(No Model.) 2 Sheets—Sheet 1.

W. E. ALLINGTON.

DUST COLLECTOR.

No. 418,836. Patented Jan. 7, 1890.

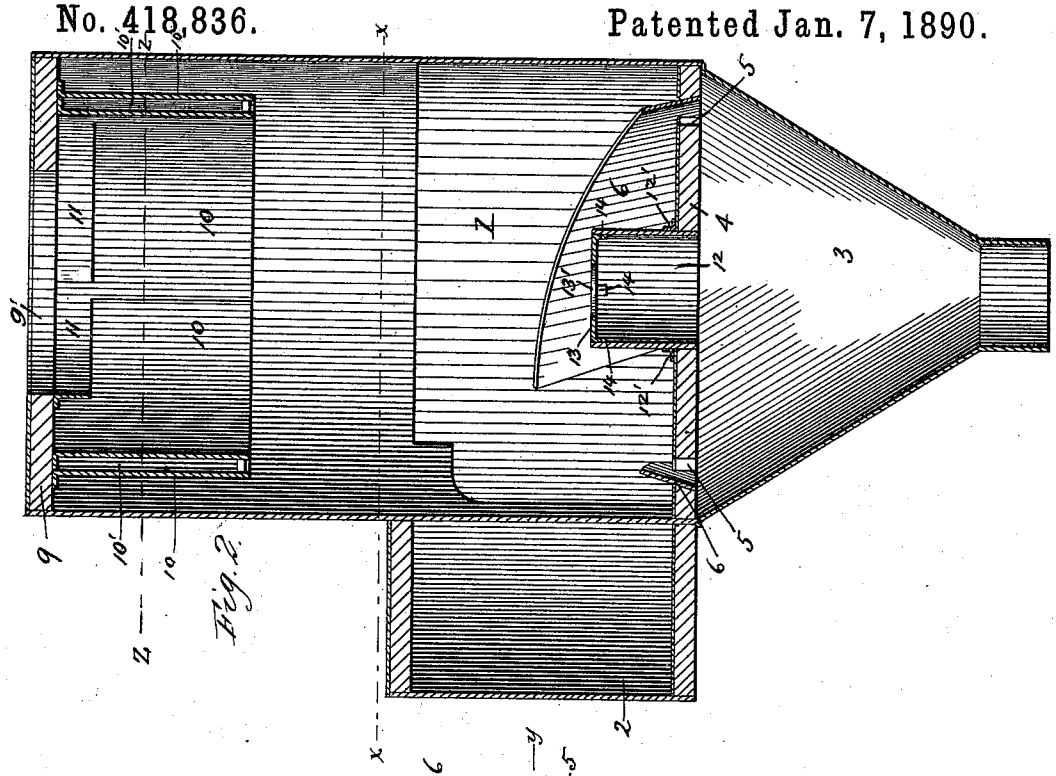


Fig. 2.

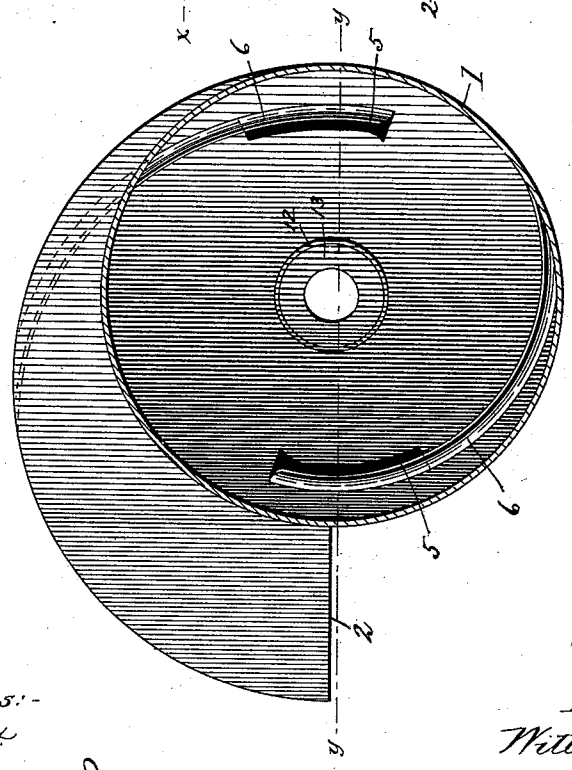


Fig. 1.

