No. 718,665. PATENTED JAN. 20, 1903.

R. SHEDENHELM.

BAND CUTTER AND FEEDER.

APPLICATION FILED NOV. 18, 1901.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

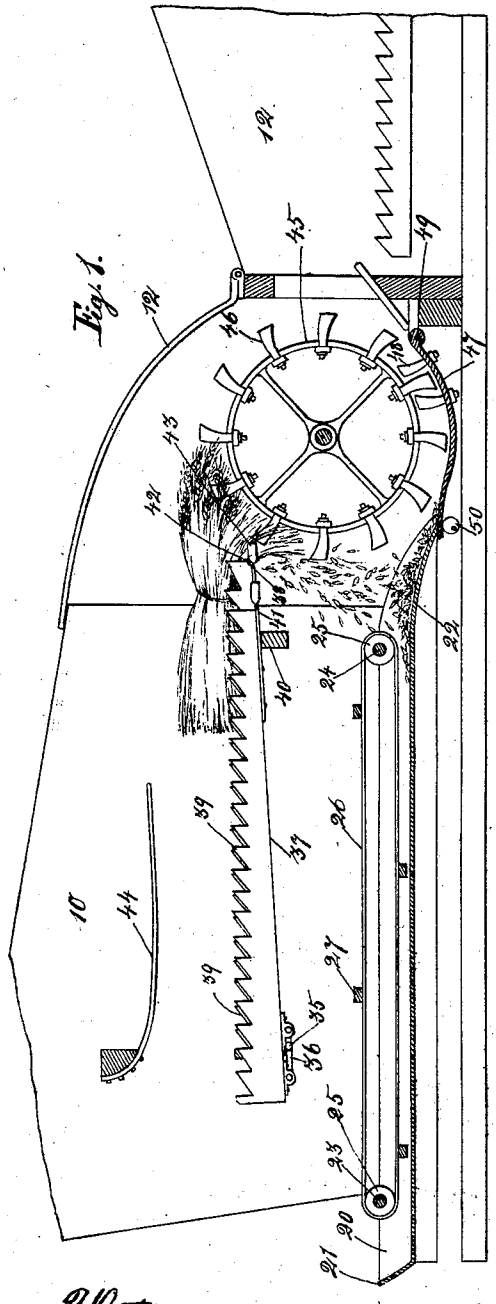
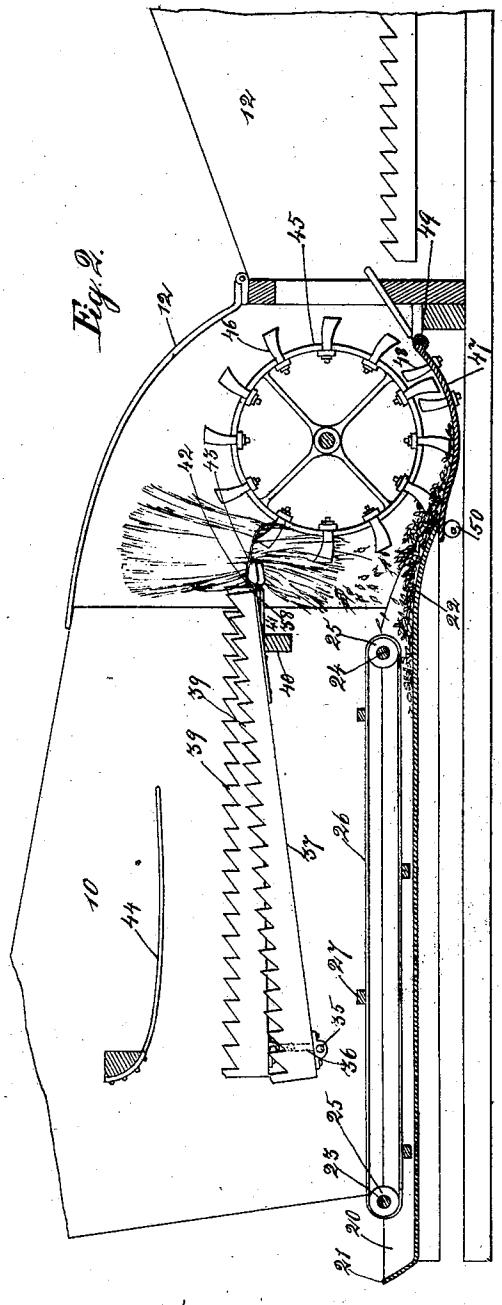


Fig. 2.



