IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF IOWA
WESTERN DIVISION

UNVERFERTH MFG. CO., INC. Plaintiff, v. MERIDIAN MFG., INC., Defendant.	Case No. 5:19-cv-4005 **COMPLAINT** **JURY TRIAL DEMANDED**

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff, Unverferth Manufacturing Company, Inc. ("Unverferth"), by and through the undersigned counsel, files this Complaint for Patent Infringement against Defendant, Meridian Manufacturing, Inc. ("Defendant" or "Meridian"), and hereby alleges as follows:

NATURE OF THE ACTION

1. This is a civil action for patent infringement. Plaintiff's claims are based on the unauthorized, infringing manufacture, use, sale, and/or offer for sale by Defendant of certain of its seed tender products including, for example, Meridian's Seed Express seed tender products.

THE PARTIES

2. Plaintiff Unverferth is a corporation organized and existing under the laws of the State of Ohio having a place of business at 601 South Broad Street, Kalida, Ohio 45853. Unverferth also operates a manufacturing facility at 27612 Temple Ave., Shell Rock, Butler County, Iowa 50670.

Unverferth Exhibit 2009
Par-Kan v. Unverferth
IPR2024-01427

3. Defendant Meridian is a corporation organized and existing under the laws of the State of Iowa having a place of business at 2902 Expansion Blvd., Storm Lake, Buena Vista County, Iowa 50588.

JURISDICTION AND VENUE

4. This is an action for patent infringement arising under the provisions of the Patent Laws of the United States, 35 U.S.C. §§ 271, 281 and 283-285. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

5. Defendant is incorporated in the State of Iowa and has a regular and established place of business at 2902 Expansion Blvd., Storm Lake, Iowa 50588, which is located within this judicial district. Defendant has manufactured, used, offered for sale and/or sold, and currently manufactures, uses, offers for sale, and/or sells infringing products, including the Seed Express seed tender products, at Defendant's facilities in this judicial district.

6. Defendant has placed its infringing products into the stream of commerce with the expectation that they will be offered for sale, sold and used in this judicial district. By way of example, and upon information and belief, Defendant's infringing Seed Express seed tender products have been and are currently available at Defendant's facilities at 2902 Expansion Blvd., Storm Lake, Iowa 50588, which are located within this judicial district. Upon information and belief, Defendant has also offered for sale and/or sold infringing Seed Express seed tender products through dealers at locations within this judicial district and the state of Iowa, including for example, Renze Feed Corp., located at 302 E 6th Street, Wall Lake, Iowa 51466.

7. This Court has personal jurisdiction over Defendant.

8. Venue is proper in this Court pursuant to 28 U.S.C. §§ 1391 and 1400(b).

THE PATENTS-IN-SUIT

9. On July 17, 2012, the United States Patent and Trademark Office ("the USPTO") duly and legally issued U.S. Patent No. 8,221,047 ("the '047 patent"), which is attached hereto as Exhibit A.

10. Plaintiff Unverferth is the owner of all right, title and interest in and to the'047 patent, including the right to sue for and recover all past, present and future damages for infringement of the '047 patent.

11. On March 3, 2015, the USPTO duly and legally issued U.S. Patent No. 8,967,940 ("the '940 patent"), which is attached hereto as Exhibit B.

12. Plaintiff Unverferth is the owner of all right, title and interest in and to the '940 patent, including the right to sue for and recover all past, present and future damages for infringement of the '940 patent.

13. On August 29, 2017, the USPTO duly and legally issued U.S. Patent No. 9,745,123 ("the '123 patent"), which is attached hereto as Exhibit C.

14. Plaintiff Unverferth is the owner of all right, title and interest in and to the'123 patent, including the right to sue for and recover all past, present and future damages for infringement of the '123 patent.

15. Plaintiff Unverferth manufactures, uses, sells, and/or offers for sale seed tender products that practice the '047, '940, and '123 patents, including by way of example its Seed Runner 2750, Seed Runner 2755, Seed Runner 2755XL, Seed Runner 3750, Seed Runner 3750XL, Seed Runner 3755, Seed Runner 3755XL, Seed Runner 3955XL, Seed Runner 3955DXL, Seed Runner 4955DXL, Seed Runner 5000, Seed Pro 200, Seed Pro 210, Seed Pro 400, Seed Pro 410, and Seed Pro 410XL products.

16. Plaintiff has complied with the statutory marking provisions of 35 U.S.C. § 287(a) with respect to the ’047, ’940, and ’123 patents. Unverferth has affixed a serial number decal to its products that identifies the ’047, ’940, and ’123 patents and/or a publicly accessible website that identifies the ’047, ’940, and ’123 patents.

17. Defendant had knowledge of Unverferth’s seed tender products and the ’047 patent no later than September 5, 2012. On September 5, 2012, Plaintiff Unverferth served Defendant with a Complaint asserting that Defendant’s seed tender products that existed at the time infringed the ’047 patent. See Unverferth Mfg. Co., Inc. v. Meridian Mfg. Grp., Inc., No. 3:12-cv-02248-JJH (N.D. Ohio Sept. 5, 2012) (D.I. 1).

18. Upon information and belief, Defendant had knowledge of Unverferth’s ’940 and ’123 patents, which are continuations of the ’047 patent, prior to the filing of this Complaint.

19. Upon information and belief, Defendant has continued to use, manufacture, sell, and/or offer for sale seed tender products that practice the ’047, ’940, and ’123 patents after learning of Unverferth’s ’047, ’940, and ’123 patents.

DEFENDANT’S INFRINGING ACTS

Infringement of the ’047 Patent

20. Defendant has manufactured, used, sold and/or offered for sale, and currently manufactures, uses, sells, and/or offers for sale products in and/or into the United States that infringe at least claim 1 of the ’047 patent under United States law. Non-limiting examples of Defendant’s products that infringe the ’047 patent include Meridian’s Seed Express seed tenders, such as the Seed Express 400 SLD and 405 SLD series models (the “Accused Products”). Annotated photographs of Meridian’s Accused Products are attached hereto as Exhibit D, Figures 1-8.

21. Defendant's Accused Products are a seed or grain tender including a frame, a main hopper mounted on the frame and having a main hopper discharge.

22. Defendant's Accused Products include a base mounted on the frame below the main hopper discharge.

23. Defendant's Accused Products include a support arm having first and second ends.

24. Defendant's Accused Products include a first coupling connecting the first end of the support arm with the base, the first coupling being rotatable in relation to the base about a first vertical axis of rotation, and the first end of the support arm being rotatable in relation to the first coupling about a first horizontal axis of rotation.

25. Defendant's Accused Products include a conveyor having a longitudinal axis and first and second ends, a conveyor hopper at the first end, a conveyor discharge at the second end, and an internal elevator for moving seed or grain from the conveyor hopper to the conveyor discharge.

26. Defendant's Accused Products include a second coupling connecting the second end of the support arm with the conveyor at an approximate center of gravity of the conveyor, the second coupling defining a second vertical axis of rotation that is not parallel to the conveyor longitudinal axis, and the conveyor being rotatable in relation to the second end of the support arm about the second vertical axis of rotation between an unloading position wherein the conveyor hopper is disposed below the main hopper discharge to receive agricultural product from the main hopper and a loading position wherein the conveyor discharge is disposed above the main hopper to dispense agricultural product into the main hopper.

Infringement of the ’940 Patent

27. Defendant has manufactured, used, sold and/or offered for sale, and currently manufactures, uses, sells, and/or offers for sale products in and/or into the United States that also infringe at least claim 16 of the ’940 patent under United States law. Non-limiting examples of Defendant’s products that infringe the ’940 patent include the Accused Products.

28. Defendant’s Accused Products are a seed or grain tender including a main hopper having a main hopper discharge.

29. Defendant’s Accused Products include a base positioned below the main hopper.

30. Defendant’s Accused Products include a support arm having first and second ends.

31. Defendant’s Accused Products include a first coupling connecting the first end of the support arm with the base, the first coupling being rotatable in relation about a first vertical axis of rotation, and the first end of the support arm being rotatable about a first horizontal axis of rotation.

32. Defendant’s Accused Products include a conveyor having a longitudinal axis and first and second ends, a conveyor hopper at the first end, and a conveyor discharge at the second end.

33. Defendant’s Accused Products include a second coupling connecting the second end of the support arm with the conveyor at an approximate center of gravity of the conveyor, the second coupling defining a first conveyor axis of rotation that is not parallel to the conveyor longitudinal axis, and the conveyor being rotatable about the first conveyor axis of rotation between an unloading position wherein the conveyor hopper is disposed below the main hopper discharge to receive agricultural product from the main hopper and a loading position wherein

the conveyor discharge is disposed above the main hopper to dispense agricultural product into the main hopper.

Infringement of the ’123 Patent

34. Defendant has manufactured, used, sold and/or offered for sale, and currently manufactures, uses, sells, and/or offers for sale products in and/or into the United States that infringe at least claim 1 of the ’123 patent under United States law. Non-limiting examples of Defendant’s products that infringe the ’123 patent include the Accused Products.

35. Defendant’s Accused Products are a seed or grain tender including a main hopper having a main hopper discharge.

36. Defendant’s Accused Products include a support arm having first and second ends.

37. Defendant’s Accused Products include a first end of the support arm being located below the main hopper and being rotatable in relation about a first axis of rotation.

38. Defendant’s Accused Products include a first end of the support arm being rotatable about a second axis of rotation that is perpendicular to the first axis of rotation.

39. Defendant’s Accused Products include a conveyor having a longitudinal axis and first and second ends, a conveyor hopper at the first end, a conveyor discharge at the second end, and an internal elevator for moving seed or grain from the conveyor hopper to the conveyor discharge.

40. Defendant’s Accused Products include a second end of the support arm that is coupled with the conveyor between the first and second ends of the conveyor.

41. Defendant's Accused Products include a conveyor that is rotatable about a third axis of rotation at the second end of the support arm that is not parallel to the conveyor longitudinal axis.

42. Defendant's Accused Products include a conveyor that is rotatable in relation to the second end of the support arm about the third axis of rotation between an unloading position wherein the conveyor hopper is disposed below the main hopper discharge to receive agricultural product from the main hopper and a loading position wherein the conveyor discharge is disposed above the main hopper to dispense agricultural product into the main hopper.

43. Defendant's Accused Products include a hydraulic piston extending at an acute angle relative to a horizontal plane to connect with a portion of the support arm spaced from the second axis of rotation.

44. Upon information and belief, Defendant reverse-engineered and copied Plaintiff's seed tender products when designing Defendant's Seed Express seed tender products.

COUNT 1
(Direct Infringement of the '047 Patent)

45. Plaintiff repeats and re-alleges the allegations of Paragraphs 1-44 above, as if set forth herein.

46. Defendant has directly infringed and is directly infringing at least claim 1 of the '047 patent by making, using, offering for sale, and/or selling at least the Accused Products, and will continue to do so unless enjoined by this Court.

47. Defendant's direct infringement of the '047 patent has damaged and will continue to damage Plaintiff and will continue to cause Plaintiff substantial and irreparable harm unless enjoined by this Court.

48. Defendant had knowledge of the ’047 patent prior to the filing of this Complaint. Upon information and belief, Defendant has willfully infringed, and continues to willfully infringe, the ’047 patent.

COUNT 2
(Indirect Infringement of the ’047 Patent)

49. Plaintiff repeats and re-alleges the allegations of Paragraphs 1-48 above, as if set forth herein.

50. Defendant is inducing infringement of at least claim 1 of the ’047 patent under 35 U.S.C. § 271(b) by actively encouraging third parties, such as equipment dealers, to offer for sale and sell the Accused Products while knowing such offers for sale and sales constitute infringement. Defendant provides marketing and advertising information to equipment dealers to promote the infringing sales and offers for sale. Exemplary marketing and advertising materials are attached hereto as Exhibit E.

51. Defendant is also inducing infringement of at least claim 1 of the ’047 patent under 35 U.S.C. § 271(b) by encouraging third parties, such as customers, to use the Accused Products while knowing that such uses constitute infringement. Defendant provides product manuals to customers to encourage the infringing use. An exemplary product manual is attached hereto as Exhibit F.

52. Despite having knowledge of the ’047 patent, Defendant has continued to actively encourage third parties, such as customers and equipment dealers, to infringe the ’047 patent. The marketing and advertising information attached hereto as Exhibit E and the product manual attached hereto as Exhibit F continue to be made available to equipment dealers and customers after Defendant had knowledge of the ’047 patent.

53. Defendant's indirect infringement of the '047 patent has damaged and will continue to damage Plaintiff. Defendant's indirect infringement will also continue to cause Plaintiff substantial and irreparable harm unless enjoined by this Court.

54. Defendant had knowledge of the '047 patent prior to the filing of this Complaint. Upon information and belief, Defendant has willfully infringed, and continues to willfully infringe, the '047 patent.

COUNT 3
(Direct Infringement of the '940 Patent)

55. Plaintiff repeats and re-alleges the allegations of Paragraphs 1-54 above, as if set forth herein.

56. Defendant has directly infringed and is directly infringing at least claim 16 of the '940 patent by making, using, offering for sale, and/or selling at least the Accused Products, and will continue to do so unless enjoined by this Court.

57. Defendant's direct infringement of the '940 patent has damaged and will continue to damage Plaintiff and will continue to cause Plaintiff substantial and irreparable harm unless enjoined by this Court.

58. Upon information and belief, Defendant had knowledge of the '940 patent prior to the filing of this Complaint. Upon information and belief, Defendant has willfully infringed, and continues to willfully infringe, the '940 patent.

COUNT 4
(Indirect Infringement of the '940 Patent)

59. Plaintiff repeats and re-alleges the allegations of Paragraphs 1-58 above, as if set forth herein.

60. Defendant is inducing infringement of at least claim 16 of the ’940 patent under 35 U.S.C. § 271(b) by actively encouraging third parties, such as equipment dealers, to offer for sale and sell the Accused Products while knowing such offers for sale and sales constitute infringement. Defendant provides marketing and advertising information to equipment dealers, and other incentives, to promote the infringing sales and offers for sale. Exemplary marketing and advertising materials are attached hereto as Exhibit E.

61. Defendant is also inducing infringement of at least claim 16 of the ’940 patent under 35 U.S.C. § 271(b) by encouraging third parties, such as customers, to use the Accused Products while knowing that such uses constitute infringement. Defendant provides product manuals to customers to encourage the infringing use. An exemplary product manual is attached hereto as Exhibit F.

62. Upon information and belief, despite having knowledge of the ’940 patent, Defendant has continued to actively encourage third parties, such as customers and equipment dealers, to infringe the ’940 patent. The marketing and advertising information attached hereto as Exhibit E and the product manual attached hereto as Exhibit F continues to be made available to equipment dealers and customers after Defendant had knowledge of the ’940 patent.

63. Defendant’s indirect infringement of the ’940 patent has damaged and will continue to damage Plaintiff. Defendant’s indirect infringement will also continue to cause Plaintiff substantial and irreparable harm unless enjoined by this Court.

64. Upon information and belief, Defendant had knowledge of the ’940 patent prior to the filing of this Complaint. Upon information and belief, Defendant has willfully infringed, and continues to willfully infringe, the ’940 patent.

COUNT 5
(Direct Infringement of the ’123 Patent)

65. Plaintiff repeats and re-alleges the allegations of Paragraphs 1-64 above, as if set forth herein.

66. Defendant has directly infringed and is directly infringing at least claim 1 of the ’123 patent by making, using, offering for sale and/or selling at least the Accused Products, and will continue to do so unless enjoined by this Court.

67. Defendant’s direct infringement of the ’123 patent has damaged and will continue to damage Plaintiff and will continue to cause Plaintiff substantial and irreparable harm unless enjoined by this Court.

68. Upon information and belief, Defendant had knowledge of the ’123 patent prior to the filing of this Complaint. Upon information and belief, Defendant has willfully infringed, and continues to willfully infringe, the ’123 patent.

COUNT 6
(Indirect Infringement of the ’123 Patent)

69. Plaintiff repeats and re-alleges the allegations of Paragraphs 1-68 above, as if set forth herein.

70. Defendant is inducing infringement of at least claim 1 of the ’123 patent under 35 U.S.C. § 271(b) by actively encouraging third parties, such as equipment dealers, to offer for sale and sell the Accused Products while knowing such offers for sale and sales constitute infringement. Defendant provides marketing and advertising information to equipment dealers, and other incentives, to promote the infringing sales and offers for sale. Exemplary marketing and advertising materials are attached hereto as Exhibit E.

71. Defendant is also inducing infringement of at least claim 1 of the ’123 patent under 35 U.S.C. § 271(b) by encouraging third parties, such as customers, to use the Accused Products while knowing that such uses constitute infringement. Defendant provides product manuals to customers to encourage the infringing use. An exemplary product manual is attached hereto as Exhibit F.

72. Upon information and belief, despite having knowledge of the ’123 patent, Defendant has continued to actively encourage third parties, such as equipment dealers, to infringe the ’123 patent. The marketing and advertising information attached hereto as Exhibit E and the product manual attached hereto as Exhibit F continues to be made available to equipment dealers and customers after Defendant had knowledge of the ’123 patent.

73. Defendant’s indirect infringement of the ’123 patent has damaged and will continue to damage Plaintiff. Defendant’s indirect infringement will also continue to cause Plaintiff substantial and irreparable harm unless enjoined by this Court.

74. Upon information and belief, Defendant had knowledge of the ’123 patent prior to the filing of this Complaint. Upon information and belief, Defendant has willfully infringed, and continues to willfully infringe, the ’123 patent.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff prays that this Court enter judgment that:

A. The ’047, ’940, and ’123 patents are valid and enforceable;

B. The ’047, ’940, and ’123 patents are directly infringed by Defendant;

C. The ’047, ’940, and ’123 patents are indirectly infringed by Defendant;

D. Defendant has willfully infringed the ’047, ’940, and ’123 patents;

E. Defendant be permanently enjoined from manufacturing, using, selling and offering to sell the infringing products in the United States prior to the expiration of the ’047, ’940, and ’123 patents;

F. Plaintiff be awarded damages adequate to compensate it for Defendant’s infringement of the ’047, ’940, and ’123 patents including lost profits, but in an amount no less than a reasonable royalty, and that such damages be trebled according to 35 U.S.C. § 284;

G. This case is exceptional within the meaning of 35 U.S.C. § 285, and that all costs and expenses of this action, including reasonable attorneys’ fees, be awarded to Plaintiff; and

H. Plaintiff be awarded such further relief as the Court may deem just, necessary, and/or proper.

JURY DEMAND

Plaintiff demands a trial by jury.

Dated: January 23, 2019

Respectfully submitted,

/s/ Michael A. Dee

Michael A. Dee, AT0002043

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Counsel for Plaintiff Unverferth Mfg. Co., Inc.

EXHIBIT A

US008221047B2

(12) **United States Patent**
Petersen et al.

(10) **Patent No.: US 8,221,047 B2**
(45) **Date of Patent: Jul. 17, 2012**

(54) **SEED CARRIER WITH PIVOTING CONVEYOR**

(75) Inventors: **Brian James Petersen**, Ottawa, OH (US); **David Richard Smith**, Fort Jennings, OH (US)

(73) Assignee: **Unverferth Manufacturing Company, Inc.**, Kalida, OH (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 56 days.

(21) Appl. No.: **12/031,867**

(22) Filed: **Feb. 15, 2008**

(65) **Prior Publication Data**

US 2008/0210145 A1 Sep. 4, 2008

Related U.S. Application Data

(60) Provisional application No. 60/901,321, filed on Feb. 15, 2007.

(51) **Int. Cl.**
B60P 1/00 (2006.01)

(52) **U.S. Cl.** **414/523**; 198/312

(58) **Field of Classification Search** 414/523; 111/11; 198/312, 315, 316.1, 317, 318
See application file for complete search history.

(56) **References Cited**

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OTHER PUBLICATIONS

Model 2300 Air System and the Model 4800 Air Drill, both made and sold by Concord, as illustrated in the Concord brochure, 12 pages.

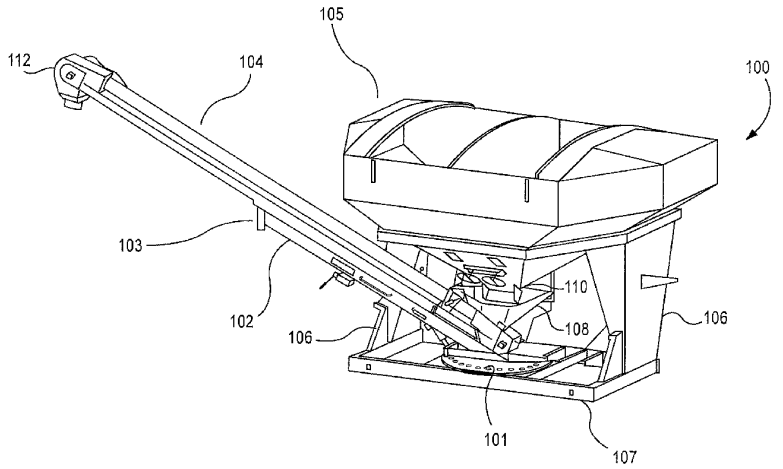
* cited by examiner

Primary Examiner — Joshua Rudawitz
(74) *Attorney, Agent, or Firm* — Rothwell, Figg, Ernst & Manbeck, P.C.

(57) **ABSTRACT**

A seed carrier includes a main hopper coupled with a frame via leg members. The main hopper has a discharge. A base plate is coupled with the frame. A support arm is rotatably coupled with the base plate at a first end. A belt driven conveyor having a conveyor hopper at a first end and a discharge at a second end is rotatably coupled with a second end of said support arm at an approximate center of gravity thereof. A latch mechanism is provided for detachably coupling the first end of the conveyor with the first end of the support arm such that the conveyor hopper is position below the main hopper discharge. When the conveyor is uncoupled from the first end of the support arm, the conveyor can rotate to a loading position wherein the discharge thereof can be positioned over the main hopper.

34 Claims, 11 Drawing Sheets



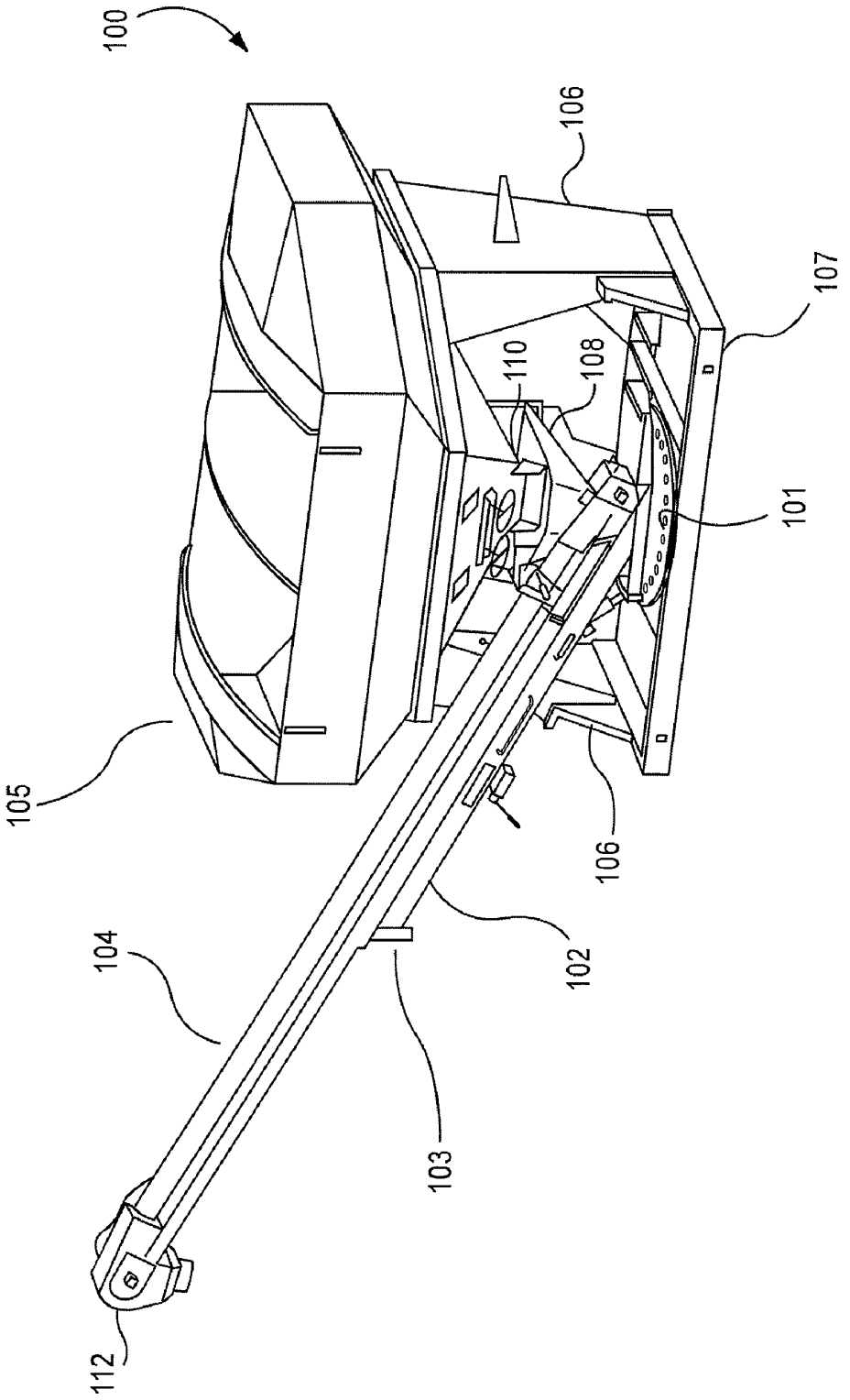


FIG.1

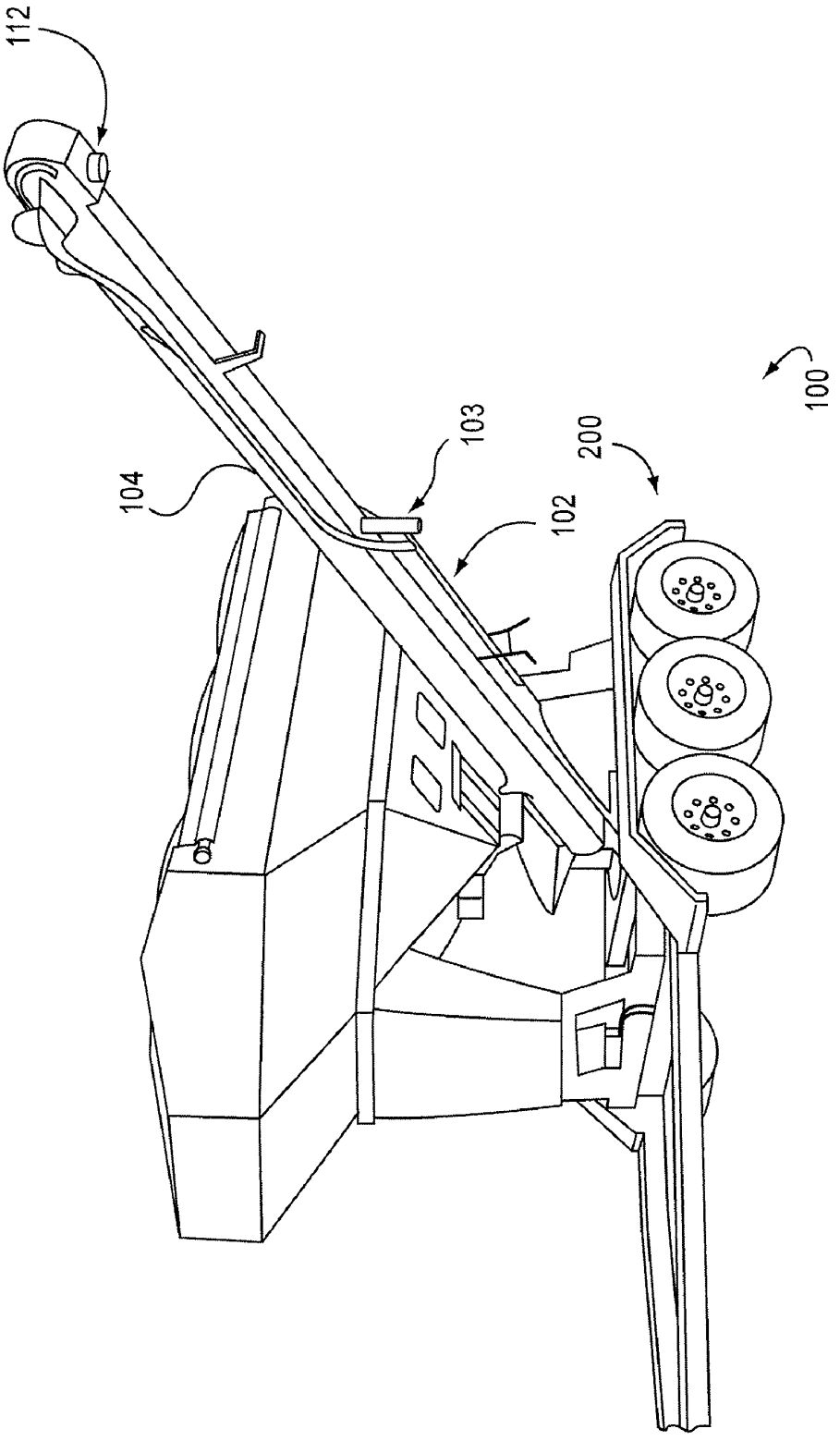


FIG.2

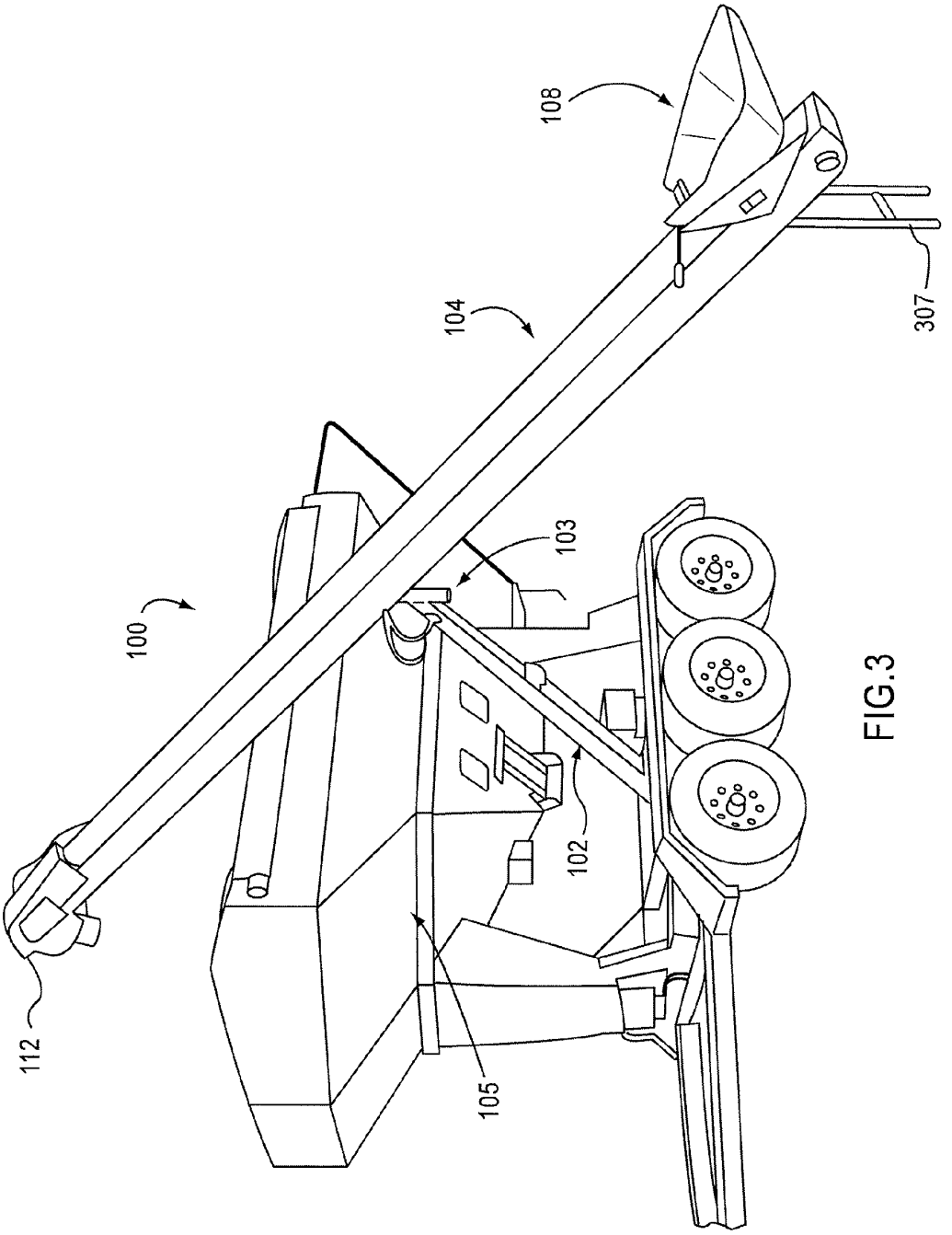


FIG.3

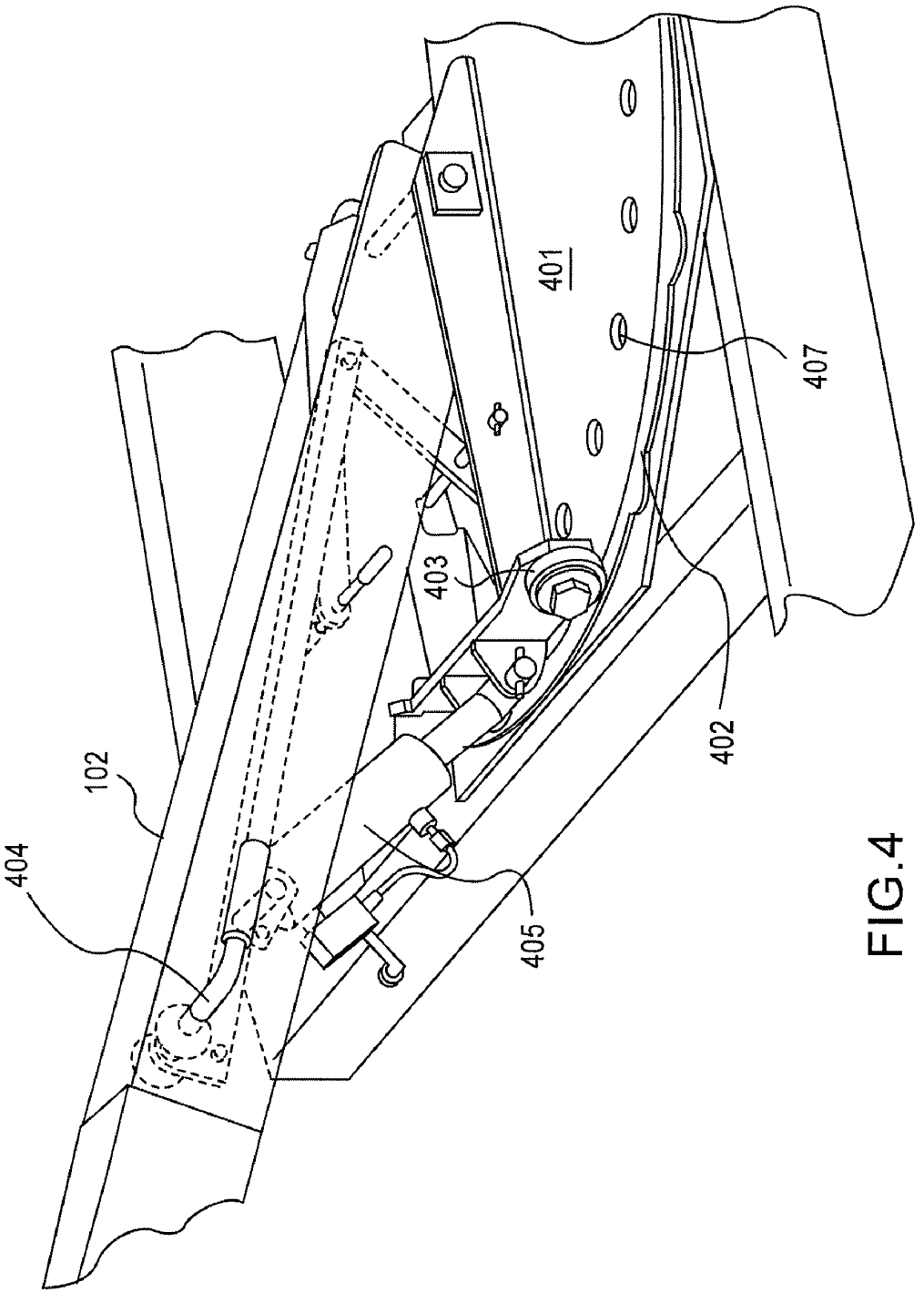


FIG.4

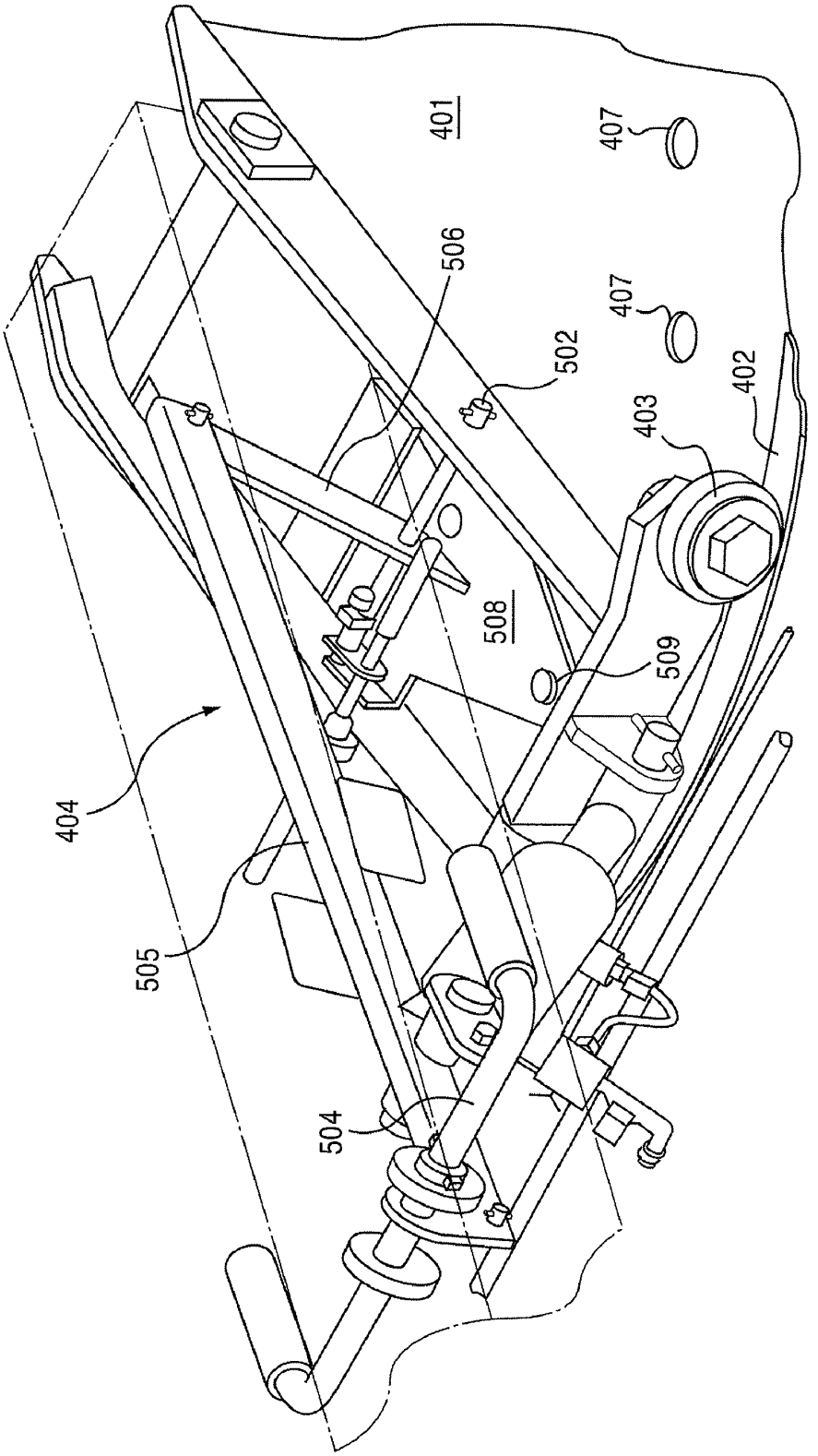


FIG.5

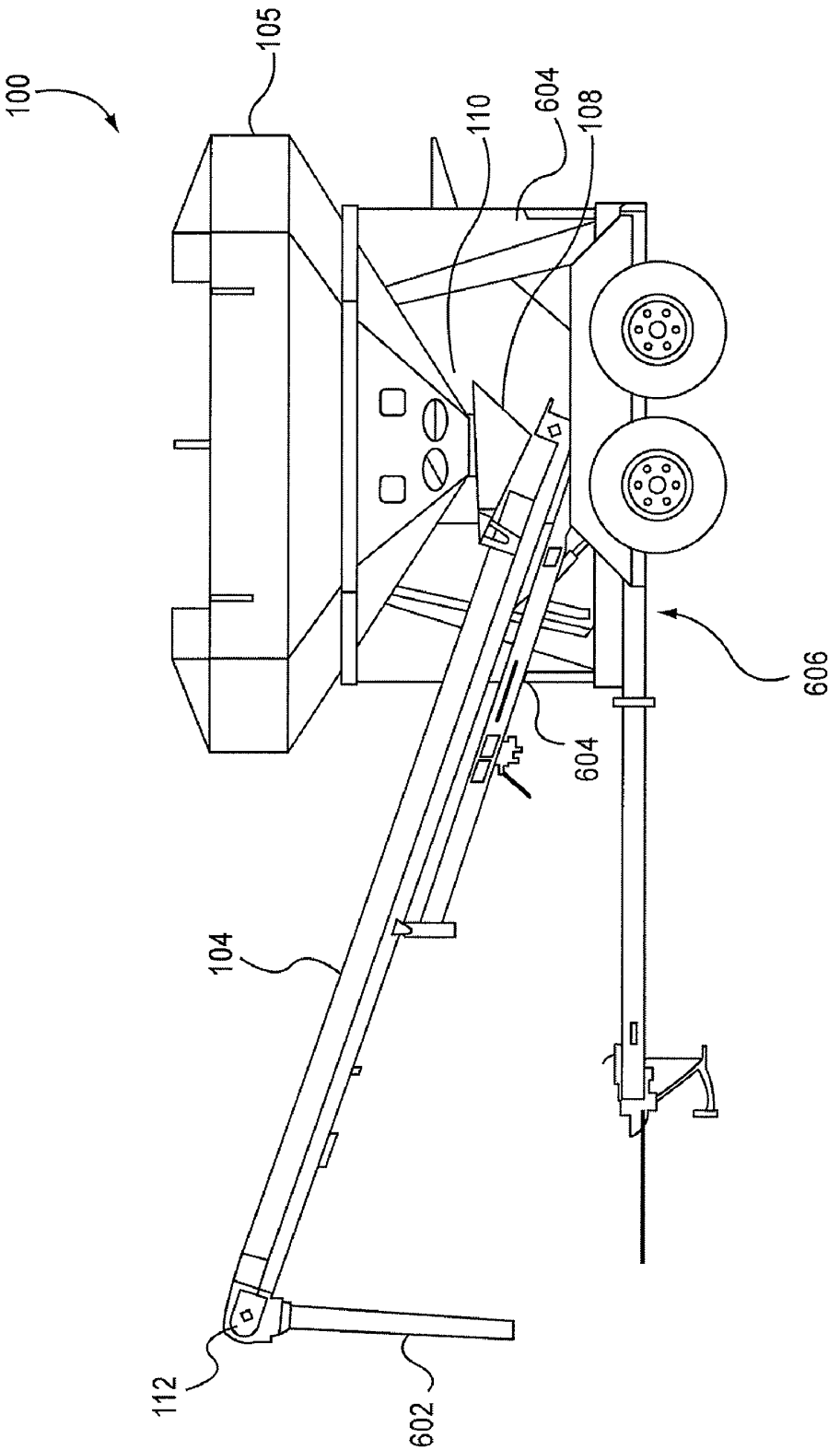


FIG.6

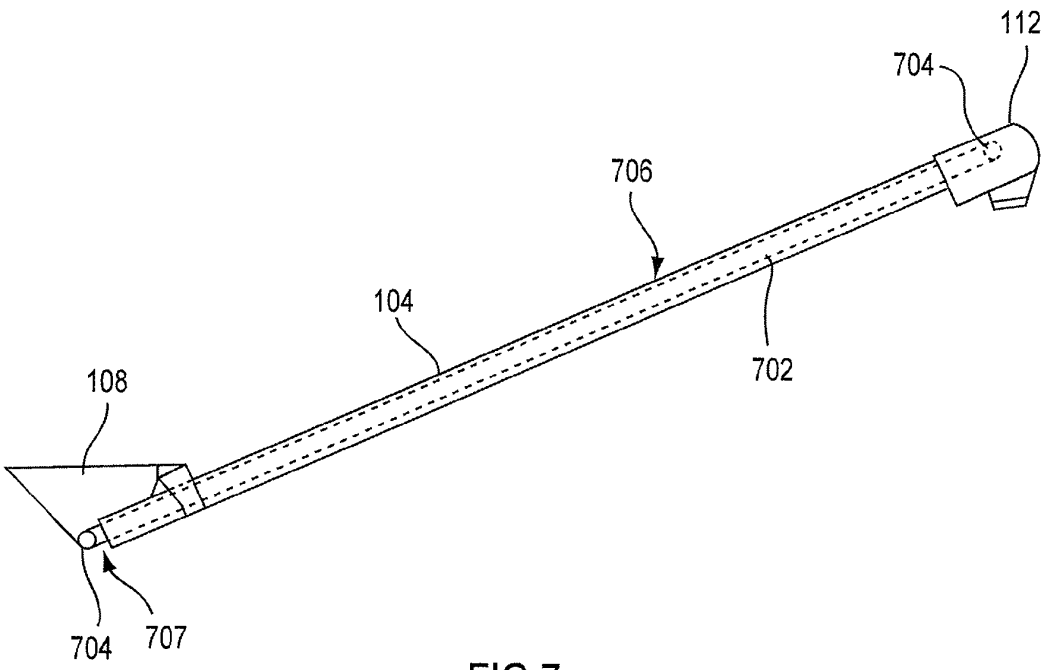


FIG.7

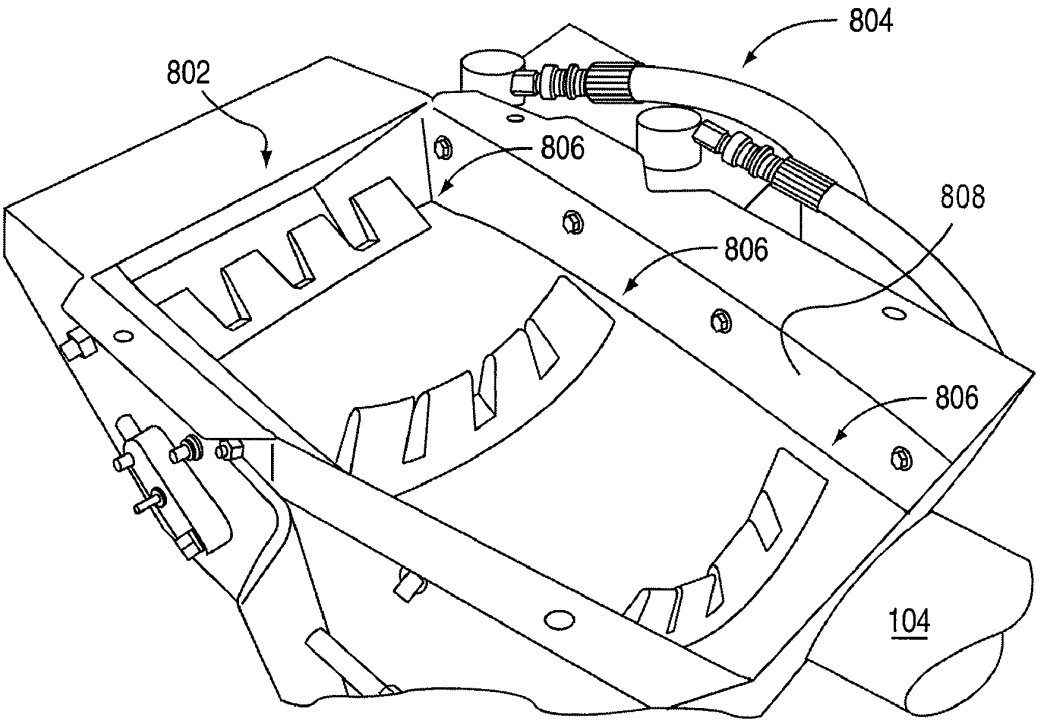


FIG.8

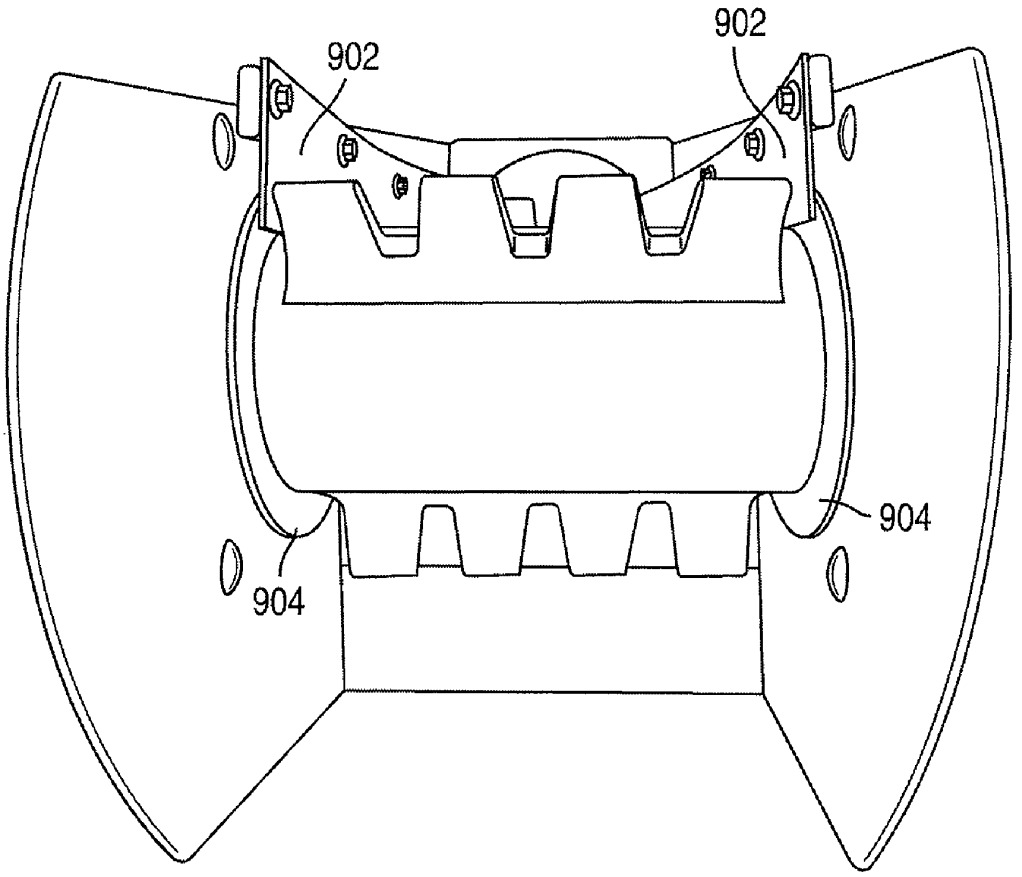


FIG.9

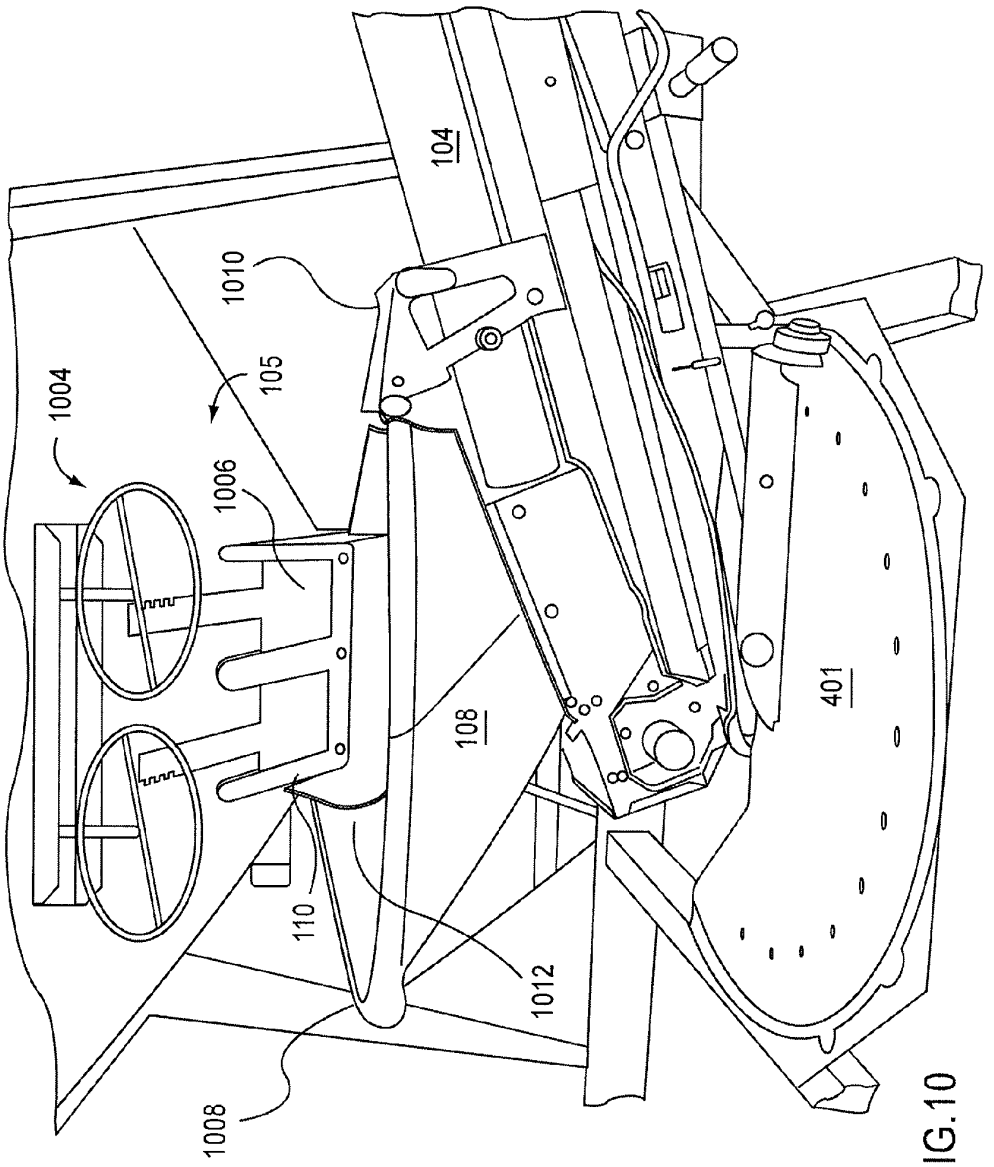


FIG.10

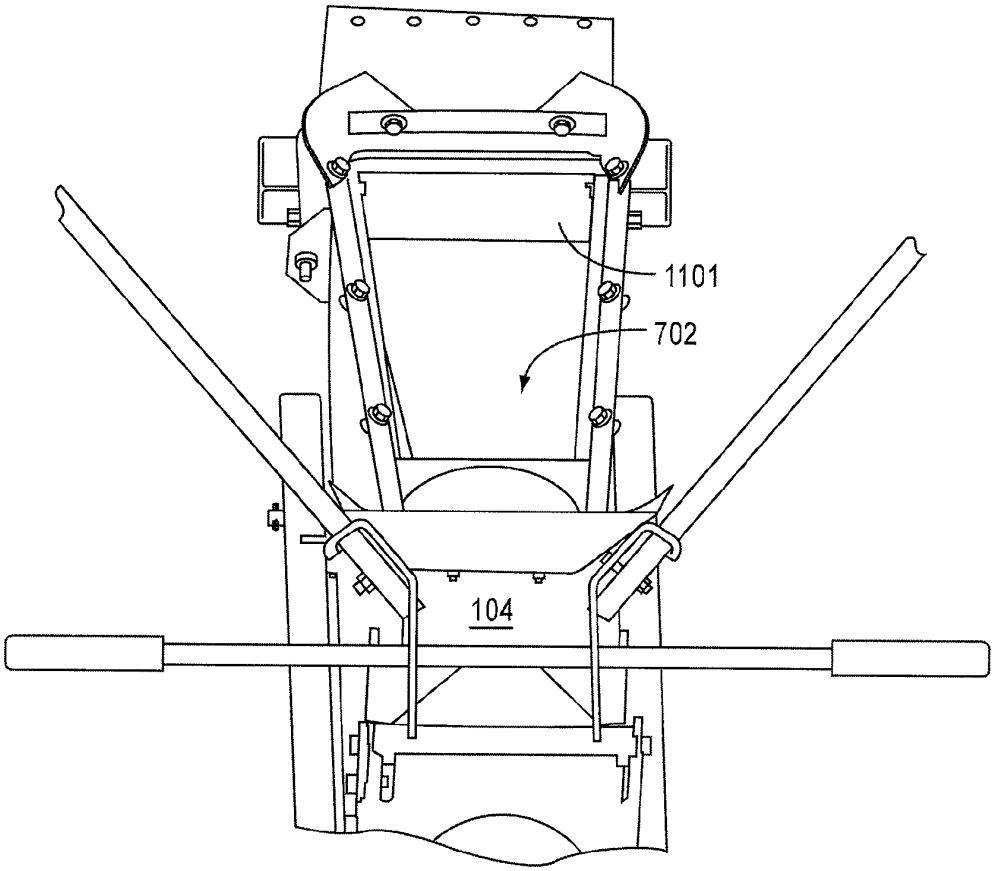


FIG.11

SEED CARRIER WITH PIVOTING CONVEYOR

CROSS-REFERENCE TO RELATED APPLICATION

The present application claims priority to Provisional Patent Application Ser. No. 60/901,321 filed on Feb. 15, 2007, the entire disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to a conveyor system for a grain or seed carrier. The conveyor system includes a novel pivot system that allows it to either load or unload a container by pivoting it into a loading or unloading position.

2. Description of the Related Art

Conveyor systems for moving grain, seed, etc. are well known. Auger systems are used to rapidly move grain such as feed or the like, while belt driven conveyors are often used for moving more expensive payload, such as seed.

One belt driven conveyor system includes a generally flat belt constructed from a flexible, sturdy material such as rubber or nylon. The conveyor is housed in a tube with rollers on both ends so that the belt may rotate in order to transmit material from one end to the other. Such conveyors are used for unloading seed carriers or the like. However, current conveyors have several problems.

First, current conveyors have the problem that the material being moved can be damaged by the rollers. Second, current conveyors do not have a full range of motion as implemented in seed carries. Third, current conveyors are only implemented for unloading.

There is a need for new and improved conveyor systems that allow a wagon to be unloaded and loaded using a single mechanism.

SUMMARY OF THE INVENTION

According to an embodiment of the present invention, a seed tender or carrier is provided that includes a main hopper for holding seed and a conveyor for transferring seed to and from the main hopper.

According to an embodiment of the present invention, in an unloading position, one end of the conveyor may be positioned under the discharge of the main hopper and coupled with a pivoting support arm. In the unload position, the conveyor can be used to transfer seed from the main hopper to another location, such as to a planter, seeding unit, or the like. A pivot mechanism allows the conveyor to be rotated from under the box into a loading position in which the conveyor intake can rest on the ground or on a stand while the conveyor discharge is positioned to allow conveyed material to be discharged into the main hopper. In this loading position, the conveyor can be used to fill the main hopper.

According to an embodiment of the present invention, a conveyor hopper is provided on the intake side of the conveyor.

According to an embodiment of the present invention, the pivot mechanism allows the conveyor to swing from side to side to simplify unloading of the main hopper and the filling of planters, etc. The pivot mechanism can include a hydraulic cylinder that adjusts the vertical height of the conveyor discharge relative for different filling applications.

