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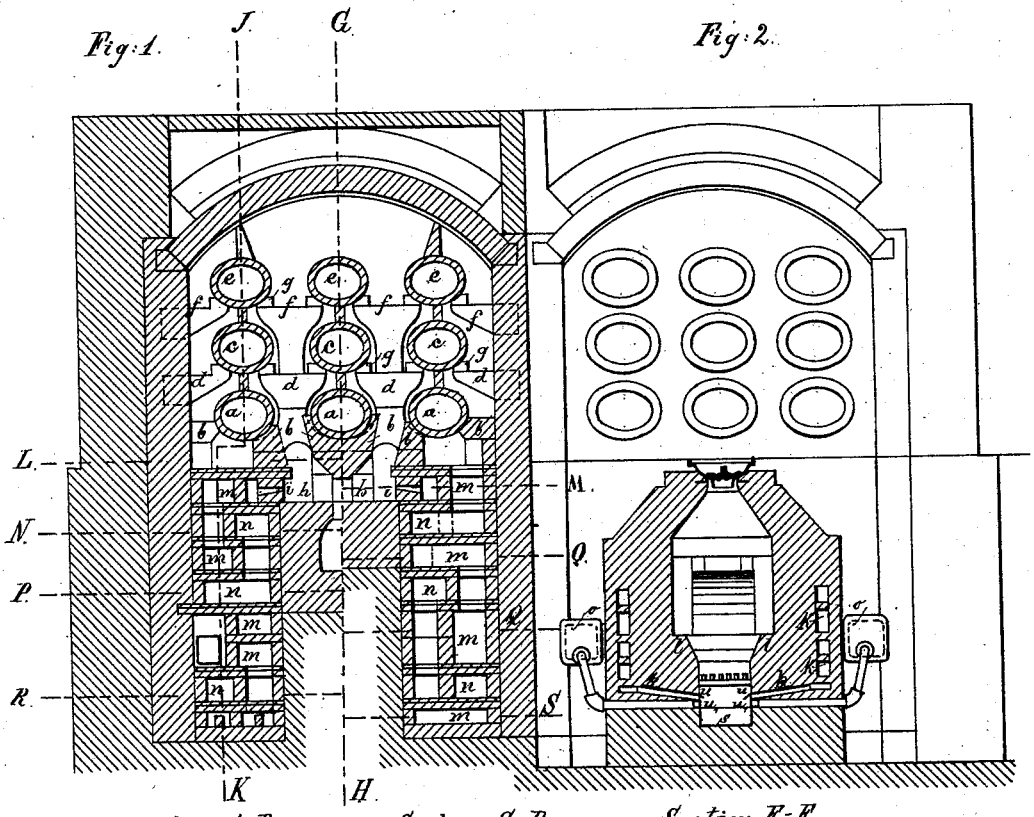
J. T. HASSE.

GAS GENERATING AND CONSUMING FURNACE FOR HEATING RETORTS.

No. 302,130. Patented July 15, 1884.

Fig. 1.



Section A-B. Section C-D.

Fig. 2.

Section E-F.

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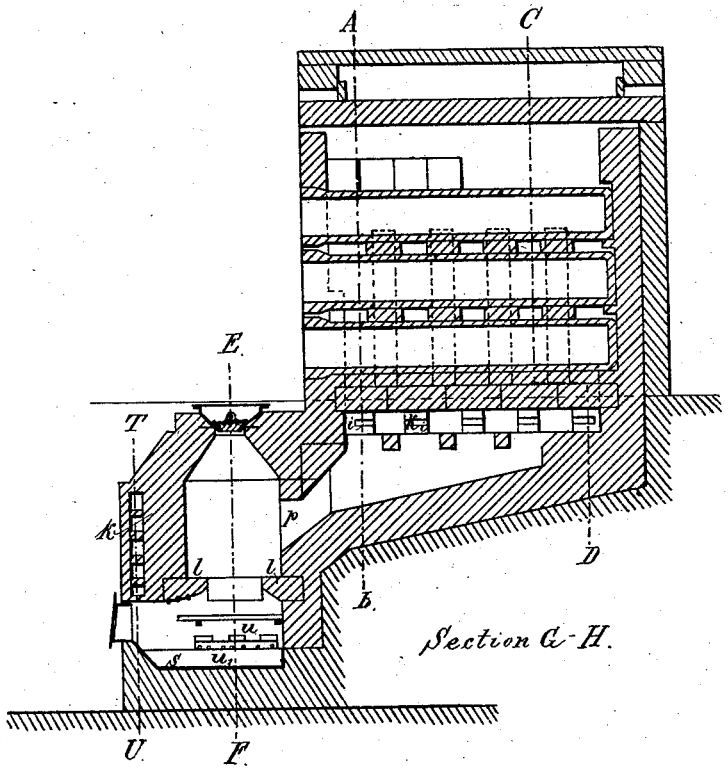
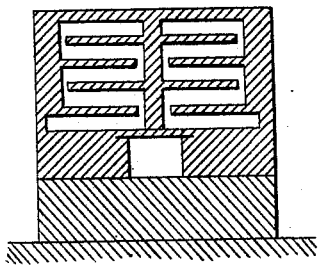
Fig: 3.



