W. H. & J. BUTTERWORTH.

Grain Thrasher and Cleaner.

No. 111,431. Patented Jan. 31, 1871.

Fig. 1.

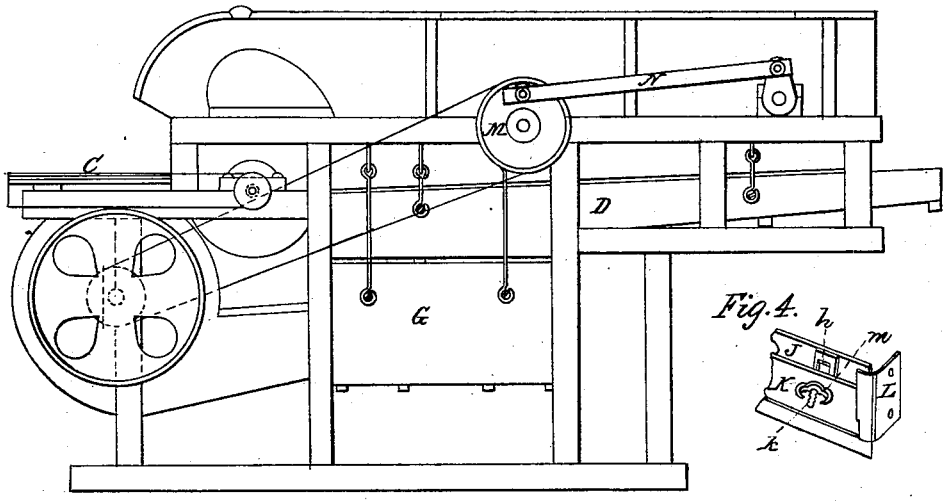


Fig. 4.

Fig. 2.

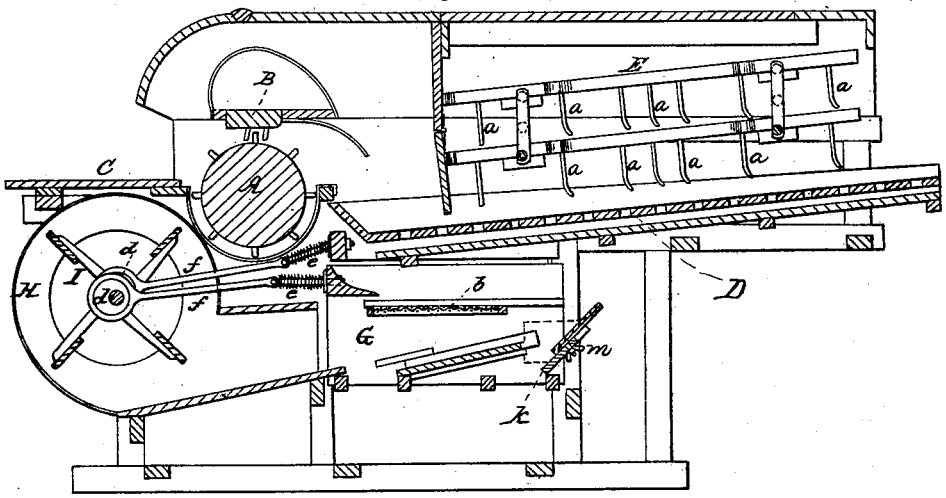
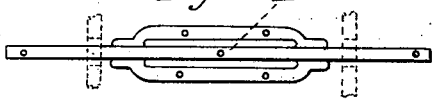


Fig. 3. E



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UNITED STATES PATENT OFFICE.

WILLIAM H. BUTTERWORTH AND JOHN BUTTERWORTH, JR., OF TRENTON, NEW JERSEY; SAID JOHN BUTTERWORTH, JR., ASSIGNOR TO SAID WILLIAM H. BUTTERWORTH.

IMPROVEMENT IN GRAIN THRASHERS AND CLEANERS.

Specification forming part of Letters Patent No. **111,431**, dated January 31, 1871.

To all whom it may concern:

Be it known that we, WILLIAM H. BUTTERWORTH and JOHN BUTTERWORTH, Jr., of Trenton, and in the State of New Jersey, have invented certain new and useful Improvements in Grain Thrashers and Cleaners; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The object of our invention is to render the thrasher and cleaner more efficient and durable than heretofore, and also to greatly diminish the waste of grain with the straw. This is accomplished by the peculiar construction of a series of rake-heads, which are provided with teeth on their under sides and hung upon cranks, which give them a forward-and-backward and up-and-down motion to act upon the straw after being thrashed.

The improvement consists in so constructing each rake-head that their sides are laterally expanded between the journals of the cranks upon which they are hung, whereby the rakes give the straw a more uniform agitation on all parts of the shaker than the old-style rake-heads, commonly known as the "straight-bar" rakes, and also at the same time embracing the great advantage claimed by the straight-bar rake—that is, the small amount of friction created in the journals on account of the bearings being narrow, as it is obvious that our mode of constructing the rake-head embraces this advantage, as well as the other great advantage, as hereinabove stated—namely, the thorough agitation of the straw on all parts of the shaker, and consequently a perfect separation of the grain from the same.

The improvement also consists in the peculiar arrangement of a spring, in combination with the jointed connecting-rods which give motion to the shakers, the ends of the said rods being pivoted to eccentrics on the fan-shaft. The springs are for the purpose of preventing the sudden jar in the joints of the rods caused by the reciprocating motion of the said rods.

The tail-board of the machine is provided with metallic shields at its ends to prevent the grain from wasting out at said ends. Its manner of adjustment is also novel and adds greatly to the saving of the grain.

