O. M. MORSE.

DUST COLLECTOR.

APPLICATION FILED JAN. 9, 1905.

943,439. Patented Dec. 14, 1909.

3 SHEETS—SHEET 1.

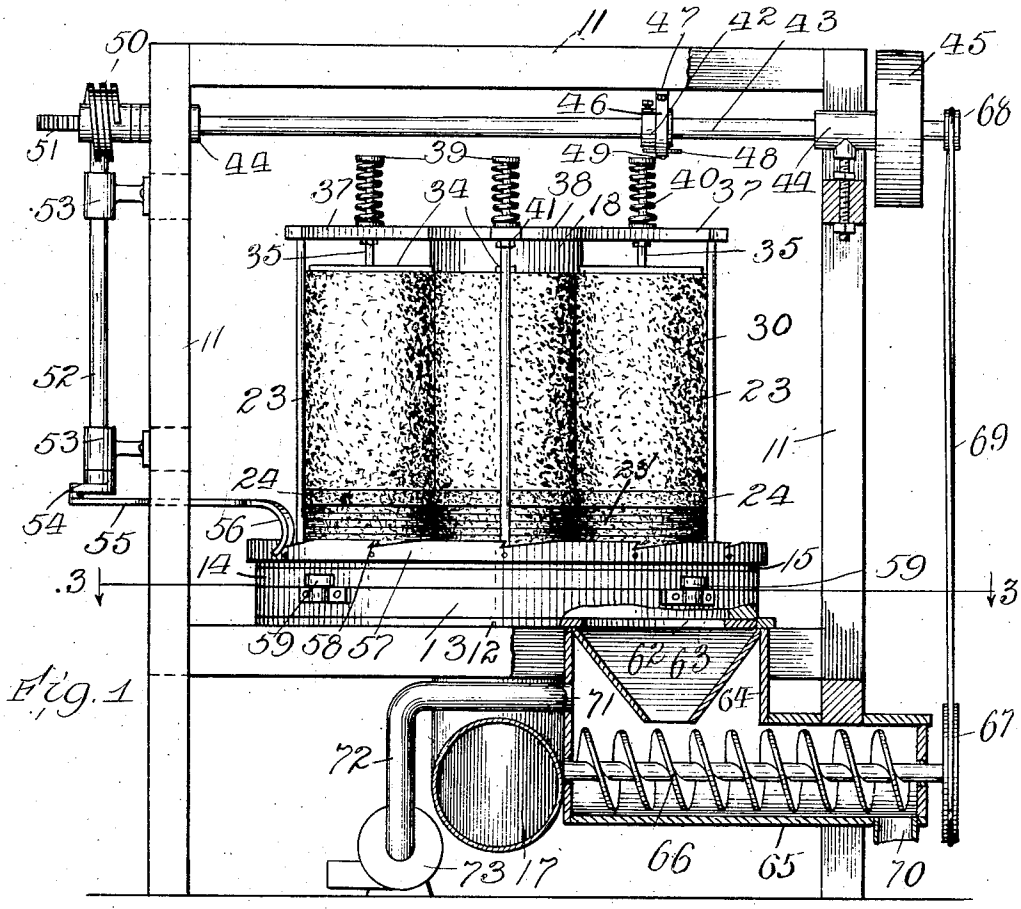

Fig. 1

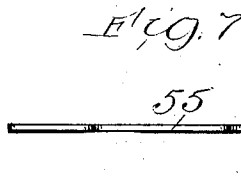

Fig. 7

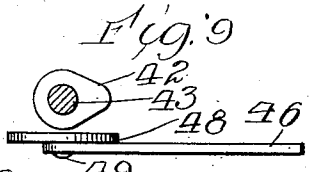

Fig. 9

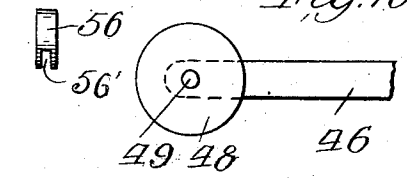

Fig. 8

Fig. 10

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3 SHEETS—SHEET 2.

Fig. 2.

