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Dankesreiter

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[54] **STRATIFIER WITH DISCHARGE MEANS FOR MAINTAINING STRATIFIED LAYERS**

[75] Inventor: **George Dankesreiter,** Oberburen, Switzerland

[73] Assignee: **Gebrueder Buehler AG,** St. Gallen, Switzerland

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[51] **Int. Cl.** **B03b 3/16**

[58] **Field of Search** 209/474, 475, 425, 490, 209/427, 423, 454, 455, 457, 466, 468

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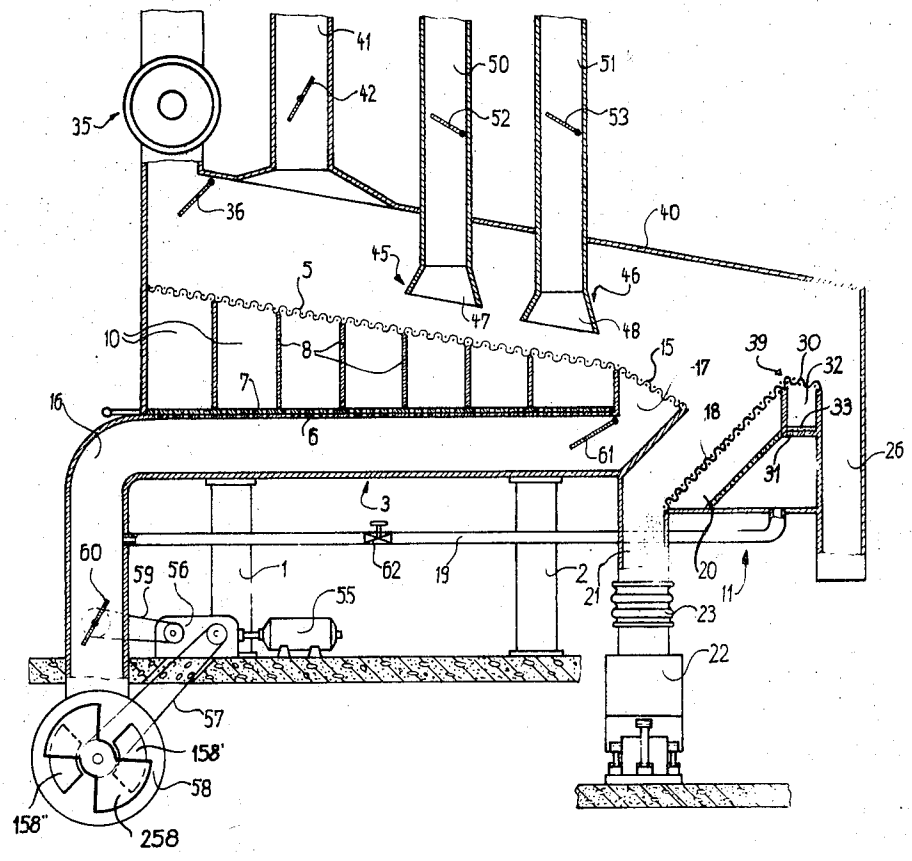
Primary Examiner—Frank W. Lutter
Assistant Examiner—Ralph J. Hill
Attorney, Agent, or Firm—McGlew & Tuttle

[57] **ABSTRACT**

A stratifier wherein means are provided for discharging the various stratified layers without disturbing the stratified condition of the remaining layers. Such means may include suction means spaced above the layers or an extra pulsated flow of gas at the lower end of the bed to maintain the stratified condition of material discharging therefrom. Treating of the materials in the stratified bed is also disclosed.

