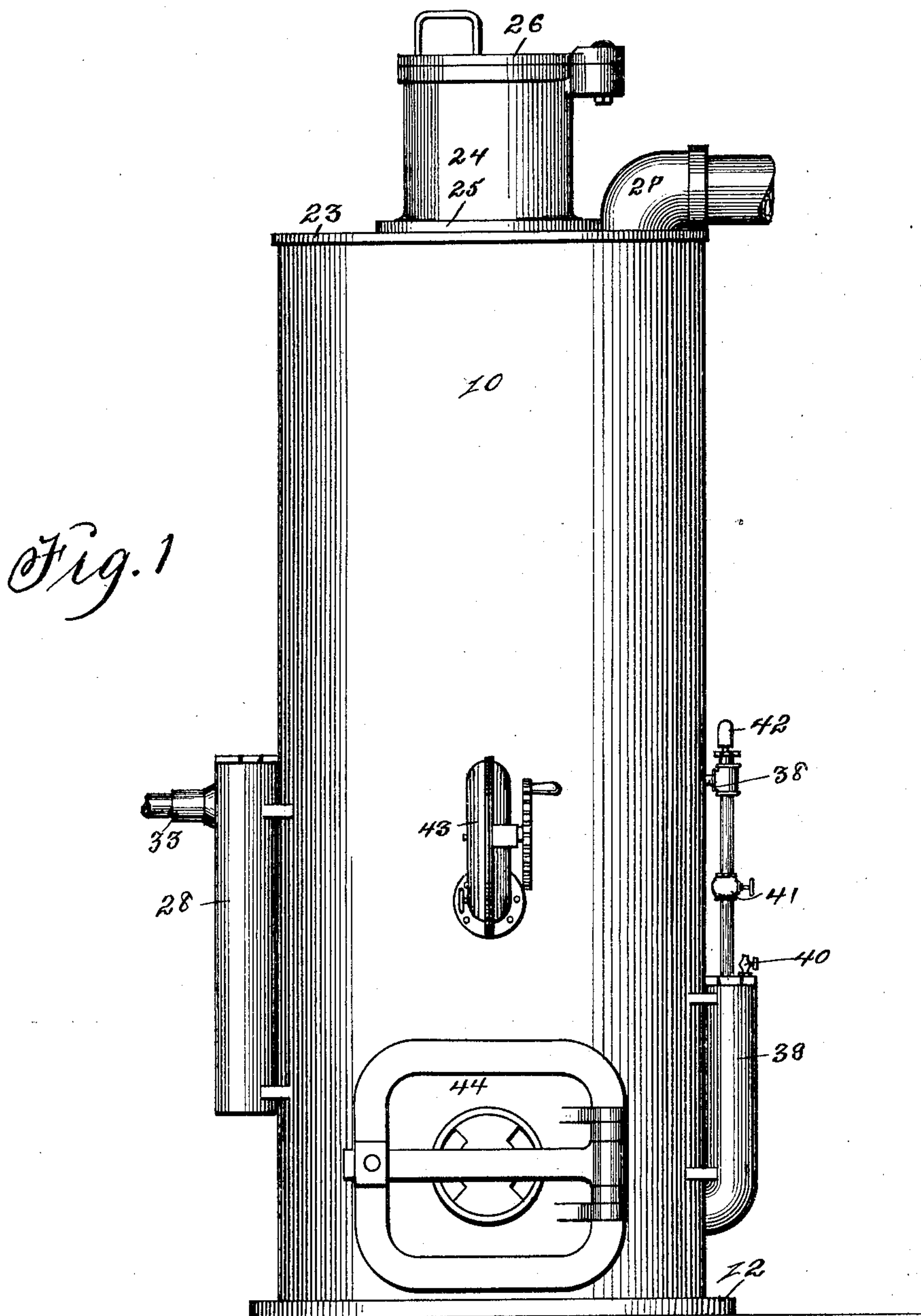
No. 793,554.

PATENTED JUNE 27, 1905.

W. VIGGERS & R. Z. BALL.
GAS PRODUCER.

APPLICATION FILED DEC. 12, 1904.

