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PNEUMATIC DUST SEPARATOR.

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1,380,322.

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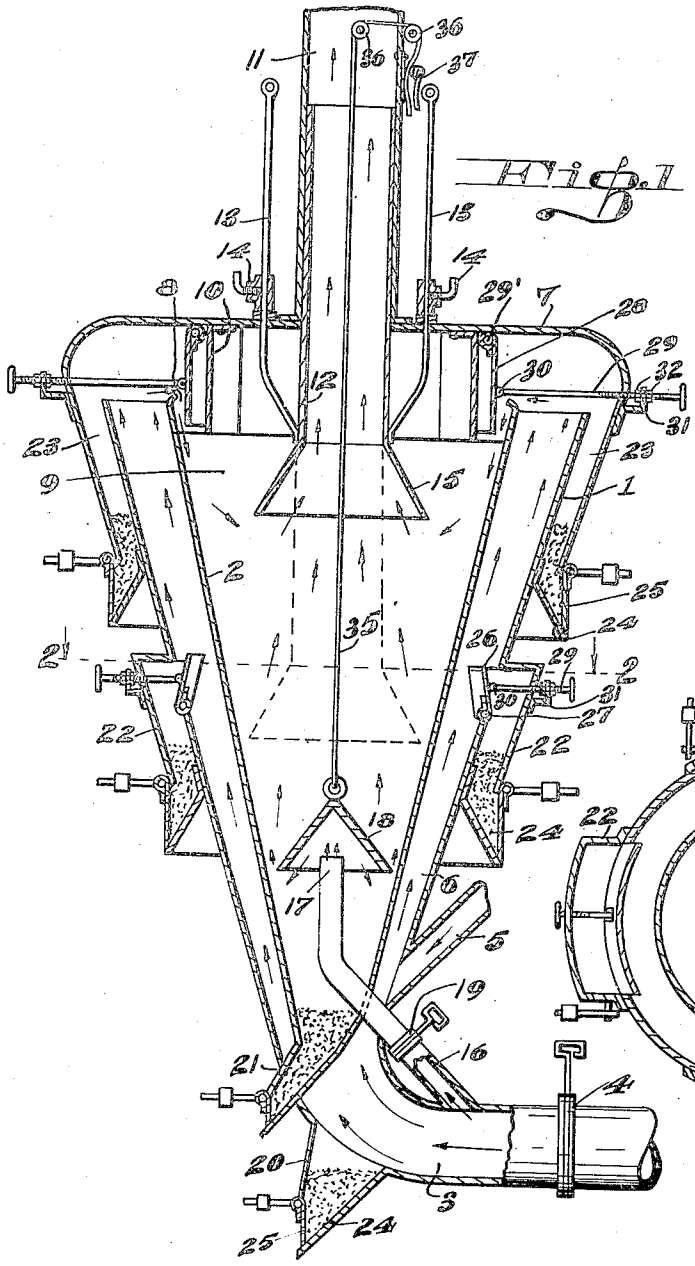


Fig. 1

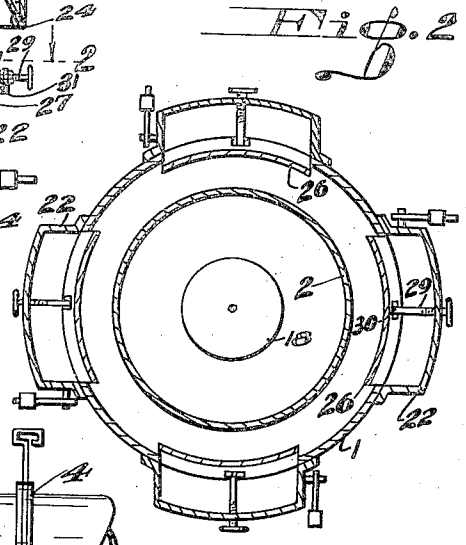


Fig. 2

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PNEUMATIC DUST-SEPARATOR.

1,380,322. Specification of Letters Patent. Patented May 31, 1921.

Application filed April 20, 1920. Serial No. 375,335.

To all whom it may concern:

Be it known that we, LYCURGUS LINDSAY and ERNEST M. DAVIDS, citizens of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Pneumatic Dust-Separators, of which the following is a specification.

This invention relates to separators and more specifically to pneumatic dust separators for handling very light powdered material, such as talcum, although it will be apparent that the basic principles of the invention are applicable to separators for any material where it is desirable to separate the fine from the coarse.

It is the object of the invention to provide a separator in which decreasing velocity of movement of the material will cause a separation of the heavier particles, the separator being provided with novel means for effectively and positively adjusting the velocity of the material through the separator.

