J. S. LANDIS

Combined Thrasher and Grain Separator.

No. 109,428. Patented Nov. 22, 1870.

Fig. 1

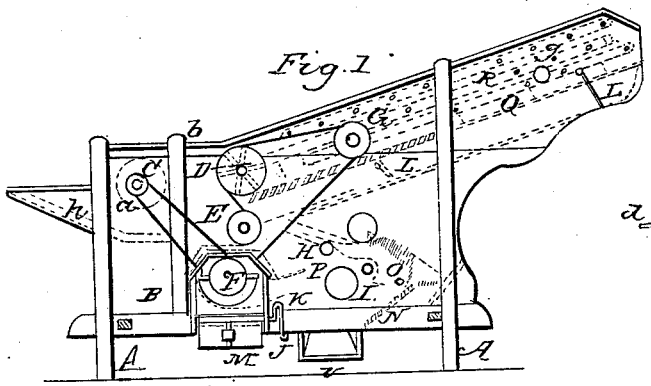


Fig. 2

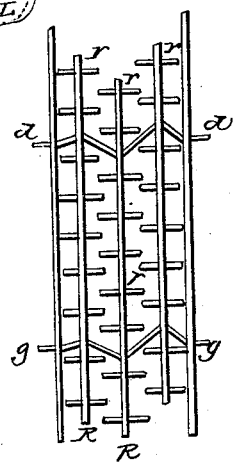


Fig. 4

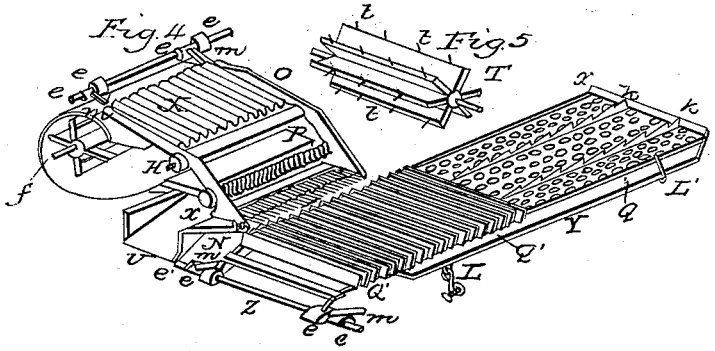


Fig. 5

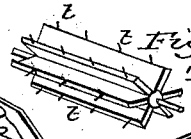


Fig. 9.

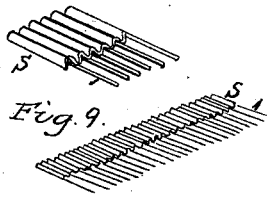


Fig. 10

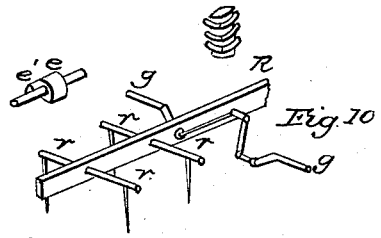


Fig. 8

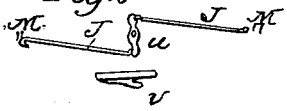
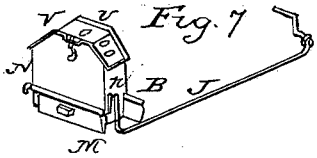


Fig. 6

Fig. 7



WITNESSES

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JACOB S. LANDIS, OF LANCASTER, PENNSYLVANIA.

IMPROVEMENT IN COMBINED THRASHERS AND GRAIN-SEPARATORS.

Specification forming part of Letters Patent No. **109,428**, dated November 22, 1870.

To all whom it may concern:

Be it known that I, JACOB S. LANDIS, of the firm of Landis & Co., machinists, in the city of Lancaster and State of Pennsylvania, have invented certain improvements in machines for separating the grain from the straw, combined with a thrasher, of which the following is a specification.

