(No Model.)

3 Sheets—Sheet 1.

O. M. MORSE.

DUST COLLECTOR.

No. 409,482. Patented Aug. 20, 1889.

Fig. 1.

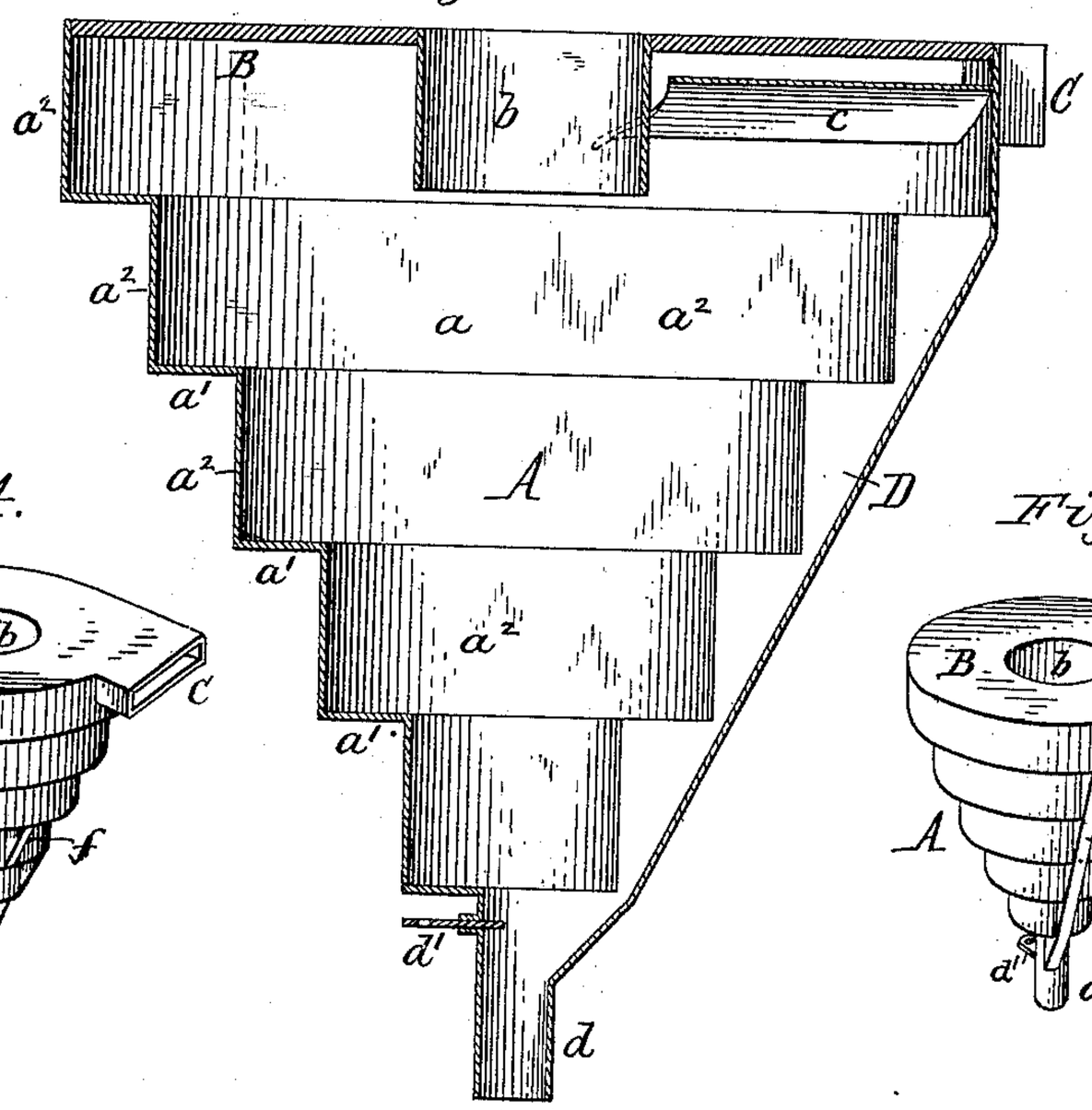


Fig. 4.

