

## Fanning Mill and Grain Separator.

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN FANNING-MILLS AND GRAIN-SEPARATORS.

Specification forming part of Letters Patent No. 45,796, dated January 3, 1865.

*To all whom it may concern :*

Be it known that I, H. OGBORN, of Richmond, in the county of Wayne and State of Indiana, have invented certain new and useful Improvements in Fanning-Mills and Grain-Separators; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a side elevation of my improved fanning-mill and separator. Fig. 2 is a vertical central section thereof in a longitudinal plane. Fig. 3 is a transverse section of the same in the line *xx*, Fig. 2. Fig. 4 is a detached view illustrating the manner in which the shoe is supported and rendered capable of adjustment at one end. Fig. 5 is a plan of the hopper detached. Figs. 6, 7, 8, 9, and 10 are detached views illustrative of the construction of various parts, to be hereinafter more particularly referred to.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to a machine embracing several features of novelty, to be hereinafter specified, which adapt the machine to perform its work in a more perfect manner while tending to simplify its construction and reduce the cost of manufacture.

To enable others skilled in the art to which my invention appertains to fully understand and use the same, I will proceed to describe its construction and operation.

In the accompanying drawings, A may represent the various parts of the main frame of the machine, and B the fan, which may be of common construction and adapted to be operated by the turning of a crank-handle, B', which may be done by hand or otherwise.

C is the hopper, provided with an adjustable inclined slide, C', which admits of an increase diminution in the quantity of grain or seed which flows to the action of the separating devices by being slid back and forth to any desirable position in the guideways formed on the inner sides of the hopper. If the grain be allowed to flow on to the first screen D in an unbroken or undivided body, extending entirely across the discharge-orifice of the hopper, its invariable tendency is to accumulate at the middle of the screen, in con-

sequence of the liability of the latter to bend or sag down at its center, and this condition of the grain prevents a large quantity of the screenings from passing through the sieve.

In the end of the hopper of my machine is a projection, C<sup>2</sup>, of semicircular form, or nearly so, a clear representation of which is given in Fig. 5. The grain which flows down the inclined slide C' strikes the projection C<sup>2</sup>, and is deflected at either side of the same, whereby it is caused to pass unto the screen D at the respective sides thereof. It then distributes itself equally over the surface of the screen D, through which passes a considerable quantity of the screenings and small particles of refuse matter. The screenings, &c., which pass through the screen or sieve D, are received by a grain-board, D', which is affixed to one side of a frame, D<sup>2</sup>, the screen being attached to the other side, as illustrated in Fig. 7. The screen D and board D' are placed at an acute angle relatively to each other, and the frame D<sup>2</sup> is shaped in conformity therewith. The ledges upon which the board D' rest at the opposite sides of the shoe E occupy positions one above the other, and therefore the board D' inclines downwardly toward one side of the machine, where the screenings and other matter which fall onto said board D' pass off through an opening, *d*, and spout E', being thereby entirely separated from the grain and other particles which are too large to go through the sieve D.

When the machine is used for separating seed or grain whose small size would allow it to pass through the screen D, the position of the latter relatively to the board D' is reversed by being overturned, together with the board D' and frame D<sup>2</sup>, in which case the board D' is uppermost or above the screen D, so that the seed or grain to be separated does not come in contact with the screen D on its way to the riddles of the shoe, which riddles may be of a coarser or firmer character, according to the size of the seed to be separated.

By an obvious manner of turning the riddle the grain-board, when uppermost, may be caused to assume a horizontal position, which is necessary in order to effect an equal spreading of the grain or seed which is conducted over the same to the riddles.

The screen D, grain-board D', and their con-

necting-frame may, by way of elucidation, be termed a "box," and in each end of this latter is a groove, *d'*, one of which constitutes a receptacle for the flange *f* on the riddle *F* in either position of the said box. The flange *f* and grooves *d'* thus employed adapt the screen *D* and riddle *F* to form a continuous bridge or conductor at all times during the operation, the grain, &c., which does not pass through the screen *D* being received upon the riddle *F*, a detached representation of which is seen in Fig. 6.