16 Claims, 7 Drawing Figures



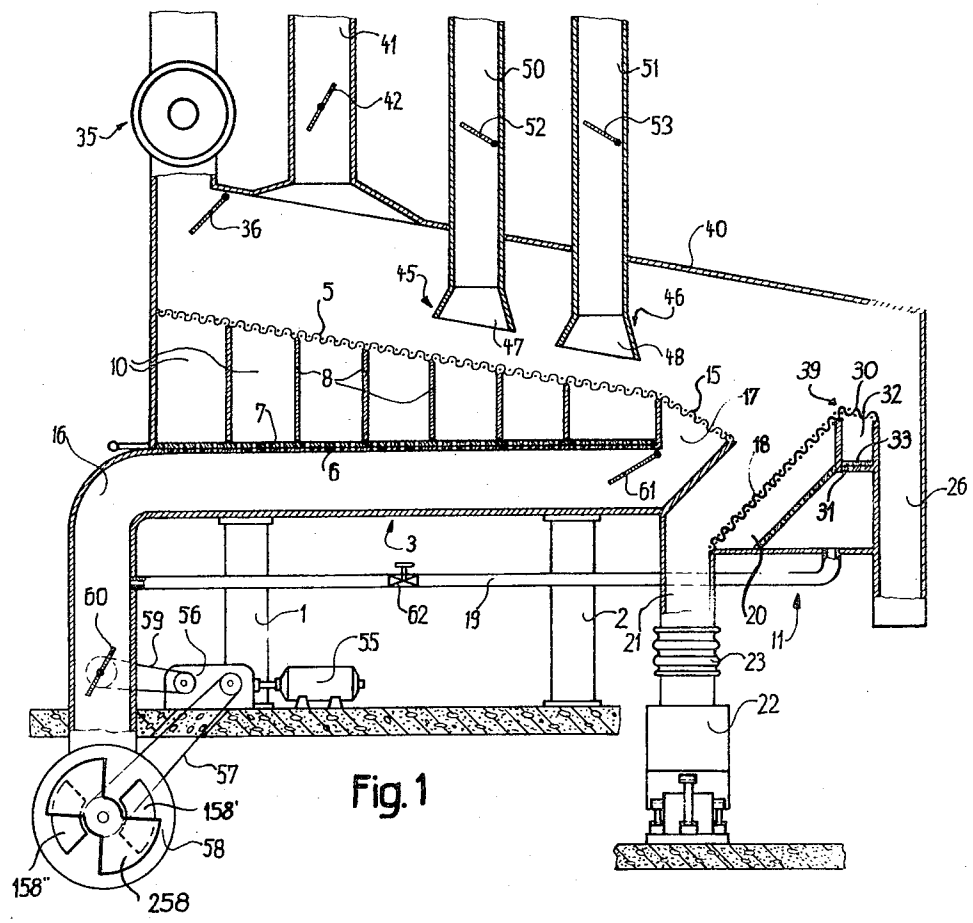

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Fig. 1

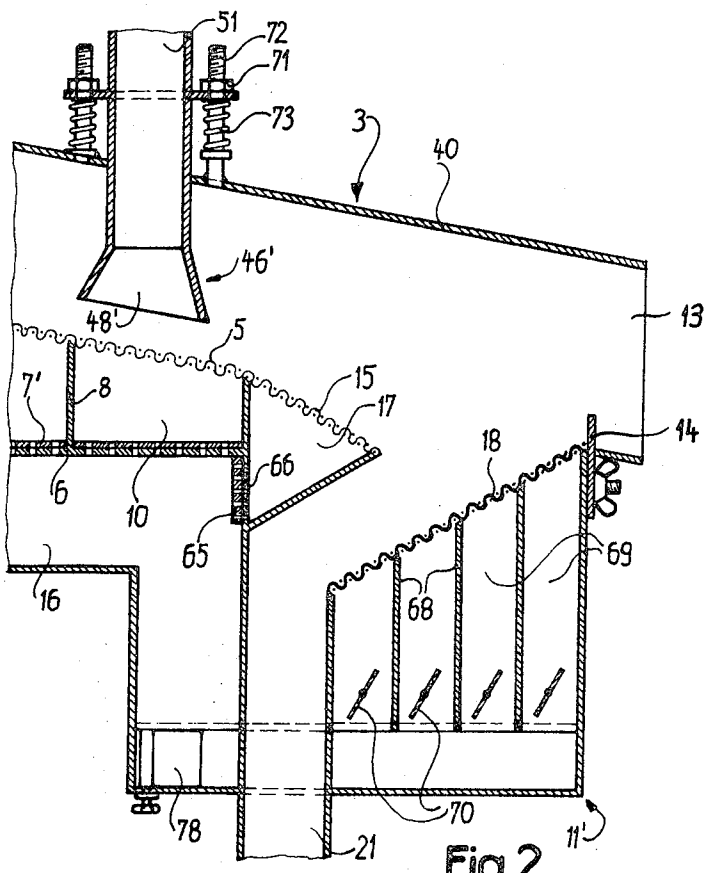

