2 Sheets—Sheet 1.

# C. E. THAYER.

## Apparatus for Catching Dust Generated in Middlings-Purifiers, Millstone Curbs, &c.

**No. 231,376.** **Patented Aug. 17, 1880.**

**Fig. 1.**

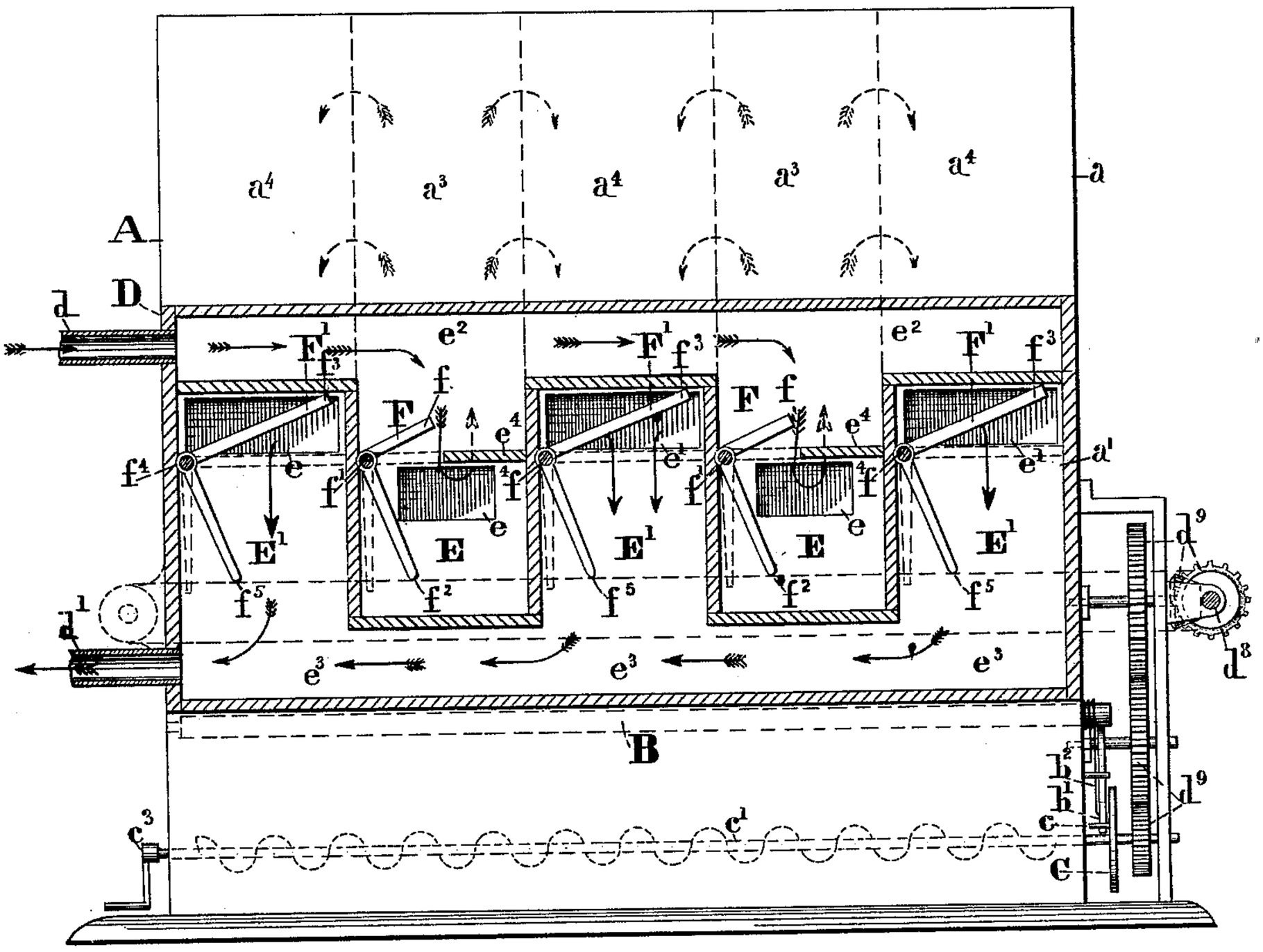
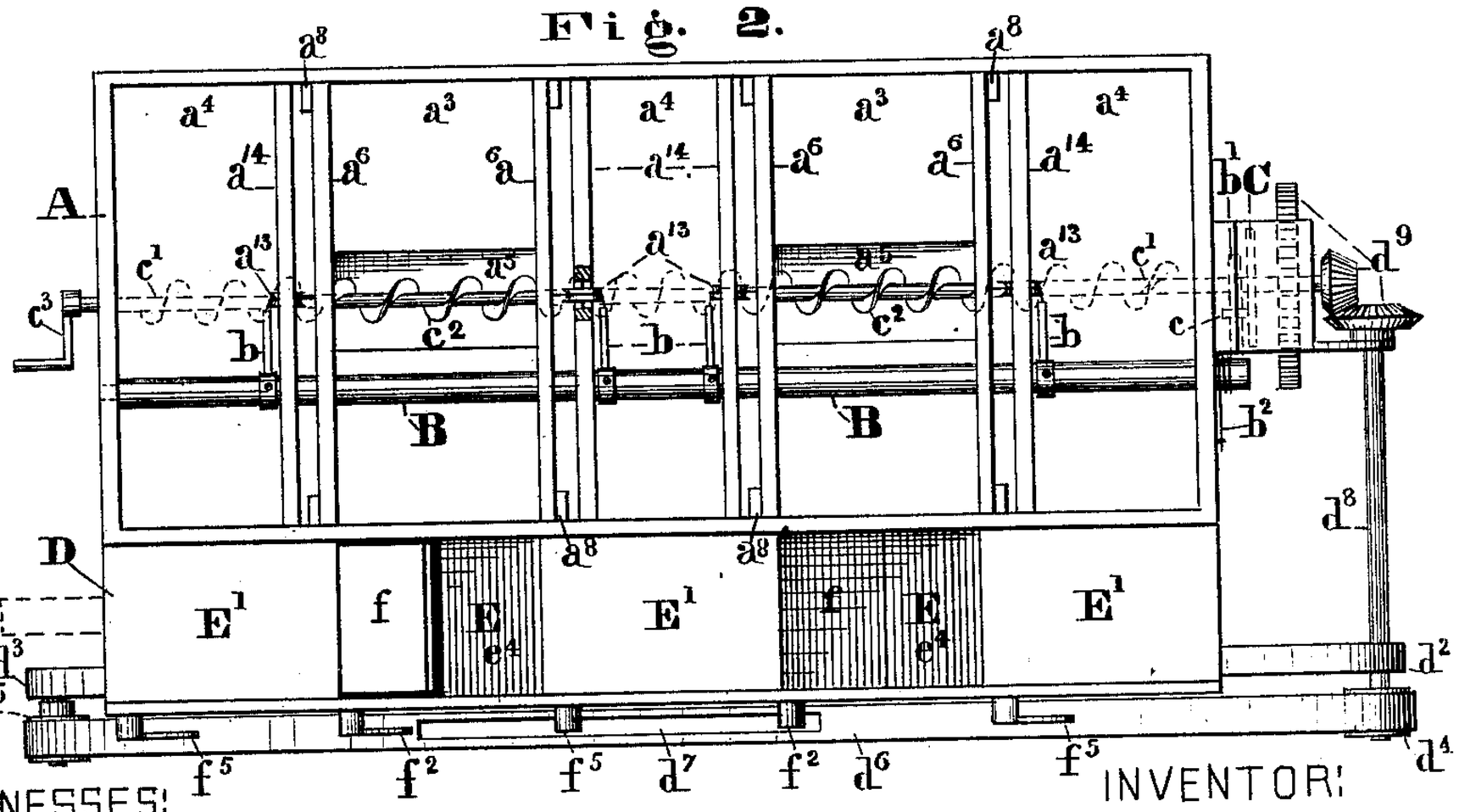



