(No Model.)

J. M. FINCH.

DUST COLLECTOR.

No. 370,533. Patented Sept. 27, 1887.

Fig. 1.

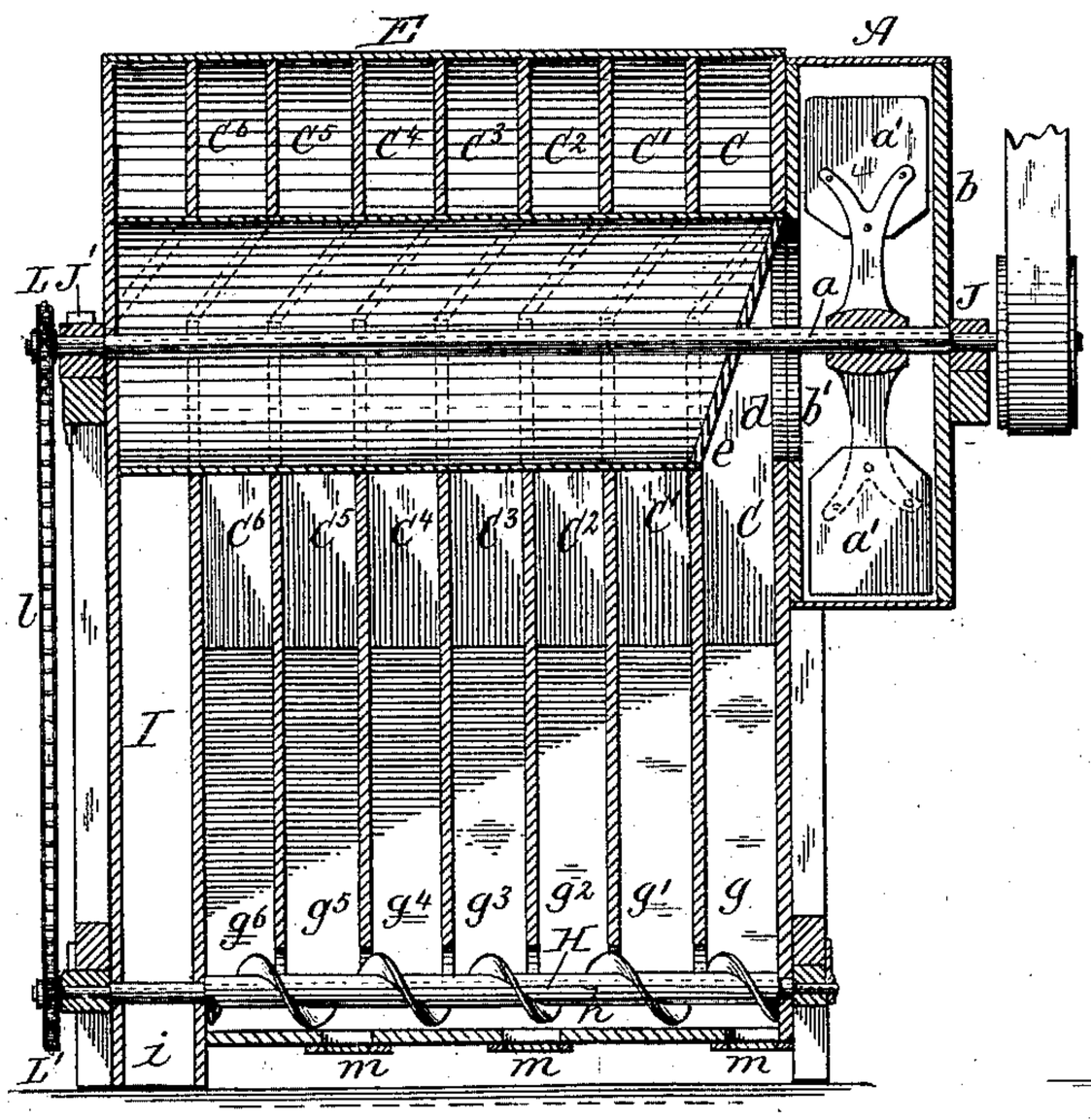


Fig. 2.

