(No Model.) 2 Sheets—Sheet 1.

C. GROVER.

COMBINED BAND CUTTER AND GRAIN FEEDER FOR THRASHERS.

No. 345,230. Patented July 6, 1886.

Fig. 1.

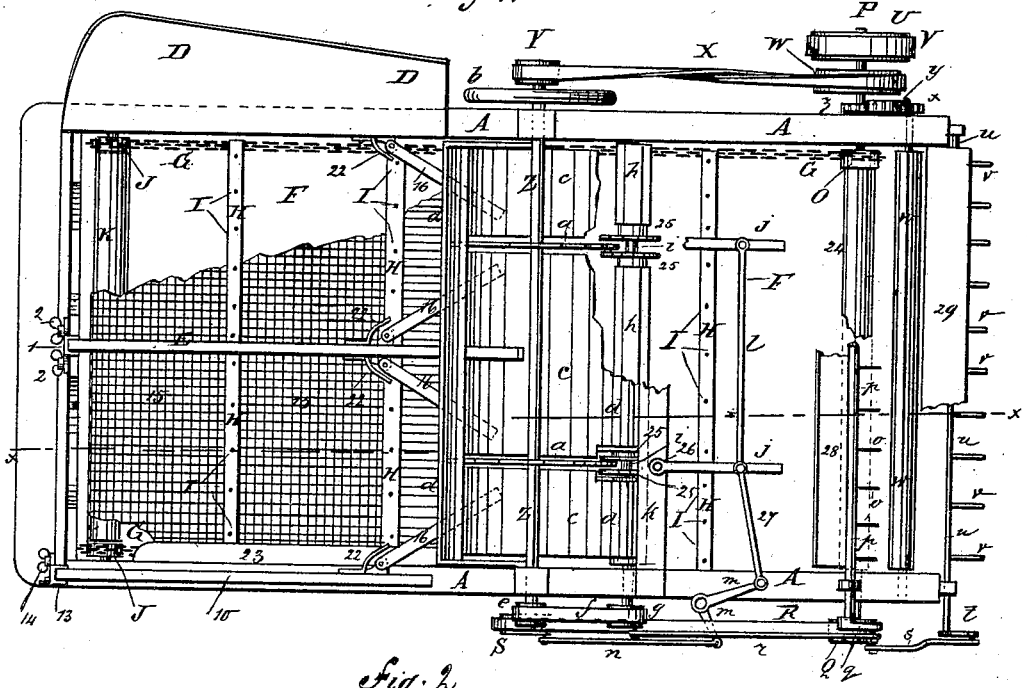
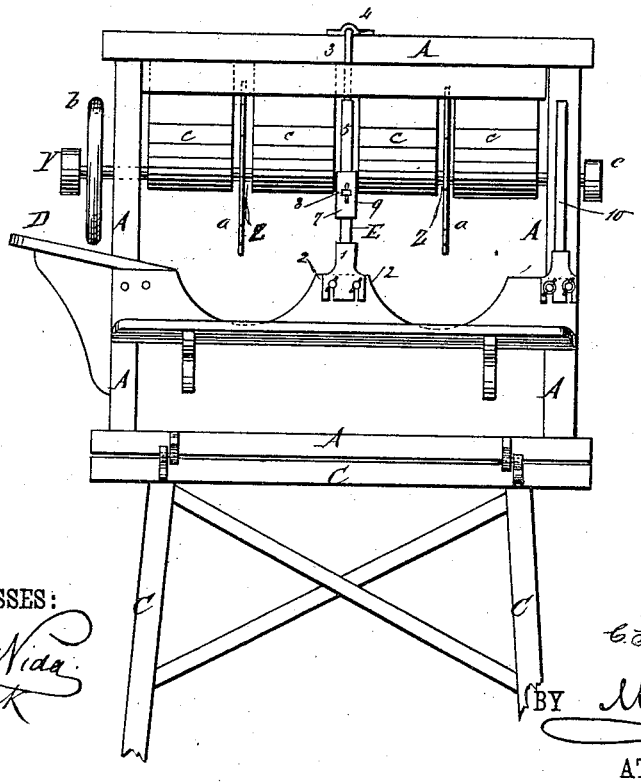


Fig. 2.



