Dec. 10, 1940. D. C. TURNBULL 2,224,169

APPARATUS FOR SORTING GRANULAR MATERIALS

Filed Aug. 20, 1938 3 Sheets-Sheet 1

Fig. 1.

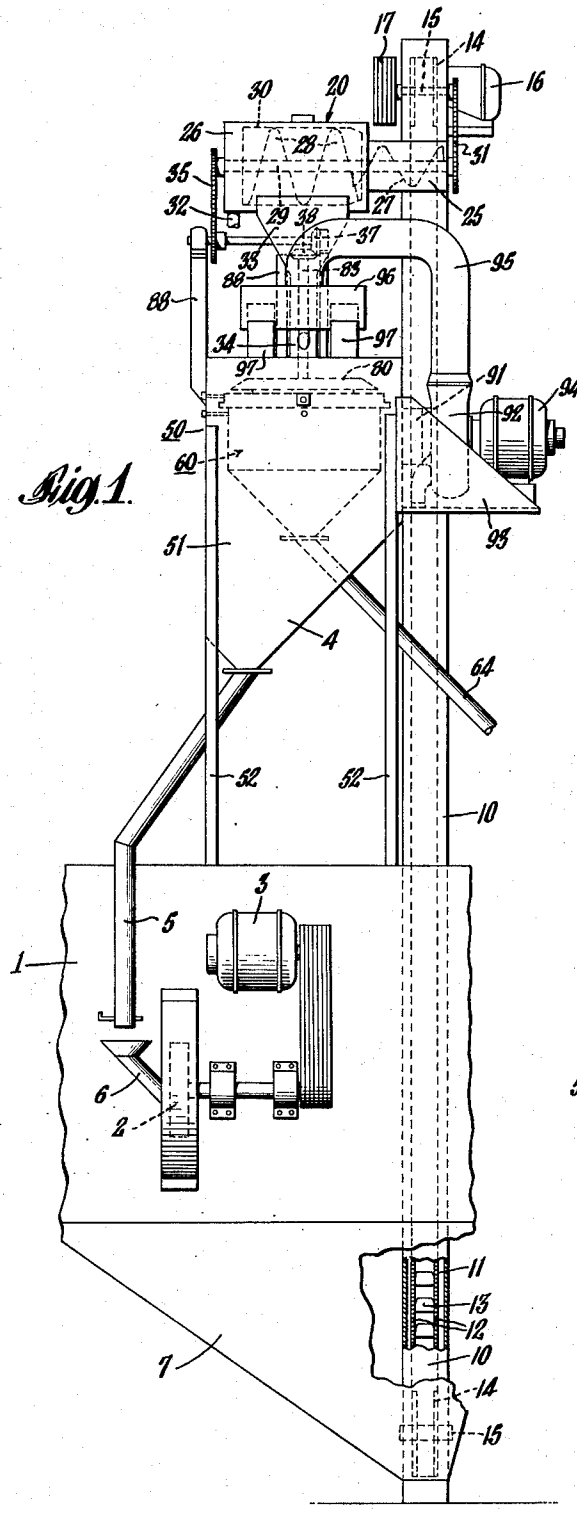
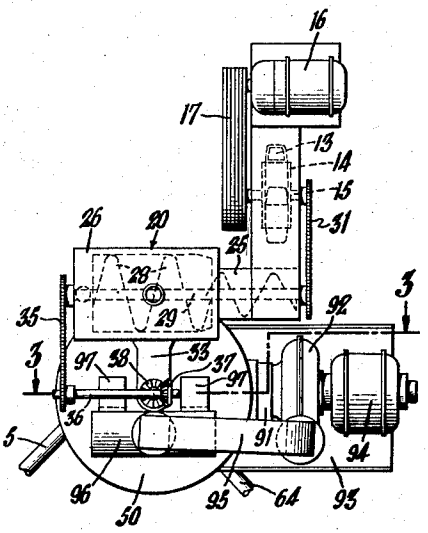


Fig. 2.



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Fig. 3.

