

C. CUSTER.
Middlings-Purifiers.

No. 157,958.

Patented Dec. 22, 1874.

Fig. 1.

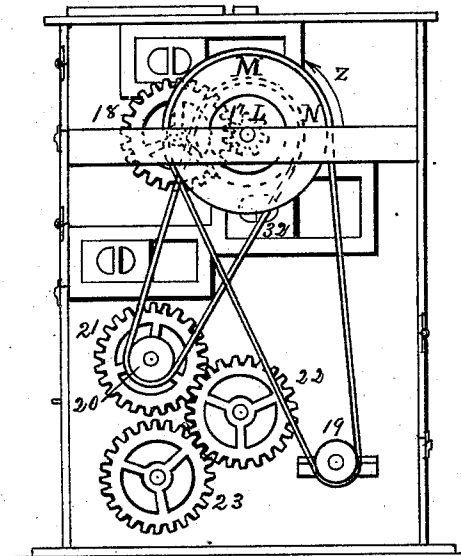


Fig. 2.

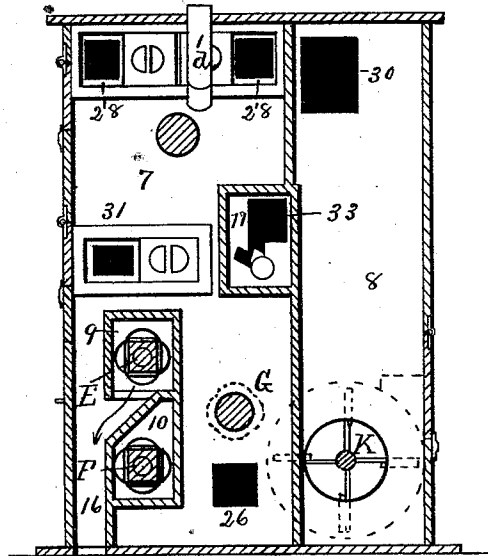


Fig. 3.

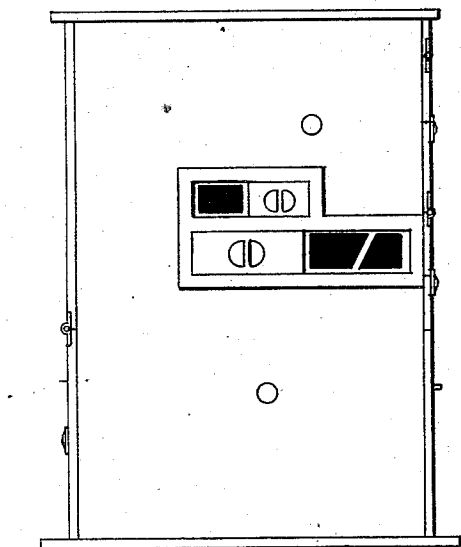
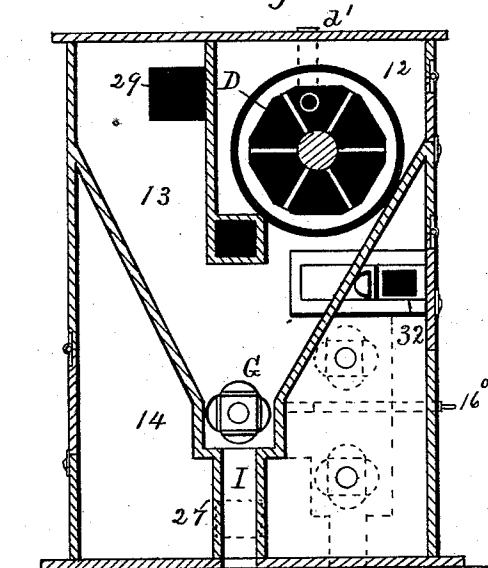


Fig. 4.



