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ROTARY STRAW DECK AND SIEVELESS CHAFFER

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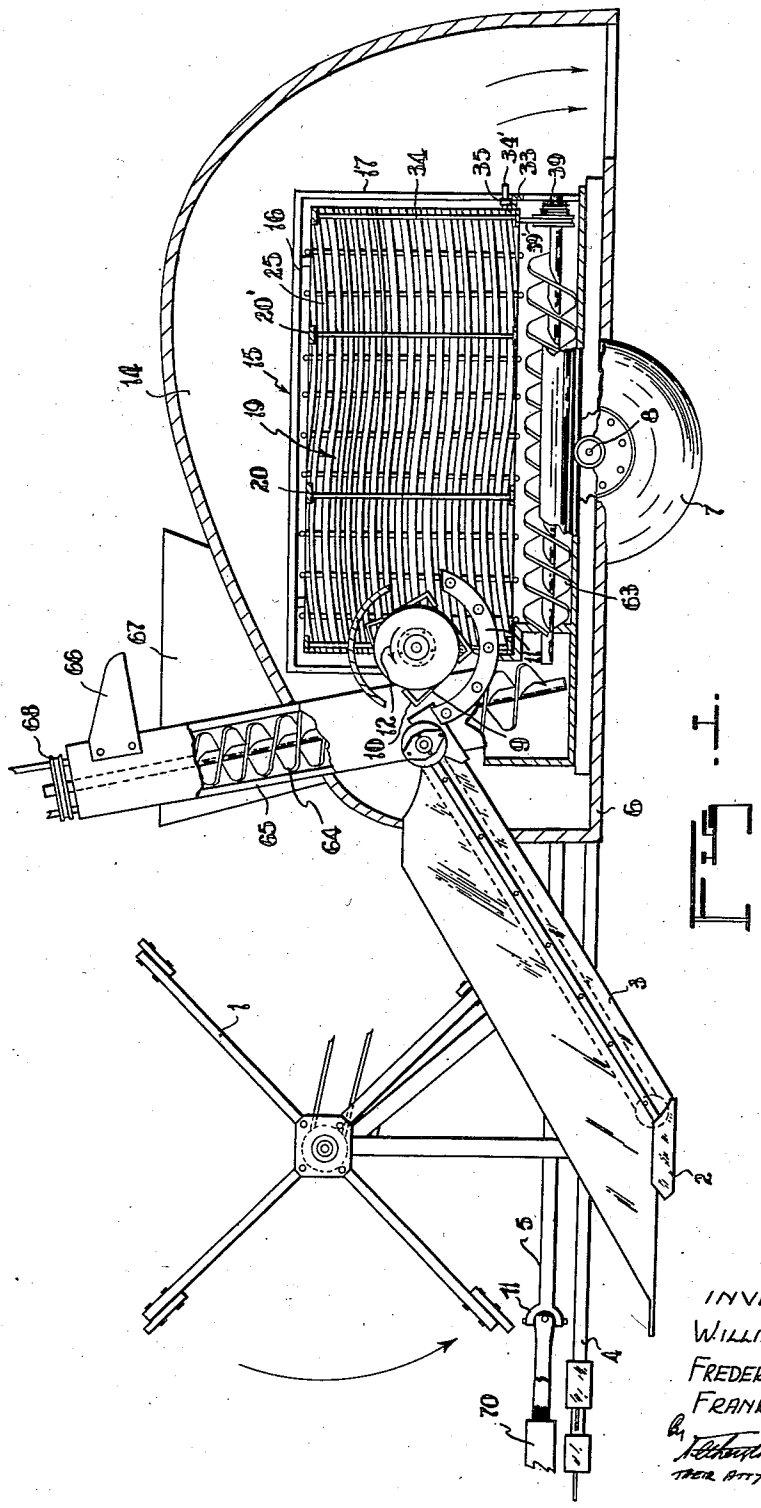