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Parker H. Sweet Jr.

Inventor:-
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(No Model.) 2 Sheets—Sheet 2.

W. E. ALLINGTON.

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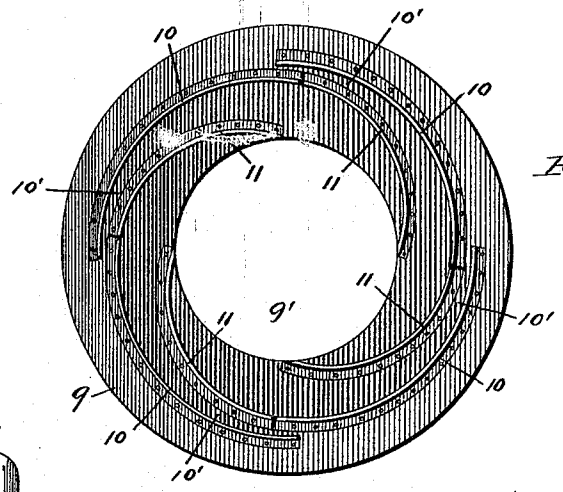


Fig. 3.

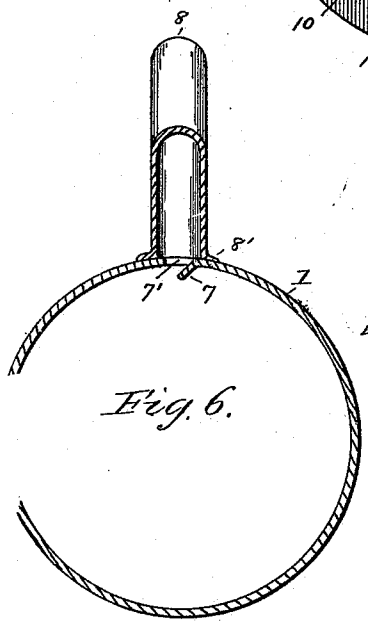


Fig. 6.

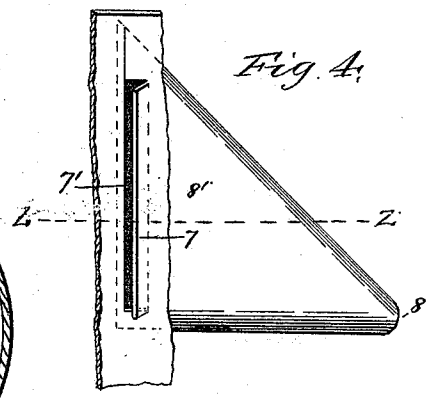


Fig. 4.

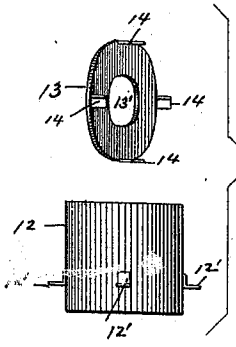


Fig. 5.

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UNITED STATES PATENT OFFICE.

WILLIAM E. ALLINGTON, OF EAST SAGINAW, MICHIGAN.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 418,836, dated January 7, 1890.

Application filed January 27, 1888. Serial No. 262,135. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. ALLINGTON, a citizen of the United States, residing at East Saginaw, in the county of Saginaw and State of Michigan, have invented certain new and useful Improvements in Dust-Collectors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in the class of machines which are employed in mills, factories, &c., for freeing the air from the dust, shavings, or other solid particles contained therein, and in which the dust-laden air receives a rapid rotative or whirling motion in the separating-chamber, whereby the dust or solid particles are driven out of the air-current and against the inner surface of the chamber by centrifugal force; and it consists in the construction and arrangement or combination of parts hereinafter disclosed in the description, drawings, and claims.

