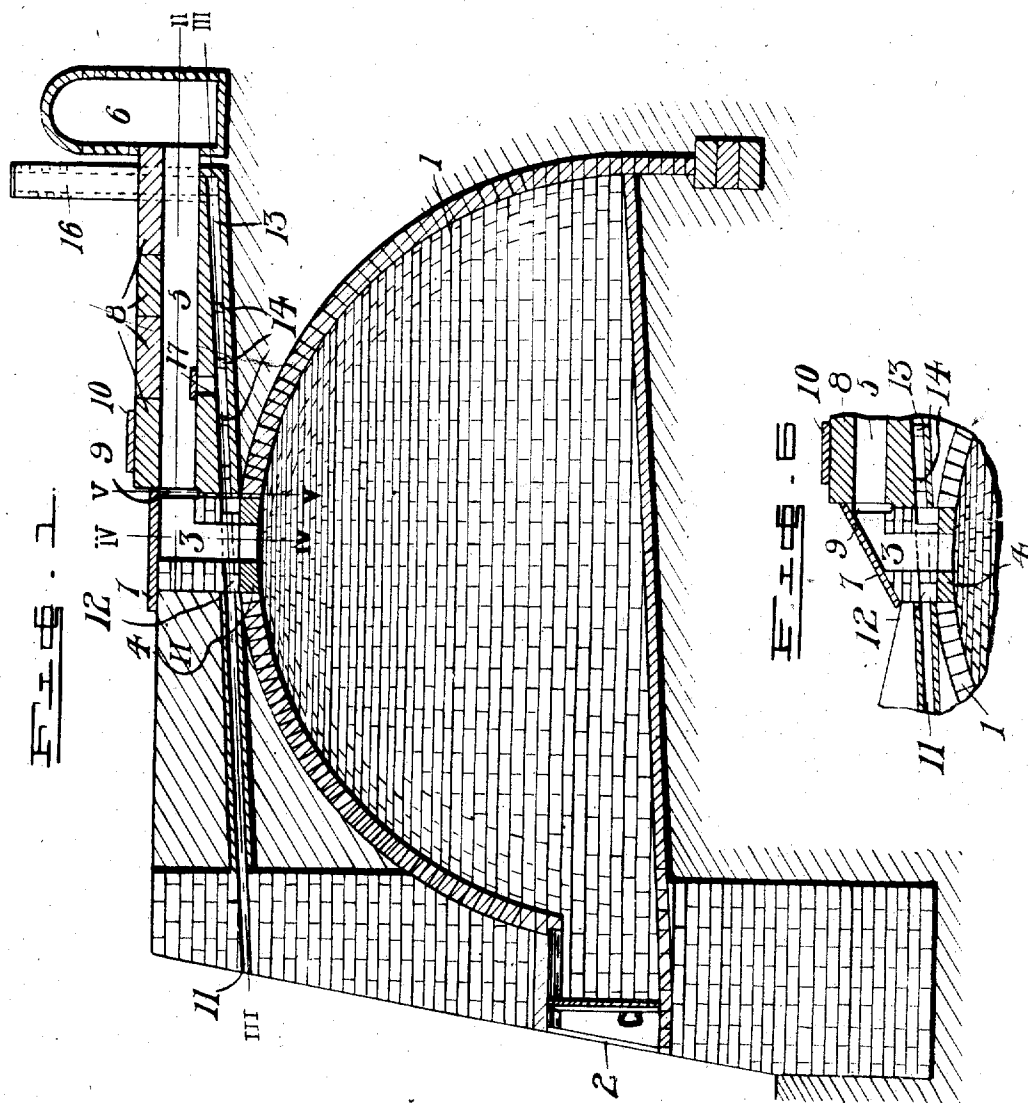


COKE OVEN.

987,993.

2 SHEETS—SHEET 1



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COKE OVEN.
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2 SHEETS—SHEET 2.