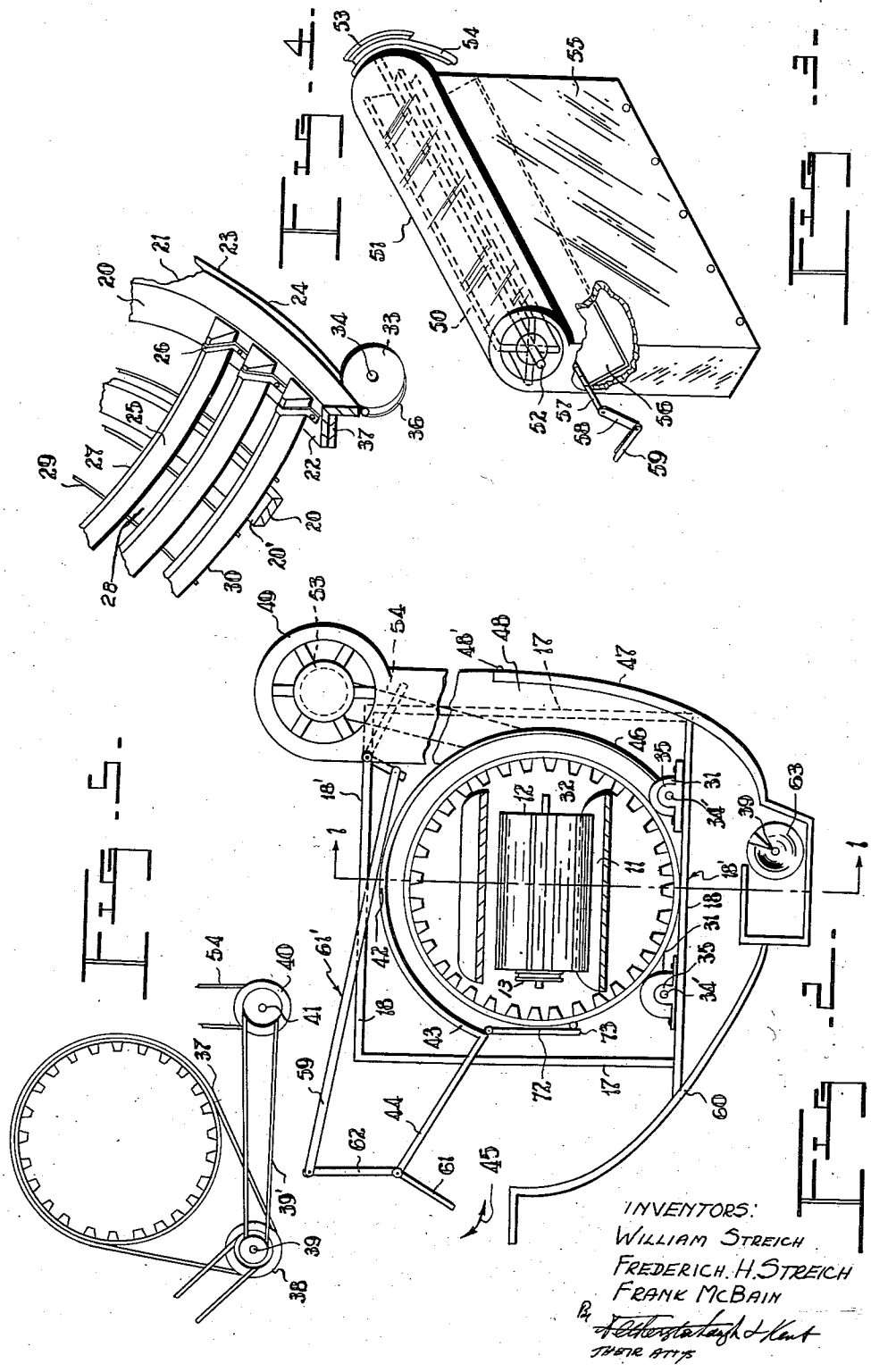
FIG. 1

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ROTARY STRAW DECK AND SIEVELESS CHAFFER

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1 Claim. (Cl. 209—32)

Our invention relates to new and useful improvements in combines, and more particularly to the provision of a rotary straw deck for combines, the principal object of our invention being to provide a device of the character herewithin described which eliminates entirely the conventional reciprocating straw deck and associated chaffing unit.

A further object of our invention is to provide a device of the character herewithin described whereby the threshed grain, straw and chaff is discharged into the rotary straw deck, whereupon the separation of the straw from the grain and chaff takes place, the straw being discharged from the end of the drum or rotary deck.

