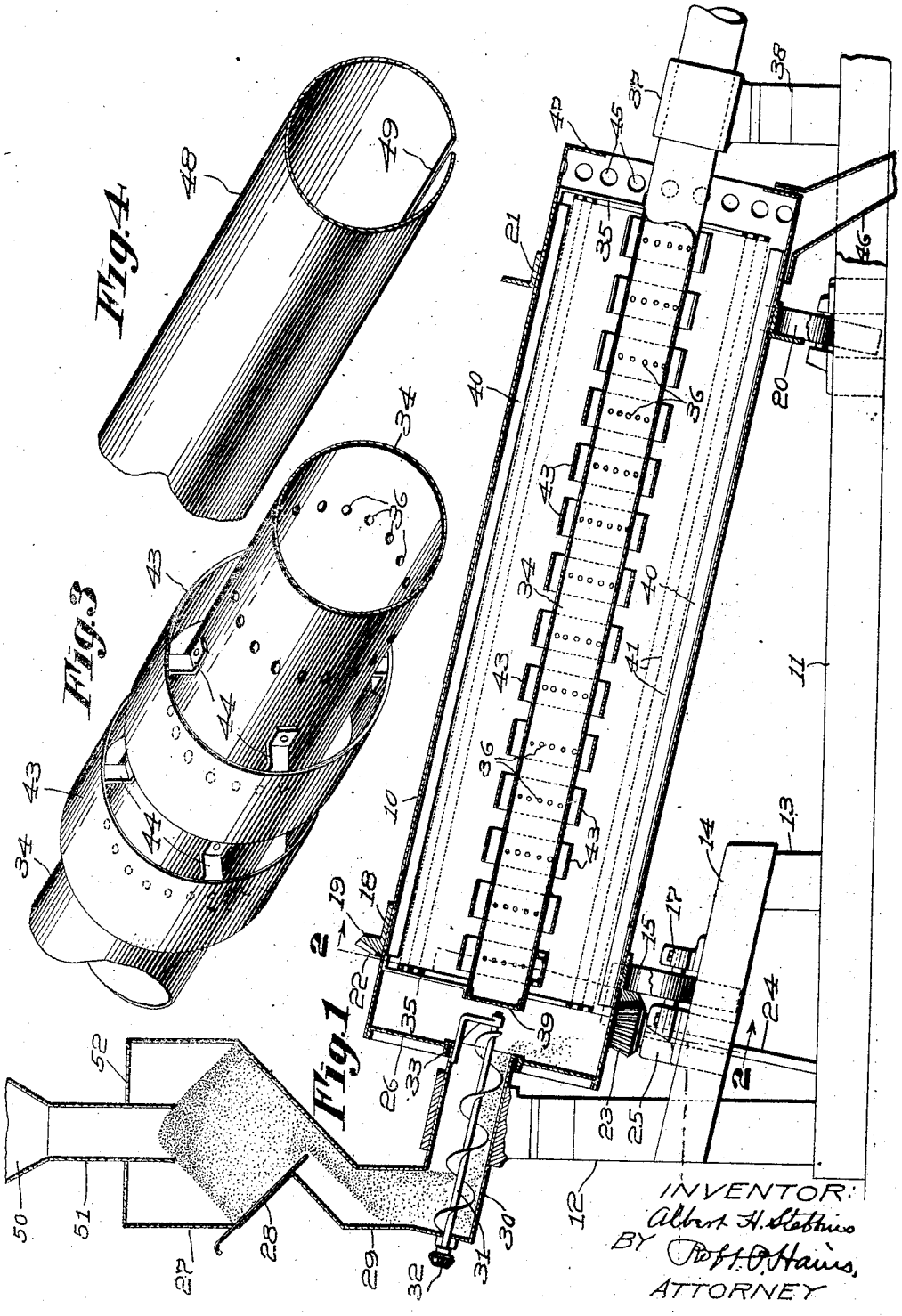
April 20, 1926. **1,581,240**

A. H. STEBBINS

PNEUMATIC CLASSIFIER

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PNEUMATIC CLASSIFIER

