No. 798,437. PATENTED AUG. 29, 1905.

O. M. MORSE.

DUST COLLECTOR.

APPLICATION FILED MAY 16, 1904.

Fig. 1

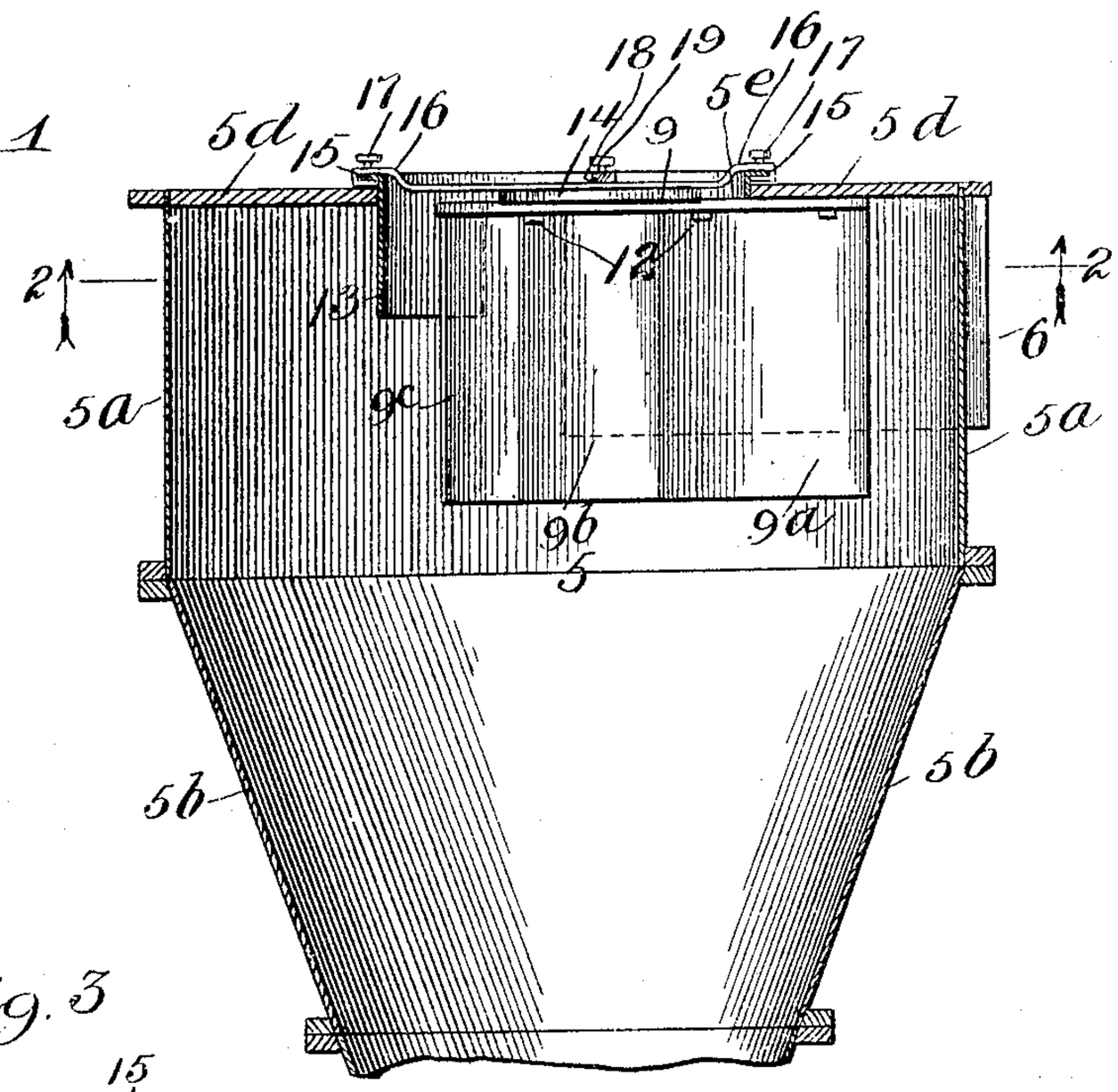
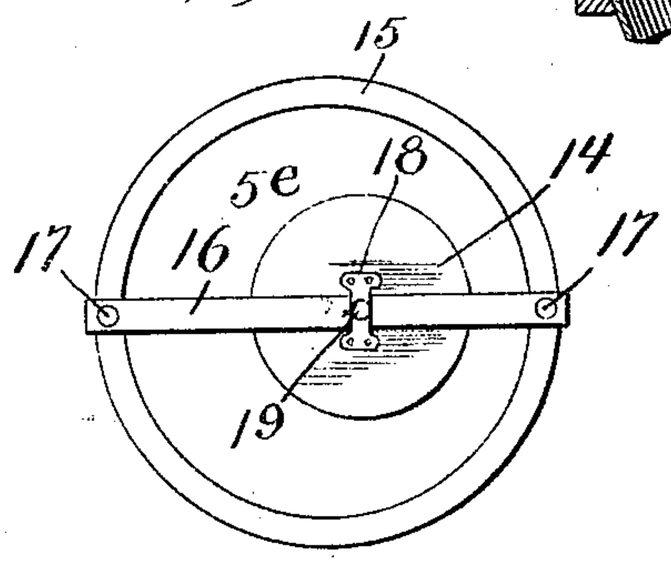


