

(No Model.)

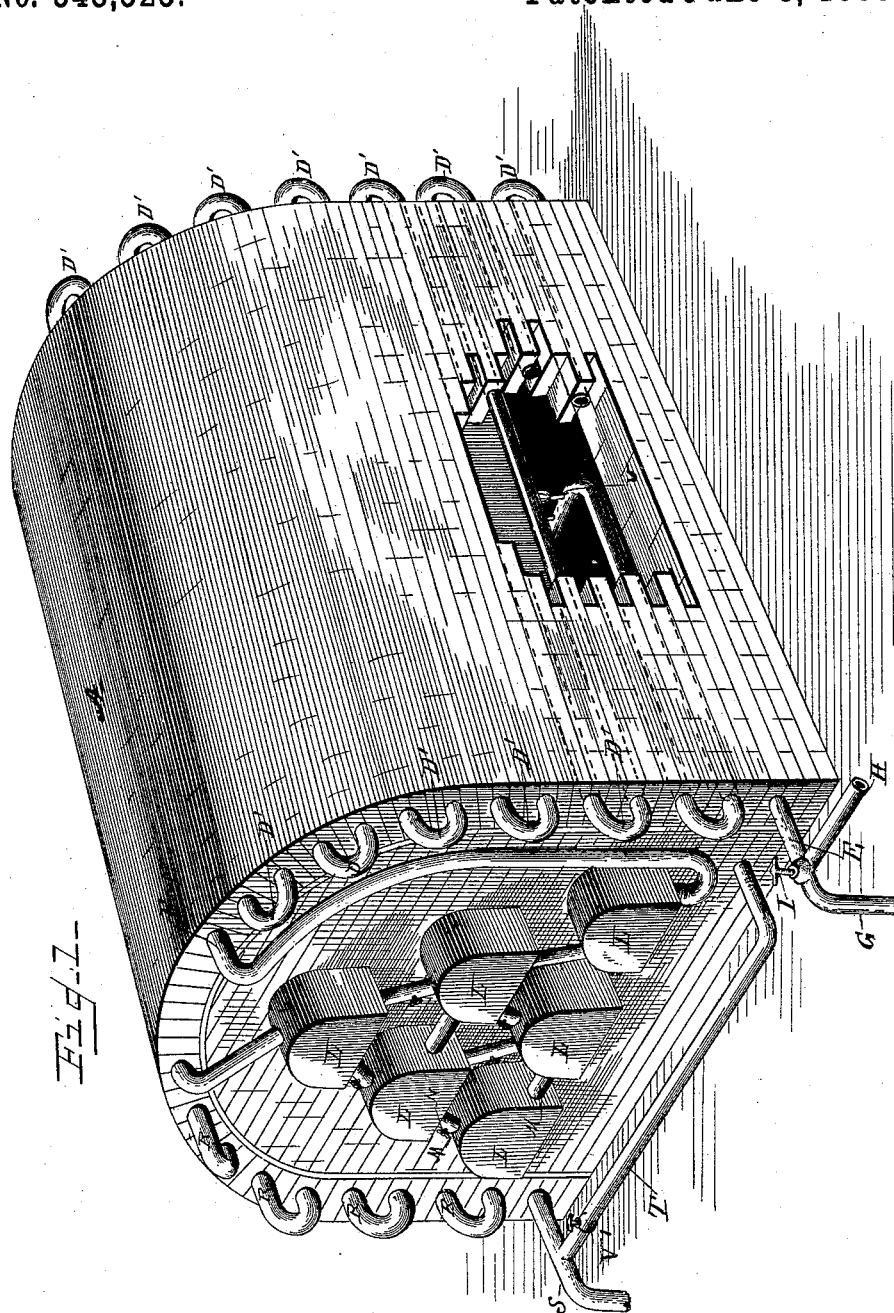
2 Sheets—Sheet 1.

W. F. M. McCARTY.

APPARATUS FOR THE MANUFACTURE OF GAS.

