

W. FEICKS.
COKE OVEN OR GAS FURNACE.
APPLICATION FILED OCT. 12, 1910.

1,051,875.

Patented Feb. 4, 1913.

2 SHEETS—SHEET 1.

FIG. 1.

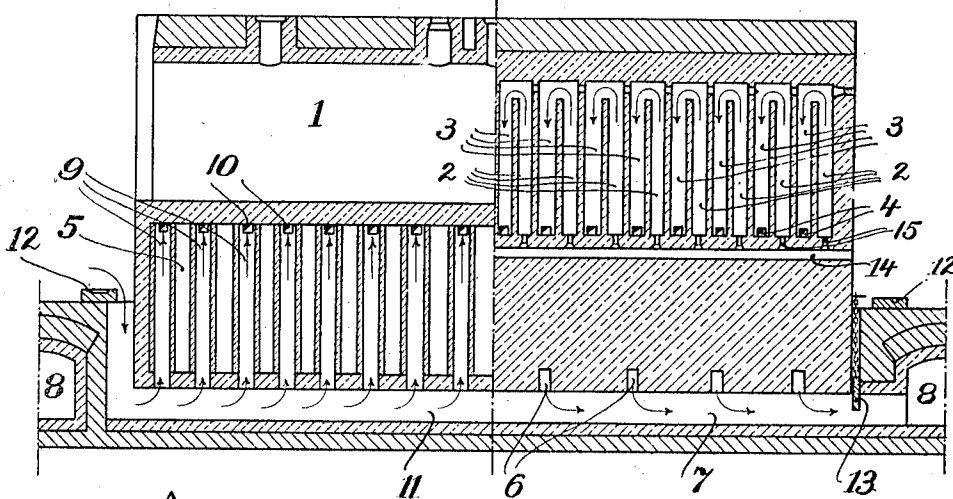


FIG. 2.

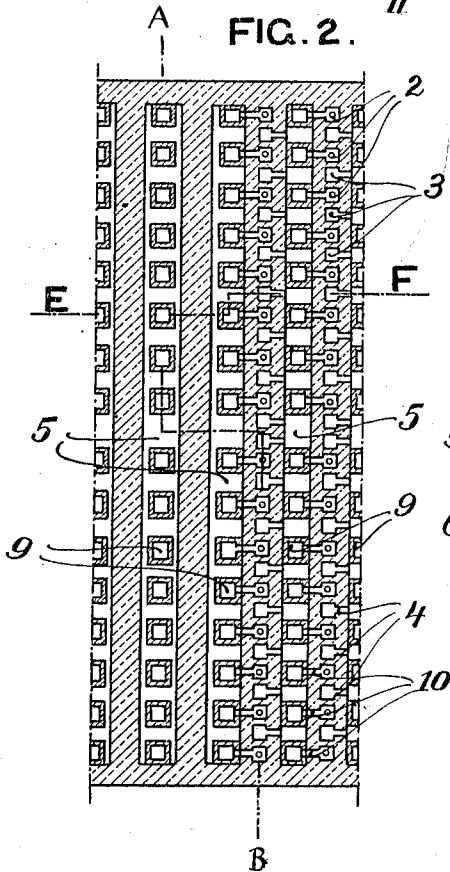
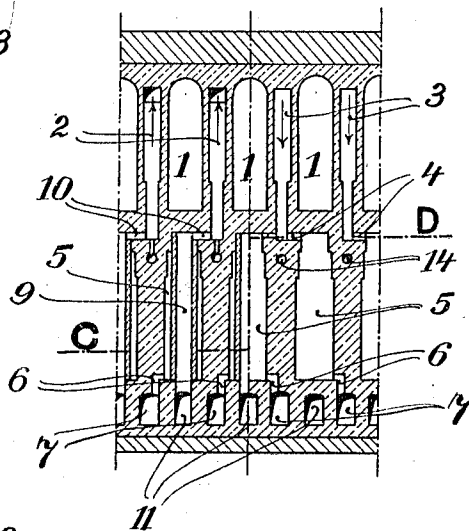


FIG. 3.