2 SHEETS—SHEET 1.



Witnesses: } Inventors: William Viggers,
L. L. Leibrock } and Roland Z. Ball.
R. G. Orwig } By Thomas G. Orwig, Attorney.

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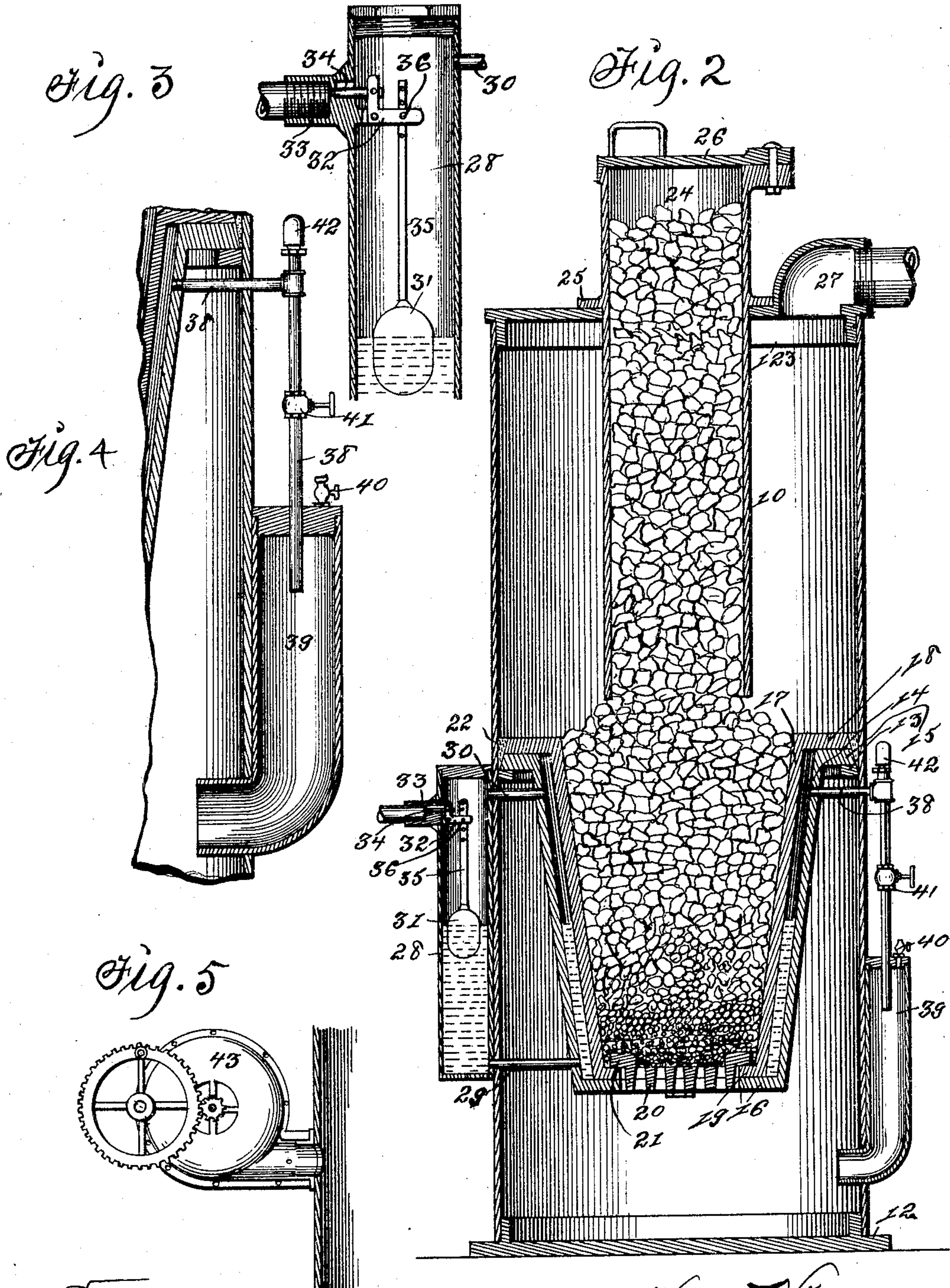
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Witnesses:
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UNITED STATES PATENT OFFICE.