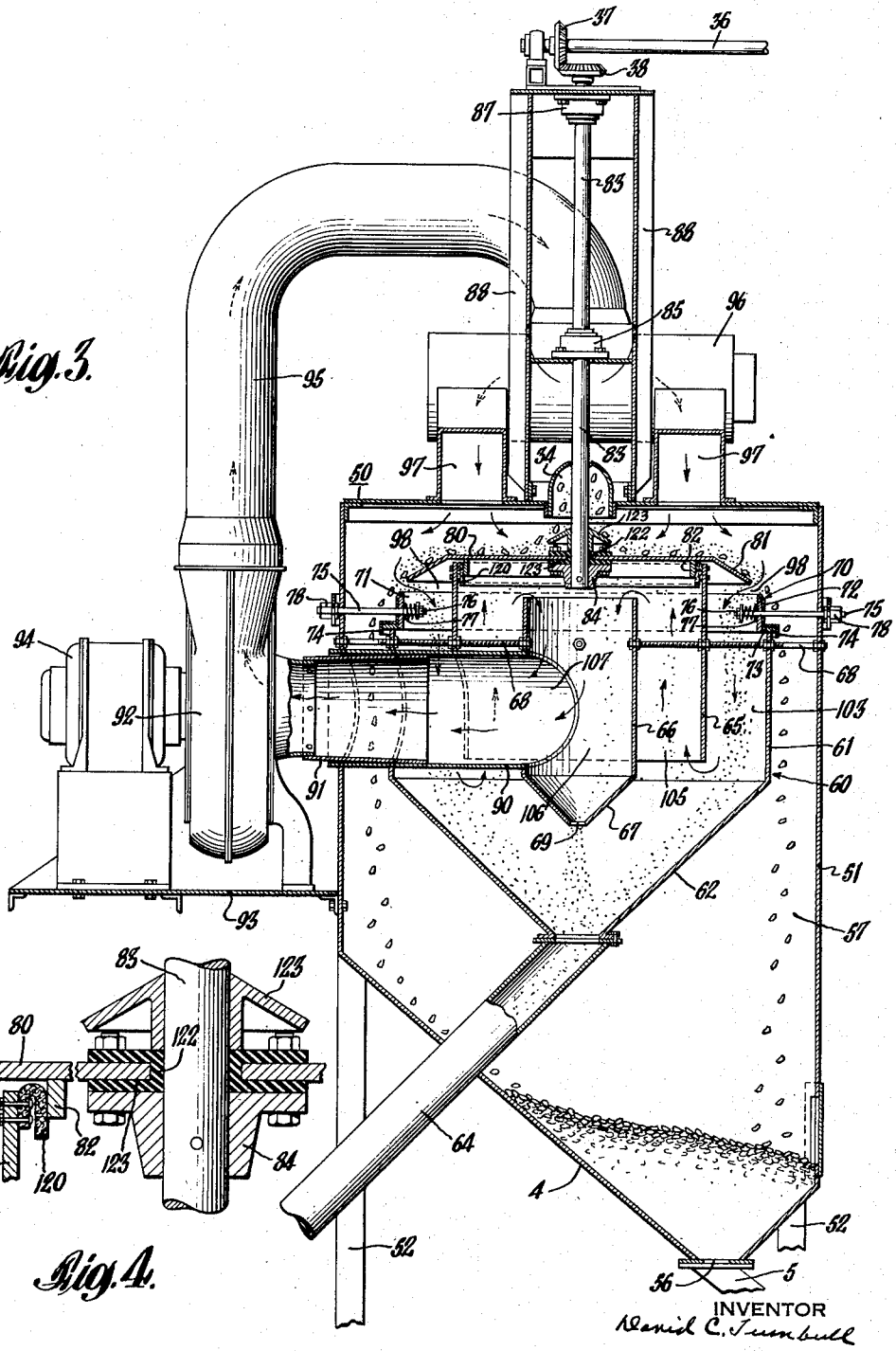


Fig. 4.

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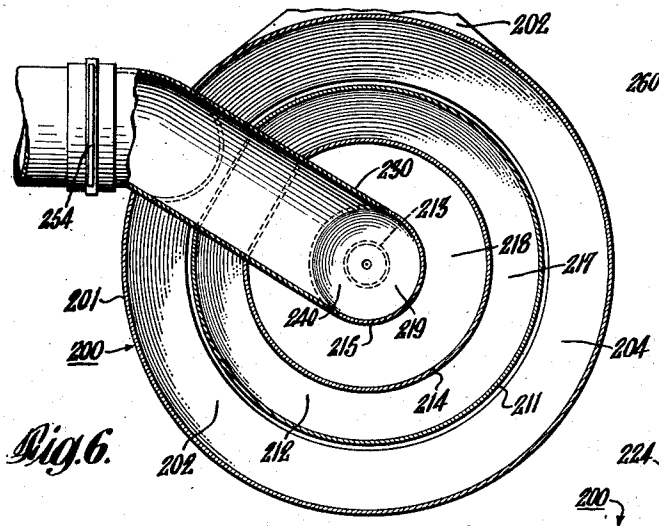


Fig. 6.