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by Orwig & Lane Atty's.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 3.

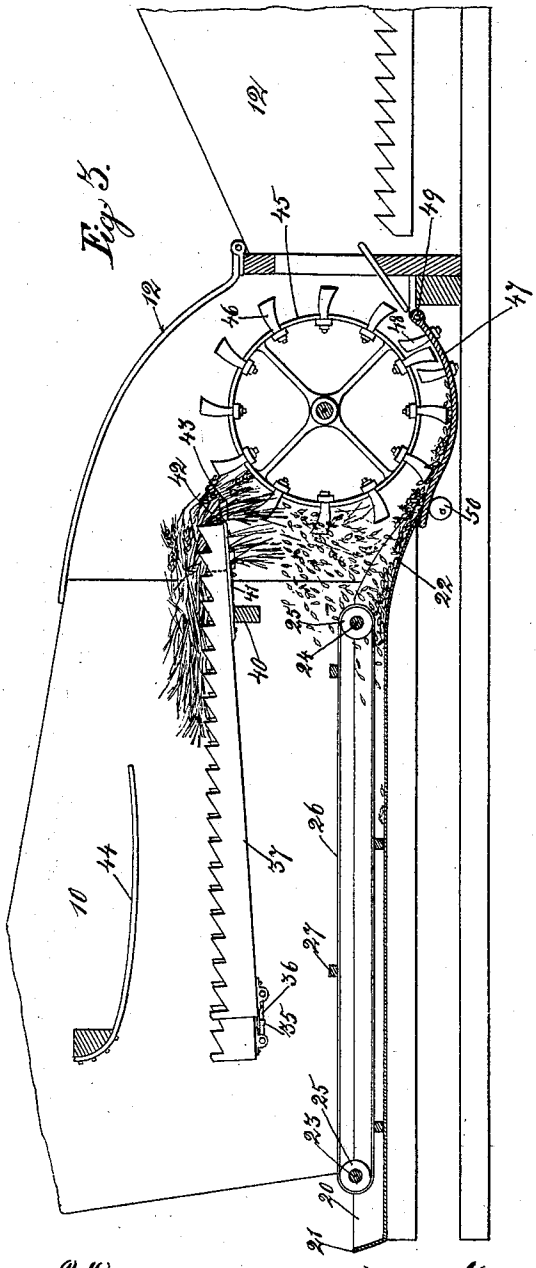
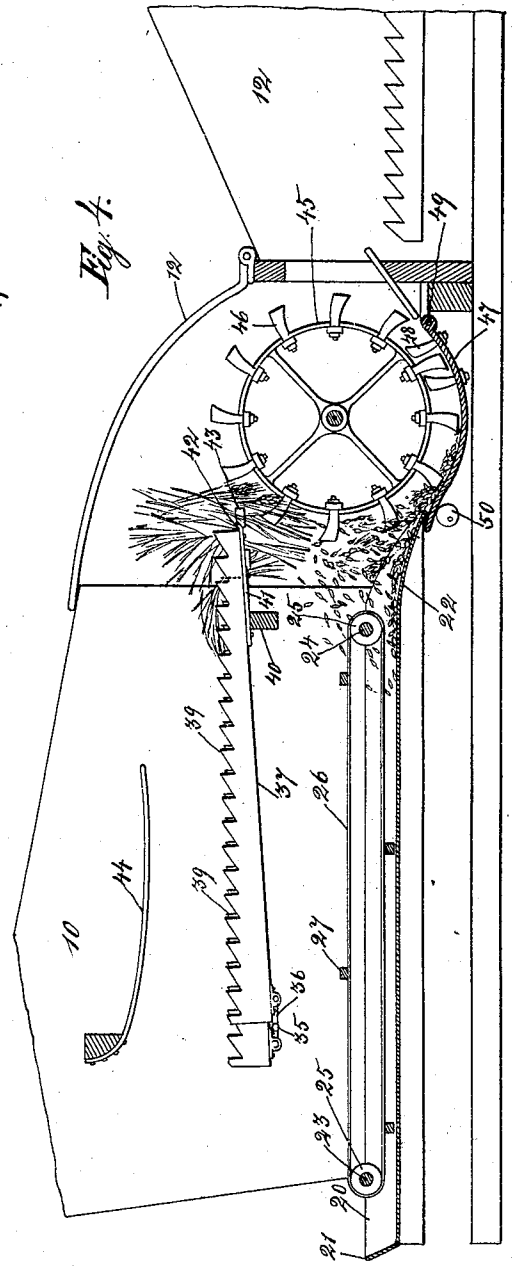


Fig. 4.



