2 Sheets—Sheet 1.

J. L. BOOTH.

Grain-Separators.

No. 196,779. Patented Nov. 6, 1877.

Fig. 1.

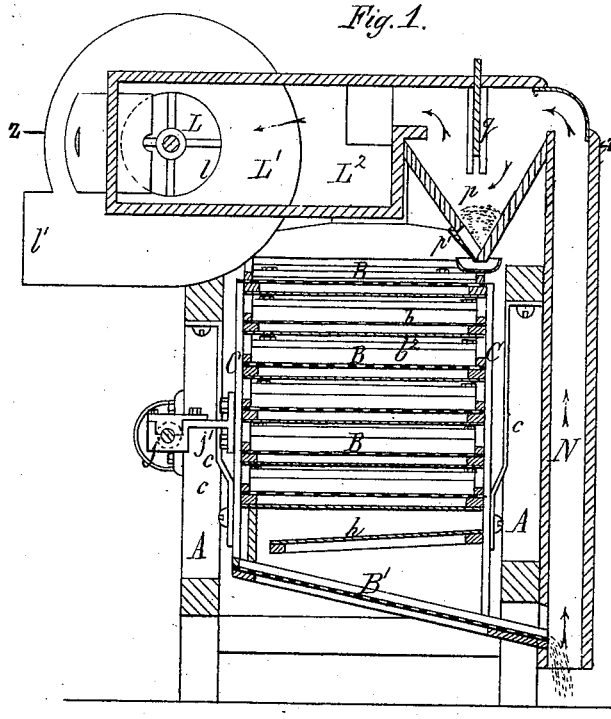


Fig. 2.

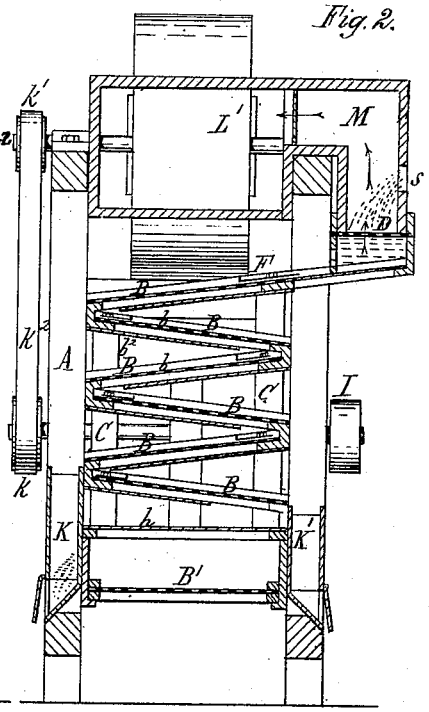


Fig. 3.

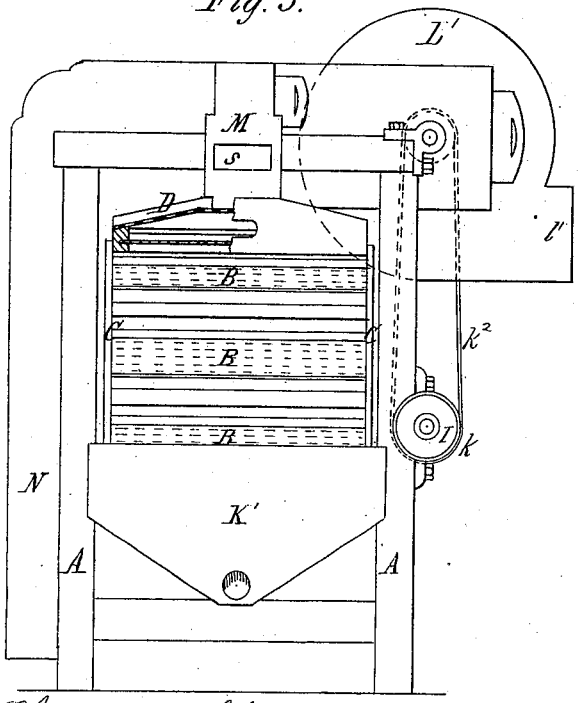
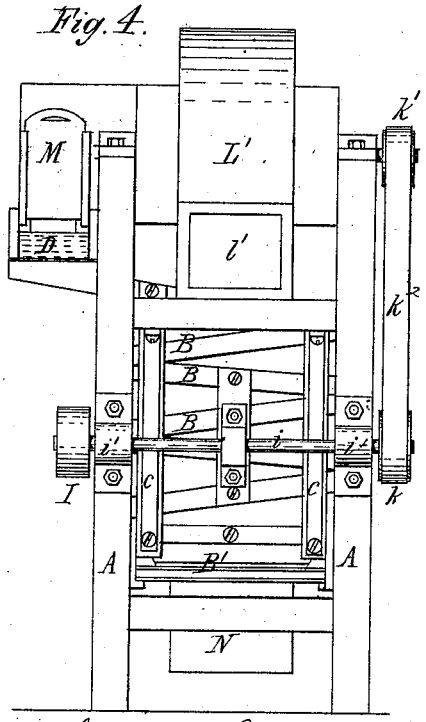


