

A. O. JONES.
COKE OVEN.

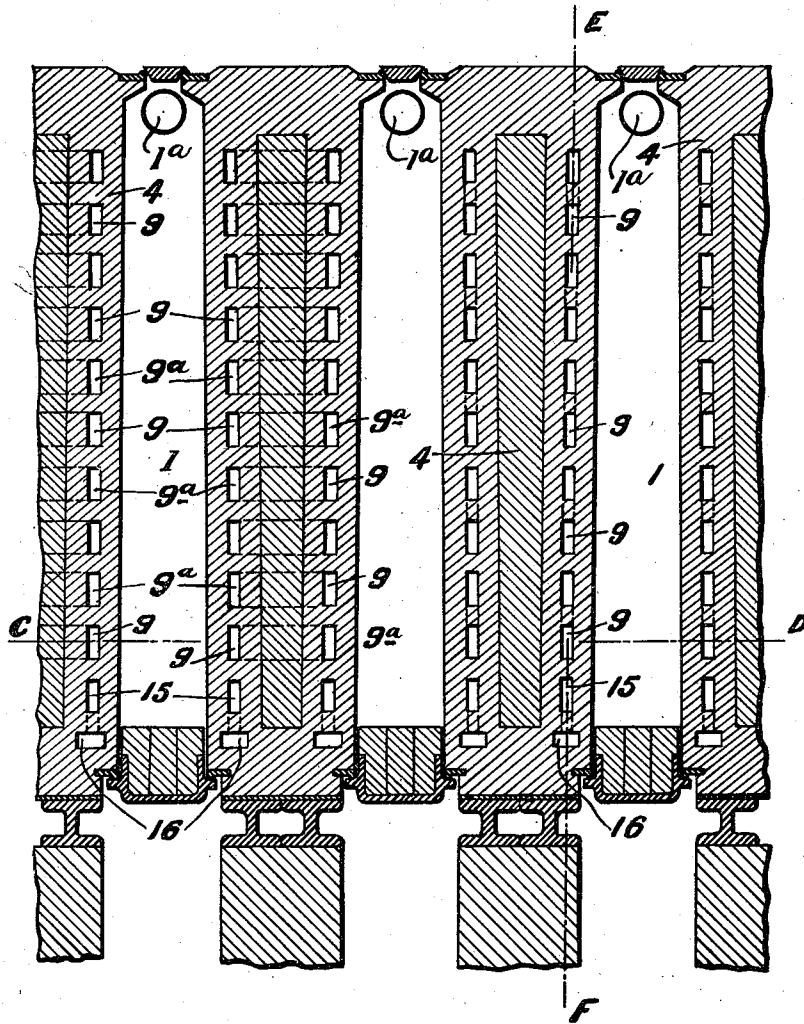
APPLICATION FILED APR. 26, 1911.

1,008,718.

Patented Nov. 14, 1911.

5 SHEETS—SHEET 1.

FIG. 1.



