

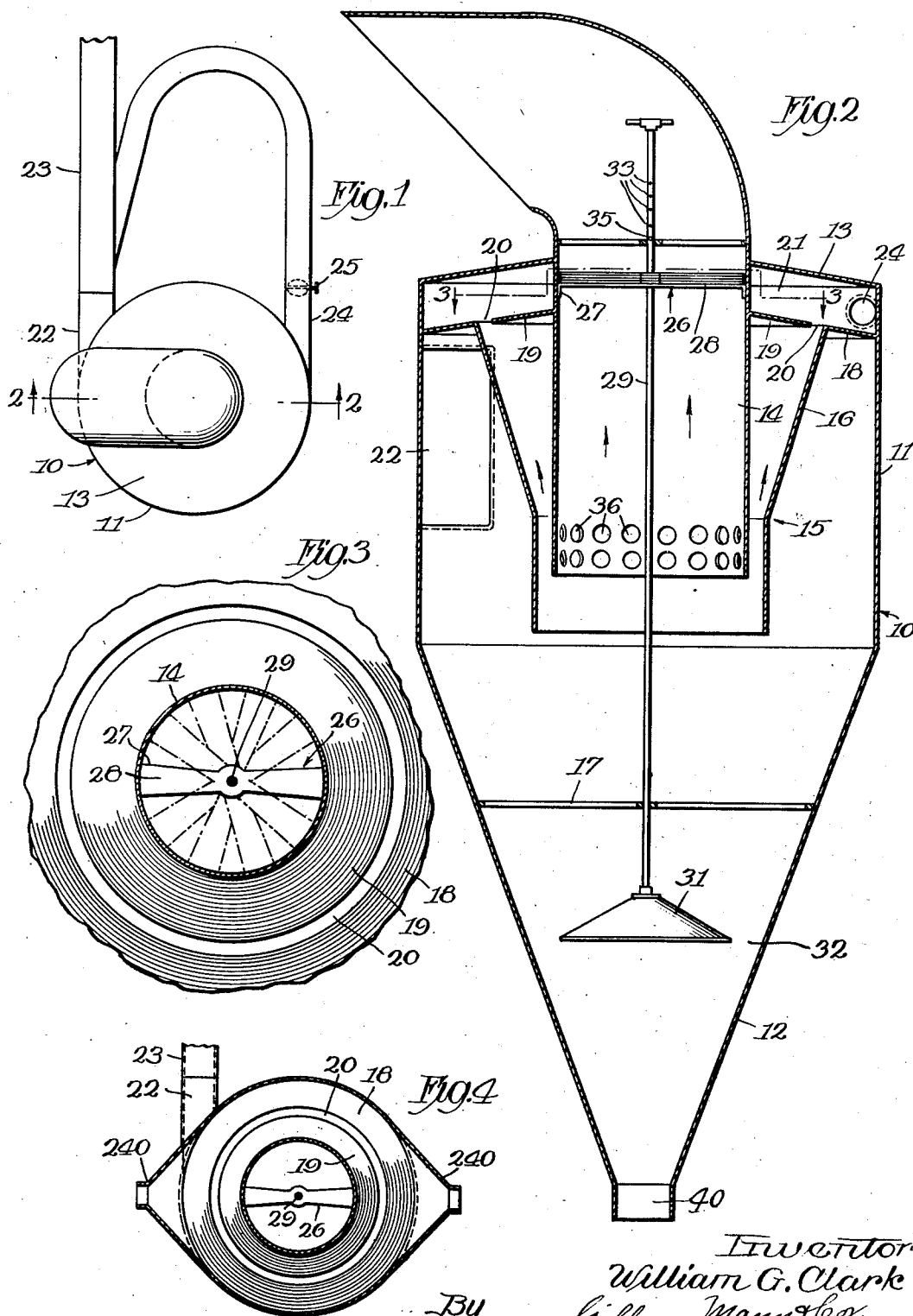
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DUST COLLECTOR

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UNITED STATES PATENT OFFICE

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DUST COLLECTOR

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The invention relates to pneumatic dust collectors and more particularly to that type that depends on centrifugal action for separating the dust or ground material from the air that conveys the same from the mill to the separator.

One of the objects of the invention is the provision of new and improved means for separating the solid material or pulverulent matter from the air as it passes upward through the vent in the separator.