WILLIAM VIGGERS AND ROWLAND Z. BALL, OF DURANGO, MEXICO.

GAS-PRODUCER.

SPECIFICATION forming part of Letters Patent No. 793,554, dated June 27, 1905.

Application filed December 12, 1904. Serial No. 236,616.

To all whom it may concern:

Be it known that we, WILLIAM VIGGERS and ROWLAND Z. BALL, citizens of Great Britain, residing at Durango, Mexico, have invented a new and useful Self-Regulating Gas-Producer, of which the following is a specification.

Our object is, first, to provide an apparatus for economically producing gas from fuel in large quantities as required for manufacturing purposes in operating machinery and also for lighting and heating buildings in towns and cities; second, to construct the apparatus, large or small, without brick walls, so it will be comparatively light in weight and portable; third, to combine an automatic fuel-feeding magazine with a crucible and suspending the crucible in a water-jacket; fourth, to combine an automatic water-feeder with the water-jacket for automatically keeping the water at a predetermined height to prevent the dangers incident to neglect of keeping a proper quantity of water in the water-jacket at all times during the operation of the apparatus; fifth, to produce a gas of uniform quality by automatic means for regulating the fire relative to the quantity of gas required at any given time; sixth, to utilize steam generated in the water-jacket for blowing the fire to promote combustion of the fuel; seventh, to provide means for feeding oxygen to the fire to promote combustion of fuel in the crucible by means of a fan-blower adapted to be manually operated as required to facilitate starting a fire in the crucible.

Our invention consists in the construction, arrangement, and combination of elements and subcombinations as hereinafter set forth, pointed out in our claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the apparatus and shows the automatic water-feeder, the steam-blower, and the air-blower on the outside of the wall that incloses the fuel-magazine, the crucible and producers, an annular air-chamber on the lower portion, and an annular gas-chamber in the upper portion of the apparatus. Fig. 2 is a vertical central sectional view of the apparatus and shows the fuel-magazine, the crucible, and the water-

jacket, the means for suspending them within the wall, the manner of combining the automatic water-feeder with the water-jacket, and also the means of connecting the steam-blower with the water-jacket and the air-chamber around and below the water-jacket and crucible. Fig. 3 is an enlarged detail view of the automatic water-feeding mechanism. Fig. 4 is an enlarged detail view of the steam-blower. Fig. 5 is an enlarged sectional view of the fan-blower.

The numeral 10 designates the cylindrical wall of the apparatus made of plate metal, preferably boiler-iron. It may vary in length and diameter as required for gas-producers of different sizes and places. It is closed air-tight at its bottom by a flanged metal base 12, as shown in Fig. 2, or in any suitable way. A metal ring 13 is fixed to its inside central portion and a water-jacket 14, having a flange 15 at its top, is suspended on the ring. The water-jacket is smaller in diameter at its bottom than at its top and has a flange 16 at its bottom projecting inward. A crucible 17 conforming in shape with the water-jacket 14 has an outward flange 18 at its top that rests upon the flange 15 of the water-jacket and a flange 19 at its bottom that rests upon the flange 16 of the water-jacket. The crucible is smaller in diameter than the water-jacket and by their combination an annular water-tight chamber is provided between them, as shown in Fig. 2. By thus shaping and combining the water-jacket and the crucible and jointly fixing them to the wall 10 a water-chamber is produced between them, and the top of the chamber beneath them is extended upward and around the water-jacket to subject its entire outer surface to heat that passes downward from the grate in the retort. A grate 20, having an annular flange 21, is fitted in the bottom of the water-jacket and crucible and supported by its flange 21, resting upon the flange 19 of the crucible. The edges of the top flanges of the water-jacket and the crucible are inclined to produce an annular cavity that is filled with cement or suitable packing 22.

