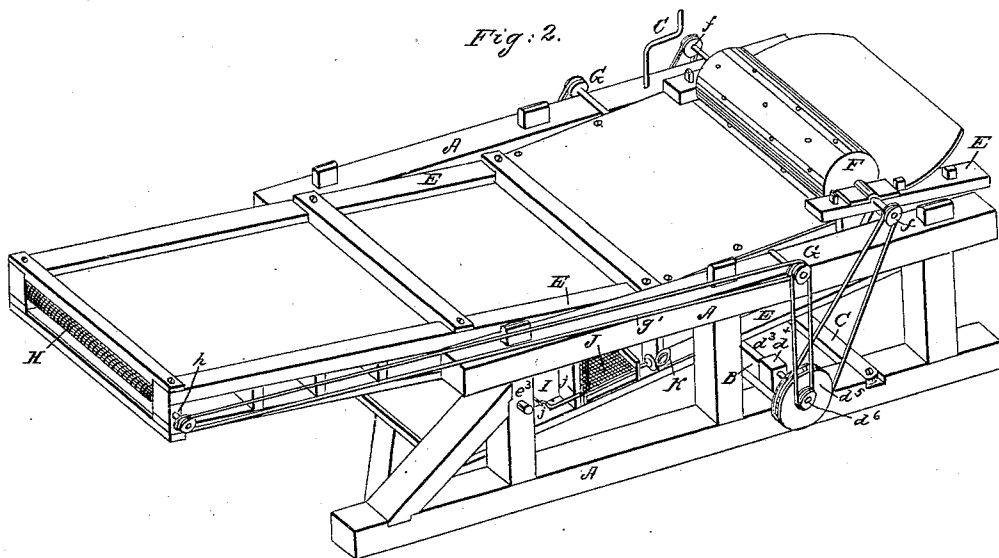
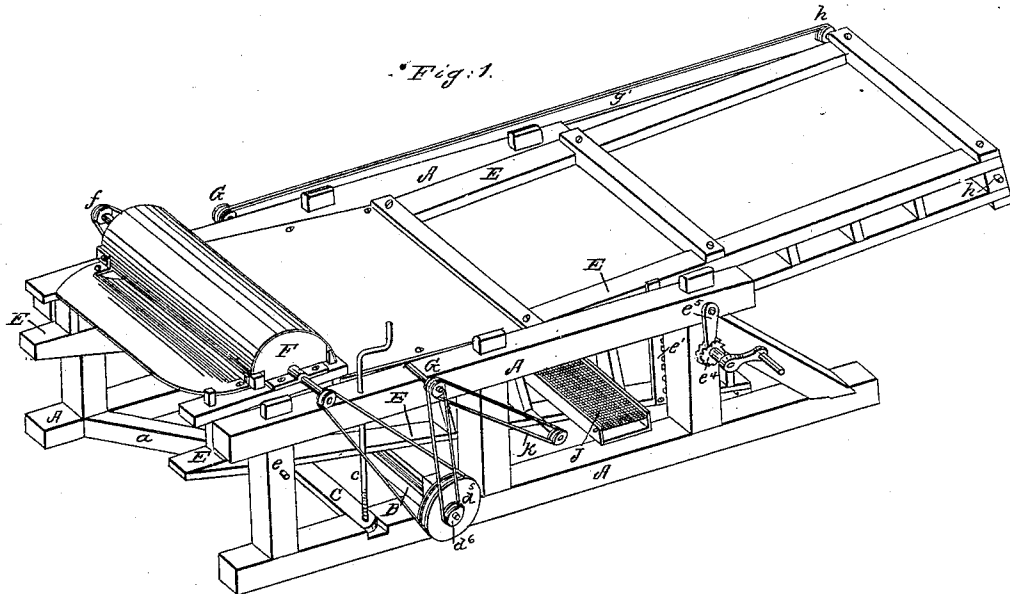


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Grain Thrasher and Separator.

No. 34,131.

