# United States Patent [19]

**Ikio**

[11] **3,902,274**

[45] **Sept. 2, 1975**


[54] **COKE OVEN LEVELING DOOR HATCH CONSTRUCTION**


[76] Inventor: **Takatoshi Ikio,** 5-32, 1-chome, Senbo, Tobata-ku, Kitakyushu, Japan



[22] Filed: **Mar. 13, 1974**

[21] Appl. No.: **450,802**

[52] **U.S. Cl.** ..... **49/334;** 49/338; 202/248

[51] **Int. Cl.²** ..... **E05F 15/02**

[58] **Field of Search** ..... 49/334, 338, 339, 340, 49/344, 279, 280; 292/78, 304; 202/248



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*Primary Examiner*—Kenneth Downey
*Attorney, Agent, or Firm*—McGlew and Tuttle



[57] **ABSTRACT**

A coke oven leveling door hatch construction, comprises a hatch pivot bearing adapted to be mounted on the coke oven door or directly adjacent the door. A hatch door for closing a leveling port includes a locking bar extending across the front face thereof which terminates in a forked end having a pair of bearings which engage over the respective ends of the hatch pivot bearing and which are secured to a pivot which extends through the pivot bearing so that the door may be pivoted thereabout. The pivot includes an offset portion or crank arm which is connectable to an opening mechanism which comprises a fluid pressure operated cylinder having a movable piston therein which is connected to a rotatable forked arm which engages the crank to rotate it through an arc to effect turning of the door to open the door. The locking bar includes an inwardly extending portion on the side of the door opposite from the pivot, which terminates in a hook which is engageable by a rotatable arm having a detent which engages with the hook. The arm is biased by a spring to rotate in a direction to cause engagement but the locking bar may be moved against the biasing force to rotate the latching arm having the detent so that the detent moves out of engagement with the hook.


