(No Model.) 2 Sheets—Sheet 1.

E. B. WHITMORE.

MIDDLINGS PURIFIER.

No. 525,301. Patented Aug. 28, 1894.

Fig. 1.

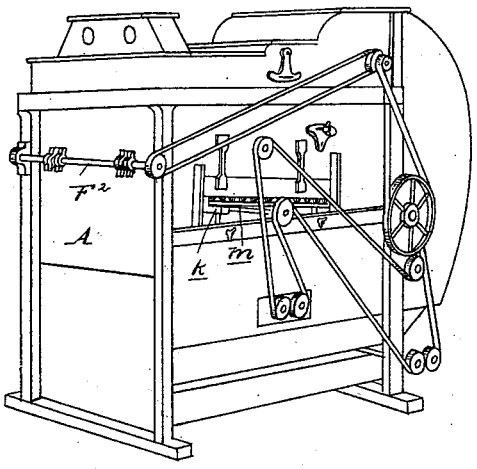
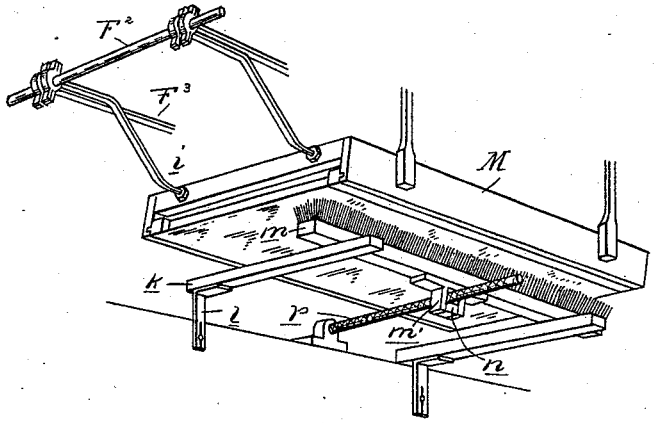


Fig. 4.



Witnesses
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M. D. Doherty

Inventor.
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Attys.

(No Model.) 2 Sheets—Sheet 2.

E. B. WHITMORE.

MIDDLINGS PURIFIER.

No. 525,301. Patented Aug. 28, 1894.

Fig. 2.

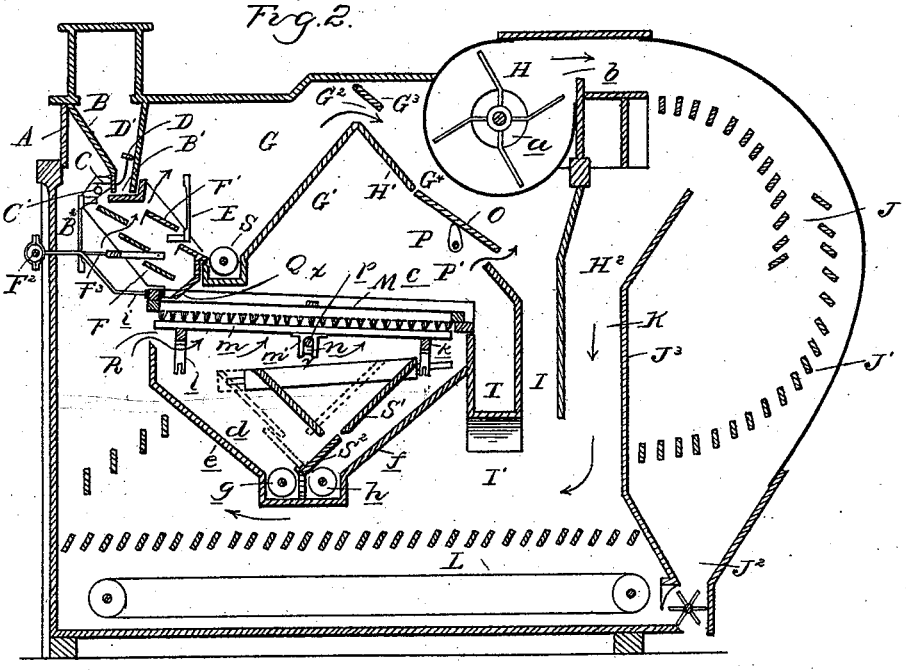


Fig. 3.

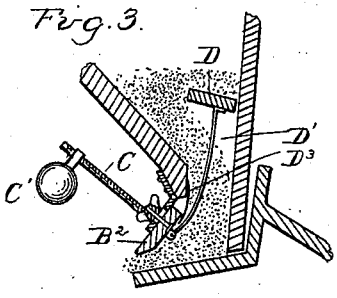


Fig. 5.

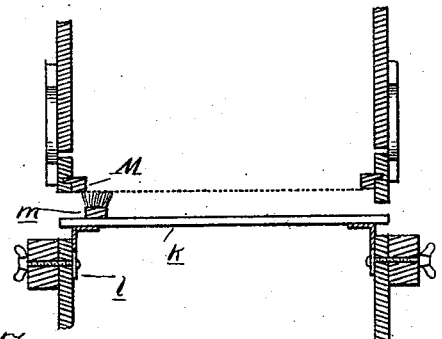


Fig. 6.