Another object of the invention is the provision of new and improved means for removing pulverulent matter from air as it passes through the vent pipe, and returning the same to the separator.

Other objects of the invention are the provision of a new and improved dust separator, that is cheap to manufacture, easily assembled, and that is efficient and economical in operation.

Other and further objects and advantages of the invention will appear from the following description taken in connection with the accompanying drawings, in which

Fig. 1 is a plan view of the device with parts broken away;

Fig. 2 is a vertical section on line 2—2 of Fig. 1;

Fig. 3 is a section on line 3—3 of Fig. 2, with parts broken away; and

Fig. 4 is a view similar to Fig. 3, but showing a modified form of the construction.

On the drawing, the reference character 10 designates the dust collector or outer casing comprising the upper cylindrical portion 11 and a conical or tapered lower portion 12. The upper portion of the casing is provided with a closure 13 having an axial opening through which extends the vent pipe 14.

Mounted within the casing 10 is a cylindrical pipe member or casing 15 having its upper portion 16 flared outwardly and provided with a laterally extending circular flange 18 about its upper portion which is rigidly connected to the cylindrical portion 11 of the collector casing in spaced relation to the closure 13.

Rigidly attached to the pipe 14 and extending radially therefrom, is an annular

flange or member 19 the peripheral edge of which is spaced from the upper inner periphery of the upper end of the pipe member 16 to form an annular opening 20. The flanges 18 and 19 are spaced from the closure 13 to form what for convenience may be termed a dust chamber 21 which is in communication with the interior of the pipe member 15 through the annular opening 20.

The cylindrical casing 11 is provided with one or more inlets 22, one only being shown on the drawings, and a conduit 23 which is adapted to conduct the air to the collector. This inlet enters the casing below the dust chamber 21 substantially tangentially or at least at an angle to the radius whereby air entering the inlet will be caused to rotate or revolve about the axis of the casing in a manner well known in the art.

The dust chamber 21 is provided with an outlet 24 which is adapted to return the dust and air either to the fan or to the conduit leading to the collector. In the form shown, the conduit 24 is arranged substantially tangentially to the collector casing and is connected to the inlet conduit 23 in such a manner that the flow of air through the conduit 23 will induce a flow of air through the conduit 24. A damper 25 is provided in the conduit 24 for controlling the flow of air there-through.

A damper 26 is also provided in the vent pipe. In the form shown the damper is composed of a plurality of deflector blades or vanes 28. The blades are preferably though not necessarily similar in construction and are mounted on a support 27 rigidly connected to the pipe 14 and extending along the diameter thereof. The vanes are provided with aligned openings at their central portions through which a stem 29 extends for holding the same in assembled relation. The stem 29 supports a circular or conical member 31 known in the art as the "disk," which limits the lower portion of the rotating mass of air and determines the amount of air passing out through the lower end of the casing. The edges of the member 31 are spaced from the walls of the conical portion 12 of the casing to form an annular space 32 through which

the dust is discharged. The upper end of the stem 29 is provided with a plurality of holes 33 through which a pin 35 may extend for adjusting the height of said stem and circular member. The stem 29 extends through a brace member 17 which will hold its lower portion in fixed position.

The lower end of the vent pipe 14 is provided with a number of openings 36 through which dust particles are adapted to be thrown by the centrifugal action of the air escaping through said vent pipe, as will presently appear.

In the operation of the device the air enters the collector casing through the conduit 23 at considerable velocity, carrying with it the dust or fine particles of ground material. Since the air enters the casing tangentially the body of air is caused to rotate around the axis of the casing, its centrifugal action causes the solid particles to be thrown against the walls of the casing, and the same will gravitate to the bottom of the casing and pass out of the same through the restricted opening 40 in the usual manner. The air, freed of most of the solid matter, escapes from the center of the revolving mass into vent pipe 14 and the pipe member 15. The air escaping through the vent pipe continues to revolve and its centrifugal action will cause almost all the solid matter remaining in the air to be skimmed off or thrown by centrifugal action through the openings 36 into the stream of air passing upwardly through the annular opening 20, and be delivered to the conduit 23 through the conduit 24. In actual practice, by properly manipulating the valves 25 and 26, as high as 98 to 99 or even a higher percent of the solid material has been removed.

