

F. F. LANDIS.
BLAST DISTRIBUTER FOR WINNOWER MACHINES.
APPLICATION FILED AUG. 23, 1904.

1,089,062.

Patented Mar. 3, 1914.

2 SHEETS—SHEET 1.

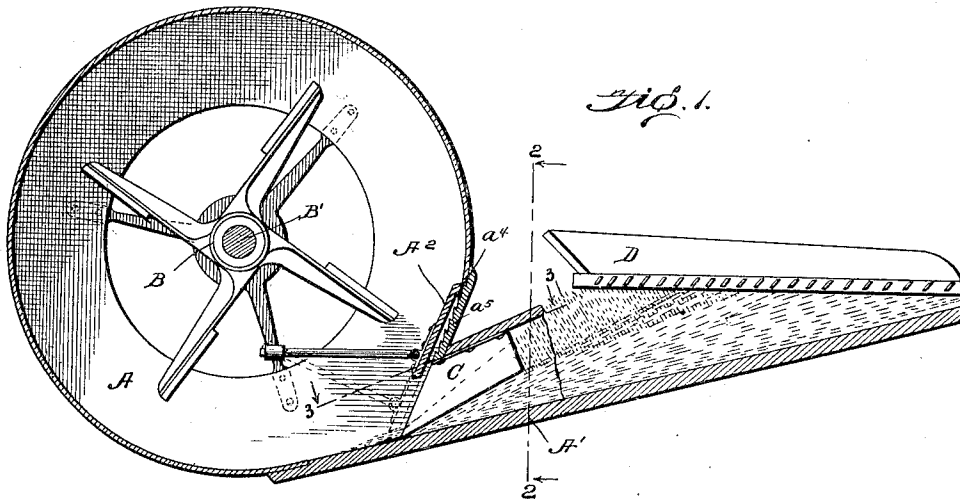


Fig. 2

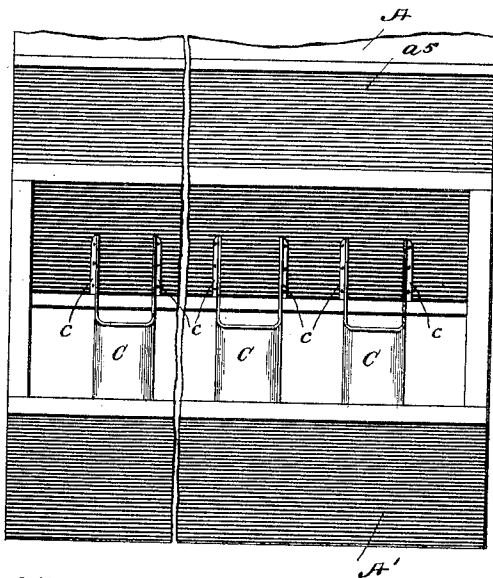
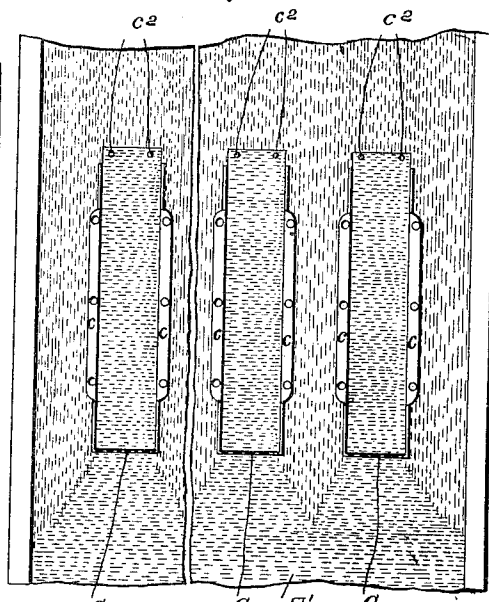


Fig. 3.



