(No Model.)

I. D. GUYER.

APPARATUS FOR THE MANUFACTURE OF ILLUMINATING GAS.

No. 328,400. Patented Oct. 13, 1885.

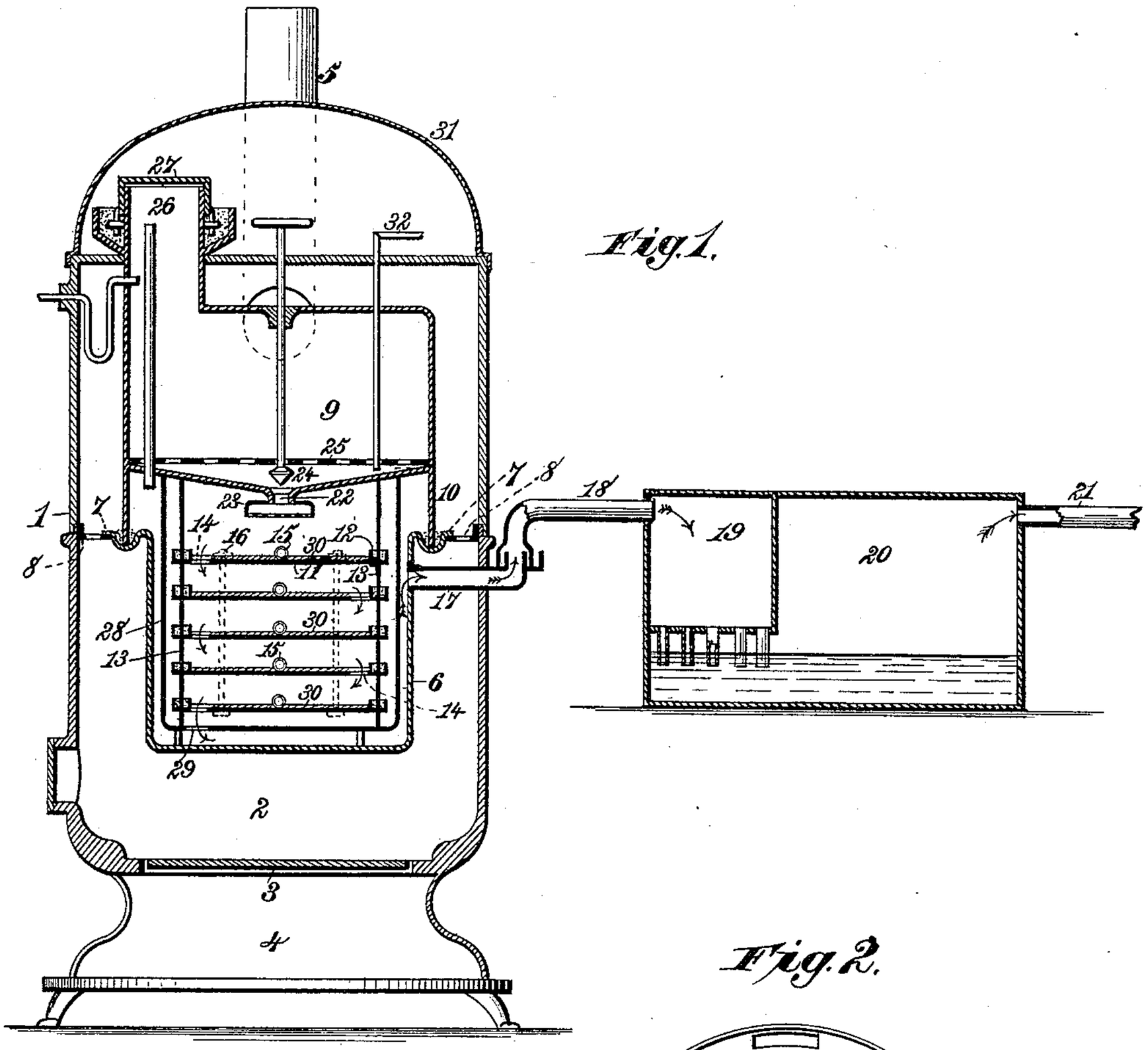

Fig. 1.

