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APPARATUS FOR EMPTYING COKE FURNACE BATTERIES

Filed May 24, 1972 2 Sheets-Sheet 1

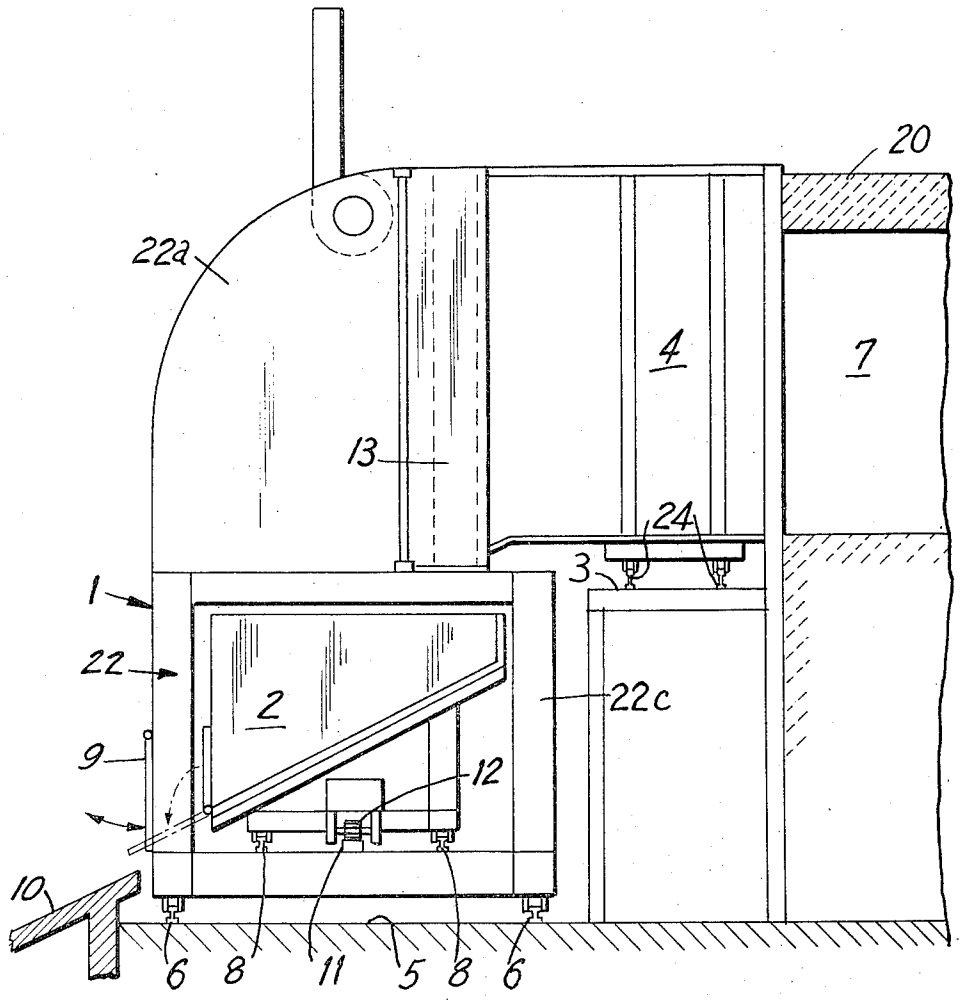

FIG. 1

APPARATUS FOR EMPTYING COKE FURNACE BATTERIES

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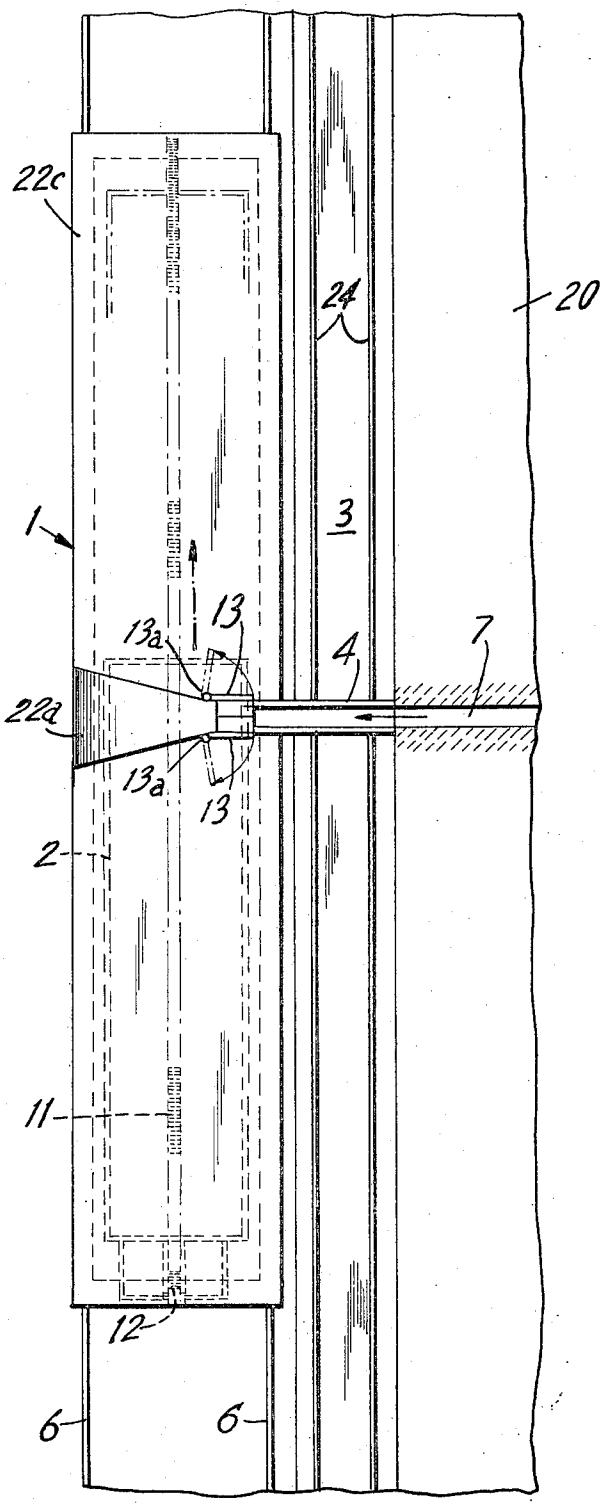

FIG. 2

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APPARATUS FOR EMPTYING COKE FURNACE BATTERIES

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ABSTRACT OF THE DISCLOSURE

A device for emptying horizontally arranged coke furnace batteries comprises a coke gas emission hood which includes an upper portion with a sealing flap part which is adapted to be aligned with and sealed with a coke guide car which is oriented at the entrance of one of the furnaces which are to be emptied. The emission hood includes a lower part which advantageously has an opening at at least one end to permit entry and passage of a coke car along horizontally extending trackways defined on a lower portion of the hood structure. The hood structure may be moved along a trackway which extends parallel to an operating stage trackway for a coke cake guide car and the upper sealing portion of the hood may be aligned with the guide car which in turn may be aligned with selective coke furnaces to permit discharge of the coke from the furnace through the guide car and into the upper portion of the hood and downwardly into the coke car which is positioned therebelow. The coke car may be shifted along the hood and/or the hood itself may be shifted in order to permit discharge of the coke after quenching in the quenching tower.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates in general to coking furnaces and, in particular, to a new and useful device for emptying coke furnaces without polluting the atmosphere.

DESCRIPTION OF THE PRIOR ART

At the present time, coke furnaces are emptied by directing the glowing coke through a guide or coke cake guide car and into a coke car or quenching car. The quenching car is movable along a track separately from a gantry-type enclosing structure or emission hood which may be positioned over the car. The entry of the coking car into this gantry-type emission hood is not desirable because of the fact that the radiant heat is so great from the formation of dust and soot and this is of particular