W. E. ALLINGTON.

DUST COLLECTOR.

APPLICATION FILED MAR. 25, 1909.

992,531.

Patented May 16, 1911.

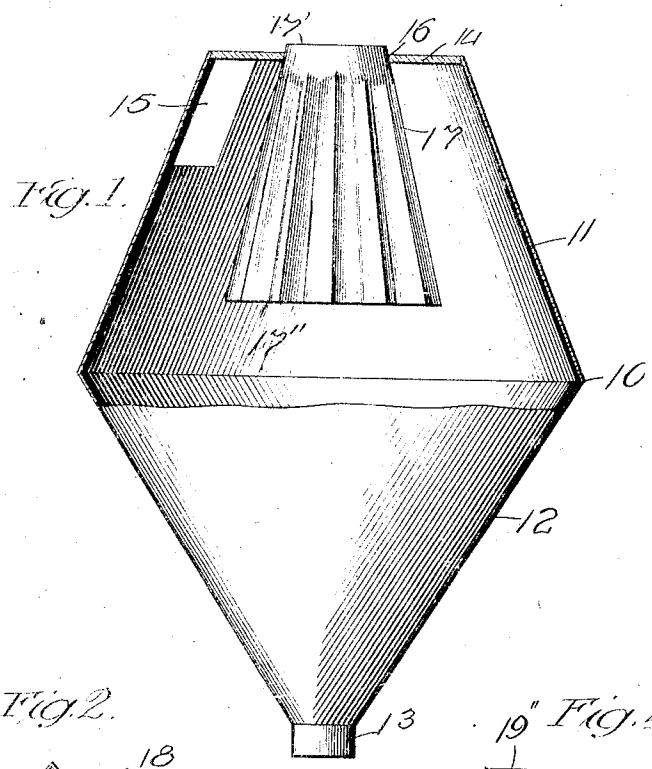


Fig. 1.

Fig. 2.

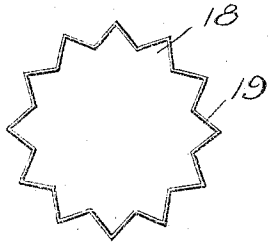
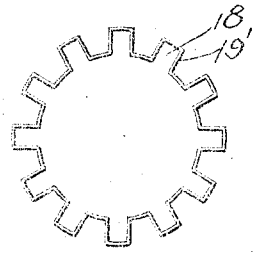
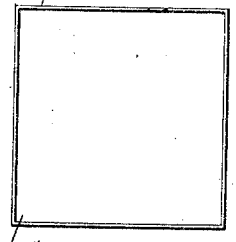


Fig. 3.

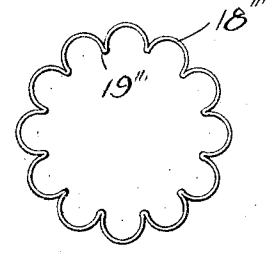


19" Fig. 4.



18"

Fig. 5.



Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM E. ALLINGTON, OF SAGINAW, ILLINOIS.

DUST-COLLECTOR.

992,531. Specification of Letters Patent. Patented May 16, 1911.

Application filed March 25, 1909. Serial No. 485,633.

To all whom it may concern:

Be it known that I, WILLIAM E. ALLINGTON, a citizen of the United States, residing at Saginaw, in the county of Saginaw and State of Illinois, have invented certain new and useful Improvements in Dust-Collectors, of which the following is a specification.

My invention relates to improvements in dust collectors, and more particularly to centrifugal dust collectors, comprising generally a casing into which air is introduced through an inlet near its top in such manner as to set up a vortical whirl therein, said casing being provided with a dust outlet adjacent its bottom and with an air outlet opening in its top surrounded by a depending tubular guard. In such dust collector constructions it is distinctly advantageous to provide a tapering tubular guard flaring downwardly and outwardly,—by which I mean, a tubular guard of any suitable contour between its ends, having its lower or intake end larger than its upper or delivery end,—so that the bottom of the guard may receive air in a zone radially beyond the area of the outlet opening proper, provided that in conjunction with such tapering guard means be employed for interrupting, or preventing the formation of, a whirl within the guard. Various constructions have been proposed for attaining these advantages by the employment of tapering tubular guards having positioned for operation in conjunction therewith deflectors structurally independent of the side walls of the guard although sometimes attached thereto. I have found that the use of independent deflectors may be dispensed with by the construction of a tubular guard, of tapering formation, having its walls so contorted as to provide air directing parts in disposition to direct air in paths tending to prevent the formation of a whirl within the guard.

In the drawing; Figure 1 is a central vertical section of a dust collector equipped with a tubular guard embodying my invention, and; Fig. 2 is a view showing the end conformation of such a guard; Figs. 3, 4 and 5 are views similar to Fig. 2 showing different configurations of guards within the teachings of my invention.

