(No Model.)

J. G. MUNDY.

DUST COLLECTOR.

No. 398,788. Patented Feb. 26, 1889.

Fig. 1.

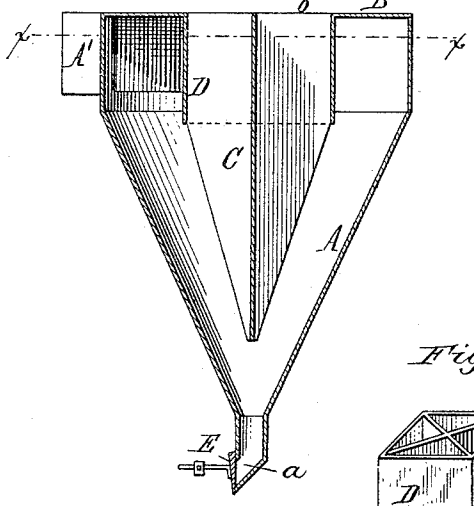


Fig. 4.

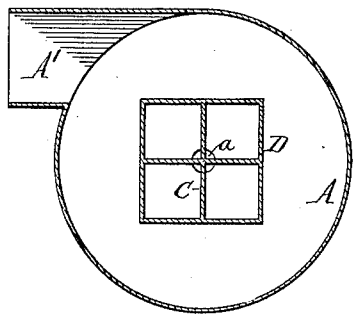


Fig. 3.

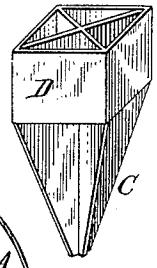


Fig. 2.

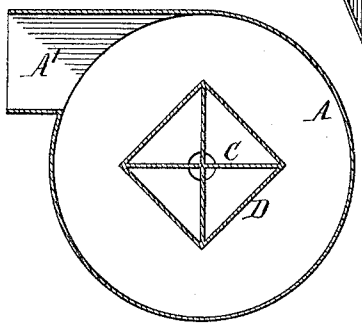


Fig. 5.

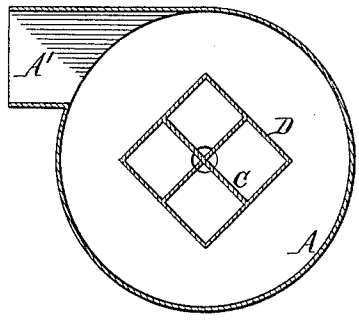


Fig. 6.

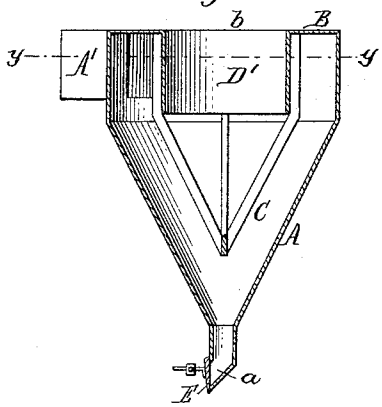
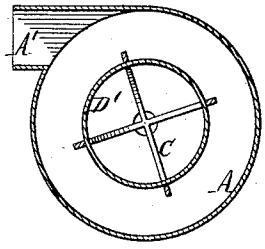


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOHN G. MUNDY, OF JACKSON, MICHIGAN, ASSIGNOR TO THE KNICKERBOCKER COMPANY, OF SAME PLACE.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 398,788, dated February 26, 1889.

Application filed December 1, 1888. Serial No. 292,364. (No model.)

To all whom it may concern:

Be it known that I, JOHN G. MUNDY, a citizen of the United States, residing at Jackson, in the county of Jackson and State of Michigan, have invented a new and useful Improvement in Dust-Collectors, of which the following is a specification.

This invention relates to that class of dust-collectors which are provided with a separating-case in which the dust-laden air is caused to assume a whirling motion, whereby the dust or solid matter is thrown off by centrifugal force, while the air freed from dust moves toward the axis of the separating-case and escapes at or near the axis thereof. In a dust-collector of this kind—for instance, that now well-known as the "cyclone dust-collector"—the purified air escapes from the separating-chamber with a whirling motion. The vortex created in the separating-chamber and its air-outlet tube causes a rarefaction of the air near the axis of the separating-chamber, which rarefaction induces central ingoing currents, both in the air-outlet tube and in the dust-outlet. The purified air escapes in a whirling annular layer, hugging the air-outlet tube, while the inner portion of the area of the air-outlet tube is occupied by the ingoing induced current of air. The effective discharge area of the air-outlet tube is therefore only a small part of its total area. A similar action takes place in the dust-discharge at the small end of the tapering separating-chamber, through which a light air-current issues in an annular layer with a whirling motion, which air-current hugs the periphery of the dust-outlet, while an induced air-current enters through the inner portion of the dust-outlet, unless the latter is closed by a trap or other discharge device. This induced current entering through the dust-outlet is liable to carry dust particles back into the separating-chamber, where they may reach the outgoing air-current, and thus be discharged with the purified air.

The object of my invention is to overcome these difficulties, and I attain this object by breaking up the whirling motion of the air in the center of the separating-chamber.

In the accompanying drawings, Figure 1 is a sectional elevation showing the preferred construction of my improvement. Fig. 2 is a horizontal section in line $x\,x$, Fig. 1. Fig. 3 is a perspective view of the air-escape device. Figs. 4 and 5 are horizontal sections showing slightly-modified constructions of the air-discharge device. Fig. 6 is a vertical section of a dust-collector, showing a modified construction of my improvement. Fig. 7 is a horizontal section in line $y\,y$, Fig. 6.

Like letters of reference refer to like parts in the several figures.

