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(54) **REAR ATTACHMENT ASSEMBLY FOR SKID LOADERS**

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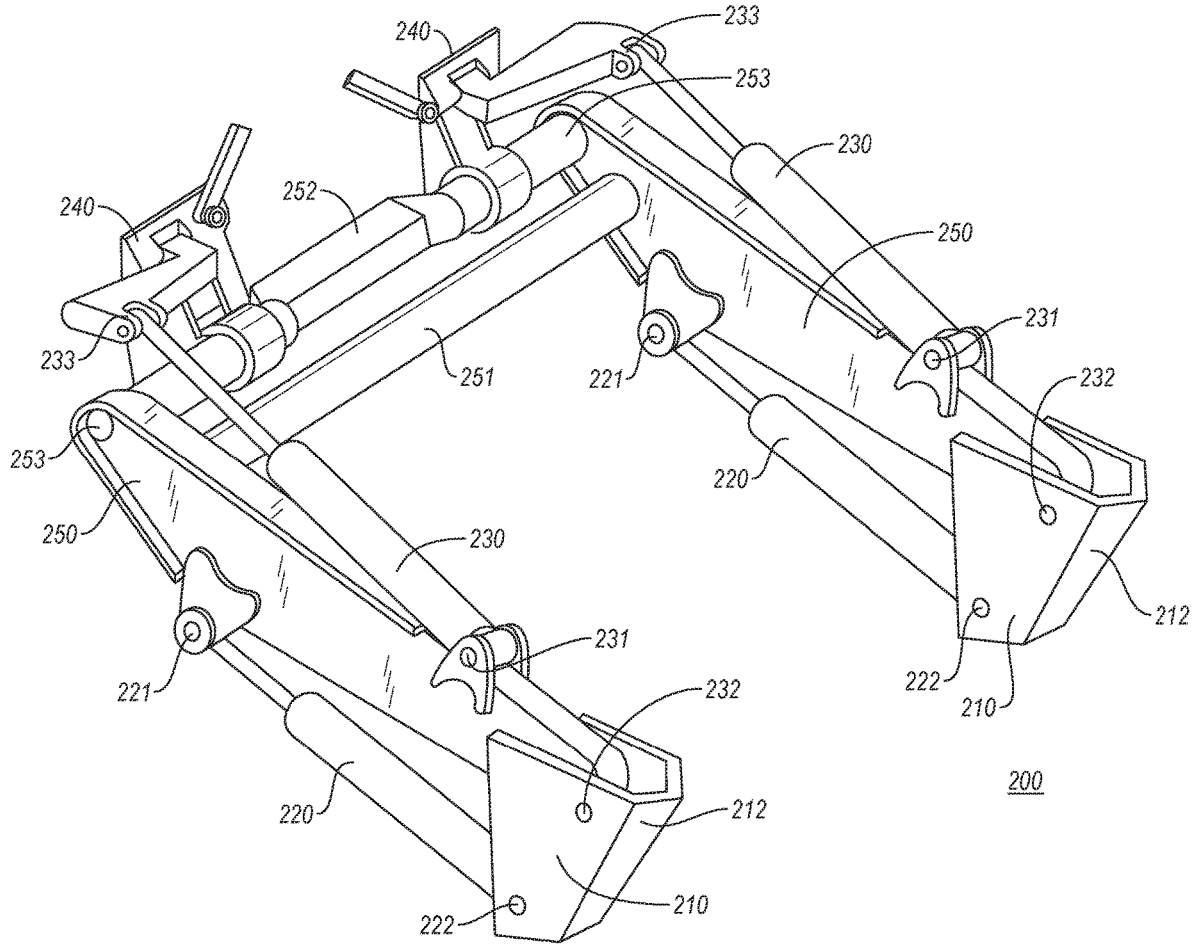
(52) **U.S. Cl.**

CPC ***E02F 3/627*** (2013.01); ***E02F 3/961*** (2013.01); ***E02F 3/4133*** (2013.01)

(57) **ABSTRACT**

An attachment assembly for attaching to a skid loader for operating at a rear of the skid loader is disclosed. The attachment assembly includes boot attachments for attaching to respective sides of the rear of the skid loader; side plates each attached to one of a respective of the boot attachments; and a quick attach plate attached to the side plates. The quick attach plate is configured for quick attachment to a skid loader accessory for performing a task at the rear of the skid loader.



