

No. 649,483.

Patented May 15, 1900.

O. RUPPERT.
EXTERNALLY HEATED COKE OVEN.

(No Model.)

(Application filed Dec. 8, 1897.)

3 Sheets—Sheet 1.

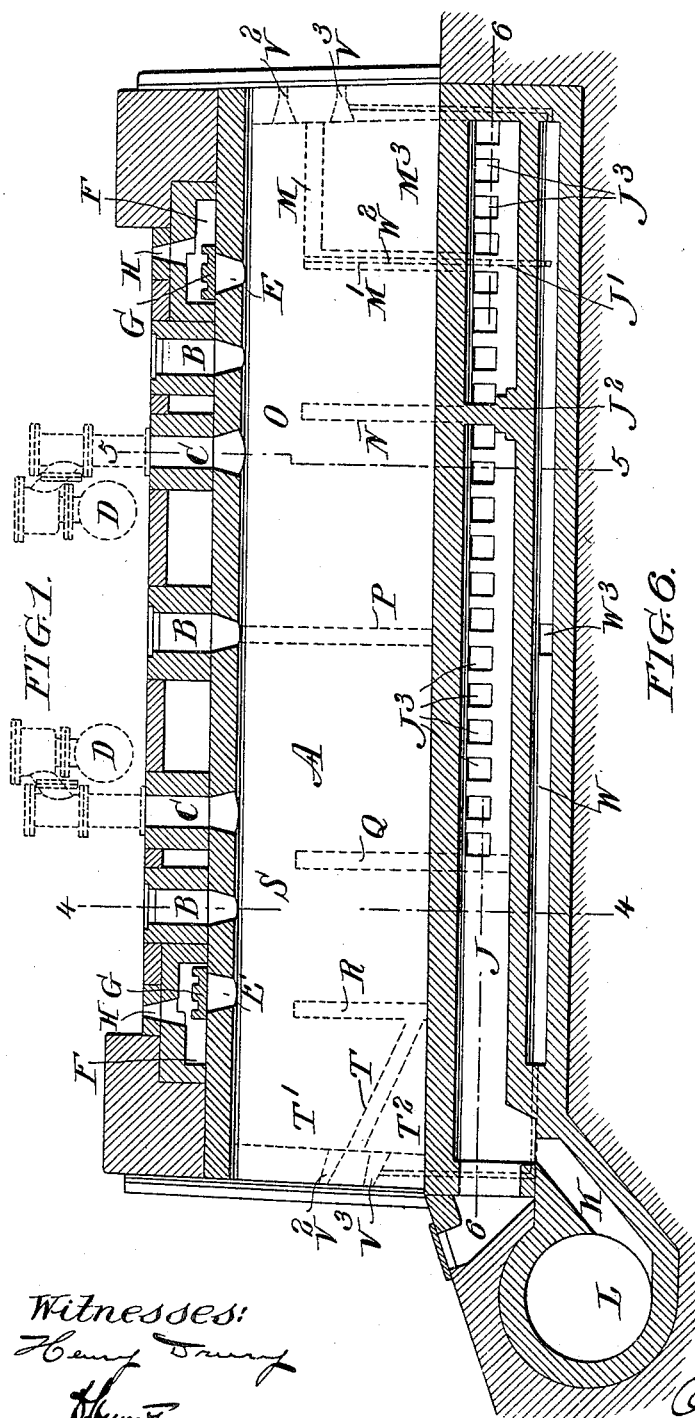


FIG. 1.

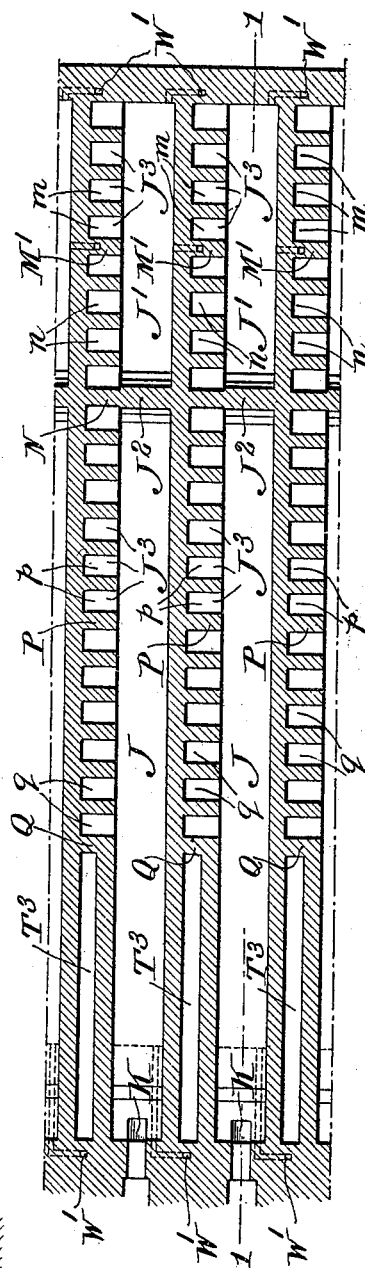


FIG. 6.

