

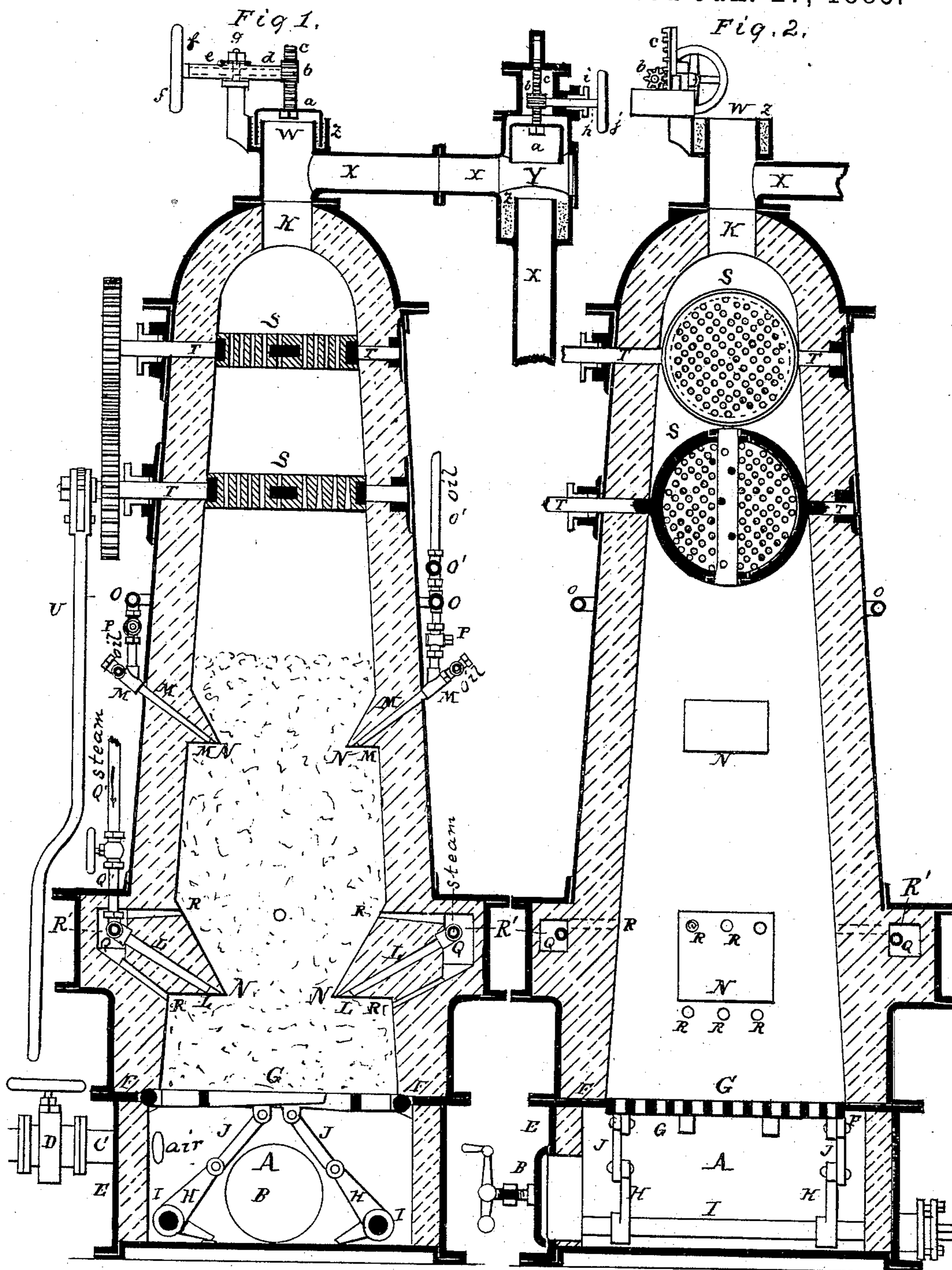
(No Model.)

S. I. ANTHONY.

FURNACE FOR GENERATING ILLUMINATING GAS.

No. 311,403.

Patented Jan. 27, 1885.



Witnesses.

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UNITED STATES PATENT OFFICE.

SAMUEL I. ANTHONY, OF NEW YORK, N. Y.

FURNACE FOR GENERATING ILLUMINATING-GAS.

SPECIFICATION forming part of Letters Patent No. 311,403, dated January 27, 1885.

Application filed May 20, 1884. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL I. ANTHONY, a citizen of the United States of America, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Furnaces for Generating Illuminating-Gas, of which the following is a specification.