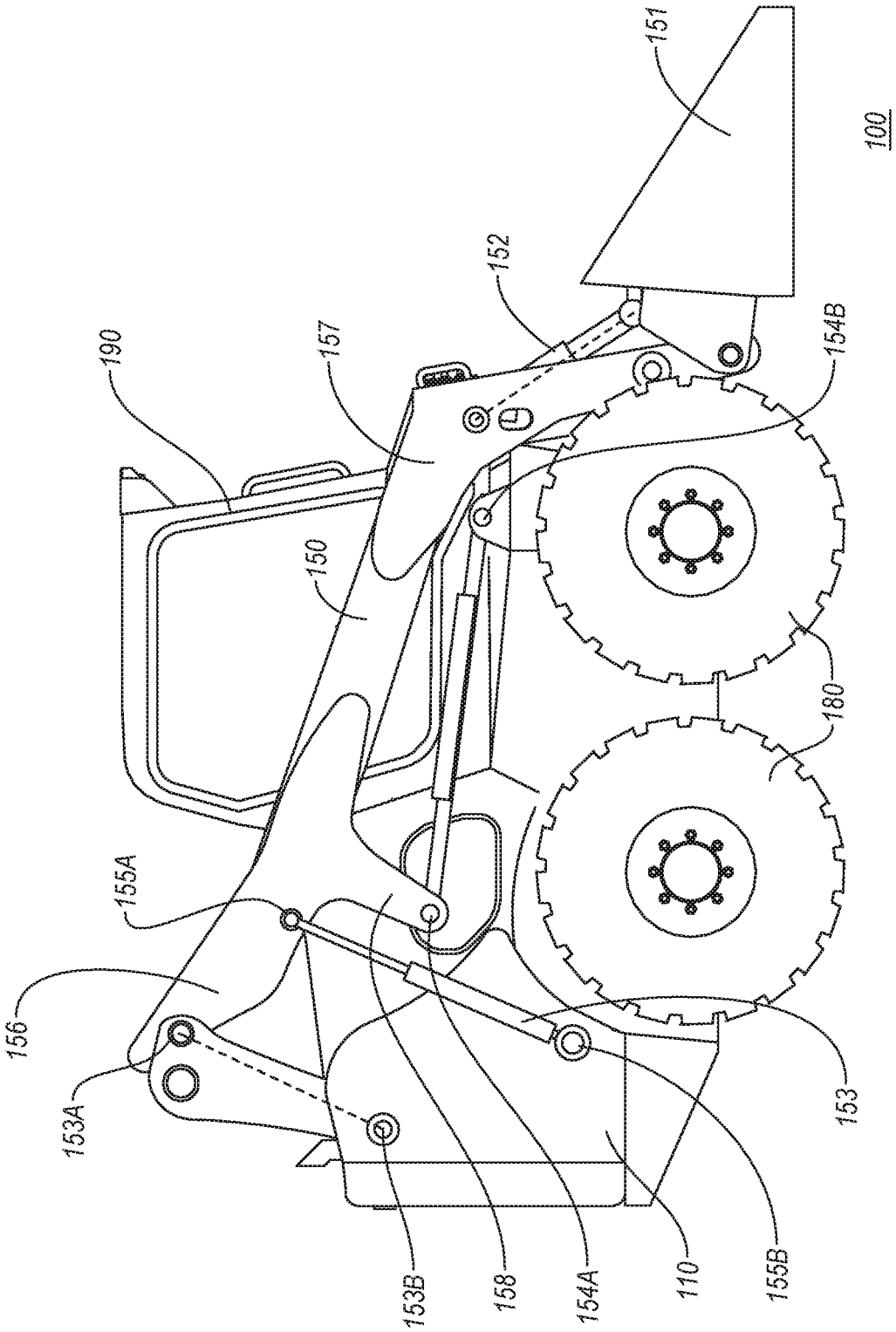

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FIG. 1

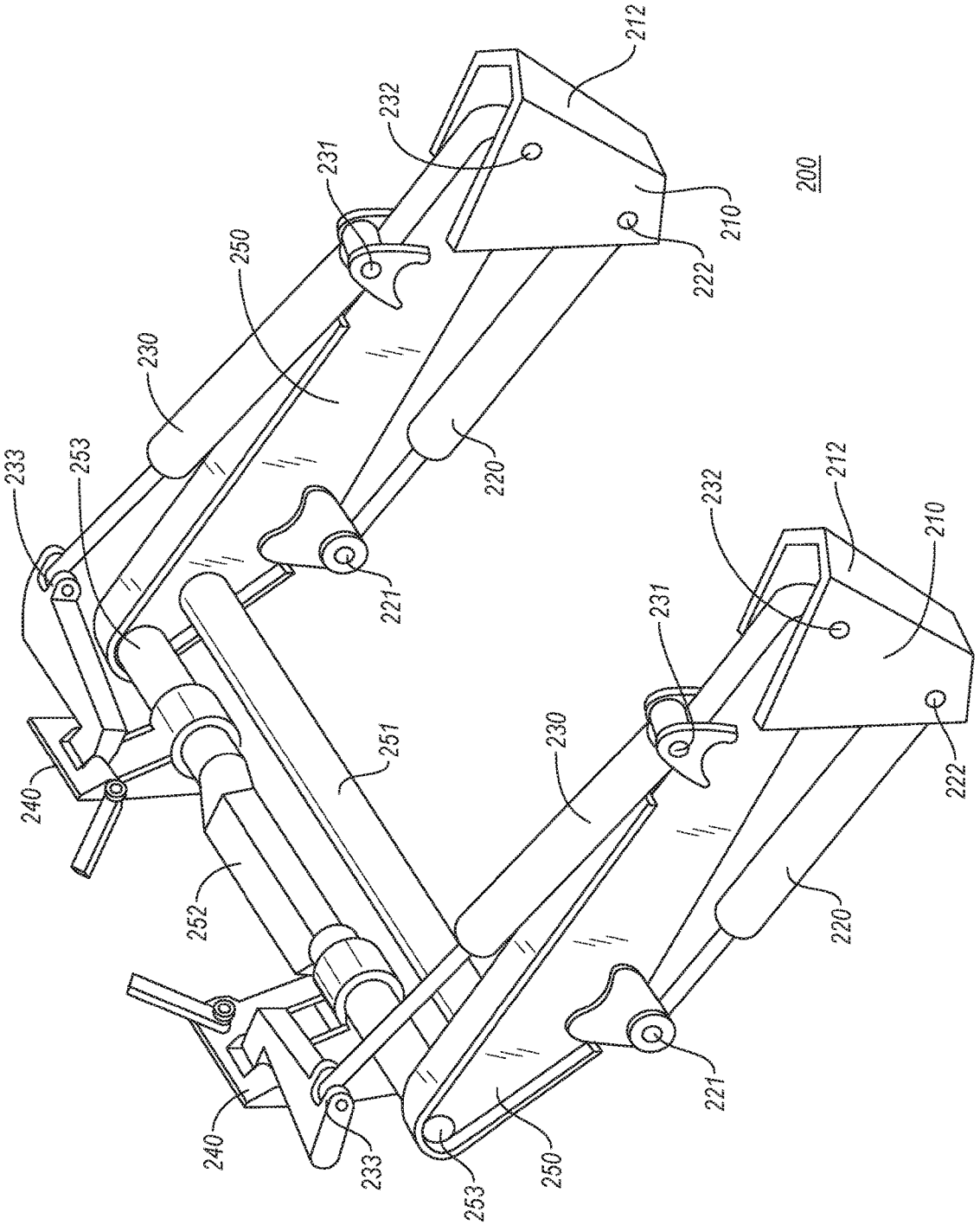

FIG. 2A

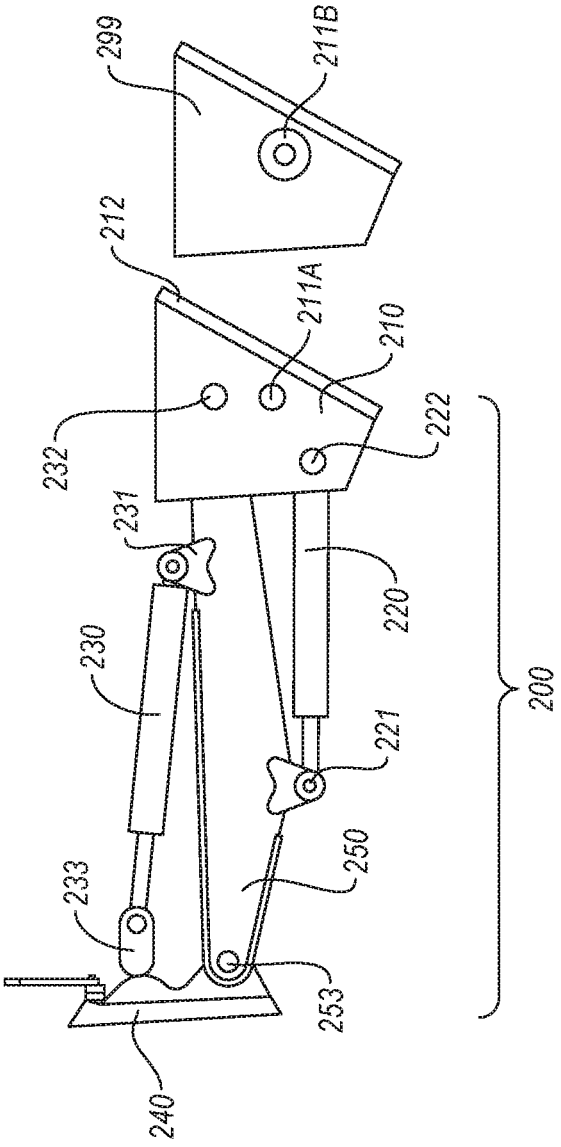
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FIG. 2B