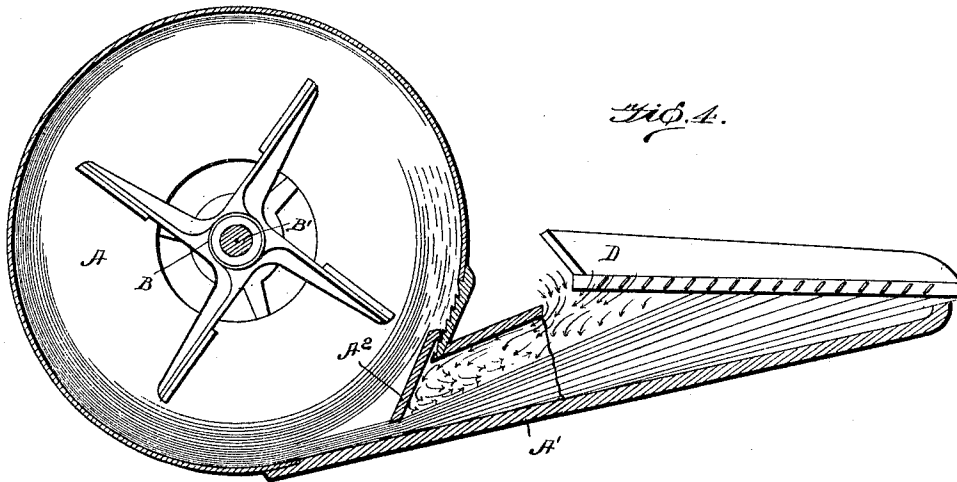
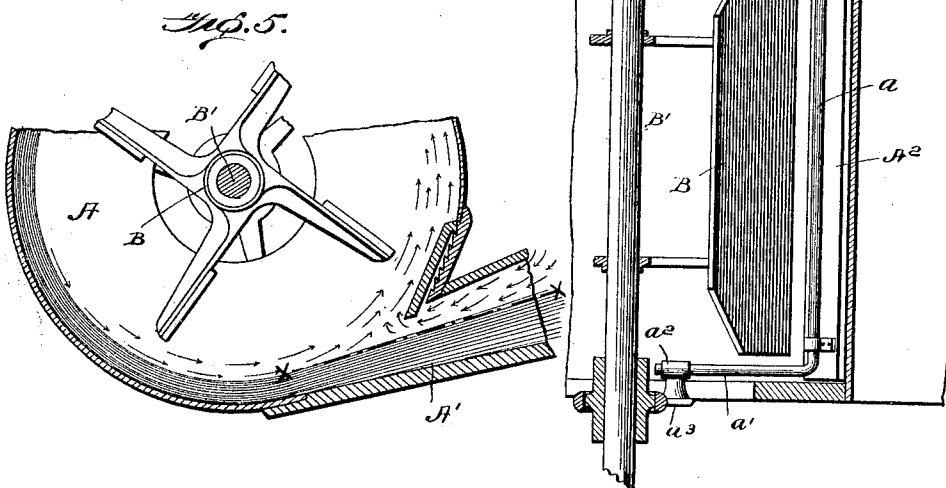
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UNITED STATES PATENT OFFICE.

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BLAST-DISTRIBUTER FOR WINNOWER-MACHINES.

1,089,062.

Specification of Letters Patent.

Patented Mar. 3, 1914.

Application filed August 23, 1904. Serial No. 221,875.

To all whom it may concern:

Be it known that I, FRANK F. LANDIS, a citizen of the United States, residing at Waynesboro, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Blast-Distributors for Winnower-Machines, of which the following is a specification.

One of the difficulties heretofore experienced in the use of winnowing machines has been the imperfect cleaning of the grain resulting from the unequal distribution of the air-blast throughout the area of the air-duct, or outlet of the blast-fan, and over the surface of the screen or riddle on which the blast is required to act.

It is well known that to secure perfect results, the blast must be at a proper and uniform pressure throughout the entire area of the cleaning device. In the machines heretofore in common use such a uniform pressure has been impossible to secure. The blast may be at a proper pressure on a part of the separating device while at other parts the pressure will be too great and at still other parts too weak. At the points where the pressure is too great, the heavy material will be carried away with the light, failing to make the proper separation, and at the points where too weak, it will fail to remove all of the light chaff and dirt from the heavy grain.

I am aware that devices have been heretofore devised for the purpose of distributing the blast over the sieve or riddle but they all require adjustment for distribution whenever the quantity or pressure of the blast is varied, requiring different positions for different pressures, which makes the proper working of the machine depend entirely upon the good judgment of the operator.