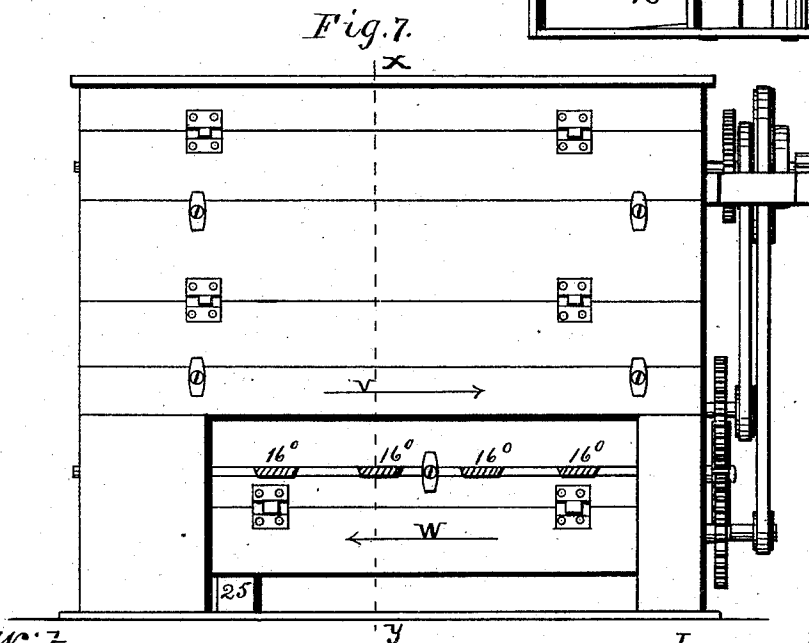
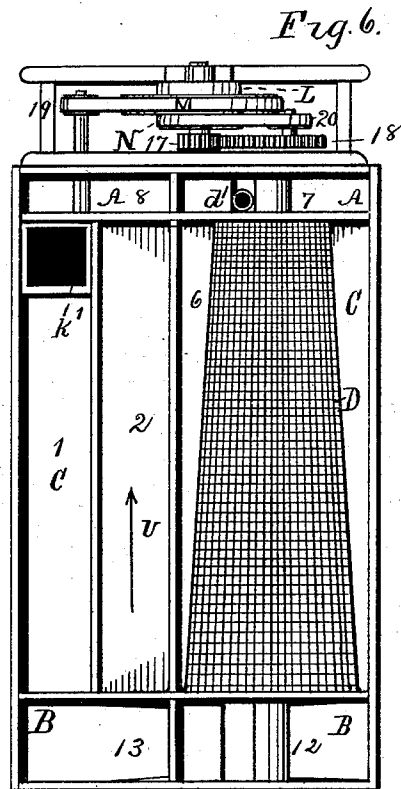
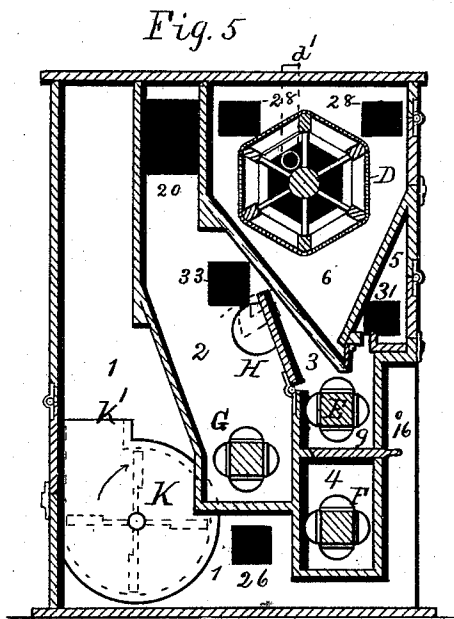
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Inventor:
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UNITED STATES PATENT OFFICE.

CHRISTIAN CUSTER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF
ONE-HALF HIS RIGHT TO CHARLES K. BULLOCK, OF SAME PLACE.

IMPROVEMENT IN MIDLINGS-PURIFIERS.

Specification forming part of Letters Patent No. 157,958, dated December 22, 1874; application filed
July 16, 1874.

To all whom it may concern:

Be it known that I, CHRISTIAN CUSTER, of the city of Philadelphia, in the State of Pennsylvania, have invented an Improvement in Middlings-Purifiers, of which the following is a specification:

The object of my invention is not only to remove the bran, specks, and dirt in a more expeditious and perfect manner from the middlings, but also to remove the light flocculent substance which generally adheres to and accompanies the middlings discharged from the purifiers in general use.

These very desirable results I accomplish by means which will hereinafter be fully described and explained with reference to the accompanying drawings, in which—

Figure 1 is an elevation of that end of the purifier to which the driving-wheels are attached. Fig. 2 shows the same end shown in Fig. 1, without the driving-wheels and the covering-board thereof. Fig. 3 is an end elevation of the opposite end of the purifier. Fig. 4 shows the same end that is represented by Fig. 3, without its covering-board. Fig. 5 is a vertical transverse section of the said purifier on the right-hand side of the dotted line *xy* of Fig. 7. Fig. 6 is a plan view of the upper side of the same machine, the top board being removed. Fig. 7 is an elevation of that side of the machine from which access may be had to the conveyers of the purified middlings, and to the separating-slides between the said two conveyers.

