

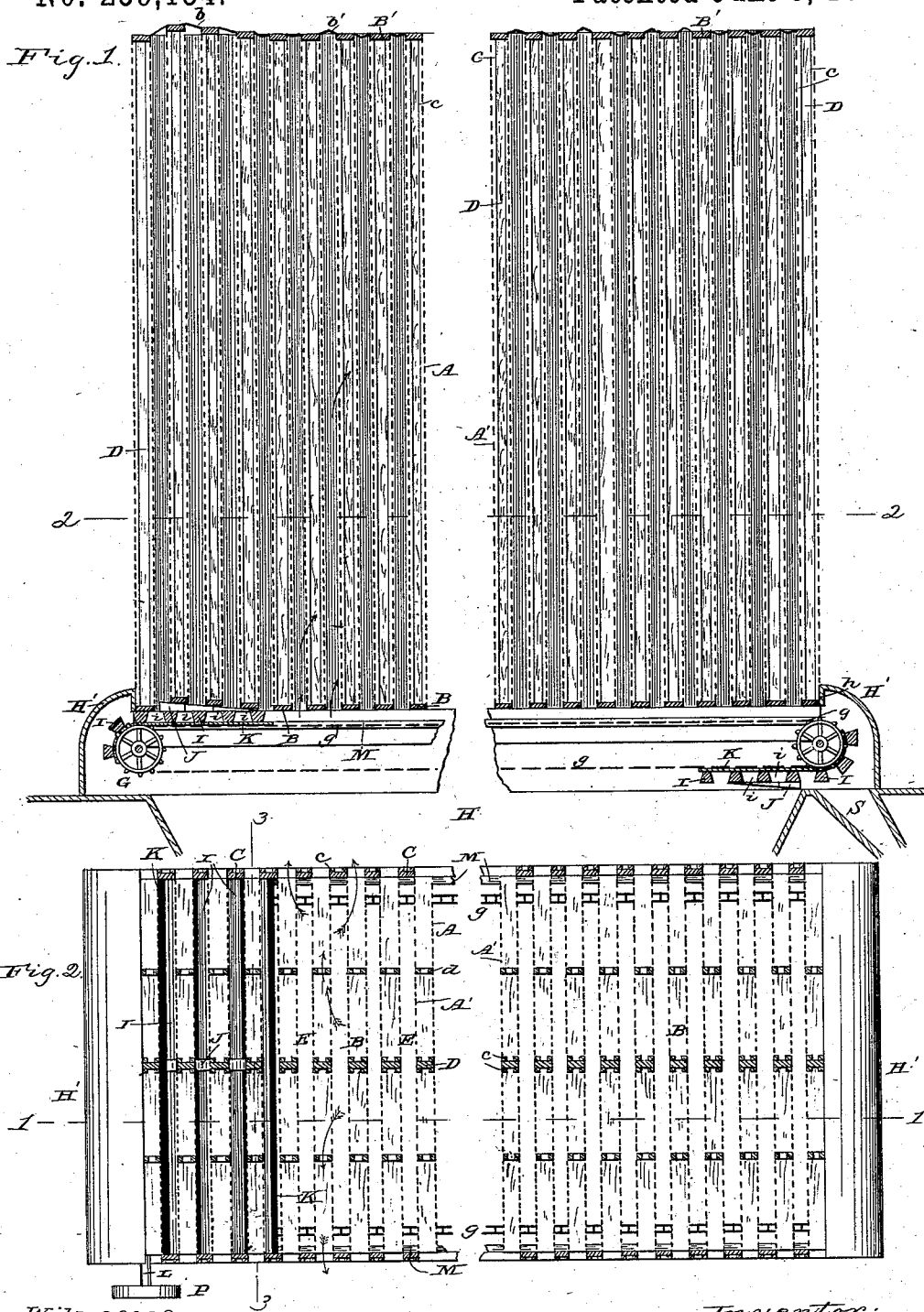
(No Model.)

3 Sheets—Sheet 1.

N. W. HOLT.  
DUST COLLECTOR.

No. 259,154.

Patented June 6, 1882.



