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COAL SPRAYING CHUTE

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Fig. 1

Fig. 2

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The present invention relates to apparatus for spraying fuel such as coal and the like with oil or wax for the purpose of dust-proofing and more particularly relates to apparatus for treating coal having a large percentage of extremely fine particles, such as slack.

Apparatus for spraying coal with oil or wax which consists of nozzles located near the end of a conveyor or boom for directing oil or wax spray against the coal as it falls due to the action of gravity, is known. Such apparatus is not perfect in its operation, however, when coal having a large percentage of very fine particles is being treated, for the reason that a relatively thick batch of very fine particles is not thinly enough distributed to permit the treating spray to reach all portions thereof.

According to the present invention the foregoing difficulties are eliminated by providing a vertical chute which is baffled to thinly distribute coal passing downwardly therethrough. Oil spraying nozzles are associated with the chute and baffles in such a manner that spray reaches all portions of the coal.

An object of the invention is to provide a device for spraying coal with oil or the like for dust-proofing purposes by directing a spray of the treating material against coal as it falls due to the action of gravity.

Another object of the invention is to baffled coal as it falls due to the action of gravity to thinly distribute the same and to simultaneously apply a dust-proofing spray thereto.

A further object of the invention is to restrict downwardly falling coal so that it is thinly distributed and to apply a spray of dust-proofing material to the same while it is in a thinly distributed state.

A still further object of the invention is to thinly distribute free falling coal while it is in a chamber and to apply heat to the chamber while a dust-proofing spray is directed against the coal.

These and other objects will be apparent from the following specification when taken with the accompanying drawings wherein:

Fig. 1 is a diagram of a vertical section of the invention taken to one side of the center line thereof, and

Fig. 2 is a diagram of a vertical section of another form of the invention taken to one side of the center line thereof.

Referring particularly to the drawing, the reference character 1 indicates a hopper communicating with a vertical chute 2. At the junction between the hopper 1 and the chute 2 is a horizontal shut-off member 3 resting on a guide 4. The shut-off member 3 is for the purpose of controlling the size of the opening from the hopper 1 into the chute 2.

The chute 2 while preferably square in horizontal cross-section may have any cross-section that is desired. Within the chute 2 are disposed a plurality of downwardly inclined baffles 5. The baffles 5 are secured fixedly to the walls of the chute 2 and are vertically spaced one from the other, arranged in a staggered relation so that coal is baffled back and forth from one side of the chute to the other.

Disposed below each baffle 5 is a spraying nozzle 6 connected to a suitable spraying mechanism for directing a spray of dust-proofing material against the coal as it falls downwardly through the chute 2. Each nozzle 6 communicates through a pipe 7 with the main spraying material pipe line 8. Contiguous with the pipe lines 7 and 8 is a continuous tube 9 through which circulates a hot oil or its equivalent for the purpose of maintaining the pipe lines 7 and 8 heated so that the coal spraying material therein will be kept at an elevated temperature and will not solidify or congeal and for the purpose of elevating the temperature of the system at the beginning of the treating operation. As shown particularly in the drawing, the tube 9 extends into the chute 2 adjacent each of the nozzles 6 providing heat radiating coils 10. The heating coils 10 heat the interior of the chute 2 adjacent the nozzles 6 and thereby maintain the material being directed from the nozzle 5 at an elevated temperature until it strikes the coal. All pipe and tube lines are covered with heat insulation 11.

Referring to Fig. 2 in the drawing there is disclosed another embodiment of the invention. The hopper 1 communicates with a chute 16 and a shut-off member 3 supported on a guide 4 controls the opening between the hopper 1 and the chute 16. Disposed within the chute 2 are two pairs of vertically spaced baffles 16 and 17. The baffles of the pair 16 are opposed to each other and of the pair 17 are opposed to each other, each having its baffles downwardly inclined and being spaced apart to provide a restricted space therebetween. The pairs of baffles 16 and 17 define a chamber 18 into which spraying nozzles 14.
are projected. The nozzles 14 direct a spray of coal treating material against the coal as it falls downwardly through the chamber 18 in a thinly distributed state. By having the nozzles 14 on opposite sides of the chute 15 both sides of the sheet of coal as it falls downwardly through the chute 15 are treated simultaneously.

