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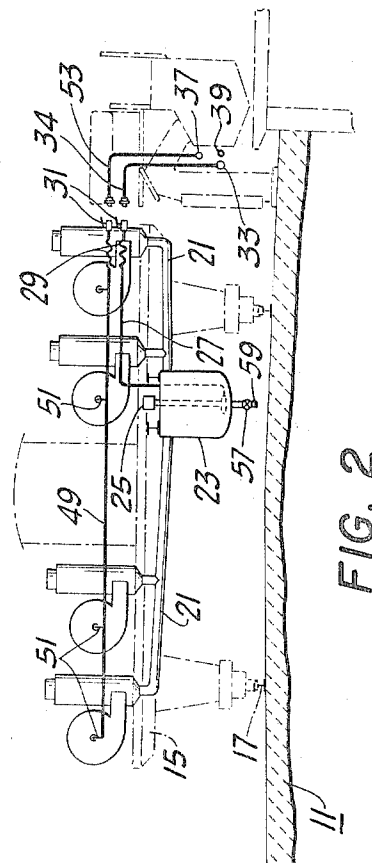
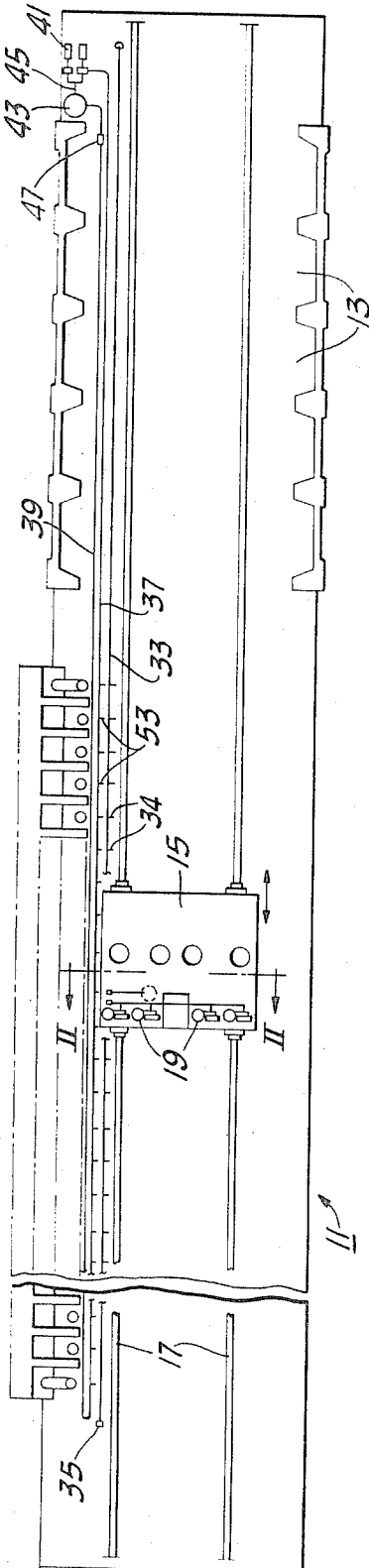
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WATER SYSTEM FOR A LARRY CAR

Filed June 23, 1971

2 Sheets-Sheet 1



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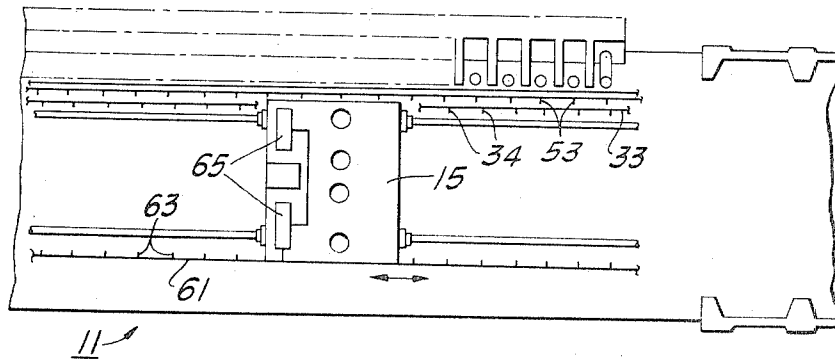