Fig. 3



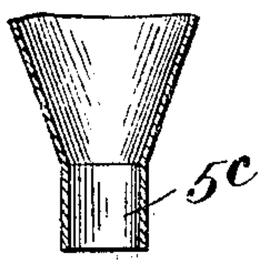
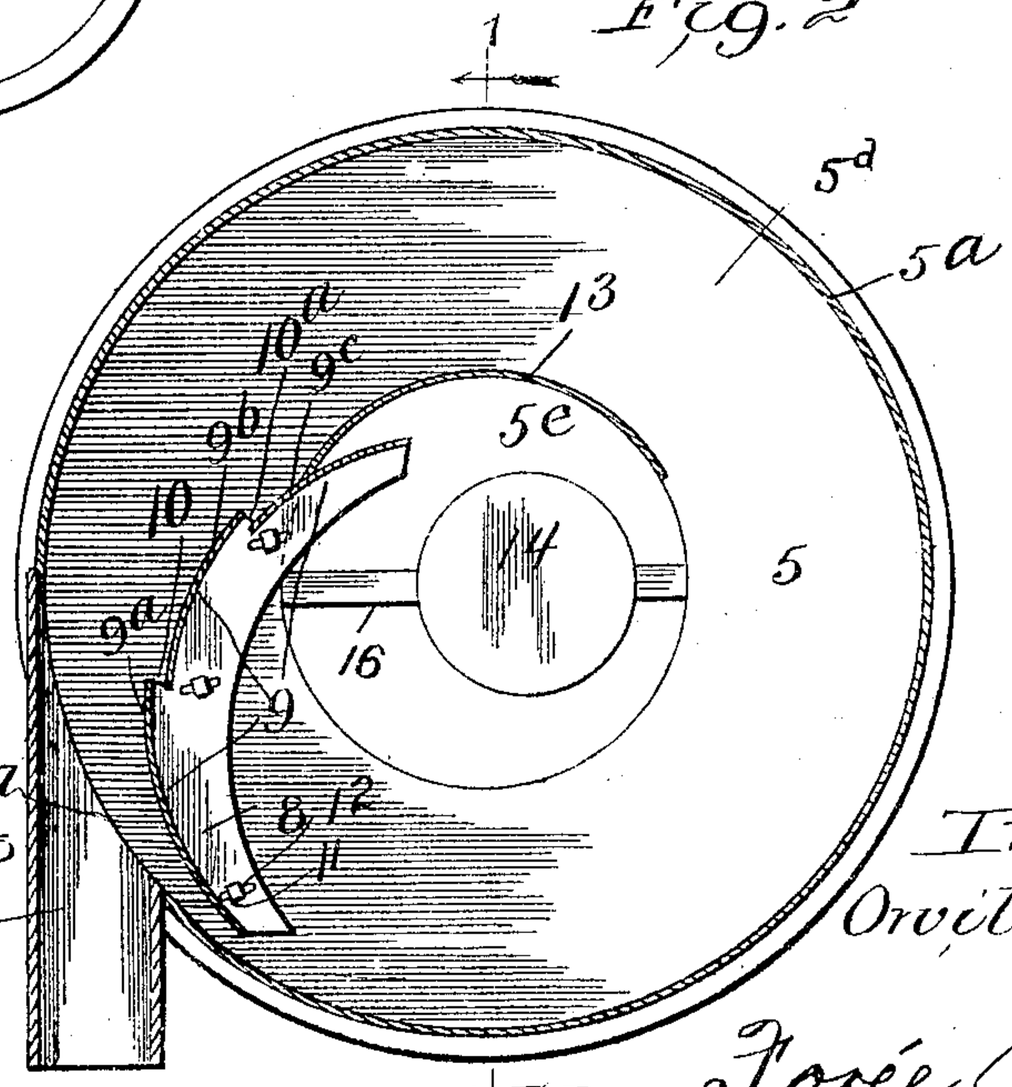


Fig. 2



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UNITED STATES PATENT OFFICE.

