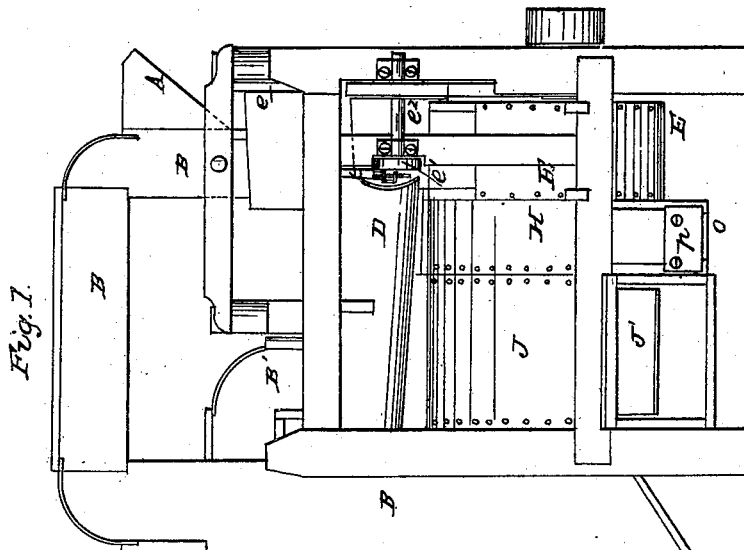
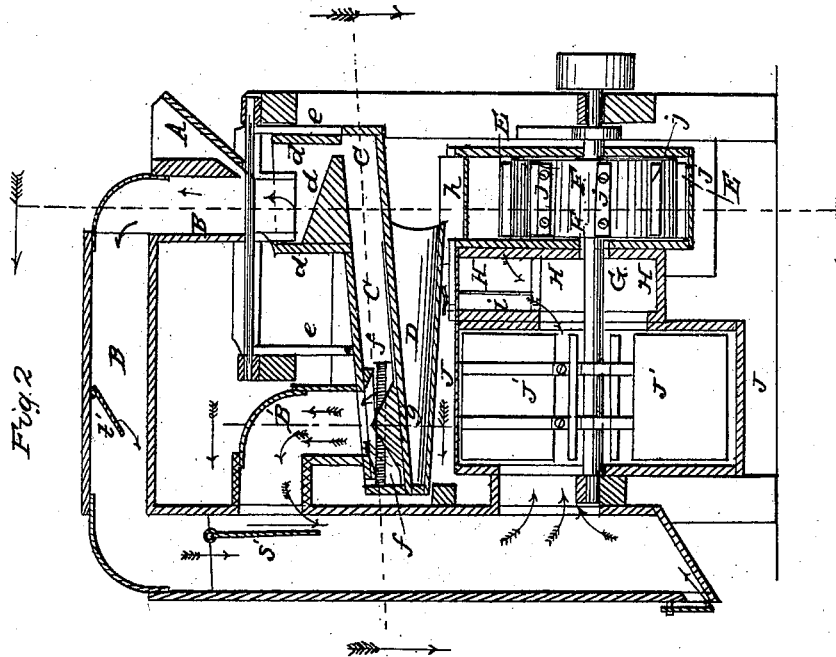


R. REDFIELD.

Grain Cleaner.

No. 52,882.

Patented Feb. 27, 1866.