Between the outside end, Fig. 1, and the vertical partition, Fig. 2, behind it, there is a narrow passage-way, A, and between the outside end, Fig. 3, and the vertical partition, Fig. 4, there is a wider passage-way, B, and both of said passage-ways extend, respectively, from side to side and from top to bottom of the machine, leaving a large intermediate passage-way, C, between them, as represented in Fig. 6. This passage-way C is divided longitudinally into six communicating passage-ways, 1 2 3 4 5 6. The passage-way A is divided, by a vertical partition, into two main passage-ways, 7 8, and the passage-way 7 is subdivided by three smaller passage-ways, 9 10 11, (see Fig. 2,) and the end passage-way

B is divided into three passage-ways, 12 13 14. (See Fig. 4.) The reel D is a hollow pyramidal frustum of six sides, consisting of a central shaft and frame covered with bolting-cloth in the usual manner. It is open at both ends, the larger end opening into the passage-way 12, and the smaller end opening sufficiently to receive the inner end of a pipe, *d'*, which, passing down through the top or cover of passage-way 7, enters the reel D, and conducts the middlings which are to be purified into said reel D as it rotates upon its shaft-bearings at the outer ends of the machine.

The object in making said reel D of the pyramidal form shown is to cause the entering air to pass along and out with a uniform velocity, which could not be the case if the said reel were made with parallel sides, because the air, entering continuously through the meshes from the whole exterior, would be more and more increased in speed to the outlet end, and thus carry out portions of the flour with the flocculent material.

The passage-way 6, in which the reel D rotates, has a bottom, formed by two downward-sloping sides, which leave a narrow longitudinal passage-way between their bottom edges, and to one of said edges a swing-valve, 15, is hinged, which extends the whole length of the passage-way 6, and remains closed until pressed open by the contents of the passage-way, as will be explained. Through the valve-opening the passage-way 6 communicates with the passage-way 3, in which a rotary conveyer, E, extending from within the passage-way 7 to the opposite end of passage-way 3, which, in Fig. 2, is marked 9, and at this point it opens into an outlet passage-way, 16. (See Fig. 2.) Directly beneath conveyer E is another conveyer, F, in a corresponding passage-way, 4, which, in Fig. 2, is marked 10, and the two are separated by a partition with several openings fitted with closing-slides 16^o, so that the contents of the upper conveyer E can be turned down at any one of the openings into the conveyer F below by withdrawing its particular slide, the object of which transfer will be explained. Near the bottom of passage-way 2 there is another conveyer, G, which is separated from conveyer E by a vertical partition

and an adjustable valve-board, H, whereby the communication between the passage-ways 2 and 3 can be regulated at pleasure. This conveyer G extends and opens into passage-way 13 just above a vertical spout, I, which opens through the bottom of the machine. The blower K is of the ordinary rotary construction, and is located in the lower part of passage-way 1, and takes in air through its center opening, which communicates with passage-way 8, and discharges it, by the spout K, into the passage-way 1. (See Figs. 4 and 5.)

The band-pulley L (see Figs. 1 and 6) drives the main shaft, upon which there is a pinion, 17, (dotted lines, Fig. 1,) that gears with spur-wheel 18 on the shaft of the reel D, and drives the latter with proportionately slower speed. On the main shaft there is also a larger pulley, M, which is connected, by a band, to the small pulley 19 on the shaft of the blower K, and drives the latter at high speed, while a third pulley, N, (dotted lines in Fig. 1,) on said main shaft, connects, by a band, with a smaller pulley, 20, on the shaft of the upper conveyer E, and drives the latter at a rapid speed, while a spur-wheel, 21, on said conveyer-shaft gears with a like spur-wheel, 22, on the shaft of the conveyer G, and the latter wheel, 22, gears with another like wheel, 23, on the shaft of the conveyer F, and consequently all three of the said conveyers, E F G, have each the same speed. The driving-shaft moves in the direction of the arrow Z, and consequently moves the reel D and the conveyer G in an opposite direction, while the conveyers E and F and the blower K each in the same direction as that of the main shaft of the machine. Although the two conveyers E and F rotate in the same direction, their conveying blades or beaters are adjusted obliquely in opposite directions, the upper one, E, driving the contents of its passage-way 9 in the direction of the arrow V, (see Fig. 7,) and the lower one, F, in the direction of the arrow W, or each in the direction of their respective outlets 16 and 25. The conveying-blades of the conveyer G drive the contents in the bottom of its passage-way 2 in the direction of the arrow U, (see Fig. 6,) or to its outlet I. (See Fig. 4.)

