

[54] **POLLUTION FREE COKE QUENCHING CAR**

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[57] **ABSTRACT**

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A coke quenching car, movable along a battery of horizontal coke ovens, has a pair of spaced vertical walls extending transversely of the car and defining a fall space between them. The upper part of this space has a front opening for receiving coke from an oven. The space below the opening is closed by a front wall, while the back of the fall space is closed by a back wall. Extending from the bottom of the opening rearwardly in the fall space part way across the car is a ramp as wide as the fall space. A deck slopes from the back wall downwardly below the inner end of the ramp for receiving coke from it and discharging it beneath the ramp onto a floor that slopes from the front wall downwardly to the back wall. The lower part of the back wall has an outlet opening in it that normally is closed by a door. In the upper part of the fall space and also below the ramp and the deck there are water sprays for quenching coke beneath them.

[30] **Foreign Application Priority Data**

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[51] **Int. Cl.**.....C10b 39/04, C10b 39/12

[58] **Field of Search**.....202/227-230, 95, 202/253; 201/39; 263/44; 110/31

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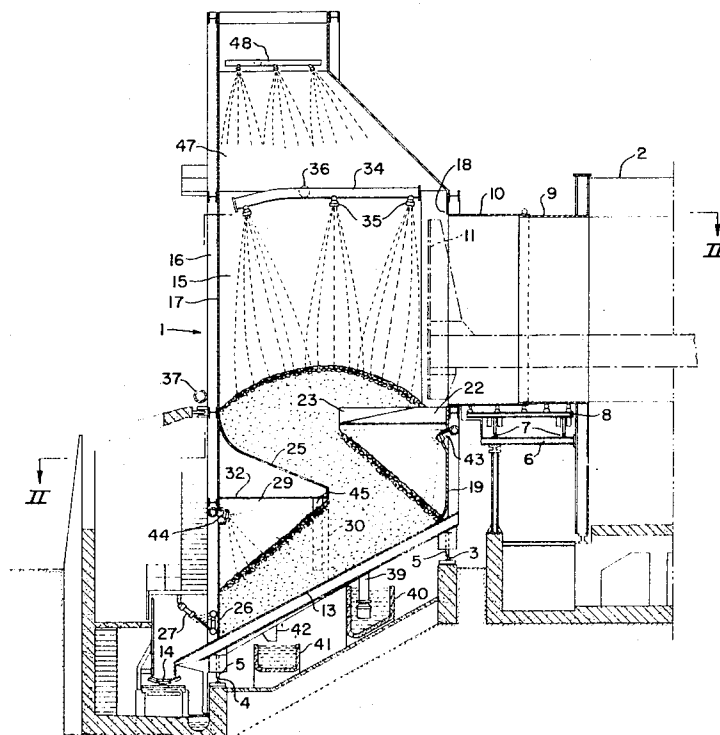
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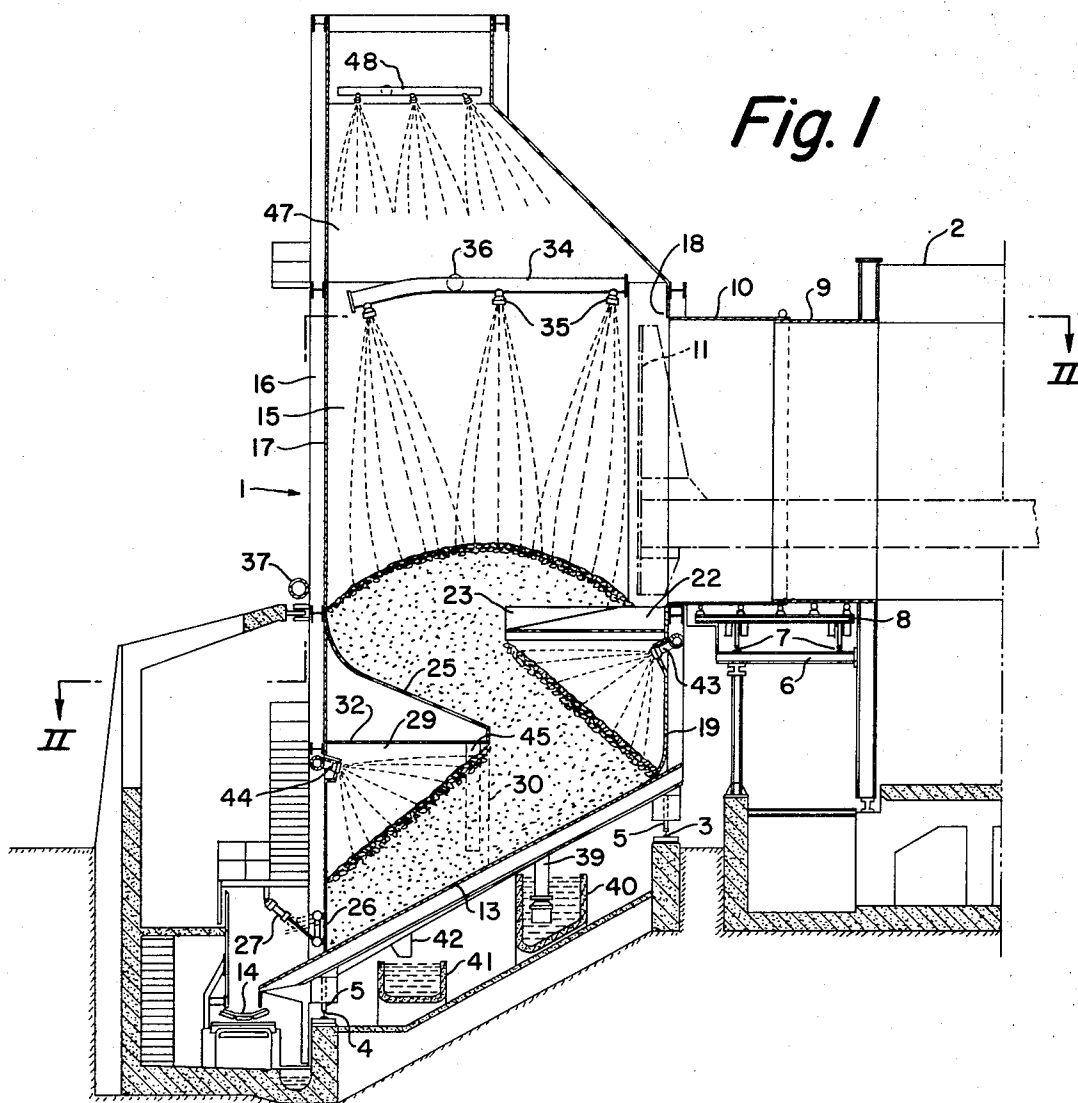
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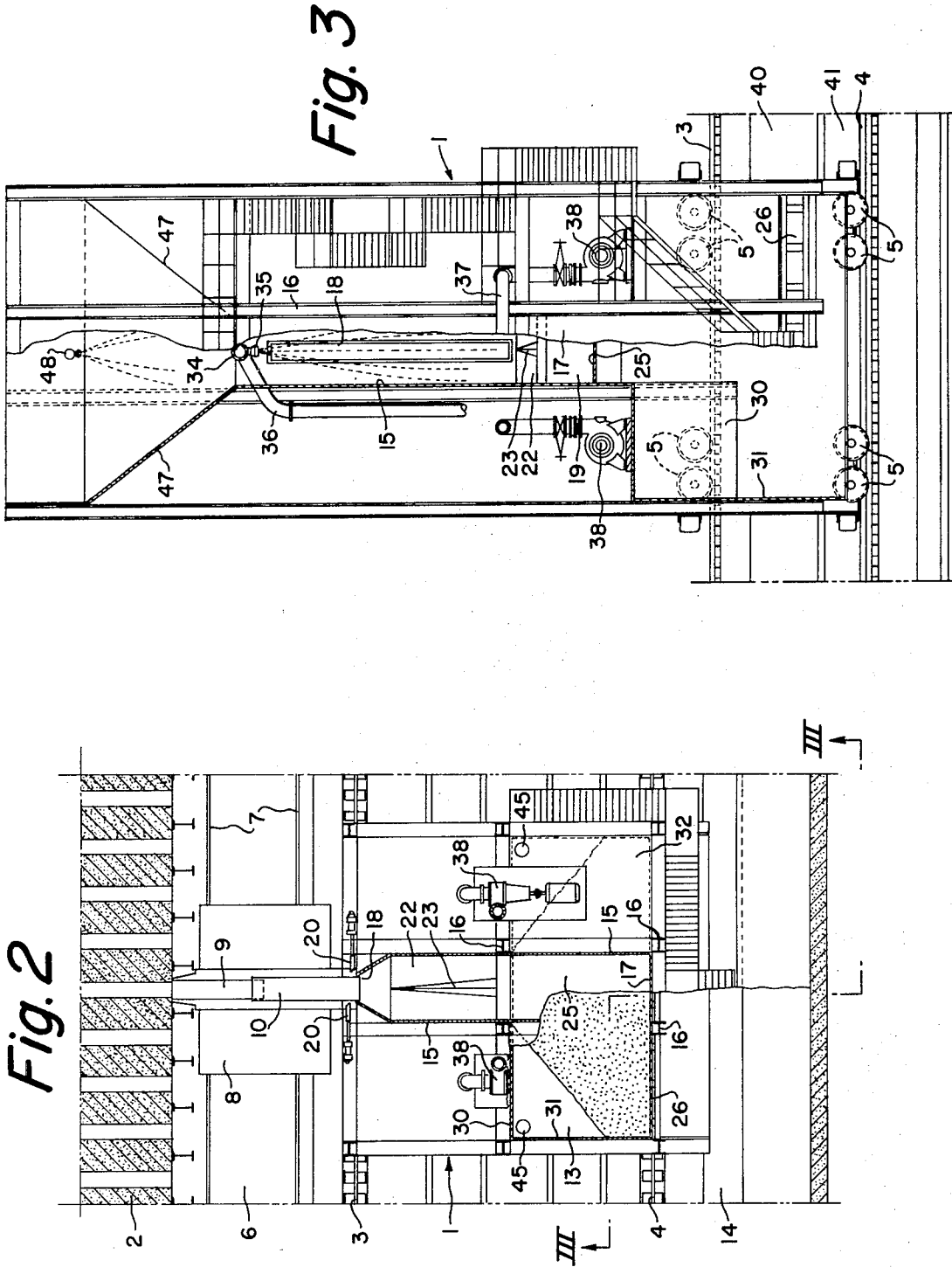
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8 Claims, 3 Drawing Figures