Other objects of the invention will be understood from the following description of the accompanying drawings in which;

Figure 1 is a longitudinal section through a separator constructed in accordance with the invention.

Fig. 2 is a transverse section on the line 2—2 of Fig. 1.

The separator comprises inner and outer shells forming a passage between the same for the material. These shells are shown as funnel-shaped, the outer shell being shown at 1 and the inner shell at 2. The lower end of the outer shell is connected to an air intake pipe 3, preferably, provided with a suitable adjustable valve 4. The ground material is discharged into the space 6 between the inner and outer shells above the pipe 3 through a spout 5.

The walls of the inner and outer shells are, preferably, inclined at different angles so that the space 6 tapers in cross sectional area, the smaller end of this space being at the lower ends of the shells. A top 7 is received over the upper ends of the shells 1 and 2 and is spaced therefrom so as to provide a passage 8 from the space 6 over the edge of the inner shell and downwardly into the interior 9 of the inner shell.

An annular baffle plate 10 is, preferably, suspended from the top 7 within the inner shell so as to deflect the material passing through the space 8 downwardly inside of the inner shell. A discharge pipe 11 leading to a suitable suction device, not shown, extends upwardly from the top 7 of the separator. A pipe nipple 12 telescopes within the discharge pipe 11 and extends downwardly into the interior 9 of the inner shell. This pipe nipple may be adjusted up and down within the space 9 by hand rods 13 secured thereto and adapted to be clamped in adjusted positions by clamps 14. The inner end of the pipe nipple 12 is, preferably, outwardly flared, as shown at 15.

Direct connection is, preferably, provided between the air intake pipe 3 and the lower end of the space 9 as by a branch pipe 16 leading from pipe 3 into the interior of the inner shell and, preferably, terminating in an upwardly extending nozzle 17. A baffle plate shown at 18 may be provided above the end of the nozzle 17, space being left for the passage of air from the nozzle upwardly through the space 9. This space is, preferably, adjustable by moving the baffle plate up and down. For this purpose a flexible connection 35 is secured to the baffle plate and extends upwardly through pipes 12 and 11 and over pulleys 36 to the exterior of pipe 11 when it is adjustably clamped by a clamp 37 to pipe 11 so as to raise or lower the baffle as desired. The branch pipe 16 may be provided with a suitable adjustable regulating valve 19. Take-off spouts lead from the space between the shells of the separator and also from the lower ends of the respective shells, these take-off spouts being arranged at different levels so that particles of the material of different weights will be recovered through the take-off spouts at various levels.

As an instance of this arrangement, a take-off spout 20 may be provided at the lower end of the outer shell 1 and a take-off spout 21 above the spout 20 may be provided at the lower end of the inner shell 2. Similar spouts 22 are provided in the wall of the outer shell intermediate of the ends of the space 6 and similar spouts 23 are provided at the upper end of the space 6, these latter spouts being, preferably, formed by extending the top 7 of the separator outwardly beyond the outer shell and then bending said top downwardly over the outer shell and in spaced relation therefrom to form the spouts 23.

Each of the take-off spouts is shown as terminating in a hopper 24 closed by a

weighted door 25 arranged to swing open and permit the discharge of the material within the hopper when the material within the hopper reaches a predetermined weight.

In operation a suction is formed through the separator from the air intake pipe 3, through the space 6 and then downwardly into the space 9 past the edge of the pipe nipple 12 and through said pipe nipple and the discharge pipe 11, the material to be separated being discharged through the pipe 5 into the current of air thus drawn through the separator, and an additional air supply to the space 9 being provided through the branch pipe 16 when found necessary.

When the material is discharged into the lower end of the space 6 the heaviest material will immediately drop into spout 20 and the remaining material will be carried in the current of air upwardly through the space 6. The area of the space 6 increasing upwardly the velocity of the current of air and the material carried thereby will decrease, and the heaviest particles of material will drop down against the inclined wall of the outer shell and will be collected through the spouts 22. By the time the current of air and the material suspended therein have reached the upper end of the space 6 the velocity of the current will have still further decreased and the next heaviest particles of material will drop through the spouts 23, and in like manner the next heaviest particles of material will drop through the spout 21 at the lower end of the inner shell 2 as the current of air and material suspended therein moves downwardly in the space 9 and then upwardly through the pipe nipple 12.

By this arrangement it will be seen that different grades of the material to be separated will be collected at the spouts arranged at various levels, it being obvious that the spouts may be provided at as many different levels along the wall of the outer shell as may be found desirable.

