

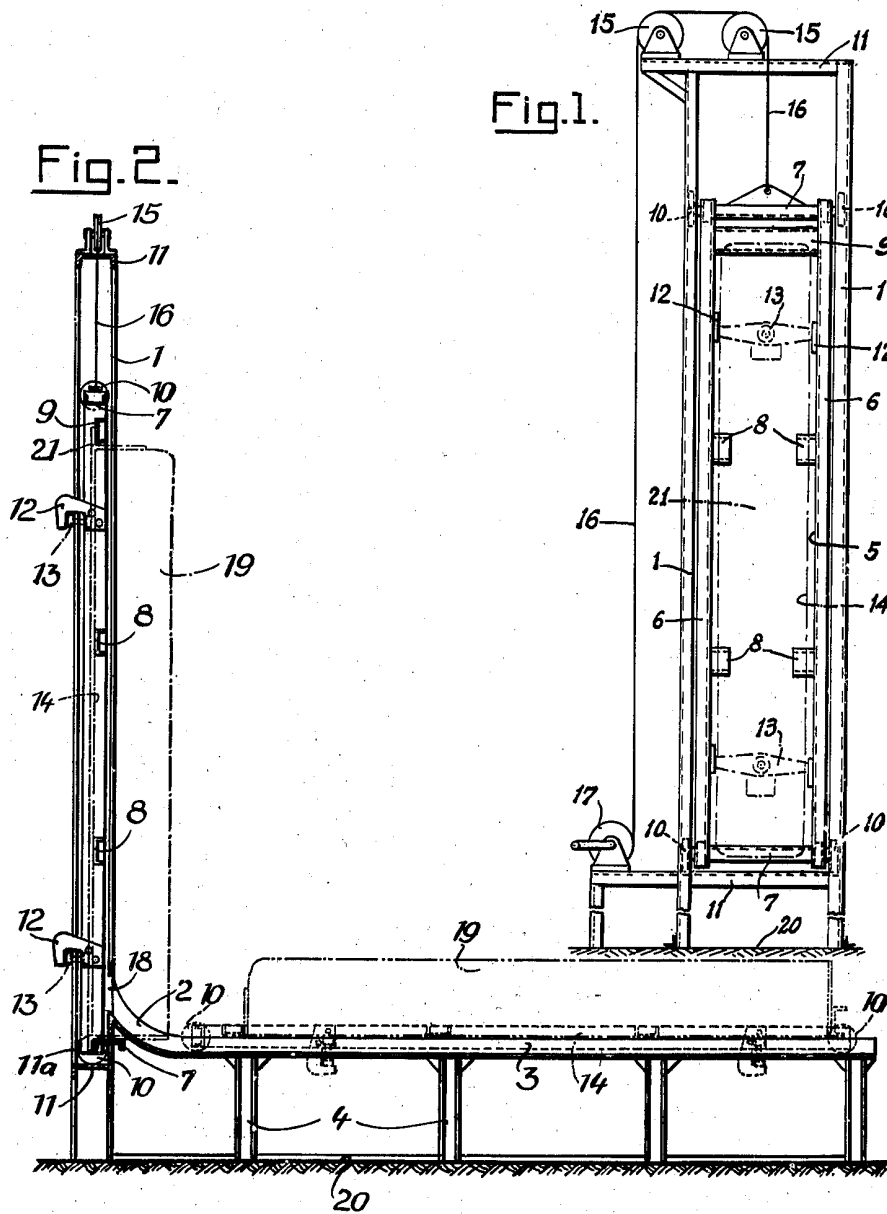
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RACKING EQUIPMENT FOR BRICK-LINED COKE OVEN DOORS

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RACKING EQUIPMENT FOR BRICK-LINED  
COKE OVEN DOORS

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The present invention relates to apparatus for holding coke oven doors in order to be able to clean or carry out repairs etc. to the doors and more particularly to the so-called coke oven stopper doors which are lined with refractory materials, reaching more or less into the coking chamber or retort.

Chamber or retort ovens for the production of gas and coke are provided with openings through which the coke may be extracted from the chamber or retort. Both sides of the horizontal chamber ovens for the production of gas and coke are provided with openings one of which serves for introducing the pusher-ram into the chamber and the other one for discharging the coked mass.