The improvements consist, in brief, of a valved chamber over the fan-openings operating in unison by connecting-rods; the addition of a fluted apron and fluted comb in the shoe; the introduction of a shaft, one half of its circumference with a screw-thread or flange running to the right, the other half to the left; a double cam on a shaft that actuates both the compound bottom and the shoe in its revolution; cross-arms with teeth in the plain bars operated by a triple crank, the arrangement of the shoe, and minor changes and improvements calculated to facilitate its operation.

The accompanying drawings illustrate the combination and construction of the several parts, in which—

Figure 1 is a side elevation, with dotted lines to indicate the interior arrangement; Fig. 2, the combined arms and cross-rakes on the triple cranks; Fig. 3, the composite bottom of slats, perforations, and toothed sections; Fig. 4, the shoe with its appliances and relative parts; Fig. 5, the reel-like beater detached; Fig. 6, the double or right-and-left screw-shaft or zigzag feeder; Fig. 7, the side fan-chamber and mode of operating the valves; Fig. 8, a modified manner for connecting the action of the valves; Fig. 9, the fluted comb, secured by caveat August, 1869; Fig. 10, the cross arms or rakes on the shaft, more fully illustrated.

Fig. 1 shows the general construction and arrangement of the several parts of the entire machine without the elevator and rear straw-carrier usually applied. The uprights A A and *b*, bottom side beams, B, and short cross-piece *a* show the outside frame-work. The pulley C is on the shaft of an ordinary spiked cylinder. The belt passes through the metallic cap V to the pulley on the fan-shaft F. The pulley D drives the reel-like beater, Fig. 5, the outer edge of the wings being provided with pins *t*, and is placed above and in front of the rake, so as to allow the straw to pass under it, while it arrests all the flying grains and delivers them to the point of discharge, and aids the first moving of the straw to the action of the rakes.

E shows the pulley on the double cam-shaft with its cams *e' e*. The prolonged end *m* of the shoe is actuated by the short cam *e'*, which gives it a quick jerk on each revolution, while the end of the combined shaking bottom Q' Q Y butts up against the elliptic cam *e* and receives a regular up-and-down motion, swinging on the link-connections L L', which supports the same. The pulley G operates the lower triple crank, *g*, to which the plain parallel bars R are connected, and with a similar crank, *g*, near their upper ends, Fig. 2, a portion of which is shown in perspective, Fig. 10, to show the insertion of the cross bars or rakes *r* in or through the bars R, operating over the composite bottom formed of a slatted lower portion, Q', and perforated upper portion, Q, with its toothed partition-flanges K, with lower bottom, Y. (Shown by Fig. 3.)

H shows the position of a plain feed-roller under the shoe O, and operating in connection with it.

I is the right-and-left screw-shaft, so hard to illustrate. The mold from which it is cast is made by first accurately turning a right-and-left screw complete of uniform thread, then dividing it and uniting the halves for a pattern. Fig. 6 is an attempt to show the spiral flange. This double screw or right and left flanged shaft I in advance of the fixed shelf P and in the rear of and above the corrugated comb *s* (which latter terminates the shoe O) is not connected with the shoe—*i. e.*, the smooth roller H, fixed shelf P, and screw-shaft I—but under it, and operates in conjunction with it and its corrugated apron X and comb *s*. Said shaft I is calculated to impart a zigzag motion to the straw and impurities, thereby the more effectually to feed them forward, which a plain or fluted roller fails to do with any degree of satisfaction.

In order to prevent side draft in windy weather and the lodgment of floating particles of straw from getting entangled or lodged in the fan-bearings, I form a side chamber over the fan-openings on each side.

