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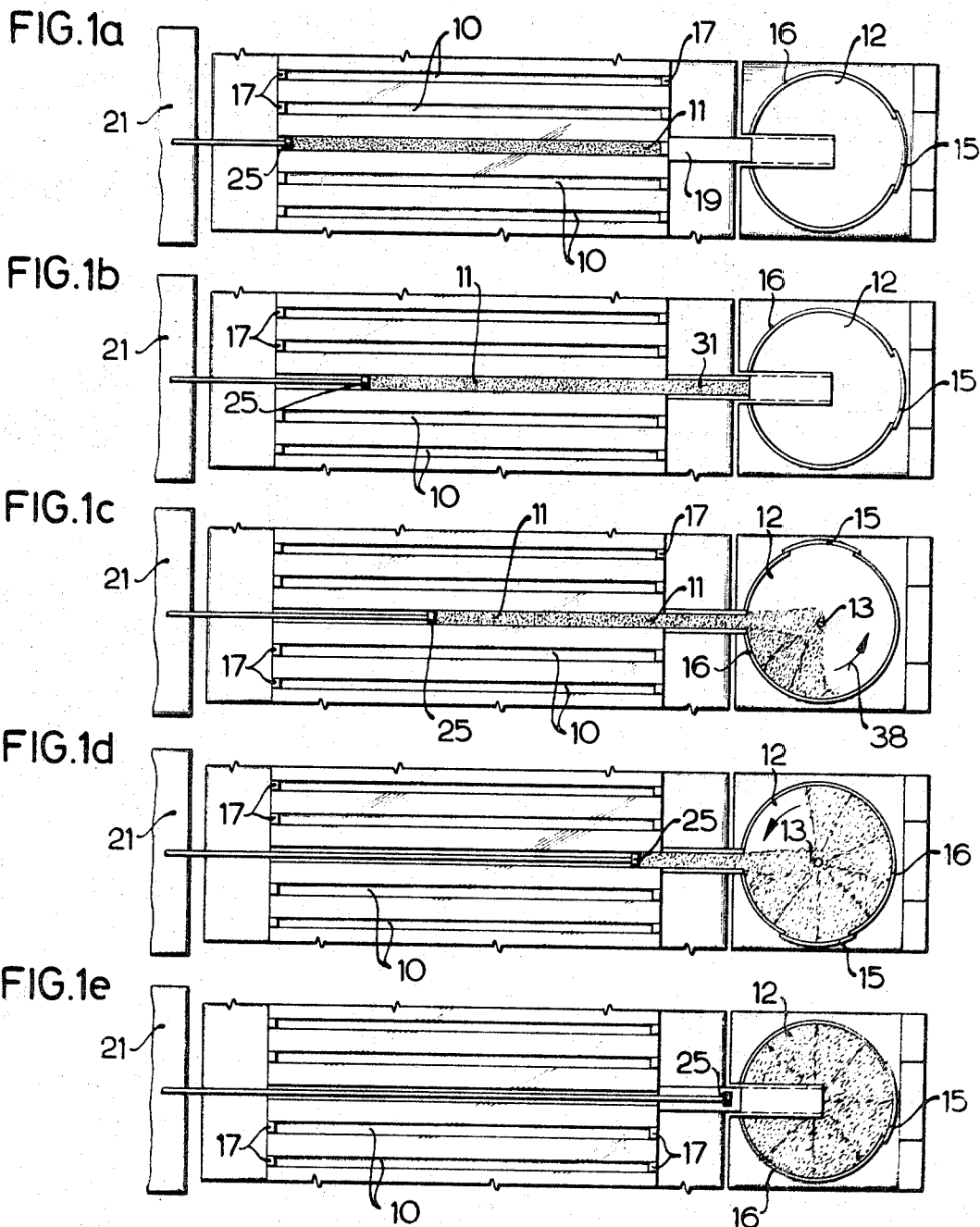
E. SCHÖN