The object of my invention is to produce a machine which will effect a perfect separation of the air and fine dust from the coarser dust, shavings, or other material, and also of the fine dust from the air, and effectually dispose of the same, and which will be simple in construction, compact, and easily understood and operated.

In the accompanying drawings, forming part of this specification, and wherein the same reference-numerals indicate the same parts, Figure 1 represents a horizontal section of my improved dust-collector on the line *x x* of Fig. 2. Fig. 2 is a vertical section of the same on the line *y y* of Fig. 1. Fig. 3 is an inverted plan view of the top plate or cover of the separating-chamber, showing the relative arrangement of the overlapping flanges or aprons and the deflectors leading thereto from the edge of the purified-air outlet. Fig. 4 is a broken perspective view of the casing of the separating-chamber formed with the vertical discharge-slot and the inwardly-projecting lip, and provided with the outlet-pipe communicating with said slot. Fig. 5 is a detail view of the short pipe, showing also a perspective view of the annulus or collar which is adapted to be removably secured therein. Fig. 6 is a horizontal section, on a somewhat reduced scale, of the upper portion of the separating-chamber, the section being taken on the line *z z* of Figs. 1 and 4, and the aprons or flanges and deflectors omitted in order to show the skimming-lip, the slot, and the conveying-pipe in connection with said separating-chamber.

In the drawings, 1 represents the cylindrical separating-chamber, 2 the external tangential inlet-spout for the dust-laden air entering said chamber from the machine from which the dust-laden air is discharged, and 3 the receptacle or hopper attached to the lower end of said separating-chamber for the reception of the heavier dust or other solid material delivered from said chamber. These parts are constructed of sheet metal or other suitable imperforate material. The bottom 4 of the separating-chamber is formed with two diametrically-opposite circularly-elongated discharge-openings 5 5, which are arranged at points intermediate of its circumference and periphery, whereby much less air and fine dust escape into the hopper than usual.

Attached to the inner surface of the casing of the chamber 1, some distance in front of the discharge-openings 5 5, and mounted upon the bottom 4 of said chamber, are two inwardly-curved rearwardly-extending slanting directing-flanges 6 6, which terminate at their rear ends in the outer walls of said discharge-openings. The lower edges of these directing-flanges are arranged at a greater distance from the center of the machine than their upper edges, thus making the space between them wider at the bottom than at the top, whereby the heavier materials are positively moved downwardly by centrifugal force and gravity over their inner faces and to their widened lower edges, and are thus guided onto and delivered through the elongated discharge-openings 5 5 and into the hopper.

The upper edges of the directing-flanges 6 6, as shown, gradually slope rearwardly, their front ends being the higher. This construc-

tion, in connection with the widened space or flare between their lower edges, enables them to receive a large body of the incoming dust-laden air at their higher ends to gradually direct the same downward toward their lower edges, aided by the gravity of the heavier particles, and to accurately guide the same through the discharge-openings 5 5. These discharge-openings are curved to conform to the directing-flanges, are widest at their rear ends, and are of considerable length, so that the exit therethrough of the air-current carrying the heavier particles will not all occur at one point, and thus choking or filling up of said openings is entirely avoided. This result is also contributed to by the arrangement of the upper edges of the directing-flanges 6 6 at an inclination or slant toward the center of the separating-chamber, or with their lower edges at a greater distance from said center than their upper edges, whereby, as is obvious, the particles of greatest specific gravity will be directed toward their lower edges, carried along their inner faces, and passed through said elongated discharge-openings with great accuracy and force, and thus the collection or separation of the heavier particles from the air and lighter or finer dust is greatly facilitated. However, I make no claim herein to the construction and arrangement of these directing-flanges and discharge-openings, as they form features of another invention claimed by me, and for which I have made application for Letters Patent simultaneously herewith, Serial No. 262,134.

