

(No Model.)

3 Sheets—Sheet 1.

A. HEINE.
MIDDLINGS PURIFIER.

No. 382,873.

Patented May 15, 1888.

Fig. 1.

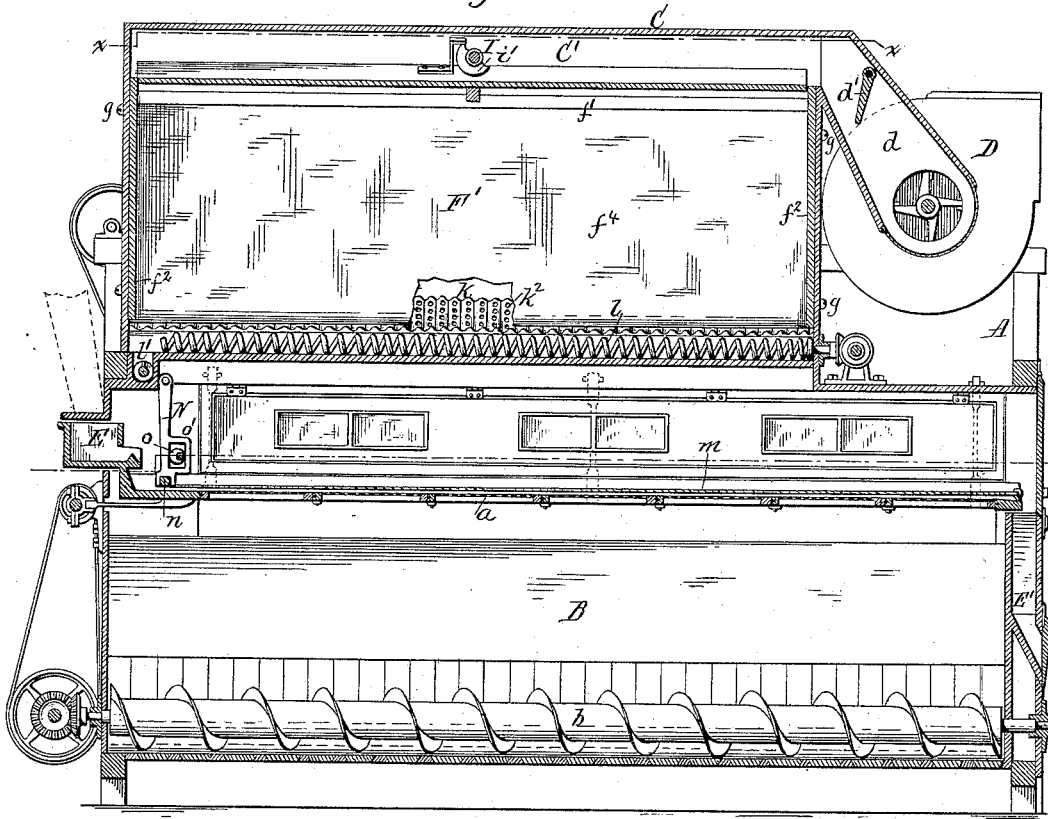
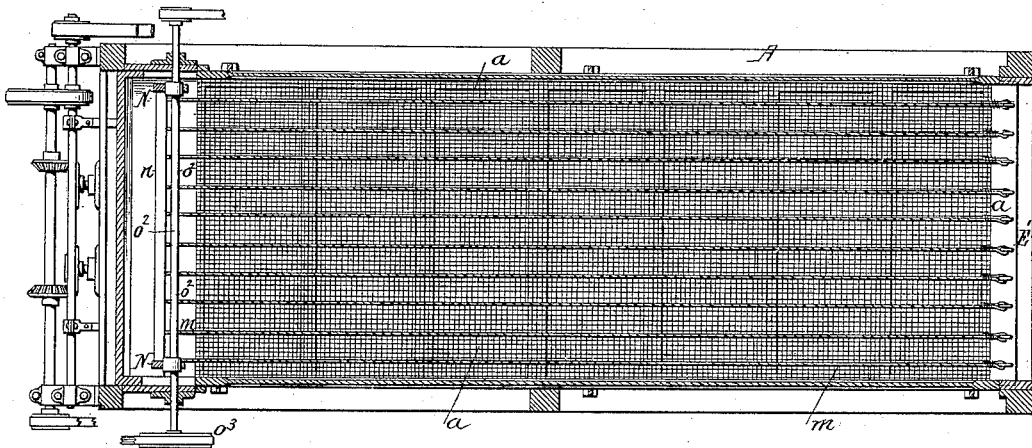


Fig. 2.



