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Moeller

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[54] **APPARATUS FOR ASSEMBLING AND STACKING MATERIAL**

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[52] **U.S. Cl.** **214/82,** 56/346, 100/218, 214/9, 214/519

[51] **Int. Cl.** **A01d 89/00**

[58] **Field of Search** 214/82, 9, 83.3, 214/152; 130/20; 56/346; 100/91, 218, 240, 245, 250

[56] **References Cited**

UNITED STATES PATENTS

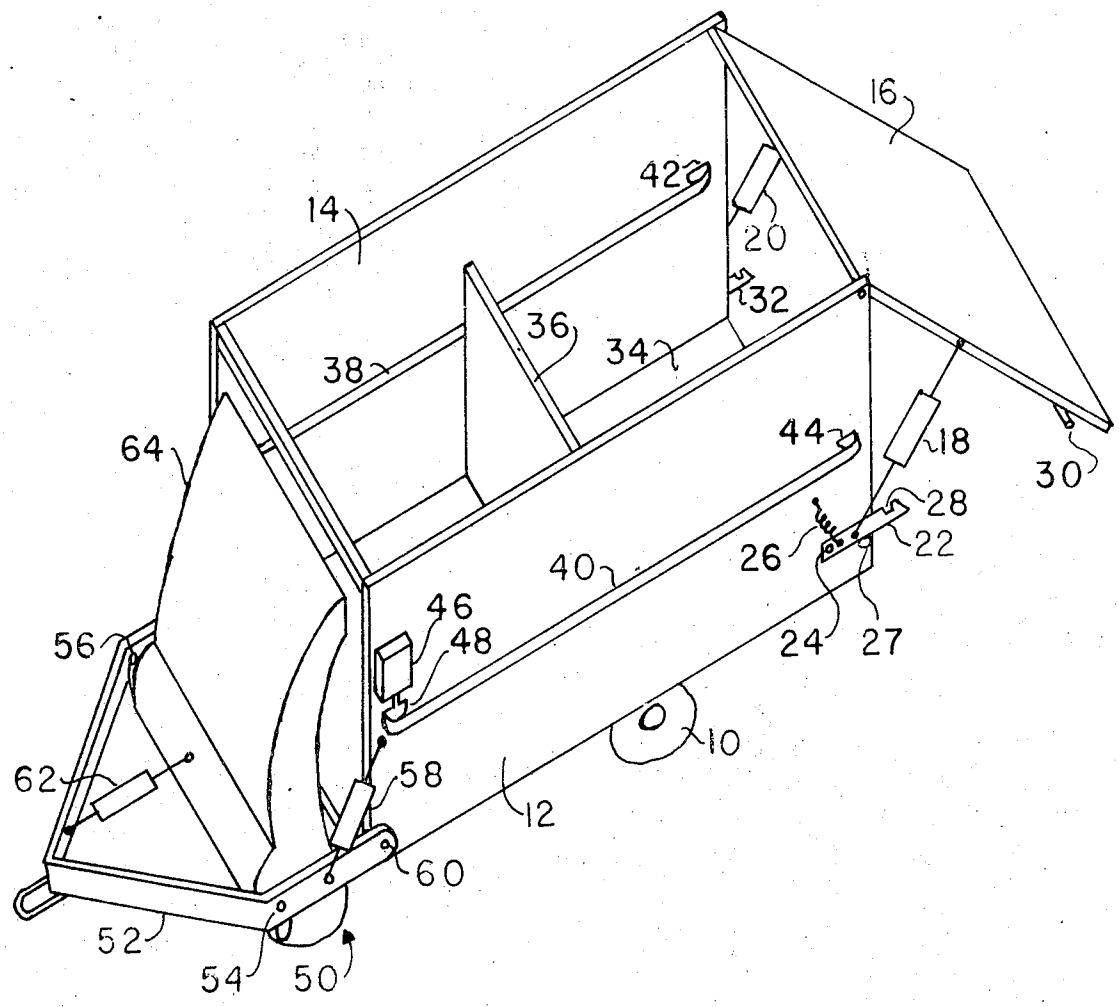
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Primary Examiner—Gerald M. Forlenza
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[57] **ABSTRACT**

The means for and the method of stacking material, such as fodder, from a mobile device which will pick up the material in the field and pack it in a stack shape or prism and deliver it to the site where it is to be stored. Upon arrival at the site, the stack will be ejected from the device as a complete stack.

