

W. W. MACFARREN.
COKE OVEN DOOR.
APPLICATION FILED AUG. 24, 1910.

1,045,864.

Patented Dec. 3, 1912.

FIG. 1

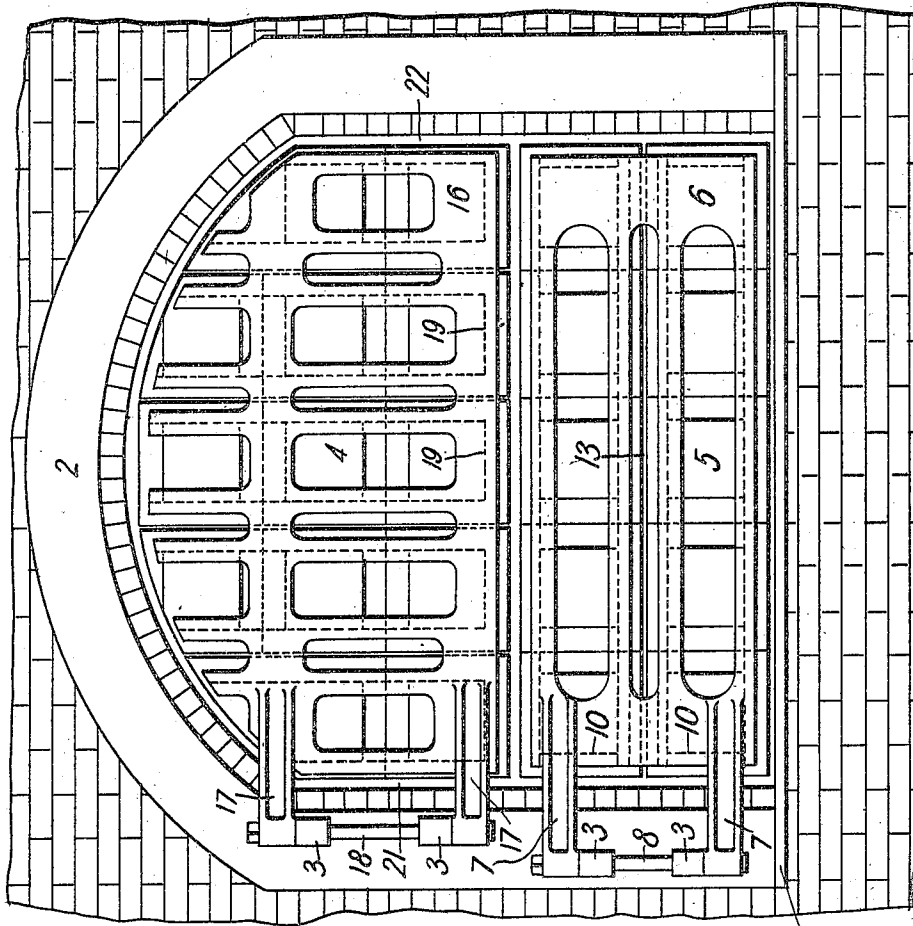


FIG. 2

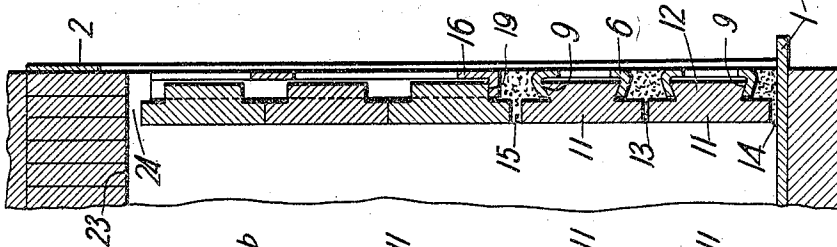
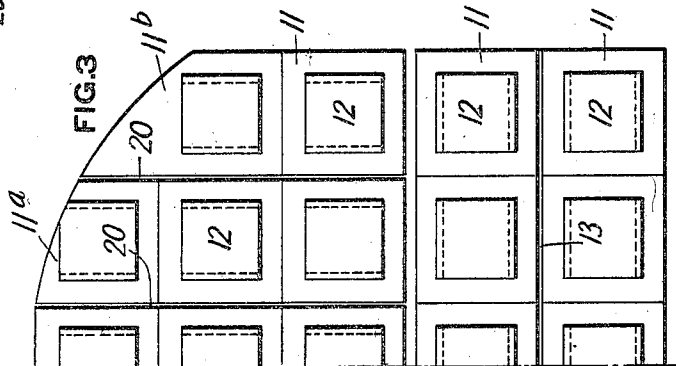


FIG. 3



WITNESSES

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COKE-OVEN DOOR.

1,045,864.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WALTER W. MACFARREN, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Coke-Oven Doors, of which the following is a specification.

My invention relates to coke oven doors suitable for any style oven.

The drawings show a door adapted more particularly for a rectangular or "Belgian" oven, but my invention may be equally well applied to "bee-hive" ovens. I have shown a door in two sections, but it is obvious that it could be made as a single door by combining the two sections shown or as a door in four sections by sub-dividing the sections shown, all of these arrangements being in common use.

The specific object of my invention is to provide a door in which the bricks used will not be readily disintegrated by expansion and contraction. The construction of a cheap and durable coke oven door is a difficult matter, owing to the intense heat on the door when in use and the fact that these doors are cooled to nearly atmospheric temperature when the ovens are drawn.

A good coke oven door must possess the following characteristics:

1st. Cheapness: (a) The frame must be light and strong. (b) The bricks must be simple in shape and easy to place.

