March 11, 1941. H. KOPPERS 2,234,826

QUENCHING TOWER FOR COKING PLANTS

Filed July 21, 1939 2 Sheets-Sheet 1

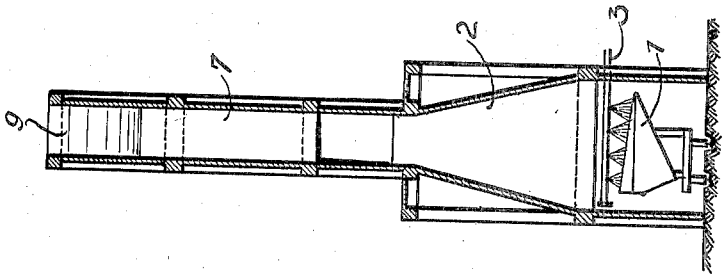


Fig. 2

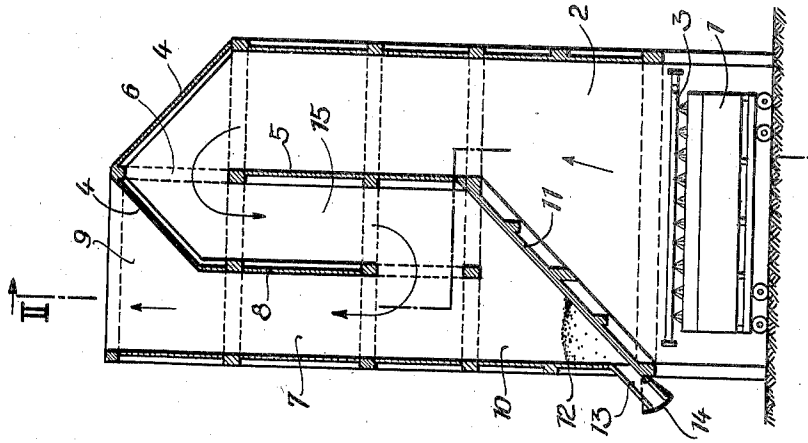


Fig. 1

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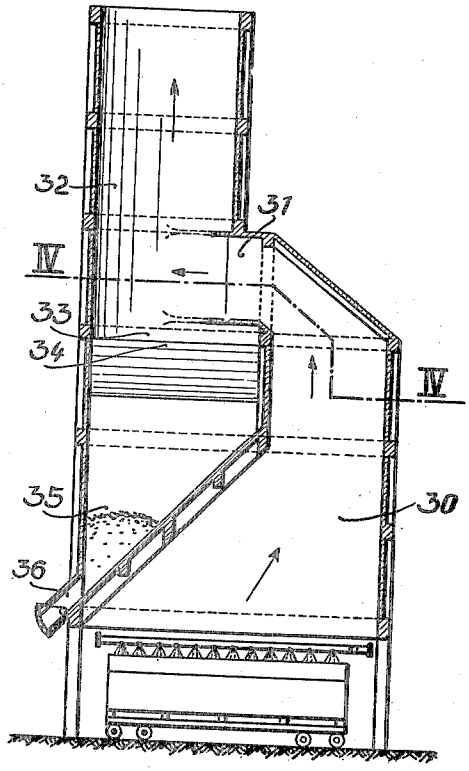


Fig. 3

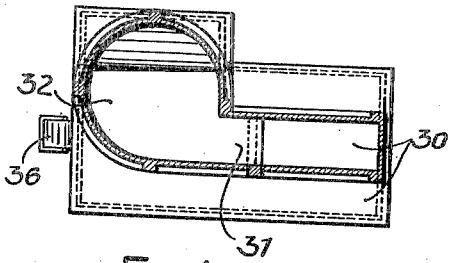


Fig. 4

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QUENCHING TOWER FOR COKING PLANTS

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Application July 21, 1939, Serial No. 285,658
In Germany July 22, 1938

3 Claims. (Cl. 202—227)

The invention relates to quenching towers for coking plants in which the glowing coke discharged into the usual quenching car is quenched by means of water and the vapours thus produced escape through the stack-like superstructure of the quenching tower.

