

(No Model.)

2 Sheets—Sheet 1.

G. WALTER.
DUST COLLECTOR.

No. 474,491.

Patented May 10, 1892.

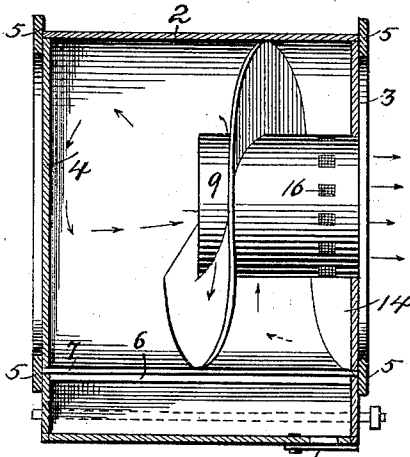


Fig. 1.

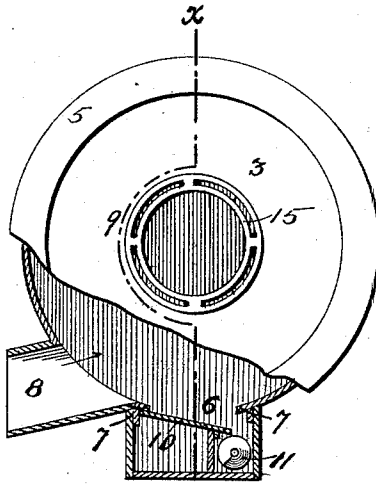


Fig. 2.

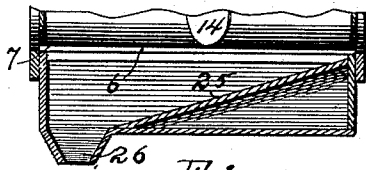


Fig. 8.

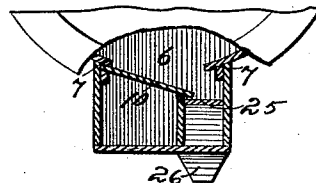


Fig. 9.

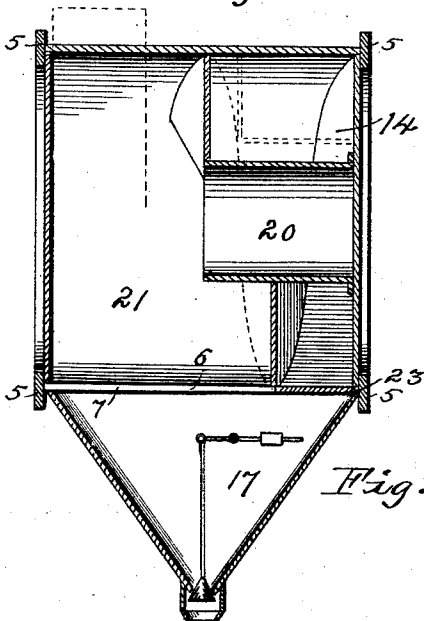


Fig. 4.

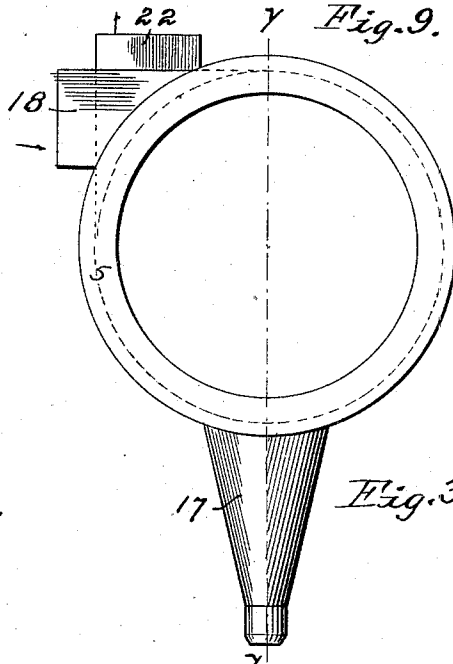


Fig. 3.