Section G-H.

Fig: 9.



Section T-U.

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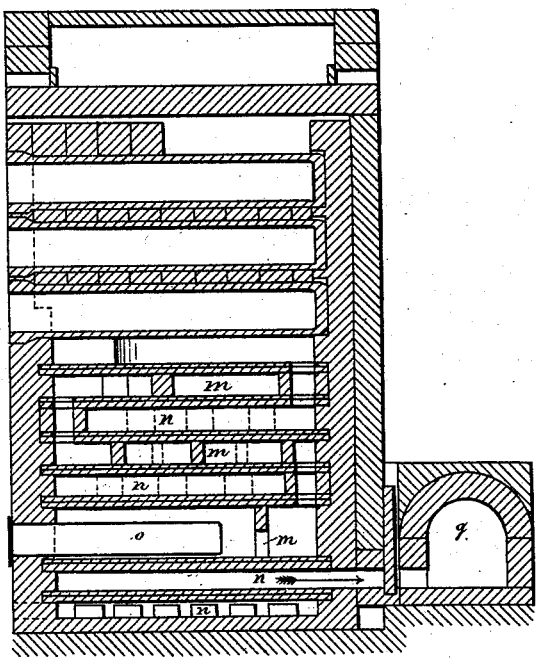
GAS GENERATING AND CONSUMING FURNACE FOR HEATING RETORTS.

No. 302,130. Patented July 15, 1884.

Fig: 4.



Section J-K.

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GAS GENERATING AND CONSUMING FURNACE FOR HEATING RETORTS.

No. 302,130. Fig. 5. Patented July 15, 1884.

Section L-M.

Fig. 6. Section N-O.

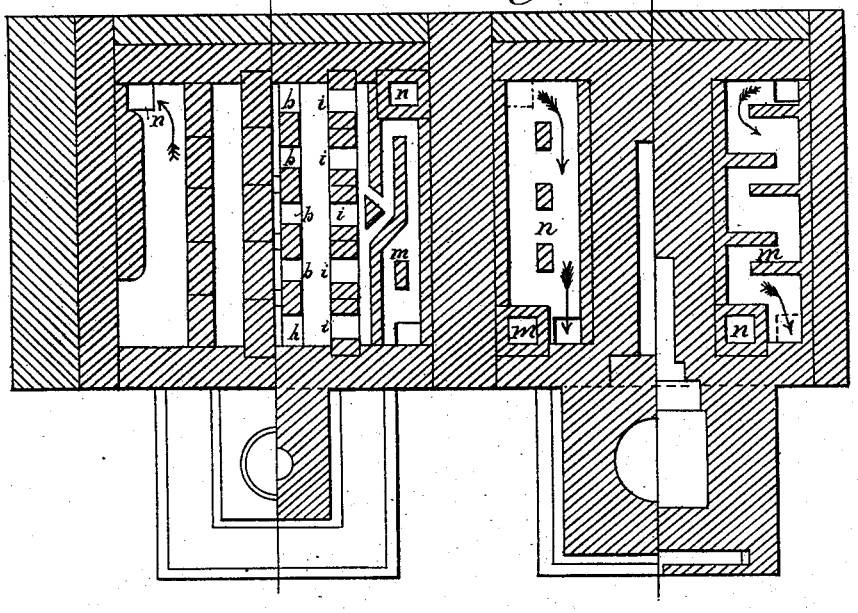
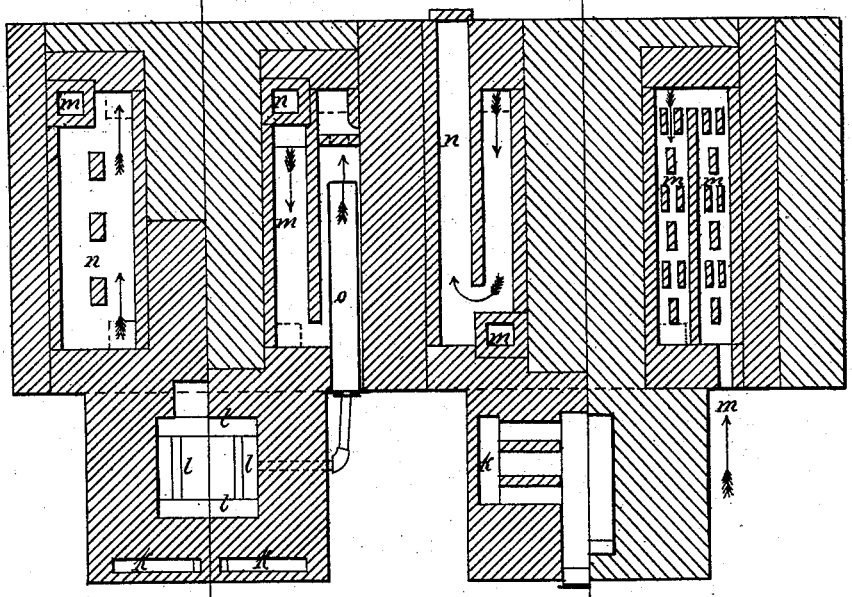


