

June 27, 1933.

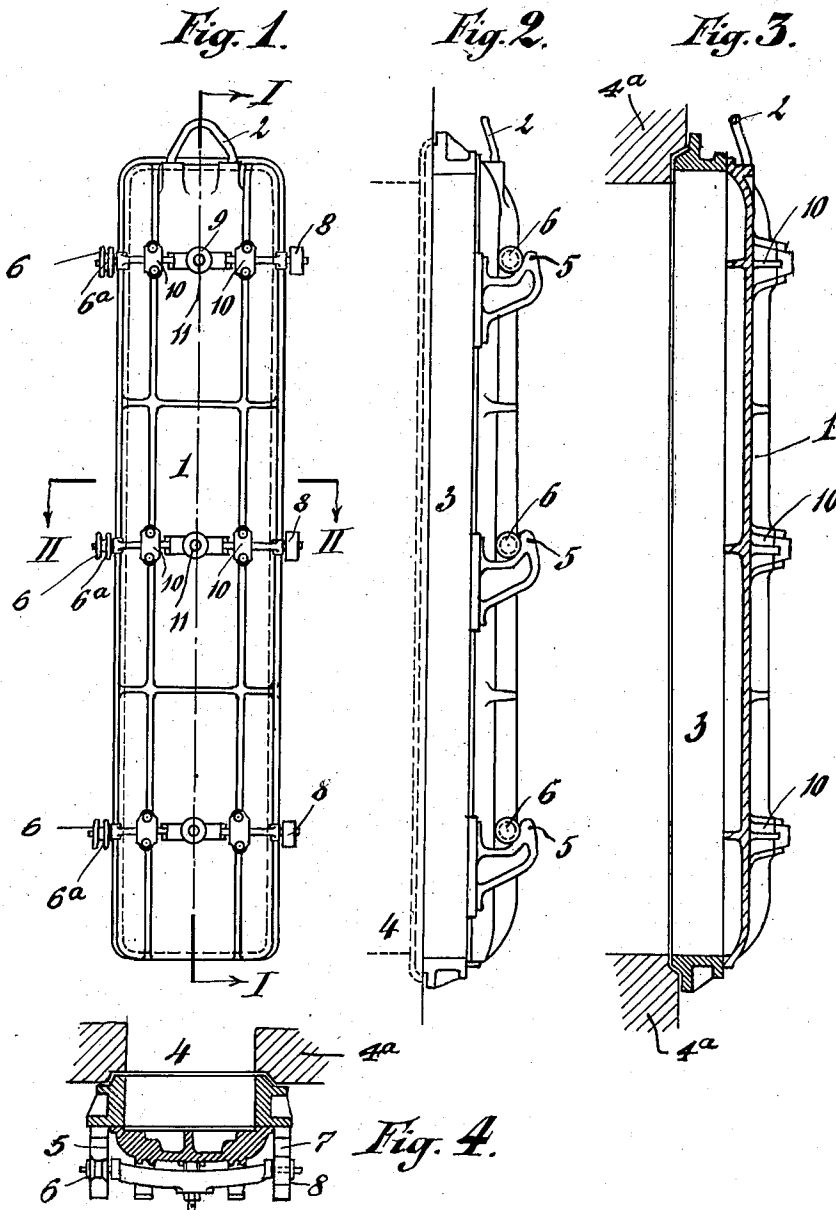
E. LECOCQ

1,915,937

DOOR FOR COKE OVENS

Filed Sept. 17, 1930

4 Sheets-Sheet 1



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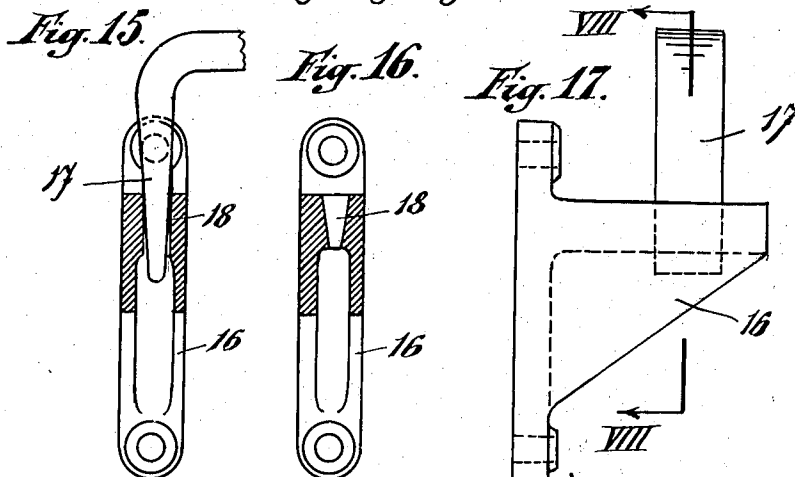
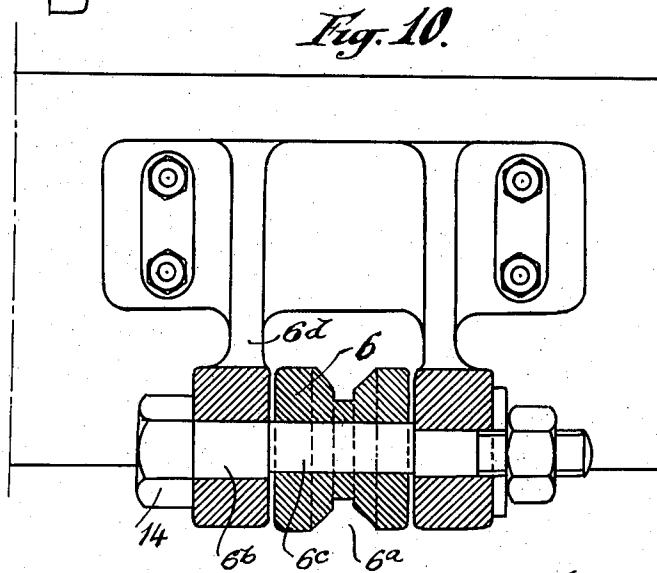