advantage when the quenching car is driven by a quenching engine which is occupied by an operator. The known construction employs a gantry-type hood which is movable independently of the quenching car. In regular operation, the quenching car leaves the emission hood after receiving the coke so that the glowing coke comes in contact with the free atmosphere on its way to the quenching tower and this permits combustion of the surface of the coke and causes the emission of fine ashes and coke dust over the thermal lift. With the known construction, it cannot be ensured that the quenching car will be moved only within the area of the emission hood. Therefore, it is also known to cover the quenching car track completely over its entire length of a coke furnace battery up to the quenching tower. The natural disadvantage of this is that it requires a separate and very expensive structure.

SUMMARY OF THE INVENTION

In accordance with the present invention, there is provided a simple device for emptying coke furnace batteries which ensures that the quenching car is covered by an emission hood in any operating position up to the quenching tower and which does not require the complete covering of the entire length of the furnace battery from the individual furnaces to the quenching tower. The inventive structure comprises an emission hood structure which is movable on trackways parallel to an operating track for coke cake guide cars which are moved selectively into alignment with each furnace. The emission hood carries a sealing structure which is engageable with the coke cake guide car and defines a sealed opening through which the coke cake may pass into the hood and downwardly into a quenching car or coke car which is movable on a trackway defined within the hood structure at the lower portion thereof. With the inventive arrangement, the quenching car track is mounted in the emission hood structure and the emission hood, together with the quenching car, can be moved to the quenching tower. The hood is advantageously of a length which is at least equal to the length of the quenching car and it may be used with a quenching car which is designed as a quenching ladle which is moved during evacuation of the coke furnace chamber. In the preferred form, the emission hood includes an enclosed trackway of at least twice the length of the quenching car.

