

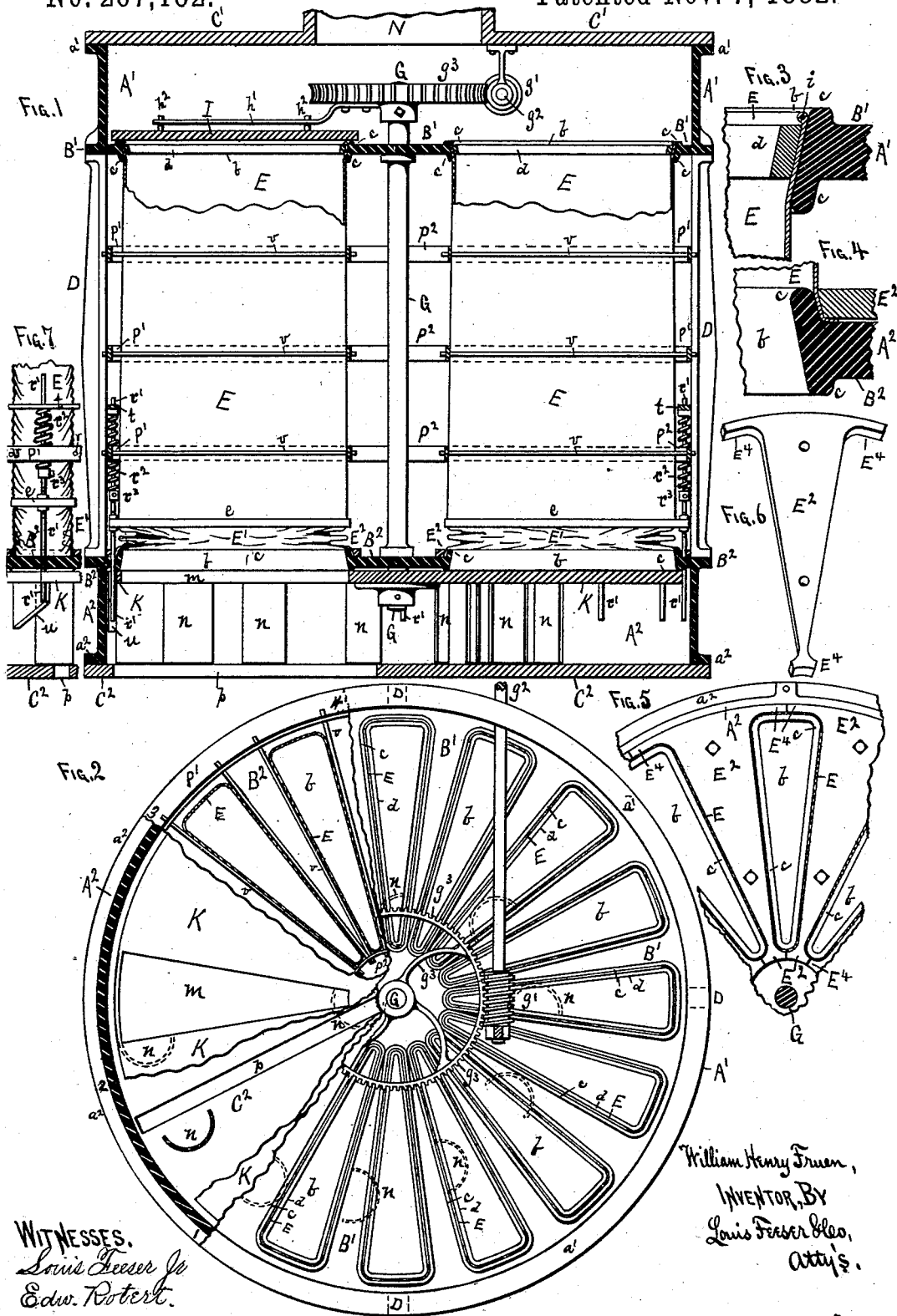
(No Model.)

W. H. FRUEN.

DUST COLLECTOR FOR FLOUR MILLS, &c.

No. 267,182.

Patented Nov. 7, 1882.



# UNITED STATES PATENT OFFICE.

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## DUST-COLLECTOR FOR FLOUR-MILLS, &c.

SPECIFICATION forming part of Letters Patent No. 267,182, dated November 7, 1882.

Application filed March 10, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM HENRY FRUEN, a citizen of the United States, and a resident of Minneapolis township, in the county of Hennepin and State of Minnesota, have made certain new and useful Improvements in Dust-Collectors for Flour-Mills, &c., of which the following is a specification.

This invention relates to dust-collectors for flour-mills &c.; and it consists in the construction and combination of parts hereinafter shown and described, and then sought to be specifically defined by the claims.