Witnesses
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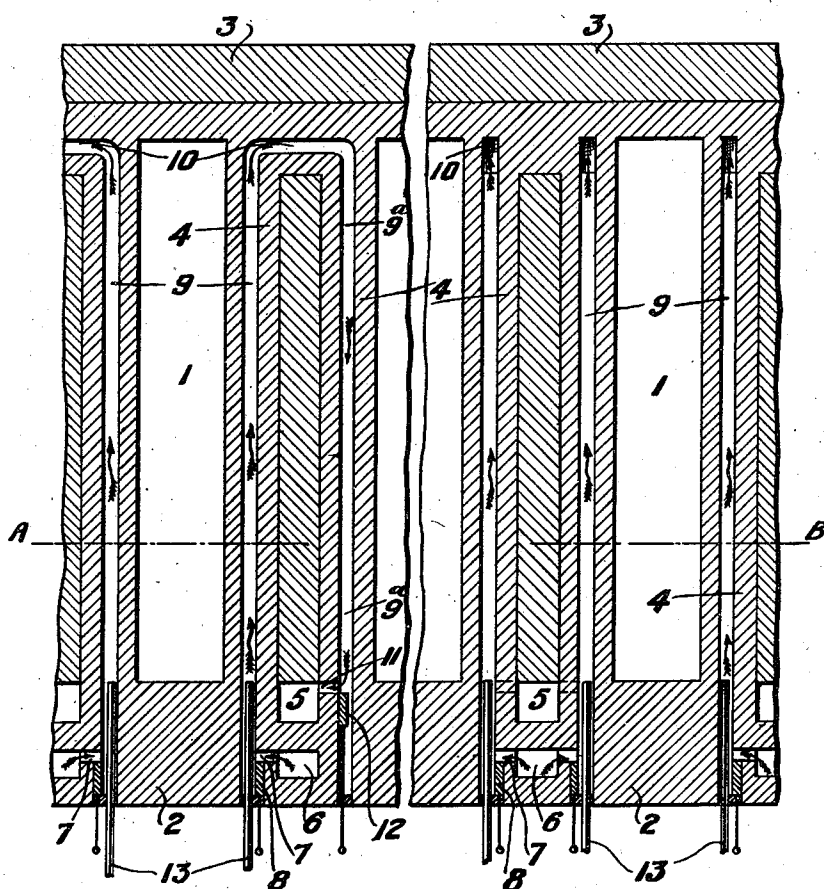
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5 SHEETS—SHEET 2.

Fig. 2.



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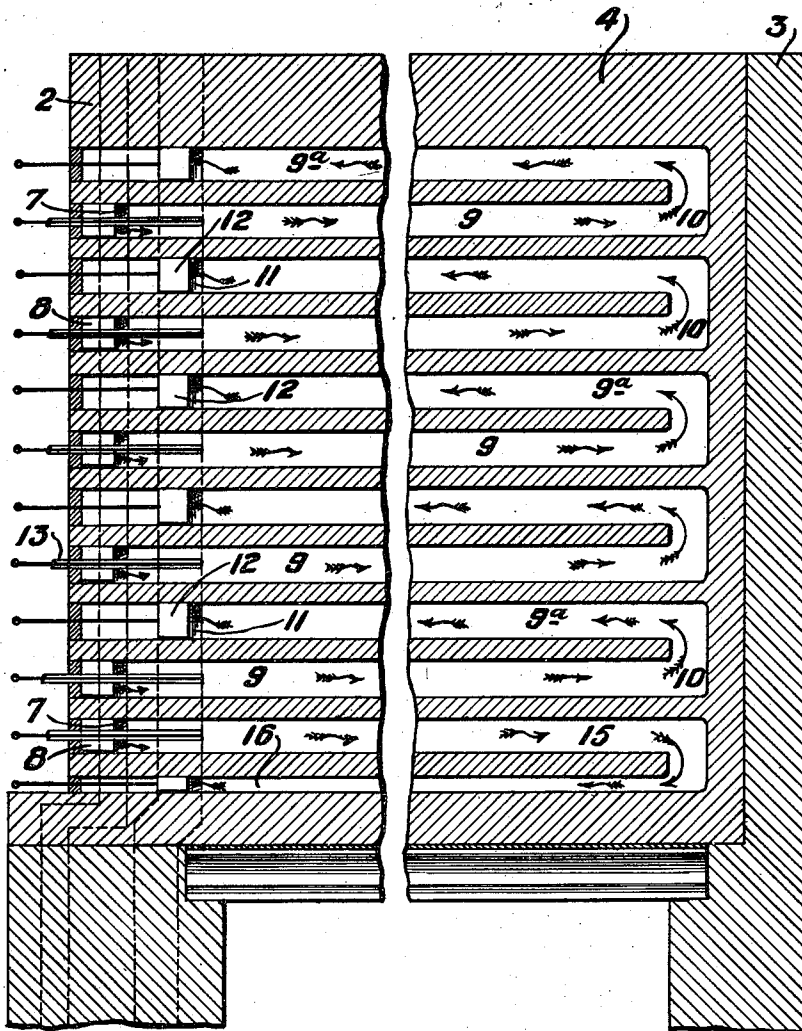
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6 SHEETS—SHEET 3.

