May 9, 1933. E. WOLFF 1,908,501

COKE OVEN DOOR

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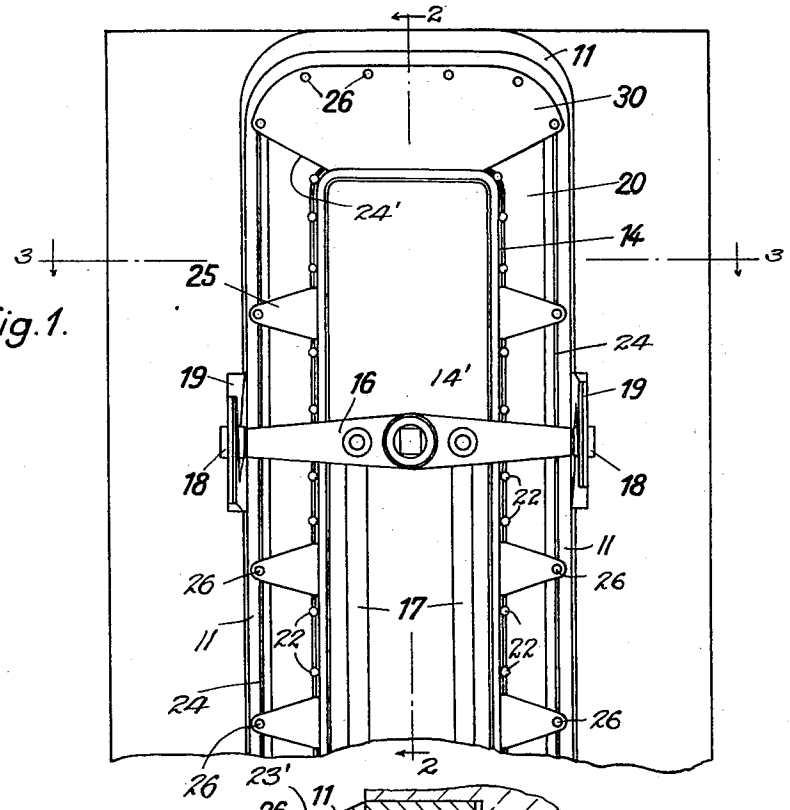

Fig. 1.

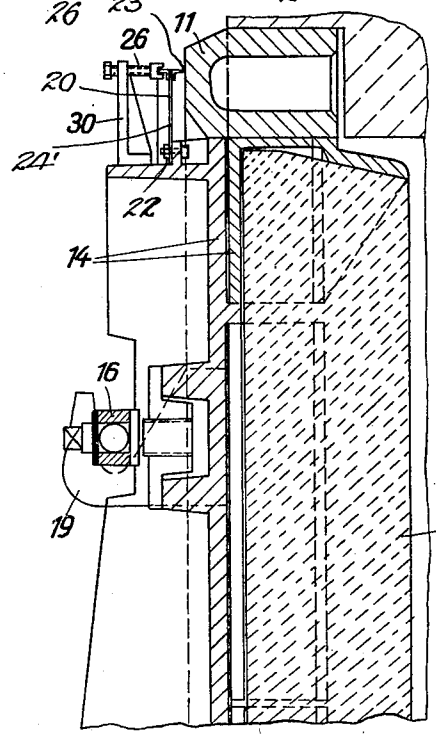

Fig. 2.

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Fig.3.

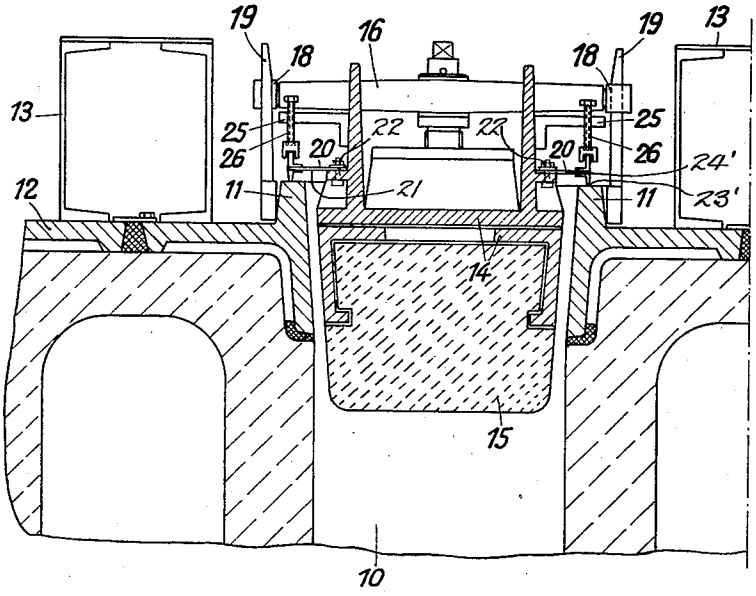
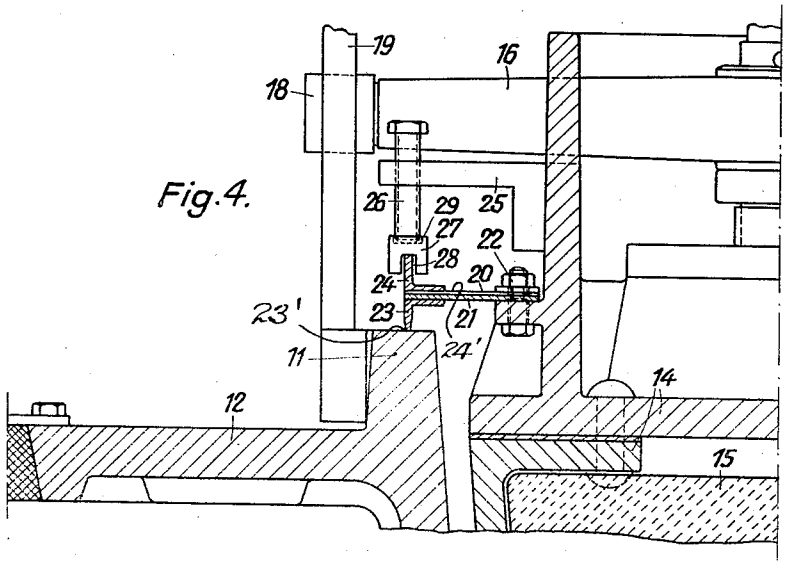


Fig.4.



