June 19, 1962 R. H. WITT 3,039,256

HAY CRUSHER

Filed June 11, 1959 2 Sheets-Sheet 1

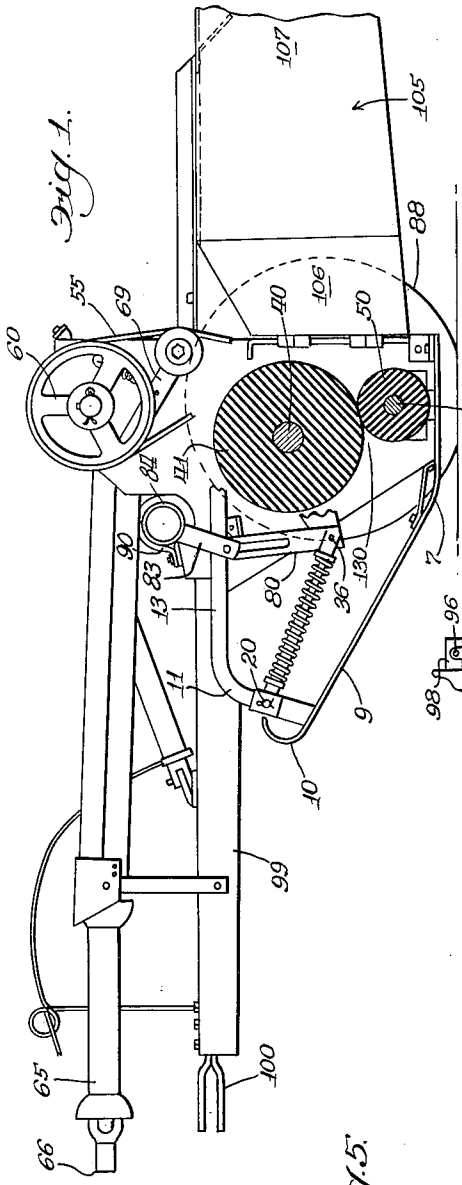


Fig. 1.

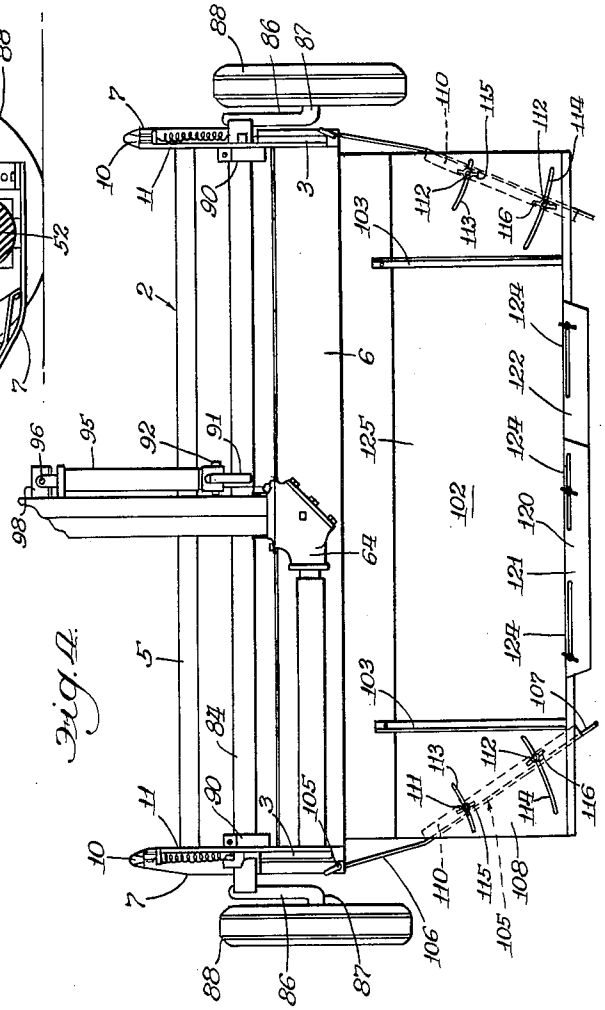


Fig. 2.

