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(12) **United States Patent**
Lewis

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(54) **COUPLER GUARD SYSTEM**

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(72) Inventor: **William Lewis**, Plantersville, TX (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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(22) Filed: **Apr. 6, 2021**

(65) **Prior Publication Data**

US 2021/0222403 A1 Jul. 22, 2021

Related U.S. Application Data

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(60) Provisional application No. 62/465,627, filed on Mar. 1, 2017.

(51) **Int. Cl.**

E02F 9/22	(2006.01)
F16L 57/00	(2006.01)
E02F 3/36	(2006.01)
F16L 37/56	(2006.01)

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

CPC ***E02F 9/2275*** (2013.01); ***E02F 3/3654*** (2013.01); ***F16L 57/005*** (2013.01); *F16L 37/56* (2013.01)

(58) **Field of Classification Search**

CPC E02F 9/2275; F16L 57/005

See application file for complete search history.

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(74) *Attorney, Agent, or Firm* — Shannon Warren

(57) **ABSTRACT**

A coupler guard configured to protect an auxiliary coupler assembly from side impacts in the rough use environment of a loader. The coupler guard comprises an encasement and a side plate. The loader comprises the auxiliary coupler assembly and a hinge extension. The encasement wraps around a top portion and interior side of the auxiliary coupler assembly. The side plate attaches to a portion of the encasement and protect an exterior side portion of the auxiliary coupler assembly. A screw assemblies selectively attaches the encasement to the side plate. A ring attaches to a portion of the side plate. The ring selectively wraps around a portion of the hinge extension of the loader. A ring screw assembly selectively holds the ring and the rest of the coupler guard to the hinge extension. An edge trim selectively sits on top of a portion of a first arm.

18 Claims, 12 Drawing Sheets

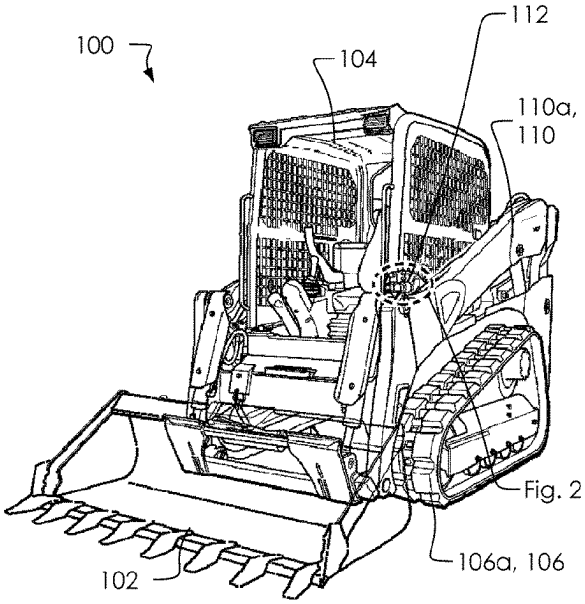
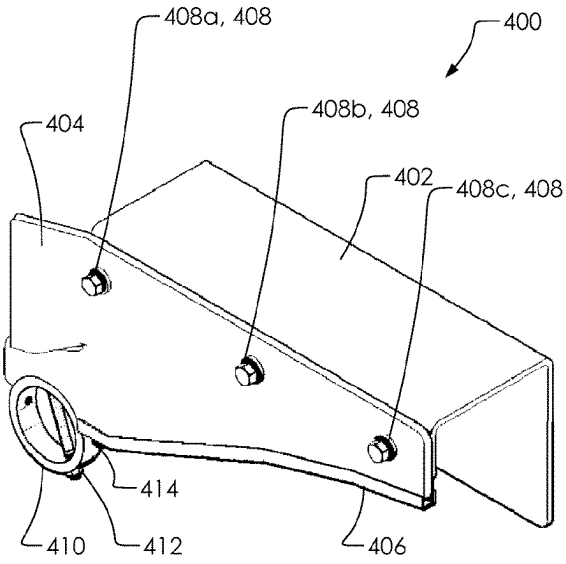


Fig. 2



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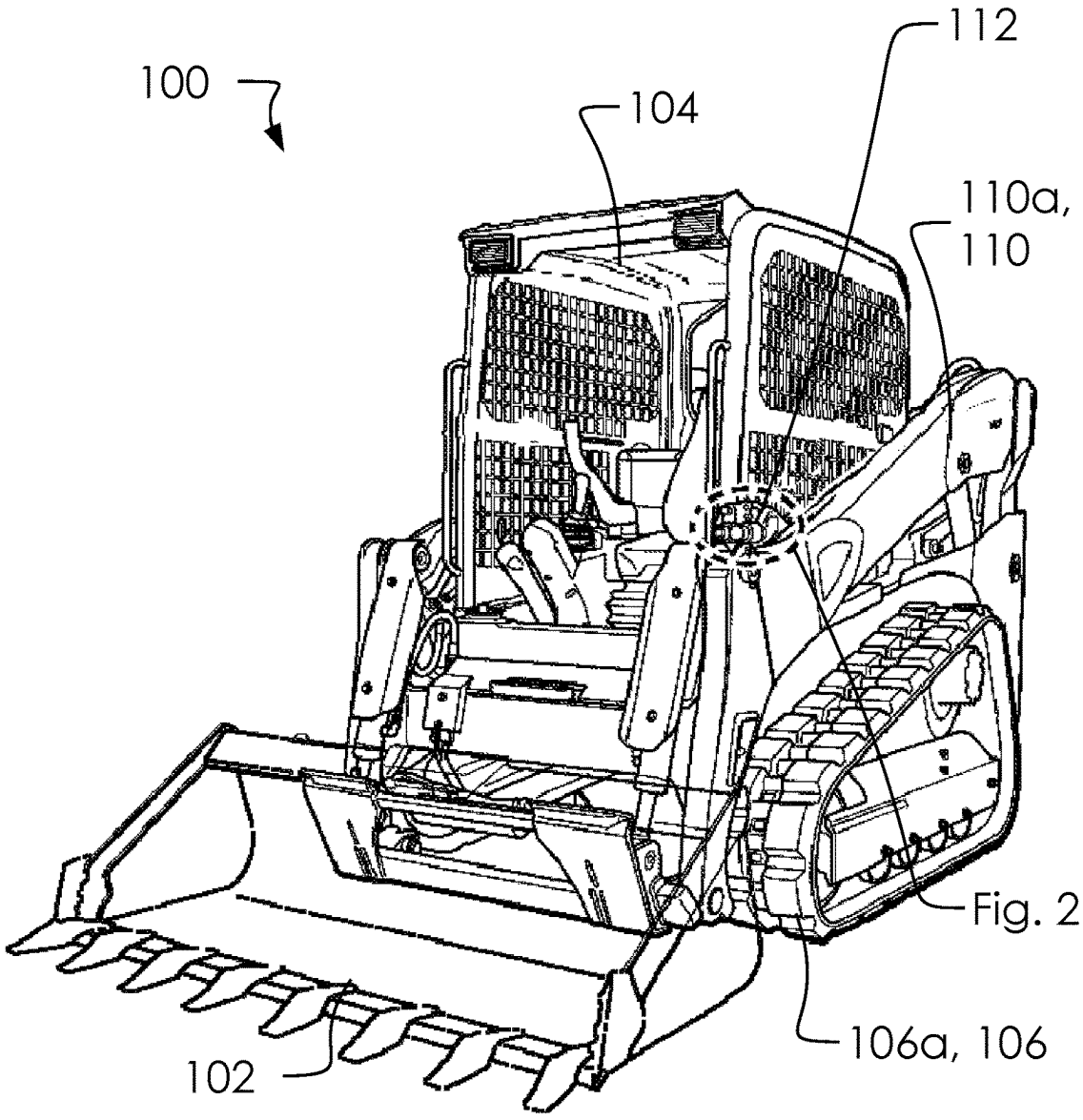