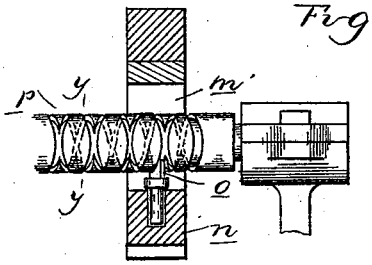
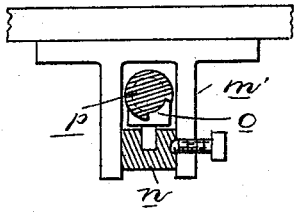


Fig. 7.



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UNITED STATES PATENT OFFICE.

EDWIN B. WHITMORE, OF THREE RIVERS, MICHIGAN, ASSIGNOR OF ONE-HALF TO LEWIS EMERY, JR., OF SAME PLACE.

MIDDLINGS-PURIFIER.

SPECIFICATION forming part of Letters Patent No. 525,301, dated August 28, 1894.

Application filed December 14, 1893. Serial No. 493,685. (No model.)

To all whom it may concern:

Be it known that I, EDWIN B. WHITMORE, a citizen of the United States, residing at Three Rivers, in the county of St. Joseph and State of Michigan, have invented certain new and useful Improvements in Middlings-Purifiers, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention consists in the peculiar construction, arrangement and combination of the various parts, as hereinafter set forth and claimed.

This machine is intended to be an improvement upon my Reissue Patent No. 11,245, dated June 21, 1892, and is intended to effect a more perfect separation of the middlings from the dust, chaff, &c., than could be accomplished heretofore, by combining with the separation by gravity in an air current, a mechanical separation by a sieve; all as more fully hereinafter described.

In the drawings, Figure 1 is a perspective view of my improved machine. Fig. 2 is a vertical, central, longitudinal section therethrough. Fig. 3 is an enlarged section through the feed hopper, to illustrate the feed valve. Fig. 4 is a detached perspective view of the screen brush or sieve and the actuating mechanism. Fig. 5 is a section through the screen. Fig. 6 is a section on line *x x* Fig. 2, showing part of the actuating screw for the brush. Fig. 7 is a section on line *y y*, Fig. 6.

A is the inclosing frame for supporting the operating parts of the machine. B is a feed hopper at the top of one end. This hopper has a lateral discharge spout B′, controlled by the valve or gate B^2, hinged at the lower edge of the hopper and provided on its outer face with the rod C, upon which the counterweight C′ is adjustably secured.

D is a plate, disk or board, connected to the valve B^2 through the curved arm D′ and serving as a plunger or actuating piston for the valve, controlled by the weight or flow of the grain, automatically closing as the grain stops flowing, the passage way into the device being always closed by the valve or the grain. To prevent the grain clogging the movement of the valve by getting into the hinge joint, I cover that joint by a flap D^3 (Fig. 3).

Supported on spring arms or links E is a vibrating frame carrying two series of inclined cant boards F F′, the upper board of the lower series F being arranged below the discharge from the hopper. This frame is vibrated in any suitable manner; I have shown an actuating shaft F^2, having an eccentric, which is connected by the strap F^3 with the frame.

G is a dust chamber, the rear wall of which is formed by the inclined partition G′, which extends to near the top of the machine, and connected through the throat G^2 (controlled by a valve G^3) into the chamber G^4, which is the suction chamber or passage to the fan H.

a is the suction aperture of the fan and *b* the discharge therefrom. The suction chamber is formed between the wall H′, and the wall H^2, and is provided with a settling leg I, which discharges into the settling chamber I′. The discharge from the fan communicates into the upper end of the dust settling or collecting chamber J, provided with suitable dust arresters J′ on either side of the passage therein, and with a settling leg J^2 at the lower end.

The dust chamber is formed between the rear wall of the casing and the wall J^3 and between the wall J^3 and the wall H^2 is a passage K leading into the settling chamber I′ at the bottom of the machine.

In the settling chamber at the bottom is a conveyer belt L, adapted to carry the dust to one end of the machine, to discharge into or beside the discharge from the settling leg J^2, so that all the dust is discharged at a single point.

Below the partitions or walls G′ H′ is a separating chamber divided by the reciprocating screen M into a dust chamber *c* and the hopper *d* formed by the partitions or walls *e f*, at the bottom of which are the conveyers *g h* leading to the side of the machine.

The screen is reciprocated from an eccentric on the shaft F^2 connected to the screen by the bent spring straps *i*, as shown in Fig. 4. The construction of this connecting strap is such as to take up all angular movement by bending of the strap without communi-

cating such movement to the screen, and yet dispense with a pivotal joint at the screen, which is objectionable on account of the rattling.

Beneath the screen are the transverse bars *k* supported at the ends upon adjustable brackets *l* and upon which is the reciprocating brush *m*, bearing against the under side of the screen, as shown in Fig. 5. Centrally of the brush block is the bifurcated bracket *m'*, between the legs of which is detachably secured the block *n*, in which is swiveled the finger *o* having a thin upper portion provided with a curved bearing adapted to engage with the reverse screw shaft *p* driven constantly in one direction, the reverse screw threads therein acting to reciprocate the brush across the screen. The construction of these parts is shown in Figs. 4, 6 and 7.

