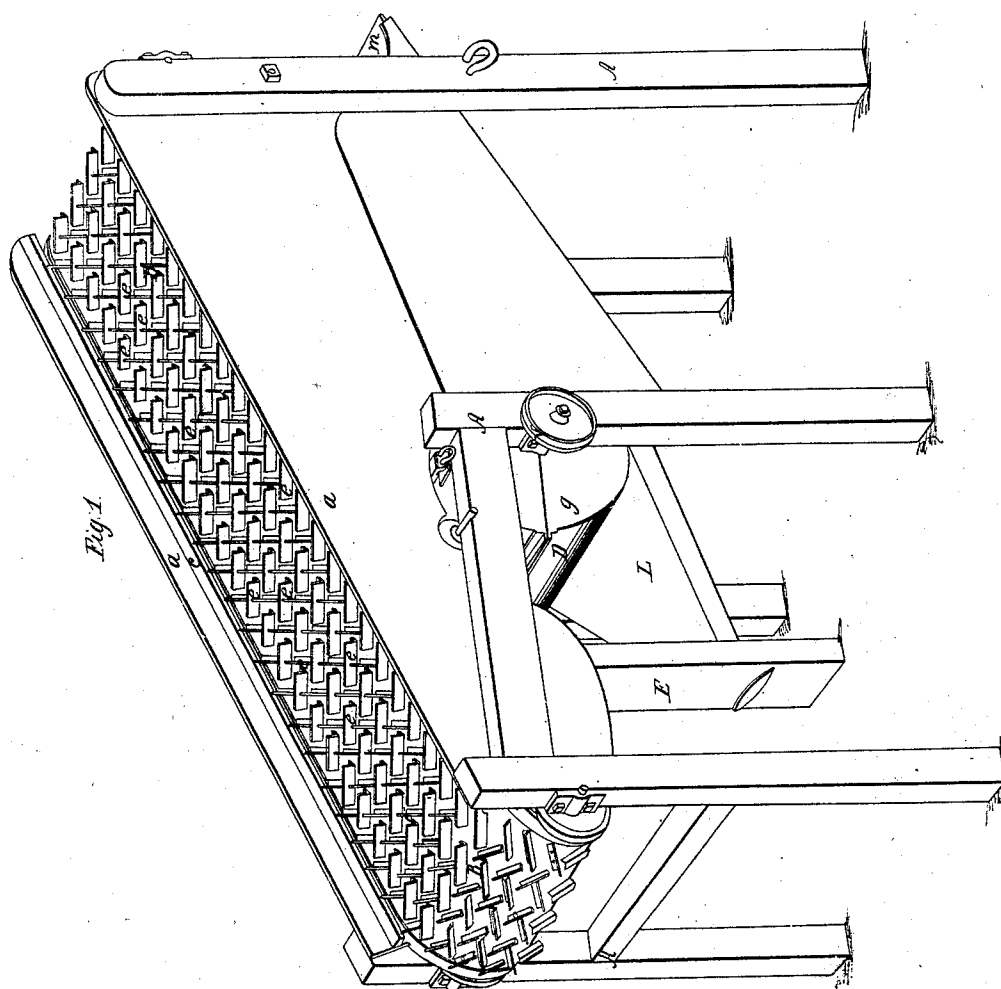


No. 8,270.

PATENTED AUG. 5, 1851.