**Fig. 2.**




WITNESSES:
Cornelius Cox
Albert B. Beadle.

INVENTOR:
C. E. THAYER,
BY H. W. Beadle & Co.
ATTYS

2 Sheets—Sheet 2.

# C. E. THAYER.

## Apparatus for Catching Dust Generated in Middlings-Purifiers, Millstone Curbs, &c.

No. 231,376. Patented Aug. 17, 1880.

Fig. 3.

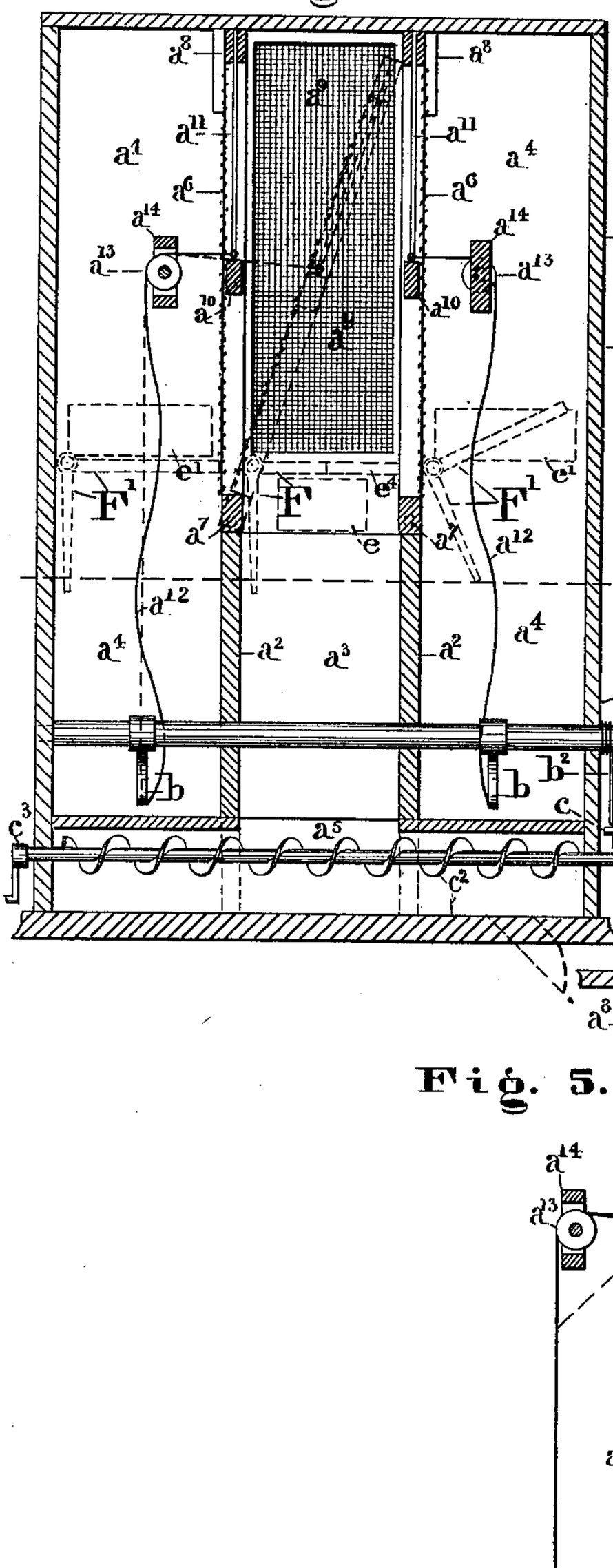



Fig. 4.

