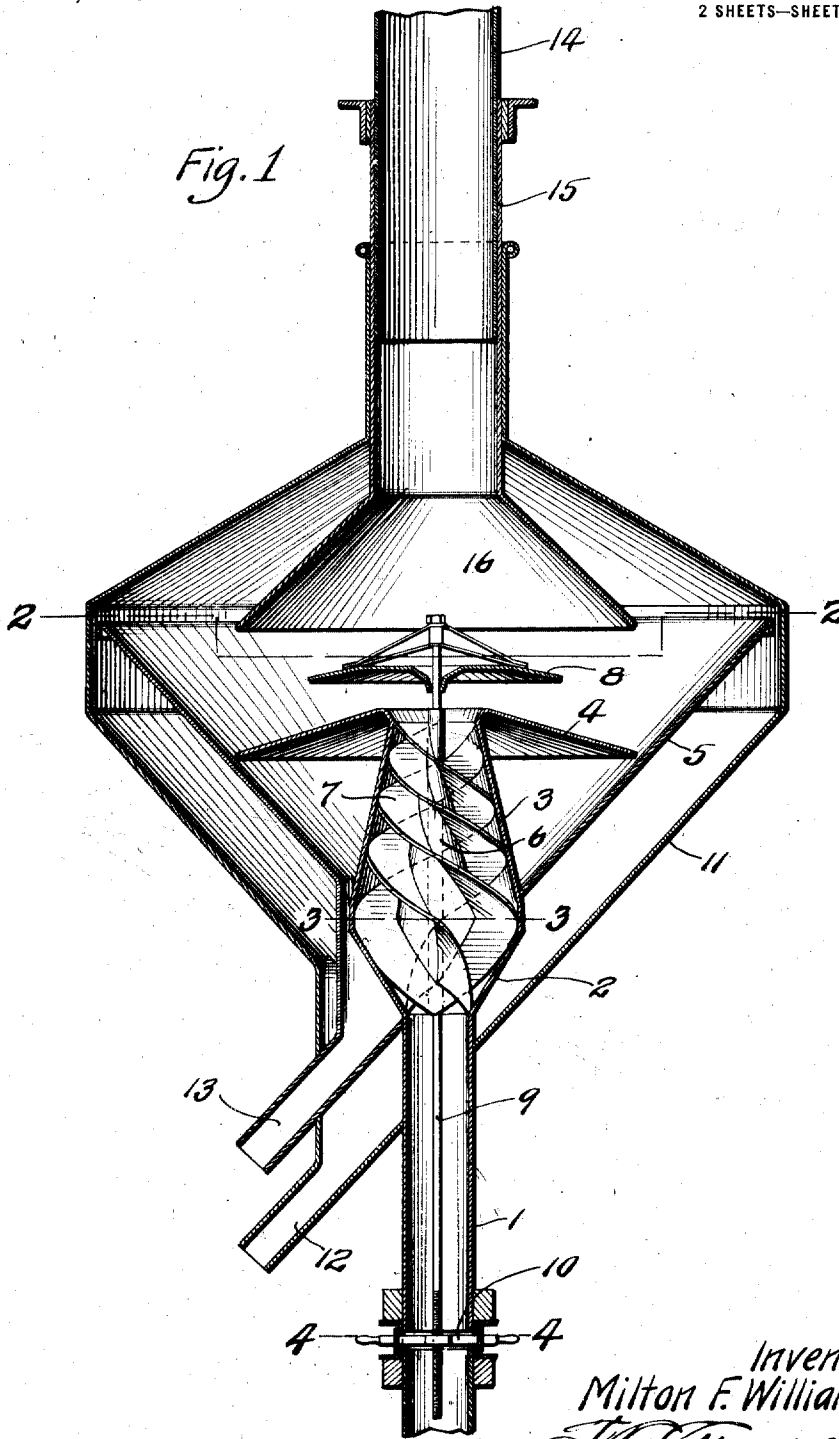


M. F. WILLIAMS.
DUST SEPARATOR.
APPLICATION FILED FEB. 3, 1916.

1,214,249.

Patented Jan. 30, 1917.