A. B. CHILDS.  
GRAIN SEPARATOR.

2 SHEETS—SHEET 1.

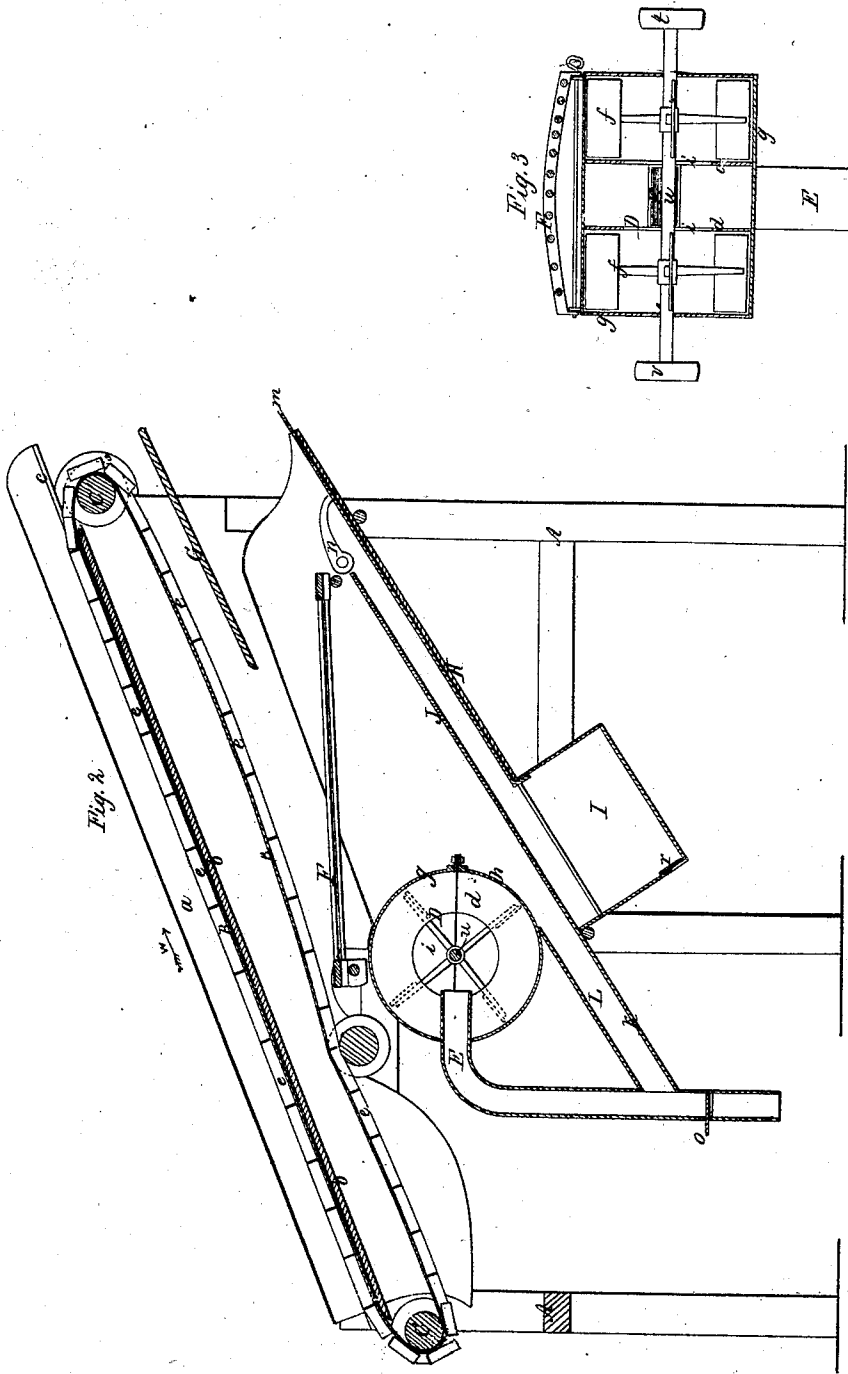


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# UNITED STATES PATENT OFFICE.

AUGUSTUS B. CHILDS, OF ROCHESTER, NEW YORK.

## GRAIN WINNOWER AND SEPARATOR.

Specification of Letters Patent No. 8,270, dated August 5, 1851.

*To all whom it may concern:*

Be it known that I, AUGUSTUS B. CHILDS, of Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Machines for Separating and Cleaning Grain; and I do hereby declare that the following is a full, clear, and exact description of my said invention, reference being had to the accompanying drawings, which form part of this specification, and in which—

Figure 1 is a view in perspective of a grain separator and cleaner constructed according to the principles of my invention; Fig. 2 is a vertical longitudinal section of the same, and Fig. 3 is a transverse section of the fan.