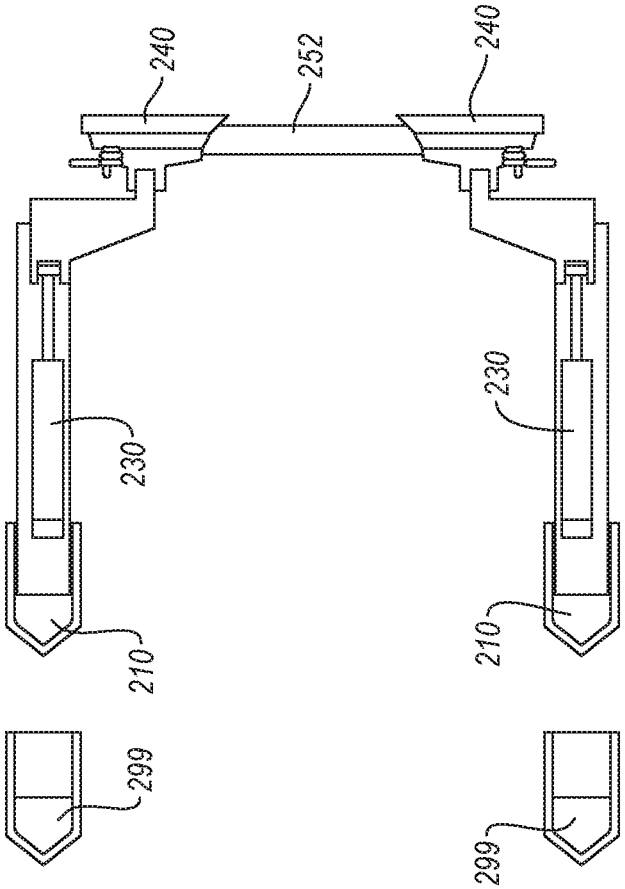

FIG. 2C

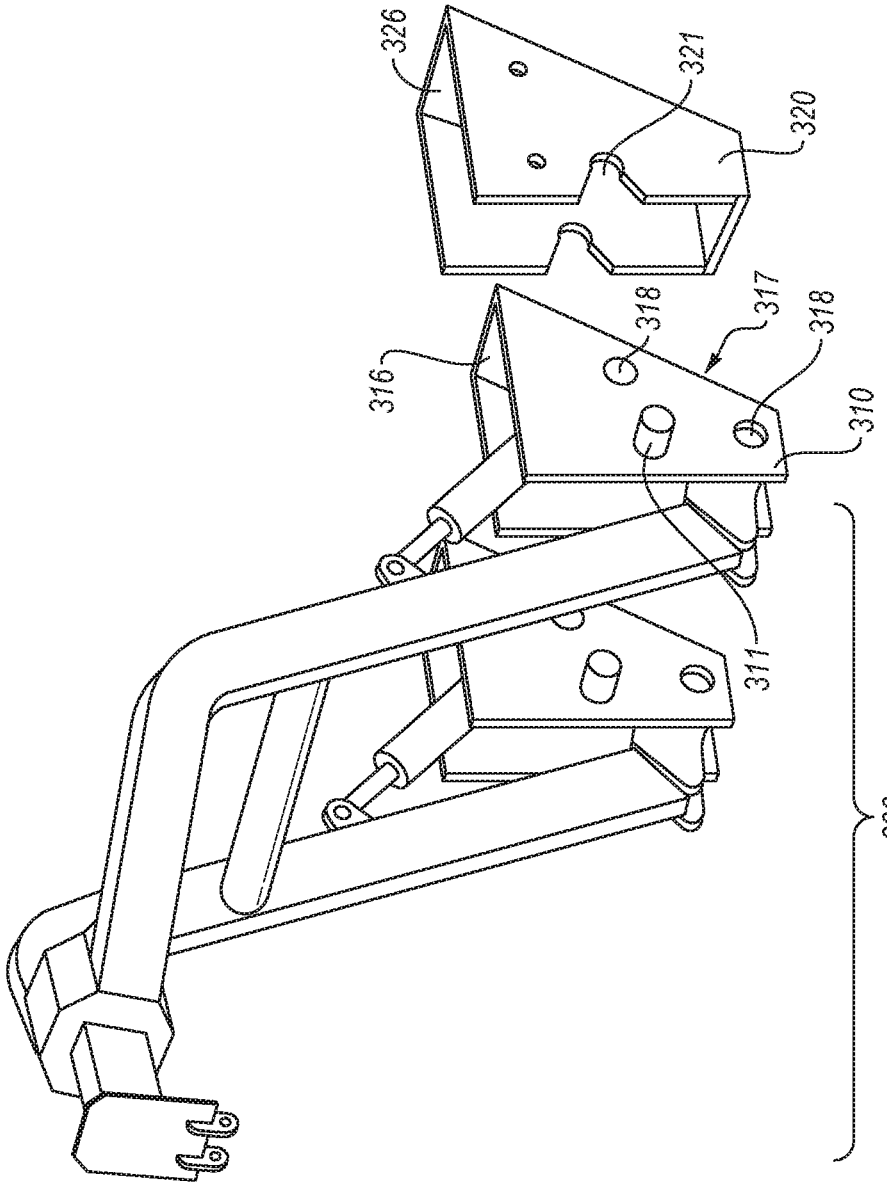

FIG. 3A

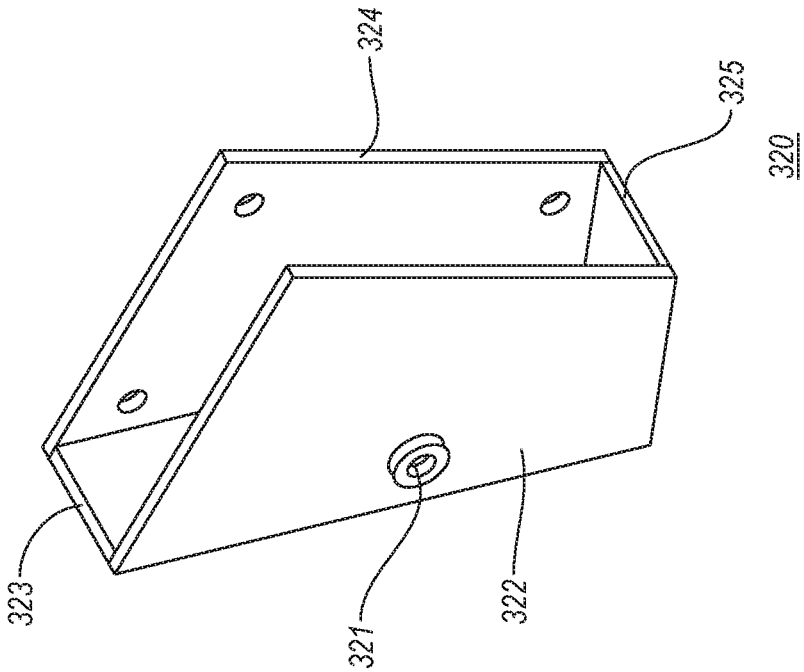

FIG. 3B

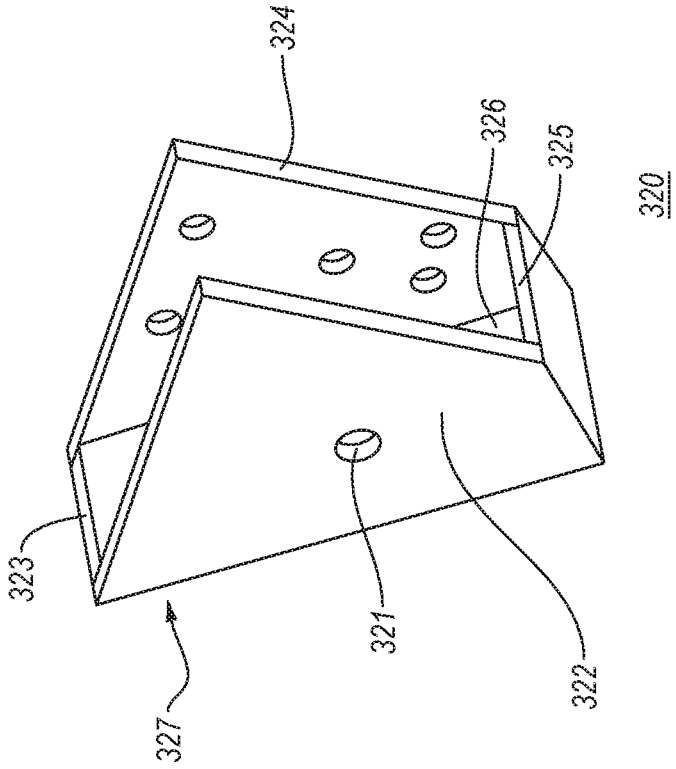

FIG. 3C