On each side of the chamber 18 is disposed a layer of insulating material 19. Also on each side of the chamber 18 is disposed a box 20, for permitting access to the nozzles 14 for inspection, cleaning, etc. The connection between the main pipe line 8 and the nozzles 14 is provided by pipe lines 21 and as in the case of Fig. 1 a continuous tubing 9 through which is circulated a hot oil or its equivalent is disposed contiguous with the main pipe line 8 and the pipe lines 21 to raise the temperature of the same on starting and to maintain the same at an elevated temperature. The pipe lines 8 and 21 as well as the boxes 20 are provided with a coating of insulating material 22 in order to prevent the loss of heat.

From the foregoing description it will be apparent that I have provided a device which provides the coal in thinly distributed sheets thereby resulting in a greater coverage by the dust-proofing material than is possible by merely applying a spray to one side of the coal as it falls from an endless conveyor belt. While the foregoing embodiments of the invention set forth structure wherein the coal falls through a vertical chute, it may be expedient in some cases to use a slightly inclined but baffled chute although in such a case it is obvious that the degree of coverage by the spraying material would not be as great as is it is in the disclosed forms of the invention. However, such an incline when baffled is considered to be within the scope of the present invention. Also, while the devices comprising the invention are particularly adaptable for dust-proofing coal having a large percentage of fine particles, they may be used for spraying any material which will flow through a chute whether it be for dust-proofing or not.

Having thus described my invention, what I desire to secure by Letters Patent and claim is:

1. A device of the character described, comprising a substantially vertical chute, a plurality of vertically spaced baffles disposed in said chute, characterized by their ability to permit the downward passage through said chute of pieces such as coal or the like, spraying means projecting laterally into said chute, and a heating coil within said chute contiguous with said spraying means, warming the atmosphere in said chute, said coil being guarded by one of said baffles, whereby the pieces falling downwardly through said chute are sprayed.

2. A device of the character described, comprising a substantially vertical, enclosed chute, a plurality of vertically spaced baffles therein characterized by their ability to permit the downward passage through said chute of pieces such as coal or the like, spraying nozzles for directing spray laterally into said chute for spraying pieces falling downwardly through said chute, and heating coils within said chute and contiguous with said nozzles for heating the interior of said chute.

3. A device of the character described, comprising a substantially vertical, enclosed chute, two pairs of vertically spaced baffles therein, the baffles of each pair projecting toward each other from opposite sides of the chute, one pair of said baffles being vertically spaced from the other pair thereof, said pairs of baffles defining with said chute a chamber having a restricted opening at the top and bottom thereof, the restricted openings defined by said pairs of baffles being characterized by their ability to permit the downward passage of pieces such as coal or the like through said chute, means for directing a spray into said chamber against pieces falling downwardly through said chute, and means for heating the interior of said chamber.

4. A device of the character described, comprising a substantially vertical, enclosed chute, two pairs of vertically spaced baffles therein, the baffles of each pair projecting toward each other from opposite sides of the chute, one pair of said baffles being vertically spaced from the other pair thereof, said pairs of baffles defining with said chute a chamber having a restricted opening at the top and bottom thereof, the restricted openings defined by said pairs of baffles being characterized by their ability to permit the downward passage of pieces such as coal or the like through said chute, baffles for projecting a spray laterally into said chamber, inspection means associated with the sides of said chute for permitting inspection and adjustment of said baffles, and means for heating the interior of said chamber.

5. A device of the character described, comprising a substantially vertical, enclosed chute, two pairs of vertically spaced baffles therein, the baffles of each pair projecting toward each other from opposite sides of the chute, one pair of said baffles being vertically spaced from the other pair thereof, said pairs of baffles defining with said chute a chamber having a restricted opening at the top and bottom thereof, the restricted openings defined by said pairs of baffles being characterized by their ability to permit the downward passage of pieces such as coal or the like through said chute, and means for directing a spray into said chamber against pieces falling downwardly through said chute.

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