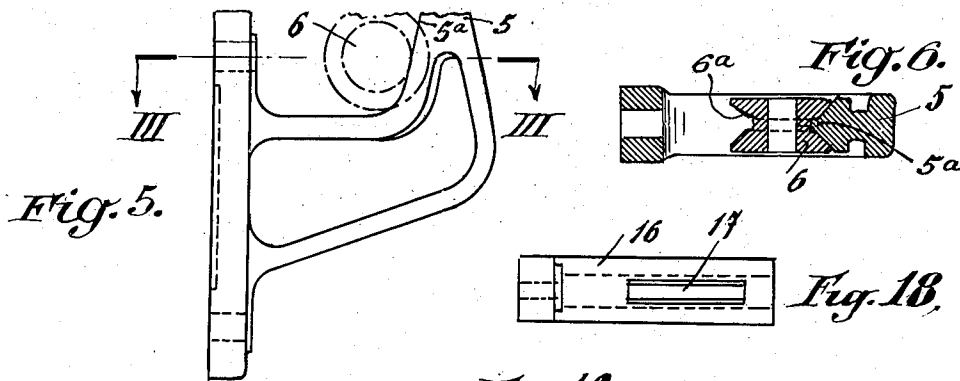
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DOOR FOR COKE OVENS

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4 Sheets-Sheet 2



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4 Sheets-Sheet 3

Fig. 1.