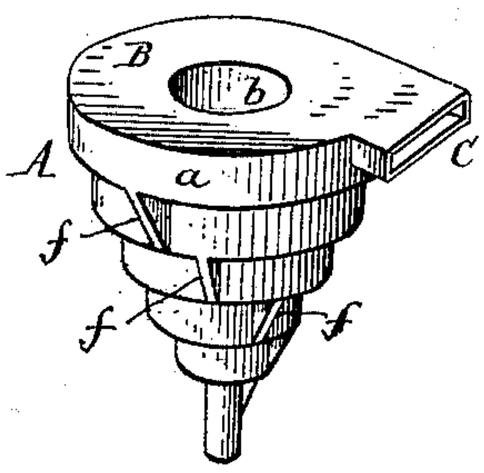
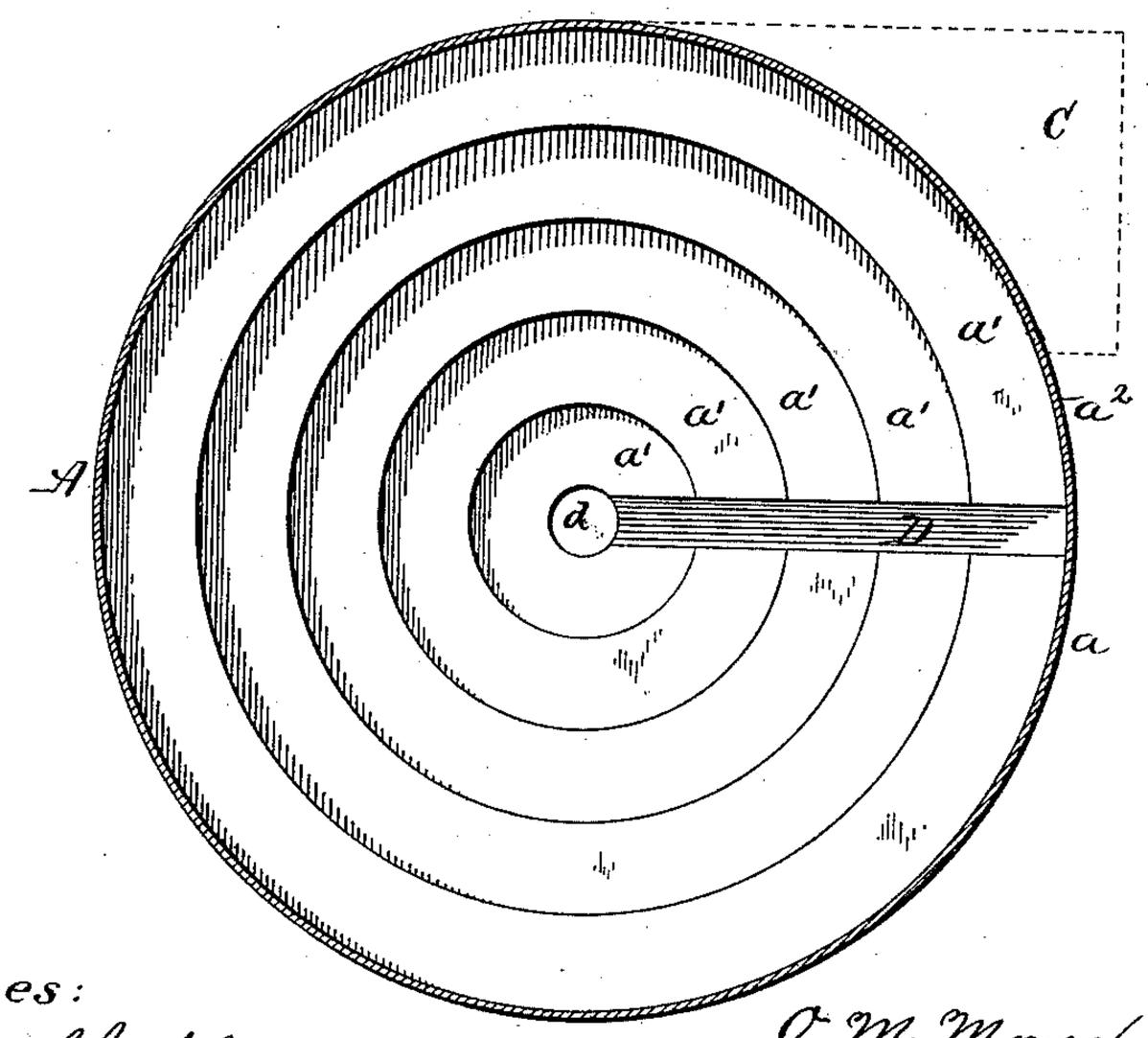


Fig. 3.

Fig. 2.



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(No Model.) 3 Sheets—Sheet 2.