The structure advantageously includes means for driving the quenching car along the trackway defined within the hood and, in a preferred embodiment, the driving means comprises a rack mounted on the emission hood plus a motor drive or transmission on the quenching car which includes a pinion engaged with the rack. The apparatus is such that it can also be used by traction means associated with a driving winch at a fixed driving station or at the quenching engine driving station. Such a traction driving means will generally comprise an endless drive member which is engageable with the quenching car. The emission hood and the car are movable together by a quenching engine which may also include an endless drive member transmission connection.

In some instances, it is desirable to couple the emission hood with the coke cake guide car, which is movable on a trackway defined on an operating stage, which runs along the coke furnace battery. With this arrangement, it is ensured that there is an adequate sealing between the hood and the coke cake guide car. The connection between the hood and the coke cake guide car comprises sealing flaps which serve as a seal therebetween.

The invention has the principal advantage that the quenching car is always covered by an emission hood on its way between the coke furnace, where it receives the glowing coke to the quenching tower, where the coke is quenched. The emission hood and the quenching car advantageously form a constructionally and functionally integrated unit. This unit can be moved by itself very easily, and, in addition, the quenching car may be moved within defined limits within the hood itself.

Accordingly, it is an object of the invention to provide an improved device for emptying coke furnaces which comprises a hood structure which forms an enclosure between the passage for the delivery of glowing coke from each individual furnace to a glowing coke car or quenching car which is carried in the hood and which is movable on a trackway defined in the hood and wherein, the hood structure itself is movable to transport the coke and the coke car from the coke furnaces to a quenching tower.

A further object of the invention is to provide a device for handling glowing coke from the point of removal from the coke furnaces to a quenching tower and without ex-

posing the coke to the atmosphere and without discharging pollutants into the atmosphere.

A further object of the invention is to provide a device for emptying coke furnace batteries 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 drawing 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 an end elevational view, partly in section, of a coke furnace battery having a combined hood and glowing coke car structure constructed in accordance with the invention; and

FIG. 2 is a top plan view of the device shown in FIG. 1.

GENERAL DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, in particular, the invention embodied therein, comprises a device for emptying each individual furnace of a coke furnace battery comprising a plurality of side-by-side horizontally arranged coke furnaces and which includes movable hood means for containing gas and dust emissions, generally designated **1**, which is movable along hood-advancing trackway means, generally designated **6**. The hood means provides sealing of the passage between individual coke furnaces **7** of a coke furnace battery **20** and a coke car or quenching car **2** in order to receive glowing coke cake and to transport the glowing coke cake to a quenching tower (not shown) where it is quenched.

In accordance with the invention, the hood means comprises a horizontally elongated hood structure **22** with an upper portion **22***a* which forms a part of an enclosure structure along with the part **22***b* of a coke cake guide car **4** which may be aligned precisely at the entrance to the coke furnace **7** and sealed against the wall thereof. Coke cake, which is discharged from the furnace **7**, moves through the coke cake guide car past a sealing flap structure **13** of the hood **1** and through the upper portion **22***a* for discharge downwardly into a lower portion **22***c*. The lower portion **22***c* defines a horizontally elongated enclosed structure having a glowing coke car trackway **8** defined along the length thereof upon which a glowing coke car **2** is movable. Car **2** is positioned along the trackway **8** at a location to receive the glowing coke which is passed through the coke cake guide car into the upper portion **22***a* and which moves downwardly into the lower portion **22***b* into the guide car positioned therein.

In the construction illustrated, the enclosed hood structure comprises the separately movable emission hood **1** and the coke cake guide car **4** which is movable along a coke cake guide at trackway **24** which is defined along a horizontally extending operating step **3** which is directly alongside the furnace bank **20**. In some instances, it is preferable to seal the guide car **4** with the hood structure **1** by the sealing flap elements **13** so that they may be moved together to orient them between the individual coke furnaces **7** and a quenching tower (not shown) which is located along the trackway **6**. The ground level **5** along which the hood structure **1** is movable is lower than the operating stage **3** and the trackway **6** comprises the rail structure extending along the ground **5**.