Another object of our invention is to provide a device of the character herewithin described which includes a sieveless chaffer adapted to separate grain and chaff components by means of an air blast, acting at right angles to the direction of travel of the straw.

A still further object of our invention is to provide a device of the character herewithin described which is virtually impossible to overload in direct contrast to the conventional reciprocating straw deck, which is easily overloaded when an extremely heavy stand of grain is encountered. In this connection, it will be appreciated that the conventional reciprocating straw deck permits the straw and grain to build up in layers when heavy stands are encountered, thus reducing the efficiency of the reciprocation, so that a considerable amount of grain is discharged over the end of the deck with the straw under the circumstances.

A further object of our invention is to provide a device of the character herewithin described in which the straw, grain and chaff are tumbled due to the rotation of the straw deck, thus permitting free fall of the grain, which assists materially in the separation thereof.

Yet another object of our invention is to provide a device of the character herewithin described in which the air blast volume is automatically adjusted depending upon the load of threshed grain passing through the machine.

A further object of our invention is to provide a device of the character herewithin described which contains considerably less moving parts than the conventional combine and is, therefore, economical in manufacture, relatively simple in construction, and otherwise well suited to the purpose for which it is designed.

With the foregoing objects in view, and such other objects and advantages as will become apparent to those skilled in the art to which this invention relates as this specification proceeds, our invention consists essentially in the arrangement and construction of parts all as hereinafter more particularly described, reference being had to the accompanying drawings in which:

Figure 1 is a side elevation of one embodiment of our device, sectioned in part, and fragmented in part the section being substantially along the lines 1—1 of the Figure 2.

Figure 2 is a cross-section, fragmentary view of our device taken just forwardly of the rotary straw deck.

Figure 3 is a perspective view of one of the air blowers used in our device, various parts being broken away and sectioned for clarity.

Figure 4 is an enlarged fragmentary perspective view of one end of the rotary straw deck with some parts in section.

Figure 5 is a rear view of the straw deck per se illustrating the various drive means but on a reduced scale.

In the drawings like characters of reference indicate corresponding parts in the different figures.

Proceeding now to describe our invention in detail, it will be seen upon reference to the accompanying drawings that we have illustrated a conventional combine including a reel 1, cutter bar 2 and elevating canvas table 3, together with an implement hitch 4, which may be attached to an associated tractor (not illustrated), said tractor providing, via its power take-off, a common drive shaft 5.

However, it is to be appreciated that the device hereinafter to be described, could be manufactured as a self-propelled combine rather than the tractor operated type illustrated. The hitch 4 is connected to the framework 6 of the combine, which in turn is supported upon a pair of ground engaging wheels 7 carried upon axles 8. The elevating canvas table 3 is adapted to discharge the cut grain into a conventional threshing cylinder collectively designated 9 and consisting of rasp bars 10 and a concave 11, said cylinder being rotatable in the direction of arrow 12, and driven by means of a pulley 13 and belt (not illustrated) connected to the drive shaft 5 in the conventional manner.

Within the main body 14 of the combine, we have provided supporting structure 15 comprising longitudinals 16, vertical members 17 and transverse member 18, thus forming a boxlike structure collectively designated 18', within which is supported our rotary straw deck collectively designated 19.

Reference to Figure 1 and 4 show the details of construction of this rotary straw deck, which comprises a plurality of circumferentially disposed bands 20 in spaced and parallel relationship, the end ones 21 of which take the form of right angled material having the horizontal flange 22 parallel to the rotary straw deck and the vertical flange 23 at right angles thereto, upon the edge of which is secured a circular cross-section rod 24.

A plurality of longitudinal and spaced slats 25 are secured to the horizontal flanges 22 of the bands 21 and to the faces 20' of the remaining bands 20 by means of angulated clips 26 and reference to Figure 2 and 4 will show that these slats are substantially triangular in cross-section, with the apices 27 facing inwardly. These slats thus provide spaces 28 therebetween through which grain and chaff may be deposited, as will hereinafter be described, but in order to retain the straw within the drum, we have provided a plurality of circumferential wires 29 secured to the outer faces 30 of the slats and in spaced and parallel relationship with the bands.