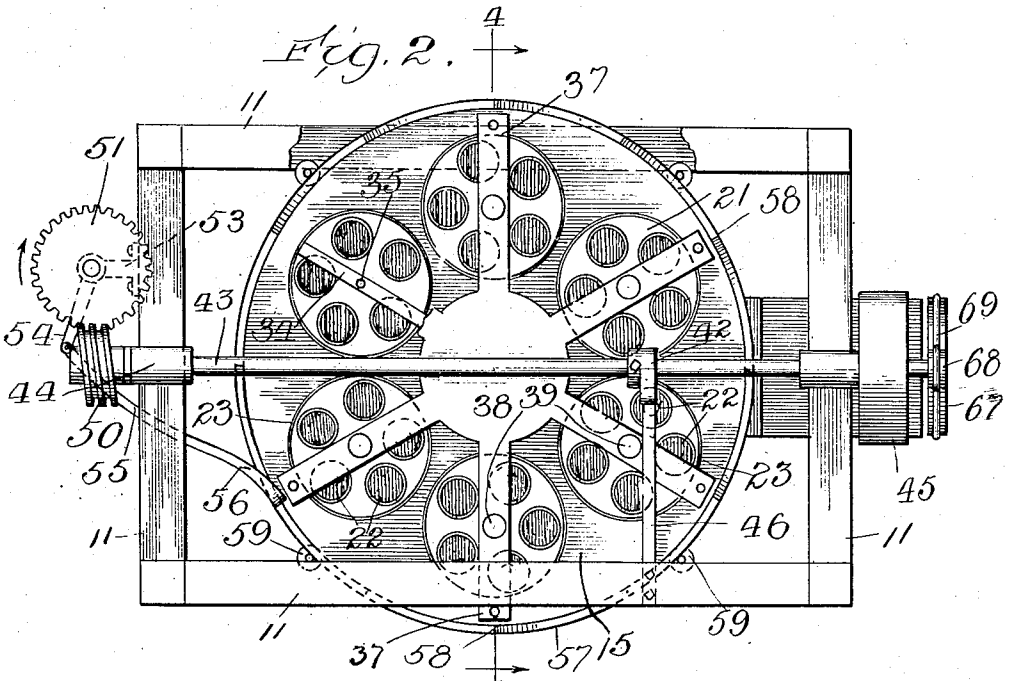
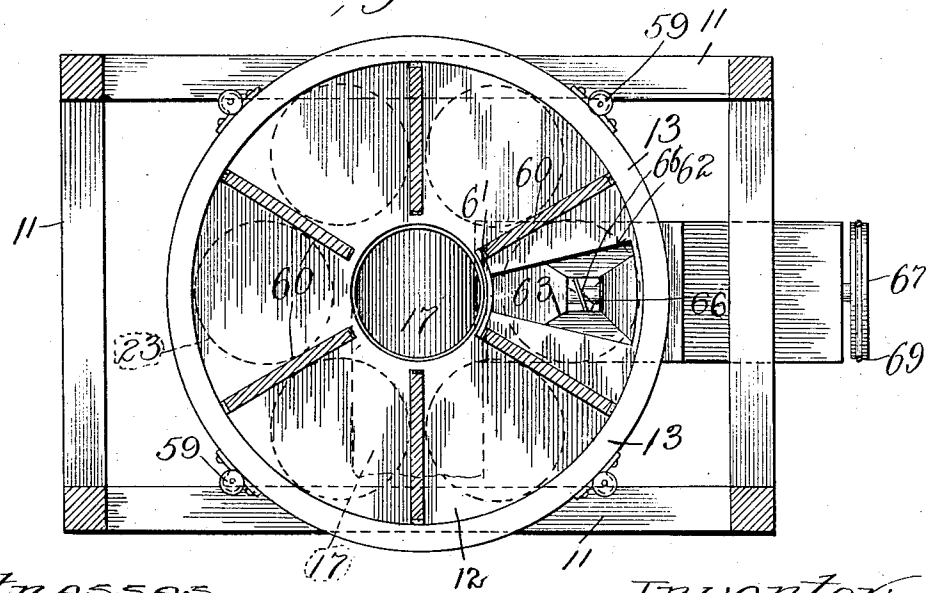