ORVILLE M. MORSE, OF JACKSON, MICHIGAN.

DUST-COLLECTOR.

No. 798,437. Specification of Letters Patent. Patented Aug. 29, 1905.

Application filed May 16, 1904. Serial No. 208,068

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 certain new and useful Improvements in Dust-Collectors; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to dust-collectors, and more particularly to "centrifugal" dust-collectors, wherein the dust-laden air is caused to rotate or whirl for the purpose of massing the dust, as the result of centrifugal action, in a portion of the machine from which the air eventually escapes.

Among the salient objects of my invention are to provide a dust-collector of the character described wherein the dust separation is economically and effectively accomplished, to provide means for regulating the escape of air and dust through the air and dust outlets, and to generally improve the construction and operation of centrifugal dust-collectors.

With a view to attaining these and other ends my invention consists in the features of construction and combinations of parts hereinafter claimed; but it may be here pointed out that my invention contemplates the provision, in a centrifugal dust-collector, of means for sharply deflecting portions of the air at the level of said inlet from the circular course which it tends to take to the air-escape outlet. It further contemplates the arrangement of such deflecting means to deflect the air within a peripheral belt, the air in said belt being allowed to continue on its natural uninterrupted course, whereby the centrifugal pressure on said belt is reduced and the density thereof diminished, so that light dust particles may penetrate therethrough to the casing-wall to be carried with the coarser particles to the dust-outlet.

Further, my invention contemplates the provision of valves or passages through the deflecting agencies so arranged that dust carried in the deflected air-body may escape therethrough and so arranging the deflecting agencies relative to the tangential inlet that the incoming air-current serves to induce the passage of dust through said valve-openings and in the peripheral undeflected belt into the path of the incoming air.

My invention also contemplates the provision of a regulating device to operate in conjunction with the air-escape outlet, as hereinafter described, and other features and combinations, which will hereinafter become apparent.

In the drawings, Figure 1 is a vertical section on line 1 1 of Fig. 2. Fig. 2 is a horizontal section on line 2 2 of Fig. 1 looking in the direction of the arrows. Fig. 3 is a detail of the air-escape regulator.

Throughout the drawings like numerals of reference refer always to like parts.

In the drawings, 5 indicates generally a collector-casing, herein illustrated as comprising a cylindrical portion 5^a, a conical portion 5^b, terminating at its lower end in an axial dust-outlet spout 5^c, and a deck 5^d, covering the upper end of the cylindrical portion 5^a and provided with an air-outlet 5^e, preferably concentric with the axis. Other forms of collector-casing known in the art may obviously be employed in the practice of my invention, and I have adopted the standard form herein shown merely as illustrative of an operative embodiment thereof.

6 indicates a tangential inlet-spout preferably communicating with the collector-chamber at the top thereof near the periphery of the casing-section 5^a.

In the plane or at the level of the inlet-spout, preferably immediately in rear thereof with reference to the direction of circulation of the air, I provide one or more deflecting instrumentalities arranged to deflect air from within a peripheral belt to the air-outlet 5^e, the course of deflection making not more than a single circuit of the machine.

Specifically, 8 indicates a plate secured to the top of the casing, having depending therefrom a deflector instrumentality 9, preferably curved in plan and eccentrically arranged relative to the casing 5, so that it extends to some point adjacent to but out of contact with the casing part 5^a to and preferably into longitudinal alinement with the air-outlet 5^e. In the construction herein shown I have indicated the deflecting instrumentality 9 as composed of three sections 9^a, 9^b, and 9^c, eccentrically arranged relative to each other, so that the end of the deflector 9^a farthest removed from the casing 5^a lies in the rear (with reference to the direction of rotation of air in the casing) of the forward end of the next deflector 9^b, which in turn overlies the forward end of the innermost deflector 9^c. By this construction tangential openings 10 and 10^a are left between the several deflectors for a purpose to be hereinafter described. The

vertical extent of the deflector is preferably equal to or greater than the height of the inlet-spout 6, and its angular measurement with reference to the casing-axis should not exceed three hundred and sixty degrees. Preferably the deflecting agency is as short as is practically possible without presenting too abrupt an angle to the circular path which the air tends to take in the casing, so that it serves to deflect the air as sharply as proper practice will warrant. The deflector structure, or the various deflector members thereof, is preferably adjustable toward and from the peripheral wall of the casing. I have herein indicated the entire structure as being adjustable as a unit and to such end provide in the plate 8 slots 11, with which engage bolts 12, taking into the deck 5^d of the casing.