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FIG. 4.

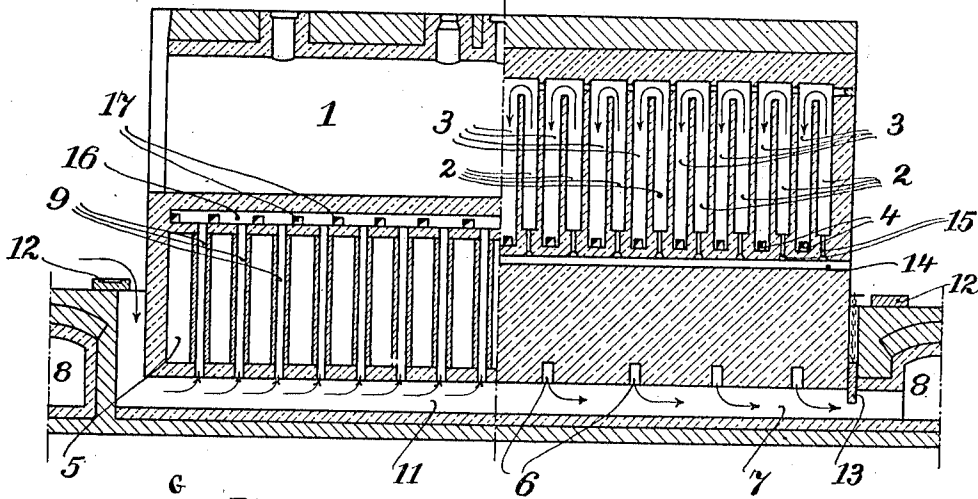


FIG. 5.

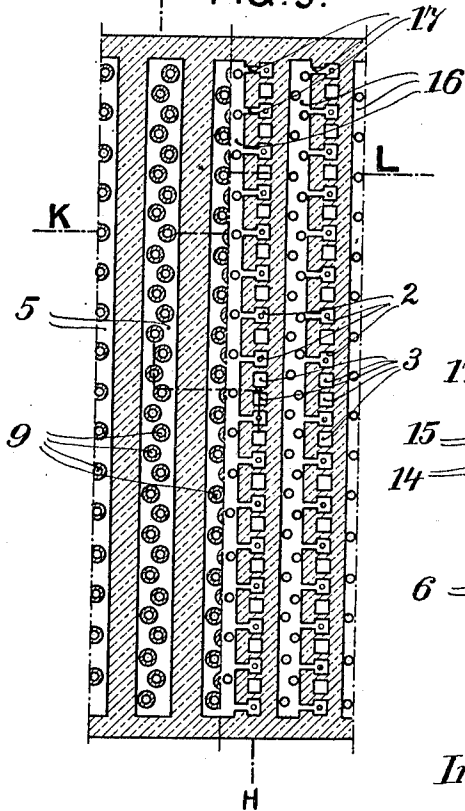
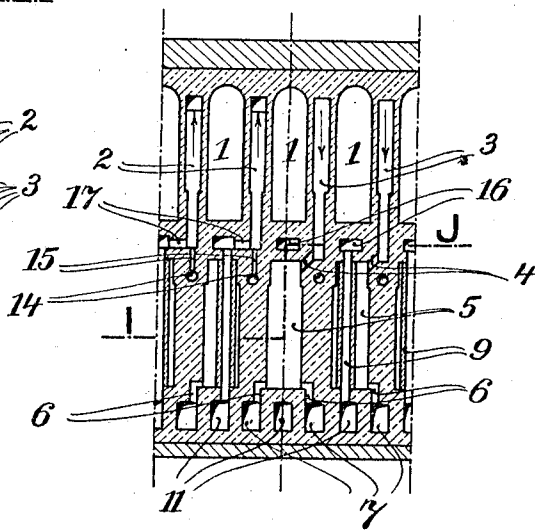


FIG. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM FEICKS, OF BETHLEHEM, PENNSYLVANIA.

