No. 755,262. PATENTED MAR. 22, 1904.

J. H. WALSH.

DUST COLLECTOR.

APPLICATION FILED MAR. 15, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

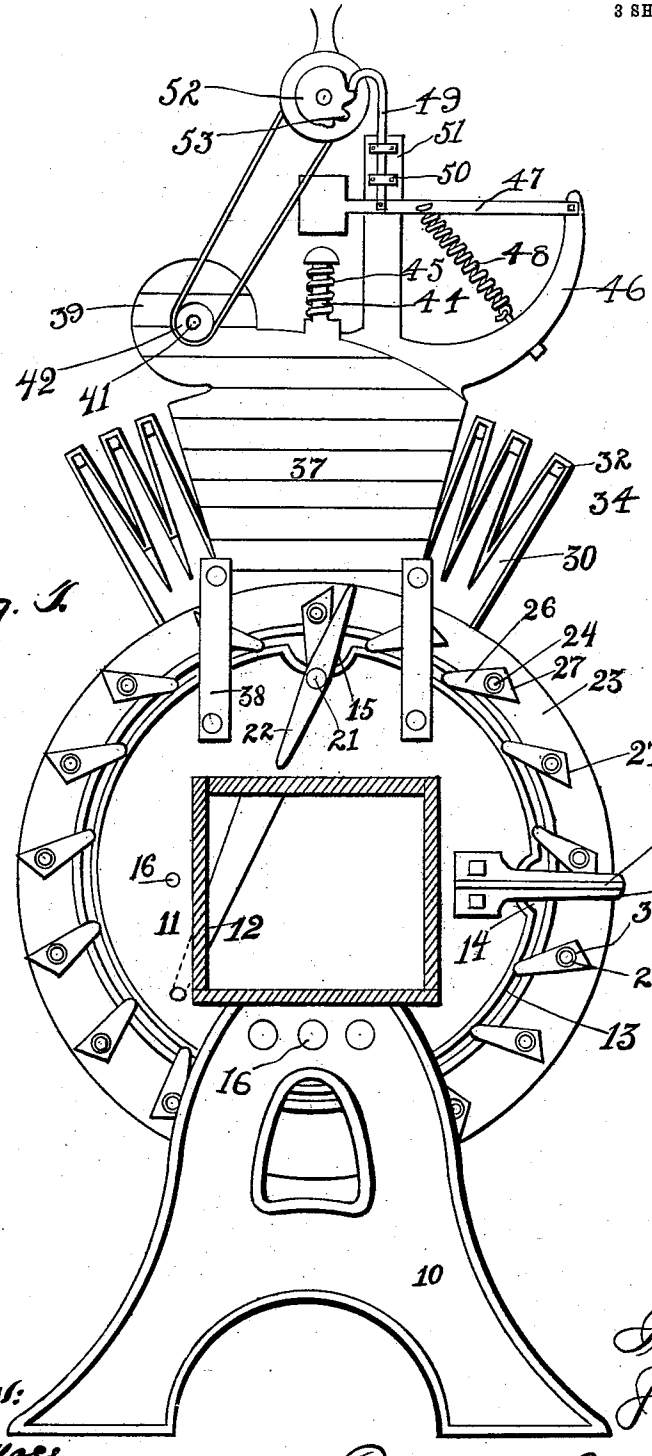


Fig. 1.

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R. S. Owig.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 3 SHEETS—SHEET 2.