WITNESSES  
R. Campbell  
C. W. Chapin

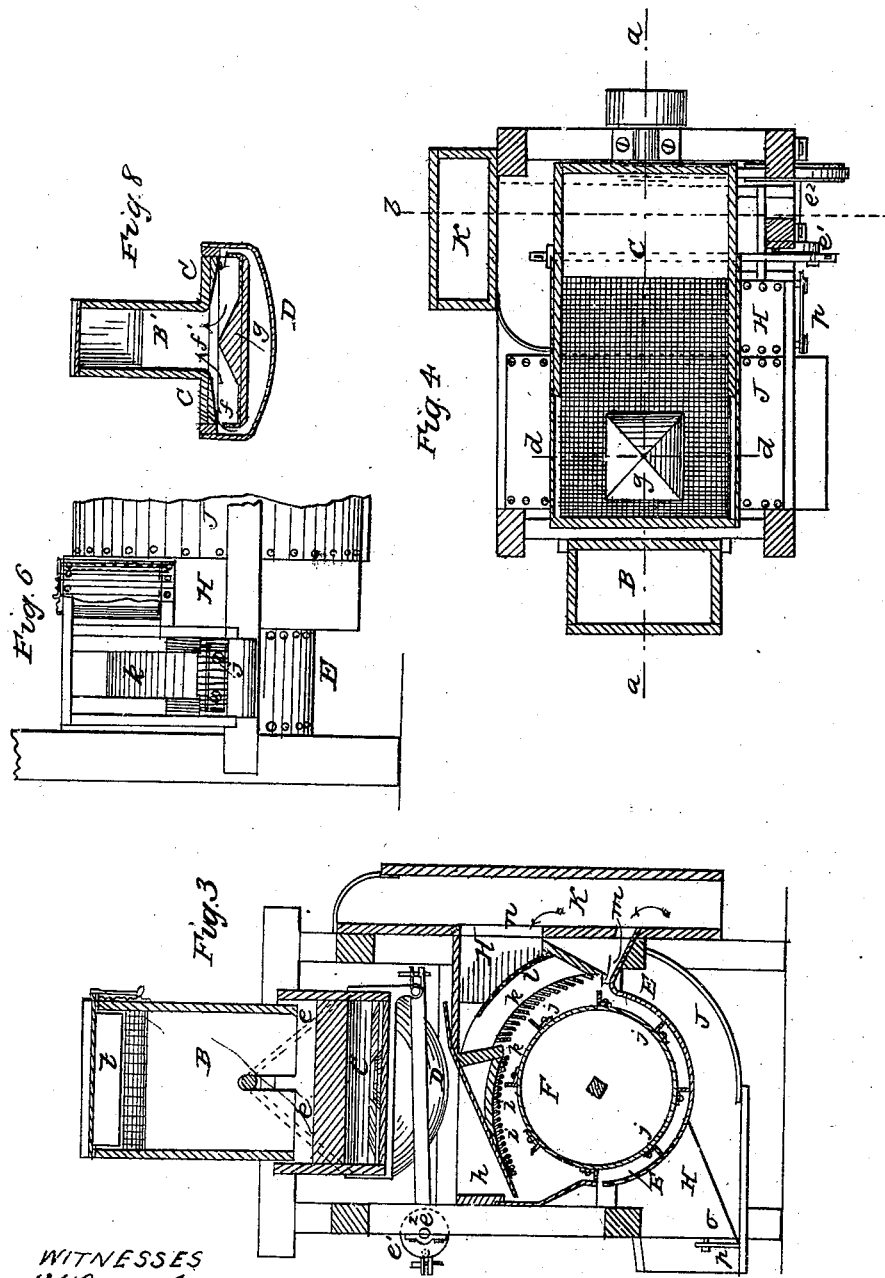
INVENTOR  
Richard Redfield  
by his atty.  
Mason Janick & Lawrence

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WITNESSES  
R. Campbell  
Edw. Schaefer

INVENTOR  
Richard Redfield  
by his atty  
Mason K. Lawrence

# UNITED STATES PATENT OFFICE.

RICHARD REDFIELD, OF SALEM, INDIANA.

## IMPROVEMENT IN CLEANING GRAIN.

Specification forming part of Letters Patent No. 52,882, dated February 27, 1866.

*To all whom it may concern:*

Be it known that I, RICHARD REDFIELD, of Salem, in the county of Washington, State of Indiana, have invented a new and Improved Machine for Cleaning Grain; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is an elevation of one side of the machine. Fig. 2 is a longitudinal section taken in a vertical plane through the center of the machine. Fig. 3, Sheet 2, is a transverse section taken in the vertical plane indicated by dotted line *b b* in Fig. 2. Fig. 4 is a section through the machine, taken in the plane indicated by the dotted line *c c*, Fig. 2. Fig. 5 is a transverse section taken in a vertical plane through the oscillating separator and its suction-spout. Fig. 6 is a sectional view, showing the outside of the slotted cleaner and a portion of the air-chamber, which is between the fan-case and the rubbing or smut case.

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

This invention relates to a new and improved machine which is intended for cleaning grain of chaff, sticks, smut-balls, dust, and all other foreign impurities which are found mixed with it.