Fig.2

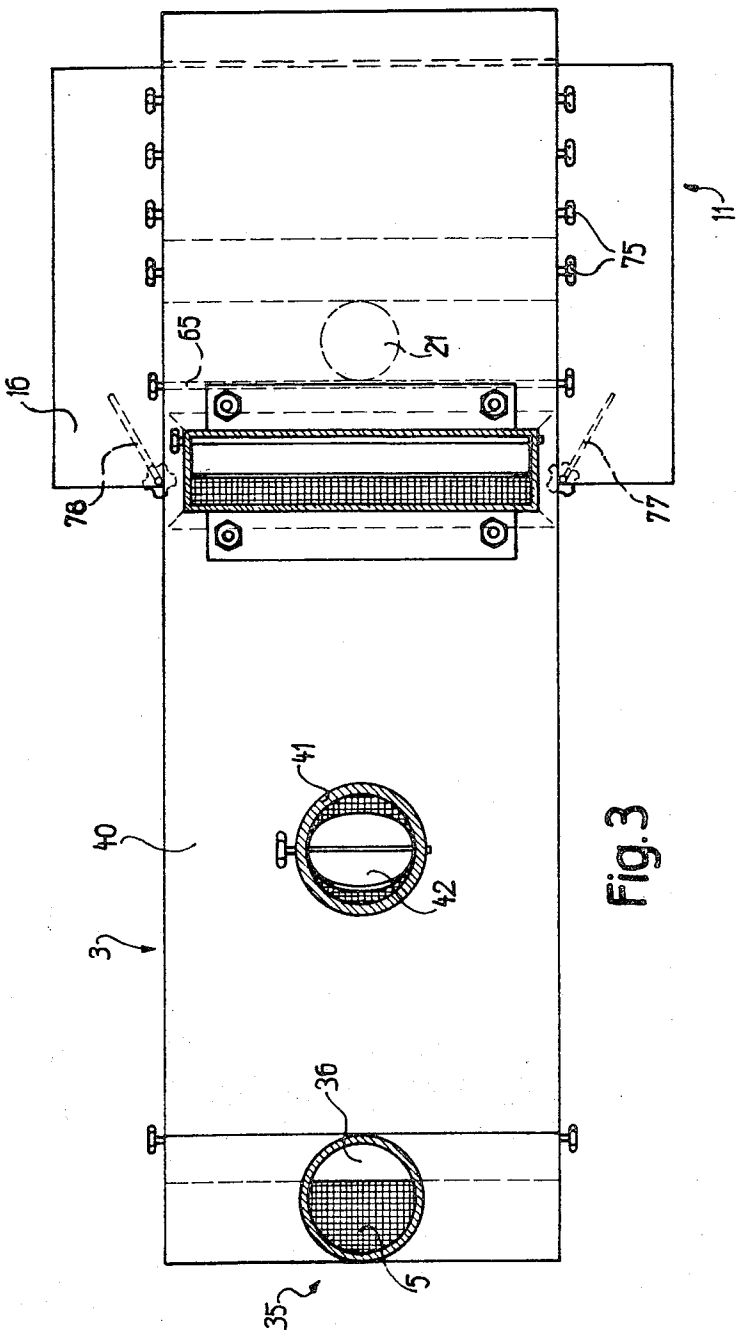

Fig. 3

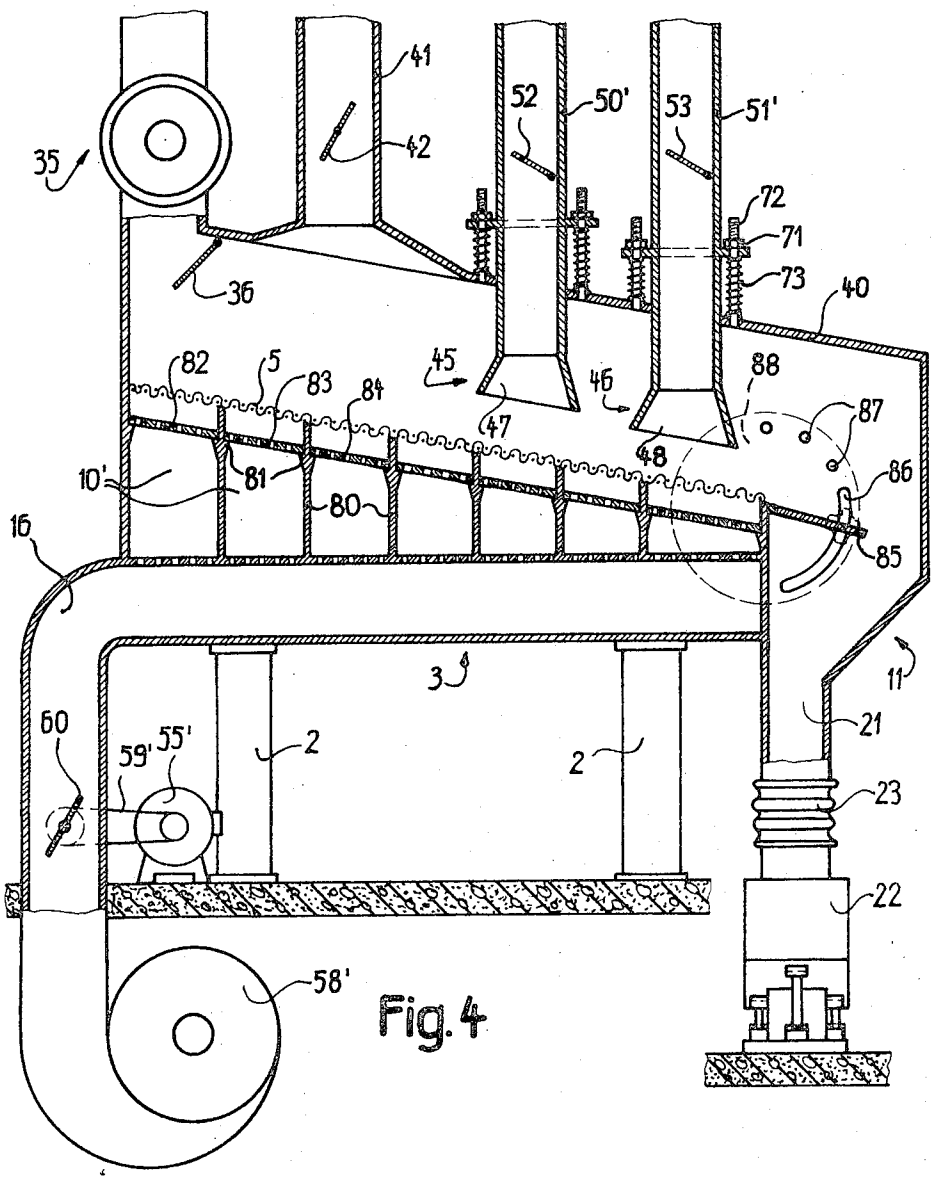
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Fig. 4