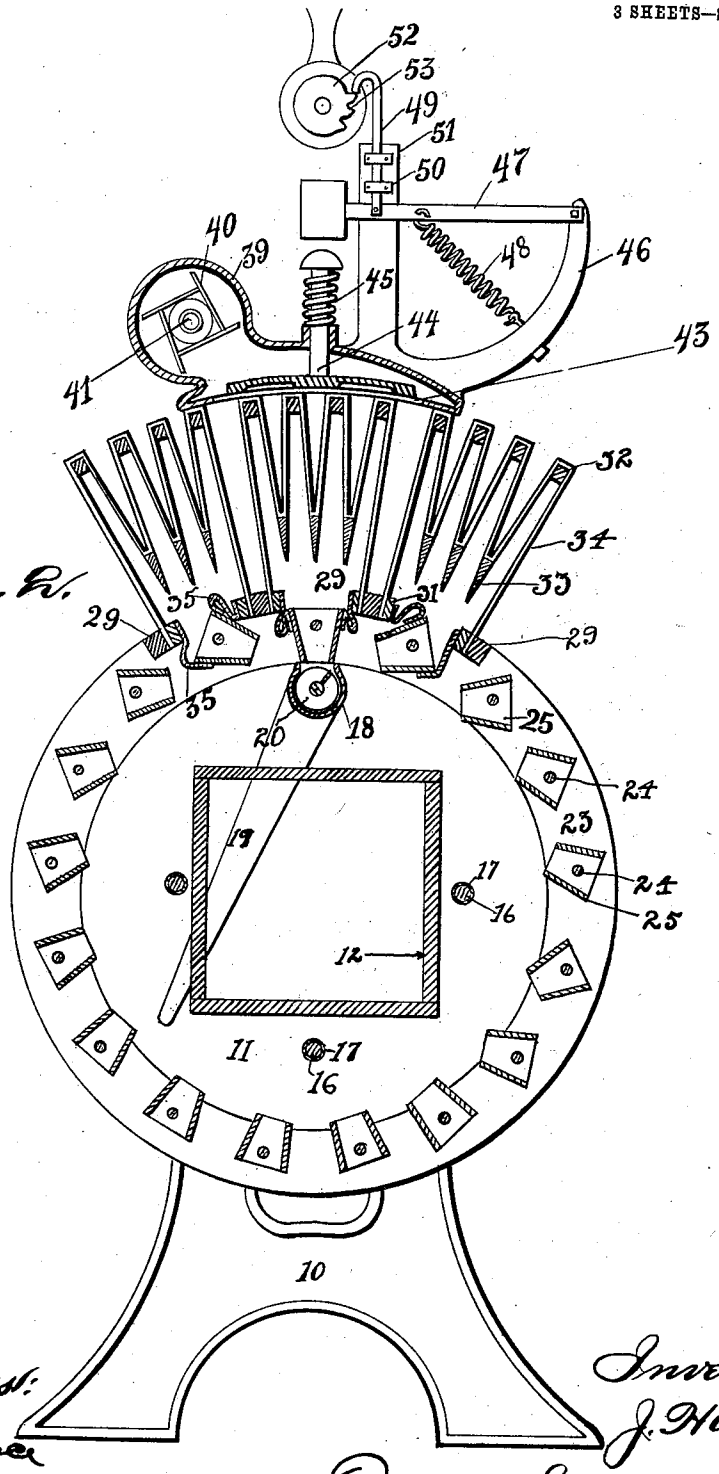


Fig. 2.

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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 3