Witnesses:

H. V. Low  
J. S. Barker

Inventor:

Noah W. Holt.  
by Doubleday & Bliss  
Atty. S.

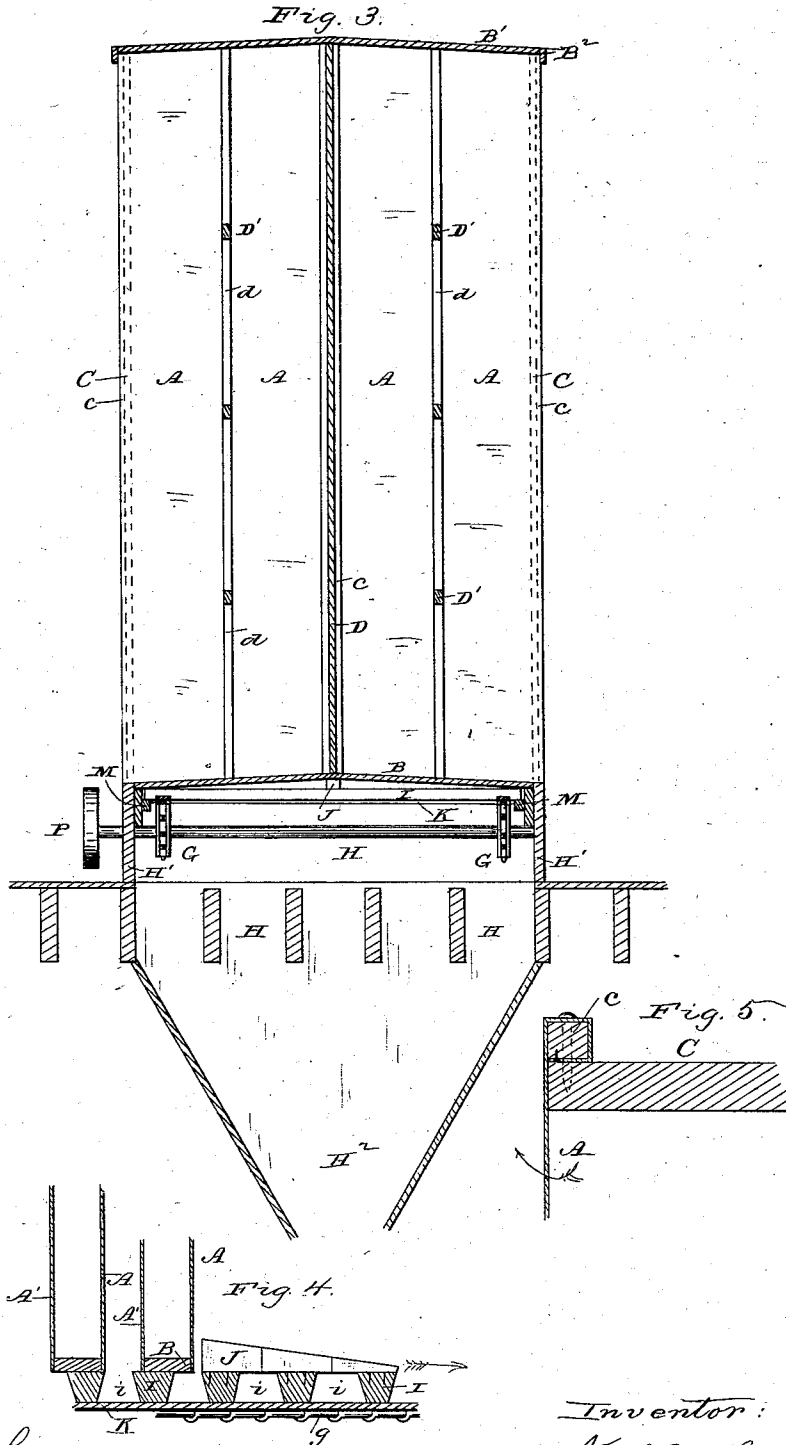
