

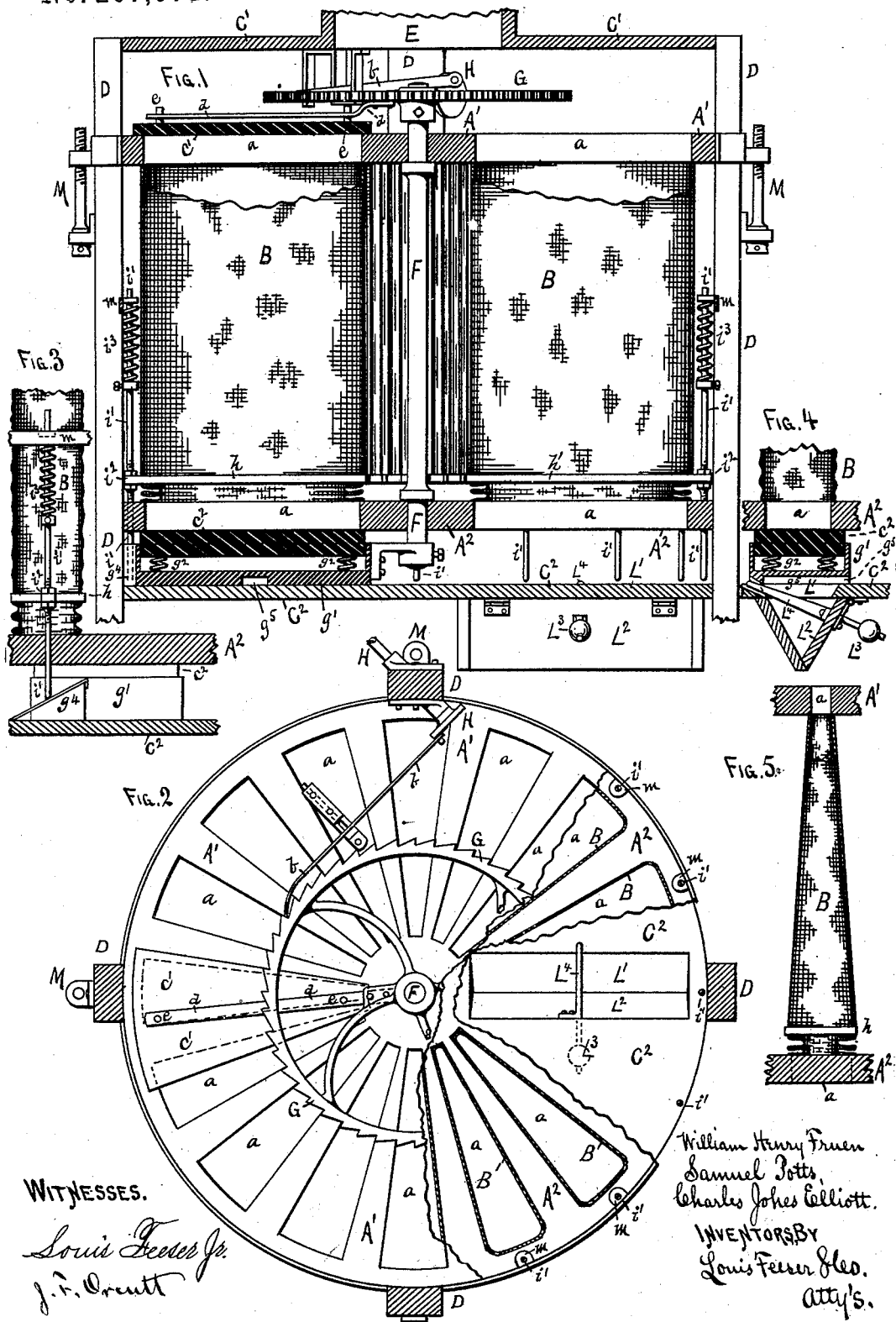
(No Model.)

W. H. FRUEN, S. POTTS, & C. J. ELLIOTT.

DUST COLLECTOR FOR FLOUR MILLS, &c.

No. 267,071.

Patented Nov. 7, 1882.



UNITED STATES PATENT OFFICE.

WILLIAM H. FRUEN, OF MINNEAPOLIS TOWNSHIP, HENNEPIN COUNTY, AND
SAMUEL POTTS AND CHARLES J. ELLIOTT, OF MINNEAPOLIS, MINN.

DUST-COLLECTOR FOR FLOUR-MILLS, &c.

SPECIFICATION forming part of Letters Patent No. 267,071, dated November 7, 1882.

Application filed October 29, 1881. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM HENRY FRUEN, SAMUEL POTTS, and CHARLES JONES ELLIOTT, all citizens of the United States, and said FRUEN a resident of Minneapolis township, and said POTTS and ELLIOTT both residents of the city of Minneapolis, all in the county of Hennepin and State of Minnesota, have jointly invented a certain new and useful Improvement in Dust-Collectors for Flour-Mills, &c., of which the following is a specification.

