

C. MARCHAND.
Apparatus for the Production of Illuminating Gas.

No. 215,949.

Patented May 27, 1879.

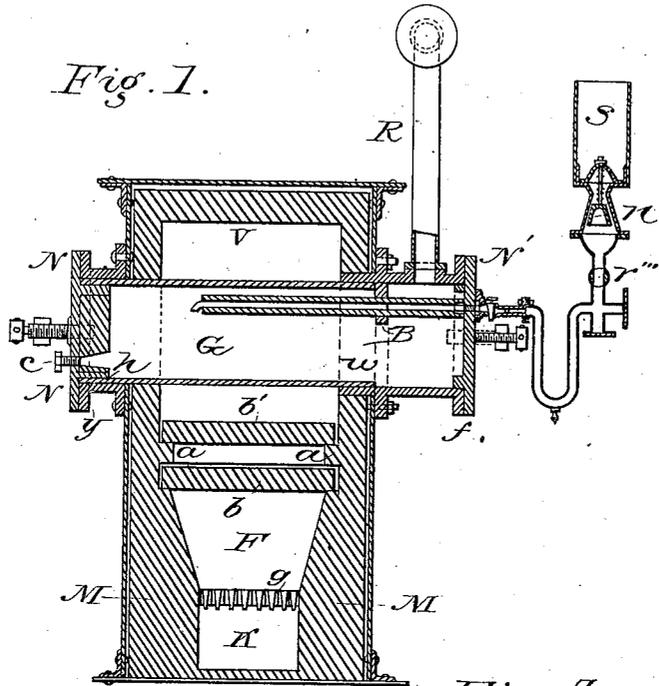
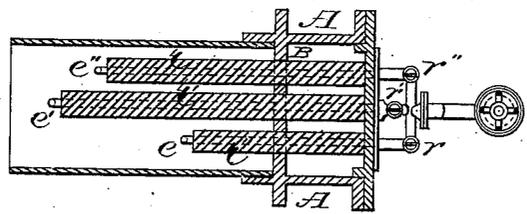


Fig. 4.



Witnesses:

Chas. McKee
Eugene Hebert

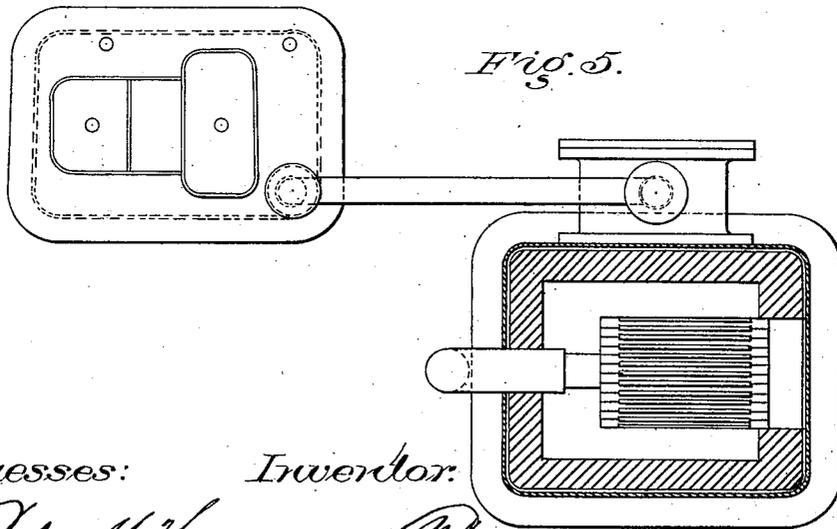
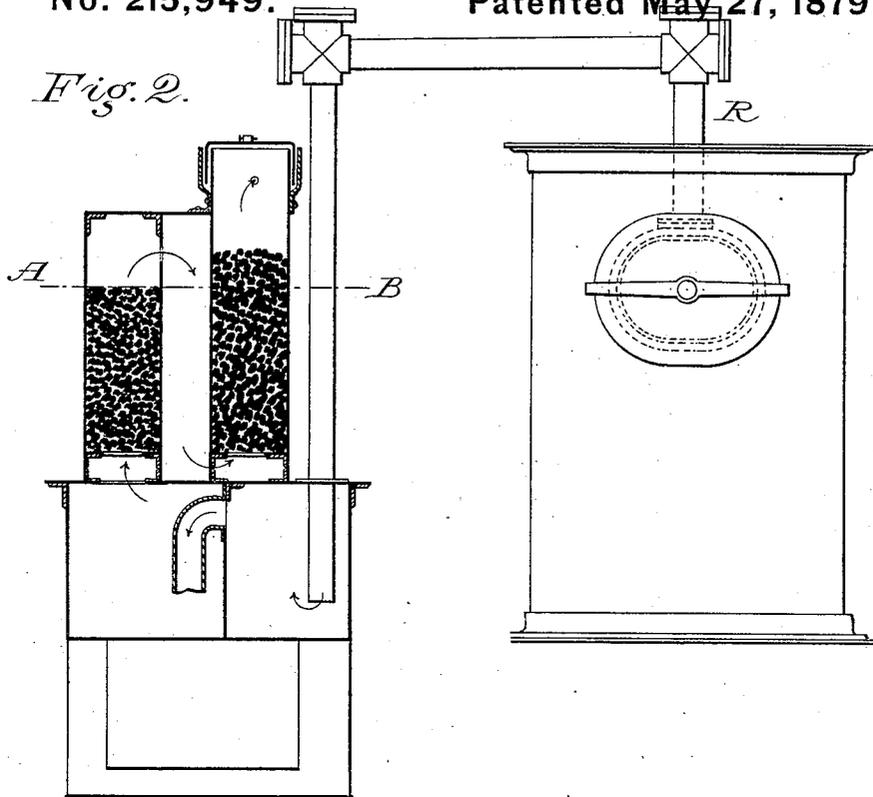
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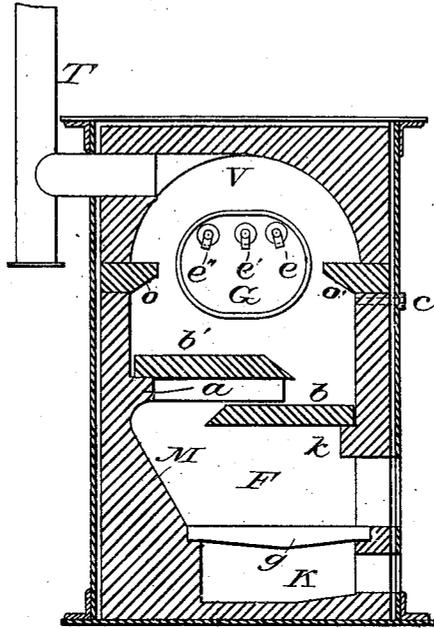
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Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES MARCHAND, OF PARIS, FRANCE.