FIG. 3

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WATER SYSTEM FOR A LARRY CAR

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Continuation-in-part of abandoned application Ser. No. 868,012, Oct. 21, 1969. This application June 23, 1971, Ser. No. 155,820

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6 Claims

ABSTRACT OF THE DISCLOSURE

Larry cars that are equipped with water scrubber type dust eliminators obtain clean water for such scrubbers from a circulating water header loop extending the length of a coke oven. A dirty water storage tank on the larry car is emptied simultaneously with the charging of coal into a coke oven.

CROSS REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of co-pending application Ser. No. 868,012, filed Oct 21, 1969, now abandoned.

BACKGROUND OF THE INVENTION

Charging a coke oven chamber with fresh coal produces a great volume of gases that pollute the environment unless they are captured and cleaned before they are released. Heretofore, it has been customary to vent the coke oven chamber and to let the gases escape to the rected into one or more gas scrubbers before they are released to atmosphere.

It has been customary heretofore for a larry car to carry a tank of clean fresh water that was used in gas scrubbers located on the larry car, and a pumping system to move the water around on the larry car. From time to time, the tank had to be refilled with fresh water, and a dirty water tank, also carried on the larry car, had to be drained and flushed of sediment.

Such a system of tanks, pumps, and piping, including valves and other equipment usually associated with such a system, is costly to install, costly to maintain, and adds considerable extra weight to the larry car that traverses along the length of the coke oven. Further, the time for charging under present conditions is determined by the capacity of the clean and dirty water tanks on the larry car.

The present invention is directed to a water system for a larry car that is equipped with water-scrubber type dust eliminators for removing dirt and particulate material from gases that evolve while charging a coke oven chamber; such system being less costly and more efficient than systems known from the prior art.

SUMMARY OF THE INVENTION

A system for delivering clean water to water scrubbers on a larry car includes a conduit with headers at each coke chamber that is connected to a source of pressurized water, and a conduit on the larry car that is connected to gas scrubbers, while a flexible length of hose is used to connect the larry car conduit to a header when a chamber is being charged with coal. Such system also includes a dirty water conduit mounted to the coke oven and a dirty water tank mounted to the larry car with a flexible length of hose that connects the larry car dirty water conduit to the dirty water header on the coke oven.

For a further understanding of the invention and for features and advantages thereof, reference may be made to the following description in conjunction with the drawing which illustrates one embodiment of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawing:

FIG. 1 is a schematic simplified plan view of the top of the coke oven battery that incorporates a system in accordance with the present invention;

FIG. 2 is a view along line II—II of FIG. 1; and

FIG. 3 is a schematic plan view similar to that of FIG. 1, showing a modified system in accordance with the invention.

DETAILED DESCRIPTION

FIG. 1 illustrates schematically and in a simplified manner a plan view of the top of a conventional coke oven battery 11 that has, at the right hand end, a plurality of coal storage bins 13, and a larry car 15 that moves along the top of the coke oven battery 11 on a pair of rails 17.

The larry car is equipped with, among things, a plurality of gas scrubbers 19 of the water type, and each gas scrubber 19 is provided with a drain line 21 leading to a common dirty water collecting tank 23. The dirty water collecting tank 23 is conveniently suspended from the larry car 15 as shown in FIG. 2.