The main object of my invention is to effect the separation of sound grain from foreign impurities by subjecting the grain, &c., to the action of an inclined laterally-oscillating trough having a roughened bottom surface, the effect of which is to toss the grain and trash in a direction at right angles to the line of its descent and cause the substances which are lighter than the sound grain to arrange themselves in the center of the said trough and on top of the sound grain, in which condition they are moved downward and brought under the influence of a strong suction of air rising through a pipe which conducts the trash out of the machine, as will be hereinafter described.

Another object of my invention is to effect the separation of the lighter substances which are mixed with grain by means of a laterally-oscillating trough having side discharges for the escape of the good grain and an intermediate escape for the foreign substances, as will be hereinafter described.

Another object of my invention is to provide for tossing the substances which are lighter than good grain and which are mixed with it over an elevated surface that is arranged beneath a suction-spout, for the purpose of more effectually bringing said light substances under the influence of the upward blast of air, so that they will be carried off thereby, as will be hereinafter described.

Another object of my invention is to conduct the grain and the heavy trash which is not separated from it in the first operation from the points of discharge of the first trough backward and downward and discharge them into a centrifugal cleaner or smut-mill which is under the influence of currents of air, when the grain is subjected to a thorough beating and scouring operation, and thus deprived of smut-balls, dust, and other impurities, and finally discharged, as will be hereinafter described.

To enable others skilled in the art to understand my invention, I will describe its construction and operation.

The first part of my invention relates to the separation of foreign substances from grain by agitating the grain, &c., while under the influence of a strong blast of air. The grain mixed with foreign substances is poured into the hopper A at the top of the machine and passes down in a thin stream through the suction-spout B upon an inclined surface, *d*. This inclined surface *d* is surrounded by an open box, *d'*, that is constructed upon the upper end of an inclined trough, C, and it discharges the grain, &c., upon the bottom of this trough in a thin stream. The trough C is suspended by means of arms *e e*, and receives a laterally-oscillating motion from an eccentric, *e'*, on a short shaft, *e''*, to which motion is communicated from the main driving-shaft by means of a belt passing over pulleys. The top and bottom and sides of this trough or trunk C are closed, except at three points, (shown clearly in Fig. 5,) said points being two oblong openings, *f f*, for the discharge of the good grain, and a central opening, *f'*, through the top of the trunk, for the discharge of the trash through a branch, B', of the suction-spout B. The bottom board of this trunk C is covered inside with a wire-cloth, so that it will present a rough surface and prevent the grain and trash

from moving too freely over it from side to side, but cause a partial separation of the sound grain from the lighter substances, at the same time allowing the whole to move downward toward the discharge-openings. The sound grain will be tossed toward the sides of the trunk, and on account of its superior gravity the lighter substances will arrange themselves on top of the grain and in the center of the bottom of the trunk.

Directly beneath the section-spout B' an elevation, *g*, is formed upon the bottom of the trunk C, for the purpose of bringing the foreign substances mixed with the grain and also those which are separated from the grain in close proximity to the mouth of said suction-spout as they are tossed back and forth by the motion of the trunk. By this arrangement the foreign substances will be drawn through the suction-spout B' into the vertical limb of the spout B and discharged at its lower end through the trap-door *g'*. (Shown in Fig. 2.)

The elevation *g* may be made pyramidal, rounded, or in any other suitable form which will cause the trash to be elevated above the bottom of the trunk C and brought under the influence of the upward blast of air. The oblong openings *f f* through the sides of the trunk C are arranged above the bottom of this trunk, so that the sound grain may pile up at these points and slowly escape free from the trash. The roughened bottom of the trunk C need not extend entirely to the upper end of this trunk, as it is desirable to leave a smooth surface beneath the discharge-opening of the hopper-box *a'* for the grain to fall upon. The openings *f f* serve not only to allow the sound grain to escape from the trunk, but they also serve as air-passages. The air rushing through them, as indicated by the arrows in Fig. 5, carries the foreign substances upward through the suction-spout B'. The inclined sides of the elevation *g* here serve to deflect the currents upward into the mouth of the suction-spout.

The spout B' is secured to and oscillates with the inclined trunk C, and its upper end should be so attached to the vertical limb of the spout B that air will not enter at the joint in any considerable quantity.

