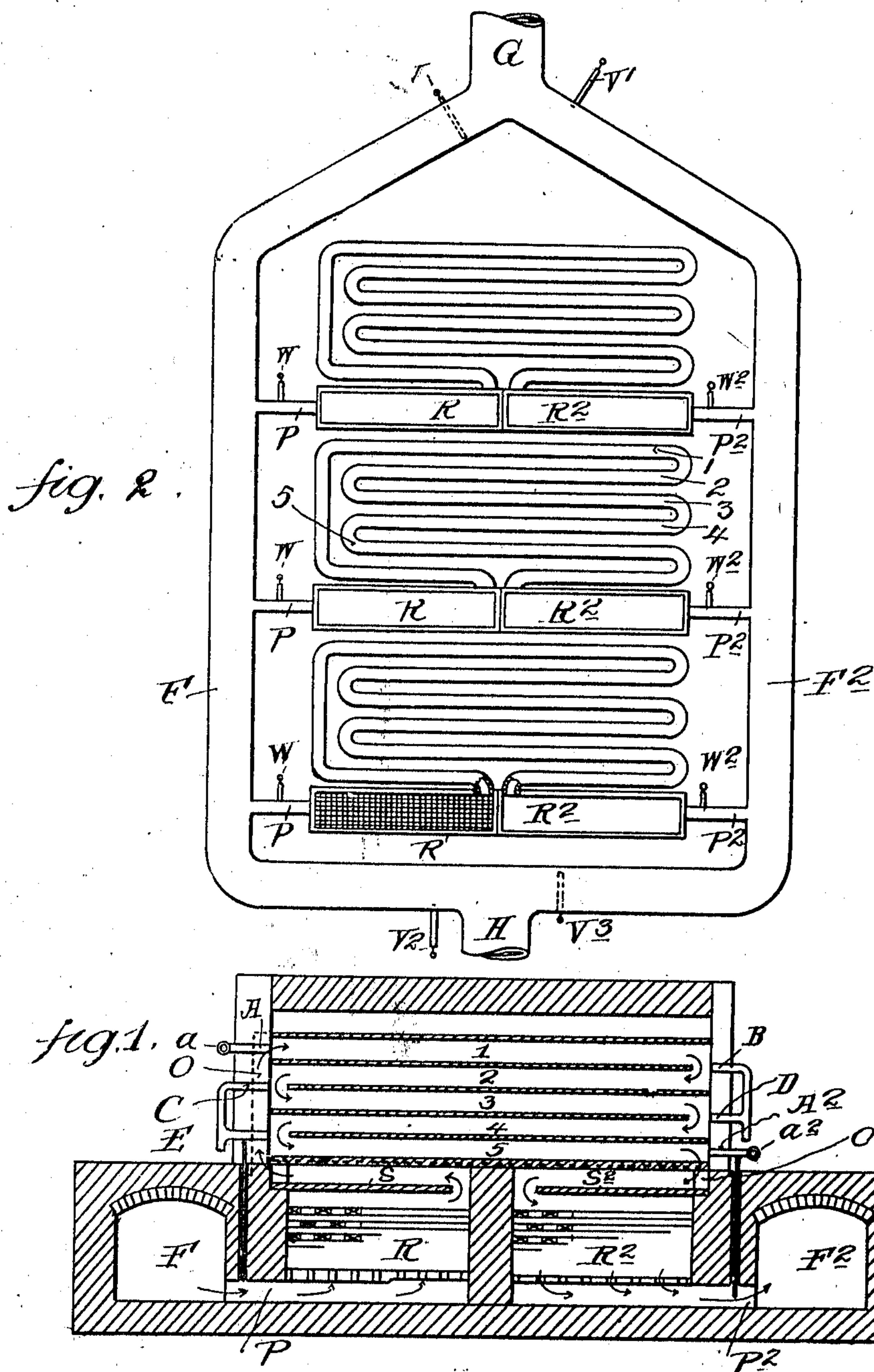


E. W. KING.
HEATING ARRANGEMENT FOR RETORT COKE OVENS.
APPLICATION FILED JAN. 26, 1910.

970,720.

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Specification of Letters Patent. Patented Sept. 20, 1910.

Application filed January 26, 1910. Serial No. 540,161.

To all whom it may concern:

Be it known that I, EUGENE W. KING, a citizen of the United States, residing at Syracuse, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Heating Arrangements for Retort Coke-Ovens, of which the following is a specification.

My invention relates particularly to retort coke ovens provided with horizontally disposed heating flues connected in series. Such an arrangement of flues presents certain advantages, since it enables a very complete utilization of the heat developed in the flues, and such a regulation thereof as to secure a uniform coking of the coal charge. Heretofore with such an arrangement of flues the preheating of the air required for the combustion of the gas has usually been effected by means of recuperators, so called, in which the incoming air to be preheated and the outgoing gases of combustion flow continuously, always in the same direction, through adjacent passages, the heat of the gases passing through the separating walls and being absorbed by the incoming air. Regenerators, in which the gases of combustion and the air to be preheated flow alternately in opposite directions through a checkered brick construction, which becomes highly heated by the gases and then imparts its heat to the air, are also employed to preheat the air, but while they are highly advantageous where their employment is feasible because of the extremely high temperature imparted to the air thereby, they are not readily applicable to the series arrangement of flues.

The object of my improvements is to provide a simple and easily operated arrangement which shall enable the combination of regenerators with a series flue system, and thus unite the advantageous features of both constructions, and also to obtain certain incidental advantages of operation.

An embodiment of my invention is illustrated in the accompanying drawings, of which—

Figure 1 shows a longitudinal section through the heating flues on one side of an oven, and Fig. 2 is a diagrammatic representation of the arrangement of parts.

