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[54] **DEVICE FOR DEDUSTING LOOSE MATERIALS**

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Related U.S. Application Data

[63] Continuation of Ser. No. 388,411, Aug. 15, 1973, abandoned.

[52] **U.S. Cl.** ..... **15/306 B;** 209/394; 209/466

[51] **Int. Cl.²** **A47L 5/14**

[58] **Field of Search** ..... 209/394, 466; 15/308, 303, 15/306 R, 306 B

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[57] **ABSTRACT**

A device for dedusting loose materials in which there is provided an inclined covered trough along which the loose material travesl downwards. The trough bottom has an opening with a slot type grate through which from a bottom inlet, a flow of compressed air is delivered to pass through the bed of material and be extracted together with dust particles of the material through an inlet in the top portion of the trough. The slotted grate is composed of separate and parallel strips positioned in a step-like fashion perpendicular to the longitudinal axis of the trough. These strips are installed for possible turning in relation to their longitudinal axes to adjust the width of the slots therebetween.

3 Claims, 2 Drawing Figures

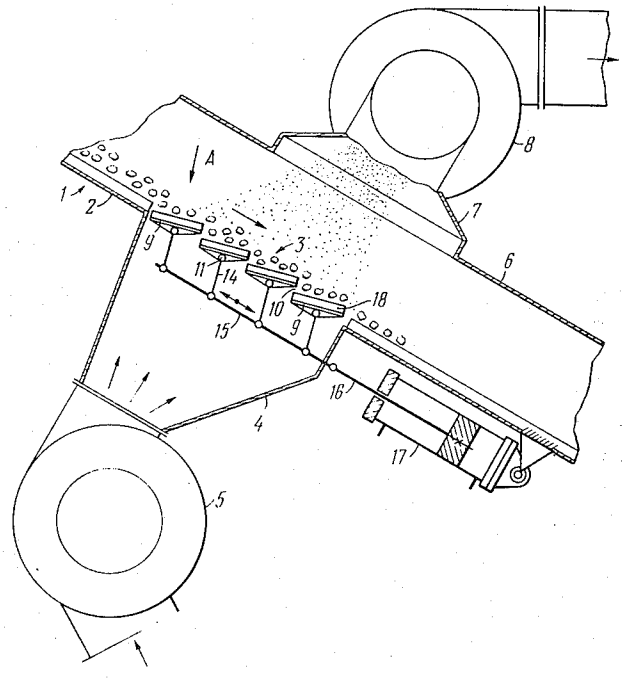
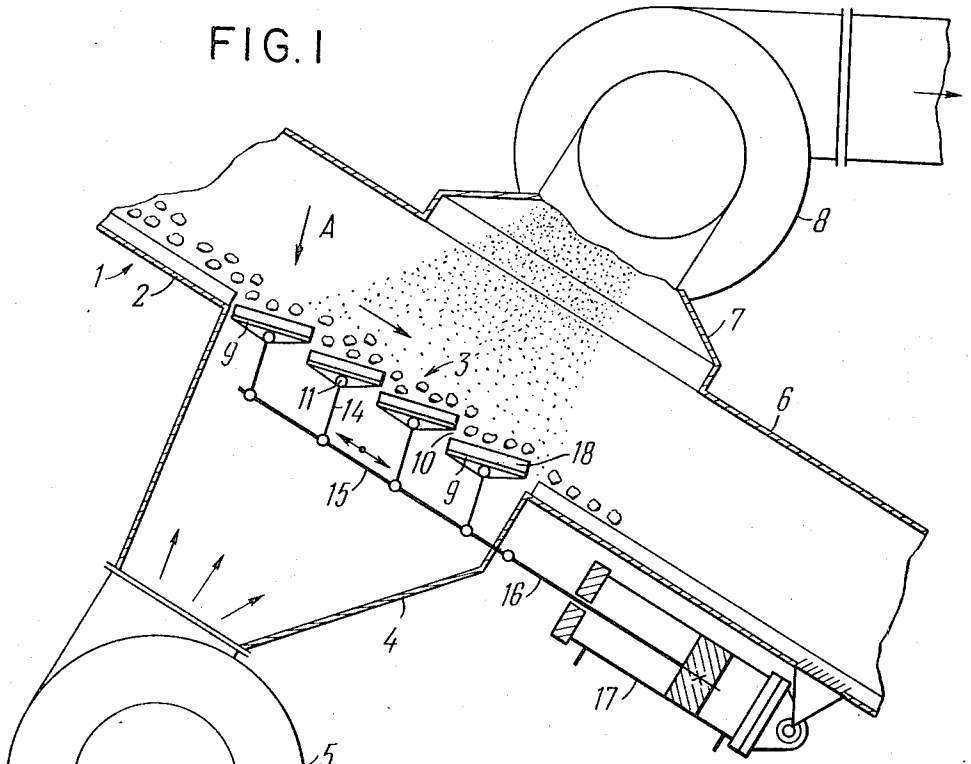