The top of the wall 10 is closed air-tight by

a flanged metal cover 23, that has a central circular opening through which is extended an open-ended fuel-magazine 24, that has an annular flange 25, that rests upon the cover 23 as required to be supported within the wall 10 and to produce an annular gas-chamber above the crucible 17. The magazine is less in diameter than the crucible and does not extend into the crucible, and consequently gas produced in the crucible can readily rise through the fuel in the crucible and enter the gas-chamber above it. A cover 26 is pivotally connected with the top of the magazine that can be pushed aside to admit fuel and closed to prevent air from entering or gas escaping therefrom. An extension 27 is provided on the top of the cover 26 for connecting a pipe therewith for conveying gas from the apparatus to burners, where it is to be consumed for the various purposes for which it is adapted to be utilized.

A water-reservoir 28 is connected with the outside of the wall 10 and with the water-jacket 14 by means of a pipe 29 at its bottom and a pipe 30 at its top in such a manner as to produce communication between the reservoir and the annular chamber between the water-jacket 14 and the crucible 17. A float 31 is suspended in the reservoir from an elbow-shaped lever 32, that is fulcrumed to the end of a feed-pipe 33, connected with the top portion of the reservoir and with a valve 34 in such manner that the quantity and height of the water let into the water-jacket can be predetermined by simply adjusting the stem 35 of the float 31 relative to the lever 32 by means of a movable pin 36 and a plurality of perforations in the stem 35 and a perforation in the lever 32 or in any suitable way so that when the water is lowered in the water-jacket by evaporation into steam the float will descend and as required for opening the valve to allow water to enter the reservoir, and when the predetermined quantity of water has been thus automatically let into the reservoir the float will rise and close the valve.

A steam-pipe 38 is connected with the water-jacket 14 and the wall 10, as shown in Fig. 2, to a blowpipe 39, that communicates with the air-chamber under the crucible 17, as required, to direct steam through the grate 20 to the fire to promote combustion of fuel in the bottom of the crucible. The top of the blowpipe 39 is provided with a cut-off valve 40 to admit air to be mingled with the steam and conveying oxygen to the fire. The pipe 38 is provided with a cut-off valve 41 for preventing the passage of steam and the top of the pipe with a safety-valve 42.

A fan-blower 43 is connected with the wall 10, as shown in Figs. 1 and 5, to be manually operated to force air into the air-chamber and under the grate as required to aid in starting a fire in the crucible before steam is gener-

ated to blow the fire. A door 44 is provided at the lower end of the wall 10 to gain access for starting a fire and for removing ashes.

In the practical operation of the apparatus a fire is started in the crucible, and as the fire increases fuel is added by opening the top of the magazine and dropping fuel into it to fill the crucible and the magazine and the top of the magazine closed; but before starting the fire water is let into the reservoir and water-jacket and the valve in the steam-pipe connected with water-jacket and the steam-blower pipe opened. The gas produced by the burning of fuel in the lower portion of the crucible will pass upward through the fuel and from the crucible into the gas-chamber above it through the open space between the open top of the crucible and the open bottom of the magazine, to be conveyed therefrom through a pipe connected with the top of the gas-chamber as required for use for the various purposes for which it is adapted. As the fuel is consumed in the lower part of the crucible more fuel is automatically fed into the top of the crucible from the bottom of the magazine by force of gravity as required to continue the operation, and before the magazine is emptied it must be refilled to prevent gas from entering it.

Having thus set forth the purpose of our invention and described the construction and function of each element and subcombination of all the parts, the practical operation and utility of the apparatus will be obvious to persons familiar with the art to which it pertains.

What we claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for producing gas, a wall closed at its top and bottom to produce airtight chamber, a retort having an exterior annular flange at its top and smaller at its bottom than its top and a water-jacket fixed to the outside of the retort to produce an annular water-chamber and the retort and the water-jacket jointly fixed to the inside of the wall and suspended to produce a chamber around and below the water-jacket and a chamber above the retort and an open-ended fuel-magazine suspended from the top of the wall, to operate in the manner set forth.

2. In an apparatus for producing gas, a cylindrical metal wall closed at its top and bottom, a ring fixed to its inside and central portion, a water-jacket having a flange at its top projecting outward and a flange at its bottom projecting inward, a retort having a flange at its top projecting outward and a flange at its bottom projecting inward, arranged and combined to operate in the manner set forth for the purposes stated.