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POLLUTION FREE COKE QUENCHING CAR

In the majority of coking plants which are now in operation, the prepared coke is pushed from a horizontal furnace chamber over the coke platform through a guide and into a car which can be moved along the battery. The car has a sloping loading face, over the length of which coke distribution takes place as the car is slowly moved along. In this car, the burning coke is driven under the quenching tower. Here extensive cooling is produced by spraying with abundant quantities of water. The quenched coke may then be discharged from said car onto a coke ramp.

This known process has two deficiencies. On the one hand, when the burning coke is discharged in the open air, violent combustion phenomena occurs which lead to strong smoke and dust formation and which also pollute the environment of the coking plant to a great extent. On the other hand, due to the relatively high and irregular coke bed in the car, it is necessary to use larger quantities of water for quenching than are generally necessary for the cooling of the coke, in order to eliminate the presence of hot coke pockets in the coke which is dumped onto the ramp. The abundant quantity of water results in a coke having a considerable water content. This causes an increased consumption of heat during smelting.

An attempt has already been made to avoid smoke and dust pollution by arranging hoods over the coke cake guide conveyor. Moreover, a chamber that can be moved in front of the oven battery and which is connected to the oven chamber so as to be smoke-tight, and which is provided with sprinklers for quenching the coke, is also known, but it entails a rather deep layer of the coke on the loading face. Finally, coke has also been pushed into a tank that has approximately the shape of a coke chamber and that can be rotated from the vertical position by 90° into the horizontal position, in which the quenching of the coke is undertaken.

The previously known apparatuses were too costly in part, and the afore-mentioned tasks were only partially solved in part.