This invention relates to a furnace and suitable attachments for manufacturing illuminating-gas in one structure by the successive operations of decomposing steam in contact with incandescent or highly-heated carbon, carbureting the resulting gases with the vapors of hydrocarbon oil, and combining and fixing the carbureted gas in such manner as to retain in the generator the lamp-black and other contaminating impurities usually passed off with the gas; and the improved apparatus embraces a number of novel features of construction, the most important of which are, first, tile-guides projecting inwardly from the furnace-lining and inclosed nozzles for the introduction of steam and oil at different heights into the central portion of the body of fuel; second, heating-channels for the steam-pipes in the wall of the generator and connecting with the fuel-chamber by heat-circulating passages; third, reversible perforated tile strainers located above the fuel in the fixing-chamber, serving as heaters for the gas and to remove impurities therefrom, and other minor features, hereinafter more fully described.

The objects of the invention are to introduce the steam and oil for generating gas away from the lining of the cupola into the inner portion of the body of heated fuel, and thereby secure better distribution of the steam through such fuel, and consequently its more thorough decomposition, and also secure more complete mingling of oil vapor with the gases resulting from the decomposed steam; also, to provide the generator with means for rubbing and straining the generated gas, whereby it is subjected to frictional contact in finely-divided streams with numerous heated surfaces of refractory material, and thus effectually fixed, while the lamp-black and tarry matter are retained within the generator and afterward burned to aid in heating up the fixing-chamber. I attain these objects by the improved

construction of the generator illustrated in the drawings hereto annexed.

Figure 1 represents a vertical central section of the generator, its seals and tile strainers shown in position as during the process of generating the gas, and constructed with my improvements. Fig. 2 is a similar view of the same with the seals and tile strainers shown in the position which they occupy during the time of blowing up the fire.

A represents the ash-pit of the cupola. It has the sealed door B for removing the ashes, and through its side passes the air-pipe C, which is connected with the blower and has the air-valve D. The base E of the cupola, containing the ash-pit, has at its top an inward-projecting flange, F, and to it is pivoted the grate G of the cupola. Said grate is made of two opposite equal sections, each with fingers projecting into the spaces between the fingers of the other at its loose end, and each section has a lug connected with a crank, H, upon the horizontal rock-shaft I at the ash-pit bottom by means of a connecting-link, J. Said rock-shaft is held in proper bearings, and has one end passing through a stuffing-box in the side of the ash-pit, and its outside end is made square for the application of a lever or wrench for turning said shaft. Both sections of said grate are furnished alike with said rock-shaft I, and by that means each section of the grate is shaken and may be dumped. The interior of the cupola above the grate is made cone shape, its sides contracting at its upper portion and the top end terminating semi-spherically, as shown, and having the gas-outlet top opening, K.

A suitable distance above the grate G are located the steam-nipples L, by which the steam is introduced into the cupola. The distance from the grate to said nipples should be sufficient to always have remaining live coal close to the top of the grate after the generation of gas by decomposition of steam, in order that the fires may be quickly lighted during the period of blowing up the same.

A suitable distance below the top of the coal are located the oil-nozzles M, through which the oil is introduced into the cupola.

For both the oil and steam nozzles the cupola-lining is made with inwardly-projecting

tile-guides N, so that each nozzle is protected, and that it conducts the oil or steam into the heart or middle portion of the incandescent coal and away from the cupola-lining, so as to prevent them from passing along the lining and escape from being properly heated. Both the oil and steam nozzles are placed inclined in a downward direction to the coal to secure better results. Each oil-nozzle is supplied from a circular main pipe, O, and its connection therewith is furnished with a proper stop-cock, P. Said main pipe O is supplied from the oil-tank by the pipe O'. The steam-nipples L are also connected by one main pipe, Q, and it is supplied by a pipe, Q', from the boiler. The steam main pipe Q is located in a circular chamber, R', made in the cupola-lining. The cupola at this place is enlarged to have sufficient lining and room for said pipe and chamber R', and said chamber is connected by the openings R with the interior of the cupola, to heat said pipe and superheat the steam therein. The exterior of the cupola is lined with iron, as shown.

