(No Model.)

J. K. MILLER.

DUST COLLECTOR.

No. 513,434. Patented Jan. 23, 1894.

Fig. 1

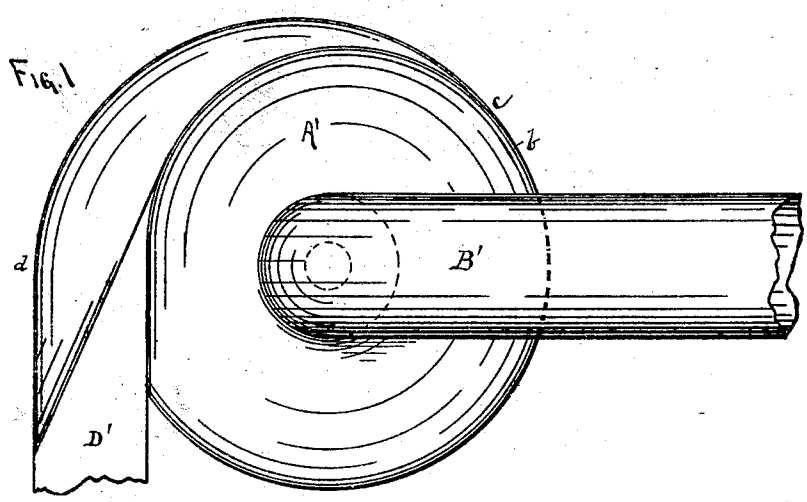


Fig. 2

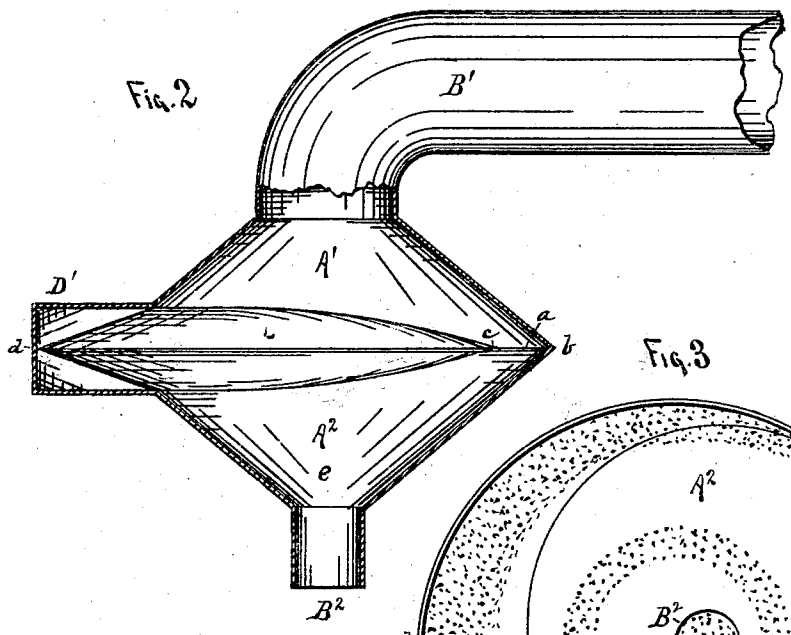
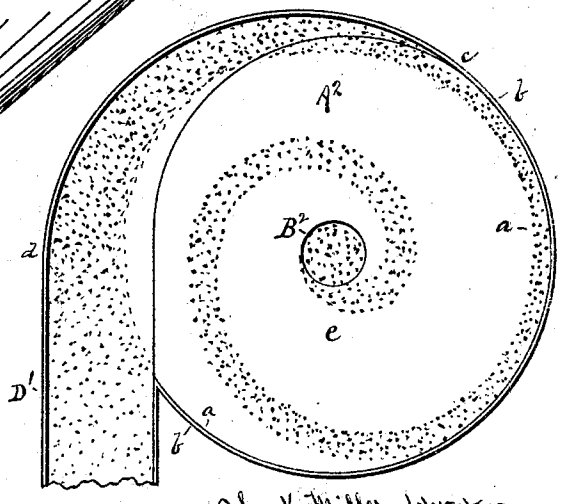


Fig. 3



WITNESSES.
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UNITED STATES PATENT OFFICE.

JOHN K. MILLER, OF MINNEAPOLIS, MINNESOTA.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 513,434, dated January 23, 1894.

Application filed May 12, 1893. Serial No. 473,959. (No model.)

To all whom it may concern:

Be it known that I, JOHN K. MILLER, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Dust-Collectors, of which the following is a specification.

This invention relates to apparatus employed in manufactories for removing the dust from the atmosphere, and consists in the combination, construction, and arrangement of parts, as hereinafter shown and described, and specifically pointed out in the claims.