The object of this invention is to provide a car that can be moved before a battery of ovens, by which smoke and dust pollutions are eliminated, in which quenching is accomplished, in which the quenching time is less than heretofore, and which leaves the coke with less water content than other quenching cars.

The preferred embodiment of the invention is illustrated in the accompanying drawings, in which

FIG. 1 is a central vertical section through the coke quenching car just after it has received coke from an adjacent oven;

FIG. 2 is a horizontal section taken on the line II—II of FIG. 1; and

FIG. 3 is a vertical section taken on the line III—III of FIG. 2.

Referring to the drawings, a coke-receiving car 1 travels along a track in front of a battery of horizontal coke ovens 2. The track is formed from upper and lower rails 3 and 4, on which the wheels 5 of the car travel. Between the track and the battery of ovens is the usual operating platform 6, on which another track 7 is mounted for supporting a carriage 8 for a tubular coke guide. This guide is made in two telescoping sections 9 and 10 that are telescoped when the carriage is moving along its track but are extended as shown in FIG. 1

when the coke from an oven is to be pushed by a pusher 11 through the guide and into the car. At that time, one end of the guide engages an oven around its open door.

The coke car has a floor 13 that slopes from the upper wheels down and across the lower wheels of the car to a point above a conveyor 14. At the central part of the car there is a pair of spaced parallel vertical transverse walls 15 that are spaced a considerable distance from the ends of the car. These walls are supported by vertical uprights 16 and suitable horizontal connecting members. The width of the space between the two vertical walls is considerably greater than the width of an oven chamber, but it still is a relatively narrow space. The back of this space, at the side of the car farthest removed from the ovens, is closed by a vertical back wall 17. The upper part of the front of the space is provided with an opening 18, around which the outer end of the coke guide section 10 will fit so that coke moving from the oven to the car will not be exposed to the atmosphere. The front of the space beneath openings 10 is closed by a front wall 19. The opening itself, when coke is not being delivered to the car, is closed by sliding doors 20 (FIG. 2). The space between vertical walls 15 forms a fall space for the coke that is pushed into the car through opening 10. The fall space is wide enough to receive the entire contents of a coke oven chamber at one time.

As the coke enters the fall space it moves across a ramp 22 that extends inwardly or rearwardly from the bottom of opening 10 to a point about half-way across the car. Although this ramp may be flat, for best results it is provided with a central longitudinal ridge 23 having laterally inclined side surfaces, and the flat areas at the opposite sides of the ridge are sloped lengthwise toward the back of the car.

Opposite the ramp there is a deck 25 that likewise extends across the fall space and slopes from the back wall downwardly below the inner end of the ramp. The inner end of the deck is located a considerable distance below the inner end of the ramp. The deck receives coke from the ramp and reverses its flow so that it moves toward the front or oven side of the car and beneath the ramp, where it falls onto the sloping floor of the car. The floor again reverses the direction of movement of the coke so that it flows away from the oven and rearwardly beneath deck 25. The lower part of the back wall of the car is provided with an outlet opening that normally is closed by a door 26 that can be swung outwardly and upwardly by a fluid pressure cylinder 27. While the coke is in the car it is quenched by water sprayed onto the coke, as will be explained presently.

It is desirable to reduce the depth of the bed of coke on the lower half of the floor of the car for more efficient quenching. This can be done by spreading the bed laterally toward the opposite ends of the car. For this purpose the side walls 15 of the fall space are provided with openings 29 beneath deck 25 so that the side walls directly beneath the deck do not extend down to the floor of the car. Therefore, as the coke slides down the sloping floor it can spread out through openings 29 as soon as it starts to move under the deck. The outlet door 26 extends substantially the full length of the car.

To enclose the coke that has moved out through the openings in the side walls of the fall space, the back

wall of the car is extended laterally away from openings 29, and a pair of front walls 30 are added that are parallel to the back wall and likewise extend laterally from the front ends of the wall openings toward the opposite ends of the car. The outer ends of these front walls and the back wall are connected by end walls 31 at the ends of the car, and the confined spaces thus produced are covered by horizontal roofs 32. The result is that the coke, from the time it leaves the oven until it is discharged from the back of the car, is enclosed.