SS represent the gas-strainers. With small cupolas one of them may be sufficient, while with larger ones more than two of them may be employed. They are arranged in the fixing-chamber of the cupola below the outlet of the gas in a horizontal lateral direction. Each is constructed of metal and tile, disk shape, and with central trunnion shaft ends, T. One end of said shaft passes through the lining and metal shell of the cupola, and passes through a stuffing-box secured on the outside of said shell. The other end is held in a bearing secured on the inside of the shell. The extreme outer end of said shaft is furnished with the ratchet-wrench lever U, for turning the strainer. In employing several strainers they are connected by cog wheels or cranks and connecting-links, so that they are all operated together. The disk portion of the strainer is composed of a disk-shaped tile, which is suitably perforated for the passage of the gas. The metal portion of the strainer is made in two semicircular frame-sections having slotted ends overlapping each other. Between these frames the tile is received and held. From each section one of the trunnion shaft ends T extends opposite the other, and the tile has a groove on its periphery and a central lateral opening through it. In said groove the circular frame is fitted, and through the central lateral opening is inserted a cross-bar, V, which engages and locks the ends of the semicircular frames together and secures the tile between them. During the time of feeding the cupola and blowing the fire up the strainers are placed in a vertical position, as shown in Fig. 2. While the gas is generating said strainers are placed in horizontal position, as shown in Fig. 1.

Centrally over the gas-outlet K is located the cupola top seal, W, on which the gas-outlet X is attached, and passes the gas down to the wash-box.

At the junction of the horizontal portion with the vertical portion of said pipe X is made a seal, Y, to stop the communication of the cupola with the wash-box after the gas is generated. Both seals Y and W are constructed to seal by sand, and both for that purpose have an annular chamber, Z, in which the sand is contained.

a a represent the seal-caps, the rims of which pass into the sand when closed. For raising and lowering the caps *a a*, I employ the pinions *b b*, which engage the rack-bars *c c*, secured each, respectively, to its cap *a*. The pinion *b* of the seal W is mounted upon the horizontal shaft *d*, which is guided in the bearing *e*, and has a hand-wheel, *f*, for operating the same. The bearing *e* is pivoted upon a vertical stud, *g*, attached to the top seal, W, so that after raising the seal-cap *a* out from the sand the bearing *e* is turned with the cap *a* off from over the opening in the top seal, W, for feeding and blowing up the fire in the cupola, as shown in Fig. 2.

In the seal Y the pinion *b* is mounted on the shaft *h*, which is guided in the stuffing-box *i*, cast on the outlet-pipe X, and said shaft has the hand-wheel *j* upon its outer end, by means of which the pinion is turned and the cap raised or forced into the sand.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination with the fixing-chamber of a gas-generator, the perforated tile strainer provided with means whereby it may be placed horizontally across the chamber or tilted at any desired angle, for the purpose described.

2. In combination with a gas-generating furnace, the perforated strainer provided with journals or shafts fitted in the walls of the furnace above the fuel-chamber, and means for operating such shafts, for the purpose described.

3. In combination with a gas-generating furnace, the perforated strainers composed of refractory material fitted within a metallic band, and provided with means for supporting it in the walls of the furnace and permitting it to oscillate as required, for the purpose set forth.

4. In combination with a gas-generating furnace, the tile-guides projecting from the walls into the feed-chamber a short distance above the grate, the steam-nozzles passing through such guides, and connected steam-supply pipe, whereby steam to be decomposed is delivered into the central portion of the fuel.

5. In combination with a gas-generating furnace, the projecting tile-guides and steam-nozzles, the heating chamber or channel formed in the wall of the furnace and connected with the fuel-chamber by suitable passages, and the steam-supply pipe placed in such heating-channel, as set forth.

6. The wall of the generating-furnace formed with a surrounding enlargement provided with

a heating-chamber extending around the fuel-chamber and connected therewith by passages, in combination with the steam-superheating pipe laid in said heating-chamber, and the steam-nozzles.

5 7. The annular heating-chamber connected with the fuel-chamber by upper and lower passages, in combination with the projecting tile-guides, the steam-superheating pipe, and
10 supply-nozzles, arranged as described.

8. In combination with a gas-generating furnace, the projecting tile-guides near the base provided with steam-supply nozzles, and the projecting tile-guides near the top of the
15 fuel-chamber provided with oil-supply nozzles, for the purpose described.

9. In combination with a gas-generating cupola, the lower and upper tile-guides, provided, respectively, with steam and oil nozzles, and the perforated strainers located in the
20 fixing-chamber of the cupola, for the purpose described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 24th day of
25 April, 1884.

SAMUEL I. ANTHONY.

Witnesses:

ISAAC W. COLE,
JOHN P. WINDOLPH.

It is hereby certified that the name of the patentee in Letters Patent No. 311,403, granted January 27, 1885, for an improvement in "Furnaces for Generating Illuminating-Gas," was erroneously written and printed "Samuel I. Anthony," whereas said name should have been written and printed *Samuel J. Anthony*; and that said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 26th day of October, A. D. 1886.

[SEAL.]

H. L. MULDROW,
Acting Secretary of the Interior.

Countersigned:

R. B. VANCE,
Acting Commissioner of Patents.