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August Heine Inventor.
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Attorneys.

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Fig. 3.

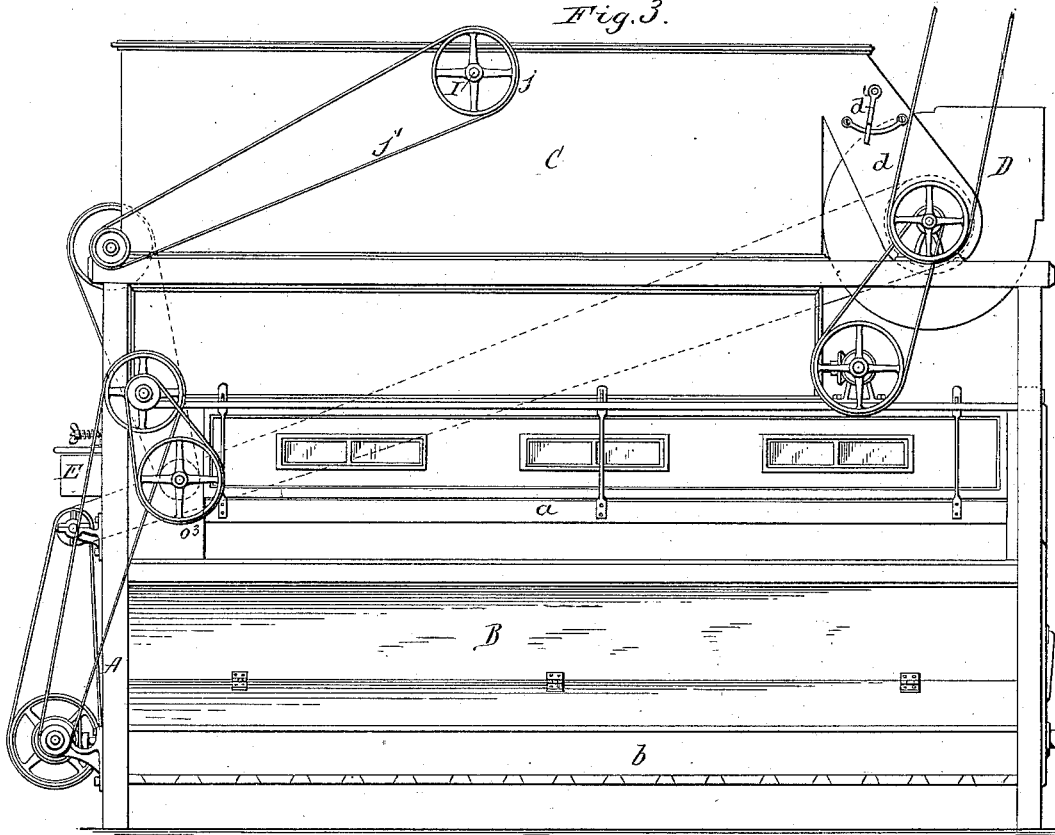
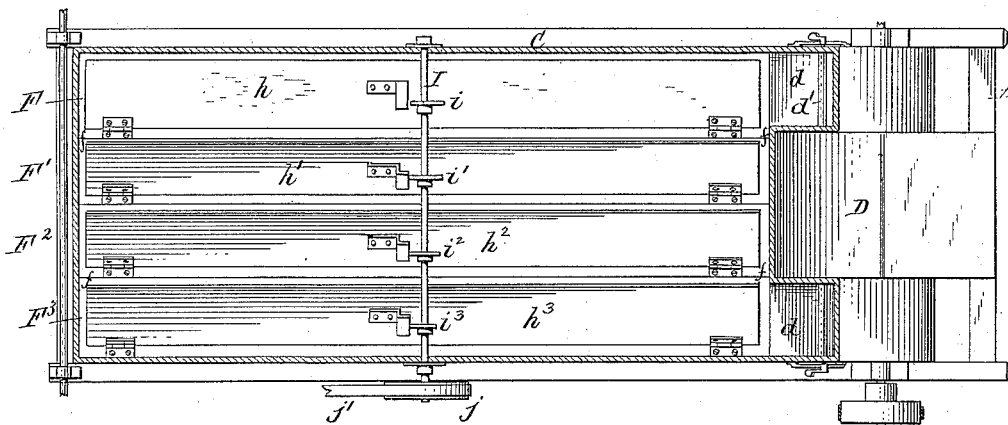


Fig. 4.