The object of my said invention is to provide a peculiar form and arrangement of the discharge or outlet of the blast fan used in connection with winnowing machinery, whereby the blast will be evenly distributed and made uniform throughout the depth and width of the fixed air-duct, or fan outlet, and also over all the surface of the screen or riddle on which the blast is required to act, whereby the above difficulties will be overcome, all as will be hereinafter more fully described and claimed.

Referring to the accompanying drawings which are made a part hereof and on which similar reference letters indicate similar

parts, Figure 1 is a vertical section through a fan casing, the discharge duct of which embodies my said invention, the end of the riddle being shown adjacent thereto in position to receive the pressure of the air-blast, as when used in the winnowing operation, Fig. 2 a front elevation as seen when looking in the direction indicated by the arrows from the dotted line 2—2 in Fig. 1, Fig. 3 a view looking downwardly from the dotted line 3—3 in Fig. 1, with the top of the duct removed, Figs. 4 and 5 views of the fan casing in vertical section omitting my invention for the purpose of illustrating the air-currents when said invention is not used, and Fig. 6 a detail view illustrating the construction and manner of mounting the blast gate.

In said drawings, the portions marked A represent the fan casing, B the fan, C the deflector, and D the riddle. The fan casing A is of an ordinary or any suitable construction having at its lower side the air-duct or outlet A¹ arranged to discharge upwardly at a suitable angle against the underside of riddle D, said air-duct is provided with a blast gate A² mounted upon a U-shaped rod *a*, the legs *a*¹ of which are mounted in suitable sockets *a*² on the ends of suitable journals mounted in bearings *a*³ in the side of the fan casing. A dog *a*⁴ on the upper edge of said blast gate is adapted to engage with a series of notches on the adjacent face of the board *a*⁵, just above the entrance to the blast outlet as shown. By adjusting said gate to different positions, the area of the outlet is regulated as desired.

The blast fan B is of ordinary construction mounted upon the shaft B¹ and adapted to be driven by any suitable gearing, as usual. The deflectors C are of substantially the form shown in Figs. 1, 2 and 3, being preferably formed of sheet iron and bent to form three sides of a box, the ends of which are open. Flanges *c* are turned outwardly from the top edges of their sides through which fastening devices, as nails *c*¹ are driven to secure them to the top of the air-duct A¹, which top will thus form the top of said boxes. The ends of the deflectors adjacent to the fan casing are arranged in a line with the entrance to the outlet or air duct and their lower sides rest upon the bottom of said air-duct and are there secured by nails or other fastening devices *c*². The bottom of each deflector extends upwardly

at an angle as shown most clearly in Fig. 1 until its rear end is substantially on a line with the center of said air-duct. Said boxes or deflectors are preferably narrow, being in practice about two inches in width and arranged with spaces of corresponding width between them. Their front ends being in a line with the entrance of the air-duct, the openings thereinto will be regulated by the adjustment of the blast gate, as will be readily understood.

To better illustrate the operation of my said invention, I have indicated in Figs. 4 and 5 the natural currents of the air with the ordinary construction of blast fan and air-duct. As is well known, the greatest pressure of the air under the operation of the blast fan is against the inner surface of the outer wall of the fan casing, as shown by the shaded lines in Fig. 5. With the blast gate wide open, as shown in said Fig. 5, the air blast under such pressure of the fan will enter the air-duct A^1 wholly below the broken line $X-X$, leaving a free space above said out-going current or broken line $X-X$. The action of the fan will draw a counter current of air through this upper space as indicated by the arrows, and as said counter current of air must come from some place other than the fan casing it will naturally be drawn from the portion of the separator around and above the riddle which is not within the direct blast from the fan. In Fig. 4 the blast gate is shown nearly closed and by means of arrows I have indicated the counter currents as they will occur with such adjustment. The result of such operation is that many particles of light substance and dirt are drawn down through the front end of the riddle and the cleaning and separation of the dirt from the material to be cleaned is thus rendered very imperfect.