Fig. 7 shows a cast plate, V, with a flange, *v*, by which it is attached to the machine. This plate is perforated for the belts to the double pulley on the fan-shaft from the pul-

leys C, E, and G, Fig. 1, The projecting sides *n* are closed, and the front is closed by a door, N, set on the side bearings of the swinging valve M, and fastened to the plate V by a button, so that it is readily set on or taken off. The swinging valve M is provided with a weight, W, made adjustable in a groove, to regulate the same for light or heavy grain, requiring a weaker or stronger blast. Fig. 7 shows the valves to swing freely on a cross-shaft, which is formed into a crank on each side of the machine. These cranks stand in a reverse position one to the other, and are connected by a rod, J, under the machine, so that the motion of each is in unison as to the degree of being drawn in by the force of the suction or speed of the machine. A more simple mode for operating the valve is shown by Fig. 8. The vibrating beam *u* is secured horizontally beneath the machine by a pivot-bolt through a supporting-bracket, *v*, on which it moves. The rod J, attached at one end to the valves M, and the other respectively to the outer end of the vibrating beam *u*, so as to actuate each other in unison, may be employed instead of the cranks and connection.

The sides of the shoe O, Fig. 4, have several adjusting-notches in the foot, by which they rest on a cross-rod, so that the shoe can be brought in closer proximity with the shelf and rollers beneath it, or farther removed, as the nature of the materials may require. The upper portion of the shoe is provided with a fluted metallic bottom or apron, X, slightly inclined, which receives the grain and chaff as it comes from the shaker or direct from the cylinder or concaves through the upper comb. These smooth grooves receive the heavier grains, while the ridges elevate the lighter materials, and thus present them to the direct action of the blast from the fan, greatly facilitating the separation of the grain from all foreign matter in the first stage, which is further promoted by the passage over the roller H, shelf P, zigzag screw-shaft I to the grooved heel-plate of the comb, Fig. 9. This plate S is waved, so that the projecting teeth are placed under the convex side of each corrugation, and the grain sliding in the concave portion by its gravity and more compact form drops from the lip, which is consequently below the projecting comb-like teeth, so as to drop down without receiving any blast. The lighter or coarser matter on top, and sustained on the ridges and teeth, is carried over into the filth-box or blown out. The ordinary receptacle is not shown which receives the tailings, and provided with conveyers to carry them forward again to the action of the thrasher. This combination of the shoe with the terminal corrugations and comb, for which latter a caveat was filed by me in the office, bearing date the day of August, 1869, produces the most happy results for thoroughly separating and cleaning grain.

I am aware that the crank, bars, slatted, perforated, and toothed bottoms are not new, as also the use of roller, shelves, combs, and the shoe, separately considered, as well as the cylinder, fan, and beater, none of which I claim as my invention, independently considered. I am not aware, however, of the use of side chambers and swinging valves constructed and operated substantially as described, nor of a shaking bottom combining the slats, perforations, and teeth-bars in the same arrangement with the short cross-bars or rakes, the double cam actuating both the bottom and the shoe, the fluted shelf or apron in the shoe, and the corrugations of the terminal comb; nor am I aware that a screw-shaft with flanges on half of its length running to the right and the other half to the left was ever used.

I claim—

1. The arrangement of the fan-chamber, with its perforated cap V, door N, and swinging or hinged valve M, operating in unison on both sides of the machine by means of connecting-rods J, substantially in the manner and for the purpose specified.

2. The twofold cams *e' e*, when arranged and operated in reference to the shaking bottom and shoe, so as to actuate both by the single shaft of said cams, in the manner set forth and shown.

3. The arrangement of the shoe O, with its fluted metallic shelf or apron X, and terminal corrugated heel S of the comb *s*, the whole being also adjustable in the manner and for the purpose described.

4. In the thrashing-machine substantially as herein described, the combination of the shoe O with the right-and-left screw or flanged shaft I, as and for the purpose herein set forth.

5. A composite shaking bottom, Q' Q Y, in combination with the cam *e*, when said cam is on the same shaft of cam *e'*, which jointly operate both the shoe and bottom in the manner set forth.

6, The combination of the corrugated metallic plate S with its projecting wire teeth *s*, forming a comb, in the manner and for the purpose specified.

JACOB S. LANDIS.

Witnesses:
W. B. WILEY,
JACOB STAUFFER.