WITNESSES:

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

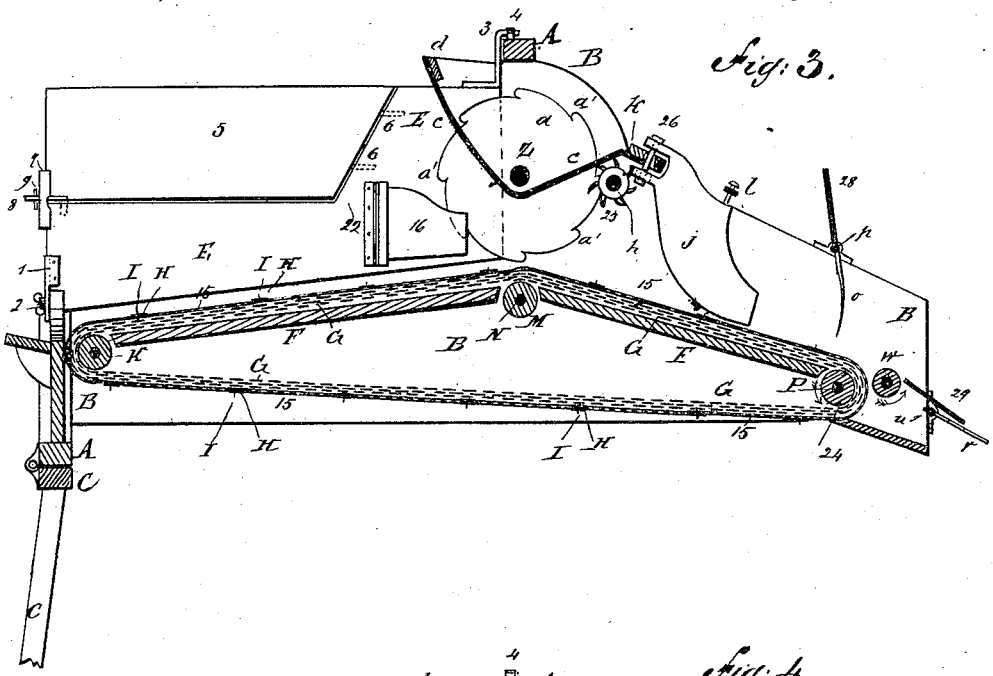


Fig. 4.

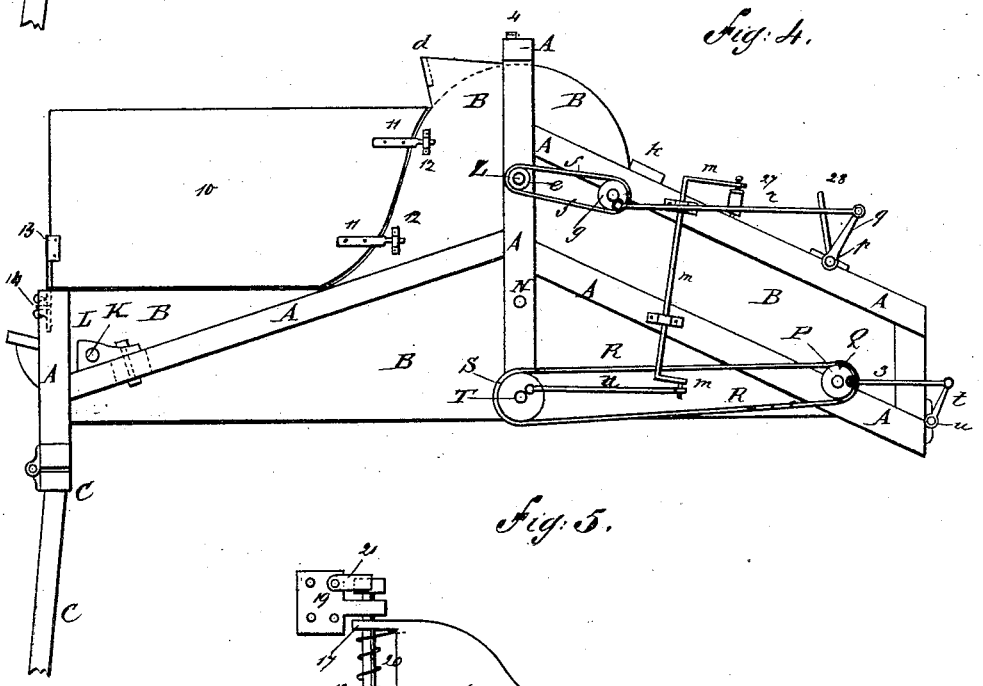
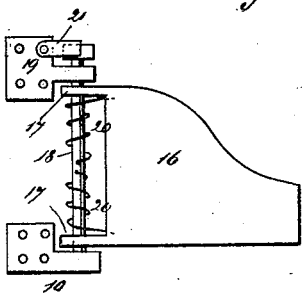