FIG. 3.



Witness

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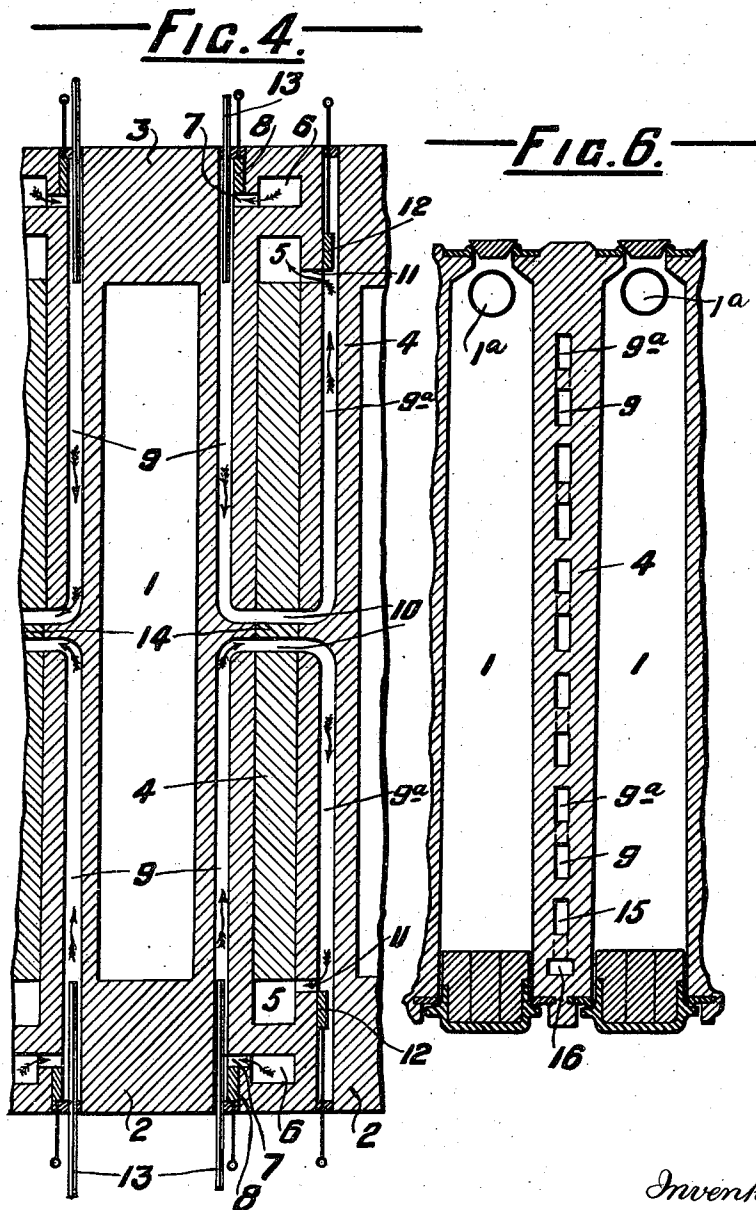
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5 SHEETS—SHEET 4.



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5 SHEETS-SHEET 5.

Fig. 5.

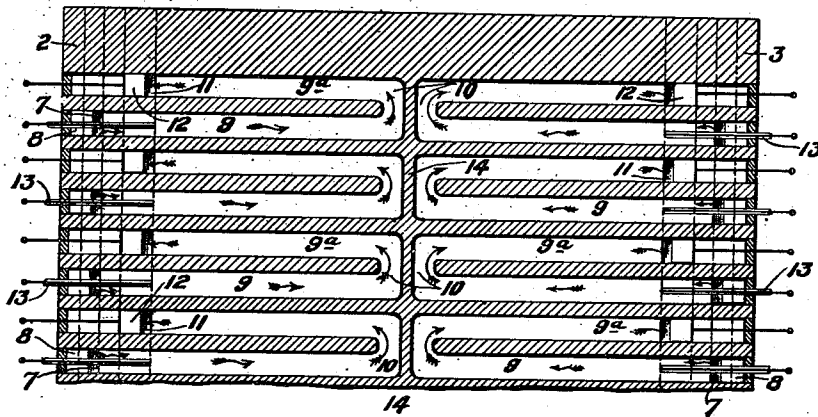


Fig. 7.