In the accompanying drawings, Figure 1 is a sectional elevation. Fig. 2 is a plan view, the right-hand half being a view of the top of the machine with the cover removed, and the part from 1 to 2 representing a portion of the upper section broken out to show the construction of the bag-supports, and that part from 2 to 3 representing both end plates broken out to show the lower shut-off disk, while the part from 3 to 4 represents a portion of the shut-off disk broken out to show the arrangement of the dust-discharge slot. Fig. 3 is an enlarged sectional detail view of a portion of the upper part of the frame, illustrating the manner of securing the upper ends of the dust-catching bags; and Fig. 4 is a similar view, showing the manner of attaching the lower ends of the dust-catching bags to the lower plate. Fig. 5 is plan view of a portion of the lower plate detached. Fig. 6 is a detached perspective view of one of the plates for holding the lower ends of the bags. Fig. 7 is a detached side view of a portion of one of the dust-catching bags.

A' A<sup>2</sup> are ring-shaped castings, having flanges *a'* at the upper edge of the ring A' and flanges *a*<sup>2</sup> at the lower edge of the ring A<sup>2</sup>; and C' is a disk of wood or other material forming a cover to the ring A', and C<sup>2</sup> another disk, forming a bottom to the ring A<sup>2</sup>. The ring A' has a bottom, B', cast in one piece therewith, and the ring A<sup>2</sup> has a top, B<sup>2</sup>, cast in one piece therewith, the ring A' and bottom B' and the ring A<sup>2</sup> and its top B<sup>2</sup> being duplicates of each other, so that they can both be cast from one pattern, and are interchange-

able, the only difference between them being that one is in the reverse position from the other.

D are a series of standards or posts connecting the rings A' A<sup>2</sup> to each other, the rings A' A<sup>2</sup>, bottoms B' C<sup>2</sup>, tops C' B<sup>2</sup>, and posts D forming the frame of the apparatus.

The plates B' B<sup>2</sup> are provided with V-shaped ports *b*, cut through them, the sides of these slots or ports converging inward from the upper to the lower side of the plate B', and of course, by reason of the plate B<sup>2</sup> being in a reversed position from the plate B', the sides of the ports *b* in the plate B<sup>2</sup> will converge outward from the upper to the lower side of the plate.

Around both the upper and lower edges or rims of the ports *b* small ribs *c* are formed, to strengthen the plates B' B<sup>2</sup>, as well as to form seats for the valves and supports for the ends of the dust-collecting tubes, as hereinafter shown.

Fitting inside of the ports *b* in the plate B' are angular-sided frames *d*, adapted to conform to the ports, so that when the upper edges of the cloth tubes *E* are bound around with a cord, *i*, as shown in Fig. 3, and inserted into the ports, and the frames *d* set inside the tubes, and the latter drawn down into the ports, the cloth will be firmly held between the frames and edges of the ports, as shown, and the harder the cloth is pulled downward the tighter the frames will grip it. By this simple means the cloth tubes are firmly held at their upper ends; but at the same time they can be easily and quickly removed by lifting the frames *d* upward. The lower ends of the tubes are connected to metal frames *e*, conforming to the ports *b*, and with short spaces between them and the plate B<sup>2</sup>, which are occupied by loose cloth sleeves or bags E', attached by their upper edges to the lower sides of the frames *e*, and by their lower edges to the outsides of the ribs *c* on the upper side of the plate B<sup>2</sup>. The lower edges of the sleeves E' are held in place by plates E<sup>2</sup>, constructed as shown in Figs. 5 and 6, to fill the spaces between the ports, and each plate is provided with projecting arms E<sup>4</sup>, which inclose one-half the ends of the ribs *c* and sleeves E', so

that each of the plates  $E^2$  holds two sides and one-half of four ends of the sleeves  $E'$ . By this means the spaces between the plate  $B'$  and cover  $C'$  and the plate  $B^2$  and cover  $C^2$  are connected to each other by the cloth tubes, and no other communication is had between them.

$G$  is a shaft passing through the centers of the plates  $B'$   $B^2$ , and projecting upward through the plate  $B'$  and downward below the plate  $B^2$ , and adapted to be revolved by a worm-pinion,  $g'$ , upon a shaft,  $g^2$ , running out through the ring  $A'$ , acting upon a worm-gear,  $g^3$ , upon the upper end of the shaft  $G$ .

$I$  is a flat plate nearly large enough to cover two of the ports  $b$  in the plate  $B'$ , and adapted to be revolved over the said ports by a bar,  $h'$ , attached to the under side of the worm-gear  $g^3$ , and resting down over pins  $h^2$  on the plate  $I$ , this plate thus forming a valve to shut off the tubes  $E$  one after the other.

Beneath the lower plate,  $B^2$ , is a circular disk,  $K$ , keyed to the shaft  $G$ , and having a port,  $m$ , conforming to one of the ports  $b$ , and directly beneath the valve  $I$ , so that when the shaft is revolved the valve will shut off the upper ends of each of the cloth tubes  $E$  in succession, while at the same time the disk  $K$  will shut off the lower ends of all the tubes  $E$  except the one above the port  $m$ , which will always be the one closed by the valve  $I$ , so that each tube  $E$  is closed at the top and opened at the bottom one after the other, and kept open at the top and closed at the bottom at all other times.