**4 Claims, 6 Drawing Figures**

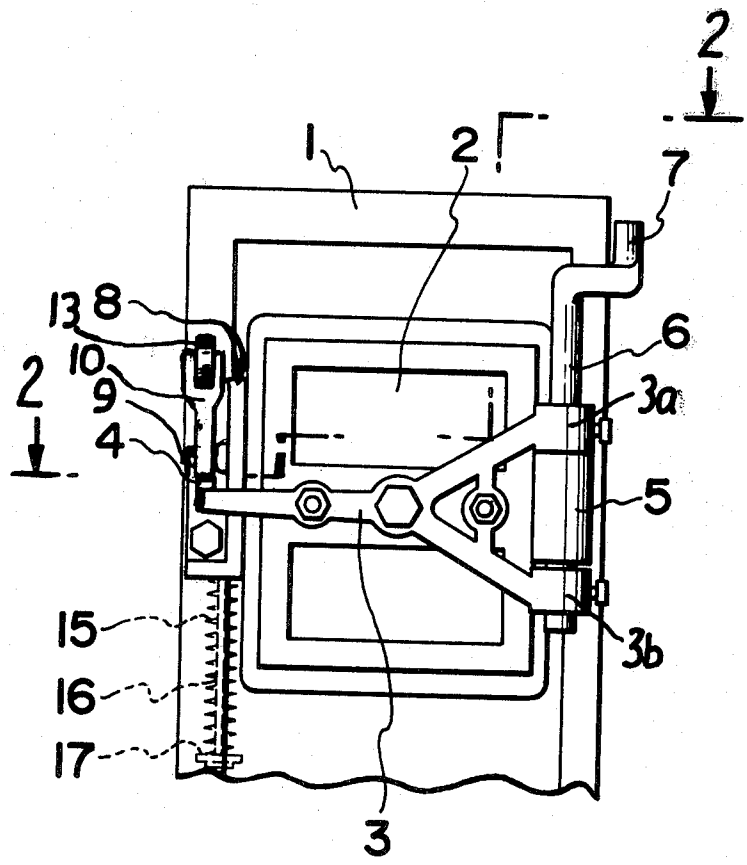


FIG. 1

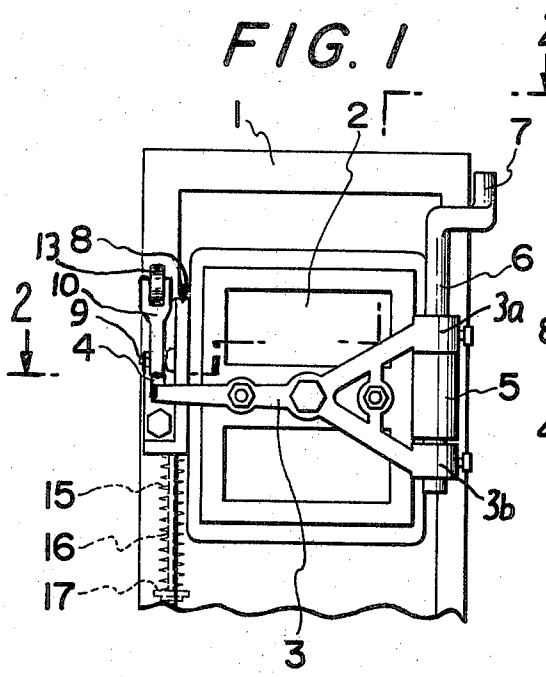



FIG. 2

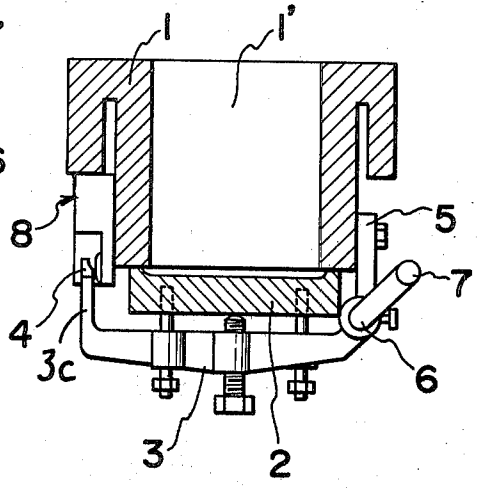



FIG. 3

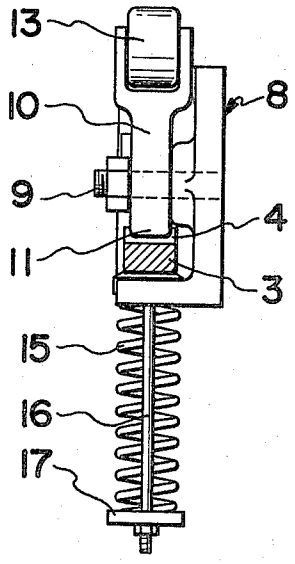



FIG. 4

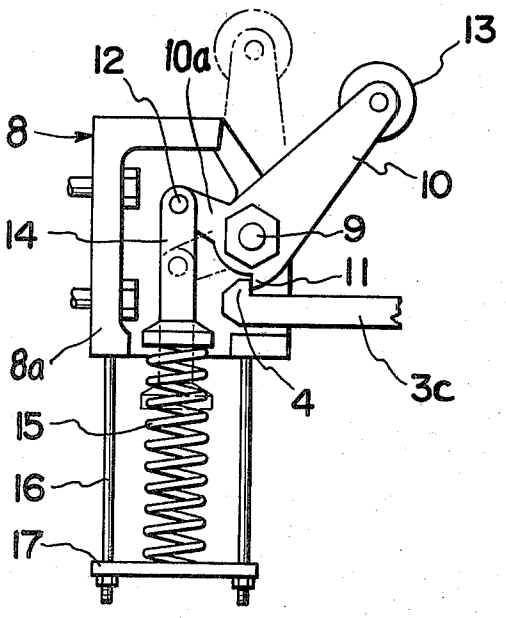


FIG. 5

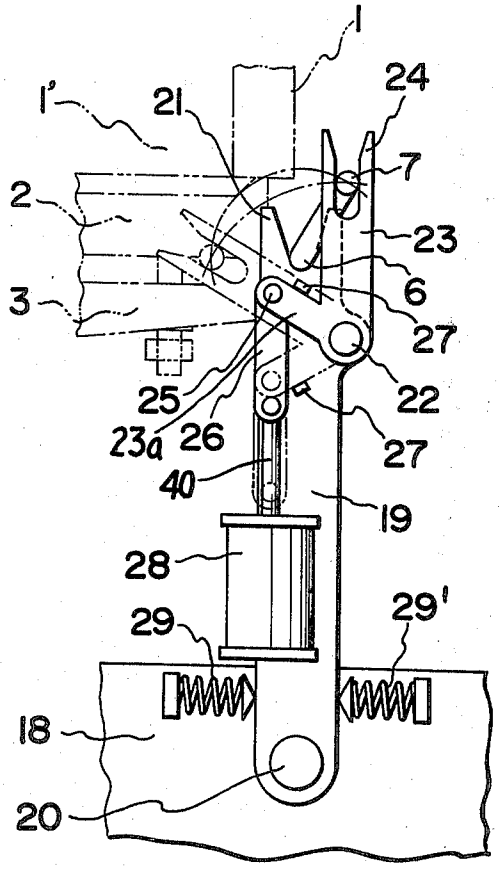
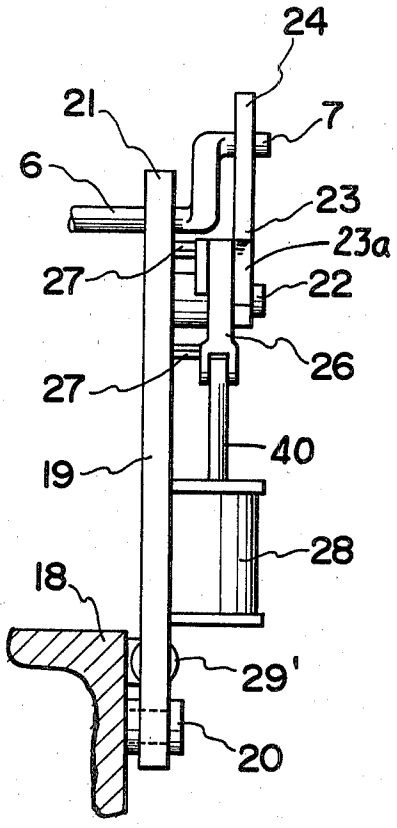

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FIG. 6


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# COKE OVEN LEVELING DOOR HATCH CONSTRUCTION

## BACKGROUND OF THE INVENTION

1. Field Of The Invention

This invention relates in general to the construction of coke oven doors and, in particular, to a new and useful coke oven leveling door hatch construction, in which the coke oven door is pivotal on a pivot member having an offset crank portion which is engageable by an opening mechanism to rotate it and wherein the locking bar includes an inwardly extending hook portion which is engageable with a rotatable latching arm having a detent which engages with the hook but which may be moved in an opposite direction of rotation against a spring-biasing force to effect disengagement.

2. Description Of The Prior Art

The known constructions for opening and closing hatch doors of coke ovens include hand-operated systems in which the hatch is opened horizontally so that, for example, it opens to one side, such as the right side, or it is opened by an automatic operating system so that is would be opened vertically. In the known automatic systems, the operation mechanism is likely to become influenced by gas, combustion flame or smoke spouting when the hatch is opened, and this is particularly disadvantageous since the hatch should be open from an angle of 90° to 120° or more.