Witnesses.

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UNITED STATES PATENT OFFICE.

GEORGE WALTER, OF THIEF RIVER FALLS, MINNESOTA.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 474,491, dated May 10, 1892.

Application filed January 6, 1891. Renewed April 12, 1892. Serial No. 428,779. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WALTER, of Thief River Falls, in the county of Polk and State of Minnesota, have invented certain Improvements in Dust-Collectors, of which the following is a specification.

My invention relates to dust-collectors of the class in which the dust-laden air is blown into a cylindrical chamber, in which the dust is settled or precipitated against the walls of the chamber and carried out through an opening therein, while the air thus freed from dust passes out of the chamber through an axial opening arranged in the end thereof.

The object of the invention is to provide a dust-collector which shall have a cylindrical form and which may be made entirely of metal or wood, and, further, which while of a very simple and economical construction will occupy but a comparatively small space and be thoroughly efficient, and, moreover, which will be adapted to be hung from a ceiling or wall or to be placed directly upon the machine provided with the blower-fan.

My invention consists in various constructions and in combinations hereinafter described, and particularly pointed out in the claims.

My invention will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a longitudinal section of a dust-collector embodying my invention, as seen from the line *x x* of Fig. 2, the axial spout and the spiral deflector being shown in full. Fig. 2 is an end elevation of the same, a portion of the front wall being broken away to show the interior. Fig. 3 is an end elevation of a somewhat different form of dust-collector. Fig. 4 is a longitudinal section of the same, taken on line *y y* of Fig. 3. Fig. 5 is a side elevation of another form of my dust-collector. Fig. 6 is a section thereof on the line *z z* of Fig. 5. Fig. 7 is a detail showing manner of closing the forward opening between the ends of the axial spout and the inner sleeve, whereby the fine dust is sent back into the cylinder or drum. Figs. 8 and 9 show a modified form of dust hopper or receptacle. Fig. 10 is a side view, partly in section, showing one of my dust-collectors arranged in a vertical position.

Fig. 11 is a plan section on the line *w w* of Fig. 10.

As shown in the drawings, the general feature of the construction is a large cylinder or drum having parallel heads or ends. The dust-laden air is blown into this cylinder in such a way that the air is driven around the inner walls of the cylinder, a longitudinal slot being provided in the cylindrical walls, through which the dust falls or is blown or forced by centrifugal action in a suitable hopper or spout. The air thus freed from the dust continues on out of the drum through a suitable opening. In the first two figures the cylinder 2 is provided with the ends or heads 3 and 4, held in place and strengthened by the rings 5. The dust-discharge slot consists in the opening 6, provided between the lower edges 7 of the cylindrical walls making up the cylinder 2. The dust-laden air enters the interior of the drum through the inlet-spout 8, provided in the lower right-hand portion of the cylinder. This spout, as shown, is set at an angle to the horizontal, so that the air is blown across the opening 6 and against the opposite side of the cylinder. From thence the air circulates through the chamber, being kept close to the walls thereof by centrifugal force until the column of air strikes the end 4 of the cylinder, when it is turned upon itself and forced to seek an outlet through the small cylinder or sleeve 9, provided axially in the main cylinder and extending, as shown in Fig. 2, through the end or head 3. Meantime the dust, owing to its greater weight, has been kept close to the wall of the cylinder by centrifugal action. Hence as it falls or rolls down the near side of the cylinder it falls through the opening 6 upon the slanting plate 10 and from thence down into the trough, in which the conveyer 11 operates to carry the dust through a suitable outlet, as that closed by the valve 13, shown in Fig. 1.

