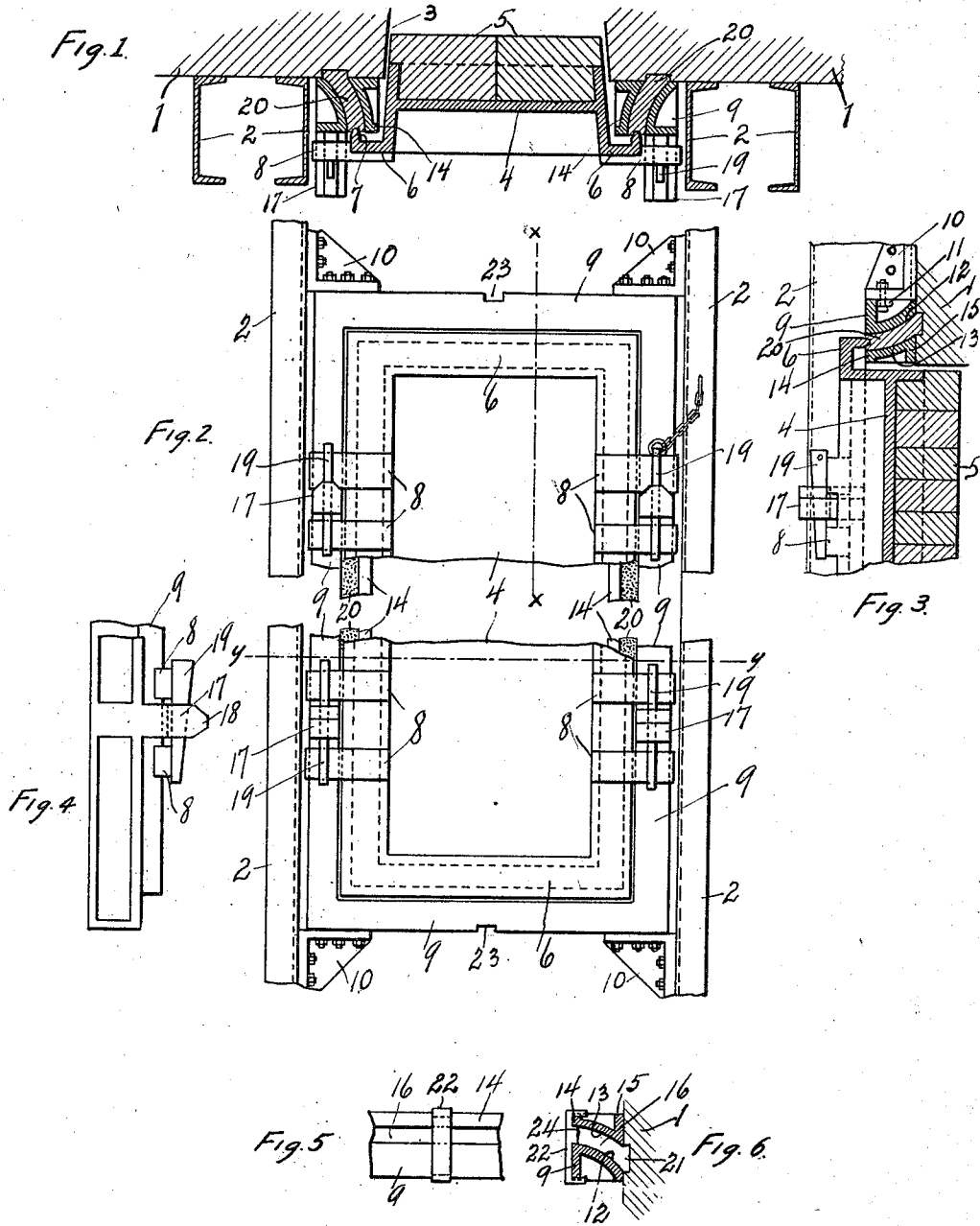


P. L. DAY.
SEALING MEANS FOR DOORS.
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SEALING MEANS FOR DOORS.

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To all whom it may concern:

Be it known that I, PATRICK L. DAY, a citizen of the United States of America, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Sealing Means for Doors, of which the following is a specification.

