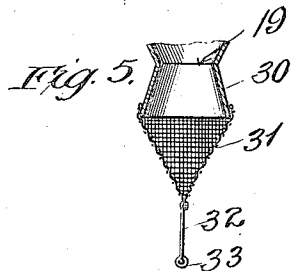
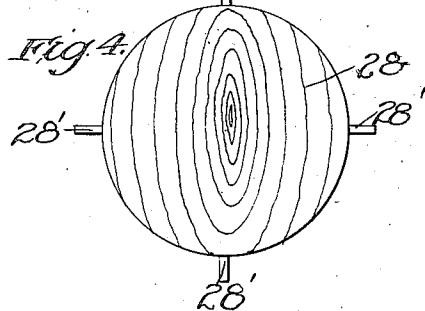
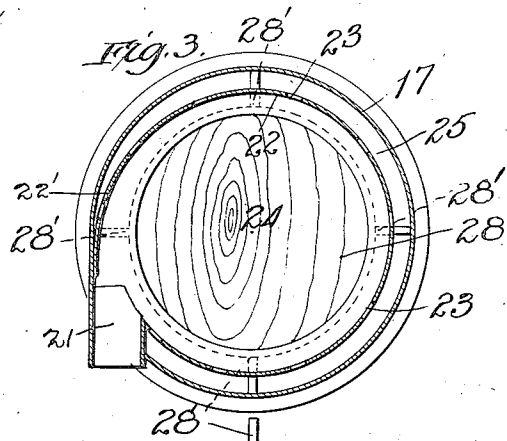
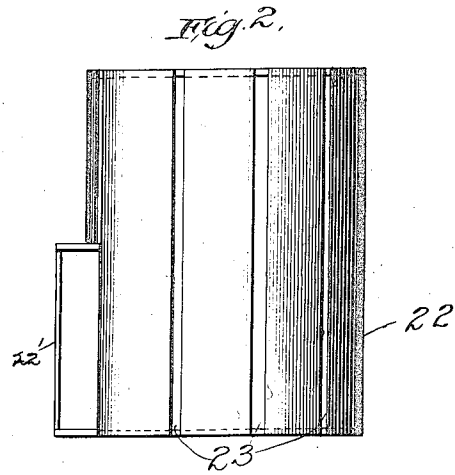
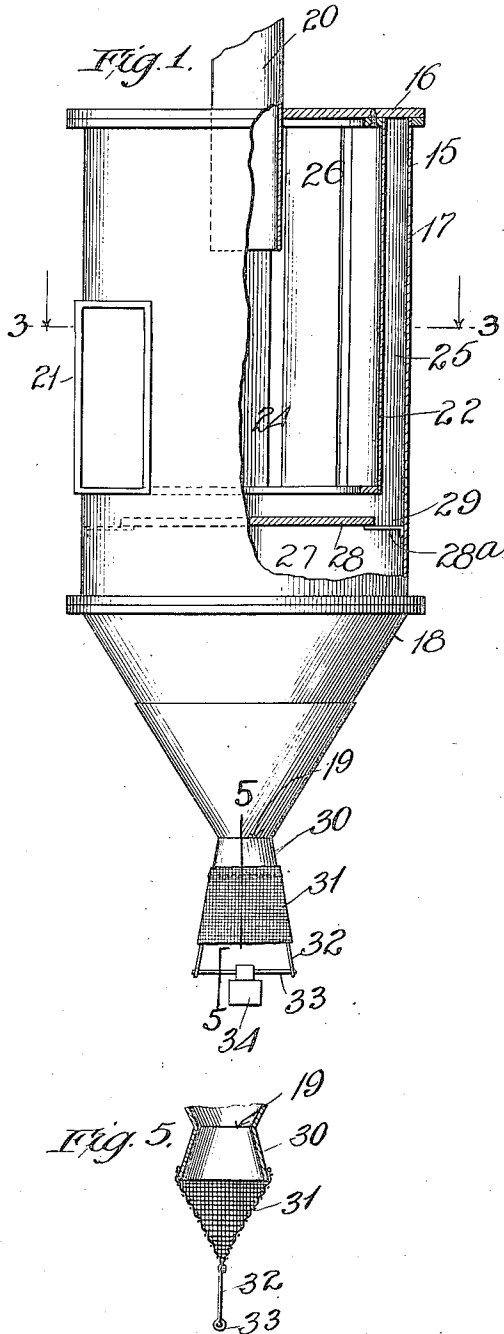