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 4

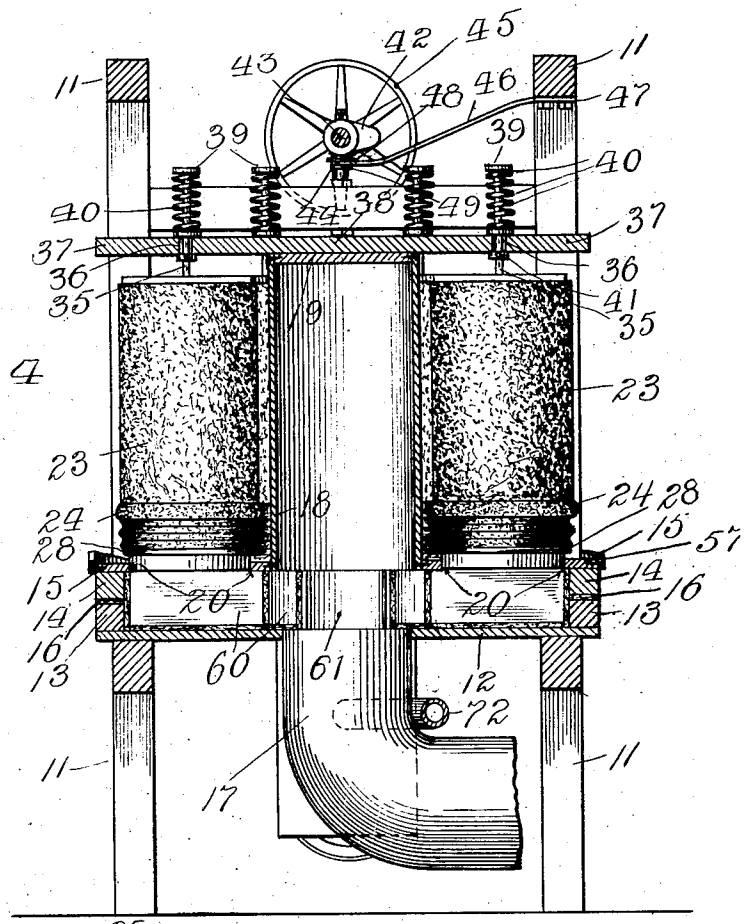


Fig. 5.

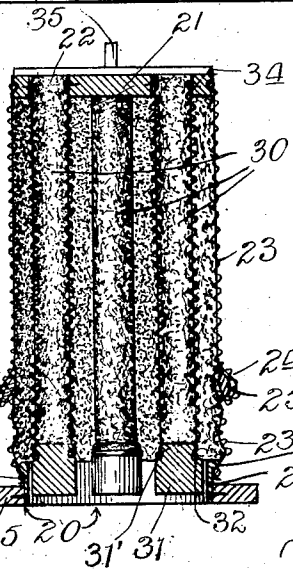
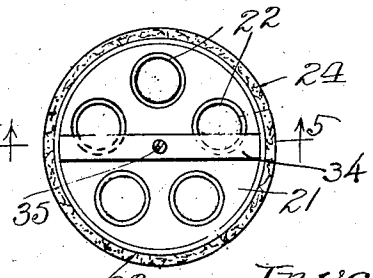


Fig. 6.



Witnesses:
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UNITED STATES PATENT OFFICE.

ORVILLE M. MORSE, OF JACKSON, MICHIGAN.

DUST-COLLECTOR.

943,439. Specification of Letters Patent. Patented Dec. 14, 1909.

Application filed January 9, 1905. Serial No. 240,348.

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 improvements in dust collectors, and more particularly to dust collectors wherein the air is freed from dust by passing it through a cloth, or fabric.

The primary object of my invention is to provide in a dust collector of the class described an improved and highly efficient arrangement for cleaning fabrics.

A further object of my invention is to provide a dust collector of generally improved construction.

More specific objects may be ascertained by reference to the following specification.

In the drawing: Figure 1 is a side elevation, with parts in section, of a machine embodying my present invention. Fig. 2 is a plan view thereof. Fig. 3 is a transverse, horizontal section on line 3—3 of Fig. 1. Fig. 4 is a transverse vertical section on line 4—4 of Fig. 2. Fig. 5 is a transverse vertical section of a single fabric collector element taken on line 5—5 of Fig. 6. Fig. 6 is a plain view of said element. Figs. 7 and 8 are respectively side and end elevations of a pawl. Figs. 9 and 10 are details of a buffer construction.