No. 343,525.

Patented June 8, 1886.



WITNESSES

Edwin L. Jewell,
A. C. Huntemann

INVENTOR

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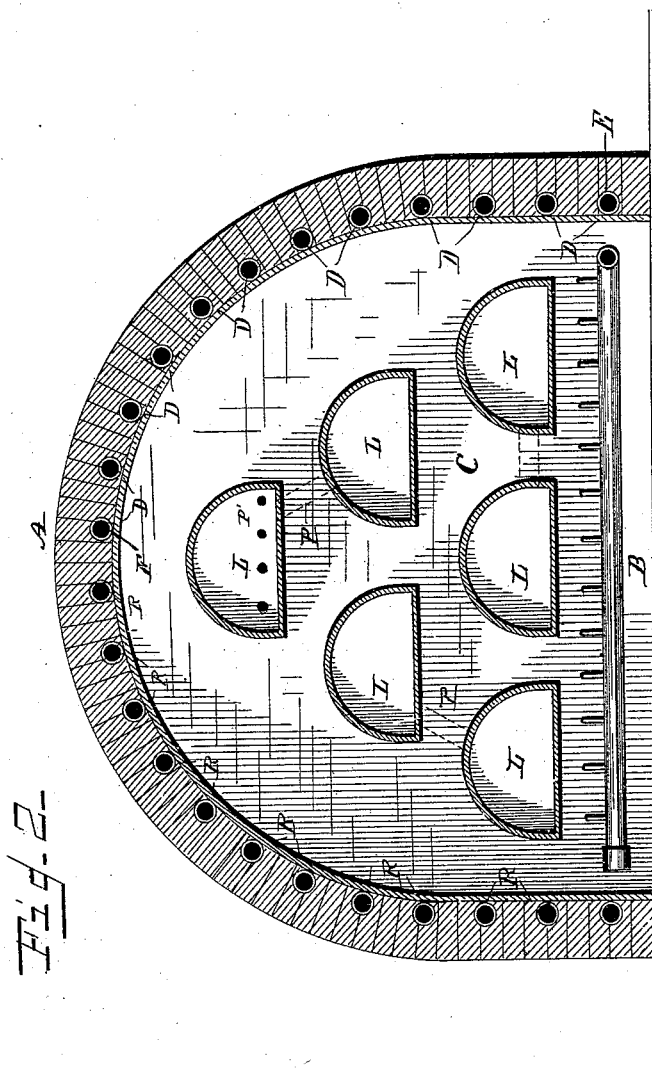
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APPARATUS FOR THE MANUFACTURE OF GAS.

No. 343,525.

Patented June 8, 1886.



WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM F. M. McCARTY, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR
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APPARATUS FOR THE MANUFACTURE OF GAS.

SPECIFICATION forming part of Letters Patent No. 343,525, dated June 8, 1886.

Application filed November 30, 1885. Serial No. 184,316. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. M. McCARTY, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for the Manufacture of Gas, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to certain improvements in the manufacture of gas for general heating and illuminating purposes; and it has for its objects to provide an apparatus whereby natural gas may be utilized in connection
15 with water-gas and a suitable hydrocarbon, when desired, to produce a permanent or fixed gas of great heating capacity and any desired illuminating standard, as more fully herein-after specified. These objects I attain by the
20 means illustrated in the accompanying drawings, in which—

Figure 1 represents a perspective view of my improved apparatus, with a portion of the same broken away, showing the means of applying the generated fixed gas to the heating
25 of the apparatus for decomposing, uniting, and fixing the gases employed for the production of the final permanent gas; and Fig. 2 represents a transverse vertical sectional view of
30 the apparatus.

In the said drawings, the letter A indicates an arched furnace, the walls of which may be constructed of masonry or any other suitable material.