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Fig. 5.

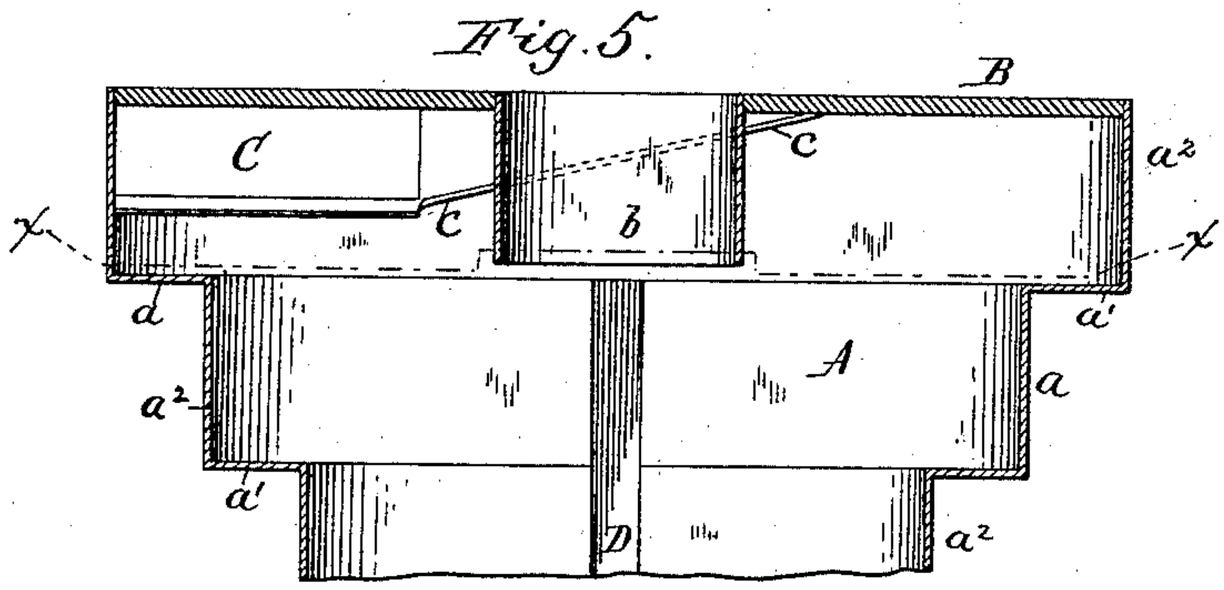


Fig. 6.