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

Referring now to said drawings, 11 indicates a suitable frame whereon is disposed a circular floor 12 to which is secured a circular wall 13 coacting with said floor to form the lower section of a distribution chamber, the upper portion of which is provided by the annular wall 14 and deck 15. Said deck 15 and wall 14 are rotatable, the joint between the wall 14 and deck 15 is preferably packed, as with sheep skin, as indicated at 16.

Into the bottom of the floor 12, preferably at or near the center thereof, leads the air inlet spout 17, and immediately above said inlet spout in the deck 15 I preferably provide an aperture and arrange in communication therewith a cylinder 18, preferably of metal or other imperforate material, and having its top closed as at 19.

In the deck 15 surrounding the cylinder 18 are made a series of relatively large apertures 20 one for each fabric collector element, any number whereof may be provided.

Various specific constructions of fabric-collector elements may be employed in the practice of my present invention, but the novel and advantageous construction which is best shown in Figs. 5 and 6, comprises a top plate or board 21 having a plurality of apertures 22 therein, and having secured about its exterior a fabric cylinder opening at its lower end into the distribution chamber, and having suspended in each aperture 22 a fabric tube closed and weighted at its lower end and open at its upper end.

Specifically 23 indicates a fabric cylinder the length of which is preferably greater than the distance from the top board 21 to the deck 15, said cylinder having formed therein near its lower end a pocket 24 wherein is contained a weight or weights, preferably a long lead strip or series of short strips 25. Said weight 25 tends at all times to keep the upper portion of the cylinder 23 taut but below said weight the fabric cylinder is slack, as indicated at 23′, for a purpose to be described.

Union is preferably effected between each fabric cylinder 23 and the deck 15 through the agency of a metallic band 26 forming a bushing for the aperture 20 and having at its upper end a flange or beading 27 over which the loose portion 23′ of the cylinder 23 passes. A strap, cord or wire 28 is bound over the fabric 23′, below the flange 27 and serves to tightly fasten the fabric to the band 26.

The fabric tubes 30—30, open at their upper ends, are secured within the apertures 22, as by means of tacks or the like, and are freely suspended from such points of attachment. Preferably each fabric tube 30 extends down to a point slightly above the upper end of the band 26 and is secured to the reduced, grooved portion 31′ of a block 31, the lower portion of which projects laterally beyond the lower end of the tube. 32 indicates a strap, cord or wire securing the fabric to the reduced portion 31′ of the block 31.

To provide yielding means for normally maintaining the fabric collector as a whole in predetermined position, I preferably secure to the top board 21, or to a reinforcing strap 34 secured thereto, a rod 35 extending upward through an aperture 36 in one of

the arms 37—37 of a spider 38 secured to the head 19 of cylinder 18, said rod 35 having on its upper end a head 39 between which and the spider arm 37 is arranged a spring 40 tending to hold said rod in its uppermost position, said position being determined by the contact of a stop 41 upon the rod 35 with the under side of the spider arm 37.

As a convenient means for jarring the fabric elements I provide a cam 42 mounted upon a main driven shaft 43 in such position that the rods 35, when the rotary deck member is turned, pass therebeneath, said shaft being mounted in suitable bearings 44 which are preferably vertically adjustable and provided with a pulley 45 or other means for applying power thereto.

When the rod 35 stands in vertical alinement with the shaft 43, rotation of the shaft 43 would cause the cam 42 to strike and depress said rod at each revolution, but such a stroke would be shearing, and to prevent bending of the rod by such shearing stroke I prefer to provide between the cam and the head 39 of the rod a buffer member, one such member being herein shown as serving for all of the rods, said member specifically comprising a leaf spring 46, at one end secured to a convenient part of frame 11, as at 47, and at its free end provided with a plate 48 of fiber or like material, which extends in such position as to lie between the cam 42 and any rod-head 39 that may pass therebeneath.

If desired the fiber plate may be omitted and the spring 46 extended to underlie the cam, as described, but I prefer to employ the fiber plate, and to make said plate of relatively large diameter and pivot it as at 49 to the spring 46.

I provide in the machine means for automatically rotating the rotatable deck member and the parts associated therewith for movement, such means being herein shown as a pawl and ratchet movement operated from the driven shaft 43.

Specifically 50 indicates a worm wheel carried by the shaft 43 and meshing with the gear 51 mounted on an upright countershaft 52 supported in suitable bearings 53, and at its lower end provided with a crank 54, to which is pivotally connected the pawl 55 having a curved or hook end 56 provided at its extremity with a notch 56′ arranged to overlie and engage with a circular crown-ratchet 57 mounted upon the deck member 15 preferably near the edge thereof, and having formed at its upper edge notches or teeth 58.