Filed April 14, 1925 2 Sheets-Sheet 2

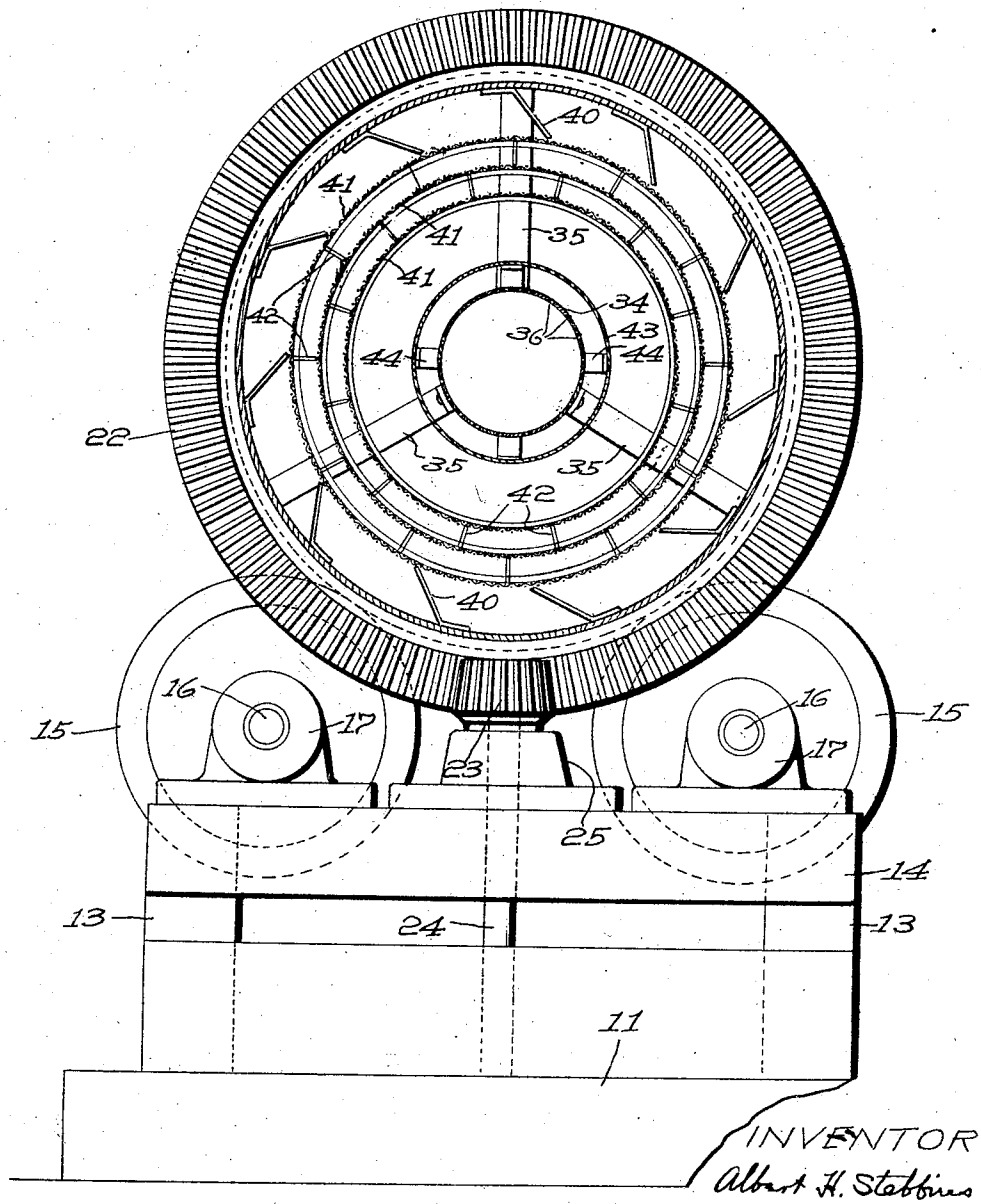


Fig. 2

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UNITED STATES PATENT OFFICE.