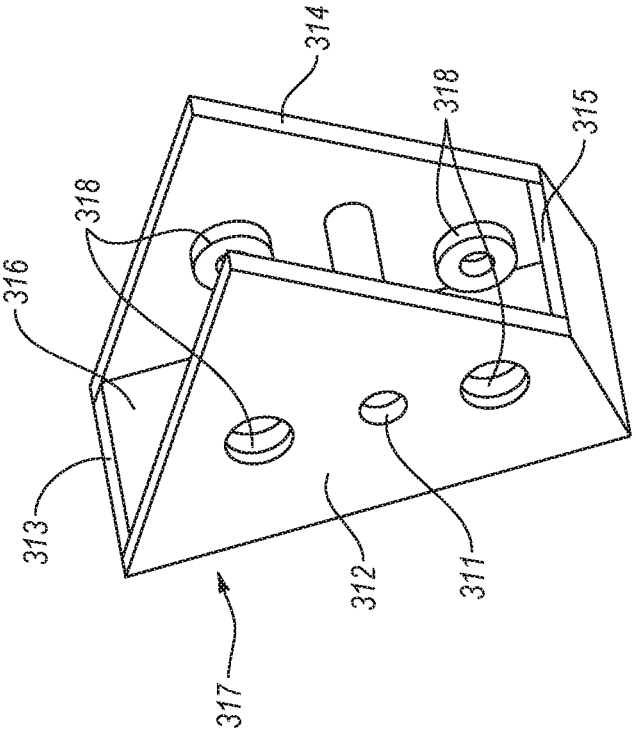

FIG. 3D

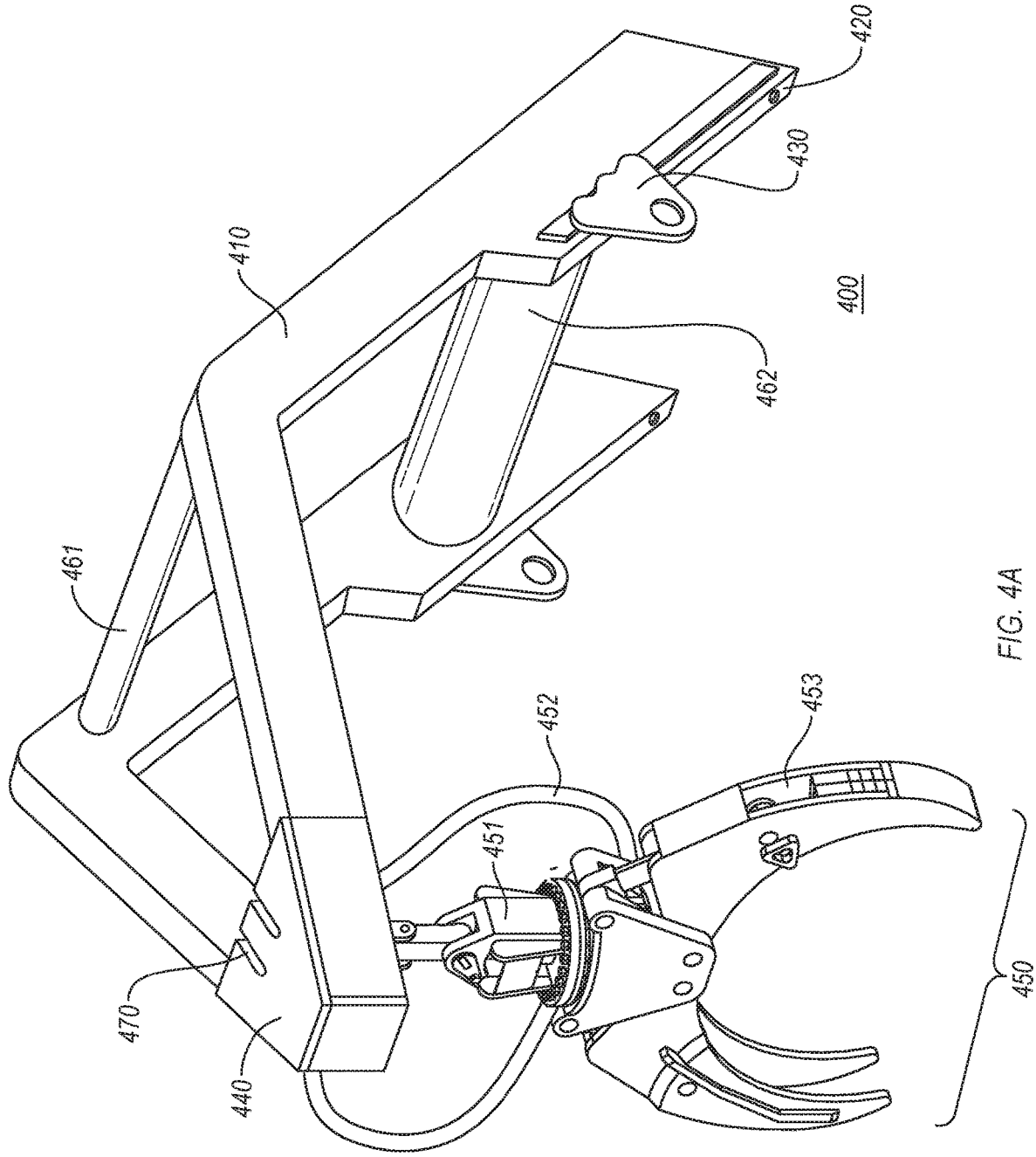

FIG. 4A

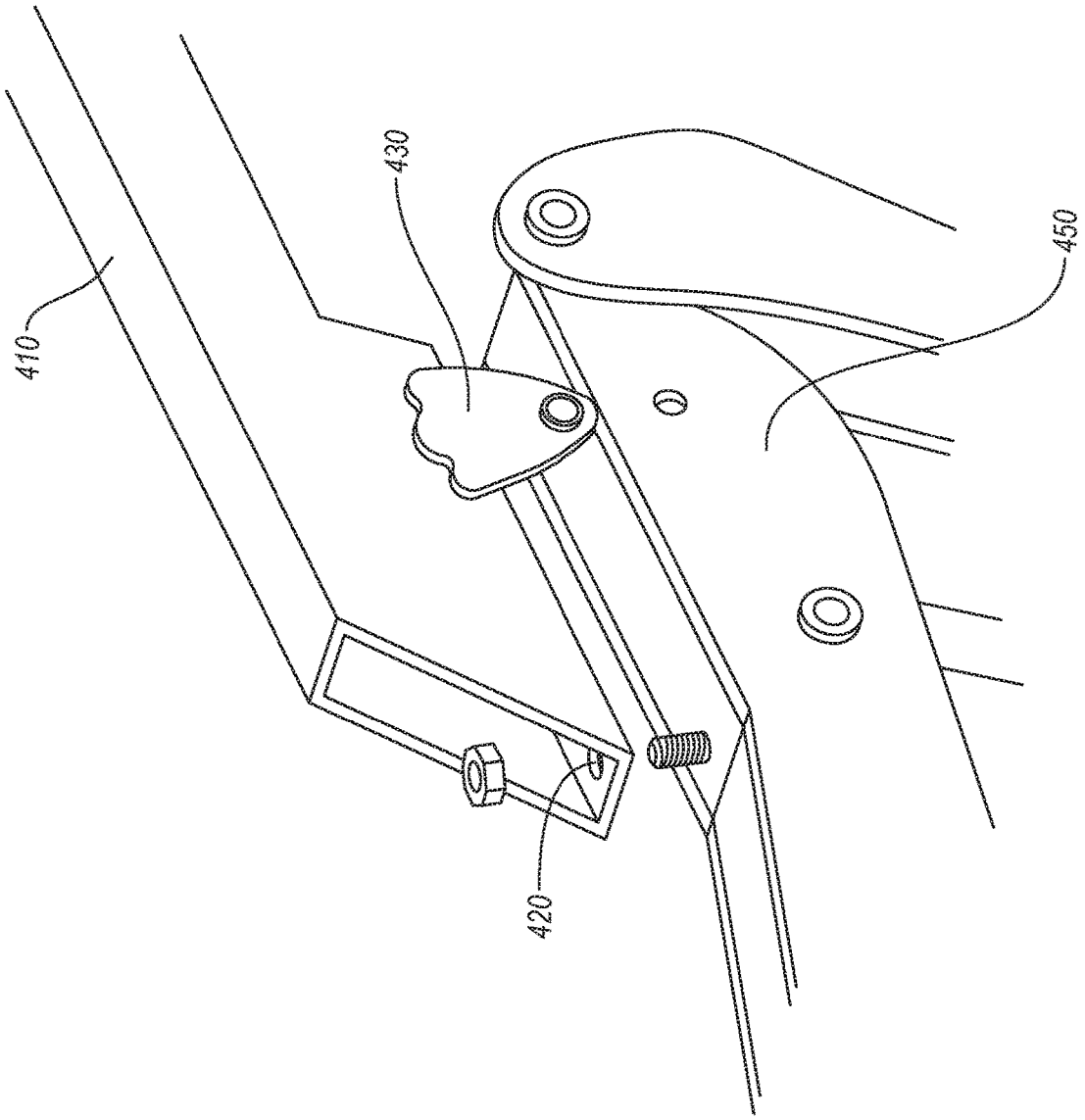

FIG. 4B

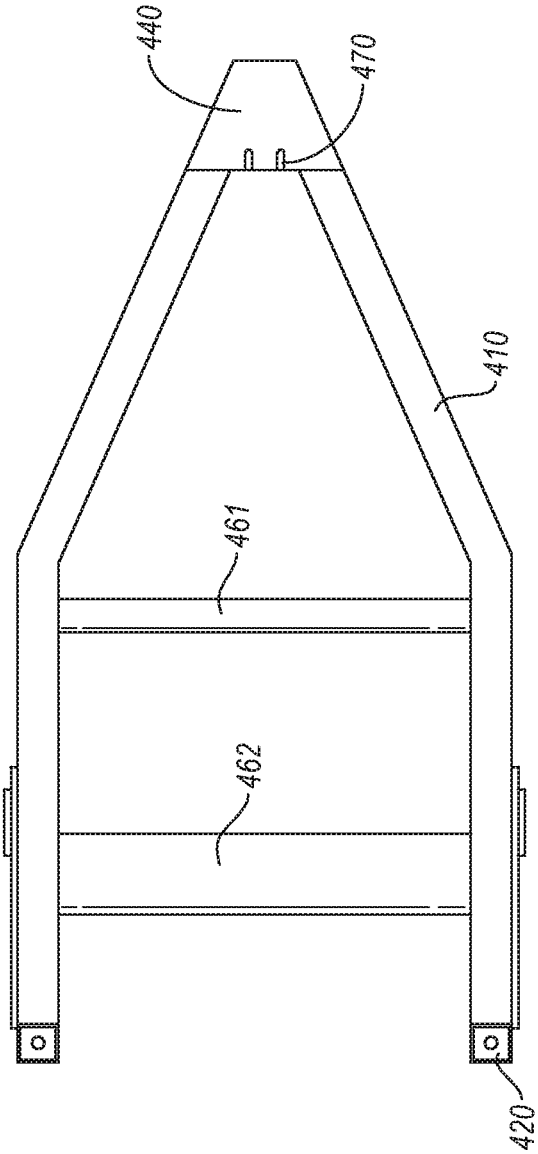

FIG. 4C

