

(No Model.)

2 Sheets—Sheet 1.

H. A. JONES
GAS APPARATUS.

No. 584,472.

Patented June 15, 1897.

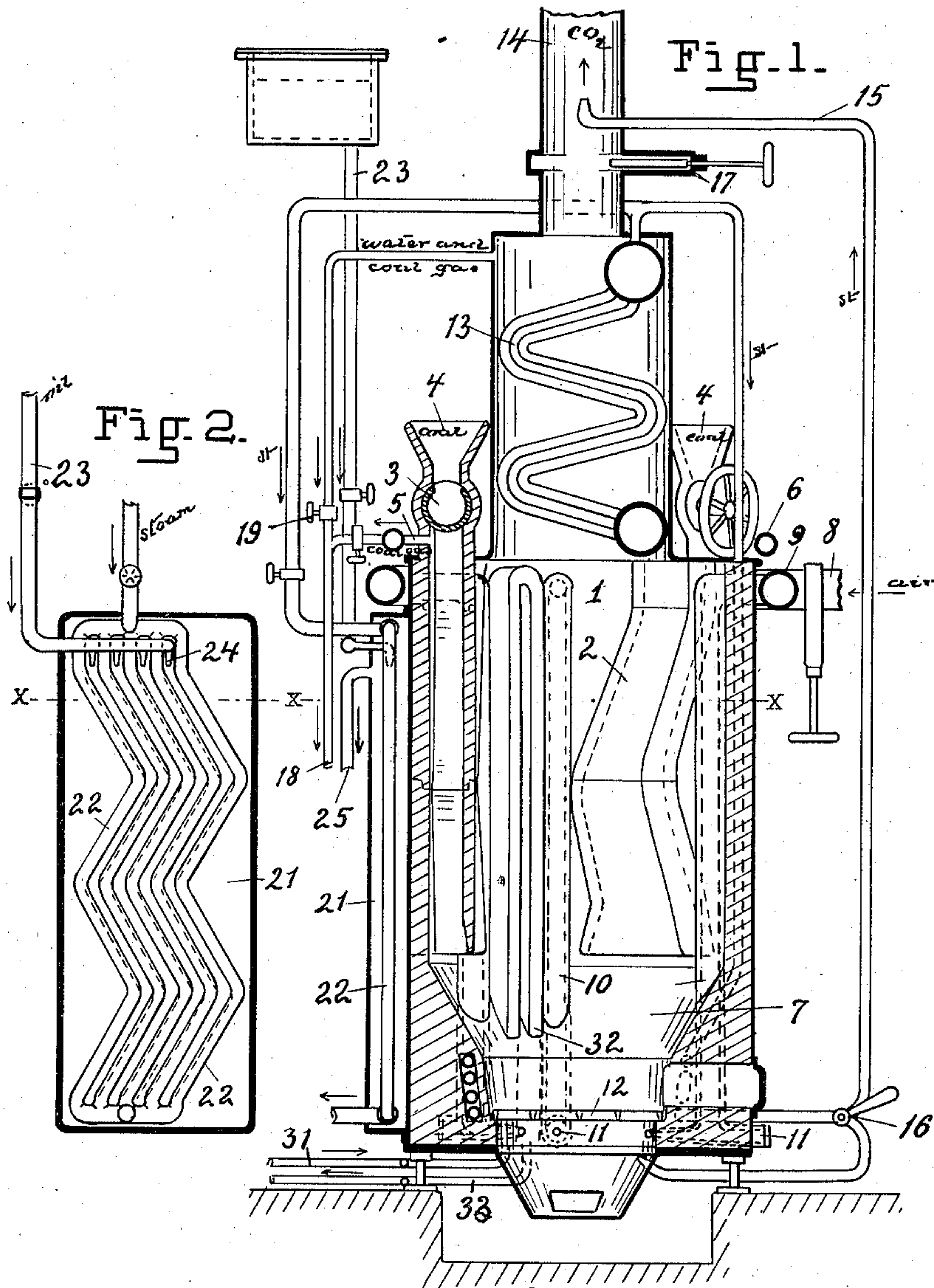


Fig. 2.