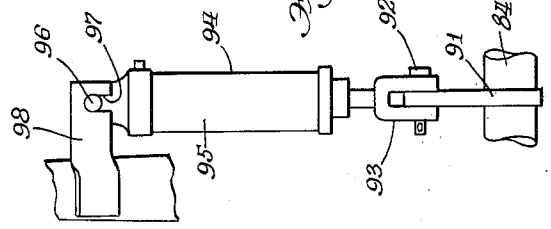


Fig. 5.

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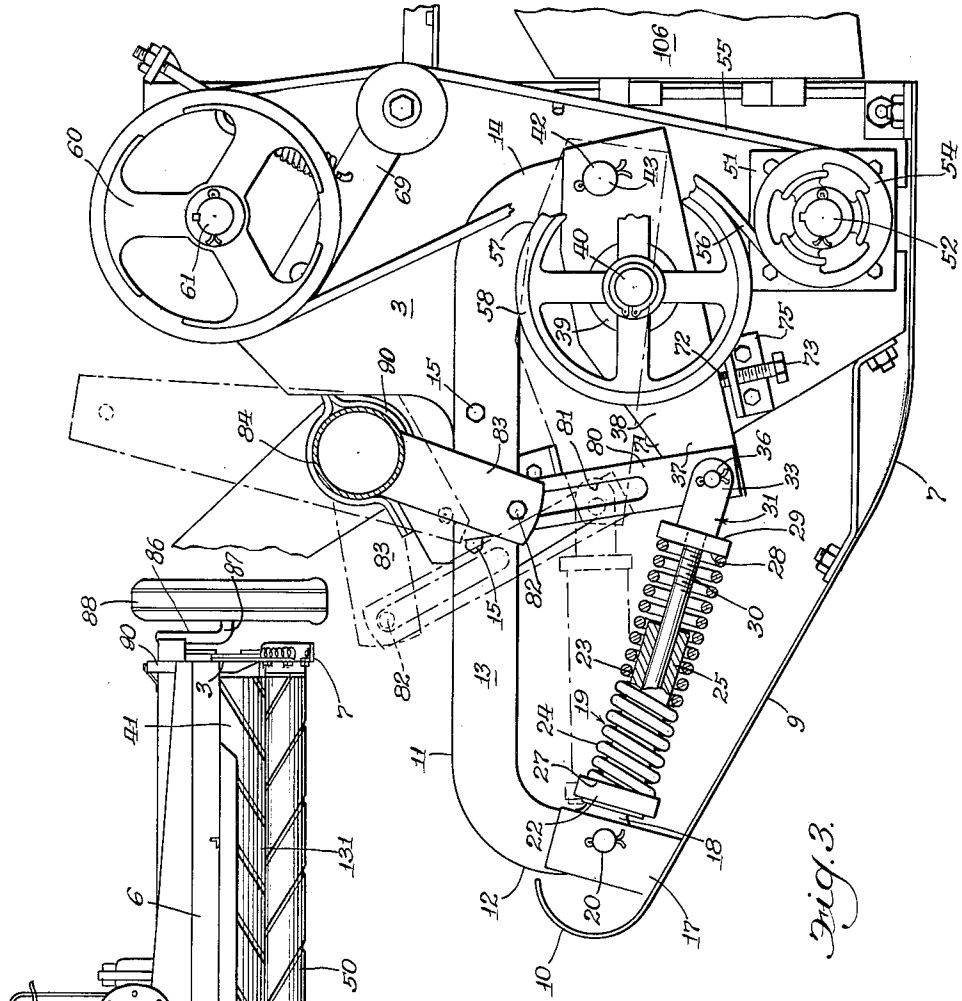


Fig. 3.