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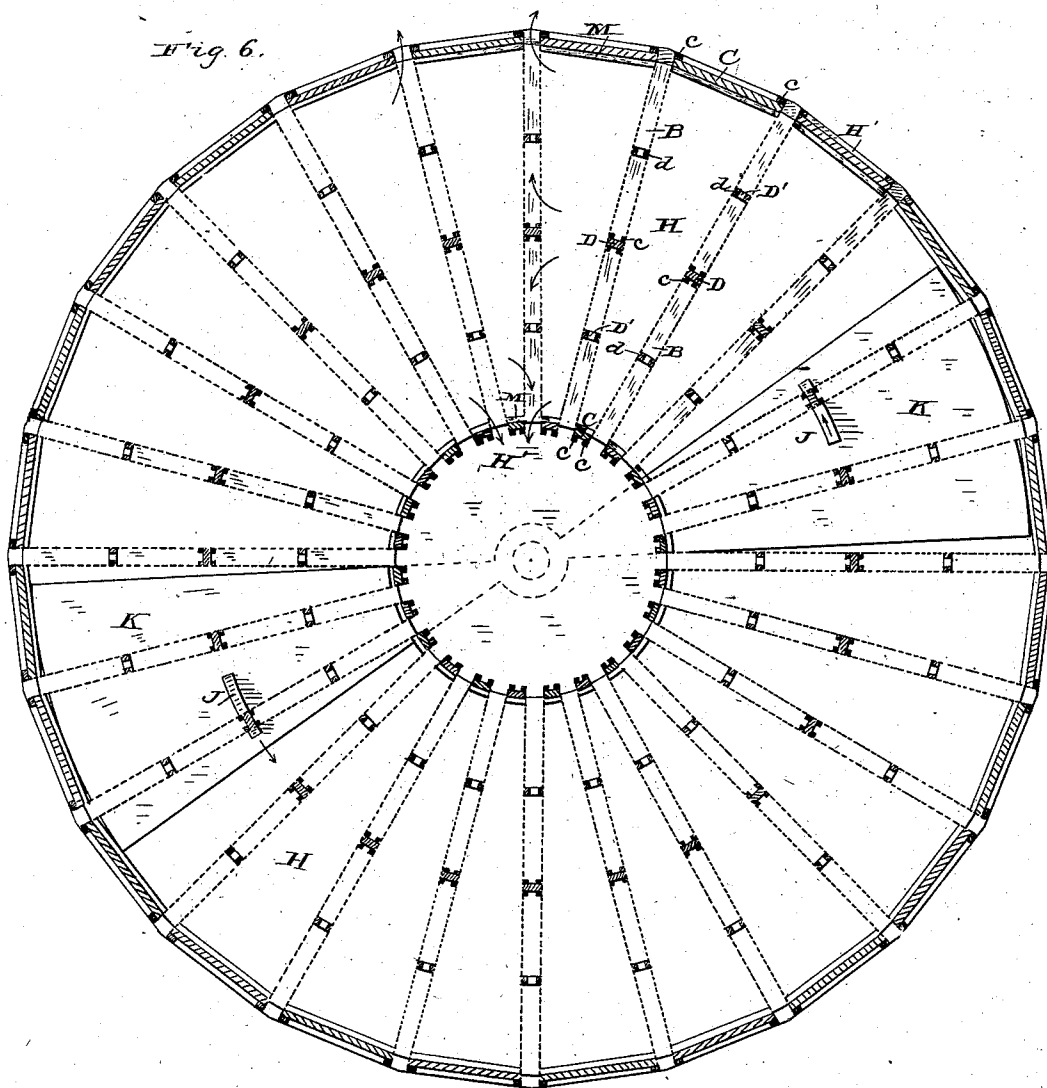
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# UNITED STATES PATENT OFFICE.

