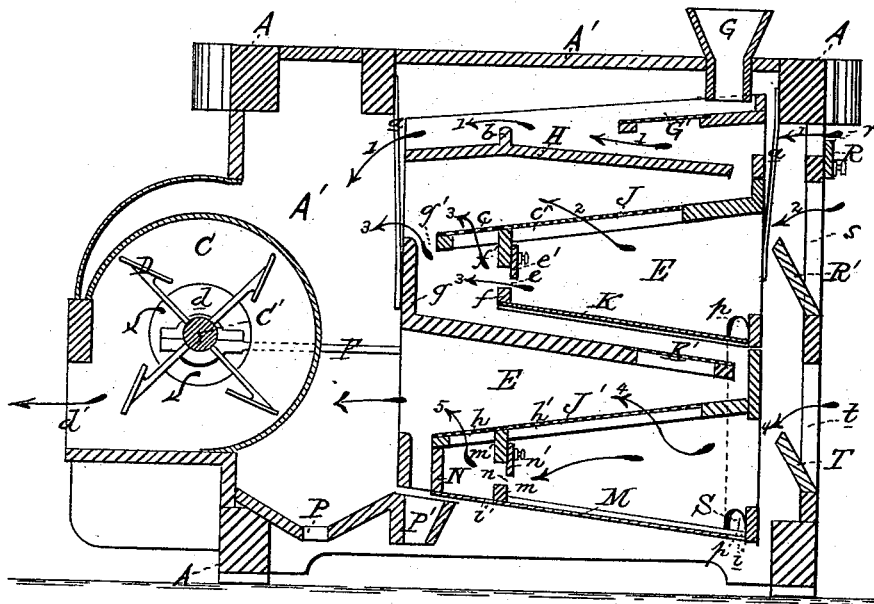


L. GATHMANN.
 Middlings-Separator.

No. 201,235.

Patented March 12, 1878.



WITNESSES:

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UNITED STATES PATENT OFFICE.

LOUIS GATHMANN, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN MIDLINGS-SEPARATORS.

Specification forming part of Letters Patent No. **201,235**, dated March 12, 1878; application filed October 25, 1877.

To all whom it may concern:

Be it known that I, LOUIS GATHMANN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Middlings-Purifiers; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable others skilled in the art to which my invention appertains to make and use the same, reference being had to the accompanying drawing, forming part of this specification, in which the figure represents a vertical longitudinal central section of a middlings-purifier embodying my invention.

The object of my invention is to improve the construction and operation of that class of machines used in purifying middlings; and my invention consists in the construction and arrangement, with respect to the blast-inducing mechanism, of the screens and carriers over and through which the material operated upon passes, as hereinafter more fully described and claimed.

In the drawing, A represents the frame, and A' the external or main case, which incloses the operating parts of the machine.

C represents the fan-case, which is located at the center of the rear end of the main case, in the usual manner.

C' represents the main shaft, which is journaled to the frame A, and so as to extend transversely across the machine, and centrally through the fan-case.

D represents the fans, which are mounted upon the shaft C' within the fan-case, and are so arranged as to freely revolve therein.

E represents the shoe, which is suspended within the front end of the main case A' by means of a series of springs, *a*, one of which is attached to each corner of the shoe, and to the case or frame, so as to allow the shoe to freely oscillate longitudinally.

F represents a connecting-rod, which is attached at one end to the sides of the shoe, and are eccentrically connected at the opposite end to the fan-shaft C', by which means an oscillating movement is imparted to the shoe by the rotation of the said shaft.

The fan-case is provided at each end with a central inlet-opening, *d*, which communicates

with the interior of the case, and through which openings the air is drawn through the shoe into the fan-case by the rotation of the fans, and is also provided upon one side with an exit-opening, *d'*, through which the air escapes.

G is the hopper through which the material to be treated is fed into the machine.

G' is a distributing-screen located within the front end of the shoe, under the hopper G, and extending backward a distance nearly equal to one-third the length of the shoe.