3,547,782

COKED CHARGE RECEIVING CARRIAGE, ESPECIALLY FOR USE
IN CONNECTION WITH COKE OVEN BATTERIES

Filed July 30, 1968

3 Sheets-Sheet 1



INVENTOR

Erich Schön

By *Walter Dübey*

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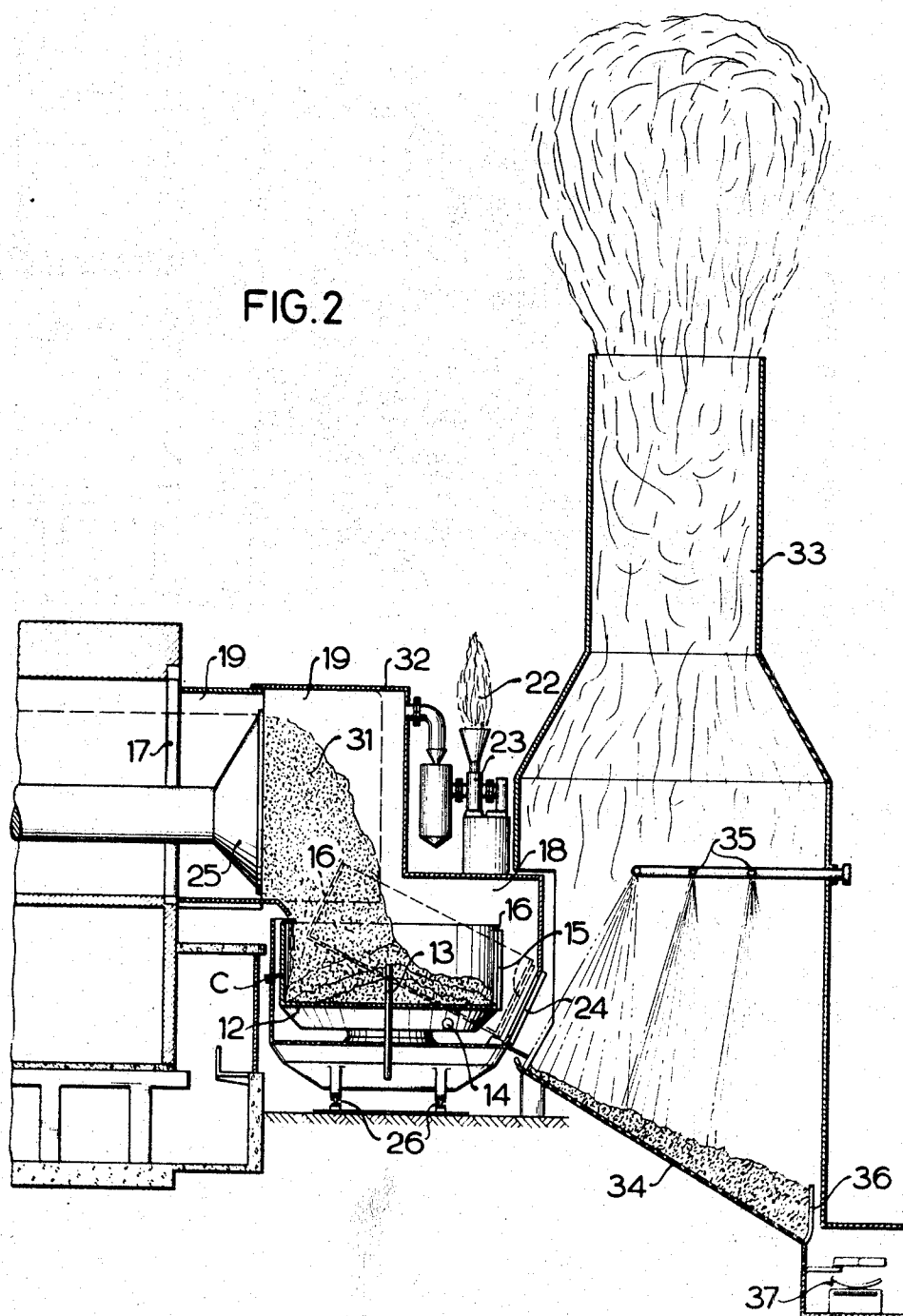
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3 Sheets-Sheet 2