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES GROVER, OF KANSAS CITY, MISSOURI.

COMBINED BAND-CUTTER AND GRAIN-FEEDER FOR THRASHERS.

SPECIFICATION forming part of Letters Patent No. 345,230, dated July 6, 1886.

Application filed February 12, 1886. Serial No. 191,738. (No model.)

To all whom it may concern:

Be it known that I, CHARLES GROVER, of Kansas City, in the county of Jackson and State of Missouri, have invented a new and useful Improvement in Combined Band-Cutter and Grain-Feeder for Thrashers, of which the following is a full, clear, and exact description.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of my improved band-cutter and grain-feeder, parts being broken away. Fig. 2 is an end elevation of the same. Fig. 3 is a longitudinal section of the same, taken through the line *x x*, Fig. 1. Fig. 4 is a side elevation of the same. Fig. 5 is a side elevation of one of the guide-boards and its attachments.

The object of this invention is to improve the construction of the combined band-cutter and grain-feeder for which Letters Patent No. 324,767 were issued to me August 18, 1885, in such a manner as to make them more effective and reliable in operation.

The invention consists in the construction and combination of various parts of the machine, as will be hereinafter fully described, and pointed out in the claims.

A represents the frame of the machine, the sides of which are closed by a casing, B. The delivery end of the frame A is designed to be connected with the receiving end of a thrasher by hooks or other suitable means, and its receiving end is supported by hinged legs C or a frame, so that the said receiving end of the machine can be adjusted higher or lower by varying the inclination of the said legs or frame.

To the sides of the forward parts of the frame A are attached inclined feed-boards D, to guide the grain into place in the machine, and the space between the said feed-boards is divided by a center-board, E, so that bundles of grain can be put into the machine on both sides of the said center-board, and will be compelled to take a position lengthwise with the machine, and will be carried rearward in that position.

To the lower part of the receiving end of the center-board E is attached an iron clamp, 1, the lower end of which overlaps the upper part of the end casing of the machine, and is slotted to receive the thumb-screws 2, that secure it to the said casing. The rear end of the center-board E is extended upward, and to its upper corner is attached a hook-arm, 3, which enters a bearing, 4, attached to the top cross-bar of the frame A. When unbound grain is to be fed to the thrasher, the center-board E can be detached by loosening the thumb-screws 2.

The center-board E is provided with an extension-board, 5, fitted to the upper edge of the said center-board, and having projections or dowel-pins 6 attached to its rear end, which enter holes in the rear edge of the upwardly-projecting rear part of the said center-board, as indicated in dotted lines in Fig. 3.

To the lower forward corner of the extension-board 5 is attached the upper end of an iron clamp, 7, the lower end of which overlaps and receives the upper part of the forward end of the center-board E. The middle part of the clamp 7 is perforated to receive a prong, 8, attached to the upper forward corner of the center-board E, and is secured in place upon the said prong by a pin, 9, passed through a hole in the prong at the outer side of the said clamp, as shown in Figs. 2 and 3.