According to an embodiment of the present invention, a pivot single pivot point can be provided at one end of the support arm to allow the conveyor to be rotated between the loading and unloading position. The conveyor may be balanced on the pivot point at a location near or at the center of gravity, thereby permitting the conveyor to be rotated with minimal effort on the part of the operator.

According to an embodiment of the present invention, the conveyor can be rotated through at least 180 degrees about a vertical axis and so that it may be positioned in either a forward or rearward transport position. This feature enables the tender to be pulled by different vehicles such as by a pick-up truck with the conveyor forward or by a grain truck with the conveyor rearward.

Further applications and advantages of various aspects and embodiments of the present invention are discussed below with reference to the drawing figures.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates a seed carrier according to an embodiment of the present invention.

FIG. **2** is a view of a seed carrier in an unloading position according to an embodiment of the present invention.

FIG. **3** is a view of a seed carrier in a loading position according to an embodiment of the present invention.

FIG. **4** is a view of a base system for the seed carrier according to an embodiment of the present invention.

FIG. **5** is a view of a lever mechanism for the base system according to an embodiment of the present invention.

FIG. **6** is a view of a seed carrier in a transport position according to an embodiment of the present invention.

FIG. **7** is a view of a belt conveyor for the seed carrier according to an embodiment of the present invention.

FIG. **8** is a view of the discharge end of a conveyor according to an embodiment of the present invention.

FIG. **9** is a forward view of a conveyor belt wrapping around a roller according to an embodiment of the present invention.

FIG. **10** is a view of the conveyor hopper in an unloading position according to an embodiment of the present invention.

FIG. **11** illustrates the receiving end of the conveyor according to one embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

While the present invention may be embodied in many different forms, a number of illustrative embodiments are described herein with the understanding that the present disclosure is to be considered as providing examples of the principles of the invention and such examples are not intended to limit the invention to preferred embodiments described herein and/or illustrated herein.

In embodiments of the present invention, the novel conveyor pivot system can be implemented with seed carrier or seeding machines. The following section describes non-limiting examples of illustrative seeding equipment according to embodiments of the present invention. It should be appreciated that the following examples are provided for illustration and the present invention is not intended to be limited to the embodiments described herein.

FIG. **1** is a diagram depicting a seed carrier having a tube conveyor according to an embodiment of the present invention. The seed carrier **100** includes a main hopper **105** coupled to a frame **107** by legs **106**. A conveyor **104** is supported by a support arm **102** coupled with a pivoting mechanism **101**

fixed to the frame **107**. The conveyor **104** is pivotably coupled with the support arm by a coupling **103** at a point that is preferably near or at the center of gravity of the conveyor **104**. The conveyor **104** is also coupled to the support arm **102** by a latch (not shown) at the bottom of the conveyor. The latch allows the conveyor **104** to be uncoupled from the support arm **102** at the bottom so that the conveyor is free to rotate about the coupling **103**. By positioning the coupling **103** at or near the center of gravity of the conveyor **104**, the conveyor **104** balances on the pivoting coupling **103** such that little effort is required to rotate the conveyor **104**.

The conveyor **104** includes a conveyor hopper **108** at its base, which is shown in the unloading position below the gravity discharge **110** of the main hopper **105**. At the other end of the conveyor **104** is the discharge **112**. Seed can be gravity feed from the main hopper **105** into the conveyor hopper **108**, which can then be moved to the discharge **112** of the conveyor **104** by an internal elevator (not shown). In one embodiment, the elevator is a motor-driven belt type elevator coupled onto rollers at both ends of the conveyor.

The seed carrier **100** may be transported by conventional means such as on a trailer. FIG. **2** illustrates the seed carrier **100** on a three axle trailer **200** according to an embodiment of the present invention. As shown, the conveyor **104** is in the unloading position.

FIG. **3** illustrates the seed carrier **100** in the loading position. As shown, the conveyor **104** is uncoupled from the support arm **102** at its base and rotated 180 degrees about pivot coupling **103** so that the conveyor hopper **108** is positioned at a convenient location away from the carrier while the discharge **112** of the conveyor **104** is located over the main hopper **105**. A stand **307** is provided for holding the conveyor hopper **108** in place. The stand **307** may be integrated with the conveyor **104**.

Accordingly, in the loading position, grain, seed or like can be feed into the conveyor hopper **108** to be moved to the discharge **112** for filling the main hopper **105**.

FIG. **4** is a view of the pivoting base of the support arm **102**. As shown, the support arm **102** can be pivotably coupled to a base **401** at a center point so that the support arm **102** is rotatable about a vertical axis. Wheels **403** provide support and can run along a track **402** to facilitate the support arm's **102** motion about the perimeter of the base **401**. The support arm **102** can be locked into a selected position of the base **401** by engaging a pin (not shown) with one of a plurality of the holes **407** distributed around the base **401**. The pin is disengaged with a hole by actuating a lever mechanism **404**, which lifts the pin out of a hole. The lever mechanism **404** may be spring actuated to bias the pin toward the holes, so that simply releasing the lever will allow the pin to engage with one of the holes **407**. Also shown, a hydraulic piston **405** is coupled with the support arm **102** for adjusting the height of the support arm **102**.

FIG. **5** is an alternative view of the support arm base. As shown, lever mechanism **404** includes a handle **504** coupled with a cross-bars **505** and **506**. Cross-bar **506** is coupled to cross-bar **505** on one end and to a plate **508** having a pin **509** on the other end, and with a pivoting coupling **502** at a point near the plate. Rotating the handle **504** applies a downward force to crossbar **506** causing it to rotate about the coupling **502** to raise the plate **508** to disengage the pin **509**. While disengaged, the base **401** is free to rotate about its vertical axis. Springs may be provided for biasing the pin **509** toward the holes **407** for engaging therewith, or the pin **509** can be engaged by gravity.

FIG. **6** is a side view of a seed carrier **100** according to an embodiment of the present invention. As shown in FIG. **6**, the conveyor **104** includes an elongated discharge spout **602** and is positioned in a transport position. Support members **604** may be mounted on or integral with the legs **106** for holding the conveyor **104** in a forward transport position as shown, or a rearward transport position. As shown, the carrier **100** is fixed to a dual axle trailer **606**.

FIG. **7** illustrates a basic belt driven conveyor according to an embodiment of the present invention. The conveyor **104** comprises a belt **702** that winds about a pair of rollers **704**. The rollers are positioned outside a tube section **706**, a first roller being positioned in the discharge **112** and a second roller being positioned below the conveyor hopper **108**. A motor (not shown) or other means for turning the rollers may be provided at either end of the conveyor. A void **707** exists below the rollers **704** to allow the belt **702** to travel on its return path.

FIG. **8** is a view of a conveyor belt according to an embodiment of the present invention. The discharge end of a conveyor is shown where a conveyor belt wraps around a motor driven roller **802**. The motor may be a hydraulic motor and therefore, hydraulic hoses **804** provide hydraulic fluid flow to and from the motor. Teeth **806** are provided to push grain or seed up the conveyor. As shown, the conveyor belt is cupped in the tube section but flattens out as it reaches the roller **802**. Channeling members (seals) **808** are provided on each side of the belt to form a seal and prevent grain or seed from falling off the edges of the belt as the belt begins to conform to the tubular portion of the conveyor **104**.

FIG. **9** is a front view of the belt as it travels over the roller **802**. Channeling members (seals) **902** are provided on each side of the belt to form a seal and prevent grain or seed from falling off the edges of the belt as the belt flattens at the roller. As shown, the channeling members **902** are fixed to the conveyor discharge **112** with bolts, but can be fixed by other means or can be integral with the discharge.

Discs **904** are provided at the rollers at the edge of the belt to provide additional channeling/sealing means. The discs **904** are preferably integral with the rollers or coupled therewith so that they may rotate.

FIG. **10** is a side view of the hopper end of the conveyor **104**. As shown, conveyor hopper **108** sits above in ingress **1003** to the conveyor **104**. When coupled to the support arm **102**, as shown, the conveyor hopper **108** is positioned below a discharge of the main hopper **106**. The discharge **110** may be opened by conventional means. As showed, a wheel handle mechanism **1004** is provided for opening the discharge doors **1006**.

The conveyor hopper **108** is preferably manufactured from light weight materials such as plastic, canvas, rubber or vinyl. As shown, the hopper **108** may include a mechanism for opening and closing the hopper. In this embodiment, flexible coupling or hinge is provided at one end **1008** of the hopper **108** and a mechanism **1010** is provided at the end of the hopper **108** and is coupled with the conveyor **104**, such that the hopper **108** may be made to have an appropriate fit with the discharge **110** of the main hopper **105**. A flap **1012** can be provided at the bottom of the discharge **110**.

FIG. **10** is a side view of the hopper end of the conveyor **104**. As shown, conveyor hopper **108** sits above in ingress to the conveyor **104**. When coupled to the support arm **102**, as shown, the conveyor hopper **108** is positioned below a discharge of the main hopper **106**. The discharge **110** may be opened by conventional means. As showed, a wheel handle mechanism **1004** is provided for opening the discharge doors **1006**.

One will understand that hydraulic power can be provided by a towing vehicle, such as a tractor or the like or alterna-

tively, hydraulic power can be provided on the tender and driving electrically from the towing vehicle, such as a truck.

Thus, a number of preferred embodiments have been fully described above with reference to the drawing figures. Although the invention has been described based upon these preferred embodiments, it would be apparent to those of skill in the art that certain modifications, variations, and alternative constructions could be made to the described embodiments within the spirit and scope of the invention

We claim:

1. A seed or grain tender comprising:

a frame;

a main hopper mounted on said frame and having a main hopper discharge;

a base mounted on said frame below said main hopper discharge;

a support arm having first and second ends;

a first coupling connecting said first end of said support arm with said base, said first coupling being rotatable in relation to said base about a first vertical axis of rotation, and said first end of said support arm being rotatable in relation to said first coupling about a first horizontal axis of rotation;

a conveyor having a longitudinal axis and first and second ends, a conveyor hopper at said first end, a conveyor discharge at said second end, and an internal elevator for moving seed or grain from said conveyor hopper to said conveyor discharge; and

a second coupling connecting said second end of said support arm with said conveyor at an approximate center of gravity of said conveyor, said second coupling defining a second vertical axis of rotation that is not parallel to said conveyor longitudinal axis, and said conveyor being rotatable in relation to said second end of said support arm about said second vertical axis of rotation between an unloading position wherein said conveyor hopper is disposed below said main hopper discharge to receive agricultural product from said main hopper and a loading position wherein said conveyor discharge is disposed above said main hopper to dispense agricultural product into said main hopper.

2. The seed or grain tender of claim **1**, wherein said support arm extends upwardly at an acute angle from said base.

3. The seed or grain tender of claim **2**, wherein said conveyor is parallel to said support arm in said unloading position.

4. The seed or grain tender of claim **3**, wherein said conveyor is disposed above said support arm in said unloading position.

5. The seed or grain tender of claim **1**, wherein said conveyor is rotatable in relation to said second coupling about a second horizontal axis of rotation.

6. The seed or grain tender of claim **5**, wherein said second horizontal axis of rotation extends through said second coupling.

7. The seed or grain tender of claim **1**, further comprising a stand coupled with said first end of said conveyor and movable between a stowed position allowing said conveyor hopper to be positioned below said main hopper discharge when said conveyor is in said unloading position and an extended position supporting said conveyor hopper above the ground when said conveyor is in said loading position.

8. The seed or grain tender of claim **1**, wherein said first vertical axis extends through said first end of said support arm.

9. The seed or grain tender of claim **1**, wherein said first vertical axis extends through said base.

10. The seed or grain tender of claim **1**, wherein said second end of said support arm terminates at or near said approximate center of gravity of said conveyor.

11. The seed or grain tender of claim **1**, wherein said first end of said support arm is fixed at a first height and said second end of said support arm is pivotable between a range of heights.

12. The seed or grain tender of claim **1**, further comprising a lift device for adjusting a height of said second end of said support arm.

13. The seed or grain tender of claim **12**, wherein said lift device is a pressurized cylinder.

14. The seed or grain tender of claim **12**, wherein said lift device is a hydraulic cylinder.

15. The seed or grain tender of claim **1**, wherein said first coupling is a U-shaped member with a horizontal base portion and a pair of upright portions, and wherein said first horizontal axis extends through said upright portions of said first coupling.

16. The seed or grain tender of claim **1**, further comprising a locking mechanism for locking or unlocking said support arm in relation to said base.

17. The seed or grain tender of claim **16**, wherein said locking mechanism includes a pin releasably engageable with one of a plurality of holes formed in said base.

18. The seed or grain tender of claim **17**, wherein said pin is spring-biased toward said holes in said base.

19. The seed or grain tender of claim **17**, wherein said internal elevator includes a motor-driven belt.

20. A seed or grain tender comprising:

a frame;

a main hopper mounted on said frame and having a main hopper discharge;

a base mounted on said frame below said main hopper discharge;

a support arm having first and second ends;

a first coupling connecting said first end of said support arm with said base, said first coupling being rotatable in relation to said base about a first vertical axis of rotation, and said first end of said support arm being rotatable in relation to said first coupling about a first horizontal axis of rotation;

a lift device extending from said base to a portion of said support arm between said first and second ends such that said support arm extends upwardly at an acute angle from said base;

a conveyor having a longitudinal axis and first and second ends, a conveyor hopper at said first end, a conveyor discharge at said second end, and a motor-driven elevator for moving seed or grain from said conveyor hopper to said conveyor discharge; and

a second coupling connecting said second end of said support arm with said conveyor at an approximate center of gravity of said conveyor, said second coupling defining a second vertical axis of rotation that is not parallel to said conveyor longitudinal axis, and said conveyor being rotatable in relation to said second end of said support arm about said second vertical axis of rotation between an unloading position wherein said conveyor hopper is disposed below said main hopper discharge to receive agricultural product from said main hopper and a loading position wherein said conveyor discharge is disposed above said main hopper to dispense agricultural product into said main hopper, wherein said conveyor is disposed parallel to and above said support arm in said unloading position; and

a locking mechanism for locking and unlocking said support arm in relation to said base.

21. The seed or grain tender of claim **20**, wherein said conveyor is disposed above said support arm in said unloading position.

22. The seed or grain tender of claim **20**, wherein said conveyor is rotatable in relation to said second coupling about a second horizontal axis of rotation.

23. The seed or grain tender of claim **22**, wherein said second horizontal axis of rotation extends through said second coupling.

24. The seed or grain tender of claim **20**, further comprising a stand coupled with said first end of said conveyor and movable between a stowed position allowing said conveyor hopper to be positioned below said main hopper discharge when said conveyor is in said unloading position and an extended position supporting said conveyor hopper above the ground when said conveyor is in said loading position.

25. The seed or grain tender of claim **20**, wherein said first vertical axis extends through said first end of said support arm.

26. The seed or grain tender of claim **20**, wherein said first vertical axis extends through said base.

27. The seed or grain tender of claim **20**, wherein said second end of said support arm terminates at or near said approximate center of gravity of said conveyor.

28. The seed or grain tender of claim **20**, wherein said first end of said support arm is fixed at a first height and said second end of said support arm is pivotable between a range of heights.

29. The seed or grain tender of claim **20**, wherein said lift device is a pressurized cylinder.

30. The seed or grain tender of claim **20**, wherein said lift device is a hydraulic cylinder.

31. The seed or grain tender of claim **20**, wherein said first coupling is a U-shaped member with a horizontal base portion and a pair of upright portions, and

wherein said first horizontal axis extends through said upright portions of said first coupling.

32. The seed or grain tender of claim **20**, wherein said locking mechanism includes a pin releasably engageable with one of a plurality of holes formed in said base.

33. The seed or grain tender of claim **32**, wherein said pin is spring-biased toward said holes in said base.

34. The seed or grain tender of claim **20**, wherein said internal elevator includes a motor-driven belt.

* * * * *

EXHIBIT B

US008967940B2

(12) **United States Patent**
Petersen et al.

(10) **Patent No.: US 8,967,940 B2**
(45) **Date of Patent: *Mar. 3, 2015**

(54) **SEED CARRIER WITH PIVOTING CONVEYOR**

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(73) Assignee: **Unverferth Manufacturing Company, Inc.**, Kalida, OH (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

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Related U.S. Application Data

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A01C 15/00 (2006.01)

(52) **U.S. Cl.**
CPC ***A01C 15/006*** (2013.01); *B60P 1/00* (2013.01); ***A01C 15/003*** (2013.01)
USPC **414/523**; 198/312

(58) **Field of Classification Search**
CPC B60P 1/00; B60P 1/36; B60P 1/42; B65G 41/002; B65G 41/005; B65G 41/008; B65G 67/02; A01C 15/003; A01C 15/006; A01D 90/00; A01D 90/02; A01D 90/10
USPC 414/523, 328, 329; 111/11; 198/312, 198/315, 316, 317, 318
See application file for complete search history.

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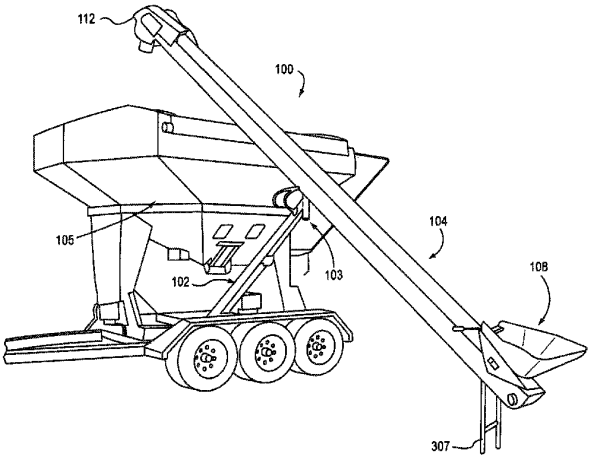
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Primary Examiner — Saul Rodriguez
Assistant Examiner — Glenn Myers
(74) *Attorney, Agent, or Firm* — Rothwell, Figg, Ernst & Manbeck, P.C.

(57) **ABSTRACT**

A seed carrier includes a main hopper coupled with a frame via leg members. The main hopper has a discharge. A base plate is coupled with the frame. A support arm is rotatably coupled with the base plate at a first end. A belt driven conveyor having a conveyor hopper at a first end and a discharge at a second end is rotatably coupled with a second end of said support arm at an approximate center of gravity thereof. A latch mechanism is provided for detachably coupling the first end of the conveyor with the first end of the support arm such that the conveyor hopper is position below the main hopper discharge. When the conveyor is uncoupled from the first end of the support arm, the conveyor can rotate to a loading position wherein the discharge thereof can be positioned over the main hopper.

23 Claims, 11 Drawing Sheets



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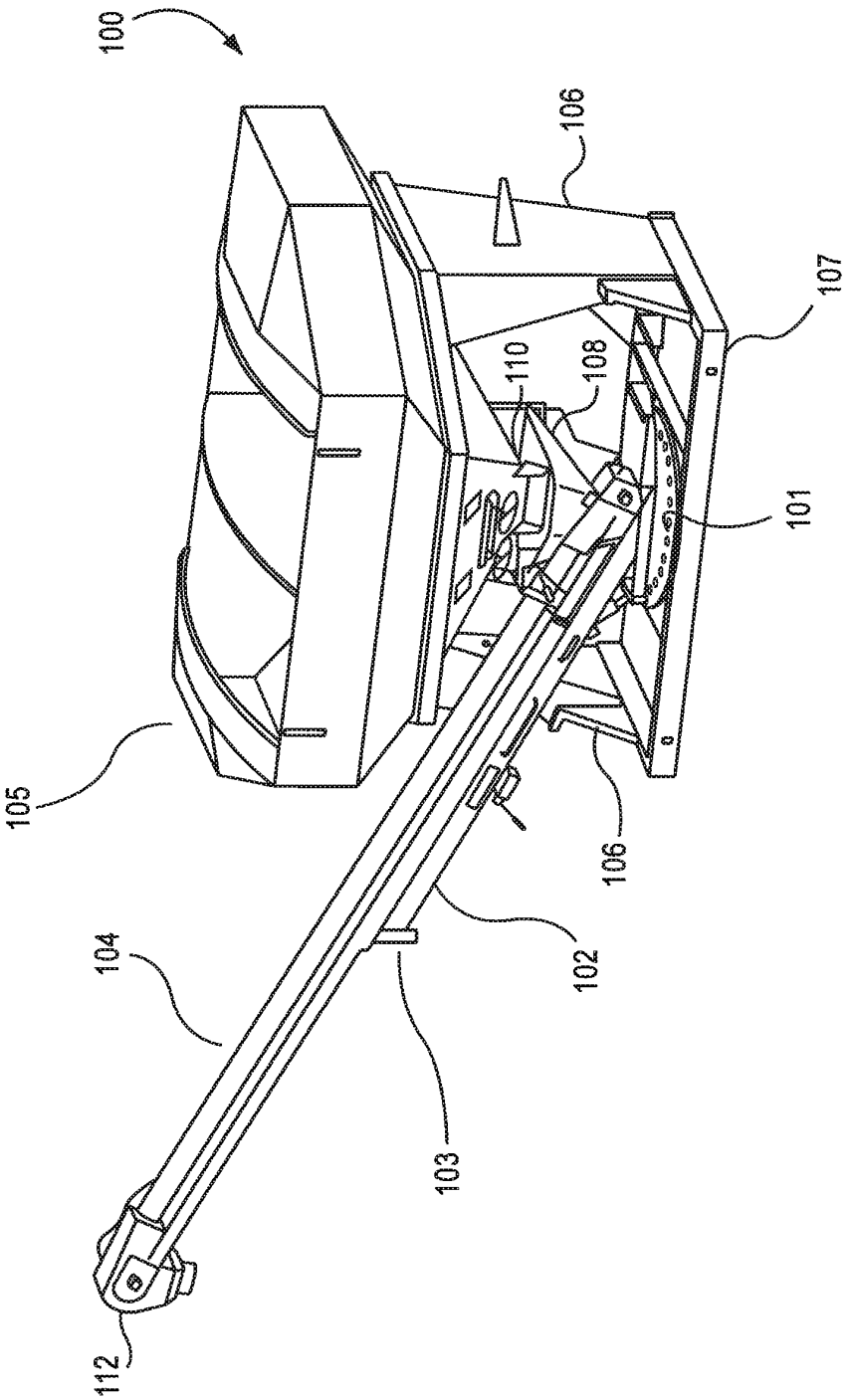


FIG.1

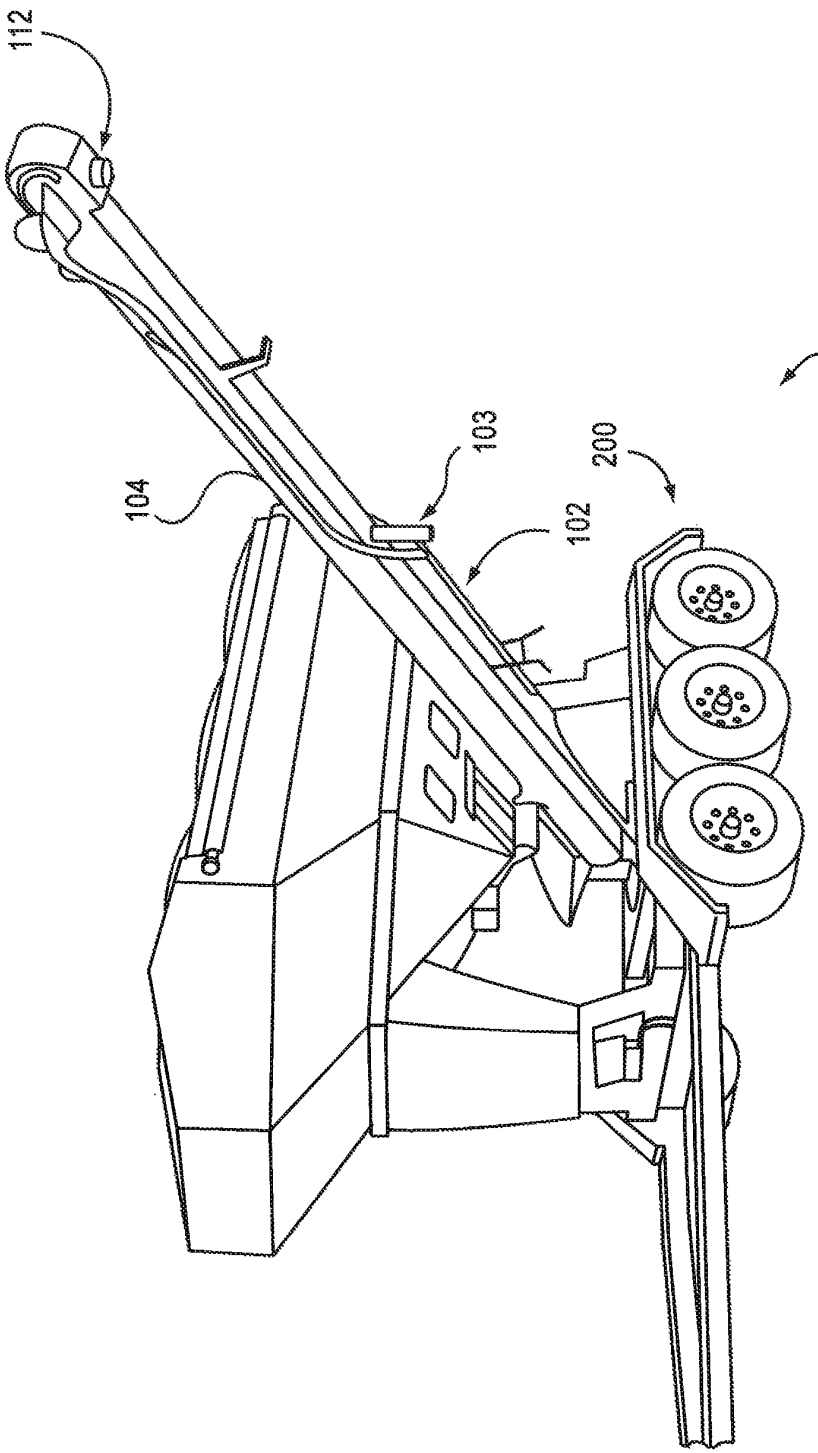


FIG.2

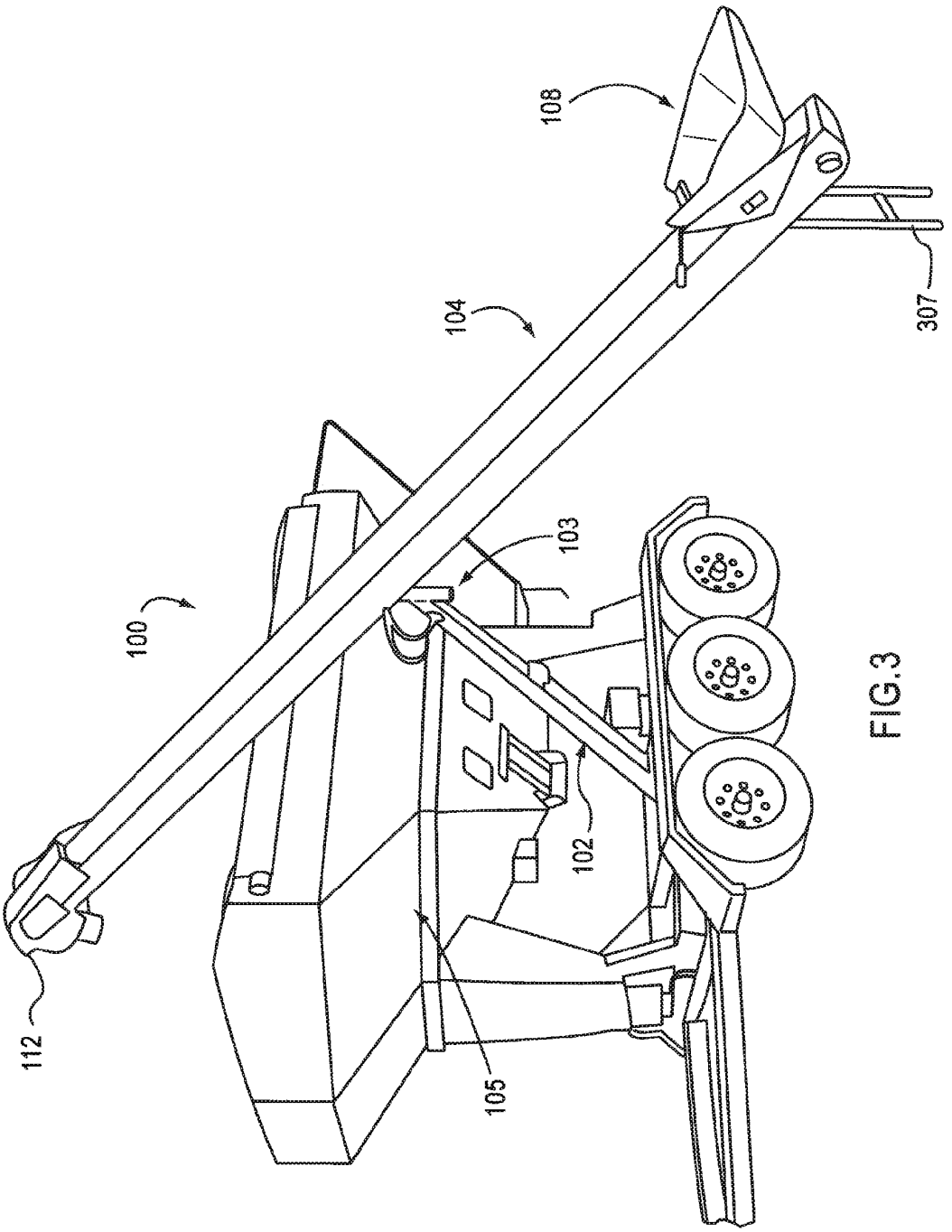


FIG.3

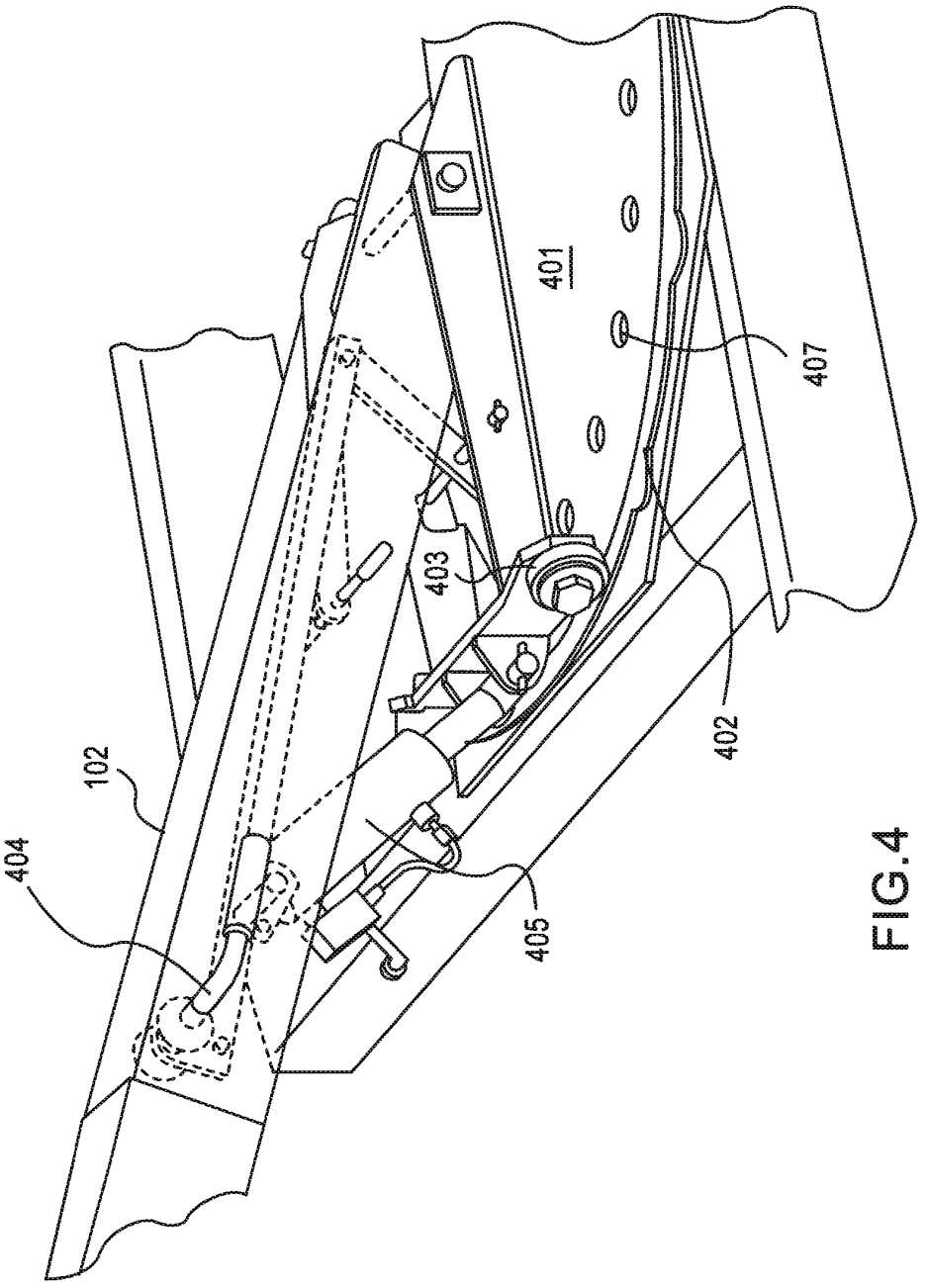


FIG.4

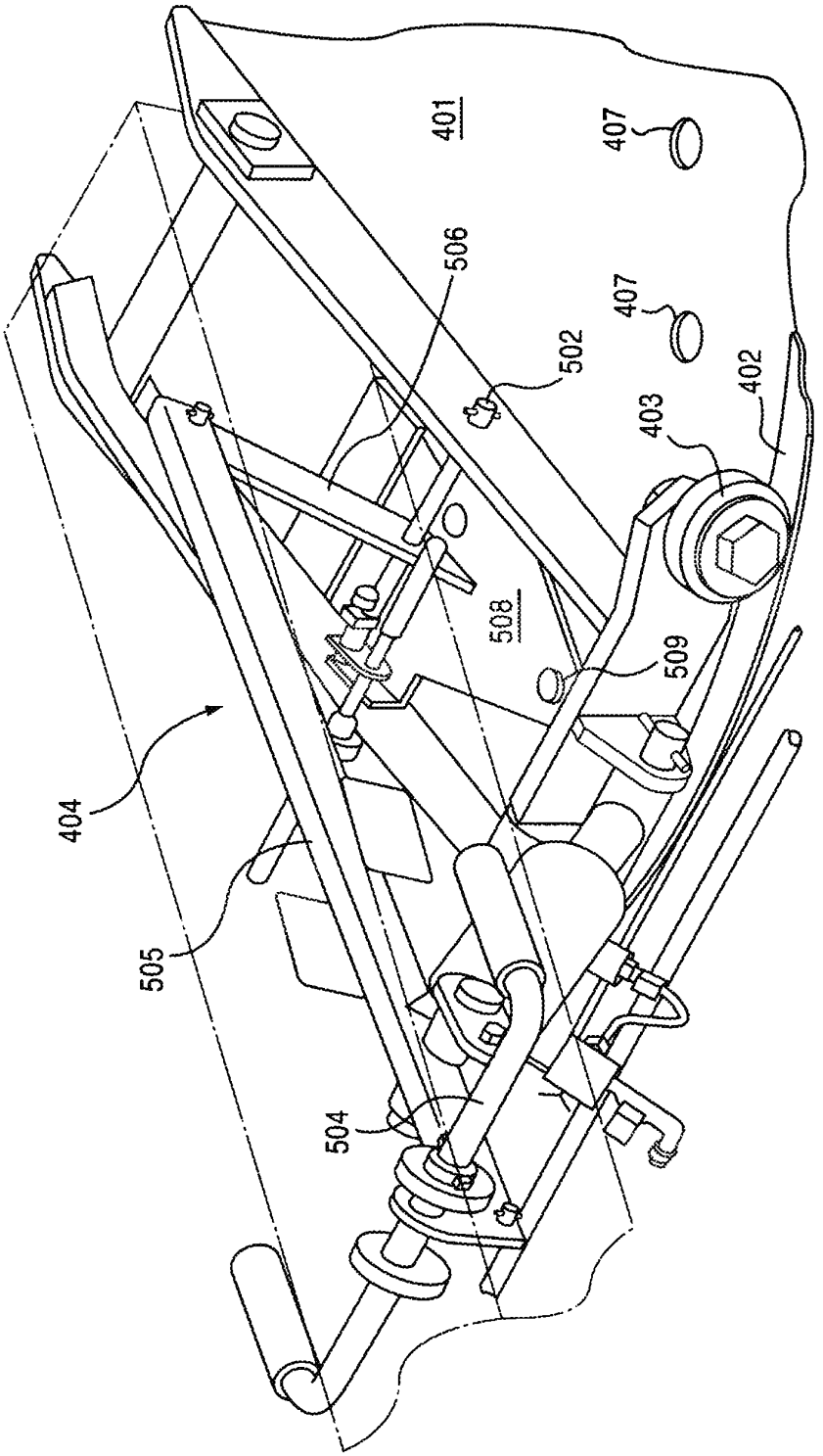


FIG.5

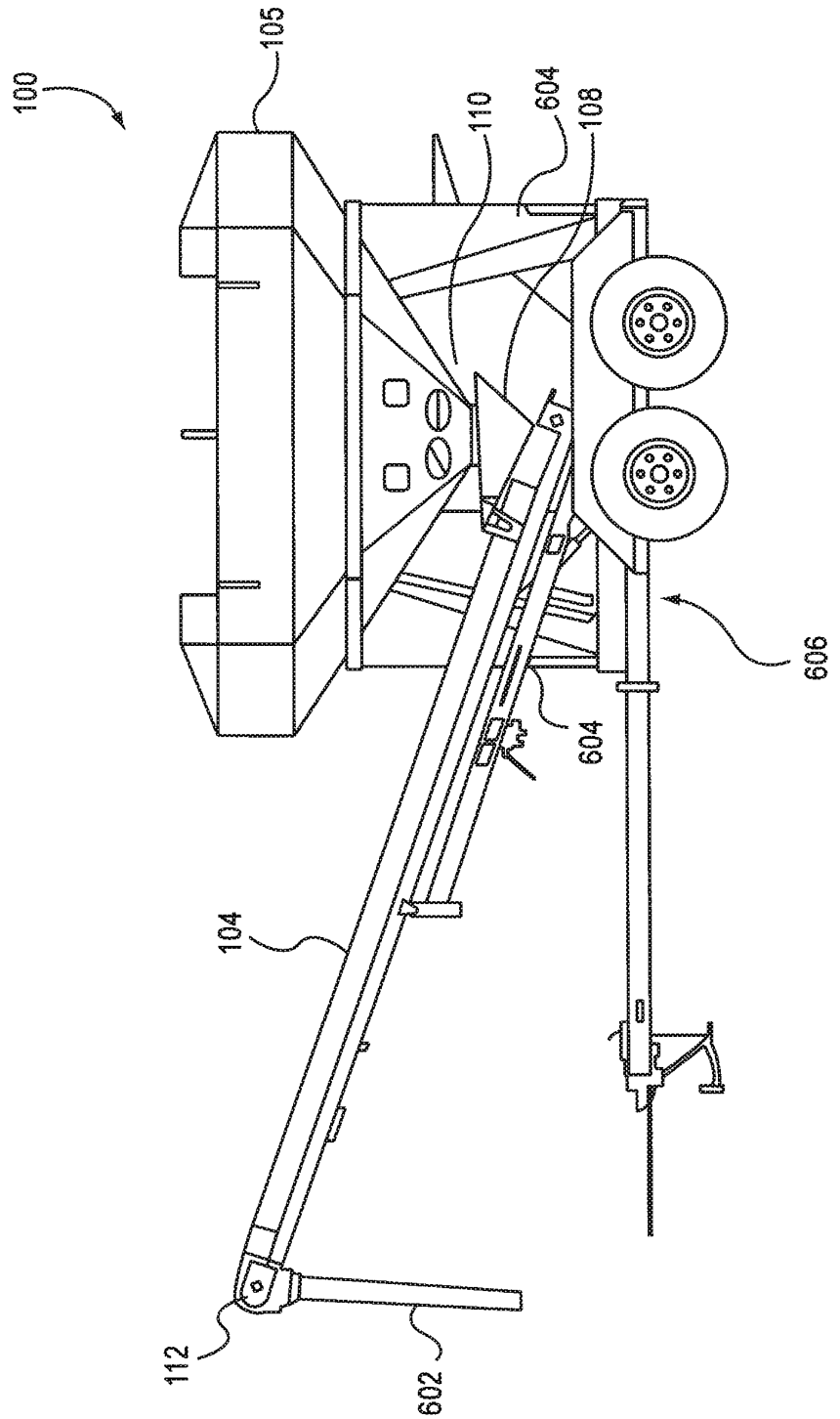


FIG.6

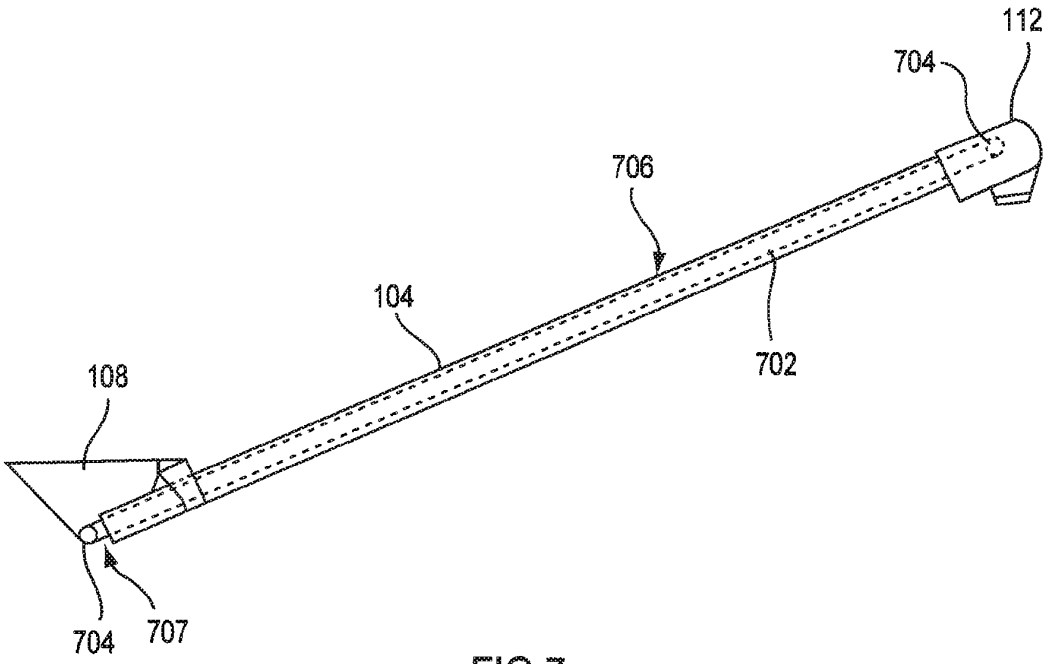


FIG.7

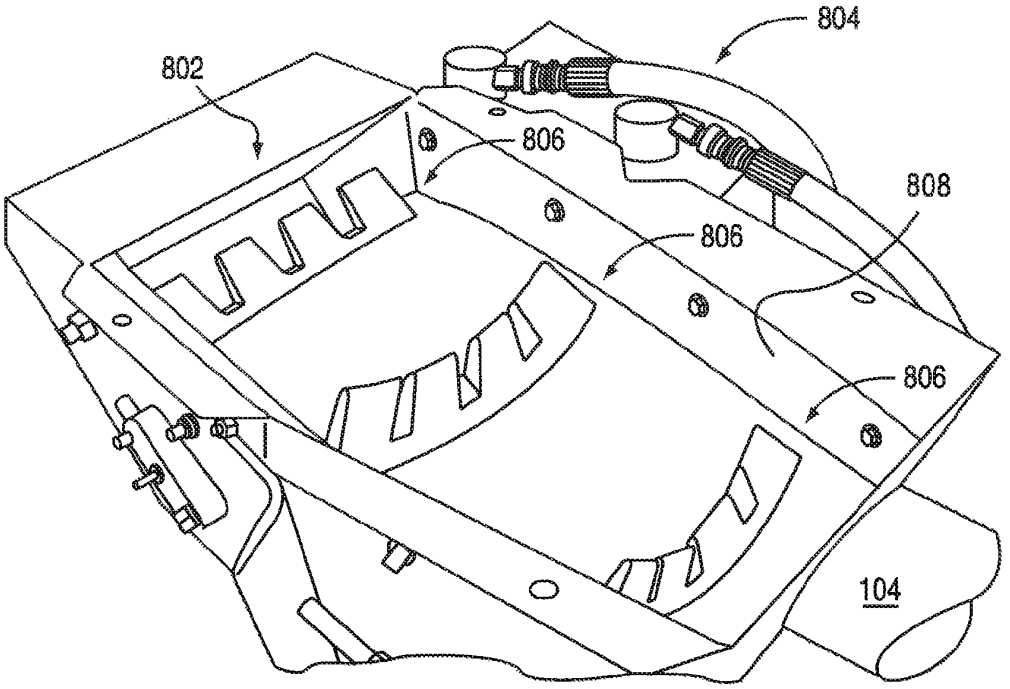


FIG.8

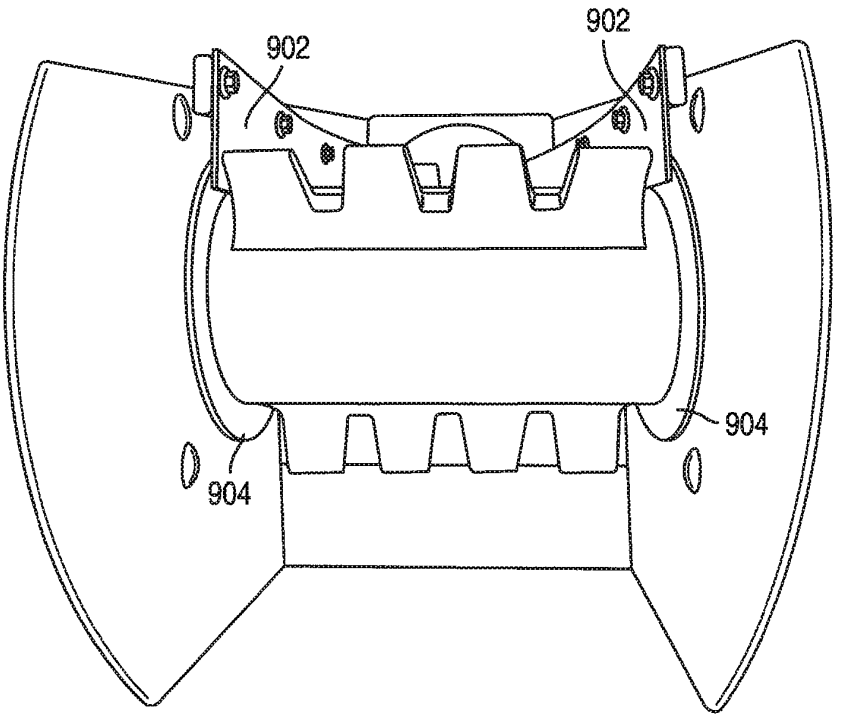


FIG.9

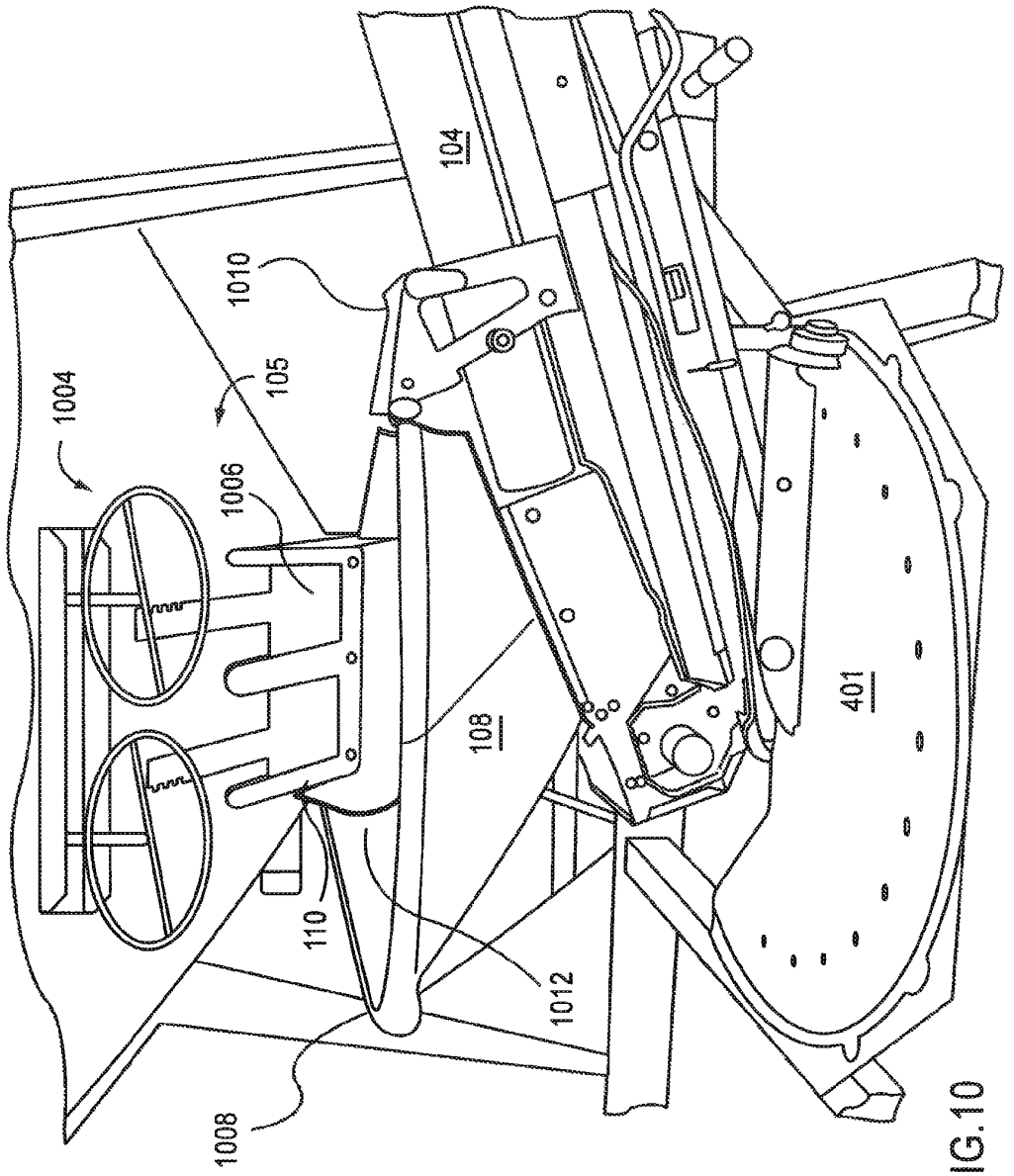


FIG. 10

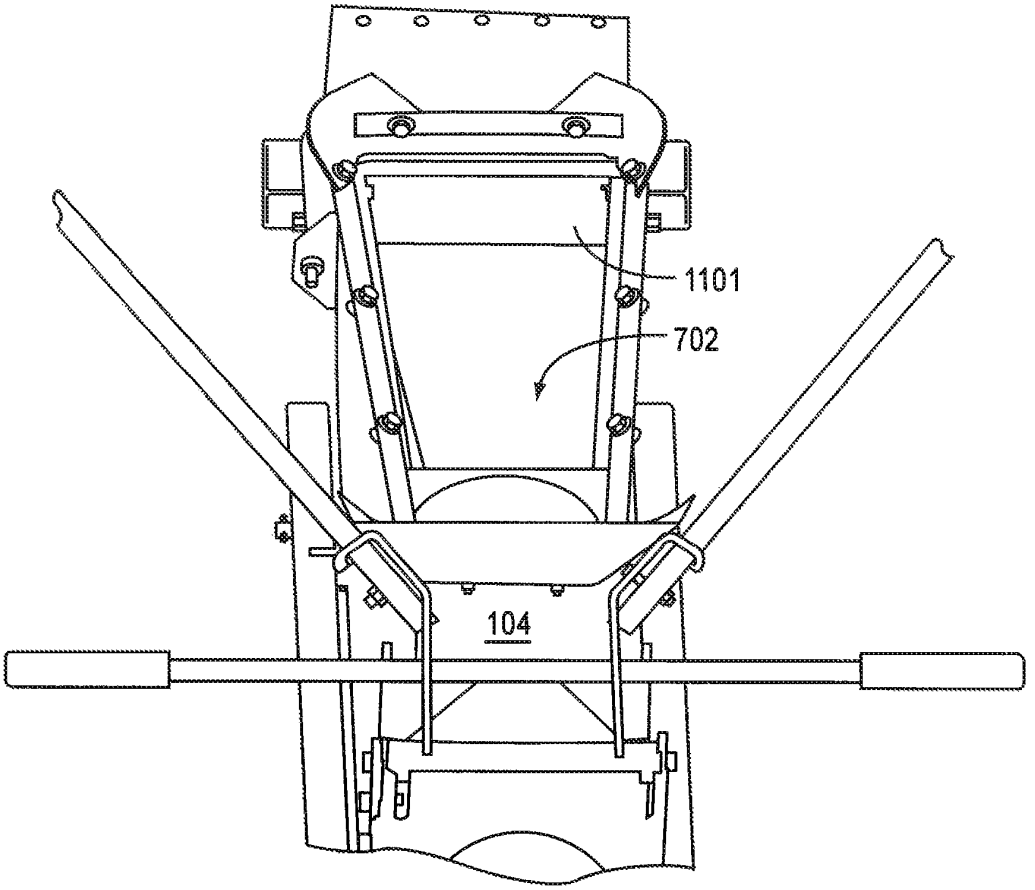


FIG.11

SEED CARRIER WITH PIVOTING CONVEYOR

CROSS-REFERENCE TO RELATED APPLICATION

The present application claims priority to U.S. Ser. No. 12/031,867, filed Feb. 15, 2008, now patented, and claims priority to Provisional Patent Application Ser. No. 60/901,321 filed on Feb. 15, 2007, the entire disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to a conveyor system for a grain or seed carrier. The conveyor system includes a novel pivot system that allows it to either load or unload a container by pivoting it into a loading or unloading position.

2. Description of the Related Art

Conveyor systems for moving grain, seed, etc. are well known. Auger systems are used to rapidly move grain such as feed or the like, while belt driven conveyors are often used for moving more expensive payload, such as seed.

One belt driven conveyor system includes a generally flat belt constructed from a flexible, sturdy material such as rubber or nylon. The conveyor is housed in a tube with rollers on both ends so that the belt may rotate in order to transmit material from one end to the other. Such conveyors are used for unloading seed carriers or the like. However, current conveyors have several problems.

First, current conveyors have the problem that the material being moved can be damaged by the rollers. Second, current conveyors do not have a full range of motion as implemented in seed carries. Third, current conveyors are only implemented for unloading,

There is a need for new and improved conveyor systems that allow a wagon to be unloaded and loaded using a single mechanism.

SUMMARY OF THE INVENTION

According to an embodiment of the present invention, a seed tender or carrier is provided that includes a main hopper for holding seed and a conveyor for transferring seed to and from the main hopper.

According to an embodiment of the present invention, in an unloading position, one end of the conveyor may be positioned under the discharge of the main hopper and coupled with a pivoting support arm. In the unload position, the conveyor can be used to transfer seed from the main hopper to another location, such as to a planter, seeding unit, or the like. A pivot mechanism allows the conveyor to be rotated from under the box into a loading position in which the conveyor intake can rest on the ground or on a stand while the conveyor discharge is positioned to allow conveyed material to be discharged into the main hopper. In this loading position, the conveyor can be used to fill the main hopper.

According to an embodiment of the present invention, a conveyor hopper is provided on the intake side of the conveyor.

According to an embodiment of the present invention, the pivot mechanism allows the conveyor to swing from side to side to simplify unloading of the main hopper and the filling of planters, etc. The pivot mechanism can include a hydraulic cylinder that adjusts the vertical height of the conveyor discharge relative for different filling applications.

According to an embodiment of the present invention, a pivot single pivot point can be provided at one end of the support arm to allow the conveyor to be rotated between the loading and unloading position. The conveyor may be balanced on the pivot point at a location near or at the center of gravity, thereby permitting the conveyor to be rotated with minimal effort on the part of the operator.

According to an embodiment of the present invention, the conveyor can be rotated through at least 180 degrees about a vertical axis and so that it may be positioned in either a forward or rearward transport position. This feature enables the tender to be pulled by different vehicles such as by a pick-up truck with the conveyor forward or by a grain truck with the conveyor rearward.

Further applications and advantages of various aspects and embodiments of the present invention are discussed below with reference to the drawing figures.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates a seed carrier according to an embodiment of the present invention.

FIG. **2** is a view of a seed carrier in an unloading position according to an embodiment of the present invention.

FIG. **3** is a view of a seed carrier in a loading position according to an embodiment of the present invention.

FIG. **4** is a view of a base system for the seed carrier according to an embodiment of the present invention.

FIG. **5** is a view of a lever mechanism for the base system according to an embodiment of the present invention.

FIG. **6** is a view of a seed carrier in a transport position according to an embodiment of the present invention.

FIG. **7** is a view of a belt conveyor for the seed carrier according to an embodiment of the present invention.

FIG. **8** is a view of the discharge end of a conveyor according to an embodiment of the present invention.

FIG. **9** is a forward view of a conveyor belt wrapping around a roller according to an embodiment of the present invention.

FIG. **10** is a view of the conveyor hopper in an unloading position according to an embodiment of the present invention.

FIG. **11** illustrates the receiving end of the conveyor according to one embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

While the present invention may be embodied in many different forms, a number of illustrative embodiments are described herein with the understanding that the present disclosure is to be considered as providing examples of the principles of the invention and such examples are not intended to limit the invention to preferred embodiments described herein and/or illustrated herein.

In embodiments of the present invention, the novel conveyor pivot system can be implemented with seed carrier or seeding machines. The following section describes non-limiting examples of illustrative seeding equipment according to embodiments of the present invention. It should be appreciated that the following examples are provided for illustration and the present invention is not intended to be limited to the embodiments described herein.

FIG. **1** is a diagram depicting a seed carrier having a tube conveyor according to an embodiment of the present invention. The seed carrier **100** includes a main hopper **105** coupled to a frame **107** by legs **106**. A conveyor **104** is supported by a support arm **102** coupled with a pivoting mechanism **101**

fixed to the frame **107**. The conveyor **104** is pivotably coupled with the support arm by a coupling **103** at a point that is preferably near or at the center of gravity of the conveyor **104**. The conveyor **104** is also coupled to the support arm **102** by a latch (not shown) at the bottom of the conveyor. The latch allows the conveyor **104** to be uncoupled from the support arm **102** at the bottom so that the conveyor is free to rotate about the coupling **103**. By positioning the coupling **103** at or near the center of gravity of the conveyor **104**, the conveyor **104** balances on the pivoting coupling **103** such that little effort is required to rotate the conveyor **104**.

The conveyor **104** includes a conveyor hopper **108** at its base, which is shown in the unloading position below the gravity discharge **110** of the main hopper **105**. At the other end of the conveyor **104** is the discharge **112**. Seed can be gravity feed from the main hopper **105** into the conveyor hopper **108**, which can then be moved to the discharge **112** of the conveyor **104** by an internal elevator (not shown). In one embodiment, the elevator is a motor-driven belt type elevator coupled onto rollers at both ends of the conveyor.

The seed carrier **100** may be transported by conventional means such as on a trailer. FIG. **2** illustrates the seed carrier **100** on a three axle trailer **200** according to an embodiment of the present invention. As shown, the conveyor **104** is in the unloading position.

FIG. **3** illustrates the seed carrier **100** in the loading position. As shown, the conveyor **104** is uncoupled from the support arm **102** at its base and rotated **180** degrees about pivot coupling **103** so that the conveyor hopper **108** is positioned at a convenient location away from the carrier while the discharge **112** of the conveyor **104** is located over the main hopper **105**. A stand **307** is provided for holding the conveyor hopper **108** in place. The stand **307** may be integrated with the conveyor **104**.

