2 Sheets—Sheet 1.

G. T. SMITH.

Middlings Separators.

No. 208,936. Patented Oct. 15, 1878.

Fig. 1.

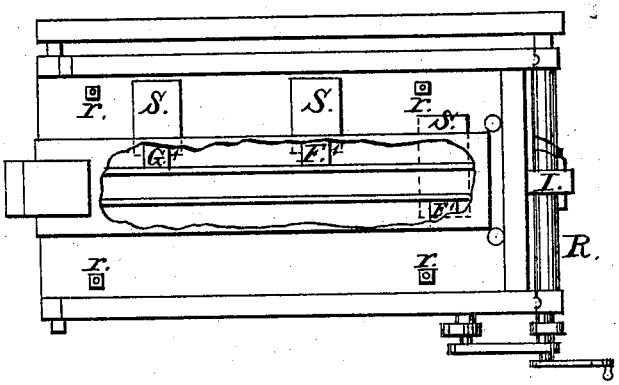
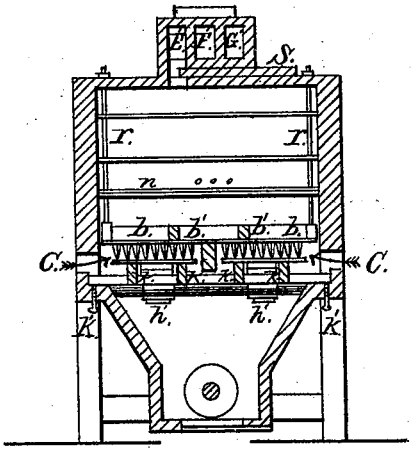


Fig. 2.



Witnesses:
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2 Sheets—Sheet 2.

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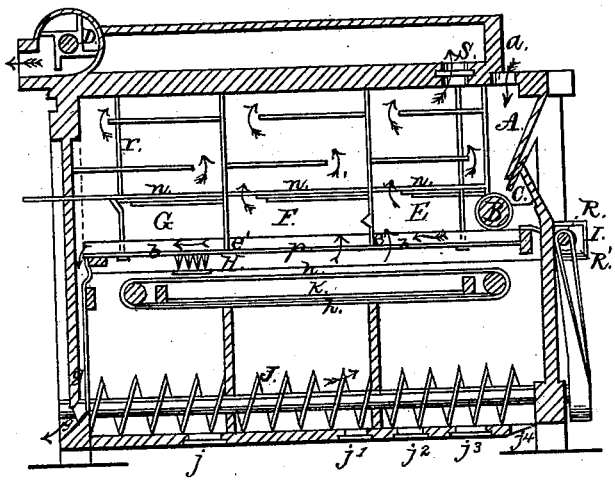
Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE T. SMITH, OF JACKSON, MICHIGAN.

IMPROVEMENT IN MIDDLINGS-SEPARATORS.

Specification forming part of Letters Patent No. **208,936**, dated October 15, 1878; application filed August 29, 1878.

To all whom it may concern:

Be it known that I, GEORGE T. SMITH, of Jackson, in the county of Jackson and State of Michigan, have invented certain new and useful Improvements in Middlings-Purifiers; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Under the circumstances and conditions found in many mills, and with the character of the grinding done therein, it is sometimes found to be very difficult to properly purify the middlings without an undue waste of other material which is intimately incorporated with them when they are delivered to the purifier, this being more particularly the case in mills in which the middlings are imperfectly dusted before they are placed on the bolting-cloth.

In order to purify middlings of the character above indicated thoroughly and economically, I have made this invention, which consists in the combination of certain devices, to be hereinafter set forth, whereby the middlings, as they pass over a reciprocating bolt, having cloth of different degrees of fineness, are acted upon by air-currents varying in strength to correspond with the difference in mesh of cloth, so that the air-currents shall take out the smallest amount of material that is possible consistently with effecting their purification satisfactorily, and whereby, further, the air-current, in passing from the bolting-cloth through a continuous air-trunk to an exit from the mill, shall traverse a collecting-chamber, in which chamber the heavier portions of the material taken from the middlings by said air-current will be deposited.

Figure 1 is a plan view of my machine with a portion of the air-flue removed. Fig. 2 is a vertical transverse section, and Fig. 3 is a vertical longitudinal section.