Fig. 2

FIG. 1

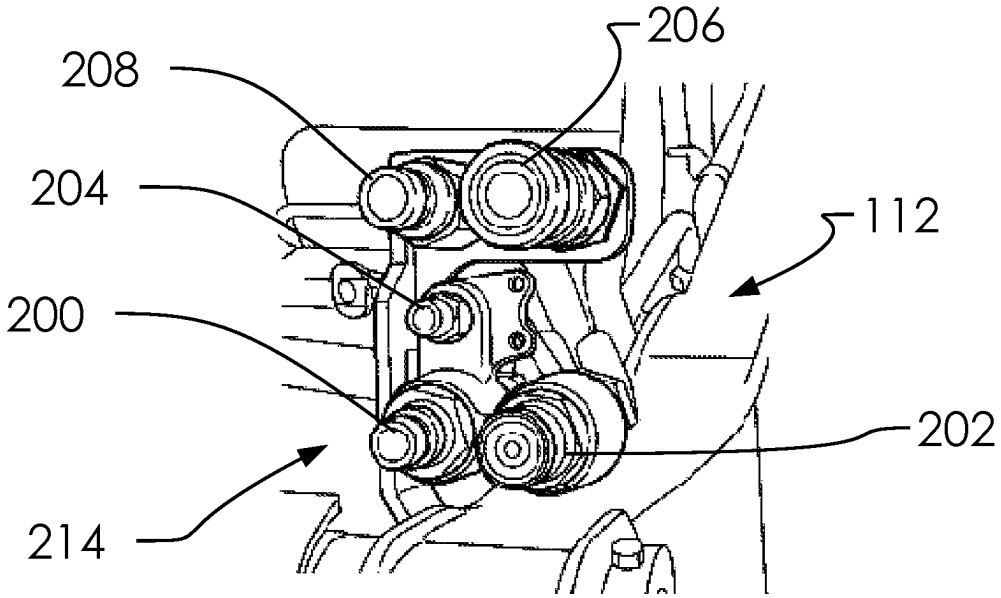

FIG. 2A

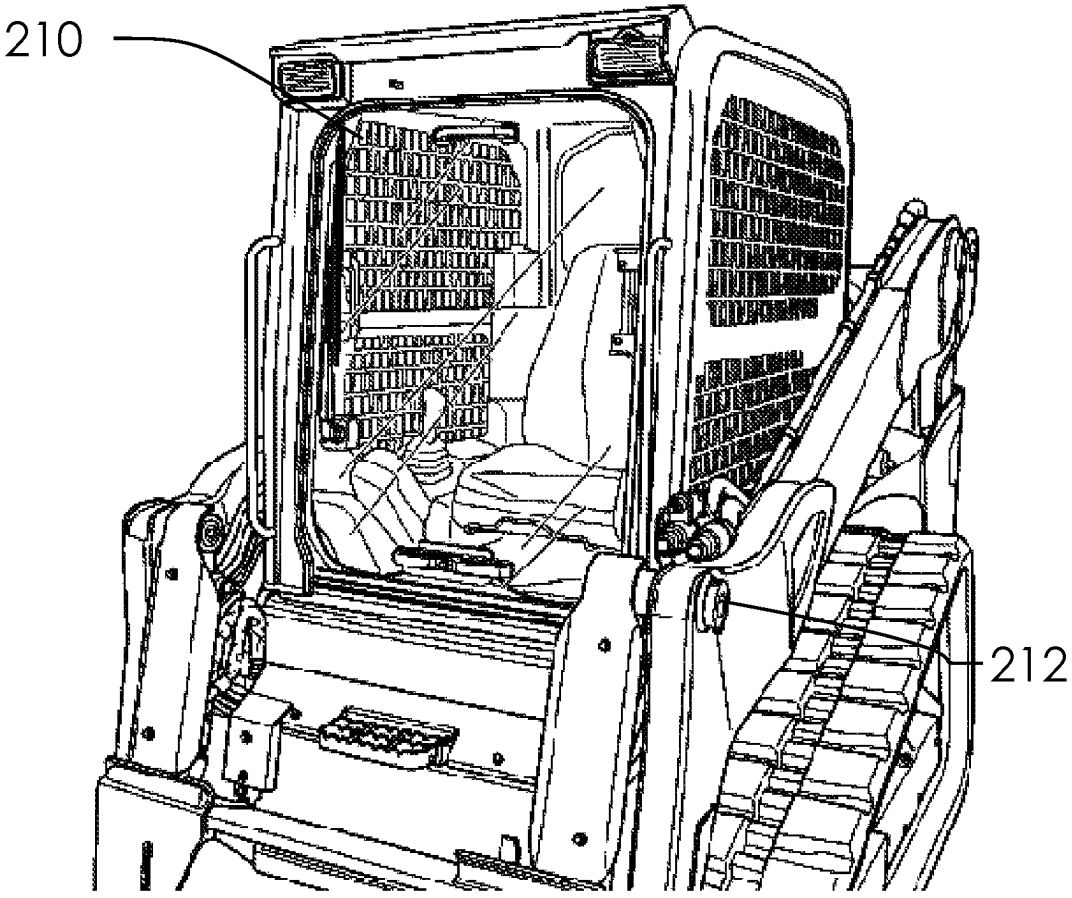

FIG. 2B

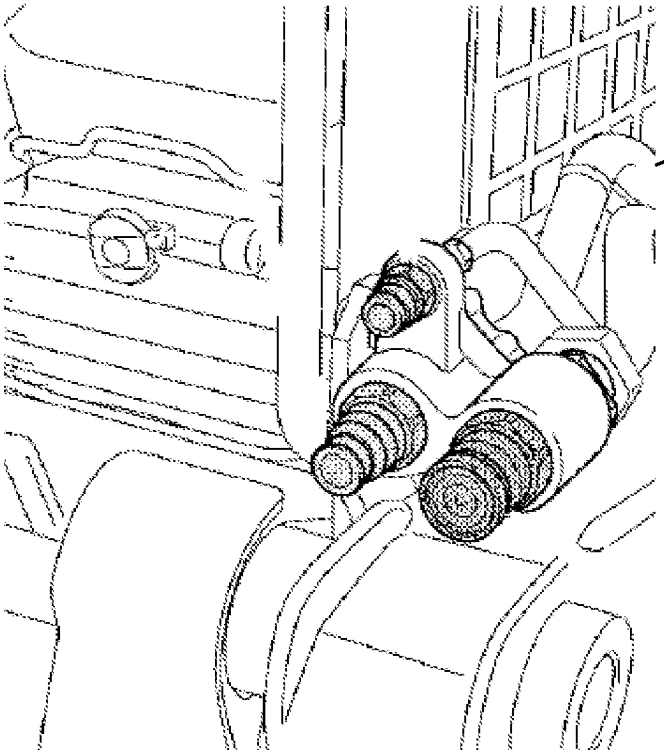

FIG. 3A

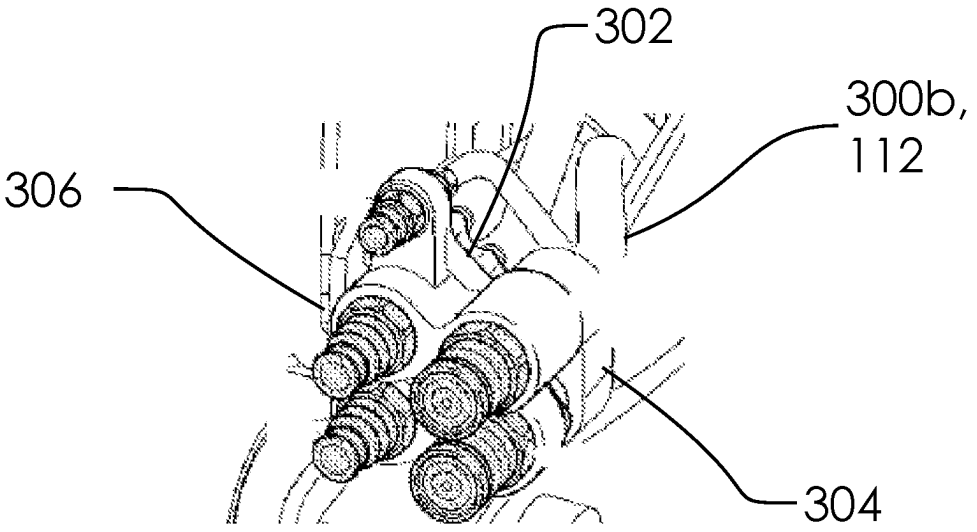

FIG. 3B

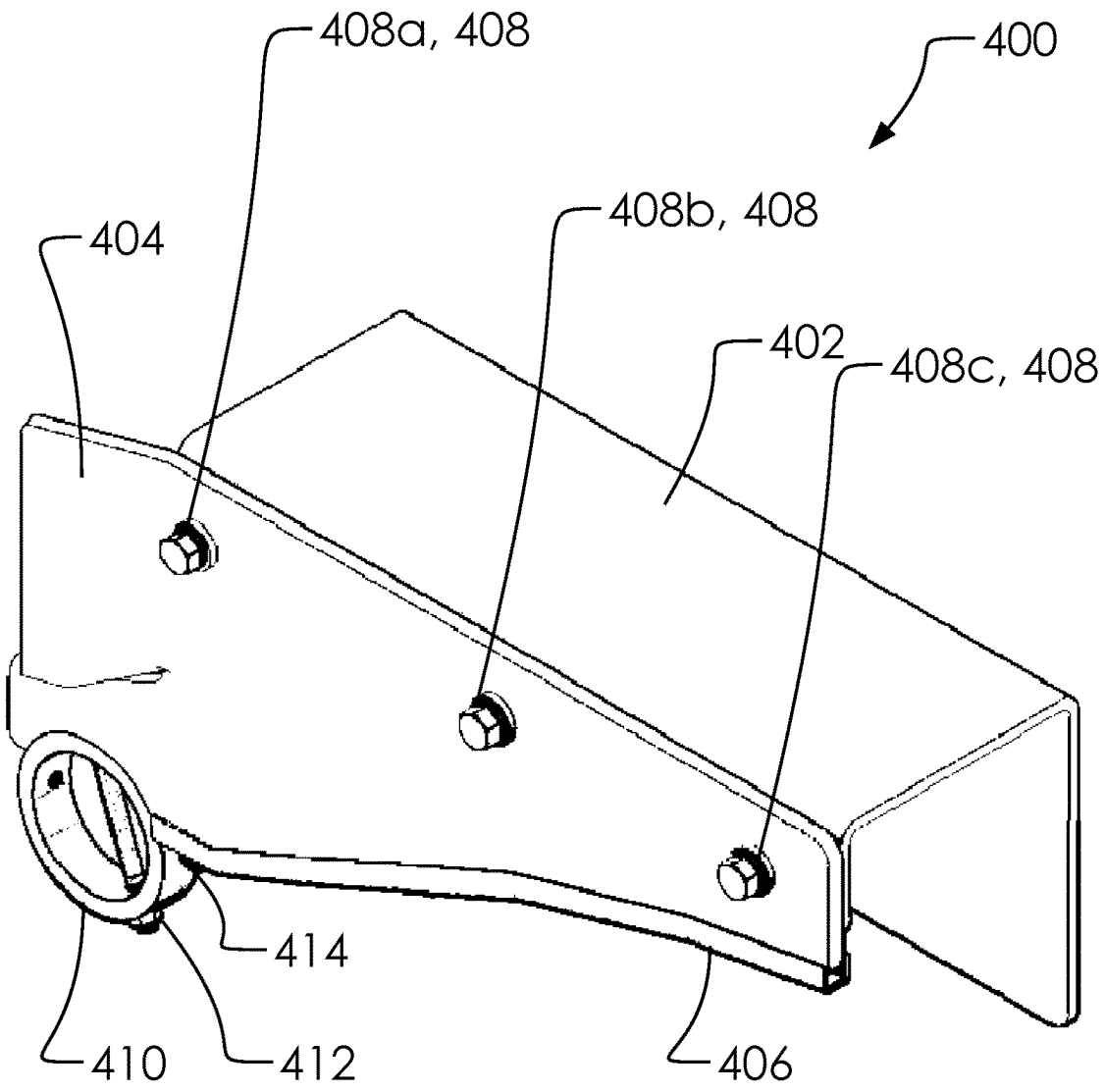

FIG. 4

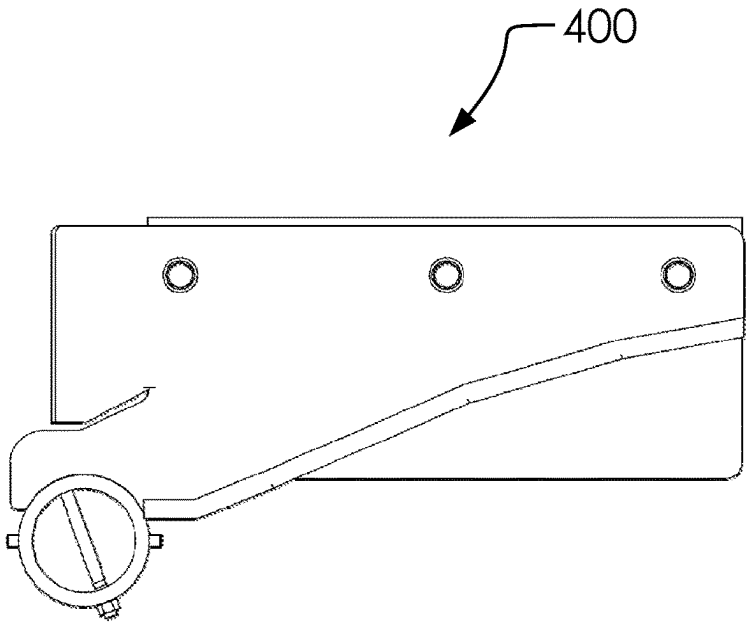

FIG. 5A

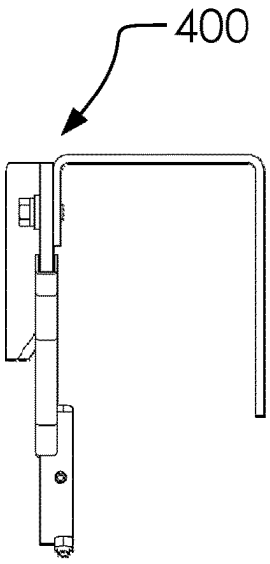

FIG. 5B

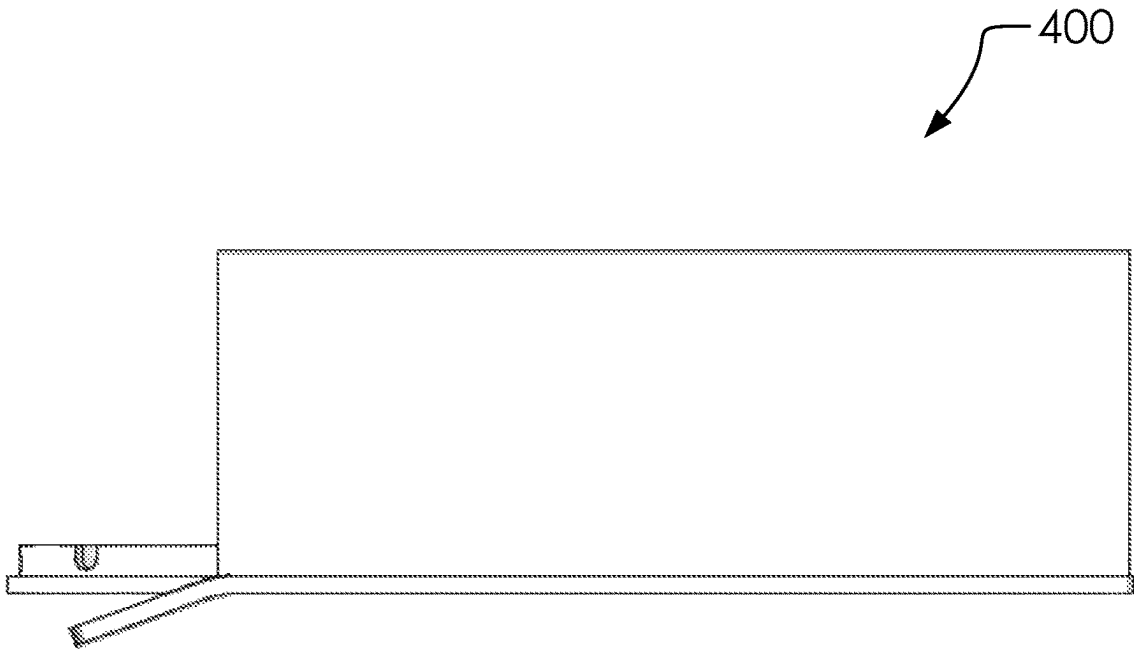

FIG. 6

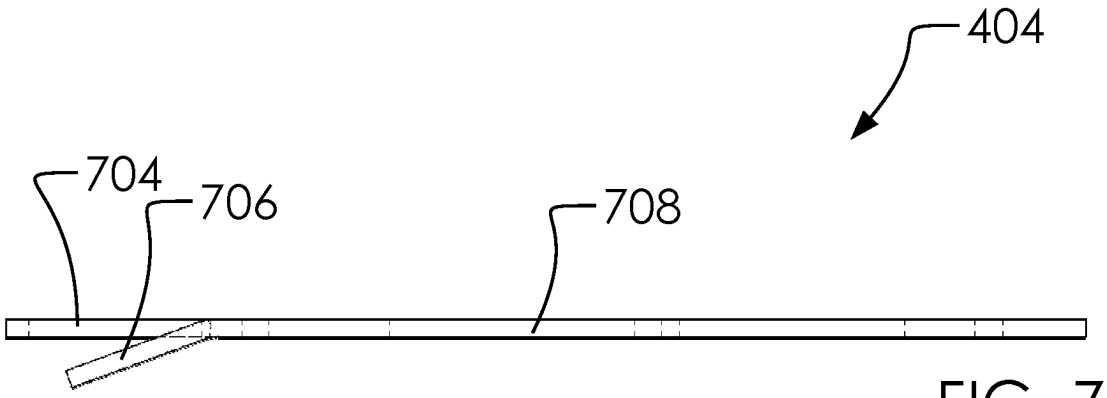

FIG. 7A

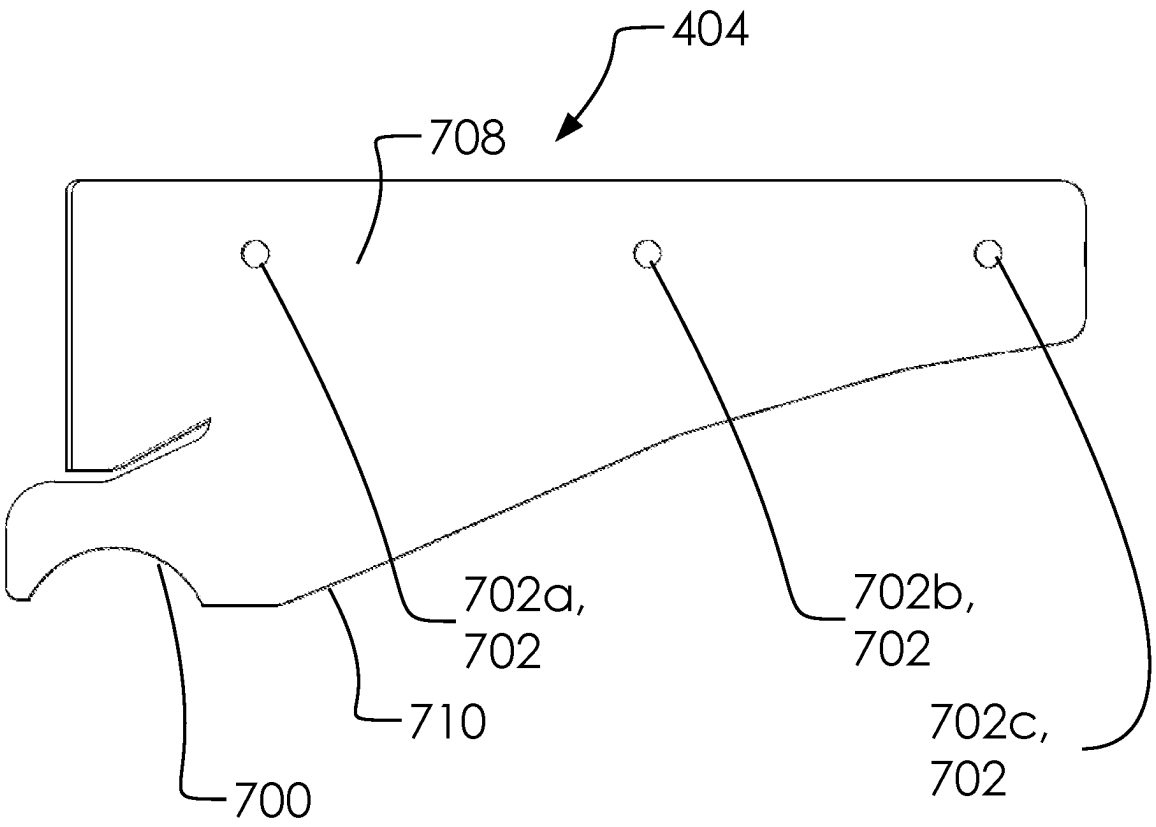

FIG. 7B

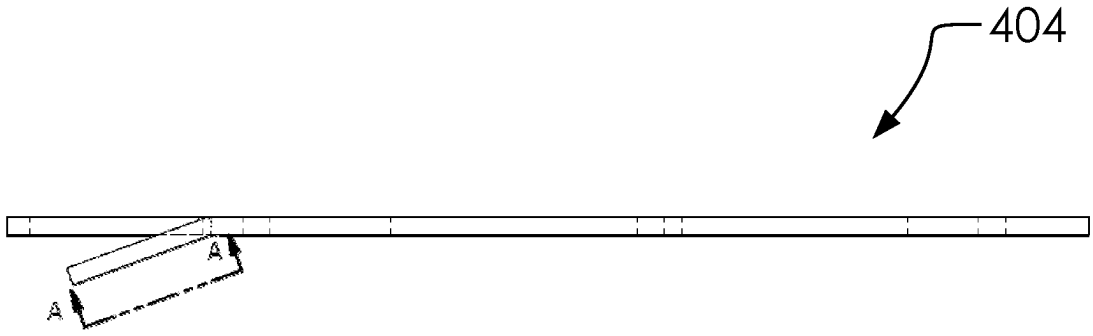

FIG. 8A

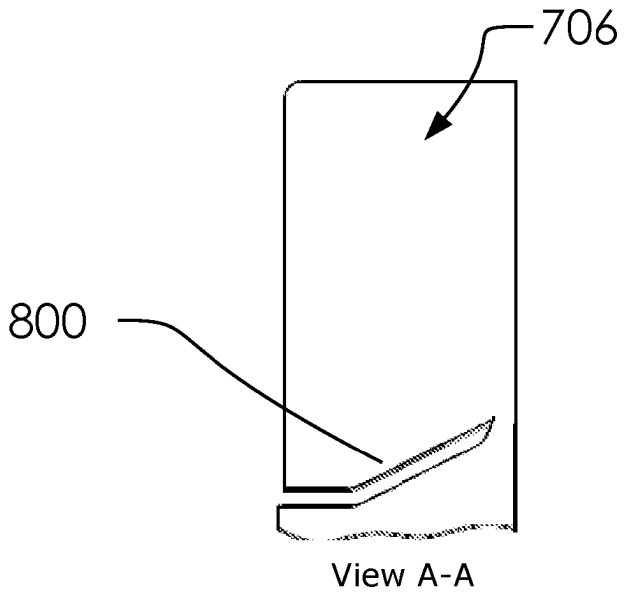

FIG. 8B

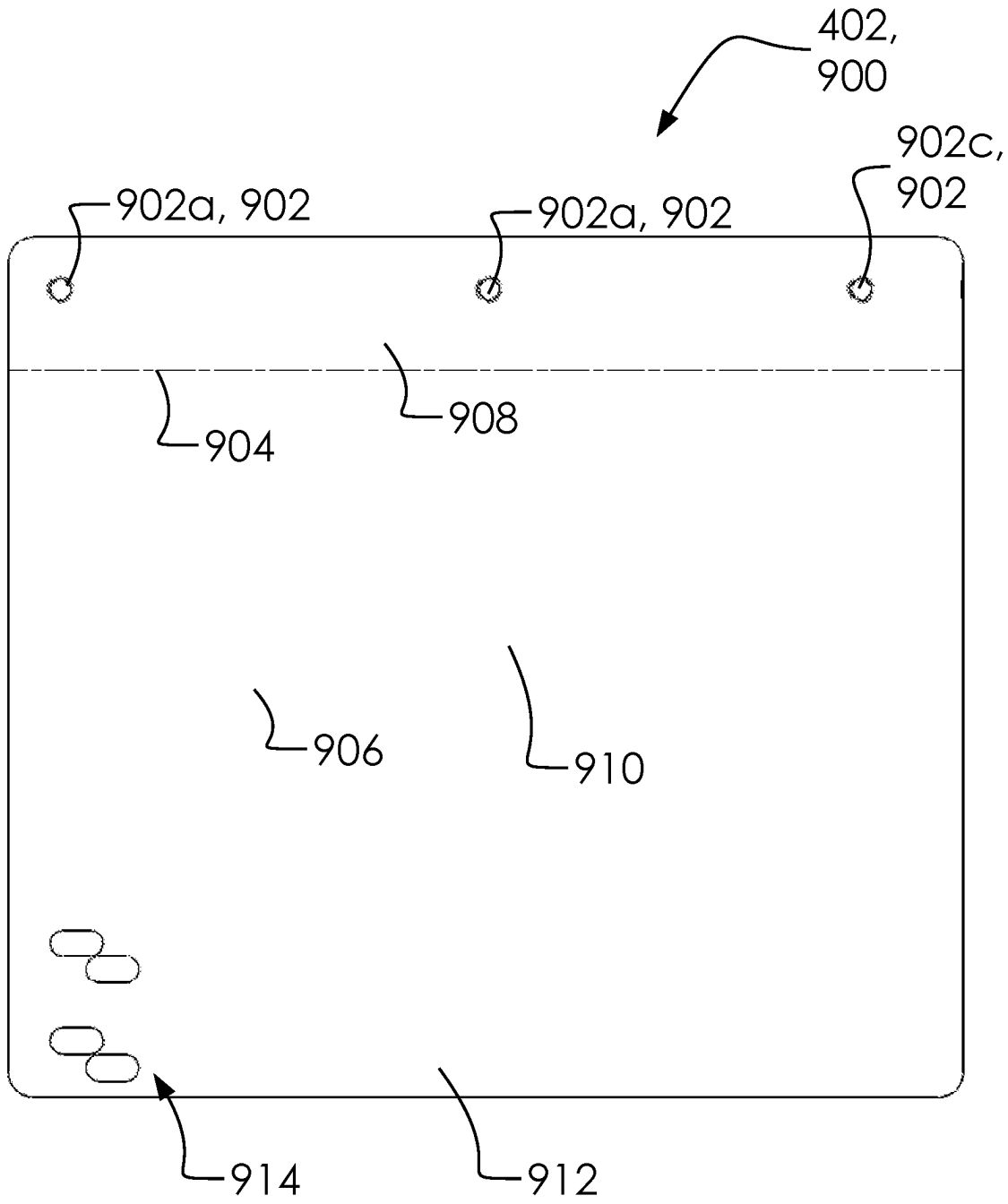

FIG. 9

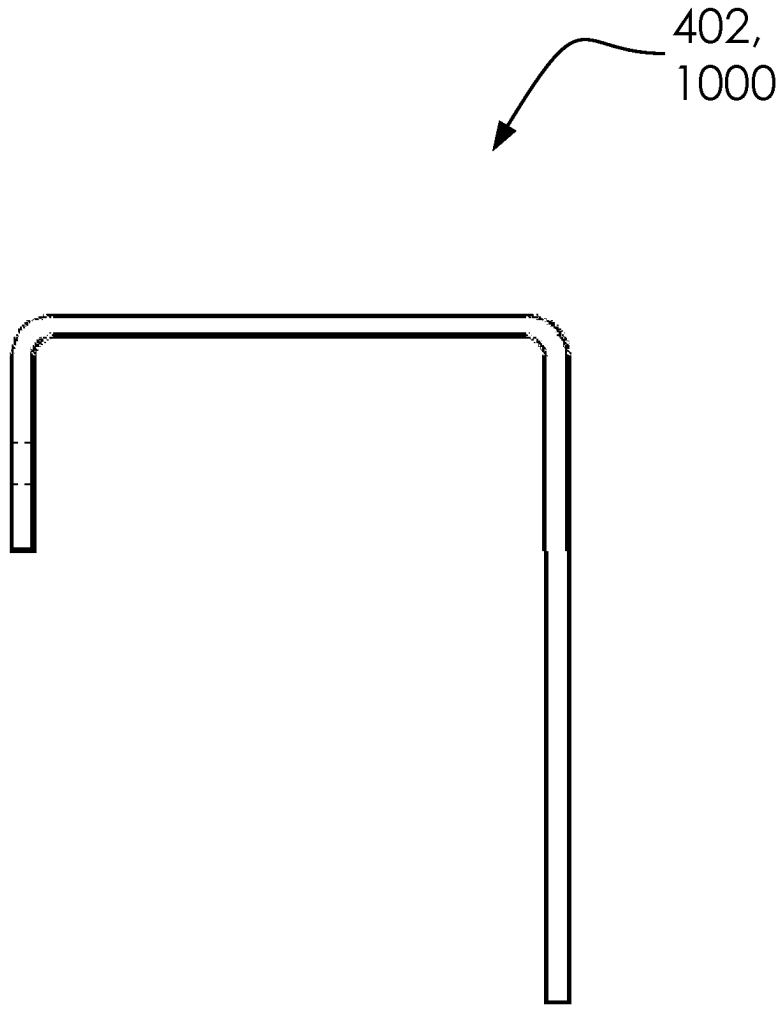

FIG. 10

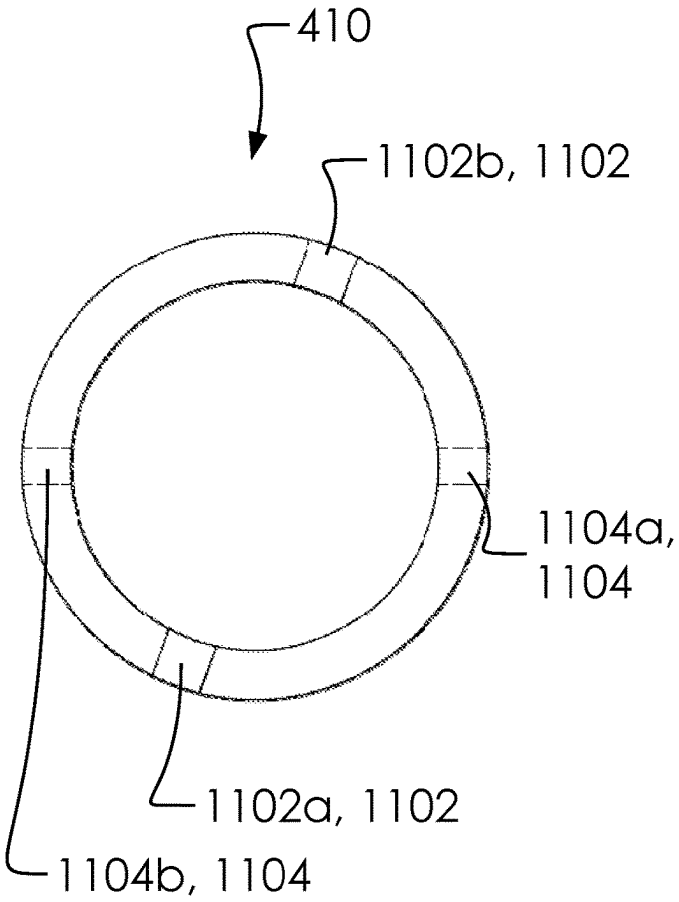

FIG. 11A

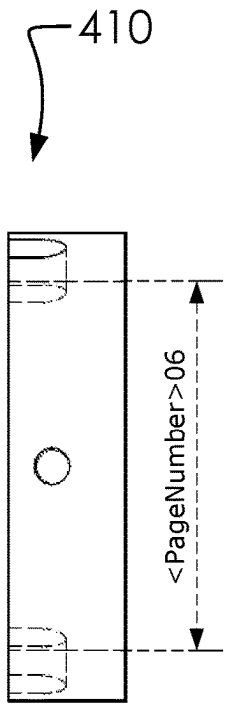

FIG. 11B

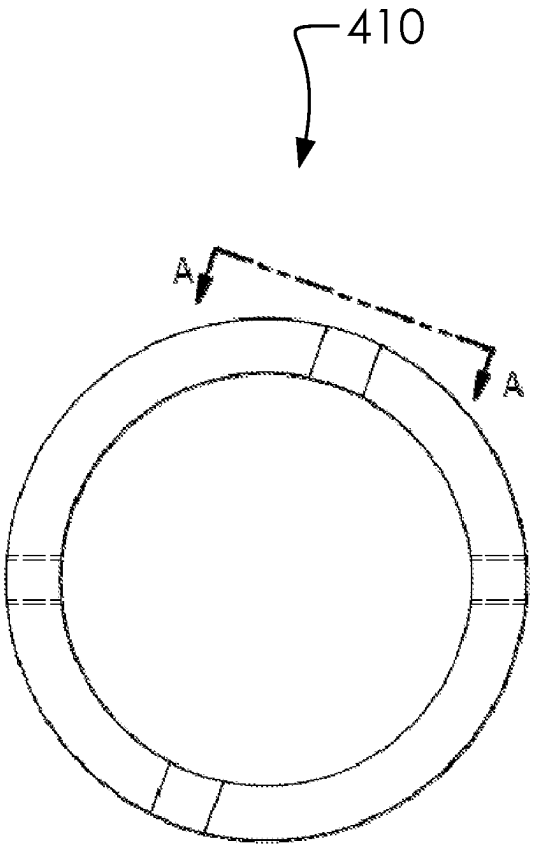

FIG. 12A

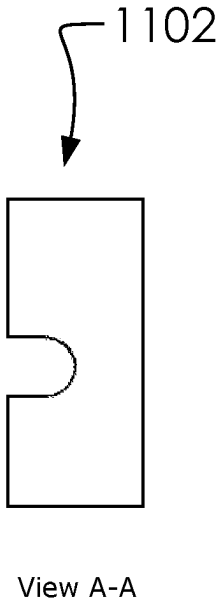

FIG. 12B

COUPLER GUARD SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims benefit to U.S. patent application Ser. No. 15/910,003 filed 2018 Mar. 1, which claims benefit to 62/465,627 filed on Mar. 1, 2017. Application '003 has issued as U.S. Pat. No. 10,995,477.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT (IF APPLICABLE)

Not applicable.

REFERENCE TO SEQUENCE LISTING, A TABLE, OR A COMPUTER PROGRAM LISTING COMPACT DISC APPENDIX (IF APPLICABLE)

Not applicable.

BACKGROUND OF THE INVENTION