Patented Jan'y 14, 1862.



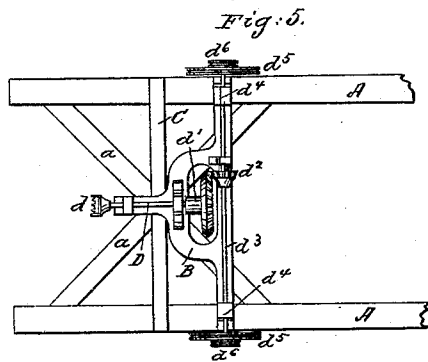
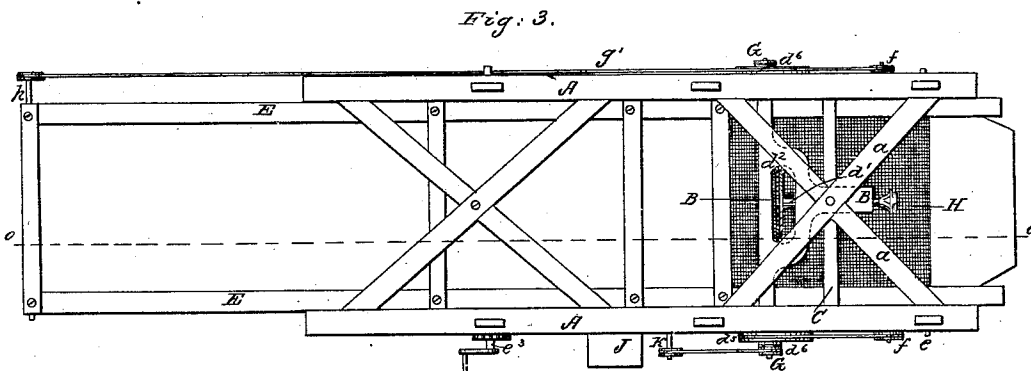
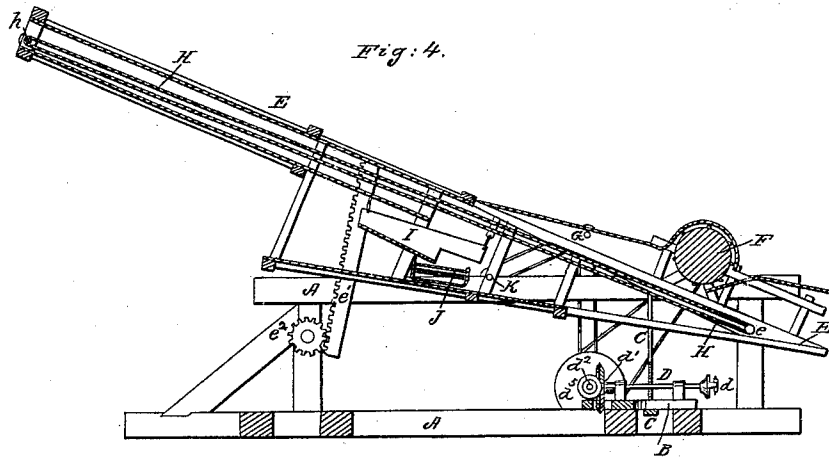
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UNITED STATES PATENT OFFICE.

WILLIAM F. COCHRANE, OF SPRINGFIELD, OHIO.

IMPROVEMENT IN GRAIN THRASHERS AND SEPARATORS.

Specification forming part of Letters Patent No. **34,131**, dated January 14, 1862.