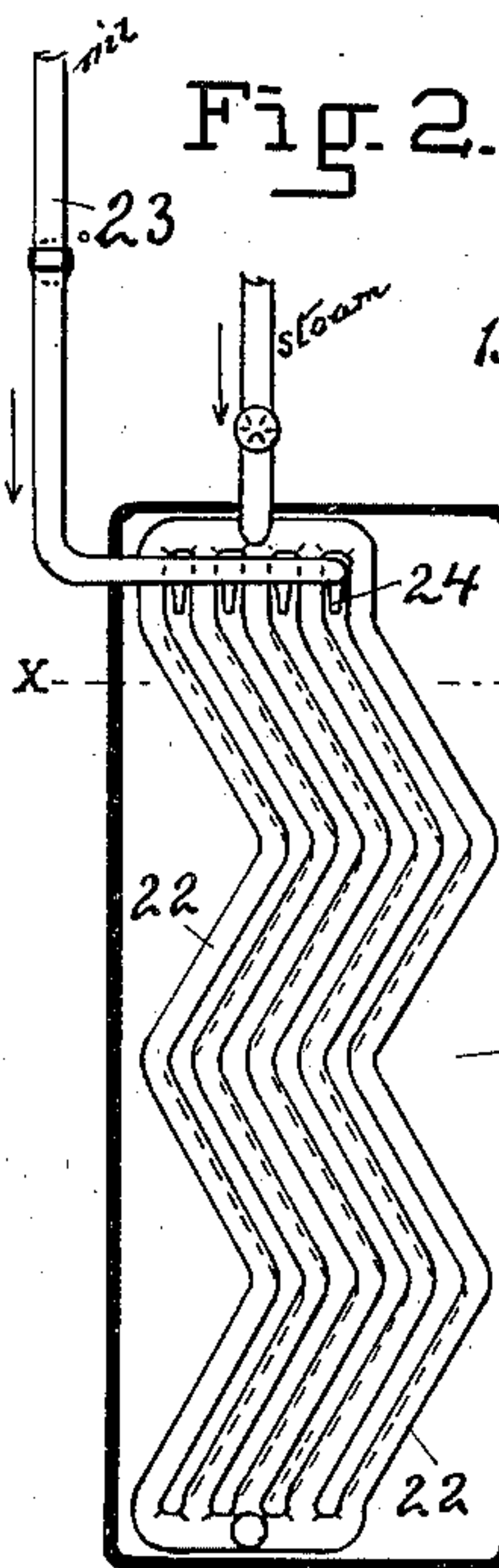
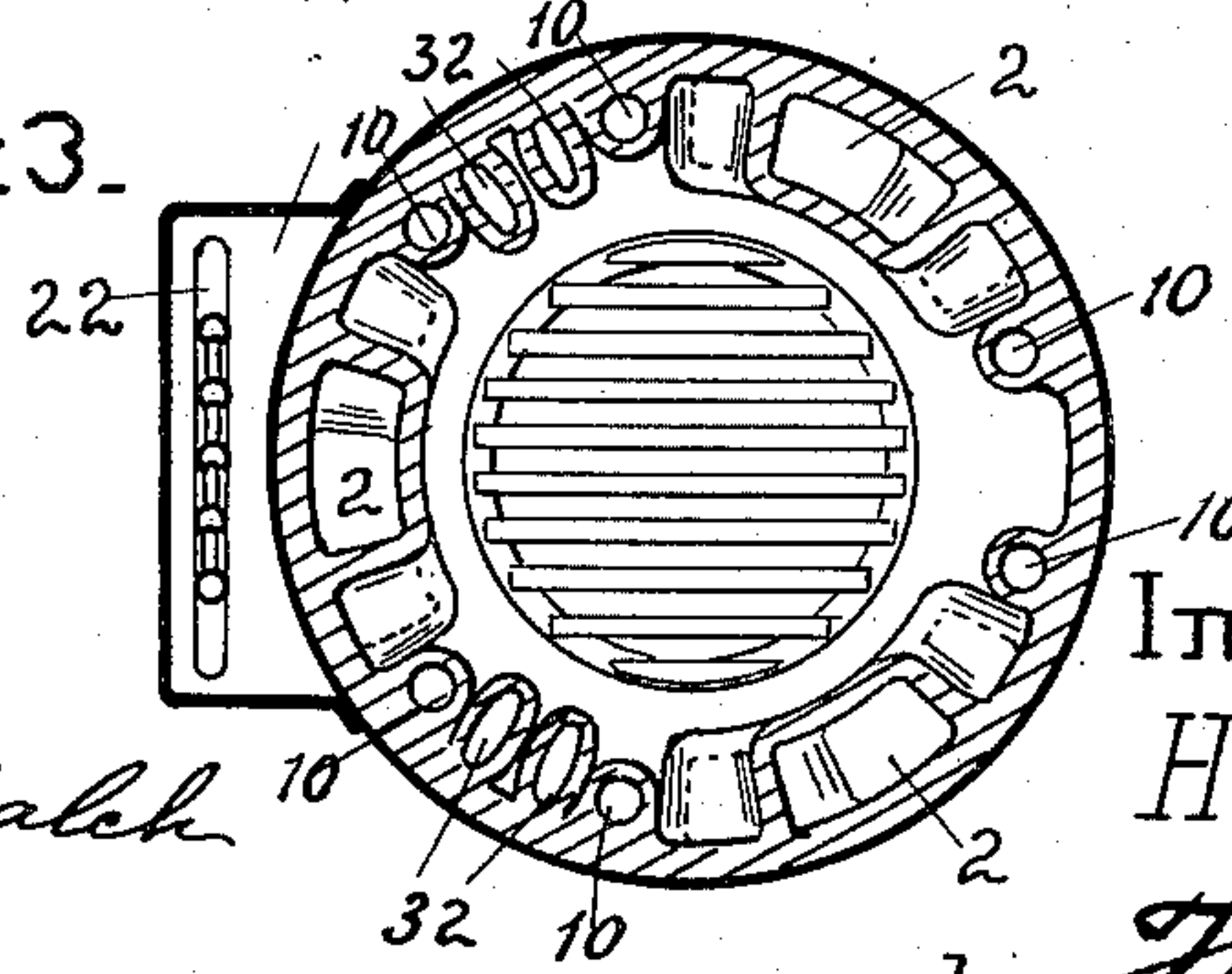


