C. P. BALLARD, L. H. PURSELL & J. D. LITTLE.

GRAIN SEPARATOR.

No. 189,545. Patented April 17, 1877.

Fig. 1.

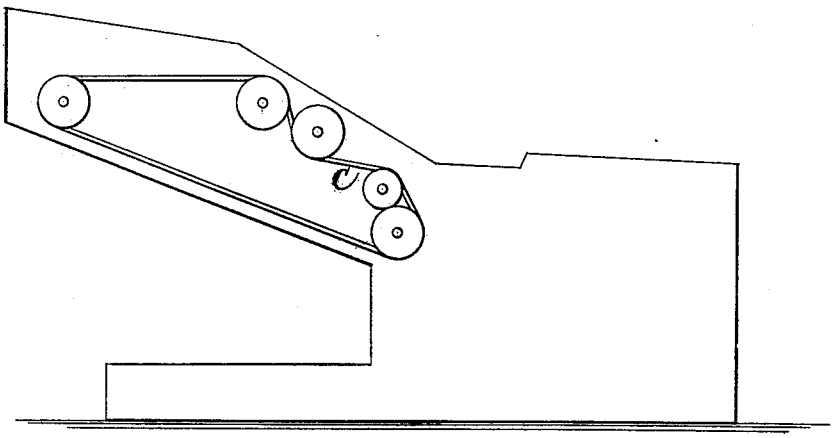
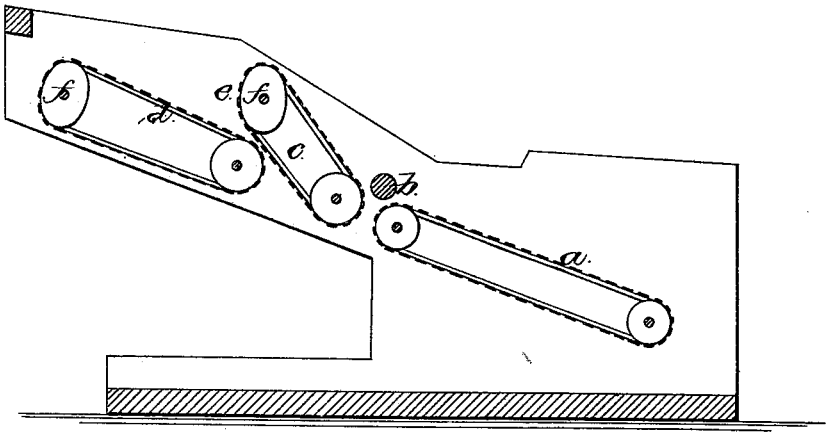


Fig. 2.



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UNITED STATES PATENT OFFICE.

CHARLES P. BALLARD, LEFFARD H. PURSELL, AND JOSEPH D. LITTLE, OF SPRINGFIELD, OHIO.

IMPROVEMENT IN GRAIN-SEPARATORS.

Specification forming part of Letters Patent No. **189,515**, dated April 17, 1877; application filed March 28, 1877.

To all whom it may concern:

Be it known that we, CHARLES P. BALLARD, LEFFARD H. PURSELL, and JOSEPH D. LITTLE, of Springfield, county of Clarke, and State of Ohio, have invented a new and useful Improvement in Straw-Carriers to be used in connection with grain-thrashing machines, which improvement is fully set forth in the following description, reference being had to the accompanying drawing, making part of the same, in which—

Figure 1 is a side elevation of a thrasher embodying our improvements, showing the preferred manner of arranging the driving-belt; and Fig. 2, a longitudinal vertical section of the same, showing our improved straw-carrier.