After the grain leaves the trunk C it falls into a spout, D, at the upper end, and is conducted downward and backward and discharged into a hopper, *h*, which conducts the grain into the cleaning-mill. This mill consists of a cylindrical case, E, having a rotary cylindrical beater, F, arranged within it upon the main driving-shaft G.

The upper surface of the concave has a number of pins or spikes, *i i*, projecting from it, against which the grain and smut-balls are thrown by means of radial wings or flanges *j j* on the periphery of the rotary beater F, as clearly shown in Fig. 3. A portion of this concave is made up of slats *k k*, which incline outward for the purpose of admitting of the discharge between them of dust. Should any

of the good grain escape between these slats *k k*, a wire-cloth screen, *l*, is arranged outside of them to prevent such grain from being drawn off into the fan-case through the suction-chamber H, which is between the fan-case J and the smut-mill, as shown in Fig. 2.

The grain enters the smut-mill case on the opposite side of the rotary beater to that having the slats applied to this case, and as the beater receives a rapid rotation the grain, &c., is thrown forcibly against the heads of the spikes *i i*, after which it is thrown against the slats or lattice-work K, and thus deprived of smut-balls and other substances, which would be broken up and reduced to powder by the scouring and beating operations. During this operation of scouring the grain all the dust is carried off into the fan-case through the air-chest H, which communicates with the fan-case, as shown in Fig. 2. At the lower termination of the slatted portion of the concave of the smut-mill case is a chute, *m*, for conducting the grain into a vertical suction-spout, K, the lower end of which is open to allow the grain to escape from the machine. This spout K has a communication at *n* with the air-chest H, and consequently there will be a strong current of air passing up through the grain as it falls through the lower end of said spout, which will carry up any light substances which may be left mixed with the grain, which substances will be carried into the chest H and discharged from the opening *o* at the opposite side of the machine, as shown in Fig. 3.

The fan-case J, air-chest H, and smut-mill are all arranged side by side beneath the oscillating trunk C, and the fan J' and beater F are secured to and operated by the main driving-shaft G, as shown in Fig. 2.

The vertical limb of the suction-spout B communicates near its lower end with the fan-case, and this spout proceeds upward and over the top of the machine to the hopper-box *d'*, so that the grain, when first introduced into the machine from the hopper A, falls through a portion of this spout and is subjected to the blast of air, which enters it beneath this hopper A.

The lower ends of the trough B and the air-case H are closed at certain times by means of valves *g' p*, which prevent the induction of air when the fan J' is rapidly revolving and admit of the escape of the trash which has been separated from the grain when the fan ceases.

The spout B is provided with two valves, *s' t'*, for regulating the force of the currents of air to the fan-case, and the air-chest H is provided with a valve, *v*, for a similar purpose.

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

1. An inclined laterally-oscillating trunk, C, constructed with a roughened bottom for separating foreign substances from grain, substantially as described.

2. Providing an oscillating separator, C, with an elevation, *g*, and a suction-spout, B', substantially as described.

3. The combination of the side discharge-openings, *f f*, with an intermediate suction-spout, B', substantially as described.

4. The inclined spout D, in combination with an inclined laterally-oscillating trunk or separator, *c*, having side discharge-openings, *f f*, for the sound grain, and a suction-spout, B', substantially as described.

5. The combination of the hopper A, suction-spout B, and a separator, C, with the spout B', substantially as described.

6. Arranging the suction-spout B so as to communicate with the upper and lower ends of the oscillating separator C, substantially as described.

7. Providing the means herein described for conducting the grain from the separator C backward and delivering it into a smut-mill which consists of a flanged cylinder, F, and a spiked concave, *i i*, said mill communicat-

ing, through a chamber, H, with the fan-case, substantially as described.

8. The slatted concave *k k*, in combination with a suction-chamber, H, substantially as described.

9. The combination of the suction-spout K and suction-chamber H with the smut-mill, substantially as described.

10. The arrangement of the wire-cloth screen *l* outside of the slatted concave *k k*, substantially as described.

11. The combination of the fan-case J, air-chamber H, and smut-mill, arranged and communicating with each other substantially as described.

12. The valves *s' t'*, arranged in the suction-spout B and in respect to the branch spout B<sup>2</sup> substantially as described.

RICHARD REDFIELD.

Witnesses:

C. W. MOBLEY,

J. H. REDFIELD.