Accordingly, in the loading position, grain, seed or like can be feed into the conveyor hopper **108** to be moved to the discharge **112** for filling the main hopper **105**.

FIG. **4** is a view of the pivoting base of the support arm **102**. As shown, the support arm **102** can be pivotably coupled to a base **401** at a center point so that the support arm **102** is rotatable about a vertical axis. Wheels **403** provide support and can run along a track **402** to facilitate the support arm's **102** motion about the perimeter of the base **401**. The support arm **102** can be locked into a selected position of the base **401** by engaging a pin (not shown) with one of a plurality of the holes **407** distributed around the base **401**. The pin is disengaged with a hole by actuating a lever mechanism **404**, which lifts the pin out of a hole. The lever mechanism **404** may be spring actuated to bias the pin toward the holes, so that simply releasing the lever will allow the pin to engage with one of the holes **407**. Also shown, a hydraulic piston **405** is coupled with the support arm **102** for adjusting the height of the support arm **102**.

FIG. **5** is an alternative view of the support arm base. As shown, lever mechanism **404** includes a handle **504** coupled with a cross-bars **505** and **506**. Cross-bar **506** is coupled to cross-bar **505** on one end and to a plate **508** having a pin **509** on the other end, and with a pivoting coupling **502** at a point near the plate. Rotating the handle **504** applies a downward force to crossbar **506** causing it to rotate about the coupling **502** to raise the plate **508** to disengage the pin **509**. While disengaged, the base **401** is free to rotate about its vertical axis. Springs may be provided for biasing the pin **509** toward the holes **407** for engaging therewith, or the pin **509** can be engaged by gravity.

FIG. **6** is a side view of a seed carrier **100** according to an embodiment of the present invention. As shown in FIG. **6**, the conveyor **104** includes an elongated discharge spout **602** and is positioned in a transport position. Support members **604** may be mounted on or integral with the legs **106** for holding the conveyor **104** in a forward transport position as shown, or a rearward transport position. As shown, the carrier **100** is fixed to a dual axle trailer **606**.

FIG. **7** illustrates a basic belt driven conveyor according to an embodiment of the present invention. The conveyor **104** comprises a belt **702** that winds about a pair of rollers **704**. The rollers are positioned outside a tube section **706**, a first roller being positioned in the discharge **112** and a second roller being positioned below the conveyor hopper **108**. A motor (not shown) or other means for turning the rollers may be provided at either end of the conveyor. A void **707** exists below the rollers **704** to allow the belt **702** to travel on its return path.

FIG. **8** is a view of a conveyor belt according to an embodiment of the present invention. The discharge end of a conveyor is shown where a conveyor belt wraps around a motor driven roller **802**. The motor may be a hydraulic motor and therefore, hydraulic hoses **804** provide hydraulic fluid flow to and from the motor. Teeth **806** are provided to push grain or seed up the conveyor. As shown, the conveyor belt is cupped in the tube section but flattens out as it reaches the roller **802**. Channeling members (seals) **808** are provided on each side of the belt to form a seal and prevent grain or seed from falling off the edges of the belt as the belt begins to conform to the tubular portion of the conveyor **104**.

FIG. **9** is a front view of the belt as it travels over the roller **802**. Channeling members (seals) **902** are provided on each side of the belt to form a seal and prevent grain or seed from falling off the edges of the belt as the belt flattens at the roller. As shown, the channeling members **902** are fixed to the conveyor discharge **112** with bolts, but can be fixed by other means or can be integral with the discharge.

Discs **904** are provided at the rollers at the edge of the belt to provide additional channeling/sealing means. The discs **904** are preferably integral with the rollers or coupled therewith so that they may rotate.

FIG. **10** is a side view of the hopper end of the conveyor **104**. As shown, conveyor hopper **108** sits above in ingress to the conveyor **104**. When coupled to the support arm **102**, as shown, the conveyor hopper **108** is positioned below a discharge of the main hopper **106**. The discharge **110** may be opened by conventional means. As showed, a wheel handle mechanism **1004** is provided for opening the discharge doors **1006**.

The conveyor hopper **108** is preferably manufactured from light weight materials such as plastic, canvas, rubber or vinyl. As shown, the hopper **108** may include a mechanism for opening and closing the hopper. In this embodiment, flexible coupling or hinge is provided at one end **1008** of the hopper **108** and a mechanism **1010** is provided at the end of the hopper **108** and is coupled with the conveyor **104**, such that the hopper **108** may be made to have an appropriate fit with the discharge **110** of the main hopper **105**. A flap **1012** can be provided at the bottom of the discharge **110**.

FIG. **11** is a schematic view of the hopper end of the conveyor. As is shown, a brush seal **1101** can be located across the belt **702**. The brush seal **1101** retains the conveyed material within the hopper and does not allow the material to enter the void **707** (shown in FIG. **7**) under the roller. Such an arrangement is desirable because it prevents the conveyed material from being subjected to mechanical agitation, which would result in damage to the conveyed material. The brush seal **1101** allows the conveyor teeth **806** to pass, but not the conveyed material.

One will understand that hydraulic power can be provided by a towing vehicle, such as a tractor or the like or alternatively, hydraulic power can be provided on the tender and driving electrically from the towing vehicle, such as a truck.

Thus, a number of preferred embodiments have been fully described above with reference to the drawing figures. Although the invention has been described based upon these preferred embodiments, it would be apparent to those of skill in the art that certain modifications, variations, and alternative constructions could be made to the described embodiments within the spirit and scope of the invention.

We claim:

1. A seed or grain tender comprising:

a frame;

a main hopper mounted on said frame and having a main hopper discharge;

a base mounted below said main hopper discharge;

a support arm having first and second ends;

a first coupling connecting said first end of said support arm with said base, said first coupling being rotatable in relation to said base about a first vertical axis of rotation, and said first end of said support arm being rotatable in relation to said first coupling about a first horizontal axis of rotation;

a conveyor having a longitudinal axis and first and second ends, a conveyor hopper at said first end, a conveyor discharge at said second end, and an internal elevator for moving seed or grain from said conveyor hopper to said conveyor discharge; and

a second coupling connecting said second end of said support arm with said conveyor at an approximate center of gravity of said conveyor, said second coupling defining a second vertical axis of rotation that is not parallel to said conveyor longitudinal axis, and said conveyor being rotatable in relation to said second end of said support arm about said second vertical axis of rotation between an unloading position wherein said conveyor hopper is disposed below said main hopper discharge to receive agricultural product from said main hopper and a loading position wherein said conveyor discharge is disposed above said main hopper to dispense agricultural product into said main hopper.

2. The seed or grain tender of claim **1**, wherein said first vertical axis of rotation extends through said main hopper discharge.

3. The seed or grain tender of claim **1**, wherein said second vertical axis of rotation extends through said approximate center of gravity of said conveyor.

4. The seed or grain tender of claim **1**, wherein said first horizontal axis extends through said first end of said support arm.

5. The seed or grain tender of claim **1**, wherein said second end of said support arm terminates at or near said second coupling.

6. The seed or grain tender of claim **1**, further comprising a hydraulic piston extending at an acute angle relative to a horizontal plane to connect with a portion of said support arm spaced from said first horizontal axis of rotation.

7. The seed or grain tender of claim **1**, further comprising a stand coupled with said first end of said conveyor and movable between a stowed position allowing said conveyor hopper to be positioned below said main hopper discharge when said conveyor is in said unloading position and an extended position supporting said conveyor hopper above the ground when said conveyor is in said loading position.

8. A seed or grain tender comprising:

a frame;

a main hopper mounted on said frame and having a main hopper discharge;

a base positioned below said main hopper;

a support arm having first and second ends;

a first coupling connecting said first end of said support arm with said base, said first coupling being rotatable about a first vertical axis of rotation, and said first end of said support arm being rotatable about a first horizontal axis of rotation;

a conveyor having a longitudinal axis and first and second ends, a conveyor hopper at said first end, and a conveyor discharge at said second end; and

a second coupling connecting said second end of said support arm with said conveyor at an approximate center of gravity of said conveyor, said second coupling defining a second vertical axis of rotation that is not parallel to said conveyor longitudinal axis, and said conveyor being rotatable about said second vertical axis of rotation between an unloading position wherein said conveyor hopper is disposed below said main hopper discharge to receive agricultural product from said main hopper and a loading position wherein said conveyor discharge is disposed above said main hopper to dispense agricultural product into said main hopper.

9. The seed or grain tender of claim **8**, wherein said first vertical axis of rotation extends through said main hopper discharge.

10. The seed or grain tender of claim **8**, wherein said second vertical axis of rotation extends through said approximate center of gravity of said conveyor.

11. The seed or grain tender of claim **8**, wherein said first horizontal axis extends through said first end of said support arm.

12. The seed or grain tender of claim **8**, wherein said second end of said support arm terminates at or near said second coupling.

13. The seed or grain tender of claim **8**, wherein said conveyor includes an internal elevator for moving seed or grain from said conveyor hopper to said conveyor discharge.

14. The seed or grain tender of claim **8**, further comprising a hydraulic piston extending at an acute angle relative to a horizontal plane to connect with a portion of said support arm spaced from said first horizontal axis of rotation.

15. The seed or grain tender of claim **8**, further comprising a stand coupled with said first end of said conveyor and movable between a stowed position allowing said conveyor hopper to be positioned below said main hopper discharge when said conveyor is in said unloading position and an extended position supporting said conveyor hopper above the ground when said conveyor is in said loading position.

16. A seed or grain tender comprising:

a main hopper having a main hopper discharge;

a base positioned below said main hopper;

a support arm having first and second ends;

a first coupling connecting said first end of said support arm with said base, said first coupling being rotatable about a first vertical axis of rotation, and said first end of said support arm being rotatable about a first horizontal axis of rotation;

a conveyor having a longitudinal axis and first and second ends, a conveyor hopper at said first end, and a conveyor discharge at said second end; and

a second coupling connecting said second end of said support arm with said conveyor at an approximate center of gravity of said conveyor, said second coupling defining a first conveyor axis of rotation that is not parallel to said conveyor longitudinal axis, and said conveyor being

rotatable about said first conveyor axis of rotation between an unloading position wherein said conveyor hopper is disposed below said main hopper discharge to receive agricultural product from said main hopper and a loading position wherein said conveyor discharge is disposed above said main hopper to dispense agricultural product into said main hopper.

17. The seed or grain tender of claim **16**, wherein said first vertical axis of rotation extends through said main hopper discharge.

18. The seed or grain tender of claim **16**, wherein said first conveyor axis of rotation extends through said approximate center of gravity of said conveyor.

19. The seed or grain tender of claim **16**, wherein said first horizontal axis extends through said first end of said support arm.

20. The seed or grain tender of claim **16**, wherein said second end of said support arm terminates at or near said second coupling.

21. The seed or grain tender of claim **16**, wherein said conveyor includes an internal elevator for moving seed or grain from said conveyor hopper to said conveyor discharge.

22. The seed or grain tender of claim **16**, further comprising a hydraulic piston extending at an acute angle relative to a horizontal plane to connect with a portion of said support arm spaced from said first horizontal axis of rotation.

23. The seed or grain tender of claim **16**, further comprising a stand coupled with said first end of said conveyor and movable between a stowed position allowing said conveyor hopper to be positioned below said main hopper discharge when said conveyor is in said unloading position and an extended position supporting said conveyor hopper above the ground when said conveyor is in said loading position.

* * * * *

EXHIBIT C

US009745123B2

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Petersen et al.

(10) **Patent No.: US 9,745,123 B2**
(45) **Date of Patent: Aug. 29, 2017**

(54) **SEED CARRIER WITH PIVOTING CONVEYOR**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 305 days.

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(22) Filed: **Jan. 27, 2015**

(65) **Prior Publication Data**

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(51) **Int. Cl.**
B65F 1/00 (2006.01)
B65D 88/54 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***B65D 88/54*** (2013.01); ***A01C 15/003*** (2013.01); ***A01C 15/006*** (2013.01); ***B60P 1/36*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC B60P 1/00; B60P 1/36; B60P 1/42
(Continued)

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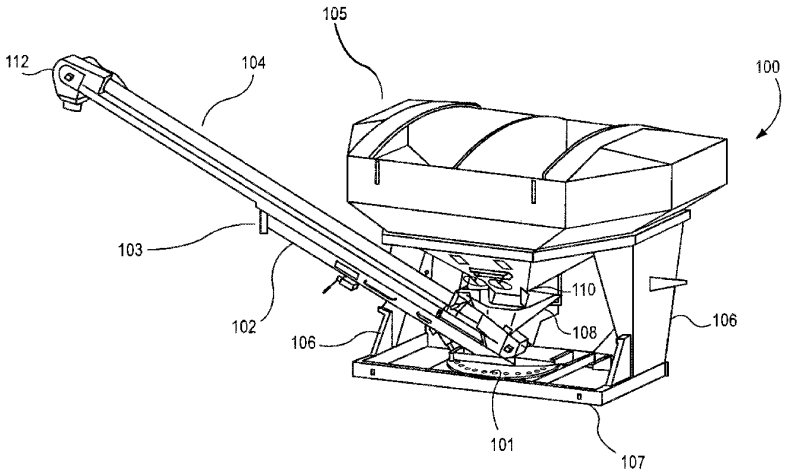
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Assistant Examiner — Willie Berry, Jr.
(74) *Attorney, Agent, or Firm* — Rothwell, Figg, Ernst & Manbeck, P.C.

(57) **ABSTRACT**

A seed carrier includes a main hopper coupled with a frame via leg members. The main hopper has a discharge. A base plate is coupled with the frame. A support arm is rotatably coupled with the base plate at a first end. A belt driven conveyor having a conveyor hopper at a first end and a discharge at a second end is rotatably coupled with a second end of the support arm at an approximate center of gravity thereof. A latch mechanism is provided for detachably coupling the first end of the conveyor with the first end of the support arm such that the conveyor hopper is position below the main hopper discharge. When the conveyor is uncoupled from the first end of the support arm, the conveyor can rotate to a loading position wherein the discharge thereof can be positioned over the main hopper.

21 Claims, 11 Drawing Sheets



Related U.S. Application Data

continuation of application No. 12/031,867, filed on Feb. 15, 2008, now Pat. No. 8,221,047.

(60) Provisional application No. 60/901,321, filed on Feb. 15, 2007.

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B60P 1/36	(2006.01)
B65G 65/32	(2006.01)
B65G 65/40	(2006.01)
B65G 65/42	(2006.01)
B60P 1/00	(2006.01)

(52) **U.S. Cl.**

CPC ***B65G 65/32*** (2013.01); ***B65G 65/40*** (2013.01); ***B65G 65/42*** (2013.01); *B60P 1/00* (2013.01)

(58) **Field of Classification Search**

USPC 414/523; 111/11; 198/312, 315, 316, 198/317, 318

See application file for complete search history.

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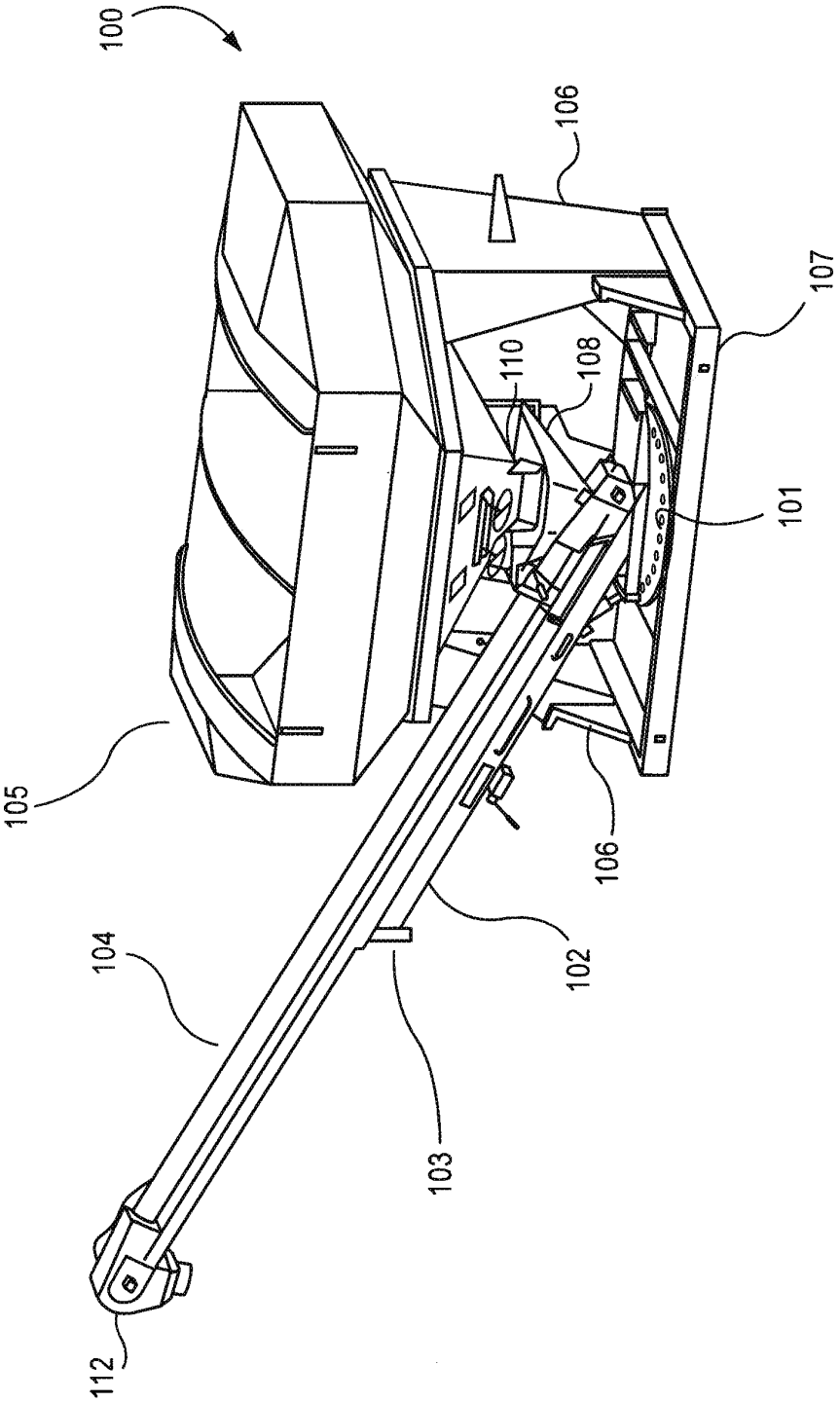


FIG.1

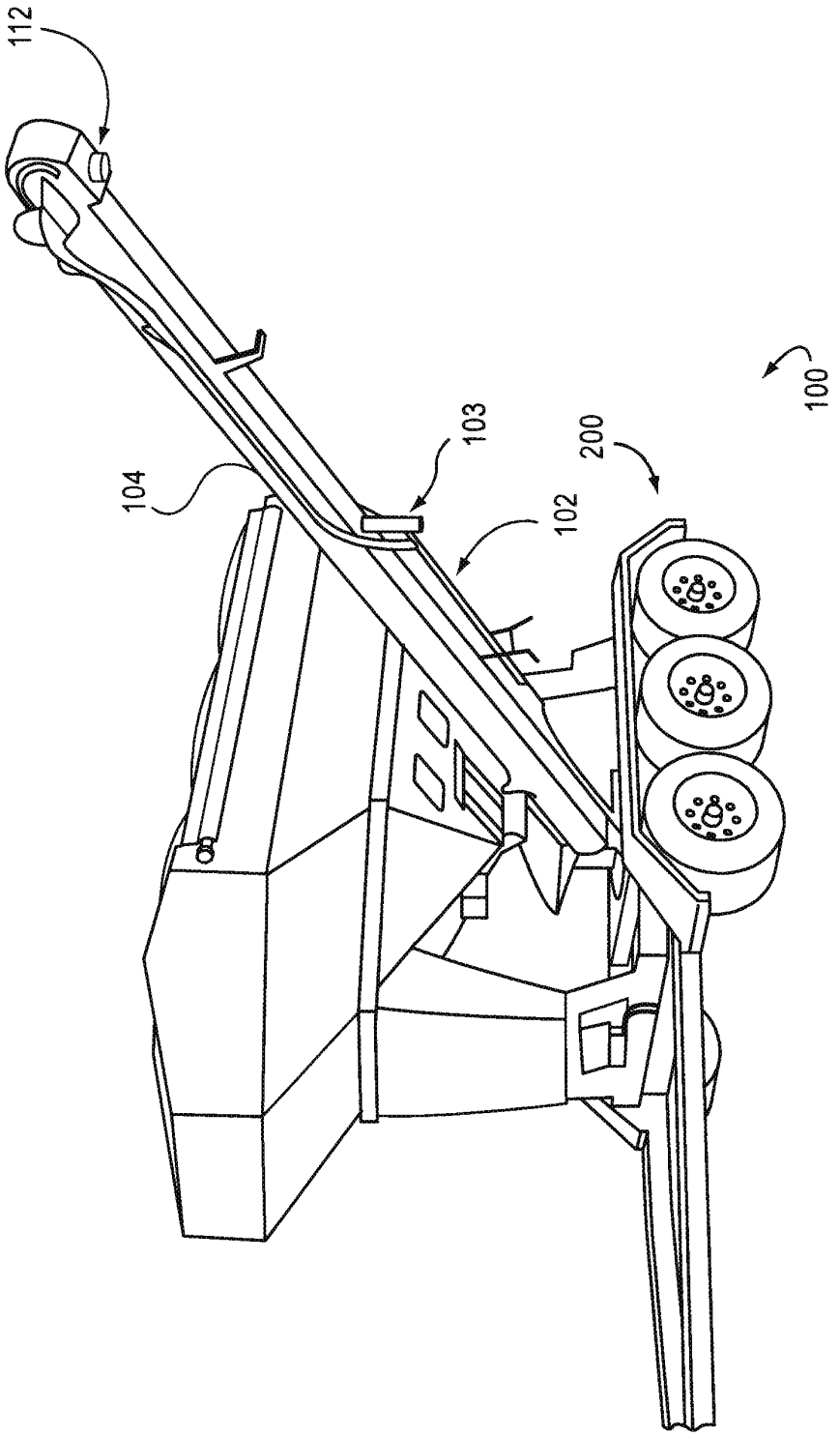


FIG.2

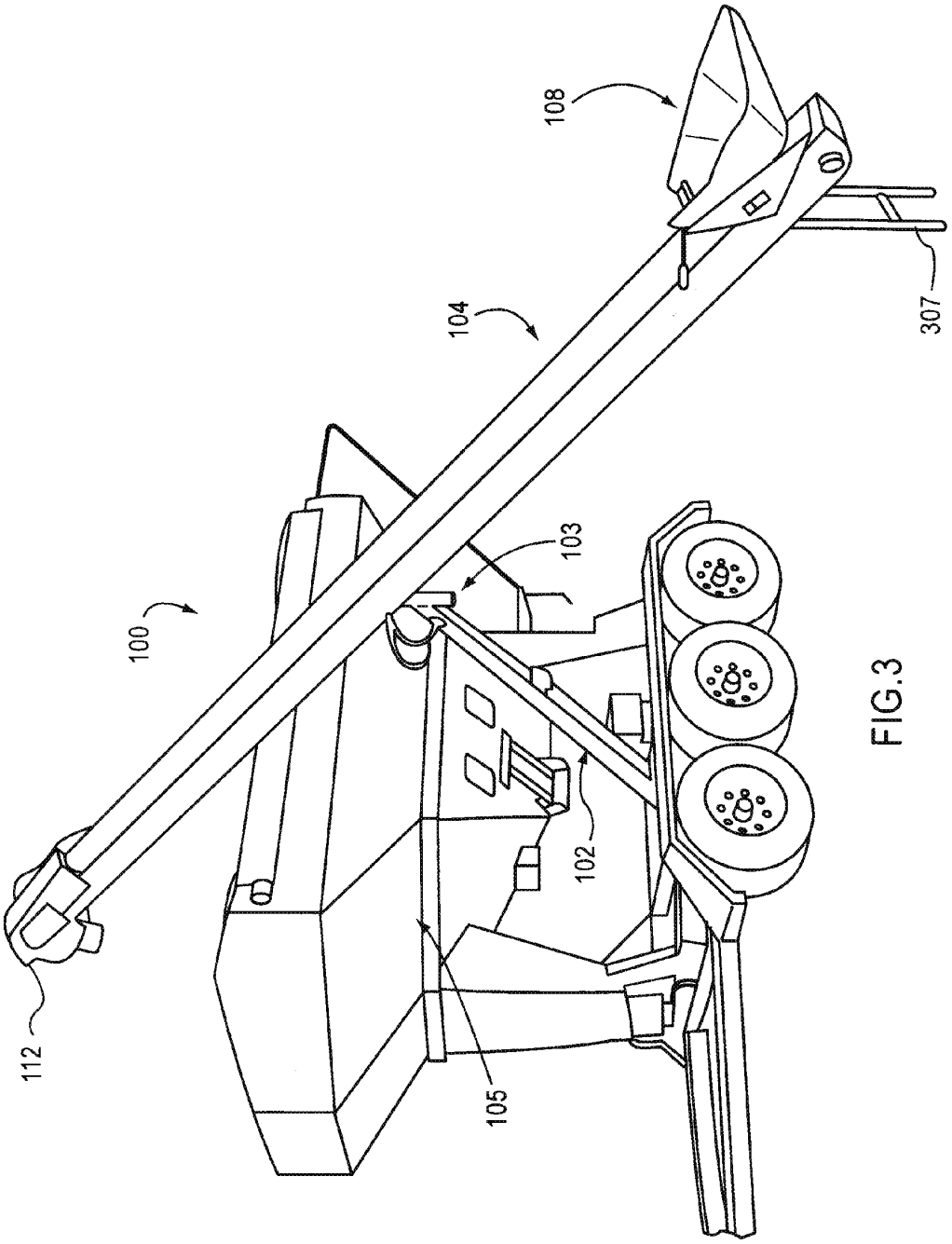


FIG.3

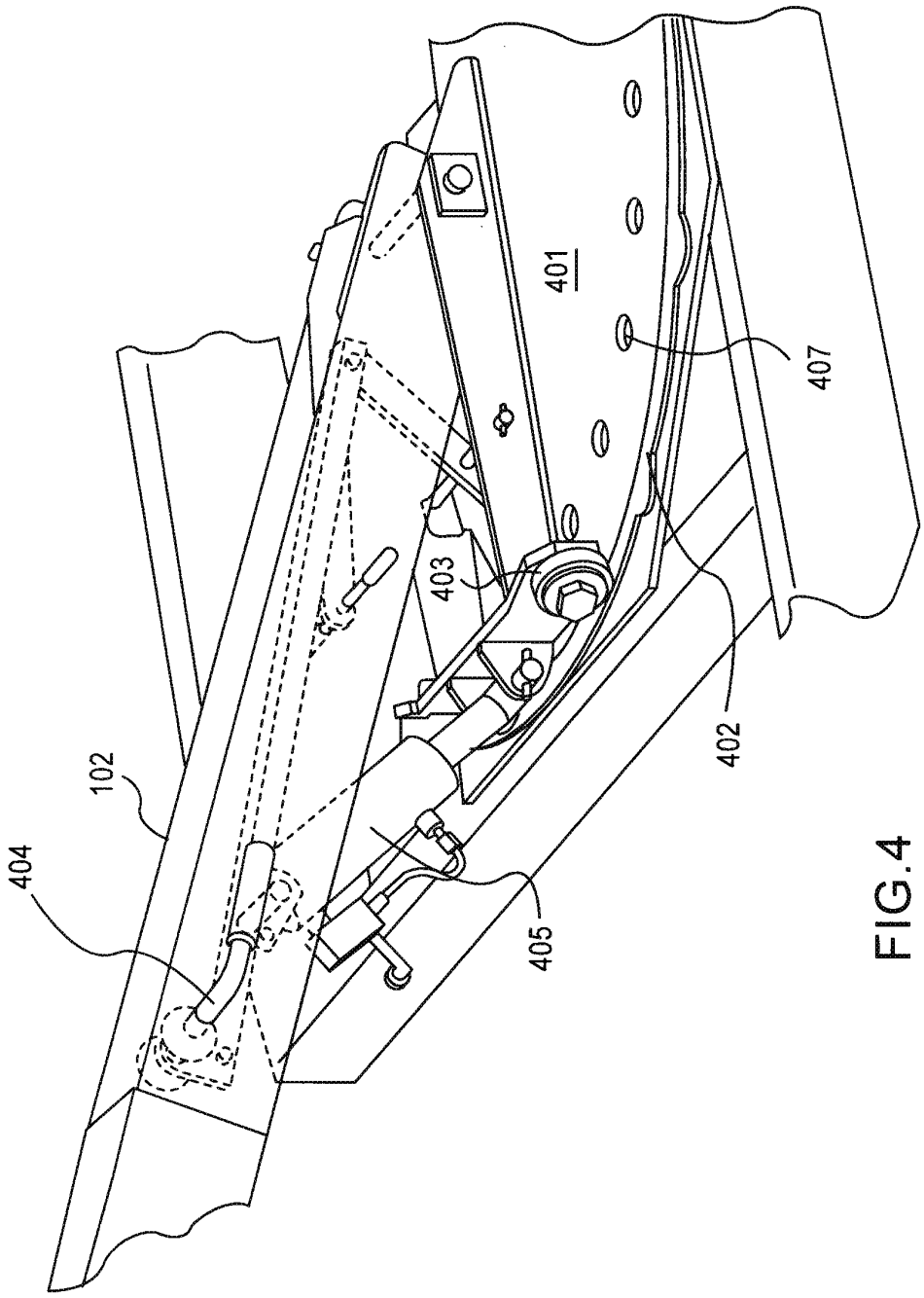


FIG.4

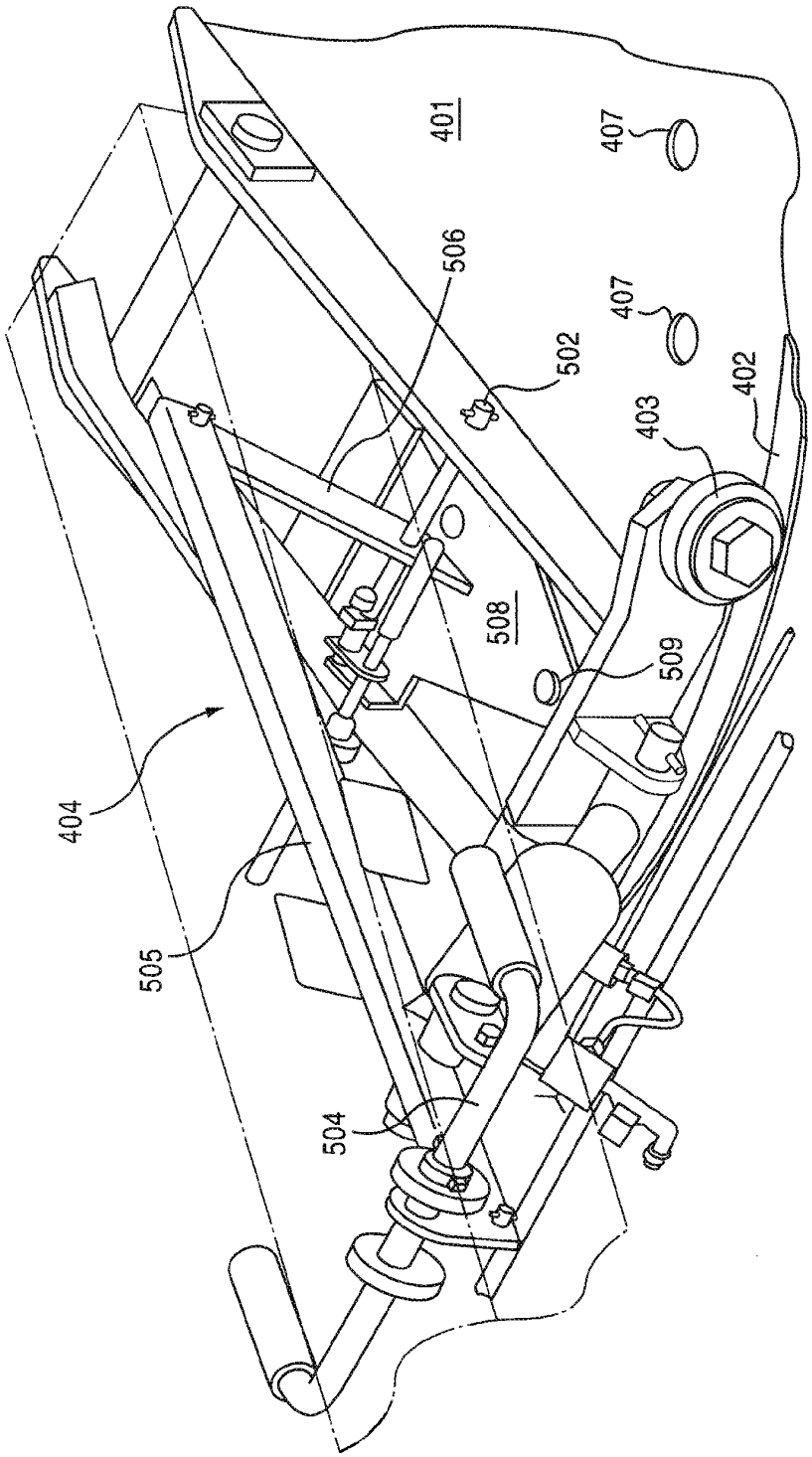


FIG.5

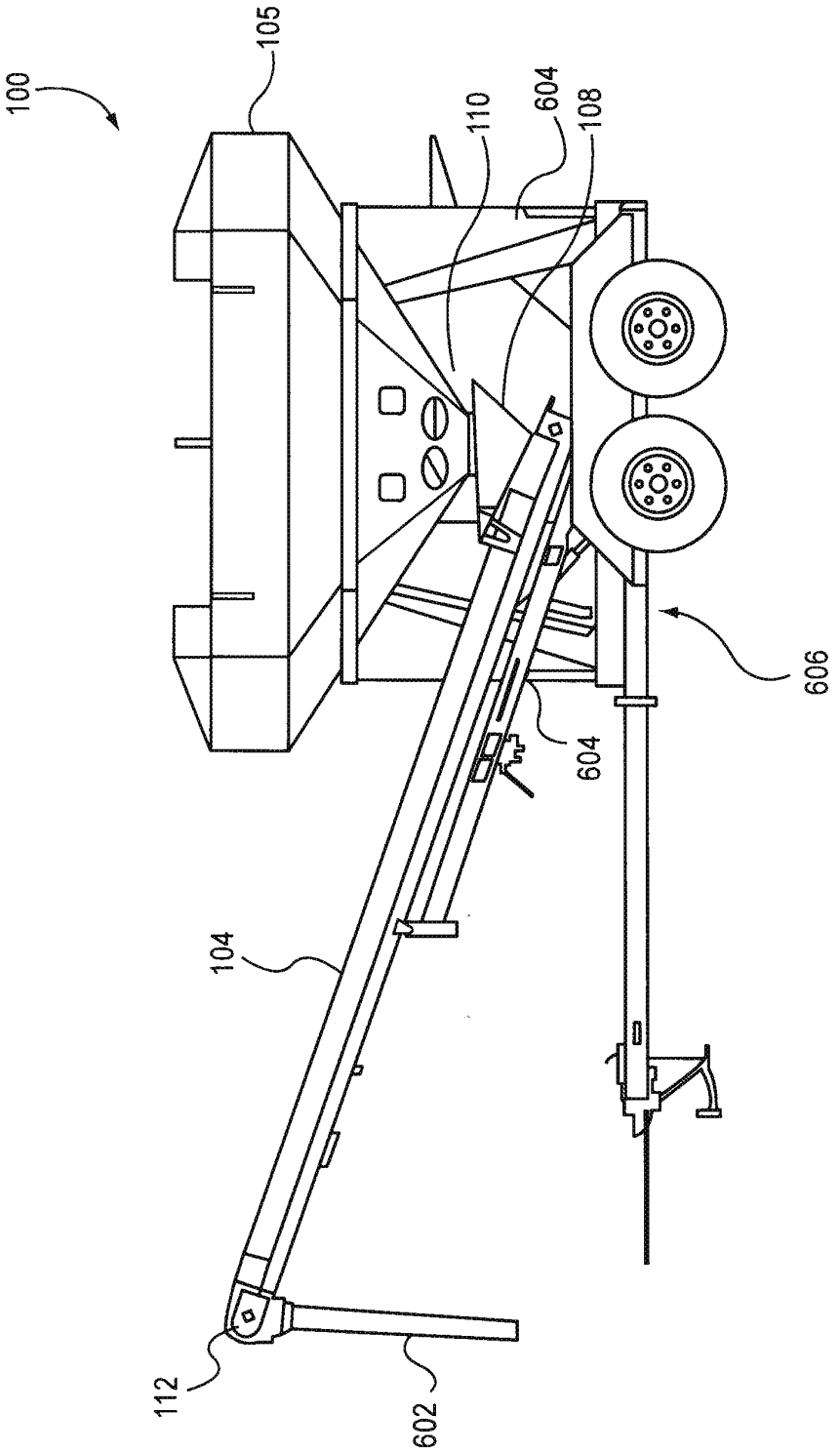


FIG.6

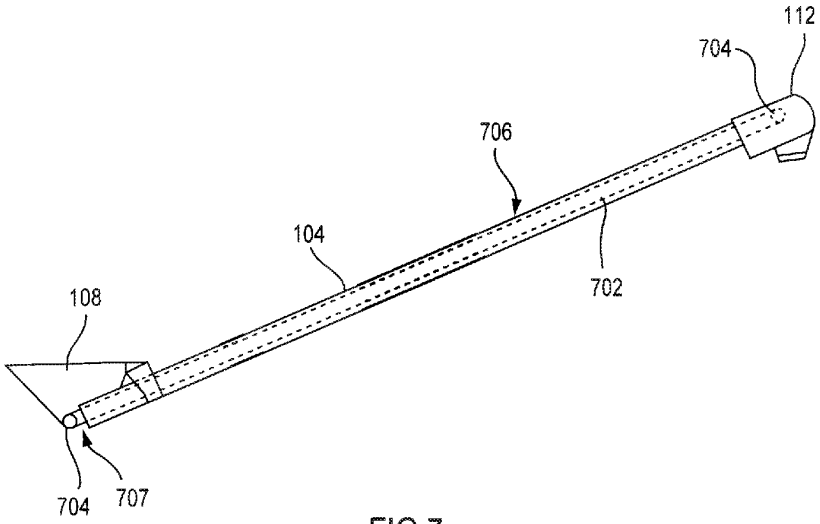


FIG.7

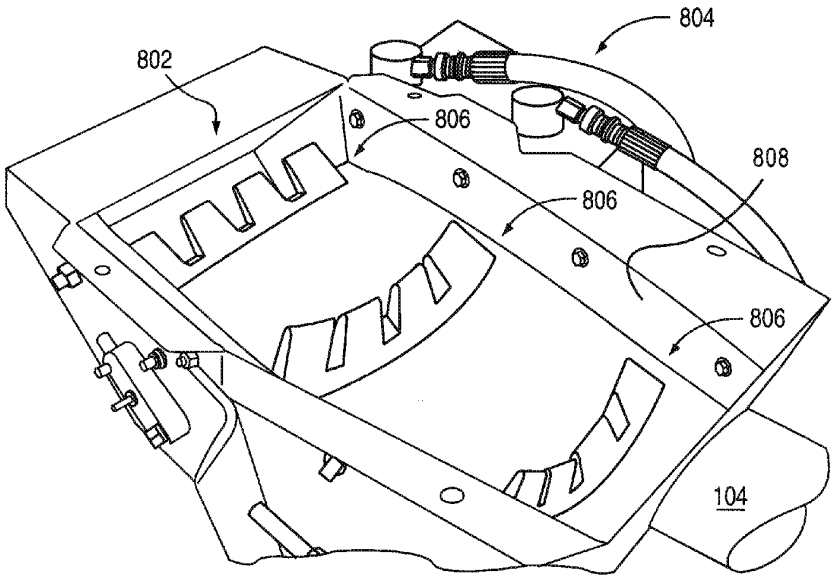


FIG.8

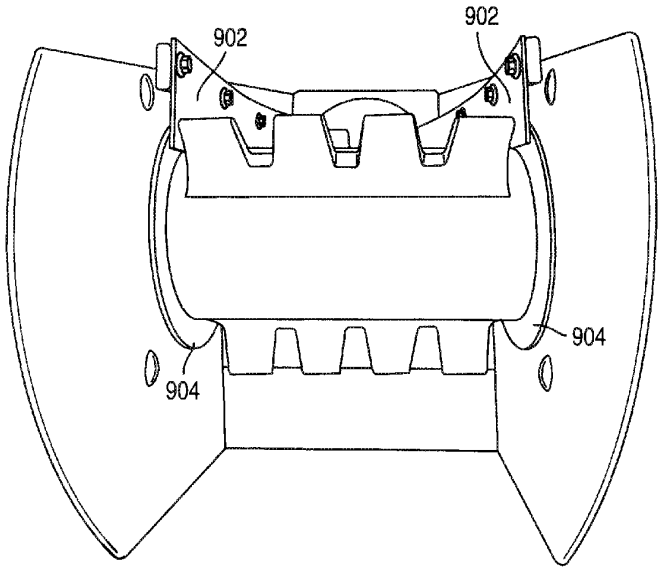


FIG.9

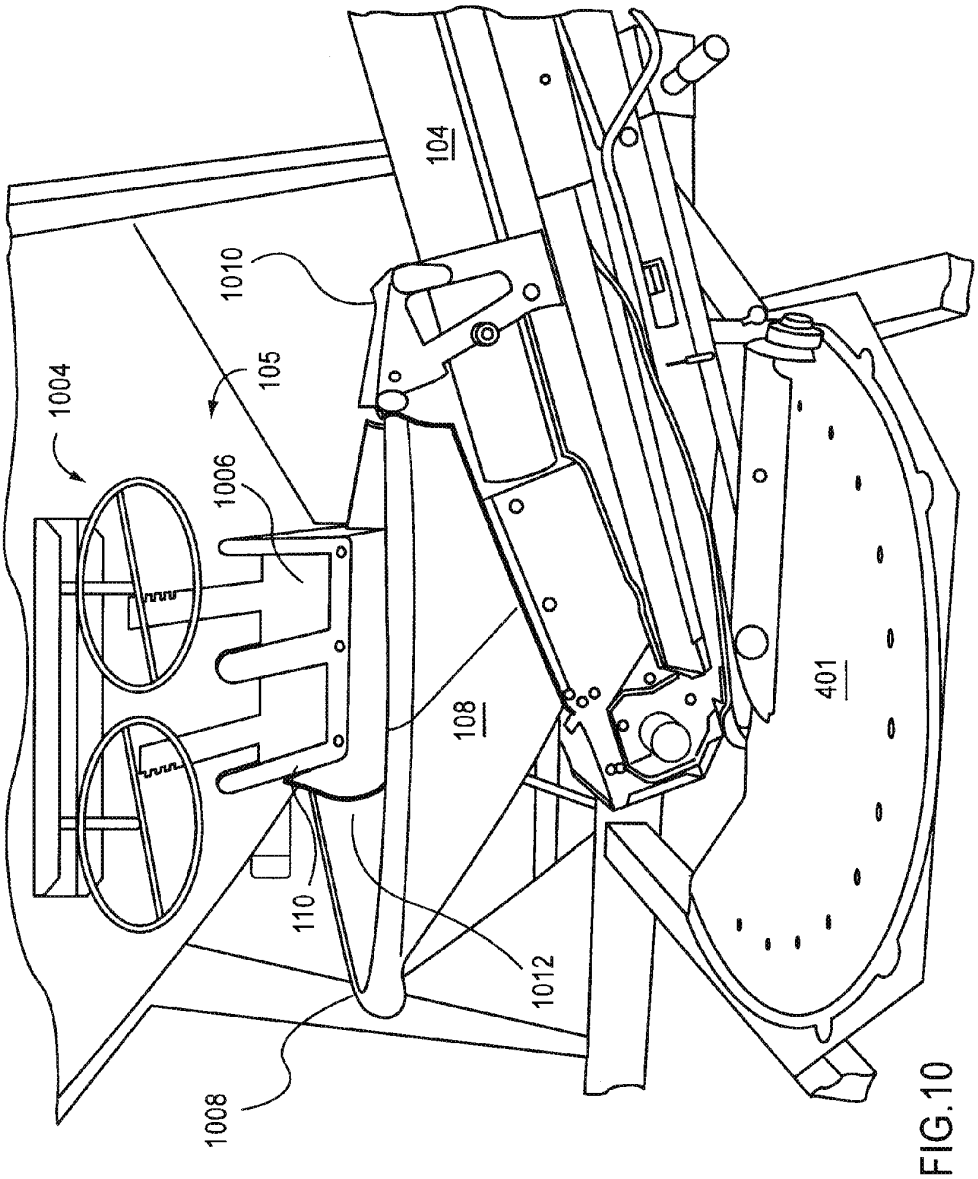


FIG.10

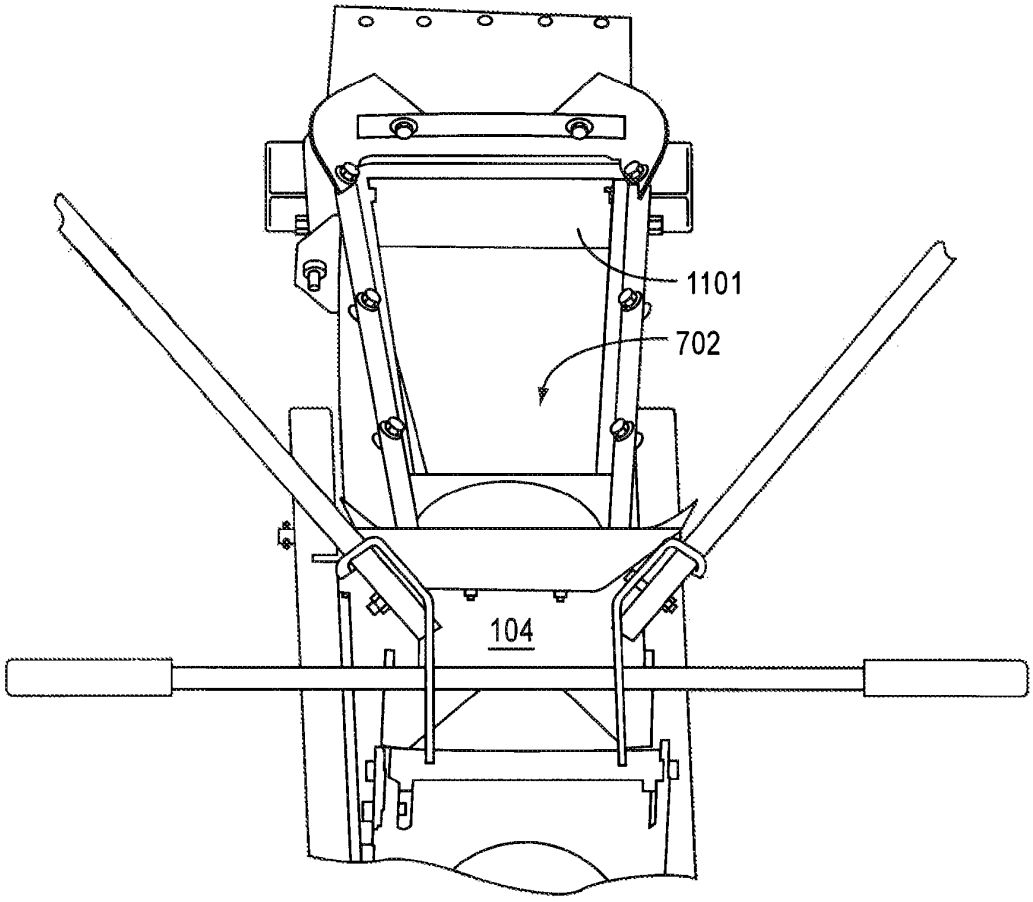


FIG.11

SEED CARRIER WITH PIVOTING CONVEYOR

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application is a Continuation of U.S. application Ser. No. 13/541,553, filed Jul. 3, 2012, which claims priority to U.S. application Ser. No. 12/031,867, filed Feb. 15, 2008, now U.S. Pat. No. 8,221,047, which claims priority to Provisional Patent Application Ser. No. 60/901,321 filed on Feb. 15, 2007, the entire disclosures of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates generally to a conveyor system for a grain or seed carrier. The conveyor system includes a novel pivot system that allows it to either load or unload a container by pivoting it into a loading or unloading position.

Description of the Related Art

Conveyor systems for moving grain, seed, etc. are well known. Auger systems are used to rapidly move grain such as feed or the like, while belt driven conveyors are often used for moving more expensive payload, such as seed.

One belt driven conveyor system includes a generally flat belt constructed from a flexible, sturdy material such as rubber or nylon. The conveyor is housed in a tube with rollers on both ends so that the belt may rotate in order to transmit material from one end to the other. Such conveyors are used for unloading seed carriers or the like. However, current conveyors have several problems.

First, current conveyors have the problem that the material being moved can be damaged by the rollers. Second, current conveyors do not have a full range of motion as implemented in seed carries. Third, current conveyors are only implemented for unloading.

There is a need for new and improved conveyor systems that allow a wagon to be unloaded and loaded using a single mechanism.

SUMMARY OF THE INVENTION

According to an embodiment of the present invention, a seed tender or carrier is provided that includes a main hopper for holding seed and a conveyor for transferring seed to and from the main hopper.

According to an embodiment of the present invention, in an unloading position, one end of the conveyor may be positioned under the discharge of the main hopper and coupled with a pivoting support arm. In the unload position, the conveyor can be used to transfer seed from the main hopper to another location, such as to a planter, seeding unit, or the like. A pivot mechanism allows the conveyor to be rotated from under the box into a loading position in which the conveyor intake can rest on the ground or on a stand while the conveyor discharge is positioned to allow conveyed material to be discharged into the main hopper. In this loading position, the conveyor can be used to fill the main hopper.

According to an embodiment of the present invention, a conveyor hopper is provided on the intake side of the conveyor.

According to an embodiment of the present invention, the pivot mechanism allows the conveyor to swing from side to side to simplify unloading of the main hopper and the filling of planters, etc. The pivot mechanism can include a hydraulic cylinder that adjusts the vertical height of the conveyor discharge relative for different filling applications.

According to an embodiment of the present invention, a pivot single pivot point can be provided at one end of the support arm to allow the conveyor to be rotated between the loading and unloading position. The conveyor may be balanced on the pivot point at a location near or at the center of gravity, thereby permitting the conveyor to be rotated with minimal effort on the part of the operator.

According to an embodiment of the present invention, the conveyor can be rotated through at least 180 degrees about a vertical axis and so that it may be positioned in either a forward or rearward transport position. This feature enables the tender to be pulled by different vehicles such as by a pick-up truck with the conveyor forward or by a grain truck with the conveyor rearward.

Further applications and advantages of various aspects and embodiments of the present invention are discussed below with reference to the drawing figures.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates a seed carrier according to an embodiment of the present invention.

FIG. **2** is a view of a seed carrier in an unloading position according to an embodiment of the present invention.

FIG. **3** is a view of a seed carrier in a loading position according to an embodiment of the present invention.

FIG. **4** is a view of a base system for the seed carrier according to an embodiment of the present invention.

FIG. **5** is a view of a lever mechanism for the base system according to an embodiment of the present invention.

FIG. **6** is a view of a seed carrier in a transport position according to an embodiment of the present invention.

FIG. **7** is a view of a belt conveyor for the seed carrier according to an embodiment of the present invention.

FIG. **8** is a view of the discharge end of a conveyor according to an embodiment of the present invention.

FIG. **9** is a forward view of a conveyor belt wrapping around a roller according to an embodiment of the present invention.

FIG. **10** is a view of the conveyor hopper in an unloading position according to an embodiment of the present invention.

FIG. **11** illustrates the receiving end of the conveyor according to one embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

While the present invention may be embodied in many different forms, a number of illustrative embodiments are described herein with the understanding that the present disclosure is to be considered as providing examples of the principles of the invention and such examples are not intended to limit the invention to preferred embodiments described herein and/or illustrated herein.

In embodiments of the present invention, the novel conveyor pivot system can be implemented with seed carrier or seeding machines. The following section describes non-limiting examples of illustrative seeding equipment according to embodiments of the present invention. It should be appreciated that the following examples are provided for illustration and the present invention is not intended to be limited to the embodiments described herein.

FIG. **1** is a diagram depicting a seed carrier having a tube conveyor according to an embodiment of the present invention. The seed carrier **100** includes a main hopper **105** coupled to a frame **107** by legs **106**. A conveyor **104** is supported by a support arm **102** coupled with a pivoting mechanism **101** fixed to the frame **107**. The conveyor **104** is pivotably coupled with the support arm by a coupling **103** at a point that is preferably near or at the center of gravity of the conveyor **104**. The conveyor **104** is also coupled to the support arm **102** by a latch (not shown) at the bottom of the conveyor. The latch allows the conveyor **104** to be uncoupled from the support arm **102** at the bottom so that the conveyor is free to rotate about the coupling **103**. By positioning the coupling **103** at or near the center of gravity of the conveyor **104**, the conveyor **104** balances on the pivoting coupling **103** such that little effort is required to rotate the conveyor **104**.

The conveyor **104** includes a conveyor hopper **108** at its base, which is shown in the unloading position below the gravity discharge **110** of the main hopper **105**. At the other end of the conveyor **104** is the discharge **112**. Seed can be gravity feed from the main hopper **105** into the conveyor hopper **108**, which can then be moved to the discharge **112** of the conveyor **104** by an internal elevator (not shown). In one embodiment, the elevator is a motor-driven belt type elevator coupled onto rollers at both ends of the conveyor.

The seed carrier **100** may be transported by conventional means such as on a trailer. FIG. **2** illustrates the seed carrier **100** on a three axle trailer **200** according to an embodiment of the present invention. As shown, the conveyor **104** is in the unloading position.

FIG. **3** illustrates the seed carrier **100** in the loading position. As shown, the conveyor **104** is uncoupled from the support arm **102** at its base and rotated 180 degrees about pivot coupling **103** so that the conveyor hopper **108** is positioned at a convenient location away from the carrier while the discharge **112** of the conveyor **104** is located over the main hopper **105**. A stand **307** is provided for holding the conveyor hopper **108** in place. The stand **307** may be integrated with the conveyor **104**.

Accordingly, in the loading position, grain, seed or like can be feed into the conveyor hopper **108** to be moved to the discharge **112** for filling the main hopper **105**.

FIG. **4** is a view of the pivoting base of the support arm **102**. As shown, the support arm **102** can be pivotably coupled to a base **401** at a center point so that the support arm **102** is rotatable about a vertical axis. Wheels **403** provide support and can run along a track **402** to facilitate the support arm's **102** motion about the perimeter of the base **401**. The support arm **102** can be locked into a selected position of the base **401** by engaging a pin (not shown) with one of a plurality of the holes **407** distributed around the base **401**. The pin is disengaged with a hole by actuating a lever mechanism **404**, which lifts the pin out of a hole. The lever mechanism **404** may be spring actuated to bias the pin toward the holes, so that simply releasing the lever will allow the pin to engage with one of the holes **407**. Also shown, a hydraulic piston **405** is coupled with the support arm **102** for adjusting the height of the support arm **102**.

FIG. **5** is an alternative view of the support arm base. As shown, lever mechanism **404** includes a handle **504** coupled with a cross-bars **505** and **506**. Cross-bar **506** is coupled to cross-bar **505** on one end and to a plate **508** having a pin **509** on the other end, and with a pivoting coupling **502** at a point near the plate. Rotating the handle **504** applies a downward force to crossbar **506** causing it to rotate about the coupling **502** to raise the plate **508** to disengage the pin **509**. While disengaged, the base **401** is free to rotate about its vertical axis. Springs may be provided for biasing the pin **509** toward the holes **407** for engaging therewith, or the pin **509** can be engaged by gravity.

FIG. **6** is a side view of a seed carrier **100** according to an embodiment of the present invention. As shown in FIG. **6**, the conveyor **104** includes an elongated discharge spout **602** and is positioned in a transport position. Support members **604** may be mounted on or integral with the legs **106** for holding the conveyor **104** in a forward transport position as shown, or a rearward transport position. As shown, the carrier **100** is fixed to a dual axle trailer **606**.

FIG. **7** illustrates a basic belt driven conveyor according to an embodiment of the present invention. The conveyor **104** comprises a belt **702** that winds about a pair of rollers **704**. The rollers are positioned outside a tube section **706**, a first roller being positioned in the discharge **112** and a second roller being positioned below the conveyor hopper **108**. A motor (not shown) or other means for turning the rollers may be provided at either end of the conveyor. A void **707** exists below the rollers **704** to allow the belt **702** to travel on its return path.

FIG. **8** is a view of a conveyor belt according to an embodiment of the present invention. The discharge end of a conveyor is shown where a conveyor belt wraps around a motor driven roller **802**. The motor may be a hydraulic motor and therefore, hydraulic hoses **804** provide hydraulic fluid flow to and from the motor. Teeth **806** are provided to push grain or seed up the conveyor. As shown, the conveyor belt is cupped in the tube section but flattens out as it reaches the roller **802**. Channeling members (seals) **808** are provided on each side of the belt to form a seal and prevent grain or seed from falling off the edges of the belt as the belt begins to conform to the tubular portion of the conveyor **104**.

FIG. **9** is a front view of the belt as it travels over the roller **802**. Channeling members (seals) **902** are provided on each side of the belt to form a seal and prevent grain or seed from falling off the edges of the belt as the belt flattens at the roller. As shown, the channeling members **902** are fixed to the conveyor discharge **112** with bolts, but can be fixed by other means or can be integral with the discharge.

Discs **904** are provided at the rollers at the edge of the belt to provide additional channeling/sealing means. The discs **904** are preferably integral with the rollers or coupled therewith so that they may rotate.

FIG. **10** is a side view of the hopper end of the conveyor **104**. As shown, conveyor hopper **108** sits above in ingress to the conveyor **104**. When coupled to the support arm **102**, as shown, the conveyor hopper **108** is positioned below a discharge of the main hopper **106**. The discharge **110** may be opened by conventional means. As showed, a wheel handle mechanism **1004** is provided for opening the discharge doors **1006**.

The conveyor hopper **108** is preferably manufactured from light weight materials such as plastic, canvas, rubber or vinyl. As shown, the hopper **108** may include a mechanism for opening and closing the hopper. In this embodiment, flexible coupling or hinge is provided at one end **1008** of the hopper **108** and a mechanism **1010** is provided at the end of the hopper **108** and is coupled with the conveyor **104**, such that the hopper **108** may be made to have an appropriate fit with the discharge **110** of the main hopper **105**. A flap **1012** can be provided at the bottom of the discharge **110**.

FIG. **11** is a schematic view of the hopper end of the conveyor. As is shown, a brush seal **1101** can be located across the belt **702**. The brush seal **1101** retains the conveyed material within the hopper and does not allow the material

to enter the void **707** (shown in FIG. **7**) under the roller. Such an arrangement is desirable because it prevents the conveyed material from being subjected to mechanical agitation, which would result in damage to the conveyed material. The brush seal **1101** allows the conveyor teeth **806** to pass, but not the conveyed material.

One will understand that hydraulic power can be provided by a towing vehicle, such as a tractor or the like or alternatively, hydraulic power can be provided on the tender and driving electrically from the towing vehicle, such as a truck.

Thus, a number of preferred embodiments have been fully described above with reference to the drawing figures. Although the invention has been described based upon these preferred embodiments, it would be apparent to those of skill in the art that certain modifications, variations, and alternative constructions could be made to the described embodiments within the spirit and scope of the invention.

We claim:

1. A seed or grain tender comprising:

a main hopper having a main hopper discharge;

a support arm having first and second ends;

said first end of said support arm being located below said main hopper and being rotatable about a first axis of rotation, and said first end of said support arm being rotatable about a second axis of rotation that is perpendicular to said first axis of rotation;

a conveyor having a longitudinal axis and first and second ends, a conveyor hopper at said first end, a conveyor discharge at said second end, and an internal elevator for moving seed or grain from said conveyor hopper to said conveyor discharge;

said second end of said support arm being coupled with said conveyor between said first and second ends of said conveyor, said conveyor being rotatable about a third axis of rotation at said second end of said support arm that is not parallel to said conveyor longitudinal axis, and said conveyor being rotatable in relation to said second end of said support arm about said third of axis of rotation between an unloading position wherein said conveyor hopper is disposed below said main hopper discharge to receive agricultural product from said main hopper and a loading position wherein said conveyor discharge is disposed above said main hopper to dispense agricultural product into said main hopper, and

a hydraulic piston extending at an acute angle relative to a horizontal plane to connect with a portion of said support arm spaced from said second axis of rotation.