Fig. 4.



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2 Sheets—Sheet 2.

J. L. BOOTH.

Grain-Separators.

No. 196,779. **Patented Nov. 6, 1877.**

Fig. 5.

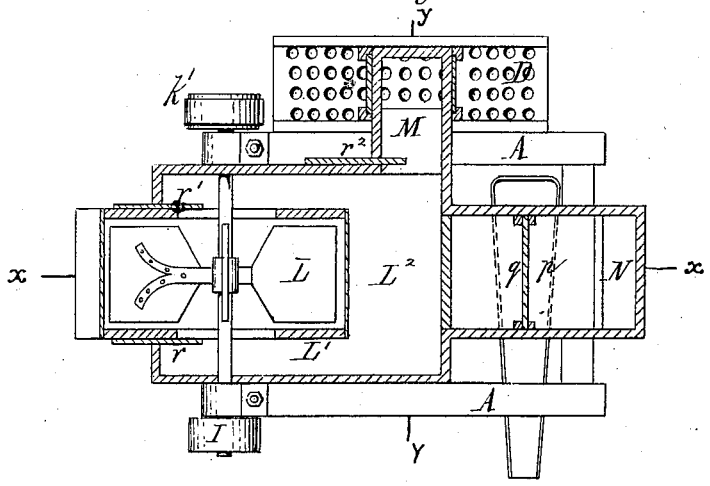


Fig. 6.

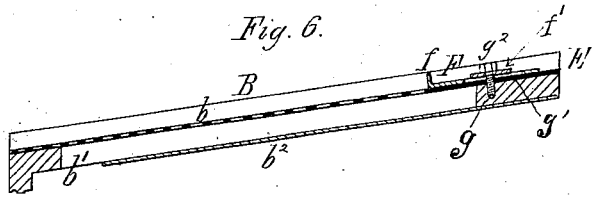
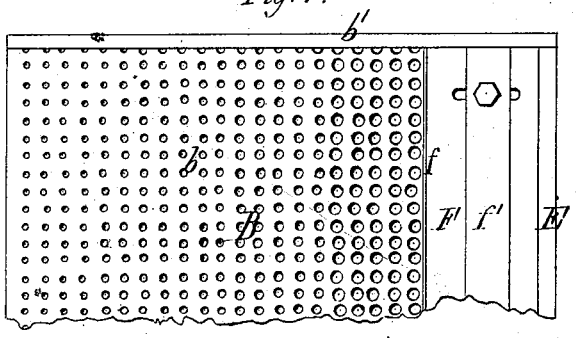


Fig. 7.



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UNITED STATES PATENT OFFICE.

JONATHAN L. BOOTH, OF ROCHESTER, ASSIGNOR TO HOWES, BABCOCK & CO., OF SILVER CREEK, NEW YORK.

IMPROVEMENT IN GRAIN-SEPARATORS.

Specification forming part of Letters Patent No. **196,779**, dated November 6, 1877; application filed August 29, 1877.

To all whom it may concern:

Be it known that I, JONATHAN L. BOOTH, of the city of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Grain-Separators, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

My invention relates to a grain-separator provided with a series of zigzag screens mounted in a vibrating frame, and having a preliminary and subsequent suction-separator so arranged that the grain, after being freed from the greater portion of the chaff, dust, and other light impurities in the preliminary separator, passes consecutively over and through the vibrating zigzag screens, whereby the large impurities, oats, &c., are separated from the grain, which is then discharged into the ascending leg of the subsequent separator, whereby the light grains and the remaining impurities are separated from the sound or plump grains.