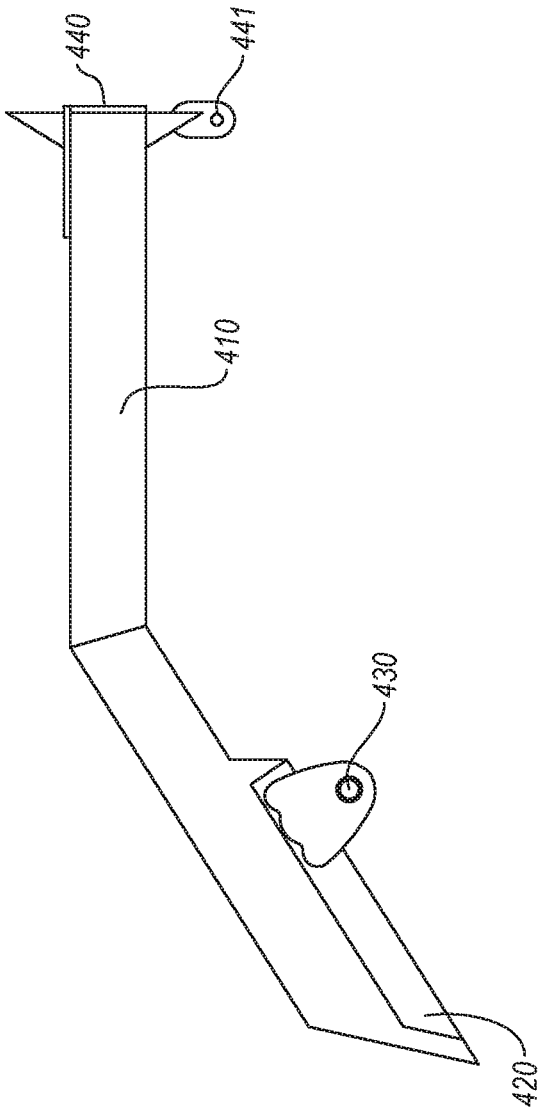

FIG. 4D

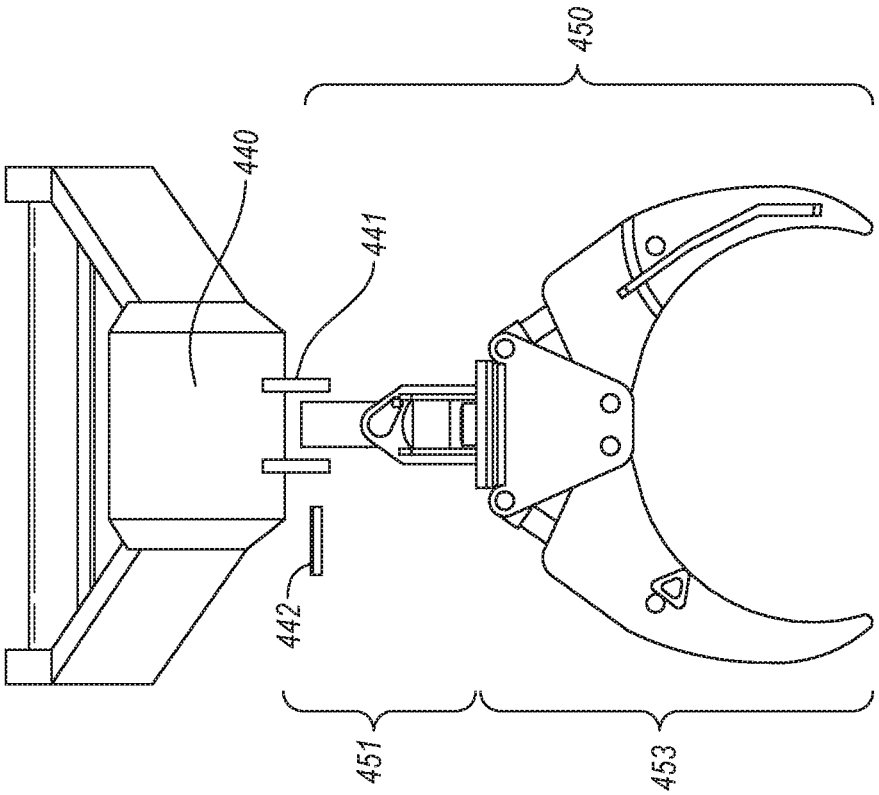

FIG. 4E

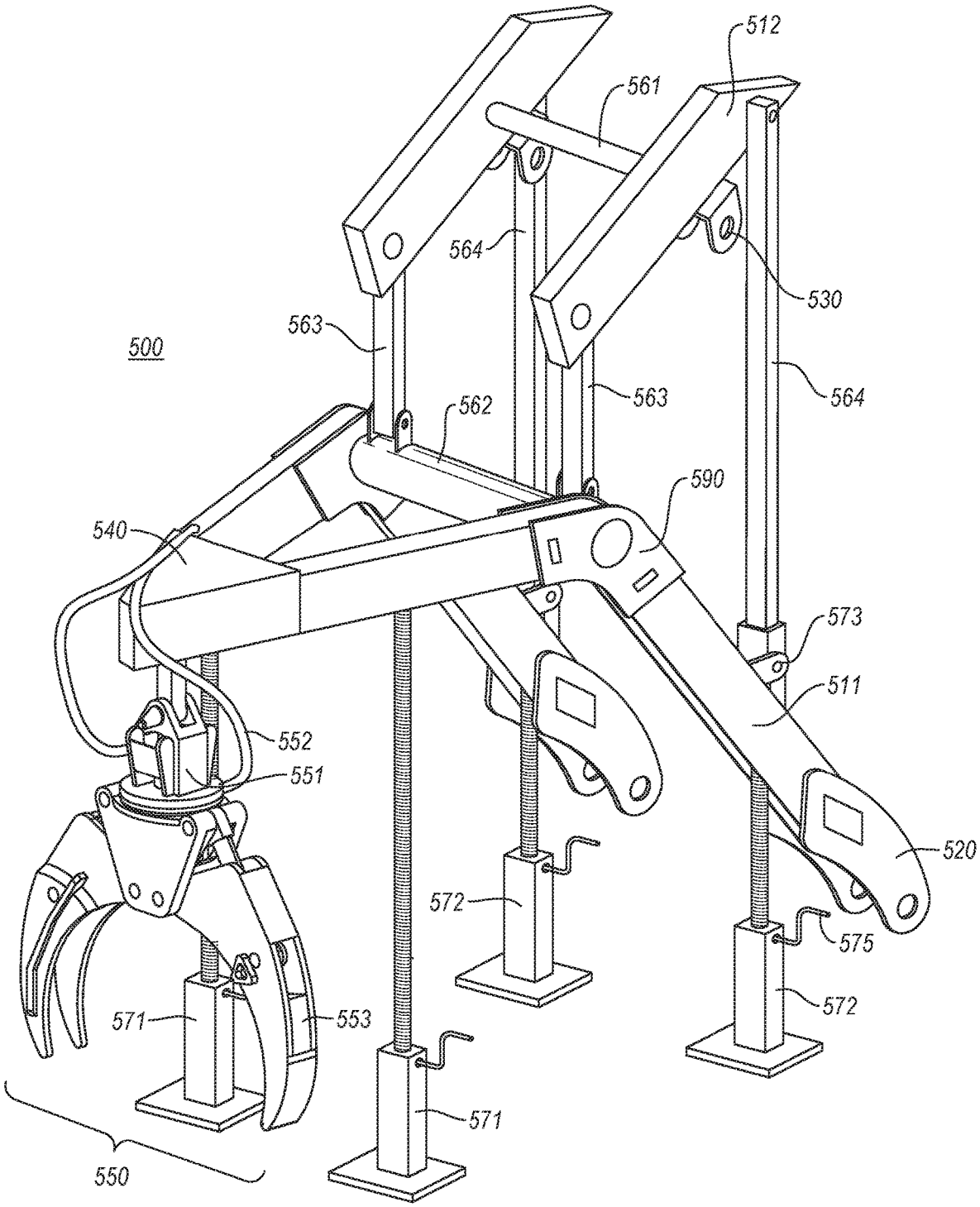
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FIG. 5

