W. J. KEARNS.

COKE OVEN.

APPLICATION FILED MAR. 27, 1909.

956,974.

Patented May 3, 1910.

2 SHEETS—SHEET 1.

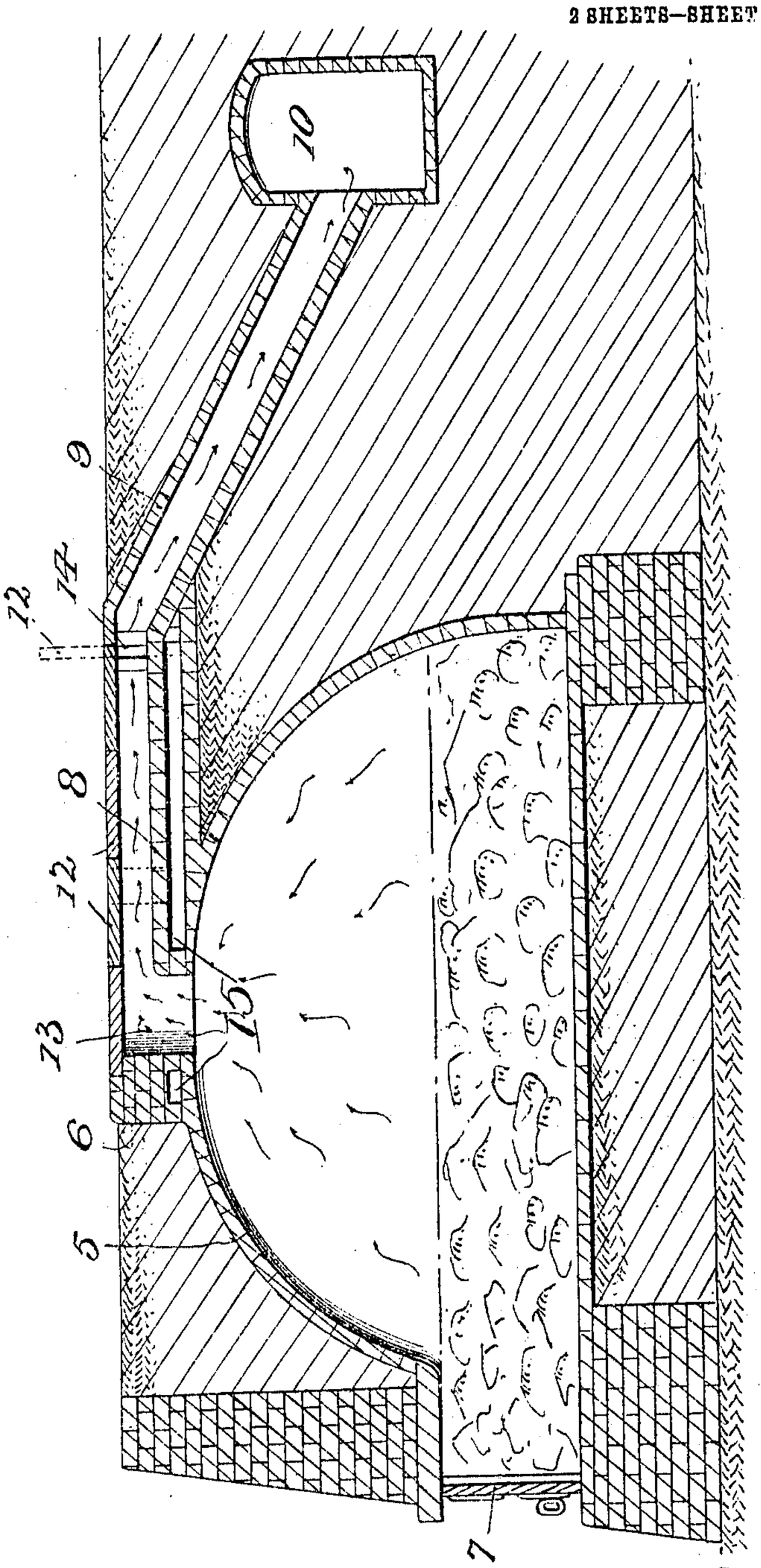

Fig. 1.

Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

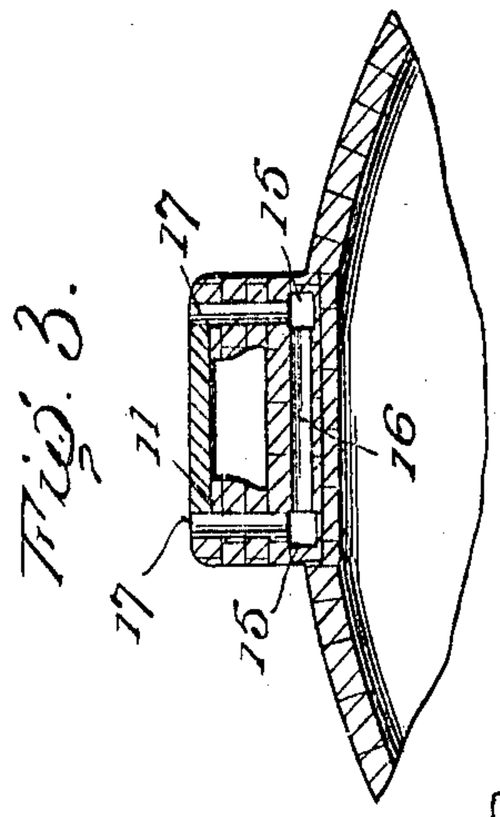


Fig. 4.

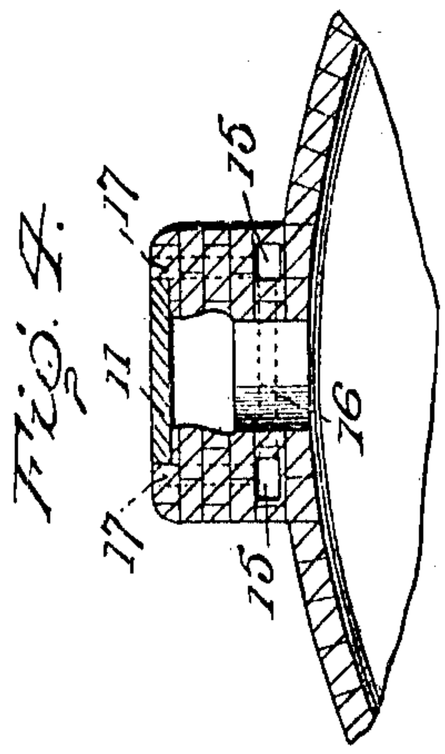
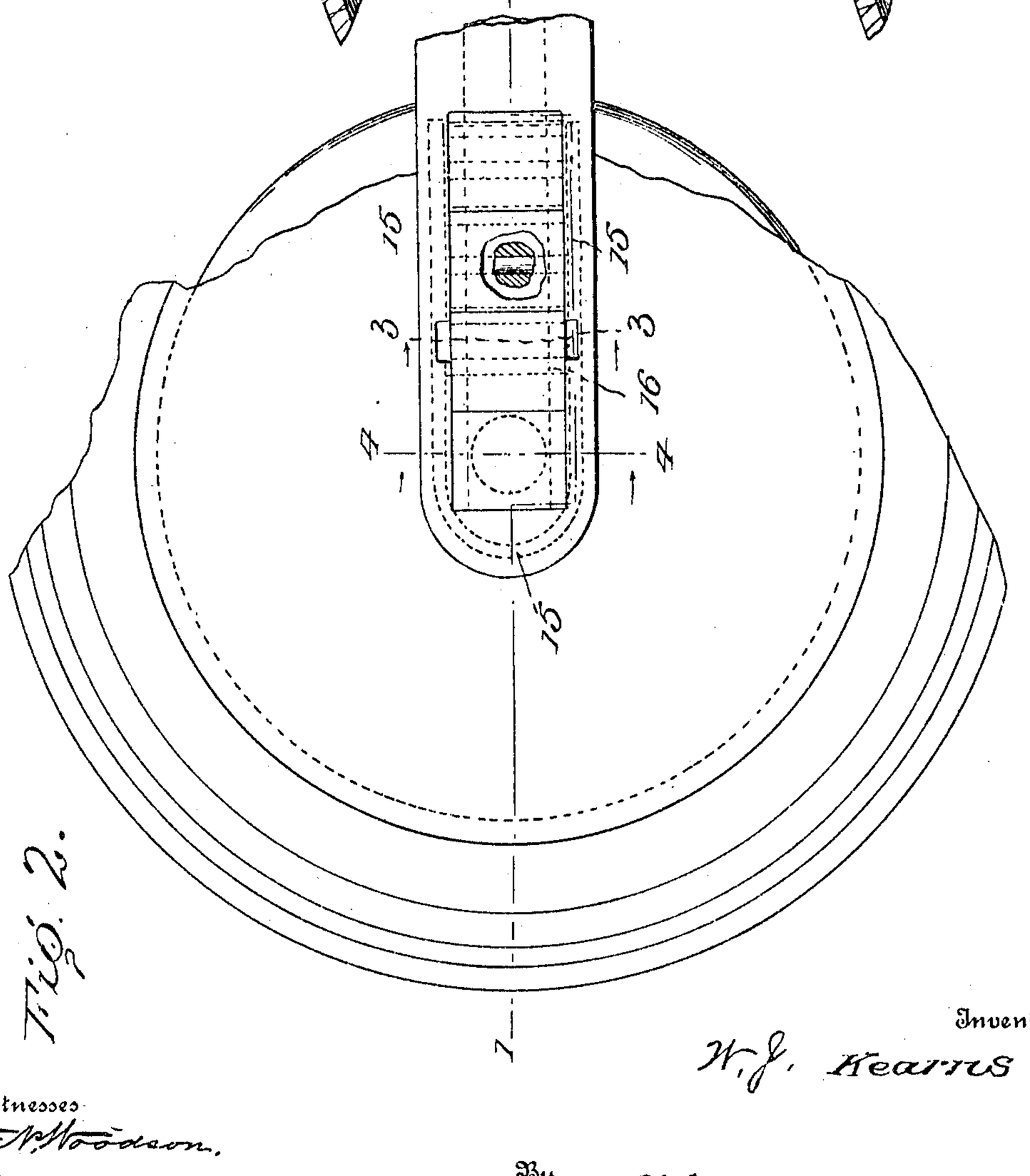