When the extension-board 5 is used, the grain is put in from both sides of the machine; but when the grain is to be put in from only one side of the machine the extension-board 5 is removed, and a side board, 10, is applied to the side of the machine opposite the side from which the grain is to be pitched, to prevent the bundles that are pitched over the center-board E from falling out of the machine, and to compel them to take a proper position on the carrier, so that bundles can be pitched upon both sides of the center-board from one side of the machine.

To one side of the rear end of the side board, 10, are attached projections or prongs 11, which enter keepers 12, attached to the casing B.

To the lower part of the forward end of the side board, 10, is attached the upper end of

an iron arm or clamp, 13, the lower end of which overlaps the casing B, and is slotted to receive the thumb-screws 14, that secure it to the said casing, so that the said side board can be readily detached by loosening the thumb-screws 14.

G are endless chains, to which, at suitable distances apart, are attached cleats H, provided with teeth I. The spaces between the cleats H are closed with canvas, 15, which is attached to the said cleats, so that the bundles and shelled grain will be carried rearward with greater certainty. The carrier G H I 15 is supported by bottom boards, F, and the lower edge of the center-board E is arranged at such a height above the receiving part of the said bottom boards, F, that the toothed cleats H I and the canvas 15 will have a free passage beneath the said edge. The bottom boards, F, are attached to the frame A, and the receiving part of the said bottom boards inclines upward toward the center of the machine, and the delivery part inclines downward from the said center.

16 are guide-boards, to the upper and lower corners of which are attached, or upon them are formed, perforated projections or lugs 17, through which pass pins 18, which also pass through lugs 19, attached to the rear portion of the center-board E, and to the casing B.

Upon the pins 18, between the lugs 17, are placed two spiral springs, 20, coiled in opposite directions. The inner ends of the springs 20 are attached to the middle parts of the pins 18, and their outer ends are attached to the lugs 17. The tension of the springs 20 is regulated by turning the pins 18, and the said pins are held from being turned back by the tension of the said springs 20 by the latches 21, pivoted to the base-plates of the lugs 19, and arranged to be turned down at the sides of the heads of the pins 18, as shown in Fig. 5.

Two guide boards, 16, are used for each band-cutting knife, and the springs 20 are arranged to swing the free ends of the said guide-boards toward the said knives. The lower edges of the guide-boards 16 are arranged at such a height above the bottom boards, F, that the toothed cleats H and the canvas 15 will have a free passage beneath the said edges. The attachments at the forward ends of the guide-boards 16 are covered by guard-plates 22, attached at their forward edges to the center-board E and the casing B, with their rear edges overlapping the said guide-boards, as shown in Figs. 1 and 3, so that the grain-stalks cannot become entangled in the said attachments. With this construction the guide-boards 16 will guide small bundles of grain into such positions that their bands will be cut with certainty by the knives, and the spiral springs 20 will allow the said guide-boards to yield when large bundles are passing through the machine, and will bring the said guide-boards back to their normal positions, ready for the next bundles. The endless chains G at the forward end of the machine pass around chain-wheels J, attached to a roller-shaft, K, the journals of which revolve in bearings L, the securing-bolts of which latter pass through slots in the side bars of the frame A, so that said bearings can be adjusted to tighten or slacken the endless chains G, as may be required. The bearings L are adjusted by screws in the ordinary manner, which screws are not shown in the drawings, as there is nothing new in their construction. The endless chains G at the angle or highest point of the bottom boards, F, pass over a roller, M, the journals N of which revolve in bearings in the frame A. The roller M forms a support for the canvas 15, and prevents the cleats H from being sprung by the downward pressure while the knives are cutting the bands. At the forward end of the machine the endless chains G pass around chain-wheels O, attached to the drive-shaft P, the journals of which revolve in bearings in the frame A. The endless chains G are covered by strips 23, attached to the casing B a little above the said endless chains G, as shown at one side in Fig. 1, to prevent the grain-stalks from becoming entangled in the said endless chains.