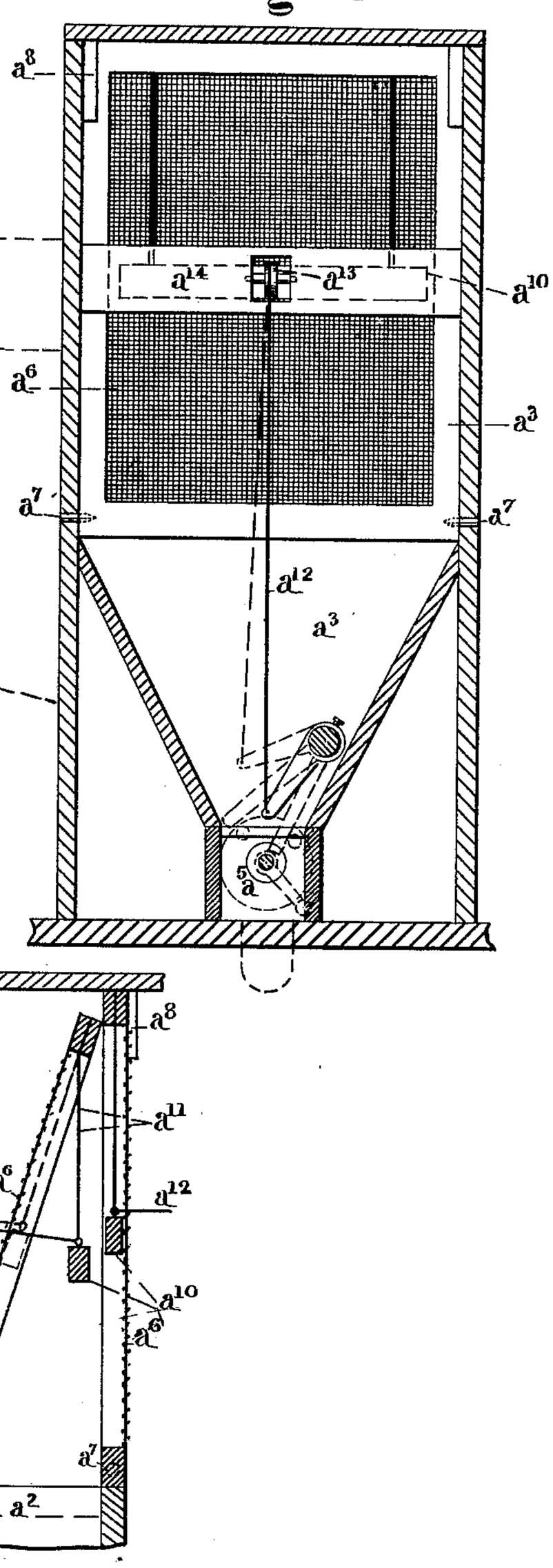
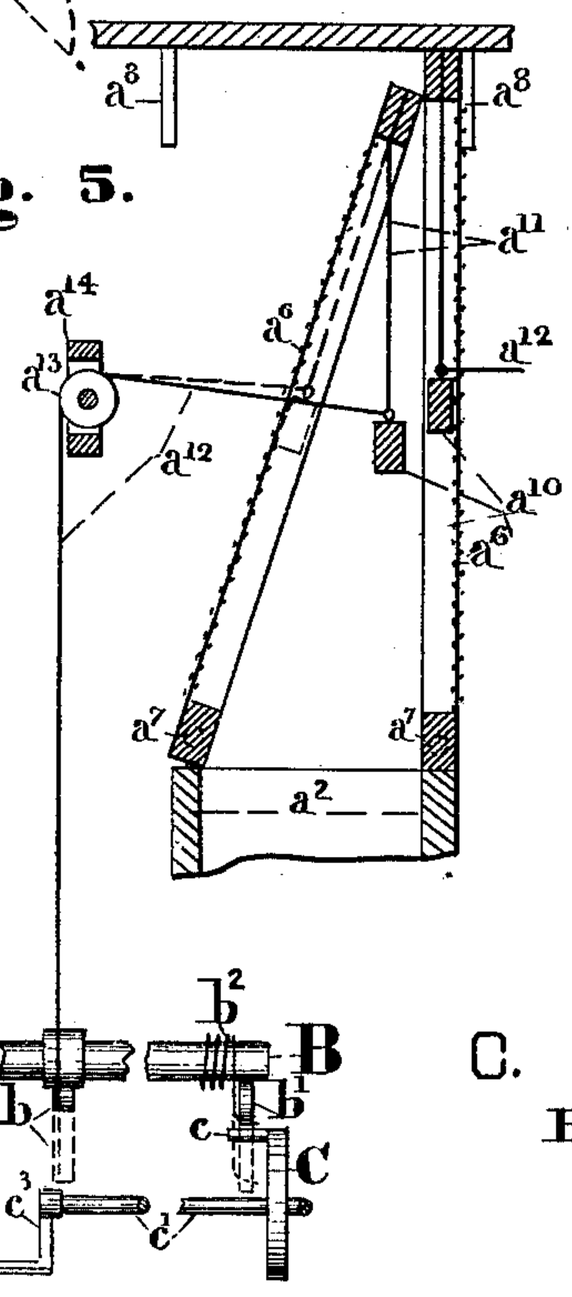



Fig. 5.