Prior art cited in the parent application to this continuation includes EP3434828A1. The Applicant wishes to address insufficiency of the cited prior art for rejecting during the prosecution of this application.

BRIEF SUMMARY OF THE INVENTION

A coupler guard configured to protect an auxiliary coupler assembly from side impacts in the rough use environment of a loader. Said coupler guard comprises an encasement and a side plate. Said loader comprises said auxiliary coupler assembly and a hinge extension. Said encasement wraps around a top portion and interior side of said auxiliary coupler assembly. Said side plate attaches to a portion of said encasement and protect an exterior side portion of said auxiliary coupler assembly. A screw assemblies selectively attaches said encasement to said side plate. A ring attaches to a portion of said side plate. Said ring selectively wraps around a portion of said hinge extension of said loader. A ring screw assembly selectively holds said ring and the rest of said coupler guard to said hinge extension. An edge trim selectively sits on top of a portion of a first arm. A set screw selectively adjusts a fit of said ring with respect to said hinge extension.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

FIG. **1** illustrates a perspective overview view of loader **100**.

FIG. **2**A illustrates a perspective detailed view of auxiliary coupler assembly **112**.

FIG. **2**B illustrates a perspective (none) view of enclosed cab **210**.

FIG. **3**A illustrates a perspective overview of auxiliary coupler assembly **112** as a low flow model.

FIG. **3**B illustrates a perspective overview of auxiliary coupler assembly **112** as a high flow model.

FIG. **4** illustrates a perspective overview of coupler guard **400**.

FIG. **5**A illustrates an elevated front side view of coupler guard **400**.

FIG. **5**B illustrates an elevated first side view of coupler guard **400**.

FIG. **6** illustrates an elevated top side view of coupler guard **400**.

FIG. **7**A illustrates an elevated top side view of side plate **404**.

FIG. **7**B illustrates an elevated front side view of side plate **404**.

FIG. **8**A illustrates an elevated top side view of side plate **404**.

FIG. **8**B illustrates an elevated front side view of upper front edge **706** at view A-A.

FIG. **9** illustrates an elevated top side view of unbent configuration **900** of said encasement **402**.

FIG. **10** illustrates an elevated first side view of bent configuration **1000** of said encasement **402**.

FIG. **11**A illustrates an elevated front side view of ring **410**.

FIG. **11**B illustrates an elevated first side view of ring **410**.

FIG. **12**A illustrates an elevated front side view of ring **410**.

FIG. **12**B illustrates an elevated front side view of notches **1102**.

DETAILED DESCRIPTION OF THE INVENTION