Our improvements relate to that class of straw-carriers in which the grain and straw coming from the cylinder is received upon an endless apron or other conveying mechanism, and conveyed through the machine, the grain being eliminated from the straw during its transit, and discharged through suitable openings upon the winnowing-sieves, or upon chutes or other suitable conveyers, which conduct it to the same; and our invention has for its special object the construction of an endless-belt carrier, or a series of such carriers, in such a manner that the mingled straw and grain, in passing from the upper or rear end of one carrier to the surface of the next, shall receive a forcible agitation and toss, the more effectually to loosen and change the mass, more or less completely turning it over in its fall from one belt to the next in the series, thereby shaking out all grain still mingled with the straw; and to this end our improvements consist, first, in the combination, with an endless carrier arranged to convey the straw upwardly in an inclined plane, of a roller or pulleys elliptical in section, over which the upper end of said carrier passes, so that said carrier, in rapid travel, shall receive a rapid up-and-down motion at its upper end, by reason of the unequal diameters of said roller or pulleys, thereby tossing the straw more and more as it approaches the upper end of the carrier, and, when it has reached that point, throwing it over upon the next carrier or discharging it from the machine; secondly, in the combination, with a series of two or more carrier belts or sections, inclined or otherwise, of an intermediate endless carrier journaled at its upper or rear end on an elliptical roller or pulleys, said intermediate carrier being more steeply inclined than the other carrier sections, and having its upper roller or pulleys journaled in a plane above the surface of the next succeeding carrier-section for the purpose of securing to the straw, in connection with the toss imparted by said elliptical roller or pulleys, a fall of some distance, to more thoroughly loosen and separate the grain; thirdly, in the combination of a series of two or more endless carriers, each journaled at its upper end on an elliptical roller or pulleys, to cause the straw to traverse an undulating course over the entire carrier for the better separation of the grain; fourthly, in the combination, with the primary carrier apron or section and the second carrier-apron, arranged to have a steeper inclination than the primary section, and carried at its upper end on an elliptical roller or pulleys, of an intermediate rotary beater, arranged above the opening between the two carrier-sections, for the purpose of tossing the straw over said interval onto the vibrating endless carrier-apron, to further the perfect separation of the grain from the straw.

Referring to Fig. 2 of the drawing, *a c d* designate a series of endless straw-carriers, preferably open or perforate, constructed of leathern or other belts and slats, in the usual manner, *a* being the carrier receiving the mingled grain and straw from the thrashing-cylinder; *c*, a second endless apron, more steeply inclined than apron *a*, an interval being left between for the escape of grain, the straw being tossed or lifted over said interval by the revolving beater *b*, of any usual or approved form. The upper end of the endless carrier *c* is journaled upon a roller or pulleys, *f*, elliptical in outline, and of a sufficient diameter, and of the requisite proportions, to give a considerable rise and fall to the upper end of the carrier, which, while continually conducting the straw forward, has also the action of a vibrating riddle, or of agitating-fingers,

causing the straw to jump along, and finally to be thrown with a forcible impulse upon the next carrier-section *d*, the lower or receiving end of which is journaled nearly beneath the upper end of carrier-section *c*, and at such distance as to allow a considerable fall of the straw. The upper surface of belt *d* likewise is caused to vibrate rapidly by means of an elliptical roller, *f*, over which the upper end of the belt passes, and the straw, turning almost or quite a somersault in its fall from belt *c*, is caused to jump in its travel along belt *d* until reaching its upper end, where it is forcibly thrown off.

Our intention is not to impart a jarring or merely tremulous motion to the straw, but to give it such a thorough bodily agitation as to scatter and loosen every part, and cause it to shift over and over without for a moment retarding its forward progress, or thereby checking the feed at the thrashing-cylinder. The number of steeply-inclined aprons *c*, with elliptical rollers, may be increased according to necessity. Other known types of carrier might be substituted for belts *a* and *d* without altering the essential character of the combination or departing from the spirit of our invention.

We do not confine ourselves exclusively to the use of open belts, or of close belts, or to any mixed use of the two, the essential character of the invention remaining the same in both cases.

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

1. In a grain-separator, an inclined endless carrier-apron, carried at its discharging end upon an elliptical roller or elliptical pulleys, substantially as and for the purpose set forth.

2. The combination, with two or more straw carriers or sections, of an intermediate endless carrier-apron, carried at its upper or discharging end upon an elliptical roller or pulleys, and having a steeper inclination than the other carrier-sections, substantially as and for the purpose set forth.

3. The combination, in a series, of two or more endless carrier-aprons, each of said aprons being carried at its upper or discharging end upon an elliptical roller or pulleys, substantially as and for the purpose set forth.

4. The combination, with the primary carrier apron or section, of an endless carrier-apron arranged at a steeper inclination, and carried at its upper end upon an elliptical roller or pulleys, and a rotary beater above the space between the two carriers, substantially as for the purpose set forth.

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