H is a distributing-apron, which is located within the shoe, a slight distance below the distributing-screen G', and is arranged to incline downward toward the front end of the machine, and is provided with an upward-projecting rib, *b*, extending transversely across the same. This rib is so arranged as to retain and prevent the good middlings from being carried off the apron toward the rear of the machine by the air-current, and at the same time allow the lighter particles, which will float in the air-current, to be carried over it.

J is a separating-screen, which is arranged within the shoe a short distance below the distributing-apron H, and so as to incline downward toward the rear end of the machine, and is of the proper length to extend to a point near the rear end of the shoe. This screen is covered with two different grades of bolting-cloth, *c* and *c'*, the part *c* being coarser than the part *c'*, as shown in the drawing.

K is a carrier-board, which is arranged within the shoe, below the screen J, and so as to incline downward toward the front of the machine, and is of the proper length to extend backward, so that its rear edge will be nearly in the same vertical plane with the front edge of the bolting-surface *c* of the said screen, and is provided at its rear edge with an upward-projecting flange, *f*, arranged in the same vertical plane with a depending rib or flange, *f'*, under the screen. These flanges are so arranged as to leave an opening, *e*, between them, through which a current of air can freely pass, and so as to cross the path of the middlings falling through the meshes of the bolting-surface *c*; and the flange *f'* is provided with a gate or valve, *e'*, arranged to admit of

being raised or lowered to open or close the opening *e*, so as to regulate the amount of the air-current passing through the same.

K' is a carrier-screen, which is arranged within the shoe, a slight distance below the carrier-board *K*, and so as to be in a plane parallel with the same, and is provided at its rear edge with an end board, *g*, which extends upward so that its upper edge will be in the same plane with the upper surface of the screen *J*. This end board is so arranged as to leave an opening, *g'*, between its inner surface and the rear end of the screen *J*, through which the air-current from the opening *e* of the carrier-board *K* passes, and through which the coarser middlings that pass off the end of the screen *J* fall.

J' is the final separating-screen, which is arranged within the lower portion of the shoe, under the carrier-screen *K'*, and so as to incline downward toward the rear end of the machine, and is covered with two different grades of bolting-cloth, *h* and *h'*, the bolting-surface *h* being coarser than the bolting-surface *h'*, as shown in the drawing.

M is the bottom board of the shoe, which is so arranged as to incline downward toward the front of the machine. *m* is a transverse rib or flange, which is permanently attached to the bottom board *M*, and in the same vertical plane with the front edge of the bolting-surface *h* of the screen *J'*. *m'* is a depending rib or cross-bar, which is arranged under the lower surface of the screen *J'* over the rib *m*, and is so arranged as to leave an opening, *n*, between its lower surface and the said rib, through which a current of air from the front end of the shoe can freely pass. *n'* is a gate or valve, which is attached to the cross-bar *m'*, and is so arranged as to admit of being opened or closed, to increase or diminish the size of the opening *n*, so as to regulate the amount and force of the air-current passing through the same.

N is an end board attached to the rear edge of the bottom board *M* of the shoe, and so as to close the space between the said bottom board and the rear edge of the screen *J'*, and so as to cause the air-current passing through the opening *n* to ascend through the meshes of the bolting-surface *h* of the said screen. *P* is a discharging-hopper, into which the coarse offal falls as it passes off the end of the screen *J'*; and *P'* is a like hopper, into which the lighter offal falls as it is drawn off the said screen by the air-current.

The shoe is provided, on its outer side and near its front end, with a conducting-spout, *S*, which communicates at its upper end with the interior of the shoe immediately above the carrier-board *K*, through an opening, *p*, and at its lower end immediately above the bottom board *M* through an opening, *p'*. The main case is provided at the front end of the machine with openings *r s t*, extending transversely across the machine, and through which the air passes into the shoe. The said open-

ings are so arranged that the air-current passing through the opening *r* will pass over the apron *H*, and across the path of the middlings falling from and through the distributing-screen *G*; and the air-current passing through the opening *s* passes partly upward through the bolting-surface *c'* of the screen *J*, and partly through the opening *e*, and thence upward through the bolting-surface *c* of the said screen; and the air-current passing through the opening *t* passes partly upward through the bolting-surface *h'* of the screen *J'*, and across the path of the middlings falling through the coarser screen *K'*, and partly through the opening *n*; thence upward through the bolting-surface *h'* of the said screen *J'*. *R*, *R'*, and *T* are valves, which are so arranged as to admit of being adjusted to partly close the respective openings *r*, *s*, and *t*, as may be required to regulate the amount and force of the air-currents passing through said openings.