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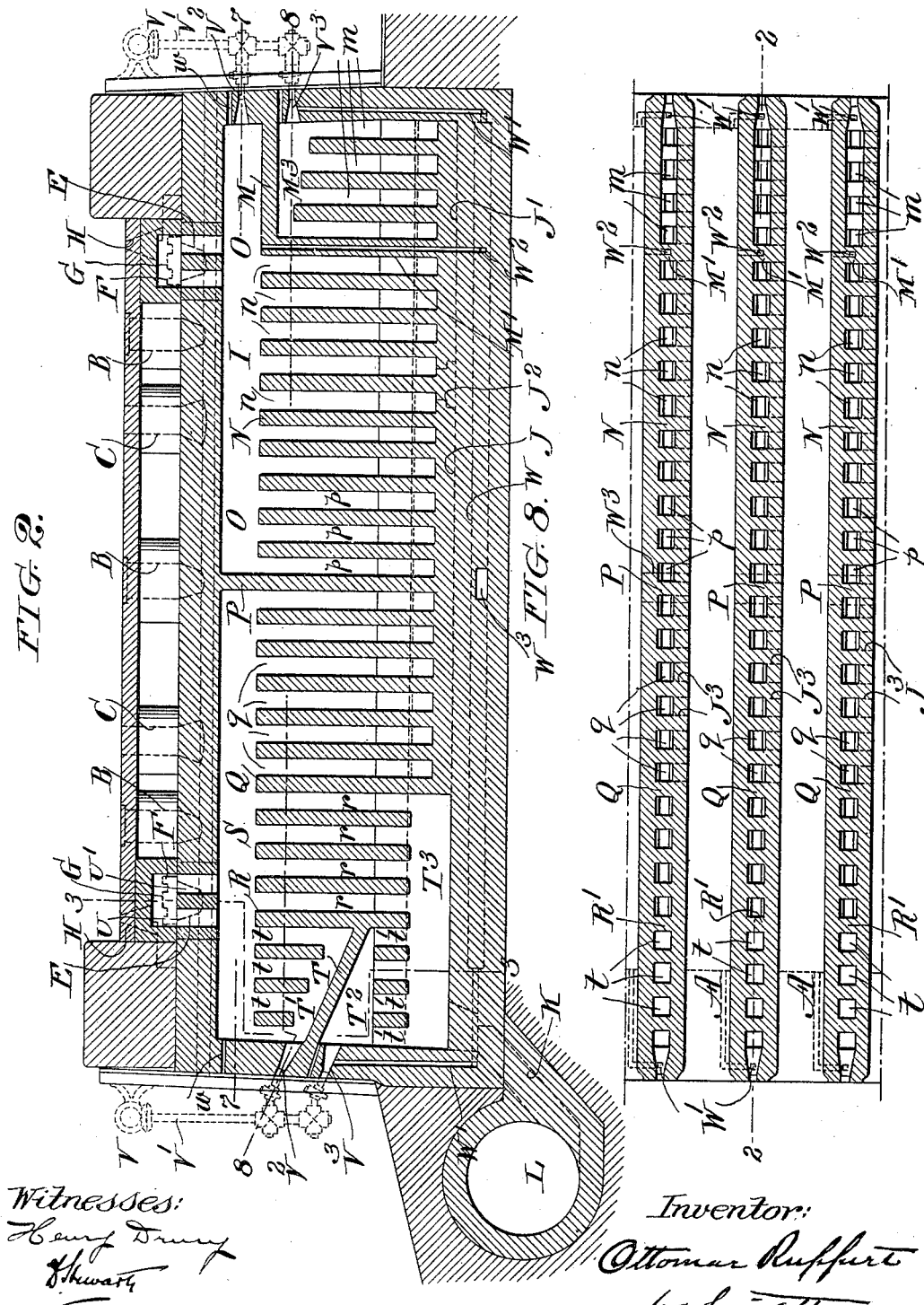
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3 Sheets—Sheet 2.

FIG. 2.