In the drawings, A represents a hopper, into which the middlings to be treated are delivered from an elevator, or by any other means, and from which they are fed by the roller B to the shaker, the rate of feed being regulated by a slide, *c*. The shaker or bolt *b* is suspended from the frame-work or the sides of the machine by pivoted links *r r*, and has a reciprocating motion imparted to it by eccentric R on shaft R′ and the inclosing-box I. *b′* (see Fig. 2) are longitudinal ribs, extending from end to end of the shaker above the bolt-cloth, said cloth being attached to the under side of these ribs *b′* by means of tacks or otherwise. The ribs perform two functions, to wit: they serve to keep the lower surface of the cloth in a plane, or substantially in a plane, thus insuring the uniform operation of the brushes upon the entire width of the cloth; and they also assist in maintaining a uniform thickness in the layer of the material upon the upper surface of the cloth by keeping the cloth more nearly flat than it would be if it were allowed to sag in the center, and also by preserving substantially the same division of the middlings that is made at the head of the shaker by the feed-roller.

The bolting-cloth on the shaker is of different degrees of fineness. I usually employ three or four numbers, the finest being at the head, coarser next, and so on.

The space above the shaker and within the frame-work is tightly inclosed, forming an air-chamber, which is divided into sections E, F, and G by means of transverse partitions.

A fan, D, is employed to draw air-currents through the shaker in an upward direction. Three air-spouts, E′, F′ G′, lead from the fan to the air-chamber, one for each section, and by means of valves or dampers S the strength of the air-currents through the bolting-cloth under each section may be regulated. Each section of the air-chamber is provided with shelves *n*, arranged in zigzag form, as indicated in Fig. 3. The air-currents, after leaving the shaker, pass around the shelves in the direction indicated by the arrows in this figure.

H is a brush, carried by belts, cords, or chains *h*, which are driven by rollers, the brush being supported on ways *k*, which keep it in close contact with the lower side of the bolting-cloth during its passage in one direction from the head to the tail of the machine.

J is a conveyer, working in a case having a number of cut-off slides or gates, $j\ j^1\ j^2\ j^3\ j^4$, through which the middlings may be delivered, as will be hereinafter fully set forth.

The middlings are fed to the shaker through the hopper A, and are thoroughly agitated as they pass over the fine cloth at the receiving end of the shaker, the finer portions sifting through this cloth, coarser ones sifting through the next coarser cloth, and so on. As there is a current of air continually passing through the bolt, it (the air-current) will cause the very fine middlings to adhere to the threads of which the cloth is composed, and thus close up the meshes to such an extent as to interfere materially with the operation of the machine. In order to obviate this difficulty I employ the brushes H to keep the bolting-cloth clean.

As the air-currents pass upward through the bolting-cloth and the layer of middlings thereon, they carry with them a portion of the finer specks, particles of bran, and other material, and deposit more or less of the same upon the zigzag shelves, this deposit varying in quality, according to the coarseness of the middlings and the strength of the air-current.

In order to produce satisfactory results with a middlings-purifier, I have found that the middlings should be placed upon a fine bolting-cloth, where they can be thoroughly agitated and subjected to the operation of an upward current of air, one object in employing a fine cloth at the receiving end of the shaker being that the coarse particles of bran may not fall through, it being impracticable to use so strong a current of air at this point as would be required to carry off or even to "float" the coarse and heavy particles over the bolt-cloth, as such current would carry away and waste much of the fine middlings and flour. The next section of cloth is of coarser mesh, and a stronger air-current is employed to carry away some of the bran, which would otherwise fall through. The next section of the cloth may be coarser, with heavier draft, and so on, the air-chamber being divided into sections corresponding substantially to the sections of the bolting-cloth.

Upon referring to the drawings and the above description, it will be readily understood that by the use of the valves or dampers S the strength of the air-currents may be so regulated as to take out from each section of the bolting-cloth only such material as the operator shall find necessary to effect the desired purification of the middlings; and it will be found that, by a frequent examination of the material deposited in that portion of the air-chamber or air-trunk through which the air passes after leaving the bolts, he will be enabled to so regulate the strength of the air-currents through the different sections of the bolt-cloth as to greatly reduce the amount of valuable material which is taken out by the air; and it is apparent that by the employment of my construction a large portion of this valuable material will be deposited as the air-current is moving forward after leaving the bolter. Of course the amount of material thus saved depends largely upon the character of the grinding and the other treatment of the middlings before they are delivered to the purifier.

I do not desire to claim in this patent any feature of invention other than the combination of elements or devices which are enumerated in the claim following.

What I claim is—

The combination, in a middlings-purifier, of the following elements, namely: a shaking bolter provided with bolting-cloths of different degrees of fineness; a fan to produce air-currents through the bolting-cloth; a bolting-chest which surrounds the bolter and forms part of an inclosed air-trunk, through which air-currents pass after leaving the bolting-cloth; valves for regulating the strength of the air-currents according to the size of mesh of the bolting-cloth, and a chamber in the eduction-passage for collecting light material carried off from the bolter by the air-currents.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

GEORGE T. SMITH,

Witnesses:
THOS. SLADE,
H. E. HADLEY.

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