

(No Model.)

W. F. C. M. McCARTY.

APPARATUS FOR THE MANUFACTURE OF GAS.

No. 321,124.

Patented June 30, 1885.

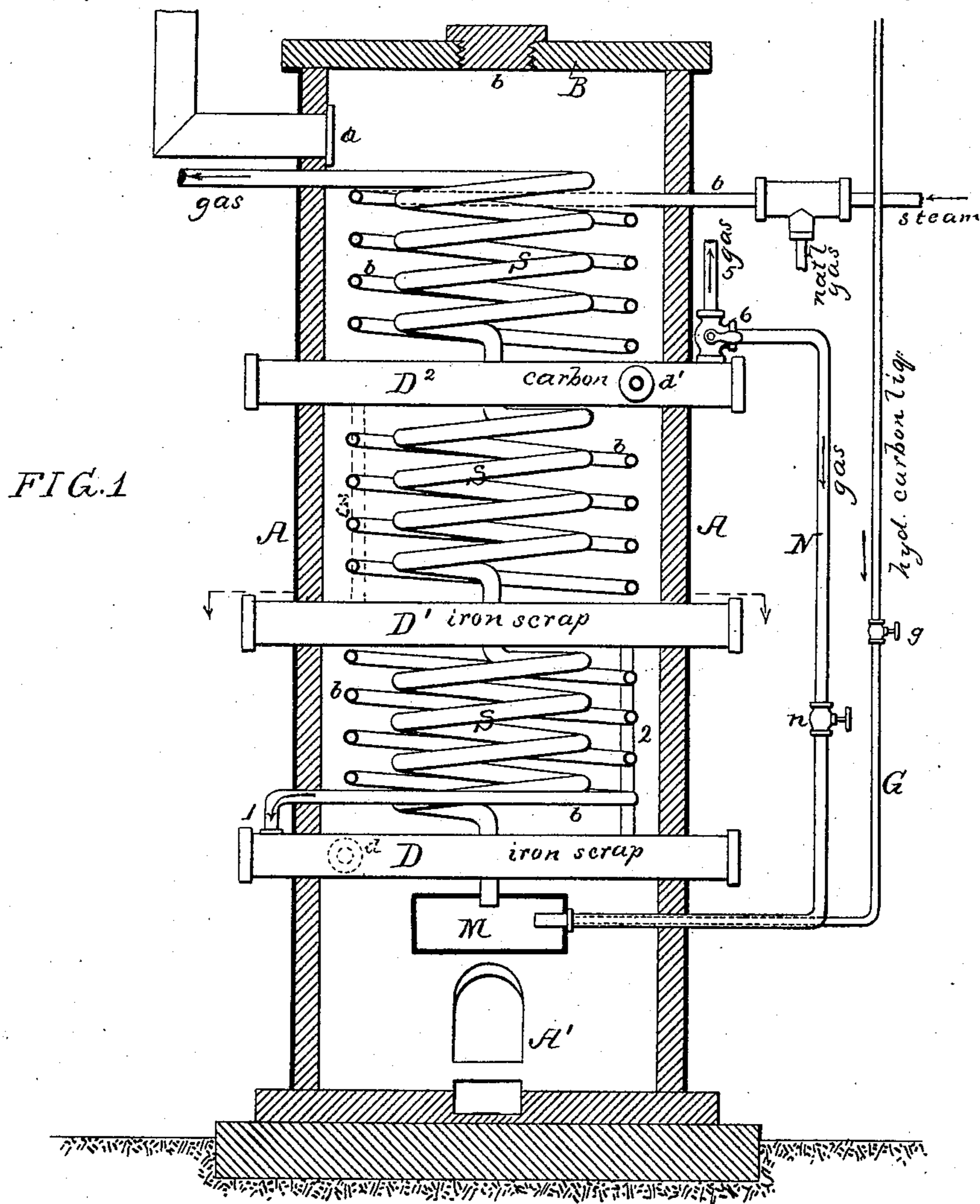
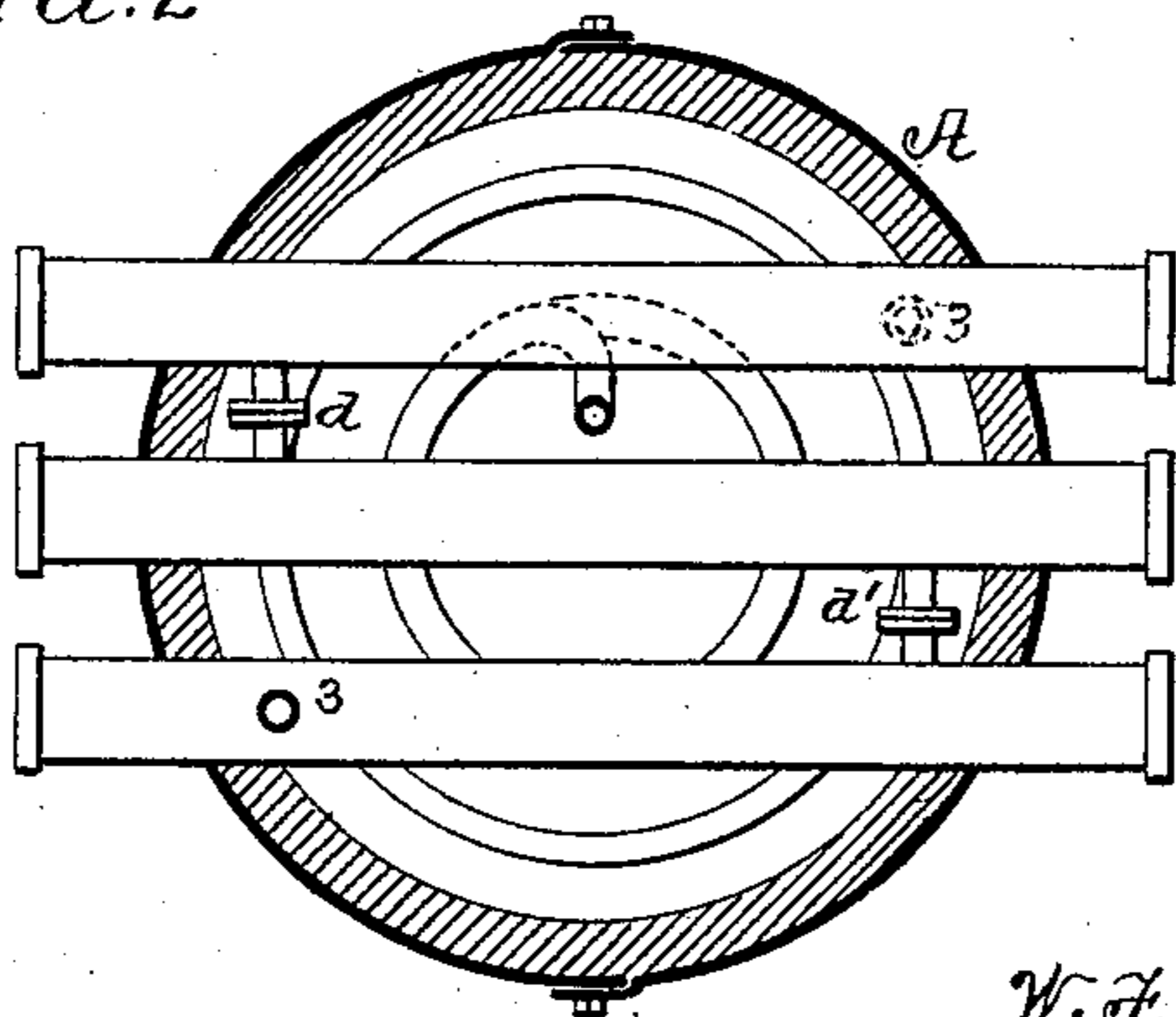