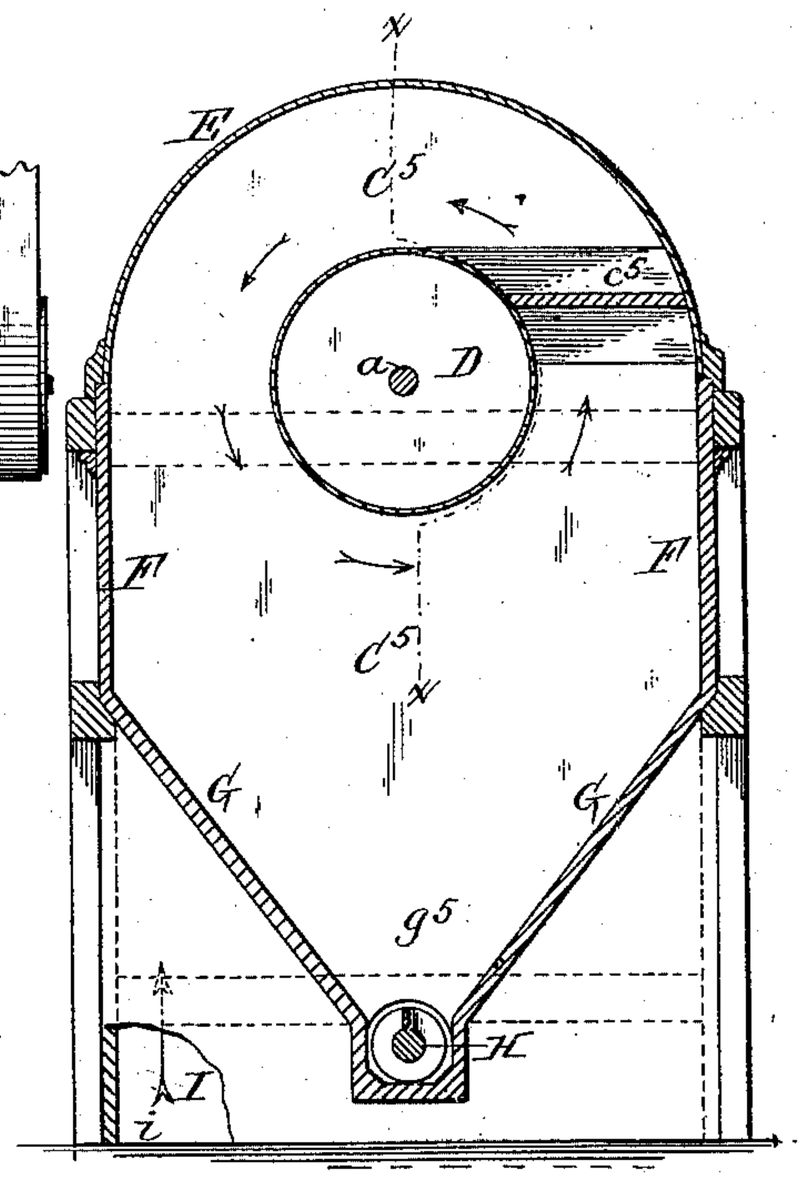


Fig. 3.

