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Net wrap roll with lift hook location markings

Abstract

A supply roll for a wrap system of a baler implement includes a core having a circumferential wall surface forming a cylindrical shape concentric with a central longitudinal axis. A wrap material includes a length wound about the circumferential wall surface of the core, and defines an exterior circumference. The core and the wrap material cooperate to define a combined center of gravity. An axial position identifier is disposed on the exterior circumference of the wrap material, and is positioned relative to the combined center of gravity to define a desired lift location.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS (1) This application claims the benefit of U.S. Provisional Patent Application Ser. No. 63/267,197, filed on Jan. 27, 2022, the disclosure of which is hereby incorporated by reference.

TECHNICAL FIELD

(1) The disclosure generally relates to a supply roll of a wrap material for a wrap system of a baler implement, and a method of manufacturing the supply roll.

BACKGROUND

(2) A baler implement gathers crop material and forms the crop material into a baler. The baler implement may be configured as a round baler, which forms the bale into a bale having a cylindrical shape. The baler implement may include a wrap system that is operable to wrap or encircle the bale with a wrap material. The wrap material generally may be supplied on a roll, which is loaded into the wrap system. The bale implement may include a roll lift system for lifting the roll of the wrap material into the wrap system. The roll lift system may include a lift hook, which engages one or more loops encircling the roll of the wrap material. If the lift hook and/or the loops are off center relative to a center of gravity of the roll of the wrap material, the roll of the wrap material may tilt or lean to one side while raising the supply roll of the wrap material into

position in the wrap system.

SUMMARY

(3) A supply roll for a wrap system of a baler implement is provided. The supply roll includes a core extending along a central longitudinal axis between a first axial end and a second axial end. The core includes a circumferential wall surface forming a cylindrical shape concentric with the central longitudinal axis. A wrap material includes a width spanning along the central longitudinal axis between the first axial end and the second axial end of the core, and a length wound about the circumferential wall surface of the core. The wrap material defines an exterior circumference substantially perpendicular to the central longitudinal axis. The core and the wrap material cooperate to define a combined center of gravity. An axial position identifier is disposed on the exterior circumference of the wrap material. The axial position identifier is positioned relative to the combined center of gravity to define a desired lift location.

(4) In one aspect of the disclosure, the axial position identifier may include a first axial position identifier and a second axial position identifier spaced apart from each other along the central longitudinal axis and across the combined center of gravity. The first axial position identifier and the second axial position identifier are spaced equidistantly from the combined center of gravity on opposing axial sides of the combined center of gravity along the central longitudinal axis.

(5) In one aspect of the disclosure, the axial position identifier may be positioned along the central longitudinal axis at the combined center of gravity.

(6) In one aspect of the disclosure, the axial position identifier may include a marking printed on the exterior circumference of the wrap material. The marking printed on the exterior circumference of the wrap material may encircle the exterior circumference of the wrap material. In other implementations, the marking may only extend partially around the exterior circumference of the wrap material.

(7) In one aspect of the disclosure, the axial position identifier may include a band wrapped around the exterior circumference of the wrap material.

(8) In one aspect of the disclosure, the supply roll may include a roll cover disposed between the axial position identifier and the wrap material. The axial position identifier may include a marking printed on the roll cover, or a band encircling the roll cover.

(9) A method of manufacturing a supply roll of a wrap material for a wrap system of a baler implement is also provided. The method includes winding the wrap material around a circumferential wall surface of a core. A combined center of gravity of the core and the wrap material may then be determined. An axial position identifier may then be affixed on an exterior circumference of the wrap material relative to the combined center of gravity. The axial position identifier defines a desired lift location determined relative to the combined center of gravity.

(10) In one aspect of the method described herein, the wrap material may be covered with a roll cover prior to affixing the axial position identifier on the exterior circumference of the wrap material.

(11) In one aspect of the method described herein, affixing the axial position identifier on the exterior circumference of the wrap material may include affixing a first axial position identifier and affixing a second axial position identifier equidistantly from the combined center of gravity on opposing axial sides of the combined center of gravity along a central longitudinal axis of the core.