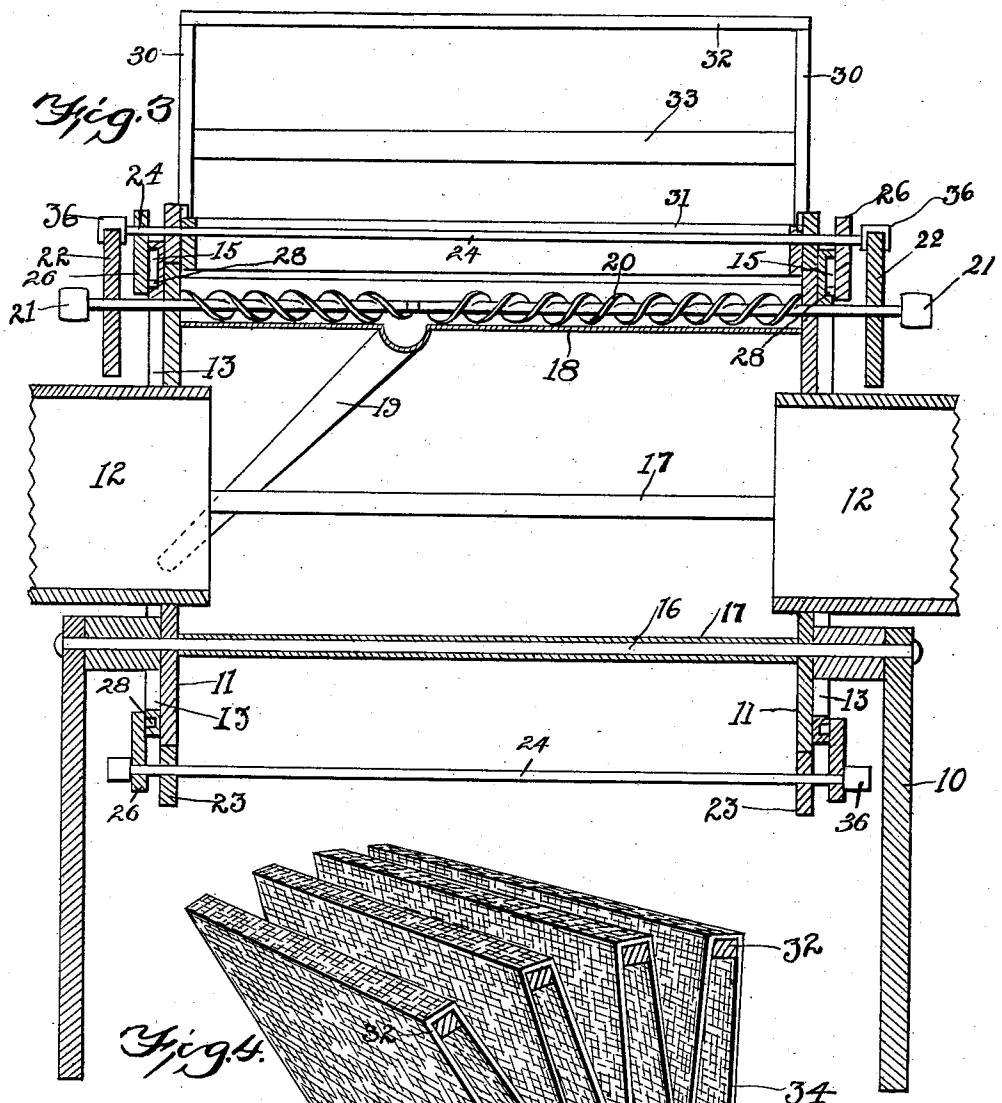


Fig. 4.

Fig. 5

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No. 755,262. Patented March 22, 1904.

UNITED STATES PATENT OFFICE.

JOHN H. WALSH, OF MASON CITY, NEBRASKA.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 755,262, dated March 22, 1904.

Application filed March 15, 1902. Serial No. 98,348. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. WALSH, a citizen of the United States, residing at Mason City, in the county of Custer and State of Nebraska, have invented certain new and useful Improvements in Dust-Collectors, of which the following is a specification.

This invention relates to that class of dust-collectors in which the dust is forced under pressure against a cloth, the dust remaining on the surface of the cloth, while the air passes through the same, and at a certain point in the movement of the machine a current of air is forced through the cloth in a direction opposite from that of the main current to thereby remove the adhering dust from the cloth, thus keeping it clean, and thereby providing a maximum of efficiency.

My object is to provide a machine of this class that is simple, strong, and inexpensive in construction and that has a maximum of effective cloth-surface and occupies a minimum of floor-space.