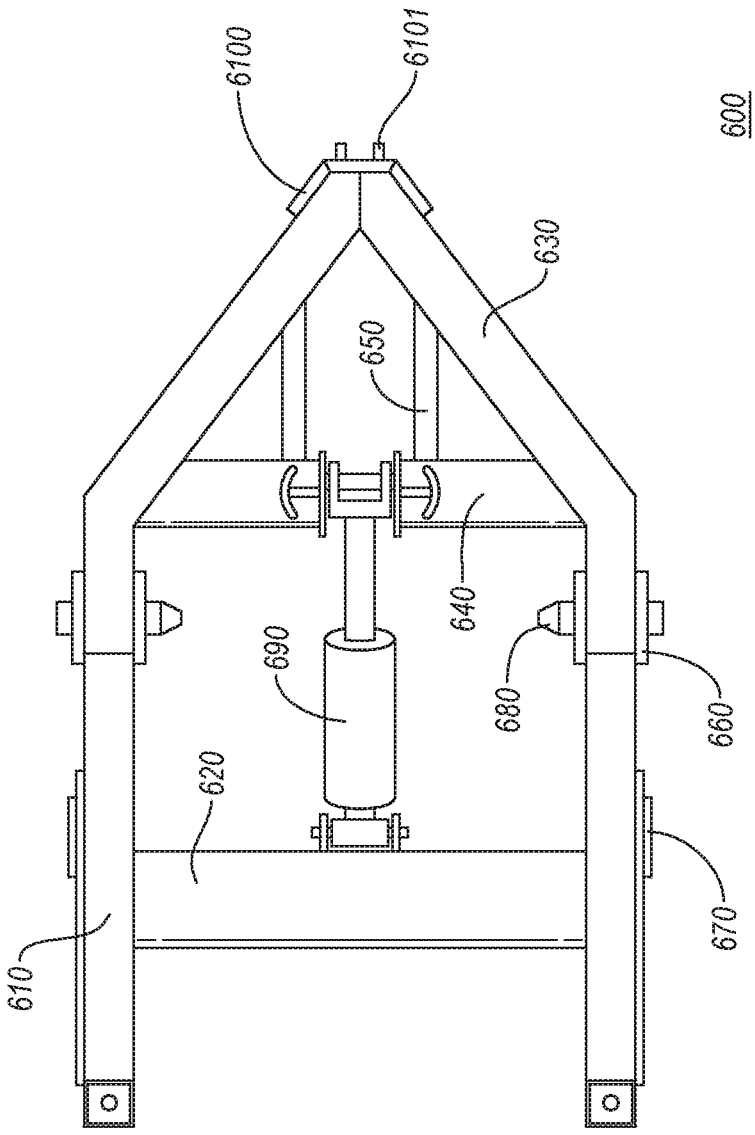

FIG. 6A

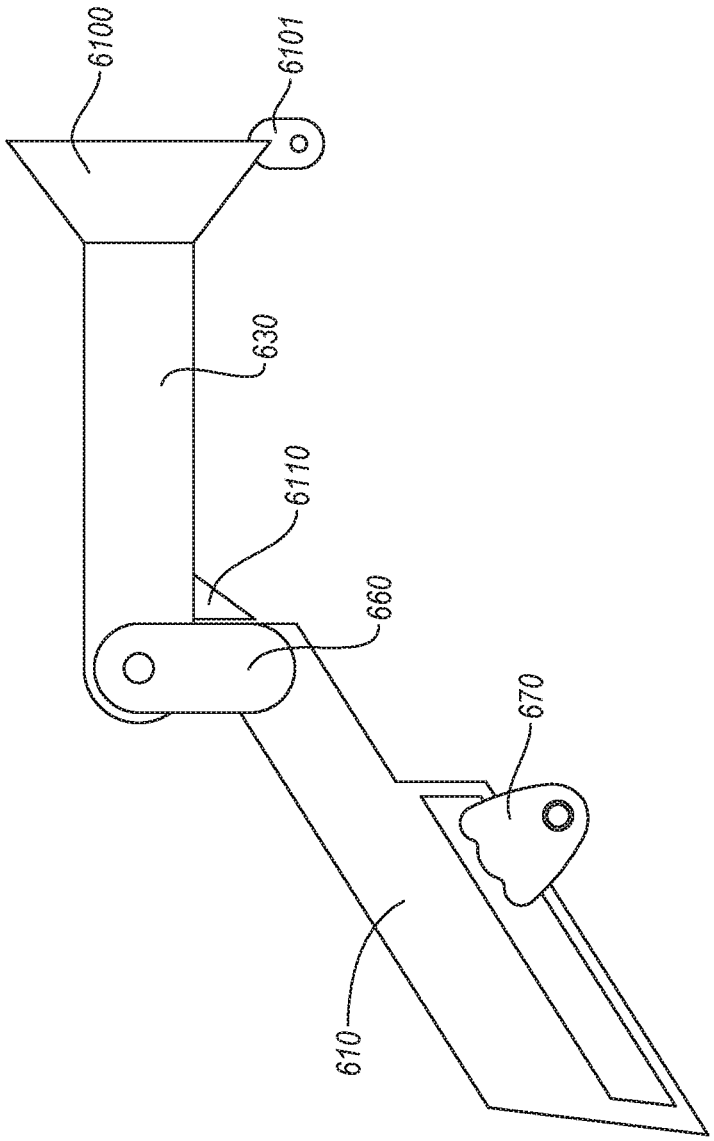

FIG. 6B