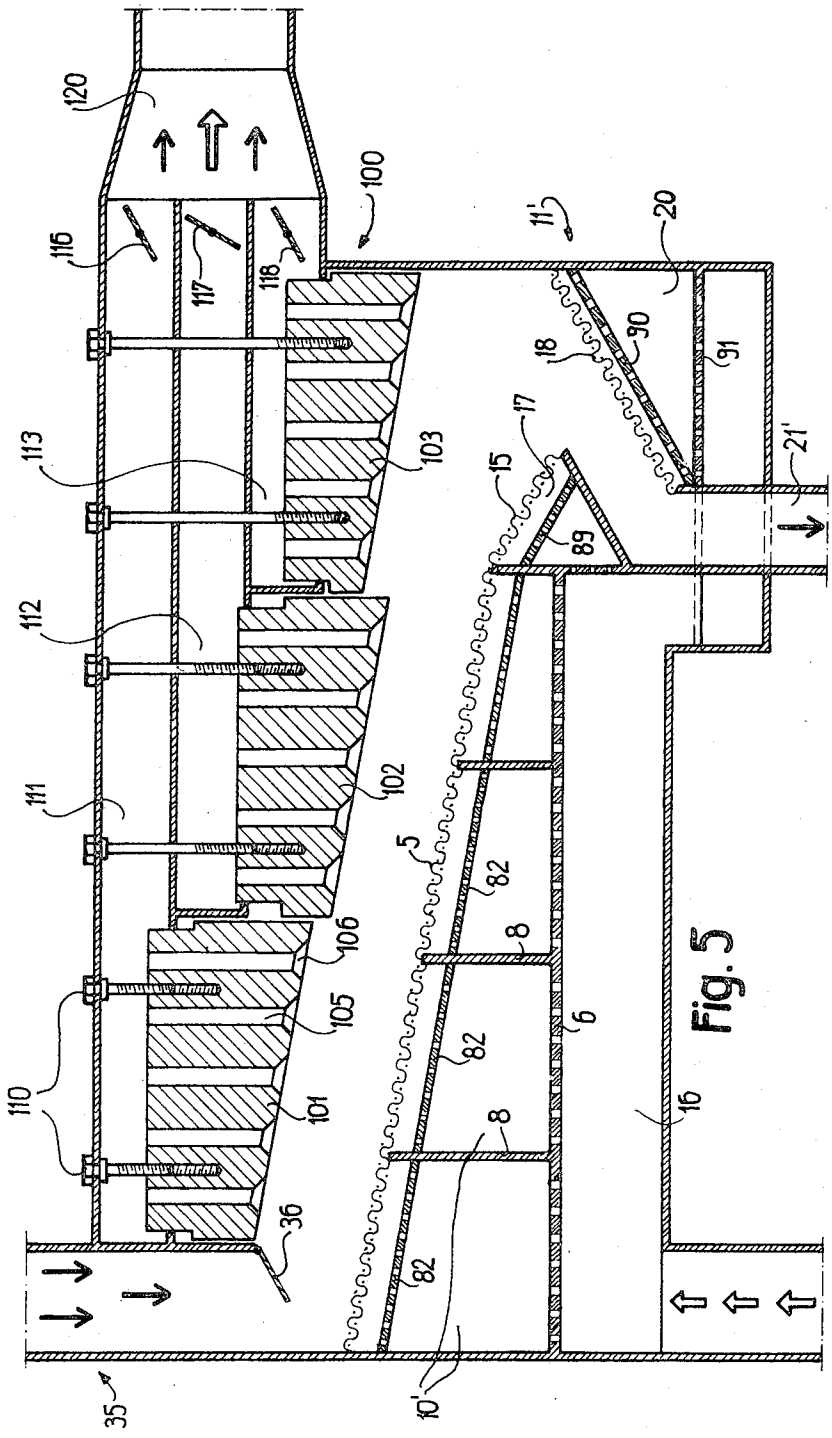
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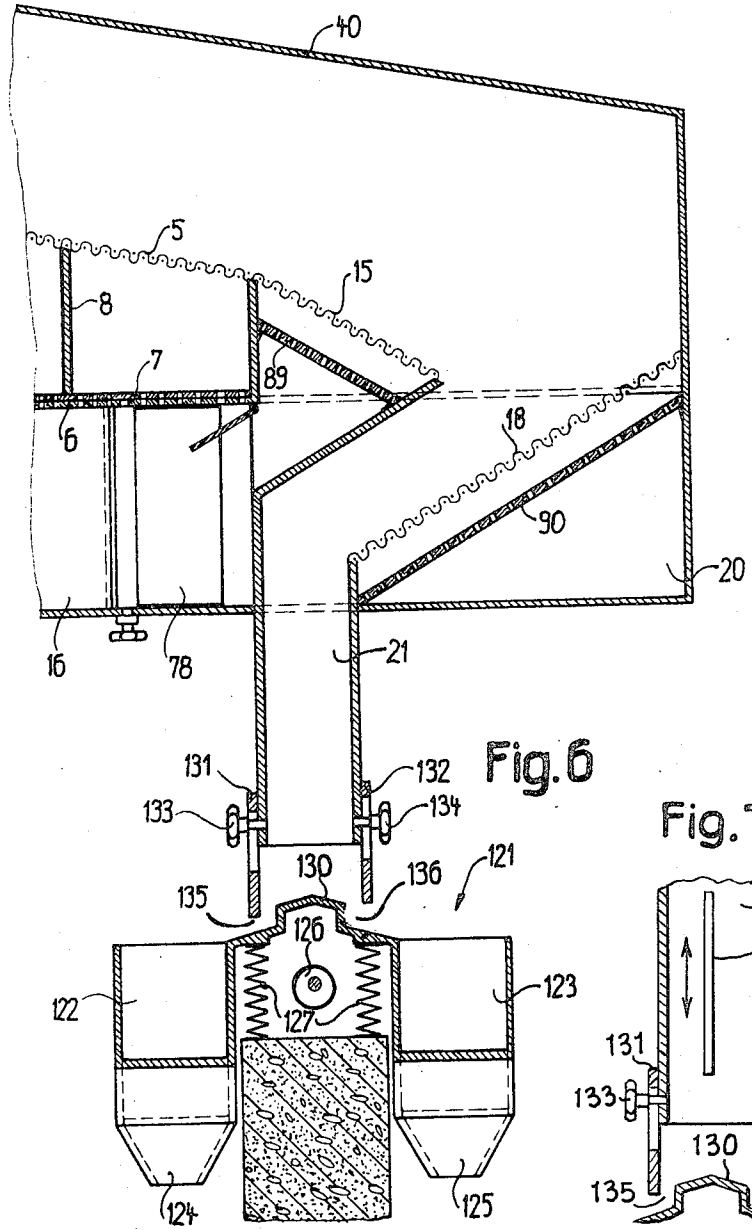
Fig. 5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125

Fig.6

Fig.7

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140
132
131
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133
130
136
121
135

STRATIFIER WITH DISCHARGE MEANS FOR MAINTAINING STRATIFIED LAYERS

BACKGROUND OF THE INVENTION

For the dry sorting and separate removal of fractions of granular bulk material, for example for separating a granulation mixture according to specific gravity and size, screening, on the one hand, and treatment in a rising or transversely flowing air stream, on the other hand, have long been known. The disadvantages of these known procedures are that very often, in the case of screening, on the one hand, the mechanical factors required have a harmful effect on the material while, on the other hand, materials which differ as to matter, but are quite similar in size and grain form, cannot be separated. In contradistinction, air stream sifting permits separating materials which differ as to matter but which are similar in grain size, although this requires considerable energy.

For special treatments of different bulk materials, the turbulent and fluid bed methods have been used for some time. It should be noted, in this connection, that the turbulent bed method for very intensive mixing of the materials to be brought in contact with one another, operates with very large quantities of air, and the bed of bulk materials is present in a very loose form. The discharge from such turbulent bed treatments generally is effected either through an overflow or through a specially controlled outflow through the bottom of the treatment device. Both discharge possibilities disturb the behavior of the turbulent bed insignificantly, in that the very large quantity of air distributes itself largely homogeneously over the entire volume of material.

In contrast to this, there are known fluid bed treatments which operate with relatively small quantities of air, just sufficient for the individual granules to be detached from the dense packing of a pile and to be carried singly by the slight flow of gas in at least partial flow therearound. The formation and handling of such an homogeneously dense fluid bed calls for a number of design expedients. One of the main difficulties in carrying out the treatment of granular materials in an homogeneously dense bed resides in the undisturbed discharge of the material once it has been treated, this applying in particular to the separating removal of grain fractions once they have been sorted. In the methods known to date, for the sorting and removal of grain fractions, especially the problem of removal never has been solved satisfactorily because, in this area, the work once done is always destroyed again partly or largely by disturbance of the fluid bed.