WITNESSES:
Cornelius Bot
Albert Z. Beadle.

INVENTOR:
C. E. THAYER.
BY H. W. Beadle & Co.
ATTYS

# UNITED STATES PATENT OFFICE.

CHARLES E. THAYER, OF MINNEAPOLIS, MINNESOTA.

## APPARATUS FOR CATCHING DUST GENERATED IN MIDDLINGS-PURIFIERS, MILLSTONE-CURBS, &c.

SPECIFICATION forming part of Letters Patent No. 231,376, dated August 17, 1880.

Application filed February 20, 1880.

*To all whom it may concern:*

Be it known that I, CHARLES E. THAYER, of Minneapolis, county of Hennepin, and State of Minnesota, have invented a new and Improved Machine for Catching Dust in Flour-Mills, &c.; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The object of my invention is the construction of a machine for removing the dust from the air coming from a middlings-purifier, millstone, or other machine which in its operation produces dust.

This invention consists, mainly, first, in an improved method of cleaning the screens of the machine by reversing, at intervals, the currents of air which are passed through them; and, second, in the combination, with the main chest having air receiving and delivering compartments, of mechanism for automatically regulating the flow of air through these compartments.

In the drawings, Figure 1 represents a front elevation of the machine with the front of the valve-chest removed; Fig. 2, a plan view of the same with the top of the main and valve chests removed; Fig. 3, a vertical longitudinal section of the main chest, showing the parts contained therein; Fig. 4, a vertical transverse section of the same, and Fig. 5 a detail view to show the manner of operation of the automatic beaters.

To enable others skilled in the art to make and use my invention, I will now proceed to describe fully the same and its manner of operation.

A, Figs. 1, 2, 3, and 4, represents the main chest, of rectangular form, which may be considered as composed of the nearly equal upper and lower portions, *a* and *a'*, Fig. 3.

$a^2$ $a^2$ represent permanent vertical partitions, by means of which the lower portion, *a'*, is transversely divided into alternating compartments $a^3$ $a^3$ and $a^4$ $a^4$, respectively, as shown in Fig. 3. The compartments $a^3$, Fig. 4, are hopper-shaped below, and open into the longitudinal chamber or trough $a^5$, which runs internally along the middle of the bottom of the main chest. The compartments $a^4$ are closed at the bottom, as shown in Fig. 3, and have no communication with the chamber $a^5$. The compartments $a^3$ and $a^4$, which extend into the upper portion, *a*, of the main chest, are converted, respectively, into the air-receiving and air-delivering compartments by the screens $a^6$, which rest on the upper edges of the vertical partitions $a^2$. These screens are formed of flannel, cloth, or other suitable material, inclosed within rectangular frames, which fit transversely within the upper portion of the main chest, and are pivoted, near their lower corners, by the pins $a^7$ in the sides of the same.

$a^8$ $a^8$ are stops fixed inside the main chest to prevent the screens from inclining over the adjacent delivering-compartments. The rear sides, $a^9$, of the compartments $a^3$, above the partitions $a^2$, are made of cloth or material similar to that used in the screens, as shown in Fig. 3.

$a^{10}$ $a^{10}$ are transverse hanging beams, attached by flexible rods or cords $a^{11}$ to the upper beam of the frames of the screens, on which screens they act as automatic beaters.

$a^{12}$ is a cord centrally attached to each beam $a^{10}$, which, after descending over the pulley $a^{13}$, pivoted in a slot in the support $a^{14}$, is fixed by its lower end to the downwardly-inclining vibrating arm *b* of the longitudinal rock-shaft B. The latter has its bearing in the sides of the main chest, and carries on its extension outside of the same the vibrating arm *b'*, controlled by the spring $b^2$.