In order to make certain the passage of the current of air back to the end 4, I provide the deflecting plate or partition 14, forming a spirally-inclined plane within the cylinder and around the spout 9, whereby the air on entering through the opening 8, as indicated by dotted lines in Fig. 1, is forced to pass while circulating about the walls of the cylinder

back against the end 4, where the onward movement of the current is interrupted and the air-column turned and forced out on a line with the axis of the cylinder through the spout 9. This takes place after the air has been freed from the dust which dropped through the opening 6 into the conveyer-trough. Some lighter dust may still remain in the air, seeking an outlet through the spout 9. In order to prevent the same being carried into the open air, I provide the second cylindrical spout or sleeve 15 within the spout 9, having the openings 16. Owing to the whirling motion of the air-current passing through the spout 9, this light dust will be driven against the walls thereof, and hence will be forced between the inner walls of the spout 9 and the sleeve 15, from whence it is conveyed back into the dust-collector through the openings 16. These openings 16 may be covered with netting or left freely open, as desired. It will be seen that the dust-collector shown in Figs. 1 and 2 is adapted to be placed on the top or the side of the machine from which the dust-laden air is being blown into the dust-collector by the fan provided on said machine. For this reason the cylinder is set down as close as possible to the top of the machine, the slanting shelf and the conveyer being provided to carry away the dust, as the form of dust-discharge occupying the least space.

Where the dust-collector is to be hung from the ceiling or wall of the room in which the several machines are placed, I preferably provide a less expensive form of dust-discharge, consisting in the flat funnel chamber or hopper 17. (Shown in Figs. 3, 4, 5, and 6.) This hopper may extend clear across the lower part of the cylinder, and has its lower end or spout closed by a suitable valve adapted to be operated in the usual manner.

In Figs. 3 and 4 the general idea of the cylindrical dust-chamber and the longitudinal dust-outlet slot are retained. The inlet and outlet passages for the air are, however, modified. As shown, the inlet-spout 18 extends tangentially through the upper part of the cylinder. The air being blown through the same strikes the opposite upper wall of the cylinder and is forced backward in a progressing and circling air-current by striking against the inclined corkscrew plates 14, arranged around the dummy cylinder or drum 20, occupying the position of the spout 9 in Fig. 1. As the air-current circles about the walls of the chamber, the dust falls down into the hopper 17. The dust-freed air finds an outlet from the cylinder 21 not through an axial spout, but through the tangential outlet-spout 22, provided at the opposite end of the cylinder from that in which the spout 18 is provided.

As shown in Figs. 1 and 4, the portion of the slot 6 lying between the lower edges of the deflecting partitions and the forward end of the cylinder may be closed to prevent the

air from diving down into the dust-discharge hopper. Practically very little danger of such action exists, and the portions 23, closing the said parts of the slots, are usually dispensed with.

Figs. 5 and 6 show a dust-collector identical with that shown in Figs. 1 and 2, except for the substitution of the dust-discharge chamber or hopper 17 in place of the conveyer-trough arrangement shown. The valve 24 is similar to that shown in Fig. 4 and is adapted to operate when a certain weight of dust has accumulated thereon. It may, however, be operated by hand or in any other convenient manner. In Figs. 6 and 7 the arrangement of the discharge-spout 9, the sleeve 15, and the openings 16 are more plainly illustrated, the openings being there shown as free, no netting being used over the same.

As shown in Fig. 7, I sometimes close the annular ring-like opening between the ends of the cylinder-spouts 9 and 15 by a tight annular wall or ring 15, thereby leading not only the light fine dust back into the drum, but also a portion of the air being discharged through the spout.

It is obvious that where the pressure of the air entering the dust-collector drum is great only a very short deflecting partition, as 14 or 19, may be provided to give the direction to the air-current. With a slow-moving current a more extended inclined or deflecting partition may be required. If the velocity of the air entering the dust-collector drum through the inlet is great, the dust will be driven round the inner walls of the drum with such velocity as to drive it clear across the opening 6 and against the opposite wall of the discharge-hopper, where the dust will collect in a long row or pile and drop off periodically as its weight becomes too great to be upheld by the air-current. It will be noted that the lower edge of the drum projects quite a distance over the top of the open dust-hopper to the end that the dust may not be drawn back into the large drum.

