K. SCHWAB.

Middlings-Purifier.

No. 163,030. Patented May 11, 1875.

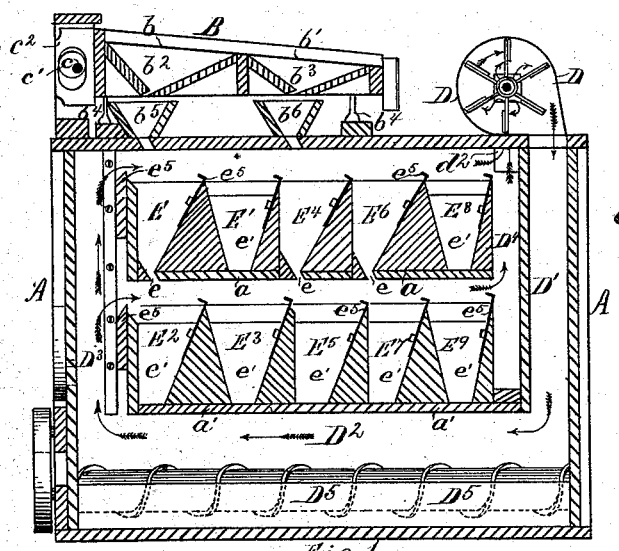

Fig. 1.

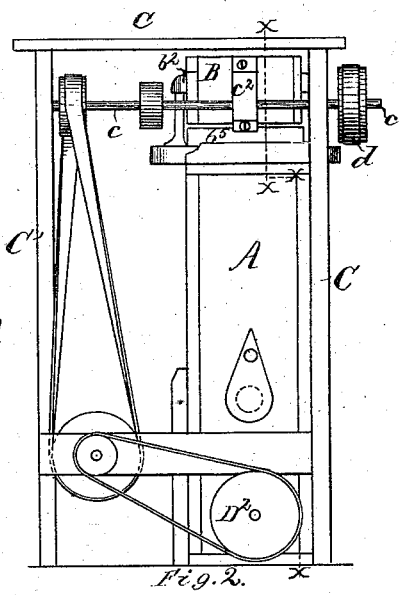

Fig. 2.

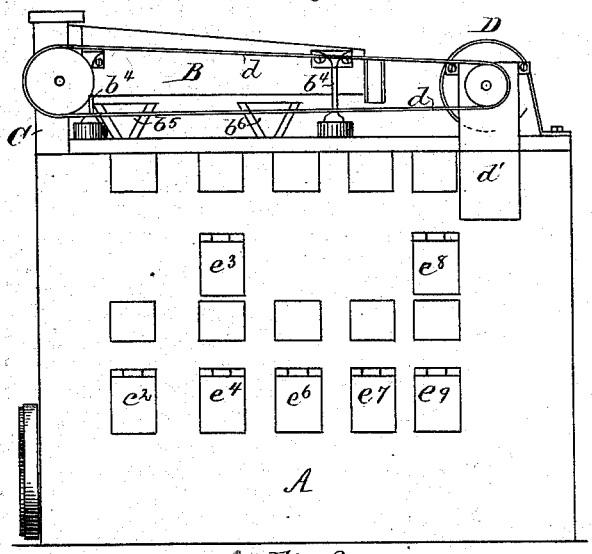

Fig. 3.

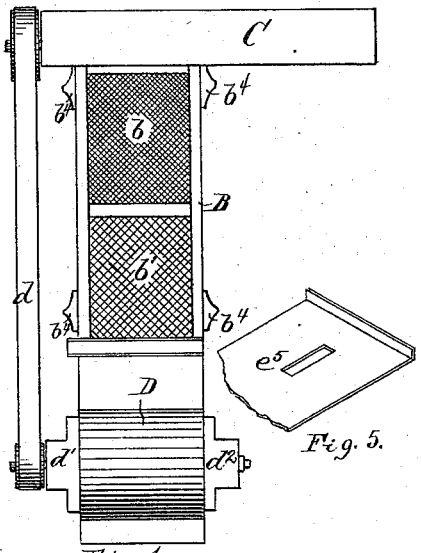

Fig. 4.

Fig. 5.