2. The seed or grain tender of claim **1**, wherein said first axis of rotation extends through said main hopper discharge.

3. The seed or grain tender of claim **1**, wherein said second axis of rotation extends through said first end of said support arm.

4. The seed or grain tender of claim **1**, wherein said third axis of rotation extends through said conveyor.

5. The seed or grain tender of claim **1**, wherein said third axis of rotation extends through said second end of said support arm.

6. The seed or grain tender of claim **1**, wherein said third axis of rotation extends through said conveyor and said second end of said support arm.

7. The seed or grain tender of claim **1**, wherein said third axis of rotation is oriented at an angle having a vertical component.

8. The seed or grain tender of claim **1**, wherein said second end of said support arm is coupled with said conveyor at or near said approximate center of gravity of said conveyor.

9. The seed or grain tender of claim **1**, further comprising a stand coupled with said first end of said conveyor and movable between a stowed position allowing said conveyor hopper to be positioned below said main hopper discharge when said conveyor is in said unloading position and an extended position supporting said conveyor hopper above the ground when said conveyor is in said loading position.

10. A seed or grain tender comprising:

a main hopper having an upper portion with a main hopper intake opening and a lower portion with a main hopper discharge;

a support arm having a first end proximate said lower portion of said main hopper and a second end;

wherein said support arm is pivotable about a first axis of rotation proximate said first end of said support arm to cause said support arm to be movable between an operating position wherein said support arm extends outwardly relative to said main hopper and a storage position wherein said support arm is folded inwardly towards said main hopper in relation to said operating position, said support arm further being pivotable about a second axis of rotation proximate said first end of said support arm to cause an elevation of said second end of said support arm to be adjustable;

a conveyor having a longitudinal axis and first and second ends, a conveyor hopper at said first end, a conveyor discharge at said second end, and an internal elevator for moving seed or grain from said conveyor hopper to said conveyor discharge; and

said second end of said support arm being coupled with said conveyor between said first and second conveyor ends, said conveyor being rotatable about a third axis of rotation proximate said second end of said support arm that is not parallel to said conveyor longitudinal axis, and said conveyor being rotatable in relation to said second end of said support arm about said third of axis of rotation between an unloading position wherein said conveyor hopper is disposed below said main hopper discharge to receive agricultural product from said main hopper and a loading position wherein said conveyor discharge is disposed above said intake opening of said main hopper to dispense agricultural product into said main hopper.

11. The seed or grain tender of claim **10**, wherein said first axis of rotation extends through said main hopper discharge.

12. The seed or grain tender of claim **10**, wherein said second axis of rotation extends through said first end of said support arm.

13. The seed or grain tender of claim **10**, wherein said third axis of rotation extends through said conveyor.

14. The seed or grain tender of claim **10**, wherein said third axis of rotation extends through said second end of said support arm.

15. The seed or grain tender of claim **10**, wherein said third axis of rotation extends through said conveyor and said second end of said support arm.

16. The seed or grain tender of claim **10**, wherein said third axis of rotation is oriented at an angle having a vertical component.

17. The seed or grain tender of claim **16**, wherein said first axis of rotation is vertical.

18. The seed or grain tender of claim **17**, wherein said second axis of rotation is horizontal.

19. The seed or grain tender of claim **10**, wherein said second end of said support arm is coupled with said conveyor at an approximate center of gravity of said conveyor.

20. The seed or grain tender of claim **10**, further comprising a hydraulic piston extending at an acute angle relative to a horizontal plane to connect with a portion of said support arm spaced from said second axis of rotation.

21. The seed or grain tender of claim **10**, further comprising a stand coupled with said first end of said conveyor and movable between a stowed position allowing said conveyor hopper to be positioned below said main hopper discharge when said conveyor is in said unloading position and an extended position supporting said conveyor hopper above the ground when said conveyor is in said loading position.

* * * * *

EXHIBIT D

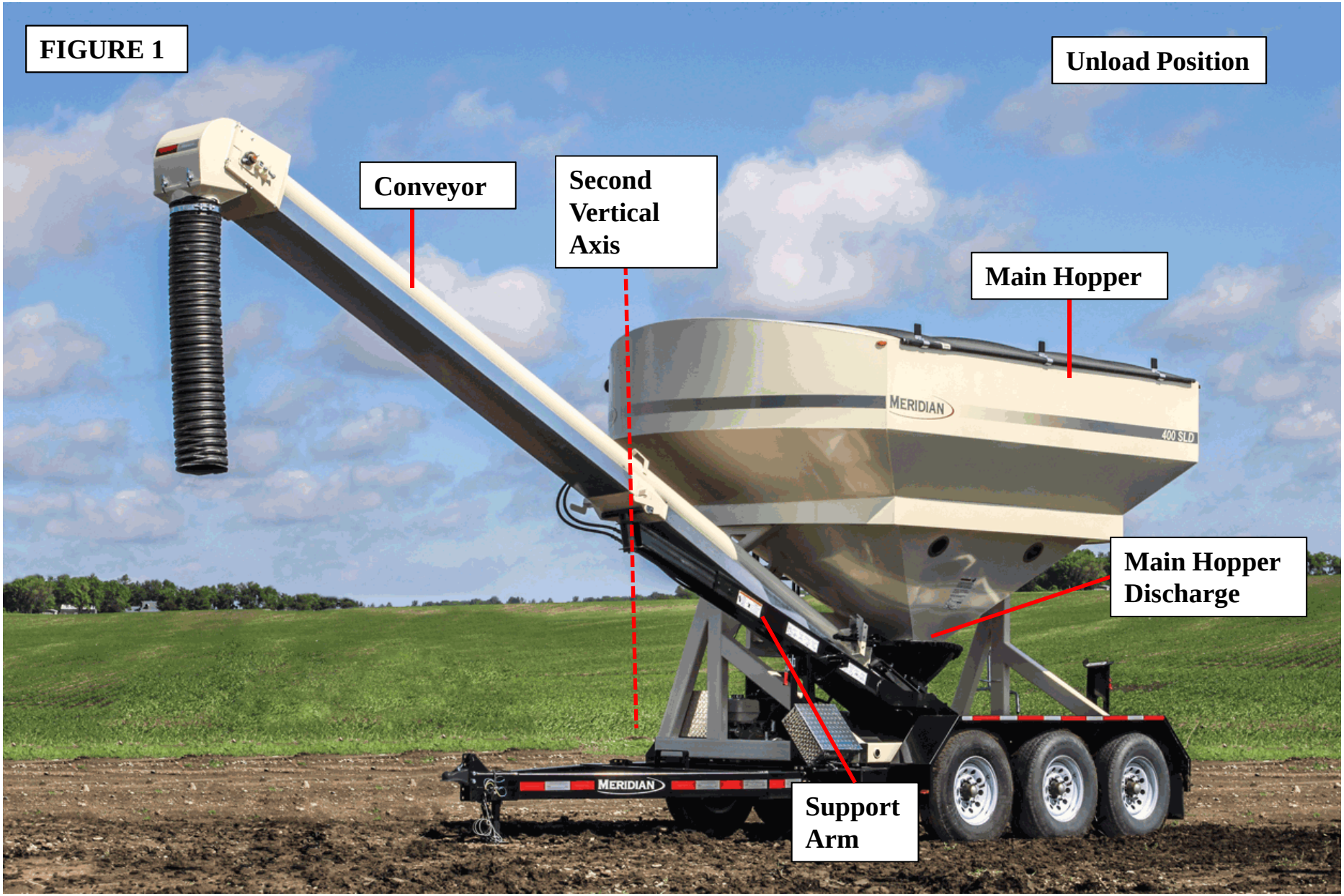
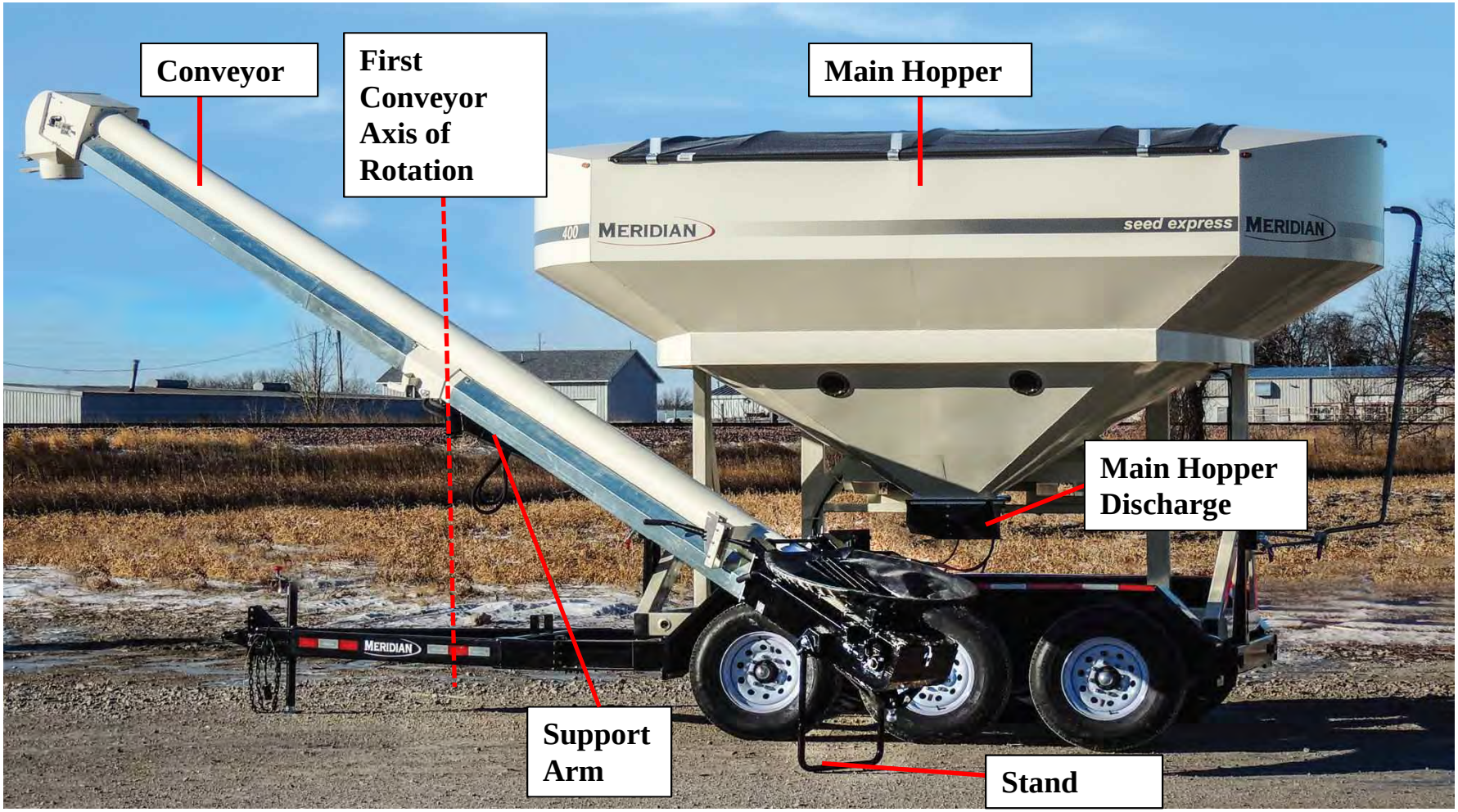
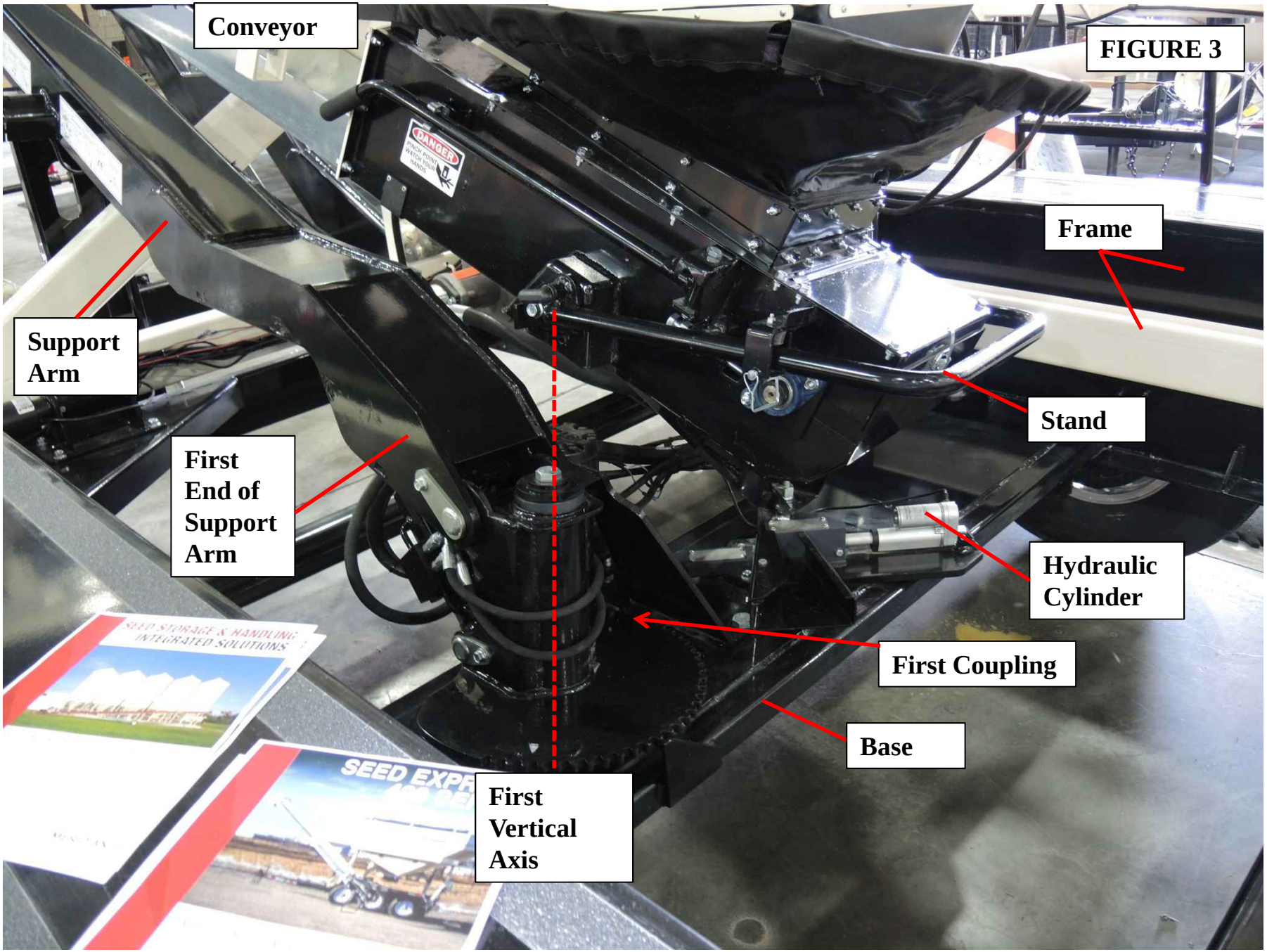
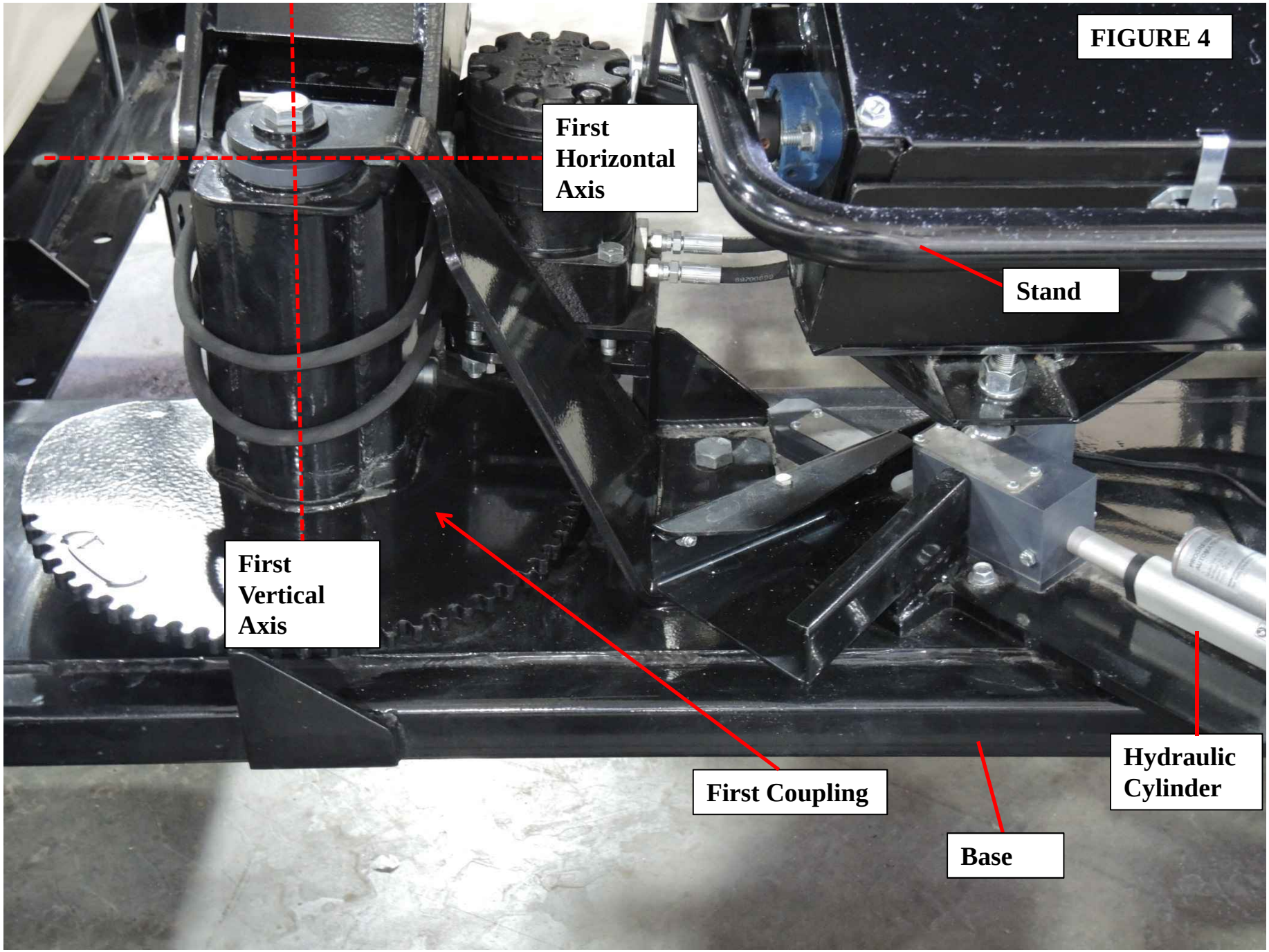
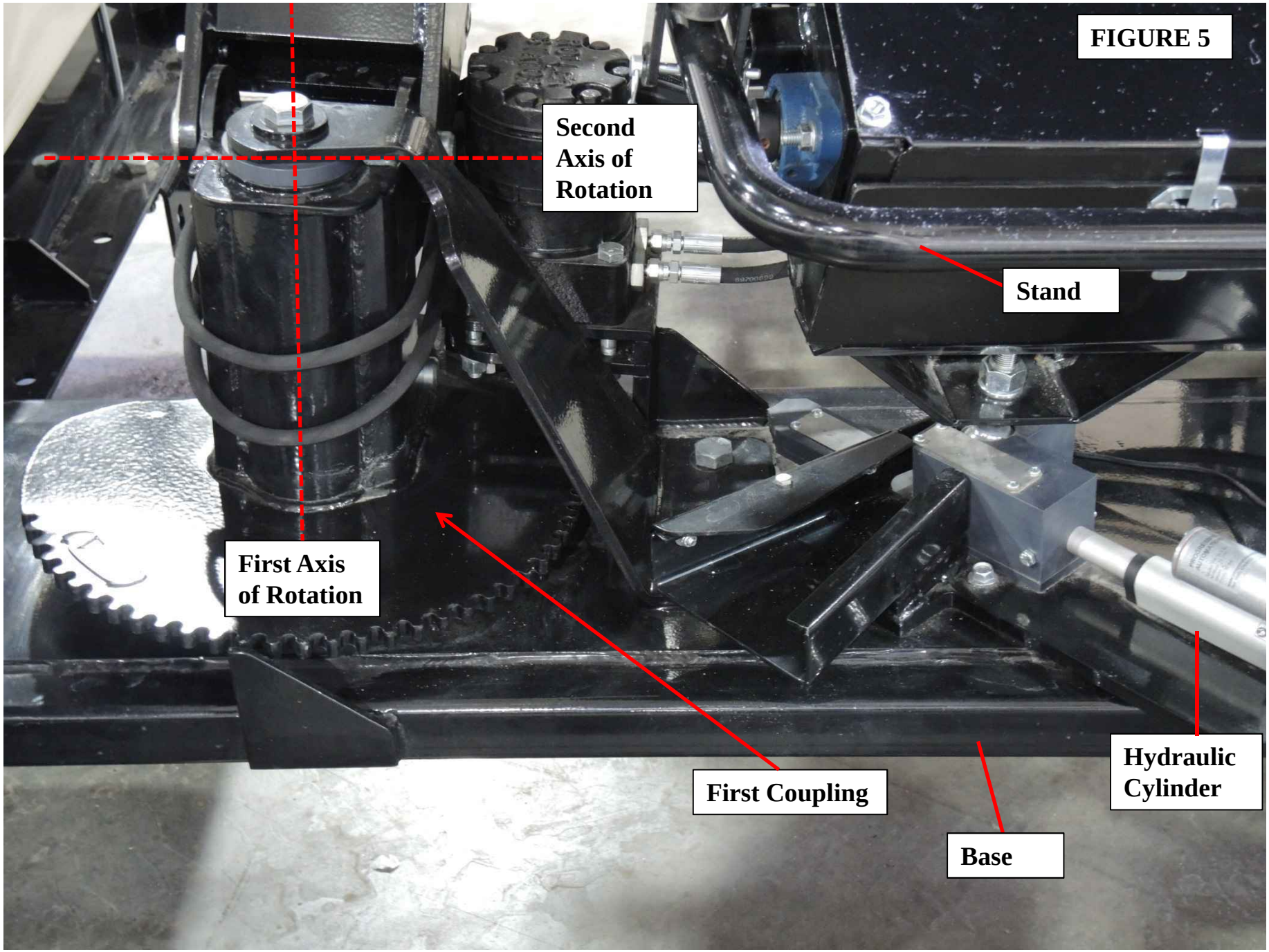

FIGURE 1
Unload Position
Conveyor
Second Vertical Axis
Main Hopper
Main Hopper Discharge
Support Arm
MERIDIAN
400 SLD
MERIDIAN

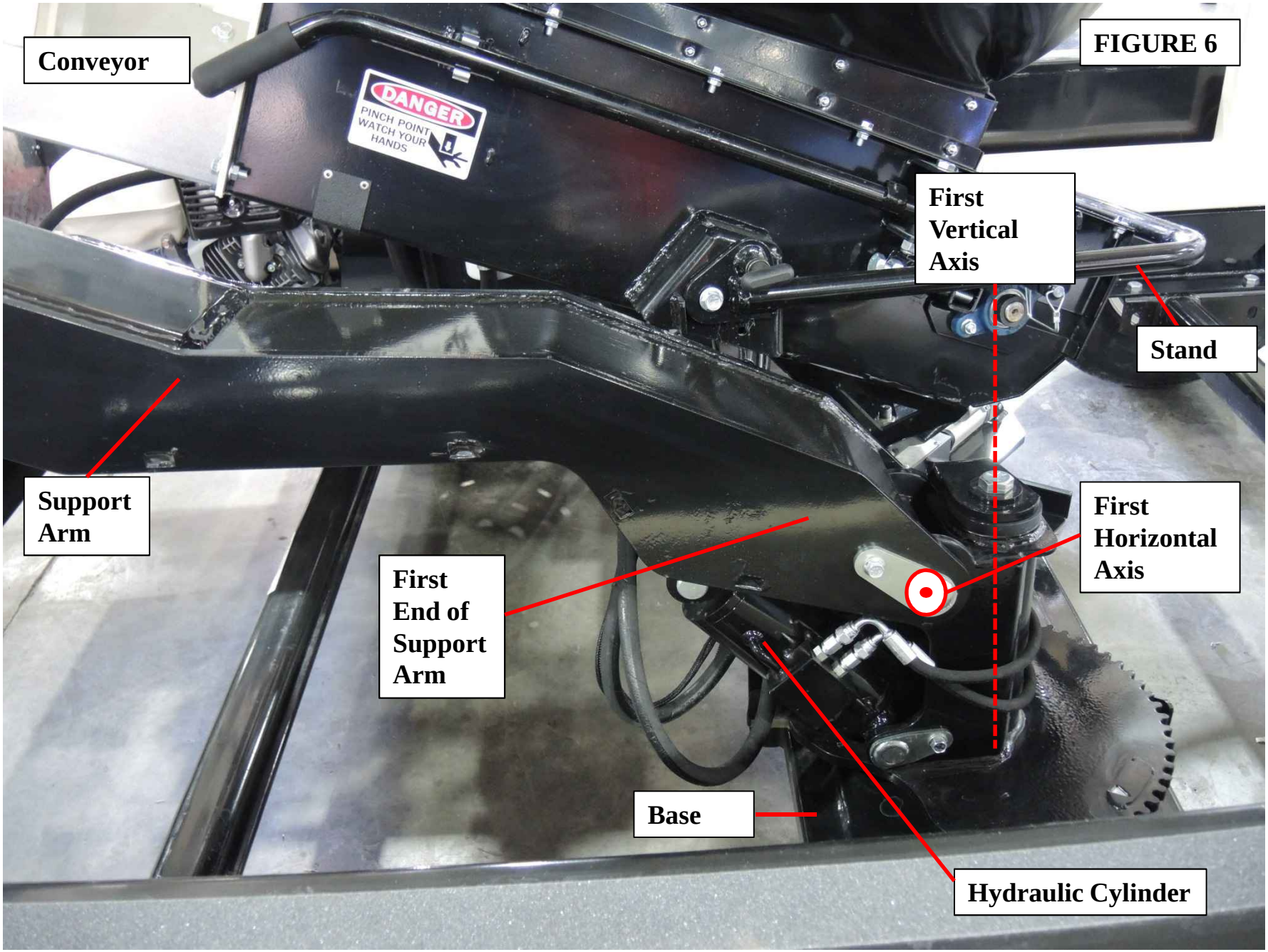
FIGURE 2


Conveyor
First Conveyor Axis of Rotation
Main Hopper
Main Hopper Discharge
Support Arm
Stand
MERIDIAN
seed express
MERIDIAN
MERIDIAN


Conveyor
FIGURE 3
Frame
Support Arm
Stand
First End of Support Arm
Hydraulic Cylinder
First Coupling
Base
First Vertical Axis


FIGURE 4
First Horizontal Axis
Stand
First Vertical Axis
First Coupling
Base
Hydraulic Cylinder


FIGURE 5
Second Axis of Rotation
Stand
First Axis of Rotation
First Coupling
Base
Hydraulic Cylinder


FIGURE 6
Conveyor
DANGER
PINCH POINT
WATCH YOUR
HANDS
First
Vertical
Axis
Stand
Support
Arm
First
Horizontal
Axis
First
End of
Support
Arm
Base
Hydraulic Cylinder

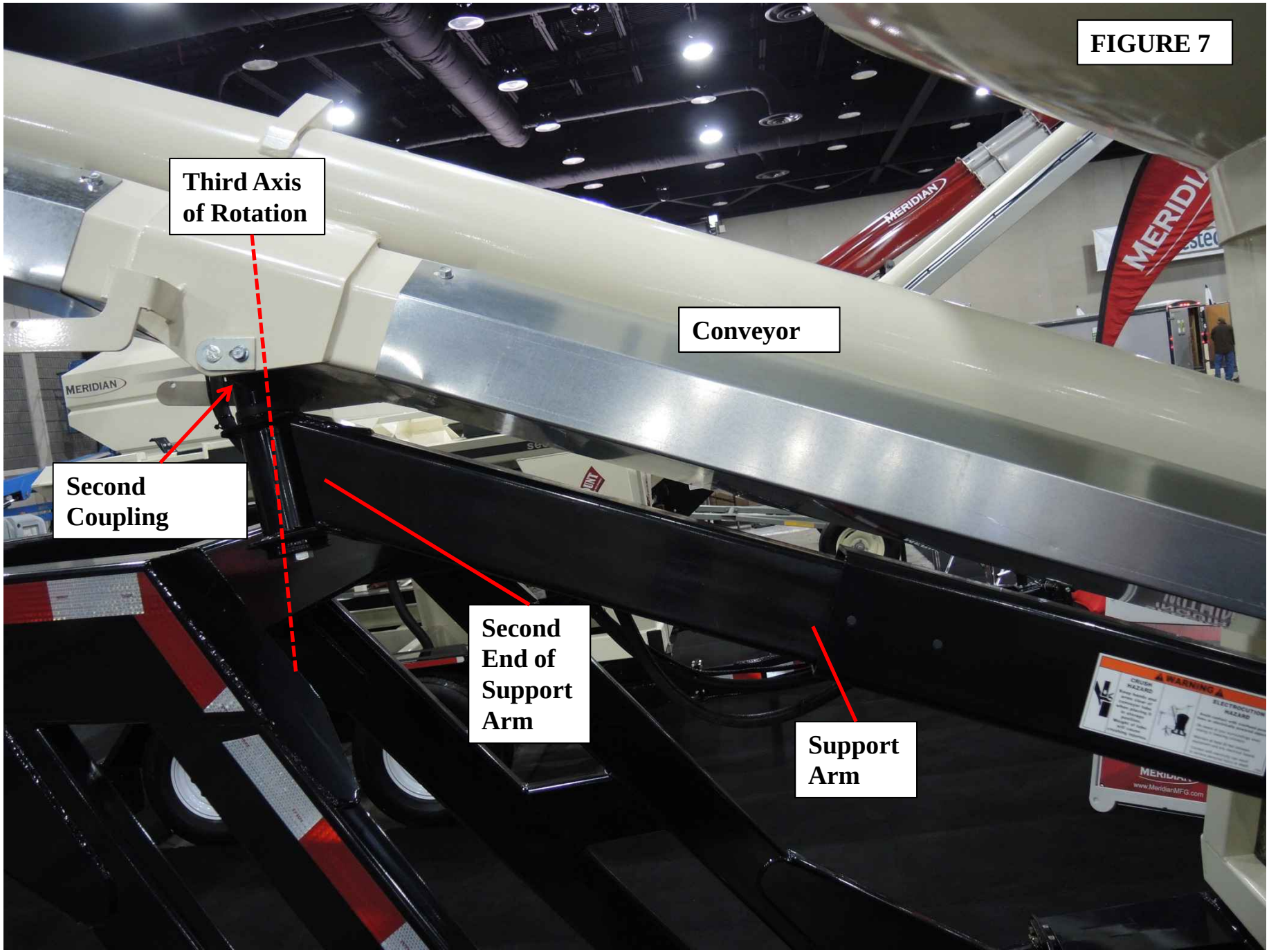

FIGURE 7
Third Axis of Rotation
Conveyor
Second Coupling
Second End of Support Arm
Support Arm
MERIDIAN
WARNING

FIGURE 8


Conveyor Discharge (Second End of Conveyor)
Load Position
Main Hopper
Conveyor
Conveyor Hopper (First End of Conveyor)
Support Arm
Stand

EXHIBIT E

MERIDIAN®

SEED TENDERS

SEED TITAN™ | SEED EXPRESS™

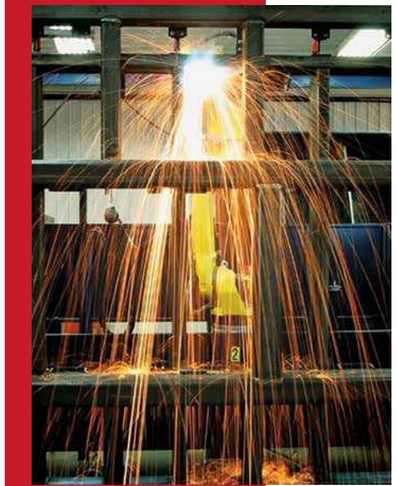


25 Years of Excellence
First in Innovation • First in Industry
Meridian Seed Tenders

PATENT PROTECTED
This product is covered by one or more U.S., Canadian, Foreign patents and/or pending patent applications. For details, see:
meridianmfg.com/patents

CANADA'S BEST MANAGED COMPANIES
Platinum member

MERIDIAN®



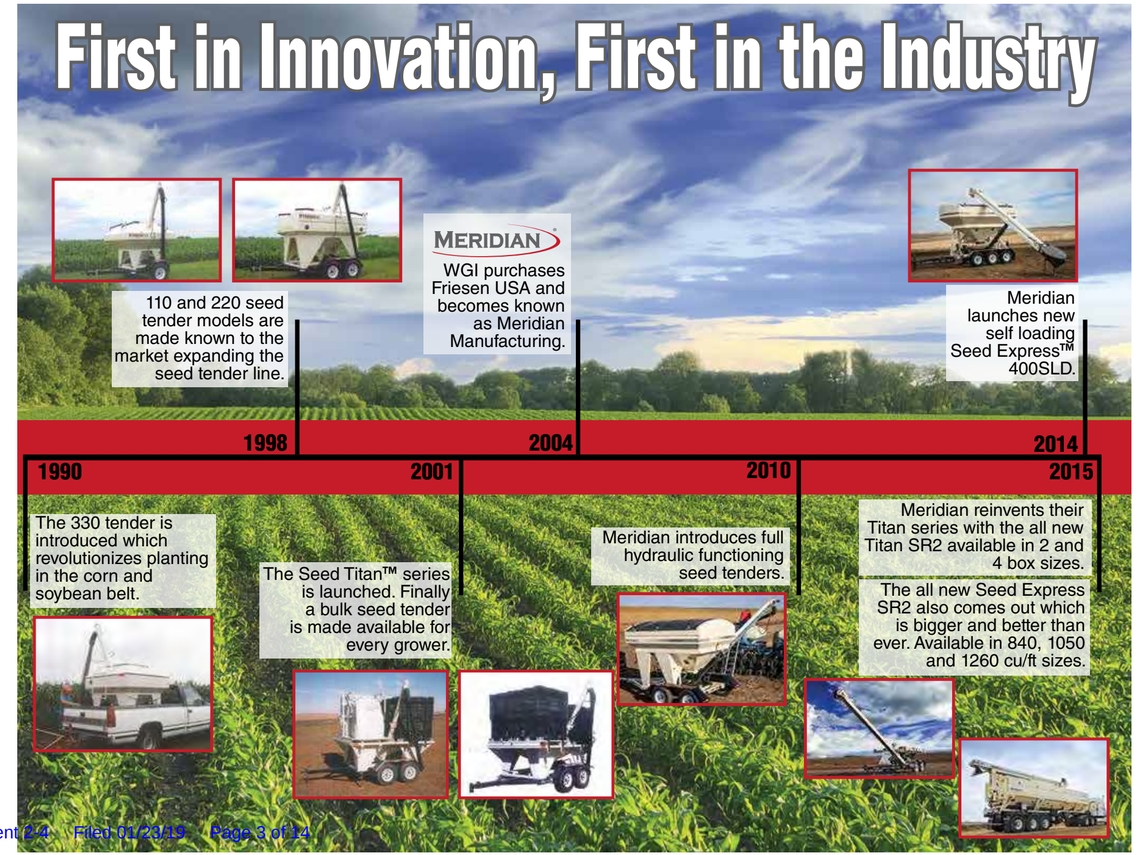
Meridian Seed Tenders were first in the industry and we continue to be first in innovation. Meridian has continuously incorporated the latest technological innovations to meet our customers' ever-changing needs. Meticulous attention to quality and detail reflects the attitude of an enthusiastic and skilled production team, providing confidence to each Meridian customer of a superior and dependable product. Meridian's best references are the thousands of farmers and commercial customers who have experienced the quality and value of the Meridian family of products.

Meridian offers the largest selection of seed tenders in the seed handling industry and can accommodate any farming operation. We take the work out of loading seed into your planter or drill—decreasing the downtime in the field in order to keep your tractor and planter moving.

Our tenders are designed with you in mind. We've optimized our tenders for various seed products, larger volume through-out, increased holding capacities, new hydraulic drive with wireless remote control and our premium powder coat paint finish, which creates a superior paint adhesion for our tenders and the trailers they are mounted on.

Our service starts before you purchase a bulk seed tender by helping you select the unit with the options and accessories to best suit your farming operation. Meridian has a large dealer network and sales team available to help you choose the right seed tender for your operation.

MERIDIAN



WHAT'S INSIDE

SEED TITAN™

6 INTRO TO SEED TITAN™ SR2 SERIES
7 SEED TITAN™ SR2 2 Box
8 SEED TITAN™ SR2 4 Box

SEED EXPRESS™

9 INTRO TO SEED EXPRESS™ SERIES
10 SEED EXPRESS™ 110BST
11 SEED EXPRESS™ 225RST
12 SEED EXPRESS™ 240
13 SEED EXPRESS™ 240RT
14 SEED EXPRESS™ 375RT
15 SEED EXPRESS™ 400SLD
16 SEED EXPRESS™ SR2 840, 1050 AND 1260

ADDITIONAL INFORMATION

19 TALC APPLICATOR
20 FEATURES AND OPTIONS
23 TESTIMONIALS



SEED TITAN™ SR2 SERIES



Meridian's new Titan SR2 Seed Tender provides a host of new, innovative features that take ease of use and product innovation to a whole new level. This next-generation tender is built to perform – a sturdier and more robust design, an inventive positioning mechanism, and the ability to interchange between a conveyor with Meridian's patented cleated belt or a one piece auger tube without hinge points. Both options are just some of the innovations designed to help improve the operational efficiency for your business. Meridian's proven patented Self Centering Box Guides continues to be the quickest, easiest, and safest way to load seed boxes onto the tender.

Meridian understands the fundamental needs of the grower – functionality, ease of use, and durability to name a few. Meridian also understands the importance of capacity, cycle time and accuracy – particularly as they apply to seeding season. To prove our understanding, we specifically designed the new Titan SR2 around these product attributes such as optional trailers and scale offerings. The result is something you simply have to see!

SEED TITAN™ SR2 2 BOX

MEETS YOUR NEEDS

Designed to hold two bulk seed boxes, the Seed Titan SR2 functions great for filling individual seed boxes and handling commodities like corn, beans, rice, cotton, wheat, and oats. It's Patented Self-Centering Box Guides can have your seed securely loaded and down the road in no time.







GREAT FEATURES. GREAT QUALITY.

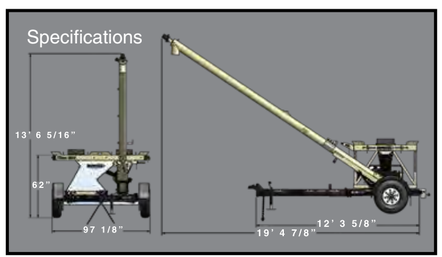
STANDARD FEATURES:

- 7 " Auger unloads up to 625lbs/minute
- 7" Conveyor unloads up to 1250lbs/minute
- Patented Self-Centering Box Guides
- Secure lockdowns
- Easy gate controls
- 7000# Torsion axles trailer
- Diamond plate body and fenders
- Low profile deck
- Powder coat finish
- Electric start gas engine

OPTIONS:

- 7"x19' Polycup Auger or Meridian's Cleated Belt Conveyor
- Scale package
- Spouts
  - 3-tier spout
  - Short spout - 48"
- Light package
- Talc applicator

Holds two 50 unit seed boxes



Case 5:19-cv-04005-LTS-KEM Document 2-4 Filed 01/23/19 Page 5 of 14

SEED TITAN™ SR2 4 BOX



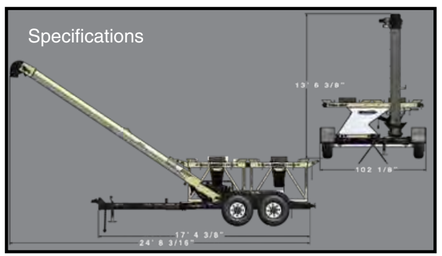
CONVENIENCE & SPEED

Designed to hold four bulk seed boxes, the Seed Titan SR2 four box was developed for operations that purchase their seed in bulk boxes, giving producers the flexibility of taking up to four different seed varieties to the field. Available in an auger or conveyor unit allowing the unit to fill individual planter seed boxes or bulk fill planters. The Seed Titan SR2 works great for handling commodities like corn, beans, rice, cotton, wheat, and oats.





Holds four 50 unit seed boxes



GREAT FEATURES. GREAT QUALITY.

STANDARD FEATURES:

- 7 " Auger unloads up to 625lbs/minute
- 7" Conveyor unloads up to 1250lbs/minute
- Patented Self-Centering Box Guides
- Secure lockdowns
- Easy gate controls
- Tandem 7000# Torsion axles trailer
- Diamond plate body and fenders
- Low profile deck
- Powder coat finish
- Electric start gas engine

OPTIONS:

- 7"x19' Polycup Auger or Meridian's Cleated Belt Conveyor
- Scale package
- Spouts
  - 3-tier spout
  - Short spout - 48"
- Light package
- Gooseneck hitch
- Talc applicator

SEED EXPRESS™ SERIES

With the grower in mind, Meridian offers a variety of bulk seed tenders to satisfy any size of operation. Meridian's lineup starts with the 110BST, which has a single compartment and polycup auger and extends to the 400SLD which has two compartments and a multitude of features. The 110BST and 225RST both have 6" polycup augers and a variable speed switch mounted at the end of the spout so you can control how much seed you are putting in. Their proven design is very user friendly and has been helping fill planters for many years. With the growth of the bulk fill planters, Meridian was asked to develop a seed tender to meet the need for self loading. Meridian's model, which features our Patented Cleated Conveyor Belt, starts with the 240 which has features such as hydraulic raise/lower and belt operation of a 6" conveyor. The 240RT and 375RT models have standard features such as a 5 function wireless remote which controls: engine start/stop, hydraulic gates, conveyor swing, conveyor elevation and conveyor belt movement.

Both RT models provide the grower the choice between a 6" conveyor with an 8" cleated belt or an 8" conveyor with a 12" cleated belt, as well as the ability to weigh product with an optional scale package. Meridian's 400SLD features a 6" conveyor with an 8" cleated belt or an 8" conveyor with a 12" cleated belt which is hydraulically raised/ lowered and driven. The conveyor on the 400SLD manually swings easily from front to rear of the tender - simply position the conveyor, open the gate open and engage the conveyor. With the 12" belt you can move up to 2,500 lb/min so your planet box will be full in a short amount of time. Like Meridian's RT model, the 400SLD has a wireless remote with the addition of a scale display built into the remote, giving you the ability to do other tasks while filling your boxes. Add the "Auto Convey" option and filling the seed box just got easier. Set the system to the desired amount and push the button and you can go focus on other items. Lastly, through the many years Meridian has been producing seed tenders we have seen the growing need for scales, talc/ graphite applicators and automated filling. In response, we have developed solutions to meet these requirements. Please ask your dealer about everything Meridian has to offer you.





SEED EXPRESS™ 110BST

PROVEN ABILITY

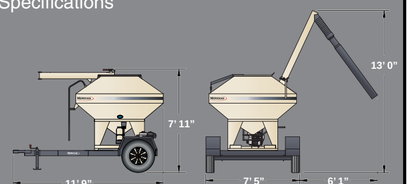
In service for nearly 20 years, the 110BST has a compact design that can easily be pulled on it's own trailer or put in a truck bed as it has its own 4' x 4' skid base. The 110BST works great for handling commodities like corn, beans, wheat, and oats.





110 Units / 88 Bushel Capacity

Specifications



GREAT FEATURES. GREAT QUALITY.

STANDARD FEATURES:

- Unloads up to 400lbs/minute
- Roll back safety lid
- 3-tier telescopic spout
- Single compartment
- Wired remote throttle control
- Powder coat finish
- 6" polycup auger
- Electric start gas engine

OPTIONS:

- Trailer
- Wireless key FOB

SEED EXPRESS™ 225RST

VERSATILE

An upgrade to the Meridian team of farm favorites, the 225RST unit is equipped with two compartments and holds enough seed to keep you in the field all day. This model works great as a tender for planters with individual boxes and bulk fill planters. Fill your planter with ease by using the control located at the end of the spout. The 225RST is great for handling commodities such as corn, beans, wheat, and oats.

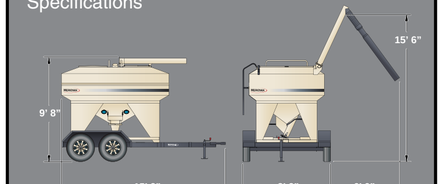






225 Units / 180 Bushels Capacity

Specifications



GREAT FEATURES. GREAT QUALITY.

STANDARD FEATURES:

- Unloads up to 400lbs/minute
- Bulk fill 6" polycup auger
- Two compartments
- Wired remote throttle control
- Agri Cover roll tarp
- Powder coat finish
- Electric start gas engine
- 3-tier telescopic spout

OPTIONS:

- Trailer
- Electric fold-over lift assembly
- Scale package
- Wireless key FOB
- Gooseneck hitch



SEED EXPRESS™ 240 BASIC

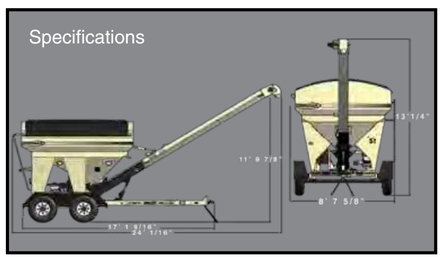
EXTRA VERSATILITY

Meridian's Seed Express 240 Basic is designed to handle and transport seed from mini-bulk bags, seed boxes or from a bulk seed facility. Our 240 features the hydraulic lower and raise and the hydraulic conveyor start/stop with variable speed setting. Also includes manual gates and rotation of the conveyor along with electric start engine.





240 Units / 192 Bushel Capacity



GREAT FEATURES. GREAT QUALITY.

STANDARD FEATURES:

- Unloads up to 1200lbs/minute
- 6"x19' conveyor tube with 8" Patented Meridian Cleated Belt
- Hydraulic variable speed conveyor
- Patented sample gates
- Two compartments
- 180° conveyor swing
- Agri-Cover FLE Drive roll tarp
- Powder coat finish
- Electric start gas engine

OPTIONS:

- 7" X 48" short spout
- Talc applicator

SEED EXPRESS™ 240RT

ADVANCED CONTROL

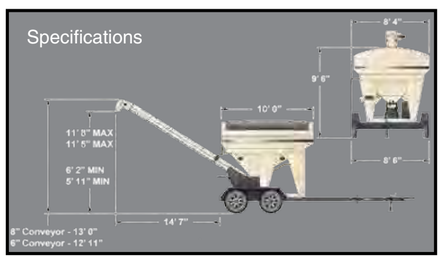
Meridian's Seed Express 240RT is designed to handle and transport seed in mini-bulk bags, seed boxes or from a bulk seed facility. The 240RT features Meridian's advanced 5 feature control system with hydraulic drive to adjust discharge height, rotate conveyor 180° to the left or right, open/close the gates, start/stop the conveyor or run conveyor drive system and start/stop engine. Conveniently controlled via wireless remote.







240 Units / 192 Bushel Capacity



GREAT FEATURES. GREAT QUALITY.

STANDARD FEATURES:

- 6"x19' Meridian cleated conveyor unloads up to 1200lbs/minute
- 8"x19' Meridian cleated conveyor unloads up to 2500lbs/minute
- Wireless 5 function remote control
- Two compartments
- Agri-Cover FLE Drive roll top
- Ultimate reach conveyor™
- Variable speed throttle control
- Powder coat finish
- Electric start gas engine

OPTIONS:

- Bumper hitch trailer
- Gooseneck trailer
- T14000ST Trailer
- Scale with digital readout
- "New" auto convey scale package
- Spouts
  - 2-tier spout - 10"
  - 3-tier spout - 7"
  - Short stub spout
  - Quick tach
- Talc applicator



SEED EXPRESS™ 375RT

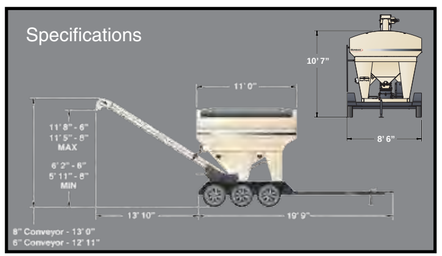
EASY TO OPERATE

Our 375RT features Meridian's advance control system with hydraulic drive to adjust discharge height, pivot conveyor to the left or right, open/close gate and the conveyor drive system while offering extra capacity. Its dual compartments have a bulk holding capacity of 300 bushels. Equipped with our Patented Meridian cleated belt, the Seed Express 375RT ensures superior seed quality when handling large volumes.





375 Units / 300 Bushels Capacity



GREAT FEATURES. GREAT QUALITY.

STANDARD FEATURES:

- 6"x19' Meridian cleated conveyor unloads up to 1200lbs/minute
- 8"x19' Meridian cleated conveyor unloads up to 2500lbs/minute
- Wireless 5 function remote control
- Two compartments
- Variable speed
- Ultimate reach conveyor™
- Agri-Cover FLE Drive roll tarp
- Powder coat finish
- Electric start gas engine

OPTIONS:

- Bumper hitch trailer
- Gooseneck trailer
- T21000ST Trailer
- Scale with digital readout
- "New" auto convey scale package
- Spouts
  - 2-tier spout - 10"
  - 3-tier spout - 7"
  - Short stub spout
  - Quick tach
- Talc applicator

SEED EXPRESS™ 400SLD

SELF-LOADING

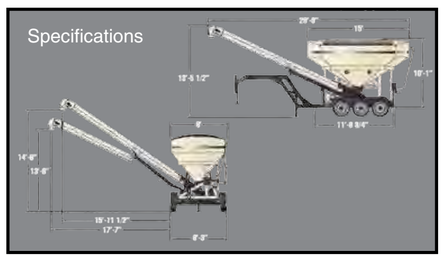
The new Seed Express 400SLD is a ground breaking innovation from Meridian that takes on-farm seed tendering to a new level of versatility. It's conveyor design allows the user to unload the tender, fill the tender, and also allow the user to use the conveyor independently for all your farm needs. Now you can use the 24ft. conveyor to unload from gravity wagons or bins into a semi-trailer. Have your planter loaded up and be ready like never before.







400 Units / 320 Bushels Capacity



GREAT FEATURES. GREAT QUALITY.

STANDARD FEATURES:

- 6"x24' Meridian cleated conveyor unloads up to 1200lbs/minute
- 8"x24' Meridian cleated conveyor unloads up to 2500lbs/minute
- Holds 400 units of seed at water level
- 24' conveyor with 14'6" discharge
- Conveyor can rotate over 180° from fully forward to fully backwards
- Agri-Cover FLE Drive roll tarp
- Wireless 6 function remote control
- Powder coat finish
- Quick connect conveyors
- Electric start gas engine

OPTIONS:

- Bumper hitch trailer
- Gooseneck trailer
- Scale with digital readout
- Spouts
  - 10" flexhose
  - 2-tier 10" spout
  - Quick tach
- Talc applicator

Case 5:19-cv-04005-LTS-KEM Document 2-4 Filed 01/23/19 Page 9 of 14

Versatile Mega Movers

SEED EXPRESS™ SR2 840 | 1050 | 1260



Meridian continues to lead the industry with innovative solutions in storage and handling equipment for the agricultural industry. For farm operations that require large capacity seed tenders, you need to look closely at Meridian's new line of Seed Express SR2 tenders. Meridian's new line offers the ideal blend of innovation, function and style. Amalgamating the best features of the previous model with new innovations that target enhanced functionality and ease of use, Meridian's new Seed Express SR2 line will enhance your on-farm operations while increasing your productivity.

Our newly redesigned Seed Express large capacity tender delivers 840, 1050, or 1260 cubic feet of seed, fertilizer and grain to your seeder. With 4 compartments on the 840, and 5 and 6 compartments on the 1050 and 1260, respectively, these large tenders can be used to transport multiple commodities and fertilizers at the same time. Because of their large capacity, these tenders can also be used as grain carts. The conveyor system offers several unique capabilities including auto features, conveyor synchronization, industry leading discharge heights and reach, and a patented cleated belt for high capacity.

ELECTRONICS:

- ► Intuitive touch screen interface.
  - Meridian's control module is a fully functional user friendly touch screen that provides an easy to follow screen.
  - Use the screen to operate all features of the tender, from unrolling the tarp, starting the engine, moving the conveyor, controlling conveyor speeds and picking gates.
- ► Deutsch connectors are used to protect electronics and the entire wiring harness is wrapped in a protective braided cover.
- ► Five function wireless remote control.





HYDRAULICS:

- ► Power pack gas tank and hydraulic tanks are mounted low for easy filling and access.
- ► The Honda engine can be started remotely including cold engine starts.
- ► There is minimal oil system head pressure at start-up
  - The engine stars much quicker because there is only minimal hydraulic load at start-up. This saves on battery life.
- ► Improved Efficiency
  - The system runs cool with an oil reservoir of only 2 gallons, which improves performance, even on hot days
- ► Hoses, Lines and fittings.
  - Connection leaks are prevented by using a new hardline-to-hose connection technique.
  - The overall number of hoses has been reduced which resolves the clutter at the rear of the tender, improves serviceability and allows for improved hose routing and fit & finish.

INCLINE CONVEYOR:



- ► Two incline conveyor lengths available:
  - Standard length; 26' provides a discharge height of 14' 6" - 19'.
  - Optional length: 17' provides a discharge height of 10' - 13' 3".
- ► Hopper uses a steel-rubber design with the forward portion of the hopper manufactured with rubber
  - The forgiving nature of rubber allows for flexing should the hopper come into contact with other parts of the tender.
- ► Both the underbin and incline conveyors are speed adjustable and synchronized.

UNDERBIN CONVEYOR:

- ► Rod style frame structure.
  - The underbin frame uses rods that form the 'pan' profile on which the belt rides.
  - This produces less friction than sheet metal pans and prevents situations where the belt freezes to the pan in cold weather conditions.
  - This also provides a deeper trough profile for the belt improving the capacity of material flow while minimizing seed spill.
  - The net effect is a smoother running belt.
- ► Belt speed synchronization.
  - ► The synchronized system automatically adjusts the underbin speed based on the speed of the incline conveyor.
- ► If you need to unload the tender without the use of the incline conveyor, Meridian has designed the underbin to run independently and at high speed.
  - Time to unload an entire 1260 tender is under 10 minutes.
- ► The gates operate incrementally from 0" to 4" opening. You can also fully open or fully close all of the gates in a single operation.

Case 5:19-cv-04005-LTS-KEM Document 2-4 Filed 01/23/19 Page 10 of 14

Unverferth Ex. 2009 - Page 86

SEED EXPRESS™ SR2 840 | 1050 | 1260

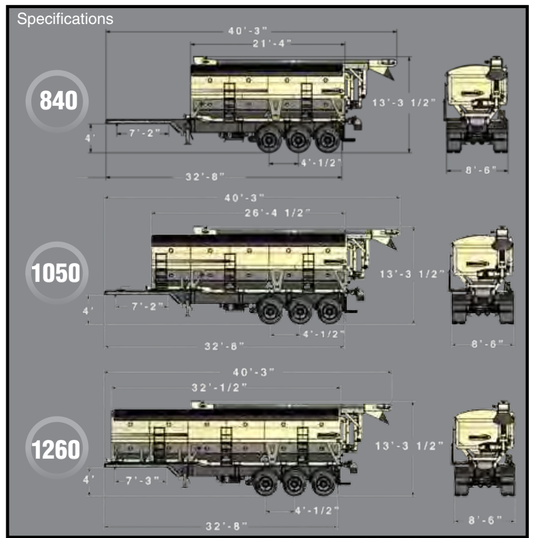
TENDER BODY:
- ► Available in 840, 1050 and 1260 cu/ft sizes.
- ► A new mounting system improves the connection of the tender body to the trailer.

TRAILER:
- ► Custom integrated trailer with air ride suspension.
- ► Landing gear on the trailer has a clearance of 15".
- ► Access holes are positioned in the trailer frame to easily tension the belt.
- ► An under run rear bumper comes standard and easily swings down and out of the way, eliminating any interference with the conveyors.

TARP & LADDERS:
- ► The Agri-Cover® Roll Tarp can be operated by either wireless FOB or control screen.
- ► Ladders run along the body of the tender so you are able to see into each compartment.

OPTIONS:
- ► Front fenders manufactured with aluminum for a sturdy, long lasting design.
- ► Aluminum mag wheels.
- ► Fertilizer Package:
  - ● Includes stainless steel conveyors.
- ► Scale Packages:
  - ● Air ride sensors - provides basic weight information.
  - ● Load cell sensors - provides accurate weights measurable for each tender compartment.
- ► Communication module - allows Meridian's service technician to communicate remotely using 4G or WiFi, from our office to your field.

840 = 840 Units / 672 Bushel Capacity
1050 = 1050 Units / 840 Bushel Capacity
1260 = 1260 Units / 1008 Bushel Capacity



TALC AND GRAPHITE

Meridian's talc applicator is available on conveyor style seed tenders and the Titan SR2 models. It has the ability to apply talc or graphite to your commodities. The internal agitator makes sure that everything flows smoothly.







GREAT FEATURES. GREAT QUALITY.