2 Claims, 2 Drawing Figures



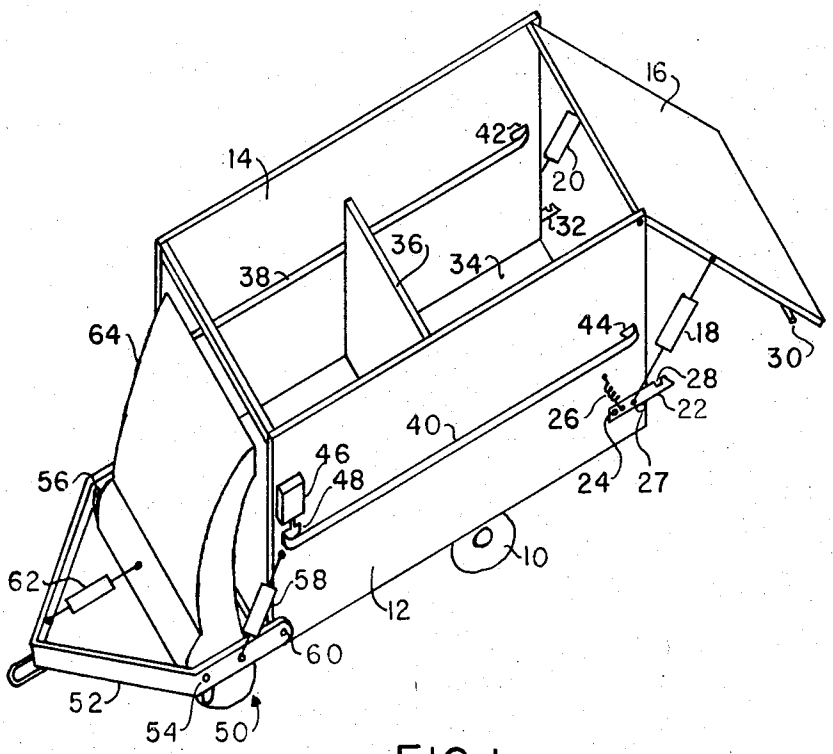

16
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FIG. 1

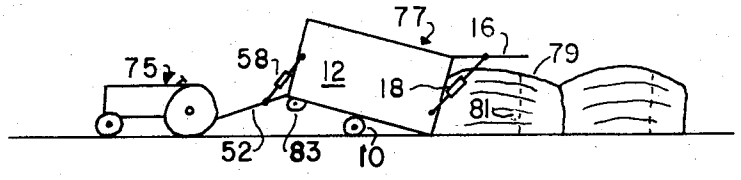

77
16
79
75
58
12
18
81
52
83
10

FIG. 2

APPARATUS FOR ASSEMBLING AND STACKING MATERIAL

The present invention is generally related to farm implements and more particularly related to a device for gathering, packing, and stacking material such as fodder used in animal husbandry.

The prior art has disclosed means for field stacking material, such as fodder, in a mobile device so that upon completion of a stack it can be moved to a convenient spot for unloading. However, the prior art has suffered from various deficiencies, a major one of which is that they have been designed to pack the material from the top and then unload the material from front to rear. Thus, two completely separate mechanisms were utilized for packing and ejecting the stack. A second deficiency of the prior art has been that due to the method of packing, the material is packed very unevenly and the resulting stack tends to sag in the middle and form a pocket in which water settles and then proceeds to seep through the entire stack.

The present invention overcomes both of the indicated deficiencies of the prior art by using the same apparatus for packing the material in the enclosure and then for later ejecting the material. This method of packing also forms a stack with the stems of the fodder in a more tightly compacted condition, wherein the stems are generally aligned with the length of the stack, to facilitate run-off of water or other precipitation falling on the stack. Since a stack is normally longer than it is high, the present packing method permits higher packing pressures with the same total force as previously was applied from the top. A final feature of the packing device of the present invention is that the stack is formed with the most material in the center of the stack and thus the center remains the highest even after the stack settles and water tends to run off towards each end and not settle in pockets to later permeate the entire stack. One example of prior art stacking apparatus is shown in U.S. Pat. No. 3,556,327.

It is thus an object of the present invention to provide an improved stack forming means.

Other objects and advantages of the present invention will be apparent from a reading of the specification and appended claims in conjunction with the drawing wherein:

FIG. 1 is an isometric view of one embodiment of a stacker constructed in accordance with the teachings of the present invention; and

FIG. 2 is a sketch of the stacker of FIG. 1 connected to a tractor and shown in a position of ejecting a stack onto the ground.