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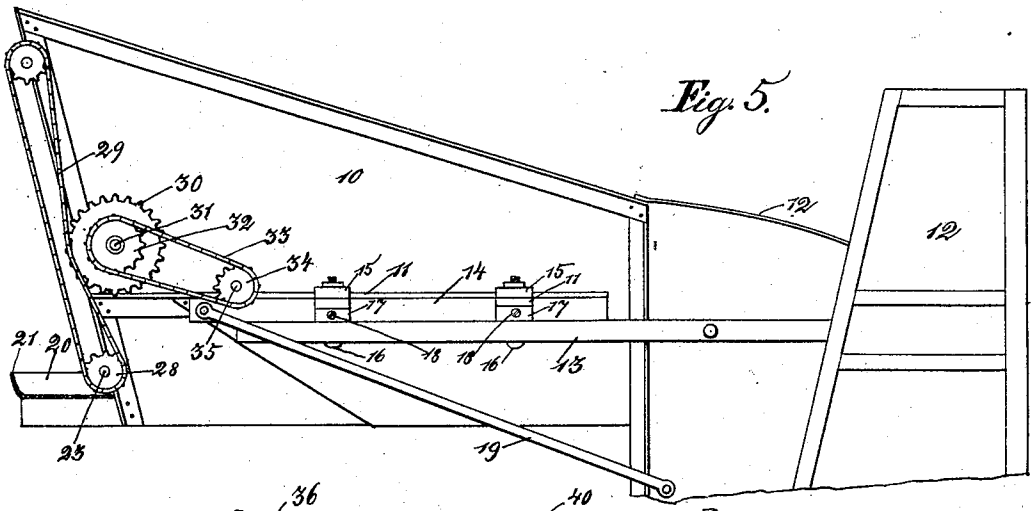
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BAND CUTTER AND FEEDER.

APPLICATION FILED NOV. 18, 1901.

NO MODEL. 3 SHEETS—SHEET 3.

Fig. 5.



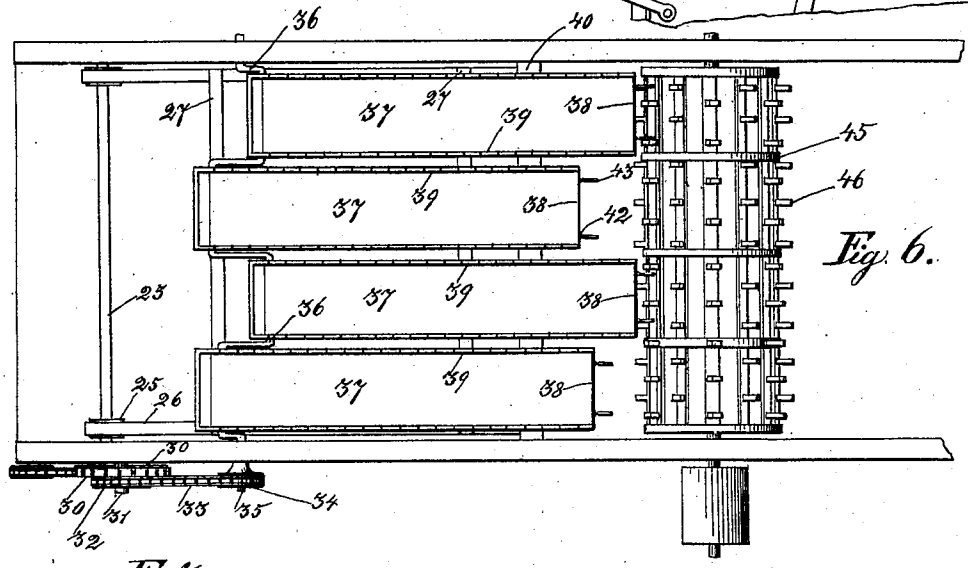


Fig. 6.