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PNEUMATIC CLASSIFIER.

Application filed April 14, 1925. Serial No. 23,076.

To all whom it may concern:

Be it known that I, ALBERT H. STEBBINS, a citizen of the United States, and resident of Los Angeles, county of Los Angeles, and State of California, have invented an Improvement in Pneumatic Classifiers, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to a classifier that is constructed to subject materials repeatedly to the separating action of air, and is directed more particularly to a classifier for treating fine materials.

When air is employed to classify fine materials the strength of air used must be slight in order to effect a separation between the fine and very fine particles, and it is desirable to subject the materials being treated repeatedly to the separating action of the air in order that the very fine particles may be completely removed.

The present invention therefore relates to a casing or container which is so constructed that as the materials travel lengthwise of the casing they are repeatedly elevated and allowed to fall in a disseminated condition so that currents of air passing thru the falling particles will carry off the very light particles.

One feature of the invention resides in a rotating casing having lifting blades that repeatedly carry the materials to the upper side of the casing and then drop them so that air currents may pass thru the materials to carry off the lighter particles as the materials fall toward the lower side of the casing.

Another feature of the invention resides in a disseminator that may comprise a screen and which serves to separate or scatter the materials dropped by the blades so that all particles will be subjected to the action of the air currents.

Other features of the invention and novel combination of parts in addition to the above will be hereinafter described in connection with the accompanying drawings, which illustrate a good practical form of the invention.

In the drawings:—

Fig. 1 is a vertical sectional view thru a pneumatic classifier, constructed in accordance with the present invention.

Fig. 2 is an enlarged transverse sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is an enlarged perspective view of a portion of the suction tube shown in Figs. 1 and 2; and

Fig. 4 is a perspective view showing a different form of suction tube.

In the embodiment of the invention illustrated the casing 10 comprises a relatively long cylindrical container which is rotatably mounted and is supported at an inclination to a horizontal plane, as clearly shown in Fig. 1. The means for rotatably supporting the casing 10 may be variously constructed, and as shown consists of a base 11 having uprights 12 and 13 which support the inclined platform 14 adapted to support the upper end of the casing 10. Upon this platform are mounted the spaced casing supporting wheels or rolls 15, the supporting shafts 16 of which are journaled in the bearing brackets 17. The wheels or rolls 15 are disposed at the opposite sides of the vertical axis of the casing 10 and the peripheries of these rolls engage an annular track or ring 18 which surrounds and is rigidly secured to the casing and has the outwardly extending flange 19. The lower end of the casing 10 is rotatably supported by a pair of wheels or rolls 20 which may be similar to the wheels 15, and the peripheries of which engage the ring 21 that embraces the cylindrical casing.

Various means may be provided for rotating the casing 10 and in the present case this is accomplished by providing the casing with a ring gear 22 which may be secured to the ring 18, and a pinion 23 mounted below the casing 10 meshes with and drives the ring gear and casing. The pinion 23 is keyed or otherwise secured to the driving shaft 24, the upper end of which is journaled in the bracket 25 supported by the platform 14. The upper end of the casing 10 is closed by the head 26 and materials are delivered to the upper end of the casing by the hopper 27 having the adjustable gate 28 for controlling the flow of materials from the hopper. The materials as they leave the hopper pass downwardly thru the pipe or chute 29 into the cylindrical tube 30 which is supported by the upright 12 and the inner end of this tube extends thru a central opening in the head 26. A conveyor worm 31 mounted to rotate within the tube 30

serves to advance the materials along the tube into the casing 10, and this feed worm has a bevel gear 32 upon its outer end for rotating the same. A ring 33 of soft non-metallic material is preferably provided between the head 26 and inner end of the tube 30 to form a dust-tight joint between these elements.