Projecting down from the plate  $K$  are a series of curved scrapers or sweeps,  $n$ , arranged in a scroll line from the outer rim of the plate to the shaft  $G$ , so that when the plate  $K$  is revolved these sweeps will brush the dust from the bottom  $C^2$  into a long slot,  $p$ , through the bottom  $C^2$ , and by the scroll arrangement of the sweeps the dust is brushed off a little at a time, and not in one mass at each revolution, as it would be if only one straight sweep were used. Thus a thin, even stream of the dust is discharged from the machine and conveyed to suitable separating-machines, where the valuable particles of the dust are removed, the even, regular feeding being a very important advantage in all separating-machines.

The frames  $e$  are provided with projecting outer ends, in which upright rods  $r'$  are secured and pass upward through a hoop,  $t$ , secured around the insides of the posts  $D$ , and with their lower ends passing down through the plate  $B^2$ , as shown.

Upon the edge of the plate  $K$ , about opposite the port  $m$ , is an inclined cam,  $u$ , adapted to pass underneath the lower ends of the rods  $r'$  as the disk  $K$  is revolved, and raise them up and permit them to fall again when the cam passes from beneath them. Coiled springs  $r^2$  are arranged around the rods  $r'$  beneath the ring  $t$ , and supported at their lower ends by collars  $r^3$ , so that when the rods  $r'$  are raised

upward by the cam  $u$  the springs will be compressed, and the tubes  $E$  loosened up in a baggy shape, as shown in Fig. 7, and then when the rods drop off from the end of the cam the springs will suddenly stretch the cloth downward and shake the adhering dust therefrom. The dust-laden air is fed in through the spout  $N$  at the top of the machine.

At equal distances apart between the plates  $B'$   $B^2$ , around the insides of the posts  $D$ , and secured to them, are a number of hoops,  $P'$ , outside the cloth tubes  $E$ , and opposite to these hoops and inside the cloth tubes are a set of smaller hoops,  $P^2$ , through both sets of which hoops wires or small rods  $v$  pass and embrace closely the outsides of the cloth tubes  $E$ . By this means guards are formed at equal distances apart upon the outsides of the tubes to prevent the air-pressure from within distending them far enough to cause them to come in contact with each other. By this construction the whole frame, excepting the parts  $C'$ ,  $C^2$ , and  $K$ , if they be considered a part of this frame, may be made by the use of only two patterns—viz., one for the combined rings and plates  $A' B'$  or  $A^2 B^2$  and one for the posts  $D$ .

By placing the castings  $A' B'$  and  $A^2 B^2$  in a lathe the ribs  $c$  can be turned off true, so that the valve  $I$  and disk  $K$  will travel over them with air-tight joints.

One of the essentials in this class of machines is air-tight joints, and by constructing the machine as shown this is very thoroughly secured.

The cover  $C'$  and bottom  $C^2$  may be formed of sheet metal, if desired, so that the whole machine except the cloth fabric may be made of metal.

What I claim as new is—

1. A chamber having its sides and bottom cast in one piece and adapted to receive the dust-laden air, and provided with open ports through said bottom, a chamber adapted to receive the dust after it is extracted from the air, having its sides and top cast in one piece, and provided with open ports through said top, and a series of tubes composed of suitable dust-collecting fabric connecting the ports of one of said chambers with the ports of the other, in combination with means for shutting off the upper openings into said tubes consecutively and opening the lower ends of the same tubes that are shut off from above at the same time, substantially as and for the purpose set forth.

2. The combination of the plate  $B'$ , having the angular-sided ports  $b$ , with the clamping-frames  $d$  and tubes  $E$ , substantially as set forth.

3. The combination, with the plates  $B' B^2$ , provided with ports  $b$ , and tubes  $E$  of suitable dust-collecting fabric, of shaft  $G$ , valve  $I$ , and disk  $K$ , having port  $m$ , substantially as set forth.

4. The combination of the plate  $B^2$ , having

the ports *b*, ring  $A^2$ , and bottom  $C^2$ , having the discharge-port *p*, with disk *K*, having the sweeps *n* and port *m*, substantially as set forth.

5 5. The plates  $B'$   $B^2$ , having ports *b*, the posts *D*, and tubes *E* of suitable dust-collecting fabric, in combination with guards *v*, arranged and operating substantially as set forth.

10 6. The combination of the plate  $B^2$ , having the ports *b* and upwardly-projecting ribs *c*,

with the sleeves  $E'$  and holding-plates  $E^2$ , substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM HENRY FRUEN.

Witnesses:

C. N. WOODWARD,

LOUIS FEESER, Sr.