WITNESSES:
J. W. Herthel.
Chas. F. Meisner.

INVENTOR:
Kilian Schwab
per: Herthel & Co
Attys.

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

KILIAN SCHWAB, OF LEBANON, ILLINOIS.

IMPROVEMENT IN MIDDLINGS-PURIFIERS.

Specification forming part of Letters Patent No. **163,030**, dated May 11, 1875; application filed January 13, 1875.

To all whom it may concern:

Be it known that I, KILIAN SCHWAB, of Lebanon, St. Clair county, and State of Illinois, have invented an Improved Middlings-Separator, of which the following is a specification:

This invention relates to the peculiar arrangement of air-chambers with relation to the fan, by means whereof a continuous circulation of air acts upon the middlings in their passage to and from the separators, the air returning to the fan-case, while the offal is permitted to drop into conveyer-chamber, to be thence passed out of same, and as will now more fully appear.

Of the drawings, Figure 1 is a sectional elevation; Fig. 2, an end elevation; Fig. 3, a front elevation; and Fig. 4, a top-plan, and Fig. 5 a detail, view.

A is a suitable frame that incloses the separators proper, as shown. Top of the frame A I provide a sieve, B. This is in sections—that is, so as to have silk or wire-cloth, which is of varying fineness, to form different sets of sieves. Thus the cloth *b* is finer than that of b^1, (see Fig. 4,) the next still coarser than the following, &c., according to the size of the machine. As here shown, the sieve B has two sets of sieves, *b* b^1, corresponding to the sets of separators, as here shown. Each sieve passes its separations to distinct hoppers b^2 b^3, which are in the sieve-boxing, and divided from each other, as shown in Fig. 1. The sieve B, thus made, rests upon upright springs b^4, which are properly secured top of frame A. (See Figs. 1, 3.) Thus suspended, said sieve receives a reciprocating movement from the same power source that operates the fan, also conveyer, and which said parts are arranged as follows: At one end of the machine is the additional upright frame C. (See Figs. 2 and 4.) In said frame C is the power-shaft. This is operated from power source as usual. On the shaft *c* is the eccentric c^1, operating in the yoke c^2, which is attached to one end of the sieve B. (See Figs. 1 and 2.) By means of the operation of the eccentric, the sieve B is reciprocated, or has a to-and-fro movement, for the purpose of separating the finer parts or substances of middlings from the coarser. From each set of sieves the middlings are dropped into the farther distinct hoppers b^5 b^6, and from these the middlings in their passage to the separators, or from one separating-chamber to another, as will hereinafter appear, are subjected to the air-blast derived from the fan. The arrangement of the fan, therefore, with relation to the separators is as follows: Top of the machine is the fan-case D. This, as usual, contains a revolving fan, operated by belting *d*, connected to the power-shaft *c*. (See Figs. 2, 3, 4.) The fan-case D communicates through an opening with an air-chamber, D^1; also with bottom or conveyer chamber D^2; also with air-chambers D^3, the said chambers being the space left surrounding the interior frame that supports the separators. (See Fig. 1.) The air-chamber D^3 is further divided or left open, so as to communicate with the spaces top and between the separators, and with a further air-chamber, D^4, which, by means of the side spouts d^1 d^2, Figs. 3 and 4, establishes return communication of the blast with the fan-case D. The current of air, by the action of the fan, is, therefore, as indicated by the arrows, Fig. 1, viz., being a continuous circulation down one side, along bottom, and up the opposite sides of the machine, returning in the direction of the arrows, over and between the separators, by means of the chamber D^4, into fan-case. By thus making the air-blast a continuous circuit, utilizing the same air, the return communication, by its suctional force, the better enables the blast to separate the middlings, and at same time the suction-blast carries with it into the fan-case all the impure stuff, dirt, and lighter particles, to be finally settled, deposited, and carried off in the conveyer-chamber D^2; the chamber D^2 having a revolving conveyer, D^5, operated by usual belting connections from power source, (see Fig. 2,) for the purpose of discharging the offal, as desired.