Fig. 7.

Fig. 8.



Section P-Q.

Section R-S.

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UNITED STATES PATENT OFFICE.

JULIUS THEODOR HASSE, OF DRESDEN, SAXONY, ASSIGNOR TO STETTINER CHAMOTTE FABRIK ACTIEN GESSELLSCHAFT, FORMERLY DIDIER, OF STETTIN, GERMANY.

GAS GENERATING AND CONSUMING FURNACE FOR HEATING RETORTS.

SPECIFICATION forming part of Letters Patent No. 302,130, dated July 15, 1884.

Application filed November 22, 1883. (No model.)

To all whom it may concern.

Be it known that I, JULIUS THEODOR HASSE, a subject of the King of Saxony, and a resident of Dresden, in the Kingdom of Saxony, have invented certain new and useful Improvements in Gas Generating and Consuming Furnaces, of which the following is a specification.

This invention relates to furnaces or ovens heated by gas, particularly to retort-furnaces for the generation of illuminating and heating gas.

An object of my improvement is to provide suitable means for the reception of the retorts; another, to secure an equal distribution and efficiency of the heating-gases in the furnace or oven, so that no dead-spaces will exist. A further object is to secure a preliminary heating of the air used for combustion, and also to secure a thorough mingling of the air and combustible gas for operating the oven. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 shows in its left half a transverse section of a retort-oven in the plane A B, Fig. 3, and in its right half a transverse section in the plane C D, Fig. 3. Fig. 2 is a vertical transverse section through the generator in the plane E F, Fig. 3. Fig. 3 is a vertical longitudinal section in the plane G H, Fig. 1. Fig. 4 is a vertical longitudinal section in the plane J K, Fig. 1. Fig. 5 is a horizontal section in plane L M, Fig. 1. Fig. 6 is a horizontal section in the plane N O, Fig. 1. Fig. 7 is a horizontal section in the plane P Q, Fig. 1. Fig. 8 is a horizontal section in the plane R S, Fig. 1. Fig. 9 is a vertical section in the plane T U, Fig. 3.

Similar letters indicate corresponding parts.