O. M. MORSE, DEC'D.
S. G. MORSE, SPECIAL ADMINISTRATRIX.
DUST COLLECTOR OR SEPARATOR.
APPLICATION FILED SEPT. 30, 1907.

1,031,862.

Patented July 9, 1912.

3 SHEETS—SHEET 1.



Witnesses
Harry R. White
Ray White

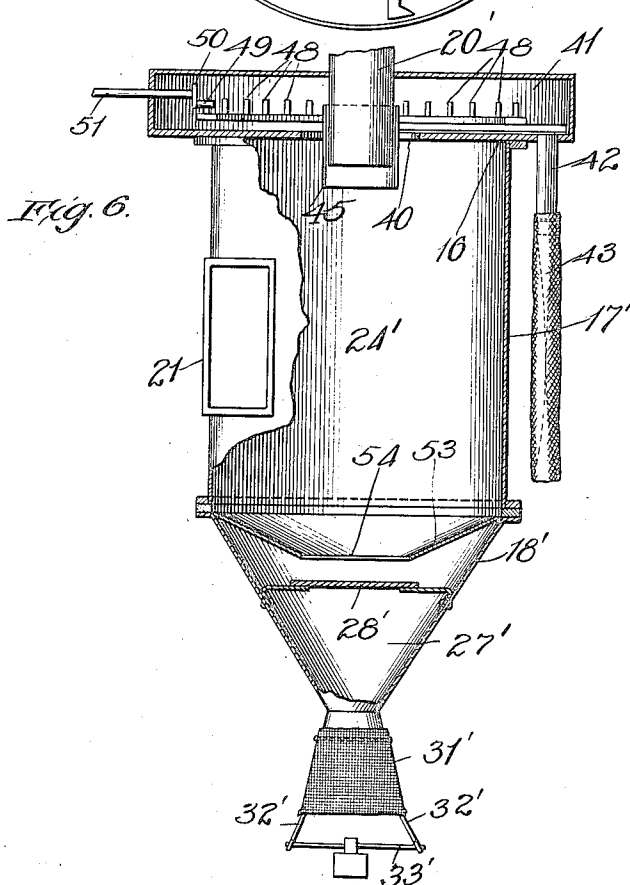
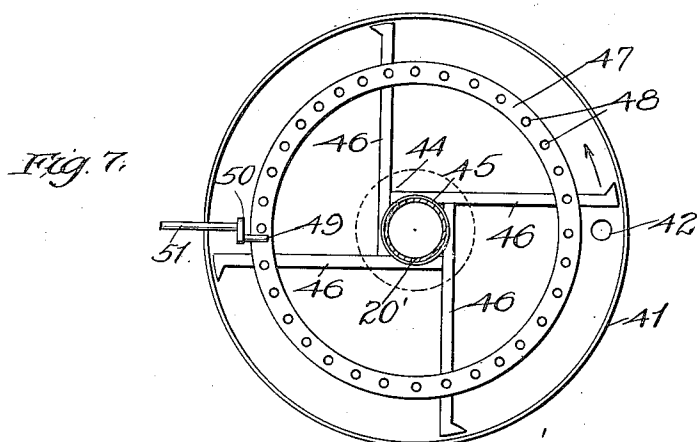
Inventor
Orville M. Morse
By Foreman & May

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3 SHEETS-SHEET 2.