Fig. 7.

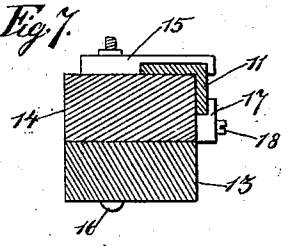
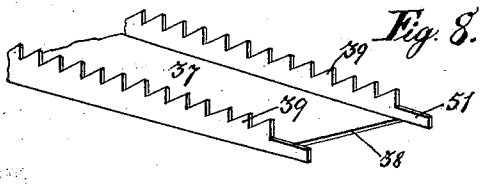


Fig. 8.



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UNITED STATES PATENT OFFICE.

ROBERT SHEDENHELM, OF DES MOINES, IOWA.

BAND-CUTTER AND FEEDER.

SPECIFICATION forming part of Letters Patent No. 718,665, dated January 20, 1903.

Application filed November 18, 1901. Serial No. 82,641. (No model.)

To all whom it may concern:

Be it known that I, ROBERT SHEDENHELM, a citizen of the United States, residing at Des Moines, in the county of Polk and State of Iowa, have invented certain new and useful Improvements in Band-Cutters and Feeders, of which the following is a specification.

The objects of my invention are to provide means of simple, durable, and inexpensive construction whereby grain is advanced to the threshing-cylinder in such manner that before the grain is discharged between the cylinder and concave the heads thereof will be projected into the path of travel of the cylinder-teeth and there held momentarily, thereby permitting the threshing-teeth to violently strike the heads of grain, with the result that the major portion of the kernels are separated from the straw before it enters between the cylinder and concave, said kernels being then permitted to drop to points beneath the path of travel of the straw, so that they cannot become commingled with the straw. Hence before the grain passes between the cylinder and concave a considerable separation has taken place.

A further object is to provide a delivering device so arranged and disposed relative to the cylinder that tightly-compressed bundles or wet and tangled masses of grain will be combed out and separated into small particles by the cylinder-teeth before passing between the cylinder and concave.

More specifically, it is my object to provide reciprocating feeding-pans arranged at or near a horizontal plane and having flat delivery ends, whose path of movement is materially above the horizontal center of the cylinder, and at one limit of their movement they pass beyond a vertical line drawn through the path of the cylinder-teeth movement at the edge thereof nearest to the feeding-pans.

A further object is to provide improved means for adjustably connecting the feeding-pans with the threshing-machine, so that the path of movement of the pans may be properly adjusted relative to the cylinder.

My invention consists in certain details in the construction, arrangement, and combination of the various parts of the device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which—

Figure 1 shows a vertical central sectional view through a portion of the band-cutter and feeder and showing a portion of a threshing-machine in position adjacent thereto. In this figure a sheaf or bundle of grain is shown supported upon the end of one of the feeding-pans, with the heads of the grain in the path of travel of the cylinder-teeth. Fig. 2 shows a similar view with the sheaf or bundle in position supported upon the fingers at the ends of the feeding-pans. Fig. 3 shows a similar view in which a tangled bundle or quantity of grain is supported upon the ends of the feeding-pans. Fig. 4 shows a similar view in which a quantity of loose dry grain is being fed to the threshing-cylinder. Fig. 5 shows a side elevation of the complete machine and a portion of a threshing-machine to illustrate the means for attaching the band-cutter and feeder to the threshing-machine. Fig. 6 shows a top or plan view of a portion of a band-cutter and feeder and the threshing-cylinder of a threshing-machine to illustrate the relative positions of the feeding-pans and the threshing-cylinder. Fig. 7 shows an enlarged detail sectional view illustrating the means for clamping the band-cutter and feeder frame to the threshing-machine frame, and Fig. 8 shows an enlarged detail perspective view illustrating a modified form of feeding-pan.