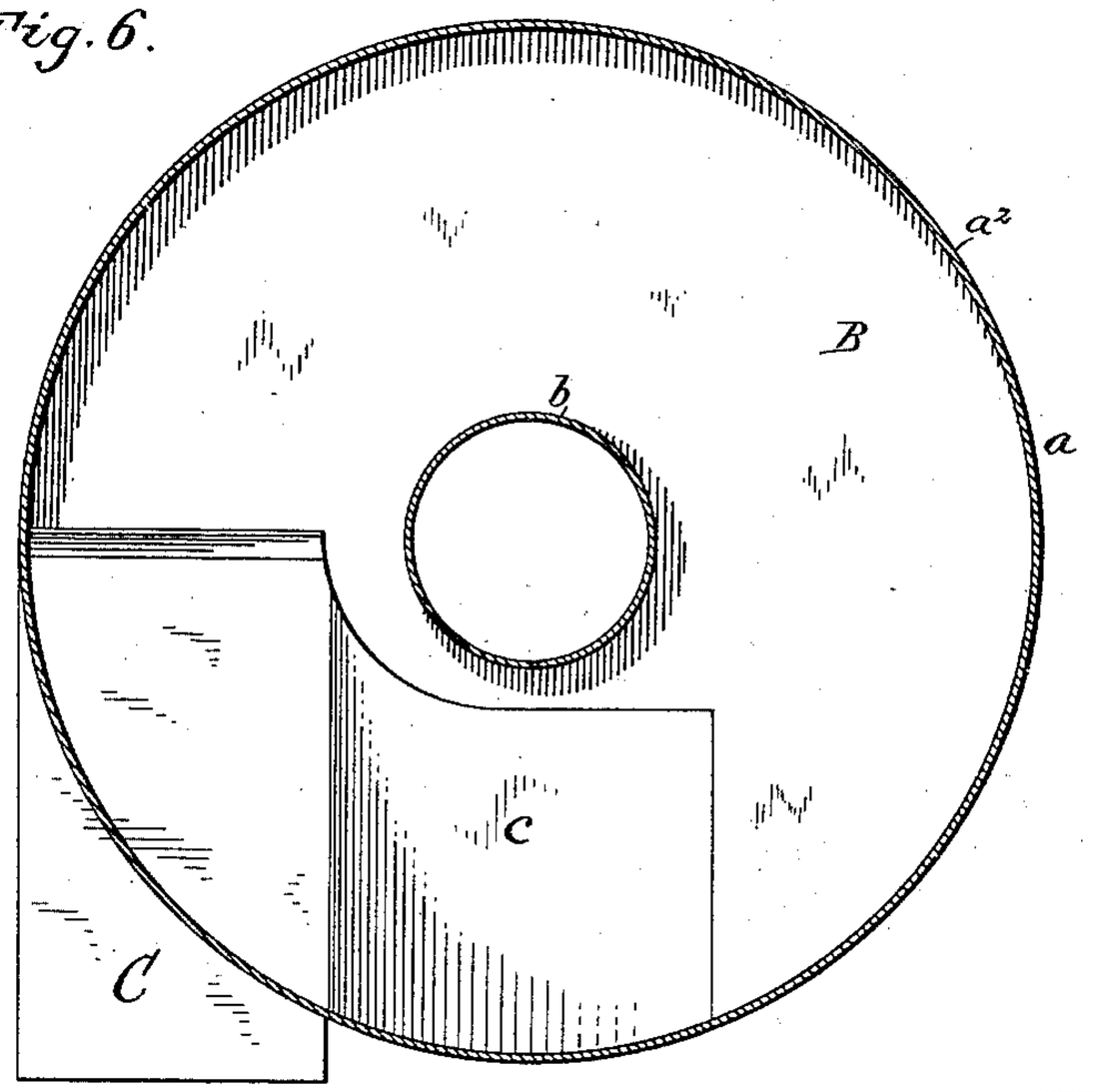


Fig. 7.

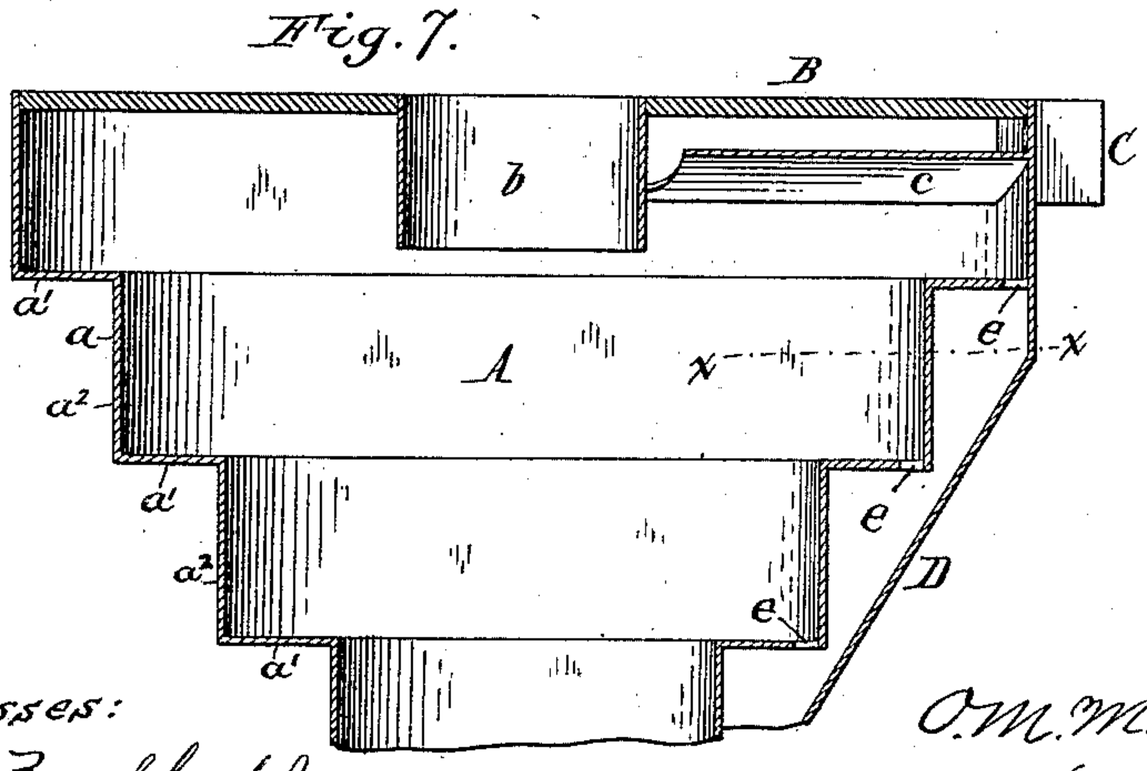
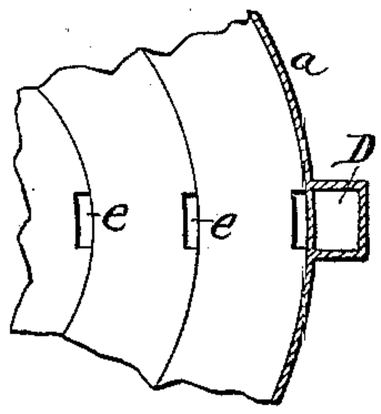