FIG. 2



INVENTOR

ETICH SCHÖN

By Walter Bucky

Dec. 15, 1970

E. SCHÖN

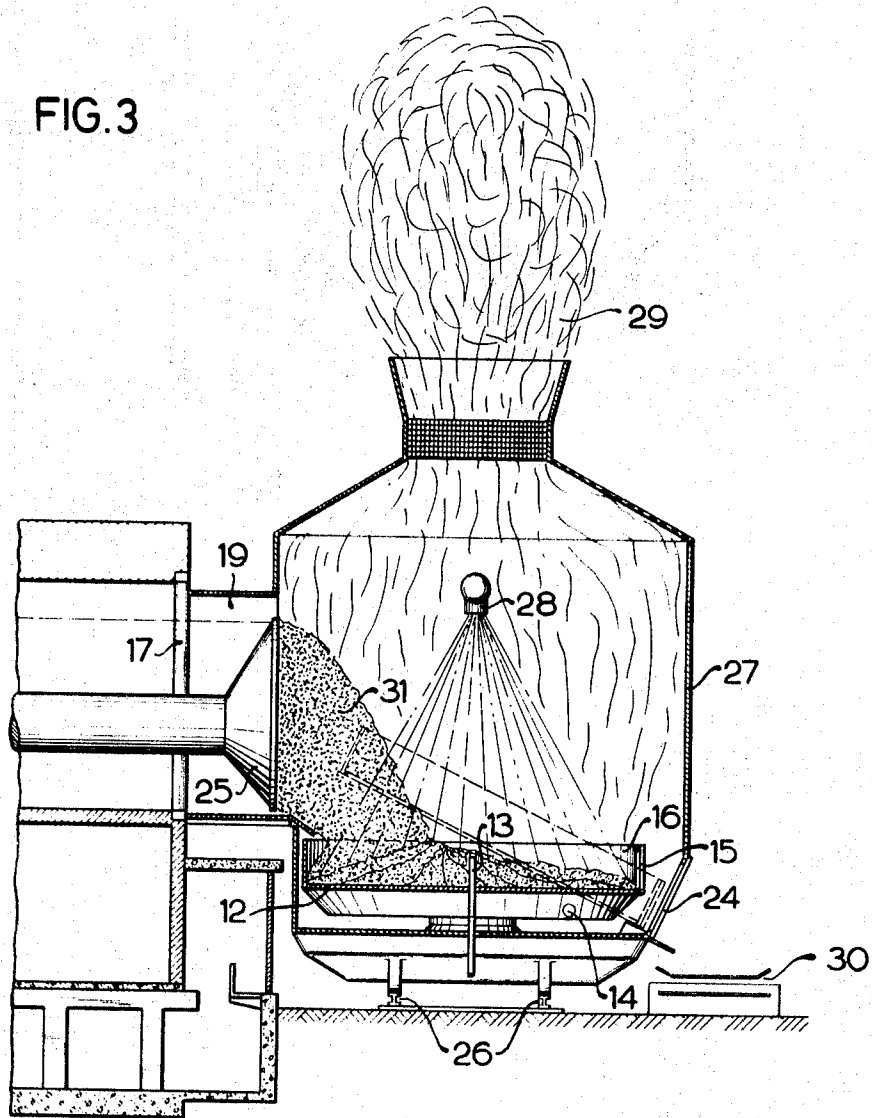
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3 Sheets-Sheet 3

FIG. 3



INVENTOR

Erich Schön

By

Walter Becker

1

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COKED CHARGE RECEIVING CARRIAGE, ESPECIALLY FOR USE IN CONNECTION WITH COKE OVEN BATTERIES

Erich Schön, Bochum-Weitmar, Germany, assignor to Dr. C. Otto & Comp. G.m.b.H., Bochum, Germany

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7 Claims

ABSTRACT OF THE DISCLOSURE

A carriage movable along a coke oven battery which comprises a table rotatable about a substantially vertical axis and provided with a confining wall forming with said table a coke charge receiving chamber adapted to be tilted about a horizontal axis for emptying said chamber of the coke charge therein.

The present invention relates to a carriage for receiving a finished coke charge, said carriage being displaceable alongside an oven battery. As a rule, horizontal coke ovens comprise rectangular chambers the height of which is a multiple of the width of such chambers while the length of such chambers is a multiple of the height thereof. Coke ovens are combined to form larger batteries while inserting therebetween heating partitions divided into individual heating flues. The coke produced in the chambers is, after withdrawal of the doors, removed in horizontal direction from the chambers at the longitudinal ends by means of the push head of a discharging machine. At this time the coke has a temperature of from about 900 to 1000° C. and as soon as it is exposed to the air, begins to burn.

As a rule, it is customary to employ a carriage, a so-called coke quenching carriage, for receiving the done coke charge, which carriage is movable alongside the oven battery. The carriage has a flat or inclined bottom and is open at the top. The coke drops into the carriage which during the discharging operation passes by the respective chamber at the proper speed. The bottom of the carriage is designed in conformity with this process and has a rectangular shape while the longer side of the rectangle is parallel to the longitudinal direction of the oven battery. During the discharge of the done coke charge, smoke and dust are developed, and if the coke ovens are operated in the neighborhood of residential areas, considerable annoyance and also damage occur.