(12) Accordingly, the supply roll described herein includes a marking, i.e., the axial position identifier, that locates the lift location from which the supply roll should be raised. The lift location is determined relative to the combined center of gravity of the core and the wrap material wound thereabout. As such, the axial position identifier enables a user to quickly identify the lift location relative to the combined center of gravity to lift the supply roll in a balanced manner, thereby preventing the supply roll from tilting while being raised. The axial position identifier may include a single marker for a single point lift, or a pair of markers, i.e., the first axial position identifier and the second axial position identifier, for a two-point lift.

(13) The above features and advantages and other features and advantages of the present teachings are readily apparent from the following detailed description of the best modes for carrying out the teachings when taken in connection with the accompanying drawings.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

- (1) FIG. 1 is a schematic perspective view of a baler implement.
- (2) FIG. 2 is a schematic side view of the baler implement showing a lift system raising a supply roll of a wrap material.
- (3) FIG. 3 is a schematic side view of the supply roll.
- (4) FIG. 4 is a schematic end view of the supply roll.
- (5) FIG. 5 is a schematic end view showing the lift system coupled to the supply roll of the wrap material using a hanger and two lift locations.
- (6) FIG. 6 is a schematic end view showing the lift system coupled to the supply roll of the wrap material using a single lift location.

DETAILED DESCRIPTION

- (7) Those having ordinary skill in the art will recognize that terms such as “above,” “below,” “upward,” “downward,” “top,” “bottom,” etc., are used descriptively for the figures, and do not represent limitations on the scope of the disclosure, as defined by the appended claims. Furthermore, the teachings may be described herein in terms of functional and/or logical block components and/or various processing steps. It should be realized that such block components may be comprised of any number of hardware, software, and/or firmware components configured to perform the specified functions.
- (8) Terms of degree, such as “generally,” “substantially” or “approximately” are understood by those of ordinary skill to refer to reasonable ranges outside of a given value or orientation, for example, general tolerances or positional relationships associated with manufacturing, assembly, and use of the described embodiments.
- (9) As used herein, “e.g.” is utilized to non-exhaustively list examples, and carries the same meaning as alternative illustrative phrases such as “including,” “including, but not limited to,” and “including without limitation.” As used herein, unless otherwise limited or modified, lists with elements that are separated by conjunctive terms (e.g., “and”) and that are also preceded by the phrase “one or more of,” “at least one of,” “at least,” or a like phrase, indicate configurations or arrangements that potentially include individual elements of the list, or any combination thereof. For example, “at least one of A, B, and C” and “one or more of A, B, and C” each indicate the possibility of only A, only B, only C, or any combination of two or more of A, B, and C (A and B; A and C; B and C; or A, B, and C). As used herein, the singular forms “a,” “an” and “the” are intended to include the plural forms as well, unless the context clearly indicates otherwise. Further, “comprises,” “includes,” and like phrases are intended to specify the presence of stated features, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, steps, operations, elements, components, and/or groups thereof.
- (10) Referring to the Figures, wherein like numerals indicate like parts throughout the several views, a baler implement is generally shown at **20**. In the example implementation shown in the figures and described herein, the baler implement **20** is configured to produce a bale having a cylindrical shape, and may be referred to as a round baler. However, it should be appreciated that the baler implement **20** may be configured differently than described herein, and that the teachings of the disclosure may apply to implements other than the round baler described herein.
- (11) The baler implement **20** accumulates cut crop material, and forms the accumulated crop material into a bale. In the example implementation described herein, the bale has a cylindrical

shape, and may be referred to as a round bale. Generally, the baler implement **20** accumulates the crop material in a bale forming chamber, wherein the baler implement **20** forms the crop material into the round bale. The manner, process, and/or features used to form the crop material into the round bale in the bale forming chamber are known to those skilled in the art, are not pertinent to the teachings of this disclosure, and are therefore not described in detail herein.