NOAH W. HOLT, OF BUFFALO, NEW YORK, ASSIGNOR TO CHARLES R. KNICKERBOCKER, OF JACKSON, MICHIGAN.

## DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 259,154, dated June 6, 1882.

Application filed April 18, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, NOAH W. HOLT, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Dust-Collectors, of which the following is a specification, reference being had therein to the accompanying drawings.

I employ two or more cloths or screens for collecting the dust, of which one or more are performing the work of collecting dust while the cleaning of the other or others is being effected. Preferably these cloths are arranged vertically, being so situated that chambers or bags are formed. The cloths and the chambers may be arranged parallel to each other throughout the whole series; or they may be arranged on lines radial to a common center.

I employ traveling devices for dislodging the dust, which are placed in close proximity to the cloths or to the frames which hold them. When the cloths or chambers are arranged parallel to each other throughout the whole series the traveling dust-dislodging devices are preferably so placed as to travel on straight lines. When the cloths or chambers are arranged radially around a common central line the dust-dislodging devices are so arranged as to move around the said central line and to be carried by a shaft mounted on that line. The cloths or chambers are so situated as to be all supplied from a common duct. The cloths are secured to frames or supporting-pieces. These supporting-pieces are so arranged that at least one end or edge of the cloths or chambers can be moved when the dust is to be dislodged, and may be arranged so that both ends shall be moved together. By means of the supporting frame or frames two or more of the cloths are connected in such manner that they shall be simultaneously moved when the dust is to be dislodged, for when so connected a chamber or bag may be formed with the cloths, which chamber or bag can at one time be opened for receiving an air-current and at another time closed to permit the dislodging of the dust. Those ends of the collecting-chambers which receive the air-current are inclosed by a tight chamber situated between the col-

lecting-chambers and the introducing air-duct 50 which leads the air from the dust-producing mechanism. This intermediate chamber operates to guide the air which it receives with the dust into the collecting-chambers and to hold a traveling cut-off, a dust-dislodging mechanism, and a dust-withdrawing mechanism. The collecting-chambers are open at one end to receive the dust-laden air, and at the opposite ends they are closed or covered, the closing or covering devices operating to compel the air to pass 60 through the cloths before escaping. A cut-off or damper is arranged to travel across the open ends or sides of the collecting-chambers, which operates to shut the air-current off from the chambers successively while the dust is being dislodged therefrom. With these collect- 65 ing cloths or chambers and the traveling devices which move the cloths for dislodging the dust I combine devices which receive and remove the dust after it has been dislodged from the cloths. If the air is introduced at the lower ends of the collecting-chambers, the dust-dislodging apparatus and the devices which receive and remove the dust may be situated in the intermediate chamber between the air- 75 duct and the collecting-chambers.

When the cloths are arranged to be moved upward preparatory to dislodging the dust lifting devices are preferably employed, consisting of one or more cams, wedges, or inclined surfaces arranged to travel in proximity to the cloth-holders, successively moving them in turn to dislodge the dust. The cam or moving device operates to move each sheet of the cloth in a direction substantially parallel 85 with that in which the cloth is supported when at rest.

With the cloths are combined devices that operate by elasticity, resiliency, or springing to give them a quick jerk to more effectually 90 dislodge the dust. To remove the accumulated dust after it has been dislodged, I employ one or more bars or carrying-pieces situated across the lines on which moves the dust that is being withdrawn. I arrange the bar or bars or carrying-pieces so that there shall be a space or 95 chamber in front of one or more of them, wherein the dust can be received. Preferably

two or more bars or carrying-pieces are employed and so arranged as to form walls both in front of the dislodged dust and behind it.

The devices which move the cloth can be connected to the bars or carrying-pieces which remove the dust, and can be arranged to move together with them, the cloth-moving devices being a little ahead of the dust-withdrawing devices, so that the dust shall be dislodged from the cloth in time to be received properly in the space intended for it in front of the appropriate carrying-piece.

In the drawings I have shown a mechanism of one of the forms that can be used to embody my invention.

Figure 1 is a vertical section on line 1 1, Fig. 2. Fig. 2 is a horizontal section on line 2 2, Fig. 1. Fig. 3 is a vertical transverse section on line 3 3, Fig. 2. Figs. 4 and 5 are detached views on a large scale. Fig. 6 shows the same cloths and collecting-chambers arranged radially around a common center, and also the same dislodging devices.