The operation of my said middlings-purifier is as follows: Motion being imparted to the moving parts of the machine by means of any suitable motor, (not shown,) the draft produced by the rotary motion of the fans causes a current of air to pass through the respective openings *r*, *s*, and *t*, and through the screens, as previously described. The unpurified middlings are then fed into the hopper *G*, and from thence fall upon the distributing-screen *G'*, and are spread over the same, and so that the finer middlings fall through the meshes of the said screen, and across the air-current, passing through the opening *r*, and rest upon the apron *H*, while the coarser middlings and offal pass off the said screen, and fall across the said air-current and upon the apron, thereby bringing all the particles of the middlings and offal in direct contact with the air-current passing through the said opening, by which means the lighter impurities are carried off, as indicated by arrows 1.

The middlings then fall from the apron *H* to and upon the head of the screen *J*, and are carried downward toward the rear end of the shoe, the finer middlings falling through the meshes of the bolting-surface *c'* and against the air-current from the opening *s*, which passes upward through the screen, as indicated by arrows 2, and thereby preventing the impurities from passing through the screen with the middlings.

The middlings which pass through the bolting-surface *c'* fall upon the carrier-board *K* in a purified state, and are discharged into the spouts *S* through the openings *p*, and fall upon the bottom board *M* of the shoe, from whence they may be drawn off through an opening, *i*, in the said bottom board.

The coarser middlings and offal upon the screen *J* pass off the same, the next finest middlings falling through the meshes of the bolting-surface *c* across the air-current from the opening *e*, and fall to and upon the carrier-screen *K'*, while the coarser middlings and offal fall from the end of the screen *J*, through

the opening g' , against the said air-current to and upon the carrier-screen. The air-current from the openings e , passing upward through the bolting-surface c and opening g' , as indicated by the arrows 3, carries off the light impurities which may be in the middlings falling upon the carrier-screen.

The middlings upon the carrier-screen pass down the same toward the front of the machine, the finer particles falling through the meshes thereof to and upon the screen J' , while the coarser particles and offal pass over the end and fall upon the head of the said screen J' . The middlings and offal upon the said screen J' then pass down the same toward the rear end of the machine, the finer middlings falling through the bolting-surface h' against the air-current passing upward through the same from the opening t , as indicated by arrow 4, which air-current carries off the remaining light impurities, and the middlings fall in a purified state upon the bottom board M , from whence they may be drawn off through the opening i .

The middlings which are too coarse to pass through the bolting-surface h' and the offal pass over the bolting-surface h , the middlings falling through the same against the air-current passing upward from the opening n , as indicated by arrow 5, and fall upon the bottom

board M , from whence they may be drawn off through the opening i' . The air-current from the opening n prevents the offal from passing through the bolting-surface h' , and causes it to pass off the end of the screen, so that the lighter particles will fall into the hopper P , and the heavier particles into the hopper P' .

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a middlings-purifier, the combination, with a fan to produce an air-current and a series of valves to regulate said air-current, of the screen J , covered with bolting-cloth c and c' , of different degrees of fineness, the opening e under said screen, and the opening g' at the discharging end of said screen, substantially as and for the purpose specified.

2. In a middlings-purifier, the combination, with a fan to produce an air-current and a series of valves to regulate said air-current, of the bottom board M , the screen J' , covered with bolting-cloth h and h' , of different degrees of fineness, and the opening n between the said screen and the bottom board, substantially as and for the purpose specified.

LOUIS GATHMANN.

Witnesses:

N. C. GRIDLEY,
N. H. SHIRBURN.