In order to enable others skilled in the art to which our invention appertains to make and use the same, we will now proceed to describe its construction and operation, referring to the annexed drawings, in which—

Figure 1 is a side elevation, and Fig. 2 is a longitudinal vertical section, of our machine. Fig. 3 is a plan view of one of the rake-heads. Fig. 4 shows a section of the tail-board.

The machine represented in the drawings is what is termed an "overshot thrasher and cleaner;" but the improvements we wish to secure are applicable to both overshot and undershot thrashing-machines.

In constructing our machine we use the ordinary spiked cylinder, A, and concave B, and a feed-table, C, arranged in front for the reception of the straw preparatory to being thrashed.

Just at the back or rear of the cylinder A is arranged a shaker, D, into which fall the grain and straw as they leave the cylinder and concave after being thrashed. This shaker D has two bottoms, one perforated and the other tight.

The straw is raked over the perforated bottom by a series of rake-heads, E, provided with teeth *a* on their under sides, and are hung upon cranks, which give them a forward-and-backward and up-and-down motion. These rake-heads are constructed as shown in Fig. 3, being expanded between the two cranks, or, in other words, each rake-head is composed of a straight bar, through which the cranks pass. Then on each side of said bar, between the cranks, is another bar attached, all three of said bars being provided with teeth on their under sides, so that a uniform agitation is given to all parts of the straw over the entire shaker.

On account of the straw being raked over and agitated on the perforated bottom, the grain and chaff are caused to fall through the perforations and onto the tight bottom. This bottom is placed onto an incline, so that the grain and chaff will slide back to the front end of the shaker—that is, the end nearest to the cylinder. As the chaff and grain slide

down the inclined bottom they pass over the end of the same and fall onto the sieves *b*, which are arranged in another shaker, G, hung directly under the shaker D. Both of the shakers G and D are suspended on hangers attached to the top rail of the machine, which allow the said shakers to have a vibratory motion.

H is the fan-box, inside of which is placed the fan I, the shaft of which revolves in journal boxes or bearings on the sides of the frame of the machine. On the fan-shaft, inside the fan-box, are secured two eccentrics, *d*, one eccentric to the other and both eccentric to the fan-shaft. Each eccentric operates a connecting-rod, *f*, in opposite directions, each of which is jointed to the stud or eye *i*. One of these is securely fastened to the shaker G and the other to the shaker D.

It is obvious that the connecting-rods *f* and eccentrics *d* on the fan-shaft give the shakers G and D a longitudinal vibratory motion in opposite directions when the fan-shaft is revolved, which prevents all clogging of the grain and chaff on the incline and perforated bottoms as well as on the sieves in the shaker D.

Each of the studs *i*, which are securely fastened to the shakers, and to which the connecting-rods are jointed, is provided with a spring, *e*, arranged to continually press on the end of the connecting-rod, which extends a short distance beyond the joint or hinge, so that all lost motion caused by wear in the joints is suppressed. This improvement not only adds to the durability of the machine, but also to the efficiency in the working of the same, and the jointed connecting-rod, which has heretofore been rendered very objectionable on account of its sudden jerking caused by wear in the hinge or joint, is now made practically useful.

The shaker G, in which are placed the sieves *b* for the purpose of cleaning the grain, has a blast passing through it, caused by the revolution of the fan I, for carrying off the chaff or light matter, while the grain falls through the sieves into proper receptacles arranged for the same. The shaker G has the usual adjustable tail-board, J, for preventing the grain from being blown out with the chaff.

The improvement consists in the peculiar arrangement of a slotted iron, *h*, attached to the tail-board, under which slides the head of the bolt *k*, the end of which passes through the stationary tail-board K and receives a thumb-nut, *m*. To adjust the tail-board we loosen the thumb-nuts *m m*, which allow the adjustable tail-board J, with the slotted irons, to slide up or down over the bolt-heads, and, when the board is adjusted as desired, screw up the thumb-nuts, as before. At the ends of the tail-boards are placed metallic or other suitable shields, L, to prevent the grain from wasting out at said ends.

The operation of the machine is as follows: The main belt passes around a pulley attached to the cylinder-shaft and revolves the said cylinder. The bottom of this cylinder passes over a large pulley attached to the fan-shaft and revolves the fan in an opposite direction from the cylinder. The fan-pulley has another small pulley fastened to its side next to the machine, and another belt passes around this pulley, and also around the pulley or balance wheel M, attached to one of the rake-cranks, whereby the rake receives motion from the fan-pulley. The connecting-rod N, which extends from one crank-shaft to the other, is for the purpose of passing both crank-shafts over their dead-centers at the same time, which gives them a uniform motion. As the main belt gives rotary motion to the cylinder and fan, the eccentrics *d*, which are attached to the fan-shaft inside the fan-box, (and which have the jointed connecting-rods *f* pivoted to them,) are caused to revolve, and consequently the connecting-rods receive a forward-and-backward movement, and on account of being connected to the shakers, which are hung upon pendulous arms or hangers, give the said shakers a similar movement. The straw is fed to the cylinder from the table C, and passes between the concave B and cylinder A, and then falls on the shaker D, back of the cylinder, and is raked over and off from the same by means of the rakes.

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

1. In combination with the shaker of a thrashing-machine, the rake-heads E, when constructed as described, and for the purposes set forth.

2. In combination with fan-shaft *x*, shaker D, and shoe G, the eccentrics *d*, jointed rods *f*, and springs *e*, arranged as described, and for the purposes set forth.

3. In combination with the stationary tail-board K, the movable tail-board J, slotted irons *h*, bolts *k*, and thumb-nuts *m*, all constructed and arranged substantially as and for the purposes herein set forth.

4. In combination with the tail-boards K and J, the shields L, arranged as described, and for the purposes set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 16th day of December, 1870.

WILLIAM H. BUTTERWORTH.
JOHN BUTTERWORTH, JR.

Witnesses:
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