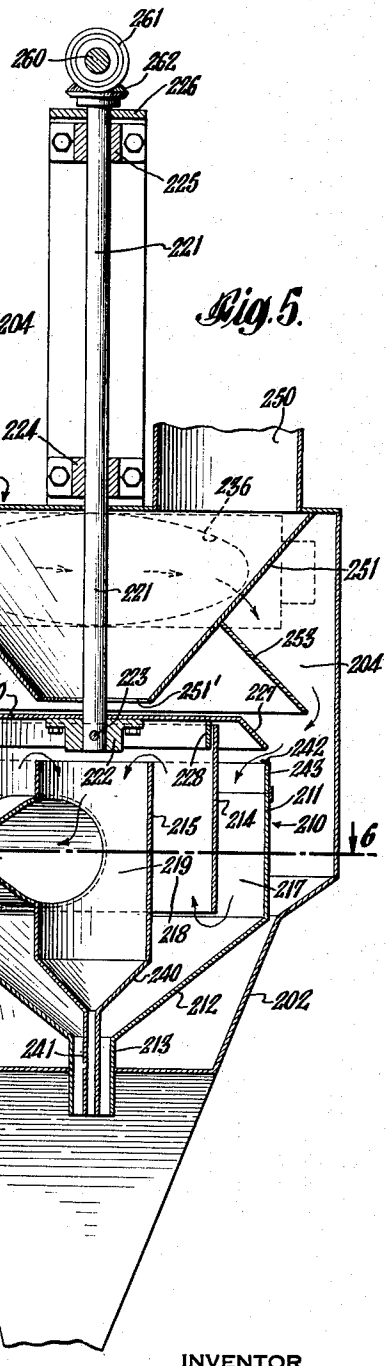


Fig. 5.

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UNITED STATES PATENT OFFICE

2,224,169

APPARATUS FOR SORTING GRANULAR MATERIALS

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Application August 20, 1938, Serial No. 225,850

7 Claims. (Cl. 209—12)

This invention relates generally to apparatus for sorting granular materials and more particularly to the separation of mixed solid particles of different weights and densities.

In various operations wherein granular material is involved, it is often necessary or desirable to separate and sort the material in accordance with the size or weight of the particles. One example of such separation is the reconditioning of granular abrading material employed in abrasive cleaning of forgings, castings or other metal members, which abrading material usually consists of round steel shot, cracked steel grits, sharp quartz sand or similar material. In the course of operation the abrading material becomes mixed with core sand, scale, rust, dust, and other foreign matter, which it is desirable to remove from the abrading material. The present invention is particularly adapted for reconditioning abrading material and in the present illustrative embodiment of the invention is described in connection with reconditioning abrading material for the cleaning or surface treating of metal castings, forgings, bars, sheets and the like.

In accordance with the present invention, the material to be sorted is urged along a supporting surface and thereafter is allowed to fall freely from the surface and a fluid current is drawn through the stream to entrain the lighter and finer particles and separate them from the heavier particles. The heavier particles are immediately isolated from the fluid current carrying the lighter particles and are collected. After separation of the heavier particles the fluid current with the lighter particles entrained therein preferably is caused to change direction abruptly whereby the particles are thrown out of the stream and can be collected. If desired, an electrostatic charge may be imparted to the lighter particles of dust or sand while on the supporting surface to retard their removal therefrom, thereby to produce a further separating effect.

The invention also provides novel apparatus for carrying out the invention, which apparatus, according to an illustrative embodiment of the invention, comprises a housing having a rotatable table or "spinner" therein, onto which the granular material is deposited. The table is rotated to cause the material to travel outwardly thereon and finally drop off across the peripheral edge. A fluid current is drawn through the material as it falls from the table or spinner, which current entrains the finer and lighter particles and carries them inwardly away from the remainder of the particles. A baffle structure is disposed in cooperative relation to the table or spinner and serves both to segregate the entrained particles from the heavier particles and to direct the flow of the fluid material. Baffle means are provided for effecting one or more abrupt changes of direction of the fluid current after it has passed through the falling material, and entrained the lighter solids, thereby to throw out the entrained solids. If desired, one or more settling chambers may be provided for effecting selective settling out of entrained particles of various sizes. Suitable means, such as a felt pad rubbing against the table, may be provided for producing or enhancing an electrostatic charge on the table whereby to electrostatically charge the finer particles such as sand and dust as they travel along the table and thereby to retard their removal from the table.

An object of the present invention is the provision of an improved apparatus for sorting granular material wherein particles of various sizes can be accurately and easily separated and segregated.

Another object of the invention is to provide an apparatus for reconditioning abrading material employed in cleaning metal forgings, castings and the like, in order to remove included sand, scale, dust and other foreign matter whereby the abradant is suitable for repeated use.

Another object of the invention is the provision of apparatus for separating solid particles of various sizes, which apparatus is simple, efficient, rugged, operates with a relatively low power consumption, and which is relatively compact and efficient as to space.

Still another object of the invention is the provision of apparatus for cleaning or treating abradant material to remove large foreign articles such as sand, dust, scale or other foreign matter to efficiently recondition the abrasive material for reuse.

Still another object of the invention is the provision of apparatus for separating solid particles in accordance with the size or weight wherein a plurality of separations can be carried out in the course of a single cycle.

Various other features and advantages of the invention will be apparent from the following particular description and from an inspection of the accompanying drawings.

Other features, objects and advantages of the present invention will in part be pointed out and in part become apparent in connection with the following detailed description of certain illustra-

tive forms of construction, reference being had to the accompanying drawings, wherein—

Fig. 1 is a fragmentary side elevational view of apparatus for abrasive blast cleaning and embodying one form of separator mechanism constructed in accordance with the invention in combination with an abradant cycling or reconditioning system;

Fig. 2 is a fragmentary top plan view of the apparatus shown in Fig. 1;

Fig. 3 is an enlarged fragmentary cross-sectional view taken along line 3—3 of Fig. 1;

Fig. 4 is an enlarged fragmentary cross-sectional view of a constructional detail of Fig. 3;

Fig. 5 is an enlarged fragmentary cross-sectional view taken through a modified form of separator; and

Fig. 6 is a view of a horizontal section taken along line 6—6 of Fig. 5.

