

O. M. MORSE.
DUST COLLECTOR.

No. 460,151.

Patented Sept. 29, 1891.

Fig. 1.

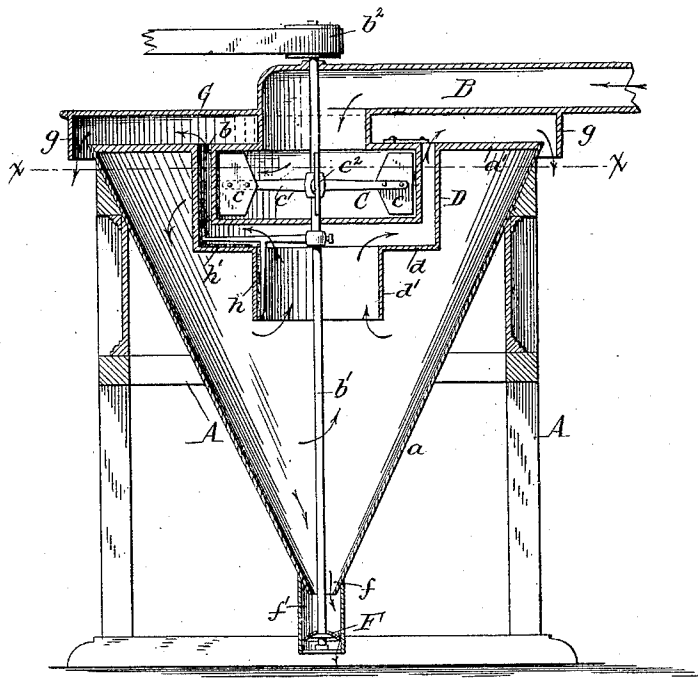


Fig. 2.

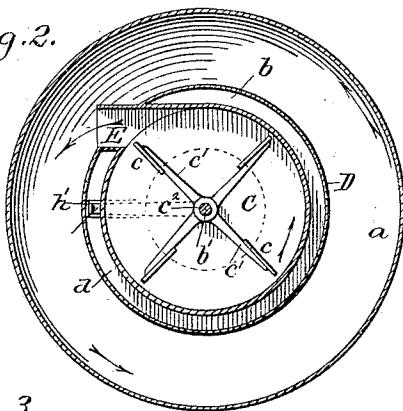
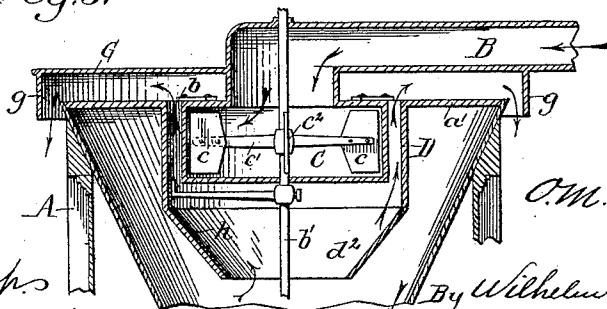


Fig. 3.



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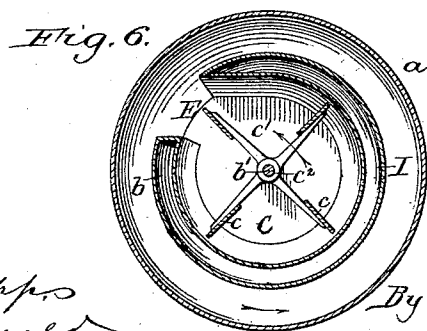
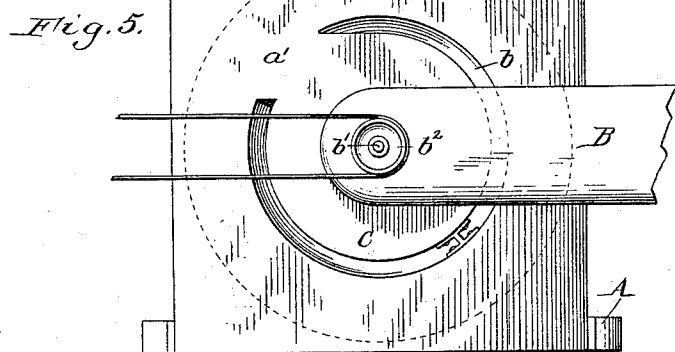
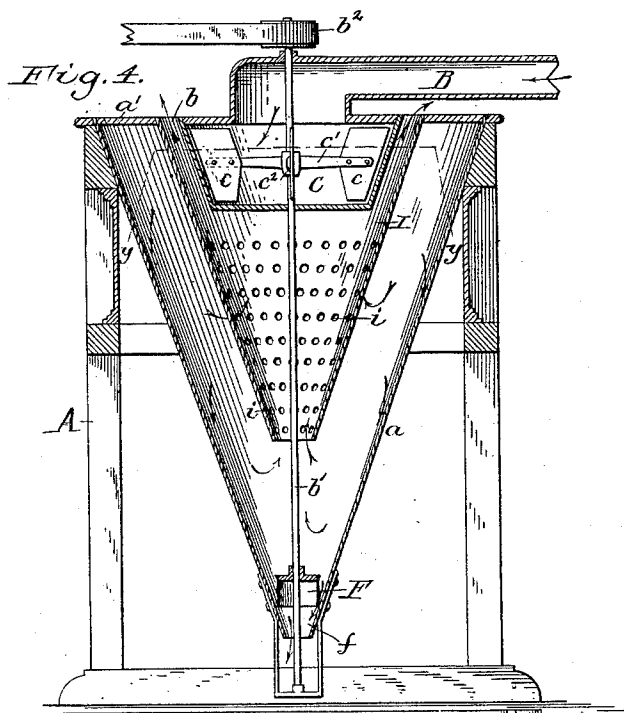
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UNITED STATES PATENT OFFICE.

