COKE GUIDE CAR

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7 Claims

ABSTRACT OF THE DISCLOSURE

A coke guideway, a door extracting machine, a door jamb cleaning machine, and a door cleaning apparatus are all mounted on a single movable car. After the car is spotted in front of a coke chamber to be pushed, the door can be removed, rotated and cleaned; the coke guide is aligned with the coke chamber and coke can be pushed into the door as the door is being cleaned. After the coke has been pushed, the door jamb may be cleaned and then the door can be replaced.

The invention relates to a coke-guide car equipped with a door-extracting machine, which moves along the oven battery. The coke guide is arranged on the undercarriage or running gear of the car and can be moved in alignment with the axis of the oven chamber.

It is known to arrange the door-extracting machine on the coke-guide car to save a special running gear for this purpose. The door-extracting machine, which is pivotably arranged on the side of the coke guide, is brought in position in front of an oven chamber to be emptied by means of the coke-guide car and is then pushed against the door. The door is extracted and swung aside for the purpose of cleaning. The coke-guide car is then moved in front of the oven chamber so that the coke guide is in alignment with the axis of the oven chamber and the coke guide is then pushed against the oven chamber.

If a door-cleaning machine is additionally arranged on the coke-guide car, the door can be cleaned by it during the pushing of the coke. Any cleaning machine for cleaning the sealing surface of the frame of the oven chamber can be brought in a position to operate after completion of the pushing of the coke and withdrawal of the coke guide; this is done by moving the coke-guide car aside and axially pushing it against the frame of the oven chamber.

Known coke-guide cars require a drive for moving the car, a drive for the axial motion in alignment with the axis of the oven chamber, and a drive for swinging the door-extracting machine when a machine for cleaning the frame of the oven chamber is also present, a drive is also required to bring it into position.

Furthermore, a reciprocating motion of the entire coke-guide car is necessary to bring in alignment with the axis of the oven chamber: first, the door-extracting machine, then the coke guide, and finally the machine for cleaning the frame of the oven chamber.

The invention now comprises arranging the coke guide and the door-extracting machine rotatably about a mutual vertical axis on a rotary plate of the supporting frame which is movable in alignment with the axis of the oven chamber such that, by turning the rotary plate in the position away from the oven chamber, either the door-extracting machine or the coke guide is in alignment with the axis of the oven chamber.

Although an additional drive for the rotary plate is required, the coke-guide car need not travel or move to accomplish all operations once the vertical axis of the rotary plate is in alignment with the axis of the oven chamber.

Both the door-extracting machine and the machine for cleaning the frame of the oven chamber, being arranged on the rotary plate, are pushed against the oven chamber with the drive of the supporting frame for axially pushing the rotary plate against the oven chamber.

An object of the invention is to arrange a door-cleaning machine on the supporting frame of the coke-guide car in such a way that, by turning the coke guide in alignment with the axis of the oven chamber, the extracted door is in proper operating position for the door-cleaning machine, the drive motors being operated by a sequence switch and cut-off switch, with use of terminal switches, so that the correct sequence of the operations is positively assured.

The invention is illustrated by way of example in the accompanying drawings.

FIG. 1 is a plan view, partly in section showing a coke-guide car, constructed according to the invention, disposed in front of the oven battery in a preferred position before extracting the door;

FIGS. 2 and 3 diagrammatically illustrate the coke-guide car in the positions before pushing and before cleaning the frame of the oven chamber respectively; and

FIG. 4 is a vertical section taken along line IV--IV of FIG. 1.

The coke-guide car consists of an undercarriage 1 (FIG. 4), which is movable in front of the oven battery by means of wheels 2 on rails 3 mounted on a support structure 4, and a coke guide 6 (FIGS. 1 and 4). The coke guide 6 is formed of vertical guide rails 8, consisting of longitudinal flat-rolled steel plates 7 and a base 9, and is arranged on the undercarriage 1 so that it is axially movable toward and away from the oven chamber 10.

