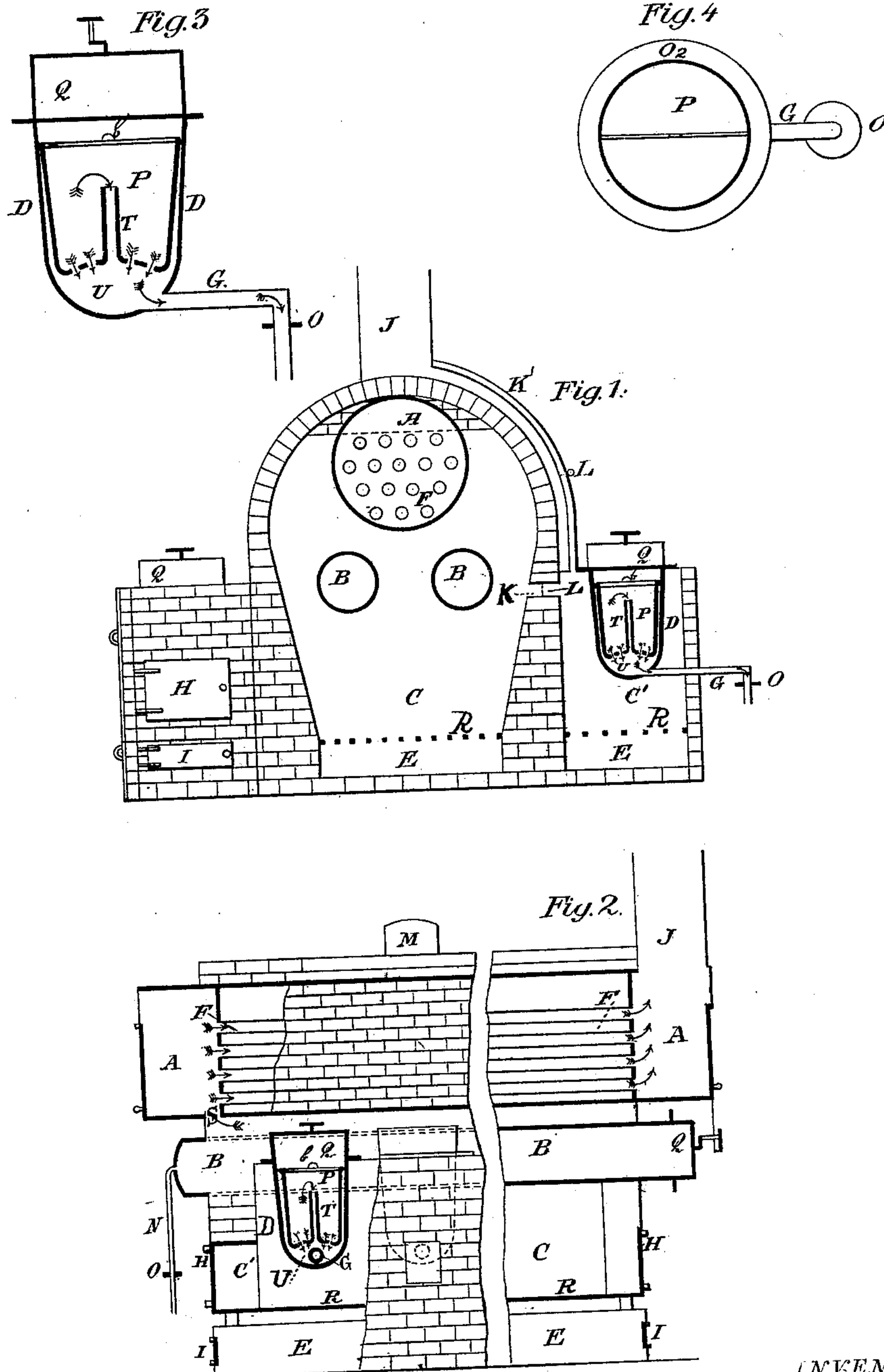


(Model.)

J. H. NEEDLES.
Combined Apparatus for Producing Illuminating Gas
and Generating Steam.

No. 231,344.

Patented Aug. 17, 1880.



WITNESSES
L. M. Gunkler.
J. C. Dreht.

By

Attorney

INVENTOR

James H. Needles

UNITED STATES PATENT OFFICE.

JAMES H. NEEDLES, OF COLUMBUS, OHIO, ASSIGNOR OF ONE-HALF OF HIS RIGHT TO GEORGE S. WOODRUFF AND JOHN M. EGAN, OF TORONTO, CANADA.

COMBINED APPARATUS FOR PRODUCING ILLUMINATING-GAS AND GENERATING STEAM.

SPECIFICATION forming part of Letters Patent No. 231,344, dated August 17, 1880.

Application filed May 15, 1880 (Model.)

To all whom it may concern:

Be it known that I, JAMES HENRY NEEDLES, of the city of Columbus, county of Franklin, State of Ohio, have invented certain new and useful Improvements in Combined Apparatus for the Production of Illuminating-Gas and Generation of Steam, of which the following is a specification.

This invention consists in an improved apparatus to utilize the heat of a bench of gas-retorts for the generation of steam in a boiler, said steam to be used for all ordinary purposes; also, in an improved construction of vertical retorts to further economize the manufacture of gas and to lessen the deposits of carbon in said retorts and their outlet-pipes; also, in an arrangement of horizontal and vertical retorts in one bench, whereby a series may be used independently.