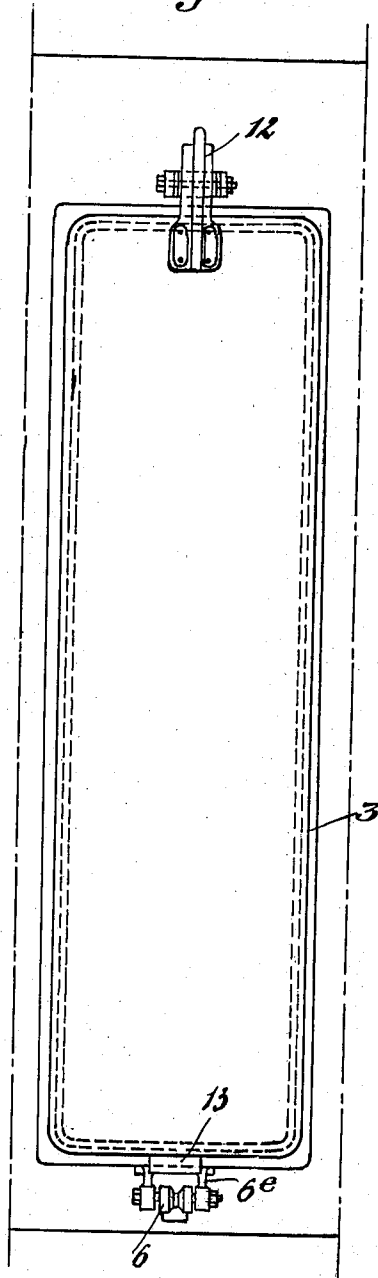


Fig. 8.

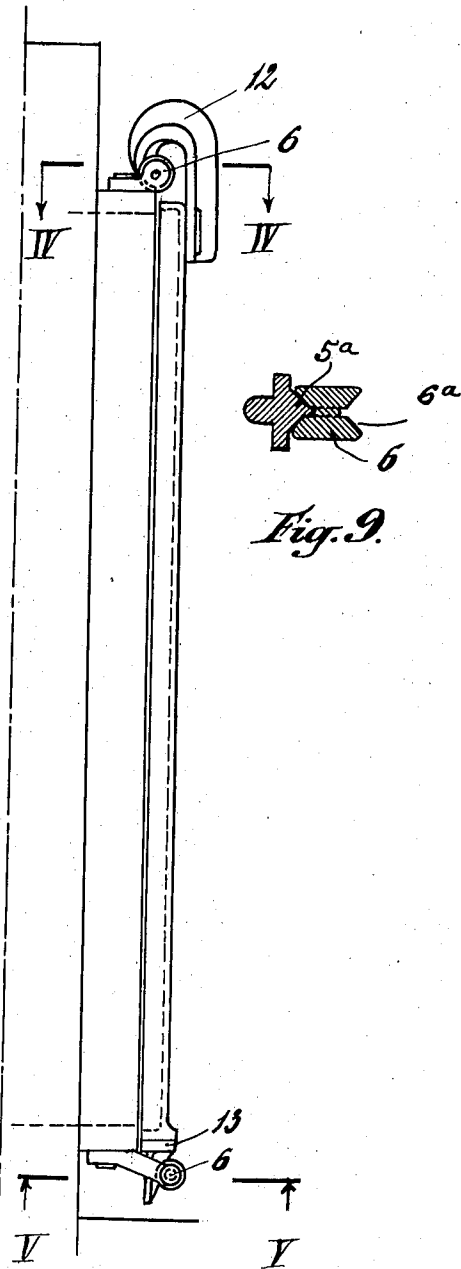


Fig. 9.

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Fig. 11.

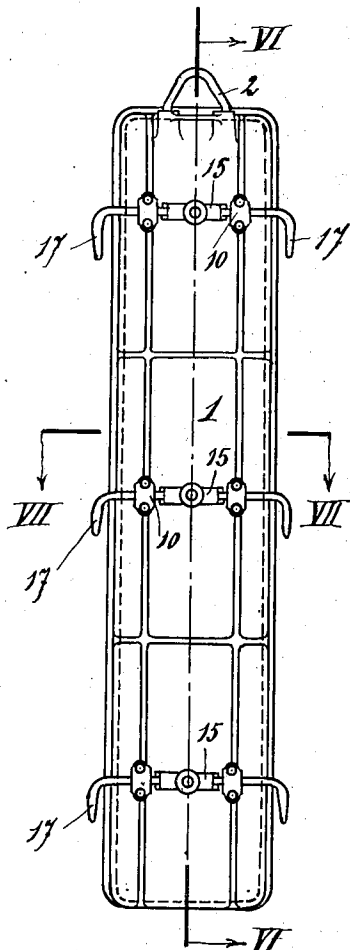


Fig. 12.