My invention relates to a new and effective means for sealing the joints between the doors and frames and between the door frames and walls of retort coke ovens, and especially doors of rectangular coke oven batteries in which the door frame must be mounted without the opening through which the coke is forced out of the retort. The difficulty in sealing such coke oven doors lies in the fact that it is impractical to anchor the door frames to the brick walls of the oven because the inner walls are filled with passages, and even if a bolt might be anchored in them the heat at times is so high that it would oxidize rapidly. The only practical way of mounting the door frames on the outer walls of the oven is by attaching them to the buck stays or similar metallic frame work, and it will be evident that this will have a different co-efficient of expansion and contraction from the brick furnace and that it will necessitate the packing of the joint between the frame and the wall as well as between the door and the frame. I have found that this packing is most effectively obtained by the provision of a double door frame comprising inner and outer frame sections which are spaced and are not rigidly connected to each other or to the oven wall and which therefore are independent sections leaving a packing space between them extending outwardly from the oven wall. This packing space surrounds the oven door opening and is spaced from its outer marginal edges. When packing is seated in this space, the outer exposed edge of the packing strip receives an inward thrust from the inwardly moving oven door which thus seals the joints between the frame and the door on one side and the oven wall on the other side. The packing space should be continuous between the distinct and relatively movable door frame sections and I prefer to use the packing itself as the means for holding the inner unattached frame section in relative position to the outer frame section, and to this end the packing space is

struck on a curve in a horizontal transverse plane.

My invention comprises other details of construction and arrangement of parts which in their preferred embodiment are hereinafter more particularly described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a horizontal cross-sectional view taken on the line $y-y$ of Fig. 2. Fig. 2 is a front elevation of the door and frame broken away. Fig. 3 is a vertical sectional view taken on the line $x-x$ of Fig. 2. Fig. 4 is a detail view in side elevation of the door frame and door fastening means. Figs. 5 and 6 are detail plan and sectional views of a spacing clamp for the door frame sections to hold them in position to receive the packing.

Similar reference numerals refer to similar parts throughout the drawings.

In accordance with the requirements of law, I have illustrated only what I regard as the preferred embodiment of my invention which I have shown in connection with a by-product coke retort where the sealing of the door is subjected to the most trying conditions, namely, alternate suction and pressure in the presence of heat.

The oven walls 1 are surrounded by spaced pairs of buck-stays 2 and have the usual door openings 3, which are necessarily equal in size to the vertical cross section of the oven itself and left unobstructed by the door frames which would be likely to interfere with the coke being ejected bodily through the oven door. The door 4, for closing these openings, may be of any suitable construction having its inner face which projects into the door opening lined with a fire brick 5 and having about its marginal edge a flange 6, the outer edge of which is inturned and beveled to form a continuous lip 7 which is spaced several inches from the outer marginal edge of the door opening. At opposite points on the door 1 fasten pairs of spaced straps 8 which overlap the door frame and are adapted to be engaged by the door fastening means hereinafter described.

The door frame, according to my preferred construction, is formed in two parts, the outer frame 9 being rigidly fastened at top and bottom by angle irons 10 to the buck-stays of adjacent pairs, the angle irons being bolted or riveted to the buck-stays and

to the door and serving to hold the outer frame rigidly in position relatively to the buck stays or bracing frame work about the oven. For the purpose of receiving the bolts or rivets of the angle irons, the outer frame is provided with perforated lugs 11, as seen in Fig. 3. The inner side wall 12 of the frame 9 curves inwardly away from the door opening as indicated in the sectional view, Figs. 1 and 3. The outer side wall 13 of the inner door frame 14, which it will be noted, is free of rigid connection to the outer frame or the oven, is correspondingly curved and is provided with an inner flange 15 which lies flat against the wall 1 which is also engaged by the inner end of the side 12 of the outer frame. The walls 12 and 13 of the door frame sections provide between them a continuous packing space 16 (Fig. 6) which extends about the inner door frame and is preferably curved in cross-section. The outer frame 9 is provided with integral outwardly projecting lugs 17 which have their outer ends 18 tapered to a point and which are spaced so that each will project between a pair of straps 8. The lugs 17 are vertically slotted to receive a tapered key 19 which spans a pair of adjacent straps 8 and when driven home wedges them and the door to which they are attached into position. It will be noted that the continuous intumed lip 7 surrounding the door stands opposite the space 16 which receives the packing. It therefore follows that when packing 20 is introduced into this space 16, the lip 7 of the door will be pressed against it to seal the door. It will be noted also that this packing will extend continuously through the curved space 16 and will engage the wall 1 which has its irregular brick surface preferably cut away slightly to form a channel 21 which furnishes a smooth and uniform surface against which the inner end of the packing is pressed. The packing as thus applied will effectively seal the joint between the door frame and the furnace walls, which joint is the one most difficult to pack and which is always more or less open, due to the difference in expansion and contraction between the metallic frame work and the oven proper. This packing may be of any available material which is suitable for the particular conditions under which it is used. I prefer in retorts and ovens where conditions of high heat exist to make this packing of asbestos or similar fire proof packing material which will form a hard non-combustible packing. This packing may be forced into the space 16 in any suitable manner. To facilitate this operation, I provide clamps 22 which are adapted to seat in grooves 23 cut at opposite points in the door frame sections 9 and 14. The ends of the clip overhang the outer edges of the door frame sections and it has an intermediate