In the drawings, the collecting-cloths are represented by A A'. They are secured to supporting-pieces in such manner that they can be held properly to receive the dust-laden air. They are shown as being arranged in pairs, the successive pairs forming chambers or bags. A suitable number of these pairs of cloths or chambers are arranged together to form a machine. To the cloths or chambers thus arranged together the dust-laden air is brought through the inlet-passage H<sup>2</sup>. Between the inlet-passage or duct and collecting chambers I arrange an intermediate chamber, H, inclosed by a housing or walls, H'. This chamber distributes the air properly to the collecting-chambers formed by the cloths.

The cloth chambers or bags are shown to be each supported at the top by means of a piece, B', to which they are attached, and at the bottom by means of another supporting-piece, B. At their outer edges they are secured to stationary supporting-pieces C C. At their inner edges they are arranged to be moved for the purpose of dislodging the dust. They are secured at their inner edges to a supporting piece or rod, D. It will be seen that a chamber or bag is formed by means of the opposite cloths, A A', upon which the dust will be deposited, and through which the cleansed air can escape outwardly from the machine. The ends of the cloths or chambers opposite to those which receive the air-current are closed by one or more flexible devices, b', formed preferably of cloth, which, while permitting the other portions of the collecting-cloth to be moved sufficiently, yet prevent the escape of the dust-laden air and compel it to pass through the cloths. This not only operates as a cover or closing device, but also as a flexible extension of the other cloths.

A traveling cut-off or valve is employed to close the chambers or bags alternately. In the construction it is formed by means of a

piece of flexible material, K, and bars I I, so related to the chambers that they can shut off the air from one or more of them. This traveling cut-off is situated opposite to the permanent cover or closing device above described, which causes the air to go through the vertical cloths.

J represents the device employed to move the cloths for the purpose of dislodging the dust. It travels continuously from one cloth or chamber to the next. It is shown to be made in the form of a cam or incline which operates to lift up the cloths or collecting-chambers, it being moved in any suitable way—as, for instance, by chains *g* and sprocket-wheels on shafts driven by pulley P. The cam moves under the cloths or chambers and elevates to a sufficient distance the frame or supporting-piece at the lower end of the cloth, and after the cam has passed from under the cloth or its supporting-piece the latter is brought back into its original position both by means of gravity, and also by the elasticity, resiliency, or springing of the parts attached to the cloth. This results in the dislodging of the dust which has been caught upon the cloths A A'. The dust that is dislodged drops downward from the collecting-chambers into the chamber H below them, where it is received by the withdrawing mechanism composed of the carrying-pieces I, which take it to a suitable place for depositing, as to a hopper or receptacle, S, communicating with the chamber H below the collecting-chambers.

It will be seen that the cloths are suspended in the frames so as to form tight sacks or bags, with which the dust-spout communicates, and that with them are combined devices for imparting a shaking or jarring motion to the cloth and the chambers or bags formed with them. It will also be seen that as the induction-opening is arranged centrally relatively to the machine, and as the air is conducted into the chambers on vertical lines, the heavy particles of dust will settle by gravity and before reaching the collector-cloths, thus lessening the screening duty of the cloth, so that it can more readily be kept clean and open.

The moving devices form a dead-air space, this space being inclosed by the cross-bars I I at the ends of the series and by the chambers above successively.

When a mechanism like that shown is used a suitable notch or recess may be made in the end portion, *h*, of the housing H' to permit the passage of the lifting or cloth-moving mechanism, and the traveling devices may be supported on the machine, as shown at M M.

In addition to the central vertical strips, D, other narrow strips may, if necessary, be employed, as shown at *d d*, and also transverse rods or bars D' at intervals.

The cloths A A' are preferably attached to their supports, so that they can be stretched from time to time as they become slack. For this small cleats *c c* may be used, they having the

cloths tacked to them, and being in turn tacked to the supporting-strips of the frame. When the cloths have become loose or slack they can be tightened by simply turning the cleats over one or more times to take up the slack cloth, and then tacking them again to the frame.

My invention may obviously be applied in a cylindrical apparatus having a vertical axis, and having the stationary cloths arranged vertically and radially therein. The traveling devices are in this case made to revolve in a horizontal plane about the axis of the cylinder, the dislodging mechanism being the same that is employed with the above-described construction, and provision being made in any one of many obvious ways to discharge the dust.