Referring to the accompanying drawings, I have used the reference-numeral 10 to indicate the frame of the band-cutter and feeder. Attached to each side of the frame is an angle-iron 11, arranged substantially in a horizontal plane. The reference-numeral 12 is used to indicate that portion of the frame of the threshing-machine that is shown, and fixed to each side of the frame of the threshing-machine is a horizontally-projecting timber 13. On top of the timber 13 is a block 14, which engages the under surface of the outwardly-projecting portion of the angle-iron 11. On top of the block 14 are two plates 15, arranged to overlap the top of the angle-iron, and these plates are connected with the timber 13 and block 14 by means of a bolt 16, which passes through the parts 13 and 14 and the plate 15. Attached to the outer surface of the block 14 is a plate 17,

supported by means of a screw 18, which passes into the block 14, and obviously by adjusting the bolts 16 and the screws 18 the block 14 may be firmly clamped to the angle-iron 11. Furthermore, the band-cutter and feeder frame may readily move longitudinally relative to the timber 13, and when the desired position is reached the said bolts and screws may be tightened and the band-cutter and feeder securely held in position. Attached to the side of the threshing-machine frame is a brace 19 to project upwardly and forwardly, its other end being attached to the block 14.

Between the sides of the machine-frame 10 and at the bottom thereof is a flat metal pan 20, the forward end of which is curved upwardly at 21 and the rear or discharge end curved downwardly at 22, said end being designed to rest upon the concave of a threshing-machine, as will hereinafter appear. Above this pan 20 are two shafts 23 and 24, and mounted upon the shafts are the wheels 25 to receive the belts 26. These belts 26 are connected by means of the cross-pieces 27, and said cross-pieces are so arranged that they will during the lower portion of their movement rest upon the bottom of the pan 20 and serve to scrape any grain that may be resting upon said pan rearwardly toward the discharge end of the pan. The conveyer thus formed is driven by means of the sprocket-wheel 28, fixed to the shaft 23. The said sprocket-wheel 28 is driven by means of a sprocket-chain 29. The said chain 29 also drives a sprocket-wheel 30, attached to the shaft 31, and on the shaft 31 is a sprocket-wheel 32, and a sprocket-chain 33 connects the wheel 32 with the sprocket-wheel 34, fixed to a shaft 35. This shaft 35 extends transversely across the machine-frame and is provided between the sides of the machine-frame with a series of oppositely-disposed crank-arms 36, and upon each crank-arm 36 is a feeding-pan. Each of these feeding-pans is composed of a flat bottom 37, preferably made of sheet metal and having a straight edge 38 at its delivery end. The sides of the pan project upwardly and are toothed at 39. The outer or delivery ends of these pans are supported upon a stationary cross-piece 40, upon which they may freely slide, and on the under surfaces of the delivery ends of these feeding-pans are the fingers 41. These fingers comprise flat metal bars arranged to lie flat under the feeding-pans and provided with twisted portions 42, directly beyond the delivery ends of the feeding-pans, and their outer ends 43 are arranged at right angles to their body portions 41—that is to say, the said part 43 has its flat surfaces on its sides and the twisted portion 42 forms an upwardly-inclined shoulder. There are preferably two of these fingers on each pan. The said cross-piece 40 is preferably arranged slightly above the shaft 34, so that the feeding-pans are supported with their delivery ends slightly higher than their forward ends.

Above the receiving ends of the feeding-pans is a flat metal guard 44 for the purpose of holding the grain down to the feeding-pans. In the frame of the threshing-machine is a threshing-cylinder 45 of ordinary construction, having the threshing-teeth 46 fixed thereto, and beneath the threshing-cylinder is a concave 47, having the teeth 48 therein. This concave is hinged at 49 and its free end is supported upon the cam 50, whereby it may be raised or lowered, and, as before stated, the delivery end of the pan 20 is supported upon this concave.

The essential feature of my invention consists in the arrangement and disposition of the feeding-pans relative to the threshing-cylinder, and it will be noted in the accompanying drawings that the feeding-pans discharge their contents at a point materially above the horizontal center of threshing-cylinder and also beyond a vertical line drawn through the path of travel of the cylinder-teeth at the edge thereof nearest the feeding-pans. The fingers on the ends of the feeding-pans project slightly farther beyond this vertical line, and it is principally on account of this feature of my invention that the advantageous results which my machine accomplish are produced.