FIG. 2

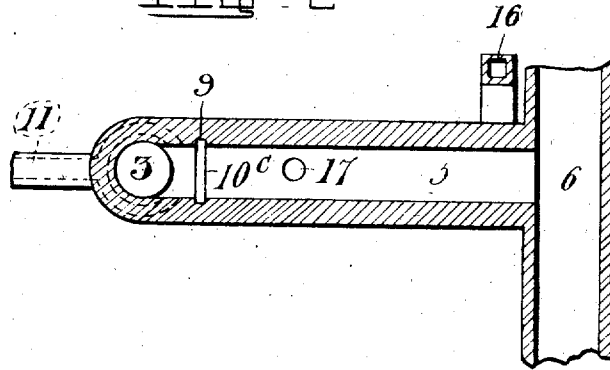


FIG. 3

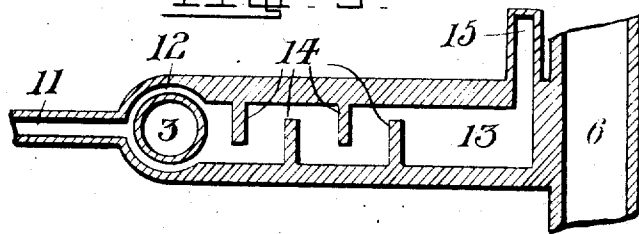


FIG. 4

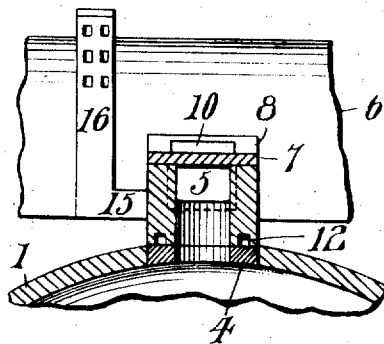
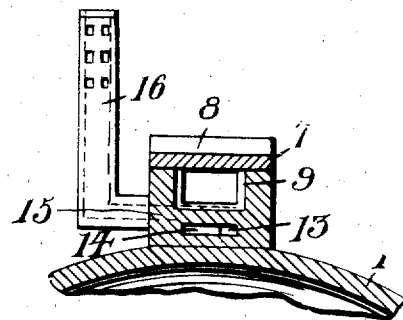


FIG. 5



WITNESSES

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COKE-OVEN.

987,993.

Specification of Letters Patent.

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To all whom it may concern:

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

My invention relates to coke-ovens and similar devices, and consists in new and improved means for conserving and leading off the gaseous products of combustion for use in the generation of steam and for other purposes.

I provide means for regulating the flow of gas through the discharge passage, so that when the oven is being charged or drawn, the entrance of cold air into said passage is prevented. I also provide means for adding to the gas flowing through said passage such quantity of air as may be required for its proper combustion.

I also provide new and improved means for preventing the burning out or disintegration of the trunnel-head of the oven, the gas passage and adjacent portions of the oven structure, consisting of an air-passage leading from the front of the oven and communicating with other air-chambers surrounding the trunnel head and beneath the floor of the gas passage. These elements are so constructed and arranged that a constant current of air or other cooling medium is maintained therethrough. The air-passage is preferably constructed to incline inwardly and upwardly to facilitate the entrance of air from outside.

In the accompanying drawings, Figure 1 is a longitudinal section of a bee-hive coke oven fitted with my invention; Fig. 2 is a horizontal section along the line II—II in Fig. 1; Fig. 3 is a similar section along the line III—III in Fig. 1; Fig. 4 is a vertical section along the line IV—IV in Fig. 1; Fig. 5 is a similar section along the line V—V in Fig. 1, and Fig. 6 is a detail vertical section similar to Fig. 1 and showing a modification of the trunnel-head construction.

The following is a detailed description of the drawings, which are, however, merely illustrative of a practical embodiment of my invention and not intended to limit the same to the exact structure shown.

I have illustrated my invention in connection with the ordinary "bee-hive" type of

coke-oven but it will be readily understood that it ~~equally~~ ^{equally} well be applied to any other type of oven or retort, such, for instance to the by-product oven or the type of oven open at both ends for the operation of the mechanical "pusher."

1 is the coke oven provided with the usual door 2, through which sufficient air is admitted for the purpose of combustion.

3 is the trunnel or crown opening and 4 is the trunnel-ring forming the bottom of the opening 3 and upon which brick wall of the upper portion of the opening rests. 5 is a gas passage leading from said opening 3 adjacent to its top to the general gas flue 6 which leads the products to the boiler room or other destination. The side walls of the flue 5 are of brick, while bottom and top of the flue are formed of tile.