A further object is to provide a machine in which the exterior of the cloth is exposed, so that any defects therein may be easily seen, and in which the cloth is secured to a number of independent sections that may be readily and easily detached for purposes of repair or replacement without affecting or disturbing the remainder of the machine.

My object is, further, to provide a machine in which the dust is removed from the cloth thoroughly and completely during each revolution by both striking the cloth and forcing air through the cloth in an opposite direction and in confining said reverse air-currents so that the air-pressure will all be utilized for the purpose of discharging the dust.

A further object is to provide means whereby the heavier particles of dust and small grains are prevented from falling out of the sections during the rotation and are all carried to a point where they may be dropped into a common conveyer, that will discharge them with the dust.

My invention consists in certain details in the construction, arrangement, and combination of the various parts of the machine whereby the objects comtemplated are attained, and particularly in the construction of the detachable sections of cloth-surface, the means for confining the reverse pressure of air to one section and for forcing all of said air through the said section, in the construction, arrangement, and combination, with said detachable sections, of the pivoted chutes connected with each section and the means for operating them, and in the construction, arrangement, and combination of means for striking upon the section through which the back draft is blowing, and in certain other details of construction, arrangement, and combination of parts, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which—

Figure 1 shows a front elevation of the complete machine, except that a number of the cloth-bearing sections are removed. Fig. 2 shows a vertical central transverse sectional view of same. Fig 3 shows a vertical central longitudinal sectional view of same with the cloth removed from the frame, and Fig. 4 shows a detail perspective view of one of the cloth-bearing sections. Fig. 5 shows a detail perspective view of the arm and roller to tilt the chutes.

Referring to the accompanying drawings, I have used the reference-numeral 10 to indicate the supporting-legs of the machine. These supporting-legs are attached to the stationary circular frame members 11, which frame members constitute the ends of the machine. Into each of these frame members I have inserted a rectangular air-trunk 12, terminating at its end a short distance beyond the inner surface of the frame member 11, the other ends of the air-trunks being designed to communicate with milling machinery which produces currents of dust-ladened air. Formed on the outer face of the frame member 11 is a raised guide, forming a groove 13, having at one side an inwardly-projecting portion 14 and at its top a downwardly-projecting portion at 15 for purposes hereinafter made clear. These frame members are connected with each other and firmly braced by means of the connecting-rods 16, passed through the frame members to thereby hold them together, and these rods are provided

with pipes or tubes 17, whereby the frame members are spaced apart. Directly above the air-trunks is a screw-conveyer trough 18, extending from one end to the other inside of the machine-frame and discharging into a downwardly-extending trough 19, which discharges at one end of the machine. Mounted within this trough 18 is a screw conveyer 20, so arranged as to convey substances within the trough from both ends toward the central discharge-trough 19. The ends of the shaft of the screw conveyer project through the frame member, and the pulleys 21 are attached to its ends, and near each end of said shaft is mounted a wiper 22 for purposes hereinafter made clear.

Rotatably mounted upon each of the frame members is a circular rim 23, and these rims are connected so that they are rotated in unison by means of a large number of shafts 24, the ends of which are mounted in the rims. Fixed to the central portion of each shaft 24 is a chute 25, open at its outer and inner ends and tapered so as to be smallest at its inner end, and fixed to each end of each shaft 24 is a lever 26, having at its outer end an inclined surface 27 and having at its inner end an inwardly-projecting roller 28, these rollers 28 being designed to enter the cam-groove 13. As will hereinafter appear, the rims 23 are made to rotate in unison around the stationary cam-groove 13, and by reason of the peculiar construction of said groove the chutes 25 have their inner open ends pointed substantially toward the central portion of the machine throughout the lower half of their movement, and throughout the upper half of their movement the inner open ends thereof stand at or near a vertical line, so that the contents of the chute will be discharged into the interior of the machine when at the upper half of their movement, and when these chutes reach the central top portion of their movement the levers 26 at the ends of the shaft 24 assume vertical positions on account of the part 15 of the groove 13, and the inner end of the chute projects straight downwardly, so that the contents of the chute are discharged into the trough 18.