STANDARD FEATURES:

- ► Ability to apply up to 1/2 pound of talc per minute.
- ► Holds up to 20 pounds of talc in a four gallon container
- ► Internal agitator keeps talc clump free
- ► Automatically powers on and off when the conveyor is started
- ► Capable of powering on and off via Meridian's wireless remote
- ► Manual override switch
- ► Manual speed selector
- ► Can be used for talc or graphite



SEED TITAN™ | SEED EXPRESS™
FEATURES & OPTIONS




	SEED TITAN SR2 2 BOX	SEED TITAN SR2 4 BOX
COMMODITY BEST HANDLED	corn, beans, rice, peanuts, cotton, wheat, oats	corn, beans, rice, peanuts, cotton, wheat, oats
STANDARD FEATURES		
BOX GUIDES US PATENT #6,964,551	●	●
SECURE LOCKDOWNS	●	●
TOTAL CLEAN OUT	●	●
EASY GATE CONTROLS	●	●
LOW PROFILE DECK	●	●
ELECTRIC START GAS ENGINE	●	●
POWDER COAT FINISH	●	●
7" CONVEYOR W/8" MERIDIAN CLEATED BELT™ UNLOADS UP TO 1250LBS/MINUTE	●	●
7" X 19' AUGER WITH POLYCUP FLIGHTING UNLOADS UP TO 625LBS/MINUTE	●	●
32" CONVEYOR INCLINE	●	●
#7000-TORSION AXLES WITH ELECTRIC BRAKES AND LIGHTS	●	
TANDEM #7000-TORSION AXLES WITH ELECTRIC BRAKES AND LIGHTS		●
3 – TIER TELESCOPIC SPOUT	●	●
SHUT OFF GATES	●	●
VARIABLE SPEED TOGGLE SWITCH	●	●
LOWER THROTTLE CONTROL	●	●
OPTIONS		
SCALES	●	●
CONVEYOR MODEL	●	●
AUGER MODEL	●	●




	SEED EXPRESS 110BST	SEED EXPRESS 225RST
	corn, beans, wheat, oats	corn, beans, wheat, oats
STANDARD FEATURES		
SINGLE COMPARTMENT	●	
DUAL COMPARTMENTS		●
ROLL BACK SAFETY LID	●	
SHUT OFF GATE	●	●
CLEANOUT DOOR	●	●
6" AUGER WITH POLYCUP FLIGHTING	●	●
ELECTRIC START HONDA GAS ENGINE	●	●
CLUTCH SYSTEM	●	●
3-TIER TELESCOPIC SPOUT	●	●
WIRED REMOTE THROTTLE CONTROL	●	●
POWDER COAT FINISH	●	●
BULK FILL AUGER		●
ROLL BACK TARP		●
OPTIONS		
TRAILER	●	●



SEED EXPRESS™
FEATURES & OPTIONS







	SEED EXPRESS 240	SEED EXPRESS 240RT	SEED EXPRESS 375RT	SEED EXPRESS 400SLD	SEED EXPRESS 840, 1050, 1260
	corn, beans, wheat, oats	corn, beans, rice, peanuts, cotton, wheat, oats	corn, beans, rice, peanuts, cotton, wheat, oats	corn, beans, rice, peanuts, cotton, wheat, oats	corn, beans, rice, peanuts, cotton, wheat, oats, fertilizer
STANDARD FEATURES					
3-TIER TELESCOPIC SPOUT WITH CONTROL SWITCH	●				
HYDRAULIC RAISE/LOWER	●	●	●	●	●
HYDRAULIC SHUT OFF GATES		●	●	●	●
HYDRAULIC CONVEYOR OR START/STOP WITH VARIABLE SPEED SETTING	●	●	●	●	●
ARTICULATING SWING CONVEYOR				●	●
WIRELESS 5 FUNCTION REMOTE CONTROL: •START/STOP CONVEYOR-VARIABLE SPEED •180° SWING •ADJUSTABLE DISCHARGE HEIGHT •OPEN AND CLOSE GATES •REMOTE START/STOP HONDA MOTOR		●	●	●	●
G• 340 HONDA ENGINE W/ELECTRIC START AND BATTERY RECHARGE				●	
MANUAL CONVEYOR SWING CONTROL-180°	●				
MANUAL GATE CONTROL	●				
6" CONVEYOR-UNLOADS UP TO 1200LBS/MINUTE	●	●	●	●	
8" CONVEYOR UNLOADS UP TO 2500LBS/MINUTE		●		●	
CONVEYOR AVAILABLE: 6" TUBE W/8" CLEATED BELT OR 8" TUBE W/12" CLEATED BELT		●	●	●	
19FT.CONVEYOR WITH MERIDIAN CLEATED BELT™	●				
(2) SEPARATE COMPARTMENTS	●	●	●	●	
AGRI-COVER FLE• DRIVE ROLL TARP	●	●	●	●	
POWER COAT FINISH	●	●	●	●	●
SAMPLE GATES US PATENT #6,396,003	●	●	●	●	
VIEW GLASSES	●	●	●	●	●
240 UNITS/192 BUSHELS	●	●			
375 UNITS/300 BUSHELS			●		
400 UNITS/320 BUSHELS				●	
ULTIMATE REACH CONVEYOR™		●	●		
VARIABLE SPEED THROTTLE CONTROL		●	●	●	●
OPTIONS					
BUMPER HITCH TRAILER •TANDEM 7000LBS TORSION AXLES •ELECTRIC BRAKES •LED LIGHTS •BATTERY BREAK AWAY •ADJUSTABLE HEIGHT 2 5/16" BALL	●	●	●	●	
GOOSE NECK TRAILER		●	●	●	
SCALE WITH DIGITAL READOUT		●	●	●	●

Case 5:19-cv-04005-LTS-KEM Document 2-4 Filed 01/23/19 Page 12 of 14

Unverferth Ex. 2009 - Page 88



Real Life Stories from Real People

"The Meridian 375RT is the quickest in over-all unloading and positioning the seed where I need it in topping off a load, on a drill or into a truck or while filling super tote sacks over a scale! With the wireless remote we can run any of the functions from any position around the trailer or even in the truck as you maneuver around an unloading place!

The serviceability of the unit is unmatched with the "will always start and run well" Honda engine and the durability of the Hydraulic system! This our second season with this machine after delivering many thousands of bushels of seed and we are very happy!"

–Steve Beattie, Dumas, Texas

"Our Meridian Seed Tender has made filling the planter so much easier and quicker, we Love it"

–Darron Rusk, Sioux Rapids, Iowa

"The titan 2SE did exactly what is was supposed to do painlessly. It had no problem reaching my center fill bins. It was very easy to use and manuever. I was very satisfied with this purchase."

–Tom Olsen, Newell, Iowa

"What a time saver and value to our operation. I have a 240RT with scales so no more guess work…or coffee cans."

–Ben Greene, Webb, Iowa

"They are a progressive company that will update and change their equipment to meet our customer's needs. Meridian also offers an excellent sales and support staff. They are very knowledgeable and have reliable service."

–Brad Sloan, Garden City, Kansas







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EXHIBIT F

MERIDIAN

BULK SEED TENDER

OPERATOR'S MANUAL



PATENT PROTECTED
This product is covered by one or more U.S., Canadian, Foreign patents and/or pending patent applications. For details, see:
meridianmfg.com/patents

SEED TENDER

FOR OWNERS AND OPERATORS OF THE 400 SLD

PRODUCT WARRANTY
REGISTRATION FORM

MERIDIAN

www.meridianmfg.com

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WARRANTY REGISTRATION

This form must be filled out by the dealer and signed by both the dealer and the customer at the time of delivery. Please mail or fax the completed form for validation of the equipment registration.

Customer's Name_____

Address_____

City, State, Postal Code____ _____, _____, _____

Phone Number (_____) _____-_____

PRODUCT INFORMATION

Seed Tender Model # _____ **Serial Number #**_____

I have thoroughly instructed the buyer on the above-described equipment, including review of the Operator's Manual content, equipment care, adjustments, operational use, safety procedures, and applicable warranty policy.

Dealer/Company Name_____

City, State, Postal Code _____, _____ , _____

Dealer's Signature_____ **Date** ____/____/_____

The above equipment and Operator's Manual have been received by me, and I have been thoroughly instructed as to care, adjustments, safe operation, and applicable warranty policy.

Owner's Signature_____ **Date** ____/____/_____

2902 Expansion Blvd. Storm Lake, Iowa 50588 Phone: 800-437-2334 Fax: 712-732-1028 Email: iowa_warranty@meridianmfg.com

PRODUCT WARRANTY
REGISTRATION FORM

MERIDIAN

www.meridianmfg.com

DEALER INSPECTION FORM

☐	Review safety and operating instructions with owner.
☐	Verify receipt of all options ordered.
☐	Verify that tow vehicle is large enough to safely tow seed tender.
☐	Check gasoline engine fuel level. Add as needed.
☐	Check gasoline engine oil level. Add as needed.
☐	Start gasoline engine and make sure it operates properly.
☐	Check oil level in hydraulic tank. Add as needed.
☐	Check air pressure in tires. Add as needed.
☐	Make sure wheel nuts/bolts are tightened to proper torque on all wheels.
☐	Make sure hitch-to-tongue and hitch-to-frame bolts are tightened to proper torque.
☐	Make sure conveyor tube rotates 180 degrees and locks into towing position.
☐	Make sure the weighing system is working properly.
☐	Make sure the remote control unit is working properly.
☐	Make sure all guards/shields are installed correctly.
☐	Make sure all safety signs are installed and legible.
☐	Reflectors and lights must be clean and working properly.
☐	Inspect brake and lighting wiring harness connections. All lights must be functioning.
☐	Make sure seed tender battery is fully charged and in good working order.
☐	Make sure breakaway brake system battery is fully charged and in good working order.
☐	Make sure electric brakes are in working condition.
☐	Inspect customer's hitch for 2-5/16" ball or fifth wheel.
☐	Make sure safety chains are properly attached and are in good working condition.
☐	Wiring harness plug must be in working condition and fit into tow vehicle's receptacle.
☐	Make sure breakaway brake cable and pin is supplied with trailer.
☐	Make sure license plate light is operating.
☐	Make sure turn signal lights are operating.
☐	Make sure brake lights are operating.
☐	Make sure owner is instructed to check wheel bolt/nut torque at 5, 10, 25, and 50 miles; then check annually.

2902 Expansion Blvd .
Storm Lake , IA 50588
PH# 712 -732-1780
FAX# 712 -732-1028

Date: ____/__/_____

CERTIFICATE OF ORIGIN

LICENSING INFORMATION

DEALER :

_____Business
_____Contact
_____Address
_____City, State, Zip

SOLD TO :

_____Business
_____Contact
_____Address
_____ City, State, Zip

TENDER MODEL #_____

TENDER WEIGHT_____

TENDER SERIAL #_____

(One serial number is issued on complete tender packages. Those trailers do not receive a serial number.)

TRAILER MODEL #:_____

TRAILER SERIAL #_____ TRAILER WEIGHT :_____

Tender 110 BST Wagon	80110	1,004#
Tender 110 BST -T (trailer included)	80111	1,830#
Tender 22 5 R ST Wagon	80131	1733#
Ten der 22 5 RST -BH	80601	3375#
Tender 225RST -GN	80602	4097 #
Tender 225RST -BWT -BH	80603	3577#
Tender 225RST -BWT -GN	80604	4299#
Tender 240RT6	80249	2,545#
Tender 240RT6 -BWT -BH	802 53	4,475#
Tender 240RT6 -BH	802 50	4,174#
Tender 240RT8	802 51	2,604#
Tender 240RT8 -BWT -BH	80248	4,534#
Tender 240RT8 -GN	8025 5	4,232#
Tender 240 RT8 -BWT -GN	80243	4,491#
Tender 375RT6 Wagon	80381	3,094#
Tender 375RT6 -BH	80324	5,636#
Tender 375RT6 -BWT -BH	80337	5,942#
Tender 375RT6 -GN	80338	6637#
Tender 375RT8	80382	3476#
Tender 37 5RT8 Wagon	80376	3106#
Tender 37 5RT8 –BH	80326	5760#
Tender 375RT8 -GN	80327	6441#
Tender 375RT8 -BWT -BH	80339	5990#
Tender 37 5RT8 -GN	80340	6672#

240 –Rear Facing (BH trailer included)	80121	3720#
240 –Fr ont Facing (BH trailer included)	80136	3720#
Tender 375 (no trailer)	80349	4207#
Tender 375-BH	80345	6071#
Tender 375-GN	80346	6721#
Tender 375-BWT -BH	80347	6079#
Tender 375BWT -GN	80348	6729#
Tender 375RT8 -BWT (trailer included)	80377	5,913#
Tender 375RT8 -T (trailer included)	80379	5,607#
Tender T itan 2SE -T (trailer included)	80201	2,254#
Tender Titan 2SE -BWT	80616	2302#
Tender T itan 2-T (11’10” discharge)	80134	1820#
Tender Titan 2 -T (15’ 6” discharge)	80135	1868#
Tender T4SE Wagon	80401	2,803#
Tender T4SE -T (trailer included)	80402	4,431#
Ten der T4SE -BWT (trailer included)	80403	4,833#
Tender T4SE -T-GN	80609	4893 #
Tender 4SE -T-GN -BWT	80608	5235 #
Tender 400 -6SLD	80352	3375 #
Tender 400BH -6SLD	80353	5040 #
Tender 400GN -6SLD	80354	5690 #
Tender 400 -8SLD	80355	3530#
Tender400BH -8SLD	80356	5195#
Tender 400GN -8SLD	80357	5845 #

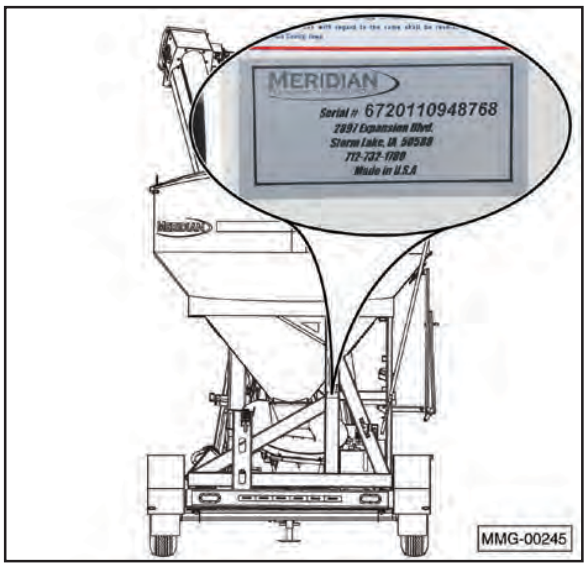
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IMPORTANT INFORMATION

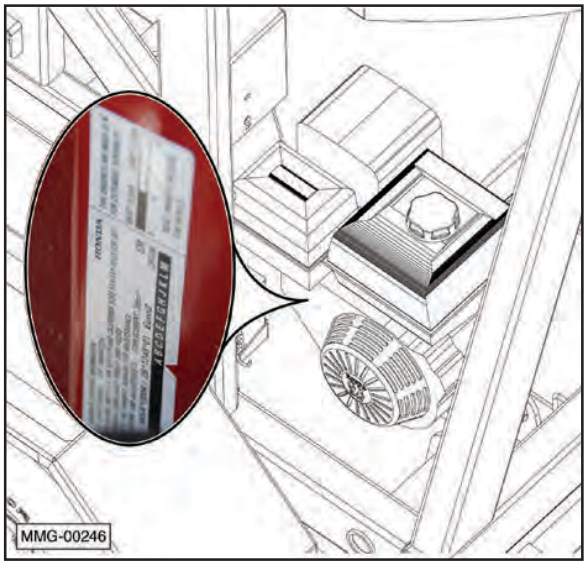
SERIAL NUMBER LOCATION

Report the serial number of your Meridian 400 SLD Seed Tender and engine when ordering parts or requesting service or other information.

The serial number plates are located where indicated. Please mark the number in the space provided for easy reference.



Seed Tender



Engine

Model Number: 400 SLD

Serial Number: _____

Engine Serial Number: _____

PATENT INFORMATION



Meridian continuously enhances its product offering through product improvements and new product innovations. Marketplace feedback, technological innovation, new materials and manufacturing methods, and a philosophy of continuous improvement constantly challenge the company to develop new and better ways of addressing market needs. Meridian is committed to innovation and reinvestment and as a result, the company maintains a portfolio of patents and intellectual property. For more information on our patents please see our website: www.meridianmfg.com/patents

CONTENTS

1. INTRODUCTION 11
1.1 Congratulations 11
1.2 Operator Orientation 11
1.3 Owner/Operator 11

2. SAFETY 12
2.1 General Safety 13
2.2 Equipment Safety Guidelines 14
2.3 Safety Training 14
2.4 Safety Signs 15
2.4.1 How to Install Safety Signs 15
2.5 Preparation 15
2.6 Operating Safety 15
2.7 Maintenance Safety 16
2.8 Lock-Out or Tag-Out Safety 16
2.9 Storage Safety 17
2.10 Transport Safety 17
2.11 Refuelling Safety 17
2.12 Battery Safety 17
2.13 Sign-Off Form 18

3. SAFETY SIGN LOCATIONS 19

4. SPECIFICATIONS 22
4.1 Overall Seed Tender Specifications 22
4.2 Bolt Specifications 23
4.2.1 Bolt Torque Values 23
4.2.2 Grade Markings Chart 23

5. MACHINE COMPONENTS AND CONTROLS 24
5.1 Component Nomenclature and Location 24
5.2 Engine and Controls 25
5.3 Control System Functions 26
5.3.1 Control Functions 26
5.3.2 Setting the Weight to Dispense 27
5.3.3 Setting Active Slide Gate 27
5.3.4 Auto Reset Function 27
5.3.5 Control System Compliance Information 27
5.4 Wireless Remote Transmitter 28
5.4.1 Functions of Keypad Buttons 28
5.4.2 Display Panel 30
5.4.3 Display Messages 30

6. PRE-OPERATING INSTRUCTIONS 31
6.1 Machine Break-In Period 31
6.1.1 Before Starting 31
6.1.2 Inspections for 1/2, 5, and 10 Hours 31
6.2 Pre-Operation Checklist 32

7. OPERATION 33
7.1 Connecting the Trailer 33
7.1.1 Bumper Hitch 33
7.1.2 Gooseneck Hitch 34
7.2 Opening and Closing Roll-Up Tarp 35
7.3 Operation 36
7.3.1 Conventional Loading (Filling the Seed Tender) 36
7.3.2 Loading Using Self-Filling Feature (Filling the Seed Tender) 37
7.3.2 Unloading (Filling the Planter) 43

Case 5:19-cv-04005-LTS-KEM Document 2-5 Filed 01/23/19 Page 9 of 46

Unverferth Ex. 2009 - Page 99

8. STORAGE 46
8.1 General Information 46
8.2 Placing in Storage 46
8.3 Removing from Storage 46

9. MAINTENANCE 47
9.1 Greasing 47
9.2 Grease Fitting Locations 47

10. SERVICE PROCEDURES 48
10.1 Remote Control Unit 48
10.1.1 Battery Replacement Tips 48
10.1.2 Battery Replacement 48
10.1.3 Remote Control Transmitter and Receiver Synchronization 48
10.1.4 Changing Sleep Time on the Transmitter 49
10.1.5 Weigh System 49
10.2 Hydraulic System 49
10.2.1 Hydraulic Oil Change 49
10.2.2 Hydraulic Pressure Relief Valves 50
10.2.3 Hydraulic Motor Coupling 50
10.3 Engine 50
10.3.1 Approved Fuel 50
10.3.3 Change Engine Oil 51
10.3.4 Clean Air Cleaner 51
10.5 Belt Delivery Tube 51
10.5.1 Unplugging 51
10.5.2 Belt Tension Adjustment 52
10.5.3 Belt Tracking Adjustment 52
10.5.4 Belt Replacement 52
10.6 Trailer Breakaway System 53
10.6.1 Testing the Battery 53
10.6.2 Changing Battery 53
10.7 Wheel Bolt Torque Requirements 54
10.8 Trailer Hitch Bolts 54
10.9 Service Record Chart 54
10.9 Service Record Chart (Continued) 55
10.10 Service Checks 56
10.10.1 Daily (8 Hours) 56
10.10.2 Weekly (50 Hours) 56
10.10.3 Annually (400 Hours) 56
10.11 Axle Maintenance 57
10.11.1 First 200 Miles 57
10.11.2 3,000 Miles or 3 Months 57
10.11.3 6,000 Miles or 6 Months 57
10.11.4 12,000 Miles or 12 Months 57
10.12 Tires 57

11. OEM LITERATURE 58
11.1 Honda® Engine 58
11.2 Retractable Compartment Tarp 58
11.3 Axle 58

12. TROUBLESHOOTING 59
12.1 Troubleshooting Chart 59
12.2 Control Panel Indicator LEDs 60
12.2.2 Error Codes 60
12.2.1 Error Code Outputs 60
12.2.3 Control System Wiring Locations 61

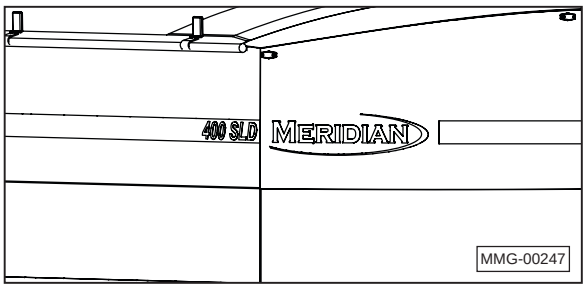
13. WARRANTY 62
13.1 Warranty Statement 62

14. PARTS 63
14.1 400 SLD Seed Tender 80137 63
14.2 Conveyor (8”) 80634 63
14.2.1 Pan Detail 64
14.2.2 Collection Chute Detail 65
14.2.3 Tube Detail 66
14.2.4 Discharge Detail 67
14.3 Ladder, Slide Gate, View Port, and Sample Gate 68
14.4 Axle/wheel Detail 70
14.5 Hydraulic Power System 71
14.5.1 Engine And Hydraulic Pump 71
14.5.2 Hydraulic Hoses And Fittings 72
14.5.3 Hydraulic Manifold 74
14.6 Weigh System 75
14.7 Decals and Lighting 76
14.8 Turret detail 78
14.9 Bumper Hitch Detail 79
14.10 Gooseneck Detail 80

1. INTRODUCTION

1.1 CONGRATULATIONS

Congratulations on your choice of a Meridian Manufacturing Group 400 SLD Seed Tender Bulk Seed Tender to complement your seed delivery system in your farming operation. This equipment has been designed and manufactured to meet the exacting standards for such equipment in the agricultural industry and will keep your seed delivery system at optimum efficiency.



The Bulk Seed Tender system is designed to handle any kind of bulk seed, quickly transport it, and then transfer it into planters and drills, as required. This unit is designed to not only off-load bulk seed into the planting equipment, but it can also load itself from a bulk seed storage container or truck.

Safe, efficient, and trouble-free operation of your Bulk Seed Tender requires that you and anyone else who will be operating or maintaining the machine, read and understand the Safety, Operation, Maintenance, and Troubleshooting information contained within this Operator's Manual.

This manual covers the 400 SLD model manufactured by Meridian Manufacturing Group, Inc. Use the Table of Contents and Index as a guide to locate required information.

1.2 OPERATOR ORIENTATION

The directions left, right, front and rear, as mentioned throughout this manual, are as seen from the truck drivers' seat and facing in the direction of travel.

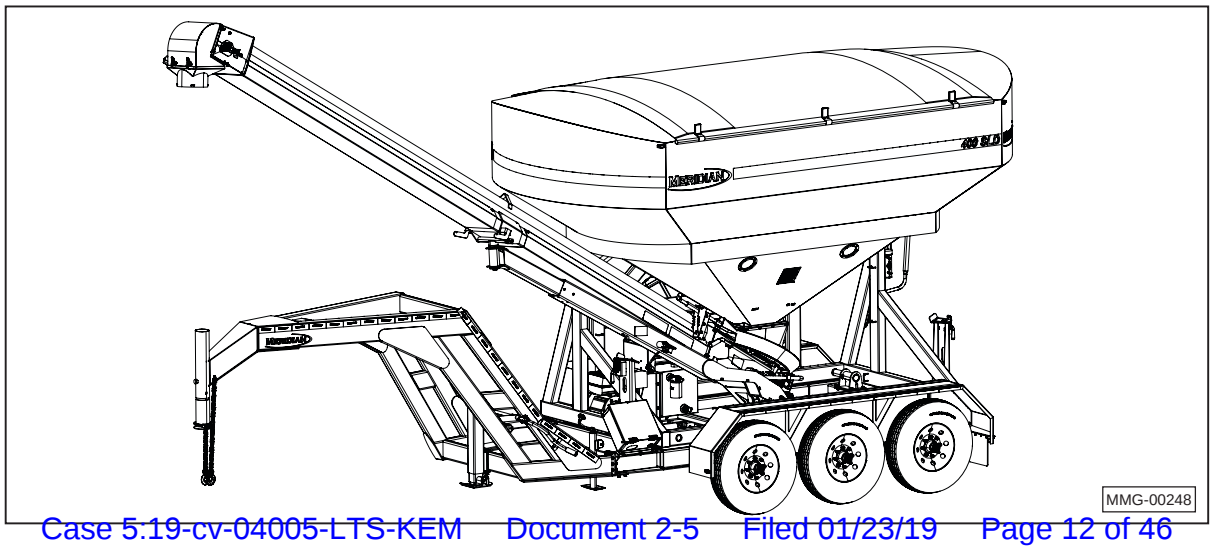
1.3 OWNER/OPERATOR

It is the responsibility of the owner or operator to read this manual and to train all other operators before they start working with the machine. Follow all safety instructions exactly. Safety is everyone's business. By following recommended procedures, a safe working environment is provided for the operator, bystanders, and the area around the work site. Untrained operators are not qualified and must not operate the machine.

In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence, and proper training of personnel involved in the operation, transport, maintenance, and storage of equipment. It is the responsibility of the owner or operator to read this manual and to train all operators before they start working with the machine. Follow all safety instructions as laid out in this manual.

Keep this manual handy for easy reference and to pass on to new operators or owners. Call your Meridian Manufacturing Group, Inc. dealer if you need assistance, information, or additional copies of the manuals.

The information, specifications, and illustrations in this manual are those in effect at the time of printing. We reserve the right to change specifications or design at any time without notice.



SAFETY ALERT SYMBOL

This Safety Alert symbol means
ATTENTION! BECOME ALERT!
YOUR SAFETY IS INVOLVED!



The Safety Alert symbol identifies important safety messages on the Meridian Bulk Seed Tender Models and in the manual. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

WHY IS SAFETY IMPORTANT TO YOU?

3 Big Reasons

• Accidents Disable and Kill •

• Accidents Cost •

• Accidents Can Be Avoided •

SIGNAL WORDS:

Note the use of the signal words **DANGER, WARNING,** and **CAUTION** with the safety messages. The appropriate signal word for each message has been selected using the following guidelines:

⚠CAUTION

CAUTION - Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

⚠WARNING

WARNING - Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

⚠DANGER

DANGER - Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations typically for machine components which, for functional purposes, cannot be guarded.

If you have any questions not answered in this manual, require additional copies of the manual, or the manual is damaged, please contact your dealer or Meridian Manufacturing Group, 2902 Expansion Blvd., Storm Lake, Iowa, 50588, toll-free 1-800-437-2834, phone (712) 732-1780, or fax (712) 732-1028.

Case 5:19-cv-04005-LTS-KEM Document 2-5 Filed 01/23/19 Page 13 of 46

YOU are responsible for the **SAFE** operation and maintenance of your Meridian Manufacturing Group bulk seed tender Model 400 SLD Seed Express delivery system. **YOU** must ensure that you and anyone else who is going to operate, maintain, or work around the Bulk Seed Tender be familiar with the operating and maintenance procedures and related **SAFETY** information contained in this manual. This manual will take you step-by-step through your working day and alert you to all good safety practices that should be adhered to while operating the Bulk Seed Tender system.

Remember, **YOU** are the key to safety. Good safety practices not only protect you but also the people around you. Make these practices a working part of your safety program. Be certain that **EVERYONE** operating this equipment is familiar with the recommended operating and maintenance procedures and follow all the safety precautions. Most accidents can be prevented. Do not risk injury or death by ignoring good safety practices.

- Bulk Seed Tender system owners must give operating instructions to operators or employees before allowing them to operate the machine, and then annually thereafter per OSHA (Occupational Safety and Health Administration) regulation 1928.57.
- The most important safety feature on this equipment is a **SAFE** operator. It is the operator's responsibility to read and follow **ALL** Safety and Operating instructions in the manual. Most accidents can be avoided.
- A person who has not read and understood all operating and safety instructions is not qualified to operate the machine. An untrained operator exposes himself and bystanders to possible serious injury or death. Always be and stay alert to any possible unsafe operating or maintenance procedures or conditions.
- Do not modify the equipment in any way. Unauthorized modification may impair the function and/or safety of the components and systems and could affect the life of the equipment, possibly invalidating the warranty coverage.
- Think SAFETY! Work SAFELY!

2.1 GENERAL SAFETY

1.  Read and understand the Operator's Manual and all safety signs before operating, maintaining, adjusting, filling, unloading, or unplugging the Bulk Seed Tender system.
2.  Have a first aid kit available for use should the need arise and know how to use it.
3.  Have a fire extinguisher available for use should the need arise and know how to use it.
4.  Do not allow riders.
5. When working around or operating this equipment, wear appropriate personal protective equipment. This list includes but is not limited to:

   - A hard hat
   - Protective shoes with slip resistant soles
   - Protective goggles, glasses, or face shield
   - Heavy gloves and protective clothing
   - Respirator
6.  Do not allow long hair, loose fitting clothing, or jewelry around equipment.
7.  Install and secure all guards before starting.
8.  Stop engine, remove ignition key, and wait for all moving parts to stop before servicing, repairing, adjusting, loading, filling, or unplugging.
9.  Establish a lock-out or tag-out policy for the work site. Be sure all personnel are trained in and follow all procedures. Lock-out or tag-out all power sources before working around loading/ unloading equipment.
10.  Clear the area of people, especially small children, before starting.
11.  Review safety related items annually with all personnel who will be operating, using, or maintaining the bulk seed tender system.

2.2 EQUIPMENT SAFETY GUIDELINES

1. Safety of the operator and bystanders is one of the main concerns in designing and developing a machine. However, every year many accidents occur which could have been avoided by a few seconds of thought and a more careful approach to handling equipment. You, the operator, can avoid many accidents by observing the following precautions in this section. To avoid personal injury or death, study the following precautions and insist those working with you, or for you, follow them.

2. In order to provide a better view, certain photographs or illustrations in this manual may show an assembly with a safety shield removed. However, equipment should never be operated in this condition. Keep all shields in place. If shield removal becomes necessary for repairs, replace the shield prior to use.

3. Never use alcoholic beverages or sedative drugs while operating this equipment. Consult your doctor about operating this machine while taking prescription medications.

4. **Under no circumstances should young children be allowed to work with this equipment. Do not allow persons to operate or assemble this unit until they have read this manual and have developed a thorough understanding of the safety precautions and how it works.** Review the safety instructions with all users annually.

5. This equipment is dangerous to children and persons unfamiliar with its operation. The operator should be a responsible, properly trained, and physically able person familiar with farm machinery and trained in this equipment's operations. If the elderly are assisting with farm work, their physical limitations need to be recognized and accommodated.

6. Never exceed the limits of a piece of machinery. If its ability to do a job, or to do so safely, is in question - **DON'T TRY IT.**

7. Do not modify the equipment in any way. Unauthorized modification may result in serious injury or death and may impair the function and life of the equipment.

8. In addition to the design and configuration of this implement, including Safety Signs and Safety Equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence, and proper training of personnel involved in the operation, transport, maintenance, and storage of the machine. Refer to Safety Messages and operation instruction in each of the appropriate sections of the auxiliary equipment and machine Manuals. Note all Safety Signs affixed to the auxiliary equipment.

2.3 SAFETY TRAINING

1. Safety is a primary concern in the design and manufacture of our products. Unfortunately, our efforts to provide safe equipment can be wiped out by a single careless act of an operator or bystander.

2. In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence, and proper training of personnel involved in the operation, transport, maintenance, and storage of this equipment.

3. The best safety feature is an informed, careful operator. It is the operator's responsibility to read and comply with ALL Safety and Operating instructions in the manual. Accidents can be avoided.

4. Working with unfamiliar equipment can lead to injuries. Read this manual, as well as the manual for your auxiliary equipment, before assembling or operating to acquaint yourself with the machines. If this machine is used by any person other than yourself, it is your responsibility to make certain that the operator reads and understands the operator's manuals and is instructed in safe and proper use.

5. Know your controls and how to immediately stop augers, conveyors, and any other auxiliary equipment in an emergency. Read this manual and the one provided with all auxiliary equipment.

6. Train all new personnel and review instructions frequently with employees. Be certain only a properly trained and physically able person will operate the machinery. A person who has not read and understood all operating and safety instructions is not qualified to operate the machine. An untrained operator exposes himself and bystanders to possible serious injury or death.

2.4 SAFETY SIGNS

1.  Keep safety signs clean and legible at all times. Replace any safety sign or instruction sign that is missing or not legible. Refer to the Safety Sign Location section for additional information.

2. When parts that displayed a safety sign are replaced, the replacement should also display the safety sign.

3. Replacement safety signs (labels) are available from your authorized Dealer Parts Department or the factory at no cost.

2.4.1 How to Install Safety Signs

- Be sure that the installation area is clean and dry.
- Be sure temperature is above 50°F (10°C).
- Determine exact position before you remove the backing paper.
- Remove the smallest portion of the split backing paper.
- Align the sign over the specified area and carefully press the small portion with the exposed sticky backing in place.
- Slowly peel back the remaining paper and carefully smooth the remaining portion of the sign in place.
- Small air pockets can be pierced with a pin and smoothed out using a piece of sign backing paper.

2.5 PREPARATION

1.  Never operate the seed delivery system and auxiliary equipment until you have read and completely understand this manual, the auxiliary equipment Operator's Manual, and each of the Safety Messages found on the safety signs on the delivery system and auxiliary equipment.

2.  **PROLONGED EXPOSURE TO LOUD NOISE MAY CAUSE PERMANENT HEARING LOSS!** Motors or equipment can be noisy enough to cause permanent or partial hearing loss. We recommend that you wear hearing protection on a full-time basis if the noise in the operator's position exceeds 80db. NOTE: Hearing loss from loud noise (tractors, chain saws, radios, and other such sources close to the ear) is cumulative over a lifetime with uncertain natural recovery.

3.  Clear working area of debris, trash, or hidden obstacles that might be hooked or snagged, causing injury, damage, or tripping.

4. Operate only in daylight or good artificial light.

5. Be sure machine is properly attached to the trailer, adjusted, and in good operating condition.

6.  Ensure that all guards, shielding, and safety signs are properly installed and in good condition.

7.  Before starting, give the machine a "once over" for any loose bolts, worn parts, cracks, leaks, frayed belts, and make necessary repairs. Always follow maintenance instructions.

2.6 OPERATING SAFETY

1.  Make sure that anyone who will be operating the bulk seed delivery system or working on or around the unit reads and understands all the operating, maintenance, and safety information in the operator's manual.

2.  Keep all bystanders, especially children, away from the machine when loading or unloading, or when authorized personnel are carrying out maintenance work.

3.  Establish a lock-out or tag-out policy for the work site. Be sure all personnel are trained in and follow all procedures. Lock-out or tag-out all power sources before servicing the unit or working around loading/ unloading equipment.

4. 

Stop engine, remove ignition key, and wait for all moving parts to stop before servicing, repairing, adjusting, loading, filling, or unplugging.

5. 
Keep working area clean and free of debris to prevent slipping or tripping.

6. 
Do not allow riders on the trailer or frame when transporting.

7. 
Keep hands, feet, hair, and clothing away from rotating parts.

8. 
Do not place hands, fingers, or arms between moving parts.

9. 
Stay away from overhead power lines. Electrocution can occur without direct contact.

10. 
Install and secure all guards before starting.

11. 
Use care when climbing on frame or ladder to prevent slipping or falling.

12. 
Fasten frame securely to trailer before transporting.

13. Always empty compartment 2 first to prevent an unbalanced load. An unbalanced load can cause the tender to upend.

14. 
Review safety related items annually with all personnel who will be operating, using, or maintaining the seed delivery system.

2.7 MAINTENANCE SAFETY

1. Good maintenance is your responsibility. Poor maintenance is an invitation for trouble.

2. Follow good shop practices.

3. 
Ensure proper ventilation. Never operate the engine in a closed building. The exhaust fumes may cause asphyxiation.

4. 

Before working on this machine, shut off the engine and remove the ignition keys.

5. 
Never work under equipment unless it is securely blocked.

6. 
Always use personal protection devices, such as eye, hand, and hearing protectors, when performing any service or maintenance.

7. 

Where replacement parts are necessary for periodic maintenance and servicing, genuine factory replacement parts must be used to restore your equipment to the original specifications. The manufacturer will not be responsible for injuries or damages caused by use of unapproved parts and/or accessories.

8. 
A fire extinguisher and first aid kit should be readily accessible while performing maintenance on this equipment.

9. 
Periodically tighten all bolts, nuts, and screws and ensure all cotter pins are properly installed to ensure unit is in safe condition.

10. 
When completing a maintenance or service function, make sure all safety shields and devices are installed before placing unit in service.

11. 
Turn OFF all electrical power and tag or lockout the power source before performing any electrical test or before connecting or disconnecting valve coils or other electrical loads.

12. 
Never operate or test any function of the equipment when people are in an area of a potential crush hazard.

2.8 LOCK-OUT OR TAG-OUT SAFETY

1. 
Establish a formal Lock-Out or Tag-Out program for your operation.

2. 
Train all operators and service personnel before allowing them to work around the seed delivery system.

3. 
Provide tags on the machine and a sign-up sheet to record tag-out details.

2.9 STORAGE SAFETY

1. Store the unit in an area away from human activity.
2. Do not permit children to play on or around the stored machine.
3. Store the unit in a dry, level area. Support the frame with planks, if required.

2.10 TRANSPORT SAFETY

1.  Comply with local, state, and federal laws governing safety and conveyance of farm machinery on public roads.
2. Ensure all lights, reflectors, and other lighting requirements are installed and in good working condition.
3. Ensure that the trailer is equipped with brakes that are in good working order. Be familiar with their operation.
4. Do not exceed a safe travel speed. Slow down for rough terrain and when cornering.
5.  Fasten frame securely to trailer before transporting.
6. Be sure the trailer is securely hitched to the towing vehicle and a retainer is used through the hitch jaws. Always attach a safety chain between the hitch and the towing vehicle.
7.  Stay away from overhead power lines. Electrocution can occur without direct contact.
8. Plan your route to avoid heavy traffic.
9. Install auger spout transport lock before transporting.
10. Do not drink and drive.
11. Be a safe and courteous driver. Yield to oncoming traffic in all situations, including narrow bridges, intersections, etc. Watch for traffic when operating near or crossing roadways.
12.  Never allow riders on the tender or the trailer.

2.11 REFUELLING SAFETY

1.  Handle fuel with care. It is highly flammable.
2.  Allow engine to cool for five minutes before refuelling. Clean up spilled fuel before restarting engine.
3.  Do not refuel the machine while smoking or when near open flame or sparks.
4. Fill fuel tank outdoors.
5.  Prevent fires by keeping machine clean of accumulated trash, straw, grease, and debris.

2.12 BATTERY SAFETY

1.  Keep all sparks and flames away from batteries, as gas given off by electrolyte is explosive.
2. Avoid contact with battery electrolyte: wash off any spilled electrolyte immediately.
3.  Wear safety glasses when working near batteries.
4. Do not tip batteries more than 45 degrees, to avoid electrolyte loss.
5.  To avoid injury from spark or short circuit, disconnect battery ground cable before servicing any part of electrical system.

2.13 SIGN-OFF FORM

Meridian Manufacturing Group follows the general Safety Standards specified by the American Society of Agricultural Engineers (ASAE) and Occupational Safety and Health Administration (OSHA). Anyone who will be operating and/or maintaining the Meridian Manufacturing Group Bulk Seed Tender Model 400 SLD seed delivery system must read and clearly understand ALL Safety, Operating, and Maintenance information presented in this manual.

Do not allow anyone to operate this equipment until such information has been reviewed. Annually review this information before the season start-up.

Make these periodic reviews of SAFETY and OPERATION a standard practice for all of your equipment. We feel an untrained operator is unqualified to operate this machine.

A sign-off sheet is provided for your record keeping to show that all personnel who will be working with the equipment have read and understand the information in the Operator's Manual and have been instructed in the operation of the equipment.

SIGN-OFF FORM		
Date	**Employee's Signature**	**Employer's Signature**

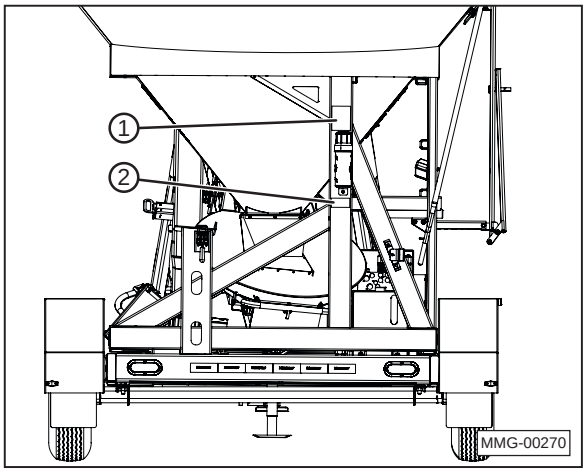
3. SAFETY SIGN LOCATIONS

The types of safety signs and locations on the equipment are shown in the following pages. Good SAFETY AWARENESS requires that you familiarize yourself with the various safety signs, the type of warning and the area, or a particular function related to that area.

REMEMBER - If safety signs have been damaged, removed, become illegible, or parts replaced without signs, new signs must be applied. New safety signs are available from your authorized dealer free of charge.

2. Product Serial Number Decal (#19984)



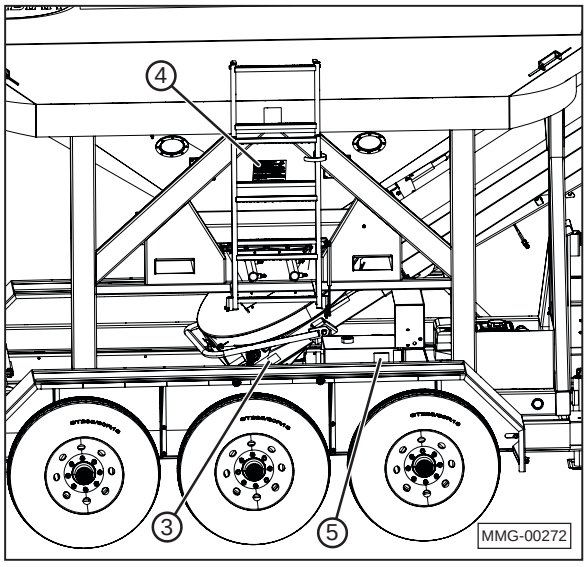


1. CAUTION — Read and Understand (#19934)

CAUTION

- Read and understand the Operator's Manual before using. Review safety instructions annually.
- Stop engine, remove ignition key, and wait for all moving parts to stop before servicing, repairing, adjusting, loading, filling, or unplugging.
- Keep working area clean and free of debris to prevent slipping or tripping.
- Do not allow riders on the trailer or frame when transporting.
- Only enter seed compartment when it is empty.
- Keep hands, feet, hair, and clothing away from moving parts.
- Do not place hands, arms, or body between seed box and frame or lid to prevent pinching or crushing. Components can move unexpectedly.
- Do not place hands, fingers, or arms between unloading auger tube segments when placing in unloading configuration.
- Stay away from overhead power lines. Electrocution can occur without direct contact.
- Install and secure all guards before starting.
- Use care when climbing on frame or ladder to prevent slipping or falling.
- Do not smoke when refuelling or working around machine.
- Fasten frame securely to trailer before transporting.
- In two compartment seed tenders, always empty Compartment 2 first to prevent an unbalanced load. An unbalanced load can cause hitch to upend.

19934



3. WARNING — Rotating Parts (#19936)

WARNING

ROTATING PART HAZARD

KEEP AWAY

To prevent serious injury or death from rotating parts:

- **Stop engine, remove ignition key, and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.**
- **Install and secure all guards before operating.**
- **Do not operate with rotating parts exposed.**

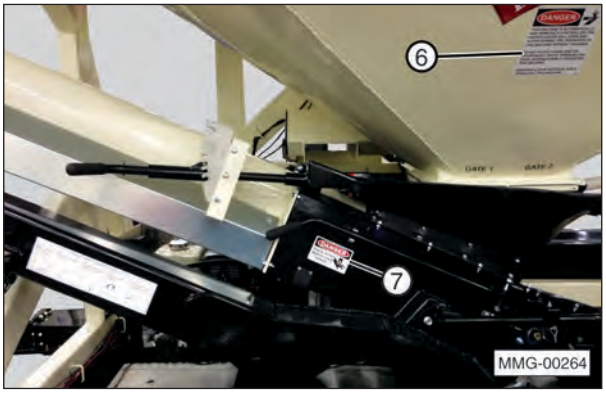
19936

4. WARNING — Fall Hazard (#19939)



5. WARNING — Hot Surface (#20088)





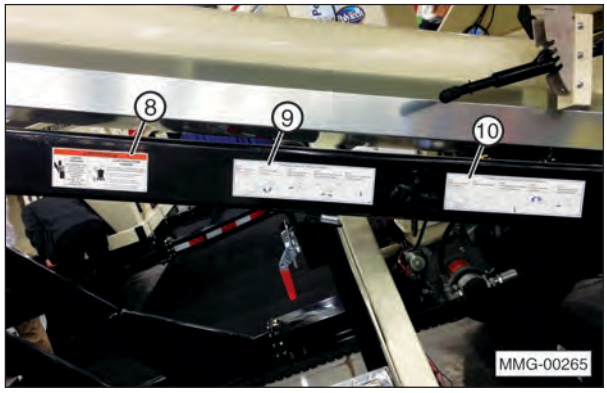
6. WARNING — Automatic Operation (#15056)



7. WARNING — Pinch Point (#20087)

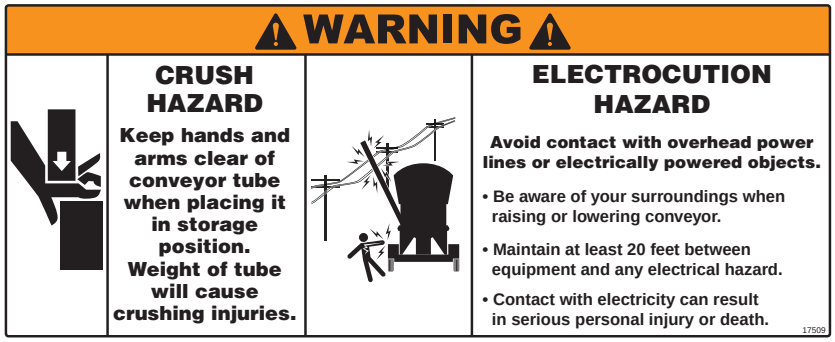




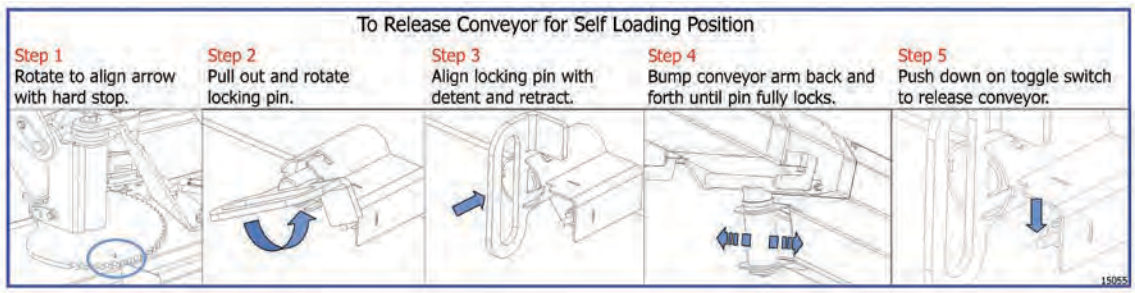




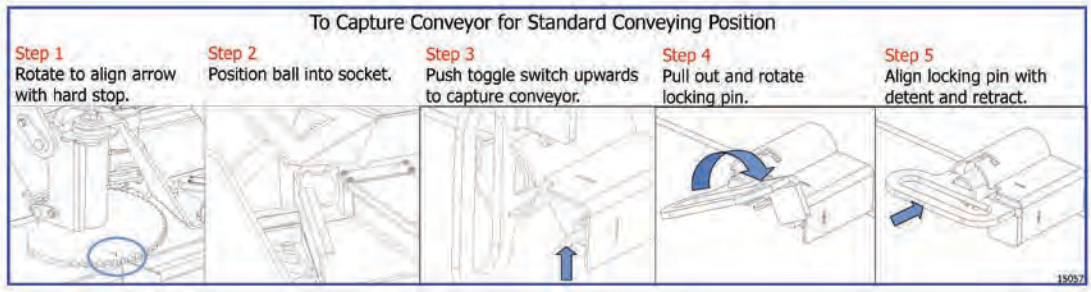
8. WARNING — Crush Hazard / Electrocution (#17509)



9. Instruction — Release Conveyor (#15055)



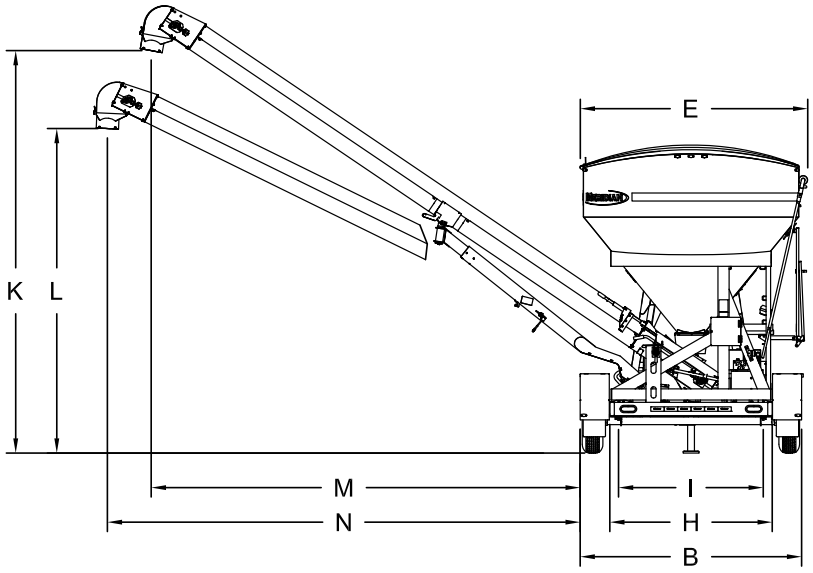
10. Instruction — Capture Conveyor (#15057)

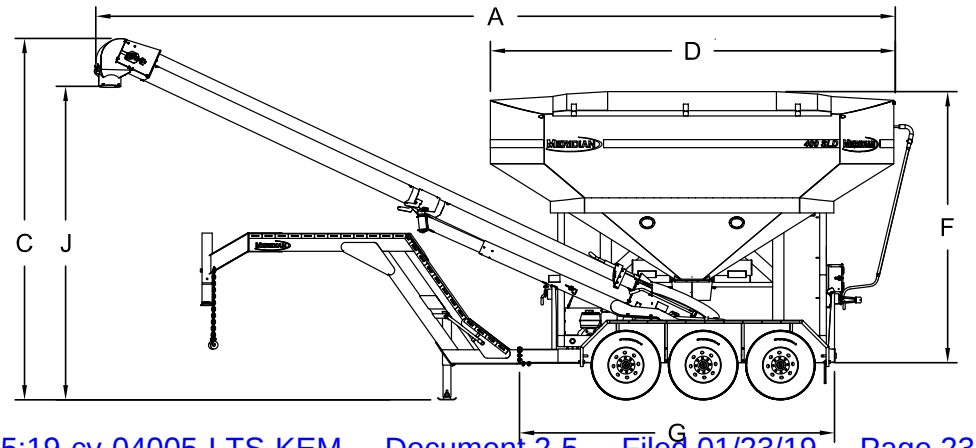


4. SPECIFICATIONS

4.1 OVERALL SEED TENDER SPECIFICATIONS

		With Axle Package	Without Axle Package
A	Overall Length	29' - 9"	
B	Overall Width	8' - 3"	8' - 0"
C	Overall Height	13' - 5 1/2"	12' - 1"
D	Main Body Length	15' - 0"	
E	Main Body Width	8' - 0"	
F	Main Body Height	10' - 1"	
G	Base Length	11' - 8 3/4"	
H	Base Width	6' - 0 1/2"	
I	Base Mount Width	5' - 4 5/8"	
J	Conveyor Height in Transport	11' - 8"	10' - 3 1/2"
K	Conveyor Height at Maximum Unload	14' - 6"	13' - 1 1/2"
L	Conveyor Height at Minimum Unload	13' - 6"	12' - 1 1/2"
M	Conveyor Reach at Maximum Unload	15' - 11 1/2"	
N	Conveyor Reach at Minimum Unload	17' - 7"	





4.2 BOLT SPECIFICATIONS

⚠ WARNING

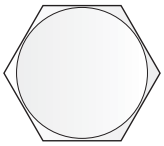
The torque value for bolts and capscrews are identified by their head markings. Replacing higher "Grade" bolts (Grade 8) with lower Grade bolts (Grade 5) will lead to equipment failure and can result in injury or death. Always use replacement bolts with the same Grade markings as the removed bolt.

4.2.1 Bolt Torque Values

Torque figures indicated above are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or cap screws unless otherwise instructed in this manual. When using locking elements, increase torque values by 5%.

Bolt Diameter "A"	SAE Grade 2 N·m (lb-ft)		SAE Grade 5 N·m (lb-ft)		SAE Grade 8 N·m (lb-ft)	
1/4"	8	(6)	12	(9)	17	(12)
5/16"	13	(10)	25	(19)	36	(27)
3/8"	27	(20)	45	(33)	63	(45)
7/16"	41	(30)	72	(53)	100	(75)
1/2"	61	(45)	110	(80)	155	(115)
9/16"	95	(70)	155	(115)	220	(165)
5/8"	128	(95)	215	(160)	305	(220)
3/4"	225	(165)	390	(290)	540	(400)
7/8"	230	(170)	570	(420)	880	(650)
1"	345	(225)	850	(630)	1320	(970)

4.2.2 Grade Markings Chart

 No Marking	**Grade 2** Low or Medium Carbon Steel
 3 Radial Lines	**Grade 5** Medium Carbon Steel Quenched and Tempered
 6 Radial Lines	**Grade 8** Medium Carbon Alloy Steel, Quenched and Tempered

5. MACHINE COMPONENTS AND CONTROLS

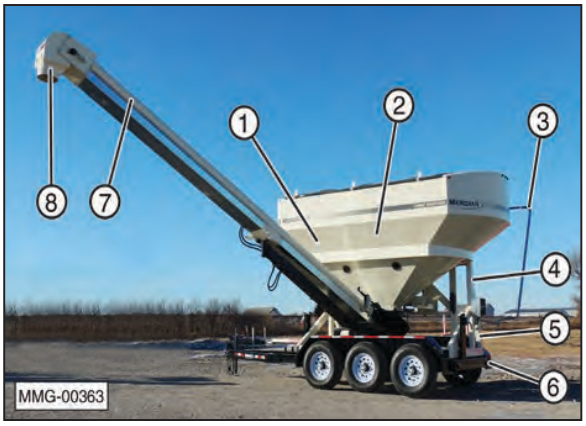
5.1 COMPONENT NOMENCLATURE AND LOCATION

The Meridian 400 SLD Seed Tender models are designed as bulk seed transfer units to transfer large amounts of seed into a planter or drill.

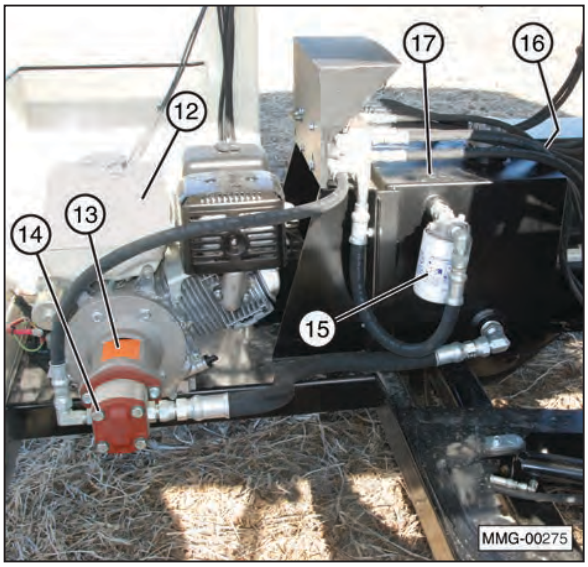
Large bulk seed containers are loaded into the seed tender compartments (1 & 2) using two methods. The seed can be loaded into one of two compartments from a seed box or other means. The seed tender can also load itself using its conveyor (23). The center-mounted conveyor (7) then transfers the seed from the compartments into planters or drills. Slide gates (22) on the compartments control the flow of seed into the conveyor.

A gasoline engine (12) mounted on the frame powers a hydraulic pump, which operates the hydraulic motor for the conveyor and the control cylinders (raise, lower, and rotate the conveyor; open and close the slide gates).

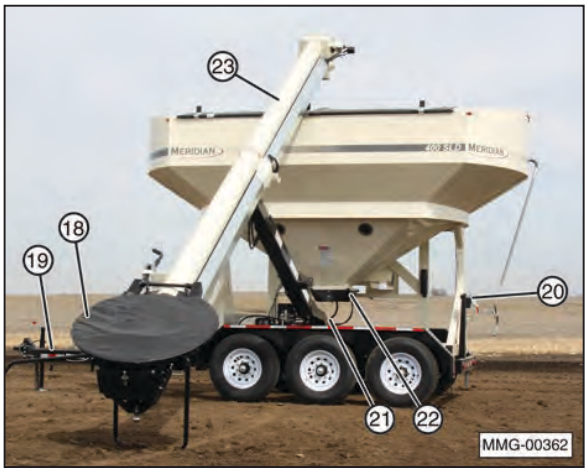
The conveyor is mounted on a pivoting platform (21) that rotates 135°. An optional spout on the end of the conveyor allows for convenient distribution.



(1) Compartment 1. (2) Compartment 2. (3) Roll Tarp and Open/Close Bar. (4) Seed Tender Frame. (5) Control Panel and Wireless Remote Control (not shown). (6) Trailer (Standard or Gooseneck). (7) Conveyor in Planter Loading Position. (8) Delivery Spout.



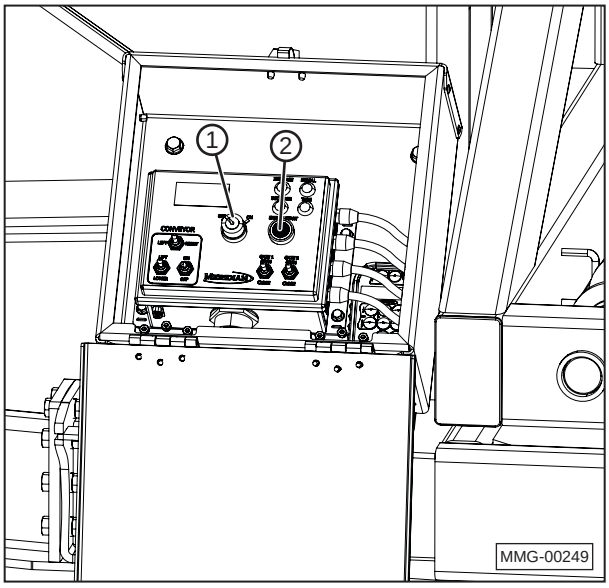
(12) Gasoline Engine to Power Hydraulic Pump. (13) Coupling (Engine to Pump). (14) Hydraulic Pump. (15) Hydraulic Oil Filter. (16) Hydraulic Tank Oil Level Sight Gauge. (17) Hydraulic Tank.



(18) Hopper and Cover. (19) Breakaway Trailer Brake System. (20) Transport Lock (Field and Road). (21) Pivot Platform. (22) Bin Slide Gates and Cylinders. (23) Conveyor in Self-loading Position.

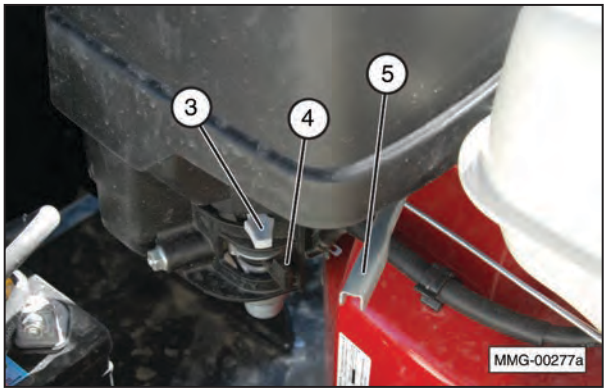
5.2 ENGINE AND CONTROLS

A Honda® engine is used with the unit. Always read the engine Operator's Manual supplied with the seed tender for the detailed operating procedures.



1. **Electrical System Key Switch (located in Control Box 5)**
   This key switch controls the power to the electrical system. Turn the key clockwise to turn the electrical system ON. The key must be in the ON position for the engine to start. Turn the key counterclockwise to stop the engine and turn OFF the electrical system.

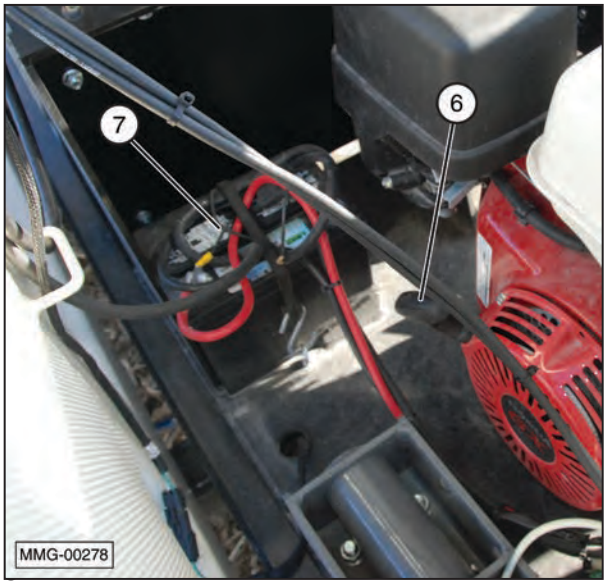
2. **Engine Start Button (located in Control Box 5)**
   Press and hold this button until the engine starts. Also set the choke lever on the engine when starting the engine. Turn the key switch counterclockwise to turn OFF the engine.



3. **Choke Lever**
   The choke lever controls the fuel/air mixture to the engine. Close the choke when starting if the engine is cold. Open the choke as the engine warms. Always open the choke fully during operation.