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

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COKE-OVEN.

956,974. Specification of Letters Patent. Patented May 3, 1910.

Application filed March 27, 1909. Serial No. 486,159.

To all whom it may concern:

Be it known that I, WILLIAM J. KEARNS, citizen of the United States, residing at Fairchance, in the county of Fayette and State of Pennsylvania, have invented certain new and useful Improvements in Coke-Ovens, of which the following is a specification.

This invention relates to coke ovens and more particularly to means for drawing off the products of combustion from said ovens and utilizing the waste heat for generating steam or for other industrial purposes.

The object of the invention is to provide a coke oven having a flue or conductor communicating with the interior of the oven at the tunnel head thereof for directing the waste heat from the incandescent bed of fuel to a steam generator, or other suitable source of discharge, means being provided for closing the conductor so as to prevent the passage of cold air through the oven to the boiler when drawing the oven.

A further object of the invention is to provide means for maintaining a circulation of air beneath the flue or conductor thereby to prevent the intense heat of the oven from melting or otherwise injuring said conductor.

A still further object of the invention is generally to improve this class of devices so as to increase their utility, durability and efficiency.

Further objects and advantages will appear in the following description, it being understood that various changes in form, proportions, and minor details of construction may be resorted to within the scope of the appended claims.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a longitudinal sectional view of a coke oven constructed in accordance with my invention, taken on the line 1—1 of Fig. 2. Fig. 2 is a top plan view of the oven. Fig. 3 is a transverse sectional view taken on the line 3—3 of Fig. 2. Fig. 4 is a similar view taken on the line 4—4 of Fig. 2.

Corresponding and like parts are referred to in the following description and indicated in all views of the accompanying drawings by the same reference characters.

The mechanism employed for drawing off the products of combustion, is shown, by way of illustration in connection with a beehive type of coke oven in which 5 designates the crown, 6 the tunnel head and 7 the oven door, through which the coke is withdrawn from the interior of the oven, in the usual manner.

Disposed above the crown 5 of the oven and preferably formed of fire brick or other refractory material is a flue or conductor 8, one end of which is extended downwardly at 9 and communicates with a main flue 10 leading to a steam generator so that the products of combustion from the interior of the oven may pass through the conductor 8 and main flue 10 to the boiler, and utilized for the purpose of generating steam.

The opposite vertical walls of the conductor 8 at the horizontal portion thereof are provided with ledges 11 which form a support for a plurality of removable slabs or tiles 12, the latter being also preferably formed of refractory material in order to successfully resist the intense heat of the oven. One of the slabs 12 is positioned over the central opening 13 in the tunnel head 6 and forms a closure for the crown of the oven thereby to prevent the admission of air into the interior of the oven during the formation of the coke.

Vertically disposed grooves 14 are preferably formed in the opposite side walls of the conductor 8 for the reception of one of the removable plates or slabs 12, which plate or slab when positioned in the grooves 14 constitutes a valve and serves to control the passage of the products of combustion from the coke oven to the steam generator. Thus it will be seen that when one of the slabs or plates 12 is positioned in the grooves 14, the door 7 may be opened to permit the withdrawal of the coke from the interior of the oven without creating a draft in the flues 9 and 10, which passage of air would have a cooling effect on the generator and thus reduce the pressure of steam in the boiler.

