ATTACHMENT FOR DISTRIBUTING MATERIAL IN THE SEPARATOR OF GRAN COMBINES

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The present invention relates to grain threshing apparatus, and more particularly to an operative attachment which increases the efficiency of some types of such "combination" gran combines.

Some well known and popular types of grain combines have their grain and straw separating mechanism so located, that the flow of material lies parallel to the axis of the beater drum or cylinder. The beater drum, which rotates at a comparatively high speed, throws the straw, the leafy vegetation, and a portion of the grain upon one side of the separating mechanism, thus causing a pile-up of material which reduces the efficiency of the separating mechanism. The present device is designed for the purpose of properly distributing the material across the separating mechanism, or in other words, for evenly distributing the material so that it is maintained at a substantially even thickness during its flow along the separating channel, after it has once been piled up on one side thereof.

Another object of the invention is to provide a re-distributing mechanism which may be easily and quickly installed on the farm, or at other places away from the factory.

A further object is to provide a combine attachment, for the purposes described, which is simple in construction, having few moving parts to become worn or to get out of order.

Other objects will be apparent from the following description when taken in conjunction with the accompanying three sheets of drawings, wherein:

Figure 1 is a fragmentary dotted line perspective view of the Patentee's invention with mechanism of the present invention being shown in solid lines operatively installed thereon;

Figure 2 is a diagrammatic fragmentary side elevational view of a conventional combine, with the arrows indicating how the major portion of the vegetable material is tossed to one side of the separating mechanism;

Figure 3 is an enlarged fragmentary dotted line perspective view of a conventional combine, with the mechanism of the present invention being shown, in solid lines, as being operatively installed thereon;

Figure 4 is a sectional view taken through the mechanism of the present invention in a vertical plane indicated by the line 5—5 of Fig. 5.

Like characters of reference designate like parts in those figures of the drawings in which they occur.

In the drawings:

The reference numeral 1 indicates, as a whole, a conventional grain threshing combine having a frame 2 adapted to be propelled along the earth's surface upon wheels, one of which is shown in Fig. 1, and is indicated by the reference numeral 3.

Journalled for rotation in the frame 2, and driven to rotation by a power unit, not shown, is a horizontal shaft 4 carrying a conventional beater drum or cylinder 5. A conveyor 6 acts to deliver the grain stalks to the drum 5, as they are mowed and are then picked up off the field. The beater drum rotates in a counter-clockwise direction, and its superficial paddles 7 act to beat the stalks upon conveyor spaced bars 8 to cause separation of the grain from the straw. Of course, this separation is not one hundred percent accomplished at the bars 8, and consequently the straw and some of the grain is thrown by the paddles 7 upwardly and rearwardly upon a plurality of spaced apart horizontal slats 9 which form a portion of the "straw-rack." The slats are mechanically shaken and are spaced apart sufficient distances to allow much of the grain and short particles of the straw to pass through.

As best illustrated in Fig. 2 by the dotted arrows, the major portion of the material which is discharged from the drum 5, are thrown against a vertical housing wall 10 from which they gravitate to the slats 9. The result is that the ends of the slats lying most remote from the drum 5, are overloaded, while the ends lying nearest the drum receive only a comparatively small amount of the material. As the slats of the straw-rack 9 are shaken, some of the "fines" pass therebetween and fall upon a lower bed of more closely spaced slats 11. The slats 11 are carried by parallel endless chains, and act to drag the "fines" along a floor to deposit them upon horizontal slats, not shown.

Since the major portion of the material is first discharged upon the remote ends of the upper straw racks 9, the similar ends of the lower slats 11 receive most of the "fines" which pass between the upper racks or slats.

It is obvious that grain can be more efficiently shaken, out of a thin layer of flocculated material, than from a thick pile of such material. It may also be readily understood that when a thick body of the material is delivered upon the sieve by the slats 11, the efficiency of the sieve is greatly reduced. It is conventional practice to blow air upwardly through the sieve, in order to separate the light weight chaff from the grain kernels. This air blast is exhausted upwardly across the entire width of the sieve, and when only one side of the sieve is loaded, the air escapes through the unloaded portion thereof without materially effecting the piled material. By evenly distributing the material across the slats 11, it is delivered to the sieve in a uniformly thick layer.

The mechanism of the present invention is designed for the purpose of dispersing the pile of material which is piled upon similar ends of the slats 11, and to distribute the material over the entire length of the slats.