The result of middlings fed from the hopper b^5, and separated by the air-blast, first drops into a separating-chamber, E; further, whatever middlings passes over said chamber E is lodged into the discharge-chamber E^1, and both of which occupy part of the first series on the division-board *a*. (See Fig. 1.)

The chamber E is a separating-chamber—that is, whatever middlings by gravity it re-

ceives can be still further separated; therefore said chamber I construct as shown in Fig. 1, having at bottom a discharge-opening, *e*, through which the middlings pass, and in doing so are further subjected to air-currents, which produces the separation, the purified middlings thus resulting dropping into the first lower chamber E^2, while the residue of middlings carried over said chamber is deposited into the second lower chamber E^3, both of which occupy part of the second series of separators, which can be provided top of the division-board *a'*. (See Fig. 1.) During the process of separation the impure stuff, &c., is carried with the air-current into conveyer, as before stated.

Instead of, as here shown, having but one separating-chamber, like E, the vertical series of these (and correspondingly all the rest) can be as many as deemed practicable; the last of which, however, at bottom, should be made a similar discharge-chamber to that of E^2, so as to effect a discharge of the grade or quality of middlings thus achieved.

The middlings, purified, from the separator E are, therefore, discharged out of the chamber E^2, this being made a discharge-chamber by having a slanting board, e^1, the inclination of which extends from near the top, at rear of the chamber, to the lowest point of the front thereof, (see Fig. 1,) the discharge taking place out of the opening closed by the hinged valve e^2. (See Fig. 3.)

The chamber E^1 is a similar constructed discharge-chamber to that of E^2, and discharges its grade of middlings out of the valve-opening e^3, Fig. 3; likewise, the chamber E^3 discharges separately out of the valve-opening e^4, Fig. 3.

Each of the separators aforesaid I provide with a movable slide, e^5. (See Fig. 6.) This slide has an elongated slot, so as, when fastened, the slide can be adjustably operated. The slide is fastened to the chambers in positions shown in Fig. 1. The operator, by raising or lowering the slide, can control and regulate the blast, as is apparent; also, by opening or closing the slide more or less, a particular quality or kind of separated middlings can be had in any of the chambers aforesaid.

The chambers described can be further duplicated and arranged as follows: Alongside of the chamber E^1, and in line with the second feed-hopper b^6 and set of sieve b^1, is a similar constructed separator, E^4, to that of E. Immediately under that of E^4 is a discharge-chamber, E^5, or again duplicated by E^6 and E^7, and finally by simply discharge-chambers E^8 E^9, as shown in Fig. 1.

The blast acts upon the middlings that pass from hopper b^6 into the separator E^4, and out of this into discharge-chamber E^5. The middlings carried over the separator E^4 and dropped in the separator E^6 are again separated in passing out of same into E^7, from whence they are discharged; the residue of middlings carried over and deposited in the final chambers E^8 E^9 being discharged out of each, respectively.

The chamber E^4 E^5 discharges its grade of middlings out of opening closed by valve e^6, and those of E^6 E^7 out of opening closed by valve e^7, and E^8 E^9 out of openings closed by valves e^8 and e^9, all said valves being shown in Fig. 3.

For fine middlings the separation produced in passing middlings from the chamber E out of E^2, or in connection therewith those of E E^3, is sufficient; but for coarser middlings, the further arrangement of separators and chambers, as here described and shown, is deemed best and most effective to divide the middlings into different grades, qualities, and separations.

The operator, by raising the slide most contiguous to the separators E^4 E^5, can prevent any middlings fed from the hopper b^5 from mixing with the middlings fed from the hopper b^6.

My machine, by the combination of the different sets of sieves, the continuous blast, and the conveyer with the separators, arranged as shown, more practically and satisfactorily purifies middlings and similar fine-grain substances, and in this respect is an improvement to that patented by me, No. 147,797, dated February 24, 1874.

What I claim is—

In combination with the separators, the fan and its case D, air-chambers D^1 D^2 D^3 D^4, and conveyer D^5, all constructed and arranged to operate substantially in the manner and for the purpose set forth.

In testimony of said invention I have hereunto set my hand in presence of witnesses.

KILIAN SCHWAB.

Witnesses:

CHRISTIAN MUELLER,

SEVERIN E. MOLL.