Referring to the drawing, 10 indicates in general a dust collector casing of a well known type,—typifying any suitable structure—providing an upper separating chamber 11, a conical dust-discharge portion 12, bottom dust outlet 13 and a deck or top 14, the upper separating chamber having therein an inlet opening 15 for the material (to be conducted thereto by the customary tangential pipe, not shown), and the top 14 having made therein an air outlet opening 16 in which is secured the depending tubular guard, generally indicated at 17. The guard is of tapering construction, flaring downwardly and outwardly, that is to say it is smaller at its upper or delivery end 17′ than at its lower or intake end 17″, and the peripheral wall of the guard is contorted to provide integral parts in disposition to direct air in paths tending to prevent the formation of a whirl within the guard. This may be accomplished with various configurations, and in the drawing I have shown a few configurations merely as indicative of the fact that the invention may be variously embodied as to precise form without departure from its spirit and scope, it being understood also that the form of the casing may be varied likewise. In general, however, it is my preference that portions of the bottom or intake end of the tubular guard shall extend outward to such radial distance as to be in vertical register with the zone of the inlet 15, that is to say, shall extend beyond the radius line to which the innermost portion of the inlet 15 reaches, as well shown in Fig. 1. In providing a suitable configuration for the lower or intake end of the tapering tubular guard to accomplish the desired results, I contort the lower portion of the guard to provide integral portions of its side wall at varying radial distance from the axis, so as to form downwardly opening channels extending upwardly a suitable distance and converging upwardly with the taper of the guard.

As shown in Fig. 1 the flaring guard is of indented outline (shown in plan in Fig. 2) throughout its entire periphery, the indented formation extending a suitable distance up the guard, from its intake end so as to provide downwardly and inwardly opening channels 18, converging upwardly with the taper of the guard for a suitable distance. As shown in Fig. 3, however, the outline might be crenelated, in which event the channels 18′ would be oblong, or it might be polygonal, as shown in Fig. 14, in which case the channels 18″ would be longer-sided angles than in the form shown in Fig. 2, or

it might be scalloped, as shown in Fig. 5, in which case the channels 18''' would be particircular in cross-section. In any of these forms, however, the portions 19, 19', etc., in planes at right angles to the axis, extend at varying radial distances from the axis of the guard to form such channels.

In the operation of a machine constructed as above described, it will be apparent that the air in whirl within the casing is substantially freed from dust by the centrifugal massing of the dust against the casing wall, in the usual manner. The air in whirl will work inward against centrifugal resistance only until it reaches the radial outmost points of the lower or intake edge of the tubular guard, when bodies of air will enter the channels provided in the construction of the guard wall and flow upwardly and inwardly therein, substantially without rotative movement about the casing axis. The guard is so constructed that the combined capacity of the channels at their lower ends may be properly related to the volume of air flowing through the machine so that the directing action of the wall portions 19 of the channels eccentric to the axis, will overcome the rotative tendency of such air as may pass the radially innermost portions of the peripheral wall or, in brief, the channel-directed currents should dominate. It will be apparent to those skilled in the art that as the action of the guard wall, with its portions at varying radial distance from the axis, is to break up the whirling action within the guard, and the difference in diameter between the top and bottom of the guard enables the air to have access to the lower open end of the guard after a minimum radial traverse against centrifugal resistance, the general effect of the guard is to pipe the air out from the radius of its bottom opening to the radius of its top opening without the resistance of centrifugal action, thereby to produce high power-efficiency within the machine.

Having described my invention, what I claim is.

1. In a dust collector, the combination with a casing, providing a top air outlet and a materials inlet near the top, of a tapering tubular guard depending from the air outlet, flaring downwardly and outwardly toward its bottom, said guard having the lower portion of its side wall contorted to provide integral portions at varying radial distances from the axis, forming downwardly opening channels converging upwardly with the taper of the guard.

2. In a dust collector, the combination with a casing providing a top air outlet and a materials inlet near the top, of a tapering tubular guard depending from the air outlet, flaring downwardly and outwardly, said guard having portions at its bottom extending into vertical register with the inlet zone, and having the lower portion of its side wall contorted to provide integral parts at varying radial distances from the axis of the guard forming longitudinal channels in the wall converging with the taper of the guard to direct air upwardly and inwardly, thereby to prevent the formation of a whirl within the guard.

3. In a dust collector, the combination of a casing providing a top air outlet and a materials inlet near the top, of a tapering tubular guard depending from the air outlet flaring outwardly and downwardly, said guard consisting of a sheet metal of a single thickness through substantially its entire peripheral extent, said guard having portions of its bottom extending into vertical register with the inlet zone, and having the lower portion of its side wall contorted to regularly approach and recede from the axis of the guard, the points of closest approach of said wall to the axis lying in the circumference of an imaginary circle described about the axis, and the portions of said wall lying beyond said imaginary circle forming longitudinal channels in the wall at regular intervals throughout the circumference of the guard, such longitudinal channels being of appropriate joint capacity sufficient to direct air in longitudinal paths to dominate the whirl tendency of the air, thereby normally to prevent the formation of a whirl within the guard.

In testimony whereof I hereunto set my hand in the presence of two witnesses.

WILLIAM E. ALLINGTON.

In the presence of—
MARY F. ALLEN,
FORÉE BAIN.