The ratchet teeth 58 are so disposed and the throw of the pawl 55 is such that the step by step rotation of the deck successively brings the stems 35 of the several fabric collector elements into position to be acted upon by the cam jarring mechanism at the end of the movement of the pawl, so that each stem remains in operative association with the cam-jarring mechanism until the pawl has begun to make return stroke.

59—59 are rollers mounted on wall 13 and bearing against wall 14 for guiding the rotary deck member in rotation.

To provide means for segregating the fabric collector element being acted upon by the cam from the body of the distribution chamber and the other collector elements, I provide the radial partition walls 60 secured to the deck member 15 between the apertures 20, and extending inward to points adjacent the cylinder member 18, and arrange upon the floor 12 the curved wall 61 with which the partitions on both sides of the fabric element positioned for coaction with the cam may make contact, said wall 61 extending into close proximity to the deck member 15, so that by said wall 61 the walls 60 and the peripheral wall sections 13 and 14 there is laterally inclosed a chamber having no communication with the distribution chamber.

In the floor member 12 is provided an aperture 62 communicating with the hopper 63 arranged within the shell 64 and at its lower end opening into a conveyer trough 65 wherein is arranged a conveyer screw 66, suitably driven as by pulleys 67 and 68 respectively mounted on the conveyer shaft and the driven shaft 43, and the belt 69, said conveyer being adapted to convey material falling from the hopper into the conveyer casing 65 to a suitable outlet 70.

Suitable provision is made for drawing air inwardly through the collector element segregated for cleaning, and to this end I provide in the shell 64 an opening 71 with which communicates the trunk 72 leading to the eye of a suitable fan 73. Obviously the fan 73 may be the same fan that propels the dust through the inlet 17, or it may be a separate fan.

The action of the machine constructed as above described will be as follows: The dust laden air propelled into the machine through the inlet 17 enters the distribution chamber and the cylinder 18, and distributes itself to the several collector elements communicating with the distribution chamber. Through the fabric collector elements the air escapes, passing outward through the outer cylinders 23 and inward to the axes of the tubes 30 whence it escapes through the open ends thereof. In traversing the fabric the dust is deposited so that the air escapes in a relatively free condition. The shaft 43 being power driven motion is communicated through the countershaft 52 to the pawl 55 which slides forward and back upon the ratchet member 57, at each back stroke moving the rotary deck member with its associated collector elements a step in advance.

As heretofore described each collector element is positioned so that stem 35 alines with the cam 42 at the end of a working stroke of the pawl, so that the elements dwell in such position during the interval of time in which the pawl makes its next forward or inactive stroke. During this interval the cam 42 makes a number of revolutions, according to the gearing relation of the parts, and at each revolution strikes upon the buffer plate 48 which communicates a blow to the head 39 of the stem 35, depressing said head against the tension of its spring 40 and then allowing it to snap back, giving the collector element a jerk.

I find that the buffer element serves two useful purposes. When it is omitted the machine is operative, but the shearing blows of the cam upon the heads of the stems tend to bend the stems, and further the blows of the cam upon the stems are accompanied by some noise. In the construction shown, however, the fabric buffer, secured to the spring 46 which extends in at right angles to the cam shaft, moves in a practically vertical line under the blows of the cam so that the shearing motion is not imparted to the stems 35, and, therefore, they are not bent. Further the buffer, being constructed of fiber or other suitable material, deadens the noise of the impact of the cam. The preferred construction of buffer shown is such that if wear takes place on one portion of the buffer it may be rotated to present a fresh surface to the action of the cam, and its life thereby lengthened.

It will be noted that the construction of each fabric element is such that it provides a plurality of fabric members—the tubes 30—each suspended from its upper end and free and weighted at its lower end, said members being arranged within striking distance from each other so that when jarred their lower ends may freely swing and strike each other; and that it further provides a fabric member—the cylinder 23—suspended from its upper end, weighted near its lower end, and so loosely associated with the deck member that its weighted portion is free to swing and become distorted in various directions, while at the same time no free opening is ever left between the deck and the pocket supporting plate 21. This arrangement I find to be peculiarly advantageous. I find from experience that a fabric member interposed in the path of escape of the air suspended from its upper end and free and weighted at its lower end will, if jarred at intervals, to cause the weighted lower end to jump around or dance, keep operatively clean for an indefinite period, and that the surface cleaned will not be confined to any one locality of the fabric but that the entire surface is cleaned. Furthermore, I find that this cleaning action is augmented when the fabric members are so collocated that in dancing or jumping about they strike each other with their weighted end.