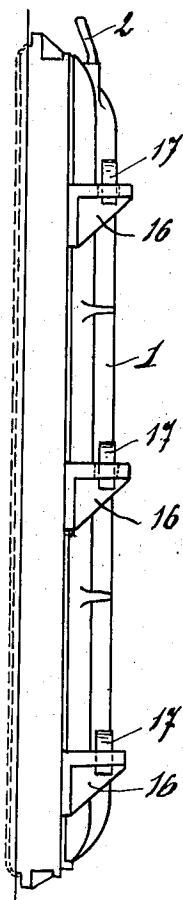


Fig. 13.

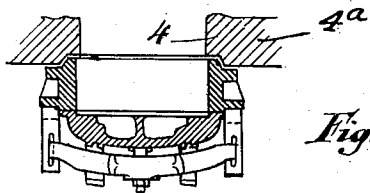
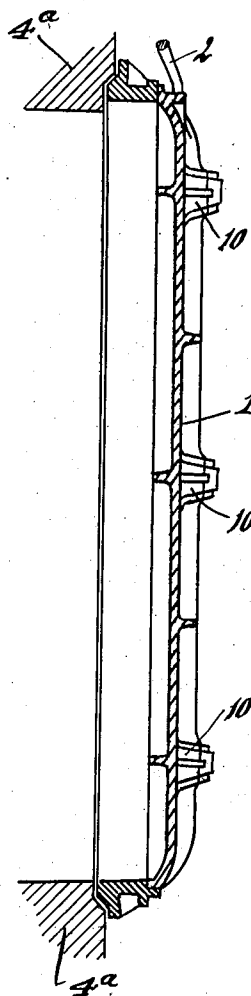


Fig. 14.

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UNITED STATES PATENT OFFICE

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DOOR FOR COKE OVENS

Application filed September 17, 1930, Serial No. 482,419, and in Belgium September 27, 1929.

For some years, the height of ovens having horizontal chambers for the distillation of coal has been increasing more and more, while the duration of carbonization, on the
5 contrary, tends to be reduced as much as possible.

On the other hand, owing to the fact that the gas and chemical industries are utilizing more and more the gas produced by the distillation of coal in coke ovens, the quality
10 which this gas must have necessitates that the carbonization chambers should be provided with doors which are as air-tight as possible, while being rapid in manipulation.
15 The result is that rudimentary doors luted with clay, which are not very air-tight, nor very easy to manipulate; and are costly and long, are inadmissible in a modern coking plant, and the constructors of coke ovens
20 have replaced them by doors of different constructions which obviate luting with clay.

These doors consist essentially of an undetachable metal frame sealed in the masonry of the oven, in which frame the door is
25 hung by means which are more or less complicated. Air-tightness between the frame and the door is effected either by means of a more or less elastic material (asbestos rope, metal rope) or without the interposition of
30 these yielding materials, air-tightness being then effected by the perfect fitting of the contact surfaces of the door and its frame.

Heretofore, coke oven doors, which are not luted, have remained air-tight for a
35 rather short time only, owing to the fact that, as regards those doors, the tightness of which is obtained by means of an elastic joint, the said joint is hardened rapidly by tar, and as
40 regards those with finished metal joints, the tightness is likewise imperfect owing to the deposit of layers of pitch on a portion of the finished surfaces.

These deposits of tar and pitch can only
45 be produced on the portions of the surfaces of the frame and door which are not in contact, and would not offer any inconvenience if the door was always replaced exactly in the same place in its frame. This condition
50 however, is not realized in any of the sys-

tems of doors without luting which have been used up to the present.

The present invention has for its object to provide a door for a coke oven or chamber
oven without clay luting, which is distinguished substantially from the known systems in the particularly simple means employed in order to ensure that, when the door
55 is operated, it will always place itself exactly and automatically in the same position in the frame serving for its seat, so as to avoid tar becoming interposed between the surfaces in contact of the door and its frame, irrespective of the manner in which the air-tightness between the frame and the door is
60 effected.