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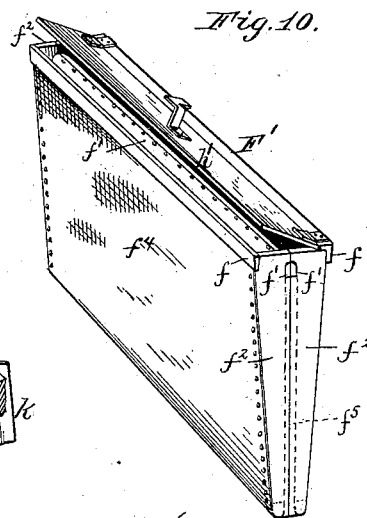
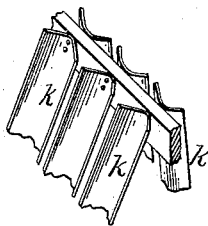
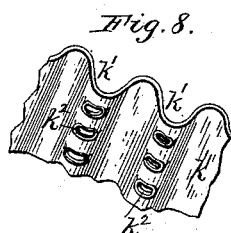
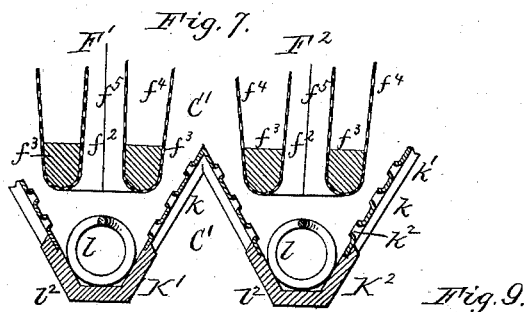
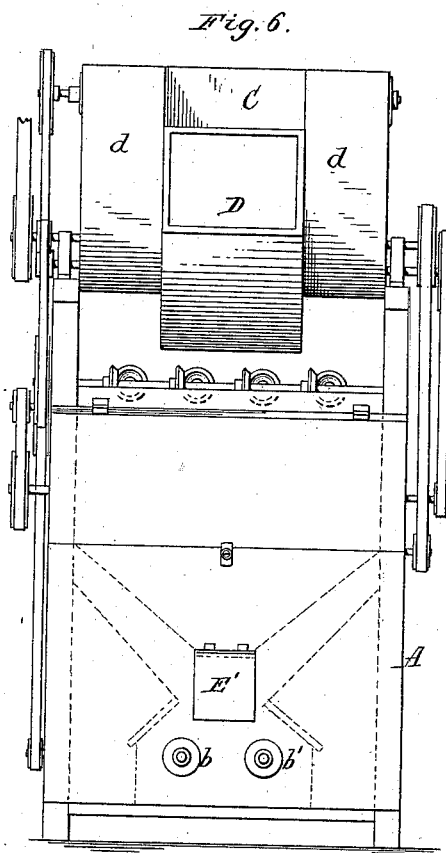
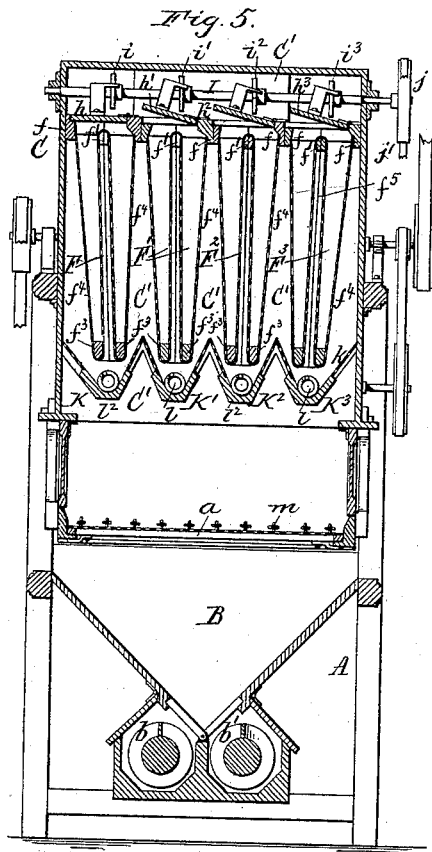
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3 Sheets—Sheet 3

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August Heine. Inventor.
By Wilhelm R. Rount. Attorneys.