In the following description and in the claims, various details will be identified by specific names for convenience, but they are intended to be as generic in their application as the art will permit. Like reference characters denote like parts in the several figures of the drawings.

Referring now particularly to Fig. 1, there is illustrated a cleaning chamber or cabinet 1 having associated therewith an abrasive throwing wheel 2 of the rotary centrifugal type, driven by a motor 3 and adapted to project a stream of abrading material at abrading velocities against articles to be cleaned, such as metal castings, forgings, bars, billets, sheets and the like. The articles are supported within the chamber in the stream or conveyed therethrough by suitable supporting or conveying means (not shown). Abrading material is delivered to the wheel 2 from a hopper 4 hereinafter more fully described, which discharges into a feed conduit 5 leading to a feed pipe 6, which latter delivers the abrasive operatively to the throwing wheel 2 in a manner which will be understood by those skilled in the art.

Spent abrading material, together with debris such as core sand, scale, rust, dust and other foreign matter, is collected in a hopper 7 from which it flows by gravity or by a suitable conveyor (not shown) to an elevator housing 10 having therein an elevator 11 comprising endless chains or belts 12 carrying buckets 13, and trained over drums or pulleys 14, 14 supported at the top and bottom of the housing 10 as by shafts 15, 15. The elevator is driven as by a motor 16 connected by a suitable drive 17 to one of the upper shafts 15.

The abrading material is delivered from the elevator 11 to a coarse separator or screening mechanism 20 adapted to remove any nuts, bolts, large pieces of scale, broken pieces of castings or other foreign articles of relatively large size, such as may be mixed with the abrading material as it comes from the cleaning chamber.

The screening mechanism 20 has an inlet passage 25 leading from the elevator housing 10 to a chamber 26 having a generally cylindrical screen 30 therein. A conveyor screw 27 is disposed in the inlet passage 25 and extends from adjacent the elevator housing to within the chamber 26, and a screw 28 is disposed within the chamber 26 and inside of the screen 30. The screen 30 may be fixed in the housing 26 but preferably is mounted for rotation with the screw 28. The screws 27 and 28 are carried by a shaft 29 for rotation, which shaft is rotated by a drive 31 connected to the shaft 15.

When the shaft 29 is rotated the screws 27 and 28, together with the cylindrical screen 30, are rotated and feed abrading material and foreign matter through the separator 20. The abrading material and fine particles pass through the screen 30 and drop into a discharge conduit 33 and the larger particles are carried to the end of the screen 30 and are discharged from the chamber 26 through a debris conduit 32.

The discharge conduit 33 extends to a feed inlet 34 of a granular material separator 50, shown more particularly in Fig. 3, to which reference now is made. It will be understood that where the separator is used in connection with apparatus of other types than that shown, the granular material to be separated will be delivered in a suitable manner to the feed inlet 34.

The separator 50, shown more in detail in Fig. 3, comprises a housing 51, preferably supported above the cleaning chamber 1 as by a suitable frame 52. The housing defines a separating chamber 57, below which is a hopper 4 which may, if desired, be defined by the lower wall portions of the housing 51. The housing has an inlet 34 in the upper wall and a discharge outlet 56 in the hopper 4.

Rotatably disposed in the chamber 57, preferably adjacent and under the inlet 34, is a spinner or table 80 preferably of circular form and having at its periphery a downwardly and outwardly projecting apron 81. The table 80 is supported for rotation by a shaft 83, a hub 84 preferably being provided for supporting the table 80 on the shaft 83. The shaft extends through the top wall of the housing and is journaled in bearings 85 and 87 suitably supported on a frame 88. The shaft is rotatably driven from the shaft 29 (see Figs. 1 and 2) of the screening separator 20 by a drive 35 which drives a shaft 36 carrying a gear 37 which meshes with a gear 38 carried on the shaft 83.

Disposed in the chamber 57, below the rotatable table 80, is a baffle unit 60 adapted to cooperate with the table 80 in separating the granular material. The baffle unit comprises an outer, and preferably cylindrical, baffle 61 cooperating with a hopper 62 to define an outer or heavy dust settling chamber 103. The baffle 61 may extend upwardly to short of the outer edge of the apron 81, a gap or passage 98 being provided of sufficient vertical extent to permit the passage of an air stream. In certain cases it is desirable that the edge of the apron 81 terminate inwardly short of the top of the baffle 61, as illustrated in Fig. 3. It is preferable that the top of the center baffle be formed as a separate skimmer ring 73, which is mounted adjacent and preferably on the top edge of the wall forming the baffle 61.