Above the screen in the wall H' of the separating dust chamber, is a valve or door O adapted to be actuated by the cam P, on the shaft P' extending to the side of the machine.

Q is a deflecting board, at the lower end of the cant board frame which serves to deflect the material from the lower cant board of the first series on to the screen, and between this deflector board and the wall *e* is the inlet throat R leading into the hopper chamber beneath the screen.

At the bottom of the dust chamber G is a trough and conveyer S, the lower one of the upper series of cant boards discharging such material as may fall upon it, into this trough.

For the purpose of grading the material passing through the screen, I arrange beneath the screen the hopper S', sliding in guide ways on the side of the machine. The discharge therefrom may be fed into either of the conveyers *g h* by the hinged valve or deflector board S^2 pivoted between the conveyers.

The hopper may be shifted under the screen to catch more or less of the material, and the screen is provided with cloth of larger mesh increasing toward the right, thereby further grading the material which may be fed into the conveyers *g h*.

The various shafts for the conveyers, fan, &c., are driven from any suitable source of power; I have shown in Fig. 1, an arrangement of belting which I deem preferable.

The parts being thus constructed they are intended to operate as follows: Middlings to be purified is fed from the hopper upon the upper cant board of the lower series, and is shaken therefrom by the vibrations thereof, falling from one to the other, the air current passing therethrough and carrying the lighter material toward the dust chamber G. The heavier material thus carried by the air current, falls upon the upper series of cant boards and finally is discharged into the conveyer S, or separates from the dust in the chamber G and falls into the conveyer. The current through the cant boards may be controlled by the valve G^3. The material falling from the lower series of cant boards upon the board Q falls therefrom upon the screen M and is gradually fed toward the end. During this operation the air current enters through the throat R under the screen, passing therethrough and through the valve O into the suction passage to the fan and thence through the machine. The air current under the screen keeps the light and fine material from passing through and carries it to the rear end of the screen or through the valve into the fan. The tailings fall from the screen into the leg or chute T. All of the material passing through the screen, or as much as desired may be deflected into the conveyers *g h*. The valves G^3 and O, determine the volume and speed of the currents passing through the cant boards or screen.

It will be seen that I first purify the middlings by the air blast and gravity, and then separate the cleaned product mechanically on the screen utilizing the air to assist in freeing it from dust and light particles remaining after the first operation.

The material passing through the screen may be further graded as described and all in a single operation.

What I claim as my invention is—

1. In a middlings purifier, the combination with a closed casing, an endless air passage therein, means for circulating the air through the passage, a hopper, a series of cant boards below the hopper in the path of the circulating air, a suction chamber, a valved passage leading thereto from the cant boards, a settling throat for the suction chamber, a separator in the air passage in advance of the cant boards, a partition in the form of a hopper located below the separator, an air inlet at the end of the partition, a valve controlling an opening between the space above the separator and suction chamber, and a dust settling chamber in the opposite end of the casing through which the air passes, substantially as described.

2. The combination with a casing having an endless air passage therein, a fan for circulating air through the passage, a suction chamber, a partition in the casing, a separator in the passage below the partition, cant boards in the passage on the opposite side of the partition, a valve in the partition, a valve controlling the passage above the partition, a hopper forming a partition below the separator, an air passage between the same and separator, a settling chamber below the separator, a dust collecting chamber, a passage between the same and settling chamber, and a discharge common to the dust collecting and settling chambers, substantially as described.

3. In a middlings purifier, the combination with a closed casing having an endless air passage therein and a fan, of a series of cant boards, a hopper, a separator, a dust collecting chamber, a partition between the same and separator, the interposed partition H^2, a settling chamber below the separator, and an

outlet for the dust common to the settling and collecting chambers, substantially as described.

4. In a middlings purifier, the combination with a closed casing having an endless air passage therein and a fan for circulating the air in the passage, of a short circuiting passage, a movable separator located therein, means for moving the separator and valves controlling the passages, substantially as described.

5. In a middlings purifier, the combination with a feed hopper having a lateral discharge, a hinged gate valve over the discharge, a weight on the valve, a curved arm secured to the inner face of the valve and passing up through the throat of the hopper, and a plate secured to the upper end of the rod and arranged horizontally in the path of the grain, substantially as described.

6. In a middlings purifier, the combination of a reciprocating screen, a hopper below the screen, having two conveyers at the bottom, a hopper slidingly, adjustably secured beneath the screen, and located in the other hopper and the swinging valve S^2 to deflect the material passing through the adjustable hopper into either of the conveyers, substantially as described.

7. In a middlings purifier, the combination of a reciprocating screen, a brush, horizontal bearings supporting the brush beneath the screen, the bifurcated bracket on the brush block, the block *n* detachably secured in the bifurcation the pin *o* swiveled therein, and the shaft passing through the bracket and having reverse threads with which the pin engages, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

EDWIN B. WHITMORE.

Witnesses:

S. B. ROBERTS,

ALBERT C. TITUS.