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UNITED STATES PATENT OFFICE

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COKE OVEN DOOR

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It is now a frequent practice to use, for packing the doors of horizontal coke and gas ovens, soft or resilient packings, in particular asbestos cord. The advantage of asbestos cord is its compressibility, whereby it is able to accommodate itself to irregularities of the door and door frame surfaces, but it is expensive both as to first cost and upkeep, and one great disadvantage is its comparative fragility, owing to which will not for long stand the rough usage of coke oven practice. Furthermore, incrustations of tar and the like destroy such tender packing surfaces.

According to my invention a self-tightening oven door is provided, which has around it a rigid door frame constructed so strongly that distortion due to thermal expansion cannot give rise to small local deflections, but only to bends of comparatively large radius gradually merging into each other if two or more of them occur in one structure. Thus the contact surfaces may be bent entirely into convex form, or they may be in the form of a warped or sinuous curve.

Deflections from the normal plane are small and merge gradually into each other, no matter from what cause the bending stress arises. A counter packing is provided on the door consisting of a packing frame of profile iron, shaped to adapt it to be pressed against the door-frame at various points, and sufficiently rigid to preserve proper tightness at these points, but as regards its whole length it is sufficiently flexible to accommodate itself to the gradual bends imported to it by the relatively rigid door frame. In order to enable the frame to recover its normal shape in relation to the door, and to insulate the frame from the effects of distortion of the door itself, the frame and door are connected by a thin metal plate. This metal plate acts both as a support for the frame and as a packing member between the frame and the door, and it provides a flexible or resilient connection, for permitting relative movement between the frame and door when screwing the outer frame down on the door frame. In connection with doors having a packing of asbestos cord, thin plates of this kind have been used for supporting and pressing down the asbestos cord.

An example is illustrated in the accompanying drawings, in which

Fig. 1 is a front elevation of a part of the oven door,

Fig. 2 a vertical section thereof taken on the line 2—2 of Fig. 1,

Fig. 3 a cross section thereof taken on the line 3—3 of Fig. 1, and

Fig. 4 is a more detailed sectional view on an enlarged scale of the left half of the portion of the door shown in Fig. 3.

The coke oven chamber 10 is provided at its charging end with a door frame 11, which on account of its cross-sectional shape and dimensions has the characteristics previously referred to, that is to say it is warped to a relatively small extent by the bending force and thermal expansion to which it is subjected. The door frame 11 is held by means of its flanges 12 under the supporting members 13 forming the oven reinforcement. The metal door member 14, provided as usual with a refractory lining 15, is disposed in the opening of the oven chamber, with its lower end resting by gravity on the bottom of the opening, the top and sides of the member 14 being unsupported by the frame of the opening. Rotatable locking bars 16, only one of which is shown in the drawings, are pivoted to the door, and are connected together by a pair of parallel rods 17 for simultaneous operation. Rollers 18 at each end of the locking bars engage hooks 19 fixed to the frame 11, and the contact surfaces of the hooks are slightly inclined so that the door member 14 is pressed tightly against its frame 11 when the bars 16 are in the locking position. The door member 14 is formed of an outer and an inner portion connected by a packing of asbestos cord, and the outer portion has a thin plate 20 and an asbestos plate 21 fixed to it by means of rivets or bolts in the manner as indicated at 22. The outer edges of the plates 20, 21, have riveted to them angle pieces 23, 24, forming a closed frame 24′ extending around the door proper 14′, the space between the plate 20 and the angle

piece 23 being packed by the asbestos plate 21. Lugs 25 are distributed uniformly around the periphery of the door member 14, and adjustable screws 26 are provided in the lugs for exerting pressure on the angle pieces 24 with the aid of blocks 27. The blocks 27 have on their inner side slots 28 for engaging the angle pieces 24, and on their outer side depressions 29 for receiving the screws 26.

When the door is in the closed position with the packing frame 23, 24, tightly pressed against the door frame 11 by the screws 26, the packing surfaces adhere to each other, notwithstanding such distortion of the packing surface of the frame 11 as may occur. Plates 30 are provided at the top and bottom of the door, and pressure screws 26 are provided in the plates at smaller intervals.

The packing edge 23′ of the frame 23 is tapered, so that it is better able to cut into any raised portions on the packing surface of the frame 11, and to undergo slight alterations in shape for preserving a proper packing. The sharp metallic packing edge provides a particularly reliable packing where large doors are used as is the case with more recent practice.

What I claim as my invention and desire to secure by Letters Patent of the United States is:

The combination with a coke oven having a metal door frame having an outer sealing surface surrounding the opening in said frame, of a door for said opening comprising a metal body portion, an annular flexible metal sealing frame having a removable gas-tight connection to said body portion and having a relatively sharp edge for making a gas-tight metal-to-metal engagement with said sealing face, and adjustable screws for positively actuating said frame to cause said edge to conform to said sealing surface.

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