C is a wheel provided with a tappet, *c*, which bears against and communicates motion to the arm *b'*, and acts in opposition to the spring $b^2$. The wheel C is fixed to an extension of the longitudinal shaft *c'*, which, with an attached conveyer, $c^2$, revolves centrally within the chamber $a^5$. The said shaft has its bearings in the sides of the main chest and carries on the outside extension of the end opposite to that bearing the tappet-wheel C a crank or pulley, $c^3$, or other device to communicate motion.

D, Figs. 1 and 2, represents the valve-chest, which is attached longitudinally to the front of the main chest, into which chest D opens the supply-pipe *d* from the purifier and the exhaust-pipe *d'*, the former near its top, the latter near its bottom.

$d^2$ $d^3$, Fig. 2, represent horizontal projections firmly fixed to the ends of the valve-chest, which form supports and bearings for the shafts of the pulleys $d^4$ and $d^5$, respectively. These pulleys carry the belt or chain $d^6$, provided with the longitudinal slot $d^7$. The shaft $d^8$ of the pulley $d^4$ extends beyond its bearings at $d^2$ along the side of the machine, and is connected by the proper gearing $d^9$ $d^9$, or its equivalent, to the shaft $c'$, extending outwardly beyond the tappet-wheel C, so that the rotation of the crank $c^3$ will cause the belt $d^6$ to travel longitudinally at the same time that the tappet-wheel can communicate motion to the rock-shaft B.

The valve-chest is internally divided by vertical and longitudinal partitions, Figs. 1 and 2, into two sets of alternating compartments, E and E′, respectively. Each of the former communicates, by the central opening, $e$, with one of the receiving-compartments of the main chest, and each of the latter communicates, by the opening $e'$, near its top, with one of the delivering-compartments of the same. All of the compartments E are closed below and open upwardly into the longitudinal trunk or passage $e^2$, into which also opens the supply-pipe $d$, while all of the compartments E′ are closed above and open downwardly into the longitudinal trunk or passage $e^3$, which communicates with the exhaust-pipe $d'$. Each of the compartments E is provided, immediately above the opening $e$, with the partition $e^4$, which closes about one-half of the transverse section of the compartment.

F and F′, Figs. 1 and 2, are two sets of alternating valves, situated on the same horizontal line at equal distances apart, and respectively controlling the openings $e$ and $e'$. Each of the valves F is situated in one of the compartments E, and is composed of a plate portion, $f$, rock-shaft $f'$, journaled in the front and rear sides of the valve-chest, and depending arm $f^2$, fixed on the outer extension of the rock-shaft at right angles to the plate portion. Each of the valves F′ is situated in one of the compartments E′, and is similarly composed of plate portion $f^3$, rock-shaft $f^4$, and depending arm $f^5$.

It will be observed, Fig. 1, that the plate portion of each of the valves F′, when closed, exactly fills the transverse section of its compartment below the opening $e^2$, and cuts off communication between said opening and the exhaust-pipe below, while the plate portion of each of the valves F fills the space in the transvese section of its compartment not occupied by the partition $e^4$, above the opening $e$, thus cutting off the communication of the opening with the supply-pipe above. Both sets of valves are kept open by their depending arms resting in an inclined position on the surface of the horizontal belt $d^6$, and are automatically closed by the said arms dropping into the slot $d^7$ when it travels immediately below them.

The slot $d^7$ has just twice the length of the distance between any two adjacent valves, for a reason hereinafter stated.

The tops or covers of both the main and valve chests are made removable, in order that the internal parts may be easily inspected or removed for repair when necessary.

The operation of the machine is substantially as follows: The valves F and F′, Fig. 1, being all open, and free communication possible from the supply-pipe through the intervening parts to the exhaust-pipe, as soon as the fan attached to the latter begins to revolve the dust-laden air is drawn through the supply-pipe $d$ into the trunk or passage $e^2$, thence downward into the compartment E, and through the opening $e$ upward into the receiving-compartments $a^3$ of the main chest; then, passing through the screens $a^6$, which are kept erect against the current by the stops $a^8$, it arrives, cleansed of all dust and floating particles, which fall into the chamber $a^5$, in the delivering-compartments $a^4$. From these it passes, by the openings $e'$, into the compartments E′, thence downward into the passage $e^3$, and out through the exhaust-pipe $d'$, its course being clearly shown by the arrows marked on Fig. 1.

