(No Model.)

B. F. MIESENHELDER & C. S. McCOY.

DUST COLLECTOR.

No. 411,602. Patented Sept. 24, 1889.

FIG. 1.

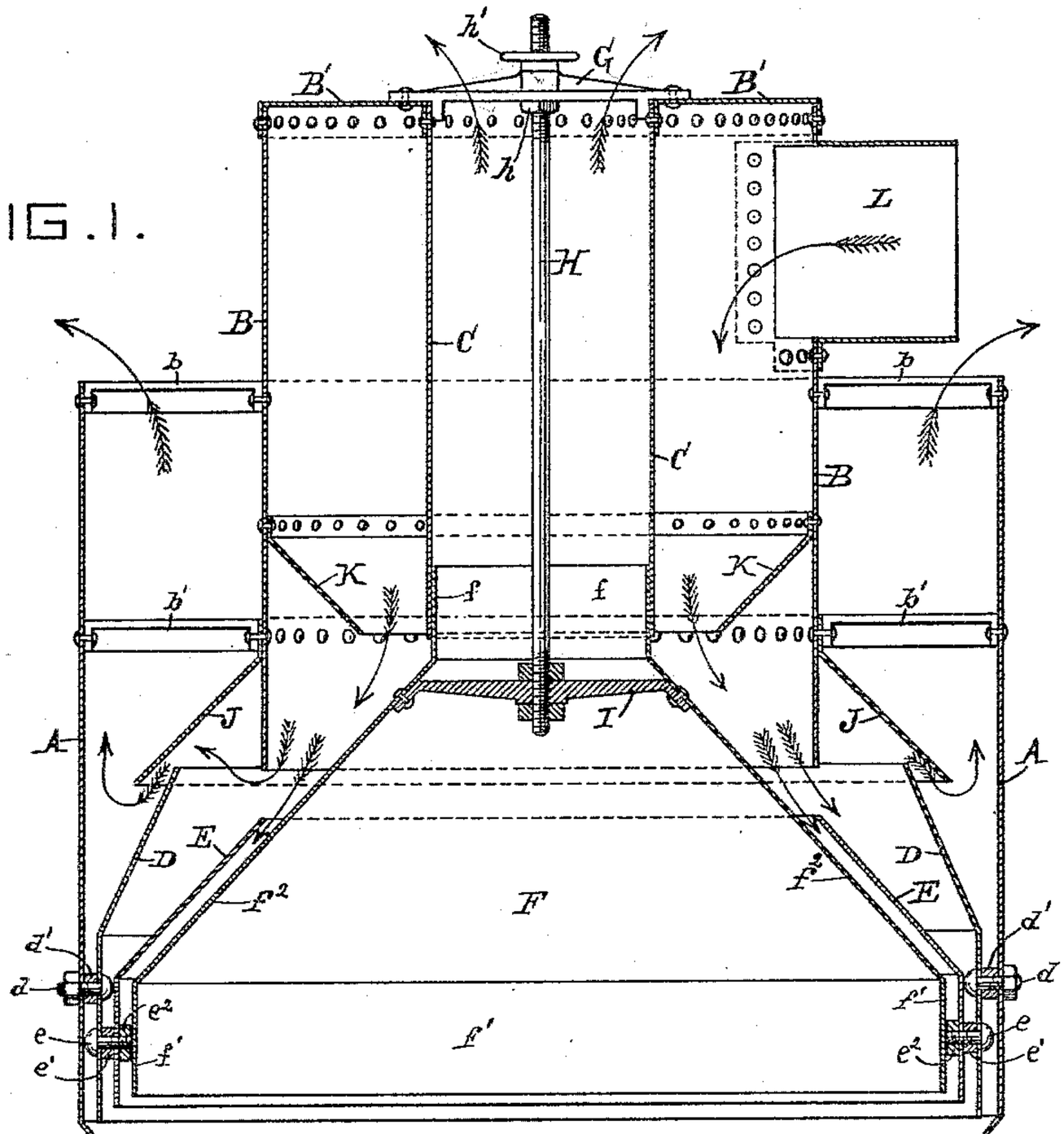
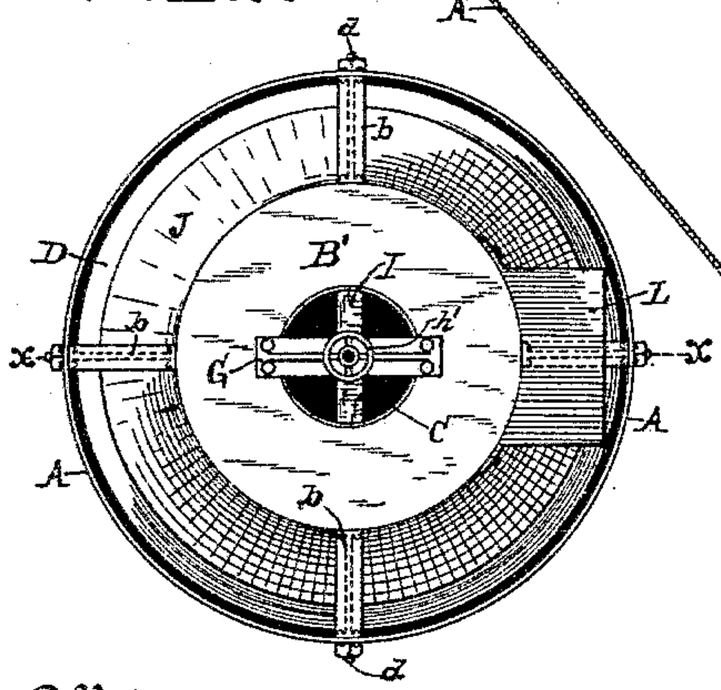


FIG. 2.