Fig. 3.



Witnesses:

Samuel W. Balch
H. A. Jones

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by Thomas Ewing, Jr.,
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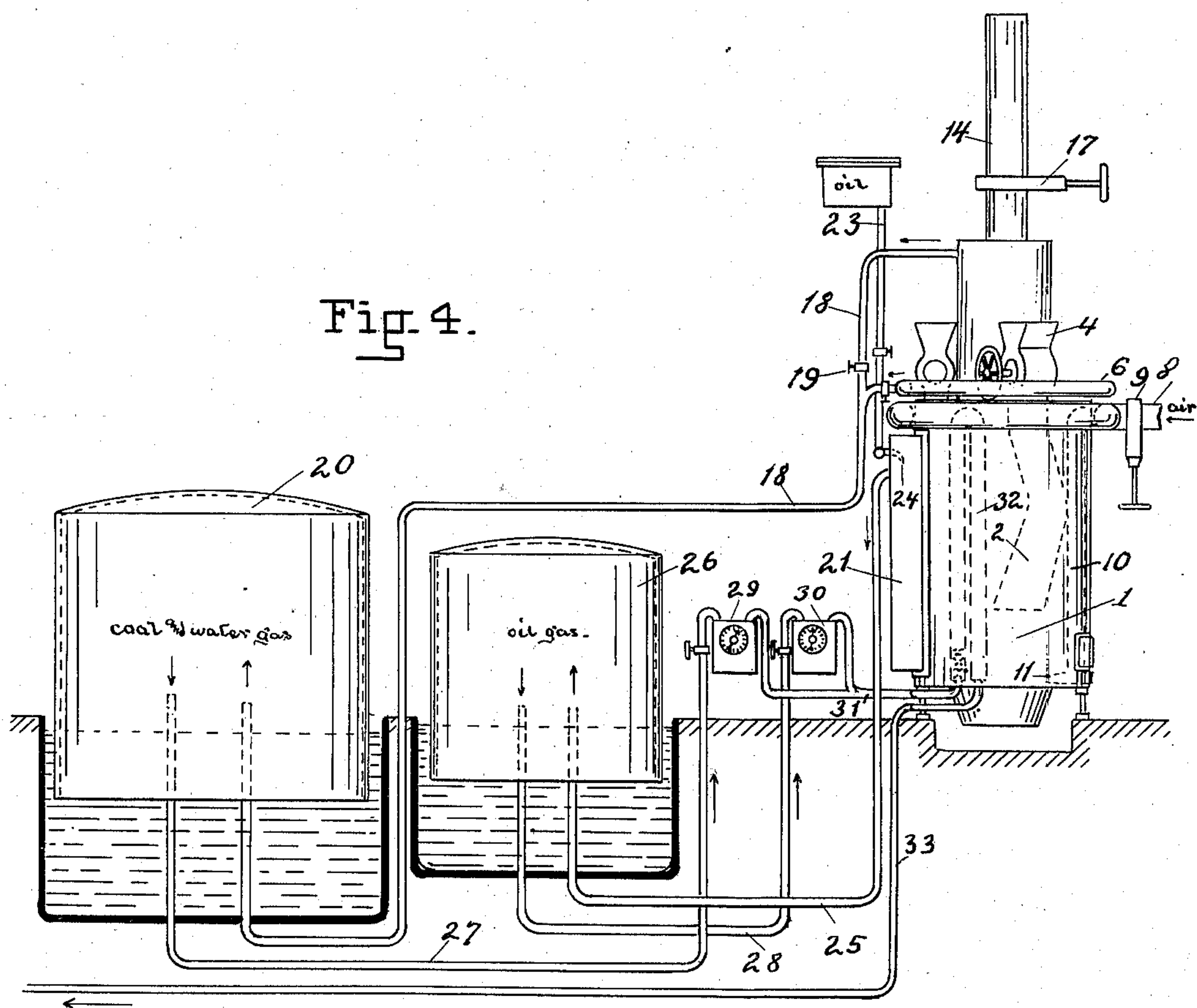
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2 Sheets—Sheet 2.