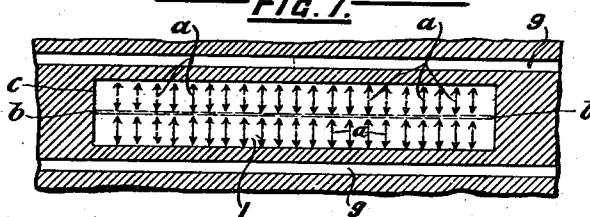
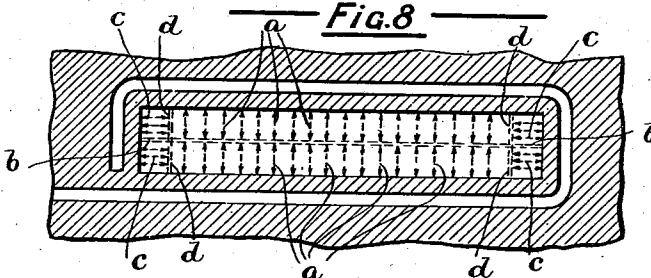


Fig. 8.



Witnesses

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UNITED STATES PATENT OFFICE.

ARTHUR OWEN JONES, OF WHITLEY BAY, ENGLAND.

COKE-OVEN.

1,008,718.

Specification of Letters Patent. Patented Nov. 14, 1911.

Application filed April 26, 1911. Serial No. 623,398.

To all whom it may concern:

Be it known that I, ARTHUR OWEN JONES, a subject of the King of Great Britain, residing at Whitley Bay, in the county of Northumberland, England, have invented certain new and useful Improvements in Coke-Ovens, and of which the following is a specification.

Coke ovens in which the coal is fed in at an open top and in which the coked product is discharged through the base, are already known and are commonly termed vertical coke ovens. Now the present invention refers to coke ovens of this type, and in such ovens it has already been proposed to provide horizontal superposed heating flues independent one of the other and all discharging the products of combustion into a common vertical outlet flue in the structure adjacent to the front wall of the oven, while the inlet end of each horizontal flue has extended to the face of the structure and has been there supplied with gas and air, and I have before proposed to supply the air to such horizontal flues by a common air supply passage. In the construction of such horizontal flues, they have been caused to pass within and along one side wall of an oven, around the end of the oven and have returned along and within the other side wall of the oven to the common vertical outlet flue at the front end of the oven.

Now the object of the present invention is to construct the horizontal heating flues of such ovens entirely in the side walls thereof, so that they do not pass around the ends of the ovens, and thereby the coking action takes place entirely from the sides of the oven and not from the ends thereof. According to this invention therefore I locate the common vertical outlet flue or flues for each oven not immediately at the ends of the said ovens but between two adjacent ovens. One end of each horizontal flue extends as heretofore to the face of the structure where it communicates with a vertical air flue common to all the horizontal flues, and where also it is supplied with gas. The flue, from its gas admittance end, extends in one side wall adjacent to one oven, and then passes by a cross passage and returns in the same side wall adjacent to the next oven, and at its return end it communicates with a vertical outlet flue (common to all the horizontal flues) which is constructed in the same side wall. The horizontal flues may

be arranged in such a manner that the gas is admitted to that horizontal arm of one of the flues extending in the wall adjacent to the oven on one side, while in the next horizontal flue the gas is admitted to that horizontal arm of that flue which is in proximity to the next oven, and so on, considering a series of said superposed heating flues, and by arranging thus, the horizontal arm of one flue, into which the gas is admitted directly, alternates with the horizontal arms of the flues through which the products of combustion pass to the common exit. Or the flues may be arranged in the wall between two ovens, so that the horizontal arm into which the gas is admitted is in the same vertical plane as the horizontal arm by which the heated products of combustion pass to the exit passage, the arm of each flue into which the gas is admitted alternating with the arm connected with the exit passage. At the base of the oven it is found desirable to admit the gas and air to a horizontal flue constructed level with or just above the upper surface of the sole plate of the oven and to cause that flue to communicate by a vertical passage with a lower flue which is vertically beneath the said admittance flue, and through this lower flue the products of combustion return. By this arrangement the requisite quantity of heat is supplied to the charge near the base and at the thickest part thereof, and by the return or outlet arm being located immediately below that inlet arm which is level with or just above the top of the sole plate, the heat is conserved in the said inlet arm.