Disposed beneath the bottom of the flue 8 at the horizontal portion thereof are spaced longitudinally disposed air passages 15 which encircle the tunnel head 6 at the

opening 13 therein and are connected by a plurality of transverse passages 16, there being vertically disposed flues or passages 17 formed in the opposite side walls of the conductor 8 and in communication with the longitudinal passages 15 so as to permit the free circulation of air through the several passages and beneath the bottom of the conductor 8 thereby to cool said conductor and thus prevent the intense heat from the incandescent body of fuel within the oven from melting or otherwise injuring said conductor.

Attention is herewith called to the fact that the inner end of the conductor 8 extends through the walls of the tunnel head 6, thus obviating the necessity of cutting one or more openings in the crown of the oven for the purpose of drawing off the products of combustion. It will also be noted that the conductor 8 is disposed at the ground line and in convenient position to effect any necessary repairs thereto, the interior of the flue 8 being exposed by removing one or more of the slabs or tiles 12.

When it is desired to charge the oven, one of the slabs 12 is removed from the ledge 11 and positioned in the grooves 14 thus cutting off the passage of the products of combustion through the conductor to the steam generator. The slab 12 above the central opening 13 is then removed and positioned on the ledge 11 adjacent the grooves 14, and the coal or other fuel introduced through the opening 13 into the interior of the oven in the usual manner.

After the oven has been charged, the valve or slab 12 is removed from the grooves 14 and again placed in position on the ledge 11 so as to permit the waste heat due to the combustion of the fuel in the oven to pass through the conductor 8 and main flue 10 to the steam generator, in the manner before described.

When withdrawing a charge of coke from the interior of the oven one of the plates or slabs 12 is removed from the top of the flue 8 and positioned in the grooves 14 after which the door 7 is opened and the coke in the oven withdrawn through the opening in the usual manner, the slab or valve 12 serving to prevent the passage of cold air through the interior of the oven to the steam generator during the drawing operation.

If desired, suitable baffle plates may be disposed in one or more of the transverse passages 16 for the purpose of retarding the passage of air through the same to the outlets 17.

While the conductor is shown in connection with a beehive type of coke oven, it will of course be understood that the same may be applied to other styles of coke ovens or to a battery of said ovens without departing from the spirit of my invention. It will also be understood that if necessary to admit cold air into the flue leading from the oven to the main flue, in order to promote combustion of gases, it may be done by connecting air passages with said flue at any desired point or points.

Having thus described my invention, what is claimed, is:

1. A coke oven including a combustion chamber and having a tunnel head provided with a feed opening, the walls of the tunnel head being formed with an air passage partially surrounding the feed opening therein, a conductor communicating with the combustion chamber at said feed opening and having its bottom wall provided with intersecting longitudinal and transverse air passages communicating with the air passage surrounding the feed opening and also with the atmosphere but separated from and independent of the interior of said combustion chamber and conductor respectively, to permit the circulation of cold air within said passages without coming in contact with the products of combustion in either the chamber or conductor.

2. A coke oven including a combustion chamber and having a tunnel head provided with a feed opening, a conductor communicating with the interior of the coke oven at said feed opening and having its walls provided with vertical air passages in communication with the atmosphere, there being a plurality of intersecting longitudinal and horizontal air passages formed in the bottom of said conductor and partially encircling the tunnel head, all of said passages being separated from and independent of the combustion chamber and conductor respectively, thereby to permit the circulation of cold air within said passages without coming in contact with the products of combustion in either the chamber or conductor.

3. A coke oven including a combustion chamber and having a tunnel head provided with a circumferential air passage and a central feed opening, a main flue spaced from the oven and disposed in a plane below the feed opening, a downwardly inclined conductor forming a source of communication between the main flue and tunnel head at the feed opening therein, there being a plurality of intersecting longitudinal and transverse air passages formed in the bottom wall of the conductor and communicating with the air passage in the tunnel head, vertical openings formed in the opposite side walls of said conductor and communicating with the longitudinal and transverse passages and also with the atmosphere, and a plurality of removable slabs forming the top wall of the conductor, one of said slabs form-

ing a closure for the feed opening and another constituting a valve for controlling the products of combustion to the main flue, said passages in the conductor and tunnel head being separated from and independent of the combustion chamber and conductor respectively, to permit the circulation of cold air within said passages without commingling with the products of combustion in either the chamber or said conductor.

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

WILLIAM J. KEARNS. [L. S.]

Witnesses:

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