The grain which reaches the riddle *F* passes through the same to the riddle *G*, the tailings being carried off at the end of the machine from the riddle *F*.

*H* is a board fitting in the groove *e*, and located at the rear end of the latter, and used for fall-wheat and some other grains. Its office is to conduct the grain to a point nearly vertical to the back end of screen *I* before it is subjected to the blast of the machine. When the board *H* is left out, the grain passes directly from the riddle *F* to riddle *G*, thence to riddle *G'*, thence to riddle *G''*, and thence to the screen *I*, upon which the grain is carried to the front end of the machine.

The office of this nest of riddles is to subject the wheat to a thorough screening at the same time that it is operated upon by the blast of the fans, thus thoroughly screening and blowing oats and other substances from the grains. The riddles *G* *G'* *G''* are all fixed in one and the same frame, *G''*, (see Fig. 8,) the edges of which *g g* project outwardly and occupy the groove *e* in the shoe, and the spaces between both ends of the riddle are open, so that the blast from the fan may pass freely between the entire series and effectually act upon the grain contained thereon. By thus fixing a number of sieves or riddles in one frame with projecting edges, I obviate the necessity of making a deep shoe with grooves for each individual riddle, and hence the building of the machine is simplified and rendered less expensive.

*J* is a pivoted deflector adjoining the under side of the fan-case and pivoted at its ends, so that it may be turned to vary the extent to which it deflects the blast at the under side.

*J'* is a pivoted deflector which regulates the fan-blast at the upper side. As the blast has to pass between the deflectors *J J'* its force may be increased by adjusting them in the manner indicated by the red lines in Fig. 2. Said deflectors *J J'* may be retained in position at which it may be desired to adjust them by means of hooked-shaped catches *j*, which take into the apertures *a* in the side of the frame *A*. It will be seen that the deflectors *J J'* are attached and adjusted independently of the shoe *E*, the motion of which cannot, therefore, vary their position while the machine is in operation, hence they are capable of regulating the fan-blast with exactness and efficiency. The shoe *E* is pivoted to a rocking-support, *K*, which has bearings for its journals in the

sides of the frame *A*, and a reciprocating movement is imparted to the shoe through the medium of a connecting-rod, *L*, attached by loose joints to one side of the shoe *E* and to a cog-wheel, *M*, which latter meshes with the main driving gear-wheel *N*. The pivots which connect the shoe to the support *K* are by the form and vibratory movement of the latter caused to oscillate in the arc of a circle whose center is the longitudinal axis of the support *K*, and hence with each vibration of the latter the shoe receives a vertical as well as a horizontal reciprocating movement. At the end where the tailings are expelled the shoe *E* is supported by arms *O O*, in each of which is found a series of oblong apertures, *o*, Fig. 4, which are adapted to be hitched or hooked over screws or bolts which have elongated heads *o'*. By turning these screws so as to bring the long diameters of their heads *o'* parallel with the corresponding diameters of the apertures *o*, which they may occupy, the arms *O* may be disengaged from the screws, and a higher or lower aperture, *o*, placed over each screw when the screws are turned in such a way as to place the long diameters of their heads at right angles to those of their corresponding apertures, *o*, so as to secure the arms *O* in position. By means of these arms and screws the rear end of the shoe may be adjusted with the greatest facility. The supporting-arms *O* are made of elastic or flexible material, and they are hinged or pivoted to the shoe *E* at their lower ends, while the screws or bolts upon which the arms *O* are suspended are inserted into the main frame of the machine. By the motion of the shoe *E* the arms *O* are swung back and forth, their lower ends moving in the arc of a circle, the center of which is constituted by the screws *o'*. This movement of the arms *O* raises and lowers the rear end of the shoe *E*, and causes the latter to rock upon the pivots, whereby it is attached to the support *K*; hence it is apparent that when the machine is in operation the shoe has three motions—namely, a horizontal, reciprocatory, and a rocking motion—all of which combine to make the riddles operate in a most effectual manner.