Although I herein describe the filtering or collecting chambers as being stationary, I do not wish to be understood as meaning that the cloths and the movable parts immediately connected to the cloths cannot in any wise move. The chambers are stationary in contradistinction to the collecting-chambers heretofore used, which have been so supported that they could be revolved or moved relatively to the main supporting-frame and relatively to the dust-dislodging devices. It will be seen that the chambers in my case are substantially stationary, while the dust-dislodging devices move from one chamber to another. The cloths are sufficiently movable to snap off the dust; but the chambers themselves do not rotate, as is customary in some machines.

The walls of the housing and the boards or bars between the chambers at the ends which receive the dust-laden air operate as air-guiding devices to compel the air from the trunk to pass to the cloths and through them, they being supplemented by the vertical parts C and the flexible extensions *b'*. Instead of the wooden bars C at the outer ends of the chamber, cloth might be employed, as will be readily understood, secured to the parts *c* and to the connecting and supporting cross-bars B<sup>2</sup>, the part *c* in this case being inserted into or fastened to the main frame at the bottom and to said cross-bars B<sup>2</sup> at the top. However, in some respects the bars in the construction shown are preferred, as a firmer and more elastic support is given to the cloths, insuring a sharp strong jerk when they escape from the lifting devices.

The elasticity of the parts B and B', which snap the cloth, can be supplemented by springs, if desired, though I have found that the snapping resulting from the devices shown is sufficient under all ordinary circumstances. If the lower bar, B, of each chamber should be made non-elastic, as by forming it in two parts loosely joined at the center, and the opposite upper part, B', should be arranged as now, it, together with the center part, D, will operate as a cloth-moving frame, the flexible extensions *b'* being also connected, as now, to the ends of the collecting-chambers in such way as to permit the

cloth-moving frame to be moved relatively to the main frame and at the same time prevent the dust-laden air from escaping at points beyond said cloth-moving frame. However, air-stopping devices of a more or less modified character may be used at the ends of the collecting-chambers opposite to those which receive the air without departing from the spirit of the invention.

I am aware that use has been made heretofore of filtering-cloths arranged in zigzag planes, and that with them there have been combined devices to dislodge the dust; but in these constructions all the collecting-surface was situated in a single chamber, into which the air was conducted in such manner that the current had to be stopped entirely while dislodging the dust. I, on the contrary, have a series of chambers independent of each other, with the cloths attached to independent frames, and combine with them devices which move from chamber to chamber to actuate the cloth-moving frames, and combine with them also a series of elastic devices to snap the cloths independently of each other one after another. I avoid stopping entirely the air-current, so that there are no checks or pulsations caused in it.

In this case I claim nothing except the combinations specifically set forth in the following claims, reserving to myself the right to claim all other patentable features in another application which I have filed, and of which this is a division.

What I claim is—

1. The combination of the air-trunk, the vertical cloths arranged to form stationary chambers, and traveling devices which cut the air off from the collecting-chambers successively to permit the dust to be dislodged, substantially as set forth.

2. The combination of the vertical cloths arranged to form stationary collecting-chambers, the air-trunk which supplies the dust-laden air, an intermediate chamber between the air-trunk and the collecting-chambers, and arranged to guide the air into the ends of the collecting-chambers, air-stopping devices at the ends of the collecting-chambers opposite to those ends which receive the air, and a traveling cut-off adapted to intermittently stop the air from passing through the walls of the stationary collecting-chambers, substantially as set forth.

3. The combination of the vertically-arranged stationary cloths, the air-trunk which conducts the dust-laden air to the cloths, the devices which guide the air from the trunk through the cloths, mechanism which intermittently shuts the air off from the cloths, the devices which dislodge the dust, and a traveling pocket or chamber which receives the dislodged dust and carries it away from the filtering-chamber, substantially as set forth.

4. The combination of the vertical cloths, forming substantially stationary vertical cham-

bers, the devices which guide the air into the chambers on vertical lines, a cam or incline which moves the cloths at the lower ends, and a traveling dust-carrying device connected to and traveling with the cloth-moving mechanism, substantially as set forth.