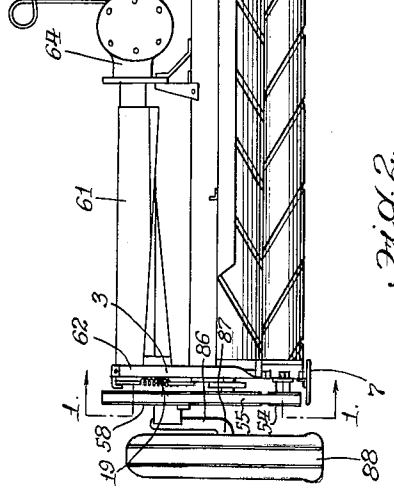


Fig. 2.

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# HAY CRUSHER

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This invention relates to a mechanism for crushing hay and the like and more specifically to a novel and improved form of such hay crusher.

The general object of the invention is to provide a novel and improved hay crusher which incorporates a support structure mounting a pair of upper and lower crushing rolls which are disposed transverse to the direction of travel of the machine and wherein a novel arrangement is employed for providing adequate pressure against the rolls to engage the same.

A further object of the invention is to provide a novel windrowing means carried by the support structure of the crusher and wherein the windrowing means is adjustable to control the width and the deposition of the material.

A still further object of the invention is to provide a novel and simplified linkage for spring loading the crushing rolls, the linkage being so arranged that a minimum amount of variation in the pressure is obtained as the rolls open and close to accommodate varying volume of material.

These and other objects of the invention will become more apparent from the specification and the drawings, wherein:

FIGURE 1 is a longitudinal sectional view of the crushing unit taken substantially on the line 1—1 of FIGURE 2;

FIGURE 2 is a rear elevational view on a reduced scale;

FIGURE 3 is a sectional view on an enlarged scale similar to FIGURE 1 and with parts broken away to more clearly show different aspects of the invention;

FIGURE 4 is a plan view, and

FIGURE 5 is a fragmentary enlarged top elevational view of the operating mechanism.

Describing the invention in detail, the crusher comprises a framework which includes a pair of upright fore and aft extending side panels or walls 3, 3 with an interconnecting brace 5 and a rear sheet metal beam member 6. The lower edges of the panels 3 and 3 are provided with runners or shoes 7, 7 which are adapted to limit downward movement of the unit. These shoes project diagonally upwardly and forwardly as shown at 9 in FIGURE 1.

The upper end of each shoe portion 9 is turned rearwardly as at 10 and in effect forms a divider and a shield for the mounting arm 11 which is turned downwardly at its forward end 12 and suitably connected to the associated shoe as hereinafter described. The arm or support member 11 has a horizontal straight portion 13 and a downwardly and rearwardly bent rear portion 14 (FIG. 3). It will be seen in FIGURE 3 that the member 11 is connected on the portion 13 as by bolting at 15 to the related side panel 3 and that the depending forward end of each arm 11 serves as an anchor together with the bracket 17 which joins with the portion 9 of the shoe and provides an anchor for the upper forward end 18 of a loading spring assembly 19, the end 18 being in the form of an eye which is pivoted to pin 20 which projects transversely and horizontally through the bracket 17.

Each spring assembly 19 comprises a mounting and seating cap 22 which is threaded on the sleeve 23 which extends through the spring 24, the sleeve 23 being integrated with the eye portion 18 and disposed in guiding



relation to the internal side of the associated spring 24. It will be seen that the spring 24 seats at its upper end as at 27 against the interior side of the cap 22 and at its other end seats as at 28 against an adjustable cap or seating member 29. The seating member 29 being threaded on the shank 30 of the member 31 which telescopes into the member or sleeve 25 and collectively therewith serves as a stabilizer for the spring to prevent its transverse deflection. It will be seen that by advancing the seating member 29 on the shank portion 30 of the connecting member 31 the compression of the spring 24 is increased and by retracting the seating member 29 by unthreading it the compression of the spring 24 is decreased. As herein shown the member 22 may be rigid with the sleeve portion 23 and only the member 29 may be rotatable on the threaded portion 30 for adjusting the loading on the spring.