I also preferably employ in conjunction with my deflector structure an apron 13, which may be of less height or vertical extent than the deflectors and extends from a point where the deflector structure intersects the edge of the outlet around the periphery of said outlet for any suitable distance less than the whole circumference of the outlet.

I also preferably employ in conjunction with my machine a means for regulating and controlling the delivery of air to the air and dust outlet, which means I have also found controls the manner of delivering the dust through the outlet-spout. This means comprises, essentially, a governing-plate 14, preferably of circular or disk form, arranged to cover a portion of the air-outlet 5^e. The plate 14 is preferably universally adjustable within the plane of the outlet 5^e. To provide this adjustment, I mount upon the top of the casing a guide-ring 15, with which engages a strap 16, adapted to be secured with relation to the ring 15 by any suitable means, such as a set-screw 17, and mount the plate 14 upon the said strap 16 so it may be adjusted longitudinally of said strap, such attachment being preferably made of a clip 18, provided with a set-screw 19. It will be obvious that by rotarily adjusting the strap 16 and adjusting the plate 19 longitudinally thereof said plate may be centered over any area of the air-outlet 5^e.

In the operation of my machine the dust-laden air being continually forced by a fan or blower tangentially into the casing, at the top thereof, sets up a whirl in the casing, wherein the dust by centrifugal effect is thrown to and massed in the peripheral belt of the whirl. Normally (as evidenced by the action of the standard or most common form of centrifugal machine) the dust-laden air tends to take a spiral downward path in the casing to some point where the pressure of the incoming air overcomes the resistance of centrifugal effect, where said air will travel inward toward the axis of the casing and thence upward through the axial outlet, the dust (or a major portion thereof) continuing in its travel down the casing-walls to the point of escape. In my improved machine, however, when the material has about completed its first circuit of the casing the portion of the rotating air body between the axis of the casing and a peripheral belt (in which belt most of the dust is massed) is interrupted by the deflector structure 9 and turned toward the air-outlet 5^e. Any dust particles in the air thus deflected by reason of their greater persistence of motion than the air follow closely the walls of the deflector and escape through the tangential valve-openings 10 and 10^a back into the incoming current. The escape of dust through the valve-openings and along the peripheral wall is aided by the action of the incoming air, which induces a draft tending to draw material through such openings. The peripheral belt, containing the major portion of the dust which escapes the deflector structure 9, continues unobstructed in its natural course. It will thus be seen that the deflector instrumentalities serve to skim or deflect the purified air away from the dust-laden peripheral belt and turn the said air toward and guide it to the axial air-outlet in less than a single turn about the axis of the casing, so that pressure within the casing is relieved and the momentum of the air body is utilized to propel it to its point of escape. This I have found prevents the massing of the air in the dust-laden belt or reduces the density thereof, permitting the particles of small specific gravity to reach the dust-laden belt within the plane of the deflector, where they will then remain and pass out with other dust particles of greater specific gravity at the dust-outlet.

While the machine is operative without the apron 13, I find that its provision prevents the undue escape of air through the dust-outlet 5^c, and therefore prefer to employ the same. I also find that by providing the plate 14 of less area than the outlet-aperture and manipulating said plate to vary the shape of the area left unobstructed thereby I am enabled to regulate or control to a great extent the air-escape through the air-outlet 5^e and the dust-outlet 5^c. The proper regulation of air-escape at the dust-outlet 5^c is important in machines of this character and probably controls to a large extent the manner of delivery of the dust. It is my opinion that the most perfect delivery of the dust is attained when there is little or no air-escape at the outlet 5^c and no counter-current entering through said spout, the dust traveling outward with an uninterrupted slow spiral motion. This condition I find that I can obtain by proper adjustment of the disk 14, and in Fig. 2 I have illustrated approximately a position which I find to be highly satisfactory in the operation of the machine.

While I have herein described one opera-

tive form of my invention the specific construction of which I believe to be new and advantageous and may claim, I do not desire to be understood as limiting the broad features of my invention to the specific structure illustratively shown, as it is apparent that numerous changes might be made therein without departing from the spirit and scope of my invention.