FIG. 1



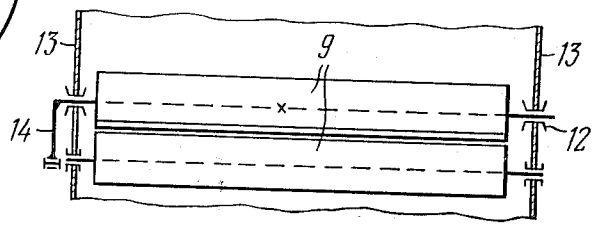


FIG. 2

DEVICE FOR DEDUSTING LOOSE MATERIALS

BACKGROUND OF THE INVENTION

The present invention relates to the by-product coke industry and more particularly to a device for dedusting loose materials, such as coke, when carried by conveyors.

PRIOR ART

There are known devices for dedusting loose materials, comprising an inclined trough along which these materials travel downwards by gravity. The bottom of the trough has an opening closed by a grate under which a duct outlet is installed to deliver compressed air from an appropriate source to the inner space of the trough underneath the grate.

The top portion of the trough has an opening with a duct inlet installed above the trough to extract the mixture of air and dust particles of loose material carried away by air.

The grate in these devices is essentially a perforated surface which, in the course of operation, is vibrated to facilitate the dust removal from the device. One of the disadvantages of such devices is that at a sudden shutdown of compressed air delivery, the openings of the perforated grate become clogged with lumps of loose material and the duct outlet delivering the compressed air is also choked by lumps of material falling through the grate openings.

Moreover, the known devices are devoid of a possibility of adjusting the size of the grate openings to vary the compressed air flow parameters which narrows the range of their application.

OBJECTS AND SUMMARY OF THE INVENTION

The object of the present invention is to provide a device for dedusting loose materials with such a grate and whose design prevents the clogging thereof with lumps of the material being dedusted and also the choking of the compressed air delivery inlet even at a sudden shutdown of the compressed air delivery, which result in the improved operating characteristics of the device as the whole.

Another object of the present invention is to provide control over the compressed air flow parameters by varying the ability of the grate to pass air therethrough for dedusting loose materials of a different granular composition.

These and other objects are achieved due to the provision of a device for dedusting loose materials travelling therethrough downwardly along an inclined covered trough having in its bottom an opening provided with a grate to effect communication between the inner space of the trough with a duct outlet connected to the bottom thereof to deliver compressed air underneath the grate, while the top portion of the trough has an opening provided with a duct inlet to extract the mixture of air with dust particles of materials, with said mixture being created when an upward flow of compressed air passes through the bed of loose material.

According to the invention, the grate is of a slotted type and composed of separate and parallel strips positioned in a step-like fashion perpendicular to the longitudinal axis of the trough and installed for a possible simultaneous turning in relation to their longitudinal axes to adjust the width of the slots between these strips.

This step-like arrangement of the strips of the grate allows the loose material, in the course of its travel along the inclined trough, to flow successively from one strip down to another without falling into the slots between the strips even at a sudden shut-down of the compressed air delivery underneath the grate.

This finally results in the improved performance of the dedusting device as no extra time is required to clean the grate and the air delivery outlet from lumps of materials trapped therein.

In addition, the step-like arrangement of the strips of the grate makes the material more loose to improve the dedusting efficiency.

It is also necessary to take into account that the positioning of the strips of the grate for possible adjustment of the width of the slots between the strips permits a varying of the clear slot area of the grate to control the flow rate of compressed air delivered into the trough, depending on the amount of loose material to be dedusted and its granular composition.

The turning of the grate strips is conveniently effected by means of levers with one end of each of levers being rigidly connected to the axle of the corresponding strip, while the other end thereof being pivotally connected to a common bar installed in parallel to the trough bottom for possible reciprocating motion thereof with respect to the trough when the width of the slots between the strips is being adjusted.

This feature allows the width of the slots between all the strips of the grate to be adjusted simultaneously.

The turning of the strips may be effected by a hydraulic piston unit with its body pivotally connected at its end to the lower surface of the trough bottom and with its bar pivotally connected to the end of the rod.

The strips of the grate are top-faced with an abrasion-resistant material to prolong their service life.

A specific embodiment of the present invention will now be described in detail with reference to the accompanying drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a longitudinal sectional view of the coke dedusting device; and

FIG. 2 is a view taken along the arrow A of FIG. 1.