4. **Fuel Shut-Off Valve**
   Each engine is equipped with a valve between the fuel tank and the carburetor. Slide the fuel valve toward the block to turn ON and away for OFF. Turn the fuel OFF when not in use or before transporting.

5. **Throttle Lever**
   This lever controls the engine RPM. Move the lever laterally to increase or decrease the RPM. Always run at maximum throttle while operating.



6. **Starting Rope**
   This retracting rope and T-handle is an optional method used to turn the engine over for starting. Grasp the T-handle firmly and pull the rope sharply to start the engine. Key on master control must be ON to pull-start.

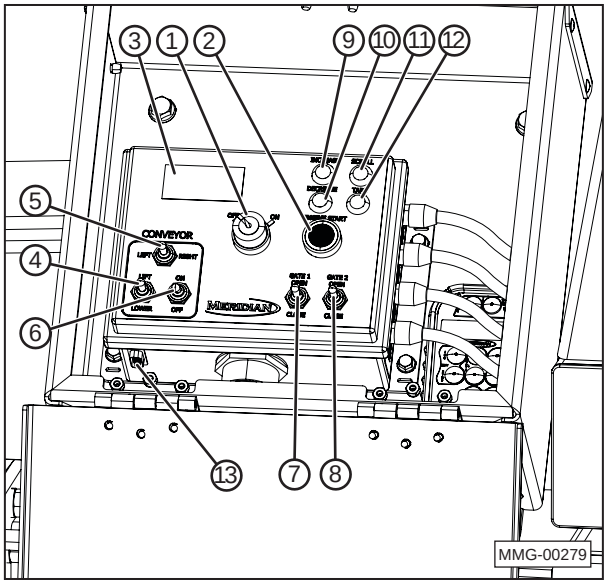
7. **Battery (12 Volt)**
   A 12 Volt battery supplies the power to start the gasoline engine. When the engine is operating a trickle charge is sent to the battery to keep it fully charged.

5.3 CONTROL SYSTEM FUNCTIONS

The MEGA REMOTE system is a state-of-the-art microprocessor based Radio Frequency (RF) control system. It provides the operator the ability to operate the seed tender from the control panel or from the wireless handheld remote transmitter.

5.3.1 Control Functions

The controls on this panel are intended to be used only as a backup resource. All of the functions of the seed tender can more easily be controlled using the handheld remote transmitter.



On/Off Key Switch (1)
This key switch controls the power to the electrical system. Turn the key clockwise to turn the electrical system ON. The key must be in the ON position for the engine to start or the handheld remote transmitter to function. Turn the key counterclockwise to turn OFF the electrical system.

Starting the Engine (2)
Press and hold this button until the engine starts. Also set the choke lever on the engine when starting the engine. Turn the key counterclockwise to turn OFF the engine.

LCD Display (3)
Turning key switch (1) to the ON position will turn the LCD backlight ON. It will stay on until the key is turned to the OFF position.

Conveyor Lift and Lower (4)
This switch raises and lowers the conveyor. Press the switch UP to raise the conveyor. Press the switch DOWN to lower the conveyor.

Conveyor Swing Left and Swing Right (5)
This switch positions the conveyor to the right or left. Press the switch to the LEFT to position the conveyor towards the front of the unit. Press the switch to the RIGHT to position the conveyor towards the rear of the unit.

Conveyor Start and Stop (6)
This toggle switch starts and stops the conveyor belt. Press the toggle switch UP to start the conveyor. Press the toggle switch DOWN to stop the conveyor.

Slide Gate 1 (7)
This switch opens and closes the slide gate at the bottom of the compartment 1. Press and hold the switch UP to open the slide gate; press and hold the switch DOWN to close the slide gate. The opening can be varied to provide the desired flow rate of seed onto the conveyor belt.

Slide Gate 2 (8)
This switch opens and closes the slide gate at the bottom of compartment 2. Press and hold the switch UP to open the slide gate; press and hold the switch DOWN to close the slide gate. The opening can be varied to provide the desired flow rate of seed onto the conveyor belt.

Increase (9)
Increases the weight when setting the Weight to Dispense function.

From the Main Display screen, to lighten the LCD display contrast press the Increase button.

Press and hold both the Increase and Decrease buttons simultaneously for ten seconds to enable or disable the display screen.

Decrease (10)
Decreases the weight when setting the Weight to Dispense function.

From the Main Display screen, to darken the LCD display contrast press the Increase button.

Press and hold both the Increase and Decrease buttons simultaneously for ten seconds to enable or disable the display screen.

Scroll (11)
Press the scroll button to scroll between the various display pages.

— Main Display screen (shows weight)

— Weight To Dispense screen (shows amount of seed that will be delivered to planter)

— Active Slide Gate screen

— Auto Reset screen

Tare (12)
To “Tare” or zero the scale when the receiver display is on the main display page showing the weight, press and hold the tare push button on either the remote transmitter or the receiver for three seconds. The display will then show the weight as zero.

RS232 Connector for Diagnostics (13)

5.3.2 Setting the Weight to Dispense

1. Select the Weight To Dispense screen using scroll button (11).
2. Press and hold Tare button (12) for five seconds.
3. The first character of the weight will start blinking.
4. Use the Increase (9) or Decrease (10) buttons to select the appropriate number.
5. Use the Scroll button to move to the next digit. Use the Increase (9) or Decrease (10) buttons to select the appropriate number. Repeat this until the desired weight has been entered.
6. Finally, holding the Tare button for another five seconds to save the new weight.

NOTE: The weight of the seed is calculated when it is inside the compartments and as it flows through the slide gates. Any seed in the seed pan or the conveyor has already been weighed and does not affect the total weight.

5.3.3 Setting Active Slide Gate

1. Select the Active Slide Gate screen using scroll button (11).
2. Use the Increase/Decrease buttons to set the slide gate to either #1 or #2.
3. When the Auto Reset button is pressed on the remote transmitter, the slide gate selected will open automatically.

5.3.4 Auto Reset Function

1. Using the Weight To Dispense screen, select the desired weight of seed to be delivered to the planter.
2. Using the Active Slide Gate screen, select either compartment 1 (Slide Gate 1) or compartment 2 (Slide Gate 2).
3. Press the Auto Reset button on the remote transmitter. The unit monitors the weight of seed being dispensed. As the weight approaches the desired Weight To Dispense, the slide gate will begin to close. If the weight stops changing too soon, the unit will open the slide gate slowly in order to get the desired amount.

5.3.5 Control System Compliance Information

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference. This equipment generates radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to the reception of other electronics, which can be determined by turning the equipment off and on, DO NOT operate this equipment around those devices.

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to FCC Rules. In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to electronic device reception. The user is cautioned that changes and modifications made to the equipment without the approval of the manufacturer could void the user’s authority to operate this equipment.

5.4 WIRELESS REMOTE TRANSMITTER

Each radio remote transmitter is designed to operate with a unique radio ID code and RF channel sequence. Each receiver is programmed to respond only to the remote transmitter with the correct ID code/RF channel sequence for which it is set. This feature allows multiple systems to work in close proximity to one another without interference.

If the remote transmitter goes out of range for more than two seconds, all outputs except CONVEYOR will turn off as a safety feature.

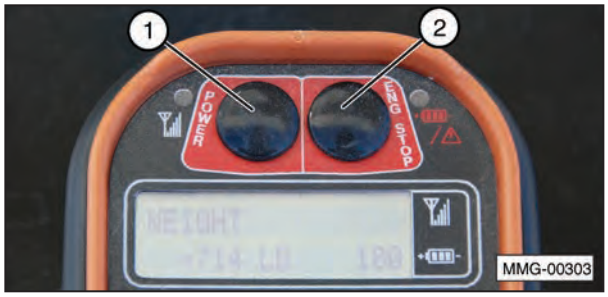
In the event that a remote transmitter becomes damaged and a new one is needed, the receiver can be reprogrammed to respond to the new remote transmitter. Refer to “10.1.3 Remote Control Transmitter and Receiver Synchronization” on page 48 of this manual.

All of the normal functions of the seed tender can be controlled by the remote transmitter.



5.4.1 Functions of Keypad Buttons

Use the buttons on the keypad to operate the desired functions of the seed tender.



POWER (1)
Press Power button (1) to turn remote transmitter ON. Press and hold the button to turn it OFF.

To save battery life, the remote transmitter will automatically turn off when it is idle (no functions are used) for a period greater than the sleep time (default is 15 minutes). Refer to “10.1.4 Changing Sleep Time on the Transmitter” on page 49 to change the sleep time on the transmitter.

NOTE: The remote transmitter will NOT automatically shut off as long as the receiver has power applied to it.

ENG STOP (2)
Press Engine Stop button to turn OFF engine.



CONV (3)
The Conveyor button starts and stops the conveyor belt. Press the INC button to start the conveyor. Press STOP button to stop conveyor.

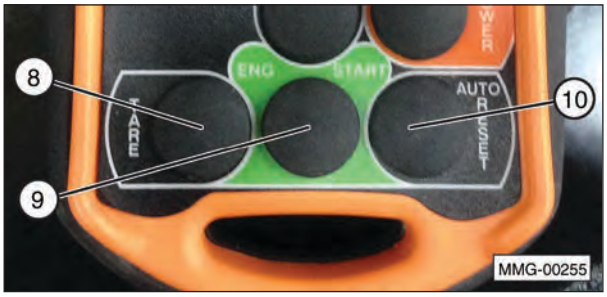
GATE 1 (4)
The Slide Gate 1 buttons open and close the slide gate at the bottom of compartment 1. Press the OPEN button to open the slide gate, and press the CLOSE button to close the slide gate. The opening can be varied to provide the desired flow rate of seed onto the conveyor belt.

CONV (5)
This Conveyor button positions the conveyor to the right or left. Press the LEFT button to position the conveyor towards the front of the unit. Press the RIGHT button to position the conveyor towards the rear of the unit.



GATE 2 (6)
The Slide Gate 2 buttons open and close the slide gate at the bottom of compartment 2. Press the OPEN button to open the slide gate, and press the CLOSE button to close the slide gate. The opening can be varied to provide the desired flow rate of seed onto the conveyor belt.

CONV (7)
This Conveyor button raises and lowers the conveyor. Press the LIFT button to raise the conveyor. Press the LOWER button to lower the conveyor.



TARE (8)
The tare button will reset the scale to zero in order to measure only the content being added to one compartment without measuring the weight of the seed tender itself. This allows an exact measurement of the seed to be placed in the compartment.

ENG START (9)
Press the engine start button to start the engine. If the engine has not been started recently set the choke to ON.

AUTO RESET (10)
Pressing the AUTO RESET button on the remote transmitter will dispense the Weight To Dispense out the selected gate. The gate that was selected in the Active Gate screen will open in #s. The unit will monitor the weight being dispensed. As the weight approaches the desired Weight To Dispense, the gate will begin to close. If the weight stops changing too soon, the unit will open the gate slowly in order to get the desired amount.

1. The auto reset mode does not turn the CONVEYOR on. The desired speed for the CONVEYOR should be set manually.
2. If the transmitter is in the middle of auto dispense mode and the remote goes out of range, the unit will close all open gates regardless the status of dispensing.
3. If the remote goes into the sleep mode during the auto dispense mode, the unit will abort the auto dispense mode and close the active gate.
4. Pressing any of the gate function buttons on the transmitter will close the active gate and stop the auto dispense mode.
5. If during the auto dispense mode the POWER button is pressed, the active gate will close.

ENABLE/DISABLE DISPLAY
Hold both INCREASE and DECREASE push buttons on the control panel simultaneously for 10 seconds to enable or disable the display.

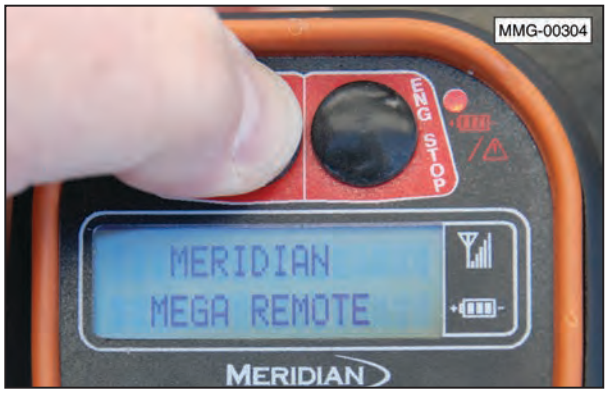
BAR PAGE
On the BAR PAGE where all weights are shown separately, holding down the TARE button on the control panel for 10 seconds will zero the reading for all the bars.

5.4.2 Display Panel



(1) Weight Displayed in Pounds. (2) Signal Strength. (3) Percentage of Battery Life.

5.4.3 Display Messages



Pressing the POWER button turns the remote transmitter ON and displays the message “Meridian Mega Remote”.



If the “NO LINK” message appears, the remote transmitter is not communicating with the control panel on the seed tender. Make sure the ON/OFF key switch is in the ON position.



The remote transmitter will display the WEIGHT of the seed in the seed compartments in pounds. It also displays the battery life of the two AA batteries in a percentage of remaining life.



When the POWER button is pressed and held, the message “Transmitter is turning OFF” will be displayed.

6. PRE-OPERATING INSTRUCTIONS

6.1 MACHINE BREAK-IN PERIOD

A special break-in procedure has been developed to ensure the integrity of the seed tender when first put into service. Follow the Before Starting instructions and then follow the Inspections for 1/2, 5, and 10 Hours instructions at the appropriate interval.

After completing these instructions, follow the normal service schedule in the Maintenance section and engine manual.

6.1.1 Before Starting

1. Read and follow the instructions in the Honda® engine and the Meridian Operator's Manuals.
2. Review and follow Set-Up Instructions and the Pre-operation Checklist before starting machine.
3. Initially check wheel bolt torque and then again at 10, 25, and 50 miles. Refer to the Wheel Bolt Torque Requirements section in this manual for tightening instructions.
4. If needed, adjust the height of the hitch assembly. Refer to the appropriate hitch section in this manual for either the standard trailer hitch or the gooseneck hitch.



5. Start the engine and check the controls. Be sure that they function properly.

6.1.2 Inspections for 1/2, 5, and 10 Hours

1. Recheck machine fluid levels. Refill as required.
2. Recheck the tension and alignment of the delivery belt.
3. Recheck hardware and fasteners; frame to trailer tie-downs, all fasteners, and wheel bolts. Tighten to their specified torque.
4. At 10 hours, change the engine oil with the specified oil.

6.2 PRE-OPERATION CHECKLIST

Efficient and safe operation of the Meridian Bulk Seed Tender system requires that each operator reads and follows the operating procedures and all related safety precautions outlined in this section.

A pre-operational checklist is provided for the operator. It is important for both personal safety and maintaining the efficient operation of the delivery system that this checklist be followed.

Before operating the delivery system and each time thereafter, the following areas should be checked:

1. Lubricate the machine, as outlined and shown in the Grease/Lubrication Location Diagram in the Maintenance section of this manual. Follow the prescribed schedule.
2. Check the engine fluid levels, fuel, and crankcase oil. Add as required.

IMPORTANT

The engine warranty is void if the engine is run without oil.

3. Check hardware and fasteners; seed tender frame to trailer tie-downs, hitch bolts, trailer hitch to trailer bolts, and all other fasteners. Tighten to their specified torque.
4. Make sure the wheel bolt lug nuts are tight.
5. Check the tires and ensure that they are inflated to their specified pressure.
6. Remove all entangled material.
7. Visually inspect the conveyor and frame for damage.
8. Test the breakaway brake unit and the trailer brakes.
   - Make sure the trailer brakes are operating properly.
   - Make sure the trip wire to the breakaway switch is connected to the tow vehicle.
   - Make sure the pin is correctly installed in the breakaway switch.
   - Press the Test button. The indicator should illuminate green. If the red light illuminates, the battery charge is low. Refer to the Breakaway system in the Maintenance section for instructions on charging the battery.
9. Check the fluid level in the hydraulic tank. Add fluid as needed.
10. Check the tension of the delivery belt. Follow the instructions in the manual to correct the tension and/or alignment.
11. When the machine is operating, check the alignment of the delivery belt. Follow the instructions in the manual to correct the tension and/or alignment.

7. OPERATION

OPERATING SAFETY

- Make sure that anyone operating the seed delivery system or working on or around the unit reads and understands all the operating, maintenance, and safety information in the Operator's Manual.
- Keep all bystanders, especially children, away from the machine when loading or unloading is being done, or when authorized personnel are carrying out maintenance work.
- Establish a lock-out tag-out policy for the worksite. Be sure all personnel are trained in and follow all procedures. Lock-out tag-out all power sources before servicing the unit or working around loading/unloading equipment.
- Stop engine, remove ignition key, and wait for all moving parts to stop before servicing, repairing, adjusting, loading, filling, or unplugging.
- Keep working area clean and free of debris to prevent slipping or tripping.
- Do not allow riders on the trailer or frame when transporting.
- Keep hands, feet, hair, and clothing away from moving parts.
- Do not place hands, arms, or body between the seed box and frame or lid to prevent pinching or crushing. Components can move unexpectedly.
- Stay away from overhead power lines. Electrocution can occur without direct contact.
- Install and secure all guards before starting.
- Use care when climbing on frame or ladder to prevent slipping or falling.
- Do not smoke when refueling or working around machine.
- Fasten frame securely to trailer before transporting.
- Review safety related items annually with all personnel who will be operating, using, or maintaining the seed delivery system.

7.1 CONNECTING THE TRAILER

WARNING

To prevent serious injury or death from upending hazard, do not stand over hitch when unhooking the trailer from the tow vehicle. Load or fill compartment 1 first to keep weight on the hitch. Unload or empty compartment 2 first to keep weight on the hitch.

7.1.1 Bumper Hitch

1. Complete the Pre-operation Checklist.

CAUTION

Ensure that all bystanders, especially small children, are clear of the working area. Ensure there is enough room and clearance to safely back up to the machine.

2. Use the trailer jack to lift the hitch above the height of the receiver on the tow vehicle (standard hitch assembly shown).



3. Slowly back the tow vehicle until the hitch and ball are aligned.



4. Lower the hitch onto the ball.



5. Raise the jack and place it in its stowed position.

6. Release the latch to lock the hitch around the ball and install the retainer clip to secure the connection.

7. Attach the safety chain securely to the truck frame to prevent unexpected separation. Cross the chains when attaching.



8. Connect the wiring harness for the lights and brakes.

9. Connect the breakaway system cable to the tow vehicle.

10. Route all the cables in a manner that will prevent snagging. Be sure to provide slack for turning.

7.1.2 Gooseneck Hitch



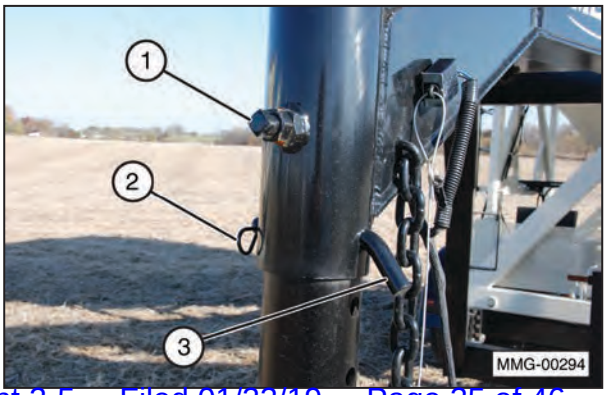
1. Adjust the trailer jack to set the trailer in a level position.



⚠ WARNING

Crush Hazard. The adjustable height tube in Step 2 is very heavy and can cause severe injury if it falls free. Once the lock bolt is loosened and the hitch pin is removed, the tube is free to fall to the ground if not properly supported.

2. Loosen lock bolt (1) on the adjustable height tube. Remove the keeper pin (2) and remove the tube lock pin (3).



3. Adjust the tube height for the tow vehicle which would keep the trailer in a level position.

4. Reinstall the pin and keeper. Tighten the tube lock bolt.

5. Raise the gooseneck ball hitch to go over the lowered tailgate of the tow vehicle and to clear the height of the gooseneck ball.

6. Open the clamp latch on the gooseneck coupler.



7. Position the trailer's coupler directly over the ball in the bed of the tow vehicle.

8. Lower the gooseneck trailer into position and latch the clamp.

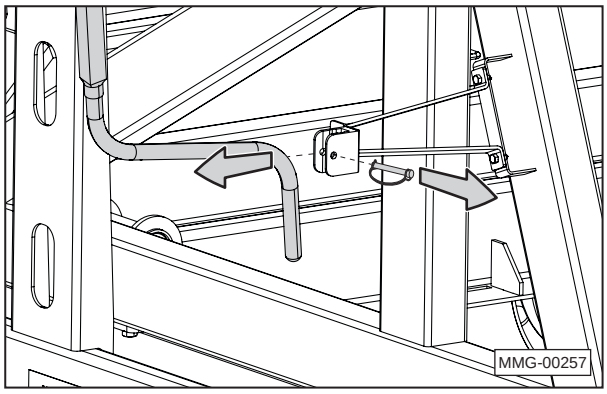
9. Attach the safety chains.

10. Connect the trailer light wiring to your vehicle's connector and check all of your lights, including your brake lights.

11. Completely raise the trailer jack to the storage/ transport position.

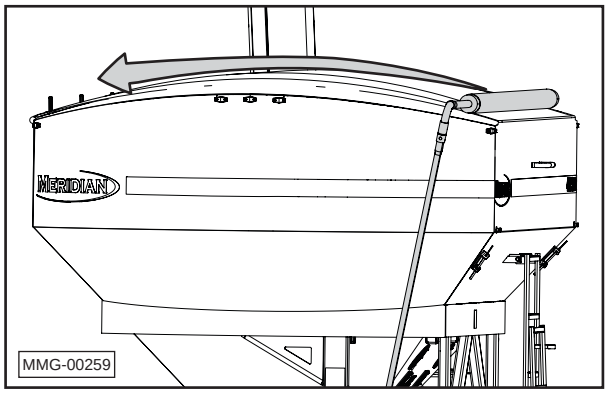
7.2 OPENING AND CLOSING ROLL-UP TARP

1. Remove the retaining pin from the crank holder. Using both hands, carefully remove the crank from the holder.

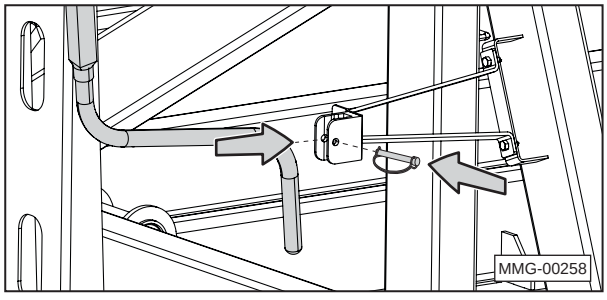


2. Extend the crank handle assembly to a comfortable operating position.

3. Roll the tarp to the fully opened position.



4. Place the crank back in the holder and reinsert the pin.



7.3 OPERATION

7.3.1 Conventional Loading (Filling the Seed Tender)

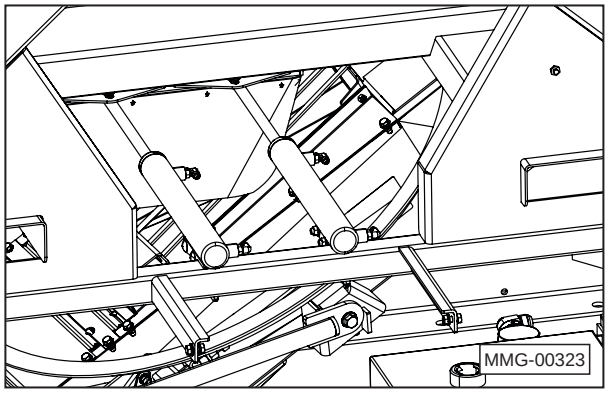
This Operation section provides a step-by-step procedure for first loading seed into the seed tender compartments by 1) using the self-filling feature at the farm or 2) using the conventional top fill method. It then shows how to unload the tender into a planter in the field or another type of container.

1. Connect the seed tender to a tow vehicle of sufficient size to safely transport the unit to its desired destination.

SAFETY INSTRUCTIONS

To prevent possible injury, do not load the seed tender unless it is securely fastened to a tow vehicle.

2. Before loading the seed tender compartments, make sure the two slide gates are in the fully closed position. The gasoline engine (hydraulic system) must be operating to close the hydraulically controlled slide gate cylinders.





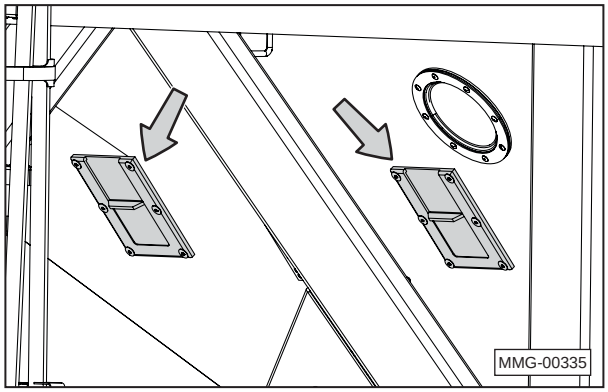
3. Open the roll-up tarp.

⚠CAUTION

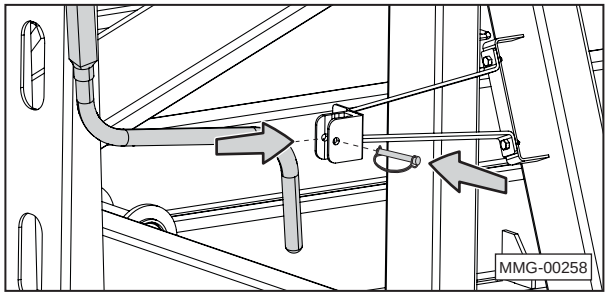
Always load compartment 1 first to maintain a positive tongue weight. Negative tongue weight can cause the hitch to rapidly swing upward if not securely fastened to the tow vehicle, which can result in personal injury.

4. Fill the front seed compartment first to maintain a positive tongue weight.

NOTE: Two sample slide gates, one in each compartment, can be used to retrieve samples of the seed from the compartment.



5. Close the roll-up tarp and secure the handle in the storage position.



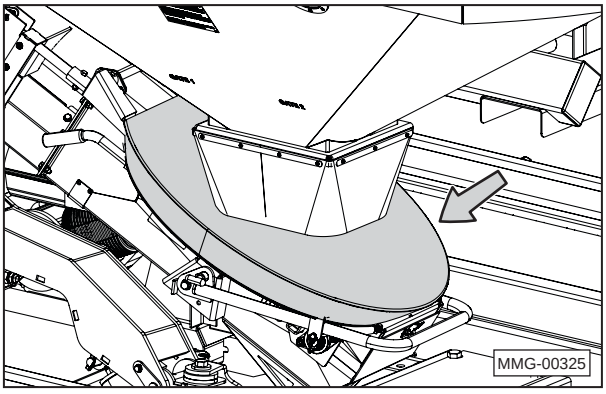
7.3.2 Loading Using Self-Filling Feature (Filling the Seed Tender)

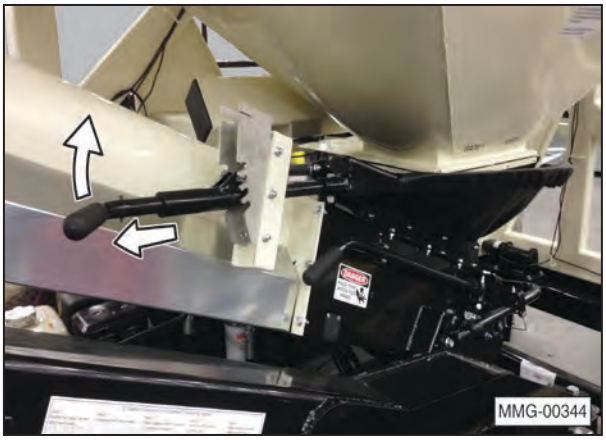
Using the self-filling feature, the seed compartments can be loaded with the seed tender's conveyor from a storage box, storage bin, grain truck, or other means directly into the seed compartments.

1. Unlatch the conveyor arm from the transport position by releasing the latch.



2. If not already removed, remove the protective cover from the seed pan. It may be necessary to lower the hopper in order to remove the cover. To lower the hopper, pull out on the sliding lock collar and raise the handle to lower the hopper.

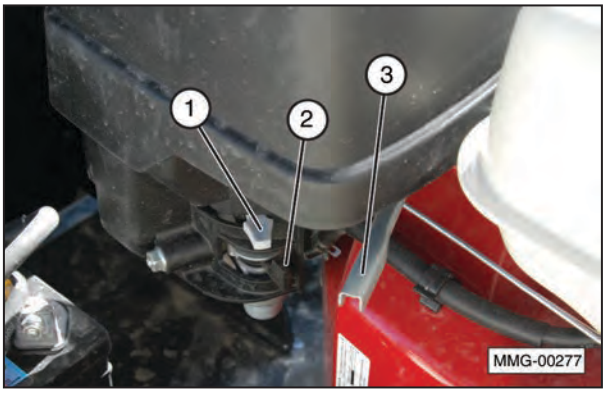




3. Turn the key switch to the ON position.



4. Move fuel valve lever (2) to the ON position.
5. To start a cold engine, move choke lever (1) to the CLOSED position.

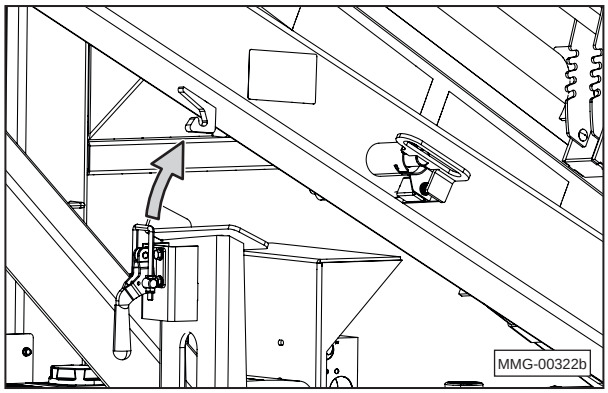


6. Start the engine and move throttle lever (3) to run the engine at full speed.

7. Using the remote control unit or the control panel, slightly raise the conveyor from the transport position.



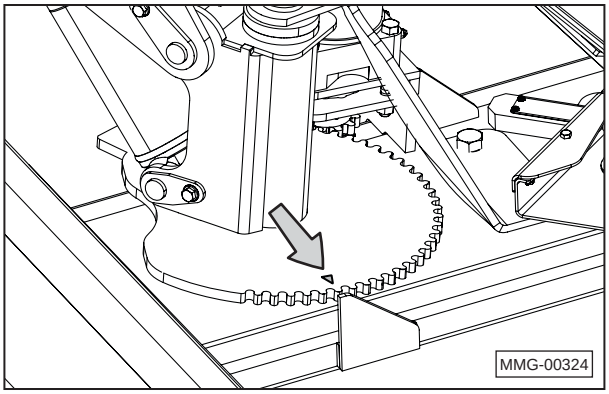




8. Using the remote control unit or the control panel, rotate conveyor to align the triangular indicator on the conveyor pivot plate with the alignment plate on the frame, as shown.



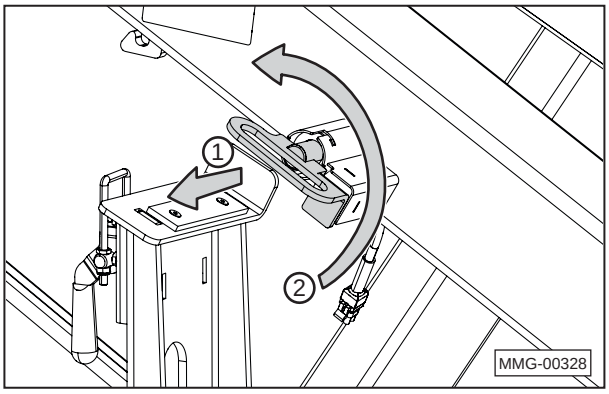




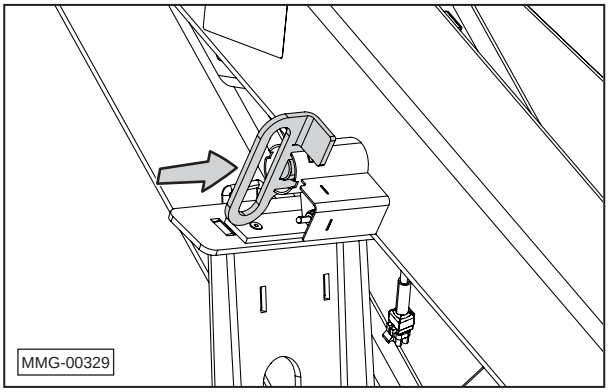
NOTICE

The indicator mark and the alignment plate must be aligned for the conveyor arm locking pin to engage. This pin locks the inner and outer tubes of the conveyor arm together. These two tubes must be locked together before releasing the conveyor hitch receiver (ball coupling). If the tubes are not locked together, the inner tube will slide down inside the outer tube and will require an external lifting device to raise it back into the correct position.

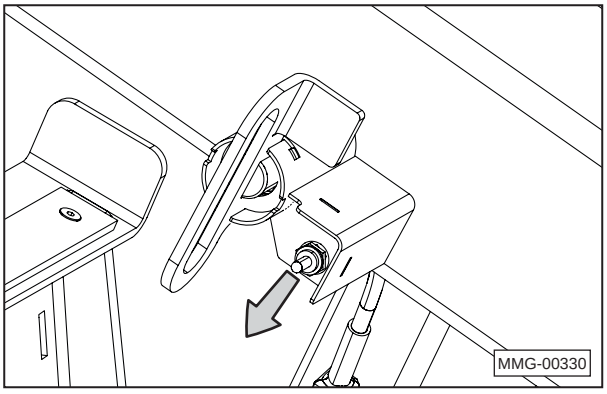
9. To lock the conveyor arm tubes together, pull the handle of the lock pin outward slightly and rotate it 90° counterclockwise.



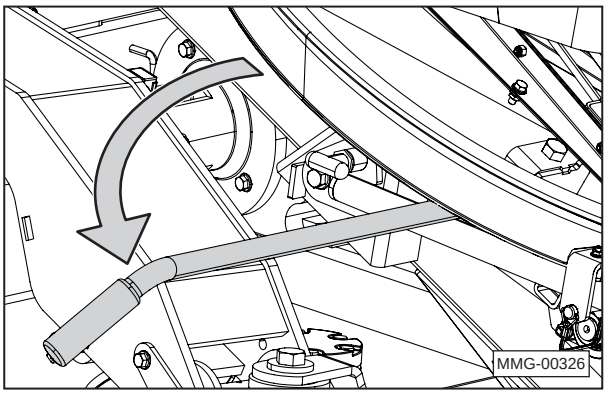
10. Release and push the lock pin inward to lock the inner and outer tubes of the conveyor arm together. Make sure the pin is fully engaged.



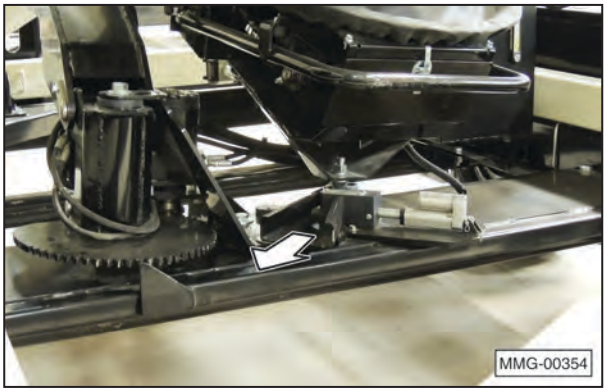
11. Once the tubes are locked together, move the toggle switch downward to unlock the conveyor hitch receiver (ball coupling) on the conveyor.

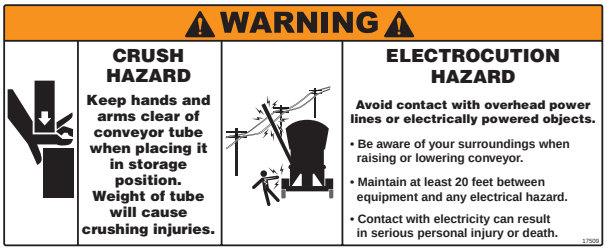


12. Rotate hopper guide handle 90° into the position shown.



13. Slide the ball coupling out of the conveyor hitch receiver.





Be observant of overhead power lines or other electrical hazards.

14. When the ball coupling is free of the conveyor hitch receiver, lift the bottom of the conveyor arm over the fender and hold it off the ground until it is in its final position.

⚠ WARNING

If two people are positioning the conveyor arm, one at the controls and the other holding the conveyor arm, be extremely careful to prevent a crush hazard. Do not place any part of your body between stationary and moving parts.



15. Use the conveyor left or the conveyor right buttons (switches) to position conveyor arm into the desired position. The photos show the self-filling position.





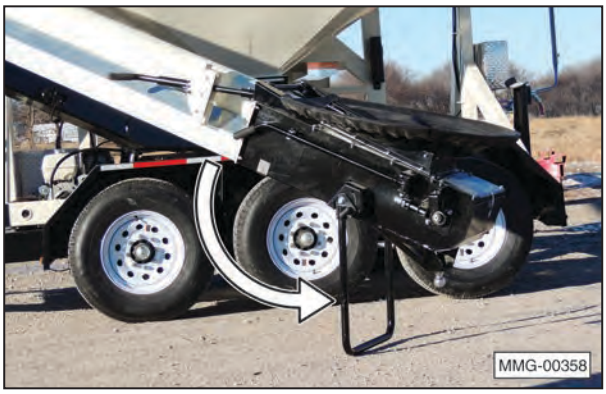






16. If desired, release the stand lock pin and rotate the stand downward. Engage the lock pin when the stand is fully extended.





17. Raise the hopper by pulling the lock collar outward and lowering the handle. Lock the handle into place when the hopper is at the desired height.



⚠CAUTION

To prevent personal injury, do not use the conveyor if the guard (metal bars) has been removed.



⚠CAUTION

Always load compartment 1 first to maintain a positive tongue weight. Negative tongue weight can cause the hitch to rapidly swing upward if not securely fastened to the tow vehicle, which can result in personal injury.

18. Start the conveyor. Refer to section 5.3 for setting automatic seed delivery functions. **Do not open the slide gates when the conveyor is in the self-filling position.**





19. Allow the seed to flow into the conveyor from the external source to fill the seed tender or other container.

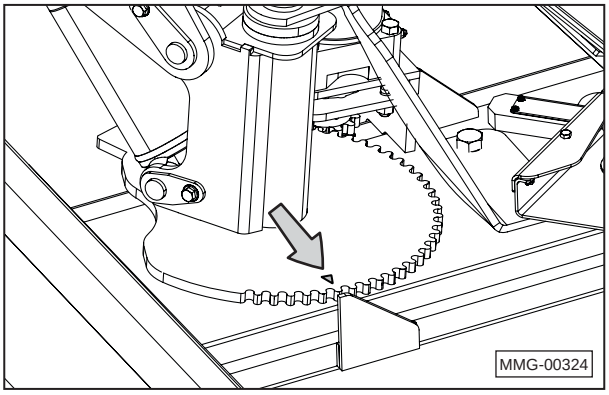


20. When the seed tender or other container is filled, stop the conveyor.



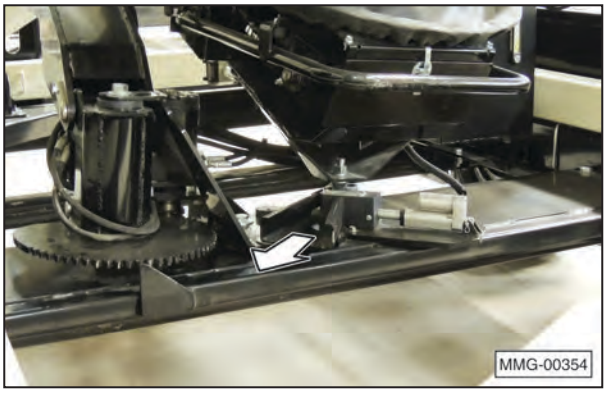


21. Return the conveyor arm to the storage position by first rotating the conveyor arm to align the triangular indicator on the conveyor pivot plate with the alignment plate on the frame, as shown.

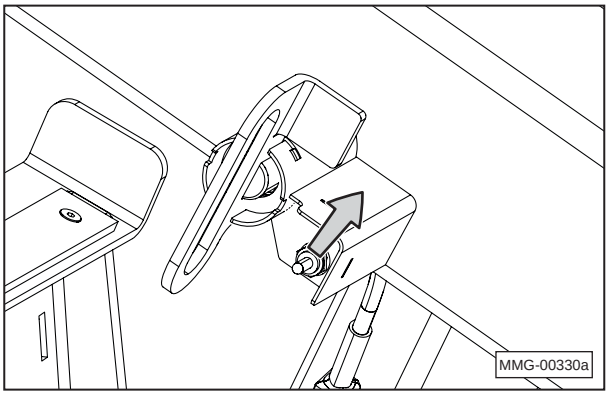


22. Lower the hopper. Raise the stand, if used.

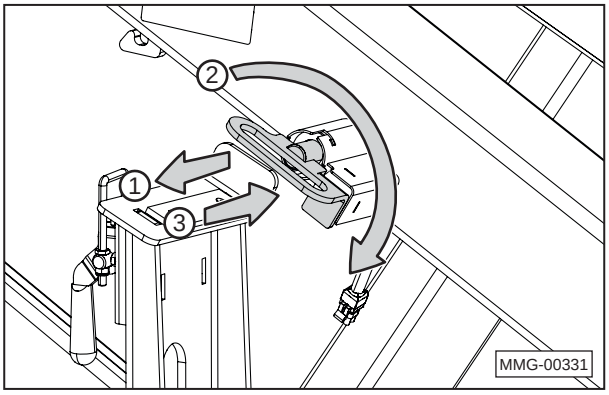
23. Guide the ball coupling into conveyor hitch receiver. Make sure ball coupling is free of dirt and debris before placing it into the receiver.



24. Press and hold the toggle switch upward to lock the ball coupling into the conveyor hitch receiver.

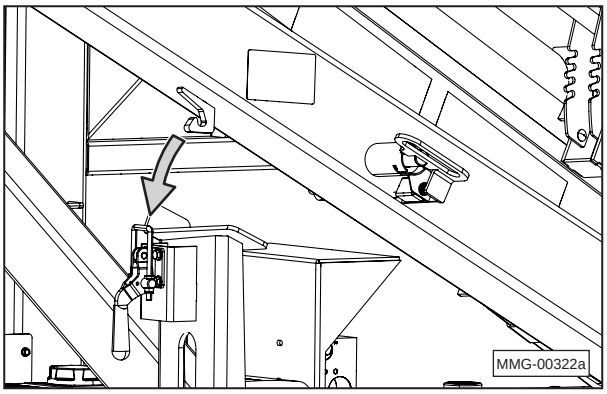


25. Pull out on locking pin and rotate 90° clockwise to shield toggle switch. Release the locking pin and make sure it is firmly seated in the open position.

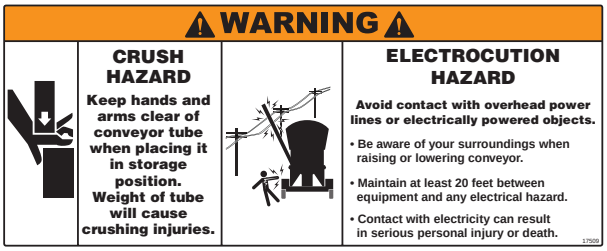


26. Rotate conveyor to the transport position; either front or back.

27. Lower the conveyor arm onto transport support and lock into place with latch.



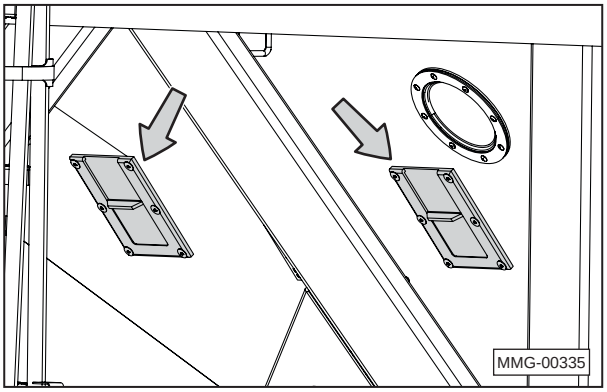
NOTE: Do not move the seed tender unless the conveyor is locked in the transport position.



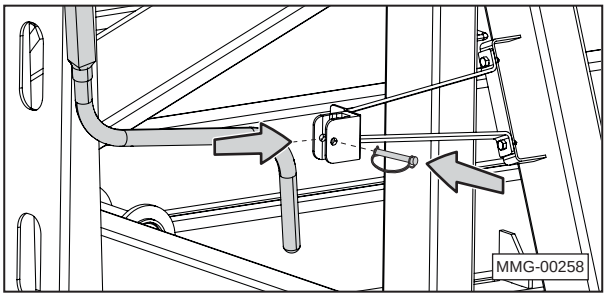
Be observant of overhead power lines or other electrical hazards.

28. Move the seed tender to the location of the planting equipment following all safe towing practices.

NOTE: Two sample slide gates, one in each compartment, are used to retrieve samples of the seed from the compartment.



29. If necessary, close the roll-up tarp and secure the handle in the storage position.



7.3.2 Unloading (Filling the Planter)

⚠CAUTION

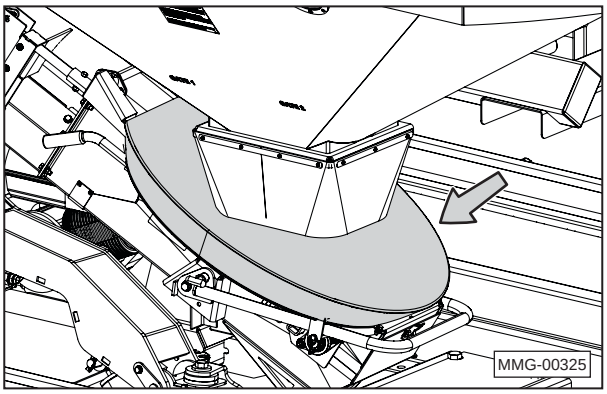
Always unload compartment 2 first to maintain a positive tongue weight. Negative tongue weight can cause the hitch to rapidly swing upward if not securely fastened to the tow vehicle, which can result in personal injury.

1. Before unloading, shut off engine on the tow vehicle, set the parking brake, and remove the ignition key.

2. Unlatch conveyor from the transport position by releasing the latch.



3. If necessary, remove the protective cover from the hopper.



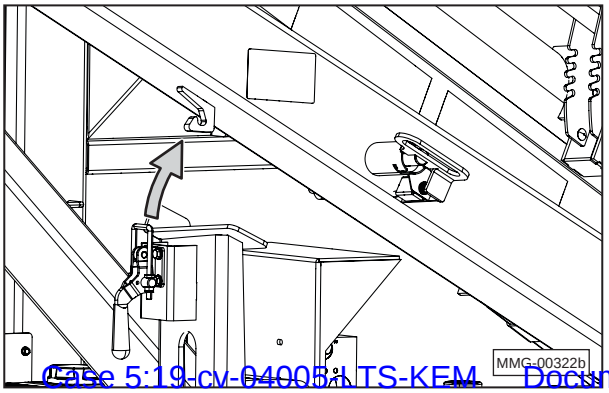
4. Turn the key switch on the control panel to the ON position.

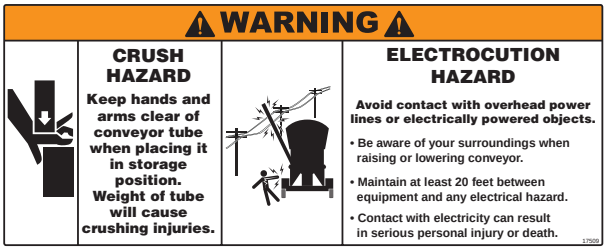
5. Move the fuel valve lever to the ON position.

6. To start a cold engine, move the choke lever to the CLOSED position.

7. Start the engine and move the throttle lever to run the engine at full speed.

8. Slightly raise the conveyor out of the transport position.



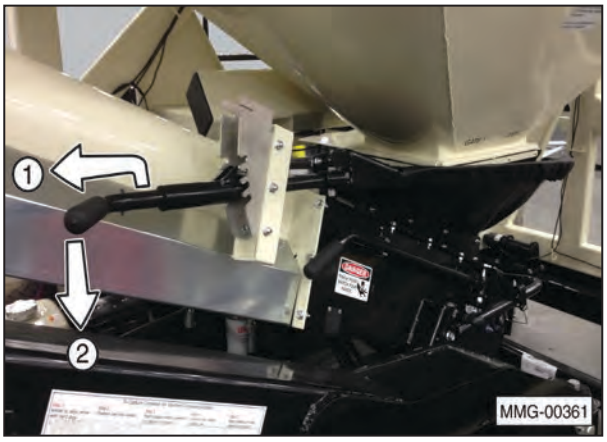


Be observant of overhead power lines or other electrical hazards.

9. Position the conveyor to place the spout over the planter's seed box.



10. Position the hopper to prevent spillage of the seed. Make sure the handle is locked into the desired position before opening the seed compartment slide gates.



11. Manually start the conveyor or use the Auto Reset feature to automatically dispense a preselected amount of seed. Refer to section 5.4 Auto Reset Function for instructions.





⚠ CAUTION

Always unload compartment 2 first to maintain a positive tongue weight. Negative tongue weight can cause the hitch to rapidly swing upward if not securely fastened to the tow vehicle, which can result in personal injury.

12. Open the slide gate on either compartment 1 or 2 with the remote control unit or the control panel for the desired seed flow.

    The button and/or switch is only activated while pressed and held. The flow of seed into the conveyor can be controlled by the amount the slide gate is opened.





13. When the planter is filled, close the slide gate and then stop the conveyor belt.



14. Return the conveyor to the transport position and latch before moving the seed tender.

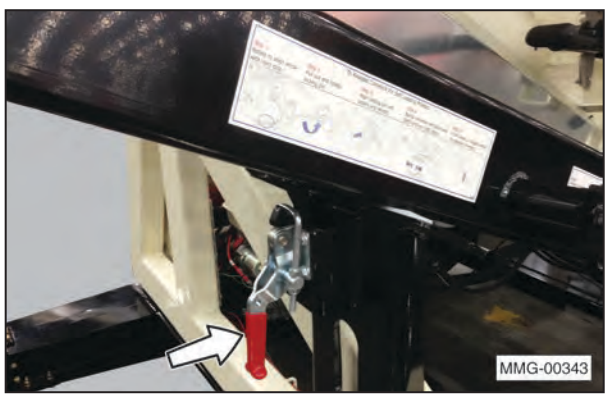


EXHIBIT F

8. STORAGE

8.1 GENERAL INFORMATION

After planting or when the machine will not be used for a period of time, completely inspect all major systems of the seed tender. Replace or repair any worn or damaged components to prevent unnecessary downtime at the beginning of the next season.

IMPORTANT

To prevent component damage, store the seed tender in a dry, level area. If the seed tender is not attached to a trailer, support the frame with planks to raise the unit off the ground.

8.2 PLACING IN STORAGE

⚠ CAUTION



Store the unit in an area away from human activity. To prevent the possibility of serious injury, do not permit children to play on or around the stored machine.

1. Remove all seed from the seed tender.
2. Place the gasoline engine fuel valve in the OFF position.
3. Thoroughly wash the machine with a pressure washer or water hose to remove all dirt, mud, or debris.
4. Inspect rotating parts for entangled material. Remove all entangled materials.
5. Check the condition of the conveyor belt. Replace or adjust, as required.
6. Check the condition of the hydraulic pump to engine shaft connectors and spider. Replace or adjust, as required.
7. Touch up paint nicks and scratches to prevent rusting.
8. Remove the ignition key and store in a secure place.
9. Remove the battery and store it in a cool, dry area on wooden blocks or a wooden pallet. Charge it monthly to maintain an adequate charge.
10. It is best to store the machine inside and if that is not possible, cover with a waterproof tarp and tie down securely.

8.3 REMOVING FROM STORAGE

When removing the machine from storage, follow this procedure:

1. Remove the tarp, if covered.
2. Install and connect the battery.
3. Review and follow the Pre-Operation Checklist.
4. Review and follow the Service Checks in the Maintenance section.

IMPORTANT

If the machine has been stored for more than twelve months, warm the engine by running it for two to three minutes and drain the oil. Change the oil while the oil is warm to remove any condensation. Refer to the Engine Oil Change in the Maintenance section.

9. MAINTENANCE

MAINTENANCE SAFETY

- Good maintenance is your responsibility.
- Follow good shop practices.
  - Keep service area clean and dry.
  - Be sure electrical outlets and tools are properly grounded.
  - Use adequate light.
- Make sure there is plenty of ventilation. Never operate the engine in a closed building. Exhaust fumes may cause asphyxiation.
- Before working on this machine, shut OFF the engine, and remove the ignition keys.
- Never work under equipment unless it is securely blocked.
- Always use personal protection devices, such as eye, hand, and hearing protectors when performing any service or maintenance.
- Where replacement parts are necessary for periodic maintenance and servicing, genuine factory replacement parts must be used to restore your equipment to the original specifications. The manufacturer will not be responsible for injuries or damages caused by use of unapproved parts and/or accessories.
- A fire extinguisher and first aid kit should be readily accessible while performing maintenance on this equipment.
- Periodically tighten all bolts, nuts, and screws and check that all cotter pins are properly installed to ensure the unit is in a safe operating condition.
- When completing a maintenance or service function, make sure all safety shields and devices are installed before placing unit in service.

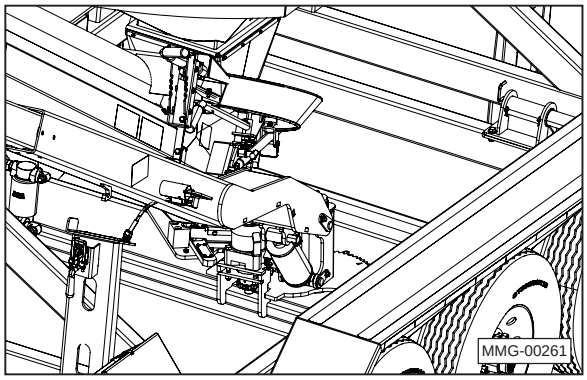
9.1 GREASING

Use the Service Checks information in the Maintenance section to keep a record of all scheduled maintenance.

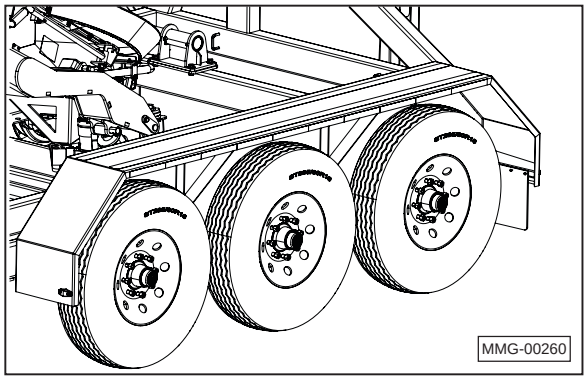
1. Use an SAE multi-purpose high temperature grease or a multi-purpose lithium base grease.
2. Use only a handheld grease gun for all greasing. An air-powered greasing system can damage the seals on bearings and lead to early failures.
3. Wipe grease fitting with a clean cloth before greasing to avoid injecting dirt and grit.
4. Replace and repair broken fittings immediately.
5. If fittings will not take grease, remove and clean thoroughly. Also, clean lubricant passageway. Replace fitting if necessary.

9.2 GREASE FITTING LOCATIONS

The lift cylinder is equipped with grease zerks on each end.



Each wheel hub is equipped with a grease zerk under the center dust cap.



10. SERVICE PROCEDURES

10.1 REMOTE CONTROL UNIT

The remote transmitter unit is powered by two AA batteries. The display window on the remote transmitter indicates the remaining battery life. When batteries are new, the display indicates 100% power. As the remote transmitter is used, the power decreases. When red indicator light (2) turns ON, the batteries should be replaced immediately, or discontinue the use of the remote transmitter.



10.1.1 Battery Replacement Tips

- Check the batteries at least every six months (for low Voltage, leakage, etc.).
- Always use the correct size and type of battery. Replace old batteries with new 1.5 Volt AA, alkaline batteries.
- Always replace both batteries at the same time.
- Do not mix types, brands, or ages of replacement batteries.
- Do not install the batteries backwards. Make sure you insert the batteries with the + (plus) and – (minus) terminals aligned correctly.
- Remove the batteries from the controller if not expected to be in use for several months.
- Do not attempt to recharge a battery unless it is specifically marked “rechargeable.”
- Dispose of old batteries properly.

10.1.2 Battery Replacement

1. Remove the two Phillips head screws from the cover on the back of the unit.
2. Replace the batteries, making sure they are correctly positioned.



10.1.3 Remote Control Transmitter and Receiver Synchronization

To reprogram the ID code to the receiver, use the following procedure.

NOTE: Do not interrupt this procedure before it has completed or the system may not operate correctly.

1. Turn the remote transmitter and receiver OFF.
2. Press and hold the POWER button on the handheld remote transmitter for more than ten seconds. The LCD display will indicate when to apply power to the receiver.
3. When directed, apply power to the receiver. Green LED stays on constantly when reprogramming is in progress.
4. When the process is completed, the green LED will blink on and off. Test the remote transmitter to make sure it functions properly.

10.1.4 Changing Sleep Time on the Transmitter

To change the sleep time on the transmitter, use the following procedure.

1. With the transmitter off, press and hold ENGINE STOP, CONVEYOR STOP and POWER button.
2. Wait for a few seconds, then release the buttons.
3. The green and red LEDs will start blinking together.
4. Use CONVEYOR INC and CONVEYOR STOP to increase/decrease the sleep time.
5. Select the desired sleep time.
6. Press POWER button to save and exit.

10.1.5 Weigh System

Clean transmitter regularly with a damp cloth and mild detergent.

Inspect electrical wiring for wear points or other damage. Repair as required.

Inspect all connections for looseness or corrosion. Tighten and/or “seal” as necessary.

⚠ CAUTION

When performing any inspection or maintenance on the remote system, always use care to prevent injury or damage to the equipment. The following are general precautions, which should be closely followed in carrying out any maintenance work.

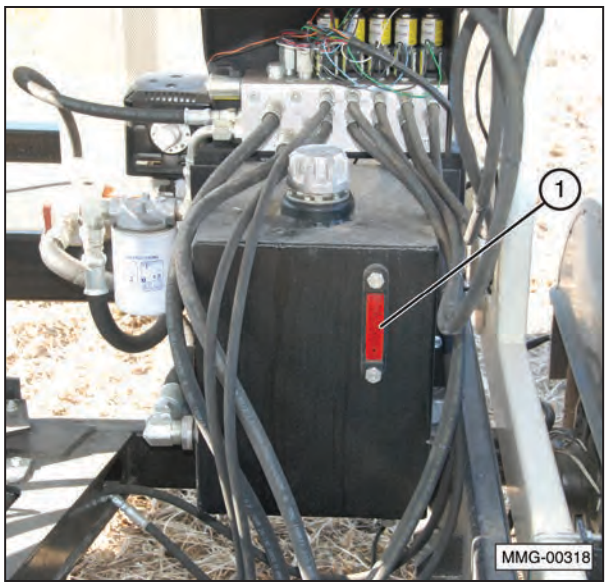
Do not have hydraulic power available to the valves when performing electrical tests.

Never operate or test any function if any person is in an area where they could be hurt by being hit or squeezed by the hydraulic equipment.

Turn power off before connecting or disconnecting valve coils or other electrical loads.

10.2 HYDRAULIC SYSTEM

10.2.1 Hydraulic Oil Change



An oil and filter change is recommended annually or every 400 hours of operation using an AW HVI Hydraulic ISO 32 oil.