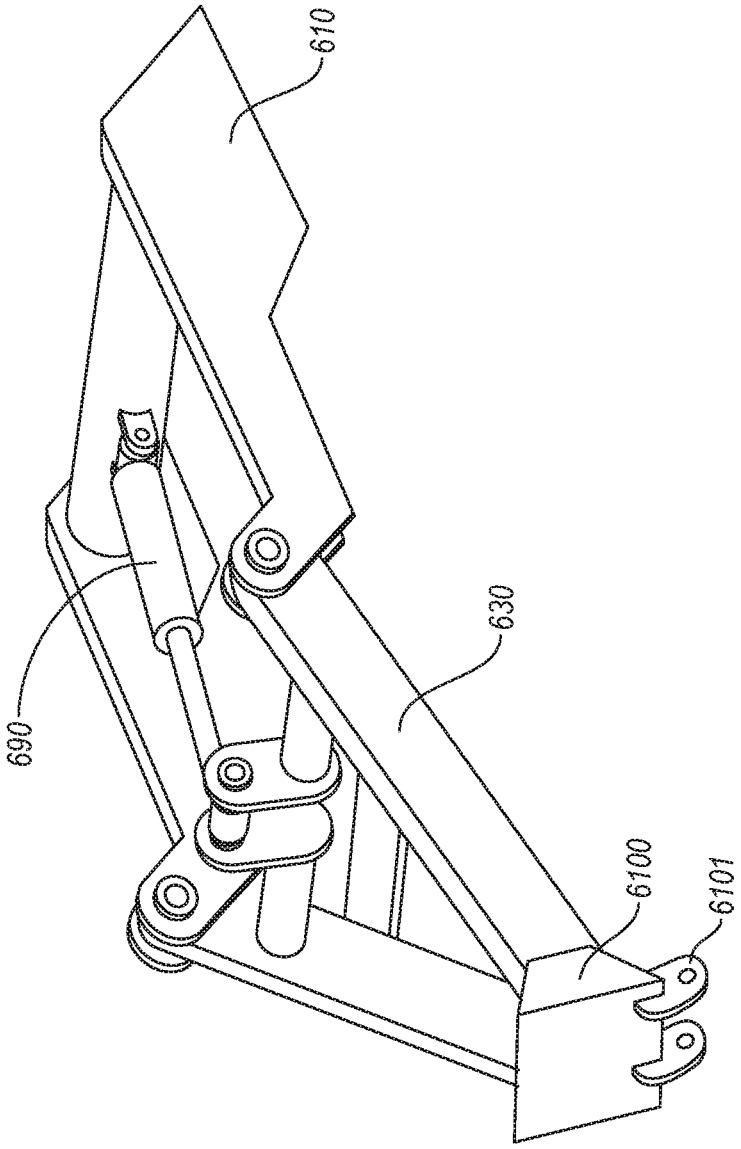

FIG. 6C

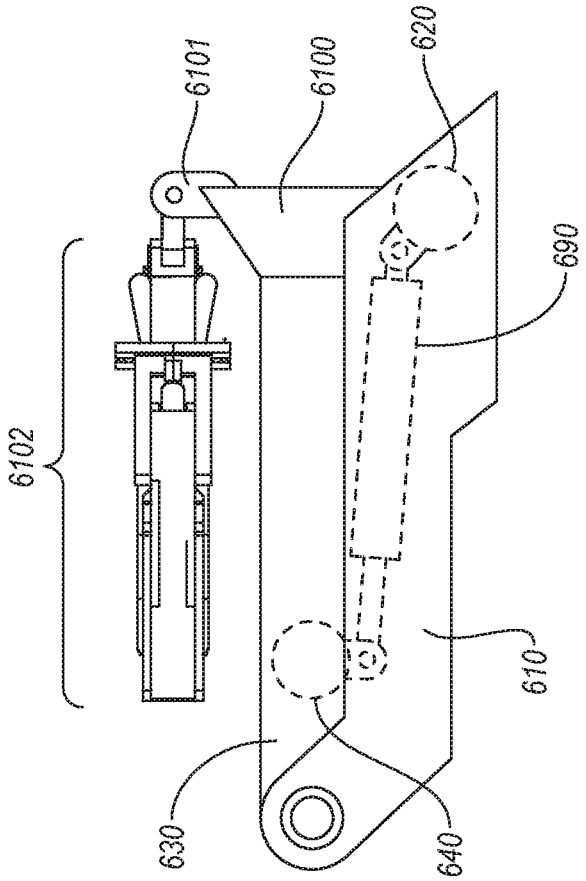

FIG. 6D

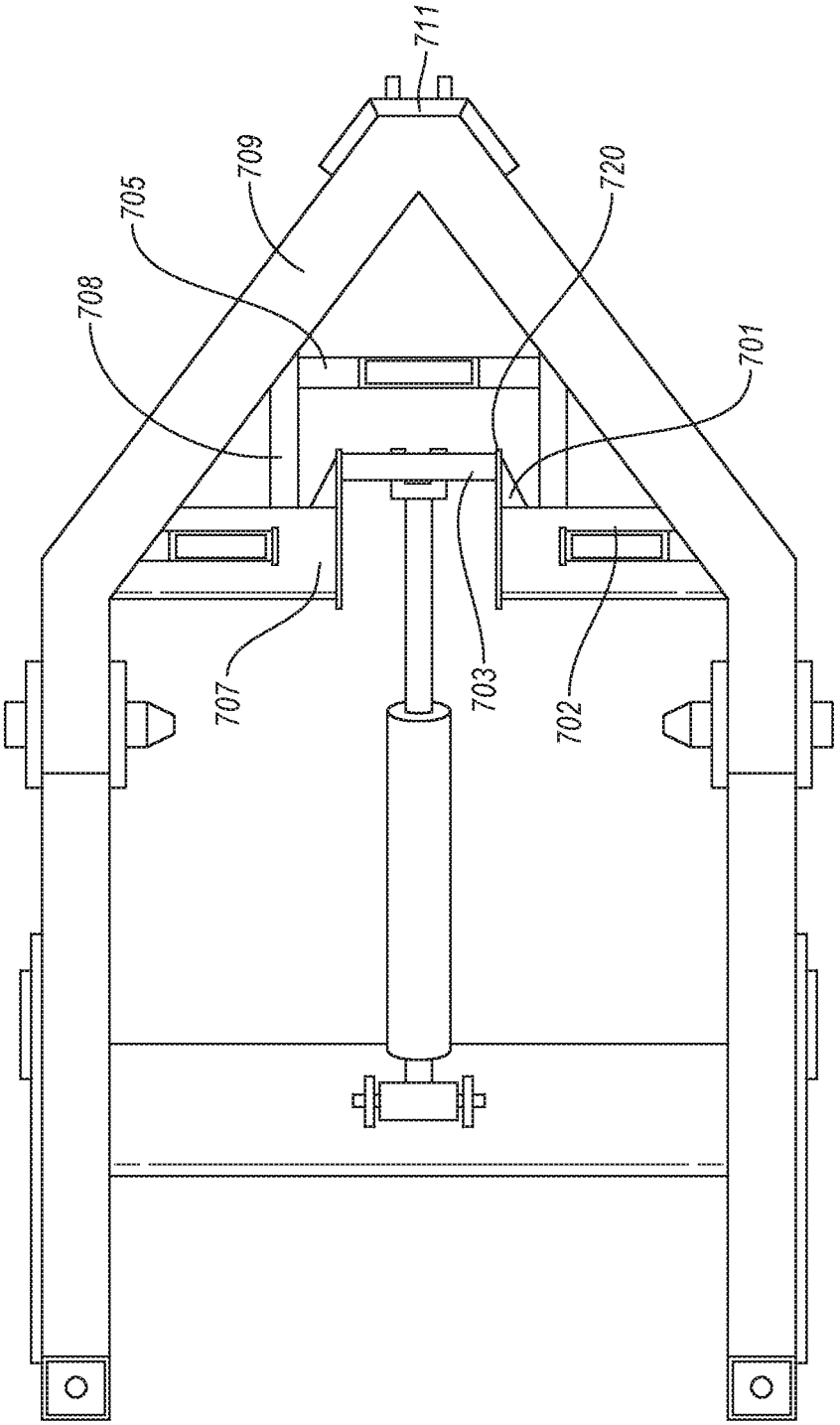

