

Dec. 16, 1969

H. JAGER

3,483,973

AIR CLASSIFIER

Filed March 2, 1967

FIG. 1

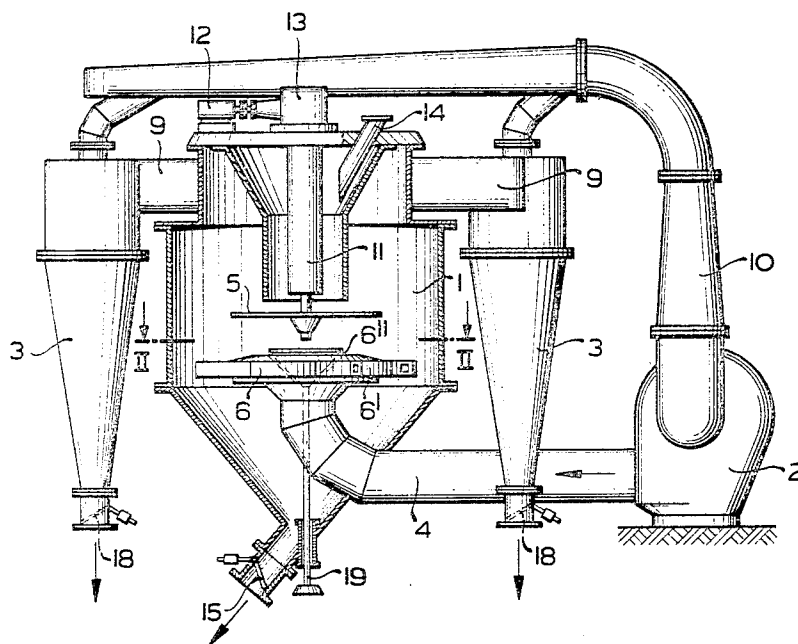
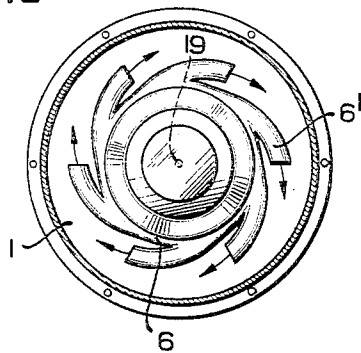


FIG. 2



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AIR CLASSIFIER

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Filed Mar. 2, 1967, Ser. No. 620,050

Claims priority, application Germany, Mar. 3, 1966,

W 41,066

Int. Cl. B07b 7/083

U.S. Cl. 209—139

4 Claims

ABSTRACT OF THE DISCLOSURE

Air classifier has an air distributing chamber with one or more air outlet nozzles located in a sizing chamber. The nozzles extend tangentially to the air distributing chamber in the direction of rotation of a rotary particulate material distributing plate centrally overlying the air distributing chamber in the sizing chamber. A conduit centrally connected to the air distributing chamber delivers air thereto from a ventilator. A conduit extending tangentially from the upper portion of the sizing chamber draws the fine-particle component of the material therefrom by suction into a cyclone.

My invention relates to an air classifier and more particularly to such device having an externally located ventilator or blower.

An air classifying device is known that has a housing enclosing a sizing chamber, into the lower portion of which air is blown from a ventilator through an air distributing chamber and an adjustable jalousie-like crown. Particulate material to be classified is flung into the sizing chamber by means of a distributor plate located in the lower part of the sizing chamber. The coarse particles are discharged downwardly from the sizing chamber, while the fine particles are withdrawn by suction at the upper margin of the sizing chamber through suction tubes extending tangentially from the sizing chamber to respective cyclones disposed around the sizing chamber housing, and are accordingly deposited in the cyclones. Such a classifier operates with a relatively unfavorable separating action because the entering air is first directed more or less strongly inwardly and thereby acts opposite to the material flung outwardly from the distributor plate. Moreover, the air inlet openings lie in the path of the coarse particles sliding off the wall of the sizing chamber so that the discharge of the coarse particles is impeded.

It is accordingly an object of my invention to provide air classifying device which avoids the aforementioned disadvantages of the heretofore known devices of this type and which more particularly effects an improved sizing or separating action.

With the foregoing and other objects in view, I provide, in accordance with my invention, air classifying device having an air distributing chamber with one or more air outlet nozzles located in a sizing chamber. The nozzles extend tangentially to the air distributing chamber in the direction of rotation of a rotary distributor plate for particulate material beneath which the air distributing chamber is located centrally in the sizing chamber. A conduit centrally connected to the air distributing chamber delivers air thereto from a ventilator or blower located externally to the sizing chamber. In this manner the material flung from the distributor plate and the sizing air discharging from the air inlet nozzles are displaced in the same direction from the inside radially toward the outside of the sizing chamber so that a powerful, unimpeded centrifugal force is exerted thereon. Since

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the wall of the sizing chamber is not interrupted by air inlet openings as in the heretofore known devices, a smooth surface down which the coarse particles can slide is thus provided and the discharge of the coarse particles is no longer impeded.