The combine further includes a power driven pulley 12 (Fig. 1), carried by a horizontal rotatably driven shaft 13. The mechanism thus far described hereinafter, and indicated by the reference numerals 1 to 13, is conventional to some present types of grain combines, and is not a part of the present invention. Such mechanism is merely the organization with which the present device is operationally associated.

The device of the present invention, per se, is best illustrated in Fig. 4 of the drawings, wherein the reference numeral 20 indicates a flat rectangular metal floor section or plate, which is rigidly mounted upon an angle-iron frame. The floor mounting frame is made up of two parallel horizontal side members 21 and 22, and two horizontal end members. One of the end members is shown in Figs. 3 and 4, and is indicated by the reference numeral 23.

A rectangular portion of the floor plate 20 is cut away to give access to a substantially rectangular hopper which is rigidly mounted to the frame members below the floor. The hopper has one vertical side wall 24 and an opposite sloping or outwardly and upwardly inclined side wall 25, and a slanted end wall 26. The bottom of the hopper is transversely arcuate to form a semi-cylindrical housing 27, the end of which is closed by a vertical end wall 28, lying opposite to the sloping end wall 26.

The end walls 26 and 28 of the hopper are alignedly perforated to receive a vertical and a horizontal conveyor 29 which passes through and projects beyond said end walls. Within the hopper, the shaft 29 is equipped with a helical vane 30, which together with the shaft 29, forms a conventional auger conveyor.

One projecting end of the shaft 29 carries a belt pulley 31 which is keyed to the shaft, and at this projecting end of the shaft 29 is journaled in bearings 32 and 33 carried by horizontal extensions 34 and 35 of the frame members 3.

As best illustrated in Figs. 1 and 3, the floor plate and its supporting mechanism is mounted in the combine frame in such a position that the plate 20 lies approximately even with the floor over which the slats 9 are spaced, with the shaft 29 lying below and parallel to the slats.

In order to drive the pulley 31, the driven shaft 13 of the combine is equipped with an auxiliary pulley 36, and an endless drive belt is trained about the two pulleys 31 and 36 for power driving the shaft 29 and its conveyor vane.
With the auger conveyor 36 being driven in a clockwise direction, the "fines" will be distributed longitudinally along the floor upon which the slats 11 travel, thereby eliminating any overload pile on the slats.

It is pointed out that to install the present device upon a combine of the type described, it is only necessary to remove one section of the combine floor, and substitute the floor section 20 in lieu thereof. It is little trouble to make this alteration, and the auxiliary pulley 36 may also be installed on the shaft 13, with little trouble.

Obviously the invention is susceptible to some change or alteration without defeating its practicality, and I therefore do not wish to be confined to the preferred embodiment shown in the drawings and described herein, farther than I am limited by the scope of the appended claims.

I claim:

1. In a grain threshing combine having a grain and straw threshing cylinder, an endless chain of substantially horizontal drag slat mechanism for receiving threshed grain and straw, said mechanism disposed at one side of and below the lowermost edge of said cylinder and having a horizontal imperforate floor disposed below the lower run of said endless chain of slats, said slats adapted to slide laterally across the top of said floor in a direction parallel with the axis of said cylinder, a mechanism for distributing said grain products longitudinally along said slats, including: a hopper disposed intermediate the ends of and below the level of said floor and parallel with said slats for receiving said grain products therein, said hopper having a semi-circular lower portion and an upwardly inclined wall extending laterally in the direction of the travel of said slats; and a power driven auger conveyor axially disposed within said semi-circular portion of said hopper for moving said grain products longitudinally of said hopper, the upper periphery of said auger lying adjacent the bottoms of said slats, whereby the grain products distributed along said hopper and pushed upwardly between said slats will be carried away by the same.

2. In a grain threshing combine having endless chain of spaced-apart substantially horizontal drag slats adapted to slide laterally across the top of a horizontal imperforate floor for receiving threshed grain and straw, a threshing cylinder disposed above and at one side of said floor on an axis lying parallel with relation to the direction of travel of said slats, including: a power driven auger conveyor disposed intermediate the ends of said floor in adjacent parallel relation to said slats with the upper periphery of said auger substantially flush with the top of said floor, and a hopper disposed below the level of said floor encompassing the lower portion of said auger for receiving threshed grain products therein and having one upwardly inclined end and one upwardly inclined wall, said wall extending laterally in the direction of the travel of said slats, whereby the rotation of said auger moves said grain products longitudinally of said hopper and thrusts said products upwardly upon said inclined end and wall between said slats to be carried away by the same.

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