The openings at both sides of the coking chambers or retorts are closed by means of doors of which the inner side is provided in most cases with a brick lining consisting of refractory material. This brick lining extends more or less into the chamber or retort to be closed similar to a stopper and therefore such coke oven doors are often called "stopper doors." The refractory brick lining of coke oven doors is manufactured usually out of individual refractory bricks, but it is also known to make the brick lining out of a stamped mass which is stamped on to the lining retainer girder provided at the door for the lining and it burns to same when the door is brought to operating temperature.

The refractory brick lining of the coke oven doors is exposed to rather high stresses during the operation of the ovens. When the door is inserted into the hot coke oven chambers, the brick lining of the door is raised to a correspondingly high temperature. When opening the coking chambers and removing the coke oven door, the hot brick lining is suddenly cooled-down whereby the refractory bricks or the stamped mass used are highly stressed thus causing a cracking of the brick body and a spalling-off. Consequently, the coke oven doors have often to be repaired, maybe requiring that individual bricks of the lining or the whole lining will have to be replaced.

The main object of my present invention is to provide an improved apparatus which allows workmen to carry out repairs on coke oven doors or the like in a most easy and safe way and even on doors of up-to-date coke ovens which often are 4 or even 5 meters high.

It is already known to provide a rack equipment for coke oven doors at the end of a horizontal coke oven battery. These rack equipments are formed by a vertical frame in which the coke oven door may be fastened similarly as

in the coke oven door frame. The door is moved into the rack by an ordinary door manipulating machine of the battery and then affixed to the frame. After cooling-down, the repairs may be carried out on the door which is fairly well accessible from all sides when in the rack equipment.

Now, my present invention has for its object to modify the frame, which has to take-up and hold the coke oven door to be repaired in such a manner that the door can be brought from a vertical position into horizontal position for the purpose of repairing, preferably in such a way that the refractory brick lining lies upward nearly at the height of an ordinary table.

According to my invention the repair rack equipment which takes-up the coke oven door during the repairing work consists of a movable door repair suspension frame into which the coke oven door to be repaired is suspended or fastened in a suitable manner, said frame being movably arranged in rails or the like having a vertical and a horizontal part so that the movable frame carrying the door to be repaired may be brought from the vertical position in which the door is fastened to the rack into horizontal or nearly horizontal position for the purpose of doing the necessary repairs.

In accordance with a preferred embodiment of my present invention, the guide for the movable frame for holding the door is formed by a horizontal pair of rails and by a vertical pair of rails connected with one another by means of bent rail pieces in such a way that the door supporting frame when combined with the rails may be driven by means of rolls from the vertical guide or vertical pair of rails across the bent rails to the horizontal guide or horizontal pair of rails and vice versa similar to a transport car.

My invention offers the special advantage that when applying same, it is easily possible to bring the coke oven doors to be repaired into such a position that repairs may be appropriately carried out to the refractory brick lining. If the door is in horizontal position, the various bricks of the lining maintain their proper position even though one or another of the bricks is taken out. Consequently, it is easily feasible to exchange the damaged bricks without causing the bricks lying over them to slide down, the whole brick lining thus losing its connection as was often experienced hitherto when repairing in the vertical position.

With the above and other objects and features of my present invention in view, I shall now de-

scribe a preferred embodiment thereof on the lines of the accompanying drawing in which:

Figure 1 is a front view of the rack equipment and

5 Figure 2 is a vertical cross section through said equipment.

The rack equipment consists of two vertical stationary rails 1 formed by channel-irons. The rails 1 are connected above and below by channel-iron yokes 11. To the bottom of the vertical rails 1 there joins a bent rail 2 and to this the horizontal rail 3 which consists of angle-iron. At the point connecting the vertical rails 1 with the horizontal rails 3, the webs of the channel-irons 15 1 are cut out, as indicated at 18.

The horizontal rails 3 rest on supports 4 and are situated nearly on the level of a standard table plate.