spacing shoulder 24 which is inserted between the walls 12 and 13 and holds them properly spaced. After the packing 20 has been rammed in, it will serve to lock the inner door frame 14 in position as its outer curved wall 13 cannot move outwardly without crushing the packing interposed between it and the wall 12 of the outer frame which is rigidly fastened to the buck-stays. As the packing wears and has to be replenished, this may be done from the outside by less expensive packing material which may or may not be of the non-combustible type. It will be noted that the application of pressure to force the door against the packing to seal it will at the same time urge the packing inwardly through the space 16 and against the furnace oven wall, thus insuring a perfect packing.

I do not desire to limit myself to any particular packing composition, nor to the particular construction of the door frame sections, and especially the inner section thereof.

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

1. Means for sealing the doors of retort coke ovens which comprise a door frame connected to the metallic frame work of the oven and held thereby against the outer oven wall at a point spaced from the outer marginal edge of the door opening, packing interposed between the wall of the furnace and the outer edge of said frame and extending continuously about the inner side wall of said frame, a door, and means to swing said door into the opening in said frame and against said packing to force the latter against the wall of the oven and seal both the joints between the frame and the door and oven.

2. Means for sealing the doors of retort coke ovens comprising two rectangular door frames adapted to set against the outer oven wall beyond the outer marginal edge of the oven door opening, the inner frame being free of rigid connection either to the outer frame or the oven, a continuous body of packing interposed in the space between the two rectangular frames and extending inwardly to engage the oven wall, and an inwardly movable door adapted to close the oven opening and to engage said packing, forcing it inwardly against the oven wall, substantially as described.

3. In combination with a retort coke oven having external metallic reinforcements, of a means for sealing the door opening of the oven comprising a door, a main door frame which is disposed without the oven opening and against the outer wall of the oven, means to connect said frame to the metallic reinforcements, an inner frame disconnected from the door opening, and a packing interposed in the space between said frames,

which packing extends continuously about the door opening and contacts with the outer wall of the oven and with the inner wall of the door when the latter is in closed position.

4. A sealing means for retort coke ovens which have a door opening and external buck stays, said sealing means comprising an inner and an outer door frame, both of which are adapted to seat against the outer wall of the oven and leave a continuous space between them extending from the oven wall outwardly, a packing interposed in said space and adapted to engage the oven wall, and a door having a flange on its inner face which is adapted to project into the space between the door frames and to engage the packing to force it inwardly against the oven wall and seal the joints between the door frame and oven and between the door and the door frame, substantially as described.

5. A sealing means for retort coke ovens comprising two door frames, an inner frame within an outer frame, external fastenings about the oven for holding the outer door frame in position, and a packing interposed between the door frames and adapted to hold the inner door frame in position, substantially as described.

6. Means for sealing the doors of retort coke ovens comprising in combination with the door and oven, of an inner and an outer door frame which set one within the other and both against the outer wall of the oven and leave between them a space extending inwardly to the outer face of the oven wall and also extending continuously around the oven opening at a point spaced therefrom, the inner side face of the outer frame being undercut, and packing interposed between the frames and adapted to engage the over-

hung wall of the outer frame and serve as a retaining means for the inner frame which is left free of rigid connection to either the outer frame or the oven.

7. A retort coke oven having a door opening in its side wall, two door frames which surround said opening and engage the outer wall of the oven, a continuous packing strip in the space between the door frames and serving as the means for holding the inner frame in position relatively to the outer frame, said space being adapted to permit the packing to move bodily through it toward the oven wall, means to hold the outer frame against the oven wall, and a door to seal the oven opening which engages and presses the exposed face of said packing strip forcing it through said space and against the outside wall of the oven, substantially as described.

8. A retort coke oven having as a sealing means for its door opening, a continuous packing strip which engages the outer furnace wall at a point spaced from the opening and which extends continuously about the opening, a door which engages the outer face of the packing strip and forces its underface against the oven wall, two door frames which are free of rigid connection, one engaging the inner side wall of the packing strip and the other the outer side wall of the packing strip, and means to hold the outer frame in position relatively to the door opening in the oven, substantially as described.

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

PATRICK L. DAY.

Witnesses:

R. D. JOHNSTON, Sr.,
NOMIE WELSH.