IMPROVEMENT IN APPARATUS FOR THE PRODUCTION OF ILLUMINATING-GAS.

Specification forming part of Letters Patent No. 215,949, dated May 27, 1879; application filed December 2, 1878; patented in France, October 22, 1878.

To all whom it may concern:

Be it known that I, CHARLES MARCHAND, of Paris, France, have invented Improvements in Apparatus for the Production of Illuminating-Gas; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed sheet of drawings, making a part of the same.

My invention relates to improved apparatus for the economical production of illuminating-gas, the improvements being based on the readiness with which liquid hydrocarbons, such as the crude light oils of petroleum, schist-oils, &c., or the tarry residues of the rectification thereof, may be decomposed into carbureted-hydrogen gas on being brought suddenly into direct contact with a metal surface heated to redness.

The invention consists in the new arrangement of ribs in the furnace for guiding the flame to the generator; also, in the novel arrangement of supply-pipes of different lengths within the generator, all as hereinafter more fully described.

The apparatus employed for this purpose is shown in the accompanying drawings, Figure 1 of which is a longitudinal vertical section of the gas-generating apparatus; Fig. 2, a front elevation, partly in section; Fig. 3, a section at right angles to Fig. 1; Fig. 4, a horizontal section of the generator of gas, and Fig. 5 a horizontal section of the furnace and purifier.

It comprises, first, a furnace, F; second, a gas-generator, G, having its body constructed of sheet-iron, by contact with which the liquid is decomposed; third, an automatic feed apparatus for supplying the oils or their liquid residues from vessel S to gas-generator G; fourth, an ascension-pipe, R, through which the gas passes to a double washer surmounted by two coke-scrubbers and thence to a gas-holder.

The furnace is carefully built of fire-brick, M, incased in sheet-iron. K is the ash-pit; F, the furnace-chamber, and *g* the grate.

b b' are two fire-clay slabs at the upper part, resting at three sides upon the ledges *a a k*, so as to be readily removable in case of fracture. A space is left between these slabs, as shown clearly in Figs. 1 and 3, parallel to the axis of the gas-generator G, by which the flame is di-

vided before reaching the gas-generator in order to prevent the flame from impinging directly thereon.

o o' are two fire-clay ribs projecting internally along either side of the chamber in which the gas-generator is set and extending from front to back thereof, so as to contract the space between the gas-generator and the sides of said chamber, and oblige the flame to impinge continually upon the gas-generator G, and more particularly its lower part.

