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Rowe

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[54] **ABRASIVE THROWING WHEEL DISTRIBUTION SYSTEM**

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[52] **U.S. Cl.** **51/9,** 209/134

[51] **Int. Cl.** **B24c 7/00,** B07b 4/02

[58] **Field of Search** 51/9, 8, 12; 209/134, 135, 136, 137, 254; 241/135

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[57] **ABSTRACT**

An abrasive throwing wheel distribution system operates without the use of a conventional distribution screw by including a plurality of separating units symmetrically arranged for receiving an abrasive particles containing mixture. The abrasive particles are removed from the mixture and fed to abrasive throwing wheels.

10 Claims, 4 Drawing Figures

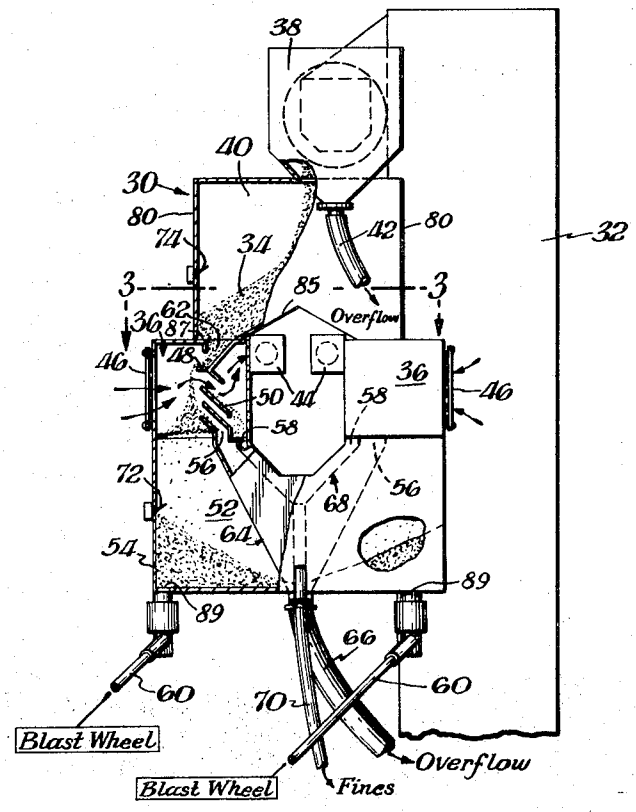


Fig. 1 (Prior Art)

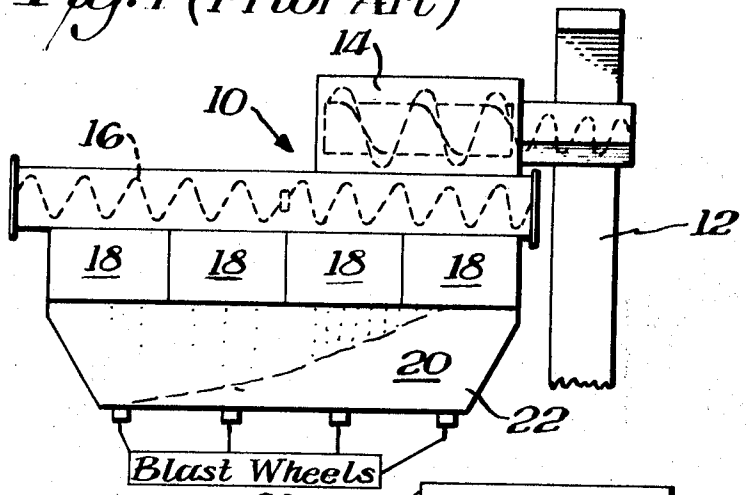


Fig. 2.