Referring to the drawings, 1, 2, 3, 4, 5, indicate the heating flues connected in series on one side of an oven. A similar set of flues is provided on each side of each oven

throughout the block of ovens. Below each of the ovens are located two regenerators, R, R², built of checkered brick work in any usual manner. The regenerators R, R², are connected by passages, P, P², with flues F, F², which are connected at one end through reversing valves, V, V¹, with an outlet passage, G, for the waste gases of combustion, leading to a stack, not shown in the drawings, and at the other end through reversing valves V², V³, with an air inlet passage, H. The passages P, P², are controlled by dampers W, W², by means of which the effective orifice of the passages may be controlled, or, if desired, closed entirely. From each of the regenerators of one set, as R, a passage, O, formed in the division wall between two adjacent sets of heating flues, leads upward and is connected with the uppermost flues, 1, of the adjacent sets of heating flues. From each of the other set of regenerators, as R², openings, O², connect with the lowermost heating flues, 5.

Preferably a shelf or partition S, S², is constructed above each regenerator, whereby the air and gases passing to and from the heating flues are caused to traverse the entire length of the regenerators R, R², instead of taking the shortest course to and from the passage, O, and opening, O².

The heating flues, 1, 2, 3, 4, 5, are provided with gas burners, A, B, C, D, E, A². The burners A and A², are respectively located opposite, or at the ends of the flues 1 and 5, while the intermediate burners B, C, D, E, are located opposite the openings which connect flue with flue. Thus it will be noted that the number of burners exceeds by one the number of flues, since one or the other of the burners, A, A², is always out of operation, according to the direction in which the gas current is flowing through the flues.

The method of operation is as follows: Assuming that the regenerators R² are being heated by the outgoing gases of combustion, valves V, V³, are closed, and valves V¹, V², are open. The air to be preheated enters through passage, H, to flue, F, and thence by the several passages, P, to and through the regenerators R, and thence by passages, O, to the uppermost heating flues, 1. The air for the combustion of the gas at all the burners is delivered in the first instance into flue 1, where it is in excess, and the excess air not used up at burner, A,

passes onward with the gases of combustion to the other burners. By adjustment of damper, W, the supply of air may be proportioned to the requirements of all the burners, and so that no excess will remain to pass out of the heating flues to the stack. The hot gases of combustion pass out of the flue system by opening, O², to and through regenerator, R², and thence by passage, P², and flue F², to the stack. During this period burner A², which is located at the end of the heating flue system, as the gases are flowing, is closed, burner A being, if desired, in operation. The flames at burners B, C, D, and E, are bent downward by the draft into the lower of the two flues between which each is located. When regenerator, R², has become sufficiently heated by the flow of hot gases therethrough, the direction of the gas current is reversed by opening valves V, V³ and closing valves V¹, V². Air then enters by flue F², to and through regenerators R², and the hot gases of combustion flow from the heating flues by passages O, to and through regenerators R, and by flue F, to the stack. In this case burner A² is opened and burner A is closed, and the flames at burners B, C, D, E, are carried by the draft into the uppermost of the two flues between which each is located, the top flue, 1, in this case being heated by the flame from burner, B, and the bottom flue, 5, being heated by the flame from burner A².

In practice the burners A, A², will be connected with separate delivery gas pipes, α , α^2 , whereby the gas can be turned on to or cut off from these burners at all the ovens of the block, by the manipulation of a single valve.

In case it is desired for any reason to cut any individual oven and the corresponding regenerators out of operation, this is readily effected by closing the passages P, P², which connect the regenerators with the flues F, F², by means of the dampers W, W². Ordinarily, however, after the dampers are adjusted for the proper supply of air to the burners, they require no further attention.

In the operation of this system of ovens the air is preferably supplied to the oven flues under pressure, and the waste gases are withdrawn by a fan produced draft. By this means a balanced draft can be secured and any transfer of gases between the heating flues and the ovens prevented.

By means of my invention I provide a simple arrangement of parts, economical of construction and easy to operate, and at the same time enable the operative combination of a regenerator with a series system of heating flues, the advantages of which will

be readily understood by those skilled in the art.

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

1. The combination with a retort coke oven of horizontally disposed heating flues connected in series, a pair of regenerators located below and parallel with the oven and connected in series with the heating flues, and means for reversing the flow of gas and air through the regenerators.

2. The combination with a retort coke oven of horizontally disposed heating flues connected in series, a pair of regenerators located below and parallel to the oven, one of said regenerators being connected by a single opening with the series of flues at one end thereof, and the other of said regenerators being connected by a single opening with the series of flues at the other end thereof and flues connected with said regenerators whereby the waste gases of combustion and air are alternately discharged therefrom and admitted thereto.

3. In a block of retort coke ovens the combination of an air inlet passage, two flues running longitudinally of the block and arranged to be alternately connected, the one with said air inlet passage and the other with a waste gas exit passage, a pair of regenerators located below and parallel with each oven and connected the one with one of said flues and the other with the other of said flues, and horizontally disposed heating flues located between the ovens and forming a continuous connecting passage between the regenerators of each pair.

4. The combination with a retort coke oven of horizontally disposed heating flues connected in series and provided at each end thereof with an opening whereby air is admitted to and the waste gases are discharged from the flues, a burner at each end of the series of flues and intermediate burners located opposite the openings which connect adjacent flues.

5. The combination with a retort coke oven of a pair of regenerators located below and parallel with the oven, a series of horizontally disposed heating flues forming a passage between said regenerators, a burner located at each end of the series of flues and intermediate burners located opposite the openings which connect adjacent flues.

In testimony whereof, I have hereunto subscribed my name, this 17th day of January A. D., 1910.

EUGENE W. KING.

Witnesses:

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ELIPHALET AUSTIN BARNES.