B. H. REDDY.

GRADING AND TRANSFERRING MECHANISM FOR GRANULAR MATERIAL.

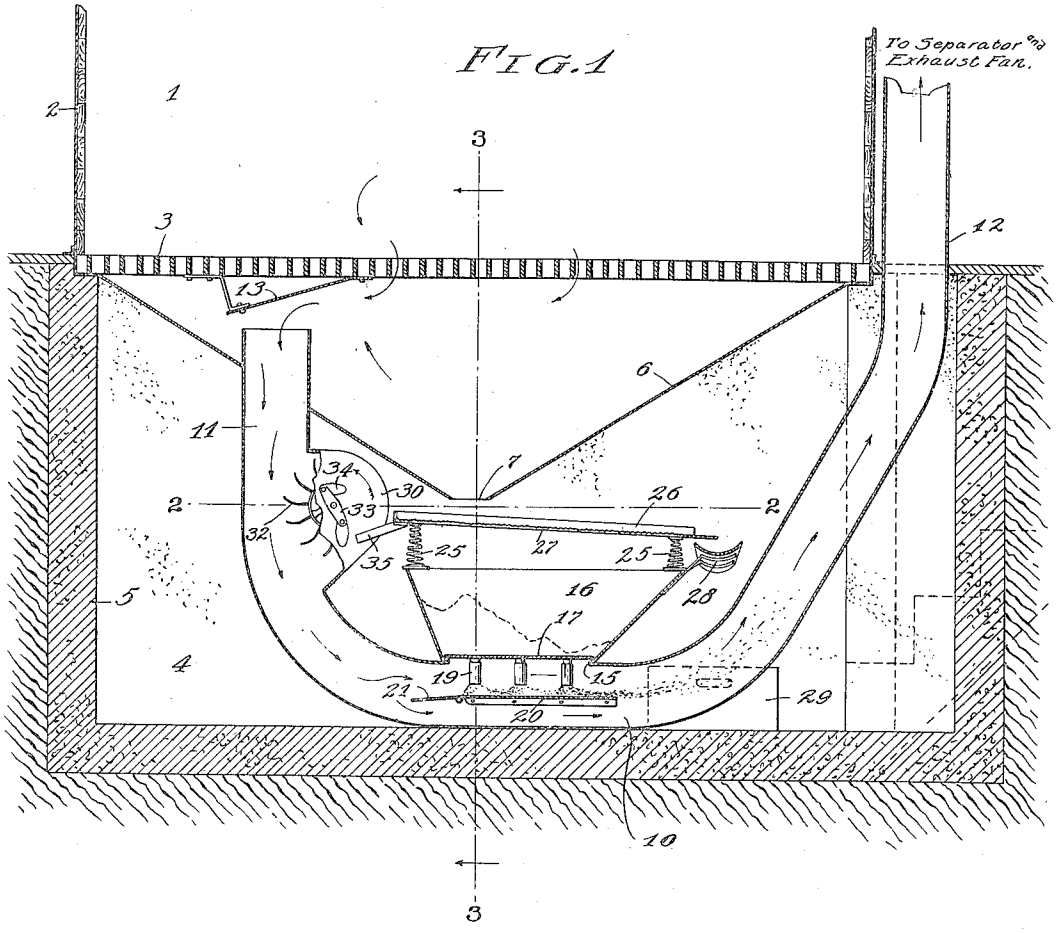
APPLICATION FILED AUG. 23, 1912.

1,207,794.

Patented Dec. 12, 1916.