H. A. JONES
GAS APPARATUS.

No. 584,472.

Patented June 15, 1897.



Witnesses:

Samuel W. Balch
Hyatt Whitman

Inventor,

Henry A. Jones,

by *Thomas Ewing, Jr.*
Attorney.

UNITED STATES PATENT OFFICE.

HENRY ANWYL JONES, OF NEW YORK, N. Y.

GAS APPARATUS.

SPECIFICATION forming part of Letters Patent No. 584,472, dated June 15, 1897.

Application filed November 16, 1894. Renewed November 18, 1896. Serial No. 612,649. (No model.)

To all whom it may concern:

Be it known that I, HENRY ANWYL JONES, a citizen of the United States of America, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Gas-Producing Apparatus, of which the following is a specification.

My apparatus generates coal-gas and water-gas from soft or hard coal or coke and steam, and also produces oil-gas from oil—as, for example, from gas naphtha. These gases are combined to form an illuminating-gas. When soft coal is used, it is charged at the upper end of zigzag gas-retorts, through which it descends and is converted into coke, while the coal-gas is driven off and collected in a holder. This coke feeds automatically from the lower ends of the retorts into the main chamber, where it is alternately brought into an incandescent heat and acted on by superheated steam to generate water-gas. The water-gas is driven off from the main chamber through a boiler, which it helps to heat, into the same holder with the coal-gas. The naphtha is vaporized in an oil-vaporizing chamber heated by specially-formed zigzag steam-pipes, and from this it is conducted into and collected in a separate holder from that used for the coal and water gas. The gases are conducted from the two holders through meters in the desired proportion required to secure the desired candle-power to a mixing and fixing retort, where they are brought together and rendered permanent by heating. From this they leave the apparatus herein shown and are conducted through a scrubber and purifier to the distributing-holder.

My improvements in this apparatus consist in the use of a zigzag coal-gas retort, in combination with various elements of a gas-producing apparatus, in various combinations of the several elements by which they are economically heated from a single source of heat, in an oil-evaporating apparatus of special construction, and in various other details, all as hereinafter described and claimed.