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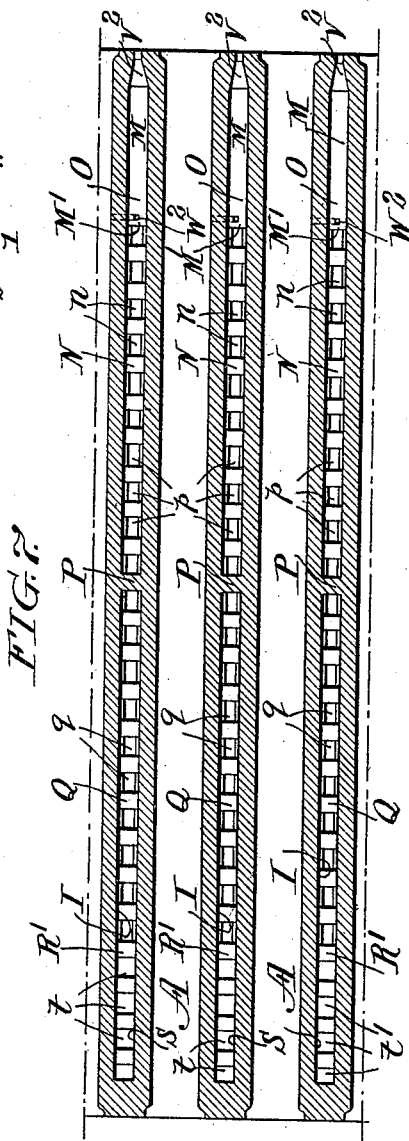
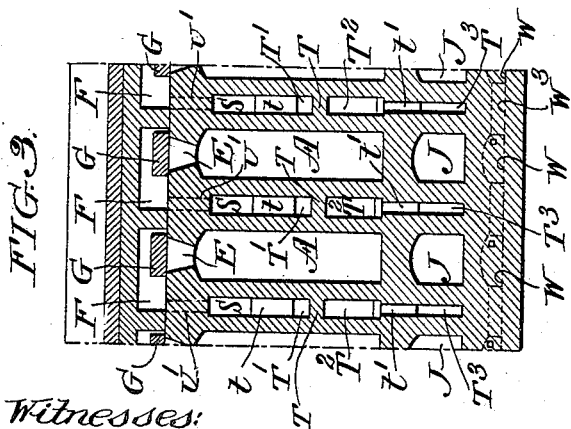
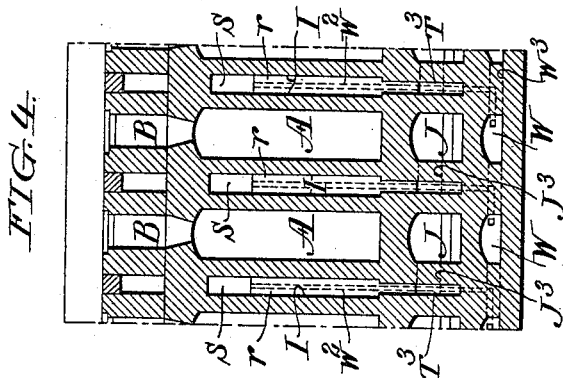
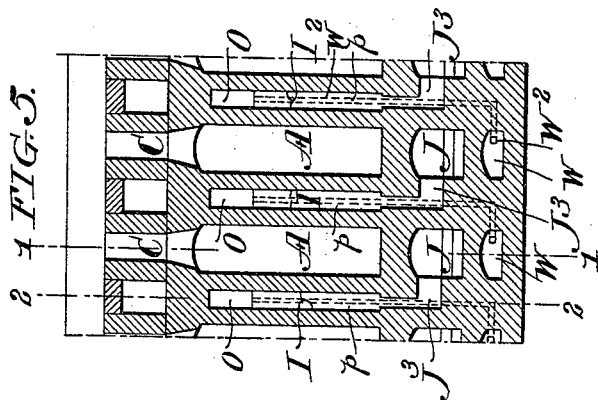
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EXTERNALLY HEATED COKE OVEN.

(No Model.)

(Application filed Dec. 8, 1897.)

3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

OTTOMAR RUPPERT, OF ESSEN, GERMANY, ASSIGNOR TO THE UNITED COKE AND GAS COMPANY, OF CHARLESTON, WEST VIRGINIA, AND PHILADELPHIA, PENNSYLVANIA.

EXTERNALLY-HEATED COKE-OVEN.

SPECIFICATION forming part of Letters Patent No. 649,483, dated May 15, 1900.

Application filed December 8, 1897. Serial No. 661,141. (No model.)