Within the casing 10 is mounted a suction tube 34 which is disposed centrally therein and extends lengthwise thereof. This tube preferably rotates with the casing 10 and it is supported within the casing by the radially extending braces 35, the inner ends of which are riveted or otherwise secured to the tube 34, while the outer ends of these braces are rigidly secured to the inner wall of the casing 10. The tube 34 is provided with a large number of inlet openings 36 disposed around the tube, and lengthwise thereof, thru which air is sucked from the interior of the casing 10 into the tube. The portion of the tube 34 which projects from the lower end of the casing 10 is journaled in a bearing 37 supported by the upright 38 and this end of the tube is connected to a suction fan or other suction producing means not shown. The upper end of the suction tube 34 is closed by the head 39 to prevent air from entering this end of the tube.

Within the casing 10 are provided a number of material lifting blades 40 which extend longitudinally thereof at an angle to the inner wall of the casing, as best shown in Fig. 2, and the construction of these blades is such that they carry the materials lying upon the lower wall of the casing upwardly to a position approximately over the suction tube 34, and then drop these materials so that they may fall towards the suction tube and be subjected to the action of the air currents produced by the suction within this tube.

It is desirable to provide means for spreading out or disseminating the materials as they are dropped by the blades 40 and to this end, in the construction shown, a plurality of annular screens 41 (three being shown) are provided within the casing 10 about the suction tube, and are supported in spaced relation to each other and to the suction tube by the longitudinally extending blades 42 and braces 35. The mesh of the cylindrical screens 41 is quite large as compared with the size of the particles being treated, so that the materials will pass freely thru the screens but will be dispersed or spread out as they leave the screens and fall towards the suction tube 34. As a result of this construction the falling materials are thoroughly subjected to the action of the air currents produced by the suction tube, and the lighter particles are drawn into the tube, while the heavier particles fall downwardly upon the lower surface of the drum to be again carried upwardly by the blades 40, for retreatment.

It is desirable to provide means for preventing the particles from falling directly into the apertures 36 and for preventing them from entering these apertures too freely. To this end, in the construction shown, in Figs. 1, 2 and 3, rings or hoods 43 are provided so that they surround the apertures 36 and are held in spaced relation thereto by the brackets 44.

As the materials travel lengthwise of the inclined cylindrical casing 10 they are carried upwardly again and again by the blades 40, and are discharged thereby to pass downwardly thru the screens and pass the intake apertures of the suction tube so that the finer particles of the falling materials are repeatedly subjected to the suction action of the air currents and they will be completely removed by the time the materials have reached the lower end of the casing 10. It will be understood that the function of the cylindrical screens 41 is not to screen or grade the materials, but to disseminate or scatter the particles so that all particles may be subjected to the action of the air currents. As the materials reach the lower end of the casing 10 they may fall thru any one of the openings 45 of the casing into the discharge chute 46 and it will be noted that the discharge end of the casing 10 is partly closed by the ring or annular flange 47. This ring has a relatively large central opening thru which air may enter the casing 10 to replace the air that is removed from the casing by the suction tube 34.

It is not essential in all embodiments of the invention that the suction tube be mounted to rotate with the casing 10, and in Fig. 4 a modified form of suction tube 48 is shown, which is adapted to be supported within the casing 10 without rotating with the casing, and this tube is provided along its lower wall with an intake slot 49. In this construction it is unnecessary to provide the rings or hoods 43 which surround the tube 34. The materials to be treated may be supplied to the hopper 27 from a bin 50 by the discharge spout 51, and a cover 52 may be provided upon the hopper 27. The construction preferably is such that the feed means completely encloses the fine materials being delivered to the casing 10, and prevents the escape of dust.

What is claimed is:—

1. A pneumatic classifier, comprising in combination, a hollow cylindrical casing rotatably supported in an inclined position to promote travel of materials longitudinally of the casing, means for rotating the casing, means for delivering materials to be treated to the upper end of the casing, a suction tube supported within the casing and ex-

tending longitudinally thereof, a cylindrical screen mounted in the casing about said tube, in spaced relation to the tube and the inner cylindrical wall of the casing, and material lifting blades secured to the inner wall of the casing and constructed to pick up the materials as the casing rotates and deposit them upon the upper portion of the screen so that they will fall thru the screen toward the suction tube in a disseminated condition.