As a further feature of my invention, I provide additionally an adjustable air outlet opening in the center of the air distributing chamber whereby the sizing air may be permitted to enter the sizing chamber partly through the air outlet nozzles and partly through the adjustable air outlet opening, so that the particle sizes to be sized are able to be largely regulated.

Other features which are considered as characteristic for the invention are set forth in the appended claims.

Although the invention is illustrated and described herein as embodied in air classifier, it is nevertheless not intended to be limited to the details shown, since various modifications and structural changes may be made therein without departing from the spirit of the invention and within the scope and range of equivalents of the claims.

The construction and method of operation of the invention, however, together with additional objects and advantages thereof will be best understood from the following description of a specific embodiment when read in connection with the accompanying drawing, in which:

FIG. 1 is a schematic elevational view, partly in section, of an air classifying device constructed in accordance with my invention; and

FIG. 2 is a sectional view of FIG. 1 taken along the line II—II in the direction of the arrows.

Referring now to the drawings, there is shown an air classifying device made up of a sizing chamber 1, an externally located ventilator or blower 2 and separator cyclones 3 for the deposit of fine particles therein. The ventilator 2 is connected by a pressure conduit 4 to an air distributing chamber 6 located centrally at the bottom of the sizing chamber 1 beneath a distributor plate 5. The air distributing chamber 6 has a plurality of air outlet nozzles 6' (six nozzles in the illustrated embodiment) extending tangentially from the peripheral surface thereof. Particulate material to be classified is supplied through the supply tube 14 into a conical hopper from which it drops onto the distributor plate 5. The distributor plate 5 is mounted on a vertically extending shaft 11 which is rotated by a motor 12 through a transmission 13. Air blown from the ventilator or blower 2 passes through the conduit 4 into air distributing chamber 6 from which it issues through the nozzles 6' into the sizing chamber 1. Simultaneously particulate material supplied from above onto the rotary distributor plate 5 is hurled outwardly in the sizing chamber 1. The coarse particles which strike the walls of the sizing chamber 1 and slide downwardly are discharged through an outlet tube provided with air lock discharge means such as a counterbalanced swinging flap 15, much like a butterfly-valve which opens as the weight of the gross particles accumulating above it exceeds that of the counterweight. The fine particles are sucked out of the sizing chamber 1 through the conduits 9 which are connected tangentially thereto and are conducted to the cyclones 3 from which the purified air is returned through the conduits 10 to the ventilator 2 while the fine particulate material is deposited in the cyclones 3 and is discharged therefrom through the swinging flap valves 18 corresponding to the aforescribed members 15. An adjusting slider or rod 19, at the upper end of which a conical closure member is provided, extends out of the sizing chamber 1 at its lower end. It can accordingly be manipulated to move the closure member upwardly or downwardly and thereby regulate the size of an air outlet opening 6'' centrally located in the air distributing chamber 6

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so as to vary the range of particle sizes being classified.
I claim:

1. Air classifying device for sizing particulate material comprising a sizing chamber having a coarse-particle component discharge outlet provided with air-lock discharge means, a rotary distributor plate located in the lower portion of said sizing chamber and defining an annular space therewith for flinging the material supplied thereto into said sizing chamber, a stationary air distributing chamber located below said rotary distributor plate in said sizing chamber and being substantially coaxial with said sizing chamber, said stationary air distributing chamber having at least one air outlet nozzle extending tangentially therefrom in the rotary direction of said distributor plate, a ventilator located externally to said sizing chamber, first duct means connected to said air distributing chamber substantially at the axis thereof and connecting said ventilator with said air distributing chamber for blowing air through said air distributing chamber into the lower portion of said sizing chamber, said air passing upwardly through said annular space to entrain fine-particle components, cyclone means located externally to said sizing chamber, and second duct means extending tangentially from the upper portion of said sizing chamber and connected to said cyclone for withdrawing by suction said fine-particle component of the material from said sizing chamber.

2. Air classifying device according to claim 1, wherein said second duct means comprises a plurality of ducts respectively connected to a plurality of cyclones located externally to and spaced around said sizing chamber.

3. Air classifying device for sizing particulate material comprising a sizing chamber, a rotary distributor plate located in the lower portion of said sizing chamber for

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flinging the material supplied thereto into said sizing chamber, a stationary air distributing chamber located below said rotary distributor plate in said sizing chamber and having at least one air outlet nozzle extending tangentially therefrom in the rotary direction of said distributor plate, said air distributing chamber having an air outlet opening substantially in the center thereof, and including means for adjusting the size of said opening, a ventilator located externally to said sizing chamber, first duct means connecting said ventilator with said air distributing chamber for blowing air through said air distributing chamber into the lower portion of said sizing chamber, cyclone means located externally to said sizing chamber, and second duct means extending tangentially from the upper portion of said sizing chamber and connected to said cyclone for withdrawing by suction a fine-particle component of the material from said sizing chamber.

4. Air classifying device according to claim 3, wherein said adjusting means comprises an adjustable slider having a closure member at one end thereof, the other end of said slider extending out of said sizing chamber.

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U.S. Cl. X.R.

209—144, 154