The dirty water collecting tank 23 is equipped with a sump pump 25, and, in some instances, with two sump pumps that are float actuated. The pump discharge is carried in a conduit 27 that is provided with a length of flexible hose 29, having at its free end a suitable coupling 31. Such coupling is preferably of the quick-connect and quick-disconnect type, with internal automatically operated valves. One suitable coupling is marketed and sold under the trademark Kamvalock by the OPW Division of Dover Corporation, Cincinnati, Ohio, but other types of couplings may be used if preferred. Such a coupling is provided with an automatic internal valve which opens when a coupling connection is securely made and which closes when the coupling connection is broken. Wherefore, no other valve on the pump discharge conduit 27 is required if such type of coupling is used.

On the pusher side of the coke oven battery 11, there is provided a dirty water collecting header 33 that has a flushing connection 35 at one end, and that communicates at the other end, below the coal bins 13, with a discharge conduit leading to a collecting tank at a remote location.

The dirty water collecting header 33 is provided with a dirty water conduit 34 at each coke oven chamber, and each conduit 34 is fitted with a coupling 31 and a gate valve.

On the pusher side of the coke oven battery 11, there is also a clean water header or loop comprising a supply conduit 37 and a return conduit 39. The supply conduit 37 is connected to clean water pumps 41 located at one end of the coke oven battery, and the return conduit 39 is connected to a clean water pumping tank 43, that also is connected to the pumps 41 by a conduit 45. A suitable pressure control valve 47 is installed in the return line 39 to maintain the pressure in the header or loop at a pre-selected value.

The larry car 15 also carries a clean water conduit 49 that has branches 51 leading to each of the gas scrubbers 19 and that is provided with a length of flexible hose and coupling 29, 31 like those mentioned previously.

Along the length of the clean water supply header conduit 37, there is at each coke oven chamber a clean water conduit 53 that includes a gate valve (not shown) and one of the couplings 31.

Each of the couplings 31 in the clean and dirty water systems on the larry car 15 may be provided with a micro-switch so that the larry car travel mechanism is de-energized when each coupling 31 is connected to another conduit coupling. Thus, the larry car remains immobile as long as the couplings 31 are mated, but when they are

separated, the larry car becomes movable again for spotting at another oven or another location.

FIG. 3 illustrates a modification of the system of the invention, which modification includes a gas duct 61 disposed along one side of the coke oven battery; either on the coke side as shown or on the pusher side, as preferred. This duct 61 is provided with a plurality of conduits 63 that are or may be similar to the conduits 53 described hereinbefore, that includes a gate or other valve and coupling 31.

The larry car 15 of the modification is provided with one or more, two being shown, fans or pumps 65 which are interconnected by a suitable conduit 67 and which are connectable to the conduits 63. Thus, dirty gases that evolve from the coke oven chamber during charging are conducted to the fans 65 and are moved by the fans through connecting conduit means into the gas duct 61. Thence, the gases flow to a gas scrubber station (not shown) located either on the coke oven battery or at a remote ground location. Such a gas scrubbing installation may be used by two or more batteries equipped with the system of the present invention.

There would be associated with the gas scrubbing station a suction fan or other a suitable fan device that will move the gases from the conduit on the coke oven battery into the gas scrubber equipment.

Those skilled in the art will appreciate that, when the modified system is employed, there is no need for the dirty water conduit header 33 on the coke oven battery; the gas duct substituting for the conduit header.

In operation, the pumps 41 continually move clean water from the clean water tank 43 through the supply header conduit 37 and through the return header conduit 39 back to the clean water supply tank 43. Make-up water for the clean water tank can be furnished from any available source of supply. The pressure control valve 47, having been previously set to a selected pressure setting, maintains the pressure in the clean water loop above the pressure required to deliver water to the sprays in the larry car scrubbers 19.

When larry car is spotted at an oven that is ready for charging with coal, the coupling 31 on the larry car clean water supply conduit is connected to a mating coupling on the clean water conduit 53 fixed to the supply conduit 37 at the respective coke oven chamber to be charged. Once such a connection is made, the larry car becomes immobile and water is available to the gas scrubbers 19. Water flow to the gas scrubbers is controlled by the larry car operator by means of suitable known solenoid control valves.