The reference-numeral 29 indicates lugs formed on or fixed to the inner face of each of the rims 23 to provide a support to which the cloth-bearing sections may be attached. These sections are constructed as follows: Referring to the drawings, it will be seen that each cloth-bearing section is composed of two end pieces 30, having at their lower ends two cross-strips 31 and at their upper ends four cross-strips 32, and midway between the strips 31 and 32 are three cross-strips 33, V-shaped in cross-section. The numeral 34 indicates a strip of cloth one end of which is attached to one of the cross-pieces 31. From this point the cloth passes over the first of the cross-pieces 32, then down to the top of the first cross-piece 33, then over the second one of the cross-pieces 32, then down to the top of the second cross-piece 33, then down on top of the last cross-piece 33, then over the fourth cross-piece 32, and the other edge of the strip is attached to the other one of the cross-pieces 31. This forms a frame which is inclosed completely by the cloth strip, except between the cross-pieces 31. In the complete machine I have provided one of these cloth-bearing sections for each of the chutes 25. In the accompanying drawings only three of these cloth-bearing sections are shown, and they are attached to the rotatable rims 23 by having their ends between the rims 23 and being attached to the lugs 29. Obviously these cloth-bearing sections may be easily and quickly removed, and any one may be removed without disturbing the others.

I have provided for each of the chutes 25 a flexible strip 35, which strips are attached to the outer edge of the chutes and also to the inner faces of the cross-pieces 31, so that the chutes may tilt to a limited degree relative to the cloth-bearing sections, and yet no dust or air may pass between the outer edges of the chutes and the inner edges of the strips 31.

I have provided means for propelling the rims carrying the cloth-bearing sections in such a manner that each cloth-bearing section will, when it reaches a position where its chute 25 is directly above the trough 18, stop and be held for a short period of time before passing beyond the trough 18, as follows: Formed on each of the shafts 24 is a roller 36 to project beyond the lever 26 and to be directly in the path of the lever 22. The shaft of the screw conveyer is constantly rotated by means of one or both of the pulleys 21, and obviously during this rotation the end of the lever 22 will strike the roller 36 and carry it a short distance before the lever 22 passes below the roller 36. When the end of the lever does pass below the roller, the rotary rims and cloth-bearing sections will, of course, stop until the opposite lever 22 engages the next one of the rollers 36, and during this interval the dust contained in the uppermost cloth-bearing section is made to drop through the chute 25 into the trough 18 and be conveyed by the screw conveyer 20 to a point of discharge, and as soon as this has been done the next cloth-bearing section is brought into position above the trough 18 by means of the lever 22.

I shall next describe the means by which the dust in the cloth-bearing sections is made to drop into the trough 18.

The numeral 37 is used to indicate a frame comprising ends and a top piece, which frame is supported directly above the machine by means of the braces 38, which are secured to the stationary frame members 11. Contained within the top of the frame 37 is a fan-housing 39, containing a rotary fan 40 on the shaft

41, and a pulley 42 is provided at the outer end of this shaft. The air-blast from this fan passes downwardly through the openings 43 in the top of the frame 37, and this opening 43 is large enough to include a complete cloth-bearing section. Mounted within the fan-housing is a knocker 44, held upwardly by the spring 45 and arranged to be capable of striking upon the top of a cloth-bearing section when pushed downwardly. On top of the fan-housing is an arm 46, to which a hammer 47 is pivoted. This hammer is provided with a contractile spring 48, attached to the hammer and to the arm 46 to exert its force in drawing the hammer downwardly. Pivoted to the hammer is an arm 49, slidingly supported in the guides 50 on the uprights 51. This arm 49 is designed to be engaged by the wheel 52, having one or more teeth 53 at one side of its periphery, and when the wheel 52 is rotated the teeth 53 successively engage and elevate the arm 49, together with the hammer 47, against the pressure of the spring 48, and when the teeth pass the end of the arm 49 the hammer will be rapidly dropped to engage the knocker 44. This operation will obviously shake the entire cloth-bearing section very violently each time the hammer descends. In addition to this the fan 40 will produce a back current of air to pass from the outer surface of the cloth downwardly through the cloth, thus dislodging the dust that has accumulated on the inner surface of the cloth, and all of this dust will pass into the trough 18 and be discharged. The said wheel 52 is fixed to a shaft 52^a, which may be rotated by any suitable means, and this shaft is provided with a pulley 52^b, connected by a belt 52^c with the pulley 42 of the fan 40.