In the specific construction herein shown it will be noted that provision is made to prevent the wearing of the cloth of the tubes by the blows of the weighted end of the adjacent fabric members, the blocks 31 being preferably so long that their lower edges strike each other rather than the cloth, and the cloth being held in upon the reduced portion 31′ of each block.

During the time a fabric element is being acted upon by the jarring mechanism, it is subjected to a reverse current, air being drawn by the fan 73 inward into the area inclosed within the cylinder 23 through the fabric cylinder and through the tubes 22, so that as dust is shaken off or loosened it is drawn downward through the opening 62 into the hopper 63, whence it falls into the conveyer trough 65 and it is conveyed by the screw 66 to point of discharge 70.

While I have herein described in some detail an embodiment of my invention which I find to be operative and successful in practice, I do not desire to be understood as limiting myself to the specific details of construction thereof further than as specified in the claims, as it will be apparent that departures might be made in the construction without departing from the spirit and scope of my invention.

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

1. In a dust collector, a structure having an opening in its bottom for the reception of air, and providing a peripheral wall and a top having therein a plurality of outlet openings, a like plurality of fabric tubes, each closed, free, and weighted at its lower end, suspended from the top in positions, respectively, to cover the several outlet openings in said top, the tubes being arranged within striking distance of one another, and means for jarring the fabric members to cause them to strike one another.

2. In a dust collector, an air chamber having an outlet opening in its top, an air receiving structure above and communicating with said outlet opening, said structure comprising a peripheral wall surrounding said outlet opening and a top provided with a plurality of apertures; a like plurality of fabric tubes each opening endwise to one of the apertures in said top, said tubes being suspended side by side from said top within striking distance of one another, and free, closed and weighted at their lower ends, and means for jarring the tubes to cause their free, weighted ends to dance about and strike one another.

3. In a dust collector, a deck having an aperture through which dust-laden air

passes; a fabric collector element comprising a support above the deck aperture, said support having an outlet opening therein, a fabric member loosely connecting the support and deck and surrounding said deck aperture, a weight intermediate the ends of the fabric member, suspended by said member, a fabric tube within the said fabric member, surrounding and opening into the outlet in the support, said tube being suspended from said support, and free, closed and weighted at its lower end; and means for jarring the element.

4. In a dust collector, an air directing part having an aperture therein through which dust-laden air passes; a fabric collector element comprising a support above said aperture, said support having a plurality of outlet openings therein, a like plurality of fabric tubes suspended side by side from said support within striking distance of one another, each of said tubes at its upper end opening into one of said outlets and at its lower end closed, free and weighted, a fabric member surrounding said support and the aperture in the air directing part, and connecting said elements, and means for jarring the fabric collector element.

5. In a fabric dust collector, a plurality of fabric tubes, each open at its upper end, and suspended from said upper end, a block at the lower end of each tube closing said tube and projecting beyond the bottom thereof to give blows to and receive blows of the blocks of the other tubes, means for supplying dust laden air to said tubes and means for jarring the tubes.

6. In a fabric dust collector, a plurality of fabric tubes, each open at its upper end, and suspended from said upper end, a block at the lower end of each tube closing said end, each block having a reduced upper portion to which the fabric is secured, said tubes and blocks being arranged so that the blocks strike each other when the tubes are jarred, means for supporting dust-laden air to said tubes and means for jarring the tubes.

7. In a dust collector, a frame part, a fabric collecting agency below the frame part having a rod projecting through said frame part, means for normally holding said agency and rod yieldingly in elevated position, a rotatable cam arranged for coaction with the rod when the rod is directly therebelow, and a buffer comprising a supporting spring and a plate constantly positioned by the spring directly below the cam for interposition between the cam and the rod therebelow.

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

ORVILLE M. MORSE.

Witnesses:
WILLIAM B. KNICKERBOCKER,
JOHN L. BENTLEY.