In a preferred arrangement, the quenching car **2** may be movable along the trackway **8** within the hood structure **1** and may also be moved out of this structure if so desired. When the glowing coke car **2** is filled, the entire

emission hood **1** with the coke cake guide car **4** is moved to the quenching tower (not shown) or the hood structure **1** and car **2** alone may be so moved with the elements **13** pivoted on pivots **13***a* into a position in which they close off the opening of the hood upper part **22***a*. The emission hood structure **1**, plus the coke car **2**, may be moved together by any drive mechanism, such as quenching engine (not shown). The emission hood **1** is normally closed on its sides but it includes a flap structure **9** at the lower part **22***c* (FIG. 1) which may be raised in order to permit emptying of the coke car to deliver the coke after it has been quenched to a receiving chute **10** for a connecting stage of operations.

As best seen in FIG. 2, the emission hood structure **1** is advantageously made with a lower portion **22***c* which is of a length which is at least sufficient to accommodate a trackway **6** which is about twice as long as the quenching car **2**. In the construction illustrated, the quenching car **2** is designed as a quenching ladle which may be moved as desired by a drive mechanism which includes a rack **11** defined along the length of the trackway which is engaged by a drive pinion **12** of a drive motor for shifting the glowing coke or quenching car **2**. The drive motor, with the drive pinion **12**, are advantageously carried on the car **2**. The drive means may comprise other drive elements, for example, a traction device in the form of an endless drive member which is moved by a driving winch at a fixed drive station. Similarly, the entire hood structure **1** may be moved by such a traction device or by a type of drive such as shown for the quenching car. In the embodiment where the hood structure **1** is connected with the coke cake guide car **4**, the elements **13** are movable flaps which may be moved to close the opening of the upper portion **22***a* of the hood **1** whenever the hood is disassociated from the coke cake guide car **4**.

What is claimed is:

1. A device for emptying glowing coke from horizontally arranged coke furnace batteries into a coke quenching car, comprising a travelling coke gas emission hood having an upper closed portion with an open top side facing the furnace adapted to be aligned with and sealed with each individual coke furnace and a lower portion with a closed furnace facing side wall and an opposite closed side wall and a closed bottom wall having a horizontally extending coke quenching car trackway defined therealong inside said hood, and a coke quenching car movable along said trackway over said closed bottom wall inside said hood and being positionable below said upper portion to receive the glowing coke.

2. A device for emptying glowing coke from horizontally arranged coke furnace batteries, according to claim **1**, wherein said emission hood lower portion is about twice as long as said coke quenching car.

3. A device for emptying glowing coke from horizontally arranged coke furnace batteries, according to claim **1**, including drive means for driving said coke quenching car along said coke car trackway.

4. A device for emptying glowing coke from horizontally arranged coke furnace batteries, according to claim **1**, wherein said coke quenching car trackway includes a rack defined along said trackway and a drive carried on said coke quenching car with a pinion engaged with said rack for moving said coke quenching car along said trackway.

5. A device for emptying glowing coke from horizontally arranged coke furnace batteries, according to claim **1**, including a fixed drive station and drive means at said station for driving said coke quenching car within said emission hood and for driving said hood along said track means.

6. A device for emptying horizontally arranged coke furnace batteries, according to claim **1**, including a coke cake guide car located between said hood upper portion and each individual furnace, a coke cake guide trackway

extending along said furnace battery for guiding said coke cake guide car for movement between said hood and said furnaces, said hood upper portion including a sealing portion of the area of said coke cake guide car for sealing said hood to said coke cake guide car.

7. A device for emptying glowing coke from horizontally arranged coke furnace batteries, according to claim 6, wherein said sealing portion comprises flaps which may be oriented to close the hood when the hood is disassociated from said coke cake guide car.

8. A device for emptying glowing coke from horizontally arranged coke furnace batteries, according to claim 1, wherein said hood opposite side wall normally closed includes a discharge opening, a closure closing said discharge opening, said coke cake car being alignable with said opening for the discharge of coke therefrom through said opening.

9. A device for emptying glowing coke from horizontally arranged coke furnace batteries, according to claim 1, wherein said lower portion of said emission hood is horizontally elongated and includes said trackway for said coke quenching car which is of a length which is at least twice the length of said coke quenching car, said upper portion comprising a relatively narrow central part with said opening being of substantially the size of said furnaces, a sealing flap pivotally carried on each side of said

opening, a coke guide car disposed between said opening and the individual furnaces, said guide flaps being movable to seal the opening with said coke cake guide car.

10. A device according to claim 1, including horizontally extending track means for moving said hood alongside the battery of coke furnaces for positioning said hood part selectively into alignment with each furnace in succession.

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