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

1. In a dust-collector, a casing wherein the dust-laden air whirls, having an inlet for the dust-laden air and an air-outlet, in combination with a deflector extending from a point within the casing out of contact with the wall thereof to the air-outlet and making not more than a single turn about the axis of the casing, said deflector being arranged with its outer end in a path of the air in its first circuit of the casing.

2. In a dust-collector, in combination with a casing wherein the dust-laden air whirls, having an inlet for the dust-laden air, and an air-outlet, of means in substantially the plane with the inlet for deflecting air sharply from within a peripheral belt to the air-outlet.

3. In a dust-collector, the combination with a casing wherein the dust-laden air whirls, having an inlet for the dust-laden air, and an air-outlet, of a deflecting instrumentality in the plane of the inlet extending from a point adjacent the casing-wall to the air-outlet, and making less than a turn about the outlet.

4. In a dust-collector, a casing wherein the dust whirls having a tangential inlet for the dust-laden air, and an axial air-outlet, in combination with a deflecting instrumentality in the path of the air in its initial circuit arranged to deflect portions of the air within a peripheral belt to the air-outlet, said deflecting instrumentality having an angular measurement of not more than three hundred and sixty degrees relative to the axis of the casing and being provided with tangential dust-valve openings.

5. In a dust-collector, a casing wherein the dust-laden air whirls, having a peripheral tangential inlet for the dust-laden air, and an axial air-outlet, in combination with a deflecting instrumentality intersecting the path of initial circuit of the air, and extending to the air-outlet and adjustable to vary the distance of its outer end from the casing-wall.

6. In a dust-collector, the combination with a casing wherein the dust-laden air whirls, having an inlet for dust-laden air, and an air-outlet near its axis, of a curved deflector eccentrically disposed relative to the casing in the path of initial circuit of the air, extending, with reference to the direction of rotation of the air, in a concave curve of less than three hundred and sixty degrees angular measurement from a point near the casing-wall to the air-outlet.

7. In a dust-collector, the combination with a casing wherein the dust-laden air whirls having a tangential inlet for the dust-laden air, and an air-outlet near its axis, of a deflecting instrumentality intersecting the path of initial circuit of the air and extending from a point adjacent the peripheral wall of the casing toward the air-outlet, said instrumentality comprising a plurality of curved plates which jointly make less than a single turn about the outlet, said plates being eccentrically disposed relative to the casing, and each having its outer end at a less radial distance from the casing-axis than the proximate end of the adjacent plate.

8. In a dust-collector, a casing wherein the dust whirls having a peripheral tangential inlet for the dust-laden air at one end of the casing, an air-outlet adjacent the axis at the same end of the casing, and a dust-outlet at the other end of the casing, of a segmental deflecting instrumentality in substantially the plane of the tangential inlet extending from a point adjacent the peripheral wall of the casing to the air-outlet, said deflector having therein approximately tangential openings opening in the direction of movement of the air within the casing.

9. In a dust-collector, a casing wherein the dust-laden air whirls, having a tangential peripheral inlet for the dust-laden air, an air-outlet adjacent the axis of the casing, of a deflector in substantially the plane of the tangential inlet, extending from a point adjacent the peripheral wall to the air-outlet, and an apron in the casing partially surrounding said air-outlet.

10. In a dust-collector, the combination with a casing having a tangential air-inlet and a substantantially axial air-outlet, of a plate 14 universally adjustable transversely of the axis in substantially the plane of the outlet-opening, substantially as described.

11. In a dust-collector, the combination with a casing wherein the dust-laden air whirls having a tangential inlet for the dust-laden air and a substantially axial dust-outlet, in combination with means in the path of initial circuit of the air for deflecting portions of the air within a peripheral belt toward the air-outlet, and a plate smaller than the outlet arranged therein to partially close the same.

12. In a dust-collector, the combination with a casing wherein the dust-laden air whirls, having an inlet for the dust-laden air and an air-outlet, both at the same end of a deflecting instrumentality in the path of initial circuit of the air extending into longitudinal alinement with the air-outlet, and a governing-plate partially closing the air-outlet.

13. In a dust-collector, in combination with a casing wherein dust-laden air whirls, hav-

ing an inlet for the dust-laden air, and an air-outlet, of a deflecting instrumentality in substantially the plane of the inlet, and leading from a point adjacent the casing to the air-outlet, for sharply deflecting the air from within a peripheral undeflected belt into axial alinement with the air-outlet.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

ORVILLE M. MORSE.

In presence of—
W. B. KNICKERBOCKER,
FORÉE BAIN.