Above the slanting or inclined directing-flanges 6 6, and above the tangential inlet-spout 2, is formed in the casing of the separating-chamber 1 an inwardly-projecting vertical lip 7 and a vertical slot 7′ for arresting and discharging the finer or lighter particles of dust, which, having been skimmed off from the dust-laden rotating air by said inwardly-projecting lip and passed through said slot, are conveyed away to any suitable receptacle through a small pipe 8, provided with a flared or flattened end 8′, registering with said slot.

Fitted in the upper end of the separating-chamber is a top plate or cover 9, which is formed with a central purified-air outlet 9′, and provided on its under side with long downwardly-projecting aprons or flanges 10. These aprons or flanges—there being four shown in this instance—are so arranged that the ends of each underlap and overlap the ends of the adjoining flanges, thus leaving between them channels or spaces 10′. The purpose of these aprons or flanges is to confine the fine dust which has been thrown by centrifugal force against the upper portion of the inner surface of the separating-chamber, prevent the same from being carried out through the outlet 9′ by the force of the upwardly-moving partially-purified air-current, and cause the same to be discharged through the vertical slot 7′.

Secured to the under face of the top plate or cover 9, and leading from the edge of the air-outlet 9′, are short curved deflectors 11, which extend to the channels or spaces 10′ between the ends of the long aprons or flanges 10 and operate to catch and deliver through said spaces and against the inner surface of the separating-chamber any fine dust which may have escaped being collected in and discharged from the space between said long aprons or flanges and the upper inner surface of said chamber. As the air laden with the fine dust continues its gyrating or whirling motion up to the upper end of the separating-chamber, and consequently as the dust still continues to be thrown outwardly at that point by centrifugal force, very little if any dust will escape through the purified-air outlet 9′. On the contrary, it will be skimmed from the outgoing air-current by the short curved deflectors 11 and be led back through the channels or spaces 10′ and against the inner surface of said chamber, where, still continuing its whirling movement, it will be discharged through the vertical discharge-slot 7′. These short curved deflectors 11 may be made separately from or integrally with the long aprons or flanges 10.

In an opening in the center of the bottom 4 of the separating-chamber 1 is removably secured a short pipe 12, which is provided with peripheral lugs 12′, for supporting it within said opening. It extends downward a short distance into the hopper 3 and upward a short distance into the separating-chamber, and is interiorly provided with an annulus or collar 13, formed with a central discharge-opening 13′, and provided with downwardly-projecting yielding or elastic strips 14, which enter said pipe and hold said collar removably therein. The purpose or function of this short pipe is to draw back into the separating-chamber for further separation such fine dust as may be in suspension at the central portion of the hopper, and at the same time relieve the hopper of overpressure of air; but this machine can be so adjusted that very little fine dust will be delivered into the hopper with the heavier particles and held in suspension at its center—for instance, by removing the collar 13 from the short pipe and making its discharge-opening larger or smaller or by using collars having differently-sized discharge-openings the communication between the hopper and the separating-chamber may be adjusted to suit different pressures of air therein; also, in case the machine be throwing air out at the bottom of the hopper, by enlarging said opening more air and fine dust will escape back into the separating-chamber and less air will pass out at the bottom of the hopper; also, under some circumstances, as in feeding furnaces, where considerable air-pressure in the hopper is

necessary to the proper discharge of the material, I provide one or more removable collars for said pipe, in which the openings are contracted or entirely absent.

It will be observed from the foregoing that my machine differs from that class of dust collectors or separators which employ superposed or additional separating-chambers for collecting very fine dust or other light material, this result being accomplished in my machine in a single separating-chamber by means of the vertical slot and inwardly-projecting lip, and also by the top plate or cover provided with the long downwardly-projecting aprons or flanges and the short deflectors constructed and arranged as above described; also, in my machine the short pipe leading back from the hopper into the separating-chamber is provided with an interior collar, which is adapted to be removed and varied in size of discharge-opening or substituted by other collars having varying-sized or no openings, according to desire or necessity; also, my separating-cylinder is cylindrical from end to end, and is provided with the tangential inlet-spout at its lower end, whereby sufficient height of space is afforded for the finer or lighter material to be thrown outward by centrifugal force against the inner surface of the separating-chamber to rise and be skimmed off by the vertical slot and inwardly-projecting lip; also, the top plate or cover of my separating-chamber, having the central air-outlet and provided with the long, downwardly-extending aprons or flanges and the short curved deflectors, constructed and arranged as described, will prevent the outward passage of any fine or light material with the escaping air-current.

