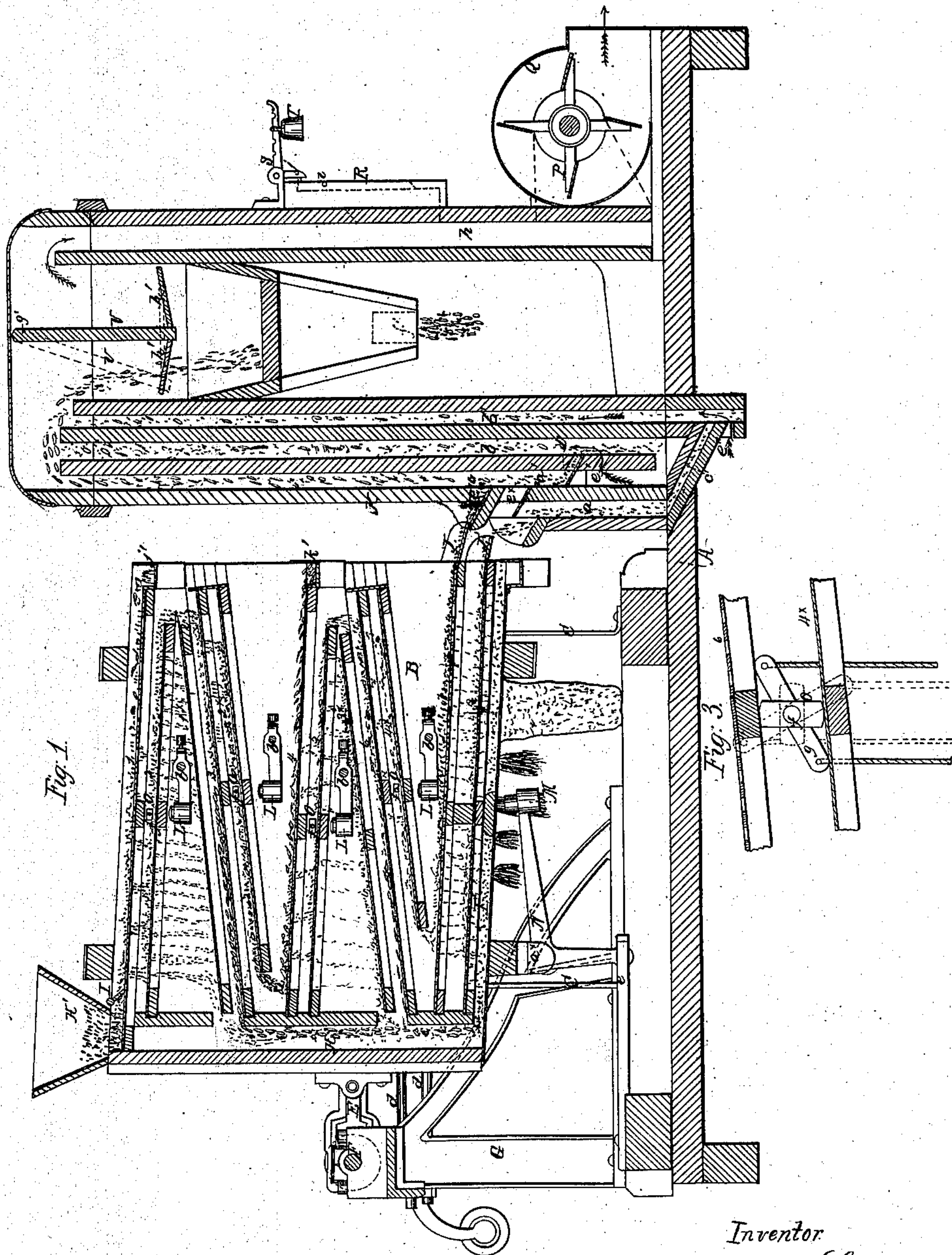


G. Leach
Grain Winnower.

No 35,421.

Patented May 27, 1862.



Witnesses.
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UNITED STATES PATENT OFFICE.

GEORGE LEACH, OF ELMIRA, NEW YORK, ASSIGNOR TO HIMSELF, AND
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IMPROVEMENT IN GRAIN-SEPARATORS.

Specification forming part of Letters Patent No. 35,421, dated May 27, 1862.

To all whom it may concern:

Be it known that I, GEORGE LEACH, of Elmira, in the county of Chemung and State of New York, have invented a new and Improved Grain-Separator; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure is a side sectional view of my invention, taken in the line *x x*, Fig. 2. Fig. 2 is a plan or top view of the same; Fig. 3, an enlarged sectional view of a portion of the same.