2nd. Durability: (a) The metal frame must be completely protected from the direct action of the fire. (b) The bricks must be supported in such a manner that strains will not be set up in them or in the frame by changes of temperature and that no sliding action of the bricks on each other can occur.

My invention comprises, therefore, means for accomplishing the desired results above and more particularly the latter.

Referring to the drawings Figure 1 is an elevation of a complete door according to my invention showing it in position on the oven and closed. Fig. 2 is a vertical sectional elevation of the same, and Fig. 3 is the rear view of half the door, showing the bricks only with the metal frame removed.

Numeral 1 indicates the door plate, and the numeral 2 a door frame which may be secured in any suitable manner to the face of the oven. The door frame 2 is provided

with lugs 3 to which are hinged the upper door section 4 and the lower door section 5. The lower door section 5 is composed of a metal frame 6 having the arms 7 which latter are connected to the lugs 3 by means of a bolt 8-forming a hinge for the door. The metal frame 6 may be of any desired construction, either in one piece as shown or in several pieces secured together in any desired manner. The frame 6 is provided with dove-tailed grooves 9. One end of the dove-tailed grooves 9 is closed by a lip 10 and the other end is left open for the insertion of the bricks 11. The bricks 11 are of any desired size, being in the design shown about 10 x 11" x 2 1/4". The bricks 11 are provided at their rear side with a dove-tailed lug 12 which is a loose fit in the dove-tailed groove 9 of the frame 6. The bricks 11 for the lower door section 6 comprise two horizontal rows, there being shown five bricks in each row. These bricks are successively slipped into the dove-tailed grooves 9, one against the other. The size of the bricks is such, and the space between the grooves 9 is such, that a clearance space 13 is left between the edges of the bricks in adjacent rows. Clearance space 14 is also left between the lower edge of the lower row of bricks and the door plate 1, and a clearance space 15 is left between the upper edge of the lower door section and the lower edge of the upper door section. The frame 16 for the upper door section is provided with arms 17 connected by a bolt 18 to the upper lugs 3. The upper frame 16 is similar to the lower frame 6 and differs from it chiefly in the fact that the dove-tailed grooves for the bricks are vertical instead of horizontal. The bricks 11 are duplicates of the bricks in the lower door section. The brick 11^a is the standard brick 11 chipped to the contour shown and the brick 11^b is a special brick. In the upper door section the lower row of bricks rests on lips 19 formed on the frame 16. The other rows of brick rest on the lower row and on each other. A clearance space 20 is left between the vertical rows of brick in the upper section. A clearance space 24 is also left between the upper edges of the bricks in the upper door section 16 and the arch 23 in the oven wall, this opening being used for the admission of air to burn the charge of coal as is well understood. The clearance spaces 13, 14, 15 and 20 and the clearance spaces 21 and

22 at the sides of the door are luted with clay to prevent the ingress of air. The doors are, of course, luted each time the oven is drawn. It will be observed that by reason of the projection 12 of the bricks 11 having a loose fit in the dove-tailed grooves of the frames 6 and 16, that they are free to move end-wise in the grooves. It will also be seen that since the adjacent rows of brick are not set tightly together, but are provided with clearance spaces between them that each brick may expand in a direction at right angles to the dove-tailed grooves supporting it with perfect freedom. It will thus be seen that I have provided means for holding the bricks in their frames in a secure manner and at the same time have allowed the necessary freedom for expansion and contraction, and further that the door is easily made air tight by luting as described.

It is obvious that various modifications of the design shown may be made without departing from the spirit of my invention, all of such changes and modifications being within the province of those skilled in the arts of building and operating coke ovens, and I therefore, do not wish to be confined to the precise construction and arrangements of parts shown, but desire to claim and hold as mine all the patentable subject matter covered by the following claims.

I claim—

1. In a coke oven door, a metal frame, a protective lining therefor made of refractory material, said lining being loosely mounted on said frame so as to permit of free expansion and contraction in all directions.

2. In a coke oven door, a metal frame, a sectional refractory lining therefor, and means for loosely mounting the sections of said lining, so they can expand or contract freely with reference to each other or to the frame.

3. In a coke oven door, a metal frame, fire brick supported thereby in rows, the bricks

in adjacent rows being set with sufficient initial clearances to permit of free expansion between the adjacent rows of bricks, and the bricks in each row being set in contact with each other and set loosely in said frame so that they can expand freely in the direction of the length of the row.

4. In a coke oven door, a metal frame and a fire brick lining therefor, comprising bricks arranged in parallel rows, clearance between adjacent rows of bricks, supports loosely engaging said bricks, and arranged to permit free expansion of the bricks lengthwise of the rows.

5. In a coke oven door, a metal frame, a protective lining therefor comprising fire brick so set as to form a substantially flat unbroken surface for the inside of the door, and means for loosely supporting said brick so as to allow of their free expansion in all directions.

6. In a coke oven door, a metal frame, grooves formed on the inner side thereof, a fire brick lining for said door, and projections on the back of the bricks engaging said grooves to hold the bricks in place, the whole arranged to permit of free expansion of the bricks in all directions.

7. In a coke oven door, a metal frame, and a fire brick lining therefor comprising individual bricks loosely mounted on said frame so as to allow of free integral expansion of all the bricks in all directions and free movement of all the bricks with reference to the frame in one direction.

8. In a coke oven door, a metal frame and a fire brick lining therefor comprising individual bricks so spaced apart that the clearance between any two bricks when cold will be at least equal to their combined lineal expansion toward each other when hot.

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Witnesses:

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