ORVILLE M. MORSE, OF JACKSON, MICHIGAN, ASSIGNOR TO THE KNICKER-
BOCKER COMPANY, OF SAME PLACE.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 460,151, dated September 29, 1891.

Application filed December 13, 1888. Serial No. 293,494. (No model.)

To all whom it may concern:

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

This invention relates to a dust-collector having a separating-chamber provided with an imperforate peripheral wall and a rotating fan arranged within the separating-chamber, whereby the dust-laden air is caused to whirl in the separating-chamber and the dust is massed by centrifugal force against the imperforate peripheral wall, along which it passes to the dust-outlet, while the purified air passes toward the axis of the separating-chamber and escapes at or near the same.

The objects of the present invention are to construct the machine in such manner as to avoid the disturbing effect of the fan-blades rotating directly in the separating-chamber and to increase the suction produced by the rotating fan-blades. These objects I attain by arranging the fan-blades in a separate case within the separating-chamber, into which case the dust-laden air is drawn, and from which it is discharged by the rotating blades in such manner as to cause a whirling motion of the air in the separating-chamber, whereby the separation of the air from the dust is effected.

My invention consists of the improvements which will be hereinafter fully set forth, and pointed out in the claims.

In the accompanying drawings, consisting of four sheets, Figure 1 is a sectional elevation of a dust-collector provided with my improvements. Fig. 2 is a horizontal section in line *xx*, Fig. 1. Fig. 3 is a sectional elevation of the dust-collector, showing a slightly-modified construction of the air-discharge. Fig. 4 is a sectional elevation showing a modified construction of the dust-collector, and Fig. 5 is a top plan view thereof. Fig. 6 is a horizontal section in line *yy*, Fig. 4.

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

In Figs. 1 and 2, *a* represents the peripheral wall of the separating-chamber of the dust-collector, made circular in cross-section

and tapering lengthwise. *A* represents the stationary frame which supports the separating-chamber.

a' is the annular head or ring secured to the large end of the separating-chamber, extending inwardly from the peripheral wall *a* and provided with a central opening *b*.

B represents the inlet-pipe for the dust-laden air, communicating with the eye of the fan-case *C*, arranged in the opening *b* within the separating-chamber, and *b'* represents a shaft arranged axially in the separating-chamber and journaled in a bearing secured in the pipe *B* and resting in a step below the small end of the separating-chamber.

b² represents a pulley secured to the upper end of the shaft *b'* for rotating the same.

c represent fan-blades arranged within the fan-case *C* and secured to the shaft *b'* by arms *c'* and a hub *c²*.

D represents a tubular guard arranged in the opening *b* of the head *a'* and extending from the latter into the separating-chamber. The fan-case *C* is somewhat smaller in diameter than the tubular guard, so as to leave an annular passage in the opening *b* between the fan-case and the guard. The lower end of the guard connects with an annular shelf *d*, which is arranged at a suitable distance below the bottom of the fan-case, and the inner edge of the annular shelf connects, preferably, with a second tubular guard *d'* of smaller diameter. These guards, the shelf, and the fan-case form the walls of the air-passages through which the purified air escapes from the separating-chamber.