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

The object of this invention is to obtain a machine by which grain may not only be separated from all impurities, but different kinds of grain separated from each other.

To this end the invention consists in the employment or use of a series of screens fitted within a case provided with a shake motion and with knocking devices, and using in connection with said parts a series of blast-spouts arranged in a peculiar way and provided with a self-acting valve, an adjustable gate, and refuse-receptacle, arranged as herein after fully shown and described.

To enable those skilled in the art to fully understand and construct my invention, I will proceed to describe it.

A represents a rectangular bed or base on which the working parts of the machine rest, and B is a box or case which is attached to elastic supports C, and has a shake motion given it by means of a crank, D, and connecting-rod E, the crank being on a shaft, F, which is placed on a suitable frame, G.

Within the box or case B there is placed a series of inclined screens, 1, 2, 3, 4, 5, 6, 7, and 8, and a series of chutes, 1^x, 2^x, 3^x, and 4^x, arranged as shown in Fig. 1, the chutes, which are simply inclined plates or boards, all inclining downward toward the front end of the case, and all, with the exception of the lower one, 4^x, lead into a vertical spout, H, while the screens incline downward both toward the back and front end of the case, the screens 1 2 inclining down toward the front end, the screen 3 toward the back, the screens

4 and 5 toward the front, the screen 6 toward the back, and the screens 7 and 8 toward the front. The lower chute, 4^x, discharges on the screen 7.

On the top of the box or case B there is secured a hopper, H', provided at its discharge-orifice with a valve, I, to regulate the discharge of grain upon the uppermost screen, 1. The lower end of the spout H communicates with a passage, I', at the bottom of the box or case B, and underneath the lowest screen, 8, as shown in Fig. 1, and the two lowest screens, 7 and 8, have troughs J J' at their discharge ends, which lead into blast-passages *a a'* in a box, K, and which will be presently explained.

L represents a series of knockers which are attached to shafts *b*, passing transversely through the box or case B, bent downward at their outer ends and connected by joints *c* to fixed rods *d*, which are attached to the frame G. The shake motion of the box or case B operates the knockers L and causes two of them to act against the under sides of the screens 2 and 5, and the other two against the under side of the chutes 2^x and 4^x. A knocker, M, acts against the under side of the bottom of the box or case B, said knocker being at the end of a bent lever, N, which has its fulcrum-pin passing through pendants *a*^x, attached to the box or case, and its lower end fitted in a fixed arm, *e*, attached to the bed A. This knocker therefore, it will be seen, is operated by the shake movement of the box or case B.

O O O O represent a series of bars, which are placed on shafts *f* in the box or case B. These shafts *f* extend through the box or case at one end, and each has a cross-bar, *g*, attached, by which the shafts *f* are turned, to admit of the bars O being in a vertical position and in contact with the two screens, or with a screen and chute, between which they are placed. This will be understood by referring to Fig. 3, in which a bar, O, is shown in tint in a vertical position and in contact with a screen and chute, and shown in a horizontal position, free from the screen and chute, in red outline. These bars O, when in a vertical position, communicate the jar from the screen or chute below them to the one immediately

above, and perform an important function in cleaning the screens. They are only used, however, when the machine is not in working operation and for the purpose above specified. The knockers, however, are always at work.

P is a suction-fan, which is inclosed in a case, Q, at the outer side and lower end of the box K. The case Q communicates at its ends with the lower part of a vertical spout, *h*, in the box K. The spout *h* is provided with a valve, R, which is hung on a pivot, *i*, and is allowed to work freely thereon, and against the upper end of said valve a pin, *j*, attached to a lever, S, bears, said lever having a weight, T, on it, which may be adjusted farther in or out on the lever to regulate the pressure of the pin *j* on the valve, which opens inward. The upper end of the spout *h* communicates with a chamber, U, in the upper part of the box K, and the upper end of the spout *a* also communicates with said chamber, as well as two spouts, *b'* *b''*, which are parallel with *a*. The lower end of the spout *a* communicates by an inclined spout, *c'*, with the lower end of the spout *b''*, and the spouts *a'* and *b'* communicate with each other by a passage, *d'*, and just below said passage there is an opening, *e'*, which communicates with the external air. In the lower part of the spout *b''*, just below the spout *c'*, there is an opening, *e''*, and a similar opening, *e'*, is made in the spout *a'* just below the passage *e'''*, through which the grain enters into it.

The chamber U extends down between the spout *b''* and spout *h*, and has a door, *f'*, at its lower end, and in the upper part of said chamber there is hung, by an axis, *g'*, a gate, V, which serves as a sort of valve and extends down below the upper ends of the spouts. The lower end of the gate has a cord, *h'*, attached to it at each side, and these cords extend through the box K at one side and serve as a means for adjusting it either forward or backward, as may be desired.