(12) Referring to FIGS. **1** and **2**, the baler implement **20** includes an implement body **22**. The implement body **22** may include one or more panels that form an exterior surface of the baler implement **20**, as well as the frame and other support members that support the panels and other components of the baler implement **20**. The baler implement **20** includes a wrap system **24** that is attached to the implement body **22**. The wrap system **24** includes a supply roll **26** of a wrap material **28** that is supported relative to the implement body **22** in an installed position **30**.

(13) The supply roll **26** of the wrap material **28** includes a width that is substantially equal to, or perhaps slightly larger than, a height (or length) of the round bale. The wrap material **28** may include a film, mesh, net, or other material suitable for wrapping around a circumference of the round bale to secure the shape and/or form of the round bale, and/or to protect the round bale from moisture intrusion. For example, the wrap material **28** may include, but is not limited to, a net or a plastic film that is wound around the circumference of the round bale.

(14) The wrap system **24** is configured for wrapping the wrap material **28** around the formed round bale in the bale forming chamber of the baler implement **20**. As such, the wrap system **24** un-winds the wrap material **28** from the supply roll **26** of the wrap material **28** and feeds the wrap material **28** into the bale forming chamber, where the wrap material **28** is wound around the circumference of the round bale. The specific manner in which the wrap system **24** un-winds the wrap material **28**, feeds the wrap material **28** into the bale forming chamber, and wraps the wrap material **28** around the round bale within the bale forming chamber is not pertinent to the teachings of this disclosure, are known to those skilled in the art, and are therefore not described in detail herein.

(15) Referring to FIGS. **1** and **2**, the baler implement **20** further includes a lift system **32**. The lift system **32** is operable to raise the supply roll **26** of the wrap material **28**, relative to the implement body **22**, into the installed position **30**. As shown in FIG. **2**, the lift system **32** may include a line actuator **34** having a lift line **36**. The lift line **36** extends from the lift location downward for engagement with the supply roll **26** of the wrap material **28**. The lift line **36** may include, but is not limited to, a cable, a rope, a chain, a strap, etc. The lift line **36** may include or may be attached to a hanger **38** for engaging lifting bands **40** associated with the supply roll **26** of the wrap material **28**.

(16) The line actuator **34** may include a mechanism capable of retracting and extending the lift line **36** in order to raise and lower the supply roll **26** of the wrap material **28**. For example, the line actuator **34** may include a winding device having a rotatable member that is rotatable about an axis, and that is capable of winding and un-winding the lift line **36** in order to raise and lower the supply roll **26** of the wrap material **28**. For example, the line actuator **34** may include, but is not limited to, an electrically driven winch or a manually operated winch that winds and unwinds the lift line **36** to raise and lower the roll. It should be appreciated that the lift system **32** may include a device other than the exemplary embodiments of the line actuator **34** described herein for raising the supply roll **26** of the wrap material **28**.

(17) Referring to FIGS. **3** and **4**, the supply roll **26** of the wrap material **28** includes a core **42**. The core **42** extends along a central longitudinal axis **44**, between a first axial end **46** and a second axial end **48**. The core **42** includes a circumferential wall surface **50** forming a cylindrical shape that is concentric with the central longitudinal axis **44**. The core **42** may include a hollow tubular structure, or a solid structure. The core **42** may be manufactured from, but is not limited to, a cardboard material, a plastic material, or a metal material. The core **42** provides a rigid structure against which the wrap material **28** may be wound or wrapped, and supports the wrap material **28** while in the wrap system **24** of the baler implement **20**.

(18) The wrap material **28** includes a width spanning along the central longitudinal axis **44** of the

core **42**, between the first axial end **46** and the second axial end **48** of the core **42**. The wrap material **28** further includes a length that is wound about the circumferential wall surface **50** of the core **42**. The wrap material **28** is wound about the core **42** to form several layers of the wrap material **28** as is understood in the art. The wrap material **28** wound around the core **42** defines an exterior circumference **52**. The exterior circumference **52** of the wrap material **28** is substantially perpendicular to the central longitudinal axis **44** of the core **42**, and is defined by the outer most layer of the wrap material **28**.