COKE-OVEN OR GAS-FURNACE.

1,051,875.

Specification of Letters Patent.

Patented Feb. 4, 1913.

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To all whom it may concern:

Be it known that I, WILLIAM FEICKS, a subject of the Emperor of Germany, residing at Bethlehem, in the county of Northampton and State of Pennsylvania, have invented new and useful Improvements in Coke-Ovens or Gas-Furnaces, of which the following is a specification.

The object of the present invention is to provide more efficient, economical and simpler means for heating the air for combustion in connection with coke ovens or gas furnaces.

Ovens have been known in which a heating of the air is effected by conducting the latter through pipes which pass through an exhaust flue arranged beneath the oven, the hot gases passing through the flue horizontally while the air flows through the tubes vertically. Such method of heating the air, however, is for obvious reasons not economical and is disadvantageous in that the air is not uniformly heated all over the oven wall.

According to my invention I provide heating chambers set out with pipes or tubes similar to those described in the British Patent No. 18,141/07, the whole, however, being so constructed and arranged that the flow of air and gas is opposed to each other, whereby an economical heat exchange of the air is effected. Furthermore, all tubes of the heat-exchange chambers being equally heated, a likewise uniform heating of the air all over the oven wall is obtained.

In an oven of my construction the air heating pipes communicate at their upper ends with the places of combustion and at their lower ends with an air supply passage, while the heat-exchange chamber communicates at its upper end with the exhaust flue or flues of the oven wall and at its lower end with an exhaust passage. This arrangement may, of course, be reversed and the pipes be connected at their upper ends to the exhaust flue or flues of the oven wall and at their lower ends to an exhaust passage while the heat-exchange chamber communicates at its upper end with the places of combustion and at its lower ends with an air supply passage. In the first case the

air ascends through the tubes and the hot gases descend through the chamber, while in the latter case the air ascends through the chamber and the hot gases descend through the tubes.

In the accompanying drawings:—Figure 1 is a longitudinal section through a furnace embodying my invention; taken along the line A—B in Fig. 2. Fig. 2 is a section on the line C—D in Fig. 3. Fig. 3 is a section on the line E—F in Fig. 2. Fig. 4 shows a longitudinal section through a furnace embodying my invention but differing in construction from the one shown in Figs. 1–3, the plane of section being on the line G—H in Fig. 5. Fig. 5 is a section taken on the line I—J in Fig. 6, and Fig. 6 is a section along the line K—L in Fig. 5.

Referring to Figs. 1–3, the coking chambers 1 are arranged side-by-side in the usual manner. The oven walls are provided with vertical heating flues, 2 indicating flues in which combustion is effected while 3 indicates the exhaust flues. The exhaust flues 3 communicate at the bottom by means of channels 4 with heat-exchange chambers 5, the latter being connected at their lower ends by means of channels 6 with exhaust passages 7 which lead into the main conduits 8. The chambers 5 are set out with pipes or tubes 9 made of fire brick, fire clay or other refractory material. They communicate at their upper ends by means of channels 10 with the combustion flues 2 of the oven walls, and at their lower ends terminate into passages 11 which lead into the open. Slides 12 serve to regulate the amount of air admitted to the passages 11, while the dampers 13 serve to regulate the chimney draft. 14 indicates gas supply passages communicating with the combustion flues by means of channels 15.

Referring to Figs. 4–6, the construction of furnace here shown differs in some respects from the one above described. As before, 1 denotes the coking chambers. 2 combustion flues, 3 exhaust flues, 4 channels connecting the exhaust flues with the heat-exchange chambers 5, and 6 channels connecting the heat-exchange chambers with the exhaust passages 7 leading to the main con-

duits 8. The chambers here are also set out with pipes or tubes 9 which, however, terminate at their upper end in collecting and distributing chambers 16, the latter communicating by means of channels 17 with the combustion flues 2 of the oven walls. All other numbers indicate same parts as in Figs. 1-3.