SUMMARY OF THE INVENTION

This invention relates to the dry sorting and separate removal of granular bulk material and, more particularly, to a novel and improved method and apparatus for effecting such dry sorting and separate removal.

The objective of the invention is to solve the problem of removal of sorted fractions of granular material without destroying the sorting work already done or without disturbing the fluid bed. To this end, the invention is directed to a method for the dry sorting and separate removal of granular bulk material which flows, from a stock mixture inlet, continuously as a layer over a stationary, inclined approach surface which is perforated and has a pulsating gas flow therethrough, the material flowing to a discharge. In accordance with the invention, removal of at least one stock fraction, sorted from the charged stock mixture, is effected by a specially produced gas flow which acts thereon in the region of the discharge.

The special gas flow can effect an unvarying stratified deflection of the stratified sorted stock fractions into a discharge chute, and can serve to remove at least one stock fraction which has been sorted out. At least a portion of the pulsating gas flow can be removed as a plurality of uniformly distributed partial gas flows having increasing flow velocity away from the fluidized bed.

In accordance with the apparatus aspects of the invention, the apparatus comprises a stationary inclined perforated approach surface traversed by pulsating air, a stock mixture inlet over this surface and feeding the stock mixture thereto, a discharge contiguous to the approach surface, a gas distributing device arranged under the approach surface, and a gas collecting hood covering the approach surface and provided with an outlet line. The outstanding feature fo the apparatus is that, in the zone of the discharge leading away from the plane of the approach surface downwardly, at least one gas flow element, with a gas flow adjusting organ means specially associated therewith, is provided and extends over the width of the approach surface and acts directly on at least one of the sorted granular stock fractions.

In the transition zone from the approach surface to the discharge, there may be provided at least two inclined slide bottoms, for the granular material, arranged in cascade, of which at least the one directly contiguous to the approach surface constitutes the gas flow element. A discharge, extending steeply downwardly, may be divided by a partition into through-flow area, making it possible, by adjustable arrangement of the partitions, to form correspondingly variable areas.

A proportioning discharge apparatus may follow the discharge, and the cascade-type slide bottoms may be permeable to gas.

Between a first discharge chute and a second one which is separated from the first one, an overflow edge, corresponding to the width of the approach surface and preferably adjustable in height, may be provided. Also, between the two discharge chutes and after the overflow edge, a gas-permeable porous discharge control area may be arranged.

The gas flow element may be one or more suction nozzles extending across the width of the approach surface and spaced above the plane of the approach surface. In the direction of flow of the stock, several consecutive similar suction nozzles may be arranged at different spacings from the approach surface, and the spacings may be adjustable. As a further feature of the invention, a plurality of suction nozzles may be substantially uniformly distributed over the area of the approach surface and in spaced relation to the plane thereof, these nozzles preferably being adjustable as to spacing from the approach surface.

The invention is further directed to a method in which, simultaneously with the dry sorting of the granular bulk materials and before separate removal thereof by the gas flow, there is effected a treatment of the

bulk material which has at least a partly varying effect on at least the physical properties thereof.

An object of the invention is to provide an improved method for the dry sorting and separate removal of fractions of granular bulk materials.

Another object of the invention is to provide an improved apparatus capable of carrying out the method.

A further object of the invention is to provide such a method and apparatus which are free of the disadvantages of prior art methods and apparatus for dry sorting and separate removal of fractions of granular bulk stock.

For an understanding of the principles of the invention, reference is made to the following description of typical embodiments thereof as illustrated in the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

In the Drawing:

FIG. 1 is a side elevation view, partly in section, of one embodiment of apparatus in accordance with the invention;

FIG. 2 is a partial longitudinal and vertical sectional view of another form of apparatus embodying the invention;

FIG. 3 is a plan view corresponding to FIG. 2;

FIGS. 4, 5 and 6 are longitudinal vertical sectional views illustrating, respectively, third, fourth, and fifth embodiments of the invention;

FIG. 7 is a detail view of a modification of the embodiment shown in FIG. 6.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring first to the embodiment of the invention shown in FIG. 1, a housing 3 rests on fixed pedestals 1 and 2, and an inclined porous approach plate or bottom 5 has a perforated air distributing plate 6 arranged therebeneath. A similarly perforated but adjustable control plate 7 is operatively associated with distributing plate 6, and partition walls 8 extend between control plate 7 and approach bottom 5, dividing the area thereof and thus forming, between partitions 8, plate 5 and distributing plate 6, individual gas distributing chambers 10.

The stock discharge 11 is arranged contiguous to plate 5 in the flow direction of the stock, and comprises a first inclined gas-permeable slide bottom 15 having a gas distributing chamber 17 formed therebeneath and connected to a gas inlet 16. A second inclined gas-permeable slide bottom 18 is arranged below slide bottom 15 in cascade arrangement, and has a gas distributing chamber 20 therebeneath connected to a gas supply line 19. A discharge chute 21 extends steeply downwardly and a vibratory discharge apparatus 22 is arranged beneath discharge chute 21, being connected thereto by a flexible connection hose 23.

A second discharge chute 26 is spaced from chute 1 in the flow direction and also extends steeply downwardly. Between first and second discharge chutes 21 and 26, there is a gas-permeable porous discharge control area having an air or gas distributing chamber 32 arranged therebeneath. A perforated gas distributing plate 31 and a perforated gas flow control plate 33 are arranged in chamber 32.

A stock supply device 35 is arranged at the uppermost end of approach plate 5 and discharges above the approach plate, and an adjustable register 36 is positioned between stock supply device 35 and approach plate 5 and above the latter. A gas collecting hood 40, of housing 3, extends over approach plate 5. An outlet line 41 is positioned between stock supply device 35 and discharge 11, extending through hood 40, and a gas flow control register 42 is arranged in outlet line 41.