Fig. 8.



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(No Model.) 3 Sheets—Sheet 3.

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DUST COLLECTOR.

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Fig. 9.

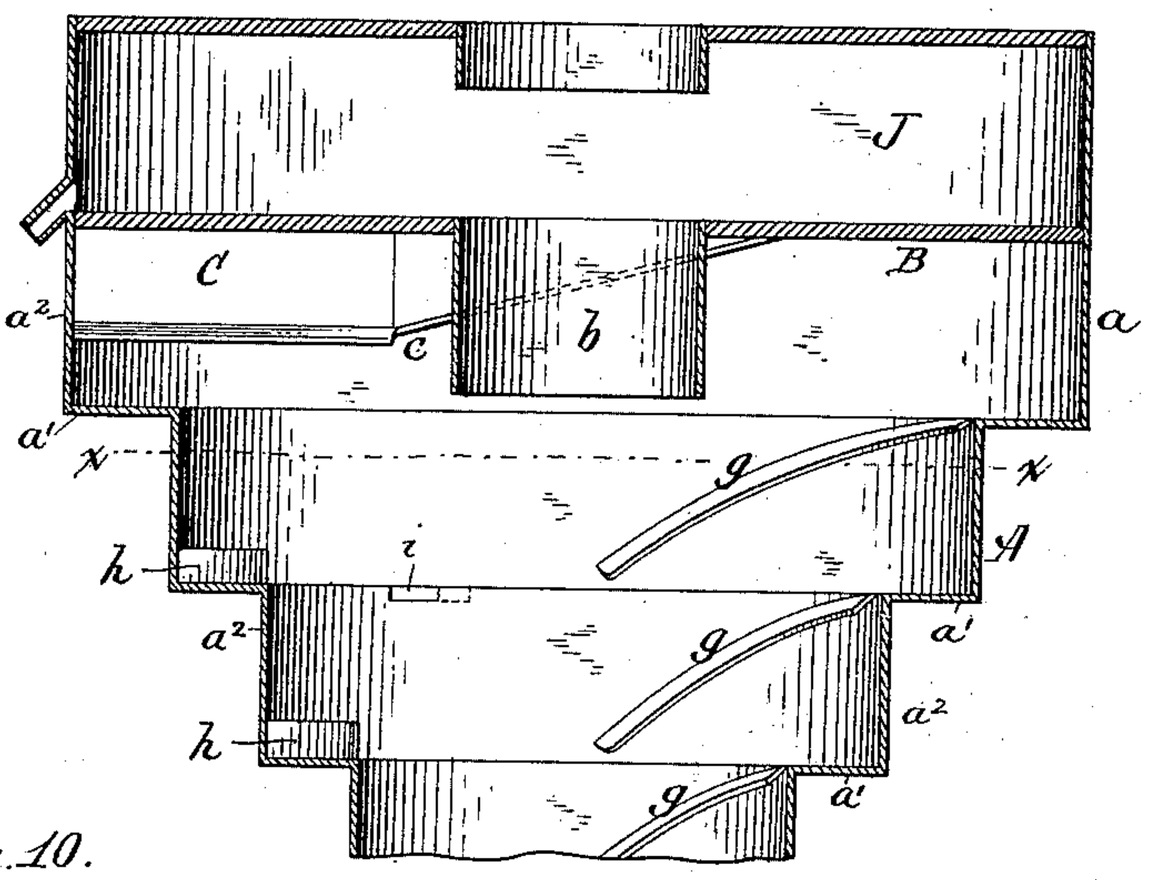


Fig. 10.