A represents the peripheral wall of the separating-chamber, having its body portion made tapering downwardly toward the dust-discharge opening a and its upper portion made cylindrical.

A′ represents the tangential inlet-spout for the dust-laden air entering the upper cylindrical portion of the peripheral wall.

B represents the head applied to the top of the separating-chamber and provided with a central opening, b, for the escape of the purified air.

C represents a wind-break arranged in the central portion of the separating-chamber, so as to break the whirling motion of the air and compel the air to assume a rectilinear motion toward the air-outlet opening b. This wind-break is made tapering toward the small end of the separating-chamber, so as to leave sufficient space between the wind-break and the peripheral wall, in which the air can whirl and the desired separation of the solid particles from the air can be effected.

D represents a square or angular outlet-tube arranged in the air-escape opening b, and depending into the separating-chamber. The wind-break C consists, as represented in Figs. 1 and 2, of two intersecting plates arranged radially and at right angles to each other in the separating-chamber. These plates extend with their upper portions into the square air-outlet tube, and are secured to the latter, while their lower tapering portions extend into the separating-chamber. As represented in Figs. 1 and 2, the plates of the wind-break are arranged diagonally in the square air-outlet tube, while in the constructions represented in Figs. 4 and 5 the plates are arranged parallel with the sides of the air-outlet tube. In the construction represented in Figs. 6 and 7 the upper portions of the

plates or strips of the wind-break are arranged on the outer side of a round air-outlet tube, D′, and the lower tapering portions do not extend inwardly so far as to come in contact with each other, except at their lower ends, but form a tapering skeleton frame open at the center.

The whirling body of air hugs the peripheral wall of the separating-chamber and throws the solid matter against the same, while the air particles are crowded gradually toward the inner or axial portion of the separating-chamber. As the whirling air-current approaches the central portion of the separating-chamber, it strikes against the radial plates or strips of the wind-break, which stand across the path or direction in which the air whirls, and whereby its whirling motion is broken, and it is turned upwardly and caused to flow in a rectilinear course through the air-discharge tube. By thus destroying the vortex in the central portion of the separating-chamber the suction effect of the vortex is also wholly or nearly destroyed and the induction of air into the separating-chamber through the air-outlet opening is avoided. The entire area of the air-outlet tube is thereby rendered available for the exit of the air, so that the area of this tube can be considerably reduced without interfering with the free escape of the air.

The flat sides of the air-outlet tube break the whirling motion of the outgoing current of purified air and change, to a large extent, the motion of this current from a whirling to a rectilinear motion in the absence of the wind-break, thereby reducing the suction effect of the whirling body of air in the separating-chamber, while when the wind-break is used the anti-vortical effect of the flat-sided tube is cumulative with that of the wind-break.

The flat sides of the air-outlet tube also serve to deflect the dust particles which come in contact with the same outwardly and toward the peripheral wall of the separating-chamber, and this action takes place to the greatest extent when the side of the air-outlet tube is arranged obliquely to the direction in which the dust-laden air enters the separating-chamber, as represented in Fig. 2.

The dust-discharge opening *a* is preferably provided with a weighted or other automatic trap, E, whereby the separated dust is discharged without permitting any considerable portion of the air to escape with the dust. Such a trap is desirable in a dust-collector containing a wind-break, because the latter has a tendency to cause an increased escape of air with the dust when the dust-outlet is unprotected.

I claim as my invention—

1. The combination, with the separating-chamber provided with means whereby the dust-laden air is caused to assume a whirling motion in the same, and having an outlet for the purified air and a dust-discharge, of a wind-break arranged across the path of the whirling air-current in the axial portion of the separating-chamber, whereby the whirling motion of the air is broken in the axial portion of the separating-chamber and the air is caused to move in a straight course toward and through the air-outlet, substantially as set forth.

2. The combination, with the separating-chamber provided with means whereby the dust-laden air-current is caused to assume a whirling motion in the same, and having an outlet for the purified air and a dust-discharge, of a radial wind-break arranged in the axial portion of the separating-chamber, substantially as set forth.

3. The combination, with the tapering separating-chamber provided with means whereby the dust-laden air is caused to assume a whirling motion in the same, and having an outlet for the purified air and a dust-discharge, of a tapering wind-break arranged across the path of the whirling air-current in the axial portion of the separating-chamber, substantially as set forth.

4. The combination, with the separating-chamber provided with means whereby the dust-laden air is caused to assume a whirling motion in the same, and having an outlet for the purified air and a dust-discharge, of a tube arranged in the air-outlet, and a wind-break arranged in said tube, substantially as set forth.

5. The combination, with the separating-chamber provided with means whereby the dust-laden air is caused to assume a whirling motion in the same, and having an outlet for the purified air and a dust-discharge, of a tube arranged in the air-outlet, and a wind-break extending from said tube into the separating-chamber, substantially as set forth.

6. The combination, with the separating-chamber provided with means whereby the dust-laden air is caused to assume a whirling motion in the same, and having an outlet for the purified air and a dust-discharge, of a flat-sided tube arranged in the air-outlet, and a wind-break arranged in the axial portion of the separating-chamber, substantially as set forth.

7. The combination, with the separating-chamber provided with means whereby the dust-laden air is caused to assume a whirling motion in the same, and having an outlet for the purified air and a dust-discharge, of a flat-sided tube arranged in the air-outlet, and intersecting tapering wind-break plates having their large ends secured in said tube and having their tapering portions projecting from said tube into the separating-chamber, substantially as set forth.

Witness my hand this 29th day of November, 1888.

JOHN G. MUNDY.

Witnesses:
R. H. EMERSON,
SAM H. CAMP.