The skimmer ring 70 is of generally annular form and preferably is provided with an upper edge of tapered form. The skimmer ring 70 may comprise a cylindrical ring 71 and an annular ring 73 secured together or a single member of angular cross-section. A cover member 72 of an abrasion-resisting material is secured to the members 71 and 73 as by welding and may have a depending apron 74 adapted to extend below the top edge of the baffle 61.

The skimmer ring 70 is supported, as by bolts 75, which extend through the wall of the housing 51 and through the upright portion of the ring 70. The bolts 75 preferably are resiliently connected to the skimmer ring as by nuts 76 and pressure springs 77, and are adjustably positioned by adjusting nuts 78. The skimmer ring 70 thus can be adjusted in a horizontal direction

so that its upper edge is centered with respect to the outer edge of the table 80 and the gap or passage 98 can be made uniform throughout its entire extent.

The vertical extent of the gap 98 can be adjusted vertically by adjusting either the table 80, or the skimmer ring 70, or both. For example, the table 80 can be adjusted by suitable adjustment of the hub 84 on the shaft 83. On the other hand, the skimmer ring 70 may be adjusted by providing for vertical adjustment of the bolts 78 in the housing 51, as for example, by providing slots (not shown) in the housing. In this connection it will be noted that the apron 74 cooperates with the baffle 61 and extends across any space or gap which may result from elevating the skimmer ring 70 relative to the baffle 61.

Preferably one or more additional baffles are disposed within the baffle 61 in order to cause the air passing into the chamber to travel in a tortuous path therein. In the present example, two additional baffles are provided, namely, an intermediate baffle 65 and an inner baffle 66, enclosing respectively an intermediate chamber 105 and an inner or light dust settling chamber 106 generally concentric with each other and with the chamber 103. The chamber 105 is open at the bottom, but is closed at the top to prevent the passage of the air stream. The top may be closed by extending the baffle 65 to the table 80 but preferably a flange or apron 82 depends from the table 80 and cooperates with the baffle 65 to close the top of the chamber 105.

The chamber 106 defined by the baffle 66 is open at the top but is partially closed at the bottom by a hopper 67 having an opening 69 communicating with the lower portion of the chamber 103.

The baffle unit 60 preferably is supported by a plurality of bolts 68 which extend radially through the walls of the housing 51 and the baffles 61, 65 and 66. These bolts carry suitable nuts, some of which position and secure the bolts relative to the housing and others of which position the respective baffles on the bolts.

Extending from the inner or light dust settling chamber 106 through the baffles 65, 66 and 61 and through the wall of the housing 51 is an air outlet conduit 90 which communicates with the casing of a blower fan 92 either directly or through an outlet pipe 91. The blower fan 92 is suitably mounted as by a bracket 93 and is rotated by a motor 94. The outlet of the blower fan is connected to a conduit 95 which leads to an equalizing chamber 96 which communicates with a plurality of air inlets leading into the separating chamber 57, preferably through the upper wall and above the rotatable table.

When the blower fan 92 is driven it circulates a relatively strong current of air through the conduit 95, the equalizing chamber 66, air inlets 97 and into the separating chamber 57. A current of air passes from the separating chamber 57 through the gap 98 and into the outer settling chamber 103 and then successively through the chambers 105 and 106 in alternate directions. Finally the air is discharged through the conduit 90 and outlet pipe 91.

The operation of the separator is as follows:

The shaft 36 is driven to rotate the shaft 83 which carries the table 80. The blower fan 92 is driven to circulate an air stream as above described. The granular material to be separated is introduced into the housing 51 through the inlet 34 and drops onto the table 80. Rotation of the table 80 causes the granular material to be carried outwardly and to be thrown off the apron 81 in a falling shower or stream.

The larger and heavier particles are thrown outwardly by a greater centrifugal force than the lighter particles and are deflected by the skimmer ring 70 and drop into the hopper 4, from whence they are withdrawn through the conduit 5.

The lighter particles travel outwardly along the table 80, but, owing to their lesser momentum are not thrown outwardly off the table with as much force as the heavier particles. The lighter particles drop off the apron 81 and the air stream passing through the stream or shower of particles entrains the lighter particles and carries them through the gap 98 and into the chamber 103, thus separating them from the heavier particles. Owing to their greater momentum the heavier particles are not entrained by the air stream but fall outside of the skimmer ring.

The downward movement of the air in the outer or heavy dust settling chamber 103, causes the entrained particles to be carried downwardly and, when the air stream changes direction abruptly and passes into the intermediate chamber 105, the heavier of the entrained particles are thrown out of the stream and fall into the hopper 62. The air stream then passes through the chamber 105 and, after again reversing its direction, passes into the inner or light dust settling chamber 106. Any fine particles which may be carried into the inner chamber 106 are thrown out, either by the abrupt change of the direction of the air current at the top of the chamber or the change in direction occurring when the air passes into the outlet passage 107. These particles drop through the opening 69 into the collecting hopper 62.

Where a separator, such as that described herein, is employed in a system for reconditioning abrading material, the operation of the separator is substantially as above described. In this case the lighter particles will generally comprise sand, dust, small particles of scale or rust and other foreign matter, and the heavier particles will generally comprise the abrading material.