In the upper part of the fall space there is a tubular header 34 provided with spray nozzles 35 that direct water down onto the coke below them. The header is connected to a pipe 36 that extends down to a horizontal pipe 37, the opposite ends of which are connected to the outlets of electric pumps 38 mounted on the two roofs 32. As shown in FIG. 1, water for the pumps can be picked up by an inlet pipe 39 extending down into a trough 40 beneath the car. Another trough 41, fed by an outlet 42 of the car, carried the drainage water away from the car. Another spray nozzle 43 is mounted in the front upper corner of the space beneath the ramp and sprays water onto the sloping upper surface of the coke that extends from the ramp down to the upper end of the sloping floor of the car. A third sprinkler system 44 is mounted on the back wall of the car for spraying the sloping upper surface of the coke beneath the deck and the adjoining roofs 32.

The spraying of water on the coke quenches it. The upper sprays 35 start to operate as soon as coke enters the car. When the falling coke reaches the sloping floor, the front spray 43 is turned on, and when the coke reaches the back wall the back sprays 44 are turned on. The amount of water used for quenching can be measured ahead of time or controlled manually so that the coke will not be oversaturated. Or, it can be regulated automatically by temperature measuring devices 45 that are located in the free spaces beneath the outer front corners of the two roofs 32. If desired, other temperature measuring devices can be located in other coke-free areas of the fall space. The quantity of water required for quenching is less than heretofore, because the quenching is done in three separate locations in the car.

The quench vapors will rise through the fall space and exit at the top of the car. To clean these vapors before they emerge, a cleaning chamber is formed above the fall space by walls 47 diverging upwardly from the upper edges of vertical walls 15 as shown in FIG. 3. Conventional cleaning apparatus can be disposed in this chamber, which also contains another sprinkling system 48 for the quench vapors.

According to the provisions of the patent statutes, I have explained the principle of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. A coke quenching car movable along a battery of horizontal coke ovens for receiving coke discharged therefrom in a horizontal direction, comprising a pair of spaced vertical side walls extending transversely of the car and defining a fall space between them, the upper part of said space having a front opening between said vertical walls for receiving coke horizontally discharged from an oven, means for closing said opening, a front wall closing the front of the fall space below said opening, a back wall closing the back of said space, a ramp as wide as said fall space extending from the bottom of said opening rearwardly in said space part way across the car, a deck sloping from said back wall downwardly toward said front wall and below the inner end of said ramp for receiving coke therefrom and discharging it beneath the ramp, a floor sloping from said front wall downwardly toward said back wall for receiving coke from said deck and directing the coke toward said back wall beneath the deck, the lower part of said back wall having an outlet opening therein extending across said floor for escape of coke from the car, a door for said opening, a first water spray located above said fall space, a second water spray located below said ramp, and a third water spray located below said deck, each of said sprays being arranged for quenching coke passing beneath the sprays.

2. A coke quenching car according to claim 1, in which said ramp is provided with a central longitudinal ridge with laterally inclined side surfaces.

3. A coke quenching car according to claim 1, including temperature measuring means disposed in the fall space for regulating the quantity of water released by said sprays.

4. A coke quenching car according to claim 1, including a vapor cleaning chamber at the top of the fall space.

5. A coke quenching car according to claim 1, including walls diverging upwardly from the tops of said vertical walls, and water sprays disposed between the upper parts of said diverging walls.

6. A coke quenching car according to claim 1, in which said vertical walls are at the central portion of the car and are provided with openings beneath said deck, said sloping bottom wall extends laterally through said wall openings toward the opposite ends of the car, and said back wall extends laterally along said floor, whereby coke sliding down said sloping floor below said deck can spread out toward the ends of the car.

7. A coke quenching car according to claim 6, including a pair of front walls extending laterally from the front of said wall openings toward the ends of the car, end walls at the ends of the car connecting the back wall with said pair of front walls, and a roof at each side of said pair of vertical walls covering the space defined by the underlying back wall, end wall and front wall.

8. A coke quenching car according to claim 7, including pumps for said sprays mounted on said roofs.

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