In order that the invention may be more readily understood, reference is made to the accompanying drawings whereon—

Figure 1 is a vertical transverse section on the line A B of Fig. 2, and Fig. 2 is a horizontal section on the line C D of Fig. 1, showing ovens provided with flues according to this invention, the left hand portion of the figure showing the arm of the flue connected with the gas supply (hereafter referred to as the inlet arm) and the arm of the flue connected with the main exit flue (hereafter referred to as the outlet arm) arranged in the same horizontal planes, the right hand portion of the figures showing the inlet and outlet arms arranged in a vertical plane, two series of such flues being arranged in one dividing or oven side wall and adapted each series to heat one side of

one oven or coking chamber. Fig. 3 is a vertical longitudinal section through the flues shown at the right of Fig. 1, the section being taken on the line E F of that figure. Fig. 4 is a horizontal section of a modification of the arrangement of flues shown at the left of Fig. 1, the flues in this case extending from the forward and rearward faces of the oven structure to the center of the dividing or side walls. Fig. 5 is a vertical longitudinal section of a modified arrangement of flues shown in Fig. 3, in which the flues extend from the forward and rearward faces of the oven structure to the center of the dividing or side wall between two ovens. Fig. 6 is a vertical transverse section showing an arrangement of flues similar to that shown at the right of Fig. 1 but in which one series of flues arranged in a vertical plane is employed to heat the adjacent sides of two ovens, and Fig. 7 is a diagram to illustrate the effect of heating and coking chambers by means of side flues only and Fig. 8 is a diagram illustrating the effect in known ovens where the flues also extend around the ends of the ovens.

In the accompanying drawings the oven structures comprise coking chambers 1 having gas outlets 1^a (see Figs. 1 and 6), front and rear walls 2 and 3 respectively, and side or dividing walls 4. Formed in the front wall 2 of the structure and immediately at the end of the dividing walls 4 as shown in Fig. 2, is a common vertical outlet flue 5, and a common vertical air inlet flue 6, with which latter flue communicates, by means of a passage 7 controlled by a valve 8, each inlet arm 9 of the heating flues. The arms 9, according to the construction shown at the left of Figs. 1 and 2, proceed rearwardly along the side of one coking chamber to the end of the said coking chambers 1, and are each connected by a cross passage 10 formed in the dividing walls 4 with the outlet arm 9^a, which extends along the opposite side of an adjacent coking chamber, and in turn communicates at its forward end with the outlet flue 5 by means of a passage 11 controlled by a valve 12.

The inlet arm 9 of each heating flue is fitted at its forward end with a gas burner 13, and is connected as aforesaid with the air inlet flue 6, the forward end of each outlet arm being connected with the outlet flue 5, and the connection of the said outlet and inlet arms with their respective flues is such that considering one side of the coking chamber, the inlet arms 9 of the flues alternate in vertical series with the outlet arms 9^a of the next upper or lower adjacent flue. This arrangement of flues is clearly shown at the left of Fig. 1. As shown at the right of Figs. 1 and 2 and at Fig. 3, the heating flues instead of extending along one side of

a coking chamber and returning along the side of the adjacent coking chamber as in the construction shown at the left of Fig. 1, are arranged so that each side of each coking chamber is heated by an independent series of heating flues, and according to this arrangement the inlet arm 9 of the heating flue is arranged immediately above or below, as the case may be, the outlet arm 9^a of its flue, the said arms being connected at their rearward ends by a short vertical passage 10 in the side or dividing walls 4.