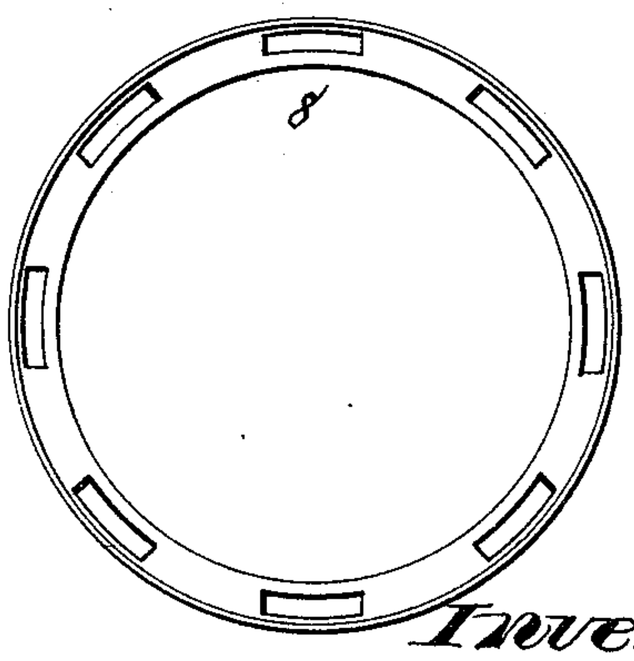

Fig. 2.

Witnesses.
Robt Everett.
A. H. Norris.

Inventor:
Isaac D. Guyer.
By James L. Norris.
Atty.

UNITED STATES PATENT OFFICE.

ISAAC DICKINSON GUYER, OF NEW YORK, N. Y.

APPARATUS FOR THE MANUFACTURE OF ILLUMINATING-GAS.

SPECIFICATION forming part of Letters Patent No. 328,400, dated October 13, 1885.

Application filed March 24, 1885. Serial No. 160,005. (No model.)

To all whom it may concern:

Be it known that I, ISAAC D. GUYER, a citizen of the United States, residing at New York, in the county and State of New York, have invented new and useful Improvements in Apparatus for the Manufacture of Illuminating-Gas, of which the following is a specification.

This invention relates to improvements in the apparatus for the manufacture of illuminating-gas from petroleum and all oil-bearing substances, for which Letters Patent No. 293,854, were issued February 19, 1884, to Wm. H. Douglass, assignor to The North American Petroleum Gas Company.

The objects of my invention are to improve the construction of such apparatus, whereby a more pure and better quality of gas is produced; to provide novel means whereby the oil passing to the chambers in the retort is absorbed and generated into gas before coming directly in contact with the heated retort; to provide novel means for increasing and preserving or maintaining the heat in the chambered retort; to provide novel means for washing, purifying, and partially cooling the gas in its passage from the retort to the ordinary condenser, and to largely increase the heating capacity of the furnace or stove. To such ends my invention consists in the combination of devices hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a vertical central sectional view of an apparatus embodying my invention, and Fig. 2 a detached plan view of the perforated ring for supporting the retort.

In order to enable others skilled in the art to make and use my invention, I will now describe the same in detail, referring to the drawings, where—

The number 1 indicates the casing of the furnace or heater; 2, the fire-box; 3, the grate; 4, the ash-pit, and 5 the smoke-flue, the casing being preferably made in sections, so that the upper section can be removed and replaced to permit access to the retort. In the lower part of the casing is a retort, 6, of metal, fire-clay, or other refractory material or metal, having a flange, 7, for suspending the retort from a perforated ring, 8, extending inwardly from the sides of the casing to divide the latter into two compartments—one above and the other below the retort—and having communication with each other through the perforations in the ring, which perforations may be opened or closed by suitable dampers, if desired, the construction being such that the products of combustion and heat may be passed through both the upper and lower compartments, or through the lower one only, as occasion may demand. The retort is of cylindrical or other appropriate form, closed at the bottom and provided with a removable cover, which when in place completely closes the upper portion of the retort. The suspending flange 7 of the retort is furnished with a groove for receiving a quantity of metal alloy fusible at a low temperature, to form a seal between the retort and the oil-reservoir 9 when the pendent rim 10 of the latter is set into the alloy. In the retort is arranged a series of horizontal plates, 11, of any suitable material, each provided with a cup or groove, 12, on its upper side, and also, with the exception of the lowermost, which has legs or rests directly on the bottom of the retort, with a downward-projecting rim, 13, which rests in the groove or cup of the plate next below, so that when the grooves or cups are filled with sand, pumice-stone, or other suitable material, a seal will be effected, so as to close all communication between the chambers formed by the plates 11 and the sides of the retort, except through the openings 14, formed in the plates at alternate sides. The series of plates are held together by rods 16, so that the whole series can be lifted out together or separately, as in the patent before mentioned.