In the accompanying drawings, in which similar letters of reference indicate like parts, Figure 1 is a transverse section of my combined bench of retorts and steam-boiler. Fig. 2 is a longitudinal section of the same. Fig. 3 is a vertical section of one of my improved upright retorts, and Fig. 4 is a horizontal section of the same.

A is an ordinary steam-boiler placed in a bench of retorts, whereby the heat used in generating gas in the retorts is utilized to generate steam in the boiler. The boiler, having flues F, is laid in the bench, the arch of which passes over and around the center horizontal retorts, B B, as shown, and a segment of brick-work connects the arch of the boiler at water-line, to prevent the heat touching the boiler above that point. The object of protecting that portion of the boiler above its water-line is to prevent heat from the furnace coming in direct contact with the steam portion of the boiler, and thus superheating the steam, which would render the boiler useless for its ordinary purpose of supplying steam for motive power.

The boiler, of which M is the steam-dome, is shown as lying directly over and between the retorts B B; but more than one boiler may be used, and placed either directly over the retorts or above and between them, or may occupy any position that wholly or partly incloses it or them within the bench.

C is the fire-box, R the fire-bars, and E the ash-pit of the central portion of the bench.

The retorts B B have the ordinary mouth-piece Q at one end, and from the other passes the outlet-pipe N to the hydraulic main.

D is a vertical retort, a number of which are arranged in a row on one or both longitudinal sides of the bench, to increase its manufacturing capacity. These retorts are heated by side furnaces, C', underneath, of which H is the fuel-door, and said furnaces are connected by a flue, K, with the central furnace, C, or with the smoke-stack J of the latter by an exterior pipe, K', both of which are provided with dampers L L, for controlling the heat to the boiler or otherwise. The heat passes from side and center furnaces, C C', through flue S and flues F, to smoke-stack J.

The vertical retorts D are constructed each with a hemispherical bottom and open at the top, which is flanged to seat a correspondingly-flanged mouth-piece, Q, the two being bolted through the flange O'. The top of the piece Q has a removable cover, which is secured by a cross-head and key, and to the bottom of the retort is connected a pipe, G, through which the gas passes to the main.

P is a removable circular bucket within each of the retorts D, to contain coal, and each bucket is constructed with a perforated convex bottom, through which the gas passes downwardly into an intermediate chamber, U, formed by the convexity of the bottom of the bucket and the concavity of the retort. From the center of the bottom of the bucket P rises a stand-pipe, T, to afford another passage downward from the upper part of the bucket to the chamber U. The buckets are made to taper slightly from top to bottom, to fit tightly around the upper part of the retort, while the lower part is free to prevent the bucket from sticking therein, and thus make its removal easy when it is desired to withdraw the bucket for recharging and to insert a newly-charged bucket, and which changing is effected without the usual loss of gas in recharging a retort of ordinary character. Each of the buckets is provided with a bail across the interior, having an eye, b, to which to secure the hook of a tackle, which may travel along the row of re-

torts on an elevated rail, whereby the changing of the buckets can be quickly accomplished for charging the retorts.

The gas, after being eliminated from the coal, passes downwardly through the bottom of the buckets into the chamber U, which, being in close proximity to the fire, is intensely hot, and thereby the deposit of carbon in the bottom of the retort and pipe G is lessened and the hydrogen of the coal is thoroughly driven off.

The intense heat beneath the vertical retorts operates to drive the carbon into the upper portion of the retort. In ordinary retorts the carbon is driven upward with the gas, and is deposited in the hydraulic main; but in my construction the gas, being taken from the lower end of the retort, causes the carbon to be deposited on the coke in the upper portion of the retort.

Any kind or construction of retort may be used, or any kind of steam-boiler may be employed in the construction of this apparatus.

I am aware that heretofore a steam-boiler has been placed in a furnace together with gas-retorts—as, for instance, in cases where superheated steam has been generated in such constructions for use in the manufacture of gas; yet it will be observed that the foregoing-described apparatus presents new features of construction which develop valuable results, first, by reason of the increased durability of boiler and retorts obtained by this improvement, and also by reason of the greater quantity of gas and steam obtained thereby.

I am also aware that retorts have been arranged transversely beneath an ordinary boiler in rear of the bridge-wall; but such construction is defective, for the reason that the boiler is subjected to the uneven heat from the re-

torts, and operates to warp the boiler-plates, and also the heat is only partially utilized. Also, retorts have been arranged parallel with a superposed boiler, but in such case were placed within the fire-box, and extended only partially the length of the boiler.

I am aware, also, that removable buckets have heretofore been used with vertical retorts, the same, however, differing in construction from that of mine.

What I claim is—

1. The main central furnace, C, steam-boiler A, and retorts B, in combination with auxiliary side furnaces, C', having vertical retorts D, and flues for the products of combustion, controlled by dampers communicating with the central furnace and with the smoke-stack, substantially as set forth.

2. The combination, with a main furnace provided with a steam-boiler and one or more retorts arranged parallel with said boiler, of one or more auxiliary furnaces provided with vertical retorts, said auxiliary furnaces being constructed and connected substantially as hereinbefore set forth, whereby the heat of the main and auxiliary furnaces will flow the entire length of the steam-boiler and the retorts, substantially as set forth.

3. The vertical retorts having a concave bottom and removable cover and an outlet-pipe leading from the bottom of the retort, in combination with a removable bucket constructed with a perforated convex bottom and a central stand-pipe, substantially as set forth.

JAMES HENRY NEEDLES.

Witnesses:

E. N. BISHOP,
D. P. COWL.