## SUMMARY OF THE INVENTION

In accordance with the present invention, there is provided a coke oven leveling door hatch construction wherein the hatch is automatically pivoted about a vertical axis so that it may be swung outwardly horizontally and which includes a locking bar secured across the face of the hatch which is connected to a pivot bar member which is journalled in a bearing on the side of the hatch, and wherein the pivot portion of the pivot bar is provided with an offset crank which may be engaged by automatically operated rotating mechanism to rotate the door to an open position. The door advantageously includes a latching mechanism in the form of a rotatable arm having a detent which is biased to rotate in a direction so that the detent engages with a hook end of a locking bar of the door. During opening, the locking bar may be moved with a force sufficient to overcome the spring-biasing force to unlatch the bar from the detent of the rotatable arm.

Accordingly, it is an object of the invention to provide an improved coke oven leveling door wherein the coke oven door includes a locking bar across its face which is connected on its one side to a rotatable pivot member journalled in a bearing on the side of the door and having a crank portion which is rotated by an automatically operable mechanism and an opposite side having a latching hook which is engageable with a rotatable arm under the force of a biasing spring.

A further object of the invention is to provide a coke oven leveling door hatch construction which is simple in design, rugged in construction, and economical to manufacture.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and specific objects attained by its uses, reference should be had to the accompanying drawings



and descriptive matter in which there is illustrated a preferred embodiment of the invention.

## BRIEF DESCRIPTION OF THE DRAWINGS

In the Drawings:

FIG. 1 is a partial front elevational view of a coke oven leveling door hatch constructed in accordance with the invention;

FIG. 2 is a section taken along the line 2—2 of FIG. 1;

FIG. 3 is an enlarged partial front elevational and partial sectional view of the latching mechanism shown in FIG. 1;

FIG. 4 is a side elevational view of the latching mechanism shown in FIG. 3;

FIG. 5 is a partial top plan view of a mechanism for opening the hatch; and

FIG. 6 is a side elevational view of the opening mechanism shown in FIG. 5.

## GENERAL DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings in particular, the invention embodied therein, comprises a coke oven levelling door hatch construction, which includes a coke oven door 1, having a leveling port 1' which is closed by hatch door 2.

In accordance with the invention, the hatch door 2 is connected to a locking bar 3 which extends across its exterior face and which includes forked arm bearing portions 3*a* and 3*b* which are aligned at respective top and bottom ends of a vertically extending hollow bearing 5 secured on door frame 1. The forked arm bearing portions 3*a* and 3*b* are secured to a pivot bar 6 which extends vertically through bores in the forked arm bearing portions 3*a* and 3*b* and in the bearing 5. Pivot member 6 includes a crank arm portion 7 which is offset from the main portion of the pivot bearing and includes an upwardly extending stub part.

The locking bar 3 includes an opposite inturned arm portion 3*c* which terminates in an upwardly extending hook 4 which is adapted to be locked by a latching mechanism, generally designated 8. The latching mechanism 8 includes a bracket 8*a* which is secured to door 1 and which is provided with a pivot 9 which rotatably supports a detent arm 10 having a radially extending detent 11 which is engageable with the hook 4. The arm 10 includes a crank arm portion 10*a* which is connected at a pivot 12 to a spring retainer member 14, which is biased upwardly by a coil spring 15 carried on a crossbar 17 of a bracket 16. Spring 15 acts to bias spring retainer 14 upwardly to cause detent arm 10 to rotate to a direction in which the detent 11 engages with hook 4. When bar 3 is opened by rotation of crank 7, the force is sufficient to overcome the force of the spring 15 so that detent arm 10 is rotated to move the detent out of the path of hook 4 to release locking bar 3.