The output end 33 of the spring assembly 19 is pivoted as at 36 by a pin to the lower end 37 of the lever 38, the mounting at 36 being disposed on a substantially horizontal axis. The lever or carrier 38 is provided with a bearing 39 intermediate its end mounting or journaling a shaft 40 of an upper roll 41, the rear end of the lever 38 being pivoted as at 42 on a pin 43 which is suitably mounted on the associated side wall 3 and extending through the rear end portion 14 of the associated inverted U-shaped mounting anchor member 11 as best seen in FIGURE 3. Thus it will be seen that the normal tendency for the spring assembly 19 is to urge the forward end of the lever assembly 38 downwardly about the pivot point 42 and that the assembly 19 and the lever assembly 38 are arranged in toggle fashion, that is, they converge downwardly toward point 36 and are mounted at fixed anchors at the remote ends. The upper roll is urged into engagement with the lower roll 50 which is mounted at opposite ends in bearing structures 51 which are mounted in respective side walls 3 of the main frame. The bearing structures 51 carry the center shaft to the lower roll 50. Shaft 52 projects outwardly at the left side of the machine as viewed from the rear in FIGURE 2 and is connected to a pulley 54 about which is trained a belt 55, the belt having a forward run 56 which is wrapped about a rear side 57 of a pulley 58, the pulley 58 being mounted on the extension of the shaft 40 of the upper roll 41. The belt extends upwardly and is trained about a pulley 60, the pulley 60 being mounted on the shaft 61 which is carried by a support bearing structure 62 mounted on the upper end extension of the panel 3 and also in the gear box 64.

The gear box 64 is suitably mounted on the beam paneling structure 56 and has an input shaft portion 65, the forward end 66 of which is adapted for connection to an associated power unit such as the power take-off of a tractor.

It will be seen that the belt 55 is maintained in proper position by means of a slack adjusting roller assembly structure 69, the mounting of which is obvious from the drawings in FIGURES 1, 2 and 3.

Referring now to FIGURE 3 it will be noted that each arm 38 has its lower edge 71 aligned for abutment with the upper end 72 of an adjusting member 73 which is in the form of a bolt threaded through a bracket 75 mounted on the associated panel 3.

The upper and lower crushing rolls made up of bodies of elastomer material such as lamination of tire carcass disks or molded material and that the loading is transverse of these rolls. If the loading transcends the desired loading then the levers 38 abut against the stop 72.

The pin 36 which forms the junction between the spring assemblies and the crusher roller mounting arms 38 also connects to the lower ends of the operating link or pull member 80 which has an elongated slot 81 which operates

a pin or bolt 82 mounted on the lower end of an arm 83 which is connected to the rockshaft 84. There is an arm 83 adjacent to each end of the rockshaft 84 and the outer extremities of the rockshaft 84 mount rearwardly extending arms 86 each having an outwardly extending spindle 87 mounting an associated supporting wheel 88 as best seen in FIG. 4 of the drawings.

The rockshaft 84 is mounted at each end in bearings 90 on a generally horizontal transverse axis, bearings 90 being suitably mounted on the associated frame work or paneling 3. The rockshaft 84 is provided intermediate its ends with an upstanding lever 91, the upper end of which is pivoted as at 92 to the piston stem 93 of the ram 94, the cylinder 95 of which is provided with a cross pin 96 which fits within a slot 97 on the bracket 98, the bracket 98 being connected and extending laterally from one side and intermediate the ends of a fore and aft extending tongue or draft member 99.

The inner end of tongue 99 connected to the main frame structure including the member 5 and the member 6 and the forward end of which is provided with suitable connecting means 100 for connection to an associated towing vehicle.