The operation of the complete abrading material reconditioning apparatus illustrated in Figs. 1 to 4 and described hereinbefore, is as follows:

Abrading material is supplied from the hopper 4 through the conduit 5 and the feed pipe 6 to the throwing wheel 2. The latter projects the abrading material at abrading velocities against the metal forgings, castings, bars, sheets or other articles to be cleaned.

Spent abrasive, together with dust, scale, sand, broken casting parts, nuts, bolts and other debris are collected in the hopper 7 and lifted therefrom by the elevator 11 and deposited in the separator 20. The rotation of the screws 27 and 28 advances the mixed material into the screen 30 and causes the finer components, such as abrading material, dust, sand, etc. to pass through the screen. The larger components, such as nuts, bolts, broken casting parts, large chunks of scale, etc. will not pass through the screen but are discharged from the end of the screen and pass out through the debris outlet 32.

The finer components drop into the discharge outlet 33 and pass through the inlet 34 into the separator 50. The separator 50 operates as above described to separate the abrasive particles from the dust, sand, etc. the former being returned

to the hopper 4 and the latter being discharged through the discharge conduit 64.

It has been found that, in certain cases the sand and dust on the table have an electrostatic charge induced therein which causes these particles to be attracted by the table and retards their movement along and off the table. The particles of abrading material are not retarded and therefore flow off the table with a greater velocity whereby there is an inherent tendency for the latter to separate from the dust and sand as they leave the table.

In some cases it is advantageous to enhance this electrostatic effect and this can be accomplished by insulating the table and causing the table to rub against a member of such material as will charge the table as it rotates, which action induces an electrostatic charge in the particles of dust and sand.

Referring particularly to Fig. 4, one or more friction members is secured to the baffle 65 in position to bear frictionally against the flange 82 as the table is rotated. The friction member 120 is formed of material which upon rubbing against the flange 82 will produce an electrostatic charge against the table 80 and for example, may comprise a ring or strip of felt. The friction member 120 preferably may be secured to the baffle 65 by one or more bolts 121 and preferably is folded over as illustrated so as to press resiliently against the flange 82.

The table 80 is insulated from the shaft 83 by an insulating bushing 122, for example, which may have a flange 123 which insulates the table from the hub 84. If desired, a protector ring 123 may be fitted on the shaft 83 above the bushing 122 to prevent the dropping material from causing undue wear of the bushing 122.

Various modifications may be made in the invention above described and a second embodiment of separator is illustrated in Figs. 4 and 5 to which reference now is made.

The separator 200 includes a housing 201 defining a separating chamber 204 below which is a storage hopper 202 for collecting separated heavier particles. A charging inlet 250 leads into the upper portion of the housing 201 and communicates with an abrasive hopper 251 having a discharge opening 251'. The abrasive hopper 251 preferably is of generally conical form as illustrated.

Disposed in the separating chamber 204, preferably closely below the discharge outlet 255 of the abrasive hopper 251, is a spinner or table 220 having at its periphery a downwardly and outwardly extending apron 227. The table 220 is carried for rotation by the shaft 221, the table being secured to the shaft as by a hub 222 and pin 223; the table 220 may be vertically adjustable on the shaft for the purpose of adjusting the width of the air stream gap hereinafter described. The shaft 221 is rotatably mounted in bearings 224 and 225 carried by a bracket 226 and is rotated from a shaft 260 by suitable gears 261 and 262, the shaft 260 being driven from a suitable source of power not shown.

Disposed in the separating chamber 204 is a baffle unit 210 comprising an outer wall or baffle 211 defining an outer chamber 217, an intermediate wall or baffle 214 defining an intermediate chamber 218 and an inner wall or wall baffle 215 defining an inner chamber 219. Extending below the outer chamber 217 and intermediate chamber 218 is a hopper 212 having a discharge spout 213 extending through the lower wall 280 of the hopper 202. Extending below the inner chamber 219 is a hopper 240 which preferably is provided with a discharge spout 241 which may extend in the discharge conduit 213 a substantial distance for the purpose of reducing or eliminating any back draft. The discharge spouts 213 and 241 may lead to a sand box or boxes (not shown) and preferably are closed by a flap valve or gate (not shown) which is yieldingly held in closed position so as to remain closed except when forced open by accumulated sand in the spouts.

The outer baffle 211 extends to a point substantially under the outer rim of the apron 227 but spaced therefrom to provide an air stream 242. The width of the gap can be adjusted by vertical adjustment of the table 220 in the shaft 221. Preferably, the top portion of the baffle 211 is formed as or carries a skimmer ring 243 which may be replaceable and which is formed of good wear-resisting material. The top edge of the skimmer ring preferably is thinned or tapered.

The intermediate baffle 214 may extend substantially to the table 220 to provide a closure between the chambers 217 and 218 at the top or if desired, a flange 228 may extend downwardly from the table in telescoping relation with the baffle 214 for the purpose of closing this space.