The object of my improvement is to effect the more thorough separation and cleansing of grain from the straw and impurities with which it is mingled when discharged from a threshing machine, and also to simplify the construction of the apparatus as well as to increase its efficiency.

The several parts of the machine as represented in the accompanying drawing are mounted upon a strong frame A higher at one extremity than at the other to support in an inclined position the elevator by which the mixed straw and grain from the threshing machine are separated, and the latter is conveyed to the winnowing and screening apparatus, while the straw is discharged from the upper extremity of the elevator upon the ground whence it is removed in any convenient manner. This elevator consists of a broad endless band B which is passed around two rollers C, C', at the opposite extremities of the machine. The upper half of this band runs in a trough formed by two side boards a, a, and a bottom or bed b, into which friction rollers may be let to diminish the friction caused by the sliding of the band; or if preferred the bottom board may be wholly replaced by friction rollers placed at suitable intervals. The edges of this part of the band are covered by strips c, c, which are secured to the side boards and prevent the grain or straw from getting beneath the edges of the band. The face of the band has an endless series of oblique plates e, e, secured to it in such relative positions that straw placed either lengthwise, crosswise, or obliquely to the direction in which the band moves is always supported upon some of the oblique plates

and cannot fall between them, thus affording ample space for the grain to separate from the straw and drop upon the face of the band. These oblique plates, in the present instance are formed of sheet iron and are riveted to the band, which may be strengthened and stiffened by placing their cross strips of wood or metal on the back of the band opposite the plates and passing the rivets through the two.

The winnowing and screening apparatus is contained within a casing supported in the frame beneath the elevator. The hinder extremity of this casing is open to permit the escape of the lighter impurities which are carried off by a strong blast of air generated by a fan D at the opposite extremity of the case. This fan consists of two sets of wings f, f, which are contained within a case g. This fan case is divided into three compartments by two transverse partitions d, d. The fans are situated in the outer compartments which have openings h in their peripheries through which the air is discharged. The heads of the fan case are closed the air being supplied through a suction pipe E to the central compartment of the case whence it is drawn into the centers of the fans through openings i, i, in the partitions d, d. The upper part of the casing is fitted with an arched grating or screen F upon which the grain is shot by an inclined board G which receives it from the elevator. The lower part of the case is closed by an inclined plate H at whose lower extremity is a box I for the reception of chaff, cockle, &c. Between the screen and the bottom plate of the casing an inclined grating or perforated plate J is placed, to receive the grain falling from the arched screen above, to expose it fully to the action of the blast, and to separate from it the smaller and heavier impurities which pass through and fall upon the bottom plate beneath. This perforated plate projects forward beneath the fan case, its projecting extremity k is not perforated but is cased in at the sides and top and is contracted laterally to form a spout L which delivers the grain into the suction pipe E of the fan. A plate m is constructed to slide longitudinally upon the bottom plate H and can be fixed in any desired position by means of a ratchet or pawl n which is hinged to the side of the case and engages in notches formed in the corresponding edge of the sliding plate.

The suction pipe E is provided with a register *o* to regulate the supply of air, the chess box I is fitted with a door *r* through which the chess, cockle, &c., can be removed. The upper elevator roller C' has a belt pulley *s* secured to its shaft, to which motion is imparted by means of a belt which encircles a corresponding pulley *t* upon one extremity of the fan shaft *u*. The other extremity of the fan shaft is fitted with a similar pulley *v* to which motion is imparted by a belt which leads from the horse power or other prime mover employed.

The operation of this machine is as follows: The fan is caused to revolve by the application of power to its belt pulley *v* and the elevating band B is moved in the direction indicated by the arrow *w* by the revolution of its upper roller C', which is driven by means of a belt from the fan shaft. The mixed grain and straw from the threshing machine are received upon the lower extremity of the elevating band B and are conveyed upward by it; as it moves upward the grain falling from the straw is received upon the face of the band and is prevented from sliding downward by the oblique plates, which also by their obliquity with respect to each other prevent the straw from falling in between them. As the band turns around the upper roller, the grain is discharged upon the inclined board while the straw is thrown off at the end of the machine.