The retort is provided with an eduction or evacuating tube, 17, and a pipe, 18, which enters a box or chamber, 19, within a water or other liquid-containing case, 20, the box having a series of tubes for delivering the gas into the water contained in the case, from whence it passes through a pipe, 21, to an ordinary condensing apparatus, which I do not deem it necessary to illustrate. The reservoir 9 fitted to the retort, as described, constitutes the removable cover therefor, and the reservoir has its bottom wall constructed with a central orifice, 22, and an attached chamber, 23, communicating therewith, and provided with a bottom wall having a series of perfo-

rations for uniformly distributing the oil, the orifice 22 being controlled by a valve, 24, having its operating-rod extending through the top of the casing, and directly above the bottom wall of the reservoir is arranged the slatted or reticulated false bottom 25. The oil or other material is supplied to the reservoir in any suitable manner—as, for example, through the medium of the tube 26 and cover 27. (Shown in the patent alluded to.) To the bottom wall of the reservoir is attached a metallic cylinder or diaphragm, 28, which surrounds or encircles the plates 11, and depends into the space between the latter and the side wall or walls of the retort, said cylinder having a side wall perforated, as at 29, and the bottom wall of the cylinder or diaphragm may have legs by which it may be supported on the bottom wall of the retort, or it may rest directly on the bottom of the retort. In the patent before alluded to the oil is delivered from the reservoir directly upon the uppermost hot metallic plate, which has been found objectionable in that a portion of the generated gas is thereby consumed, and, besides, a large percentage of carbon and tar residuum accumulates, and a poor quality of gas is the result. I provide each of the plates 11, on its upper side, with a layer, 30, of pumice-stone, fire-brick, terra-cotta, or other refractory and absorbent material, so that the oil dropping on the said absorbent layer is vaporized or converted into gas before such oil comes in contact with the hot metal surface, thus commencing to generate the gas at a low temperature and increasing gradually until the generation becomes perfect; and in this way I am enabled to produce a larger percentage of pure and rich illuminating-gas.

The metallic cylinder or diaphragm encircling the plates 11 between the latter and the wall of the retort increases the heat, and also maintains a more uniform and higher temperature in the chambers formed by the said plates. The heat in these chambers increases from the uppermost to the lowermost one, and consequently the vaporized oil is subjected to a gradually-increasing heat as it traverses from chamber to chamber in its passage to the eduction-tube of the retort.

The interior box and the water-holding case serve to cleanse or wash and purify and partially cool the gas prior to reaching the usual condenser, and thus contributes largely to the production of a pure and rich gas of a high-standard quality.

A hood or dome, 31, of metal or other material, is removably arranged upon the top wall of the casing 1 of the furnace or stove for the purpose of increasing the heating capacity thereof and preserving and confining the heat, thus rendering the apparatus more efficient in use.

I have shown and described the apparatus forming the subject-matter of Letters Patent No. 293,854, in order that my improvements thereon may be readily understood; but, of course, I do not broadly claim the features disclosed in the said patent.

In operation the material, after its introduction into the reservoir, is liquefied by heat radiated from the retort against the bottom of the reservoir, or by the heat and products of combustion arising from the fire-box upward around the retort and the reservoir. The cylinder or diaphragm becomes heated, and contributes largely in heating the chambers formed by the plates 11, and also serves to preserve a uniform and high temperature therein.

The material used may be solid, semi-solid, or liquid form, such as resins of commerce and fats, together with various hydrocarbons, such as petroleum and its distillates.

Instead of using horizontal metal plates 11 having a layer of pumice-stone or other material, as described, to absorb the oil, I may construct the plates themselves of the absorbent refractory material.

Where petroleum-oil or other liquid hydrocarbons are used, they are supplied to the reservoir through the medium of a pipe, 32.

What I claim is—

1. The combination of the furnace or stove having a grate, a retort suspended therein above the grate, a series of horizontal plates arranged within the retort and surrounded thereby and sealed around their edges from communication with the retort at such point, a layer of fire-clay or its described equivalent upon each metallic plate, said plates, and also the layers of fire-clay, being provided with openings therethrough for the passage of the gas, and a reservoir for delivering oil upon the fire-clay layer of the upper plate, whereby the gas commences to generate at a low temperature and advances gradually through the plates and their fire-clay layers, substantially as described.

2. The combination of the furnace or stove having a grate, a retort suspended therein above the grate, a series of plates arranged horizontally in the retort and surrounded thereby, a layer of fire-clay or its described equivalent on each plate, said plates, and also the fire-clay layers, having communicating openings therethrough, and a reservoir for delivering the oil upon the upper layer of fire-clay, substantially as described.

3. The combination of the furnace or stove, the suspended retort therein, the series of plates arranged horizontally in the retort and sealed around the edges thereof, and the layer of fire-clay or its described equivalent on each plate, said plates and fire-clay layers having openings therethrough, substantially as described.

4. The combination of a furnace or stove, an interior retort, a series of plates forming chambers in the retort, a metallic cylinder or diaphragm surrounding the plates, between the latter and the wall of the retort, and means for delivering oil or other material upon the uppermost plate, substantially as described.

5. The combination of a furnace or stove, an interior suspended retort, a series of communicating chambers formed in the retort, a metallic cylinder or diaphragm surrounding the chambers, between the walls thereof and the wall of the retort, and means for delivering oil or other material into the uppermost chamber, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ISAAC DICKINSON GUYER.

Witnesses:
THO. WINDOZ,
G. WAIT TUBBS.