I have also provided means whereby the chutes 25 will be tilted from a downwardly-inclined position at their inner ends to an upwardly-inclined position near the center of their upward movement, as follows: The numeral 54 indicates an arm fixed to the frame member 11, and this arm has a roller 55 on the inner surface of its outer ends, which roller is in position to engage the inclined ends 27 of the levers 26. As will be seen by referring to Fig. 1 of the drawings, the levers 26 will as they start on their upward movement incline downwardly at their inner ends, and when the rollers on the ends of the levers 26 reach the part 14 of the groove 13 the roller 55 will engage the inclined surface 27 of the lever. This will tend to retard the outer end of the lever and permit the inner end to move upwardly, so that when the levers pass the part 14 they will incline upwardly instead of downwardly, and then when the rollers 26 enter the part 15 of the grooves 13 they will assume a straight vertical position.

In practical use and assuming that a current of dust-laden air is passed through the air-trunks, it is obvious that this air will pass outwardly through all of the cloth-bearing sections, except the one protected by the frame at the top, leaving the dust on the inner surface of the cloth. It frequently happens that small grains and other solid substances will be forced through the air-trunks, and these of course will drop into the lower cloth-covered sections. Then after the chutes connected with each cloth-bearing section approach the top portion of their movement these chutes are turned, by means of the eccentric groove and the levers working therein, to such position that the chutes will hold any grain or solid substances that may drop from the cloth-bearing section downwardly, and the said chutes will carry such substances until the chute is turned to a vertical position, it will be directly above the trough 18. It has been previously explained how the cloth-bearing sections are rotated and stopped for a short space of time directly over the trough 18, and when in this position all of the solid substances contained in the section will drop by gravity into the trough, and in addition to this a current of air is forced by the fan from the outer surface of the cloth into the interior of the cloth-bearing section and at the same time the cloth-bearing section is violently shaken by the knocker, so that all of the dust in the cloth-bearing section is dropped into the trough 18 and carried away, as before explained. For purposes of repair or replacement it is obvious that any one of the cloth-bearing sections may be quickly and easily removed, so that access may be had to the interior of the machine or to the other sections of the same.

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

1. In a dust-collector, the combination of two stationary disks, each having a cam-groove, a rotatable side plate on each of said disks, a series of cloth-covered filter-sections secured between the side plates and open only to the interior of the machine, a chute adjacent to the inner end of each filter-section and open at its inner and outer ends, a flexible strip connecting the sides of the chutes and the filter-sections, shafts fixed to the chutes and crank-arms on the shafts, rollers on the crank-arms to enter the grooves in the stationary disks and means for receiving and carrying off dust from the uppermost chute, for the purposes stated.

2. A dust-collector comprising in combination two stationary end pieces, an air-trunk for introducing dust-laden air through one of said end pieces, a rim rotatably mounted on each end piece, a series of cloth-covered filter-sections secured to said rims and open at their inner ends, a chute at the inner end of each section, means for tilting said chutes when at their upper limit of movement to allow the

solid contents thereof to drop and for holding said chutes throughout the rest of their rotation in position to prevent solid substance from dropping from the section downwardly, a dust-conveyer below the uppermost chute, a fan above the uppermost filter-section so arranged that the air from said fan must pass through the cloth of the section and means for rotating the rims bearing the filter-sections intermittently, for the purposes stated.