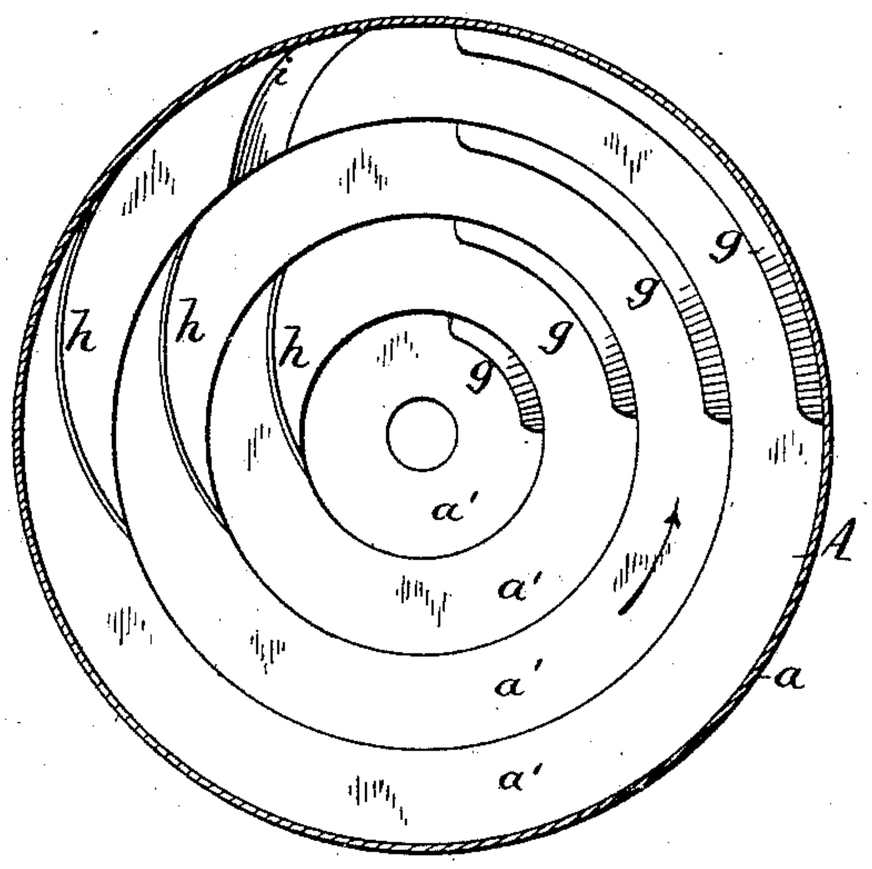
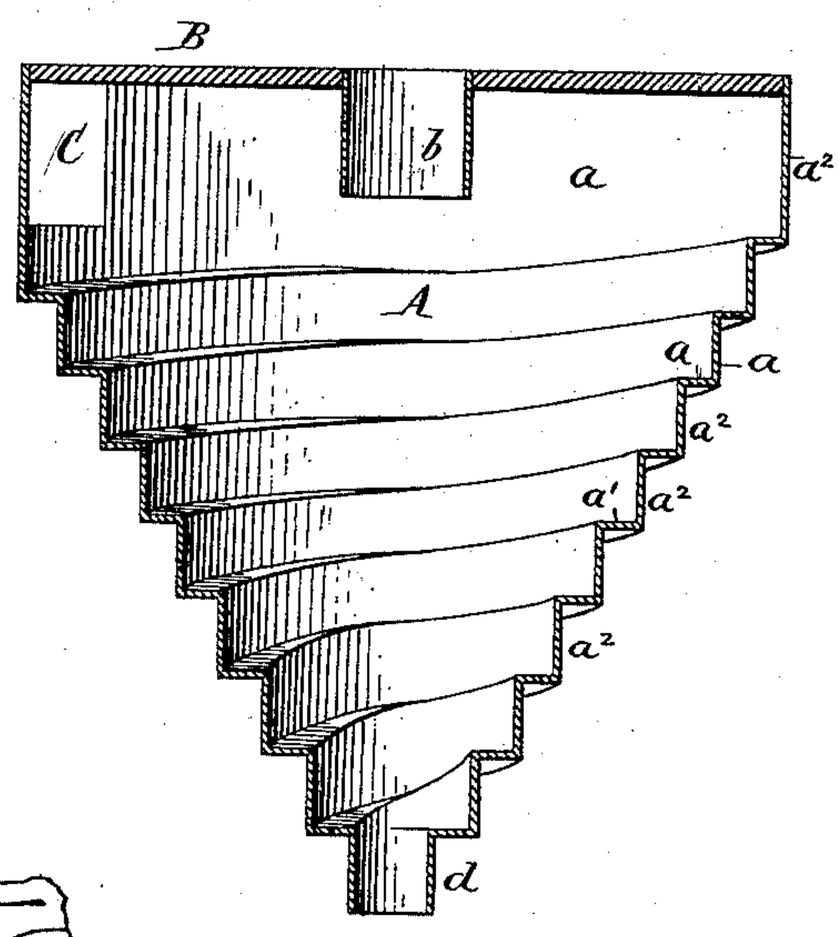