Therefore, devices have been developed which are intended during the discharge of the coke and during its dropping into the quenching carriages to catch the dust containing smoke gases. These devices are primarily hoods covering the path through which the coke charge moves during the discharge operation. These hoods are frequently provided with gas-tight displaceable coke guiding means. Such devices have also been connected to the quenching carriage and have additionally been equipped with dust separators mounted on the frame of the carriage for the coking mass.

If in this connection the customary shape of the quenching carriage with a substantially rectangular support for the done coke was retained and if during the discharge a displacement of the carriage was necessary, very expensive and voluminous constructions were required which have not been adopted in practice. This applies in particular to designs according to which the discharge of the done coke and the quenching of the

2

coke were to be effected in a device combined to one structural unit.

It is, therefore, an object of the present invention to provide a device of the type mentioned above which will overcome the above mentioned drawbacks.

It is another object of this invention to provide a relatively simple and easily operable device which, while employing a hood covering the glowing coke during the unloading and loading operation, will eliminate the spreading of dust caused by the fumes which in view of the contact with air are formed during the discharging of the coke.

It is a further object of this invention to provide a coke receiving device which is displaceable in front of the coke oven and which will make it possible that also the quenching operation can be carried out by the same device so that following the discharge and the immediately starting quenching operation carried out in one working step, a sufficiently quenched coke is obtained which can be placed on a conveyor or the like.

These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings, in which:

FIGS. 1A to 1E diagrammatically illustrate in top view a partial section through the oven chambers the operation of a carriage according to the invention for receiving a done coke charge.

FIG. 2 is a diagrammatic vertical section through an oven wall and the carriage equipped with hood and fume withdrawing means and also shows the coke discharge operation, a quenching tower according to the invention being shown in view at the end of the battery.

FIG. 3 illustrates a displaceable carriage in an illustration similar to that of FIG. 2 by means of which during the coke discharge operation and subsequently thereto simultaneously the quenching of the glowing coke is effected.

The element which makes possible the simplification of the carriage according to the invention for receiving the done coke charge is formed by a circular dish which serves as coke support and which during the coke discharge occupies a horizontal position and is rotatable about its center. This dish or table is along its periphery surrounded by a cylindrical mantle and can be tilted into an inclined position in which a sliding off of the coke occurs. When the coke receiving carriage is intended to convey the hot coke to the quenching tower, it will suffice to dimension the radius of the dish or turntable so small that it equals approximately the projection of the fall curve on the horizontal plane of the dropping out coke.

The device according to the invention may be so designed that the cylindrical mantle which surrounds the turntable is firmly connected to the latter. The turntable and the cylindrical mantle or both may be so designed that they can be lifted and lowered independently of each other.

According to a preferred embodiment of the invention, the cylindrical mantle is fixedly connected to the turntable which serves as coke support. The mantle is provided with an opening adapted to be closed and to serve for emptying the dish or turntable when the latter occupies its inclined position. The wall of the hood of the device is provided with an outlet for the coke which outlet is adapted to be closed and is opened when the dish or turntable occupies its inclined position. The outlet corresponds to the discharge opening of the cylindrical mantle if such mantle is provided.

The operation of the device according to the invention is such that it is moved in front of the respective coke

3

chamber to be emptied. Thereupon the gas-light guiding means for the coking mass are moved to the coke oven whereupon the discharge of the coke charge from the oven is started. The turntable may already prior to the start of the discharge operation be caused to rotate and may continue its rotation until the entire done coke charge has been discharged onto the turntable. During the entire time which coke is discharged from the oven, the coke receiving carriage remains at its place, in other words, the coke receiving carriage is not displaced, as was the case with heretofore used coke quenching carriages with rectangular supporting surface.

After the coke discharge has been completed, the guiding means for the coking mass are withdrawn and the hood is closed at this section whereupon the carriage is moved to the quenching tower. Here the turntable is tilted and the coke is discharged through the opening in the hood onto the inclined surface of the quenching tower the bottom of which is perforated and on which the quenching is effected.

The displaceable carriage may, however, also be so designed that already within the hood the quenching of the coke is effected. To this end, the entire cross-section of the turntable is provided with nozzles for spraying the water while a corresponding steam vent is provided above the turntable. In this instance the diameter of the turntable must be so selected that a pouring height for the done coke charge is obtained which will assure a uniform quenching of the coke. The hood of the device is also in this instance provided with an outlet which is adapted to be closed and which corresponds to the inclined position of the turntable. The quenched coke may be directly discharged onto a conveyor alongside the battery.