E represents the blast-spout of the fan-case, which extends across the air-passage between the latter and the tubular guard *D* and opens into the separating-chamber tangentially, so as to cause the dust-laden air to whirl in the same. The contracted extension *d'* of the guard *D* compels the air to travel some distance toward the apex of the separating-chamber before it can escape through the air-outlet. The dust-laden air is drawn into the eye of the fan-case from the inlet-pipe and driven tangentially against the peripheral wall of the separating-chamber, in which it assumes a whirling or rotating motion, whereby the dust and other solid particles are quickly

driven against the peripheral wall. The dust particles pass along the peripheral wall to the small end of the separating-chamber and escape through the opening *f* formed at the apex thereof.

5 *F* is an annular valve or trap secured to the shaft *b'*, and arranged in a tubular extension *f'*, which surrounds the dust-discharge opening *f* and extends below the same. The valve or trap *F* is made of saucer or cup shape, the peripheral portion being secured to a head or disk of metal and constructed of cloth, leather, or other flexible material which will allow the dust to escape past the valve, but will hug the interior of the surrounding tube or sleeve by centrifugal force so snugly as to check the ingress of air into the separating-chamber through the dust-discharge opening.

20 *G* represents a circular deflector or hood which surrounds the inlet-pipe *B* above the air-outlet opening *b*, and which deflects the escaping air downwardly by means of an annular depending flange *g*, surrounding the large end of the separating-chamber, so that any dust particles that may be contained in the escaping air-current will be deposited on the floor, from where they can be easily removed. This hood also serves to intercept any air which tends to pass into the vortex of the separating-chamber.

Any particles of dust that may be carried into the guard *d'* and lodge on the shelf *d* are removed by revolving wipers *h h'*, which are attached to the shaft *b'* by an arm.

35 The fan-case is preferably supported on the head *a'* by arms extending across the annular escape-opening, as indicated in Fig. 1.

If preferred, the guard *D* may be provided with a funnel-shaped extension *d²*, as represented in Fig. 3, thereby avoiding the angular path for the escape of the purified air.

In the modified construction represented in Figs. 4, 5, and 6 the peripheral walls of the fan-case and the tubular guard are tapered parallel with the peripheral wall of the separating-chamber, which permits the guard to be carried farther down into the separating-chamber, thereby submitting the air to a longer purifying action before it can escape through the guard. The guard *I* is preferably perforated below the fan-case, as shown at *i*, whereby the purified air is caused to escape in finely-divided currents. In this construction the air-trap *F* is arranged in the small end of the separating-chamber.

I claim as my invention—

1. The combination, with the separating-chamber having an imperforate peripheral wall, a dust-discharge opening, and a central

air-escape opening, of a fan-case and fan arranged in said air-escape opening and made of smaller size than said opening, and an inlet-pipe for the dust-laden air communicating with said fan-case, substantially as set forth. 65

2. The combination, with the tapering separating-chamber provided with a dust-discharge opening at its small end and an air-escape opening at its large end, of a fan-case and fan arranged in said air-escape opening and made of smaller size than said opening, and an inlet-pipe for the dust-laden air communicating with said fan-case, substantially as set forth. 70

3. The combination, with the separating-chamber having an imperforate peripheral wall, a dust-discharge opening, and an air-outlet at its end, of a tubular guard surrounding the air-outlet, a fan-case and fan arranged within said guard, and an inlet-pipe for the dust-laden air communicating with said fan-case, substantially as set forth. 75

4. The combination, with the tapering separating-chamber provided with a dust-discharge opening at its small end and an air-escape opening at its large end, of an inwardly-contracted tubular guard surrounding the air-escape opening, a fan-case and fan arranged within said guard, and an inlet-pipe for the dust-laden air communicating with said fan-case, substantially as set forth. 80

5. The combination, with the separating-chamber having an imperforate peripheral wall, an inlet for the dust-laden air, a dust-discharge opening, and an air-outlet at its end, of a deflecting-hood provided with a depending flange arranged opposite the air-outlet, substantially as set forth. 85

6. The combination, with the separating-chamber provided with an inlet for the dust-laden air, a dust-discharge, and an air-escape opening, of a rotating flexible valve or trap arranged in the dust-discharge passage, whereby the dust is permitted to escape past the flexible valve or trap while the ingress of air is checked, substantially as set forth. 90

7. The combination, with the tapering separating-chamber provided with an inlet for the dust-laden air, an air-outlet at its large end, and a dust-discharge at its small end, of a rotating flexible valve or trap arranged at the small end of the separating-chamber in the dust-discharge passage, substantially as set forth. 95

Witness my hand this 1st day of December, 1888. 105

ORVILLE M. MORSE.

Witnesses:

JNO. G. MUNDY,
SAM. H. CAMP.