On account of the violent evaporation of water within the quenching tower, a great amount of small particles of coke is carried out of the quenching tower in the form of dust along with the quenching vapours. This fine coke dust deposits later-on in the open air and covers, for instance, the leaves of trees and bushes in the neighbourhood of quenching installations with rather a thick layer impermeable to the light. In consequence thereof the effective radiation of the sunlight cannot penetrate the leaves thus affecting the growth to a considerable extent.

The present invention now has for its object to improve the quenching towers of coking plants as known heretofore and in such manner that a separation of the troublesome fuel dust from the quenching vapours may be attained by simple means.

According to the invention there is arranged within the quenching tower of the coking plant, adjacent the space in which are placed the quenching car and the quenching water delivery, a cleaning compartment which is provided with a central partition and connected with the vapour discharge outlet opening. A water circulation system for the washing and cooling of the quenching vapours may be arranged therein, preferably independently of the quenching water delivery system.

The cleaning compartment according to my invention is suitably provided with guide-walls by means of which the quenching vapours are forced to undergo a change in the direction of flow. The bottom of the cleaning compartment is provided with a closable dust-collecting space for collecting the separated coke dust. From time to time, the solid constituents may be extracted from the dust collecting space.

The present invention further comprehends constructing the cleaning compartment, arranged adjacent the quenching tower housing, the quenching car, and the quenching water delivery system, in such a manner that it has nearly a cylindrical form in a vertical upright position, with a tangential inlet for the introduction of the quenching water vapours. The vapours produced and rising upwards violently during the quenching process are thus led in whirling current through the cleaning compartment, the dust particles being thrown towards the outer walls as a result of the centrifugal force and falling downwards. The quenching vapours then rise through the stack, arranged above the cylindrical cleaning compartment, into the open air.

With the above and other objects and features of my present invention in view, I shall now describe a preferred embodiment of my invention along the lines of the accompanying drawings, in which:

Fig. 1 is a vertical longitudinal section and

Fig. 2 is a vertical cross section on line II—II of Fig. 1.

Fig. 3 is a vertical section through another embodiment of my present invention and

Fig. 4 finally shows a horizontal section on line IV—IV of Fig. 3.

The quenching car 1 charged with the glowing coke extracted from the coke oven is driven underneath the quenching chamber section 2 of the quenching tower where the glowing coke is treated with large quantities of water by means of spraying tubes 3 arranged above the quenching car in the quenching chamber section 2. The quenching chamber section 2 is closed at the top by a roof 4. The left wall 5 of the quenching chamber section is provided at its upper part with an opening 6 leading to the cleaning compartment 7 arranged beside the quenching chamber section.

A vertical guide wall 8 extending from the roof 4 is installed in the cleaning compartment 7 by means of which the quenching vapours rising upwards in the quenching chamber section 2 after passing the opening 6 are forced to flow downwards in order to pass around the guide wall 8 on its way to the cleaning compartment for flow through the stack 9 upwards into the open air.

With the sudden reversal of the direction of flow of the vapours from the downward to the upward direction, the coke particles carried along during the quenching process, due to the vehement raising of steam, are separated from the quenching steam and they fall into the dust-collecting space section 10. The dust-collecting space section 10 is provided with an inclined bottom 11 which fits against the vertical wall 12 of the quenching tower. To the very end of the inclined bottom 11 there is connected an outlet 13 for the dust which is closed by a sealing damper 14. From time to time the coke dust accumulating in the collecting space section 10 is discharged through the outlet 13. It may,

however, also be advantageous to assist the separation of dust from the quenching vapours by means of sprinklers arranged within the space 15.

