

E. N. LACROIX.
Middlings Purifiers.

No. 139,585.

Patented June 3, 1873.

fig. 1.

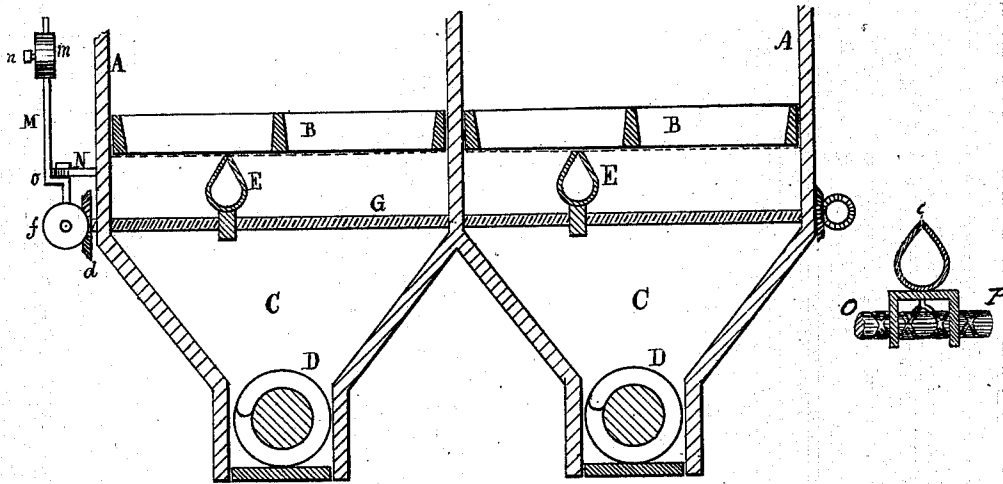
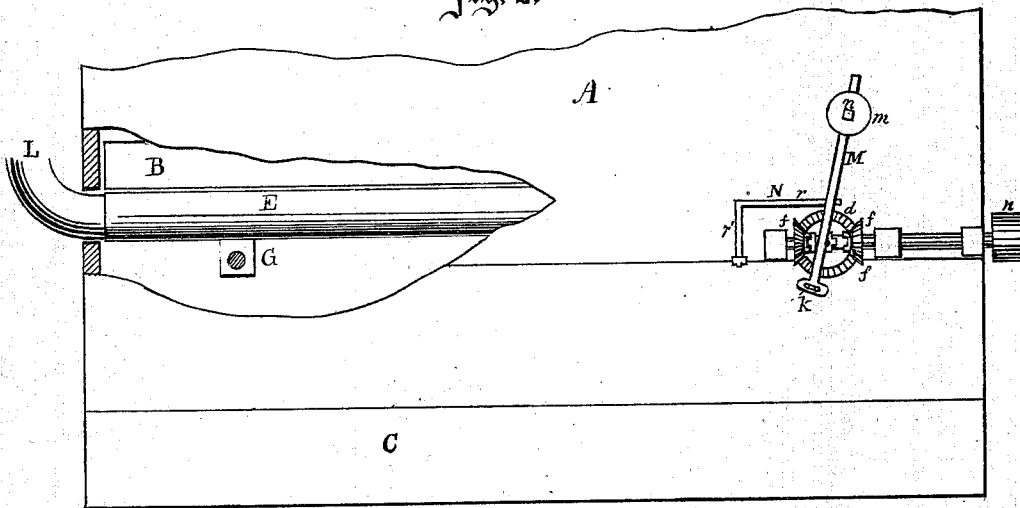


fig. 2.