This invention relates to apparatus for collecting the dust and similar impurities from the air, especially that blown from middlings-purifiers and similar machines in flour-mills; and it consists in the construction and the combination of parts hereinafter particularly described, and then sought to be specifically defined by the claims.

In the accompanying drawings, Figure 1 is a longitudinal sectional elevation, and Fig. 2 is a sectional plan view, portions of one side being broken out to show the arrangement of the cloth tubes and dust-trap. Fig. 3 is a detached detail view of the shaker-operating mechanism. Fig. 4 is a detached cross-sectional view of the dust-trap valve. Fig. 5 represents a slight variation in the manner of constructing the cloth tubes.

A' A² are two circular heads connected together at equal distances apart by a series of angular-shaped cloth tubes, B, this cloth being of a texture adapted to catch and retard the dust from the air as it passes through its meshes. Through the heads A' A², opposite each end of each of the tubes, angular ports *a*, corresponding to the shape of the tubes, are formed, so that communication may be obtained between the heads A' A² through the open-ended cloth tubes, as shown, and by no other means.

Above the head A' a short distance, another head, C', is arranged, and a short distance beneath the lower head A² a fourth head, C², is similarly arranged, the four heads being connected together by a number of upright posts or frames, D, and the remainder of the space between the heads A' and C' and A² and C² being covered with cotton cloth or other suitable light material, the space between the heads A' C' forming a distributing-chamber, as herein-

after shown. In the center of the head C' is a spout, E, through which the dust-laden air enters.

F is an upright shaft journaled in the heads A' A², and provided at the upper end with a ratchet-wheel, G, adapted to be slowly revolved from the outside by a dog, *b*, and crank-wheel or other suitable device, H, as shown.

c' is a flat plate conforming to the shape of the ports *a*, but large enough to cover about one and one-half (1½) of said ports, and adapted to be revolved over the surface of the head A' by a rod, *d*, connecting it to the ratchet-wheel G, the plate *c'* thus forming a valve traveling over the ports *a*, and shutting them off, one after the other, as hereinafter shown. The rod *d* does not come in contact with the valve *c'*, but is a short distance above it, and is connected to it by pins *e*, rising from the valve and passing loosely through the rod, so that while the valve is drawn over the head A' by the rod and pins it is at the same time free to rise and fall slightly, and thus rest upon the head by its own weight and adapt itself to any irregularities of surface that may occur.

Attached to the lower end of the shaft F is another valve, consisting of a hollow casing, *g'*, about the size and form of the valve *c'*, in which a second valve, *c''*, fits, and is adapted to be held up against the under surface of the head A² by springs *g''*, so that it will conform itself to any irregularities of the surface of the head, the two parts *c''* and *g'* completely filling the space between the heads A² and C², and thus not only forming a shut-off valve to the lower series of ports, *a*, but also serving as a scraper or sweep to remove the dust from the head C², as hereinafter set forth. The valves *c'* *c''* are arranged to be at all times opposite to each other. Hence they shut off the air from both ends of the same cloth tube, B, at the same time. The tubes B are provided near their lower ends with angular-shaped hoops *h*, between which and the head A² the cloth is very loose, (or a different quality of cloth may be used,) so that the whole tube above the hoop may be loosened up by raising the latter, as shown in Fig. 3.

i' are a series of rods, one for each tube B, held by their upper ends in suitable guides, *m*, and with their lower ends running down

through the head A^2 , and ending near the lower head C^2 . The hoops h are attached to these rods i' by adjustable nuts i^2 , so that the tubes may be adjusted to secure the requisite tension, and the rods are provided with springs i^3 , by which they are held down. By this arrangement, if the rods i' are forced upward the hoops h will be raised with them, loosening the cloth of the tubes B into a loose, baggy condition, as shown in Fig. 3. Then when the rods are released the springs i^3 will suddenly stretch the cloth downward again, and throw it into quick vibrations to remove any particles of adhering dust therefrom.

Attached to the end of the casing g' is an inclined cam-lug, g^4 , which passes beneath the lower ends of the rods i' as the valves c' c^2 are revolved, and raises them up and allows them to fall again when it passes from beneath them, thus automatically shaping the cloth of the tubes B, while the valves c' c^2 have shut off the air.

As before stated, the space between the heads A' C' forms a distributing-chamber for the dust-laden air, so that when said air enters at E it expands in this chamber, and passes down through the tubes in even, slow currents and without whirls or eddies. Hence a larger amount of the heavier particles of dust falls through the tubes without touching them. By these arrangements the dust-laden air enters the tubes B at their tops and passes downward in a line parallel with their sides, and as it approaches the bottom plate A^2 it gradually turns toward the sides and passes out through the meshes of the cloth, the latter catching and retaining any dust that may be in the air, and allowing pure air only to escape. The dust in the air, being heavier than the air, falls down upon the lower head C^2 , while the dust that is caught by the cloth is shaken loose by the spring-rods i' , as before described, while the tubes B are shut off by the valves c' c^2 , the loosened dust, falling upon the lower valve, c^2 , is swept therefrom by the valve, when it moves onward and falls upon the lower head C^2 . As is well known, it is very essential that no air-currents are permitted to pass through the cloth while it is being shaken; hence the necessity for the shut-off valve c' c^2 .