Among other things, the invention relates to the manner of placing the retorts. As seen in Fig. 1, the retorts are walled in by stones or supports, so that each retort rests by itself, and not so that one retort is weighed down by another one. The retorts *a* rest upon the stones *b*, the retorts *c* upon the stones *d*, and the retorts *e* upon the stones *f*. The retorts are not braced against the vault of the oven, but rest freely in the oven, and can consequently easily follow the movements of the oven. The stones resting between the retorts *a* and *c*, as also between the retorts *c* and *e*, do not serve for the support of the retorts, but are only for the formation of drafts in the oven. The wedges *g* serve for securing the retorts in a fixed position. Between the walls of the retorts and the ceiling of the oven-vault is a space. The placing of the supporting-stones, as also their form, secures an equal distribution, and consequently an equal efficiency of the heating-gases in the oven, so that there will not be any dead-spaces. The generator for the formation of the heating-gases lies in front of the oven in a lower position. The carbonic-oxide gases generated in the generator pass through a channel, *p*, leading from the generator to the retort-oven, and can thus be exactly regulated. The channel *p* is so constructed that a constant layer of burning material or fuel can be maintained in the generator. The slits or openings *h* allow the entrance of the gases into the oven, and through the openings *i* is led in the air, which has first been warmed in the channels through which it is led. The openings *i* and *h* are so constructed that a thorough mixing of gas and air must take place. Thereby the combustion is not only the most thorough, but the heating-gases also are burned at the proper place, and are so thoroughly utilized that they only pass into the escape-channel *q* with the low temperature of 400° centigrade. The generator itself is not affected by the fire and is almost indestructible. The walls of the generator are provided with air-channels *k*, in which the primary air is heated before being led under the grate of the generator. In consequence of this arrangement the disagreeable radiating heat of the generator is almost wholly removed, these channels *k* surrounding the generator not only at the sides, but also at the front. The fire-chamber has a grate which lies about twenty-five centimeters (about ten inches) above the sole of the generator, and below which are conduits *u*, for the primary air to be led in, and which has been first warmed, and *u'*, for the steam or water vapor to be led in, as also a vessel, *s*, of cast-iron, which receives the water of condensation. The air and steam conduits are advantageously pro-

tected against choking up by a roof-like covering of sheet metal. The heating material is by all these arrangements thoroughly burned, only ashes and slag remaining on the grate, which can be pulled out by a hook. The stones *l* form a rest or support for the coke in the generator, and hinder the coke falling down during the removal of the slag and ash. These stones *l* also hinder the air and water-vapor entering underneath the grate from gliding up along the walls of the generator, and compel them to pass through the fuel. In the oven under the retorts and at each side of the oven lies a system of channels intended to heat the secondary air prior to its being burned in the oven, and also to lead off the spent heating-gases. The secondary air is led to the oven through the channels *m*. Through the channels *n* the spent heating-gases are led off. The air-channels *m* lie between the gas-channels *n*, and the heat radiating from the latter thus heats the air in the channels *m* to a high temperature. The air enters into the lowermost of the channels *m* through openings in the wall of the furnace, as indicated in Fig. 8, and the successive tiers or layers of channels *m* are caused to communicate by vertical or other suitable perforations, Fig. 7, which are so placed that the direction of the flow of air is different in any one channel from its direction in the channel *m* immediately above or below. By means of partitions between the channels *m*, lying on the same level, Fig. 8, the air in such channels is also caused to flow alternately backward and forward. The construction of the channels *m* at various levels may vary from that just described in connection with Fig. 8, such modified construction being shown, for example, in Fig. 6. The spent gases pass from the retort-vault into the upper layer of channels *n*, Fig. 5, and thence back and forth through the successively lower channels, *n*, until they pass into the escape-channel *q*, Fig. 4. The successive tiers of channels *n* communicate by vertical or other suitable perforations or channels, as seen in Fig. 7, in the same manner as the successive tiers or layers of channels *m*. The channels *m* and *n* are formed by stones shaped for this purpose, and are covered with a double layer of plates. In the oven at each side of the gas-generator lies the automatic steam-generator *o*, which is fed by water which can be caused to continually flow into it by any suitable device. The steam generated is led into the conduits under the grate of the generator by suitable pipes or other means. The steam-generator may be provided with a water-glass and safety-valve, as also with an overflow-pipe. The generation of steam is caused by the heat of the oven. The generator is hermetically closed in front of the grate by an air-tight closing-door.

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

1. The combination, with a retort-oven and with a gas-generator, of a channel, *p*, leading from the generator to the oven, primary air-channels *k* at the sides and in front of the generator, and openings *h*, for the entrance of gases, and openings *i*, for the entrance of air, whereby the gases and air are mingled and consumed in the retort-chamber in the immediate presence of the retorts, substantially as set forth.

2. The combination, with a retort-oven and with a gas-generator, of a cast-iron furnace plate or vessel, *s*, projecting stones *l*, air-conduits *u*, and steam-conduits *u'*, placed beneath the grate of the generator, and a boiler, *o*, placed in said oven, adapted to be heated by the spent gases, substantially as and for the purpose set forth.

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

JULIUS THEODOR HASSE.

Witnesses:

PAUL DINCKMÜLLER,

CARL SCHRÖDER.