5. The combination of the vertical cloths forming stationary vertical chambers, the devices which guide the air into the chambers on vertical lines, a traveling cam or incline for lifting the cloths at the inner ends, and a traveling dust-carrying device connected to the cloth-moving mechanism and arranged to have the dust-carrying devices, substantially as set forth.

6. The combination of the main frame, the vertical cloths, the vibratable frame-pieces attached independently of each other to the cloths, devices for lifting the vibratable frame-pieces independently of each other, and a series of elastic devices respectively attached to the vibratable frame-pieces and arranged to return the cloths successively after they have been lifted, whereby the cloths are one after another snapped or jerked for dislodging the dust, substantially as set forth.

7. The combination of the air-trunk, the vertical cloths arranged to form stationary chambers, an inclosing intermediate chamber between the air-trunk and collecting-chambers, and traveling devices which cut the air off from the collecting-chambers successively to permit the collected dust to be dislodged, substantially as set forth.

8. The combination of the vertically-arranged cloths forming chambers which receive the air on vertical lines, a chamber below the collecting-chambers, into which the dislodged dust drops, the mechanism which shuts off the air from one or more chambers independently of the others, and a traveling pocket or receptacle mounted in said lower chamber below the collecting-chambers and moving from one to the other, substantially as set forth.

9. In a dust-collector, the combination of a series of collecting-chambers, an air-trunk arranged to supply air to several of the chambers simultaneously, and flexible extensions which are connected to the ends of the main collecting-chambers opposite to the air-trunk, and which permit the cloth-moving frame to be moved relatively to the main frame, but prevent the dust-laden air from escaping at points beyond said cloth-moving frame, substantially as set forth.

10. In a dust-collecting machine having a series of chambers, the combination of an air-conduit which supplies air to several chambers simultaneously, filtering-cloths arranged to form said chambers, vibratable bars or frames connected to the cloth, and flexible extensions attached to said vibratable bars or frames and

situated at the ends of the chambers opposite to the air-conduit, substantially as set forth.

11. The combination, with the vertically-arranged cloths adapted to have the dust drop below them when it is dislodged, of a cam arranged to travel from chamber to chamber in horizontal planes to lift a portion of each of the cloths preparatory to dislodging the dust, substantially as set forth.

12. The combination of the frame D B B' with the vertical cloths arranged in pairs and made stationary at their outer edges, and secured at their inner edges to the vertically-movable rods D, at their upper edges to the swinging bars B', and at their lower to the swinging bars B, substantially as set forth.

13. The combination of the main frame-work, the collecting-chambers extending inwardly from both the opposite edges or sides of the main frame, and having vertically-movable supports on substantially the central line of the frame-work, and mechanism for jarring simultaneously the two opposite chambers, substantially as set forth.

14. In a dust-collector, the combination of a series of collecting devices, each having two vertically-arranged cloths secured to a vibrating bar at the lower ends and between the cloths, an opposing vibrating bar at the upper ends, a rising and falling bar at the inner edges, connected to the top and bottom vibrating bars, and stationary supports for the outer edges of the cloth, substantially as set forth.

15. In a dust-collector, the combination of a main frame, collecting-chambers arranged in pairs, the chambers of each pair being on opposite sides of the central line of the main frame, the filtering-cloths which form the collecting-walls of said chambers, vertically-movable bars attached to the inner edges of the cloths, and cloth-lifting devices which are mounted on substantially the central line of the main frame and elevate the vertically-movable bars at the inner ends of the collecting-chambers, substantially as set forth.

16. In a dust-collector, the combination of the main frame, the chambers extending inwardly from the sides or edges of the frame and arranged in pairs, the cloths having their vertical inner edges attached to vertically-movable bars, the bottom vibrating bars, B, each attached to the lower end of two adjacent cloths, and the upper supporting-bars, B', respectively opposite to the bars B, said bars B and B' being arranged, substantially as set forth, to have the air pass out horizontally or laterally between them.

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

NOAH W. HOLT.

Witnesses:

A. B. KELLOGG,  
E. L. BURDICK.