It should also be noted at this point that the slats spiral rearwardly slightly occasioned by a difference in relationship of the point of attachment of the slats to the forward band to the points of attachment on the rear band and this spiraling, together with the rotation of the drum, urges straw from the intake end of the drum rearwardly and discharges same from the rearward end thereof.

The afore-mentioned drum 19, which is open ended, is mounted upon two pairs of rollers, one pair 31 being adjacent the forward end 32 of the drum and the other pair 33 being adjacent the rear end 34 thereof.

Each of these rollers is journalled upon a shaft 34' supported for rotation within bearings 35 in turn secured to cross-members 18 and reference to Figure 2

shows the positioning of these rollers in order to support the drum for rotation therewithin. In this connection, reference should be made to the afore-mentioned circular cross-sectioned member 24, which is adapted to engage within grooves 36 formed in the rollers 31 and 33.

The drive for rotation of the drum is provided by a belt 37 extending around the rear band 21, as clearly shown in Figure 4 and extending around a triple pulley 38 below and to one side of the rotary straw deck 19.

This triple pulley is mounted upon the end of an auger flight shaft 39, which will hereinafter be described, but at this point mention should be made of Figure 5, which shows a belt 39' extending around one of the sheaves of the triple pulley 38 and around a double pulley 40, which is secured to a main drive shaft 41 and is connected to the drive shaft 5 by conventional means (not illustrated).

Reference to Figure 2 will show that we have provided a semi-cylindrical housing 42 extending over the major portion of the drum and spaced slightly therefrom. The left hand end 43 (with relation to Figure 2) of the housing, is angulated outwardly and upwardly to form the upper wall 44 of a discharge outlet 45 and the right hand end 46 of the housing (also with relation to Figure 2) terminates adjacent the right hand pulley 31. Spaced from the right hand end 46 of the housing is a shroud 47 extending upwardly and forming an air inlet duct 48 between the housing 42 and the shroud 47 and surmounting this air inlet duct is a fan collectively designated 49 and shown in detail in Figure 3. This fan comprises a rotor 50 within a circular open-ended casing 51, said rotor being mounted upon shaft 52, which in turn is provided with a pulley 53 upon one end thereof, over which a belt 54 extends and is connected to the other of the double pulleys 40 hereinbefore referred to. This fan delivers a blast of air through the inlet duct 48 which communicates with housing 42 at one side thereof adjacent the bottom of the deck 19 and discharges the air transversely of the bottom of said deck.

Rotation of the rotor 50 draws air into the ends of the casing 51 and discharges same downwardly through the outlet casing 55, which is connected to the air inlet duct 48 by bolts 48' on similar means and it will be noted that an adjustable flap 56 is situated within the outlet casing being pivotally mounted upon shaft 57, which in turn is provided with an opposite crank 58 connected to linkage 59.

Referring back to Figure 2, it will be seen that on the left hand side of the drawing a further shroud or casing 60 is curved upwardly towards the discharge 45 and forms the opposite wall thereof, said shroud being spaced from the drum as clearly illustrated thus forming an air outlet duct. It will be seen also that a further flap 61 is pivotally or swingably secured on a horizontal axis to the outer extremity of the portion 44 and is adapted to lie within the air discharge area 45 of the outlet duct, said flap also having an angulated crank 62 secured thereto, to which the opposite end of linkage 59 is pivotally attached, the purpose of which will hereinafter become apparent.

The fan 49 together with duct 48 and shrouds 47 and 60 constitute what we define as a sieveless chaffer and it will be appreciated that this chaffer is adapted to operate in a direction at right angles to the longitudinal axis of the straw deck, thus permitting an increase in capacity of the chaffer with relation to the straw deck without any increase in the space required. In other words, a chaffer of conventional design acts in the same direction as the straw deck and therefore the available area of air blast effect is limited to the diameter of the straw deck. With this present design however the effective area of air blast is limited only by the length of the deck and is therefore approximately three times as great in capacity without taking up any more space.