To the drive-shaft P, between the chain-wheels O, is attached a wooden roller, 24, to keep the canvas 15 taut while passing around the said drive-shaft.

To one end of the drive-shaft P is attached a pulley, Q, around which passes an endless belt, R. The belt R also passes around a pulley, S, attached to the shaft T, which revolves in bearings in the frame A. To the other end of the drive-shaft P is attached a large pulley, U. Around the pulley U passes an endless belt, V, by means of which motion is given to the drive-shaft P from the driving mechanism of the thrasher.

To the drive-shaft P is also attached a second large pulley, W, around which passes an endless belt, X. The belt X is crossed and passes around a small pulley, Y, attached to the end of the shaft Z, so that the said shaft Z will receive a rapid movement from the slow movement of the drive-shaft P. The shaft Z revolves in bearings in the frame A, is directly over the highest point of the bottom boards, F, and to it are secured one or more circular cutters or knives, *a*, the teeth *a'* of which are rounded, as shown in Fig. 3, so that the straw or other material forming the bands will not adhere to them.

To the cutter-shaft Z is attached a fly-wheel, *b*, to give steadiness of movement to the shaft Z and the cutting-knives *a*.

To the forward edge of the cross-bar *k*, secured at its ends to the frame A, in rear of the cutting-knives *a*, are attached the rear ends of the fenders *c*, which are nearly as wide as the spaces between the knives *a* and between the side knives and the casing B. The fenders *c* are curved to pass beneath the cutter-shaft Z, and their forward ends are attached to the cross-bar *d*, secured to the casing B, a little forward of the top cross-bar of the frame A.

To the other end of the cutter-shaft Z is attached a small pulley, *e*, around which passes a belt, *f*. The belt *f* also passes around a pulley, *g*, attached to a journal of the cylinder *h*, the journals of which revolve in bearings in the frame A. The cylinder *h* is made of octagonal or other desired shape, has annular grooves *i* formed in it opposite the knives *a*, and is so placed that the edges of the said knives will be in the said grooves as the knives and cylinder are revolved.

To the cylinder *h*, at each side of each annular groove *i*, are attached curved teeth 25, so that the knives cannot become clogged with the straw or other material on which the said cutters operate. With this construction, as the bundles are carried forward by the carrier G H I 15, they pass between the guide-boards 16 and beneath the knives *a*, by which their bands are cut. As the loose bundles pass from the knives *a*, they are spread evenly over the carrier G H I 15 by the spreaders *j*, which are attached at their forward upper corners to the cross-bar *k*. The rear upper corners of the spreaders *j* are recessed to embrace the cross-bar *k*, and are secured to the said cross-bar by pins 26, passing through the said cross-bar and the upper rear corners of the said spreaders. The apertures through the cross-bar *k* are flared upon their rear sides toward their lower ends, giving them a triangular form, so that the lower rear parts of the spreaders *j* can swing up and down vertically to accommodate themselves to the thickness of the grain passing through the machine. The spreaders *j* at their forward upper corners are pivoted to a cross-bar, *l*, so that the said spreaders can be vibrated laterally to spread the grain by the longitudinal movements of the said bar *l*. To one end of the cross-bar *l* is pivoted the end of a connecting-bar, 27, the other end of which is pivoted to the upper arm of the crank-shaft *m*, which rocks in bearings attached to the frame A, and to its lower arm is pivoted one end of a connecting-rod, *n*. The other end of the connecting-rod *n* is pivoted to a crank-pin attached to the pulley S on the shaft T, so that the spreaders *j* will be vibrated by the revolution of the said shaft. When grain in large quantities is passing through the machine, it is kept back in part and is made to pass on in uniform and proper quantity by the prongs *o*, attached to the shaft *p*, which rocks in bearings on the top of the frame A.

To the shaft *p*, or to arms attached to the said shaft, and upon the opposite side from the prongs *o*, is secured a fender, 28, to prevent the grain detained by the prongs *o* from passing over the said shaft *p*.

