2 Sheets--Sheet 1.

H. OGBORN & T. T. KENDRICK.

Grain-Separator.

No. 163,516. Patented May 18, 1875.

Fig. 1.

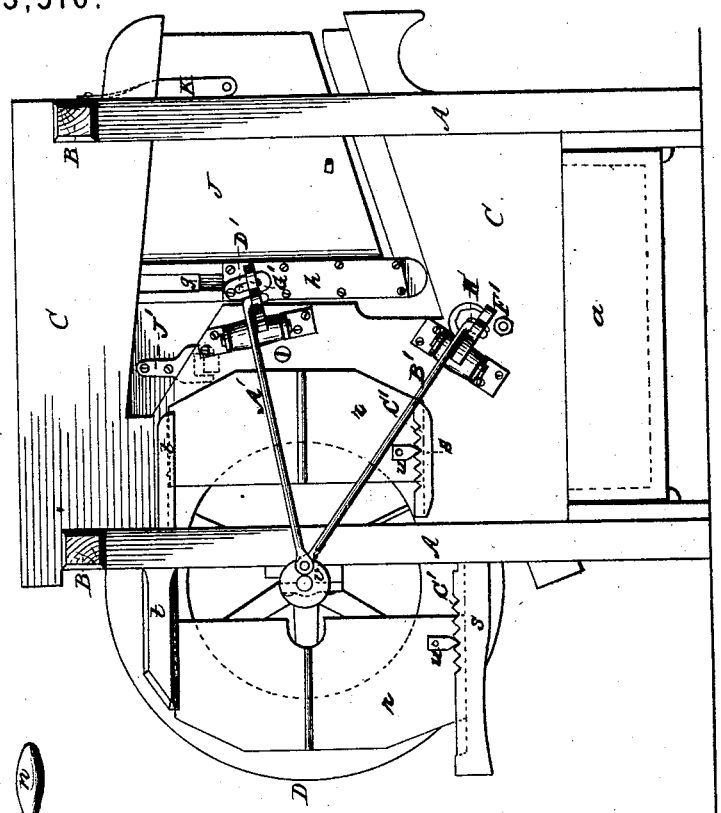
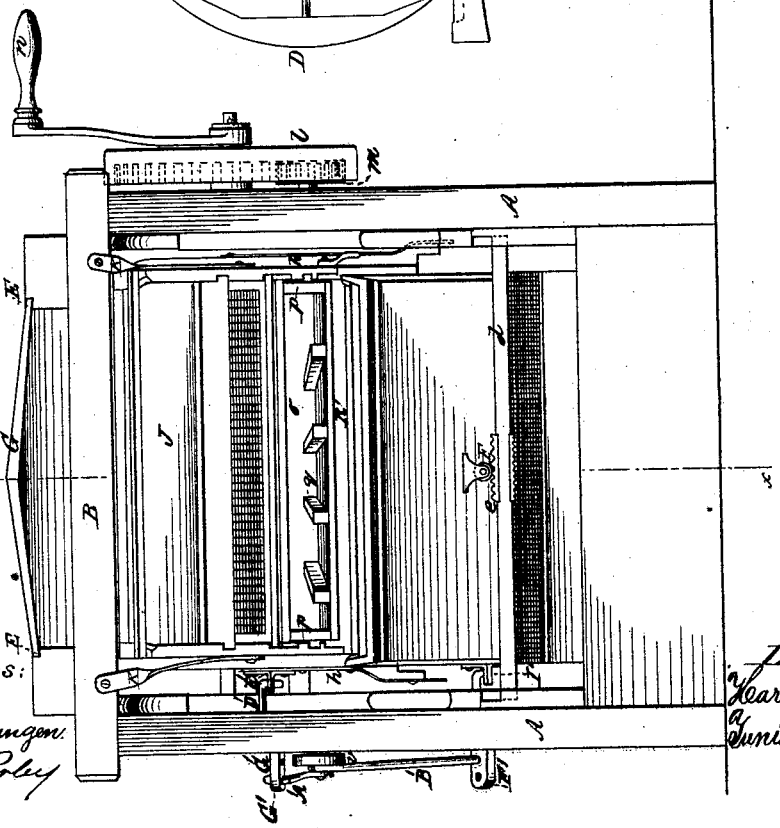


Fig. 2.