Referring now to the drawings in detail, FIGS. 1A-1E illustrate the horizontal coke chambers 10 which have both of their ends provided with door closures 17. The discharging machine 21 has a discharging head 25. The reference numeral 11 designates a coke chamber which is in the condition of being discharged, while the reference numeral 31 designates the coke being discharged as coke cake.

A coke receiving carriage generally designated C is displaceable on rails 26 and comprises a turntable 12 which is rotatable about a vertical axis 13. The marginal area of the turntable 12 has a cylindrical mantle 16 while a hood 32 surrounds the coke receiving carriage C on all sides. Gas-tight coke cake guiding means 19 are insertable into said hood. When the coke guiding means 19 have been inserted into the hood, the opening provided for moving the guiding means 19 outwardly is closed by a door. The turntable 12 and the cylindrical mantle 16 define a container, and above said container there is provided a chamber 18. The said chamber communicates a withdrawing and cleaning device 23 from which the air 22, after having been cleaned of fumes and dust, can be withdrawn.

The turntable 12 can be tilted about the horizontal shaft 14 into the dash line position. The cylindrical mantle 16 is furthermore provided with outlet doors 15 to which corresponds an opening 24 in the hood 32.

FIG. 2 furthermore indicates the quenching tower 33 with inclined bottom 34 and sprinkling nozzles 35. The reference numeral 36 designates a wall which is adapted to hold the done coke charge and is adapted to be lifted. The reference numeral 37 designates the conveying means onto which the done coke is discharged from the inclined quenching tower 33.

The oven chambers 10 are filled with coke which is in different conditions of coking. In the chamber 11 to be emptied, according to the condition of FIG. 1A, the doors 17 have already been lifted. The gas-tight guiding means 19 have been placed in front of the oven opening (FIG. 1A). Thereupon the discharge operation is initiated. When the head of the coke cake 31 has passed by the marginal area of the control platform (FIG. 1B), the

4

coke begins to drop down. In the meantime the turntable 12 which is in horizontal position has been subjected to a turning movement. When the discharging or pressing head 25 occupies the position of FIG. 1C, the drop curve or trajectory of the coke 31 as indicated in FIG. 2 has developed. It will be noted that the vertical projection of the drop curve corresponds to the radius of the turntable 12. During the further advance of the head 25 (FIG. 1C) and the turning of the turntable 12 in the direction indicated by the arrow 38, the done coke spreads uniformly over the bottom of the turntable.

FIG. 1E shows the condition after completed discharge of the coke charge. The head 25 is now pulled back. The coke cake guiding means 19 may be pulled into the hood 32. The fumes forming during the discharge operation and subsequently thereto are withdrawn by the device 23 and are cleaned correspondingly. The carriage C can now be moved to the quenching tower 23. The turntable 12 is tilted about the shaft 14 and the doors 15 are opened so that the opening 24 of the hood 32 is relieved and the glowing coke slides onto the quenching surface 34. After completed quenching operation, the damming-up wall 36 is lifted and the coke is discharged onto the conveyor 37. The coke receiving carriage may in the meantime be returned to its position for receiving the discharge of another oven.

According to the device of FIG. 3 in which simultaneously with the discharge of the done coke charge also the quenching is effected immediately in front of the oven chamber to be emptied, the base surface of the turntable must be of increased dimensions inasmuch as it has to take into consideration that for a uniform quenching of the coke a certain pouring height must not be exceeded. This difference in the dimensioning of the turntable can easily be seen from FIG. 3.

The arrangement of FIG. 3 is similar to that described above. Also the arrangement of FIG. 3 is provided with a hood 27 and the device is displaceable on rails 26. The device of FIG. 3 furthermore comprises similar to the device of FIG. 2 gas-tight coke cake guiding means 19 while the turntable 12 has a mantle 16 fixedly connected thereto. The turntable 12 is rotatable about a vertical axis 13 and can be tilted about the horizontal shaft 14. Furthermore, the device is provided with quenching water nozzles 28.