3. A dust-collector, comprising in combination two stationary end pieces, a conveyer for introducing dust-laden air through one of said end pieces, a rim rotatably mounted on each end piece, a series of cloth-covered filter-sections secured to said rims and open at their inner ends, a chute at the inner end of each section, means for inclining the chutes during the rotation of the rims, a dust-conveyer below the uppermost chute, a fan above the uppermost filter-section, means for inclosing the uppermost filter-section so that the air from said fan must pass through the cloth of the section, means for rotating the rims bearing the filter-sections intermittently, and means for striking the uppermost filter-section when it is directly above the conveyer, for the purposes stated.

4. An improved dust-collector, comprising in combination two stationary end pieces, supporting-legs attached thereto, two circular rims rotatably mounted on the end pieces, a number of cloth-covered filter-sections mounted upon the rotatable rims and covered on all sides except the side toward the interior of the machine, means for discharging a current of dust-laden air to the interior of the machine, an open-topped trough on the interior of the machine, one of said end pieces having an eccentric groove with an enlarged portion near its top, a shaft mounted in said trough and projected through the end pieces, a wiper on the shaft, a screw on the shaft to carry the contents of the trough to a point of discharge, a chute for each cloth-covered filter-section open at its top and bottom, a supporting-shaft for each chute, said shaft having bearings in the rotatable rims, a lever on one end of each shaft, a roller on each lever to enter the eccentric groove and another roller on each lever to be engaged by the wiper on the screw-shaft and means for driving the screw-shaft.

5. An improved dust-collector, comprising in combination two stationary end pieces, supporting-legs attached thereto, two circular rims rotatably mounted on the end pieces, a number of cloth-bearing filter-sections mounted upon the rotatable rims and covered on all sides except the side toward the interior of the machine, means for discharging a current of dust-laden air into the interior of the machine, an open-topped trough on the interior of the machine, one of said end pieces having an eccentric groove provided with an enlarged portion near its top, a shaft mounted in said trough and projecting through the end pieces, a wiper on one end of said shaft, a screw on the shaft carrying the contents of the trough to a point of discharge, a chute open at its top and bottom for each cloth-bearing filter-section, a shaft for supporting each chute, said shaft having its bearings in the rotatable rims, a lever on the end of each of said shafts, a roller on each of said levers to enter the eccentric groove and another roller on each of said levers to be engaged by the wiper on the screw-shaft, means for rotating the screw-shaft and flexible strips connecting the edges of each chute with the edges of the adjacent filter-section.

6. An improved dust-collector, comprising in combination two stationary end pieces, supporting-legs attached thereto, two circular rims rotatably mounted on the end pieces, a number of cloth-bearing filter-sections mounted upon the rotatable rims and covered on all sides except the side toward the interior of the machine, means for discharging a current of dust-laden air into the interior of the machine, an open-topped trough on the interior of the machine, one of said end pieces having an eccentric groove provided with an enlarged portion near its top, a shaft mounted in said trough and projecting through the end pieces, a wiper on one end of said shaft, a screw on the shaft carrying the contents of the trough to a point of discharge, a chute open at its top and bottom for each cloth-bearing filter-section, a shaft for supporting each chute, said shaft having its bearings in the rotatable rims, a lever on the end of each of said shafts, a roller on each of said levers to enter the eccentric groove and another roller on each of said levers to be engaged by the wiper on the screw-shaft, means for rotating the screw-shaft and flexible strips connecting the edges of each chute with the edges of the adjacent filter-section, and means for automatically turning said levers on the shafts of the chutes from a downwardly to an upwardly inclined position when on their upward movement.

Des Moines, Iowa, January 16, 1902.

JOHN H. WALSH.

Witnesses:

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GEORGE HOULISTON.