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2 Sheets--Sheet 2.

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Fig. 3.

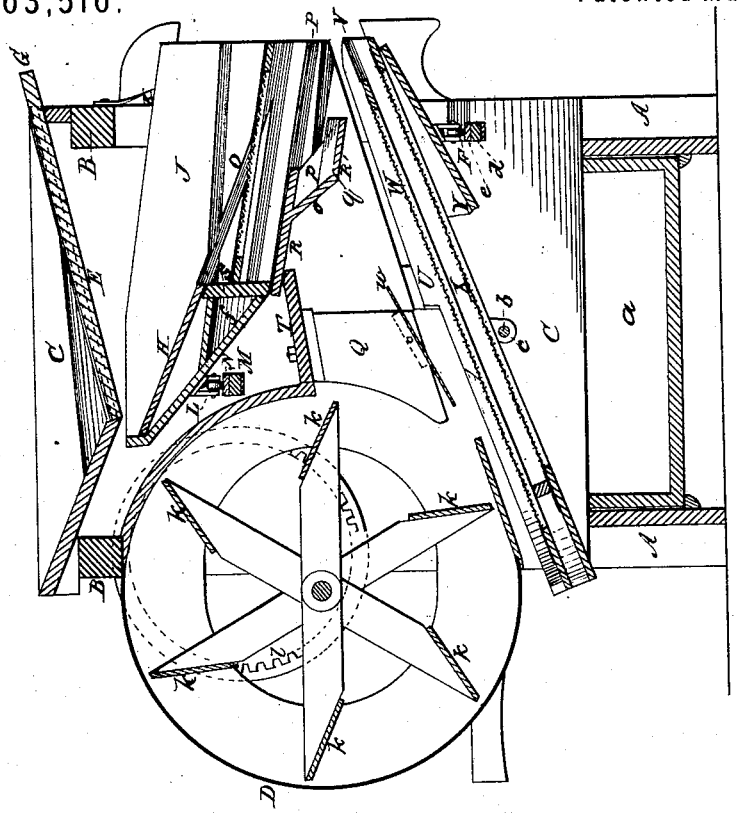


Fig. 4.

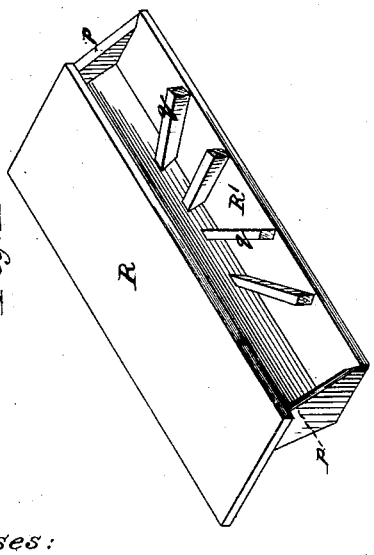
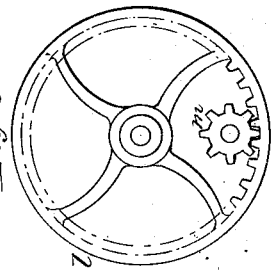


Fig. 5.



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UNITED STATES PATENT OFFICE.

HARRISON OGBORN, OF RICHMOND, INDIANA, AND TUNIS T. KENDRICK, OF NEW YORK, N. Y.

IMPROVEMENT IN GRAIN-SEPARATORS.

Specification forming part of Letters Patent No. **163,516**, dated May 18, 1875; application filed April 19, 1875.

To all whom it may concern:

Be it known that we, HARRISON OGBORN, of Richmond, in the county of Wayne and State of Indiana, and TUNIS T. KENDRICK, of the city, county, and State of New York, have invented new and useful Improvements in Combined Fanning-Mills and Grain and Seed Separators; and we do hereby declare the following to be a full, clear, 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 the machine; Fig. 2, an end elevation of the same. Fig. 3 is a vertical cross-section. Fig. 4 is a perspective of double chess-board. Fig. 5 is a detailed view of the gearing.