To all whom it may concern:

Be it known that I, WILLIAM FRAZER COCHRANE, of Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Machines for Thrashing and Separating Grain, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which make part of this specification, and in which—

Figure 1 represents a view in perspective of a thrashing and separating machine embracing my improvements, as seen from one side. Fig. 2 represents a similar view of the other side of the same with the cap of the thrashing-cylinder removed. In both these figures the independent or adjustable frame, which carries the thrashing and separating mechanisms, is shown as lowered upon the main frame, which is the position most suitable for transportation. Fig. 3 represents a plan or view of the bottom of the machine inverted, showing more particularly the construction of the bottom part of the frame and the position of the stand or frame which contains the gearing. Fig. 4 represents a vertical longitudinal section through the machine at the line *o o* of Fig. 3, the grain-belt and adjustable frame being elevated to the position most favorable to its successful operation; and Fig. 5 represents a plan or view of a portion of the frame as seen from above, with the upper part removed in order to show the gearing and its frame or stand.

In machines for thrashing and separating grain from the straw, chaff, and impurities with which it is surrounded as constructed prior to the date of my invention motion is communicated from the horse-power or other prime mover to the driving-gear of the thrasher and separator at a point high up on the main frame, where the gearing is located. This gearing, moreover, has its bearing in various parts of the frame-work itself. These methods of connection and construction are in my opinion objectionable, inasmuch as they involve the use of a long heavy connecting-rod or coupling-shaft between the prime mover and gearing. Moreover, the vibration and jar produced by the motion of the gearing, owing to its being located so high up on the frame and to the manner in which its

journals are supported, tend to impede the proper working of the machine and to wear it out.

It is the object of the invention claimed under this patent to remedy the above-mentioned and other defects incident to thrashing and separating machines as heretofore constructed, and to produce a simple, serviceable, and effective machine.

To these ends my improvements consist, first, in locating the driving-gearing in a central position on the bottom sills of the frame-work and forming the connection between the prime mover and gearing at a point in or nearly in the same horizontal plane with the sills, whereby I am enabled to reduce the length and weight of the connecting-rod and to diminish the vibration of the frame and the consequent strain upon and jar of the gearing; secondly, in inclosing the driving-gearing in a solid stand or frame independent of the main frame, although connected with it, whereby the main frame is relieved from the torsion and strain of the gearing; thirdly, in the employment of diagonal braces to connect the bottom sills of the main frame, in combination with a solid stand or gearing frame, which arrangement permits the connecting-rod to lie closer to the frame than if rectangular bracing were employed; fourthly, in supporting the gearing stand or frame in bearings upon the sills of the main frame, whereby the stand is rendered adjustable, in order to vary the distance between the counter-shaft and the shafts of the thrashing-cylinder and separating mechanism; fifthly, in a mechanism for regulating the position of the gearing stand or frame relative to the thrashing and separating mechanisms, whereby the tension of the driving-bands can be varied by the attendant who feeds the thrasher without moving from his position or stopping the machine; sixthly, in driving the thrashing-cylinder independently of the separating mechanism and directly from both ends of the counter-shaft, whereby the steadiness of its movement is increased and the liability of the cylinders to burst diminished; seventhly, in driving the thrashing and separating mechanisms independently of each other by means of pulleys on each end of the counter-shaft, the cylinder-shaft, and the shaft

which actuates the separating mechanism, whereby the strain and torsion upon the gearing, thrashing-cylinder, and separating mechanism are reduced.

To carry out the objects of my invention in the most perfect manner, I use a frame of strong timbers differing somewhat in its form and construction from those heretofore employed. In this frame the bottom sills are connected by horizontal diagonal braces, and the uprights terminate at the upper sill instead of extending above it and being connected to the frame which sustains the grain-belt. This frame may be mounted on a truck in the usual way for convenience of transportation.

The gearing which actuates the mechanism has the bearings of its respective shafts in a solid stand or frame, which I call a "combined stand." I prefer to make this stand in one piece and of cast-iron. It rests upon the sills of the frame in a central position, and is provided with journals turning in bearings on the sills of the frame in order to give it a vertical rocking movement when required. By means of a suitable lever and detent the attendant who feeds the thrashing-cylinder can raise or lower the stand without leaving his post, and can hold it in any position desired.