2 SHEETS—SHEET 1.

FIG. 1



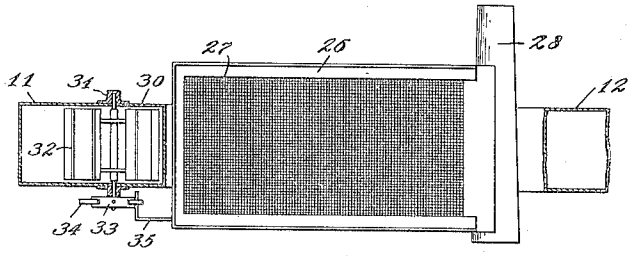


FIG. 2

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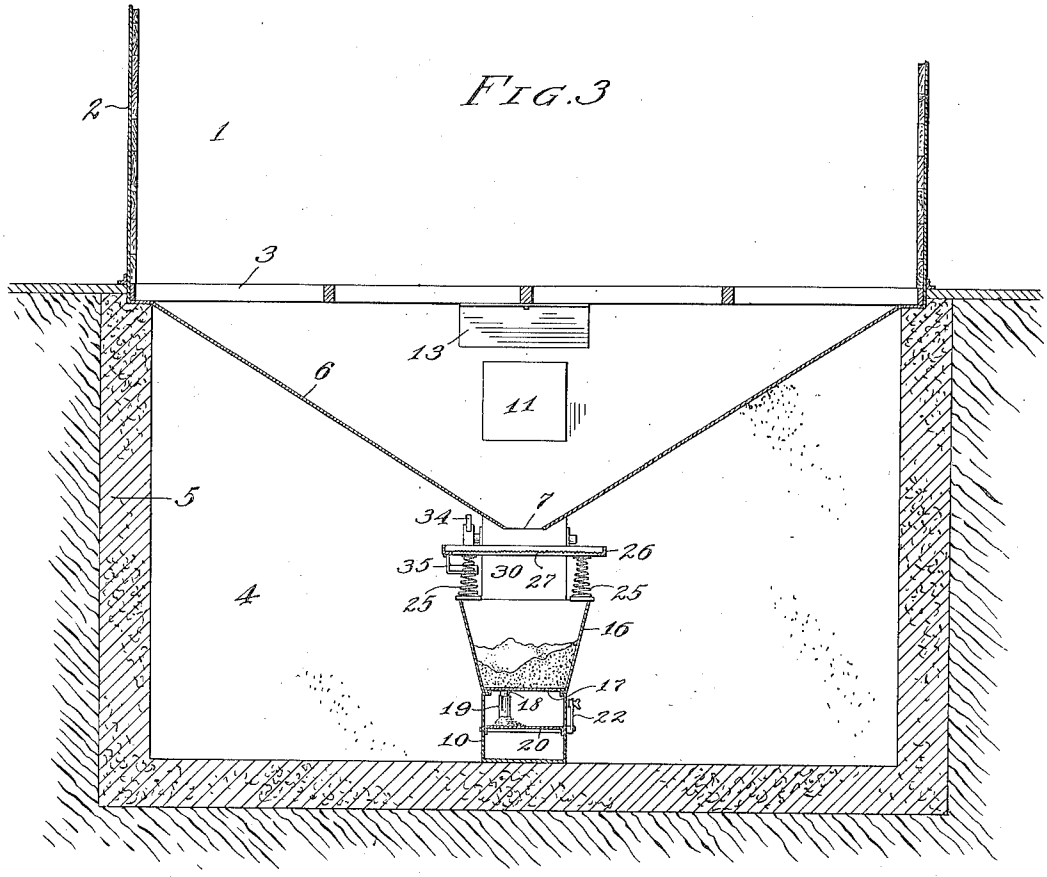
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2 SHEETS—SHEET 2.

FIG. 3



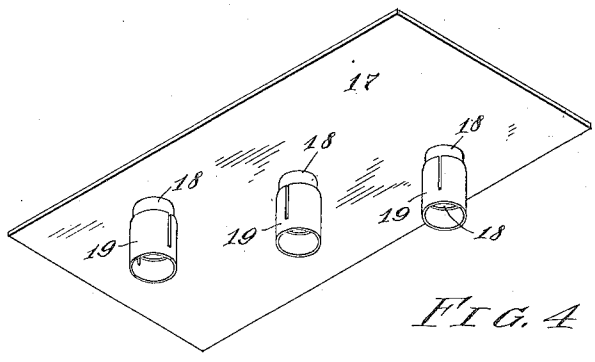


FIG. 4

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GRADING AND TRANSFERRING MECHANISM FOR GRANULAR MATERIAL.

1,207,794. Specification of Letters Patent. Patented Dec. 12, 1916.

Application filed August 23, 1912. Serial No. 716,628.

To all whom it may concern:

Be it known that I, BYRON H. REDDY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Grading and Transferring Mechanism for Granular Material, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to grading and transferring mechanism for granular material and particularly for sifting and recovering the sand used for cleaning castings and the like either by the sand-blast or the tumbling barrel process. However, it is not limited to this use as I apprehend the arrangement disclosed herein to be of value for grading and transferring other granular materials such as grain, etc. The most satisfactory and expeditious method of cleaning castings of foundry sand, scale, core-sand, and the like consists, as is well known, of directing thereupon a blast of abrasive sand, the castings being meanwhile supported in such manner as to expose a large portion of their surface or being inclosed in a slowly rotating tumbling barrel so as to expose all sides thereof to the action of the blast. The cost of suitable sand together with the expense of transporting and drying the same render it desirable that the same be used over and over.