IMPORTANT

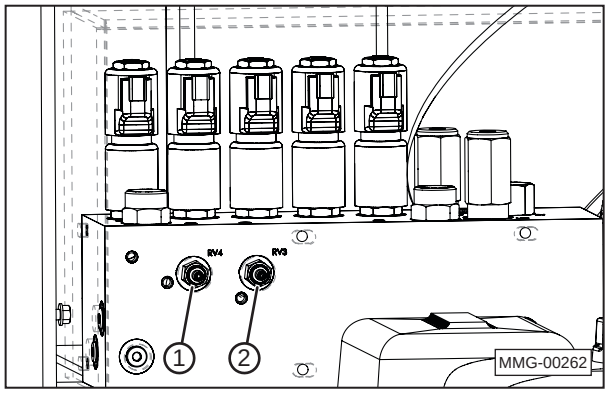
Never run the hydraulic pump unless the hydraulic oil tank is full (indicated in sight level gauge). (1)

1. Place a large waste oil container under the tank drain port. The hydraulic tank holds approximately ten gallons of oil.
2. Drain the hydraulic tank by removing the drain plug from the tank. Allow the tank to drain completely.
3. Remove and replace the oil filter. Apply a thin coat of oil to the rubber seal of the new oil filter. Hand-tighten only.
4. Re-install the drain plug.
5. Fill the tank to the fill line at the top of the gauge with approximately ten gallons of AW HVI Hydraulic ISO 32 oil. Replace the cap.
6. Start the engine and cycle all the cylinders several times.
7. Recheck the oil level in the tank and add as needed.

10.2.2 Hydraulic Pressure Relief Valves

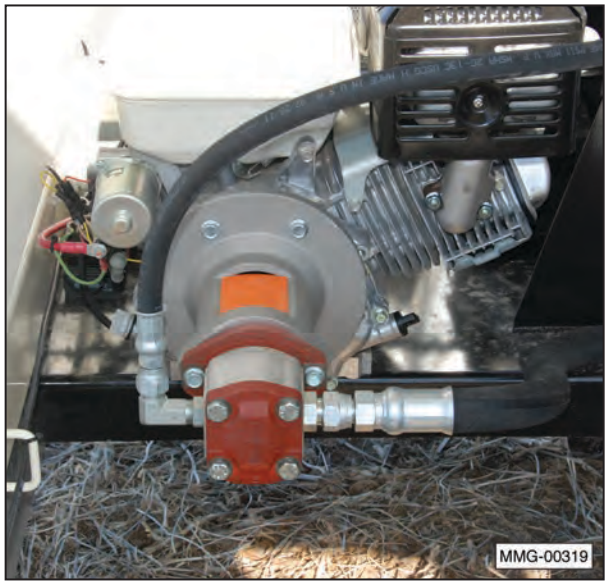
IMPORTANT

There are two pressure relief valves (1 and 2) which have been factory preset for the most efficient operation of the seed tender. **DO NOT** adjust these relief valves. If the unit is not operating properly, refer to the Troubleshooting section, call an authorized dealer, or call the factory.



10.2.3 Hydraulic Motor Coupling

Changing the pump coupling does not require the hydraulic tank to be drained. If the pump must be disconnected, drain the hydraulic tank and be prepared to catch any oil that remains in the two hydraulic hoses.



1. Remove the orange protective cover from the adapter assembly.
2. Remove the two pump mounting bolts.
3. Pull the pump away from the adapter to separate the coupling halves.



4. Loosen the setscrews in each coupling half and remove the old couplings. Install new couplings on the engine shaft and the pump shaft. When completely assembled, the shaft length in each coupling half should be the same. Tighten the pump end setscrews to 78 to 87 lb-in. Do not tighten the engine shaft coupling at this time.
5. Place the urethane spider in the pump coupling. Align and install the pump and pump coupling.
6. Tighten the pump bolts to a “Grade 5” bolt toque for that size of bolt. Refer to the 4.2 Bolt Specifications section.
7. Slide the engine coupling against the other coupling half and tighten the setscrew.
8. Replace the orange protective cover.

NOTE: If the adapter plate was removed, tighten the four retaining bolts to “Grade 5” bolt torque for that size of bolt.

10.3 ENGINE

For any questions concerning the Honda® engine not provided in this manual, refer to the OEM manual that was provided with the seed tender.

To contact Honda®, refer to the OEM Literature section in this manual.

10.3.1 Approved Fuel

Use a regular unleaded automotive gasoline for all operating conditions. The fuel tank capacity is 1.0 liter (2.1 US pints).

10.3.2 Engine Oil

Use a typical SAE 10W-30 or 10W-40 multi-viscosity motor oil for normal operating conditions. Consult your engine manual for the recommended oil in cold temperatures. The crankcase capacity is 1.1 liters (1.16 US qt.).

10.3.3 Change Engine Oil

1. Review the Operator's Manual for the engine.
2. Allow the engine to cool before changing oil. Draining works best when oil is warm.

⚠CAUTION

Burn Hazard. Hot engine oil can burn skin.

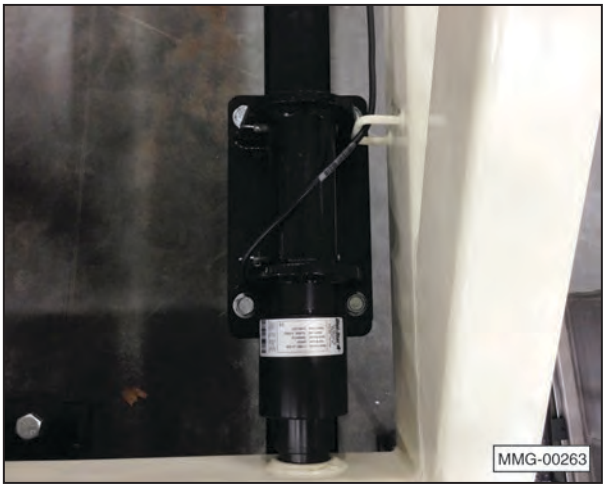
3. Be sure the engine key switch is in the OFF position and the fuel valve is turned OFF.
4. Place a pan under the drain plug.
5. Remove the drain plug and allow oil to drain for ten minutes.
6. Reinstall the engine drain plug and tighten.
7. Dispose of the oil in an approved container. Follow industrial disposal regulations.
8. Fill the engine with SAE 10W-30 oil for general usage. If the engine is operated in more extreme conditions, refer to the OEM manual for oil recommendations.
9. Run the engine for one minute and recheck the oil level. Add oil as needed.

10.3.4 Clean Air Cleaner

Check the air cleaner daily before each usage. Clean it every three months or 50 hours of operation (clean it more frequently when used in dusty conditions).

10.4 LOAD CELLS

Four load cells are used with the weighing system. There is no maintenance required for these load cells. If the seed tender does not seem to be functioning correctly, refer to the Troubleshooting section, call an authorized dealer, or call the factory.

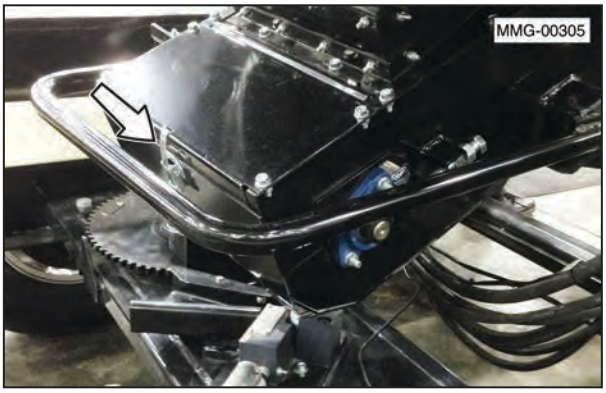


10.5 BELT DELIVERY TUBE

10.5.1 Unplugging

If the conveyor becomes plugged, follow this procedure:

1. Position the conveyor with easy access to both ends.
2. Stop the engine and remove the ignition key. Place a lock-out tag on the control box to prevent accidental starting of the conveyor.
3. Open the lower access door at the bottom of the conveyor and/or open the delivery spout cover.

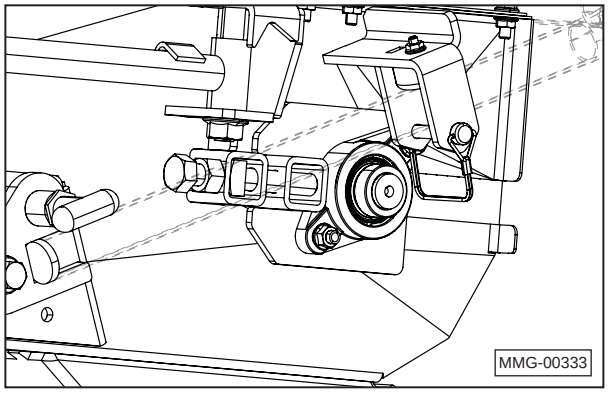




4. Remove obstruction.

5. Close and secure the lower access door and delivery spout cover.

10.5.2 Belt Tension Adjustment



1. Loosen the locknut on each side of the belt tension mechanism.

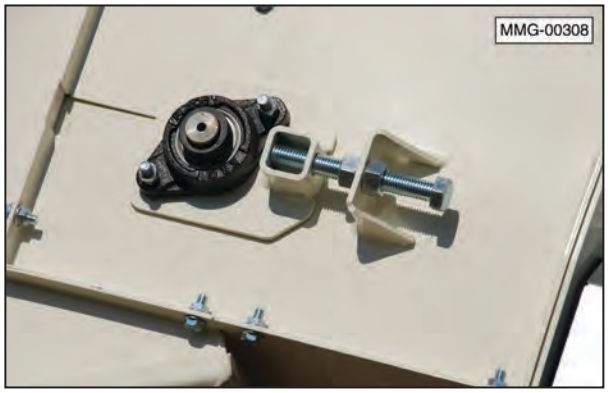
2. Tighten the two adjusting bolts equally to 23 lb-ft. While holding the adjusting bolt in place, retighten both locking nuts.

3. Start the conveyor and make sure the belt is tracking in the center of the drive drum. If the belt is not tracking properly, use the Belt Tracking Adjustment procedure to correct the problem.

IMPORTANT

The drive drum at the bottom of the conveyor must be square (drive shaft must be equal distance from end of unit) for the belt to track properly.

10.5.3 Belt Tracking Adjustment



1. Loosen the locknuts on the adjusting bolt.

2. Tighten or loosen the bolt to correct the tracking problem.

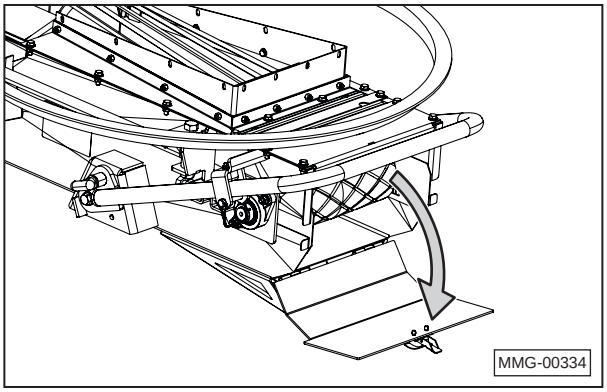
3. Place both locking nuts on either side of the lock plate and tighten the locking nuts together.

4. Start the conveyor and make sure the belt is tracking in the center of the drive drum. Readjust if needed.

10.5.4 Belt Replacement

Use the old belt to thread the new belt into the delivery tube.

1. Unlatch and open the access door.





2. Loosen the lower drive drum adjusting bolts to their loosest position.

3. Disconnect the two ends of the conveyor belt.

4. Attach the replacement belt to the end of the old conveyor belt.

5. Slowly pull the old belt out of the delivery tube and thread the new one into position.

6. Disconnect the old belt and connect the ends of the new belt together.

7. Readjust the belt tension.

8. Close and latch the access door.

9. Start the conveyor to make sure the belt is tracking properly.

10. Recheck the tension and alignment of the belt frequently during the first ten hours of operation and adjust as needed.

NOTE: Typically a belt will seat itself during the first ten hours of operation and then require less or no adjustment.

10.6 TRAILER BREAKAWAY SYSTEM



10.6.1 Testing the Battery

1. Disconnect the trailer plug from the tow vehicle; otherwise, you are testing the tow vehicle's battery.

2. Press the green TEST button on the control box located inside the frame of the trailer. The green indicator light should illuminate if the battery is fully charged. If the yellow or red indicator lights illuminate, the unit's battery should be charged before towing the trailer.

IMPORTANT

If the battery is weak or dead (red indicator, even after charging), as indicated by the indicator light, the battery must be replaced.

3. Plug the trailer into the tow vehicle. The yellow "Charging" light should be ON.

4. Test the system by pulling the pin out of the breakaway switch. The battery will activate the brakes. (**Note**: Do not use this kit as a parking brake). The battery should be charged and tested prior to each trailer outing.



10.6.2 Changing Battery

The battery in the breakaway system is rechargeable, but not replaceable. If the battery will not hold a charge, replace the unit.

10.7 WHEEL BOLT TORQUE REQUIREMENTS



1. Initially check the wheel bolt torque at 5, 10, 25, and 50 miles and after each wheel removal.

NOTE: Torque wrenches are the best method to ensure the proper amount of torque is being applied to a wheel nut.

⚠CAUTION

To prevent injury due to possible dangerous separation of wheels from the axle, the wheel nuts must be maintained at the proper torque levels. Properly maintained wheel nuts prevent loose wheels and broken studs.

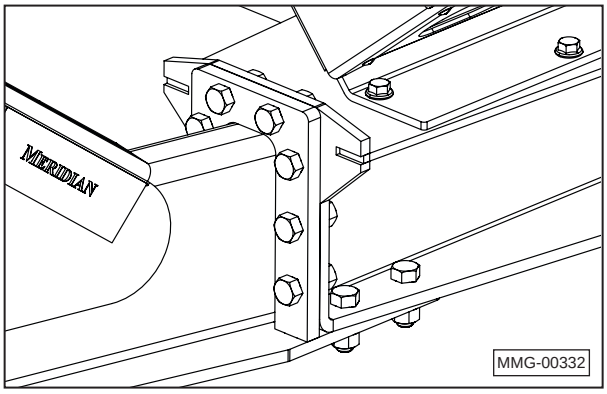
2. Tighten the wheel nuts in three stages.
   — First stage: 20 to 25 foot pounds.
   — Second stage: 50 to 60 foot pounds.
   — Third stage: 90 to 120 foot pounds.

3. Tighten the wheel nuts in a clockwise, cross-axle alternating pattern.

10.8 TRAILER HITCH BOLTS

The front hitch section of the seed tender is bolted to the trailer frame. This design allows the same trailer to use either a standard hitch assembly or a gooseneck trailer hitch. These hitch assemblies are interchangeable, if needed.

Check the torque on the trailer hitch bolts at least once per year. Tighten the bolts to 115 lb-ft.



10.9 SERVICE RECORD CHART

The chart on the following page should be copied and filled out as maintenance is performed on the machine. Refer to the Lubrication, Maintenance, and Service sections for additional instructions.

10.9 SERVICE RECORD CHART (CONTINUED)

Date														
Serviced by														
8 hours or daily														
Check Engine Fluid Levels														
Check Hydraulic Tank Oil Level														
Test Breakaway Brake System														
Inspect Tires														
Check Remote Control Battery Life														
Check Conveyor Belt Tension and Alignment														
50 Hours or Weekly														
Clean Engine Air Intake Filter														
Check Tire Pressure														
Check Conveyor Belt Tension and Alignment														
Clean remote transmitter with a damp cloth and mild detergent.														
200 Hours or SEMI/ANNUAL														
Adjust Brakes														
Inspect Brake Magnets														
400 hours or annually														
Change Engine Oil														
Check Wheel Bolt Torque														
Check Frame and Trailer Hold-Downs														
Check Hydraulic Motor Coupling														
Check Conveyor Tube Slide Plates														
Check Load Cells														
Inspect Brake Lining Wear, Brake Cylinder, and Brake Wiring														
Grease Wheel Bearings and Check Hub for Wear														
Inspect Axle Grease Seal														
Inspect all electrical wiring connections for looseness or corrosion.														
Thoroughly Clean Machine														

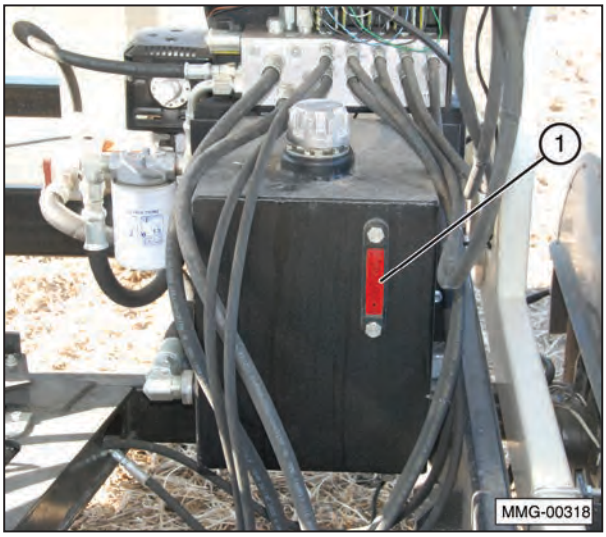
10.10 SERVICE CHECKS

10.10.1 Daily (8 Hours)

⚠ WARNING

Gasoline is a highly combustible fuel. Improper use, handling, or storage of gasoline can be dangerous. Never touch or fill a hot engine. DO NOT fill the engine's fuel tank near an open flame while smoking or while engine is running. DO NOT fill tank in an enclosed area with poor ventilation. Wipe up spills immediately.

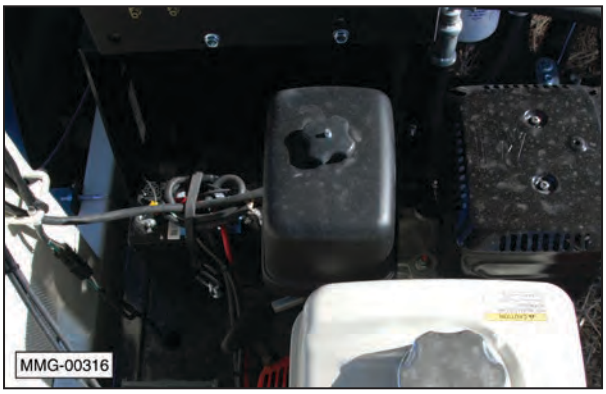
1. Check engine oil level and fill as needed.
2. Check engine fuel level and fill as needed.
3. Check hydraulic fluid level (1) and fill as needed.



4. Test trailer breakaway system. Refer to "10.6 Trailer Breakaway System" on page 53of this manual.
5. Initially check wheel bolt torque at 5,10, 25, and 50 miles. Refer to "10.7 Wheel Bolt Torque Requirements" on page 54 of this manual for tightening instructions.
6. Check remote transmitter battery life and change them, if needed. Refer to "10.1 Remote Control Unit" on page 48 of this manual for additional information.
7. Check delivery belt for proper tracking. Refer to "10.5.3 Belt Tracking Adjustment" on page 52 of this manual.

10.10.2 Weekly (50 Hours)

1. Change engine oil.
2. Clean or change engine air filter.



3. Check the tension on the delivery belt. Adjust tension if needed. Refer to "10.5.2 Belt Tension Adjustment" on page 52 of this manual for instructions.
4. Check tire pressure. Inflate the tires to the recommended pressure stated on the tire.

10.10.3 Annually (400 Hours)

1. Check wheel bolt torque. Refer to 10.7 Wheel Bolt Torque Requirements section in this manual for tightening instructions.
2. Check frame and trailer hold-down bolts.
3. Check hydraulic motor to engine shaft coupling and spider. Refer to the Changing Hydraulic Motor Coupling section for instructions.
4. Thoroughly clean the seed tender.
5. Check the tires for wear, and replace if needed.

10.11 AXLE MAINTENANCE

10.11.1 First 200 Miles

1. Adjust brakes. Refer to OEM manual for procedure.

10.11.2 3,000 Miles or 3 Months

1. Adjust brakes. Refer to OEM manual for procedure.
2. Check torque on wheel nuts. Refer to the section in this manual.
3. Inspection tires for wear. Refer to OEM manual for procedure.

10.11.3 6,000 Miles or 6 Months

1. Inspect brake magnets for wear. Refer to OEM manual for procedure.
2. Inspect suspension parts for wear. Refer to OEM manual for procedure.

10.11.4 12,000 Miles or 12 Months

1. Inspect brake lining wear, check brake cylinder for leaks, and inspect brake wiring for damage. Refer to OEM manual for procedure.
2. Grease the wheel bearings and check the hub for wear. Refer to OEM manual for procedure.
3. Inspect grease seal for leakage. Refer to OEM manual for procedure.
4. Inspect springs for any wear or loss of arch. Refer to OEM manual for procedure.

10.12 TIRES

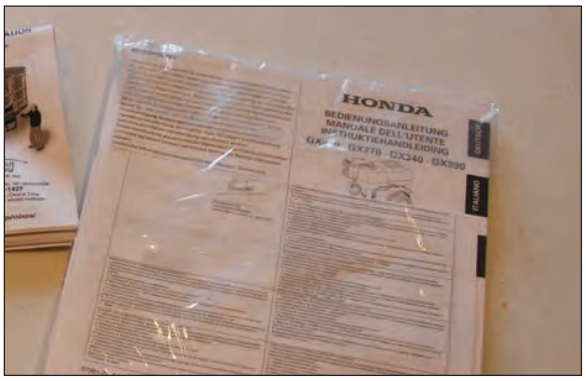
Check the tires for normal and/or abnormal tire wear. Replace tires that are damaged or worn beyond normal tread life. Refer to the axle OEM manual for a Tire Wear Diagnostic Chart.

Replace the tires with Meridian part number 18131
or an equivalent tire:
3T235/80R16
TR643
Load Range E
For Trailer Service Only

11. OEM LITERATURE

11.1 HONDA® ENGINE

For any questions concerning the Honda® G340X Engine, refer to the OEM manual that was provided with the seed tender.



Additional information can be obtained from:

United States Power Equipment Division
Customer Relations Office
4900 Marconi Drive
Alpharetta, GA 30005-8847
(770) 497-6400

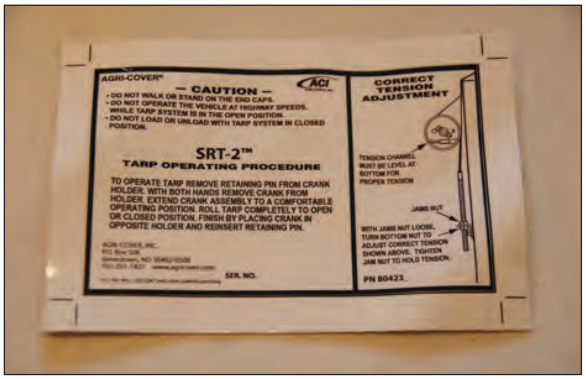
Honda® Canada, Inc.
715 Milner Avenue
Toronto, ON M1B 2K8
(888) 946-6329

11.2 RETRACTABLE COMPARTMENT TARP

For any questions concerning the Agri-Cover, refer to the OEM manual that was provided with the seed tender.



Three decals are also provided showing the correct operation and maintenance for the tarp. Attaching these decals is the responsibility of the purchaser.





Additional information can be obtained from:
ACI Agri-Cover
PO Box 508
Jamestown, ND 58402

Phone: (866) 414-5422
Fax: (701) 251-1512
customerrelations@agricover.com

11.3 AXLE

For any questions concerning the Axis Products axle, refer to the OEM manual that was provided with the seed tender. An Owner's Manual and parts listing is provided with the seed tender.

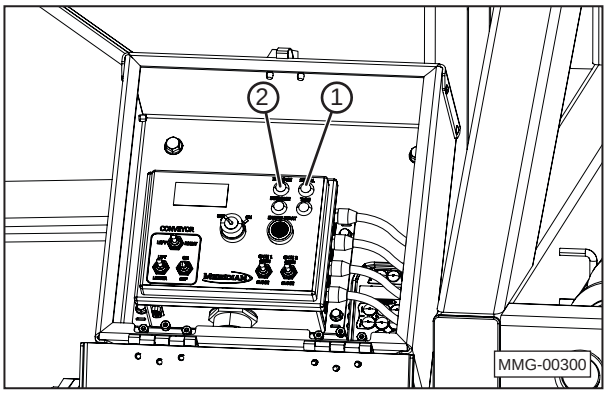
Additional information can be obtained from:
Axis Products, Inc.
3403 Reedy Drive
Elkhart, IN 46514
Phone: (574) 266-8282

12. TROUBLESHOOTING

12.1 TROUBLESHOOTING CHART

PROBLEM	CAUSE	SOLUTION
Engine will not start.	No fuel.	Fill the fuel tank.
	Low engine oil.	Fill the crankcase with oil.
	Cold engine.	Open choke.
	Ignition key switch off.	Turn ignition key switch on.
	Battery dead.	Recharge or replace battery.
	Engine problem.	Refer to engine manual.
Conveyor belt will not start.	No power.	Start engine and increase speed above 1400 RPM.
	Drive motor coupling.	Repair or replace coupling.
	Belt tension.	Increase belt tension.
	No hydraulic oil.	Check oil level.
Electrical or hydraulic functions are not working properly.	Transmitter power is OFF.	Turn Power ON.
	Receiver power is OFF.	Turn Power ON.
	Battery cable or battery.	Check battery cable and make sure battery is fully charged.
	Error in the control system.	Check LED Error Code light.
	Improper ground.	Check for proper grounding electrical circuit.
	Hydraulic valve or motor.	Ensure hydraulic pump is working properly and hydraulic tank is filled with oil.
	Intermittent function.	Check receiver antenna for damage and proper connection. Loose connector at the valve coil.

12.2 CONTROL PANEL INDICATOR LEDS



12.2.1 Error Code Outputs

The receiver module can identify problems with the system in the form of an error code. Check red indicator light (1) on the receiver to diagnose system problems.

Each of the outputs from the receiver module is designed with built-in short circuit and overload protection. The outputs can also detect a no-load or broken wire condition.

These error conditions are indicated by the red LED indicator on the receiver module or the HISTOGRAM page on the optional Palm Pilot™. Refer to the Error Code Chart for explanation of the error codes. Green LED indicator light (2) will blink on the receiver during normal communication.

The ON/OFF outputs will indicate an error under no load or broken wire status if NOT activated, and will detect a short if activated.

12.2.2 Error Codes

Error Code	Cause	Solution
1	RF Communication	Transmitter is OFF. Transmitter went into sleep mode. Interference in RF communication link.
2	Wrong ID	Transmitter and receiver are not synchronized.
3	Scale Bar Fault	RS-232 communication cable between scale unit and receiver is damaged, disconnected, or the scale unit is OFF.
4	Low Battery	System voltage is below 10.5 Volts.
5	Conveyor Speed Fault	Check for short or open circuit.
6	Engine Start Fault	Check for short or open circuit.
7	Engine Stop Fault	Check for short or open circuit.
8	Conveyor Lift Fault	Check for short or open circuit.
9	Conveyor Lower Fault	Check for short or open circuit.
10	Conveyor Left Fault	Check for short or open circuit.
11	Conveyor Right Fault	Check for short or open circuit.
12	Slide Gate 1 Open Fault	Check for short or open circuit.
13	Slide Gate 1 Close Fault	Check for short or open circuit.
14	Slide Gate 2 Open Fault	Check for short or open circuit.
15	Slide Gate 2 Close Fault	Check for short or open circuit.

NOTE: Error codes are invalid during manual operation.

12.2.3 Control System Wiring Locations

Pin	Description
A	Conveyor Speed CR Proportional Output - Orange/Black
B	Engine Start Output
C	Engine Stop Output
D	Conveyor Lift Output - Red
E	Conveyor Lower Output - Blue
F	NC
G	NC
H	Power
J	NC
K	NC
L	Conveyor Left Output - White
M	Conveyor Right Output - Green
N	Ground
O	Slide Gate One Open Output – Red/Black
P	Slide Gate One Close Output – Blue/Black
Q	Slide Gate Two Open Output – Green/Black
R	Slide Gate Two Close Output- Black/White
S	NC
T	NC
U	NC
V	NC
W	NC
X	NC

13. WARRANTY

13.1 WARRANTY STATEMENT

Limited Materials and Workmanship Warranty
For Bulk Seed Tenders

Meridian Manufacturing Group (hereinafter referred to as the Manufacturer) hereby warrants the Bulk Seed Tender(s) sold by it to be free from any defect in material or workmanship under normal use and service for a period of one (1) year from the date of shipment. The Manufacturer's obligation under this warranty shall be limited to the repair or replacement only, FOB the original point of shipment, of any defective parts or portions of the seed tender or accessories manufactured by Meridian. Any warranty claim must be reported to the Manufacturer within one (1) year from the date of shipment.

THIS WARRANTY IS SUBJECT TO THE FOLLOWING LIMITATIONS, PROVISIONS AND CONDITIONS:

1. This warranty does not apply:
   a) To any product sold by the Manufacturer where it is used in areas exposed to corrosive or aggressive conditions including salt water, acids, alkaloid, ash, cement dust, animal waste or other corrosive chemicals from either inside or outside the bin.
   b) For failures or defects arising out of damage during shipment or during storage on site.
   c) To materials replaced or repaired under this warranty except to the extent of the remainder of the applicable warranty.
   d) To damage resulting from misuse, negligence, accident or improper site preparation by others.
   e) If the product has been altered or modified by others.
   f) If in the case of coating failures the failure is the result of damage, lack of proper maintenance or failure to remove road salt or other contaminants that may have come in contact with the bin surface.
   g) To loss of time, inconvenience, loss of material, down time or any other consequential damage.
   h) For a function that is different than original designed intent.

2. The obligation of the Manufacturer under this warranty shall not arise unless the Manufacturer is notified and this warranty is presented together with a written statement specifying the claim or defect within thirty (30) days after the failure is first detected or made known to the owner and within one (1) year from the shipment date. The Manufacturer in its sole discretion shall determine if the claim is valid and whether correction of the defect or failure shall be made by repair or replacement of the materials.

3. The coating warranty is based on the manufacturer's performance specification for Polyester Powder finishes and does not include repair of minor blemishes or rusting that is normally part of the general maintenance of the seed tender. This warranty does not cover excessive wear on interior coatings. See attachment for full Performance Specification details on Polyester Powder Finishes.

4. The obligation of the Manufacturer hereunder extends only to the original owner and to the Meridian dealer to whom the materials may have been initially sold. This warranty shall not be subject to any assignment or transfer without the written consent of the Manufacturer.

5. The customer shall acknowledge that it has made its own independent decision to approve the use of the supplied materials and also the specific fabrication and construction procedures utilized to complete the seed tender, and has satisfied itself as to the suitability of these products for this particular application.

6. The foregoing sets forth the only warranties applicable to said materials and said warranties are given expressly and in lieu of all other warranties, expressed or implied, statutory or otherwise, of merchantability or fitness for a particular purpose and all warranties which exceed or differ from said warranties herein are disclaimed by the Manufacturer.

7. The owners sole and exclusive remedy against the Manufacturer shall be limited to the applicable warranty set forth herein and the endorsements, if any, issued together with this document and no other remedy (including but not limited to the recovery of assembly or disassembly costs, shipping costs, direct, incidental, special, indirect or consequential damages for lost profits, lost sales, injury to person or property or any other loss, whether arising from breach of contract, breach of warranty, tort, including negligence, strict liability or otherwise) shall be available to the owner or Meridian Dealer or any other person or entitles whether by direct action or for contribution or indemnity or otherwise.

8. The financial obligation of the Manufacturer under this warranty shall be limited to the repair or replacement of the product as originally supplied and in no event shall exceed the original cost of the product supplied.

9. The Manufacturer shall not have any obligation under any warranty herein until all accounts for materials, installation and erection of the said product thereof and for labor and other work performed by the Manufacturer or its dealers have been paid in full by the owner.

Warranty Claim Procedure

1. Registering product with Meridian Manufacturing.
2. Contact the dealer unit was purchased from upon discovery of any defects.
3. A completed warranty claim form submitted by dealer to Meridian warranty representative for review and course of action.
4. Warranty repair work will only be performed by Meridian, the dealer or an approved representative. No warranty work completed prior to approval. Failure to follow procedure may affect any or all reimbursement.
5. Claims will be adjudicated at the sole discretion of the manufacturer and in accordance with the terms and conditions of the applicable limited warranty.
6. A complete list of warranty procedures can be procured from the Warranty Department or found in your owner's manual.

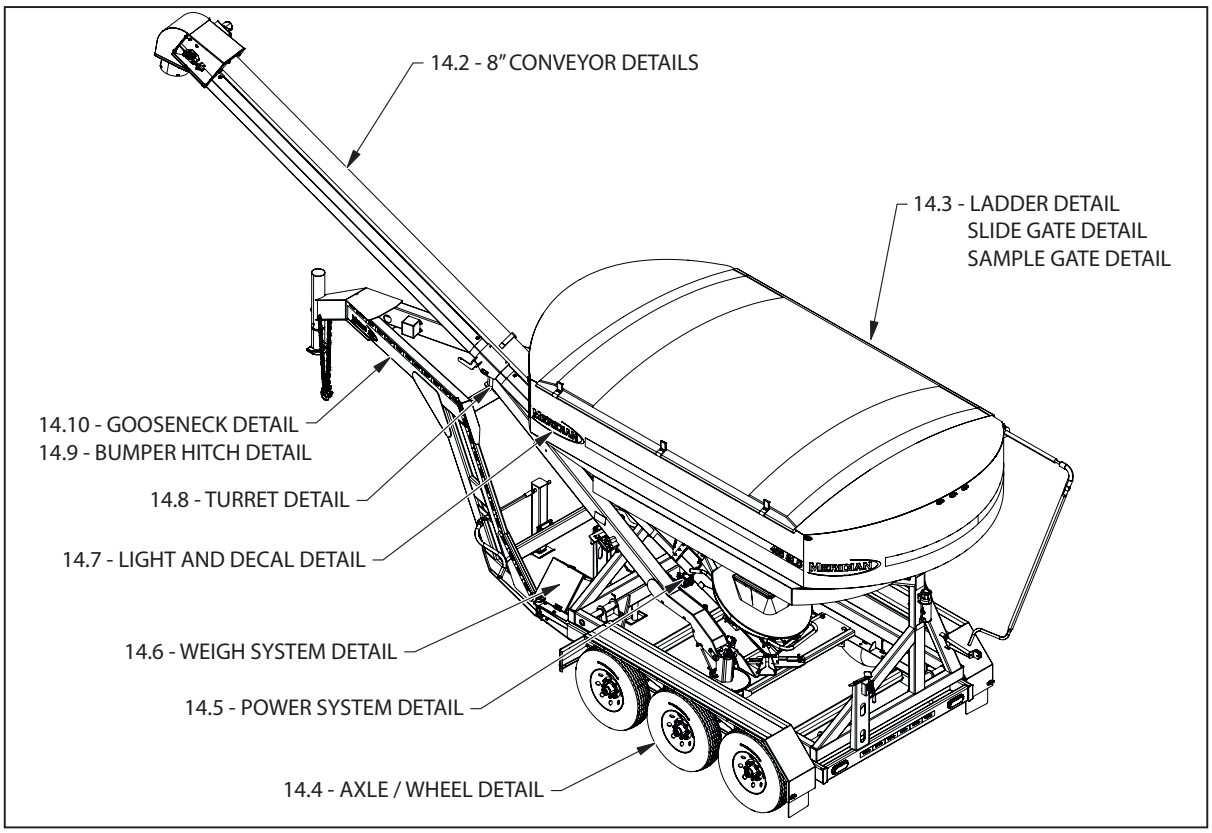
Effective July 1, 2009

14. PARTS

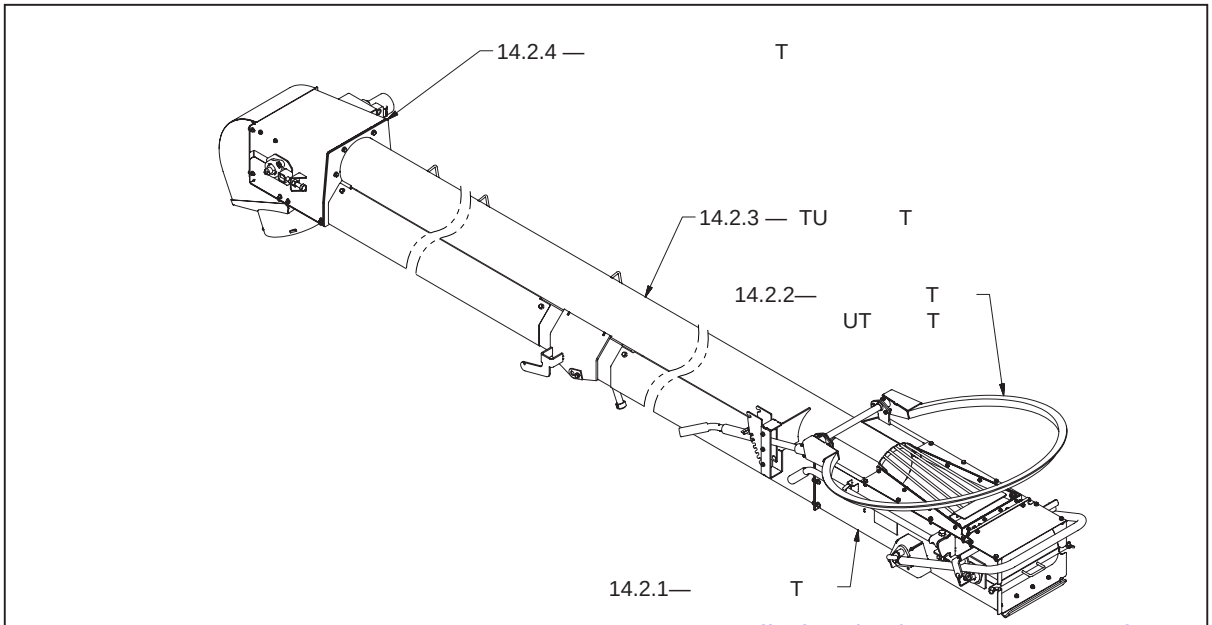
The following pages contain a list of serviceable parts for the 400 SLD Seed Tender unit.

Parts are available from your authorized Dealer Parts Department.

14.1 400 SLD SEED TENDER 80137

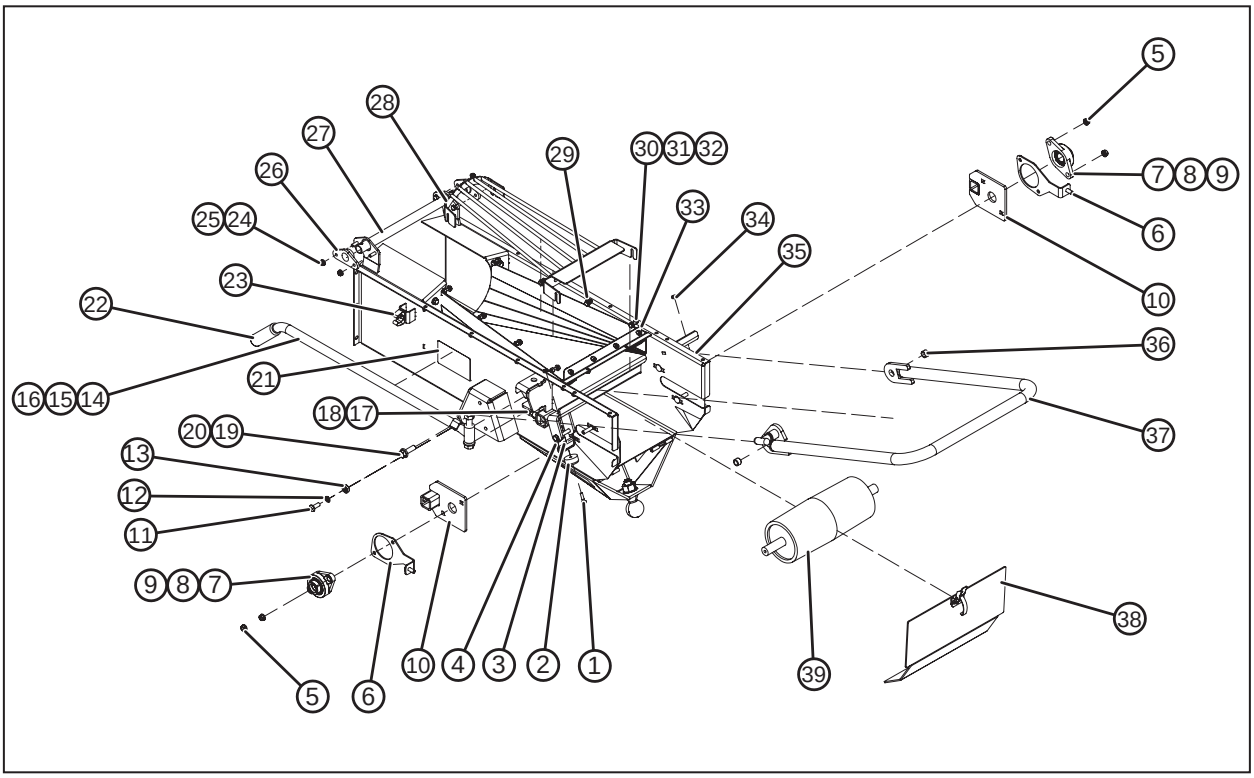


14.2 CONVEYOR (8") 80634



Case 5:19-cv-04005-LTS-KEM Document 2-6 Filed 01/23/19 Page 19 of 40

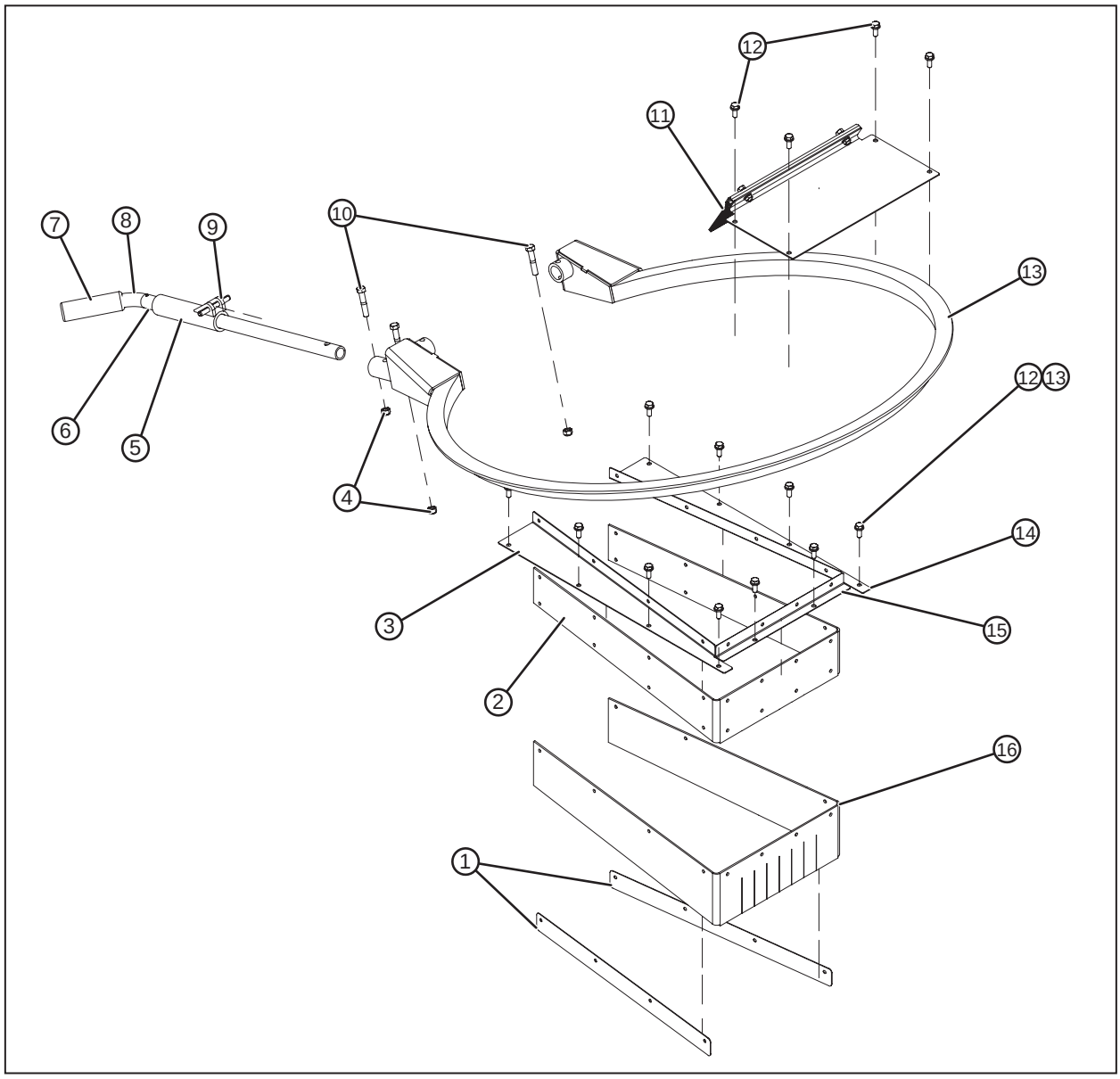
14.2.1 Pan Detail



Item	Qty.	Part No.	Description
1	6	19301	Bolt, Hex, 1/4-20 x 1”
2	2	19133	Bumper, Rubber
3	4	19335	Bolt, Carriage, 3/8-16 x 1-1/2”
4	1	19118	Ring, Snap, Square, Zinc, 3/8 x 2-1/4”
5	18	19564	Nut, Hex, Flanged, 3/8-16
6	2	25248	Weldment, Scoop Bracket
7	4	27040	Housing, Roller Bearing
8	4	21258	Bearing
9	4	21258	Bearing, Collar
10	2	25842	Weldment, Roller Side Plate
11	2	19069	Screw, Rnd Head Phillips, 3/8-16 x 1”
12	2	19349	Washer, Lock, 3/8”
13	2	19093	Bearing, Roller, 7/8” OD
14	1	19566MS	Nut, Hex, Flanged, 5/8-11
15	1	19376	Bolt, Hex, 5/8-11 x 4”
16	1	25273	Weldment, Swing Handle
17	3	19380	Bolt, Hex, 5/8-11 x 4-1/2”
18	2	19663	Nut, Square, 5/8-11
19	2	19575	Bolt, Hex, Flanged, 1/2-13 x 1-1/2”
20	4	19595	Nut, Hex, Flanged, 1/2-13

Item	Qty.	Part No.	Description
21	2	20087	Decal, Pinch Point, Hand
22	2	19447	Grip, Handle
23	1	19095	Holder, Tool
24	8	19310	Bolt, Hex, 5/16-18 x 1”
25	42	19318	Nut, Hex, Flanged, 5/16-18
26	2	19404	Bushing, Nylon 1”
27	1	26029	Pin, Hopper Loop Pivot
28	1	25429	Guard, Hopper Weldment
29	11	19560	Bolt, Hex, 1/4-20 x 3/4”
30	12	19128	Nut, Hex, Nylon, 1/4-20
31	12	19307	Washer, Flat, 1/4
32	1	25241	Seal, Hopper Retainer (Rear)
33	5	19126	Nut, Hex, Flanged, 3/8-16
34	1	19126	Nut, 1/4-20
35	1	25781	Weldment, Pan
36	2	25664	Bushing, 0.75 OD x 0.507 ID x 0.5
37	1	25251	Weldment, Stand
38	1	23684	Cover
39	1	19554	Roller, Idler Assembly

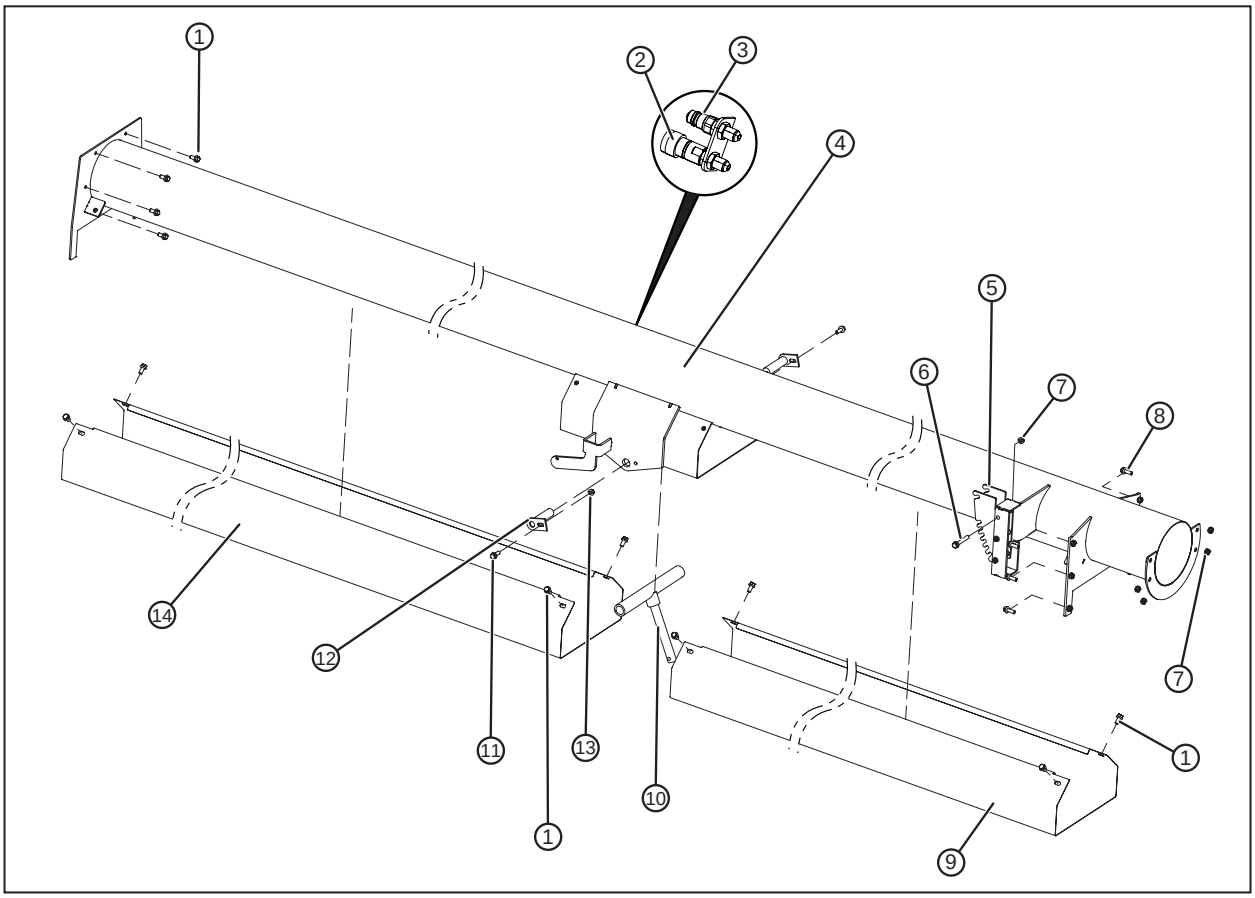
14.2.2 Collection Chute Detail



Item	Qty.	Part No.	Description
1	2	25242	Seal, Hopper Retainer, Side
2	1	25240	Retainer, Hopper, Rubber
3	1	25787	Plate, Left Cap
4	3	19347	Locknut, Nylon, 3/8-16
5	1	25277	Weldment, Hopper Lever Lock Collar
6	1	19284	Pin, Spring, 3/16 x 1-1/8”
7	2	19447	Grip, Handle
8	1	25290	Lever, Hopper
9	1	19177	Pin, Slotted Spring

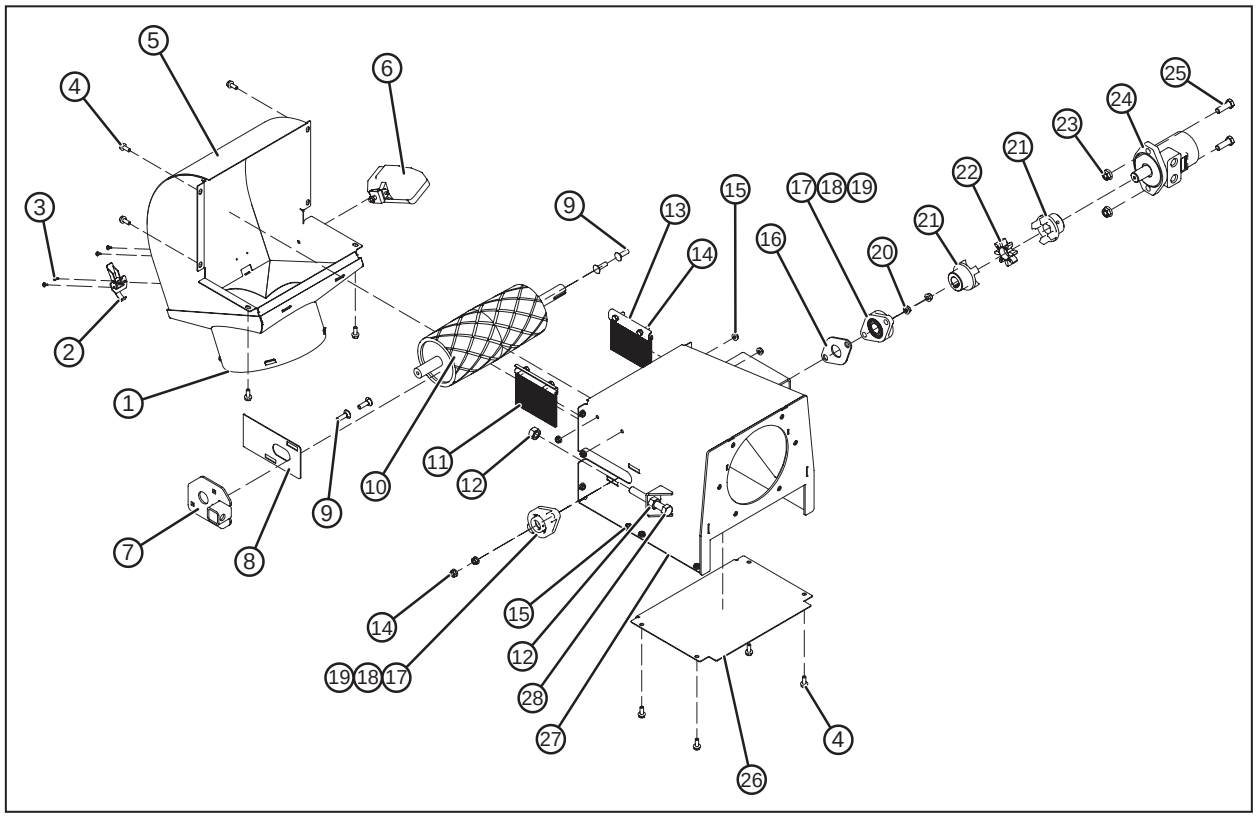
Item	Qty.	Part No.	Description
10	3	19328	Bolt, Hex, 3/8-16 x 2
11	1	25844	Holder, Brush Assembly
12	24	19568	Bolt, Hex, Flanged, 5/16-18 x 3/4”
13	1	26032	Weldment, Hopper Loop
14	1	25786	Plate, Right Cap
15	1	25672	Plate, Hopper Cap (Rear)
16	1	25240	Seal, Rubber, Hopper
17	1	25660	Cover (Ns)

14.2.3 Tube Detail



Item	Qty.	Part No.	Description
1	18	19577	Bolt, Hex, Flanged, 3/8-16 x 3/4
2	1	17707	Coupler, Quick (Female) 4050-15P
3	1	17708	Coupler, Quick (Male) 8010-15P
4	1	36209	Weldment, Conveyor Tube
5	2	25666	Plate, Lock, Stainless
6	10	19315	Bolt, Carriage, 5/16-18 x 3/4
7	12	19318	Nut, Hex, Flanged, 5/16-18
8	8	19569	Bolt, Hex, Flanged, 3/8-16 x 1”
9	1	23815	Guard, Belt
10	1	30469	Weldment, Rocker Pin
11	4	19325	Bolt, Hex, 3/8-16 x 1”
12	2	25696	Pin, Hammerstrap, 1 x 3-3/4”
13	4	19564	Nut, Hex, Flanged, 3/8-16
14	1	23618	Guard, Belt

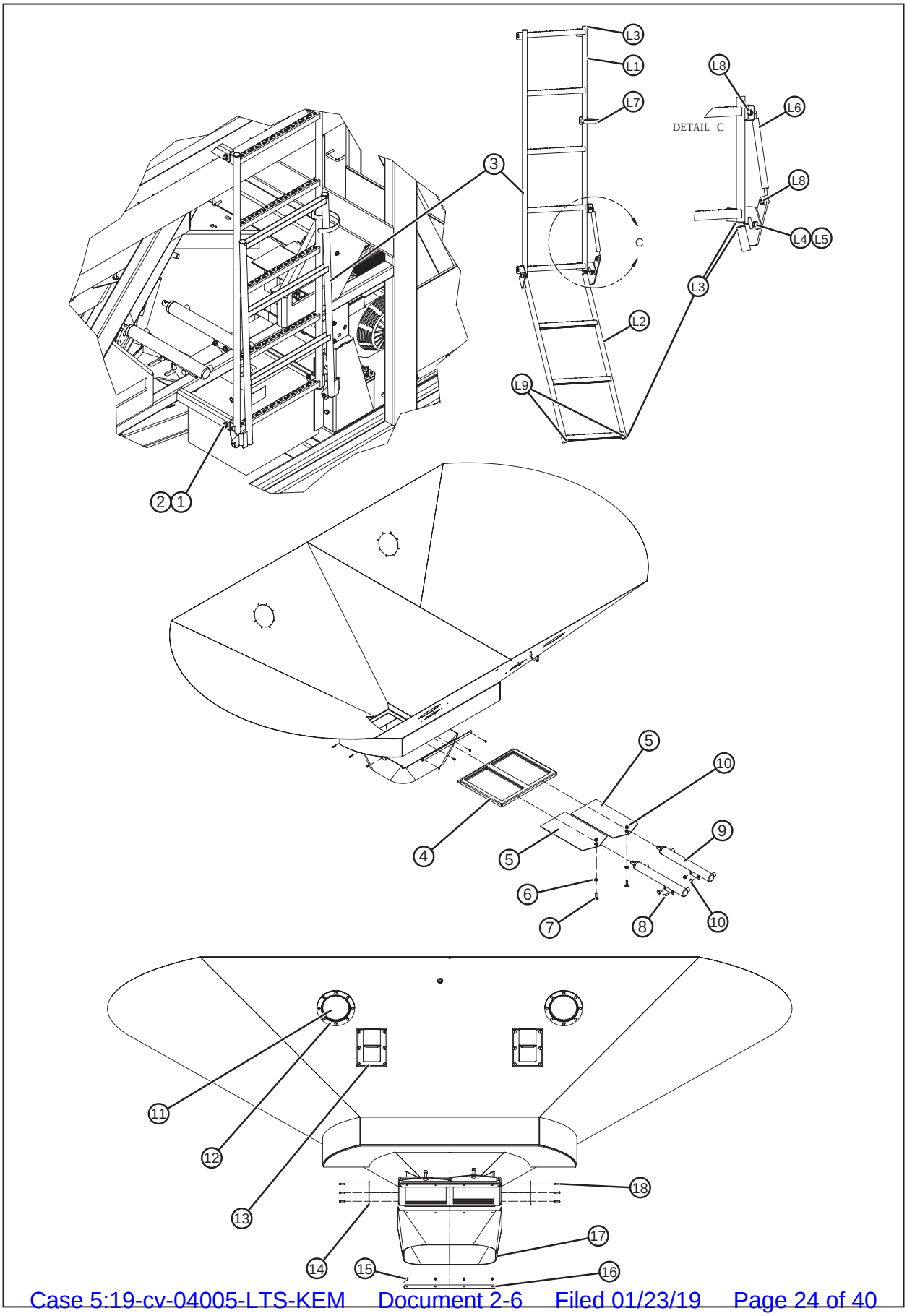
14.2.4 Discharge Detail



Item	Qty.	Part No.	Description
1	1	25827	Weldment, Discharge Hood Transition
2	2	21257	Latch, Over-Center
3	4	19548	Rivet, 1/8”
4	24	19568	Bolt, Hex, Flanged, 5/16-18 x 3/4”
5	1	25829	Weldment, Discharge Hood
6	1	18188	Light, Work (Optional)
7	1	25278	Plate, Discharge Roller Slide
8	1	25838	Plate, Transition Seal
9	4	19695	Bolt, Carriage, 3/8-16 x 1-1/4”
10	1	19533	Roller, Drive Assembly
11	2	25810	Brush, 5-1/4”
12	4	19382	Nut, Hex, 5/8-11
13	2	25809	Retainer, Brush
14	8	19310	Bolt, Hex, 5/16-18 x 1”