It is evident that as long as all the valves remain open and the fan revolves this operation will continue; but soon the screens will become clogged with the accumulated dust, and it will become necessary to clean them. This end is accomplished by reversing the current through the screens one by one and by bringing the automatic beaters into play, which two operations are carried on simultaneously, and are substantially as follows: Power being applied to the crank or pulley $c^3$, motion is communicated by the shaft $c'$, connecting-gearing $d^9$, shaft $d^8$, and pulley $d^4$ to the slotted belt $d^6$, and the same consequently begins to travel longitudinally below the arms $f^2$ and $f^5$, which drop one by one, closing their attached valves as soon as the slot $d^7$ arrives immediately below them; but as the slot has just double the length of the distance between any two adjacent valves, only two of the latter can remain closed at the same time, the first arm rising again on the belt as the third drops into the slot, the second arm rising as the fourth drops, &c. Fig. 3 shows in dotted lines the first and second valves thus closed, the former connecting with the first delivery-compartment and the latter with the adjacent receiving-compartment. In this case it is evident that the first delivering-compartment is cut off from the exhaust-pipe, and that the supply-pipe is cut off from the receiving-compartment. The exhaust, however, being still connected with the second delivering-compartment, will draw the air both from the receiving and first delivering compartments, and also through the cloth side of the former, and will cause the first screen, $a^6$, to turn on its pivots $a^7$, and assume the position shown in dotted lines in the drawings, Fig. 3. The end of the slot $d^7$

now reaching and raising the depending arm of the first valve, the arm of the third will drop, the arm of the second still remaining down. This action will open the valve of the first delivering-compartment and close that of the second, and hence the first and second screens will reverse their positions, the former becoming erect, while the latter falls toward it. The revolution of the shaft $c'$ also rotates the tappet-wheel C, and causes the tappet $c$ to rise and suddenly release the arm $b'$, which is thereupon brought quickly down by its attached spring $b^2$, the same motion being communicated to the arms $b$ $b$. Attached to the latter are the cords $a^{12}$, which have just sufficient length to hold the beaters loosely against the sides of the screens when the arms $b$ are in their lowest position and the screens inclined. When the arms $b$ rise the beaters fall away from the screens, as seen in full lines, Fig. 5, and then when the arms are jerked down again the connecting-cords bring the beaters sharply against the surface of the screens. This operation is repeated at every revolution of the tappet-wheel, and thus the screens are beaten automatically while in an inclined position, the accumulated dust falling into the chamber $a^5$, to be removed by the conveyer $c^2$.

From this description it will be understood that the currents of air through the screens are reversed at intervals, and that when the currents are reversed from the normal direction the screens are moved into an inclined position, and are beaten to remove the dust.

Having thus described my invention fully, what I claim as new, and desire to secure by Letters Patent, is—

1. In a dust-catching machine, the combination, with a main chest divided by dust-screens into alternate air-receiving and air-delivering compartments, of mechanism, substantially as described, for reversing the air-currents through the machine.

2. In combination with mechanism, substantially as described, for reversing the air-currents through the screens, mechanism, substantially as described, for beating the same when these currents are reversed.

3. In a dust-catching machine, the combination of the main chest A, valve-chest D, mechanism for reversing the air-current, and mechanism for operating the automatic screen-beaters $a^{10}$, substantially as shown and described.

4. In a dust-catching machine, the combination of the main chest A, pivoted screens $a^6$, and stops $a^8$ with the valve-chest D, alternate valves F and F′, slotted belt $d^6$, and actuating mechanism, substantially as shown and described, for the purpose specified.

5. In a dust-catching machine, the combination of the main chest A, pivoted screens $a^6$, stops $a^8$, valve-chest D, alternate valves F and F′, and slotted belt $d^6$ with the hanging beaters $a^{10}$, cords $a^{12}$, rock-shaft B, provided with arms $b$, arm $b'$, and spring $b^2$, and tappet-wheel C, all constructed and arranged substantially as shown and described, for the purpose specified.

This specification signed and witnessed this 16th day of February, 1880.

C. E. THAYER.

Witnesses:
H. W. HOLMES,
D. WILLIAMS.