DETAILED DESCRIPTION OF THE INVENTION

The coke dedusting device comprises an inclined top-covered trough 1 (FIG. 1) for a gravity flow of coke. A bottom 2 of the trough 1 has an opening in which a slot type grate 3 is installed. Secured below the grate 3 to the bottom 2 of the trough 1 is a duct outlet 4 connected to the delivery port of a blower 5 installed therebelow to deliver compressed air into the inner space of the trough 1 through the slots in the grate 3.

Installed in an opening formed in a cover or top portion 6 of the trough 1 above the grate 3 is a duct inlet 7 connected, via a dust collecting device (not shown), to an upper blower 8 for extracting the mixture of air with dust particles of coke from the inner space of the trough above the bed of loose material lying on the grate 3.

The grate 3 is of the slot type, composed of separate and parallel to strips 9, with the strips being rectangular in shape. These strips 9 are arranged one-above-the-other in a step-like succession and perpendicular to the longitudinal axis of the trough 1 so that longitudinal

slots 10 are left between the longitudinal edges of the strips.

Connected to each strip 9 of the grate 3 along the geometric axis thereof is a longitudinal axle 11 whose ends are mounted in bearings 12 (FIG. 2) fixed in side walls 13 of the trough 1.

One of the ends of the axle 11, protruding beyond the limits of the trough 1 is rigidly connected to a lever 14 and the opposite end of the lever is pivotally connected to an inclined bar 15 which is common for all the levers 14 and the bar is positioned in parallel to the bottom 2 of the trough 1.

This bar 15 has one end thereof connected to a rod 16 of a hydraulic cylinder piston unit whose body, 17 through its end is pivotally connected to the underside of the bottom 2 of the trough 1.

For longer surface life, the strips 9 of the grate 3 are faced on the top with a abrasion-resistant material 18, say diabase (igneous rock);

The device operates as follows;

The flow of coke during its downward travel along the bottom of the inclined trough 1 reaches the strips 9 of the grate 3 and successively transfers from each upper strip 9 to the next lower strip without falling into the slots 10 therebetween because of a certain travel speed of the coke flow.

When the blowers 5 and 8 are actuated the flow of compressed air from the delivery port of the lower blower 5 via the duct outlet 4 passes upwards through the slots 10 of the grate 3 and at the moment the coke is transfering from one strip 9 to another the air takes away fine dust particles of coke to the upper duct inlet 7 connected to the intake port of the upper blower 8.

To protect this blower 8 against premature wear, dust-laden air passes through a dust collecting device before reaching the blower.

For more efficient extraction of dust, the volume rate of air drawn in by the upper blower 8 should exceed the volume rate of air delivered by the lower blower 5.

The compressed air flow parameters, depending on the granular characteristics of coke, can be controlled (beside varying the rotational speed of the blower 5) by adjusting the width of the slots 10 between the strips 9 of the grate 3.

For this purpose, the hydraulic cylinder is actuated and its rod 16 moves the bar 15 which turns the levers 14 through an equal angle. The levers 14 turn the axles 11 of the strips 9 of the grate 3 and consequently the strips 9 themselves, thus altering the width of the slots therebetween.

The present device raises the code dedusting efficiency to improve working conditions in production buildings in which coke is processed.

What is claimed is:

1. A device for dedusting loose materials, comprising: an inclined trough having side walls, a top and a bottom along which loose material travels downwards; a lower opening in the bottom of said trough; an upper opening in said top above the lower opening; a slot type grate mounted in said lower opening, said grate including separate parallel strips, the top surfaces of said strips being arranged in a descending step-like fashion perpendicular to the longitudinal axis of said trough for transferring the material step-by-step across said lower opening to the lower side thereof, said strips being mounted for simultaneous rotation about the longitudinal axes thereof to adjust the width of slots provided between and formed by said strips; a duct outlet connected to said lower opening to deliver compressed air from a source to the inner space of said trough via the slots between said strips of the grate; a source of suction connected to said upper opening to extract the mixture of air with dust particles of bulk material from the inner space of said trough, with the mixture being created when an upward flow of compressed air passes through the bed of material travelling across said strips and slots along the trough.

2. The device according to claim 1, wherein the simultaneous rotation of the strips of the grate is effected by means of levers, each lever having one end rigidly connected to a corresponding strip at the rotative axis thereof and with the other end pivotally connected to a bar installed in parallel to the bottom of the trough for reciprocating motion in relation to the trough to adjust the width of the slots between the strips of the grate.

3. The device according to claim 2, wherein the reciprocating motion of the bar is effected by a hydraulic cylinder-piston unit whose cylinder is pivotally connected via its end to a lower surface of the trough bottom, while its piston is pivotally connected to the end of the bar.

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