

R. L. DOWNTON & W. H. FORMAN.

Middlings-Purifiers.

No. 147,749.

Patented Feb. 24, 1874.

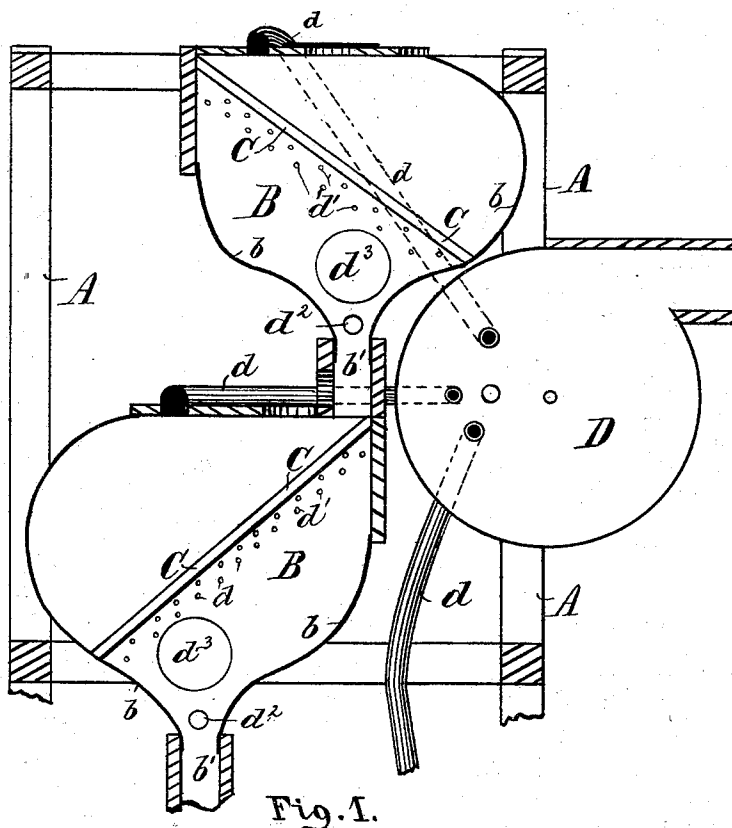


Fig. 1.

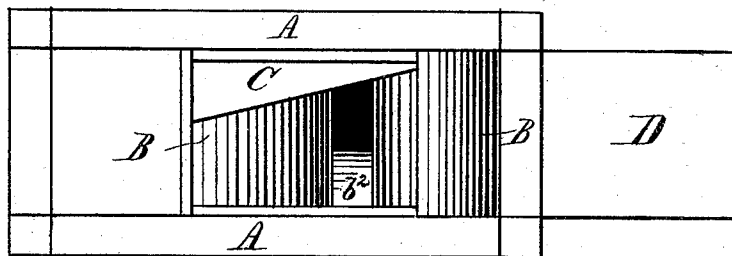


Fig. 2.

Witnesses.

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IMPROVEMENT IN MIDDLEINGS-PURIFIERS.

Specification forming part of Letters Patent No. 147,749, dated February 24, 1874; application filed December 27, 1873.

To all whom it may concern:

Be it known that we, ROBERT L. DOWNTON, of Collinsville, Illinois, and WILLIAM H. FORMAN, of St. Louis, Missouri, have invented an Improved Middlings-Purifier, of which the following is a specification:

In this invention, one or more separating chambers or boxes can be used, as well as one or more fan attachments. The novelty of separating-chamber consists in its peculiar curve-shaped bottom, and made to narrow as it approaches connection with the next chamber below, thus adapting the chamber for the introduction of outside currents of air, as well as a better passage of the heavy particles from one chamber to another. Within the box or chamber is an incline tapered spreading-board, for the purpose of spreading the middlings in their passage over said board, and to better enable the outside currents, as well as suction currents of air, to act upon each particle. Near bottom each box has one or more valve-openings for the admission of outside air, and also each box has a series of small openings along the bottom line of spreading-board for the admission of outside air. The fan attachment, being made to create a suction upward through the box or machine, and the outside currents of air, combining, and being properly regulated, produce the new result of forming an eddy or eddies, which act upon the particles of middlings falling from spreading-board, so that the lighter materials, dust, impurities, and the like, are carried off with the suction current, and the purified middlings, by their own gravity, drop or pass from one box to another, where the same process of separation and purification can be repeated. The machine is provided with detail parts, all of which will now more fully appear.

Of the drawing, Figure 1 is a sectional elevation with lower series of boxes broken away. Fig. 2 is a top plan of machine, with top board removed to show interior view of top separating-chamber.