The form of the device shown in Fig. 4 differs from that just described in that instead of a single outlet conduit as 24 arranged tangentially as shown in Figs. 1 and 2, a plurality of outlets 240, radially arranged, are employed. The conduits 240 are preferably connected to the conduit 23 in the same manner as disclosed in Fig. 1 instead of connecting them to the intake of the fan, which may be done if desired.

It is thought from the foregoing taken in connection with the accompanying drawings that the construction and operation of my device will be apparent to those skilled in the art, and that various changes in size, shape, proportion and details of construction may be made without departing from the spirit and scope of the appended claims.

I claim as my invention:

1. In a dust collector, a cylindrical casing terminated in a tapered lower section, a pipe member suspended within said casing and having a cylindrical lower portion and a downwardly tapered upper portion, a vent pipe extending downward into said cylindrical portion and terminating short of the

lower end of said member and spaced from the wall thereof, and having a plurality of apertures in the lower portion thereof.

2. A dust collector comprising a casing having a closure across its upper end, a partition spaced from said closure beneath the same and provided with an opening, a pipe member extending downwardly from said partition, said pipe member being flared at its upper end, a vent pipe extending through said closure and partition into said casing, the lower end of said vent pipe being provided with apertures, an intake for said casing below said partition, an outlet between said partition and closure, a conduit from said outlet for conducting material from the space between said closure and partition to said intake, a conical member supported beneath said vent pipe and in axial alignment therewith, and means for raising and lowering said conical member.

3. A dust collector comprising a casing, a closure for said casing, a partition beneath said closure for forming a dust chamber, said partition being provided with a circular slot, co-axial with said casing, an inlet for said casing, an outlet for said dust chamber, a conduit for connecting said outlet to said inlet, a valve in said conduit, a vent pipe extending downwardly through said closure into said casing, and a damper in said pipe for controlling the flow of air therethrough.

4. A dust collector comprising a casing having an upper cylindrical portion and a lower tapered portion, a closure for the upper end of said casing, a pipe member having a flared upper end, a laterally extending flange on the flared end of said member secured to said casing in spaced relation thereto, a vent pipe extending down into said casing and member, a flange on said vent pipe member for cooperating with said first-named flange for forming a partition in said casing, the adjacent edges of said flanges being spaced apart to form a circular opening about said vent pipe, an inlet below said partition, an outlet above said partition, the lower end of said vent pipe being provided with a plurality of openings for skimming off solid particles of air escaping through said vent pipe.

5. A vent pipe for dust collectors comprising a tubular member having its wall at one end provided with a plurality of openings for skimming off solid particles from air passing through said member with a gyratory motion, the end of said member adjacent to said openings being open and a flange extending about an intermediate portion of said vent pipe and adapted to form a portion of the bottom wall of a dust chamber.

6. A dust collector comprising an upper cylindrical portion, a closure for the upper end of said portion, an annular partition

member in spaced relation to said closure and secured to said cylindrical portion, a pipe member having a lower cylindrical portion and an upper flared portion secured to said partition, a vent pipe extending through said closure, an annular flange secured to said pipe and spaced radially from said partition member for forming an annular slot, an inlet below said partition, and an air outlet between said closure and partition.

7. In a dust collector, a casing having a cylindrical upper portion and conical lower portion, a closure for said casing, a partition for forming a dust chamber in the upper portion of said casing, a tube extending downwardly from said partition, said tube being in communication with said chamber and tapering downwardly therefrom and terminating in a cylindrical portion, a vent pipe extending downwardly through said closure and partition and terminating within said cylindrical portion short of the lower end thereof and spaced from the wall thereof, the lower portion of said pipe being provided with a plurality of openings, a tangential inlet for said casing below said partition and a discharge outlet for said dust chamber.

8. In a dust collector, a casing having a cylindrical upper portion and a conical lower portion, a closure for said casing, a partition for forming a dust chamber in the upper portion of said casing, a tube extending downwardly from said partition, said tube being in communication with said chamber and terminating in a cylindrical portion, a vent pipe extending downwardly through said closure and partition and terminating within said cylindrical portion short of the lower end thereof and being of materially less diameter than said tube, the lower portion of said pipe being provided with openings there-through, a tangential inlet for said casing adjacent to but below said partition, and an outlet for said dust chamber.

In testimony whereof I affix my signature.
WILLIAM G. CLARK.