The opening mechanism, as shown in FIGS. 5 and 6, comprises a housing 18 on which is mounted a pivotal arm 19, on a pivot 20. The arm is centered by means of springs 29 and 29' which act on respective opposite sides. The arm includes an outer end forming a recess or groove which is engageable with pivot axle 6. It also includes a forked lever 23 which is pivoted at 22 on arm 19 and which includes a forked end 24 defining a groove which engages with the crank 7. Arm 23 also

includes a crank arm portion 23*a* which is pivoted at 25 to a link 26 carried on a connecting arm 40 of a piston which is movable in a fluid pressure cylinder 28. When the piston is moved, the forked arm 23 may be rotated from the solid line position to the dotted line position to cause a rotation of the crank and an opening of the door. A portion 27 forms a stop for limiting the amount of movement as desired. The opening mechanism is located so as to be in a position in which it is shielded by the hatch door 2 during the opening and closing movement.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A coke oven leveling door hatch construction, comprising a hatch pivot bearing having a vertically extending bore adapted to be mounted on the coke oven door, a hatch door having an outer face, a locking bar extending across the outer face of said hatch door and having a locking portion extending around an edge of said hatch door and terminating in an inwardly extending latch hook and having an opposite end forming a pivot bearing and overlying said pivot bearing bore and with an axle portion secured thereto rotatable in said pivot bearing, said axle portion having an offset crank arm portion, a latching mechanism adjacent said latching hook on said door including a rotatable arm having a detent projecting outwardly therefrom engagable with said latching hook, means to bias said arm to rotate it in a direction to engage said detent with said latching hook, said arm being movable by outward movement of said bar to rotate said arm against said biasing means to unlatch said bar from said detent, and door moving means connectable to said crank portion to rotate said crank portion with said axle portion, said locking bar and said hatch door to open said hatch door and to close said hatch door, said door moving means comprising a pivotal arm having an end engageable with said axle member a forked arm pivoted on said pivotal arm having a forked end engagable with said crank, said forked arm having a crank arm portion and a fluid pressure operated piston and cylinder connected to said crank arm portion to pivot said crank arm portion with said forked arm to rotate said crank, and a spring retainer connected to said arm at a location spaced from the pivotal mounting of said arm, said biasing means comprising a coil spring engageable with said spring retainer to urge said spring retainer to rotate said arm to close said detent of said arm to move into engagement with said hook.

2. A coke oven leveling door hatch construction, comprising a hatch pivot bearing having a vertically extending bore adapted to be mounted on the coke oven, a hatch door having an outer face, a locking bar extending across the outer face of said hatch door and having a locking portion extending around an edge of said hatch door and terminating in an upwardly extending latch hook and having an opposite end forming a pivot bearing and overlying said pivot bearing bore and with an axle portion secured thereto rotatable in said pivot bearing, said axle portion having an offset crank arm portion, a latching mechanism adjacent said latching hook on said door including a rotatable arm extending obliquely outwardly and upwardly from the oven and having a lower end with a detent projecting downwardly therefrom engageable with said latching hook and an outer end which is engageable to be moved inwardly to open said latching mechanism, means to bias said arm to rotate it in a direction outwardly from the oven so as to form an inwardly and downwardly extending side surface down to said detent to permit easy engagement of said latching hook with said detent, said arm being movable by outward movement of said bar to rotate said arm against said biasing means to unlatch said bar from said detent, and door moving means connectable to said crank portion to rotate said crank portion with said axle portion, said locking bar and said hatch door to open said hatch door and to close said hatch door.

3. A coke oven leveling door hatch construction, as claimed in claim 2 wherein said door moving means comprises a pivotal arm having an end engageable with said axle member, a forked arm pivoted on said pivotal arm having a forked end engageable with said crank, said forked arm having a crank arm portion and a fluid pressure operated piston and cylinder connected to said crank arm portion to pivot said crank arm portion with said forked arm to rotate said crank.

4. A coke oven leveling door hatch construction, as claimed in claim 2, wherein said arm outer end having a release engagement roller thereon, a spring retainer connected to said arm at a location spaced from the pivotal mounting of said arm, said biasing means comprising a coil spring engageable with said spring retainer to urge said spring retainer to rotate said arm to close said detent of said arm to move into engagement with said hook.

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