The operation is as follows:

The main shaft, being put in motion in the direction specified, gives simultaneous rotary motions to the reel D, blower K, and the three conveyers E F G in the directions specified, while the impure middlings, which are to be purified by the separation therefrom of the bran, specks, dirt, and the light flocculent substance before mentioned, are run into the smaller end of the reel D through the feed-pipe *d'*. The rapidly-rotating motion of the blower keeps up a strong and constant current of air through the machine, drawing the air of passage-way 8 through the central opening of the blower, and driving it through the outlet *k'* into passage-way 1, where it is divided into three portions, the first portion passing onward to and through the hole 26 into pas-

sage-way 7, and upward through openings 28 into the reel passage-way 6, through the bolting-cloth into the said reel, and out through the larger end of the latter into passage-way 12; thence along over conveyer G in passage-way 13, and out through opening 29 into passage-way 2; thence through opening 30 into passage-way 8, and down through 8 back to the blower K, which it enters, as before; the second portion of air in passage-way 1 passing, at the same time, down through passage-way 7 and opening 31 into chamber 9; thence down under and around conveyer E, up through passage-way 3 into passage-way 2; thence through opening 30 into passage-way 8, and back to blower K; while the third portion of the air in passage-way 1, passing out through opening 27 into passage-way 14, enters opening 31 into passage-way 5, and around under conveyer E to passage-way 3, and, finally, like the second portion, into passage-way 2, where the conveyer G operates.

The impure middlings which are intended to be purified enter, through the pipe *d'*, into the smaller end of the reel D, where they are subjected to agitation by the rotary motion of the pyramidal reel and the air-current coming through the meshes of the bolting-cloth. The incoming air-current blows back the light flocculent substance. The fine meshes of the bolting-cloth keep back the specks, dirt, and bran, while the flour of the middlings passes out through the said meshes of the reel, together with the adhering portion of flocculent substance, (which will be subsequently removed,) down through the valve-opening in the bottom of passage-way 6, by pressing open the said valve, (against the pressure of the air-current from passage-way 5,) into conveyer E, which dashes the said middlings and the accompanying adherent flocculent substance against the inner sides of the conveyer passage-way, thus separating the flour from the said flocculent substance, and the latter, being much lighter than the former, is carried by the current of air, through the adjustable valve-opening in passage-way 3, into passage-way 2, while the purified middlings or flour, free from all impurities, is carried by the said conveyer to its outlet 16. In the meantime the bran and dirt or specks and the flocculent substance pass out through the larger open end of the reel D, to and through passage-way 12, to conveyer G, which conveys the bran and dirt into outlet I, and most of the lighter or flocculent substance at the same time settles, and is carried out in the same direction by the conveyer.

The valve-board H can be readily adjusted through an opening, 32, (shown in Fig. 1,) and a corresponding opening, 33. (Shown in Figs. 2 and 5.)

The object of making the outlet end of the reel D larger than the inlet end is mainly to allow the current of air coming through the bolting-cloth to pass out at a more uniform velocity throughout the whole length of said reel.

The object of the lower conveyer F is to enable the attendant at any time to tap the upper conveyer E at any point of its length by withdrawing any one of the slides 16^o, (see Figs. 4, 5, 7,) and thus cause the flour in E to fall into conveyer F, if it be desired to have a grade of flour not absolutely pure, which would be produced if allowed to pass through the conveyer E to its outlet 16.

There are several openings, each covered by a slide, or by a hinged door, whereby an inspection can be made of the interior of the machine at any time it may be necessary; but during the working of the machine there is not any outlet for the contents, including the current of air, except the outlets from the three conveyers E F G, which are intended to open into respective bins.

I claim as my invention—

1. The conveyer G and passage-way 2, with its spout or outlet I and openings 29 and 30, in combination with the passage-way 13 and reel D in the passage-way 12, the said parts being constructed and arranged substantially as and for the purposes set forth and specified.

2. In a middlings-purifier, the arrangement of the passage-ways 26 12 13 2 8 7 9 3 1 27 14 5 and openings 28 28 29 30 31 in relation to the blower K and reel D, substantially as and for the purposes hereinbefore set forth and described.

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