In the accompanying two sheets of drawings, Figure 1 shows a vertical section of the main chamber and the oil-evaporating chamber of my apparatus. Fig. 2 shows the pipe connections of the oil-evaporating chamber, the chamber being in section. Fig. 3 is a top

view of a section taken on the line $x x$ of Fig. 1; and Fig. 4 is an elevation of the apparatus, on a smaller scale, showing the gas-holders and all the connections for conveying gas, but for clearness omitting the steam connections.

That part of my apparatus which I term the “cupola” consists of a main chamber 1, which is of cylindrical form. When constructed as shown, it is about five feet in diameter and ten feet high and may be of various diameters and heights. Around the sides of the chamber and forming a part of its lining are zigzag coal-gas retorts 2. Each of these retorts, as shown, consists of two angularly-connected inclined sections; but if the height of the cupola is increased the other proportions should be enlarged and the sections in each retort should be more numerous.

A charging device and valve (shown as one apparatus) is at the top of each retort for charging. It consists of a cylindrical chamber 3, open on one side, which fits in a cylindrical opening across the upper protruding end of the retort. When this chamber is rotated to bring its opening upward, it is filled with soft coal through the hopper 4, and the coal is discharged into the retort by rotating the chamber so as to bring its opening on the under side. In all positions the valves seal the retorts and prevent the escape into the air of the coal-gas, and as the gas is generated it finds its way through the outlets 5 of the retorts, which lead from just below the valves into a pipe 6 encircling the cupola.

As the soft coal descends through the zigzag retorts it is converted into coke, while the coal-gas is driven off. The coal receives support from the lower inclined sides of each section, so that when near the bottom of the retorts it will not be unduly packed by that which is above, and as the sections are angularly connected the direction of the descending column is changed at each bend and the column broken up, so as to keep it open and free for the disengagement of gas. There is a flaring downward to prevent any wedging of the descending coal.

The retorts open downward at the bottom and discharge the fuel from them over the inclined sides of the boshes 7 of the main chamber. As these openings have no valves, the

top of the bed of fuel in the main chamber must be as high as the bottoms of the retorts in order that they may retain their charge. As the fuel in the main chamber is burned or
 5 used up in the production of water-gas it is automatically replenished from the retorts and the fuel-line maintained even with their discharging ends.

The air for combustion passes through a
 10 valve 8 into a pipe 9, encircling the cupola. From this it passes into and down flues 10 around the interior of the main chamber and into twyers 11, which discharge it under the grate-bars 12. In descending through the
 15 flues the air takes up the heat of the combustion in the main chamber, which would otherwise be conducted in part through the lining or pass out of the chimney and be lost. As the combustion proceeds the products of combustion or generator-gas pass up around the
 20 pipes 13 of a tubular boiler, making steam, and then into the chimney 14. The steam is conducted down to a coil surrounding the lower part of the main chamber, where it is
 25 superheated. When the combustion is going on, the steam exhausts into the chimney through a pipe 15 to promote the draft. When the coal has been raised to incandescence, the combustion is stopped by closing the air-inlet
 30 valve 8. The valve 16 is turned at the same time, shutting off the steam-jet in the chimney and directing the superheated steam through a nozzle 15^a into the fire-chamber through the grate-bars. The steam acting on
 35 the incandescent coal generates water-gas. The valve 17 in the chimney is now closed and the gas is drawn off through the pipe 18, the valve 19 being opened for the purpose. This pipe conducts both the coal-gas gener-
 40 ated in the retort and the water-gas generated in the main chamber into a holder 20.

At the side of the cupola and attached to it is an oil-vaporizing chamber 21. Zigzag steam-pipes 22 with a general vertical direc-
 45 tion are contained in this chamber and are located so that the sections of the zigzags of adjoining pipes alternate under each other. Those sections in the series of zigzag pipes which lie under other sections have grooves
 50 on their upper sides. Oil is fed by a pipe 23 between each pair of steam-pipes through nozzles 24 at the uppermost grooves of the sections. The course of each of the streams of oil in descending is zigzag, for after run-
 55 ning down to the end of any section it drips into the upper end of the groove in the section of the adjoining pipe, and thus alternates back and forth between the pipes until it is vaporized. The resulting oil-gas is conducted
 60 through a pipe 25 to an oil-gas holder 26.

By the use of the vaporizing apparatus of the peculiar construction shown I am enabled to thoroughly vaporize the oil without burn-
 65 ing any considerable portion of it. Where the oil is vaporized by spraying it into hot gases a large proportion of it is burned.