FIG. 2



Witnesses:
Alex. Barkoff
Henry Bossert.

Inventor:
W. F. C. M. McCarty
by his Attorneys
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UNITED STATES PATENT OFFICE.

WILLIAM F. C. M. McCARTY, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR
TO ADOLPH OHL, JAMES McC. CREIGHTON, AND BERNARD C. LAUTH, ALL
OF SAME PLACE, AND JANE LOGAN, OF HAGERSTOWN, MARYLAND.

APPARATUS FOR THE MANUFACTURE OF GAS.

SPECIFICATION forming part of Letters Patent No. 321,124, dated June 30, 1885.

Application filed May 20, 1885. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. C. M. McCARTY, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have
5 invented certain Improvements in Apparatus for the Manufacture of Gas, of which the following is a specification:

My invention consists of an improved apparatus for the continuous and economical
10 manufacture of gas and for the conversion of the natural gas of the earth into an illuminating-gas in one self-contained furnace or apparatus, as fully described hereinafter.

In the accompanying drawings, Figure 1 is
15 a vertical section of my improved apparatus, and Fig. 2 is a sectional plan view of the same.

A is the body of the furnace, preferably of the circular form shown, and built of fire-brick with metal sheathing. At the bottom
20 of the structure is the fire-place A', and near the upper end the outlet *a* for the products of combustion, the cover B of the furnace being provided with a suitable man-hole, *b*. In the present instance I have shown three banks of
25 retorts, D, D', and D², arranged horizontally across the furnace at different heights, there being three retorts in each bank or row. The retorts are built into the structure of the furnace, and may have their ends extending out-
30 side its walls, as shown in the drawings. The three retorts of each bank or row are connected with each other at alternate ends through suitable necks, *d d'*, as shown in the plan view, Fig. 2. The first retort of the
35 bottom row, D, is provided with an inlet, *l*, leading from a heating-coil, *b*, which passes down through the combustion-chamber and between the retorts. The third retort of the first row, D, is connected through a tube, 2,
40 to the first retort of the second row, D'. The third retort of this second row, D', is connected through a tube, 3, with the first retort of the third row, D², while from the last retort of the upper row leads an outlet-pipe,
45 N, provided with a valve or cock, *n*, and this pipe passes down the outside of the furnace and into the interior thereof again, where it communicates with and opens into a closed mixing chamber or box, M, immediately over

the fire-place of the furnace and below the
50 lowermost bank of retorts. Another valved pipe, G, leading from a suitable source of supply, may open into this same mixing-chamber M, and from the latter a superheat-
55 ing and fixing coil, S, passes up through the interior of the furnace between the rows of retorts to the upper end, where it leads out to a gas washer or receiver or to any other de-
sired point.

The apparatus above described has been
60 designed more particularly for carrying out in a single self-contained furnace and in the most economical manner a continuous process of converting the natural gas of the earth into
65 illuminating-gas. This process forms the subject of a separate application for a patent filed May 20, 1885, Serial No. 166,124, and may be briefly described as follows: The two
70 lower rows of retorts are first supplied with turnings or other scraps of iron or similar suitable metal, while in the top row is placed carbon, preferably in the form of gas-coke,
75 and the fire having been lighted, the natural gas of the earth is introduced with steam through the coiled pipe *b* into the lower re-
torts, where it is subjected to excessive heat and to the action of the finely-divided metal
80 and carbon. The resultant gas will pass down through the pipe N and enter the mixing and expansion chamber M, whence the gas passes through the superheater S to a
85 suitable washer, and a fine illuminating-gas of high candle-power is produced. In this process the pipe G is kept closed.

My improved apparatus may also be used
85 for the production of pure hydrogen gas for various uses, and also for the production therefrom by a continuous process of hydrocarbon gas. In using the apparatus for these pro-
90 cesses the two lower rows of retorts are supplied with iron turnings, borings, or equivalent, as before, and the upper row is provided with hydrate of lime and Glauber's salt, preferably in a finely-divided state. Steam is in-
95 troduced into the retorts through the coiled pipe *b*, and the vapor of water under the intense heat is deoxidized by the finely-divided metal, and the gas thereby produced in pass-

ing through the upper retorts is purified by the hydrate of lime and Glauber's salt, so as to remove any carbonic-acid gas remaining in it, thus giving a perfectly-pure hydrogen, which, by proper adjustment of the three-way cock 6, may be carried off through the outlet 5 to any suitable receiver for any desired use--such as the reduction of ores, and so forth; or the cock 6 may be turned to carry the hydrogen off through the pipe N into the mixing-chamber M, into which a liquid hydrocarbon is introduced in a finely-divided spray through the pipe G to carburet the hydrogen in the closed chamber or retort M, and thence it passes to the coil S, where it is superheated and fixed into a hydrocarbon gas.

I claim as my invention--

1. The combination of the furnace with two or more rows of retorts in the combustion-chamber of the furnace and a connected heating-coil, *b*, between the retorts in said combustion chamber, as set forth.

2. The combination of the furnace with two or more rows of retorts in the combustion-chamber of the furnace, and a superheating-coil, S, between said retorts in the combustion-chamber and connected to the last retort of the series, as and for the purpose described.

3. The combination of the furnace with two or more rows of retorts, a heating-coil, *b*, between the latter, and a chamber, M, the said retorts, coil, and chamber all being in the combustion-chamber of the furnace, substantially as specified.

4. The herein-described gas-making apparatus, consisting of a furnace having a series of retorts communicating with each other, and an inlet at one end and an outlet at the other, and the first set of retorts containing metal in a finely-divided state, while the last set of retorts contains hydrate of lime and Glauber's salt, substantially as and for the purpose set forth.

5. The herein-described gas-making apparatus, consisting of a furnace having therein banks of retorts, one above the other and communicating with each other, the lower retorts containing metal in a finely-divided state and the upper retorts containing hydrate of lime and Glauber's salt, substantially as set forth.

6. The herein-described gas-making apparatus, consisting of a furnace containing a series of retorts communicating with each other, a preliminary heating-coil connected to the first retort, and a superheating-coil connected to the last retort, both the coils and the retorts being in the combustion-chamber of the furnace, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

W. F. C. M. McCARTY.

Witnesses:

HUBERT HOWSON,
HARRY SMITH.