Fig. 11.



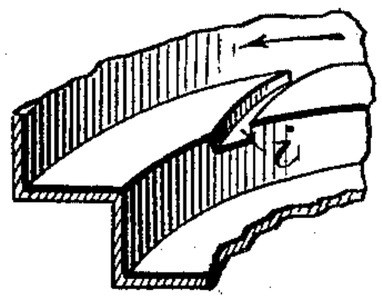


Fig. 12.

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UNITED STATES PATENT OFFICE.

ORVILLE M. MORSE, OF JACKSON, MICHIGAN, ASSIGNOR TO THE KNICKERBOCKER COMPANY, OF SAME PLACE.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 409,482, dated August 20, 1889.

Application filed April 12, 1888. Serial No. 270,414. (No model.)

To all whom it may concern:

Be it known that I, ORVILLE M. MORSE, of 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 that class of dust-collectors which contain a separating-chamber in which the dust-laden air is caused to assume a whirling motion, whereby the solid particles are driven against the peripheral wall of the separating-chamber.

The object of my invention is to simplify the construction and to improve the operation of this class of machines.

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

In the accompanying drawings, consisting of three sheets, Figure 1 is a sectional elevation of my improved dust-collector. Fig. 2 is a horizontal section of the same. Fig. 3 is a perspective view of the same. Fig. 4 is a similar view showing a slightly modified construction of the dust-conduit. Fig. 5 is a vertical section of the upper portion of the dust-collector at right angles to Fig. 1. Fig. 6 is a horizontal section in line $x\,x$, Fig. 5, looking upward. Fig. 7 is a vertical section of the upper portion of the dust-collector, showing another modified construction of the recessed dust-conduit. Fig. 8 is a fragmentary horizontal section in line $x\,x$, Fig. 7. Fig. 9 is a vertical section of the upper portion of the dust-collector, showing modified means for conducting the dust from one shelf to the other. Fig. 10 is a horizontal section in line $x\,x$, Fig. 9. Fig. 11 is a sectional elevation showing a modified construction of the dust-collector. Fig. 12 is a fragmentary internal perspective view of the separating-chamber, showing one of the oblique recessed passages formed in one of the shelves.

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

A represents the separating case or chamber of the dust-collector provided with a peripheral wall a, which is composed of a series of annular shelves a', connected by cylindrical bands a^2. The shelves a' and cylindrical bands a^2 are made of gradually-decreasing diameter from the air-inlet toward the opposite end of the separating-chamber.

B represents the head, which is applied to the large end of the separating-chamber and provided with a central opening having a tubular guard b, which projects into the separating-chamber, and through which the purified air escapes from the separating-chamber.

C represents the inlet-spout for the dust-laden air, connected with the large end of the separating-chamber, which latter it enters tangentially through an opening formed in the largest cylindrical band a^2.

c represents an inclined deflecting-plate extending from the under side of the head B to the under side of the air-inlet spout C, as represented in Figs. 5 and 6, whereby the air-current is directed below the air-inlet spout C when it has completed one revolution, and interference of the whirling body of air with the newly-entering air is avoided.

The dust-laden air-current entering the separating-chamber through the tangential inlet-spout assumes a violent whirling motion in the separating-chamber, whereby the solid particles are quickly driven against the peripheral wall of the separating-chamber, which wall is composed of alternate cylindrical bands and shelves of gradually-decreasing diameter. As the cylindrical bands have their inner surfaces arranged parallel with the axis of rotation, the effect of centrifugal force upon the bulky solid particles is simply to drive them against the inner surface of the bands, on which they are gradually carried toward the small end of the separating-chamber by the air-current moving spirally from the large toward the small end of the separating-chamber. This avoids the conflict of the large bulky particles with the very fine particles, which tend to move in opposite directions when driven by centrifugal force against a conical or tapering peripheral wall.