(19) A roll cover **54** may be wrapped around the exterior circumference **52** of the wrap material **28** for protection. The roll cover **54** may include, but is not limited to, a solid plastic sheet that is wrapped around the exterior circumference **52** of the wrap material **28** and fully covers the length of the wrap material **28**.

(20) The core **42** and the wrap material **28** cooperate to define a combined center of gravity **56** of the supply roll **26**. If equipped with the roll cover **54**, the roll cover **54** may further contribute to define the combined center of gravity **56** of the supply roll **26**. As is understood by those in the art, the combined center of gravity **56** of the supply roll **26** is a point from which the weight of the supply roll **26** may be considered to act.

(21) The supply roll **26** further includes an axial position identifier **58**, **58A**, **58B** that is disposed or positioned adjacent the exterior circumference **52** of the wrap material **28**. The axial position identifier **58**, **58A**, **58B** is positioned relative to the combined center of gravity **56** to define a desired lift location **60**, **60A**, **60B**. The desired lift location **60**, **60A**, **60B** is the preferred location from which to lift the supply roll **26** from when raising the supply roll **26** via the lift system **32** into the wrap system **24** of the baler implement **20**.

(22) Referring to FIG. 5, as described above, the lift system **32** may utilize the hanger **38** attached to the lift line **36**. The hanger **38** has a single attachment location to the lift line **36**, but includes two attachment locations for supporting the supply roll **26**, i.e., a first pocket **62** and a second pocket **64**. The first pocket **62** and the second pocket **64** are spaced equidistance from the lift line **36**. Accordingly, in order to secure the supply roll **26** to the hanger **38** of the lift system **32**, the axial position identifier may include a first axial position identifier **58A** and a second axial position identifier **58B** spaced apart from each other along the central longitudinal axis **44** of the core **42** and across the combined center of gravity **56** of the supply roll **26**. As such, the first axial position identifier **58A** and the second axial position identifier **58B** are spaced equidistantly from the combined center of gravity **56** of the supply roll **26** on opposing axial sides of the combined center of gravity **56** along the central longitudinal axis **44** of the core **42**.

(23) As noted above, the combined center of gravity **56** of the supply roll **26** is the point at which gravitational forces may be considered to act on the supply roll **26**. By lifting the supply roll **26** at two locations that are spaced equidistant from and on opposing sides of the combined center of gravity **56**, the supply roll **26** is balanced while raised, and will not significantly shift, tilt or lean. The first axial position identifier **58A** may be positioned relative to the combined center of gravity **56** to define a desired first lift location **60A**. Similarly, the second axial position identifier **58B** may be positioned relative to the combined center of gravity **56** to define a desired second lift location **60B**. The first axial position identifier **58A** and the second axial position identifier **58B** identify the two desired lifting locations **60A**, **60B** corresponding to the first pocket **62** and the second pocket **64** of the hanger **38** from which to lift the supply roll **26** from. Accordingly, a user may easily identify the desired lift locations **60A**, **60B** to secure the supply roll **26** to the hanger **38** via the first axial position identifier **58A** and the second axial position identifier **58B**.

(24) If the hanger **38** is not used to raise the supply roll **26**, the supply roll **26** may be directly attached to the lift line **36**, whereby the supply roll **26** is engaged at only a single desired lift location **60**. Referring to FIG. 6, when lifting from the single desired lift location **60**, the lift line **36** may be secured to the supply roll **26** along the central longitudinal axis **44** at the combined center of gravity **56**. As such, the axial position identifier **58** may be positioned along the central

longitudinal axis **44** at the combined center of gravity **56** to identify the desired lift location **60** for a single location lift.

(25) The axial position identifier **58**, **58A**, **58B** may include a marking printed or otherwise affixed on the exterior circumference **52** of the wrap material **28**. For example, the axial position identifier **58**, **58A**, **58B** may include a paint or ink marking applied to the exterior circumference **52** of the wrap material **28**. The axial position identifier **58**, **58A**, **58B** may include a marking that does not fully encircle the exterior circumference **52** of the wrap material **28**, e.g., a dot, dash, star, etc. In other implementations, the axial position identifier **58**, **58A**, **58B** may include a marking that does fully encircle the exterior circumference **52** of the wrap material **28**.