In FIG. 1 a mobile trailer unit is shown mounted on wheels **10**, one of which is shown, and having first and second sides **12** and **14**, respectively. In addition, the trailer contains a tailgate **16** attached by pivotal means (not shown) at an upper extremity thereof. The tailgate **16** is moved from a closed to an open position by a pair of pistons **18** and **20** which in general will receive their force-producing fluid from a tractor attached to the trailer. Since such actuation is well known in the art, the actual lines have not been shown connected to the hydraulic cylinders **18** and **20**. While one end of the cylinders **18** and **20** are shown connected to the tailgate **16**, the other end is shown connected to a portion of a latching device **22**. Latching device **22** is pivotally connected to the side **12** of the trailer at a pivotal point **24**.

The latching means **22** is biased in an upward direction by a biasing or spring means **26** and is prevented from moving in a downwardly direction by more than a predetermined amount by a stop **27**. As will be noted, latch **22** contains a notch indicated as **28** which coacts with a rod **30** of the tailgate**16**. A similar latching means **32** is shown extending from side **14**. It also coacts with a rod (not shown) on the other side of tailgate **16** and contains a similar biasing means (not shown). When the force is released from the hydraulic cylinders **18** and **20**, the tailgate **16** will drop into position and the rods will ride over the angled portion of the latching means **22** and **32** and settle in the notches such as **28**. The biasing means will return the latches to an upward condition and hold the tailgate from reopening until power is applied to the hydraulic means **18** and **20** to force the latching means **22** and **32** in a downwardly direction whereby the tailgate is again allowed to move outwardly and upwardly. The bed of the trailer is shown as **34** and interior to the enclosure produced by the tailgate and sides **16, 12** and **14**, is a packing and ejecting means **36** which is generally situated in a forwardly or frontal position within the enclosure. As shown, it is moved partially towards the rear for illustrative purposes. The packer **36** is moved longitudinally of the enclosure via a connection to one or more chains of which chains **38** and **40** are shown. These chains travel on rollers **42** and **44** and are driven by means such as a hydraulic or electric motor **46** which is connected to a drive gear **48**. The chain **38** also has a similar drive motor or can be connected by other chains to the one motor **46**. Although a single pair of chains has been shown to move the packer, it will be realized that other chains may be added at the bottom and other means of moving the packer such as hydraulic may be used in place of the mechanism shown.

A pick-up device and blower means generally shown as **50** and which may be similar to that shown in the referenced patent is connected to a hitch **52** at pivotal points **54** and **56** and is connected at other points such as by a hydraulic or force-producing means **62**. The hitch is connected to the sides of the enclosure **12** and **14** and is shown connected to side **12** at a pivotal point **60**. As will be further described in conjunction with FIG. **2**, a hydraulic cylinder **58** is utilized to tilt the trailer for the purpose of facilitating ejection of a stack by applying pressure between the hitch **52** and the side of the box. A further similarly situated hydraulic means may be advantageously placed on the opposite side of the trailer. The hydraulic means **62** is shown connected between the hitch **52** and the pick-up means **50**. This allows adjustment of the pick-up with respect to the ground and further facilitates high speed movement of the trailer by pivoting the pick-up off from the ground. Other adjustments have appeared on one embodiment of the invention but it is deemed not necessary to complicate the drawing with additional details not pertinent to the invention. Thus, the adjustment as shown is minimal. Within the pick-up means **50** are devices for throwing or injecting the fodder picked up through a chute **64** into the interior of the enclosure. Since the packing means **36** is normally in a most forward position, the fodder is thrown over the top of the packer **36**. In most instances the trailer will be provided with a top to prevent the material from being blown away. The top was removed for purposes of illustration but one embodiment utilized a top with a great many holes to

allow movement of air out of the enclosure after being injected into the enclosure from the blower within pick-up 50. This air is blown in along with the material being picked up and tends to deposit the pieces of material in a generally longitudinal manner (i.e., parallel to the sides) within the enclosure due to the air flow pattern.

The pick-up 50 may also contain cutting devices for chopping field stubble such as corn stalks so that the fodder or material need not be cut and raked into windrows as is often required with some types of prior art devices.

Further, the pick-up need not inject the material over the top of the packer 36, but rather may be of the type which picks up material from the ground and stuffs it in the bottom of the wagon at a point rearward of the packer 36. In this configuration of utilization, the device may not produce a stack with longitudinally situated stems in the fodder but will still operate in substantially the same manner for packing and ejecting the stacked material from the trailer.