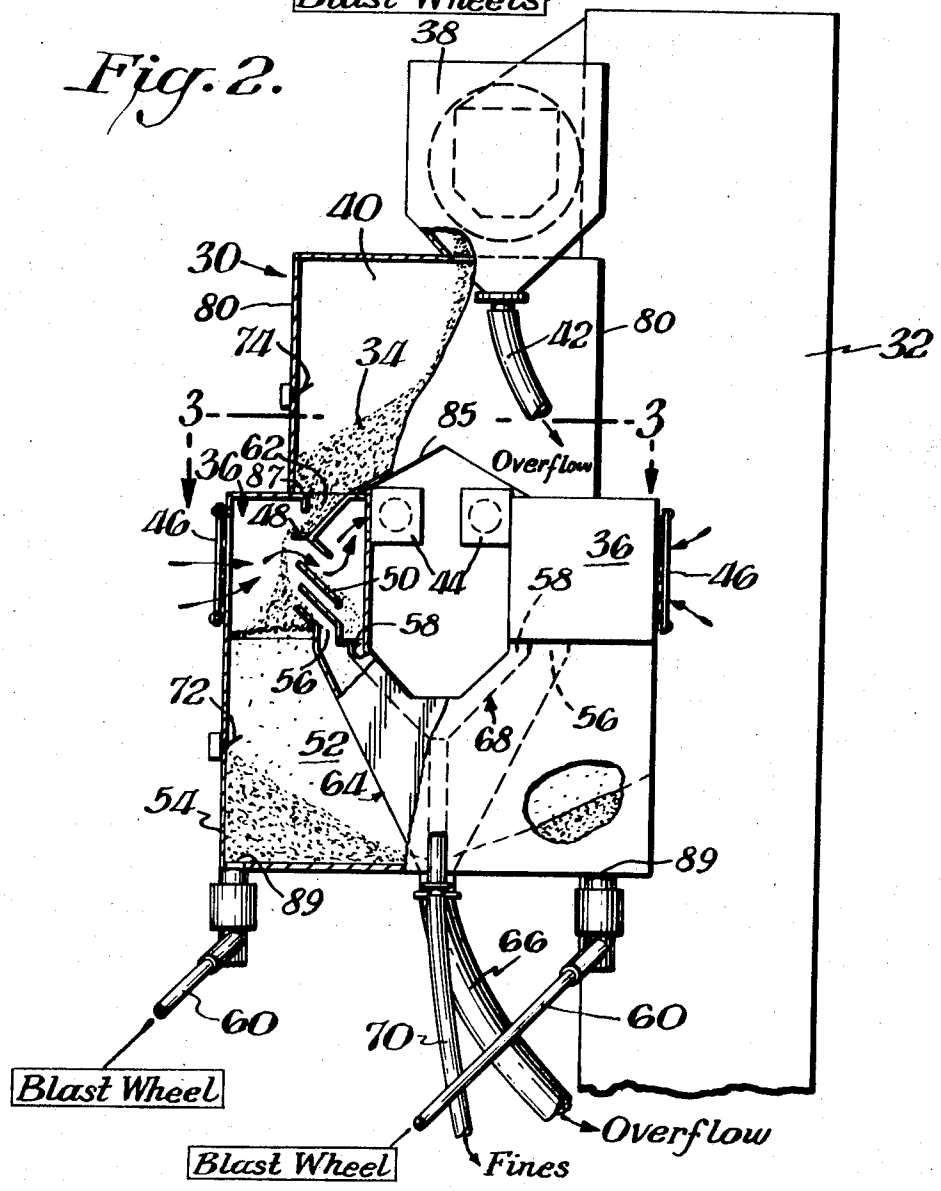


Fig. 3.