A single series of heating flues such as lastly described may be employed to heat the adjacent sides of two adjacent coking chambers, as illustrated in Fig. 6, in which case the thickness of the dividing wall between the coking chambers 1 is materially decreased.

Obviously, the heating flues may extend from the front wall to about the center of the structure and also another series extends from the rearward wall to about the center of the structure, so that with one set of flues the inlet arms will open on the front of the structure while the outlet arms will communicate with a vertical outlet flue in the front wall of the structure, and the rearward set of flues will have their inlet arms also opening at the rearward wall and their outlet arms communicating with a common vertical outlet flue in the rearward wall of the structure, a central partition in the dividing side wall of an oven separating these two forward and rearward sets of flues. Such a construction is illustrated at Fig. 4 in sectional plan with these two sets of forward and rearward flues respectively constructed on similar lines to those shown on the left hand side of Fig. 2, the two adjacent passages 10 in a side wall being divided the one from the other by the partition 14, and the other features of this construction are marked with letters corresponding to the left hand side of Fig. 2 and will therefore be readily understood.

At Fig. 5 in vertical section is shown an arrangement of the flues in vertical series similar to that illustrated and already described at the right hand side of Fig. 2, there being at Fig. 5 two sets of these flues opening on to the rearward and forward walls of the oven structure divided by a partition 14.

At the base of the oven as shown at Fig. 1 I arrange the lowermost heating flue so that its inlet arm 15 is level with or just above the top of the sole plate, while its outlet arm 16 is beneath it so that the communicating passage between the inlet arm and the outlet arm is vertical, and similarly on the other side of the oven, whereby the base of the charge is effectively treated.

In the constructions which I have described in illustrating my invention, it will

be observed that in no case do the heating flues pass around the ends of the ovens, and I would therefore explain that it is unnecessary that the flues should do so, because owing to the fact that the heat is equal on opposite sides of the oven, the coking proceeds toward the center, and this idea I have illustrated at Fig. 7 by the diagram plan where the small arrows *a* illustrate the heat proceeding from the sides of the oven toward the center, and then a cleavage forms in the central vertical plane *b b*. Where a flue passes around the ends of the oven also (as shown at Fig. 8) (which it does not in the present invention), then coking also proceeds from the ends as indicated by the small dotted arrows marked *c*, which in fact forms another plane of cleavage as shown by dotted lines marked *d* extending transversely of the central plane. With the arrangement according to the present invention as shown in Fig. 7, there is less liability to form small coke than is the case when the coking chambers are heated from the ends as shown in Fig. 8.

With the heating flues 9, 9^a arranged as has been described at Figs. 1 to 6, alternating in a vertical plane as regards the direction in which the heat travels, the amount of heat imparted to the coking chambers on each side is substantially equal, while with the arrangement dealt with in this specification, the length of the flues is lessened so that the travel of the heating medium is correspondingly shorter than if the said flues extended around the ends, and beyond this, the arrangement described presents constructional advantages, because the end walls of the ovens are materially strengthened, and the possible leakage of the by-products into the heating flues through cracks in the said flues is diminished inasmuch as the length of flue adjacent to the coking chambers is lessened.

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

1. Coking ovens comprising in combination vertical coking chambers surrounded by end and side walls, each side wall having a plurality of superposed two-armed U-shaped heating flues, the ends thereof extending adjacent to the exterior of the end wall of the structure, one end of each side wall having a vertical air inlet flue with which flue one arm of each U-shaped flue communicates, and a vertical outlet flue with which the other arm of each U-shaped flue communicates and through which the products of combustion from said heating flues pass, means in connection with each U-shaped heating flue to admit heating gas thereto, and means for controlling the passage of products of combustion through one or more of the U-shaped flues independent of the other U-shaped flues.