Our invention relates to improvements in fanning-mills or grain-separators; and it consists in the construction and arrangement of certain devices as hereinafter more fully described and explained.

In our drawings, A represents the upright frame of our separator; B, the cross-pieces; C, the sides; D, the drum. Secured to the sides of the separator E are the boards which form part of the hopper; these boards are supplied with grooves, in which the slide-board G moves to regulate the flow of the grain. This board, at its lower end, comes close to screen or board H, whichever may be in use, which prevents the grain running out of the hopper when the mill is not running, and to cause it to feed regularly when in use. J is an upper vibrating shoe, hung at its rear end by straps K, and supported near its front or feed end by a friction-wheel, L, on a cross-bar, M, and resting on a corrugated plate, N, attached to the cross-bar M. This bar has four sides, two of which are smooth, the others corrugated, the one fine, the other coarse, to give a light or heavy jarring motion to the shoe. The sides of the shoe are provided with different sets of grooves, groove O running the entire length of the shoe, to admit either the screen or board H, as may be required. The groove P receives the step chess-board R R′, and runs the entire length of the lower part of the upper shoe, its upper edges sliding between the breast-board S, and cut-off board T, to allow of the adjustment of the chess-board. The other grooves are used as they are needed, for different screens, for cleaning the various kinds of grain and seeds. At the upper inner part of the shoe J is placed a bottom, *f*, sloping each way from the middle of the shoe to a hole, *g*, in the sides thereof. Connecting with this hole is a conductor or spout, *h*, for conducting the refuse into the chess-box. This part of the shoe is provided with a screen, H, over which wheat and other grains pass in cleaning. A board may be substituted for the screen H, when cleaning small seeds. For some other kinds of cleaning other screens belonging to the mill may be used. The lower shoe U runs the entire length of the separator. Its sides are narrow and come close to the bottom of the upper shoe J, to prevent the scattering of the grain and to confine and direct the blast. The shoe U has one groove, V, running its entire length for the admission of the long seed-wheat screen W, which slides freely in this groove to admit of its adjustment endwise. This screen has a narrow strip of wood near its lower end, extending part of the way across its face diagonally, to cause the grain to pass to one side of the mill. Below this screen, a sufficient distance to allow the grain to pass, is a screen, X, of a smaller mesh, permanently attached to the shoe. Partly across the lower end of this screen extends a narrow strip of wood, to give direction to the grain in an opposite direction from the screen above it. Below the screen X is a broad bottom, Y, extending part of the way down the shoe, to catch and direct the blast, and also to conduct the refuse into the chess-box *a*. This shoe is supported and pivoted below its central part on a transverse horizontal rod, *b*, passing under it and through eyes *c*, attached to its side. The rear end of this shoe is supported by a cross-bar, *d*, its ends resting in gains cut on the inside of the fan-case. In the middle of the bar corrugated plates *e* are fastened, on which a roller, F, attached to the under side of the shoe, rests, and runs, when the machine is in operation. To impart an oscillation and jar to the shoe, one of these plates has fine corrugations, the other coarse.

This bar has two smooth surfaces. Inside the drum rotates the fan *k*, usually made with six wings, to give a strong, even, continuous blast. Immediately in front of the middle of this fan is located two vertical boards, Q, pivoted at their top to the under side of the cut-off wind-board T, to give direction to the blast horizontally. Pivoted to the boards T are horizontal wind-guides *w* to give direction to the blast in a vertical direction.

The fan-case is cut away at its sides to correspond to the shape of the shoe J, so that the piece coming out of the sides of the fan-case will make part of the shoe J. It also lightens the separator. A gear-wheel, *l*, having its cogs on the inner side of the rim, is placed on the opposite side of the separator from where it usually is to give motion to the fan-wings and other operating parts by means of the pinion *m*, operated by the handle *n*. Placing the cogs on the inside of the rim rotates the fan in the right direction, and allows the operator to stand in a position where he can turn the crank with his right hand, and look into the back part of it and see when it is working properly.