My invention consists of the particular construction of the screens and connecting parts, whereby the desired separation is more perfectly accomplished and regulated, as will be hereinafter fully set forth.

In the accompanying drawings, consisting of two sheets, Figure 1 is a sectional elevation of my improved separator in line *x x*, Fig. 5. Fig. 2 is a similar view in line *y y*, Fig. 5. Fig. 3 is a side elevation, and Fig. 4 an end elevation, of the machine. Fig. 5 is a horizontal section in line *z z*, Fig. 1. Fig. 6 is a sectional view, on an enlarged scale, of one of the screens. Fig. 7 is a fragmentary plan view thereof.

Like letters of reference designate like parts in each of the figures.

A represents the stationary frame of the machine, which may be of any suitable construction. B represents the series of inclined sieves or screens, arranged in a zigzag form, as shown in Fig. 2, and secured to a vibrating or shaking frame, C, hung to the main frame A by elastic hangers or straps *c*. Each screen B is composed of a perforated plate, *b*, secured to a suitable frame, b^1, and a tight plate, b^2, secured to the frame b^1 underneath the perforated plate *b*, and extending to within a short distance from the lower end of the perforated plate, as shown in Figs. 2 and 6. The screens B are so arranged with reference to each other that the material which passes through the perforations of each sieve is discharged by the tight plate b^2 upon the upper portion of the next sieve below.

D represents a spreading-sieve arranged above the upper end of the first or uppermost sieve B, and secured to the latter so as to move therewith. The sieve D is made highest at the middle and sloping toward its ends, as shown in Fig. 3, the direction of its inclination being at right angles to that of the screens B. The perforations of the sieve D are made so large that all of the wheat, oats, and other grains pass through the same, while the larger impurities—such as straw, stones, and the like—are prevented from doing so, and pass over the inclined sides of the sieve D, and are discharged over the tail ends thereof.

E represents a tight plate, forming the upper portion of each screen B; and F, an adjustable tight plate arranged upon the plate E, and projecting upon the upper portion of the screen, as clearly shown in Figs. 6 and 7. The plate F is provided at its lower edge with a transverse dam or upwardly-projecting flange, *f*. The plate F is secured in place by bolts *g*, tapping into the upper portion of the frame of the screen, and passing through elongated holes g^1 in the plate F. f' is a narrow strip of metal interposed between the heads g^2 of the bolts *g* and the plate F, so as to hold the latter in close contact with the screen through its entire width. Upon loosening the bolts g^2 the plate F can be readily adjusted so as to cover a greater or less portion of the perforated plate *b*. The perforations of the plates *b* are preferably made largest at the top of the screen, and gradually decrease in size toward the tail end thereof, so that the separating capacity is largest at the top, where the grain is delivered in a dense mass, and gradually decreases toward the tail end of the screen in

the same measure as the amount of grain contained on the screen decreases by the passage of the grain through the perforations of the screen. The dam *f* serves to distribute or spread the grain evenly over the entire width of the screen, whereby all portions of the screen are equally called into action for performing the desired separation. By adjusting the plate F so as to cover a greater or less portion of the perforated plate *b*, the larger openings at the top thereof may be covered or uncovered, and the separating capacity of the screen be lessened or increased, as may be desired, while by the same means the screen may be adapted to separate grains of different sizes.

The tight plate b^2 of the lowest sieve B extends only to the middle of the machine, or thereabout, as clearly shown in Fig. 2, and discharges the grain passing through the lower sieve B on a tight inclined plate, *h*, leading to the upper end of a sieve, B′, the inclination of which is at right angles to that of the sieves B. The perforations of the sieve B′ are made of such size that only cockle and similar small grains will pass through the same, while the wheat will pass over the tail end of this sieve and be discharged into the ascending leg of the subsequent separator. The sieves B are rigidly secured to the shaking frame C, while the cockle-screen B′ is removably connected therewith.

i is the driving-shaft of the machine, supported in bearings *i′*, secured to the uprights of the main frame; and I, the driving-pulley secured to the end of the shaft *i*. *j* is an eccentric mounted on the shaft *i*, and engaging with a connection, *j′*, secured to the frame C, so that the rotation of the shaft *i* will cause the frame C to vibrate or shake at right angles to the direction in which the grain moves over the sieves B. By this peculiar shake-motion of the sieves the grain to be separated is slowly and uniformly passed over the sieves, and a most complete and thorough separation is accomplished.