2 SHEETS—SHEET 1.

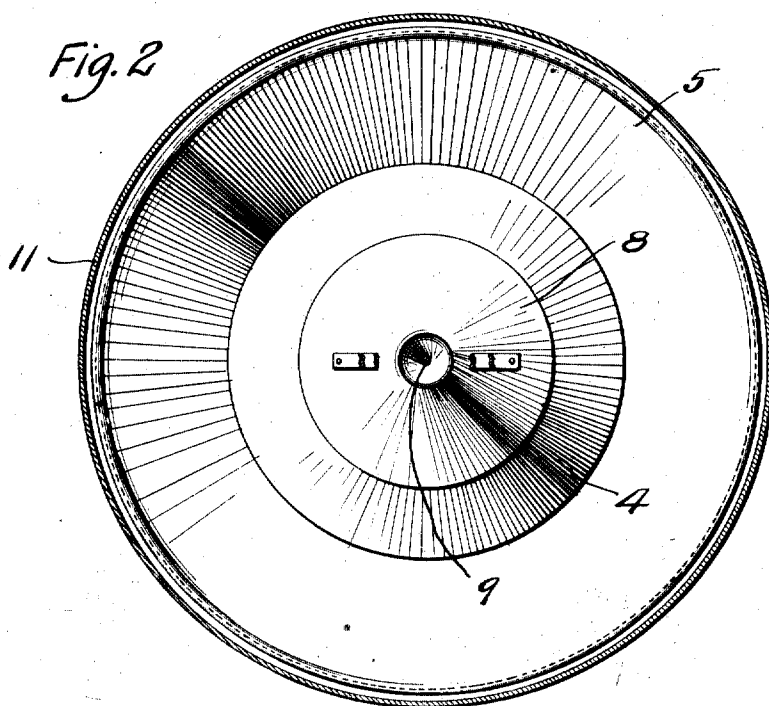
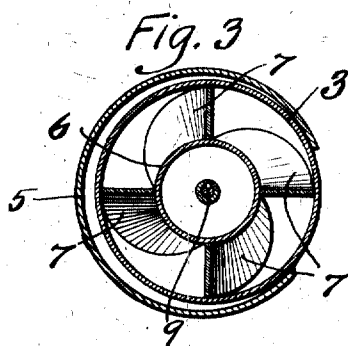
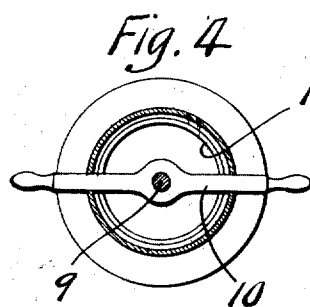


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By *J. M. Bernwardt*, Atty

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UNITED STATES PATENT OFFICE.

MILTON F. WILLIAMS, OF ST. LOUIS, MISSOURI, ASSIGNOR TO WILLIAMS PATENT CRUSHER AND PULVERIZER COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

DUST-SEPARATOR.

1,214,249.

Specification of Letters Patent.

Patented Jan. 30, 1917.

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To all whom it may concern:

Be it known that I, MILTON F. WILLIAMS, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented a certain new and useful Improvement in Dust-Separators, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical sectional view of my improved separator. Fig. 2 is a cross sectional view on line 2—2 of Fig. 1. Fig. 3 is a cross sectional view on line 3—3 of Fig. 1. Fig. 4 is a cross sectional view on line 4—4 of Fig. 1.

This invention relates to a new and useful improvement in dust separators, the object being to simplify and cheapen the cost of separators and to enable them to be employed for different classes of material.

In the drawings 1 indicates an inlet pipe through which the dust laden air is forced upwardly under pressure. The upper end of this inlet pipe is flared outwardly as at 2, above which flaring portion the walls converge as at 3. The downwardly and outwardly extending flange 4 is arranged at the upper end of the walls 3, the outer edges of which are spaced apart from the conical wall 5 mounted in the separating chamber.

6 indicates a double-tapered core arranged in the enlarged end of the inlet pipe around which are arranged spiral blades 7 for imparting to the dust laden air a whirling motion as it enters the expansion chamber.