The present invention relates more particularly to a means for separating from the used sand the slivers of metal, particles of scale, and other larger material prior to its being conveyed to the dust separating apparatus; the provision of means whereby such sand or other granular material may be delivered to a pneumatic conduit at a rate strictly in proportion to the rapidity with which it is taken up by the air in that conduit, and in such manner as to prevent the flooding and choking of the conduit upon the stopping of the air current therein; the provision of means whereby the rapidity with which the granular material is delivered to the conduit may be readily varied; the provision of means whereby the rapidity with which the particles are taken up by the air may be regulated to correspond with the weight and density of those particles; the provision of new and useful means whereby the grading or sifting apparatus may be operated directly by the force of the air current; and generally to produce a device for the purpose specified of great cheapness, compactness, and reliability.

Generally speaking my invention may be defined as consisting of the combination of elements recited in the claims hereto annexed and illustrated in the drawings accompanying and forming a part of this application wherein;

Figure 1 is a vertical cross sectional view through my improved grading and transferring mechanism, showing the same in connection with a sand room; Fig. 2 is a longitudinal cross sectional view taken upon the line 2—2 of Fig. 1 and looking downwardly; Fig. 3 is a vertical cross sectional view taken upon the line 3—3 of Fig. 1 and looking in the direction of the arrows; and Fig. 4 is a perspective view of the bottom plate of the sand receptacle taken from beneath and looking upwardly.

Described the parts by reference characters, 1 represents a sand room or casting cleaning chamber defined by walls 2 and having a grated floor 3. Beneath this chamber is a pit 4 defined by walls 5. Beneath the floor 3 a hopper 6 is preferably located so as to receive the sand and scale which falls from the room above, said hopper having at its lower portion a discharge aperture 7. Located in this pit is an air conduit of substantially U shape having a horizontal portion 10 and vertical legs 11 and 12. The leg 11 preferably projects upwardly through the hopper 6 as shown in Figs. 1 and 3, while the leg 12 communicates with a separator of any suitable type and an exhaust fan as will be understood without particular illustration. A plate 13 is mounted in inclined position beneath the grating 3 as shown in Figs. 1 and 3 so as to prevent the sand and scale from falling directly into the conduit. This plate is preferably inclined so as to prevent material from lodging thereon in any great quantity, and the direction of this inclination is preferably from the middle of the floor outwardly as shown in Fig. 1, so that the major portion of the air inspirated into the conduit will be taken from the middle part of the chamber so as to maintain the air therein in better condition. It is found that this arrange-

ment, in addition to affording the air necessary to the proper operation of the transferring mechanism largely prevents the rising of dust in the sand room and renders the operation less detrimental to the workmen employed.

The horizontal portion of the air conduit is formed at its upper side with an elongated opening 15 above which is mounted an oblong receptacle 16 preferably having flaring walls as shown in Figs. 1 and 3 and having a substantially horizontal top. The bottom of this receptacle is preferably formed by a separate plate 17 whose lower face is provided with a plurality of depending hollow nipples 18. Each of these nipples is provided with a slidable sleeve or shell 19 whereby its effective length may be varied, and the nipples are preferably arranged upon the plate 17 otherwise than in alinement as illustrated in Fig. 4. Mounted in the air conduit 10 beneath the ends of these nipples is a substantially horizontal plate 20 here shown as spaced a distance above the bottom of the conduit for a purpose hereinafter described, although for some purposes the plate might doubtless be formed as the bottom of the conduit. Mounted upon a substantially horizontal axis at the forward edge of this plate is a movable leaf 21 provided with a handle 22 whereby its position may be determined. It will be apparent that by changing the elevation of this leaf the proportion of air passing above and below the plate 20, respectively, can be varied.

Carried by the upper edge of the receptacle 16 are a plurality of upwardly projecting spiral springs 25, said springs preferably having a volute or tapered form and disposed with their smaller ends uppermost. Secured to the upper ends of these springs is an oblong frame 26 having a bottom 27 of wire cloth or other foraminous material and forming a sieve. This sieve is preferably inclined slightly in a longitudinal direction, its lower end being that adjacent to the leg 12 of the air conduit, and an inclined trough 28 is carried by the end of the receptacle 16 beneath the edge of the sieve so as to discharge into a suitable collector 29.