The following description is presented to enable any person skilled in the art to make and use the invention as claimed and is provided in the context of the particular examples discussed below, variations of which will be readily apparent to those skilled in the art. In the interest of clarity, not all features of an actual implementation are described in this specification. It will be appreciated that in the development of any such actual implementation (as in any development project), design decisions must be made to achieve the designers' specific goals (e.g., compliance with system- and business-related constraints), and that these goals will vary from one implementation to another. It will also be appreciated that such development effort might be complex and time-consuming, but would nevertheless be a routine undertaking for those of ordinary skill in the field of the appropriate art having the benefit of this disclosure. Accordingly, the claims appended hereto are not intended to be limited by the disclosed embodiments, but are to be accorded their widest scope consistent with the principles and features disclosed herein.

These parts are illustrated in the figures and discussed below:

a loader **100**,
A bucket assembly **102**,
A cab **104**,
One or more track assemblies **106**,
A first track assembly **106***a*,
A second track assembly **106***b*,
One or more arms **110**,
A first arm **110***a*,
A second arm **110***b*,
An auxiliary coupler assembly **112**,
A small male coupler **200**,
A small female coupler **202**,
A male case drain coupler **204**,
A larger female coupler **206**,
A large male coupler **208**,
An enclosed cab **210**,
A hinge extension **212**,
One or more couplers **214**,

One or more embodiments **300**,
A first embodiment **300***a*,
A second embodiment **300***b*,
A coupler guard **400**,
An encasement **402**,
A side plate **404**,
An edge trim **406**,
One or more screw assemblies **408**,
A first screw assembly **408***a*,
A second screw assembly **408***b*,
A third screw assembly **408***c*,
A ring **410**,
A ring screw assembly **412**,
A set screw **414**,
A ring notch **700**,
One or more fastener apertures **702**,
A first fastener aperture **702***a*,
A second fastener aperture **702***b*,
A third fastener aperture **702***c*,
A lower front edge **704**,
An upper front edge **706**,
A side body **708**,
A lower edge **710**,
A slot **800**,
An unbent configuration **900**,
One or more fastener apertures **902**,
A first fastener aperture **902***a*,
A second fastener aperture **902***b*,
A third fastener aperture **902***c*,
A bend line **904**,
A bend line **906**,
An exterior portion **908**,
A top portion **910**,
An interior portion **912**,
A bent configuration **1000**,
A notches **1102**,
A first notch **1102***a*,
A second notch **1102***b*,
A set screw apertures **1104**,
A first set screw aperture **1104***a*,
A second set screw aperture **1104***b*, and
An internal diameter **1106**.