A feature of the invention is in the provision of a windrowing means which comprises a top panel member 102 which extends rearwardly from the member 6, above the rolls 41 and 52 and is carried by a means of braces 103 suitably connected to the member 6. In addition the windrower is provided with a pair of upright side members 105 each of which has a forward portion 106 pivoted on the vertical axis as at 107 to the adjacent panel 3 along its rear edge. Each member 105 also has a rear portion 107 angled inwardly and extends under the portion 108 of the top panel. Each portion 107 comprises an upper inturned flange 110 which is underposed with respect to the related portion 108 and the flange portion 110 is provided with a pair of upstanding bolts 111 and 112 which project upwardly through slots 113 and 114 in the related portion 108, the said slots 113 and 114 being concentric with the pivot of the related side member 105. The bolts 112 and 113 are supplied with butterfly nuts 115 and 116 for tightening the associated structure in adjusted position. It will be seen that the opposed portions 107 of the deflector sheets determine the width of the windrow in conjunction with the downwardly and rearwardly inclined upper deflector sheet assembly 120 which comprises portions 121 and 122 which have transversely elongated slots 24, the portions 121 and 122 overlapping a portion of the center section 125 of the top panel of the deflector structure and being adjustable lengthwise that is transversely of the direction of the movement of the machine in order to correspond to the lateral positions of the portions 107 on the side deflectors. It will be appreciated that as the rolls rotate they gather the material in the forwardly facing transverse intake nip 130 between the rolls and discharge the material through the rear sides 131 in an upwardly and rearwardly discharging stream inasmuch as the upper roll is disposed slightly forwardly of the lower roll. The material impinges against the inner side of the deflector sheet 102 and flows along the converging portions 107 of the side deflector members 105 and is discharged into appropriate windrow.

It will be observed that the points 20, 36 and 42 are so chosen that they are very close to the straight line as shown in the dotted position in FIGURE 3 and that considerable separation of the rolls occurs concomitant with the raising of the crusher. Thus there is little variation in the amount of pressure applied by the upper roll throughout its various positions from operating to transport or discharging position, said transport or discharging position being illustrated in phantom lines in FIGURE 3 in which the unit is raised and the rolls separated to clear out excessive volume or accumulations of material when the machine tends to choke. There is a considerable vertical adjustment of the machine before there is any actuation of the rolls and this is due to the lost motion connection obtained between the slot 81 and the pin 82 so that pin 82 must reach the upper end of slot 81 before the rolls begin to separate due to the extension of the ram 94 which rotates shaft 84 thus rotating arm 83 counterclockwise FIGURE 3 with attendant elevation of link 80 upon pin 82 reaching the upper end of slot 81 whereupon the carrier 38 is rotated in a counterclockwise direction lifting the upper roll 41 off the roll 52. Simultaneously the wheel mounting arms 86 are rotated downwardly which in effect lowers the wheels and elevates the hay conditioner.



I claim:

1. In a hay conditioner having a main frame including a pair of horizontally spaced apart side supports, roll mounting and adjusting mechanism comprising a first horizontal roll journalled at opposite ends on the supports; a pair of horizontal carriers each pivoted to a respective side support, intermediate portions of said carriers journaling the adjacent ends of a second roll, and said carriers having terminal forward ends, a pair of biasing means pivotably connected respectively between the respective side supports and the forward ends of respective carriers in a toggle arrangement.

2. The invention according to claim 1 and a wheel and axle assembly supporting the frame and including a transverse axle rotatably mounted on the frame and rotatable from a position wherein the assembly supports the conditioner in an elevated position to a lowered operating position and vice versa, and a lost-motion connection between said toggle arrangement and said axle effective to break the toggle upon elevation of the conditioner to separate the rolls.

3. The invention according to claim 1 and each side support comprising an inverted U-shaped member having front and rear legs, the rear leg pivoted to the respective carrier and the forward leg pivoted to the respective biasing means.

4. The invention according to claim 1 and the point of pivot of the biasing means to the respective carrier being below the points of pivot of the carrier and biasing means to the support.

5. A hay conditioner comprising a frame, a first and a second roll mounted on said frame for rotation about horizontal, parallel axes, said rolls having peripheries normally in generally abutting relationship, said second roll being movable radially away from said first roll responsive to material passing between the rolls, means supporting said second roll on said frame for such movement including a member swingable relative to the frame, and a pressure exerting member pivoted to said frame and to said member, said pressure exerting member and said first mentioned member being swingable past dead center to relieve pressure on said second roll.


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