3. In an apparatus for producing gas, a cylindrical metal wall closed at its top and bottom, a ring fixed to its inside and central portion, a water-jacket having a flange at its top

projecting outward and a flange at its bottom projecting inward, a retort having a flange at its top projecting outward and a flange at its bottom projecting inward, and a grate in the bottom of the retort, arranged and combined to operate in the manner set forth for the purposes stated.

4. In an apparatus for producing gas, a cylindrical metal wall closed at its top and bottom, a ring fixed to its inside and central portion, a water-jacket having a flange at its top projecting outward and a flange at its bottom projecting inward, a retort having a flange at its top projecting outward and a flange at its bottom projecting inward, and a grate in the bottom of the retort, and an open-ended magazine suspended from the top of the wall over the top of the crucible, arranged and combined to operate in the manner set forth for the purposes stated.

5. In an apparatus for producing gas, a cylindrical metal wall closed at its top and bottom, a ring fixed to its inside and central portion, a water-jacket having a flange at its top projecting outward and a flange at its bottom projecting inward, a retort having a flange at its top projecting outward and a flange at its bottom projecting inward, and a grate in the bottom of the retort, and means to feed water into the water-jacket, arranged and combined to operate in the manner set forth for the purposes stated.

6. In an apparatus for producing gas, a cylindrical metal wall closed at its top and bottom, a ring fixed to its inside and central portion, a water-jacket having a flange at its top projecting outward and a flange at its bottom projecting inward, a retort having a flange at its top projecting outward and a flange at its bottom projecting inward, a grate in the bottom of the retort a water-reservoir connected with the wall and provided with tubes at its top and bottom portions to communicate with the annular chamber between the water-jacket and the crucible and means to regulate the flow of water into said chamber to feed water into the water-jacket, arranged and combined to operate in the manner set forth for the purposes stated.

7. In an apparatus for producing gas, a cylindrical metal wall closed at its top and bottom, a ring fixed to its inside and central portion, a water-jacket having a flange at its top projecting outward and a flange at its bottom projecting inward, a retort having a flange at its top projecting outward and a flange at its bottom projecting inward, a grate in the bottom of the retort, a tube fixed on the top portion of the reservoir, a valve in the tube, an elbow-shaped lever connected with the valve and a float adjustably connected with the lever

to feed water into the water-jacket, arranged and combined to operate in the manner set forth for the purposes stated.

8. In an apparatus for producing gas, a cylindrical metal wall closed at its top and bottom, a ring fixed to its inside and central portion, a water-jacket having a flange at its top projecting outward and a flange at its bottom projecting inward, a retort having a flange at its top projecting outward and a flange at its bottom projecting inward, a grate in the bottom of the retort, a water-reservoir connected with the wall and provided with tubes at its top and bottom portions to communicate with the annular chamber between the water-jacket and the crucible means to regulate the flow of water into said chamber to feed water into the water-jacket and means to convey steam from the said chamber and to discharge it to blow a fire in the crucible, arranged and combined to operate in the manner set forth for the purposes stated.

9. In an apparatus for producing gas, a cylindrical metal wall closed at its top and bottom, a ring fixed to its inside and central portion, a water-jacket having a flange at its top projecting outward and a flange at its bottom projecting inward, a retort having a flange at its top projecting outward and a flange at its bottom projecting inward, a grate in the bottom of the retort, means to feed water into the water-jacket, a blower-pipe connected with the wall to communicate with the air-chamber around and below the water-jacket and connected with the top portion of said annular chamber and means to regulate the passage of steam into the blowpipe, arranged and combined to operate in the manner set forth for the purposes stated.

10. An apparatus for producing gas comprises a cylindrical wall closed at its top and bottom, a water-jacket, a retort, a grate in the bottom of the crucible, a fuel-magazine suspended in the top portion of the wall, a movable cover on the top of the magazine, a service-pipe connected with the gas-chamber surrounding the magazine, a water-reservoir connected with the water-jacket and means to feed water from the reservoir into the water-jacket, a blowpipe and means to convey steam from the water-jacket into and through the blowpipe and a fan-blower connected with the air-chamber surrounding the water-jacket, arranged and combined to operate in the manner set forth for the purposes stated.

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