FIG. **1** illustrates a perspective overview view of loader **100**.

In one embodiment, said loader **100** can comprise said bucket assembly **102**, said cab **104**, said second arm **110***b* and said auxiliary coupler assembly **112**.

In one embodiment, said one or more track assemblies **106** can comprise said first track assembly **106***a* and said second track assembly **106***b*.

In one embodiment, said one or more arms **110** can comprise said first arm **110***a* and said second arm **110***b*.

In one embodiment, said loader **100** can comprise a compact track loader or a skid loader, as is known in the art.

FIG. **2**A illustrates a perspective detailed view of auxiliary coupler assembly **112**.

FIG. **2**B illustrates a perspective (none) view of enclosed cab **210**.

In one embodiment, said loader **100** can comprise said enclosed cab **210** and said hinge extension **212**.

In one embodiment, said auxiliary coupler assembly **112** can comprise said small male coupler **200**, said small female coupler **202**, said male case drain coupler **204**, said larger female coupler **206**, said large male coupler **208** and said one or more couplers **214**.

In one embodiment, said auxiliary coupler assembly **112** can comprise said one or more couplers **214** being arranged above and moving relative to one among said one or more arms **110**. In one embodiment, said auxiliary coupler assembly **112** can be at a proximal end of said auxiliary coupler assembly **112** nearest said cab **104**, as illustrated.

Referring to the operational manual for a common manufacturer of said loader **100**, it is noted that said auxiliary coupler assembly **112** suffers from dirt and debris on all of said one or more couplers **214**. Owners are warned to visually check said one or more couplers **214** for corroding, cracking, damage and excessive wear. In case of damage to any of said one or more couplers **214** they must be replaced. Owners are further warned to use long enough hoses when connecting to said auxiliary coupler assembly **112**, otherwise said one or more couplers **214** could be damage due to frequent side load and impacts. Owners are further warned not to use their hands when checking for leaks. When using a high flow model (illustrated below), owners are further warned to not exceed the rated operating capacity of the unit, as exceeding such capacity can cause hydraulic imbalance with other operational commands (such as "lift arms raise", "bucket roll back" or "auxiliary hydraulic control"). Accordingly, damage to or lack of care for said one or more couplers **214** can lead to poor performance of said loader **100** such a causing said one or more arms **110** to lower slowly. Further, operators are warned that failing to follow these instructions can lead to personal injury or death.

FIG. **3**A illustrates a perspective overview of auxiliary coupler assembly **112** as a low flow model.

FIG. **3**B illustrates a perspective overview of auxiliary coupler assembly **112** as a high flow model.

In one embodiment, said one or more embodiments **300** can comprise said first embodiment **300***a* and said second embodiment **300***b*.

In one embodiment, said auxiliary coupler assembly **112** can comprise said one or more embodiments **300**.

Said loader **100** can comprise variations on said auxiliary coupler assembly **112**, as illustrated and known in the art. Further, said auxiliary coupler assembly **112** can comprise a top side **302**, a first side **304** and a second side **306**, as illustrated.

FIG. **4** illustrates a perspective overview of coupler guard **400**.

In one embodiment, said coupler guard **400** can comprise said encasement **402**, said side plate **404**, said edge trim **406**, said edge trim **406**, said screw assemblies **408**, said ring **410**, said ring screw assembly **412** and said set screw **414**.

In one embodiment, said screw assemblies **408** can comprise said first screw assembly **408***a*, said second screw assembly **408***b* and said third screw assembly **408***c*.

In one embodiment, said auxiliary coupler assembly **112** can comprise said set screw **414**.

In one embodiment, said encasement **402** and said side plate **404** can be configured to protect said auxiliary coupler assembly **112** from side impacts in the rough work environment of said loader **100**. In one embodiment, said encasement **402** can wrap around a top portion and interior side of said auxiliary coupler assembly **112**; said side plate **404** can attach to a portion of said encasement **402** and protect an exterior side portion of said auxiliary coupler assembly **112**; said screw assemblies **408** can selectively attach said encasement **402** to said side plate **404**; said ring **410** can be attached to a portion of said side plate **404**; said ring **410** can selectively wrap around a portion of said hinge extension **212** of said loader **100**; said ring screw assembly **412** can selectively hold said ring **410** and the rest of said coupler guard **400** to said hinge extension **212**; said edge trim **406** can selectively sit on top of a portion of said first arm **110***a*;

and said set screw **414** can selectively adjust a fit of said ring **410** with respect to said hinge extension **212**.

FIG. **5**A illustrates an elevated front side view of coupler guard **400**.

FIG. **5**B illustrates an elevated first side view of coupler guard **400**.

FIG. **6** illustrates an elevated top side view of coupler guard **400**.

In one embodiment, said coupler guard **400** can protect said auxiliary coupler assembly **112** from strikes from above with portions of said encasement **402** and said side plate **404**.

FIG. **7**A illustrates an elevated top side view of side plate **404**.

FIG. **7**B illustrates an elevated front side view of side plate **404**.

In one embodiment, said one or more fastener apertures **702** can comprise said first fastener aperture **702***a*, said second fastener aperture **702***b* and said third fastener aperture **702***c*.

In one embodiment, said side plate **404** can comprise said ring notch **700**, said ring notch **700**, said one or more fastener apertures **702**, said lower front edge **704**, said upper front edge **706**, said side body **708** and said lower edge **710**.

In one embodiment, said lower front edge **704** can comprise a straight portion of said side body **708** being substantially planar with the rest of aid side body **708**. In one embodiment, said upper front edge **706** can comprise a portion of said side body **708** being bent slightly outward to accommodate portions of said auxiliary coupler assembly **112**, as necessary.

FIG. **8**A illustrates an elevated top side view of side plate **404**.

FIG. **8**B illustrates an elevated front side view of upper front edge **706** at view A-A.

In one embodiment, said upper front edge **706** can comprise said slot **800**.

In one embodiment, said upper front edge **706** can comprise a portion of said side body **708** being cut apart from said lower front edge **704** at said slot **800** and bent outward, as illustrated.

FIG. **9** illustrates an elevated top side view of unbent configuration **900** of said encasement **402**.

In one embodiment, said one or more fastener apertures **902** can comprise said first fastener aperture **902***a*, said second fastener aperture **902***b* and said third fastener aperture **902***c*.

In one embodiment, said encasement **402** can comprise said unbent configuration **900**, said unbent configuration **900**, said one or more fastener apertures **902**, said bend line **904**, said bend line **906**, said exterior portion **908**, said top portion **910** and said interior portion **912**.

In one embodiment, said one or more fastener apertures **902** can selectively attach to said one or more fastener apertures **702** with said screw assemblies **408**, as is known in the art.

FIG. **10** illustrates an elevated first side view of bent configuration **1000** of said encasement **402**.

In one embodiment, said encasement **402** can comprise said bent configuration **1000**.

In one embodiment, said ring **410** can comprise said bent configuration **1000**.

FIG. **11**A illustrates an elevated front side view of ring **410**.

FIG. **11**B illustrates an elevated first side view of ring **410**.

In one embodiment, said notches **1102** can comprise said first notch **1102***a* and said second notch **1102***b*.

In one embodiment, said set screw apertures **1104** can comprise said first set screw aperture **1104***a* and said second set screw aperture **1104***b*.