In practical use and assuming that a sheaf or bundle of grain with its bands intact should have passed upon the feeding-pan it will be advanced by the feeding-pans to the delivery end thereof. When the heads of the sheaf or bundle pass beyond the delivery end of the pan, they will be directly in the path of travel of the cylinder-teeth, and hence a great portion of the kernels will be separated from the straw before the bundle tilts upwardly as required to drop from the end of the feeding-pan. When the feeding-pan moves away from the threshing-cylinder, it will drop downwardly to the position shown in Fig. 2 of the drawings, and when in this position the function of the fingers at the ends of the feeding-pans becomes apparent, for the band of the said sheaf or bundle will be caught upon the twisted portion 42 and there held until such time as the teeth of the threshing-cylinder engage the band and break it. This will separate the straw of the bundle and permit it to feed gradually between the cylinder and concave. Inasmuch as such a sheaf or bundle of grain is advanced slowly by the feeding-pans, the heads of the grain in said bundle will have been projected into the path of travel of the cylinder-teeth several times before the bundle has advanced far enough to tilt to the position shown in Fig. 2, and each time the bundle is so advanced by the feeding-pan the heads of the grain will be engaged by the thresher-teeth. Furthermore, by supporting the delivery ends of the feeding-pans materially above the horizontal center of the thresher-cylinder I accomplish another very advantageous result in this: The impact of the thresher-teeth

upon the heads of the grain is in a direction tending to force the grain back upon the feeding-pans, thus temporarily holding the grain upon the ends of the feeding-pans while the threshing-teeth operate upon the grain to separate the kernels from the straw. If the feeding-pans were arranged near or below the horizontal center of the threshing-cylinder, the impact of the teeth upon the grain would tend to draw the grain into the space between the cylinder and concave. Hence the grain would not be temporarily held at the ends of the feeding-pans, and there would be no further separation of grain from the time they are received upon the feeding-pans until they enter between the cylinder and concave, while with my device a very material separation of grain takes place at the ends of the feeding-pans and before the grain enters between the cylinder and concave. The particular reason for locating the delivery ends of the feeding-pans beyond a vertical line drawn through the path of travel of the cylinder-teeth at the end of said path nearest the feeding-pans is this: When the grain projects a slight distance beyond the delivery end of the feeding-pan, the heads thereof will be immediately engaged by the threshing-cylinder teeth and the cylinder-teeth may strike upon the heads a number of times before the grain will begin to pile upwardly before dropping from the feeding-pans, and a narrow space is provided between the delivery ends of the feeding-pans and the threshing-cylinder for the passage of grain, so that if tightly-compressed or wet and tangled masses of grain should be placed upon the feeding-pans the said masses will rest upon the feeding-pans while the cylinder-teeth tear it away and separate the kernels from the straw, and only very small quantities of grain may pass downwardly through the openings between the feeding-pans and the thresher-cylinder. Such a wet or tangled mass of grain will usually rest partially upon two or more of the feeding-pans, and during that portion of the stroke of the feeding-pan where it projects farthest over the thresher-cylinder practically none of the grain may pass from this end between the cylinder and concave, and it is only when at its limit of movement in the direction away from the threshing-cylinder that any considerable quantity of grain may pass from the feeding-pans. Hence as parts of such wet or tangled masses will be resting upon more than one feeding-pan the mass must be fed between the cylinder and concave only in small quantities. Hence the great advantage in causing the feeding-pans to project partially over the threshing-cylinder and as grain is forced upon the feeding-pans faster than it can be delivered to the cylinder the surplus will pile upon top of the cylinder; but it will not clog the cylinder by entering between the cylinder and concave, for if the feeding-pans were farther from the cylinder all of the grain upon the delivery ends thereof would enter between the cylinder and concave. The feature of arranging the feeding-pans near a horizontal plane and providing flat bottoms therefor produces a result that cannot be obtained by endless conveyers. As follows, when the heads of the grain have been projected beyond the delivery end of the pans they will be engaged by the cylinder-teeth. Assuming that the straw is short and dry, the effect of the cylinder-teeth striking upon it will be to tilt the straw and permit it to pass from the pans; but if wet or tangled masses of grain approach the ends of the pans the effect of the cylinder-teeth striking upon the grain will be to not only remove the kernels, but to bend or break the straw at the end of the pan, so that it hangs downwardly, as illustrated in Fig. 3, and is not drawn from the pans, but there held until as each successive movement of the pans causes the straw to bend or break at a new point the straw is thoroughly combed out and the wet or tangled masses separated before leaving the pans. Obviously when the conveyers are used none of the grain can be held at the delivery end of the conveyer for any time; but all grain is advanced between the cylinder and removed alike.