L' is an open port through one side of the lower plate C^2 , into which the dust that has fallen from the tubes is scraped by the casing g' , as before described. This port L' opens into a trough-shaped box, one side of which, L^2 , is hinged at the top to the plate C^2 , and provided on the rear side with a weighted arm, L^3 , by which the lower edge of the hinged side L^2 is held in contact with the remainder of the trough-shaped box, as shown in Fig. 4.

Attached to the front of the side L^2 is a rigid arm, L^4 , passing forward and upward and projecting a short distance above the surface of the plate C^2 , so that the front edge of the casing g' may strike it in passing around and force it downward to open the hinged side L^2 and permit the dust to escape.

g^5 is a recess or groove formed in the lower side of the casing g' , into which the upper end of the arm L^4 rises after being forced down by the front edge of the casing g' , so that the hinged side L^2 will be held open only for a very brief period, to prevent the escape of the air. The thickness of the casing between the recess g^5 and the front edge of the casing g' is all that affects the valve L^2 . Hence its thickness determines the time which the valve L^2 shall be held open, and by making it thicker or thinner the valve may be held open for a longer or shorter period of time, as desired. By this means the valve L^2 forms a dust-trap, (in connection with the casing g' , which covers the port L' while the valve L^2 is open,) so that none of the air from the tubes B can escape through the port L' , except what passes through the rear end of the groove g^5 , which will be so small as not to affect the operation of the device.

The head A' will be made adjustable higher or lower by screws M, upon which it is mounted, so that the tubes B may be stretched tight when desired.

A very large percentage of the dust never comes in contact with the cloth of the tubes B, but falls directly upon the head C^2 and valve c^2 . This is a very important feature of our invention, as the dust-laden air is not driven through the cloth at right angles or nearly right angles thereto, as in all machines with which we are acquainted. This arrangement greatly lessens the amount of dust caught by the cloth. Hence the cleaning of the latter is not as troublesome a matter as formerly. By this arrangement, also, no "eddies" or "whirls" of the air are formed, as the force required to pass the air through the machine is only sufficient to form a slight current, as the natural motion of the air is nearly enough to move it. Hence the air is not driven against obstacles and around corners. This is a great advantage, as the dust is thus left free to fall through the air, the greater portion of the movement of the air being also downward. Still another important advantage gained by these arrangements is the manner of shaking the cloth by loosening the whole mass of the tube B, and then suddenly stretching it again, by which means the particles of adhering dust are driven from the cloth toward the center, and then fall upon the valve c^2 and do not come again in contact with the cloth. The particles of dust are thus removed from the cloth with great force and thoroughness.

In Fig. 5 we have shown one of the tubes B small at the top and large at the bottom, so that the sides are sloped outward. Hence the dust once shaken loose cannot again come in contact with the cloth, as the particles in falling are carried farther away from the cloth the nearer they approach the valve c^2 . This is also an important feature of our invention.

What we claim as new is—

1. The combination of the heads A' A^2 , having ports a , the tubes B, of suitable dust-col-

lecting fabric or texture, supported at the ends only and connecting said heads, and the valves c' c^2 , adapted to be revolved over and beneath said heads, whereby the air may be shut off from one or more of said tubes B in succession, substantially as set forth.

2. The combination of the heads A' A^2 C' C^2 , tubes B, of suitable dust-collecting fabric or texture, shaft F, and valves c' c^2 , substantially as set forth.

3. The combination of the heads A' A^2 , shaft F, valves c' c^2 , ratchet-wheel G, adapted to be revolved, and the tubes B, substantially as set forth.

4. The combination of the heads A' A^2 , tubes B, posts D, and adjusting-screws M, substantially as set forth.

5. The combination of the heads A' A^2 , tubes B, hoops h , rods i' , springs i^3 , and cam g^4 , adapted to be revolved beneath said rods, substantially as set forth.

6. The combination of the heads A^2 C^2 , casing g' , valve c^2 , springs g^2 , and revolving shaft F, substantially as set forth.

7. In dust-collectors, the combination of a dust-collecting conduit and a trough for receiving the dust from said conduit, having a hinged valve provided with a projecting arm, with a moving valve intermediate between said conduit and trough, adapted in its movements to close communication between the conduit and trough, and to strike the projecting arm of the hinged valve so as thereby to open said valve, whereby the several parts will operate as set forth.

8. The combination of casing g' , having the recess g^5 , valve L^2 , having the rigid arm L^4 and weighted arm L^3 , and the plate C^2 , having the port L' , substantially as set forth.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

WILLIAM HENRY FRUEN.

SAMUEL POTTS.

CHARLES JONES ELLIOTT.

Witnesses:

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