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A. H. C. Torrie
Wm. J. Ryder

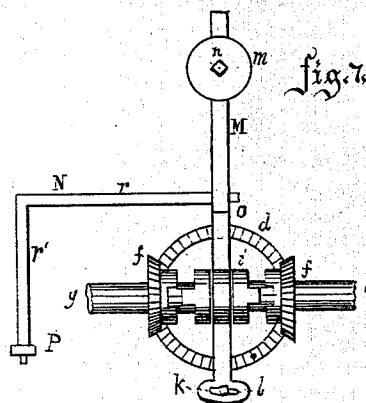
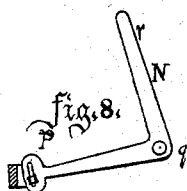
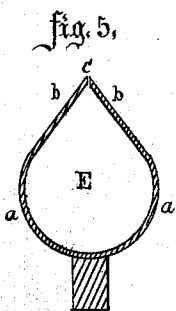
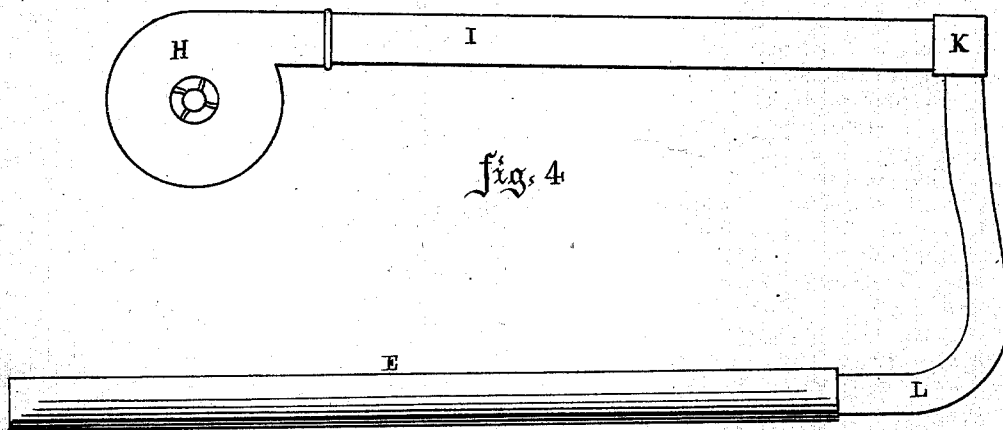
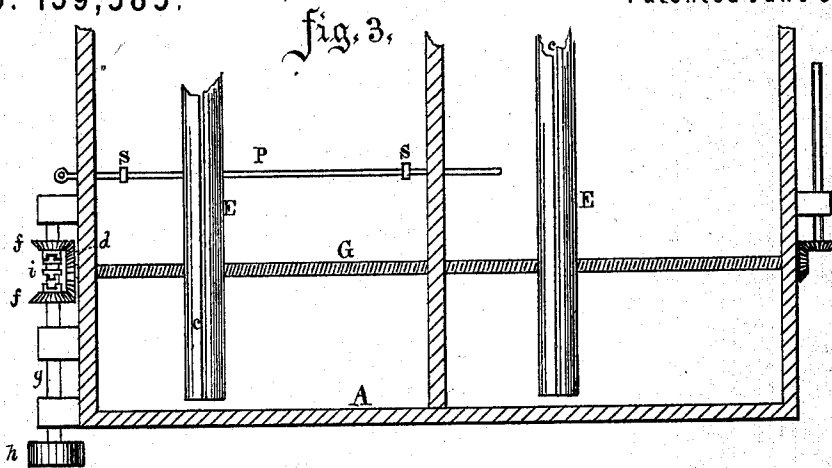
Inventor

Edmund N. Lacroix.
By James L. Norris.
Atty.

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Attest
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UNITED STATES PATENT OFFICE.

EDMUND N. LACROIX, OF MINNEAPOLIS, MINNESOTA.

IMPROVEMENT IN MIDDLEINGS-PURIFIERS.

Specification forming part of Letters Patent No. **139,585**, dated June 3, 1873; application filed May 28, 1873.