Referring now to FIG. 2 it will be noted that a tractor generally designated as 75 is shown connected by the hitch 52 to a trailer device (FIG. 1) generally indicated as 77. The hydraulic means 58 has been operated so that it produces a force between the side of the trailer and the hitch 52 to tilt the trailer as shown. The tailgate 16 has been opened by operation of the hydraulic means 18. Although not shown, the packer means 36 could either be at the rearward most portion of the trailer 77 from having just ejected stack 79 or it could be in the most forward section of the trailer preparatory to ejecting a new stack completely enclosed within the trailer 77. The stacks such as 79 are shown having an imaginary line 81 siruated therein. The line 81 represents a condition, not normally found in the stack representing the portion of the stack which is formed upon the first packing operation of the packer 36. In other words, when the trailer is substantially full of loose material, the operation is stopped and the packer 36 is moved in a rearward direction as far as is possible. This forms a portion of the stack to the rear of the imaginary line 81. In some instances the device will be stopped once again when the trailer is again substantially full and the packer will again be moved towards the rear. Such a second stop is not always necessary and depends on the material being stacked. In any event when the place is reached where the stack is to be ejected from the trailer 77, the trailer is tilted in the position shown via hydraulic lines (not shown) attached to cylinder 58 and the packer 36 is moved to force the stack from the trailer 77. The pressure produced by packer 36 forces material to the center of the stack and packs this material in such a condition that an apex or summit is formed near the center of the stack and the stack slopes towards each end. Thus, water does not settle, after a rain, in the center or another portion of the stack but rather runs off the stack towards the ends. The present method of injecting the material tends to facilitate the longitudinal placement of the sticks or stems of fodder or other material in the stack and by packing from the front to the rear, the longitudinally placed stems of the fodder are interleaved one into the other whereby a much denser stack is formed than is accomplished by packing from the top.

Although not necessary to the practice of the invention, the packer 36 is generally constructed to be powerful enough to eject the stack, such as 79, from the trailer 77 against the stationary forces of the tractor 75 and the trailer 77. Thus, the entire operation of picking up the material, stacking it into the wagon 77 and ejecting it into a stack after opening the tailgate 16 can be accomplished by one person who may remain seated on the tractor 75. The fact that this may all be accomplished by one person increases the efficiency of a field worker.

The apparatus discussed briefly previously for picking up material and injecting the material through the bottom of the trailer is shown in basic outline form as a pickup 83 attached to the underside of trailer 77. Since such a pickup is not the subject of the present application, further expansion thereupon is believed unnecessary. However this point is mentioned to further point out the fact that the primary inventive concept involves compressing material and ejecting it with the packer gate 36 and the concept includes any means of inserting the material in front thereof for said compression, including insertion from the side of the wagon.

While the single embodiment has been shown devoid of some details such as connection for the motor 46 and the various hydraulic cylinders to illustrate power sources, it is believed that such details are not necessary to an explanation of the operation of the inventive concept which after material injection and longitudinal packing allows later movement of the material via the same device to a convenient spot for stacking.

Although a specific embodiment has been disclosed, it is to be realized by those skilled in the art that other embodiments may be designed within the inventive concept and I therefore wish to be limited only by the scope of the appended claims wherein I claim:

1. Stacking apparatus of the class described comprising, in combination:
   - mobile means for supporting material to be stacked and said mobile means being enclosed on at least two sides;
   - gate means attached in a rearward portion of said mobile means wherein said gate means has first and second positions;
   - endless chain drive mechanism means attached to each of said at least two sides for movement within said mobile means and horizontally with respect to said two sides; and
   - packer means movably attached to said endless chain drive mechanism means within said mobile means, said packer means being normally situated in a forward portion of said mobile means and constructed to move rearwardly toward said gate means, material in said mobile means being compacted between front and rear ends thereof upon rearward movement of said packer means when said gate means is in said first position, said material being forceably restrained on only the sides, bottom and ends when said gate means is in said first position and said material being forceably removed from said mobile means to form a stack of said material upon rearward movement of said packer means when said gate means is in said second position.

2. Stacking apparatus of the class described comprising, in combination:
   - mobile means for supporting material to be stacked and said mobile means being enclosed on at least two sides;

gate means attached in a rearward portion of said mobile means wherein said gate means has first and second positions;

packer means movably attached within said mobile means, said packer means being normally situated in a forward portion of said mobile means and constructed to move rearwardly toward said gate means, material in said mobile means being compacted between front and rear ends thereof upon rearward movement of said packer means when said gate means is in said first position, said material being forceably restrained on only the sides, bottom and ends when said gate means is in said first position and said material being forceably removed from said mobile means to form a stack of said material upon rearward movement of said packer means when said gate means is in said second position;

latching means attached for movement between first and second positions, said latching means in said first position holding said gate means in its said first position until said gate means starts movement toward its said second position;

biasing means biasing said latching means toward its said first position; and

force exerting means operably connected between said gate means and said latching means for first moving said latching means to its said first position before moving said gate means to its said second position upon application of force thereto.

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