The fan P is driven by a belt, *i'*, from the shaft F, and when the machine is in operation a suction-blast is generated in the blast-spouts *a'* *b'* *b''* *h*, as indicated by the arrows in Fig. 1. The grain passes from the hopper H' upon the uppermost screen, 1, which allows the grain, cockle, and fine impurities to pass through, but excludes the large foreign substances, which pass off from the lower or depressed end of said screen into a spout, *j'*, which discharges said impurities at one side of the box or case B. The grain falls on screen 2, which allows the cockle and fine impurities to pass through it, but not the grain. The cockle and fine impurities are conveyed by the chute 1^x into the spout H, while the grain passes over screen 2 and is discharged on the highest end of screen 3, which separates oats and other larger grain from the smaller kind—such as wheat—which passes through screen 3 and falls on chute 2^x, the large grain passing into spout H, while the chute 2^x conveys the smaller grain to the screen 4, through which it also passes, while any oats or larger grain than wheat passes off

the depressed end of the screen 4 into a spout, *k'*, and are discharged from the side of the case or box B. The grain which passes through screen 4 falls upon screen 5 and passes over it and is conducted to screen 6, while the screen 5 admits of fine impurities passing through it and falling upon chute 3^x, which conducts it to spout H. The small grain (wheat) passes through screen 6, while the large grain (oats, &c.) passes over it into spout A. The grain which passes through screen 6 falls on the chute 4^x, which conducts it to the screen 7, over which the large wheat passes into the blast-spout *a'*, while the smaller wheat, which passes through 7, falls upon screen 8, over which it passes into the blast-spout *a*. The knockers insure the free passage of the grain over the screens and chutes, and also insure the efficiency of the screening operation. The bars O, however, during the screening operation, are not, as previously mentioned, turned vertically, so as to transmit the jar of the knockers to all the screens and chutes, as the jar in that case would be too great. The bars O are only made to serve as a connection for this purpose, in order to clean the meshes of the screens after the work of the latter is performed, so that they may be clean for a succeeding operation. The oats and large grain pass off in a spout at the depressed end of the passage I', the bottom of which may be perforated to allow the dust and fine impurities to pass through into a bag or receptacle prepared to receive it. The large wheat, which passes into the blast-spout *a'*, is subjected to a suction-blast therein, which takes up fine impurities, while the grain in passing down by the opening *e'* and *e'* is subjected to a cross-blast which serves to turn any long impurities—such as bits of straw and the like—and cause them to be carried up by the direct blast. This cross-blast is an important feature of the invention, as it effectually prevents the foreign substances specified from passing down with the wheat—a contingency which would be likely to occur if suffered to be retained in an endwise position to the blast. The smaller grain, which passes from screen 8 into the blast-spout *a*, is subjected to a similar action at the opening *e''* at the lower end of the spout *b''*. The large wheat is discharged from a side spout, *b'*, at the lower end of spout *b'*, while the smaller wheat is discharged from the lower end of the spout *b''*.

The strength of the suction-blast is regulated by adjusting the weight T on the lever S, which bears against the valve R, as previously described, and all impurities—such as light shrunken grain, &c.—are deposited in the chamber U, it being designed that they shall drop or fall therein, the suction-blast being regulated to effect that result, while the dust and lightest impurities are drawn into the fan-case Q and expelled therefrom by the action of the fan. The gate V serves to prevent the casual passage of the light shrunken grain over the chamber U, as it gives the blast

a serpentine course directly over said chamber, and by adjusting it backward toward the spout *b''*, as shown by dotted lines, the upward suction at its forward side will be weakened in consequence of the area of the upward passage being increased, and the light impurities—such as dust, chaff, &c.—can only pass into the spout *h*.

This invention has been practically tested and found to operate in the most efficient manner.

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

1. The arrangement of the screens and chutes in the vibrating box or case B, in combination with the spout H, passage I', and knockers L and M, substantially as and for the purpose herein set forth.

2. The adjustable bars O, placed in the vibrating box or case B and arranged with the screens and chutes thereof, substantially as and for the purpose herein set forth.

3. The cross-blasts formed in the spouts *a* *b''* by means of the openings *e*^x *e'* *e''*, as described, for the purpose set forth.

4. The combination of the spouts *a* *a'* *b'* *b''*, and *h* with the chamber U, fan P, adjustable gate V, and self-acting valve R, all arranged as shown, in connection with the box or case B, containing the screens and chutes, as and for the purpose herein specified.

GEORGE LEACH.

Witnesses:

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JAMES LAIRD.