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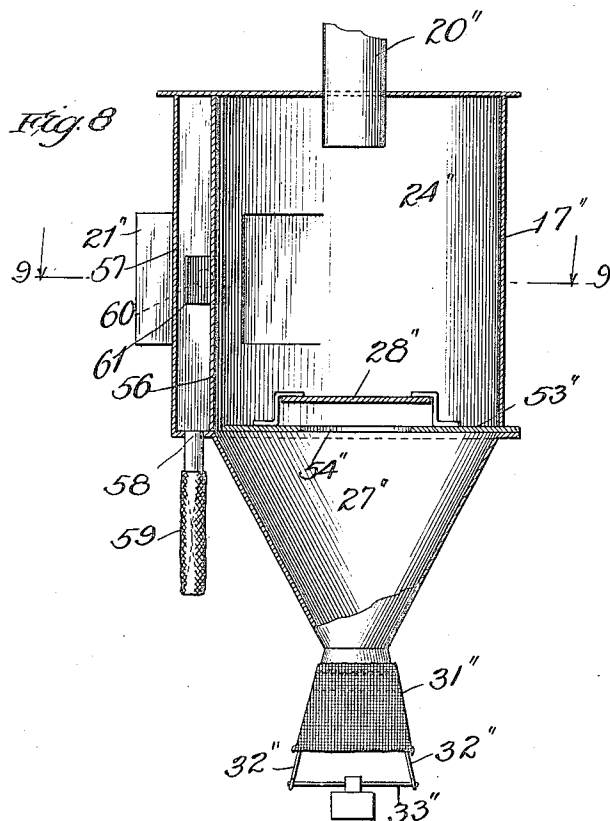
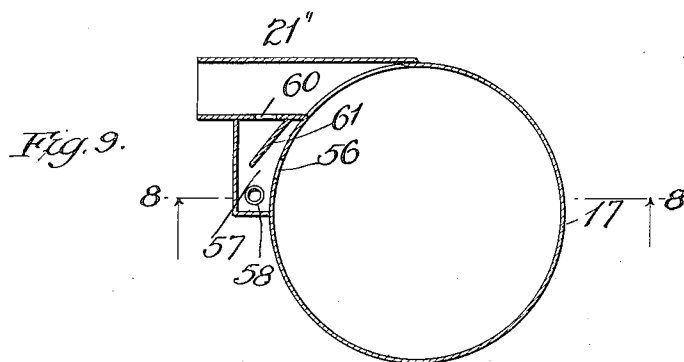
Inventor
Orville M. Morse
By Goree Bainbridge May

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3 SHEETS—SHEET 3.



Witnesses
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Ray White

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By Forster Bain & May
Attys

UNITED STATES PATENT OFFICE.

ORVILLE M. MORSE, OF JACKSON, MICHIGAN; SARAH G. MORSE SPECIAL ADMINISTRATRIX OF SAID ORVILLE M. MORSE, DECEASED.

DUST COLLECTOR OR SEPARATOR.

1,031,862.

Specification of Letters Patent.

Patented July 9, 1912.

Application filed September 30, 1907. Serial No. 395,125.

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 certain new and useful Improvements in Dust Collectors or Separators, of which the following is a specification.

My invention relates to improvements in dust collectors or separators, and more particularly to dust collectors or separators which operate in conjunction with an exhaust fan maintaining within such collector or separator a vacuum tendency or rarefied air condition.

One of the objects of my invention is to provide a machine of the character described, of upright construction, to occupy a relatively small amount of floor space.

A further object of my invention is to provide a construction whereby the rarefaction is substantially equalized in an area of the machine axially beyond the end of the air outlet opening or exhaust stack.

A still further object of my invention is to provide an improved trapping device for permitting the constant discharge of material from the material outlet without admitting air to the interior of the machine.

Other and further objects of my invention will become apparent to those skilled in the art from the following description taken in conjunction with the accompanying drawings, wherein;

Figure 1 is a side elevation of a machine embodying my invention; Fig. 2 is an elevation of the skimmer wall construction; Fig. 3 is a transverse section on line 3—3 of Fig. 1; Fig. 4 is a detail of the equalizing plate construction, and Fig. 5 is a section on line 5—5 showing the delivery trap construction; Fig. 6 is a section with parts in elevation of a modified construction embodying my invention, and Fig. 7 is a section on line 7—7 of Fig. 6. Fig. 8 is a central vertical section of another embodiment of my invention, and Fig. 9 is a horizontal section on line 9—9 of Fig. 8.