To one end of the rock-shaft *p* is attached a crank, *q*, to which is pivoted one end of a connecting-rod, *r*. The other end of the rod *r* is pivoted to a crank-pin attached to the pulley *g* on the shaft of the cylinder *h*.

To a crank-pin attached to the pulley Q is pivoted one end of a connecting-rod, *s*, the other end of which is pivoted to a crank, *t*, attached to the end of a shaft, *u*. The shaft *u* rocks in bearings attached to the rear end of the machine, and to the said shaft *u* are attached rearwardly-projecting prongs or teeth *v*. The shaft *u* and the rear parts of the teeth *v* are covered by a fender, 29, to prevent the chaff and the grain from falling between the teeth *v* and clogging the shaft *u*. The fender 29 projects in the rear of the shaft *u*, and extends back to the roller *w*, pivoted to the frame A at the delivery end of the carrier G H I 15. With this construction, by the movement of the shaft *u*, teeth *v*, and fender 29, the grain-stalks are shaken and loosened, and are delivered to the cylinder of the thrasher. The roller *w* carries the grain from the carrier G H I 15 to the agitator *u v* 29, and to one of the ends of the said roller *w* is attached a small gear-wheel, *x*, into the teeth of which mesh the teeth of the larger intermediate gear-wheel, *y*, journaled to the frame A. Into the teeth of the intermediate gear-wheel, *y*, mesh the teeth of the small gear-wheel *z*, attached to the drive-shaft P, so that the roller *w* will be revolved in the same direction as and at a greater velocity than the said drive-shaft P. With this construction bound or headed grain will be fed to thrashers evenly and uniformly and at any desired rapidity.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a combined band-cutter and grain-feeder for thrashers, the combination, with the frame A, the casing B, and the center-board E, having upwardly-extended rear end, of the hook 3, the clamp 1, and the thumb-screw 2, substantially as herein shown and described, whereby the said center-board will be held securely in place and can be readily detached, as set forth.

2. In a combined band-cutter and grain-feeder for thrashers, the combination, with the center-board E, having prongs 8, of the extension-board 5, having prongs 6 and clamp 7, substantially as herein shown and described, whereby the throwing of grain over the said center-board is prevented, as set forth.

3. In a combined band-cutter and grain-feeder for thrashers, the combination, with the frame A and the casing B, having keepers 12, of the side board, 10, having prongs 11 at its rear end, and clamp 13 and thumb-screw 14 at its forward end, substantially as herein shown and described, whereby the throwing of grain over the machine is prevented, as set forth.

4. In a combined band-cutter and grain-feeder for thrashers, the combination, with the casing B, the center-board E, and the bearings 19, attached thereto, of the guide-boards 16, having lugs 17, the headed pins 18, passing through the said lugs and the bearings, the wire springs 20, attached to the said pins and to the said guide-boards, the latches 21,

and the covering-plates 22, substantially as herein shown and described, whereby the bundles will be properly guided to the cutters, as set forth.

5. In a combined band-cutter and grain-feeder for thrashers, the combination, with the cutters *a* and the cylinder *h*, having annular grooves *i*, of the sets of curved teeth 25, substantially as herein shown and described, whereby the teeth of the said cutters are kept clear, as set forth.

6. In a combined band-cutter and grain-feeder for thrashers, the combination, with the carrier and the rock-shaft *p* and its downwardly-projecting prongs *o*, of the guard-board 28, substantially as herein shown and described, whereby the grain stopped by the said prongs will be kept from passing over the said shaft, as set forth.

7. In a combined band-cutter and grain-feeder for thrashers, the combination, with the carrier, the rock-shaft *u* at the rear outer corner, and prongs *v*, of the guard-board 29, substantially as herein shown and described, whereby the chaff and grain shaken loose by the said prongs are kept from clogging the said shaft, as set forth.

CHARLES GROVER.

Witnesses:
D. A. N. GROVER,
G. F. PUTNAM.