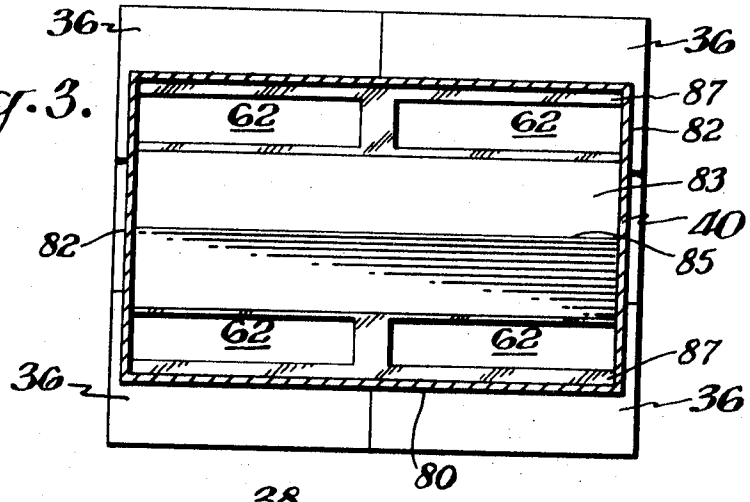
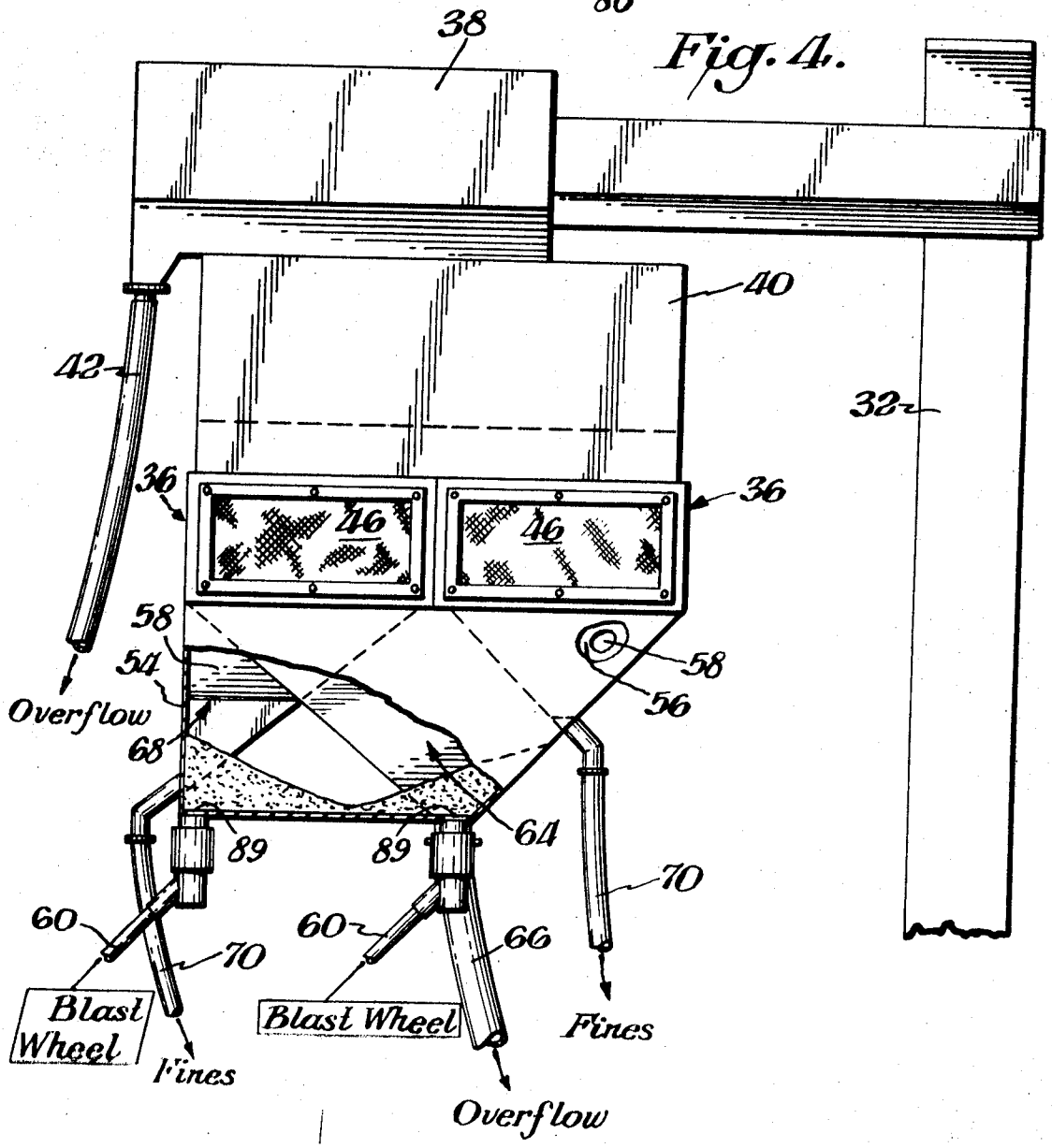

36
36
62
62
87
82
83
40
82
85
62
62
87
36
36
80

Fig. 4.