To all whom it may concern:

Be it known that I, OTTOMAR RUPPERT, a subject of the King of Prussia, Emperor of Germany, and a resident of Essen-on-the-Ruhr, Germany, have invented a certain new and useful Improvement in Externally-Heated Coke-Ovens, (for which I have obtained German Letters Patent No. 78,927, dated December 19, 1894,) of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to the construction and heating of sets or banks of horizontal externally-heated coke-ovens adapted for the saving of the by-products of the coking operation. Such ovens are heated by the combustion of gas in flues formed in or between the walls of adjacent ovens, and prior to my invention the gas and air to support combustion were admitted either at a single point or at several points in the wall-flues. In the first case the oven-walls were intensely heated at the point of introduction of the gas, while in the second case while the walls were somewhat more evenly heated the heat was still not even and not at all controllable, owing to the fact that the gas and air being admitted into a single chamber the combustion was irregular and in all cases more intense in some than in other parts of the chamber.

The object of my invention is to insure a more even and regulable combustion of gas in the chambers or flues situated between the ovens, so that a practically-even heat can be secured throughout the ovens, and I secure this result by dividing each interposed heating-flue into two or more separate combustion-chambers each having separate gas and air inlets, and thereby secure a thorough and independent ignition of each separate gas-supply at the place where I desire its ignition, and of course by this arrangement I can regulate the gas and air supplied to each chamber independently and so as to produce the best results in each chamber and its connected flues. I preferably utilize flues for the products of combustion passing from the chambers aforesaid which are also situated

in and form a part of the interposed heating-flue between the ovens and which may each, if more than one is used, conveniently take off gases from two or more of the separate combustion-chambers, and to effect a proper distribution of heat as well as to brace the oven-walls I prefer to form or provide some or all of the combustion-chambers with divisional extensions or flues, the divisions being separated by vertical walls, and this arrangement of vertical division-walls is advantageously employed also in the flues common to two or more combustion-chambers.

Reference being now had to the drawings, which illustrate a portion of a coke-oven bank constructed in accordance with my invention, Figure 1 is a longitudinal section taken through the center of a coke-oven; Fig. 2, a longitudinal section taken through the center of one of the interposed heating-flues; Fig. 3, a vertical section on the irregular line 3 3 of Fig. 2; Fig. 4, a vertical section on the line 4 4 of Fig. 1; Fig. 5, a vertical section on the line 5 5 of Fig. 1; Fig. 6, a horizontal section on the line 6 6 of Fig. 1; Fig. 7, a horizontal section on the line 7 7 of Fig. 2, and Fig. 8 a horizontal section on the line 8 8 of Fig. 2.

A A, &c., are the horizontal parallel coke-ovens; B B, Figs. 1, 2, and 4, the charging-openings; C C, Figs. 1, 2, and 5, gas take-offs connecting to mains D, Fig. 1.

E E, Figs. 1, 2, and 3, are openings from the ovens into flues F, which, as shown, Figs. 2 and 3, connect through passages U U' with the interposed flues I, as shown, with the portions O and S thereof.

G G, Figs. 1, 2, and 3, are valves for closing openings E.

H H, Figs. 1 and 2, are openings to the top of the stack from flues F, through which air can be drawn into the flues I or, if desired, into the ovens.

J J, &c., Figs. 1, 3, 4, 5, and 6, are flues for products of combustion, situated, as shown, beneath the ovens A and connected with the divisions of the heating-flue I, as shown, by passages J³. These flues J connect by passages K, Fig. 1, with a take-off conduit L. As shown, the flues J run from the partition-