UNITED STATES PATENT OFFICE.

AUGUST HEINE, OF SILVER CREEK, NEW YORK.

MIDDLINGS-PURIFIER.

SPECIFICATION forming part of Letters Patent No. 382,873, dated May 15, 1888.

Application filed April 1, 1887. Serial No. 233,390. (No model.)

To all whom it may concern:

Be it known that I, AUGUST HEINE, of Silver Creek, in the county of Chautauqua and State of New York, have invented a new and useful Improvement in Middlings-Purifiers, of which the following is a specification.

This invention relates to that class of middlings-purifiers which are provided with a shaking-screen through which an air-current passes, whereby the light impurities are removed from the material passing over the screen; and it has for its object to provide simple means for separating these light impurities from the air and to provide simple means for keeping the meshes of the screen open, thereby maintaining a proper and uniform action of the air-currents in the machine. In middlings-purifiers of this general character the light impurities in ascending through the air-passage above the screen frequently form aggregations or flakes of greater or less bulk, which, being too heavy to be further lifted by the air-current, fall back upon the material upon the screen, and in this manner escape the separating action of the machine.

My invention is designed to remedy this difficulty; and it consists of the improvements which will be hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, consisting of three sheets, Figure 1 is a longitudinal sectional elevation of a middlings-purifier provided with my improvements. Fig. 2 is a horizontal section of the machine taken above the screen. Fig. 3 is a side elevation of the machine. Fig. 4 is a horizontal section in line *xx*, Fig. 1. Fig. 5 is a cross-section of the machine. Fig. 6 is an elevation of the tail end of the machine. Fig. 7 is a vertical cross-section of the lower portions of two of the dust-collecting chambers on an enlarged scale. Fig. 8 is a fragmentary perspective view of one of the perforated walls of the dust-collecting troughs. Fig. 9 is a similar view showing a modified construction of said walls. Fig. 10 is a perspective view of one of the dust-collecting chambers.

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

A represents the stationary frame of the machine, and *a* the shaking-screen, arranged in the lower portion of the frame in the usual manner.

B represents the hopper-shaped receptacle arranged underneath the screen for the reception of the material which passes through the screen, and provided with the usual conveyers, *b b'*.

C represents the casing arranged above the screen and inclosing the air-passage *C'*, through which the dust-laden air passes from the screen to the fan *D*, by which the air-current is set in motion in the usual manner.

E represents the feed-box from which the material to be purified is delivered upon the head of the shaking-screen *a*, and *E'* represents the discharge-spout through which the tailings escape from the machine.

F F' F² F³ represent dust-separating chambers supported in the upper portion of the casing *C* and depending into the same. Each separating-chamber consists of two compartments formed by top bars, *f f'*, depending end pieces, *f²*, two longitudinal bars, *f³ f³*, arranged side by side and connecting the lower ends of the end pieces, *f²*, and suitable filter-cloths *f⁴ f⁴*. The latter extend each from one top bar, *f*, down to and around one of the lower bars, *f³*, and thence upwardly to the upper bar, *f'*. The two bars *f'* of two adjacent compartments lie closely against each other, while the lower bars, *f³*, are separated. The two compartments of each chamber are separated by a space, *f⁵*, through which the dust-laden air enters between the compartments.

Each chamber is secured to the inner side of the casing *C* by screws *g*, or other suitable means. The inlet-spout *d* of the fan is connected with the casing *C* above the chambers *F F' F² F³*, as represented in Fig. 1, and is provided with a suitable valve, *d'*, for regulating the strength and volume of the air-current.

h h' h² h³ represent movable gates or valves attached to the open tops of the respective chambers, so as to alternately open and close the same. These gates are opened and closed by cams *i i' i² i³*, which engage against hooks attached to the gates. The cams are secured to a transverse shaft, *I*, which is rotated by a pulley, *j*, and endless belt *j'*, or other suitable means. The cams are so arranged on the shaft that one of the gates is closed while the other gates are open, thereby permitting the cleaning of the filter-cloth of the chamber which is cut off from the air-current while the other chambers are in operation. The cams are con-

structed to drop the gates suddenly or with a jar, whereby the dust is dislodged from the filter-cloth; but, if desired, the separating-chambers may be jarred by any other suitable means.