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DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 411,602, dated September 24, 1889.

Application filed June 20, 1889. Serial No. 314,973. (No model.)

To all whom it may concern:

Be it known that we, BENJAMIN F. MIESENHELDER and CHARLES S. McCOY, citizens of the United States, and residents of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Dust-Collectors, of which the following is a specification.

Our invention relates to dust-collectors and particularly to that class which are connected to the air-discharge from purifiers, scourers, and separators used in flouring-mills.

Its object is to effect a complete separation of the dust from the air, and discharge the dust and other impurities from the bottom of the machine while the freed air is allowed to escape from the top. These objects we accomplish by the means hereinafter described, and illustrated in the accompanying drawings.

Referring to the drawings, in which like parts are indicated by similar reference-letters wherever they occur, Figure 1 is a central vertical section of our improved dust-collector taken through line $x\,x$ of Fig. 2, which is a top or plan view upon a diminished scale.

The upper part of the outer shell A is cylindrical and the lower portion is conico-cylindrical, and has an opening at its lower end which is closed by a valve a, which is controlled by a weighted lever a'. Within the upper part of the shell A is centrally secured the cylinder B by stay-bars $b\,b'$. Within the cylinder B is a smaller cylinder C. The cylinders B and C are united at their top edges by the flanged cap B′, which closes the space between the two cylinders at the top with an air-tight joint. Within the lower part of the cylindrical body A is rigidly secured a shell D, the lower portion of which is cylindrical and the upper portion conico-cylindrical. The shells A and D are secured together by bolts d and their tightening-nuts. The bolts pass through the two shells and through intervening collars d', which stay the two shells apart. Within this shell D is secured a similarly-shaped shell E, but of less diameter. The shells D and E are secured together and at the proper distance apart by bolts e, which pass through the shell D, intervening collars e', the shell E, and are tapped into nuts e^2, inside the shell E.

Within the shells E and C is hung an inverted-funnel-shaped shell F, the upper portion f of which is cylindrical and is fitted to slide in the lower end of cylinder C. The lower portion f' is also cylindrical, and is stayed off from the cylindrical part of shell E by the intervening nuts e^2. The conico-cylindrical part f^2 of the shell F is inclined at the same angle to the axis as the conico-cylindrical upper part of shell E, so that the space between the inclined parts of both shells may be increased or diminished by lowering or elevating the shell F, the inclined portion f^2 thus, in addition to its other functions, acting in connection with the inclined part of shell E as a valve to regulate the supply of air to the cone end A′ of the outer shell and thence to the central exhaust through cylinder C. The shell F is hung from a cross-bar G, which is secured upon the cover B′ and extends across the upper open end of the cylinder C by a rod H. The lower end of the rod is secured in the hub of a spider I. The outer flanged ends of the spider-arms are riveted to the inside of the part f^2. Both ends of the rod H are screw-threaded and pass loosely through the spider I and bar G, respectively. The lower end has nuts above and below the hub of the spider. The vertical adjustment of the shell is effected by means of the nut h, below the bar G, and the hand-wheel h' above it. For instance, if it is desired to contract the air-space between the cone parts of shells E and F, the nut h is loosened and the rod drawn up by rotating the hand-wheel h' to the right until the air-space is contracted as much as desired, when the nut h is tightened up and the relative position of the parts permanently retained. To increase the air-space between the two shells the hand-wheel is turned to the left or unscrewed until the shell drops down the desired distance, after which the nut h is tightened up underneath the bar G.

Around the outside of cylinder B is secured the conico-cylindrical shell J, and to the inside of the same cylinder is secured a similar but inverted shell K. Both of these shells

have cylindrical flanges, through which they are riveted to the cylinder B. The inner ends of the stay-bars *b'* rest against the flange of shell J. Its securing-rivets pass through this flange, the flange of the stay-bar, and the walls of cylinder B. The lower flaring edge of the shell J overhangs the upper edge of the shell D, so as to leave a contracted air-space between the two. The upper part of the cylinder B is perforated and has a short rectangular neck L secured around the opening to connect with the exhaust-spout from a purifier, grain-cleaner, or similar machine.