In the operation of the oil-vaporizer the

oil-cock leading to the vaporizer is opened and adjusted until the oil is found to be evaporated, so that there is no drip of oil from the
 70 bottom of the grooves, and while only one cock is shown controlling the drips to all the grooves it is obvious that there may be a separate cock for each drip.

From the holders 20 and 26 the mixed gas
 75 and the oil-gas are drawn off by pipes 27 28 through meters 29 30 in just such proportions as are necessary for the desired candle-power, and enter together through a pipe 31 into a
 80 fixing-retort 32. At the bottom where they enter their mixing is assisted by passing them up through an open construction of fire-brick. (Indicated by dots in Fig. 4.) The retort has
 85 two branches, joined together at the top, and all of it but the lower ends of these branches is exposed to the heat of the main chamber. The mixed gas passes up one branch, over
 90 the bend at the top, and down the other branch, where it passes off through the pipe 33 to the customary scrubber, purifier, and distributing-holder. I have shown two such
 retorts in my apparatus in order to get the necessary capacity.

Without limiting myself to the precise details shown, what I claim as new, and desire to
 95 secure by Letters Patent of the United States, is—

1. In a gas-producing apparatus, a generator consisting of a main chamber provided with suitable inlets and outlets, in combina-
 100 tion with a zigzag retort flaring downward provided with an outlet for coal-gas and a charging device and a valve at its upper end, and a discharge at its lower end into the main chamber, substantially as described. 105

2. In a gas-producing apparatus, a generator consisting of a main chamber provided with suitable inlets and outlets, in combina-
 110 tion with a zigzag retort provided with an outlet for coal-gas and a charging device and a valve at its upper end, and having its lower end opening at the fuel-line into the main chamber, whereby the latter is automatically fed with fuel from the retort, substantially as described. 115

3. In a gas-producing apparatus, a generator consisting of a main chamber provided with suitable inlets for steam and fuel and outlets for gas, an oil-vaporizing apparatus consisting of zigzag steam-pipes contained
 120 therein and located so that the sections of the zigzags of adjoining pipes alternate under each other, means for supplying oil to the surface of the pipe and means for mixing the gases from the generator and oil-vaporizing
 125 apparatus, substantially as described.

4. In a gas-producing apparatus, a generator consisting of a main chamber provided with suitable inlets for steam and fuel and outlets for gas, an oil-vaporizing apparatus
 130 with zigzag steam-pipes contained therein, and located so that the sections of the zigzags of adjoining pipes alternate under each other, means for supplying oil to the surface of the

pipe and a fixing-retort, and connections for mixing the gases from the main chamber and from the oil-vaporizing apparatus and passing them through the fixing-retort, substantially as described.

5 5. In a gas-producing apparatus, a generator consisting of a main chamber provided with suitable inlets for steam and fuel and outlets for gas, and means for passing steam
10 through the main chamber to produce water-gas, an oil-vaporizing apparatus with zigzag steam-pipes contained therein, and located so that the sections of the zigzags of adjoining pipes alternate under each other, each section
15 having a groove formed in its upper side, permitting the oil to drop from one groove to another until vaporized, an oil-inlet for dropping oil in the upper grooves and a fixing-retort, and connections for mixing the gases
20 from the main chamber and from the oil-vaporizing apparatus in suitable quantities and passing them through the fixing-retort, substantially as described.

6. In a gas-producing apparatus, an oil-vaporizing chamber, in combination with a series of zigzag steam-pipes contained therein, and located so that the sections of the zigzags of adjoining pipes alternate under each other, and an oil-inlet for dropping oil onto the zigzag pipes, substantially as described.

7. In a gas-producing apparatus, an oil-vaporizing chamber, in combination with the zigzag steam-pipes contained therein and located so that the sections of the zigzag of adjoining pipes alternate under each other, each section being provided with a groove on its upper side, permitting the oil to drop from one groove to another until vaporized, and an oil-inlet for dropping oil into the upper groove, substantially as described.

Signed by me, in New York city, this 15th day of November, 1894.

HENRY ANWYL JONES.

In presence of—

THOMAS EWING, Jr.,
SAMUEL W. BALCH.