7 is a slidable plate adapted to close the top of opening 3 and to be slid aside when the oven is to be charged or allowed to cool. The top of flue 5 is composed of a series of thick tile 8—8, against the end of the forward tile of which series the tile or plate 7 abuts when in place to close opening 3.

9—9 are vertical grooves in the inner faces of the side walls of passage 5 just in advance of the forward tile 8, so that, when it is desired to cut off the passage 5 to prevent the passage of cold air through said flue when, for instance, the oven is being drawn, all that is required is to slide the tile 7 forwardly a short distance and insert a tile 10 downwardly with its edges engaging the grooves 9—9. The said tile 10 is shown in Fig. 1 laid upon the top of the flue 5 in its inoperative position.

11 is an air passage, walled with brick, having its mouth at the front of the oven and leading inwardly and upwardly to discharge into an annular chamber 12 surrounding the brick wall of opening 3 above the trunnel-ring 4, the trunnel-ring being preferably of sufficient width to form also the bottom of said chamber 12. The chamber 12 in turn discharges into a chamber 13 which is located beneath the floor of flue 5. To cause a lateral circulation of the cooling medium while passing through chamber 13, I provide a series of staggered baffles in said chamber extending from the side walls thereof, marked 14—14. These baffles, 14—14, extend from top to bottom of the chamber and serve also to support the bottom tile of the flue 5, which tile preferably

extend the full width of the flue. At the rear of chamber 13, the cooling medium passes to a lateral flue 15 which extends beyond the plane of flue 5 and discharges into a vertical chimney or stack 16 which carries off the heated air at an elevation to promote the draft. I prefer to incline the passage 11 from the front upwardly toward the rear to facilitate the draft. The chamber 13 may also be inclined in the same direction and for the same purpose. I prefer also to provide means for admitting air, when desired to promote combustion of the gas, into the flue 5 by means of a port 17 which, when not in use, may be closed by a removable tile.

I find that the use of a relatively thick tile for the top of passage 5 is a positive advantage over the usual practice of bricking the top of said passage and covering the same with a thick layer of earth. The latter method results in burning out the top of the flue but the thick tile, without an earth covering, radiate enough of the heat to prevent injury to the tile without harmfully cooling the gas in the flue.

In Fig. 6 I have shown a slight modification wherein the trunnel-head opening is inclined so that the movement of tile 7 in opening the trunnel head is facilitated.

My invention can be applied to any coke-oven at less expense than that of constructing the usual gas passages and the arrangement of cooling means prolongs the life of the structure indefinitely.

What I desire to claim is—

1. In a coke-oven, a gas flue communicating with the trunnel-head, a cooling chamber beneath said flue, and an air-passage leading from the front of the oven into said cooling chamber.

2. In a coke-oven, a gas flue communicating with the trunnel-head, a chamber be-

neath said flue, means for introducing a cooling medium into said chamber from the front of the oven and withdrawing said cooling medium at the rear of the oven.

3. In a coke-oven, a gas flue communicating with the trunnel-head, a cooling chamber surrounding said trunnel head below said flue, an upwardly inclined passage leading from the front of said oven into said cooling chamber, a second cooling chamber beneath said flue communicating with said first cooling chamber, and an outlet flue at the rear of said second cooling chamber.

4. In a coke-oven, a gas flue communicating with the trunnel-head, an annular cooling chamber surrounding said trunnel-head below said flue, a second cooling chamber beneath said flue and communicating with said first chamber, an upwardly inclined passage leading from the front of the oven into said first cooling chamber, and an elevated escape passage for said cooling medium at the rear of said second chamber.

5. In a coke-oven, a gas flue communicating with the trunnel-head, an annular cooling chamber surrounding said trunnel-head below said flue, a second cooling chamber beneath said flue and communicating with said first cooling chamber, an upwardly inclined passage leading from the front of the oven into said first cooling chamber, an elevated escape passage for the cooling medium at the rear of said second cooling chamber, and baffles in said second chamber to regulate the current of said cooling medium.

Signed at Pittsburg, Pa., this 2nd day of August, 1910.

WILLIAM J. KEARNS.

Witnesses:

EDWARD A. LAWRENCE,
J. H. HARRISON.