With this object in view, the invention essentially consists in the special arrangements and combinations of parts hereinafter fully described and pointed out in the appended claims.

On the annexed drawings:

Figure 1 is a front elevation of a door fitted with rollers co-operating with hooks fixed to the metal frame (the frame is not
75 shown in this Figure 1).

Figure 2 is a corresponding side elevation of the door and frame.

Figure 3 is a vertical section of the door and its frame along the line I—I in Figure 1.
80

Figure 4 is a horizontal section along the line II—II in Figure 1.

Figure 5 is a side view of one of the V-hooks, the roller being shown in chain dotted
85 lines.

Figure 6 is a horizontal section taken along the line III—III in Figure 5.

Figures 7 to 10 show another form of construction of the door. Figure 7 is an elevation
90 of the door applied against its frame.

Figure 8 is a corresponding side view.

Figure 9 is a horizontal section along IV—IV in Figure 8 showing the co-operation of the V-hooks and rollers.
95

Figure 10 is an enlarged transverse section of a bracket and roller supported thereby, taken along the line V—V of Figure 8.

Figure 11 is a front elevation of a door fitted with bars with wedge-shaped ends co-
100

operating with channels provided in right-angled irons fixed to the metal frame.

Figure 12 is a side elevation of the door shown in Figure 11.

5 Figure 13 is a vertical section of the door and its frame taken along the line VI—VI in Figure 11.

Figure 14 is a horizontal section taken along the line VII—VII in Figure 11.

10 Figure 15 shows the front view, cut by a vertical plane, of a wedge of the door engaging in the groove of a right-angled iron fixed to the frame.

Figure 16 is the same as Figure 15, with the wedge removed from the groove.

Figure 17 is a side view of the members shown in Figure 15.

Figure 18 is a plan corresponding to Figure 17.

20 In the construction of the door shown in Figures 1 to 6, the hooks are fixed to the frame and the rollers to the door.

In Figures 1 to 6, the door proper 1, provided with a suspension hook 2, co-operates with a rigid metal frame 3, built into the front walls 4a of the oven 4. According to the invention, the frame 3 carries projecting hooks 5 along one side thereof and hooks 7 along the other side, co-operating with the rollers 6 and 8 respectively mounted on cross-members 9 in any suitable manner.

In the example shown in the drawings, the rollers 6, three in number, have a V-shaped groove 6a, while the hooks 5 have a V-shaped section 5a corresponding to the V of the groove of the roller, the hooks and rollers constituting guides and the V-shaped section of the hooks and the V-shaped grooves of the rollers constituting complementary projections and recesses. The said hooks 5 and rollers 6 are situated on the same side of the vertical axis of the door, while the hooks 7 and rollers 8, situated on the other side of the said axis, are smooth so as to avoid the unequal expansion of the door and frame causing abnormal stresses on the fixing hooks 5 and 7. The cross-members 9 slide in the supports 10 integral with the door, the screws 11, placed in the middle of the cross-members, bearing against the door 1, and permitting the latter to be tightened on its frame 3.

The door being suspended by the hook 2 from a suitable wheel and axle, it is merely necessary to allow it to descend so that the rollers 6 engage in the hooks 5, which have their V-surface inclined to the plane of the door frame for the purpose of facilitating the guiding of the door while it is descending and pressing the door to the door frame. When the latter is brought into contact with the frame by tightening the screw 11 the rollers 6 are obliged to fit in the V-section of the hooks 5 and the door is therefore always applied in the same place of the frame.

65 The guiding of the door when it is placed

in position on its frame may obviously be obtained in numerous other ways. Figures 7, 8, 9 and 10 show in this connection a modification in which use is made of two V-rollers 6 fixed to the frame 3, while the hook 12 is fixed to the upper portion of the door and the wedge-shaped projection 13 to the lower portion. It is easy to see by examining the drawings that this projection 13 is wedge shaped both transversely and longitudinally and that like the preceding device, obliges the door always to take up the same position on the frame. In this construction a roller 6 is carried between the arms of a bifurcated bracket 6c extending from the bottom of the door frame. The roller 6 is carried by an axle 6b having an eccentric central portion 6c upon which the roller 6 is mounted. The axle 6b is mounted in bearings 6d. With this construction, the position of the roller 6 may be adjusted by rotating the axle 6b in the bearings 6d.