The baffle 215 is spaced from the table to permit the passage of an air stream from chamber 218 to chamber 219. Thus it will be seen that an air stream can flow from the separating chamber 204 through the gap 242 downwardly through the chamber 217, upwardly to the chamber 218 and downwardly into the chamber 219.

An outlet duct 230 extends from the inner chamber 219 through the baffles 215, 214 and 211 and through the side wall of the housing 201 for the purpose of conducting an air stream from the inner chamber. The outlet duct extends to the casing of a blower fan 232 and may be provided with a gate or valve 254 for controlling the flow of air. The blower fan 232 is suitably mounted as by a frame 233 and is driven by a suitable source of power such as a motor 234. The outlet of the blower fan 232 is connected by a conduit or duct to an inlet 236 in the wall of the housing 201.

The baffles 211, 214 and 215 are suitably supported within the housing in properly spaced relation. These members may conveniently be supported by securing them to the outlet duct 230, as by welding. The outer baffle 211 may be additionally supported by securing the discharge spout 213 to the lower wall 280 of the hopper 202. If desired, additional supporting and spacing means (not shown) for the baffles may be provided.

Cooperating with the hopper 251 is a baffle 253 which preferably is of conical form and which, with the upper portion of the hopper 251 and the adjacent portion of the housing 201, defines a wind box or chamber 254 in the upper portion of the housing 201.

The operation of the apparatus illustrated in Figs. 5 and 6 is as follows:

The shaft 260 is suitably driven to drive the shaft 221 and thereby rotate the table or spinner 220. The motor 234 is energized to drive the blower fan 232 and thereby cause a stream of air to flow serially through the duct 235, wind box 254, gap 242, chambers 217, 218, 219 and duct 230.

Granular material to be separated is introduced into the housing 201 to the charging inlet 250 and flows from the hopper 251 through the opening 255 and is deposited on the rotating table 220. The granular material is urged outwardly along the table and finally drops off the outer rim of the apron 227. The larger and heavier particles have a greater momentum imparted thereto and are thrown outwardly with greater force than the lighter particles.

An air stream enters the wind box in a generally tangential direction and then flows from the wind box into the separating chamber 204 and through the stream of falling material and entrains the lighter particles and carries them into the chamber 217. The baffle 253 prevents the air stream from agitating the granular material which is on the table and directs the air stream through the falling stream of granular material. The air stream changes direction abruptly in passing from the outer chamber 217 to the intermediate chamber 218 and the heavier of the entrained particles are thrown out of the stream and are collected in the hopper 212. The air stream then passes from the chamber 218 into the chamber 219 and thence into the duct 230. The lighter dust particles drop out of the stream in the chamber 219 and are collected in the hopper 240.

In the form of apparatus illustrated the air stream is continuously circulated through the cycle as described but in some cases it may be desirable to provide a by-pass in the air stream circuit leading to a dust filter or arrester whereby to remove very fine solid particles which may not be completely removed from the air stream in the settling chambers.

The separator illustrated in Figs. 5 and 6 is admirably suited for use in reconditioning abrading material and this separator may be employed in an abrasive reconditioning or cycling system, such as illustrated particularly in Figs. 1 and 2 instead of the form of separator therein illustrated. If desired, means similar to that illustrated and described in connection with the form of apparatus shown in Figs. 3 and 4 may be provided for electrostatically retarding the flow of dust and sand along the table.

From the foregoing it will be seen that the present invention provides apparatus for separating granular material, which apparatus is simple and rugged, which has a relatively small number of moving parts and which can be operated with the expenditure of relatively little power. The separator is effective in action and insures a substantially uniform separation of granular material over long periods of operation. In fact, the construction of the separator inherently is such that the effectiveness of the separator remains substantially uniform throughout its life.

The separator is relatively compact and is capable of being installed readily in connection with other apparatus as for example, apparatus for recycling or reconditioning abrading material, and when once installed, requires little or no attention or adjustment. The separator substantially is self-cleaning and requires little or no shut-down for cleaning or adjustment. By suitable control and adjustment of the speed of rotation of the table, the velocity of the air stream, the spacing of the gap between the table and skimmer ring, it is possible to provide for considerable variation and adjustment in the operation of the separator to provide for separating articles of various sizes and weights. It is also possible to separate the granular material into three or more components. In fact, a substantial number of baffles and associated hoppers may be provided for separating the particles entrained by the air stream into numerous components depending upon the respective weights of the particles.

While certain novel features of the invention have been disclosed herein, and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes may be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. Apparatus for separating granular foreign material from abrading material, comprising a housing, a table within said housing and having an upper surface adapted to permit substantially free movement of granular material thereon, means for depositing granular material on the upper surface of said table, means for rotating said table to effect movement of granular particles across and off said table, means whereby rotation of said table produces an electrostatic charge thereon for retarding the movement of the lighter particles across said table, and means for passing a fluid current through the granular material leaving said table to entrain therein said lighter particles and separate them from the heavier particles.