With the mode of construction illustrated in Figs. 3 and 4, the dust cleaning chamber is designed according to the present invention in such a manner that it acts as a centrifugal dust separator or cyclon. An essentially horizontal tubular passage 31 leads from the quenching chamber section 30 to the cleaning chamber section 32. The cleaning chamber section 32 is essentially in the form of a vertical cylinder. The passage 31 terminates in the chamber section 32 tangentially. The gases or vapours flowing at a rather high velocity on leaving the passage 31 and entering the cleaning chamber section 32 rotate within the cylindrical chamber 32, and the dust particles contained in the gases or vapours are deposited mostly on the chamber walls and finally fall through an opening 33 provided in the bottom 34 of the cleaning chamber section into the dust collecting space section 35. They are removed at 36.

When carrying out the invention according to Figs. 3 and 4, the upper part of the cleaning chamber 32 serves simultaneously as a chimney in which a natural draught necessary for moving the gases and vapours is produced. The movement of the gases and vapours may, however, also be effected or assisted by forced draught, for instance by adopting fans or other means.

I have now above described my present invention on the lines of a preferred embodiment thereof, but my invention is not limited in all of its aspects to the mode of carrying it out as described and shown, since the invention may be variously embodied within the scope of the following claims.

I claim:

1. A quenching tower for coking plants or the like comprising a quenching chamber section in which the glowing coke charged into the quenching car is treated with quenching water, a dust cleaning chamber section arranged to one side of said quenching chamber section and communicably connected at its lower part with the quenching chamber section and at its upper part with an outlet discharge for the quenching gases and quenching vapours, and a dust collecting space section below the dust cleaning chamber section and communicating at its upper part with the lower part of the dust cleaning chamber section; and in which the communicable connection of the dust cleaning chamber section with the quenching chamber section is constituted of gas flow passage having means therein adapted to impart a sudden reversal in the direction of flow of the gases and vapors inducing a whirling centrifuging effect on the gases and vapours over the dust collecting space section as they enter the bottom of the cleaning chamber section from the quenching chamber section for flow thence through the cleaning section to its outlet discharge.

2. A quenching tower for coking plants or the like comprising a quenching chamber section in which the glowing coke charged into the quenching car is treated with quenching water, a dust cleaning chamber section arranged to one side of said quenching chamber section and communicably connected at its lower part with the quenching chamber section and at its upper part with an outlet discharge for the quenching gases and quenching vapours, and a dust collecting space section below the dust cleaning chamber section and communicating at its upper part with the lower part of the dust cleaning chamber section; and in which the communicable connection of the dust cleaning chamber section with the quenching chamber section is constituted of gas flow passage means adapted to impart an abrupt change in direction of flow inducing a whirling centrifuging effect on the gases and vapours over the dust collecting space section as they enter the bottom of the cleaning chamber section from the quenching chamber section for flow thence through the cleaning section to its outlet discharge, and in which vertical guide walls are arranged between the dust cleaning chamber section and the quenching chamber section, said guide walls being arranged to cause the gases and vapours from the quenching chamber section to flow upwardly alongside a partition, over the same, then downwards along the other side of said partition to the communicable connection, and thence be centrifuged before flowing up again through the cleaning section.

3. A quenching tower for coking plants or the like comprising a quenching chamber section in which the glowing coke charged into the quenching car is treated with quenching water, a dust cleaning chamber section arranged to one side of said quenching chamber section and communicably connected at its lower part with the quenching chamber section and at its upper part with an outlet discharge for the quenching gases and quenching vapours, and a dust collecting space section below the dust cleaning chamber section and communicating at its upper part with the lower part of the dust cleaning chamber section; and in which the communicable connection of the dust cleaning chamber section with the quenching chamber section is constituted of gas flow passage means adapted to impart an abrupt change in direction of flow inducing a whirling centrifuging effect on the gases and vapours over the dust collecting space section as they enter the bottom of the cleaning chamber section from the quenching chamber section for flow thence through the cleaning section to its outlet discharge, and in which the dust cleaning chamber section is substantially in the form of a vertical cylinder and the communicable connection is constituted of a connecting pipe between the quenching chamber section and the dust cleaning chamber section, which pipe terminates in the latter substantially tangentially.

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