35 B indicates the fire-box, and C the combustion-chamber, of the same.

Through the walls of the furnace, at one side, extend a series of horizontal longitudinal pipes, D, which project at the front and rear
40 of the furnace, and are alternately formed with return-bends D', so as to constitute a continuous series or passage, commencing at E at the base of the furnace and terminating at F at the crown of the same. The lower front end of
45 the series of pipes is branched, as indicated in Fig. 1 of the drawings, one branch, G, connecting with a supply-pipe leading from the natural-gas delivery, and the other, H, with a generator for supplying carbonic-oxide gas. At

the junction of the branches is located a three- 50
way valve, I, by means of which the admission of the gases may be controlled, so that they may be supplied in the proper relative proportions to the pipes D. The upper pipe of the
55 before-mentioned series of pipes D connects at its forward end with the forward end of one of the lower retorts of a bench of retorts, L, which project at the front of the furnace. The
60 said retorts are located in the combustion-chamber above the fire-chamber of the furnace, and are connected at their front ends by the pipes M, which are provided with valves N, and at their rear ends by pipes P. (Shown
65 in dotted lines in Fig. 2.) The upper retort of the bench communicates with the upper pipe of a series of pipes, R, which pass longitudinally and horizontally through the wall of the furnace in
70 the same manner, but on the side opposite the pipes D, before mentioned, the lower pipe of the last-mentioned series branching at its front end, as indicated by the letters S T, the branch
75 S connecting with a suitable storage-reservoir or gas-holder, and the branch T with a pipe having a series of burners, V, located in the fire-chamber directly under the retorts, as
80 plainly shown in both figures of the drawings. The branch T may be provided with a stop-cock, V', by which the delivery of gas to the burners may be regulated and controlled as
85 desired. The pipes extending through the side walls run close to the inner surfaces of the same, so as to be effectively heated; or they may be laid adjacent to said walls, and covered with a coating of fire-clay of sufficient
90 thickness to protect them from the destructive effect of the direct heat of the fire.

The operation of my improved apparatus is as follows: The retorts are first filled with finely-divided iron, preferably scrap-iron, and the retorts are initially heated in any convenient manner. When the proper heat is attained in the furnace, the natural gas and the water-gas are supplied to the pipes D in proper proportions, wherein the natural gas is gradually heated and expanded to its greatest tension. The combined gases, which are now in a highly-heated state, pass to the retorts, where they are brought into intimate contact with

the iron, which is heated to about 1,500°. The iron takes up a portion of the oxygen of the carbonic acid of the combined gases, and another portion of the oxygen of the carbonic acid forms, with the excess of hydrogen, water, which may be condensed and separated, and frees the same of carbonic acid, while a portion of the hydrogen combines with the natural gas, forming acetylene, a gaseous hydrocarbon of considerable illuminating-power. The gases then pass into the pipes R, through which, during their passage, they are fixed at a gradually-decreasing heat, and from whence they are passed to the holder or partly supplied to the burners for heating the furnace.

The water-gas can be enriched by mingling it with a fluid hydrocarbon before it is mingled with the natural gas; or the fluid hydrocarbon may be admitted into the upper retort through the pipe or pipes P' after the natural gas and water-gas have been heated and purified through the retorts.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with the heating-pipes,

wherein the natural gas is heated and expanded and commingled with the carbonic acid (CO₂) and free hydrogen, of the purifying-retorts and the fixing-pipes located on the side of the retorts opposite that of the heating-pipes, whereby the gases are initially heated and expanded, then purified and enriched by the introduction of a hydrocarbon, and finally fixed to produce a permanent gas, substantially as specified.

2. The combination, with the pipes wherein the gases are heated, of the purifying-retorts and the fixing-pipes located on the side of the retorts opposite that of the heating-pipes located within the walls of the furnace, and extending from the crown to the base of the same, whereby the gas is fixed at a gradually-reduced temperature, substantially as described.

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

WM. F. M. McCARTY.

Witnesses:

WM. H. DE LACY,
L. W. SINSABAUGH.