The direction of currents forced into the collector is indicated by the arrows, and the operation of the device is as follows: The dust-laden air enters the device through the neck or throat L, and as it has no escape upward by reason of the closed top of cylinder B, is forced downward, first striking the inwardly-inclined wall of the shell K, by which it is deflected toward the center and against the outside of the shell F, the heavier portions of the dust passing downwardly, while the air and some of the lighter particles of dust strike against the inside of shell J, by which they are again deflected downwardly, the dust, if any remains in the air, by its gravity passing downwardly between the shell D and the outer cylinder A. The purified air passes up and out through the open top of the cylinder A. The dust falling upon the inner shells drops by gravity, assisted by the downward pressure of the air-blast, into the cone end A' of the outer casing. As the openings to this cone end are contracted, while the center exhaust-opening through the cylinder C is free, there is no upward pressure through this center exhaust, the force of the blast being expended before it reaches the cylinder C. The dust will therefore settle in the cone end A', while only air freed from dust will pass out of the upper opening.

The valve *a* is so regulated (according to the material under treatment) that it will automatically open when the cone end is partially filled with dust, so that there is no escape of air or dust-laden air from below. Should the operator discover that the air from the upper central discharge contains any dust the force of the current is reduced by contracting the opening between the shells F and E, as before described. The shells are all made of sheet metal securely bolted together. There are therefore no parts to get out of repair or require any attention after the device is fitted up for use.

We have shown and described our invention in what we find to be its best form, but do not limit ourselves to the exact construction shown, as it is evident that many mechanical modifications may be made without departing from the spirit and scope of our invention. For instance, it would be only an inferior modification to omit the means for vertically adjusting the shell F and secure it permanently in position by making it a part of tube C or permanently securing it thereto by riveting the neck *f* to the lower end of said tube, and good but not perfect results would be obtained if either the shell K or shell E were entirely omitted. In fact, the parts A, A', B, B', C, L, and F, if permanently secured in the relative position to each other shown, will effect a better separation than machines now in common use, which are much more expensive to construct and require more attention in use.

We claim as new and desire to secure by Letters Patent—

1. In a dust-collector, the combination of the outer shell A A', the cylinder B, and stay-bars connecting them and leaving a free-air passage at top between the two, the inner cylinder C, open at the top, the cap B', to close the opening between cylinders B and C, the inlet L, to the top of the chamber between the cylinders B C, and the inverted funnel F, connected to the lower end of cylinder C and having its enlarged flaring lower end extending outwardly, so as to form a contracted annular passage between it and the shell A, substantially as and for the purpose set forth.

2. The combination, substantially as hereinbefore set forth, of the cylinders A B C, connected together, as shown, the inverted funnel F, connected at its upper end with the inner cylinder C, the cap B', closing the top of cylinder B, surrounding the central opening, and the inverted conico-cylinder K, secured to the inside of the cylinder B.

3. The combination of the outer case, the inner cylinders B C, and inverted funnel F, connected together, as shown, with the shell K, secured to the cylinder B, the shell D, secured in the lower part of the outer case, and the bolts, nuts, and collars for securing the said shell D to the other shell and leaving an air-space between them, substantially as shown and described.

4. The combination of the outer case, the inner cylinders B C, the cap B', closing the top of the cylinder B, the shell F, connected to the cylinder B, the shell D, within the lower part A of the outer case and separated therefrom, and the shell J, secured at its smaller end around the cylinder B and having its lower flaring edge overhanging the upper edge of the cylinder D, substantially as shown and described.

5. The combination, substantially as specified, of the outer shell A A', the cylinder B, and stays *b b'*, connecting the two, the inverted-funnel-shaped shell consisting of the parts F *f f'*, and cylinder C, centrally located within said shells A B, the shell D within the lower part A of the outer case, the shell J, overhanging the upper end of shell D, and the shell K, secured inside of cylinder B to deflect the air toward the shell of said central funnel.

6. The combination of the outer shell A A', the cylinder B, cylinder C, and shell F *f f'*, the shell J, outside of cylinder B, and shell K,

within it, and the shells D and E, arranged in the lower part A of the outer case and separated from each other, substantially as shown, and for the purpose specified.

7. The combination, substantially as set forth, of the outer case A A′, the cylinders B C, the stays to connect the case to cylinder B, the cap inclosing the space between the two cylinders at the top, the shells D E, arranged in the lower part of the case, with the shell F, having the neck *f* to slide within the lower end of cylinder C, and the part f^2, parallel with the inclined portion of the shell E, and means, such as shown, to vertically adjust the shell F with relation to the shell E to regulate the passage between the two, for the purpose set forth.

8. In a dust-collector such as described, consisting of cylindrical shells, one within the other, and separated, as shown, the said outer and inner cylinders being open at the top, and the intermediate cylinder closed at the top and having an induction-port near its upper end, the combination of the shell F, having neck telescoped in the lower end of the central cylinder, the spider secured to said shell, the bar G, crossing the upper end of the said central cylinder, the rod H, passing through said bar and having its lower end secured to the spider, the hand-wheel and nuts to vertically adjust the shell F, and the outer shell E, of similar shape surrounding said shell, for the purpose set forth.

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