As previously stated the current of air moving up through the space 6 will decrease in velocity, and in order to regulate and increase the velocity of the current of air valves 26 are, preferably, arranged to project into the space 6 and to regulate the openings of the spouts 22, these valves being shown as plates pivoted to the wall of the outer shell at one side of the openings to spouts 22, as shown at 27, and arranged to be moved outwardly so as to project into the space 6 and to open the openings in the shell 1 leading to the spouts 22, or to be moved in the opposite direction for forming less obstruction to the current of air through space 6 and to close the openings leading to spout 22.

Means are, preferably, also provided for increasing the velocity of the current of air as it moves through the space 8 by decreasing the width of the space 8. For this purpose valves 28 are suspended into the space 8, preferably, by pivotal connections 29′ at the top 7 of the separator, so that by swinging said valves toward or away from the wall 2 of the inner shell of the separator the width of space 8 may be regulated as found desirable.

Manual operating means are provided for valves 26 and 28, said manual operating means, preferably, comprising rods 29 pivotally connected at 30 to the respective valves and extending through suitable brackets 31 upon the exterior of the separator, these rods being, preferably, adjustable relative to their supporting brackets for adjusting the valves actuated thereby as by nuts 32 having threaded engagement upon the rods 29 and arranged to abut against the opposite sides of the brackets 31. It will thus be seen that a separator is provided having means for recovering various grades of material, the velocity of the current of air carrying the material through the separator being arranged to be so regulated as to cause grades of material of any desired weight to be recovered at the various take-off spouts.

Various changes may be made without departing from the spirit of the invention as claimed.

What is claimed is:

1. A separator comprising an upwardly inclined conical passage of increasing width, an air intake at the lower end of said passage directing air upwardly through the same, means for directing material downwardly into the path of said air in said passage, suction creating means at the upper end of said passage, and take-off spouts at different levels along the outer wall of said passage.

2. A separator comprising an upwardly inclined conical passage of increasing width, means for discharging material into the lower end of said passage, an air intake at the lower end of said passage, suction creating means at the upper end of said passage, take-off spouts at different levels along the outer wall of said passage, and an adjustable valve in said passage.

3. A separator comprising inner and outer conical shells forming an upwardly inclined passage of increasing width between said shells, said passage communicating at its top with the interior of the inner shell, means for discharging material into the lower end of said passage, an air intake at the lower end of said passage, a suction pipe leading from the interior of the inner shell, take-off spouts arranged in various levels at the outer wall of said inclined passage and at the bottom of said inner shell, and adjustable gates in said inclined pas-

sage and between said passage and the interior of the inner shell.

4. A separator comprising inner and outer conical shells forming an upwardly inclined passage of increasing width between said shells, said passage communicating at its top with the interior of the inner shell, means for discharging material into the lower end of said passage, an air intake at the lower end of said passage, a suction pipe leading from the interior of the inner shell, said suction pipe extending into and being adjustable up and down within the interior of the inner shell, take-off spouts arranged at various levels in the outer wall of said inclined passage and at the bottom of said inner shell, and adjustable gates in said inclined passage and between said passage and the interior of the inner shell.

5. A separator comprising inner and outer conical shells forming an upwardly inclined passage of increasing width between said shells, said passage communicating at its top with the interior of the inner shell, means for discharging material into the lower end of said passage, an air intake at the lower end of said passage, a suction pipe leading from the interior of the inner shell, take-off spouts arranged in various levels at the outer wall of said inclined passage and at the bottom of said inner shell, and an air intake pipe at the lower end of the interior of the inner shell.

6. A separator comprising inner and outer conical shells forming an upwardly inclined passage of increasing width between said shells, said passage communicating at its top with the interior of the inner shell, means for discharging material into the lower end of said passage, an air intake at the lower end of said passage, a suction pipe leading from the interior of the inner shell, take-off spouts arranged at various levels in the outer wall of said inclined passage and at the bottom of said inner shell, and adjustable gates in said inclined passage arranged when opening said passage to close said take-off spouts and adjustable gates between said inclined passage and the interior of the inner shell.

7. A separator comprising inner and outer shells forming an upwardly inclined passage of increasing area between said shells, said passage communicating with the interior of the inner shell, means for discharging material into the lower end of said passage, an air intake at the lower end of said passage, a suction pipe leading from the interior of the inner shell, take-off spouts arranged in various levels at the outer wall of said inclined passage and at the bottom of said inner shell, an air intake pipe at the lower end of the interior of the inner shell, and a baffle plate over said air intake pipe adjustable relative thereto to control said air intake.

In testimony whereof we have signed our names to this specification.

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