Between outlet line 41 and discharge 11, two suction nozzles 45 and 46 are arranged in succession in the flow direction of the stock, and extend over the width of approach bottom or plate 5. The respective inlets 47 and 48 of the suction nozzles are spaced different distances from the plane of approach bottom 5. Suction lines 50 and 51 extend from the respective suction nozzles 45 and 46, and lead to a known suction unit which has not been shown. Lines 50 and 51 have respective adjusting registers 52 and 53 arranged therein.

A motor 55 has a coupled transmission gear 56 which is connected, by an overdrive 57, with a fan 58 having two suction or inlet apertures 158', 158'' selectively partially coverable by respective suction control registers 258. A gas supply line 16 extends from the outlet of fan 58 under perforated gas distributing plate 6, and a gas stream interrupting register 60 is rotatable in conduit 16 and connected by an overdrive 59 with gear 56. An adjustable register 61 is arranged between conduit 16 and gas distributing chamber 17, for adjusting the gas flow. A gas supply line 19, having a throttle member 62 interposed therein, extends from conduit 16 to distributing chambers 20 and 32.

In using the apparatus shown in FIG. 1 for sorting and separate removal of granular stock, a pulsating gas stream through approach bottom or plate 5 is maintained by fan 58, rotating register 60 in conduit 16, air distributing plate 6, adjusting plate 7 and gas distributing chambers 10. The granular stock flowing in through stock admission 35 onto approach bottom or plate 5 is brought into a liquid-like state by the pulsating gas stream, and the granular contents simultaneously are stratified one above the other, sorted according to the rate of suspension. Depending on the fixed spacing of the first and second suction nozzles 47 and 48 from bottom or plate 5, and the gas flows adjusted by suction nozzles 47 and 48, a supernatant layer, differing in volume, of sorted bulk stock is carried away successively by suction nozzles 47 and 48. The remaining bulk stock continues to flow along approach plate 5 in sorted stratification into the zone of discharge 11.

Depending on the adjusted gas flows through the gas-permeable slide bottoms 15 and 18, arranged in cascade, a more or less voluminous bottom layer of bulk stock flows into the discharge chute 21, from where it is drawn off, in a proportioned manner, through vibration discharge apparatus 22 and supplied to a following processing stage. An upper layer of the bulk stock flows over the overflow edge 39 onto the discharge regulating area 30 which, by the gas flow therethrough, influences the flow property, and the upper layer continues through the second discharge chute out of the apparatus. For varying the respective quantities of bulk stock which must be carried away by the two discharge chutes 21 and 26, the following ad-

justment possibilities are provided, and are partly interdependent:

a. variation of the gas flow through the inclined gas-permeable slide bottoms **15** and **18** arranged in cascade;
b. variation of the delivery output of the vibratory discharge apparatus **22**;
c. variation of the height of the overflow edge **39** located between the zone of the first discharge chute **21** and the discharge regulating area **30**;
d. variation of the gas flow through discharge regulating area **30**.

The quantity-wise removal of supernatant bulk goods in advance of discharge **11** takes place through suction nozzles **45** and **46**, and this removal is adjusted, on the one hand, by adjusting the spacing of these nozzles relative to approach plate **5** and, on the other hand, by variation of the gas flow through the nozzles **45** and **46** into the respection suction lines **50** and **51**.

The apparatus has various advantages for the dry sorting and separate removing of granular stock. Consequently, over the entire flow distance of the stock, there is no unsteadiness in its fluidization. Thus, the sorting into superposed stratifications, once carried out, is no longer disturbed, so that any desired layer thickness can be removed neatly. The apparatus permits large throughputs with only very small dimensions, and its adaptation to different sorting and separating problems is possible with simple means. The major part of the apparatus does not execute movements of any kind, so that maintenance and installation do not depend on any special conditions. Finally, separation occurs at low bulk stock velocity and low treatment gas velocity, as well as with very small relative movements, resulting in little wear of the apparatus and minimum abrasion of the stock to be treated.

The embodiment of the invention shown in FIG. **2** differs from that shown in FIG. **1** mainly by virtue of a different discharge **11'** as well as by virtue of a special arrangement of suction nozzle **46'**, so that the various parts are designated by the same reference characters as used in FIG. **1**. In contrast to the apparatus shown in FIG. **1**, each gas distributing chamber **10** has arranged therein a respective adjustable regulating plate **7'** above the air distributing plate **6**. A flow adjusting plate **65** and an air distributing plate **66**, both perforated, are positioned between gas conduit **16** and gas distributing chamber **17** under slide bottom **15** which is contiguous to approach bottom or plate **5**. A slide bottom **18**, arranged substantially in cascade to slide bottom **15**, leads out of the zone of gas collecting hood **40** into a discharge chute **21** extending steeply downwardly.

Below slide bottom **18**, partitions **68** are provided and divide the bottom area thereof into individual aeration chambers **69**. The gas conduit **16** extends laterally past discharge chute **21** under aeration chamber **69**, and each aeration chamber has a flow adjusting register **70** at its connection to conduit **16**. For the purpose of adjusting the spacing of the opening **48'** of suction nozzle **46'** relative to plate or bottom **5**, suction nozzle **46**, along with suction line **51'**, is adjustable in height by nuts **71** threaded on stay bolts **72** embraced by springs **73**, so that nuts **71** can be readily adjusted relative to hood **40** of housing **3**. An outflow aperture **13** is recessed in housing **3** adjacent plate or bottom **5**, and a damming plate **14**, which is adjustable in height, is provided in advance of outflow aperture **13**.

Since it is not necessary, in all cases, to separate into several fractions but merely to draw off a specific different type of stock from the mixture of granular material, the apparatus of FIG. **2** has the advantage that the single suction nozzle is adjustable, by very simple height adjusting means, to a specific thickness of the layer, that up to the discharge there exists a satisfactory fluidization and thus a satisfactory stratification, and that the material can be guided into the discharge chute in controllable discharge output. To adapt especially these discharge properties exactly to the particular given conditions, the area of slide bottom **18** is divided into several differently aeratable fields. By this design, and in conjunction with damming plate **14**, small quantities of supernatant light fractions can still be removed through outflow aperture **13**.