In one embodiment, said ring **410** can comprise said notches **1102**, said second notch **1102***b*, said set screw apertures **1104** and said internal diameter **1106**.

In one embodiment, said internal diameter **1106** can be suited to fit around portions of said hinge extension **212** of said loader **100**.

FIG. **12**A illustrates an elevated front side view of ring **410**.

FIG. **12**B illustrates an elevated front side view of notches **1102**.

In one embodiment, a portion of said ring screw assembly **412** fit through a portion of said notches **1102**.

In another embodiment, a portion of said set screw apertures **1104** fit through a portion of said notches **1102**

The following sentences are included for completeness of this disclosure with reference to the claims.

A coupler guard **400** configured to protect an auxiliary coupler assembly **112** from side impacts in the rough use environment of a loader **100**. Said coupler guard **400** comprises an encasement **402** and a side plate **404**. Said loader **100** comprises said auxiliary coupler assembly **112** and a hinge extension **212**. Said encasement **402** wraps around a top portion and interior side of said auxiliary coupler assembly **112**. Said side plate **404** attaches to a portion of said encasement **402** and protect an exterior side portion of said auxiliary coupler assembly **112**. A screw assemblies **408** selectively attaches said encasement **402** to said side plate **404**. A ring **410** attaches to a portion of said side plate **404**. Said ring **410** selectively wraps around a portion of said hinge extension **212** of said loader **100**. A ring screw assembly **412** selectively holds said ring **410** and the rest of said coupler guard **400** to said hinge extension **212**. An edge trim **406** selectively sits on top of a portion of a first arm **110***a*. A set screw **414** selectively adjusts a fit of said ring **410** with respect to said hinge extension **212**.

Various changes in the details of the illustrated operational methods are possible without departing from the scope of the following claims. Some embodiments may combine the activities described herein as being separate steps. Similarly, one or more of the described steps may be omitted, depending upon the specific operational environment the method is being implemented in. It is to be understood that the above description is intended to be illustrative, and not restrictive. For example, the above-described embodiments may be used in combination with each other. Many other embodiments will be apparent to those of skill in the art upon reviewing the above description. The scope of the invention should, therefore, be determined with reference to the appended claims, along with the full scope of equivalents to which such claims are entitled. In the appended claims, the terms "including" and "in which" are used as the plain-English equivalents of the respective terms "comprising" and "wherein."

The invention claimed is:

1. A coupler guard configured to protect an auxiliary coupler assembly of a loader from side impacts in the rough use environment, wherein:

said coupler guard comprises an encasement and a side plate;

said coupler guard is configured attach to a portion of said loader and to wrap around and protect

a top side and a first side of said auxiliary coupler assembly with said encasement, and

a second side of said auxiliary coupler assembly with said side plate;

said coupler guard attaches to said loader by attaching a portion of said side plate to a hinge extension of said loader;

one or more screw assemblies selectively attach said side plate to a portion of said loader;

said coupler guard further comprises a ring comprising a cylindrical element having open ends at either end of said cylindrical element's shape; and

said ring slides over said hinge extension to hold a portion of said coupler guard against a portion of said loader.

2. The coupler guard of claim **1**, wherein:

a ring screw assembly selectively holds said ring and the rest of said coupler guard to said hinge extension; and

a set screw selectively adjusts a fit of said ring with respect to said hinge extension.

3. The coupler guard of claim **1**, wherein:

said one or more screw assemblies comprises a first screw assembly, a second screw assembly and a third screw assembly;

said one or more screw assemblies selectively attach said coupler guard to a portion of said loader; and

a set screw is configured to selectively adjust a fit of said ring with respect to said hinge extension.

4. The coupler guard of claim **3**, wherein:

said coupler guard further comprises an edge trim aligned with a lower edge of said side plate; and

said edge trim is configured to selectively sit on top of a portion of said loader.

5. The coupler guard of claim **1**, wherein:

a ring located at a lower front portion of said side plate of said coupler guard.

6. The coupler guard of claim **1**, wherein:

said side plate comprises a lower front edge, an upper front edge, a side body and a lower edge;

said lower front edge comprises a straight portion of said side body being substantially planar with the rest of said side body; and

said upper front edge comprises a portion of said side body being bent slightly outward to accommodate portions of an auxiliary coupler assembly, as necessary.

7. A coupler guard configured to protect an auxiliary coupler assembly of a loader from side impacts in the rough use environment, wherein:

said coupler guard comprises an encasement and a side plate;

said coupler guard is configured attach to a portion of said loader and to wrap around and protect

a top side and a first side of said auxiliary coupler assembly with said encasement, and

a second side of said auxiliary coupler assembly with said side plate; and

a ring located at a lower front portion of said side plate of said coupler guard.

8. The coupler guard of claim **7**, wherein:

said coupler guard attaches to said loader by attaching a portion of said side plate to a hinge extension of said loader;

one or more screw assemblies selectively attach said side plate to a portion of said loader;

said coupler guard further comprises said ring comprising a cylindrical element having open ends at either end of said cylindrical element's shape; and

said ring slides over said hinge extension to hold a portion of said coupler guard against a portion of said loader.

9. The coupler guard of claim **7**, wherein:

said ring screw assembly selectively holds said ring and the rest of said coupler guard to said hinge extension; and

a set screw selectively adjusts a fit of said ring with respect to said hinge extension.

10. The coupler guard of claim **7**, wherein:

said one or more screw assemblies comprises a first screw assembly, a second screw assembly and a third screw assembly;

said one or more screw assemblies selectively attach said coupler guard to a portion of said loader; and

a set screw is configured to selectively adjust a fit of said ring with respect to said hinge extension.

11. The coupler guard of claim **10**, wherein:

said coupler guard further comprises an edge trim aligned with a lower edge of said side plate; and

said edge trim is configured to selectively sit on top of a portion of said loader.

12. The coupler guard of claim **7**, wherein:

said side plate comprises a lower front edge, an upper front edge, a side body and a lower edge;

said lower front edge comprises a straight portion of said side body being substantially planar with the rest of said side body; and

said upper front edge comprises a portion of said side body being bent slightly outward to accommodate portions of an auxiliary coupler assembly, as necessary.

13. A coupler guard configured to protect an auxiliary coupler assembly of a loader from side impacts in the rough use environment, wherein:

said coupler guard comprises an encasement and a side plate;

said coupler guard is configured attach to a portion of said loader and to wrap around and protect

a top side and a first side of said auxiliary coupler assembly with said encasement, and

a second side of said auxiliary coupler assembly with said side plate,

said side plate comprises a lower front edge, an upper front edge, a side body and a lower edge;

said lower front edge comprises a straight portion of said side body being substantially planar with the rest of said side body; and

said upper front edge comprises a portion of said side body being bent slightly outward to accommodate portions of an auxiliary coupler assembly, as necessary.

14. The coupler guard of claim **13**, wherein:

said coupler guard attaches to said loader by attaching a portion of said side plate to a hinge extension of said loader;

one or more screw assemblies selectively attach said side plate to a portion of said loader;

said coupler guard further comprises a ring comprising a cylindrical element having open ends at either end of said cylindrical element's shape; and

said ring slides over said hinge extension to hold a portion of said coupler guard against a portion of said loader.

15. The coupler guard of claim **14**, wherein:

a ring screw assembly selectively holds said ring and the rest of said coupler guard to said hinge extension; and

a set screw selectively adjusts a fit of said ring with respect to said hinge extension.

16. The coupler guard of claim **13**, wherein:

said one or more screw assemblies comprises a first screw assembly, a second screw assembly and a third screw assembly;

said one or more screw assemblies selectively attach said coupler guard to a portion of said loader; and

a set screw is configured to selectively adjust a fit of said ring with respect to said hinge extension.

17. The coupler guard of claim **16**, wherein:

said coupler guard further comprises an edge trim aligned with a lower edge of said side plate; and

said edge trim is configured to selectively sit on top of a portion of said loader.

18. The coupler guard of claim **13**, wherein:

said coupler guard further comprises a ring located at a lower front portion of said side plate of said coupler guard.

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