8 indicates a hood or cap plate for spreading the dust laden air downwardly and outwardly as it enters the separating chamber, this hood or cap plate being mounted on a rod 9 which passes through core 6 and having a key-way, not shown, which engages a key carried by said core. In this manner the rod 9 is prevented from rotating, but permitted to move vertically and carry with it the cap plate 8. The lower end of rod 9 is threaded and coöperates with a manually operable nut 10 whereby upon rotating said nut the cap plate 8 may be adjusted vertically with respect to the inclined flange 4.

11 is the wall of the separating chamber terminating at its lower end in a spout 12 and from which casing the inclined wall 5

is spaced as shown in Fig. 1. The wall 5 which forms an inner chamber also connects with a discharge spout 13.

14 is an exit pipe preferably stationary and around which is an adjustable pipe section 15 whose lower end extends down into the separating chamber and is provided with a flaring portion 16. Any suitable means for adjusting the pipe 15, and its flaring mouth 16, relative to the cap plate 8, may be provided. I have shown none in the accompanying drawings but such is contemplated.

In operation the dust laden air passing upwardly through the pipe 1 is given a whirling motion by passing between the spiral blades 7, and this whirling motion is gradually increased by the tapering wall 3, which gradually contracts the diameter of the spiral passages formed by the blades between the wall 3, and the central core, whereby these currents, traveling with a definite velocity due to the pressure of the air blast, are first given a high rotary motion on a large diameter in the enlarged end of the inlet pipe section 3—3, and then are caused to move in concentric whirls of smaller diameter but with the same velocity, thereby greatly increasing the vortex action, till they reach the top of the spirals. The heavier dust particles will become charged with correspondingly greater momentum, and will slip over the inner edge of the flange 4, while the lighter particles will take a more central and upward course, and impinge on the concaved under surface of the cap plate 8, which assists in deflecting the particles down said inclined flange away from the air current proper, carrying the "fines" which thus are carried upward, while the heavier particles travel outwardly and downwardly over the edge of the inclined flange 5 and pass out through the spout 12. The larger particles of material fall over the edge of the inclined flange 4 and pass out through the tailings spout 13, while the smaller particles of material pass upwardly and outwardly along the wall 5, and if possessed of sufficient gravity, will drop over the edge of wall 5. Such particles of material as are carried upwardly by the whirling air will eventually pass out through the exit pipe, but the condition of the "fines" passing through the exit pipe, that is, of the requisite fineness, to give a certain percentage of finished product in

passing through a screen of the desired mesh, will be determined by the location of the mouth 16 of the exit pipe. If this mouth is adjusted downwardly, it is obvious
5 that larger particles will be permitted to pass through the exit pipe than is the case where the lower end of the exit pipe is in the position shown in Fig. 1.

Having thus described my invention, what
10 I claim is:

1. A dust separator comprising walls forming an expansion chamber, an inlet pipe leading into the lower portion of said chamber, the inner end of said inlet pipe
15 being provided with an enlarged portion and a contracted discharge, means in said enlarged portion for imparting a whirling motion to the dust laden air, a downwardly inclined flange around the inner end of said
20 pipe, an inclined wall spaced apart from the outer edge of said flange, and an adjustable cap piece or spreader plate mounted above the inner end of the inlet pipe for forcing the dust laden air downwardly and
25 outwardly.

2. A dust separator comprising walls forming a casing, an inlet pipe leading into the lower end of said casing, means located within said inlet pipe for giving to the dust
30 laden air a whirling motion, a conical wall spaced apart from the walls forming said casing, a discharge spout leading from the

apex of said conical wall, and an outwardly extending flange on the inner end of the inlet pipe whose outer edge extends nearly to
35 said conical wall.

3. A dust separator comprising walls constituting an expansion chamber, the bottom walls of which chamber are conical so as to convey material into a down-spout, a
40 down-spout leading from said conical walls, a conical wall located within the chamber and whose upper edge is spaced from the walls of said chamber, said last named conical wall also leading into a down-spout, a
45 down-spout leading from said last mentioned conical wall, an inlet pipe leading into the expansion chamber and whose upper end terminates above said conical wall,
50 means arranged in said inlet pipe for imparting whirling motion to the dust laden air, a flange on the upper end of said inlet pipe extending outwardly merely to said last mentioned conical wall, and a discharge
55 pipe leading from the upper end of the expansion chamber.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this 26th day of January, 1916.

MILTON F. WILLIAMS.

Witnesses:

M. A. KINCER,
WM. WEBER.