By means of the deflectors C , dividing the entrance to the air-duct A^1 into a number of air conveyers or channels, the bottoms of the discharge ends of part of which are at or above the line of the normal top of the air blast, it will be seen that this difficulty is overcome. I have indicated in Fig. 1, by dotted lines running in the direction of the air-blast, air currents following their natural course as through the air conveyers between the deflectors, and by dotted lines running cross-wise, or parallel with the ends of the deflectors, I have indicated the air current coming through said deflectors. In Fig. 3 the same method of illustrating the air current is followed and it is shown how said currents after coming through the deflectors immediately expand to meet and commingle with each other. The air currents passing through the conveyers between the deflectors will also expand to meet each other beneath said deflectors, so that the air-blast, whether weak or strong, little or much, will always

be evenly distributed throughout the entire cross area of the air-duct and will be directed to the riddle or screen over its entire surface under an even and uniform pressure. The openings into the fan casing as indicated in Fig. 1 are made of sufficient size to admit all of the air which the fan can move regardless of the size of the air-duct thereby always maintaining within the fan casing the maximum strength of blast due to the speed at which the fan is run, the variations of the blast pressure to the cleaning device being entirely controlled by the adjustment of the blast gate A^2 .

While this invention has been described herein in connection with a grain cleaning machine, it will be understood, of course, that the blast-fan structure may be used in connection with other cleaning machines or for other purposes where it is desired to distribute the blast of the fan over considerable area. It will also be understood that while the deflectors are shown U-shaped in cross section that other forms of deflectors may be used without departing from my said invention, as well as other obvious modifications in the form and arrangement of parts. The particular form in combination with a grain cleaning machine is shown in my co-pending application #221,492, together with other modifications in the structure.

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

1. A blast-fan structure comprising a casing having an air-duct leading therefrom said air-duct being divided vertically into air conveyers with uniform entrances, some of which conveyers are arranged to discharge at a point above the bottom of the main air-duct, substantially as set forth.

2. In a cleaning machine, the combination, of a blast-fan the casing whereof is formed with an air-duct, and a series of deflectors mounted at intervals in said air-duct to divide it into air conveyers, the bottom of said deflectors being inclined upwardly from their entrances and mounted with their entrance ends resting on the bottom of said air-duct, substantially as set forth.

3. A blast-fan structure comprising a fan-casing containing a blast-fan, an air-duct formed thereon, and deflectors mounted in said air-duct to divide the same by vertical partitions into longitudinal air conveyers from bottom to top thereof, the bottom of said deflectors being set to extend upward at an angle from the entrance to their discharge ends, substantially as set forth.

4. A cleaning machine comprising a blast-fan the casing whereof is provided with an outlet air-duct which is divided into air conveyers, the entrances to which are in the

same plane and the bottoms of the discharge ends of adjacent channels whereof are arranged in different planes, substantially as set forth.

5 5. A cleaning machine comprising a blast-fan having a casing provided with an air-duct or outlet arranged to discharge against the separating devices, which air-duct is divided vertically into longitudinal air conveyers, the bottoms of the discharge ends of adjacent conveyers whereof are arranged in different horizontal planes, whereby the blast of alternate conveyers is directed at different angles and the complete blast is distributed over greater area, substantially as set forth.

6. A blast-fan the casing whereof is provided with an air-duct or outlet divided vertically into longitudinal air conveyers, the bottoms whereof are in different horizontal planes at their discharge ends, substantially as set forth.

7. A blast-fan the casing whereof is provided with an air-duct or outlet which is divided into air conveyers, the entrances to which are in the same plane and the discharge ends of the adjacent conveyers whereof are arranged in a different plane, substantially as set forth.

8. A blast-fan for cleaning machines the casing whereof is provided with an air-duct having deflectors mounted therein and ex-

tending longitudinally thereof, the entrance to said deflectors being the entire vertical width of the air-duct, and their bottoms being at an angle to the bottom of the air-duct, substantially as set forth.

9. In a blast-fan structure the combination of a fan-casing formed with air inlets of fixed area, a blast-fan mounted in said casing, an air-duct or outlet for said casing, an adjustable blast gate mounted at the entrance to said air-duct and a series of deflectors mounted in said air-duct formed to divide the same into longitudinal channels, the bottoms of the discharge ends whereof are in different planes, substantially as set forth.

10. The combination of a fan-casing, a fan therein; an air-duct formed on said casing, a blast gate mounted upon a hinged U-shaped rod, means for supporting said gate in different adjustments, and deflectors mounted in said air-duct, substantially as set forth.

In witness whereof, I have hereunto set my hand and seal at Washington D. C. this 25th day of July, A. D. nineteen hundred and four.

FRANK F. LANDIS. [L. S.]

Witnesses:

MARY A. WILSON,
E. W. BRADFORD.