The gearing is of a very simple description. It consists of a horizontal longitudinal shaft or connecting-rod, one end of which is coupled to the prime mover by a universal joint while the other carries a bevel-wheel which drives a corresponding pinion on the center of a counter-shaft arranged horizontally across the frame instead of driving the counter-shaft from one end, as has heretofore been the case. The ends of the counter-shaft project beyond the frame and carry two sets of pulleys, one set of which drives the thrashing-cylinder and the other the separating mechanism.

The thrashing and separating apparatus is mounted in an independent frame which moves freely up and down within the main frame, and can be held in any desired position by means of a suitable detent.

The thrashing-cylinder may be constructed in any convenient manner. It has pulleys on each end of its shaft by which it is driven from corresponding pulleys on the counter-shaft; but it does not drive any part of the separating mechanism, as has heretofore been the case. The beater-shaft, which actuates the separating mechanism, has also pulleys on each end of the shaft, which are driven by corresponding pulleys on the counter-shaft instead of being driven from the thrashing-cylinder, as heretofore.

The grain-belt is driven by a band from one end of the beater-shaft, while the fan and shoe are driven from the other. A suitable winnowing apparatus is arranged beneath the grain-belt. An elevator or conveyer may be added to convey the grain from the winnower to a bagging apparatus should one be attached to the machine.

In the accompanying drawings, which represent a convenient arrangement of parts for carrying out the objects of my invention, the main frame is shown as consisting of strong timbers A, connected by suitable uprights and securely fastened together. The bottom sills are connected by stout diagonal braces *a*. The gearing, through which motion is communicated to the thrashing and separating mechanisms, has its bearings in a solid cast-iron frame or stand B, provided with lugs or ears *b*, which turn in bearings *b'* upon the bottom sills A. A lever C, one end of which is pivoted in one of the sills flush with its upper surface, extends across the frame underneath the front part of the combined stand B. A lifting-screw *c* passes through the side timbers of the frame and through the other end of this lever, so that by turning the screw (which is provided with a handle for this purpose) in the proper direction the combined stand may be raised to any desired position and held there.

The driving-gear consists of a connecting-rod D (having a universal joint *d* on its forward end to form a connection with the horsepower or other prime mover) extending lengthwise of the frame and turning in bearings in the center of the combined stand B. This stand is so placed on the frame that the universal joint lies in front of and between the forks of the diagonal braces *a*, which arrangement permits the connecting-rod to lie close to the braces.

On the rear end of the rod D is a bevel-wheel *d'*, gearing into a corresponding pinion *d²* on the center of the counter-shaft *d³*, which latter turns in suitable bearings *d⁴* in the combined stand and projects at each end beyond the main frame. It carries two sets of pulleys, the inner and larger ones *d⁵* of which drive the thrashing-cylinder, while the other set *d⁶* drives the beater-shaft G.

The thrashing-cylinder and separating mechanism are contained within a stout frame E, which in this instance is represented as hinged on a pivot *e* near the upper front corner of the main frame A. This independent frame fits snugly within the main frame and is capable of sliding freely up and down in the arc of a circle of which the pivot *e* forms the center. The frame can be adjusted at will by means of a rack *e'* upon it and a pinion *e²* on a shaft *e³* turning in bearings in the main frame, and can be held at any desired elevation by means of a ratchet *e⁴* and detent *e⁵*, as shown in Fig. 1 of the drawings. A thrashing-cylinder F is supported in bearings in this independent frame near its forward end, and is driven by small pulleys *f* on each end of its shaft. A beater-shaft G is mounted in suitable journals just back of the thrashing-cylinder and is rotated by pulleys on each end of its shaft from the counter-shaft *d³*. A band *g'* from one end of the beater-shaft drives the shaft *h* of the grain-belt H, the front end of which belt runs over the