Formed in the upright leg 11 of the air conduit is an enlargement 30 in which is journaled, upon a substantially horizontal axis, a shaft 31 carrying vanes 32 adapted to be acted upon by the air passing thereby so as to rotate the shaft. At its outer end this shaft carries a cross head 33 having a weight or striker 34 pivoted to each of its ends. The frame 26 also carries an arm 35 which is engaged by each of these strikers at each rotation of the shaft whereby the sieve is vibrated.

The operation of the device is as follows: Upon the starting of the exhaust fan (not shown) and the consequent rush of air through the conduit, the shaft 31 will begin to revolve so as to vibrate the sieve. Any sand or other granular material delivered to the hopper 6 will fall upon the sieve and be freed from the particles of metal and scale or other larger particles and will fall into the receptacle 16. From this receptacle the smaller and more uniform particles will flow through the nipples 18 onto the plate 20 in little conical heaps whose height and diameter will depend upon the distance of the ends of the sleeves 19 from this plate. Inasmuch as the air can pick up this sand only from the surfaces of these piles, it will be apparent that the rate at which this sand is blown therefrom can be very exactly determined by adjusting the sleeves 19, since the greater the distance between the sleeves and the plate the greater will be the height of the piles and consequently the rapidity with which the granular material will be picked up by the air stream. As the sand is blown over the farther edge of the plate 20 by the air which passes above such plate, it is immediately caught up by the air passing below the plate and carried up the vertical leg 12 to the separator (not shown). In case the granular material consists of large or heavy particles it is obvious that less can be carried than when the particles are small and light. In the former case the damper 21 is raised so as to decrease the amount of air flowing across the top of the plate and increase the amount flowing therebeneath. This adjustment not only decreases the amount of material blown from the plate 20 but gives a somewhat greater pressure of air beneath that plate whereby the grains are caught up as they pass the farther end thereof. In case particles of very small size such as dust, bran, flour, gypsum, talc, finely granulated quartz, or the like were to be transported, it might be possible to close the lower passage entirely, or, what is the same thing, to discharge the granular material directly upon the bottom of the conduit. Whatever the particular arrangement, it is obvious that by using these tubes or nipples the granular material is delivered to the conduit only as fast as it is removed by the air stream and that, if for any reason, the exhaust fan should be stopped, there is no danger that the sand will continue to run into the conduit so as to clog and choke the same as has been the case with previous apparatus. Furthermore the mounting of the sieve upon the springs as illustrated has been found to be much more advantageous in dealing with abrasive material than any method with which I have heretofore been acquainted, owing to the fact that springs, owing to the absence of any friction surfaces, are substantially unaffected by the material, whereas pivots, bearings, sliding surfaces, and the like

which have heretofore been employed, are seriously affected by the grit which inevitably lodges thereon. It will also be apparent that I have produced a mechanism of great simplicity and reliability and which will operate with a minimum of attention inasmuch as its operation depends solely upon the maintenance of the current of air.

While I have necessarily described my invention in detail and pointed out with care the particular construction which with my present experience has appeared most effective to attain the end in view, I do not propose to be limited to such details except as the same may be positively included in the claims hereto annexed or may be rendered necessary by the prior state of the art.

Having thus described my invention, what I claim is:

1. In a pneumatic transferring device for granular material, the combination, with an air conduit having a substantially horizontal portion and a receptacle for the granular material located above said horizontal portion, of one or more vertical tubular nipples leading from said receptacle into said conduit and spaced above the bottom thereof, and means for adjusting the distance between the lower ends of said nipples and the bottom of said conduit.

2. In a pneumatic transferring device for granular material, the combination, with an air conduit having a substantially horizontal portion and a receptacle for the granular material located above said horizontal portion, of one or more vertical tubular nipples leading from said receptacle into said conduit and spaced above the bottom thereof, and means for varying the length of the said nipples.

3. In a pneumatic transferring device for granular material, the combination, with an air conduit having a substantially horizontal portion and a receptacle for the granular material located above said horizontal portion, of one or more vertical tubular nipples leading from said receptacle into said conduit and spaced above the bottom thereof, and an adjustable sliding sleeve carried by said nipple whereby its length may be varied.

4. In a pneumatic transferring device for granular material, the combination, with an air conduit and a receptacle for granular material, of a substantially horizontal plate within said conduit, and one or more substantially unimpeded tubular conduits having their upper ends communicating with said receptacle and having their lower ends extending downwardly into said conduit and terminating at a point above said plate, said plate extending beyond said vertical conduits at each side a distance not less than the height of such conduits above said plate.