The operation of the furnace is as follows:—The fresh air enters the passages 11 at the front and back of the battery. The air in these passages is subjected to a preheating by the exhaust passages 7 and then ascends through the tubes 9, to be delivered either direct into the combustion flues by the channels 10, (see Figs. 1-3) or into the collecting and distributing chambers 16 and from there into the combustion flues 2, (see Figs. 4-6). In the combustion flues 2 the air mixes with the gas, which is delivered by means of the passages 14 and channels 15. The products of combustion pass upward in flues 2 and down the flues 3 through the channels 4 into the chambers 5. Descending through the chambers the greatest part of the heat contained in the hot gases is transmitted to the air ascending through the tubes, the waste gases leaving the chambers at the bottom by the channels 6 to enter the passages 7 from whence they are conducted to the main conduits 8 which are connected with the chimney.

In the furnace illustrated in Figs. 4-6, the construction of air heating chambers is entirely independent upon the arrangement of the heating flues in the oven walls, which may be of any different kind than illustrated. Another advantage of this construction is that the number of air heating tubes can be increased as desired, thus making it possible to obtain a very efficient heating of the air.

It is evident that various changes may be made which may come within the scope of my invention, and I do not, therefore, desire to be limited in every way to the exact constructions shown and described.

For convenience of description and designation of the structural features in the claims, I have employed and set forth in the claims the terms of the parts and their relative arrangement as described in the specification, but, of course, either of the arrangements disclosed in the specification or their equivalents may be used without departing from the spirit and scope of my invention.

Having thus described the invention, I claim:—

1. In combination, a series of coking ovens having combustion and exhaust flues in the oven walls, a series of waste gas chambers arranged below the battery of

ovens and communicating with said exhaust flues throughout their upper ends, a series of upright air preheating pipes passing freely through said waste gas chambers and communicating at their upper ends with said combustion flues of the oven walls, a series of exhaust passages in proximity to the lower ends of said waste gas chambers and longitudinally to same, and connections interposed along said exhaust passages between these latter and the lower ends of said waste gas chambers, and a series of air supply passages in proximity to the lower ends of said waste gas chambers and longitudinally to same, and connections interposed along said air supply passages between these latter and forming communication with the lower ends of aforesaid air preheating pipes, and the air supply passages.

2. In combination, a series of coking ovens having vertical combustion and exhaust flues arranged in the oven walls, the exhaust flues being alternately interposed between the combustion flues, a series of waste gas chambers communicating with the exhaust flues throughout the upper ends thereof and arranged below the battery of ovens, a series of vertical air preheating pipes passing through said waste gas chambers, passages for supplying gas to said combustion flues, a series of horizontal exhaust passages at the lower ends of said waste gas chambers and longitudinally to same and connections interposed along said exhaust passages between these latter and the lower ends of said waste gas chambers, and a series of horizontal air preheating inlet passages arranged alternately between the horizontal exhaust passages, and connections along said air preheating inlet passages between these latter and aforesaid air pipes, forming communication with the lower ends of said air pipes and said air pre-heating inlet passages.

3. In combination, a series of coking ovens having combustion and exhaust flues in the walls thereof, a series of waste gas chambers arranged below the battery of ovens and communicating with said exhaust flues throughout their upper ends, a series of upright air preheating pipes passing through said waste gas chambers and terminating at their upper ends into common passages extending beneath the ovens and communicating with said combustion flues, a series of exhaust passages in proximity to the lower ends of said waste gas chambers and longitudinally to same, and connections interposed along said exhaust passages between the latter and the lower ends of said waste gas chambers and a series of air supply passages in proximity to the lower ends

of said waste gas chambers and longitudinally to same, and connections along said air supply passages between the latter and the lower ends of aforesaid air preheating pipes, forming communication with the lower ends of said air pipes and said air preheating inlet passages.

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

WILLIAM FEICKS.

Witnesses:

K. ALLEN,

BENNETT S. JONES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."