We use a chess-board, R R′, the upper part of which is long enough to project into the groove P, which holds it in place. On the under side of this chess-board, a board, *o*, is fastened at an angle to the board R R′. The bottom chess-board R′ is fastened at some distance below R—usually placed so as to be slightly nearer horizontal than board R—to retard the rapid motion of the grain. It is also held in place by a board, *p*, attached to it at each end, which holds all the parts firmly together. It may also be made of a single piece of thin board by steaming and bending, so as to present two parallel planes. On the top of the board R′ are cleats *q*, pivoted near their middle to spread the grain.

The fan-doors *r* are provided with blocks *u* on their outside, pointed at their lower ends. These fan-doors are held in place by grooved cleats *s t*, the lower one having notches G′ cut on its upper edge to receive the points of the block *u*. On the opposite side of the mill from the handle a crank, *v*, is attached to the end of the fan-shaft. Two rods, A′ and B′, having holes near their ends for the purpose, are attached to the crank-wheel, as shown. The rod A′ has a bent end that passes into and operates the shaker or elbow-lever G′, which is connected to the shoe by the short rod D′ and eye-piece E′. This shaker has a series of holes in each arm to give any required shake to the shoe. The rod B′ operates the lower shockel F′, and the lower shoe in a similar manner, by the elbow-lever or shaker F and rod H′; yet each part is adjustable independently of the other. The upper part of the shoe may have the heavy shake and the lower part the light, or the reverse, or both parts made to shake alike.

To clean wheat, pour it into the hopper onto the wide board G, on which, by reason of its being near the width of the shoe, the grain is spread out and delivered in a thin, wide, even sheet onto the screen H, which is so placed that when the grain falls upon it most of the chess, cockle, small seeds, and other impurities pass through the screen H, by reason of its vibrating, jarring motion communicated to it by the shaker and jarring friction-roller, and fall upon the sloping bottom *f* in the upper part of the shoe, and are carried down the incline planes into the conducting-spouts *h* at the sides of the shoe. When they fall into the chess-box *a* the wheat passes onto the short coarse screens in the upper grooves, which take out the coarse large particles and allow the wheat to fall upon the upper part of step chess-board R, when it moves downward and falls upon the lower part of the chess-board R′, where it is retarded in its motion and is spread evenly by the adjustable grain-spreaders *q*, and falls off this board, when the wind strikes it for the first time and blows out most of the remaining impurities. The heaviest part of the grain now falls upon the screen W, and the lighter grains upon the screen X. The remaining impurities will pass through the screens W X into the chess-box *a*. On account of the screens being shaken horizontally by the shoe U, and vertically by the roller F passing over the corrugated plate *e* on the bar *d*, the grain on the upper screen is carried downward and to one side—that on the lower screen, to the other side, when it is found to be finished, cleaned, graded, and deposited in separate receptacles placed to receive it.

To clean spring-wheat, the operation is the same, except that a series of screens are placed in the grooves in shoe J, or a nest of screens may be used to remove the oats, barley, and other impurities.

To clean small seeds, the screen H is taken out and a board placed in its stead, and the proper screens placed in their respective places in the shoe.

By the devices described, very superior results are obtained in all ordinary grain and seed cleaning and separating operations.

Having thus described our invention, what we claim therein as new and useful, and desire to secure by Letters Patent, is—

1. A chess-board for grain-separators, formed in two or more parallel, or nearly parallel, planes or steps, R R′, having the space between said steps closed by inclined board *o* to deflect and concentrate the blast upon the fan, substantially as set forth.

2. The shoe J, suspended at its rear end by straps K, and supported at its front or feed end upon roller L, reciprocating upon corrugated cross-bar M, said shoe being guided thereon by yokes J′, as and for the purpose set forth.

3. The shoe U, pivoted and sliding on horizontal rod *b*, and with one end riding upon roller F over corrugated bar *d*, to impart an

oscillation and jar to said shoe during its movements, as set forth.

4. Two or more vertical wind-guides, Q, placed in front of the middle of the fan-wings, substantially as and for the purpose herein set forth.

5. The horizontal adjustable wind-guides *w*, pivoted to the upright adjustable wind-guides Q, substantially as and for the purpose set forth.

6. The fan-doors *r* and pointed blocks *u*, in combination with notched cleats *s*, substantially as and for the purpose set forth.

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TUNIS T. KENDRICK.

Witnesses:
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THEODORE MUNGEN.