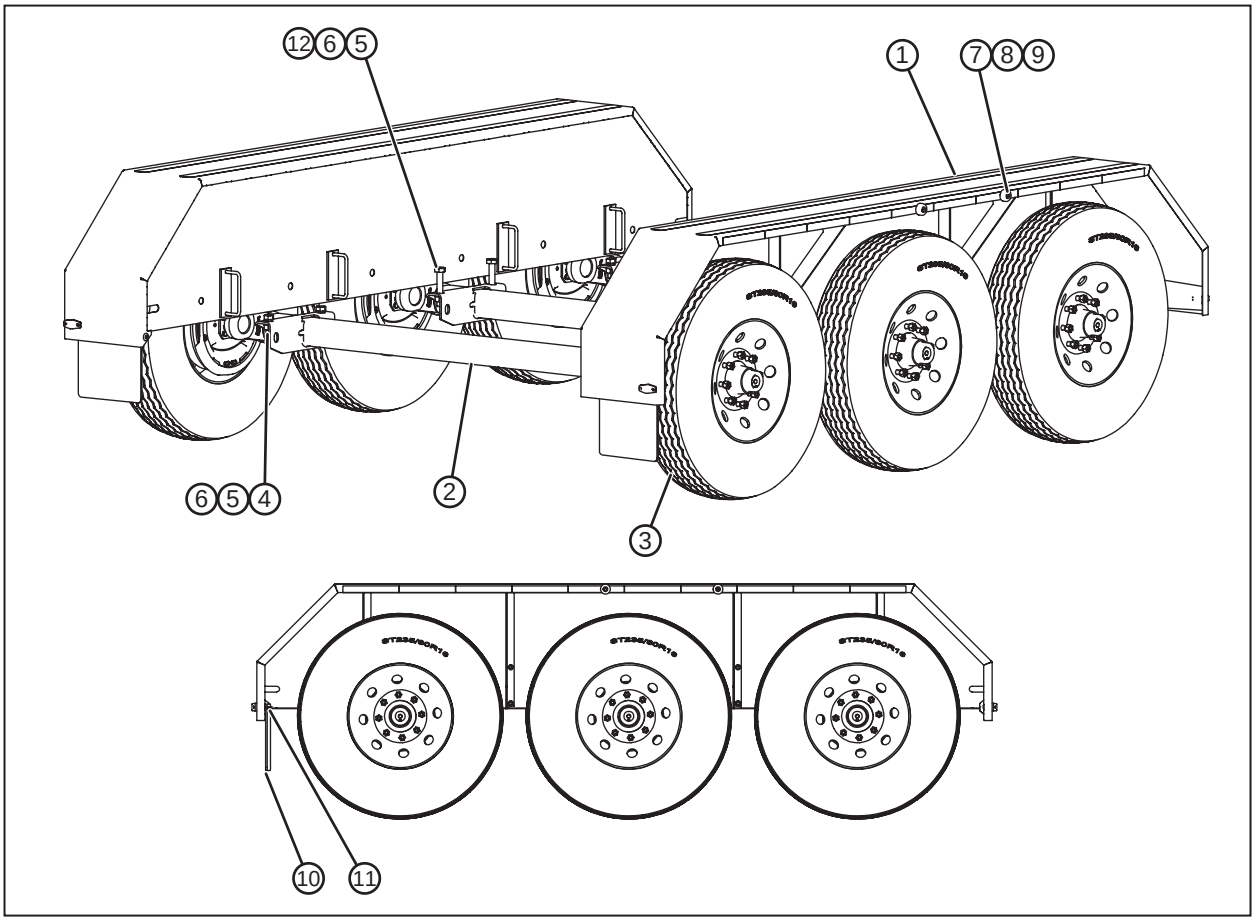
Item	Qty.	Part No.	Description
15	42	19318	Nut, Hex, Flanged, 5/16-18
16	1	25839	Plate, Bearing Spacer
17	4	27040	Housing, Roller Bearing
18	4	21258	Bearing
19	4	21258-00c	Bearing, Collar
20	18	19564	Nut, Hex, Flanged, 3/8-16
21	2	19249	Coupler, Lovejoy
22	1	19291	Coupling, Red Spider
23	4	19595	Nut, Hex, Flanged, 1/2-13
24	1	19768	Motor, Hydraulic 4.5 cubic inch
25	2	19355	Cap Screw, 1/2-13 x 1-1/2”
26	1	25799	Plate, Discharge Bottom
27	1	25805	Weldment, Discharge Transition
28	3	19380	Bolt, Hex, 5/8-11 x 4-1/2”

14.3 LADDER, SLIDE GATE, VIEW PORT, AND SAMPLE GATE



Item	Qty.	Part No.	Description
1	24	19564	Nut, Hex, Flanged, 3/8-16
2	9	19577	Bolt, Hex, Flanged, 3/8-16 x 3/4
3	1	25899	Ladder Assembly
L1	1	25673	Ladder, Top Assembly
L2	1	25674	Ladder, Swing Assembly
L3	8	19063	Plug, 1" Tube
L4	2	19325	Bolt, Hex, 3/8-16 x 1
L5	2	19347	Locknut, 3/8-16 Nylon
L6	1	19064	Shock, 120 Lb. Gas Spring Assist
L7	1	19138	Cable, Self Gripping Velcro
L8	2	19318	Nut, Hex, Flanged, 5/16-18
L9	2	19067	Pad, Rubber
4	1	25793	Insert, Slide Gate UHMW
5	2	25794	Slide, Gate
6	6	19348	Washer, Flat, 3/8
7	2	19335	Bolt, Carriage, 3/8-16 x 1-1/2
8	4	19334	Bolt, Carriage, 3/8-16 x 1
9	2	19149	Cylinder, Gate
10	7	19347	Locknut, Nylon, 3/8-16
11	4	47008	View Glass, S.S. Ring Assembly
12	12	19129	Rivet, 3/16 x 1/2
13	2	36150	Gate, Sample
14	2	25279	Retainer, Gate Skirt Side
15	4	19699	Screw, Self Drilling, 8-32 x 1/2
16	1	25276	Retainer, Gate Skirt
17	1	25662	Skirt, Gate
18	10	19779	Screw, Self Drilling, Zinc, 8-18 x 3/4

14.4 AXLE/WHEEL DETAIL

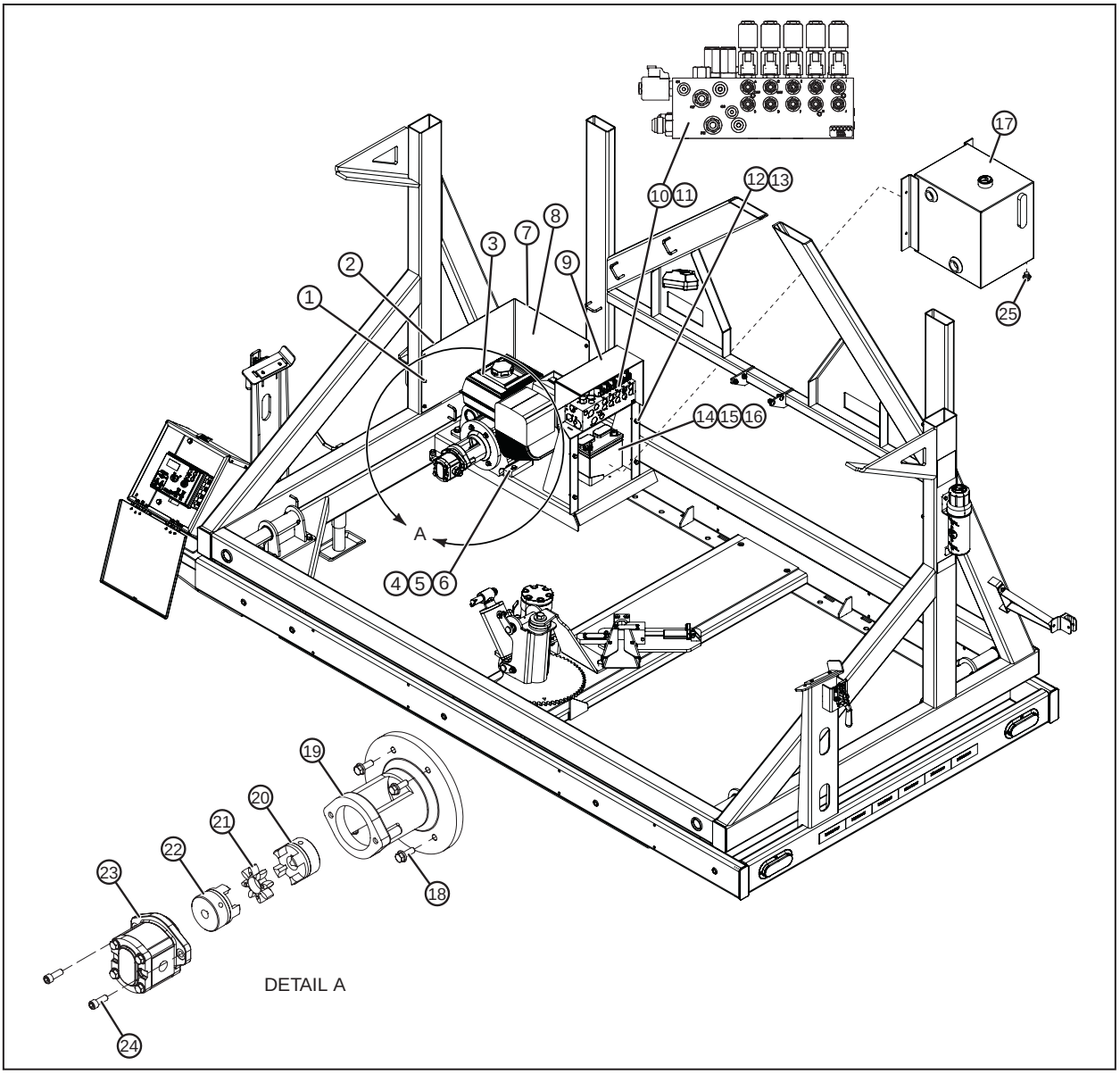


Item	Qty.	Part No.	Description
1	2	40145	Fender Assembly, Triple Axle
2	3	18193	Axle, 7000 lbs.
3	6	18131	ST235/80R16
4	8	19388	Bolt, Hex, 3/4-10 x 2
5	12	19396	Washer, Helical Spring Lock, 3/4
6	12	19394	Nut, Hex, 3/4-10
7	2	19133	Bumper, Rubber
8	2	19560	Bolt, Hex, 1/4-20 X 3/4
9	2	19126	Nut, Hex, Flanged, 1/4-20
10	2	19274	Flap, Mud
11	8	18482	Screw, Hex, Self-Tap 10-24 x 1/2
12	4	19650	BOLT, HEX, 3/4-10 X 4-1/2
13	2	23873	Plate, Hitch (NS)
14	1	14048	Wire Harness Fender 2012 (NS)
*			(NS) Not Shown

Note: Quantities shown are for the triple axle model.

14.5 HYDRAULIC POWER SYSTEM

14.5.1 Engine And Hydraulic Pump

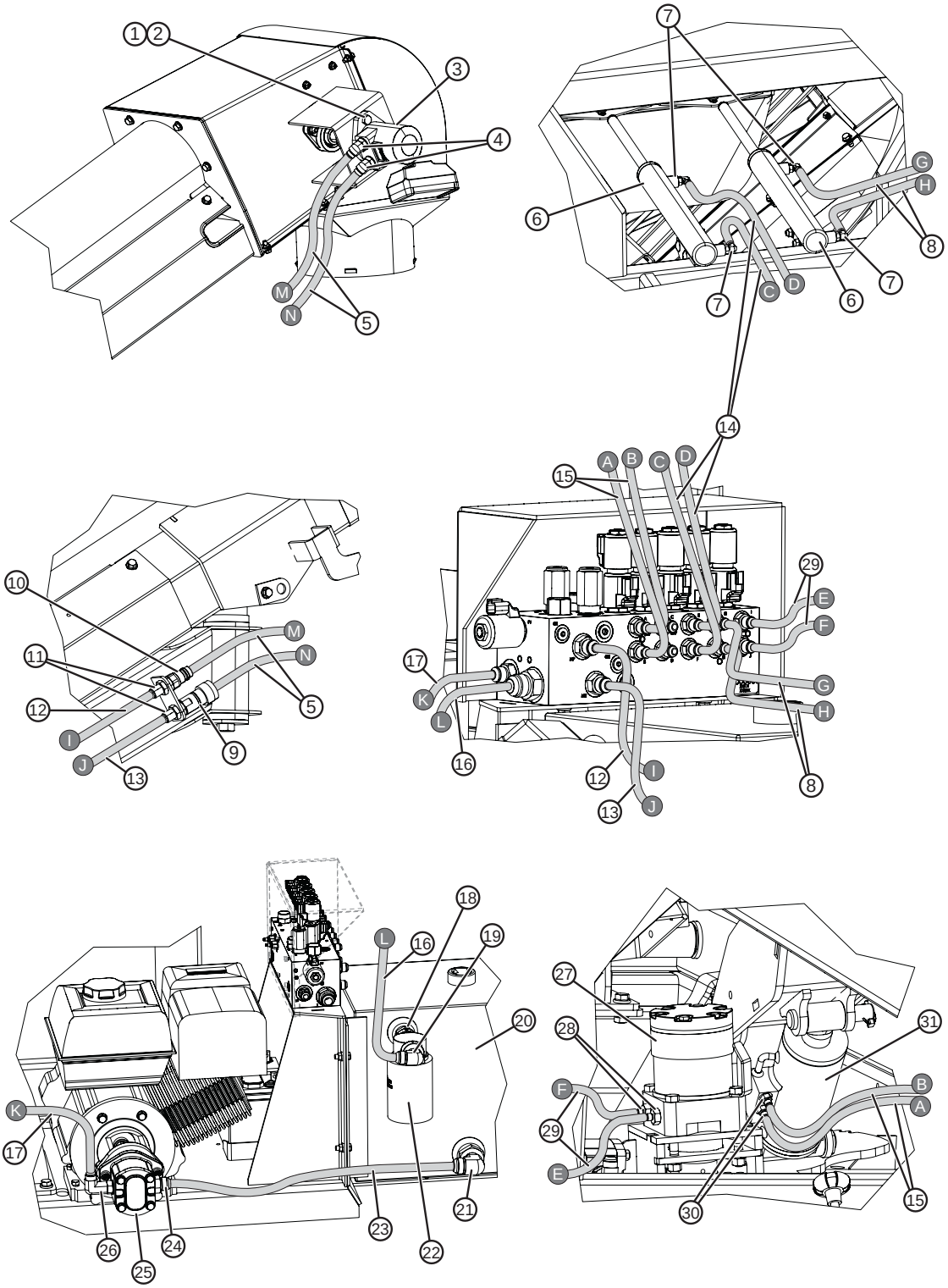


Item	Qty.	Part No.	Description
1	6	19597	Screw, Self Drilling,1/4-14 x 3/4
2	1	26119	Trim, Edge (10-5/8)
3	1	21270	Honda G340 (w/o Ignition Switch)
4	4	19328	Bolt, Hex, 3/8-16 x 2
5	6	19347	Locknut, Nylon, 3/8-16
6	6	19348	Washer, Flat, 3/8
7	1	26120	Trim, Edge (27-5/16)
8	1	23838	Plate, Motor Guard
9	1	26115	Cover, Manifold, Plastic
10	1	19165	Valve, Manifold
11	12	19568	Bolt, Hex, Flanged, 5/16-18 x 3/4
12	4	19325	Bolt, Hex, 3/8-16 x 1-3/4
13	24	19564	Nut, Hex, Flanged, 3/8-16

Item	Qty.	Part No.	Description
14	1	18658	Cable, Battery, Set (33-1/2)
15	1	21286	Battery, SP-30
16	1	21319	Strap, Rubber Bungee (6”)
17	1	19294	Tank Assembly, Hydraulic, 10 Gallon
18	10	19569	Bolt, Hex, Flanged, 3/8-16 x 1
19	1	19289	Housing, Bell
20	1	19247	Coupling w/ Setscrew, Engine Side
21	1	19290	Coupler, Spider, Black
22	1	19248	Coupling w/ Setscrew, Pump Side
23	1	19295	Pump, Hydraulic
24	2	18577	Capscrew, Socket Head
25	1	18006	Plug, Drain

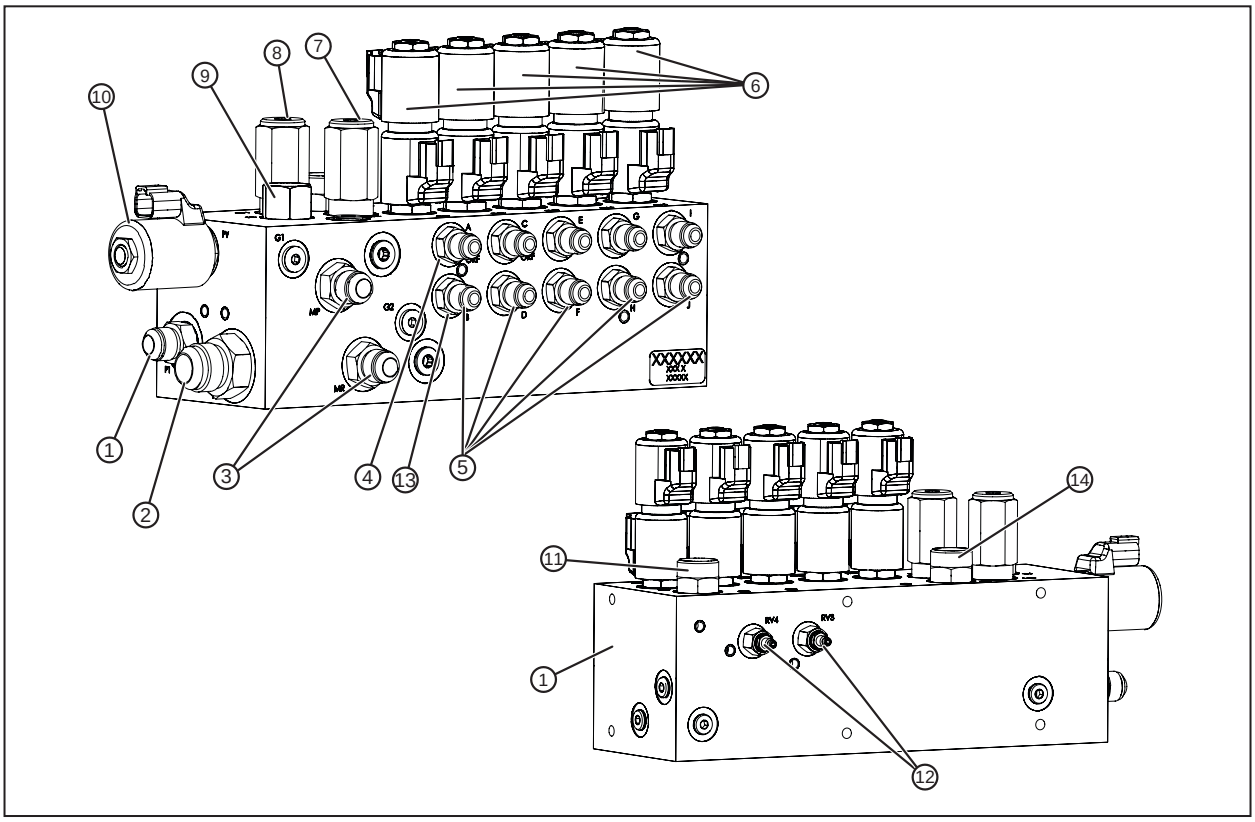
Case 5:19-cv-04005-LTS-KEM Document 2-6 Filed 01/23/19 Page 27 of 40

14.5.2 Hydraulic Hoses And Fittings



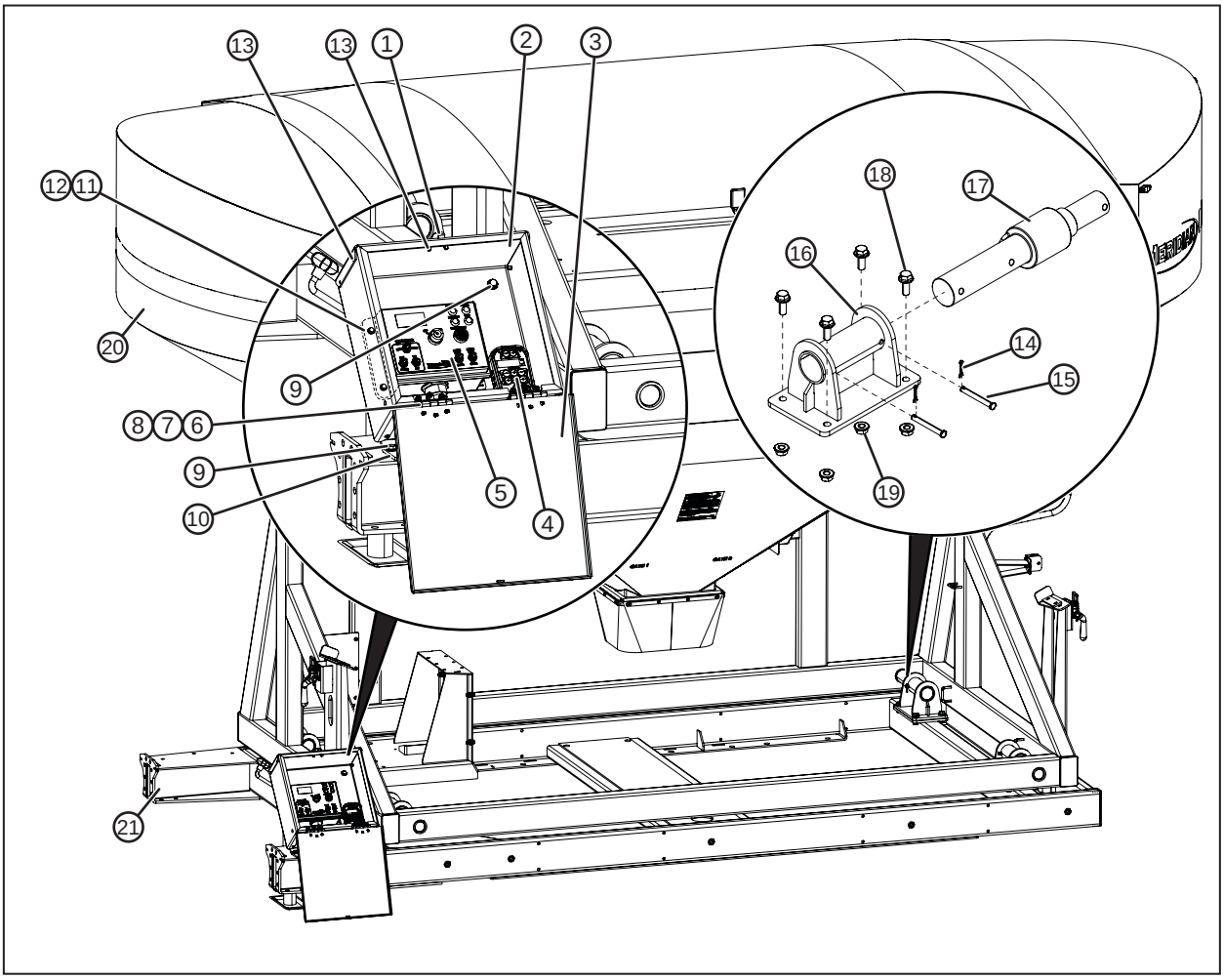
Item	Qty.	Part No.	Description
1	2	19355	Bolt, Hex
2	2	19595	Nut, Hex, Flanged, 1/2-13
3	1	19768	Motor, Hydraulic
4	2	17999	
5	2	32338	Hose, Hydraulic
6	2	19149	Cylinder, Gate
7	4	18284	O-ring, Boss to 7/16-20 SAE 37°
8	2	32331	Hose, Hydraulic Valve to Gate, 1-1/4”
9	1	17707	Coupler, Quick (Female) 4050-15P
10	1	17708	Coupler, Quick (Male) 8010-15P
11	2	17623	O-ring, Boss to 3/4-16 SAE 37°
12	1	32335	Hose, Conveyor Motor Pressure ,1/2” Dia.
13	1	32336	Hose, Conveyor Motor Return, 1/2” Dia.
14	2	32332	Hose, Valve to Gate, 2-1/4” Dia.
15	2	32329	Hose, Raise and Lower, 1/4” Dia.
16	1	32333	Hose, Valve T-port to Return Filter, 3/4” Dia.
17	2	32334	Hose, Pump Pressure, 1/2” Dia.
18	1	5404-16-12	
19	1	17133	Adapter, Elbow, 3/4 NPT to 1-1/16-12 SAE 37°
20	1	19294	Tank, 10 Gallon Hydraulic Assembly
21	1	17754	Elbow, Adapter, 1 NPT to 1-5/16-12 SAE 37°
22	1	CP-752-10	Filter, 10 Micron Oil
23	1	32330	Hose, Tank to Pump, 1” Dia.
24	1	18285	Adapter, 1-1/16-12 Male SAE O-ring Boss to 1-1/16-12 Male SAE 37°
25	1	19295	Pump, Hydraulic
26	1	18292	Adapter, Elbow 7/8-14 Male SAE O-ring Boss (Long) to 7/8-14 Male SAE 37°
27	1	18578	Motor, 28.3 cubic inch, Pivot Plate
28	2	17699	Adapter, 1/2-14 Male BSPP to 7/16-20 SAE
29	2	32328	Hose, Valve to Rotate Motor 1/4” Dia.
30	2	17720	Adapter, 7/16-20 SAE O-ring Boss to 7/16-20 SAE 37°
31	1	17718	Cylinder, 3-1/2” Bore x 1.2 Stroke x 1-3/4” Rod

14.5.3 Hydraulic Manifold



Item	Qty.	Part No.	Description
1	1	C12133	Body, Five Function Seed Tender
2	1	6400-12-12	Fitting, Straight, -12 MJIC x -12 MORB
3	2	6400-08-08	Fitting, Straight, -8 MJIC x -8 MORB
4	1	4500210	Orifice Check Disc, 0.037
5	8	6400-04-06	Fitting, Straight, -6 MJIC x -6 MORB
6	8	SV9-8-A-0-00 300AA00061A C11374	Cartridge, Solenoid Coil, P Series 12 Vdc Deutsch Spacer, Coil
7	1	RV1-10-I-0-30/24	Cartridge, Relief Valve 2400 PSI
8	1	RV1-10-I-0-30/26	Cartridge, Relief Valve 2600 PSI
9	1	PCS4-10-0-80	Cartridge, Pressure Compensator 80 PSI
10	1	ESV1-10-C-0-00	Prop. Poppet Valve Normally Closed
11	1	PFR1-10-F-0-/1.25	Cartridge, Prioirty Flow, 1.25 GPM
12	1	RDH042S30	Cartridge, Relief Valve 100-3000 PSI
13	1	4500220	Orifice Check Disc, 0.046
14	1	PFR1-10-F-0-/0.50	Cartridge, Prioirty Flow, 0.50 GPM

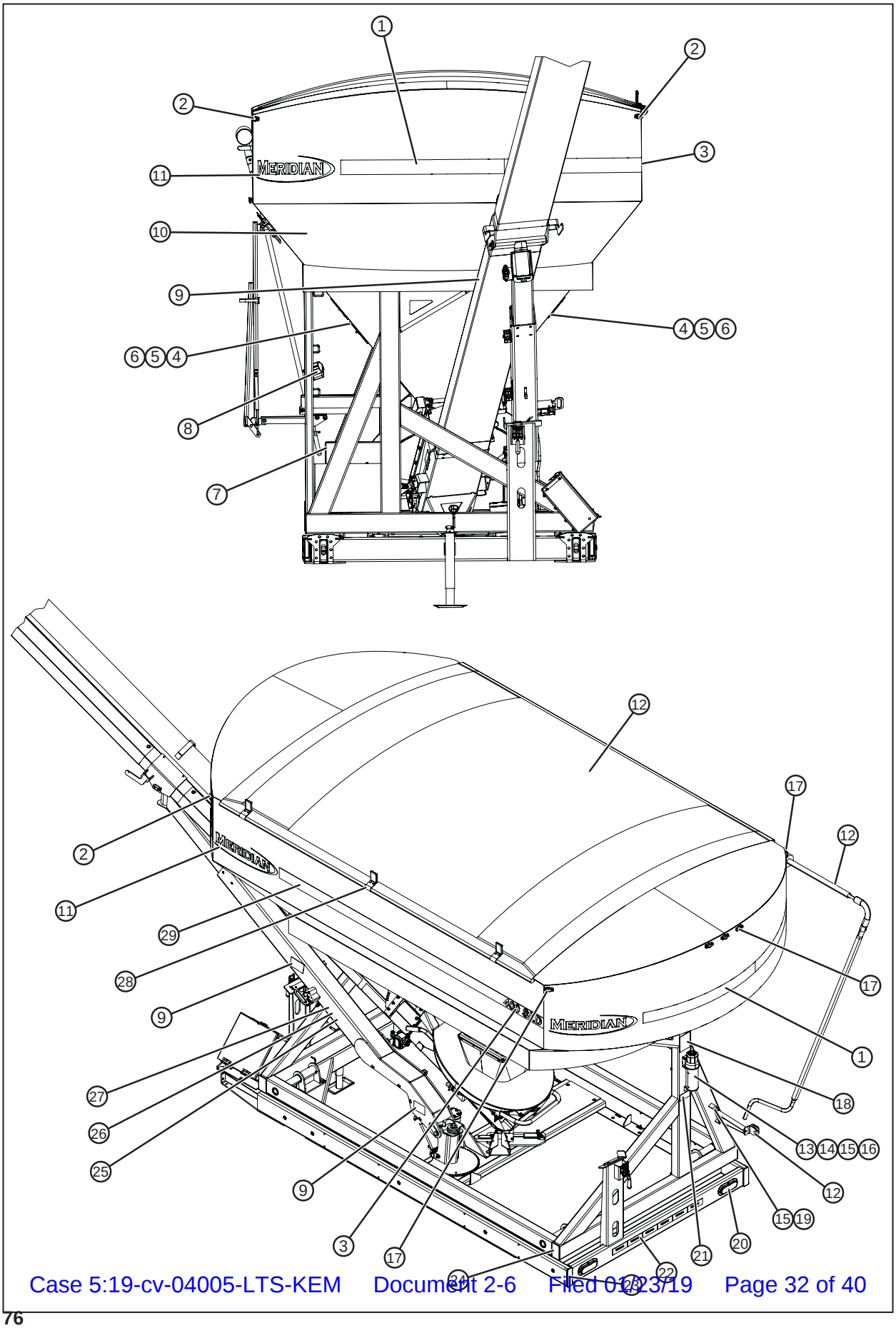
14.6 WEIGH SYSTEM



Item	Qty.	Part No.	Description
1	1	21257	Latch Assembly
2	1	23929	Enclosure Box
3	1	23930	Enclosure Box Lid
4	1	17610	Transmitter, Solid State 3A2222a
5	1	17612	Solid State Control Box 3B2223a2a
6	2	17625	Hinge
7	14	18941	Screw, Machine, Pan Head, #10
8	14	17722	Nut, #10-32 Nylon
9	7	19564	Nut, Hex, Flanged, 3/8-1 6
10	1	24689	Weldment, Enclosure Mount
11	4	19126	Nut, Hex, Flanged, 1/4-20

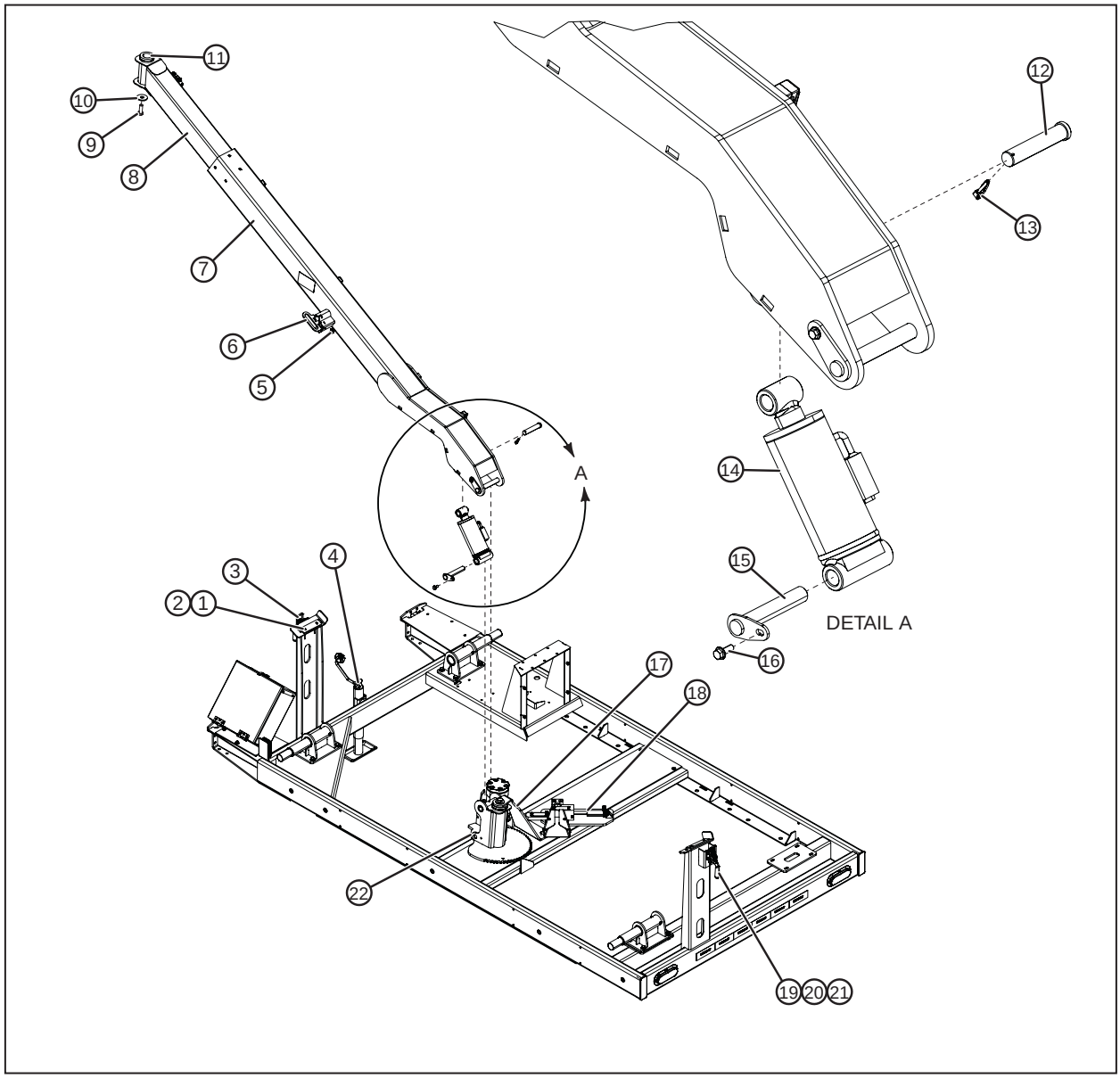
Item	Qty.	Part No.	Description
12	4	17769	Bolt, Hex, Flanged, 1/4-20 x 0.75
13	12	19129	Rivet, 3/16” x 1/2”
14	8	19795	Pin, Cotter 1/8 x 1 Square Cut Type
15	8	18641	Pin, 3/8” x 3” Headed
16	4	30458	Mount, Load Cell
17	4	13147	Bar, Load Cell
18	16	18943	Bolt, Hex, Flanged, 1/2-13 x 1.25
19	16	19595	Nut, Hex, Flanged, 1/2-13
20	1	30449	Weldment, Main Body
21	1	30454	Weldment, Undercarriage

14.7 DECALS AND LIGHTING



Item	Qty.	Part No.	Description
1	2	20089	Decal, Gradient
2	2	18151	Light, Amber Clearance
3	2	15054	Decal, 400 SLD
4	2	15056	Decal, Gate Pinch Point
5	1	19052	Decal, Gate 1
6	1	19053	Decal, Gate 2
7	1	20088	Decal, Warning Hot Surface
8	1	18188	Light, Work
9	2	20087	Decal, Pinch Point Hand
10	1	19939	Decal, Falling Hazard
11	4	20082	Decal, Meridian
12	1	26095	Kit, Agri Cover Tarp
13	1	17730	Manual, 400 SLD Owners
14	1	18128	Tube, Storage
15	3	19309	Bolt, Hex, 5/16-18 x 3/4
16	5	19318	Nut, Hex, Flanged, 5/16-18
17	5	18229	Light, Red Clearance
18	1	19934	Decal, Caution Read Manual
19	6	19568	Bolt, Hex, Flanged, 5/16-18 x 3/4
20	1	19984	Decal, Serial Number
21	2	18117	Light, Tail
22	3	18096	Tape, Reflective, Meridian 2x6x6
23	2	19111	Plug, 6” x 2” Tube (0.188” Wall)
24	4	18420	Plug, 5” X 3” Tube (0.188” Wall)
25	1	17509	Decal, Warning, Crush/Electrocution Hazard
26	1	15055	Decal, Instruction, Release Conveyor
27	1	15057	Decal, Instruction, Capture Conveyor
28	3	14069	Sleeve, Tarp Stop Flat (FS627)
29	2	20090	Decal, Gradient
30	1	14044	Harness, Clearance Light (NS)
31	1	14046	Harness, Work Light (NS)
32	1	14067	Harness, Undercarriage Wire (NS)

14.8 TURRET DETAIL



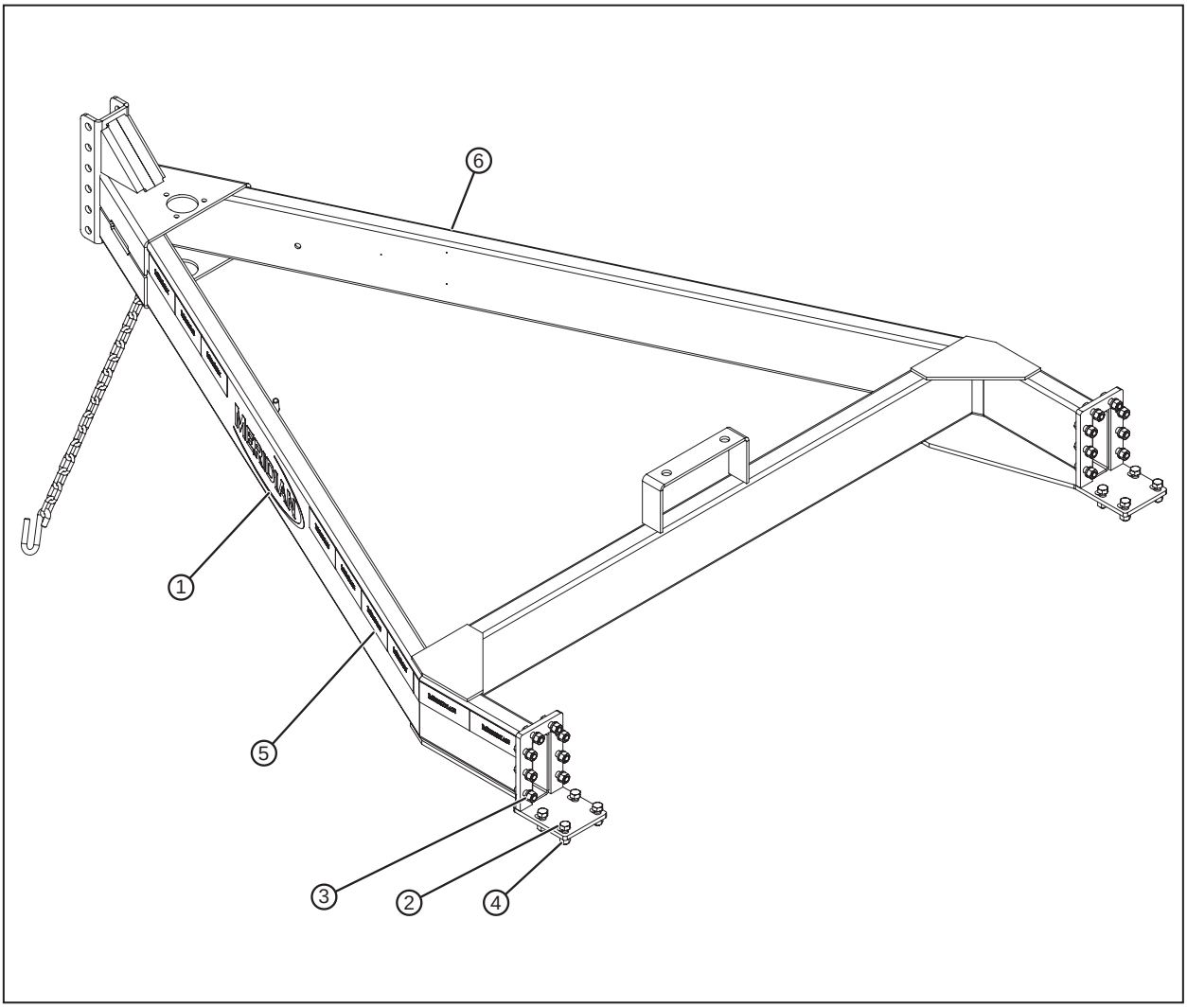
Item	Qty.	Part No.	Description
1	4	19126	Nut, Hex, Flanged, 1/4-20
2	4	19114	Screw, Countersunk Cap 1/4-20 x 1
3	2	25849	Pad, Wear, Extend Arm
4	1	18164	Jack, 5K, 10” Stroke Top Wind
5	1	14002	Switch
6	1	30468	Pin, Lock
7	1	30453	Weldment, Conveyor Arm Bottom
8	1	36031	Weldment, Conveyor Arm Top
9	3	18476	Bolt, Hex, 3/4-10 x 1-1/2
10	1	23757	Plate, Retainer, Swivel, Conveyor
11	1	17758	Bushing
12	1	12582	Pin, Clevis 1 x 4-45/64 Eff. Length
13	1	19794	Pin, Lynch 3/16 x 1
14	1	17718	Cylinder

Item	Qty.	Part No.	Description
15	1	30461	Pin, Cylinder
16	5	19569	Bolt, Hex, Flanged, 3/8-16 x 1
17	1	23901	Plate, Reinforcement
18	1	30459	Receiver, Conveyor Hitch
19	12	19568	Bolt, Hex, Flanged, 5/16-18 x 3/4
20	10	19318	Nut, Hex, Flanged, 5/16-18
21	2	19624	Latch, Horizontal
22	1	30452	Weldment, Conveyor Pivot Plate

Case 5:19-cv-04005-LTS-KEM Document 2-6 Filed 01/23/19 Page 34 of 40

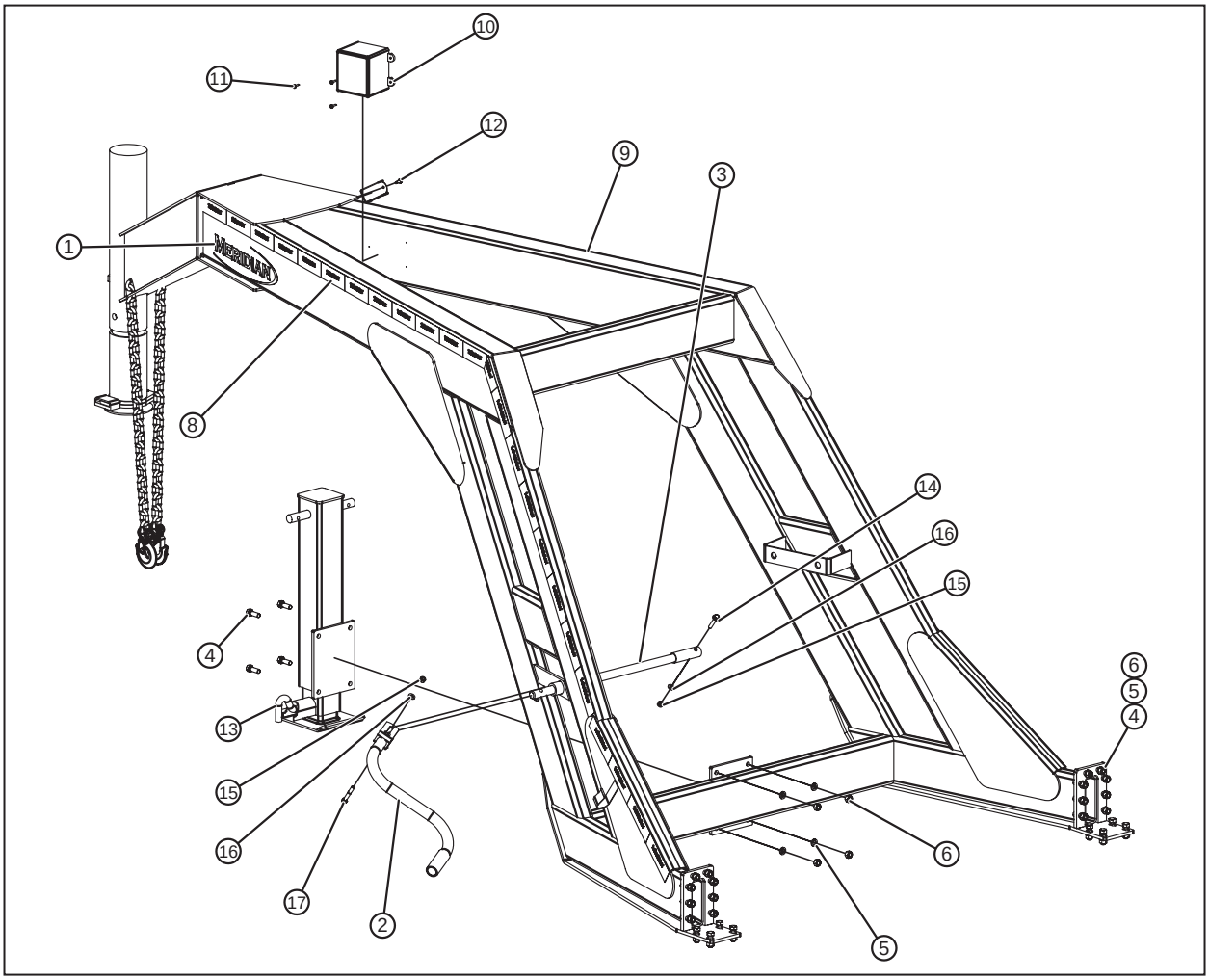
Unverferth Ex. 2009 - Page 170

14.9 BUMPER HITCH DETAIL



Item	Qty.	Part No.	Description
1	2	19911	Decal, White, Meridian Trailer
2	24	19116	Bolt, Hex, 1/2-13 x 1-1/2” long Grade 8
3	24	19373	Washer, Lock, 1/2"
4	24	19115	Nut, Hex, 1/2-13, Grade 8
5	21	18096	Tape, Reflective, Meridian 2 x 6 x 6”
6	1	25851	Weldment, Bumper Hitch
7	1	14047	Wire Harness, Tongue (NS)
8	1	18192	Mount, Jack Stand A-Frame (NS)
9	1	19298	Coupler, Hitch 2-5/16 Adjustable (NS)
10	1	19275	Breakaway, Battery (NS)
*			(NS) Not Shown

14.10 GOOSENECK DETAIL



Item	Qty.	Part No.	Description
1	2	19911	Decal, White, Meridian Trailer
2	1	18197	Crank, Handle, Gooseneck Jack
3	1	25325	Extension, Handle, Gooseneck Jack
4	28	19116	Bolt, Hex, 1/2-13 x 1-1/2” Grade 8
5	28	19373	Washer, Lock, 1/2”
6	28	19115	Nut, Hex 1/2-13, Grade 8
7	1	14043	Wire Harness, Tongue (NS)
8	26	18096	Tape, Reflective, Meridian 2 x 6 x 6
9	1	25336	Weldment, Gooseneck
10	1	19275	Breakaway, Battery BA10-150
11	3	19779	Screw, Self Drilling, #8-18 x 3/4
12	1	19597	Screw, Self Drilling 1/4-14 x 3/4
13	1	25322	Weldment, Jack, Gooseneck - 12k
14	1	19626	Bolt, Hex, Flanged, 3/8-16 x 1-3/4
15	2	19347	Locknut, nylon, 3/8-16
16	3	19348	Washer, Flat, 3/8
17	1	19592	Bolt, Hex, 3/8-16 x 2-1/2

NOTES

NOTES

Unverferth Ex. 2009 - Page 174

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Form No. 17730
Printed In U.S.A. (03-2014)

JS 44 (Rev. 06/17)

CIVIL COVER SHEET

The JS 44 civil cover sheet and the information contained herein neither replace nor supplement the filing and service of pleadings or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. *(SEE INSTRUCTIONS ON NEXT PAGE OF THIS FORM.)*

I. (a) PLAINTIFFS

Unverferth Mfg. Co., Inc.

(b) County of Residence of First Listed Plaintiff Putnam County, Ohio
(EXCEPT IN U.S. PLAINTIFF CASES)

(c) Attorneys *(Firm Name, Address, and Telephone Number)*
Michael A. Dee, Brown, Winick, Graves, Gross, Baskerville & Schoenebaum PLC (515-242-2451); Joseph A. Hynds, Jenny L. Colgate Brett A. Postal, Rothwell Figg Ernst & Manbeck, P.C. (202-783-6040)

DEFENDANTS

Meridian Mfg., Inc.

County of Residence of First Listed Defendant Buena Vista County, Iowa
(IN U.S. PLAINTIFF CASES ONLY)

NOTE: IN LAND CONDEMNATION CASES, USE THE LOCATION OF THE TRACT OF LAND INVOLVED.

Attorneys *(If Known)*

II. BASIS OF JURISDICTION *(Place an "X" in One Box Only)*

- ☐ 1 U.S. Government Plaintiff
- ☒ 3 Federal Question *(U.S. Government Not a Party)*
- ☐ 2 U.S. Government Defendant
- ☐ 4 Diversity *(Indicate Citizenship of Parties in Item III)*

III. CITIZENSHIP OF PRINCIPAL PARTIES *(Place an "X" in One Box for Plaintiff and One Box for Defendant)*
(For Diversity Cases Only)

	PTF	DEF		PTF	DEF
Citizen of This State	☐ 1	☐ 1	Incorporated *or* Principal Place of Business In This State	☐ 4	☐ 4
Citizen of Another State	☐ 2	☐ 2	Incorporated *and* Principal Place of Business In Another State	☐ 5	☐ 5
Citizen or Subject of a Foreign Country	☐ 3	☐ 3	Foreign Nation	☐ 6	☐ 6

IV. NATURE OF SUIT *(Place an "X" in One Box Only)*

Click here for: Nature of Suit Code Descriptions.

CONTRACT
- ☐ 110 Insurance
- ☐ 120 Marine
- ☐ 130 Miller Act
- ☐ 140 Negotiable Instrument
- ☐ 150 Recovery of Overpayment & Enforcement of Judgment
- ☐ 151 Medicare Act
- ☐ 152 Recovery of Defaulted Student Loans (Excludes Veterans)
- ☐ 153 Recovery of Overpayment of Veteran's Benefits
- ☐ 160 Stockholders' Suits
- ☐ 190 Other Contract
- ☐ 195 Contract Product Liability
- ☐ 196 Franchise

TORTS

PERSONAL INJURY
- ☐ 310 Airplane
- ☐ 315 Airplane Product Liability
- ☐ 320 Assault, Libel & Slander
- ☐ 330 Federal Employers' Liability
- ☐ 340 Marine
- ☐ 345 Marine Product Liability
- ☐ 350 Motor Vehicle
- ☐ 355 Motor Vehicle Product Liability
- ☐ 360 Other Personal Injury
- ☐ 362 Personal Injury - Medical Malpractice

PERSONAL INJURY
- ☐ 365 Personal Injury - Product Liability
- ☐ 367 Health Care/ Pharmaceutical Personal Injury Product Liability
- ☐ 368 Asbestos Personal Injury Product Liability

PERSONAL PROPERTY
- ☐ 370 Other Fraud
- ☐ 371 Truth in Lending
- ☐ 380 Other Personal Property Damage
- ☐ 385 Property Damage Product Liability

FORFEITURE/PENALTY
- ☐ 625 Drug Related Seizure of Property 21 USC 881
- ☐ 690 Other

LABOR
- ☐ 710 Fair Labor Standards Act
- ☐ 720 Labor/Management Relations
- ☐ 740 Railway Labor Act
- ☐ 751 Family and Medical Leave Act
- ☐ 790 Other Labor Litigation
- ☐ 791 Employee Retirement Income Security Act

IMMIGRATION
- ☐ 462 Naturalization Application
- ☐ 465 Other Immigration Actions

BANKRUPTCY
- ☐ 422 Appeal 28 USC 158
- ☐ 423 Withdrawal 28 USC 157

PROPERTY RIGHTS
- ☐ 820 Copyrights
- ☒ 830 Patent
- ☐ 835 Patent - Abbreviated New Drug Application
- ☐ 840 Trademark

SOCIAL SECURITY
- ☐ 861 HIA (1395ff)
- ☐ 862 Black Lung (923)
- ☐ 863 DIWC/DIWW (405(g))
- ☐ 864 SSID Title XVI
- ☐ 865 RSI (405(g))

FEDERAL TAX SUITS
- ☐ 870 Taxes (U.S. Plaintiff or Defendant)
- ☐ 871 IRS—Third Party 26 USC 7609

OTHER STATUTES
- ☐ 375 False Claims Act
- ☐ 376 Qui Tam (31 USC 3729(a))
- ☐ 400 State Reapportionment
- ☐ 410 Antitrust
- ☐ 430 Banks and Banking
- ☐ 450 Commerce
- ☐ 460 Deportation
- ☐ 470 Racketeer Influenced and Corrupt Organizations
- ☐ 480 Consumer Credit
- ☐ 490 Cable/Sat TV
- ☐ 850 Securities/Commodities/ Exchange
- ☐ 890 Other Statutory Actions
- ☐ 891 Agricultural Acts
- ☐ 893 Environmental Matters
- ☐ 895 Freedom of Information Act
- ☐ 896 Arbitration
- ☐ 899 Administrative Procedure Act/Review or Appeal of Agency Decision
- ☐ 950 Constitutionality of State Statutes

REAL PROPERTY
- ☐ 210 Land Condemnation
- ☐ 220 Foreclosure
- ☐ 230 Rent Lease & Ejectment
- ☐ 240 Torts to Land
- ☐ 245 Tort Product Liability
- ☐ 290 All Other Real Property

CIVIL RIGHTS
- ☐ 440 Other Civil Rights
- ☐ 441 Voting
- ☐ 442 Employment
- ☐ 443 Housing/ Accommodations
- ☐ 445 Amer. w/Disabilities - Employment
- ☐ 446 Amer. w/Disabilities - Other
- ☐ 448 Education

PRISONER PETITIONS

Habeas Corpus:
- ☐ 463 Alien Detainee
- ☐ 510 Motions to Vacate Sentence
- ☐ 530 General
- ☐ 535 Death Penalty

Other:
- ☐ 540 Mandamus & Other
- ☐ 550 Civil Rights
- ☐ 555 Prison Condition
- ☐ 560 Civil Detainee - Conditions of Confinement

V. ORIGIN *(Place an "X" in One Box Only)*

☐ 1 Original Proceeding ☐ 2 Removed from State Court ☐ 3 Remanded from Appellate Court ☐ 4 Reinstated or Reopened ☐ 5 Transferred from Another District *(specify)* ☐ 6 Multidistrict Litigation - Transfer ☐ 8 Multidistrict Litigation - Direct File

VI. CAUSE OF ACTION

Cite the U.S. Civil Statute under which you are filing ***(Do not cite jurisdictional statutes unless diversity)***:
35 U.S.C. 1, et seq.

Brief description of cause:
Patent Infringement

VII. REQUESTED IN COMPLAINT:

☐ CHECK IF THIS IS A **CLASS ACTION** UNDER RULE 23, F.R.Cv.P.

DEMAND $

CHECK YES only if demanded in complaint:
JURY DEMAND: ☒ Yes ☐ No

VIII. RELATED CASE(S) IF ANY

(See instructions): JUDGE _____ DOCKET NUMBER _____

DATE 01/23/2019

SIGNATURE OF ATTORNEY OF RECORD /s/ Michael A. Dee

FOR OFFICE USE ONLY

RECEIPT # AMOUNT APPLYING IFP JUDGE MAG. JUDGE

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INSTRUCTIONS FOR ATTORNEYS COMPLETING CIVIL COVER SHEET FORM JS 44

Authority For Civil Cover Sheet

The JS 44 civil cover sheet and the information contained herein neither replaces nor supplements the filings and service of pleading or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. Consequently, a civil cover sheet is submitted to the Clerk of Court for each civil complaint filed. The attorney filing a case should complete the form as follows:

I.(a) **Plaintiffs-Defendants.** Enter names (last, first, middle initial) of plaintiff and defendant. If the plaintiff or defendant is a government agency, use only the full name or standard abbreviations. If the plaintiff or defendant is an official within a government agency, identify first the agency and then the official, giving both name and title.

(b) **County of Residence.** For each civil case filed, except U.S. plaintiff cases, enter the name of the county where the first listed plaintiff resides at the time of filing. In U.S. plaintiff cases, enter the name of the county in which the first listed defendant resides at the time of filing. (NOTE: In land condemnation cases, the county of residence of the "defendant" is the location of the tract of land involved.)

(c) **Attorneys.** Enter the firm name, address, telephone number, and attorney of record. If there are several attorneys, list them on an attachment, noting in this section "(see attachment)".

II. **Jurisdiction.** The basis of jurisdiction is set forth under Rule 8(a), F.R.Cv.P., which requires that jurisdictions be shown in pleadings. Place an "X" in one of the boxes. If there is more than one basis of jurisdiction, precedence is given in the order shown below.
United States plaintiff. (1) Jurisdiction based on 28 U.S.C. 1345 and 1348. Suits by agencies and officers of the United States are included here.
United States defendant. (2) When the plaintiff is suing the United States, its officers or agencies, place an "X" in this box.
Federal question. (3) This refers to suits under 28 U.S.C. 1331, where jurisdiction arises under the Constitution of the United States, an amendment to the Constitution, an act of Congress or a treaty of the United States. In cases where the U.S. is a party, the U.S. plaintiff or defendant code takes precedence, and box 1 or 2 should be marked.
Diversity of citizenship. (4) This refers to suits under 28 U.S.C. 1332, where parties are citizens of different states. When Box 4 is checked, the citizenship of the different parties must be checked**.** (See Section III below**; NOTE: federal question actions take precedence over diversity cases.**)

III. **Residence (citizenship) of Principal Parties.** This section of the JS 44 is to be completed if diversity of citizenship was indicated above. Mark this section for each principal party.

IV. **Nature of Suit.** Place an "X" in the appropriate box. If there are multiple nature of suit codes associated with the case, pick the nature of suit code that is most applicable. Click here for: Nature of Suit Code Descriptions.

V. **Origin.** Place an "X" in one of the seven boxes.
Original Proceedings. (1) Cases which originate in the United States district courts.
Removed from State Court. (2) Proceedings initiated in state courts may be removed to the district courts under Title 28 U.S.C., Section 1441. When the petition for removal is granted, check this box.
Remanded from Appellate Court. (3) Check this box for cases remanded to the district court for further action. Use the date of remand as the filing date.
Reinstated or Reopened. (4) Check this box for cases reinstated or reopened in the district court. Use the reopening date as the filing date.
Transferred from Another District. (5) For cases transferred under Title 28 U.S.C. Section 1404(a). Do not use this for within district transfers or multidistrict litigation transfers.
Multidistrict Litigation – Transfer. (6) Check this box when a multidistrict case is transferred into the district under authority of Title 28 U.S.C. Section 1407.
Multidistrict Litigation – Direct File. (8) Check this box when a multidistrict case is filed in the same district as the Master MDL docket.
PLEASE NOTE THAT THERE IS NOT AN ORIGIN CODE 7. Origin Code 7 was used for historical records and is no longer relevant due to changes in statue.

VI. **Cause of Action.** Report the civil statute directly related to the cause of action and give a brief description of the cause. **Do not cite jurisdictional statutes unless diversity.** Example: U.S. Civil Statute: 47 USC 553 Brief Description: Unauthorized reception of cable service

VII. **Requested in Complaint.** Class Action. Place an "X" in this box if you are filing a class action under Rule 23, F.R.Cv.P.
Demand. In this space enter the actual dollar amount being demanded or indicate other demand, such as a preliminary injunction.
Jury Demand. Check the appropriate box to indicate whether or not a jury is being demanded.

VIII. **Related Cases.** This section of the JS 44 is used to reference related pending cases, if any. If there are related pending cases, insert the docket numbers and the corresponding judge names for such cases.

Date and Attorney Signature. Date and sign the civil cover sheet.