While the larry car is spotted at an oven that is ready for charging, the coupling 31 on the larry car dirty header is connected to a mating coupling on the dirty water conduit 33. After such a connection is made, the larry car becomes immobile and then dirty water may be collected in the dirty water tank. Then, while the gases that evolve from the coke oven chamber during the charging process are being cleaned in the gas scrubbers, the dirty water produced in the gas scrubbers flows into the dirty tank and is removed simultaneously therefrom by the pump. The dirty water is pumped from the tank through the dirty water conduits to a receiving tank at ground level or otherwise mentioned hereinbefore.

Of course, there is no dirty water tank that needs to be drained and flushed when the modified apparatus of FIG. 3 is employed. The dirty gases evolving from the coke oven chamber being charged, merely pass through the fan or fans on the larry car and then into the gas duct.

After charging of the coal is completed, the clean water supply to the larry gas scrubbers is stopped by disconnecting the clean water coupling, and the dirty water discharge from the larry car is stopped by disconnecting the dirty water coupling. After the clean water and the dirty water coupling are disconnected, the larry car becomes

mobile again and the empty larry car then returns to the coal bins for another charge of coal.

Those skilled in the art will recognize many significant features and advantages in the present invention, among which are:

That conventional clean water storage tanks and pumps are removed from the larry car which results in a lighter weight larry car;

That more available space on the larry car is available when such storage tanks and pumps are removed; and

That the gases evolving from the coke oven chamber are collected and moved easily and effectively by means of a fan or fans to a central gas scrubbing station, thereby also removing much weight from a larry car that is equipped with gas scrubbing apparatus.

Although the invention has been described herein with a certain degree of particularity, it is understood that such description is made only as an example and that the invention is defined by what is hereinafter claimed.

What is claimed is:

1. In a coke oven battery equipped with a larry car for receiving and charging coal into respective coking chambers of said battery, the combination with said larry car and said battery of:

- (a) a water-type gas scrubber on said larry car;
- (b) a first conduit on said larry car carrying clean water to said scrubber;
- (c) a second conduit having a plurality of outlets therein extending along the length of and on top of said coke oven carrying clean water from a source of supply of water;
- (d) means for connecting said larry car conduit to an outlet of said second conduit adjacent a coke oven chamber of said coke oven as said larry car charges coal into a coke oven chamber;
- (e) a dirty water tank on said larry car for receiving particle contaminated water from said scrubbers after the gases from a coke oven chamber being charged with coal through said scrubbers; and
- (f) means for discharging the dirty water from said tank as coal is being charged into said coking chamber.

2. The apparatus of claim 1 wherein:

- (a) said means for connecting said larry car conduit to said coke oven conduit is a quick-connect and quick-disconnect coupling.

3. The apparatus of claim 1 wherein:

- (a) said means for discharging dirty water from said tank includes
 - (i) a drain conduit on said coke oven battery; and
 - (ii) a conduit connectable to both said conduit on said coke oven battery and on said tank.

4. The apparatus of claim 1 including:

- (a) a pump for removing clean water from said clean water source of supply into said conduit carrying clean water.

5. In a coke oven battery equipped with a larry car having a water-type gas scrubber thereon, the improvement comprising:

- (a) a clean water header disposed along the length of said coke oven battery with branching conduits at respective coke oven chambers;
- (b) a conduit on said larry car connected to said gas scrubber;
- (c) means for connecting water from a branching conduit of said header carrying water to a conduit on said larry car when said larry car is positioned at an oven to be charged with coal;
- (d) a dirty water header disposed along the length of said coke oven battery with a branching conduit at each coke oven chamber;
- (e) means to conduct dirty water from said gas scrubber to said dirty water conduit while coal is being charged into a respective coke oven chamber.

6. The apparatus of claim 2 including:

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(a) means responsive to the connection of said larry car conduit to said coke oven conduit to immobilize said larry car as long as said connection is made.

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