As fast as the grain falls upon the inclined board it slides down the same and is shot upon the arched grating F where it is exposed to the current of air generated by the fan D; this current carries off the shorter pieces of straw, the whitecaps and chaff, which are discharged at the hinder open end of the case, while the grain and heavier impurities fall through the grating upon the perforated plate J down which they slide in opposition to the current or blast produced by the fan. This blast effectually removes the lighter impurities, while the cockle, chess, dirt, and other small and heavy impurities, falling through the perforations of the plate, slide down the plate beneath into the chess box. The tailings or lighter portions of grain which are carried off by the current of air, are caught by the adjustable plate *m* which is set to project a greater or less distance beyond the extremity of the bottom plate H as may by trial be found most suitable. As the grain continues to move down the perforated plate it passes beneath the fan case and is shot into the suction pipe E, where it is winnowed a second time, which operation removes from it any light impurities that may have escaped the blast passing over the perforated plate.

From the foregoing description and the

accompanying drawings it will be perceived that no motion is imparted to the grating F, or to the perforated plate-screen J, and inclined bottom board H. This motion is rendered unnecessary by the arching form of the grating F which tends to give the mass falling upon it a lateral movement under the action of the blast, while the latter works it rapidly through the screen and thus not only facilitates the separation of the short pieces of straw, the chaff and whitecaps, but also tends to distribute the grain equably upon the perforated plate beneath and thus obviates the necessity of shaking the latter. It will also be perceived that as the grain is subjected to the whole force of the current of air which feeds the fans, and that too in the contracted space of the suction pipe, it will be thoroughly cleaned from all light impurities. The fan also by its division into two narrow sets of wings, and by the arrangement of the suction pipe, will be thoroughly supplied with air; the air also is more equably distributed across the entire space beneath the screen and therefore acts with greater uniformity upon the grain.

The elevator I have described, with its surface studded with oblique plates, supports the straw and separates the grain therefrom much more effectually than those elevators whose surfaces are covered with series of parallel cells, of which class, the elevators of Davenport and Pitts are examples; the chief objection to which is that the straw is continually working into the cells and is thus preventing the separation of the grain.

Various plans have at different times been essayed to obviate this serious defect of the cell-covered elevator, the most successful of these has been to construct the elevating band in the form of an endless grating; but while this elevator completely obviated the difficulty incident to the cell covered elevator it was found in practice to possess a defect peculiar to itself, and which is even more serious than those it was designed to obviate; for the straw became entangled in the meshes of the grating to such an extent as to impair its action, and to render frequent stoppages necessary for the purpose of cleansing it.

The elevator I have described is constructed upon principles different from those embodied in those above noticed for while it separates the grain and straw as effectually as the grate formed elevator it is not more liable to entangle the straw than the endless apron covered with cells. The oblique plates with which the surface of the apron is studded may be made of metal as represented or of any other material that may be deemed suitable for the purpose, and the elevator may have a lateral movement

imparted to it, or the trough in which it runs may be provided with beaters to shake up the straw; a rotating discharge or doffer may also be fitted to the upper extremity of the elevator to detach and project the straw from the upper surface of the elevating band.

With the exceptions of the parts specially claimed every portion of the elevating and winnowing apparatus may be modified both in construction and arrangement to meet the views of different constructors or to adapt them to particular circumstances, and the devices I have described may be employed separately or may be adapted to other machines of the same class as may be found advisable in practice.

I claim—

1. The elevator constructed substantially as herein set forth with oblique plates or blocks to support the straw and facilitate the separation of the grain.

2. I also claim the arched grating in connection with a blast to effect the separation of the lighter impurities from the grain.

3. I likewise claim the arrangement substantially as herein described of the air chamber between the fans, the suction-pipe to supply the chamber with air, and the spout to conduct the once winnowed grain from the screen into the lower extremity of the suction pipe, to be winnowed a second time by the entering current of air; whereby the grain is subjected to the full force of two independent blasts acting consecutively, which insures its effectual winnowing as herein set forth.

In testimony whereof I have hereunto subscribed my name.

A. B. CHILDS.

Witnesses:

E. S. RENWICK,  
P. H. WATSON.