Throughout the several views like numerals of reference refer always to like parts.

In the various embodiments of my invention I provide a casing, preferably of

upright construction, involving preferably a cylindrical, or nearly-cylindrical top and a conoidal bottom portion, provided in its top with a central air outlet for connection through suitable piping with an exhaust fan, and provided further with a tangential and preferably peripheral inlet, so that the exhaust fan acts to draw air in whirl or rotation through the casing, wherein is provided, without the path of travel of the flowing air a rarefied air chamber opening endwise to the whirl for the reception of the reclaimable material escaping from the air stream, such rarefied area communicating with an outlet through which accumulating material may be trapped, and such area being preferably partially separated from the whirl area proper by an equalizing member or plate, operating to prevent undue rarefaction in that portion of the dust collecting area aforesaid alining with the outlet opening.

In the drawings, referring particularly to Figs. 1 to 5, 15 indicates in general a casing, comprising a deck 16, a generally cylindrical upper section 17 and a conoidal material receiving section 18 therebelow, provided with a material outlet 19.

20 indicates the outlet pipe or stack opening through the deck 16 endwise of the casing, preferably at the center of the deck, and preferably projecting axially somewhat below the deck 16.

21 indicates the inlet, preferably arranged at a level below the end of the outlet, or exhaust stack 20, and opening in a generally tangential direction to the interior of the casing.

22 indicates a perforated interior wall detachably secured to the deck 16 for ready renewal, and extending preferably from the deck downward to or below the bottom of the inlet 21, separated somewhat from and concentric with the casing wall 17, at its upper end, and having in its lower end an opening to the inlet formed by a deflection of a part of the wall 22' into an eccentric or scroll-like curve contacting with the peripheral wall 17 at its point of juncture with the outer wall of the tangential inlet 21, such eccentric portion being closed at top and bottom. Thus the inlet 21 vents into the area within the perforate wall 22.

Through the wall 22 are made openings 23, preferably extending vertically throughout the entire extent of the wall and arranged at suitable intervals, said openings affording communication between the central area within the wall 22, indicated generally as 24 and the area 25 intermediate wall 22 and the casing wall 17. It will thus be seen that when the machine is in operation and a suitable exhaust fan is exhausting air through stack 21 the dust laden material entering at the inlet 21 flows in a narrowing whirl within the area 24, to the outlet stack 20, excluding from the path of air flow the area 26 above the lower end of air outlet 20, the area 25 and the area 27 below the inlet 21. In these areas the air content is rarefied provided the fan be suitably proportioned to the machine, and the outlet 19 is constantly closed by suitable trapping devices such as those hereafter described.

I preferably further provide in the machine, between the dust-discharge hopper 18 and the whirl area 24, plate 28, which I arbitrarily term an equalizing plate, arranged transversely to the axis of exhaust stack 20 and arranged with respect to its surrounding parts to leave a peripheral space 29 for the passage of material.

For trapping material from the outlet 19 substantially without admitting air, I provide below the outlet 19 a slightly flaring spout 30, having secured to its lower edge throughout its entire periphery a flexible air tight tube 31 preferably of fabric, having secured to diametrically opposite points at its lower edge wire links 32, normally stretched apart or separated to such an extent as to flatten the mouth of the tube 31 into a straight line, as by means of a spreader 33 carried by the lower ends of links 32 provided with a weight 34. I have found in practice that such construction affords a very effective, constantly operating trap for powdered material such as flour dust.

In practical operation, it is my belief, the heavy particles of material having the greatest specific gravity are centrifugally expelled from the air current and passing through the apertures 25 in the wall 22 drop down through the space 29 surrounding the equalizing plate 28 into the delivery hopper 18. Lighter dust particles, it is my belief, which have not sufficient momentum by reason of their low specific gravity to overcome at once the draft of the air current, escape from such air current into the rarefied areas in the machine, particularly the areas 26 and 27, the dust entering area 26 finding its way out through openings 23 into the peripheral area 25, and thence downward into the dust hopper 18. I have found that if the casing is open from the dust outlet to the air outlet, the rarefaction adjacent the dust outlet

is too extreme for best practice, and causes the dust to collect at the outlet and tend to bridge. The plate 28 causes more equal distribution of the rarefaction and overcomes such difficulty.