shaft *e*, which in this instance also forms the pivot upon which the independent frame turns. A vibrating shoe *I*, provided with proper screens, &c., is also arranged within the independent frame beneath the grain-belt. When it is desired to bag the grain instead of discharging it upon the ground, in place of the elevators heretofore used I employ a creeping cloth or endless apron *J*, which reaches across the frame above the wheels and just below the vibrating shoe *I* in order to receive the winnowed grain and conduct it to the bagging apparatus. A shaft *K*, which carries the fan, is located in front of the creeping cloth. The fan and fan-case are not shown in the drawings; but their position is sufficiently indicated by that of the shaft *K*. This shaft is driven from a pulley on the end of the beater-shaft opposite to that from which the grain-belt is driven. A spur-wheel on the opposite end of the fan-shaft drives a shaft *j*, which carries the creeping cloth. The vibrating shoe is also actuated by a crank *j'* on the end of this shaft.

In Figs. 1 and 2 the machine is represented with the frame *E* lowered upon the main frame for convenience of transportation, while in Fig. 4 it is represented as elevated to the proper angle for working effectively. It may, in fact, be worked in either position by shortening or lengthening the driving-bands, which are shown as drawn tight in either position.

The operation of the machine is as follows, viz: Rotary motion is imparted to the connecting-rod *D* from any suitable prime mover. This rod imparts motion to the counter-shaft *d*³. Motion is given to the thrashing-cylinder *F* by bands from the pulleys *d*⁵ on the counter-shaft, and to the beater-shaft *G* by bands from the smaller pulleys *d*⁶. The attendant stands upon a platform in front of the machine, which platform is not shown in the drawings, and feeds the grain to the thrashing-cylinder, which tears the grain from the stalks. This attendant can tighten or slacken the driving-bands both of the thrasher and separator without leaving his platform by turning the handle of the lifting-screw *c*, and thus tilting the combined stand *B*. After the grain and stalks have passed through the thrasher, they are struck by the beater *G* and swept upon the grain-belt *H*, which conveys them to the back of the machine, where the straw falls upon the ground, while the grain falls upon an inclined plane, down which it slides into the vibrating shoe *I*, where it is properly sifted and winnowed. It then falls upon the creeping cloth *J*, which conveys it into a bagger or other suitable receptacle.

My improved mode of driving the thrashing-cylinder independently of the separating

mechanism I consider of very great importance, as under the old method of construction the cylinder was driven from one end only of its shaft, while the separating mechanism was driven from the other. The counter-shaft was also driven by a spur-wheel on one end and drove the cylinder from the other. As the thrashing-cylinder is required to revolve with great velocity, (usually at the rate of twelve hundred revolutions per minute,) the strain and torsion produced by this defective mode of gearing frequently caused the cylinder to burst. This danger is entirely obviated by my improvement. The separating mechanism is also caused to run more smoothly, and a greater latitude for modification of the machinery allowed.

It is obvious that most of the above-mentioned improvements are adaptable as well to machines having a rigid frame, as heretofore constructed, as to those having an adjustable independent or auxiliary one, such as I have described. I do not, therefore, under this application confine myself to machines having an independent or adjustable frame to support the thrashing and separating mechanisms; but

What I claim under this patent as my invention, and desire to secure by Letters Patent, is—

1. Locating the driving-gearing upon the base of the machine, substantially in the manner described, for the purposes set forth.

2. Inclosing the driving-gearing in a solid stand or frame independent of the main frame, substantially as described.

3. The combination of the diagonal braces *a* with the combined stand *B*, substantially as herein described, for the purposes specified.

4. Pivoting the combined stand to the main frame, substantially in the manner and for the purpose described.

5. The combination of the combined stand *B*, lever *C*, and lifting-screw *c*, substantially in the manner described, for the purpose set forth.

6. Driving the thrashing-cylinder directly from both ends of the counter-shaft and independently of the separating mechanism, as described.

7. Driving the thrashing and separating mechanisms independently of each other by means of pulleys on each end of the counter-shaft, cylinder-shaft, and beater-shaft, as described, for the purposes specified.

In testimony whereof I have hereunto subscribed my name.

WILLIAM F. COCHRANE.

Witnesses:

B. H. WARDER,
WM. D. BALDWIN.