Having thus sufficiently described the construction, arrangement, and operation of the several parts of my invention to enable those skilled in the art to construct and use the same, what I claim as new is—

1. In a dust-collector, a separating-chamber provided with an external tangential inlet-spout, with a dust-discharge outlet, with a vertically-arranged discharge-slot, and with a top plate or cover formed with an outlet for purified air, and provided with downwardly-extending aprons or flanges secured to the lower face thereof and arranged to form channels or spaces between their proximate ends, substantially as described.

2. In a dust-collector, a separating-chamber provided with an external tangential inlet-spout, with a dust-discharge outlet, and with a top plate or cover formed with an air-outlet and having attached to its lower face short curved deflectors which lead from the edge of said air-outlet toward the inner surface of the upper part of said chamber, substantially as and for the purpose described.

3. In a dust-collector, a separating-chamber provided with an external tangential inlet-spout, with a vertical discharge-slot, and with a top plate or cover formed with an air-outlet and having attached to its lower face short curved deflectors which lead from the edge of said air-outlet toward the inner surface of the upper part of said chamber, substantially as and for the purpose described.

4. In a dust-collector, a separating-chamber provided with an external tangential inlet-spout, with a vertically-arranged discharge-slot for fine dust, and with a top plate or cover formed with an outlet for purified air, and provided with downwardly-extending aprons or flanges secured to the lower face thereof and arranged to form channels or spaces between their proximate ends, and with short curved deflectors leading from the edge of said outlet to the channels or spaces between said aprons or flanges, substantially as and for the purpose described.

5. In a dust-collector, a separating-chamber provided with an external tangential inlet-spout, with a vertical discharge slot and lip, with a horizontal bottom formed with discharge-openings, and with a top plate or cover formed with an air-outlet and having downwardly-extending aprons or flanges and short curved deflectors secured to its lower face, substantially as and for the purpose described.

6. In a dust-collector, a separating-chamber provided with an external tangential inlet-spout, with a vertical discharge slot and lip, with a horizontal bottom formed with discharge-openings, and with a top plate or cover formed with an air-outlet, and having downwardly-extending aprons or flanges and short curved deflectors secured to its lower face, in combination with a hopper arranged beneath and communicating with said separating-chamber, substantially as and for the purpose described.

7. In a dust-collector, a separating-chamber provided with an external tangential inlet-spout, with a vertical discharge slot and lip, with a horizontal bottom formed with discharge-openings, and with a top plate or cover formed with an air-outlet, and provided with downwardly-extending aprons or flanges, and curved deflectors secured to its lower face, in combination with a hopper arranged beneath and communicating with said separating-chamber, and a pipe which extends through said bottom and a short distance into said separating-chamber, substantially as described.

8. In a dust-collector, the combination of a separating-chamber provided with a bottom and a hopper arranged beneath and communicating with said chamber, with a pipe which extends through said bottom and a short distance into said separating-chamber and is provided with an interior annulus or collar, substantially as and for the purpose described.

9. In a dust-collector, the combination of a separating-chamber provided with a bottom and a hopper arranged beneath and communicating with said chamber, with a remov-

able pipe which extends through a central opening in said bottom and terminates within said hopper and separating-chamber and is provided with a removable annulus or collar having a discharge-opening and downwardly-projecting yielding or elastic strips, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM E. ALLINGTON.

Witnesses:
EDWIN F. SAUNDERS,
ALFRED W. NEWTON.