In the frame formed by the rails 1, 2 and 3 the door girder 5 is arranged slidably. The door girder consists of two channel-irons 6 which above and below are connected by cross webs 7. Several projections 8 extending inwards are fastened to the channel irons 6. Moreover, the door girder is also provided at the top below the cross web 7, with a sectional iron 9 connecting the two channel irons 6, said sectional iron 9 lying in the same vertical plane as the projections 8 and the lower cross webs 7, so that the door when placed into the frame 5 may rest with its metal rim edge 21 against these parts. To the inner sides of the channel-irons 6 of the door girder 5 there are furthermore provided hooks 12 in such a manner that the ordinary latch bars 13 of the coke oven door, after the insertion into the door frame 5, may be swung behind the hooks 12 whereby the door itself is united with the door girder.

The coke oven door 14 inserted into the door girder 5 by means of the door lifting machine is attached thereto in such a manner that one side of the door rests, on the one hand, with its edge 21 on the faces 8, 9 and the lower cross connection 7 of the door girder and, on the other hand, the door is secured by the interlocking device 12, 13. Above and below, the door girder is equipped with a guide roll 10 which slides in the vertical rails 1 of the rack equipment.

At the top of the cross connection 7, the door girder 5 is connected with pulling means 16 moving over rolls 15, said pulling means 16 being actuated by a winch 17.

As may be seen from Figure 2 of the drawing, the vertical rails 1 are somewhat extended beyond the bottom horizontal rails 3, as indicated at 11a. The lower guide rolls 10 of the door girder 5 repose within this extension when the girder is ready to take-up the door, which insertion is performed by the door lifting machine of the oven battery. The guide rolls 10 then rest on the bottom 11 of the rail extension 11a.

In order to be able to move the door, after its insertion into the girder 5, into the horizontal position, the girder 5 is first of all lifted together with the door 14 by means of the winch 17 to such an extent that the lower guide rolls 10 come within the range of the recesses 18 of the side webs of the vertical channel irons 1 of the rigid holding frame where it is joined to the horizontal guide frame 3 by the rail curve 2. By pressing the lower part of the door towards the horizontal

guide frame 3, the door girder 5 on a simultaneous lowering of the same reaches the horizontal position on the rack frame 3 by means of the guide rolls 10, whereby the brick lining 19 of the oven door is in upward position.

The horizontal guide frame 3 is situated at such a distance from the platform 20 that repairs can now easily be carried out.

I have now above described my present invention on the lines of a preferred embodiment thereof, but my invention is not limited in all its aspects to the mode of carrying it out as described and shown, since the invention may be variously embodied within the scope of the following claims.

What I claim is:

1. Repair rack equipment for holding coke-oven doors with an inner brick lining for repair, comprising: a rigid stationary vertical frame with vertical side-guide rails connected at their lower parts by curved rails with horizontal side-guide rails of a rigid stationary horizontal frame forming a lateral extension of the vertical frame on one side of the lower part thereof and of a length to support a door in horizontal position; a coke-oven door-holding frame having sliding elements on its sides mounted for sliding cooperative movement with the guide rails in fully erect position on the vertical frame, over the curved rails and horizontally over the horizontal frame; said holder frame being open in its middle area for projection of the inner brick lining through the same, and said vertical frame being open in its middle area and accessible from the side of the vertical frame opposite the horizontal frame for positioning of a door from that side into the holder frame, when it is fully erected in vertical frame, by a door handling machine while the door is in erect position thereon, and with a horizontal movement of the machine towards the vertical frame projecting the brick lining through the holder frame beyond the side thereof facing the horizontal frame so that when the holder frame slides from fully erect position downwardly over the curved rails onto the horizontal frame, the door is turned so as to have the inner brick lining come into the upward position on the horizontal frame.

2. Apparatus as claimed in claim 1, and in which rim retainers are arranged around the rim of the holder frame on the side towards the horizontal frame for retaining engagement with the inside of the rim of a coke-oven door beyond the inner lining, and in which hooks are arranged on the opposite side of the holder frame for latching engagement with latch bars on the outside of the coke-oven door, for securing the door in the holder frame.

3. Apparatus as claimed in claim 1, and in which a seat is provided on the vertical frame below the entrance to the curved rails for resting the holder frame in erect position on the vertical frame, and in which the holder frame is raisable from the seat to bring the bottom of the holder frame to the level of the curved rails, and the vertical frame is adapted for accommodating swinging of the bottom of the holder frame out to the curved rails and over the horizontal frame with simultaneous lowering of the holder frame in the vertical frame, and reversely.

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