The products of combustion pass off by a chimney, T, Fig. 3, provided with a damper for regulating the draft. The gas-generator G may be made either of plate-iron welded or of fire-clay, like coal-gas retorts. The gas-generator is a fixture, and is in each case provided with a central body or lining of sheet-iron, forming a second gas-generator within the fire-clay surrounding it. This jacket of fire-clay is not illustrated in the drawings.

The gas-generator is at right angles to the grate-bars *g*, so that the flame is obliged by the fire-clay slabs *b b'* on the one hand and the ribs *o o'* on the other to completely envelop the gas-generator, and thus insure a more constant as well as a more extensive heating-surface.

Space is left between the cover N and the end *y* of the gas-generator to permit of its free expansion. The opposite end, *w*, is fixed.

Both covers N N' are of cast-iron, and N is lined with fire-brick and enters the gas-generator, as shown in Fig. 1, to prevent all escape of heat. *c* is the sight hole; *h*, cast-iron mouth bolted on either side and firmly fixed to the metal casing of the furnace, and fitting closely on the end *y* of the gas-generator, which is free to slide therein to allow for expansion and contraction.

The cover N fits against the flange of *h*, is luted with fire-clay, and secured by a screw, as shown, so as to make a perfectly tight joint. The cover N' has three holes, through which pass three pipes, *t t' t''*, of unequal length, (see Fig. 4,) connected to the oil-reservoir S. These pipes are firmly fixed to cover N', and are also supported by a cross-bar, B, cast on the mouth A. They may be made of iron, or preferably copper, and are covered with abestus, which is in turn enveloped in a thin casing of fire-

clay. From these three pipes the oil drips slowly at different points, $e e^1 e^2$, Figs. 3 and 4, in the gas-generator, which is previously heated to redness, ascertained through the peep-hole c .

It is indispensable that the distribution of oil should be automatic, owing to the back-pressure, which might result if the oil were fed too quickly.

For this purpose the oil-vessel S is provided with a cone-valve, n , kept open by a spring, but closed by an excess of pressure in the gas-generator, forcing back the liquid in the pipes $t t^1 t^2$, and raising the liquid column in the siphon-tube.

The supply of liquid is thus cut off as long as there is an excessive pressure on the gas-generator; but immediately the pressure falls to its normal point the valve is opened again by the spring and the oil recommences to flow.

$r r^1 r^2 r^3$ are cocks controlling the supply to the different pipes. As the liquid falls upon different points of the surface of the gas-generator maintained constantly at a red heat, it is decomposed almost instantly as fast as it is supplied without allowing time for distillation.

The joint f of cover N' is made in the same way as for cover N .

The gas generated passes through one or more ascension-pipes, R , in which it is considerably cooled, to the washer and purifier.

An inspection of the drawings will show the ease with which the central part of the gas-generator may be withdrawn and replaced by another when it is desired to remove the carbon deposit formed therein.

I will remark here that the inner gas-generator is indispensable only in case the liquid hydrocarbons treated produce a considerable deposit of carbon.

To this end cock r^3 is closed and cover N removed, which may be done without letting the fire go quite out. The lining can then be withdrawn by means of pinchers, and replaced

by a fresh one while the first is being cleaned, so that the working of the apparatus is not interrupted for any length of time. The ascension pipe or pipes R may also be readily cleaned by removing their covers.

The following are the principal features and advantages of the invention: first, the use, as a substitute for the ordinary iron retorts, of a gas-generator whose body or central part is either entirely of sheet-iron or of fire-clay lined with removable thin sheet-iron, both being of elliptical form in cross-section, this form affording the largest heating-surface; second, the utilization of the whole heating-surface by the use of several pipes, $t t^1 t^2$, distributing the oil at points $e e^1 e^2$, thus rendering it possible to manufacture gas at a rapid rate as required; third, there is no liability of accident even in the event of the pipe R becoming choked, as the oil-supply is immediately cut off by the closing of the movable valve n . The working of the apparatus may thus be safely intrusted to any unskilled person.

I claim—

1. The furnace F , having the several obstruction-plates $b b'$ and the ribs $o o'$, combined with the gas-generator G to form a zigzag passage below the gas-generator and contract the space at each side of the gas-generator throughout the length of the furnace, substantially as herein shown and described.

2. The combination of the reservoir S with a series of pipes, $t t^1$, and with the gas-generator G , into which said pipes are conducted and within which they are of unequal lengths, to distribute the liquid in different parts of the generator, substantially as specified.

3. The combination, in a gas-generator, of the cover N' , pierced by the pipes $t t^1$, &c., with the plate or brace B , substantially as herein shown and described.

CHARLES MARCHAND.

Witnesses:

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