K K′ are two boxes or receptacles secured to the main frame A at opposite sides of the sieves B, so as to receive the oats and other tailings passing over the same.

L is the suction-fan, arranged in the upper part of the machine, and driven from the shaft *i* by two pulleys, *k* k^1, and a belt, k^2. L^1 is the fan-case, having two eyes, *l*, and a discharge-spout, *l′*. L^2 is an air chamber or passage communicating with both eyes *l* of the fan-case, and arranged between the upper portion of the main frame A, as clearly shown in Fig. 5. M is the wind-trunk of the preliminary separator, having its ascending leg arranged centrally over the spreading-sieve D, and connecting with the air-chamber L^2 and the eyes of the fan-case. N represents the wind-trunk of the subsequent separator, having the foot of its ascending leg arranged near the tail end of the cockle-screen B′, so as to receive the material discharged over the tail end thereof. The wind-trunk N is provided at the top of its ascending leg with a short descending leg, opening into a chess-hopper or separating-chamber, *p*, which latter is provided with a discharge-valve, *p′*, and communicates with the air-passage L^2, leading to the eyes of the fan-case. The vertical partition *q* of the chess-hopper *p* is made vertically adjustable, and the force of the air-currents in the wind-trunks is regulated by slides *r r′* at the eyes of the fan-case.

Power being applied to the driving-shaft *i*, the sieves B are vibrated or shaken in a direction at right angles to that in which the grain passes over the same, and air-currents are created in the wind-trunks M and N, traveling toward the eyes of the fan in the direction of the arrows in Figs. 1 and 2. The grain to be separated is spouted into the opening *s* of the ascending leg of the preliminary separator, where it meets an ascending air-current, which separates the chaff and dust from the sound or plump grains. The former are carried by the air-current through the wind-trunk M to the fan, and expelled through the discharge-spout *l′*. The grain, after descending through the ascending air-current, drops upon the screen D, where the wheat, oats, and other grains pass through the perforations thereof onto the first sieve B, while the larger impurities are discharged over the tail ends of the screen D. The latter serves at the same time to spread the grain over the entire width of the first sieve B. The ascending air-current, before it enters the wind-trunk M, passes partially through the screen D, and assists in separating the impurities from the grain spouted upon the screen. In passing over the shaking sieves B, the wheat passes through the perforations of the sieves, and the oats over the tail ends thereof into the boxes K K′. The material passing through the perforations of the first sieve B is subjected to a separation by the second sieve, and so on through the entire series of sieves B, until the wheat and smaller grains are finally delivered onto the cockle-screen B′, whereby the cockle and small grains are separated from the sound wheat, the latter passing over the tail end of the screen B′ into the ascending leg of the subsequent separator N. The wheat meets here the ascending air-current, which separates and removes from the wheat all remaining dust, chaff, chess, and light grains, the chess and light grains being deposited in the hopper *p*, whence they are discharged by the valve *p′*, while the dust and chaff are carried to the fan and expelled through the discharge-spout *l′*. The oats, owing to the previous separation by the screen D of the stones, straws, and other large impurities from the grain, are deposited in the receptacles K K′ comparatively free from impurities.

Having thus fully described my invention,

what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a shaking screen, B, of an adjustable tight plate, F, provided with a spreading-dam, *f*, substantially as and for the purpose hereinbefore set forth.

2. The combination, with the shaking screen B, provided with tight plate F, having a spreading-dam, *f*, of the preliminary screen D, inclined at right angles to the inclination of the screen B, and arranged so as to discharge the grain upon the screen B above the plate F, for spreading the grain over the entire width of the screen B, substantially as set forth.

3. The combination, with a shaking screen, B, of the adjustable tight plate F, bolts *g*, having heads g^2, and cross-bar f', substantially as and for the purpose hereinbefore set forth.

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Witnesses:

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FRANK W. HAWLEY.