As shown in details, Figs. 8 and 9, I may provide the slanting shelf in the shallow dust-hopper in place of the conveyer. The dust dropping onto this shelf 25 is blown forward and down into the small outlet-hopper 26, where it is discharged with a small volume of air, from which it is easily separated.

It is obvious, as shown in Figs. 10 and 11, that my cylinder or drum may with practically the same results be placed on end, so that the axis of the same will stand in a vertical line. With this construction the wide longitudinal slot also stands vertical and is inclosed by the secondary drum or receptacle arranged on the outer walls of the main drum or cylinder. A tapering hopper 30 is provided in the bottom of the vertical receptacle and is adapted to carry away the dust. The air enters this dust-collector through the longitudinal inlet provided in the upper end of the device, and being blown against the spiral

deflector is sent downward into the bottom of the drum. From thence the air-currents turn and, rising, find an outlet through the axial outlet shown. The dust as it reaches the edges of the slot is carried by the tangential momentum out into the receptacle, from whence it is discharged through the hopper in the bottom of the same.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, in a dust-collector, of the cylinder having ends 3 and 4, with the wide continuous slot 6 extending the entire length of the case, provided in the walls of said cylinder, a dust-receptacle arranged about the same, a tangential air-inlet, an axial outlet-spout extending through one end of said cylinder, the diameter of said outlet-spout and the width of said longitudinal slot and the space between the walls of said outlet-spout and the walls of said cylinder being substantially equal, as described.

2. The combination, with the cylinder or drum 2, having the longitudinal slot in its walls, of the heads or ends 3 and 4, the air-inlet spout 8, arranged to discharge the air across said slot or opening, the spout 9, having the openings 16, the sleeve 15, provided within said spout 9, and means whereby the air-currents are driven backwardly through the cylinder, substantially as described.

3. The combination, in a dust-collector, of the cylinder 2, with the heads 3 and 4, the wide slot 6, existing between the lower edges 7 of the cylinder-walls, the inlet 8, the spout 9, the deflecting-plate 14, the plate 10, the conveyer-trough, and a conveyer 11, substantially as described.

4. The combination, in a dust-collector, of the cylinder 2, with the heads 3 and 4, the longitudinal slot arranged in the lower part of the cylinder, the axial spout 9, having openings 16, the sleeve 15, arranged in said spout,

the inlet 8, the air-current deflector 14, the dust-hopper, and the slanting shelf arranged therein, substantially as described.

5. The combination, in a dust-collector, of the horizontal plane cylinder or drum having ends 3 and 4, with the axial discharge-spout 9, passing through the end 3 and extending back to the middle of the drum or cylinder, a dust-receptacle provided beneath said cylinder, and a longitudinal slot provided in said cylinder and extending between the ends thereof, said slot being of a width substantially equal to the width of said discharge-spout, a tangential inlet provided in the walls of the cylinder, and the edges of said slot or opening projected over the opening in the top of the dust-receptacle, whereby shoulders are provided beneath said edges to prevent the passage of the dust back into the cylinder, substantially as shown and described.

6. In a dust-collector, the combination, with the circular drum, of the tangential inlet-spout through which the dust-laden air is discharged into the top of the said drum or cylinder, an axial air-discharge spout 9, extending through the cylinder end adjacent to said inlet, said spout extending longitudinally to about the middle of said cylinder, a spirally-inclined deflecting partition or guide placed transversely between said spout 9 and the walls of said cylinder, a dust-receptacle provided in connection with said cylinder, and the wide longitudinal opening 6, through which the dust falls into said receptacle, said slot being of a width substantially equal to the diameter of the said spout, substantially as described.

In testimony whereof I have hereunto set my hand this 18th day of December, 1890.

GEORGE WALTER.

In presence of—

CARL MAX PETZOLDT,

CHARLES ALWIN ROBBECKE.