To all whom it may concern:

Be it known that I, EDMUND N. LACROIX, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Middlings-Separators, of which the following is a specification:

My invention consists essentially in combining with the separating screen or screens a reciprocating air tube or tubes, so arranged as to concentrate a narrow blast upon the said screens, and thereby open the meshes and stir up the material on top. It also consists in combining with the air-tubes flexible air-pipes, which travel with the tubes and supply the blast; and it furthermore consists in combining with the traveling air-tubes an arrangement for shifting or alternating the motion of the air-tubes, as hereinafter described.

In the drawings, Figure 1 is a cross-section; Fig. 2, an elevation with a portion broken away to show the interior arrangement; Fig. 3, a horizontal section with the separators or screens removed from place; Fig. 4, a diagram, showing the blast arrangement connected with the air-tubes; and Figs. 5, 6, 7, and 8 are detail views.

A represents the casing, in which are mounted one or more separators or screens, B B, covered with the sifting-cloth at their bottoms, and receiving a reciprocating and jarring movement, as usual. The middlings are fed through the hoppers, over the separators or screens, and the purified middlings fall through into the conveyer-boxes C C, and are conveyed off by the ordinary screw conveyers D D. Beneath the separators or screens are located air-tubes E E, which are mounted on screws G G so that by turning said screws first in one direction and then the other said air-tubes receive a reciprocating travelling motion beneath the separators, and pass a blast of air through their meshes. I prefer to locate the air-tubes lengthwise of the separators, so that their travel will be crosswise of the same; but, if desired, they may be located in the opposite direction, so as to travel in line with the separators. These air-tubes are made each with an enlarged body or base, *a*, and with a contracted top, *b*, so arranged as to concentrate the blast in the upper wedging-space and discharge it

in a thin sheet through the narrow slit or opening *c*, which extends the whole length of the tube. In this consists one of the main features of my invention, as it is necessary to pass the blast in a thin line through the meshes of the cloth to stir up the middlings and keep the meshes clear, instead of producing a blast which is diffused over the whole surface, as in the latter case it would have to be so strong, in order to clear all the meshes at once, that it would carry off the returns and middlings which are to be sifted through, and also impair the proper diffusion of the material over the screens. By passing the blast through in a thin line, as I do, the proper intensity of the blast may be attained without in the least disturbing the other parts of the screen, while at the same time the constant travel of the air-tube will cause the blast to act on all parts of the screen in proper time. Traveling-brushes have heretofore been used for this purpose, but I find this blast arrangement more effective than brushes, since the latter can produce only a rubbing action, which wears the cloth, and is frequently ineffective to clean the meshes, and can produce no stirring up of the mass on top of the screens. The air-tubes are not only more effective in clearing the meshes, but the blast raises and stirs up the middlings so that they fall lightly over the sifting-cloth, and the light fibrous matters are so raised, lightened up, and elevated above the middlings, that they are readily drawn off by the suction-fan, which is employed on top of the machine, as usual. By this means a more effectual separation of the middlings is produced than has heretofore been the case, and a much more rapid action is attained, and the middlings and returns which fall through are of better quality, for the reason that they are more free from fiber and light bran. This lightening up of the material also causes the middlings, which are heavier than the fibrous mass, to fall first, by reason of their greater specific gravity, so that the action is greatly facilitated thereby. The form of the air-tube shown in Fig. 5 is the best, but any form may be employed which will concentrate the air at the top and pass it through a narrow slit or opening to reach the screens, and in close proximity to the screens.

At any point on the machine is located a blower, fan, or other device, H, Fig. 4, for supplying the blast. A tube, I, extends from the mouth of the blower and communicates with a cross-tube, K. Flexible pipes L L extend from the cross-tube and connect with the ends of the air-tubes E E. These flexible pipes allow the movements of the air-tubes E without impediment, and insure the necessary supply of air to produce the blast. They may connect with the air-tubes either at the ends, as shown, or at any intermediate point. A valve is used to regulate the blast. Instead of flexible pipes, stiff pipes might be used, attached to a band or slide which covers one side of an air receptacle or spout, said band or slide receiving corresponding motion with the travel of the air-tubes E. One of the screws, G, has a bevel-gear, *d*, at one end, with which engage, on opposite sides, bevel-pinions *ff*. These pinions turn loose on a short shaft, *g*, on the end of which is situated a pulley, *h*, by which power is applied by a band. Between the pinions *ff* rests a clutch, *i*, which slides freely endwise, and has the usual coupling-lugs to connect with corresponding notches of the pinion-hubs. Motion is imparted to shaft *g* and transferred to screw G by wheels *f d*, and the shifting of the clutch from one side to the other reverses the motion.