The casing is formed of two reversed cones united at their bases and having a common axis perpendicular to the plane of their junction, and with an external inlet spout entering the casing tangentially at the center of the casing, or at the line of juncture of the two cones, and gradually merging into the casing and conforming substantially thereto, and with an air exit at the apex of the upper cone, and a discharge opening at the apex of the lower cone, whereby the dust laden air entering by the curved tangentially formed inlet spout is caused to pass around the interior of the casing with a volute like whirling motion to cause the particles of dust to be released and pass to the outer portion of the interior of the casing and gradually settle and pass out through the discharge from the apex of the lower cone, while the purified air escapes from the air exit in the apex of the upper cone, as hereinafter explained. By this simple arrangement, two independent dead air spaces are formed in the interior of the double conical casing, one around the interior of the casing at the point of juncture of the two cones, and the other at the lower portion of the lower cone just above the discharge opening. The air entering the casing through the curved tangentially arranged inlet spout and suddenly expanding into the interior of the casing, the pressure is greatly reduced, while at the same time by the combined action of the whirling motion and the centrifugal force, the particles of dust are suddenly released and thrown outward and held against the interior of the casing at the point of juncture of the two cones where the air is comparatively quiescent, and from whence they gradually settle down along the interior of the lower cone in a volute like path and into the discharge opening. The interior of the double conical casing being entirely free from obstructions, and the inner surface of the upper cone inclining upward in all directions to the outlet, the air freely rises at the same time that it is whirling about, the pressure in the lower portion of the casing being thereby greatly reduced and forming another dead air space in the lower portion of the lower cone, which greatly assists in the separation and discharge of the separated material by permitting the dust to freely settle without disturbance from the rapidly moving air currents.

In the drawings,—Figure 1 is a plan view. Fig. 2 is a cross sectional view, and Fig. 3 is a longitudinal section on the base line of the two reversed cones.

A′ A^2 represent the two cones forming the double conical casing when united at their base lines *b*, the part A′ tapering upward and inward and provided with an air exit B′ at its upper contracted end, and while the part A^2 likewise tapers downward and inward and is provided with a discharge B^2 at the lower contracted end, as shown.

D′ is the inlet spout for the dust laden air which may be of any form, but for the purpose of illustration it is shown oblong in cross section.

The inlet spout will be arranged to enter the casing A′ A^2 tangentially, as shown, at the center of the casing or point of juncture of the two cones, the portion from *c* to *d* gradually merging from the inlet spout D′ into the two parts of the casing and conforming substantially thereto, as shown. The inlet spout being thus arranged the air currents enter on such gradually decreasing curved lines that the whirling motion is imparted to them the moment they enter the interior of the casing, and expand into its interior, so that the particles of dust are suddenly released, and pass to the outer dead air space *a* around the interior of the casing. By this means also no abrupt corners or other obstructions are offered to the flow of the air currents, and no dead air pockets left at any point in the inlet spout.

I claim a special advantage in the formation of the two independent dead air spaces,

as the first or upper one *a* receives and retains the particles of dust until they have accumulated in sufficient quantities to flow down by their own gravity into the lower dead air space in a volute like path, as clearly indicated in Fig. 3.

The inlet pipe D′ enters the casing on a curve, and is gradually merged into the casing; hence the air enters at a true tangent, the separation taking place immediately upon the entrance of the air into the casing.

In most forms of dust collectors now in use, a tendency to "blow" from the dust discharge end exists, caused by the back pressure necessarily present, to a greater or lesser extent, owing to the presence in the upper portion of the casing of obstructions or irregularities of the internal surface; but in my device, the upper portion of the casing rising gradually and regularly from the center and without sudden breaks or obstructions of any kind, the whirling air currents freely rise and pass out through the purified air outlet, so that no back pressure is formed in the lower portion of the casing. By this means the air in the lower portion of the casing remains quiescent or "dead," so that the particles of dust settling therein form themselves into a gradually decreasing volute like course as shown in Fig. 3, undisturbed by the whirling currents above. This is an important function of my invention, and cannot be accomplished by any form of dust collector with which I am acquainted.

Where obstructions or irregularities exist in the upper portion of the casing, or where the entering air currents are caused to take a downward course before they rise through the purified air outlet, the currents are so retarded that a back pressure is formed in the casing causing a serious interference with the perfect action of the apparatus, and forcing a portion of the air downward through the lower discharge along with the dust, thereby causing what is known as "blowing" from the lower discharge of the casing, which greatly interferes with the efficiency of the apparatus, and renders it entirely useless for a large number of purposes.

These dust collectors, so called, are frequently employed to collect the fine dust or powder from pulverizing machines, and any form of dust collector which "blows" at the bottom is useless for that purpose, as the fine dust will be blown out and not allowed to settle into the receptacle placed for it. In my construction however the whirling air currents being confined entirely to the upper portion of the casing and the air in the lower portion being entirely undisturbed, no back pressure exists and consequently no "blowing" occurs, so that the finest dust or powder is free to settle into the casing and pass therefrom without disturbance, as before described. This, as before stated, is a very important feature of my invention and renders it possible to employ the apparatus for many purposes for which other forms of collectors are entirely impracticable.

Having thus described my invention, what I claim as new is—

1. In a dust collector, a casing formed of two reversed cones united at their bases and having a common axis perpendicular to the plane of their junction, an external inlet spout entering said casing tangentially at its center or at the line of juncture of the two cones, the interior of said upper cone being free from obstructions or irregularities of surface, an air exit at the apex of the upper cone, and a discharge opening at the apex of the lower cone, substantially as and for the purpose set forth.

2. In a dust collector, a casing formed of two reversed cones united at their bases and having a common axis perpendicular to the plane of their junction, an external inlet spout entering said casing tangentially at its center or at the line of juncture of the two cones and gradually merging into the casing and conforming substantially thereto, the interior of said upper cone being free from obstructions or irregularities of surface, an air exit at the upper apex of the upper cone, and a discharge opening at the apex of the lower cone, substantially as and for the purpose set forth.

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

JOHN K. MILLER.

Witnesses:
C. N. WOODWARD,
F. E. HOBBS.