In order to impart an "up-and-down" or vertical movement to the lower screen, *I*, in addition to the reciprocatory motion communicated to it from the shoe *E*, I attach to the forward end of said screen *I* a flexible strap, *P*, which may be fastened to the fan-case or other rigid part of the machine, and hitched over a pin, *I'*, projecting from the end of the screen *I*. In the strap *P* are a series of holes, which permit the point of attachment of the strap to the pin *I* to be increased or diminished in distance relatively to the permanently-attached end of the strap. By thus varying the point of attachment of the strap *P* the extent of the vertical movement given the screen *I* may be varied to any desired degree; or the said screen may be allowed to play horizontally without drawing the strap

taut, and consequently without receiving any vertical movement.

Attached to the posts of the shoe E, at the rear end thereof, are a series of hooked-shaped bearings, I<sup>2</sup>, which support the laterally-projecting arms *i* of the screen I. While the degree of curvature of the bearings I<sup>2</sup> permits the arms *i* to be readily inserted and removed for the adjustment of the rear end of the screen I, said bearings do not admit of the accidental displacement of the arms *i* when the machine is in operation.

The support K, in addition to its function of giving a particular motion to the shoe, serves the purpose of a deflector or interceptor for the counter-current of air within the shoe, which might be caused by the action of the fan. The location and shape of the support K are such as to adapt it to effectually prevent tailings or other substances being carried into the fan-case.

For the purpose of insuring the ready and unretarded adjustment of the fan-doors Q Q, (which is done to increase or diminish the volume of the blast,) I provide each door with two or more pins, projections, or small rollers, *q q*, secured in the side of the door and occupying a slot, *r*, in the bar R. These means of adjustment are the most simple and effectual. I am aware that grain-separators have heretofore been constructed with a bar answering in locality to the bar R, and the doors have each been adapted for adjustment by cleats or blocks capable of being slid in a groove on the inside of such bar, hence my claim relative to this feature will be limited to the particular method represented.

A' is the bottom board of the machine, the same receiving the screenings which are separated from the wheat in its passage over the screen I. The forward end of the board A' is composed of a section, A<sup>2</sup>, which is hinged or pivoted to the vertical supports of the machine.

When the machine is used for cleaning wheat, the section A<sup>2</sup> is turned down in the manner indicated by red lines in Fig. 2, and when thus turned down it forms, in connection with the piece A<sup>3</sup>, a partition to prevent the admixture of the wheat and screenings on being discharged.

When the machine is employed for separating oats and some other grains, the screen I is dispensed with, in which event the section A<sup>2</sup> is turned up and held by a button, A<sup>4</sup>, so

as to form a continuous conductor in conjunction with the board A'.

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

1. The rocking support K, adapted to transmit motion to the shoe E, in the manner explained, and constituting a medium for preventing the existence of a counter-current of air, thus increasing the efficiency of the operating current.

2. Supporting the shoe at its rear end by means of arms O, provided with elliptical or oblong apertures *o*, fitting over screws or bolts having elongated heads *o'*, which admit of the ready adjustment of the arms O, as and for the purpose explained.

3. The strap or flexible attachment P, for giving a vertical motion to the screen I, simultaneously with its reciprocatory movement, substantially as described.

4. The bearings I<sup>2</sup>, when curved in such a way as to allow the arms *i*, which they support, to be readily removed for adjustment while preventing their accidental displacement, as herein set forth.

5. The combined screen and grain-board D D, arranged and employed in the manner and for the purposes specified.

6. The deflectors or guides J J', for regulating the fan-blast, when the same are pivoted directly to the main frame of the machine, (in contradistinction to being pivoted to the shoe,) and adjusted by means of the catches *j* and holes *a*, in the manner and for the purpose explained.

7. In combination with the doors Q of the fan case, the slotted bar R *r*, and pins or projections *q q*, arranged to operate substantially as and for the purpose described.

8. The circular distributor C<sup>2</sup>, employed to prevent the grain from accumulating at the center of the screen D, substantially as and for the object specified.

9. The grooves *d' d'*, in combination with the flange *f* of the screen F, said grooves and flange admitting of the formation of a continuous conductor for the grain in both positions of the box D D' D<sup>2</sup>, substantially as explained.

HARRISON OGBORN.

Witnesses:

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