(26) As noted above, the axial position identifier **58**, **58A**, **58B** may include a paint or ink marking applied to the exterior circumference **52** of the wrap material **28**. In other implementations, the axial position identifier **58**, **58A**, **58B** may include the lifting band **40** wrapped around the exterior circumference **52** of the wrap material **28** in a manner that prevents relative movement between the lifting band **40** and the supply roll **26**, e.g., a tight frictional engagement. It is contemplated that the lifting band **40** utilized for the axial position identifier **58**, **58A**, **58B** may further include a loop **66**, hook, or other feature configured for engaging the hanger **38** and/or the lift line **36** to attach the supply roll **26** thereto.

(27) In other implementations, if the supply roll **26** is equipped with the roll cover **54**, the axial position identifier **58**, **58A**, **58B** may be affixed to the exterior of the roll cover **54**, such that the roll cover **54** is disposed between the axial position identifier **58**, **58A**, **58B** and the wrap material **28**. For example, the axial position identifier **58**, **58A**, **58B** may include a marking printed or painted onto the roll cover **54**. In other implementations, if the roll cover **54** is clear and/or generally translucent, the axial position identifier **58**, **58A**, **58B** may be affixed to the exterior circumference **52** of the wrap material **28** underneath the roll cover **54**, such that the axial position identifier **58**, **58A**, **58B** is visible through the roll cover **54**.

(28) A method of manufacturing the supply roll **26** is also provided. The method includes winding the wrap material **28** around the circumferential wall surface **50** of the core **42**. The wrap material **28** may then be covered with the roll cover **54** if desired.

(29) A combined center of gravity **56** of the core **42** and the wrap material **28** is then determined. If the supply roll **26** includes the roll cover **54**, it should be appreciated that the combined center of gravity **56** includes the roll cover **54** in combination with the core **42** and the wrap material **28**. The combined center of gravity **56** may be determined by, for example, balancing the supply roll **26** to identify the combined center of gravity **56**. In other implementations, the combined center of gravity **56** may be determined for a specific test supply roll **26**, whereby the combined center of gravity **56** for the specific test supply roll **26** may be presumed to approximate the combined center of gravity **56** of all future supply rolls **26** of the same size, material, and construction.

(30) Once the combined center of gravity **56** is determined, the axial position identifier **58**, **58A**, **58B** may be affixed onto an exterior circumference **52** of the wrap material **28** or the roll cover **54**. The position of the axial position identifier **58**, **58A**, **58B** is determined relative to the combined center of gravity **56** at the defined lift location. Affixing the axial position identifier **58**, **58A**, **58B** onto the exterior circumference **52** of the wrap material **28** may include, but is not limited to, painting or marking the axial position identifier **58**, **58A**, **58B** onto the exterior circumference **52** of the wrap material **28** or the roll cover **54**. In other implementations, affixing the axial position identifier **58**, **58A**, **58B** onto the exterior circumference **52** of the wrap material **28** may include, but is not limited to, securing the lifting band **40** or strap around the supply roll **26**.

(31) If the supply roll **26** is to be raised with a single lift location, then affixing the axial position identifier **58** on the exterior circumference **52** of the wrap material **28** includes affixing the axial position identifier **58** at the location along the central longitudinal axis **44** corresponding to the location of the combined center of gravity **56** along the central longitudinal axis **44**.

(32) If the supply roll **26** is to be raised with two lift locations, i.e., the first and second desired

lifting locations **60A**, **60B**, then affixing the axial position identifier **58A**, **58B** on the exterior circumference **52** of the wrap material **28** includes affixing the first axial position identifier **58A** at the first desired lift location **60A** relative to the combined center of gravity **56**, and affixing the second axial position identifier **58B** at the second desired lift location **60B** relative to the combined center of gravity **56**. The first axial position identifier **58A** and the second axial position identifier **58B** are affixed equidistantly from the combined center of gravity **56** on opposing axial sides of the combined center of gravity **56** along the central longitudinal axis **44** of the core **42**.