A is a suitable frame. B represents our separating chamber or boxes. One or more of said boxes can be provided, as desired. At top the box B is closed with a top board having a feed-hopper opening. The boxes B we form

with metallic bottoms *b*, made to curve in shape, so as to form the narrow bottom passage *b'*, as indicated in Fig. 1, the object of giving the boxes B the peculiar bottom *b* being to better facilitate the downward passage of the heavy particles or separated middlings, and specially to break the too great force of the outside currents of air introduced near bottom of boxes. C, Figs. 1 and 2, is an incline tapered spreading-board; this is arranged within each box B. The purpose of the tapering board is to act as a gradual spreader of the introduced middlings. Hence we arrange and secure the spreading-board at one side, and so as to slant or incline from the top downward and across the box, as shown in Figs. 1 and 2. The middlings are so fed that the greatest quantity thereof first drops upon the wide or top end of the spreading-board, and, in their tendency to reach the narrow or low point of said board, are caused to continually drop off or over the inner edge of spreading-board, its spreading shape causing this distinct separation of the particles of middlings to take place. It is our object at this stage to catch and subject the falling middlings to a purifying action. This we accomplish by the combined action of introduced currents of air and the suction produced by one or more fan attachments, as follows: D is the fan-case, in which a suitable fan is provided, as ordinary, and operated by power, as usual. From the fan-case a pipe or spout, *d*, connects to communicate with the interior of the box or boxes B through top thereof, the spout *d* being shown in dotted lines in Fig. 1. The suction produced is upward or from the bottom of the box B through its spout *d*. Our suction is not only to carry off the lighter particles from the separated middlings, but especially to coact with under introduced outside currents of air to produce eddies within the box or separating-chamber, and upon which we rely as an improved method of purifying middlings. To form this eddying action, we therefore introduce outside air, first, through a series of small openings, *d'*. (See Fig. 1.) The openings *d'* we position immediately under the line, and the whole length of the spreading-board, so that the introduced air-currents, passing horizontally under and

out from the bottom of said board, come in contact with the suctional force or current produced by the fan attachment. The contact or commingling of the currents of air just stated produces eddies, and this eddying action we further augment by the further introduction of outside air, viz., secondly, through valve-openings near bottom of each box or chamber. Hence d^2 represents one or more openings through the passage b^1 . (See Fig. 1.) The openings d^2 are controlled by suitable valves, so as to regulate the admission of outside air. Here it will be noticed that the curved shape of the bottom of the boxes, before alluded to, acts also to break the too great force of currents of air passing in the bottom openings d^2 . The further essential object of introducing sufficient air-currents through the openings d^2 is to prevent the suction from the lower box or separating-chamber from passing up into the upper box or chamber, or to prevent the suction from being so great as to prevent the purified middlings in the upper boxes from freely being passed from the upper into the lower.

The operation of the parts thus described is, therefore, as follows: The middlings are fed through the hopper at top, so as to fall upon the top of spreading-board. The spreading-board spreads the middlings, separates its particles, and in doing so the same are subjected to and acted upon by the eddies. The eddies partially suspend the particles, which allows and better enables the lighter stuff, dirt, dust, and impurities to float off with the suctional force. The foreign matter of the middlings is, therefore, drawn out through the pipe or spout d in the fan or fans, and deposited in a settling chamber or chambers. The heavy particles or purified mid-

dlings, by their own gravity, drop through the passage b^1 into the top of the next box or separator below. The middlings can be passed through a series of separate boxes, B, and when delivered out at bottom, the finest product of pure middlings is obtained. Each of the boxes B will have separate pipes, d , connecting to a fan, D, or fans. The pipes d , connecting near top of each box, can be provided with slide-valves or cut-offs, so as to regulate the suctional force. d^3 are glasses to enable the operator to see the interior of the boxes. To cause the middlings passing from one box to another to drop upon the spreading-board, we provide the opening or passage b^1 with a beveled block. (See Fig. 2.) The middlings then slant off and drop upon the spreading-board, which is positioned opposite thereto.

What we claim is—

1. The incline tapered spreading-board C, in combination with the box B, substantially as and for the purpose specified.

2. The box B, having bottom b , passage b^1 , conducting-block b^2 , valve-openings d^2 , series of openings d^1 , incline tapered spreading-board C, all arranged as herein shown, to operate as and for the purpose set forth.

3. A box or boxes, B, having bottom b , passage b^1 , conducting-block b^2 , spreading-board C, openings d^1 d^2 , and one or more fan attachments, all combined to operate as and for the purpose set forth.

In testimony of said invention we have hereunto set our hands.

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WILLIAM H. FORMAN.

Witnesses:

WILLIAM W. HERTHEL,
TOM MILLER, Jr.