2. Apparatus for sorting mixed granular abrading material and foreign particles, comprising a housing, a table rotatably mounted in said housing, means for depositing granular material on the central portion of said table, means for rotating said table to effect movement of the granular material across said table and to eject the same adjacent the periphery of the table, stationary friction means engageable with said table for creating a static electrical charge on said table to selectively retard movement of said granular material, and means for passing a fluid current through the granular material leaving said table whereby to entrain in said current the lighter particles and separate them from the heavier particles.

3. Apparatus for separating and classifying granular material comprising a housing, a table in said housing having a substantially unobstructed upper surface, means for depositing granular material on the upper surface of said table centrally thereof, means for rotating said table to effect a flow of granular material outwardly and downwardly therefrom by combined centrifugal and gravitational force, means for passing a fluid current inwardly through said granular material leaving said table whereby to entrain in said current the lighter particles of granular material, and baffle means for isolating the gaseous current containing the lighter particles from the remaining heavier particles, said baffle means including an outer circular baffle having an upper free edge spaced from and disposed substantially under the periphery of said table in position to segregate the lighter and heavier falling particles and a plurality of inner baffles positioned inwardly of said outer baffle to effect a tortuous flow of the gaseous current whereby to separate the entrained particles therefrom.

4. Apparatus for sorting mixed granular material comprising a housing, a main chamber having an inlet therein, a generally circular table mounted for rotation in a horizontal plane, a plu-

rality of generally vertically extending concentric, cylindrical partitions disposed below said table and substantially concentric therewith and defining a series of communicating inner chambers, said table being associated with at least one of said partitions to close the upper end of the corresponding chamber, the outermost of said partitions having an upper free edge disposed adjacent but spaced from the periphery of said table to effect a primary separation of granular material and to provide a gap leading into the chamber defined by said outermost partition, the remaining partitions being disposed to define a tortuous path, an outlet conduit extending from the innermost chamber through the remaining chambers and out of said housing, and means for circulating a current of air through said inlet, said outer chamber, said gap, said inner chambers and said outlet conduit successively.

5. Apparatus for sorting mixed granular material comprising a housing defining a main chamber having an inlet for granular material and an inlet for a gaseous current, a table mounted for rotation about a vertical axis, means for rotating said table for causing granular material to fall therefrom, a plurality of vertically extending, generally cylindrical partitions disposed in said main chamber below said table and substantially coaxial therewith, said partitions defining a series of inner chambers communicating at their tops and bottoms alternately to define a tortuous path for a gaseous current, the outermost of said partitions presenting an upper edge disposed in spaced relation to the periphery of said table to provide a gap leading into the upper portion of the chamber defined by said outermost partition, said edge being positioned to effect a primary segregation of the components of granular material falling from said table, one separation component passing through said gap and the other passing outwardly of said outermost partition, means for collecting granular material falling from said inner chambers, conduit means leading from said innermost chamber, and means for conducting a gaseous current through said second named inlet, inwardly through said falling granular material and serially through said gap, said inner chambers and said conduit means.

6. Apparatus for sorting mixed granular material comprising a housing defining a main chamber having an inlet for granular material and an inlet for a gaseous current, a generally circular table mounted for rotation about a vertical axis, means for rotating said table to cause granular material to fall therefrom, a plurality of vertically extending, generally cylindrical partitions disposed in said main chamber below said table and substantially coaxial therewith, said partitions defining a series of inner chambers communicating at their tops and bottoms alternately to define a tortuous path for a gaseous current, the outermost of said partitions presenting an upper free edge disposed in spaced relation to the periphery of said table to provide a gap leading into the upper portion of the chamber defined by said outermost partition, said edge being positioned to effect a primary segregation of the components of granular material falling from said table, one separation component passing through said gap and the other passing outwardly of said outermost partition, hopper means disposed under and communicating with said inner chambers for freely and continuously collecting granular material falling from said inner chambers, conduit means leading from said innermost chamber through said other chambers, and means for conducting a gaseous current through said second named inlet, inwardly through said falling granular material and serially through said gap, said inner chambers and said conduit means.

7. Apparatus for sorting mixed granular material comprising a housing defining a main chamber, a table, means mounting said table for rotation in a horizontal plane, said means including a substantially vertical shaft having its lower end terminating adjacent said table, a plurality of generally vertically extending, generally cylindrical partitions disposed in said main chamber below said table and substantially coaxial therewith, said partitions defining a series of substantially unobstructed inner chambers communicating at their top and bottom alternately to define a tortuous path for a gaseous current, the outermost of said partitions presenting an upper free edge disposed in spaced relation to the periphery of said table to provide a gap leading into the upper portion of the chamber defined by said outermost partition, said edge being positioned to effect a primary segregation of the components of falling granular material, one separation component passing through said gap and the other passing outwardly of said outermost partition, means for collecting granular material falling from said inner chambers, conduit means leading from said innermost chamber out of said housing, and means for conducting a gaseous current inwardly through said falling granular material and serially through said gap, said inner chambers and said conduit means.

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