By providing alternately-reciprocating feeding-pans which during part of their travel project above the parts of the cylinder-teeth, and by providing a fixed bottom in the feeder-frame some distance beneath the feeding-pans I accomplish another material advantage in this: The heads of dry grain projecting from the ends of the feeding-pans receive the impact of the thresher-teeth when the teeth are traveling toward the pans, with the effect that the heads are threshed and the kernels thrown away from the cylinder beneath the pans and also beneath the straw hanging from the pans, so that the kernels may pass under the feeding-pans and fall upon the fixed bottom, and from thence they are carried under the layer of straw upon the concave. Furthermore, when threshing wet grain the straw is bent by the thresher-teeth so that it hangs downwardly from the pans, and each time the feeding-pans are reciprocated the heads of the hanging grain are brought into the path of the cylinder-teeth and the kernels are threshed from them. In devices of this class that do not project the feeding-pans above the cylinder-teeth the heads of wet grain hanging from the feeding-pans would not be successively forced into position where they would be engaged by the teeth of the threshing-cylinder. Hence the grain would not be threshed and combed out, but would be carried by the straw between the cylinder and concave in a tangled mass that might clog the cylinder. This feature is of material advantage when it is remembered that in machines which do not separate the kernels from the grain before passing between the cylinder and concave many of the kernels of grain will be thrown on top of a mass of straw and are carried upon said mass

to the discharge end of the threshing-machine, whereas when the separation takes place at the delivery ends of the feeding-pans the kernels and straw are not mixed.

In the modified form shown in Fig. 8 I have shown fingers 51, formed integral with the sides of the pan and projecting parallel with the longitudinal axis of the pan.

One of the vital features of my invention is to provide means by which it is made impossible for a whole bundle of grain or a large, tangled, or wet mass of grain to leave the ends of the feeding-pans without being torn apart and separated along longitudinal lines by the threshing-teeth, and, furthermore, to make it impossible for even a thin layer of grain extending across the whole feeding-surface to leave the pans at the same time. These desirable results are accomplished by causing the pans that support and carry the grain to project during part of their travel to a point above the vertical center of the threshing-cylinder and so close to the cylinder that even a thin layer of grain could not pass between the thresher-teeth and the pans that happen to be at their outer limit of their movement in a direction toward the threshing-cylinder.

By placing the feeding-pans in a plane above the inner ends of the uppermost threshing-teeth I have provided means whereby in the event that two bundles were placed on the pan one above the other the upper one would project above the cylinder's teeth and the cylinder-teeth would engage only the lower one and would have the effect, first, of threshing the grain from the lower one and gradually carrying it away before the teeth could reach the upper bundles.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States therefor, is—

1. The combination with a threshing-cylinder and concave, of a reciprocating feeding device for conveying unthreshed grain to the cylinder, projected during part of its stroke over a portion of the cylinder and coacting with the cylinder-teeth to prevent the passage of the stock from the feeding device, and supporting the grain until its heads are bent backwardly under the feeding device and a portion of the kernels are separated from the heads and thrown under the feeding device away from the cylinder, and during the remainder of its stroke being removed from the cylinder far enough to permit the straw to discharge from the feeding device.

2. The combination with a threshing-cylinder and concave, of a reciprocating feeding device for conveying unthreshed grain to the cylinder, projected during part of its stroke over a portion of the cylinder and coacting with the cylinder-teeth to prevent the passage of the stock from the feeding device, and supporting the grain until its heads are bent backwardly under the feeding device and a portion of the kernels are separated from the heads and thrown under the feeding device away from the cylinder, and during the remainder of its stroke being removed from the cylinder far enough to permit the straw to discharge from the feeding device, a solid bottom some distance beneath the feeding device, and a scraping conveyer traveling over the solid bottom carrying the accumulated grain from the solid bottom to the concave.

3. The combination with a threshing-cylinder and concave, of a series of alternately-reciprocating feeding-pans, each projected during part of its stroke over a portion of the cylinder and coacting with the cylinder-teeth to prevent the passage of the stock from the feeding-pan, and supporting the grain until its heads are bent backwardly under the feeding-pan, and during the remainder of its stroke being removed from the cylinder far enough to permit the straw to discharge from the feeding-pan.

Des Moines, Iowa, November 13, 1901.

ROBERT SHEDENHELM.

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