A top plan view of the apparatus of FIG. **2**, shown in FIG. **3**, illustrates the two channels of the conduit **16** extending laterally past discharge chute **21** and leading under aeration chamber **69**. Grip wheels **75** are provided to adjust flow adjusting registers **70**. Two registers **77** and **78** in the transition zone from conduit **16** into the channels to the aeration chamber **69** permit a first adjustment of the gas stream required in this zone.

In the further embodiment of the invention shown in FIG. **4**, the most important elements are the same as in FIG. **1**, namely the housing **3**, conduit **16**, air distributing plate **6**, approach bottom or plate **5**, stock admission **35**, gas collecting hood **60** and suction nozzles **45**, **46** which are adjustable in height relative to approach bottom or plate **5**. The apparatus also includes the discharge chute **21** connected by a flexible sleeve **23** to vibratory discharge apparatus **22**.

The first difference between the embodiment of FIG. **4** and that of FIG. **1** is that, for the formation of gas distributing chambers **10** between air distributing plate **6** and approach plate **5**, separators **80** are provided with shoulders or noses near approach plate **5**. Perforated gas stream limiting plates **82**, with possibly different perforations, are placed on these noses or shoulders, in order to vary the fluidization air impinging thereon in good distribution through the air distributing plate **6** with respect to flow properties, and hence the fluidization capacity, of the stock layer flowing along approach plate **5** from stock inlet device **35** to discharge **11**. In the example shown, gas stream limiting plates **82** effect, due to the different respective perforations, different pressure gradients on the one hand and different flow quantites of the treatment gas on the other hand.

Following the approach plate **5**, there is provided, instead of the gas-permeable slide bottoms, an outflow plate **85** which is adjustable with respect to its inclination. The adjustment can be effected either along the adjustment slot **86** or by using one of the predetermined adjustment holes **87**. Gas tightness to the exterior is insured by the covering **88** which closes both adjusting slot **86** and the holes or apertures **87**. Due to the fluidization angle of repose of the bulk stock, which is different from the actual angle of repose characteristic of the material, it is possible to control, using such an outflow plate **85**, the flowing out of bulk stock and hence the stay time on approach plate **5**. Together

with vibratory discharge apparatus 22, the treatment influence can be varied within wide limits.

In the embodiment of the invention shown in FIG. 5, the essential elements for the fluidization of the bulk stock, flowing from the zone of stock admission 35 through register 36 and over approach bottom plate 5 into the zone of discharge 11, are largely the same as in the embodiments of the invention shown in FIGS. 1 and 4. In FIG. 5, gas stream limiting plates 82 are provided within gas distributing chambers 10' near approach plate 5, and there are differences in the discharge 11'' and especially in the gas collecting hood. In gas distributing chamber 17 and 20, respective flow plates 89 and 90 are provided near the respective slide bottoms 15 and 18. An inner distributing plate 91 is interposed between conduit 16 and gas distributing chamber 20.

Gas collecting hood 40 is replaced by a suction system 100. Three nozzle plates 101, 102, and 103 cover approach bottom or plate 5 and discharge 11'', and each nozzle plate is formed with nozzle channels 105 having openings 106 toward plate 5, the nozzle channels being essentially uniformly distributed. The outlets of nozzle channels 105 discharge into suction lines 111, 112, and 113 each correlated with a respective nozzle plate 101, 102 and 103. Respective flow adjusting registers 116, 117 and 118 are pivotally mounted in each of the suction lines 111, 112 and 113 before these suction lines terminate in a common collecting channel 120 leading to a suction system which has not been shown. By means of regulating screws 110, the spacing between each of the nozzle plates 101, 102 and 103 and approach plate or bottom 5 is adjustable.

The stock to be sorted and separated passes from supply device 35 onto approach plate 5, whereupon, by the gas flow from gas conduit 16 into collecting channel 120, both the stratification of the stock into different stock fractions and the flowing of the superposed layers into discharge 11'' is effected. Nozzle channels 106 and nozzle plates 101, 102 and 103 make possible, along the entire flow path, the removal of certain stock fractions swimming on top or floating in suspension. For this purpose, the individual gas flows throgh nozzles 105 into the corresponding suction lines 111, 112 and 113 are adjusted by the respective flow adjusting registers 116, 117 and 118. In order further to regulate the suction effect, nozzle plates 101, 102 and 103 are adjustable, by zones, to a suitable spacing from approach plate 5. Thus, in different zones of the fluid path, different fraction quantities of the stock are removed, before the remaining stock flows over slide bottoms 15 and 18, in discharge 11'' into discharge chute 21'.

The embodiment of the invention shown in FIG. 5 is advantageous inasmuch as fractions of stratified bulk stock are carried away continuously and not at individually pronounced points, so that stratification can be carried out more effectively. Also, the apparatus is very simple in operation and maintenance, as it contains no moving parts in the zone of the stock treatment.

In extensive correspondence with the already-described embodiments, the embodiment of FIG. 6 is directed to a special measure for discharging the stock as it arrives in discharge chute 21. Chute 21 is contiguous to slide bottoms 15 and 18 arranged in cascade, and under which perforated flow plates 89 and 90, respectively, are arranged for air distribution and air flow control. From gas conduit 16, the aeration gas is conducted laterally past adjusting register 78 and discharge chute 21 into gas distributing chamber 20. Beneath discharge chute 21, a discharge conveyor 121, with two discharge troughs 122 and 123 extending parallel to each other and crosswise of the sorting and separating apparatus, is arranged. Discharge troughs 122 and 123 slope toward outlets 124 and 125, respectively. The drive of conveyor 121 is effected by an eccentric flywheel mass 126, suspended by springs 127 in a manner such that the entire discharge conveyor 121 can be vibrated.

Between the outlet end of discharge chute 21 and discharge conveyor 121, there are provided adjusting slides 131 and 132 which are adjustable in height relative to the respective discharge troughs 122 and 123. Slides 131 and 132 are secured in adjusted position by respective adjusting screws 133 and 134 threaded into discharge chute 21. Opposite the discharge end of chute 21, discharge conveyor 121 has slide areas 130 which open into discharge troughs 122 and 123. Between adjusting slides 131 and 132 and slide areas 130, respective discharge slots 135 and 136 are left free, and the widths of these slots is determined by the adjustment of slides 131 and 132, respectively.