Situated below the drum 19 is a collecting auger 63 and extending the full length of the drum, said auger being mounted upon the afore-mentioned shaft 39. This auger is driven by belt 39', as hereinbefore described and is adapted to convey grain forwardly to a substantially vertical auger 64 mounted within casing 65 and extending upwardly forwardly of the drum and terminating in a discharge spout 66, which is adapted to discharge into a conventional grain tank 67 mounted upon the side of the combine. In this connection, drive for the auger 64 is via a belt and pulley assembly 68 upon the upper end thereof, the belt extending to a convenient power take-off point on the machine (not illustrated).

In operation, the unit, in this embodiment, is attached to an associated tractor (not illustrated), the power take-off of which is secured to drive shaft 5, which is provided with a splined slip joint 70 and a universal joint 71. Grain is cut by the cutter 2 and deposited by means of the reel 1 upon the elevating canvas 3, which conveys same to the threshing cylinder 9, which threshes same in the usual way and deposits threshed grain, chaff and straw into the cylinder or drum 19 which is being revolved, as hereinbefore described.

The straw, grain and chaff mixture is tumbled by the drum 19, thus separating out the grain and chaff, which passes downwardly through the interstices between the slats, the straw being conveyed rearwardly by the screw action occasioned by the spiralling of the slats, to be discharged at the rear end thereof onto the ground in the usual way.

The grain and chaff falling through the interstices between the slats is met by the air blast travelling at right angles to the longitudinal axis of the deck passing down air inlet duct 48, which carries the chaff around the shroud 60 and out of the discharge 45, the grain, being heavier, being deposited adjacent the auger 53, to be conveyed to the grain tank 67.

In order to prevent the air blast interfering with the tumbling action of the drum, we have provided a flap 72 pivotally secured to the lower end of the left hand side of housing 42 (with reference to Figure 2), said flap resting against the wall of the drum and being provided with anti-friction rollers 73 to ensure quiet operation and to prevent straw from being rolled upwardly and dogging the underside of the flap.

From the foregoing description, it will be appreciated that the tumbling action which carries the straw partially around the drum before dropping same vertically across same, prevents overloading occurring, as a straw deck of this type cannot become choked by succeeding layers of straw.

However, when a relatively heavy stand of grain is reached, the air blast passing across the base of the drum tends to be restricted momentarily by the volume of grain and chaff passing therethrough and the self-adjusting air blast control means collectively designated 61' operates, which permits the baffle 61 to fall inwardly or to close, urged by gravity, it being understood that normally this flap is kept in the open position by the pressure of air going therepast.

However, when this flap 61 falls, the linkage 59 which is operatively connected to flap 56 actuates this flap 56 in the blower unit and opens the passageway, it being understood that this flap is normally substantially closed thereby permitting a greater volume of air to pass through the air inlet duct 48, thus taking care of the excess load. Conversely, when the load is decreased, the air passing out of the discharge is increased, thus opening the flap 61 and closing the flap 56 by a similar amount, thus automatically regulating the air passing through the device.

Since various modifications can be made in our invention as hereinabove described, and many apparently widely different embodiments of same made within the spirit and scope of the claim without departing from such spirit and scope, it is intended that all matter contained

in the accompanying specification shall be interpreted as illustrative only and not in a limiting sense.

What we claim as our invention is:

In a grain combine, the combination of a rotary straw deck, a housing enclosing the same, an air inlet duct communicating with said housing at one side thereof adjacent the bottom of said deck, an air outlet duct provided at the other side of said housing, a fan on said inlet duct for delivering a blast of air transversely of the bottom of said deck through said outlet duct, and self-adjusting air blast control means comprising a first flap swingable on a horizontal axis in said outlet duct and urged by gravity to a substantially closed position when material in said deck obstructs the air blast therethrough, a second flap pivotally mounted in said inlet duct and

disposed in a substantially closed position when said first flap is open by an air blast through the outlet duct, and linkage operatively connecting the first flap to the second flap whereby the latter may be opened by closing of the former.

References Cited in the file of this patent

UNITED STATES PATENTS

929,157	McBride	July 27, 1909
1,063,834	Schesser	June 3, 1913
1,226,441	Atterbury	May 15, 1917
1,254,750	Wieler	Jan. 29, 1918
1,907,344	Climer	May 2, 1933