U-shaped rails 14, directed axially toward the oven chamber 10, are fixedly arranged on the undercarriage 1. Traversing wheels 12, cooperating with the U-shaped rails, are mounted on a supporting frame 11 of the coke guide 6.

The undercarriage 1 is provided with a support formed by vertical beams 15, and U-shaped rails 14a (FIG. 1) extending horizontally toward the oven battery, are fixedly arranged underneath the upper horizontal beams 16. Traversing rollers 12 (FIGS. 1 and 4) of a guide frame 11a engage the rails 14a.

A ring 19 is fixedly arranged on the supporting frame 11, and an angular shaped ring portion 20 of a rotary plate member or a rotary gear 30 slidingly engages with the ring 19. Vertical beams 21, 22 are mounted on the rotary plate 30, and the beams 21, 22 are connected at their tops by horizontal beams 23. The horizontal beams 23 are provided at the top with an angular shaped ring portion 20a, which slidingly engages with a ring portion 19a of the guide frame 11a.

The rotary plate 30 is provided with a gear ring 13 (FIG. 1) and is turned about an imaginary vertical axis 17, by a suitable drive mechanism 24.

The coke guide 6 is connected at the bottom with the rotary plate 30 by the base 9, and it is connected at the top to the horizontal beams 23 engaging the ring portion 20 so that the coke guide 6 is rotatable with the rotary plate 30.

A door-extracting machine 25 is arranged on the vertical beams 21 and a machine 26, for cleaning the sealing surface of the frame 27 of the oven chamber 10, is arranged on the vertical beams 22. Furthermore, a door-cleaning machine 28 is also mounted on the supporting frame 11 in such a way that it is in alignment with the axis of the door-extracting machine 25 when the rotary...
plate 30 is in the position illustrated in FIG. 2. A door 29 held by the door-extracting machine 25 can then be cleaned.

The motion of the supporting frame 11, together with the rotary plate 30 and the accompanying apparatus, such as the coke guide 6, the door-extracting machine 25, and the cleaning machine 26 for cleaning the frame of the oven chamber, is effected by a drive 31 operating through a shaft 32 and a lever arrangement 33. At 34, the lever arrangement 33 engages the supporting frame 11.

The operation for emptying an oven chamber 10 is as follows:

The coke-guide car 1 is moved by a drive mechanism 35 until the coke guide 6 is in position, illustrated in FIG. 1, in front of the oven chamber to be pushed, and the door-extracting machine 25, in the withdrawn position, is in alignment with the axis of an oven chamber 10.

After bringing the door-extracting machine 25 adjacent to a door 29, by moving the supporting frame 11, with its traversing wheels 12 cooperating with the U-rail guide 14, by means of a drive 31 and extracting the door, the supporting frame 11 is again withdrawn to its original position.

The rotary plate 30 is then turned 90° in the direction of arrow 36 to the position illustrated in FIG. 2, whereby the coke guide 6 is in alignment with the axis of the open oven chamber 10 and the door-extracting machine 25, supporting the door 29, is in alignment with the axis of the door-cleaning machine 28. The cleaning of the door can now begin and may be continued until the coke is pushed from the oven. By laterally moving the supporting frame 11, the coke guide 6 is brought into such a position that it communicates with the oven chamber 10, as illustrated in dotted lines in FIG. 2, and the coke may then be pushed through coke guide 6 into a quenching car 37 (FIG. 4).

After completion of the pushing of the coke, the coke guide 6 is again withdrawn to the original position as indicated in FIG. 2.

The rotary plate 30 is now again turned 90° in the direction of arrow 36 to the position illustrated in FIG. 3, whereby the cleaning machine 26 is in front of the oven chamber. The supporting frame 11 is again moved toward the oven chamber 10 and the frame 27 of the oven chamber may be cleaned. The supporting frame 11 is then withdrawn and the rotary plate 30 is turned 180°, either in the direction of arrow 36 or in the opposite direction, whereby the door 29 is brought into the position illustrated in FIG. 1, that is in alignment with the axis of the oven chamber. The door 29 is then inserted into the oven 10 by moving the supporting frame 11 toward the oven.