For the purpose of removing the separated solid particles from the separating-chamber various devices may be employed; but I prefer for this purpose a recessed or depressed conduit D, as represented in Figs. 1, 2, and 3, which extends from the large to the small end of the separating-chamber and discharges the dust through a tube d at the small end of

the separating-chamber, where it is provided with a slide d', by which the volume of air which escapes with the dust can be regulated. This recessed conduit projects outwardly beyond the cylindrical bands a^2, and opens inwardly through the latter and through the annular shelves a', so that the solid particles as they are swept around by the whirling body of air are forced into this recessed conduit, in which they are practically removed from the influence of the whirling body of air. By this means the solid particles which are massed against the cylindrical bands a^2 of largest diameter are discharged from the latter directly into the recessed conduit, and do not pass upon the next smaller cylindrical band, whereby the separating capacity of the machine is increased as the batch of solid matter separated by each band is immediately removed.

Instead of constructing the recessed passage D so as to open inwardly through the annular shelves and cylindrical bands, as represented in Figs. 1, 2, and 3, it may be placed in communication with the interior of the separating-chamber by openings *e*, formed in the shelves, as represented in Figs. 7 and 8. A recessed dust-conduit is preferable, because it offers no resistance to the whirling body of air, thereby reducing the back-pressure upon the fan, by which the dust-laden air-current is driven into the separating-chamber. If this immediate delivery of the separated solid matter is not desired, the solid matter may be discharged from each annular shelf upon the next following smaller shelf by recessed conduits *f*, as represented in Fig. 4, or by means of spiral flanges *g*, applied to the inner sides of the cylindrical bands, or by spiral flanges *h*, applied to the upper sides of the annular shelves, or by recesses or grooves *i*, formed in the shelves, as represented in Figs. 9, 10, and 12. These recesses or grooves are arranged in the shelves obliquely or inwardly curved across the line of movement of the whirling air-current, so that their farther wall deflects the solid particles inwardly or toward the axis of the separating-chamber. A similar effect may be produced by constructing the shelves and bands in helical form, as represented in Fig. 11.

If desired, the head B at the large end of the separating-case may be surmounted by a supplementary separating-chamber J, through which the escaping purified air passes and which intercepts any small solid particles which may be contained in the escaping air-current.

The separating-case of my improved dust-collector is constructed more easily and with less waste of material than a tapering case, as it is composed of straight cylindrical bands and annular shelves, which latter can be formed by concentric cuts out of a single disk.

My improved dust-collector is applicable to the separation of solid particles from air in various industrial establishments—for instance, flouring-mills, planing-mills and other wood-working factories, grain store-houses, &c.

I do not wish to claim in this application the recessed dust-conduit, broadly as it is claimed in another application filed by me April 12, 1888, Serial No. 270,415.

I claim as my invention—

1. A dust-collector having the peripheral wall of its separating-chamber composed of inwardly-projecting shelving portions alternating in the longitudinal direction of the separating-chamber, with connecting portions arranged parallel with the axis of the chamber, substantially as set forth.

2. A dust-collector having the peripheral wall of its separating-chamber composed of a series of shelves of gradually-decreasing diameter, and cylindrical bands connecting said shelves, substantially as set forth.

3. A dust-collector consisting of a separating-chamber having its peripheral wall composed of a series of annular shelves of gradually-decreasing diameter connected by cylindrical bands, an inlet-spout for the dust-laden air entering the large end of the separating-chamber, a dust-discharge, and a discharge for the purified air, substantially as set forth.

4. The combination, with the separating-chamber having its peripheral wall composed of a series of annular shelves of gradually-decreasing diameter and connecting cylindrical bands, of a recessed dust-conduit arranged on the side of the separating-chamber, substantially as set forth.

5. The combination, with the separating-chamber having its peripheral wall composed of a series of annular shelves of gradually-decreasing diameter and connecting cylindrical bands, an inlet-spout for the dust-laden air entering the large end of the separating-chamber, and a dust-discharge at the small end of the separating-chamber, of a recessed dust-conduit extending on the side of the separating-chamber from the large end thereof to the dust-discharge and communicating with the interior of the separating-chamber, substantially as set forth.

Witness my hand this 6th day of April, 1888.

ORVILLE M. MORSE.

Witnesses:
SAM. H. CAMP,
C. H. BENNETT.