The members serving for the support of the door may be constructed in quite a different manner from rollers with V-shaped grooves cooperating with hooks likewise having a V-shaped section. For example, the cross-members 9 of the door shown in Figures 1, 2, 3 and 4 may be replaced by the cross-members 15 having curved, tapered or wedge shaped ends 17 cooperating with lugs or right-angled irons 16, integral with the frame and constructed as shown in Figures 11, 12, 13 and 14, which only differ from Figures 1, 2, 3 and 4 in the members serving to support the door.

Figures 15, 16, 17 and 18 show the constructional details of the said supporting members as well as their co-operation.

It will readily be seen, on examining these figures, that when the door is lowered, the cooperation of the curved and tapered ends 17 of the bars 15, and of the channels 18, provided in the right-angled irons 16 will cause the door to be guided so that it must always be applied to the same place on the frame.

The invention is obviously not limited by these constructional details and may vary according to the applications and according to the greater or lesser degree of perfection required.

What I claim is:

1. In a coke oven, a door structure therefor comprising a door frame rigidly mounted about the door opening to the oven, a door cooperating with the frame member for closing the opening to the oven, and cooperating guides on said door and said frame for aligning the door with the frame, said guides including complementary wedge-shaped projections and recesses adapted to interengage for positioning the door with respect to the frame.

2. In a coke oven, a door structure therefor comprising a door frame rigidly mounted

about the door opening to the oven, a door cooperating with the frame member for closing the opening to the oven, and cooperating guides on said door and said frame for aligning the door with the frame, said guides including complementary wedge-shaped projections and recesses adapted to interengage for positioning the door with respect to the frame, and means including said complementary wedge-shaped positioning projections and recesses for pressing the door against the frame member.

3. In a coke oven, a door structure therefor comprising a frame member rigidly mounted about the door opening to the oven, a hook-shaped projection extending from the side of said frame member and having a wedge-shaped surface, a door cooperating with the frame member for closing the opening to the oven, a cross bar on said door, a grooved roller on said cross bar adapted to engage the wedge-shaped surface of the hook shaped projection on said frame member, and means including said roller and said hook-shaped projection for pressing the door against the frame member, the grooved roller and the hook-shaped projection cooperating to position the door with respect to the frame member.

4. In a coke oven, a door structure therefor comprising a frame member rigidly mounted about the door opening to the oven, a lug extending from the side of the frame member and having a wedge-shaped recess therein, a door cooperating with the frame member for closing the opening to the oven, a cross bar on said door having a wedge-shaped portion

complementary to the wedge-shaped recess in the lug extending from the side of the frame and adapted to be received therein and cooperate therewith to position the door with respect to the frame member, and means for pressing the door against the frame member including the wedge-shaped portion of said cross bar and the recessed lug on the frame member.

5. In a coke oven, a door structure therefor comprising a frame member rigidly mounted about the door opening to the oven, a door member cooperating with the frame member for closing the opening to the oven, a wedge shape projection on one of said members, a grooved roller on the other of said members adapted to cooperate with the wedge-shaped projection for positioning the door with respect to the frame.

6. In a coke oven, a door structure therefor comprising a frame member rigidly mounted about the door opening to the oven, a bifurcated bracket extending from the bottom of said frame member, a grooved roller carried between the arms of said bifurcated bracket, a door cooperating with the frame member for closing the opening to the oven, and a wedge-shaped projection on the bottom of said door, said projections being wedge-shaped transversely and longitudinally for cooperating with said grooved roller to position the door with respect to the frame member and press the door against the frame member.

In testimony whereof I have affixed my signature.

EUGÈNE LECOCQ.