2. Coking ovens comprising in combination vertical coking chambers surrounded by end and side walls, each side wall having a plurality of superposed two-armed U-shaped flues extending from the forward end of said side wall to the end of the coking chamber, the forward end of each side wall having a vertical air inlet flue with which flue one arm of each U-shaped flue communicates, and a vertical outlet flue with which the other arm of each U-shaped flue communicates and through which the products of combustion from said heating flues pass, means in connection with each U-shaped heating flue to admit heating gas thereto, and means for controlling the passage of products of combustion through one or more of the U-shaped flues independent of the other U-shaped flues.

3. Coking ovens comprising in combination vertical coking chambers surrounded by end and side walls, each side wall having a plurality of superposed U-shaped heating flues, one arm of each of said heating flues forming the inlet to and the other arm the outlet from said flue, said inlet arms alternating in a vertical plane with said outlet arms of the adjacent heating flues, one end of each side wall having a vertical inlet flue and a vertical outlet flue and one arm of each heating flue connected by a passage with the vertical inlet flue and the other arm of each heating flue connected by a passage with the vertical outlet flue, a valve in connection with each passage to control the communication between said heating and vertical flues, each valve being adapted to be operated independent of the others, and means in connection with each U-shaped heating flue to admit gas thereto.

4. Coking ovens comprising in combination vertical coking chambers surrounded by end and side walls, each end of the side walls having a vertical air inlet flue and a vertical outlet flue, each side wall having a plurality of superposed two-armed U-shaped heating flues and one arm of each heating flue connected by a passage with the vertical inlet flue and the other arm of each heating flue connected by a passage with the vertical outlet flue, means in connection with each U-shaped heating flue to admit heating gas thereto, and means for controlling the passage of products of combustion through one or more of the U-shaped flues independent of the other flues.

5. Coking ovens comprising in combination vertical coking chambers surrounded by end and side walls, each side wall having a plurality of superposed two-armed U-shaped heating flues, the arms of each of which are arranged in the same vertical plane, one arm of each of said U-shaped heating flues forming the inlet to and the other arm thereof the outlet from said flue, said inlet arms

alternating in a vertical plane with said outlet arms of the adjacent flues, one end of each side wall having a vertical inlet flue and a vertical outlet flue and one arm of each heating flue connected by a passage with the vertical inlet flue and the other arm of each heating flue connected by a passage with the vertical outlet flue, means in connection with each U-shaped heating flue to admit heating gas thereto, and means for controlling the passage of products of combustion through one or more of the U-shaped flues independent of the other flues.

6. Coking ovens comprising in combination vertical coking chambers surrounded by end and side walls, each side wall having a plurality of superposed two-armed U-shaped heating flues, the two arms of each of said flues being arranged in a horizontal plane, one end of each side wall having a vertical air inlet flue and a vertical outlet flue, and one arm of each heating flue connected by a passage with the vertical inlet flue and the other arm of each heating flue connected by a passage with the vertical outlet flue, said inlet arms of said heating flues alternating in a vertical plane with said outlet arms of the adjacent flues, means in connection with each U-shaped heating flue to admit heating gas thereto, and means for controlling the passage of products of combustion through one or more of the U-shaped flues independent of the other flues.

7. Coking ovens comprising in combination vertical coking chambers surrounded by

end and side walls and closed at their lower ends by means of sole plates, one end of each of the side walls having a vertical air inlet and a vertical outlet flue, each side wall having a series of superposed two-armed U-shaped heating flues, one arm of each of which forms the inlet to and the other arm the outlet from said heating flue, one end of each side wall having a passage connecting one arm of each U-shaped heating flue with the vertical inlet flue and a similar passage connecting the other arm of each U-shaped heating flue with the vertical outlet flue, each said side wall having a U-shaped heating flue located below said series of heating flues, one arm of which heating flue is located above the upper surface of said sole plate, the other arm of which is located below the upper surface of said sole plate, the end of said side wall having a passage connecting the upper arm of said lower heating flue with the vertical inlet flue and a similar passage connecting the lower arm of said flue with the vertical outlet flue, means in connection with each U-shaped heating flue to admit heating gas thereto, and means for controlling the passage of products of combustion through one or more of the U-shaped flues independent of the other flues.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

ARTHUR OWEN JONES.

Witnesses:

H. NIXON,

ALFRED BOAZMAN.