In the embodiment of my invention shown in Figs. 6 and 7 the relative arrangement of the portions 17' and 18' of the casing, and the inlet 21' may be substantially the same as in Fig. 1, but through the deck 16' surrounding outlet stack 20' I provide an orifice 40 communicating with the chamber 41 superimposed upon the deck and preferably extending laterally beyond the limits of the cylindrical portion 16, of the casing. In the overhanging part of the chamber I provide a dust-outlet spout 42 having connected to its periphery adjacent its bottom a flexible fabric member 43 forming an automatic trap. Within the casing 41 I provide a sweep construction 44, comprising a sheet metal hub 45 and a series of diverging arms 46 arranged when rotated in the direction of the arrow of Fig. 7 to sweep dust particles outward to the dust-outlet 42. For driving the sweep construction 44 in rotation I provide an annular ring 47, mounted upon the arms 46, and having projecting pins 48 for coaction with a finger 49 eccentrically mounted on a head 50 carried by a shaft 51 projecting to the exterior of the casing and arranged to be suitably driven. Obviously each rotation of shaft 51 moves the sweep structure forward the distance of one tooth. In this form of construction the interior of the cylindrical portion 17 of the casing may, if desired, be substantially free, and between the free chamber 24' within such cylindrical part of the casing, and the chamber member 27' within the conoidal lower section of the casing, I provide a downwardly tapering apron 53, having a central opening 54 aligning with the outlet opening 20, there being provided below and in register with the opening 54 an equalizing plate 28' suitably supported from the wall of the casing. The dust outlet from the base of the conoidal section 18, is preferably provided with a fabric trap of the character heretofore described.

In operation it will be understood that when an exhaust fan is connected with the stack 20' to draw air therethrough, the dust laden air entering the casing sets up a narrowing whirl within the unobstructed area 24', the heavy dust particles being thrown centrifugally against the casing wall 17' and finding the way down over the inclined apron 53 and laterally down through the opening between the lower edge of the apron 53 and the plate 28', into the rarefied area 27' and thence being trapped out of the dust outlet in a manner heretofore described. Other light dust particles tending to be carried by the draft into the outlet sack 20' 130

escapes through the annular opening 40' surrounding the outlet stack into the chamber 41, wherein rarefaction is maintained, and the dust accumulating in said chamber 41, which will invariably be of a light quality is swept outward by the arms 46 to pass through the throat 42, and to be trapped out through the fabric trap 43 in a manner well understood in the art.

In the embodiment of my invention shown in Figs. 8 and 9, the casing is generally of the character shown in Fig. 6, but between the area 24'' within the cylindrical section and the area 27'' within the conoidal base of the casing is provided a generally horizontal apron 53'' having therein a central opening 54'' preferably overlain by an equalizing plate 28'' suitably supported thereabove out of contact therewith. At a suitable point in the casing wall, preferably adjacent the heel of the inlet 21'' is provided a longitudinal slot 56 opening into a small vertical chamber 57 having at its bottom an outlet 58 normally maintained closed against the ingress of air by a suitable trap 59. In order that the air within the collection chamber 57 may be rarefied, I provide an opening 60 between said chamber and the inlet 21'' and to prevent the escape of dust through said inlet I provide a guard 61 disposed between the orifice 60 and the peripheral opening 56 of the casing wall. In the operation of this construction of machine embodying my invention it will be understood that when a suction fan is applied to the outlet stack 22 the air whirls from the inlet 21 to the outlet 22 and a condition of rarefaction is set up in the interior of the casing outside of the path of air flow. The heavier dust particles are thrown out tangentially and against the casing wall and escape through the skimmer opening 56 into the dust chamber 57. Lighter dust particles seeking the area of least pressure find their way through the lateral opening between the equalizing plate 28'' and the apron 53'' into the area 27'', and is trapped out in the manner heretofore described.