The construction of the clutch-coupling, so far as above described, is in common use.

With the clutch *i* connects a forked lever, M, the fork or loop of which rests in the groove of the clutch, with suitable pivot-bearings. The end of the lever, below the fork, extends downward a suitable distance and has a head with a slot, K, concentric with the bearing of the fork in the groove, and through this slot passes a stop-bolt, *l*. The lever extends up some distance above the fork, and has a sliding weight, *m*, thereon, held by a set-screw, *n*. At a little distance above the fork the lever also has an angular shoulder, *o*, on which rests the outer end of an elbow, N. The end of the elbow is also formed with a head, in which is a slot, *p*, concentric with the pivot *q* of the elbow, Fig. 8. The opposite arm *r*, of the elbow, is carried outward of sufficient length, when it is turned down vertically, as shown at *r'*, Fig. 7, and jointed to the end of a rod, P, which runs horizontally inward through the casing beneath the air-tubes a suitable distance and rests loosely, so that it can receive end movement. On this rod are two rigid stops, *s s*, and on the bottom of one of the air-tubes is a forked plate, *t*, which embraces the rod between the stops, as shown in Fig. 6.

The operation is as follows: Motion being given, the screws G G are run in one direction till the air-tubes nearly reach the side of the separators or screens. The forked plate *t* then strikes the top plate *s* on that side, thereby drawing the rod P back; and this rod, acting through the medium of elbow N,

gradually raises lever M to a vertical position. As soon as it passes the vertical line, it drops over on the other side by its own gravity, and thereby shifts the clutch *i* to the opposite side, and engages it with the other pinion, *f*. In the reverse movement of the screws the same shifting device takes place by the striking of the forked lever *t* with the other stop, *s*. The action is thus automatic. An essential feature in the shifting action is the slots K and *p*, by which the lever is allowed to fall far enough before striking to give an impetus sufficient to change the clutch from one side to the other. This could not be done if the latter commenced to act upon the clutch as soon as it had passed the dead-center, owing to the friction.

If desired, the air-tubes E E may be operated by other means: For instance, double threaded screws O P, which carry them to the extent of the stroke by one thread, and then carry them back by the other, the screws being continuous in their rotation in one direction; or an endless chain, rope, or cord may be employed by passing around pulleys and carrying the tube either by a reciprocating or a continuous movement. In the latter case a loop or stirrup may be attached to the chain which rests in the loop, the latter being long enough to allow the pin to pass over the pulleys and give the reverse movement.

I do not claim broadly the use of the auxiliary blast, as the same is the subject-matter of a separate application.

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

1. The combination of the traveling air-tube or tubes E E with the separator or separators B B, said air-tubes being arranged so as to concentrate the blast and force it through the meshes in a thin line, as herein shown and described, and for the purpose specified.

2. The construction of the air-tube E, with the enlarged body *a*, contracted top *b*, and narrow slit or opening *c* extending longitudinally of the tube, as and for the purpose specified.

3. In combination with the traveling air-tube or tubes E E, the pipe or pipes L L, and a blower, fan, or other device for forcing air through the pipes, as herein shown and described, and for the purpose specified.

4. The combination, with the screws G G, and with the clutch-coupling, of the rod P provided with stops *s s*, the elbow N, and lever M provided with the slots *k p*, the whole arranged and operating as herein described.

In testimony that I claim the foregoing, I have hereunto set my hand this 28th day of May, 1873.

EDMUND N. LACROIX.

Witnesses:

JAMES L. NORRIS,
WM. J. PEYTON.