2. A pneumatic classifier, comprising in combination, a hollow cylindrical casing rotatably supported in an inclined position to promote travel of materials longitudinally of the casing, means for rotating the casing, means for delivering materials to be treated to the casing, a suction tube supported within the casing and extending longitudinally thereof, a disseminator mounted within the casing to surround the tube and constructed to rotate with the casing to scatter the materials delivered to the disseminator, and material lifting blades mounted within the casing to rotate therewith and constructed to pick up the materials as the casing rotates and deposit them upon the portion of the disseminator above the suction tube so that they will pass from the disseminator toward the suction tube in a scattered condition.

3. A pneumatic classifier, comprising in combination, a hollow cylindrical casing rotatably supported, means for rotating the casing, means for delivering materials to be treated to the casing, a suction tube supported within the casing to extend longitudinally thereof and having inlet openings along its length, hoods disposed over the openings to prevent materials from falling into the openings, an apertured disseminator extending longitudinally of the casing about the tube to surround the tube and hoods and constructed so that the materials delivered thereto will pass through its apertures and issue therefrom in a disseminated condition, and material lifting blades mounted in the casing and constructed to pick up the materials as the casing rotates and deposit them upon the portion of the disseminator above the suction tube so that they will be delivered by the latter to the suction tube in a scattered condition.

4. A pneumatic classifier, comprising in combination, a hollow cylindrical casing rotatably supported in an inclined position to promote travel of materials longitudinally of the casing, means for rotating the casing, means for delivering materials to be treated to the casing, a suction tube extending longitudinally within the casing to rotate therewith and having inlet openings in its walls disposed about the tube and longitudinally thereof, hoods disposed over the openings and supported by the tube in spaced relation thereto to prevent materials from passing directly into the openings, and material lifting blades mounted in the casing and constructed to pick up the materials as the casing rotates and carry them above the tube and then release them to fall toward the suction tube in a disseminated condition.

5. A pneumatic classifier, comprising in combination, a hollow cylindrical casing supported in an inclined position to promote travel of materials longitudinally of the casing, means for delivering materials to be treated to the casing, a suction tube extending longitudinally within the casing, a cylindrical screen extending longitudinally within the casing about said tube and in spaced relation to the tube and the cylindrical wall of the casing, and material lifting blades within the casing and operable to carry the materials upwardly over the screen and then release them to fall upon the screen and pass downwardly thru it toward the suction tube in a disseminated condition.

6. A pneumatic classifier, comprising in combination, a hollow cylindrical casing rotatably supported in an inclined position to promote travel of materials longitudinally of the casing, means for rotating the casing, means for delivering materials to be treated to the casing, a suction tube extending longitudinally within the casing, cylindrical screens extending longitudinally within the casing about said tube and mounted in spaced relation to each other and to the cylindrical wall of the casing, and material lifting blades within the casing and operable to carry the materials upwardly over the screens and then release them to fall upon the screens and pass downwardly thru the screens toward the suction tube in a disseminated condition.

7. A pneumatic classifier, comprising in combination, a hollow cylindrical casing rotatably supported in an inclined position to promote travel of materials longitudinally of the casing and having material-tight cylindrical walls, means for rotating the casing, means for delivering materials to be treated into the casing at its upper end, a suction tube mounted within the casing to rotate therewith and extending longitudinally of the casing, a cylindrical screen mounted within the casing about the tube to rotate therewith, and material-lifting blades secured to the inner wall of the casing and constructed to pick up the materials as the casing rotates and deposit them upon the upper portion of the screen to pass through its apertures and fall toward the suction tube in a disseminated condition.

In testimony whereof, I have signed my name to this specification.

ALBERT H. STEBBINS.