It will thus be seen that the constructions all provide for the collection of both fine and heavy dust, the forms shown in Figs. 6 to 9 also making provision for maintaining a separation of the dust into two grades of different qualities.

While I have herein described in some detail several specific embodiments of my invention, it will be understood that I do not intend to limit my invention in its broader aspect to one or all of such particular constructions, as the various modifications are shown as illustrative of the fact that the embodiment of my invention is not limited in narrow bounds of construction, and that widely various constructions may be employed to embody the gist of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent of the United States is:

1. In a machine of the character described, a casing providing an exhaust outlet, a tangential inlet to the casing located suitably to exclude from the air whirl path between said inlet and the exhaust outlet areas of the casing wherein a rarefied air condition may be maintained by the exhaustion of air through the outlet, and a dust outlet from such area of rarefaction alining with the air outlet, an equalizing device interposed in alinement between the dust and air outlets, and means for trapping dust through said dust outlet substantially without admitting air.

2. In a machine of the character described, an upright casing having an air axial exhaust outlet in the top thereof for connection with an exhausting means, an axial dust outlet in its bottom, a tangential inlet thereto for air and material positioned remote from the dust outlet, whereby said bottom end of the casing is excluded from the path of the air current for rarefaction of its air-content, a trapping means for permitting escape of dust from said dust outlet substantially without admitting air; and a plate interposed in alinement between said dust outlet and the air outlet for equalizing pressure in the rarefied area adjacent said dust outlet.

3. In a machine of the character described, a casing, an axial air outlet therefrom for connection with an exhaust means, a tangential inlet thereto for air and material, positioned remote from the end of the casing opposite said outlet, whereby said end of the casing is excluded from the path of air current for rarefaction of its air content, an axial dust outlet from said area for rarefaction, a trapping means permitting escape of dust from said outlet substantially without admitting air, and a plate interposed transversely across the direct line between the dust outlet and the air outlet.

4. In a machine of the character described, a vertical casing having a tapering base, an air and material inlet above the base, an exhaust air outlet in the top, a dust outlet in the smaller end of the base, means associated with said dust outlet for trapping material therefrom substantially without admitting air, and a transverse plate interposed between the dust outlet and air outlet.

5. In a machine of the character described a vertical casing comprising a cylindrical upper portion and a tapering base, having an air-and-materials inlet above the base and an exhaust air outlet in its top and a dust outlet in the bottom of the base, means associated with said dust outlet for trapping material therefrom substantially without admitting air, and an interior apertured

5 wall local to the cylindrical portion of the casing through which the inlet opens dividing the upper portion of the casing into a central area for the passage of air from the inlet to the outlet, and a peripheral area for rarefaction by exhaustion of air through the outlet, said peripheral area communicating directly with the tapering base for delivery of material thereto.

10 6. In a machine of the character described, a vertical casing comprising a cylindrical upper portion and a tapering base, having an air and materials inlet above the base, an exhaust air outlet in the top, and a

15 dust outlet in the bottom of the base, means associated with the said dust outlet for trapping material therefrom substantially without admitting air, an interior, apertured wall through which the inlet opens dividing

20 the upper portion of the casing into a central area for the passage of air from the inlet to the outlet, and a peripheral area for rarefaction by exhaustion of air through the outlet, said central area being open at its

bottom, and a transverse plate, underlying substantially the entire central area, spaced apart vertically from the interior wall and laterally from the casing, to leave the base in direct vertical communication with the peripheral area of the top portion.

30 7. In a machine of the character described, a casing, an air outlet therefrom for connection with an exhaust means, a tangential inlet, a dust outlet, and an interior, apertured wall, dividing the casing into a central area for passage of air to the outlet, and a peripheral area for rarefaction by exhaustion of air from the casing, said wall being arranged to receive within it air and material from the tangential inlet, and said

40 wall being removably positioned in the casing for ready renewal.

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

ORVILLE M. MORSE.

In the presence of—

WILLIAM B. KNICKERBOCKER,
JOHN L. BENTLEY.