The stock to be separated, sorted into layers, passes from approach layer 5 to the inclined slide bottoms 15 and 18 where a deflection of stratified stock into the discharge chute 21 occurs without alteration of the stratification so that, in chute 21, the layer boundaries continue to extend in the flow direction, i.e., substantially vertically in chute 21. By adjustment of slides 131 and 132, the widths of discharge slots 135 and 136, respectively, can be varied so that the outflow quantities from discharge chute 21 into the respective discharge troughs 122 and 123, are varied. A small width of discharge slot 135, for example, and a large width of discharge slot 136, cause a large quantity of stock to flow off thorugh discharge slot 136 and a small quantity through discharge slot 135. Thereby, a large quantity of the stratified stock lying on top approach or bottom plate 5 is conveyed into discharge trough 123 and only a small quantity lying therebelow into discharge trough 122. It will be evident from this that a separation of stratified stock is possible with surprisingly good separation effect without the use of shearing separating sheets, permitting the much simpler adjustment of the separation boundary. Yet, it may be desirable, in certain cases, to provide such a separating sheet 140, which is vertically displaceable in discharge chute 21 and extends thereacross, in combination with the adjusting slides, as indicated in FIG. 7.

It has been found, surprisingly, that, simultaneously with the sorting work in such a fluid bed process, and before the separate removal, various treatments can be carried out with the effect of varying at least the physical properties of the treated granular bulk stock. For this purpose, there may be named, in particular, heat exchange, such as heating and cooling, substance exchange, such as drying and wetting, surface modifications, such as coating and stabilizing and volume variation such as swelling and shrinking. Additionally, the fluid-bed devices of the present invention prove emminently suitable for exerting a proportioning effect on the partial streams, in addition to the sorting work, during the separate discharging.

While specific embodiments of the invention have been shown and described in detail to illustrate the application of the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. In apparatus for the dry sorting and separate removal of fractions of a granular bulk material, of the kind including a stationary inclined perforated approach bottom traversed by a pulsating gas flow, a stock mixture inlet discharging onto the approach bottom from above the latter, a discharge immediately following the approach bottom, and a gas distributing device arranged beneath the approach bottom, the improvement comprising, in combination, said discharge extending downwardly away from said approach bottom; at least one gas flow conduit extending over the width of said approach bottom and acting directly on at least one of the sorted granular stock fractions; a respective gas flow adjusting means operatively associated with each gas flow conduit; at least two inclined slide bottoms in a transition zone from said approach bottom to said discharge, and arranged in cascade; at least that slide bottom directly adjacent said approach bottom being a gas-permeable porous gas flow element; and a gas distributing chamber disposed beneath said porous gas flow element.

2. The improved apparatus claimed in claim 1, in which said discharge, below said slide bottoms, is a discharge chute extending steeply downwardly; and a proportioning discharge apparatus connected to the outlet of said discharge chute.

3. The improved apparatus claimed in claim 2, including two discharge troughs extending transversely of the flow direction of the stock beneath said discharge chute; and means forming converging slide areas in the zone of the outlet of said discharge chute.

4. The improved apparatus claimed in claim 3, including means operable to vary the spacing of the discharge mouth of said discharge chute from said slide areas.

5. The improved apparatus claimed in claim 4, in which said last-named means comprises two respective adjusting slides, one for each slide area, the spacing of said slides from the associated slide area being adjustable.

6. The improved apparatus claimed in claim 3, including a partition extending throughout the width of said discharge chute in the direction of material flow thereto to subdivide the discharge chute into partial discharge chutes.

7. The improved apparatus claimed in claim 1, including means forming an overflow edge extending throughout the width of said approach bottom in said transition zone and downstream of said discharge chute; and a second discharge chute separated from said first discharge chute by said overflow edge.

8. The improved apparatus claimed in claim 7, in which said overflow edge is adjustable in height.

9. The improved apparatus claimed in claim 7, including means forming a gas-permeable porous discharge regulating area between the said two discharge chutes and downstream of said flow edge; and a gas supply and distribution chamber operatively associated with said gas-permeable porous discharge regulating area for variable pressurization of said area.

10. The improved apparatus claimed in claim 1, including a plurality of suction nozzles distributed substantially uniformly over the area of said approach bottom in spaced relation to the plane of the latter.

11. The improved apparatus claimed in claim 10, in which said plurality of suction nozzles comprise adjustable flow section nozzles arranged in groups each covering a portion of the area of said approach bottom; and respective suction lines connecting each group of adjustable flow section nozzles to at least one suction conduit.

12. The improved apparatus claimed in claim 1, including a gas collecting hood covering the approach bottom and provided with an outlet line; said gas flow conduit being a suction conduit having a suction nozzle.

13. The improved apparatus claimed in claim 12, in which said suction nozzle has a nozzle aperture which is small relative to its width, and extending over said approach bottom; said suction nozzle being spaced from the plane of said approach bottom; and a suction line connected to said suction nozzle to connect the latter to a suction unit.

14. The improved apparatus claimed in claim 13, including plural said suction nozzles spaced longitudinally of the flow direction of the stock and having different spacings from the plane of said approach bottom.

15. The improved apparatus claimed in claim 14, including means operable to adjust the spacing of said suction nozzles from said approach bottom.

16. In a method for the dry sorting and separate removal of fractions of granular bulk stock, flowing as a continuous layer over a stationary inclined perforated surface from a stock mixture inlet to a discharge, and traversed, on the stationary inclined perforated surface, by a pulsating gas flow which stratifies the flowing layer and sorts it into stock fractions, the improvement comprising, at a zone directly following the inclined perforated surface in the direction of stock flow, and immediately in advance of the discharge, deflecting the flowing layer to flow downwardly at a steeper angle of inclination to a discharge chute while directing a second pulsating gas flow through the thus deflected layer of stock to maintain the stock layer entering the chute stratified and sorted into stock fractions; and utilizing the second gas flow to remove at least one sorted fraction from the stock layer flowing into the discharge chute.

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