5. In a pneumatic transferring device for granular material, the combination, with an air conduit and a receptacle for granular material, of a substantially horizontal plate within said conduit, one or more substantially unimpeded tubular conduits having their upper ends communicating with said receptacle and having their lower ends projecting downwardly into said conduit and formed with discharge openings above said plate, and means for varying the distance between said plate and the ends of said tubes, said plate extending beyond said conduits in all directions an amount not less than the distance of said plate from said conduits.

6. In a pneumatic transferring device for granular material, the combination, with an air conduit having a substantially horizontal portion and a receptacle for granular material located above the horizontal portion of said air conduit, of one or more substantially vertical tubular delivery nipples leading from said receptacle into said conduit, said nipples being substantially unimpeded, and a substantially horizontal plate mounted in said conduit below the mouths of said nipples and located intermediate of the upper and lower sides of said conduit and adapted to receive upon its upper surface the granular material delivered by said nipples, said plate extending beyond said nipples in all directions an amount not less than its distance from said nipples.

7. In a pneumatic transferring device for granular material, the combination, with an air conduit having a substantially horizontal portion and a receptacle for granular material located above the horizontal portion of said air conduit, of one or more substantially unimpeded tubular delivery nipples leading from said receptacle into said conduit at a point removed from both ends thereof, a substantially horizontal plate mounted in said conduit below the mouths of said nipples and located intermediate of the upper and lower sides of said conduit and adapted to receive upon its upper surface the granular material delivered thereto by said nipples, and means for determining the distance between said plate and the ends of said nipples, said plate extending beyond said conduits in all directions an amount not less than its distance from said conduits.

8. In a pneumatic transferring device for granular material, the combination, with an air conduit having a substantially horizontal portion and a receptacle for granular material located above the horizontal portion of said air conduit, of one or more substantially vertical tubular delivery nipples leading from said receptacle into said conduit, a substantially horizontal plate mounted in said conduit below the mouths of said nipples and located intermediate of the upper and lower sides of said conduit and adapted to receive upon its upper surface the

granular material delivered by said nipples, and means for determining the proportion of air which shall pass above and beneath said plate.

9. In a pneumatic transferring device for granular material, the combination, with an air conduit having a substantially horizontal portion and a receptacle for granular material located above the horizontal portion of said air conduit, of one or more substantially vertical tubular delivery nipples leading from said receptacle into said conduit, a substantially horizontal plate mounted in said conduit below the mouths of said nipples and located intermediate of the upper and lower sides of said conduit and adapted to receive upon its upper surface the granular material delivered by said nipples, and a pivoted member at the end of said plate whereby the proportion of air passing above and below this plate respectively may be regulated.

10. In a pneumatic transferring device for granular material, the combination, with an air conduit having a substantially horizontal portion, and a receptacle for granular material disposed at a higher level than said horizontal portion, of a substantially horizontal plate in the horizontal portion of said conduit and located between the upper and lower walls thereof, and an unobstructed passageway communicating directly with said receptacle for delivering granular material to the upper surface of said plate, the edge of said plate extending beyond said passageway on every side an amount not less than the vertical distance of said plate beneath the mouth of said passageway, whereby the current of air passing over the top of said plate will blow a portion of such granular material into the current of air passing beneath said plate so as to cause such granular material to become thoroughly mingled with the air passing through said conduit.

11. In a pneumatic transferring device for granular material, the combination, with an air conduit having a substantially horizontal portion, and a receptacle for granular material disposed at a higher level than said horizontal portion, of a substantially horizontal plate in the horizontal portion of said conduit and located between the upper and lower walls thereof, means for delivering granular material to the upper surface of said plate whereby the current of air passing over the top of said plate will blow a portion of such granular material into the current of air passing beneath said plate so as to cause such granular material to become thoroughly mingled with the air passing through the conduit, and a damper pivoted upon a substantially horizontal axis at the forward edge of said plate whereby the proportion of air passing above and below said plate may be regulated.

12. In a pneumatic transferring device for granular material, the combination, with an air conduit having a substantially horizontal portion and a receptacle for the granular material disposed above such horizontal portion, of a plurality of hollow delivery nipples leading from said receptacle into said conduit, said nipples being out of alinement with each other and disposed in different portions of said conduit, and a substantially horizontal plate spaced below the ends of said nipples and adapted to receive the granular material discharged therethrough.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

BYRON H. REDDY.

Witnesses:
HAROLD S. SMITH,
BRENNAN B. WEST.