The various steps of operation discussed in connection with FIGS. 1A to 1E during the discharge of a coke charge are also being practiced when using a device according to FIG. 3. The turntable 12 immediately at the start of the discharge of an oven is put into rotation, and already the unloading of the first portion of the coke upon the turntable, the quenching nozzles 28 are actuated. In order to assure a uniform distribution of the coke over the turntable, it has been found expedient to rotate the turntable at a higher speed so that the coke spreads in a plurality of successive layers. This is highly advantageous for a uniform quenching and furthermore furnishes the possibility of operating with a greater final pouring height. This in turn permits a reduction in the diameter of the turntable 12. When the discharging operation of an oven has been completed, the means 19 are pulled out. The quenched coke can, by tilting the turntable 12 about shaft 14, moving the doors 15 laterally and by opening the discharge opening 24 of hood 27, be discharged onto the conveyor belt 30 arranged alongside the oven battery.

It will be evident that water connections which may selectively be engaged and disengaged are provided for feeding the water nozzles 28 alongside the battery at different areas in order to feed the considerable quantities of water which are required for the quenching of a coke charge. Of course, those devices which have been developed for withdrawing fumes during the quenching operation and for withdrawing vapors 29 from the hood 27 may also be employed in this instance. In this connec-

tion, grate-shaped inserts may be mentioned which bring about a return of the water condensing from the quenching vapors and which contribute to washing out harmful ingredients from the quenching vapors.

It is, of course to be understood that the present invention is, by no means, limited to the particular constructions shown in the drawings and that modifications are possible, the scope of the invention being determined by the disclosure.

What I claim is:

1. A carriage combination for receiving a coke charge from a coke oven and for movement along a coke oven battery, said carriage including frame means, wheel means supporting said frame means, container means supported by said frame means and comprising a table rotatable about a substantially vertical axis and provided with a confining wall forming with said table a coked charge receiving chamber, said container means also comprising substantially horizontal shaft means tiltably supporting said chamber to empty the same when it contains a coked charge, said substantially horizontal shaft means being located eccentrically with regard to the axis of rotation of said table, hood means substantially enclosing said container means, reciprocally movable coke charge guiding means movable outwardly into a position in front of the oven battery at a respective chamber location and movable inwardly into said hood means, and suction-maintaining means operatively associated with said hood means for withdrawal of contaminants therefrom.

2. A carriage combination according to claim 1, in which said container means in a cylindrical mantle formation comprises a lower portion carrying the substantially horizontal shaft means and rotatable about said substantially vertical axis and also comprises an upper portion formed by said coked charge receiving chamber and tiltably supported by said substantially horizontal shaft means and also supported by said lower portion when said upper portion is in non-tilted position.

3. A carriage combination according to claim 1, in which said table has a radius approximately equalling the vertical projection upon a horizontal location particularly of the desired drop curve of the coke charge when being discharged from the coke oven chamber to be emptied.

4. A carriage combination according to claim 1, in which said confining wall is interconnected with said table and provided with a normally closed opening adapted to be opened in tilted position of said chamber.

5. A carriage combination according to claim 4, which includes said hood means for covering up said container means and into which said coke charge guiding means can be fully pushed as a coked charge is being filed thereinto during a coke oven discharging operation, said hood means always maintained at vacuum therein being pro-

vided with a normally closed opening registering with said normally closed opening in said confining wall and adapted to be opened when said chamber is in tilted position.

6. A carriage combination according to claim 5, which includes nozzle means arranged within said hood means and connectable to a water supply for spraying water over at least the major coked charge receiving surface of said table, and venting means in said hood means for relieving the suctional interior of said chamber from further contamination by fumes and smoke developing therein during the quenching operation, the diameter of said table being dimensioned in conformity with the quantity of coked charge to be quenched so that an approximately uniform pouring height will be assured.

7. In combination with a coke oven battery, a carriage for receiving a coked charge from a coke oven and a quenching tower to receive the charge from the carriage, said carriage being movable from alongside said coke oven battery to said quenching tower, said carriage comprising a coked charge receiving chamber forming means rotatable about a substantially vertical axis and also tiltable about a substantially horizontal axis, hood means substantially enclosing said chamber forming means, reciprocally movable coke charge guiding means positioned in said hood means adjacent said chamber forming means and movable outwardly of and inwardly into said hood, suction-maintaining means operatively associated with said hood for withdrawal of contaminants therefrom, said hood having an opening adjacent said chamber forming means to discharge said charge when said chamber forming means is tilted, and said tower having an opening above its bottom wall opposite the opening in said hood when said carriage is moved to said tower to receive the charge from said chamber forming means to quench said charge in said tower.

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WILBUR L. BASCOMB, Jr., Primary Examiner

D. EDWARDS, Assistant Examiner

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