walls J^2 , Figs. 1 and 6, to flues K. Flue J' , which structurally might be considered as a portion or extension of flue J separated from the main portion by the wall J^2 , is, in fact, in the construction shown a mere connecting-flue between the divisional flues m and n . M and M' are walls separating from or forming in the heating-flue I the combustion-chamber M^3 , which, as shown, is provided with divisional flues m , n , &c., formed by vertical partition-walls. As illustrated, said divisional flues connect at bottom with the connecting-flue J' and through said connecting-flue J' with the vertical divisional flues n , which are situated between the wall M' and the vertical wall N, which rises in the flue I in line with the wall J^2 . Above the top of the horizontal wall M is formed a second combustion-chamber, which, as shown, extends along the top of the flue I in the form of a flue or passage O, into which the vertical divisional flues n open at the top and into which open also the divisional flues p , situated between the upwardly-extending wall N and the downwardly-extending wall P, the said divisional flues p opening at bottom into the flues J. At the other end of the heating-flue I, I form two combustion-chambers T' and T^2 , separated from each other, as shown, by the inclined partition-wall T and separated from the next adjacent flues r by the vertical partition-wall R. The combustion-chamber T' is provided with vertical partition-walls t , separating its upper part into a series of divisional flues which open into the horizontal flue S at the top of the heating-flue I, while the lower combustion-chamber T^2 is also provided with vertical partition-walls t' , which form divisional flues in its lower part opening at bottom into the connecting-flue T^3 , from which extend the divisional flues r , formed by vertical partition-walls lying between the wall R and the wall Q. The horizontal flue S, into which both the flues t and the flues r open, connects in turn with the divisional flues q , formed by vertical partitions situated between the walls Q and P and opening at bottom into the flue J. Into each combustion-chamber open gas and air supplying devices, the gas, for instance, being drawn from pipes V, Fig. 1, through connections V' to burners V^2 and V^3 , one situated in each combustion-chamber. The air may be forced into the combustion-chamber with and by the gas or may be supplied where it is desired to use cool air through independent channels, such as are indicated at w as entering the upper combustion-chamber v^2 , formed at the end of flue O and at the end of flue S, and, as shown in connection with the burners V^3 , the air is drawn into the combustion-chamber through flues W' , formed in the masonry of the stack and which may be conveniently connected, for instance, with the flues W, which, as shown, are formed beneath the

flues J and which would thus serve both to cool the bottom of the flues J and to preheat the air introduced into the combustion-chambers.

At W^2 , Fig. 2, I have shown a divisional air-flue extending up through the wall M' into the flue O, and it will of course be understood that air may be introduced at any points where it is desired that it should combine with the gas to facilitate combustion.

W^3 indicates an intersecting flue connecting flues W with the outer air; but it will be understood such connections can be made in any convenient way.

In operation gas and air are introduced into the combustion-chambers M^3 , O, T' , and T^2 and thoroughly ignited in said chambers, the burning gases and products of combustion passing from the chamber M^3 into the flue J' , then upward through flues n into flue O, mingling with the ignited gases from the combustion-chamber above the wall M in the flue O, and the mixed gases from both combustion-chambers passing down through flues p into the take-off flue J. The burning gases in the combustion-chambers T' and T^2 pass, respectively, upward through the flues t into the horizontal flue S, downward through the flues t' , and then upward through the flues r into the flue S, the mixed gases passing down through the flues q into the flue J.

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

1. In combination with a series of horizontal coke-ovens arranged to receive heat through their walls and for the saving of by-products, two or more separate and relatively-independent combustion-chambers situated between the walls of adjacent ovens, separate gas and air supplies entering each said chamber and a system of flues for products of combustion, said flue system connecting with but not passing through the combustion-chambers.

2. In combination with a series of horizontal coke-ovens arranged to receive heat through their walls and for the saving of by-products, two or more separate and relatively-independent combustion-chambers situated between the walls of adjacent ovens, separate gas and air supplies entering each said chamber and a system of flues for products of combustion also situated between the walls of the ovens said flue system connecting with but not passing through the combustion-chambers.

3. In combination with a series of horizontal coke-ovens arranged to receive heat through the walls and for the saving of by-products, two or more separate and relatively-independent combustion-chambers situated between the walls of adjacent ovens, separate gas and air supplies entering each said chamber, a separate flue leading from each said chamber and also situated between the ovens

and one or more common flues also situated between the ovens and connected to receive gases from the independent flues aforesaid.

4. In combination with a series of horizontal coke-ovens arranged to receive heat through their walls and for the saving of by-products, two separate and relatively-independent combustion-chambers situated one above the other between the walls of adjacent ovens, separate air and gas supplies entering each combustion-chamber and a common flue system also situated between the adjacent ovens connected with but not passing through the combustion-chambers.

5. In combination with a series of horizontal coke-ovens arranged to receive heat through their walls and for the saving of by-products, two separate and relatively-independent combustion-chambers situated one above the other between the walls of adjacent ovens, separate air and gas supplies entering each combustion-chamber, an independent flue situated between the ovens and leading

from each combustion-chamber and a common flue system also situated between the adjacent ovens connected with the independent flues aforesaid.

6. In combination with a series of horizontal coke-ovens arranged to receive heat through their walls and for the saving of by-products, two separate and relatively-independent combustion-chambers situated one above the other between the walls of adjacent ovens at each end of the ovens, separate air and gas supplies entering each combustion-chamber, an independent flue situated between the ovens and leading from each combustion-chamber and common flues also situated between the ovens connecting with the independent flues at each end of the ovens and leading to a gas take-off flue.

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Witnesses:

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