Finally, the supporting frame 11 is again withdrawn and the operation is complete.

As is evident from the foregoing, the door-extracting machine 25 and the cleaning machine 26 for cleaning the frame of the oven chamber are arranged on the rotary plate 30 in such a way that the supporting frame 11 moves the same horizontal distance when either apparatus is brought into operative position. Naturally, moving the individual apparatus a shorter distance is also possible when terminal or limit switches (not shown) are arranged in the end position to disconnect the drive mechanism 31.

The rotary plate 30 and the upper horizontal beams 23 can also be supported in a vertical pivot bearing, if preferred, instead of in rotary guides.

Furthermore, the door-cleaning machine 28 can be fixedly arranged on the undercarriage 1 in such a way that the door 29 in the extracting machine 25 is brought into alignment with the axis of the door-cleaning machine only after the coke guide 6 has been moved up to the oven chamber.
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4. Apparatus for use with a chambered coke oven battery comprising:
(a) an undercarriage movable along the battery relative to the coke chambers thereof;
(b) a platform mounted on said undercarriage and movable toward and away from said battery;
(c) a rotary member mounted on said platform which is rotatable about a vertical axis;
(d) a coke guide structure adapted to receive and channel coke from said coke chambers mounted diametrically on said rotary member;
(e) apparatus adapted to remove a coke oven door from a coke chamber and replace said door mounted diametrically on said rotary member on one side of said coke guide and in such a manner that its longitudinal axis is substantially perpendicular to the longitudinal plane of said coke guide;
(f) apparatus adapted to clean a coke oven door fixedly mounted to said platform;
(g) apparatus for cleaning a coke oven door frame mounted on said rotary member diametrically opposite said door handling apparatus and on the opposite side of said coke guide; and
(h) means to rotate said rotary member to selected positions whereby in a first position said door handling mechanism is positioned relatively to said door cleaning apparatus and said coke guide is positioned with respect to the coke chamber, and in a second position of said rotary member said door frame cleaning apparatus is positioned with respect to said coke chamber.

5. The invention set forth in claim 4 wherein:
(a) means are provided to laterally move said platform whereby when said rotary member is in said first position said coke guide is operatively positioned with respect to said coking chamber, and when said rotary member is in said second position said frame cleaning apparatus is operatively positioned with respect to the frame of said coke chamber.

6. A coke guide car that is movable along one side of a coke oven battery comprising:
(a) a supporting frame rollably mounted to said car in such a way that said frame is movable horizontally and axially toward and away from a coke oven chamber;
(b) a rotary plate mounted to said supporting frame for rotation about a vertical axis to which plate are mounted a plurality of individual units including a door extracting machine and a door jamb cleaning machine, with the door extracting machine and the door jamb cleaning machines being positioned on opposite sides respectively of said coke guide and along an axis perpendicular to the axis of said coke guide;
(c) means to rotate said rotary member about said vertical axis to bring said units to respective selected positions; and
(d) means to advance and retract said platform and the units mounted on said rotary member into operative position when said rotary member is rotated to each selected position.

7. The invention of claim 6 including:
(a) a door cleaning machine fixedly mounted to said platform in such a position that, when said rotary member is rotated through an angle of substantially 90° to align said coke guide with said coke chamber, said door extracting machine is presented toward said door cleaning mechanism for cleaning a door removed by said door extracting machine.

References Cited
UNITED STATES PATENTS

FOREIGN PATENTS
333,294 8/1930 Great Britain.
373,349 4/1923 Germany.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

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It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

In the heading to the printed specification, lines 3 to 5, "assignor to Heinrich Koppers Gesellschaft mit beschränkter Haftung, Essen, Germany" should read -- assignor, by mense assignments, to Koppers Company, Inc., Pittsburgh, Pa., a corporation of Delaware --.

Signed and sealed this 7th day of April 1970.

(SEAL)
Attest:
Edward M. Fletcher, Jr.
Attesting Officer

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