5 K K' K² K³ represent troughs arranged lengthwise underneath the dust-separating chambers F F' F² F³ and constructed with inclined perforated side walls, through which the
10 dust-laden air passes upwardly from the screen to the dust-separating chambers. These troughs form a diaphragm across the air-passage O' between the screen and the dust-separating chambers, which prevents the dust after
15 having passed through this diaphragm from falling back upon the screen. The side walls, k, of these troughs are preferably constructed of metal, having corrugations k', arranged side
20 by side in vertical planes, each corrugation being provided in its crown line with perforations k². The air-currents ascending from the screen gradually increase in force in the up-
25 wardly-converging passages formed between inclined side walls of the troughs and in the perforations with which the side walls are pro-
vided, whereby the force of the air-currents is increased in the same measure as the weight
30 of the dust is liable to increase by aggregation, and whereby the flakes or aggregations of dust particles are prevented from overcoming the force of the air-currents and falling
35 back upon the screen. The air-currents issuing from the perforations k² are weakened by expansion above the diaphragm formed by
40 the troughs, whereby the heavier dust particles are caused to drop out of the air-currents upon the troughs, from which latter the dust
is removed by conveyers l, of any suitable construction, which deliver the dust to a trans-
45 verse conveyor, l'. The corrugations in the side walls of the trough cause the dust particles to be collected in the depressions between the rows of perforations and prevent the dust
particles from falling through the perfora-
45 tions.

As a further safeguard, the perforations may be provided with raised burrs or edges on the upper sides of the plates, as represented in Fig. 7. The dust which is dislodged
50 from the cloths of the separating-chambers is also collected upon the tight bottoms l' of the troughs and is removed by the conveyers l. These troughs, or the zigzag diaphragm formed by the troughs, effect a preliminary separation of the heavier impurities from the air-
55 current before the latter reaches the separating-chambers, whereby the latter are relieved to that extent and required only to separate the lighter dust particles from the air-current. It is obvious that slots may be substituted for the perforations, as indicated in Fig. 9.

60 m represents cords or bands arranged lengthwise on the shaking-screen a, and secured with their rear ends to the frame thereof, while their front ends are secured to a cross-
65 bar, n, or support which is independent of the screen. This cross-bar is suspended by

hangers N, which are pivoted at their upper ends to the casing above the screen, and which receive an oscillating motion by ec-
70 centrics o engaging in yokes o' on the hangers, and secured to a transverse shaft, o². The latter is rotated by a pulley, o³, or other suitable means. The cross-bar n receives a
75 short reciprocating movement toward and from the tail of the screen, whereby the cords m are alternately loosened and tightened. The cross-bar n is slightly elevated above the
80 screen, so that when the cords are tightened they are lifted above the screen, and do not come in contact with the cloth of the same. When the cords are slack, they rest upon the
85 screen and assume a sinuous or serpentine motion by the shaking motion of the screen, whereby the meshes of the screen are freed from any particles which may have lodged in
the same.

By holding the cords part of the time in an elevated position above the screen the wear upon the bolting-cloth is considerably re-
90 duced.

I claim as my invention—

1. The combination, with the casing through which the dust-laden air passes, of a diaphragm extending across said casing and com-
95 posed of a series of dust-collecting troughs having the upper portions of their side walls perforated, and a series of dust-collecting chambers arranged in said casing above the said diaphragm, substantially as set forth. 100

2. The combination, with the casing through which the dust-laden air passes, of a diaphragm arranged across said casing and provided with inclined side walls having upright
105 corrugations, and air-passages in the crown portions of said corrugations, and dust-collecting chambers arranged in said casing above said diaphragm, substantially as set forth.

3. The combination, with the casing through
110 which the dust-laden air passes, of a dust-collecting chamber depending into said casing, open at its top, closed at its bottom, and having its sides covered with filter-cloth, a vertically-movable gate applied to the upper end
115 of said dust-collecting chamber, and a cam whereby the gate is raised and then suddenly dropped, thereby shutting off the air-current and jarring the chamber, substantially as set forth. 120

4. The combination, with the shaking screen, of cleaning-cords arranged on the screen and secured at one end to the screen, and a support
125 to which the opposite ends of the cords are secured, and which moves independent of the screen, whereby the cords are at intervals loosened to rest on the screen and tightened to be lifted clear of the screen, substantially as set forth.

Witness my hand this 25th day of March, 130
1887.

Witnesses: AUGUST HEINE.
I. D. MERRITT,
G. B. DOUGLAS.