38
40
42
32
36
36
46
46
58
58
54
56
Overflow
68
64
89
89
70
60
60
66
70
Blast Wheel
Blast Wheel
Fines
Fines
Overflow

ABRASIVE THROWING WHEEL DISTRIBUTION SYSTEM

BACKGROUND OF INVENTION

This invention relates to an abrasive throwing wheel distribution system which omits the conventional distribution screw. With the conventional arrangements an elevator delivers the mixture to a distribution screw which distributes the mixture over an elongated area along the length of the screw to separating means disposed beneath the screw. A disadvantage with such an arrangement, however, is that the separators at the furthest distance from the elevator do not receive enough abrasive which results in "starving" some of the abrasive throwing wheels. A further serious disadvantage with these conventional arrangements is that in large installations the screw is quite large and since it is a rotating member it presents serious maintenance problems.

SUMMARY OF INVENTION

An object of this invention is to provide an abrasive throwing wheel distribution system which omits the conventional distribution screw.

A further object of this invention is to provide such a system which avoids the "starving" of abrasive to the throwing wheels.

A still further object of this invention is to provide such a system which has minimal maintenance problems.

In accordance with this invention an abrasive throwing wheel system operates without the use of a conventional distribution screw by including a plurality of separating units symmetrically arranged for receiving an abrasive particles containing mixture. The abrasive particles are removed from the mixture and fed to abrasive throwing wheels.

The separating units may comprise four individual units of the air-wash type arranged in a cluster in a box-like manner. Additionally, a single feed hopper may be used for receiving the abrasive particles removed from the mixture by the separating units, with the hopper thereafter feeding the particles to the throwing wheels. Advantageously level indicating means may be provided in the feed hopper to prevent overfilling, and additional level indicating means may be provided in the receiving bin which supplies the mixture to the separating units to maintain flow of the mixture to the unit.

THE DRAWINGS

FIG. 1 is a schematic showing of a prior art arrangement incorporating a conventional distribution screw;

FIG. 2 is a schematic showing partly in section of an abrasive throwing wheel distribution system in accordance with this invention;

FIG. 3 is a cross-sectional view taken through FIG. 2 along the line 3—3; and

FIG. 4 is a side elevation view of a portion of the system shown in FIG. 2.

DETAILED DESCRIPTION

FIG. 1 shows a prior art arrangement 10 which includes an elevator 12 for receiving and delivering a mixture of spent abrasive, fines, etc., from the throwing wheels and from the work pieces being treated, to a feed screw and scalping drum 14. The mixture is then delivered to a distribution screw 16 which deposits the

mixture into individual separating units 18. In these separating units the abrasive particles 20 are removed from the mixture and supplied to feed hopper 22. At times the bed of abrasive particles 20 assumes an angle of repose similar to that shown in FIG. 1. This angle of repose results from the separator 18 located the furthest distance from elevator 12 not being supplied sufficient mixture by the distribution screw 16. As a result of this the corresponding blast wheel would be starved since insufficient abrasive particles would be fed to it. A number of disadvantages are readily apparent from such a system including the insufficient treating of the work piece. Moreover because distribution screw 16 is a rotating member and thus, for example, must include bearings 24 maintenance problems are created by this arrangement.

FIGS. 2–4 show an abrasive throwing wheel distribution system 30 in accordance with this invention. In general the system 30 also includes an elevator 32 which recirculates or supplies an abrasive particles containing mixture 34 to a cluster of individual separating units 36 by means of feed screw and scalping drum 38 communicating with receiving bin 40. An overflow conduit 42 is provided for feed screw and scalping drum 38 should an excessive amount of mixture be supplied thereto.

The bin 40 has side walls 80, end walls 82 and bottom 83. The bottom 83 slopes downwardly from a raised portion 85 to lower portions 87 which are adjacent side walls 80. As illustrated in the drawings, the bottom 83 has an inverted V-shape with the raised portion 85 at the top of the inverted V and the lower portions 87 at the bottom of the inverted V adjacent the side walls 80. A plurality of openings 62 are located in each of the lower portions 87 of the bottom 83. The openings 62 are of substantially equal size and are symmetrically arranged. The configuration of the openings 62 and bottom 83 results in an excess mixture within the bin 40 being evenly distributed over the openings 62 to form a bed 34 covering the openings 62.

As shown in FIG. 4, the separating units 36 are arranged under bin 40 in a cluster in a box-like manner whereby each unit is disposed at the corner of a box. By this arrangement, there is equal distribution of the mixture through openings 62 into each of the separating units. Accordingly, by this arrangement none of the separating units would receive an insufficient supply of mixture which in turn would have led to the starving of certain blast wheels.