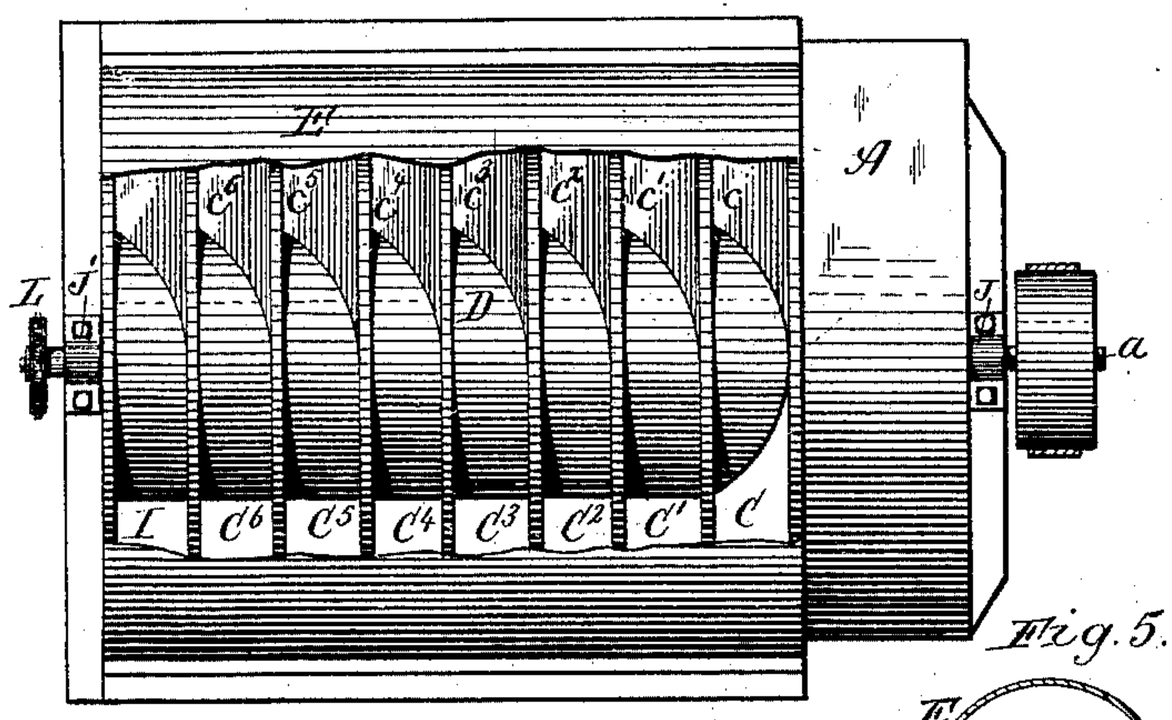


Fig. 4.

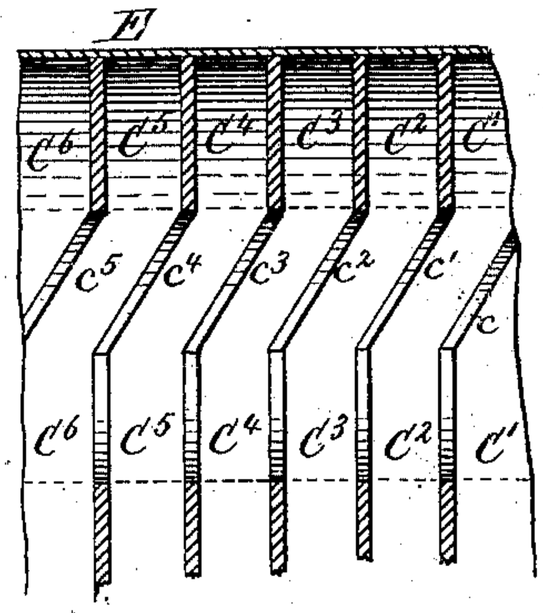
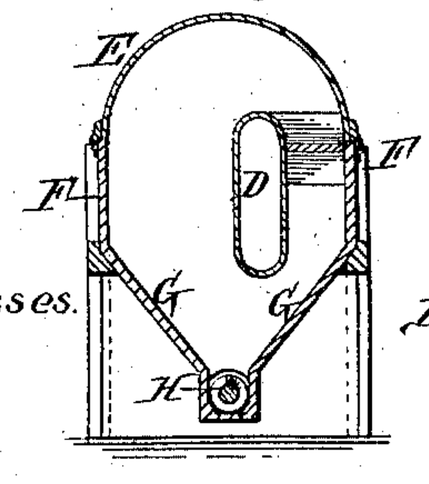


Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHN M. FINCH, OF JACKSON, MICHIGAN, ASSIGNOR TO THE KNICKERBOCKER COMPANY, OF SAME PLACE.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 370,533, dated September 27, 1887.

Application filed December 27, 1886. Serial No. 222,578. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. FINCH, of Jackson, in the county of Jackson and State of Michigan, have invented new and useful Improvements in Dust-Collectors, of which the following is a specification.

This invention relates to that class of dust-collectors which are employed in flouring-mills, planing-mills, and other industrial establishments for separating flour-dust, shavings, sawdust, and other solid particles from the air-currents by which they are carried along or in which they are suspended.

The object of my invention is to produce a simple and efficient dust-collector; and my invention consists of the improvements which will be hereinafter fully set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a longitudinal sectional elevation of my improved dust-collector. Fig. 2 is a vertical cross-section of the same. Fig. 3 is a top plan view with part of the casing broken away. Fig. 4 is a longitudinal vertical section in line *x x*, Fig. 2. Fig. 5 is a vertical cross-section on a reduced scale, showing a slightly-modified construction of the machine.

Like letters of reference refer to like parts in the several figures.

A represents a suction-fan whereby the air-current is created which carries off the dust, shavings, or other solid particles from the machine or apparatus in which they are produced or liberated.

a represents the horizontal shaft, on which are mounted the fan-blades *a'*.

b represents the casing of the fan, and *b'* the eye formed in one end of the casing concentric with the shaft, and through which the air-current is drawn into the casing.