(33) The detailed description and the drawings or figures are supportive and descriptive of the disclosure, but the scope of the disclosure is defined solely by the claims. While some of the best modes and other embodiments for carrying out the claimed teachings have been described in detail, various alternative designs and embodiments exist for practicing the disclosure defined in the appended claims.

Claims

1. A supply roll of wrap material for a wrap system of a baler implement, the supply roll of wrap material comprising: a core extending along a central longitudinal axis between a first axial end and a second axial end, wherein the core includes a circumferential wall surface forming a cylindrical shape concentric with the central longitudinal axis; a wrap material having a width spanning along the central longitudinal axis between the first axial end and the second axial end of the core, and a length wound about the circumferential wall surface of the core, wherein the wrap material defines an exterior circumference substantially perpendicular to the central longitudinal axis; wherein the core and the wrap material cooperate to define a combined center of gravity; and an axial position identifier on the exterior circumference of the wrap material and positioned relative to the combined center of gravity to define a desired lift location for lifting the supply roll of wrap material into the wrap system of the baler implement.
2. The supply roll set forth in claim 1, wherein the axial position identifier includes a first axial position identifier and a second axial position identifier spaced apart from each other along the central longitudinal axis and across the combined center of gravity.
3. The supply roll set forth in claim 2, wherein the first axial position identifier and the second axial position identifier are spaced equidistantly from the combined center of gravity on opposing axial sides of the combined center of gravity along the central longitudinal axis.
4. The supply roll set forth in claim 1, wherein the axial position identifier is positioned along the central longitudinal axis at the combined center of gravity.
5. The supply roll set forth in claim 1, wherein the axial position identifier includes a marking printed on the exterior circumference of the wrap material.
6. The supply roll set forth in claim 1, wherein the axial position identifier includes a band wrapped around the exterior circumference of the wrap material.
7. The supply roll set forth in claim 1, further comprising a roll cover disposed between the axial position identifier and the wrap material.
8. The supply roll set forth in claim 6, wherein the axial position identifier includes a marking printed on the roll cover.
9. The supply roll set forth in claim 1, wherein the axial position identifier encircles the exterior circumference of the wrap material.
10. A supply roll of wrap material for a wrap system of a baler implement, the supply roll of wrap material comprising: a core extending along a central longitudinal axis between a first axial end and a second axial end, wherein the core includes a circumferential wall surface forming a cylindrical shape concentric with the central longitudinal axis; a wrap material having a width spanning along the central longitudinal axis between the first axial end and the second axial end of the core, and a length wound about the circumferential wall surface of the core, wherein the wrap

material defines an exterior circumference substantially perpendicular to the central longitudinal axis; wherein the core and the wrap material cooperate to define a combined center of gravity; and a first axial position identifier on the exterior circumference of the wrap material and positioned relative to the combined center of gravity to define a desired first lift location; a second axial position identifier on the exterior circumference of the wrap material and positioned relative to the combined center of gravity to define a desired second lift location; and wherein the first axial position identifier and the second axial position identifier are spaced equidistantly from the combined center of gravity on opposing axial sides of the combined center of gravity along the central longitudinal axis to define a desired balanced lift location for lifting the supply roll of wrap material into the wrap system of the baler implement.

11. The supply roll set forth in claim 10, wherein the first axial position identifier and the second axial position identifier each include a respective marking printed on the exterior circumference of the wrap material.

12. The supply roll set forth in claim 10, wherein the first axial position identifier and the second axial position identifier each include a respective band wrapped around the exterior circumference of the wrap material.

13. The supply roll set forth in claim 10, further comprising a roll cover disposed between the first axial position identifier and the wrap material, and between the second axial position identifier and the wrap material.

14. The supply roll set forth in claim 13, wherein the first axial position identifier and the second axial position identifier each include a respective marking printed on the roll cover.

15. The supply roll set forth in claim 10, wherein the first axial position identifier and the second axial position identifier each encircle the exterior circumference of the wrap material.