Separating units 36 may take any suitable form such as being of the air-wash type as disclosed in U. S. Pat. No. 3,368,677 the details of which are incorporated herein by reference thereto. Essentially, each separating unit includes suction means 44 for drawing an air curtain or stream through inlet 46. The falling mixture passes over metering gate 48 and is exposed to the air stream whereby in conjunction with any suitable number of skimmer plates 50 the mixture is subdivided in any desired manner or number of sub-streams and includes for example pure abrasive particles 52 as well as any suitable number of correspondingly lighter submixtures. The abrasive particles from all separating units are collected in a single hopper 54. Hopper 54 includes a plurality of openings 89 with each opening being disposed under a respective separating unit 36 so as to receive abrasive particles therefrom. Separating units 36 also include overflow means 56 for excessive

pure abrasive particles or for a mixture of pure abrasive particles and heavier contaminants. Additionally, means **58** are provided to receive the fines or other light weight contaminants. From the feed hopper **54** the abrasive particles are fed through supply tubes **60** to the individual blast wheels (not shown) of the conventional centrifugal throwing wheel type.

As shown in FIGS. **2** and **4** the feed hopper **54** receives pure abrasive particles **52** from the individual separators **36** in such a manner that there are actually four angles of repose or beds in contrast to the single angle of repose resulting with prior art arrangements. Moreover the deepest portion of each bed of abrasive particles is disposed directly over the feed conduit **60**. This also assists in preventing the starving of blast wheels.

The central portion of feed hopper **54** also includes an inverted conical type chamber **64** which comprises part of the overflow means **56** and communicates with overflow conduit **66**. Similarly, within the chamber **64** is arranged a further Y-shaped chamber **68** for receiving the fines from the individual separators **36** and discharging them through spouts **70**. The chamber **68** and spout **70** thus comprise the main elements of means **58**. As is apparent from the drawings the single chamber **64** and the single chamber **68** each communicate with all of the separators **36**.

As also shown in FIG. **2** a suitable level indicating means **72** is provided in feed hopper **54** to prevent over filling of this feed hopper. Similarly, level indicating means **74** is provided in bin **40** for use as a replenisher to assure the maintenance of flow of the mixture **34** to the individual separating units **36**.

What is claimed is:

1. An abrasive throwing wheel apparatus comprising a receiving bin having side walls and a bottom, said bottom sloping downwardly from a raised portion to lower portions, each lower portion being adjacent a side wall, means for feeding an abrasive particle containing mixture to said receiving bin, each lower portion having a plurality of openings therein, said openings permitting the mixture received in said bin to be distributed through the openings in substantially equal portions, a plurality of separating units symmetrically arranged under said receiving bin, each of said separating units communicating with one of the openings to permit the mixture to flow into said separating units, separating means in each of said separating units for removing abrasive particles from the remainder of the mixture, collecting means connected to each of said separating units for collecting the remainder of the mixture, feed hopper means communicating with each of said separating units for receiving the abrasive particles removed from the mixture, a plurality of abrasive throwing wheels, and feed means connected to said feed hopper means and said abrasive throwing wheels for feeding abrasive particles to said throwing wheels.

2. An apparatus as set forth in claim **1** wherein feed hopper means is a single feed hopper.

3. An apparatus as set forth in claim **2** wherein said separating units comprise four separator units clustered together in a box-like manner whereby each of the units are disposed at the corners of a box.

4. An apparatus as set forth in claim **3** wherein each unit is of the air-wash type.

5. An apparatus as set forth in claim **4** wherein level indicating means are in said feed hopper to prevent over filling of said feed hopper.

6. An apparatus as set forth in claim **5** wherein level indicating means are in said receiving bin to maintain flow of the mixture to said units.

7. An apparatus as set forth in claim **6** wherein said means for feeding an abrasive particle mixture includes an elevator and a scalping drum.

8. An apparatus as set forth in claim **7** wherein said collecting means includes an inverted conical abrasive particles overflow chamber within said feed hopper and a Y-shaped fines chamber.

9. An apparatus as set forth in claim **2** wherein each separating unit has an abrasive particles outlet communicating with said hopper, and said feed means for each of said throwing wheels being directly under a respective outlet.

10. An apparatus as set forth in claim **3** wherein said feed hopper includes a plurality of openings therein, each opening being disposed for receiving abrasive particles from a respective separating unit.

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