C C' C^2 C^3, &c., represent a series of dust-separating compartments or chambers arranged side by side and communicating with each other by air passages or spouts *c c' c²* *c³*, &c., arranged in the upper portions of the compartments. The compartment C is contiguous to the fan A, and is provided with an opening, *d*, which coincides with the eye *b'* of the fan, whereby the compartment C is placed in communication with the fan.

D represents a core or deflector, of cylindrical or other suitable form, arranged horizontally and extending through the several compartments C C' C^2, &c. The core D is cut away on its under side in the compartment C, as shown at *e*, so as not to obstruct the eye of the fan. Each of the compartments C C' C^2, &c., is bounded by an upper semi-cylindrical cover, E, arranged concentric with the core D, vertical side walls, F, and inclined lower walls, G, forming hopper-shaped enlargements or pockets *g g' g²*, &c., in the several compartments below the core.

H represents a screw-conveyer, and *h* its trough, arranged lengthwise underneath the enlargements *g g' g²*, for removing the material which is deposited in the same.

I represents the compartment which is farthest removed from the fan, and which is provided with an inlet for the dust-laden air. As shown in the drawings, the dust-inlet *i* of this compartment is arranged at its lower end, which opens downwardly, and which may be directly connected with the air-escape spout of a middlings-purifier or other similar machine from which the dust is removed. In this case the fan A may perform the function of the fan usually provided in a middlings-purifier.

The fan-shaft *a* may extend through the core D, as shown, in which case it is journaled in bearings J J', secured to the ends of the machine. The shaft of the screw-conveyer H may be driven from the fan-shaft by an endless chain or belt, *l*, running around sprocket-wheels or pulleys L L' on the respective shafts.

The dust-laden air-current enters the compartment I through the opening *i*, ascends in the compartment, and passes through the passage c^6 into the compartment C^6. In this compartment the air-current moves with a whirling motion around the core D, and finally escapes through the passage c^5 into the next compartment, C^5, in which the operation is repeated, and so on through the series of compartments. As the air-current is an induced current created by suction, it tends to take the shortest course to the fan by which the suction is created, and hugs the core D closely in whirling in the compartments. The solid

particles move toward the circumference of the whirling air-current in each compartment and enter the pockets or enlargements below the core in which the air is in a state of comparative rest. In this manner the suction created by the fan counteracts the tendency of the whirling motion to drive the air particles toward the walls of the compartments and imparts to the air particles a tendency to seek the innermost layer of the whirling air-current, while the tendency of the solid particles is to seek the outermost layer thereof. The different directions thus imparted to the air particles and the solid particles effect quickly a separation of the dust from the air. The heaviest particles are separated in the compartment farthest from the fan in which the air-current is first subjected to this separating action. The gravity of the separated particles decreases gradually as the compartments approach the fan. Several grades of the separated material may be separately discharged from the machine by slides *m*, with which the conveyer-trough is provided, or the several grades may be commingled by the conveyer and discharged together, as may be preferred.

The air-passages *c c' c²* which connect successive compartments are preferably inclined in order to break the air-current as little as possible. The lower wall or bottom of each passage extends across the compartment into which it leads, as represented in Figs. 2 and 4, whereby the air-current is compelled to move through the successive compartments in a spiral or winding course.

The form of the core D is immaterial, as it forms merely the inner wall of the passage through which the air-current is drawn. For instance, it may be constructed with upright sides, as represented in Fig. 5, and that part of the compartment through which the air-current descends in passing around the core may be enlarged or made eccentric with the core, as shown in the same figure, to facilitate the separation of the solid material from the air.

I claim as my invention—

1. In a dust-collector, the combination, with a series of communicating separating-chambers arranged side by side, of a core extending through said chambers at unequal distances from the inclosing-walls of said chambers, whereby enlargements are formed in said chambers on one side of the core, in which enlargements the air-current is weakened, thereby permitting the solid particles to pass out of the air-current, substantially as set forth.

2. In a dust-collector, the combination, with a suction-fan, of a series of communicating separating-chambers arranged side by side and connected with the eye of the fan, and a core extending through said chambers, the latter being constructed on one side of the core with enlargements through which the air-current passes and in which the solid matter is deposited, substantially as set forth.

Witness my hand this 21st day of December, 1886.

JOHN M. FINCH.

Witnesses:
JNO. J. BONNER,
GEO. J. BUCHHEIT, Jr.