FIG. 7

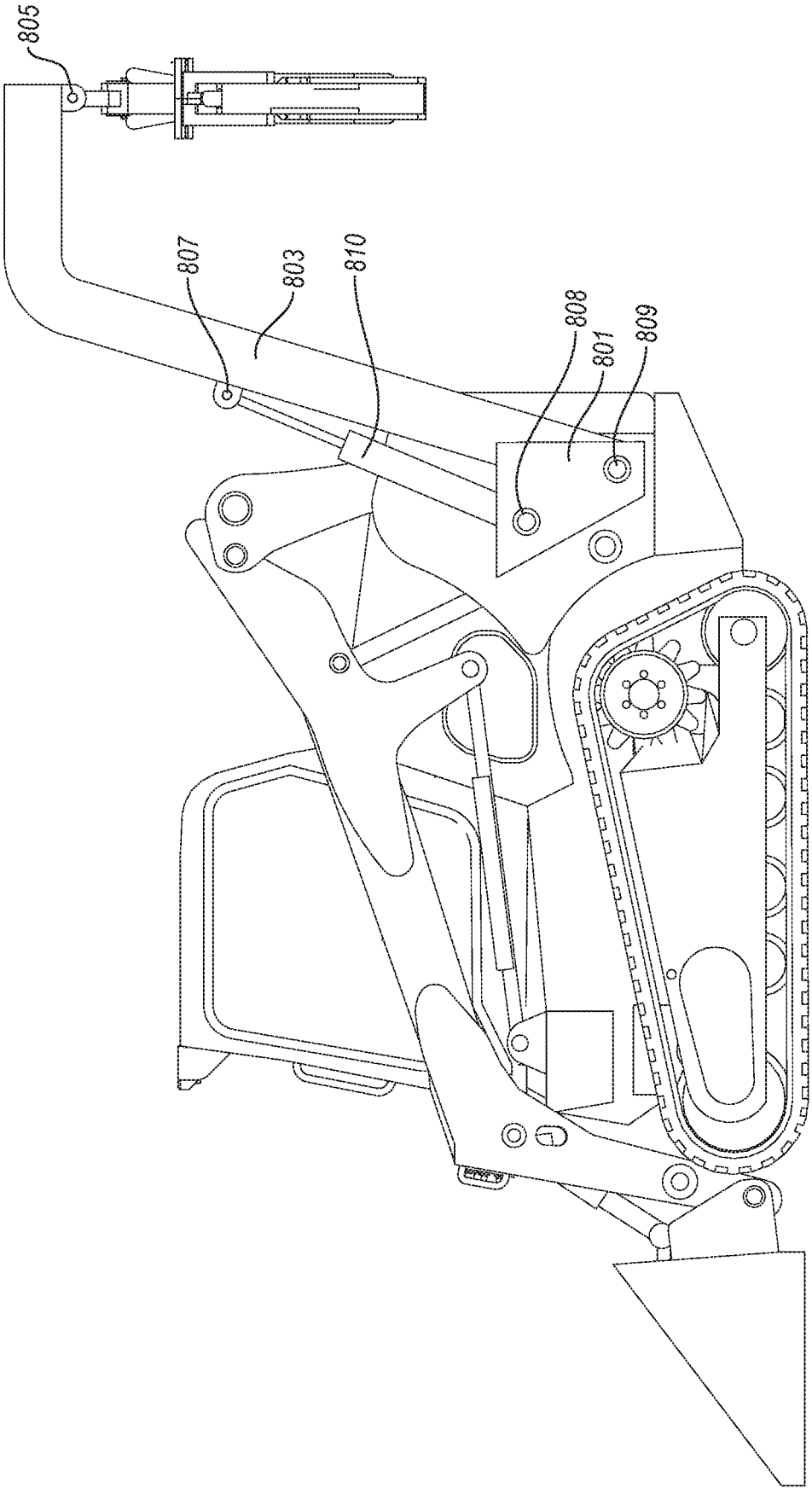

FIG. 8A

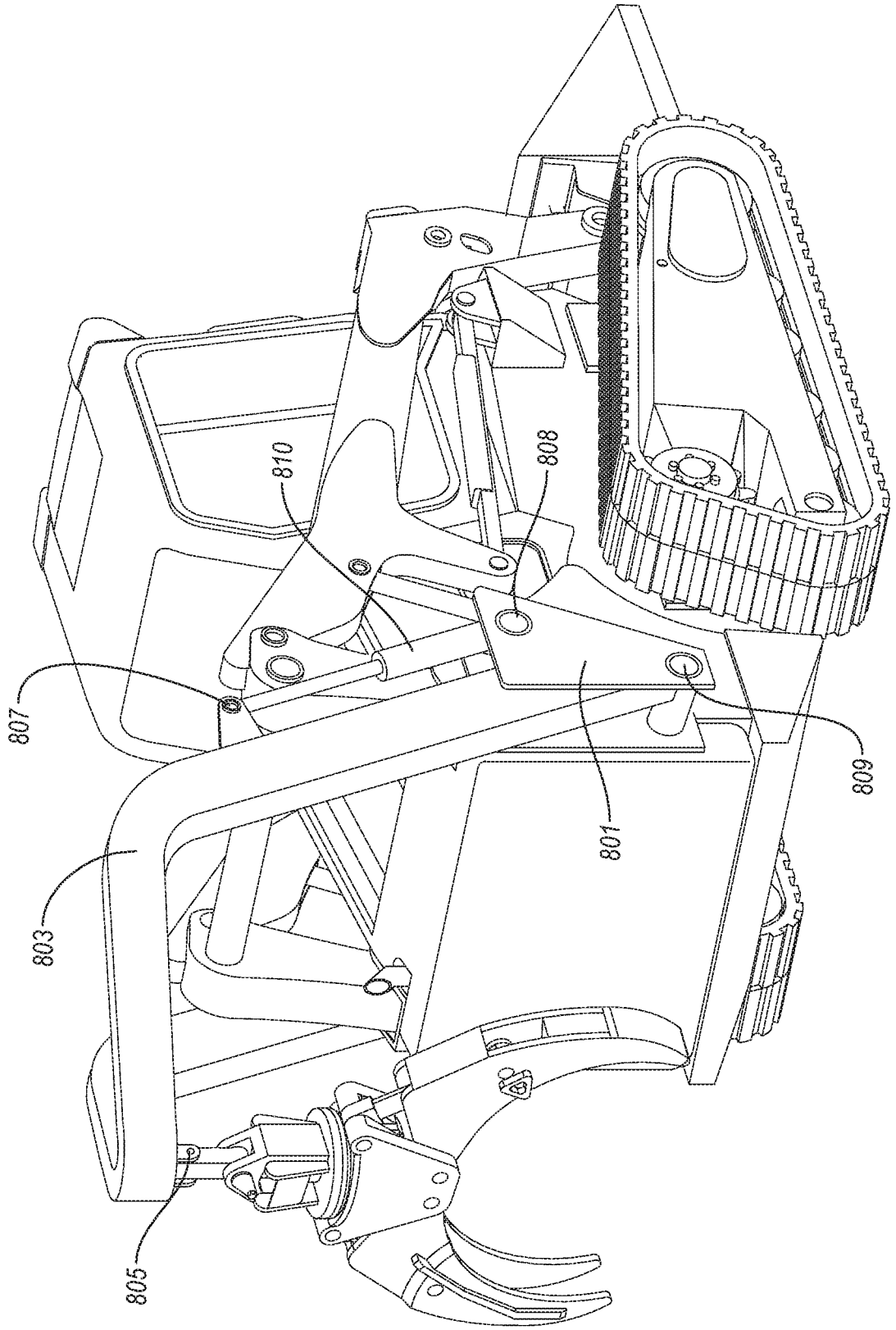

FIG. 8B

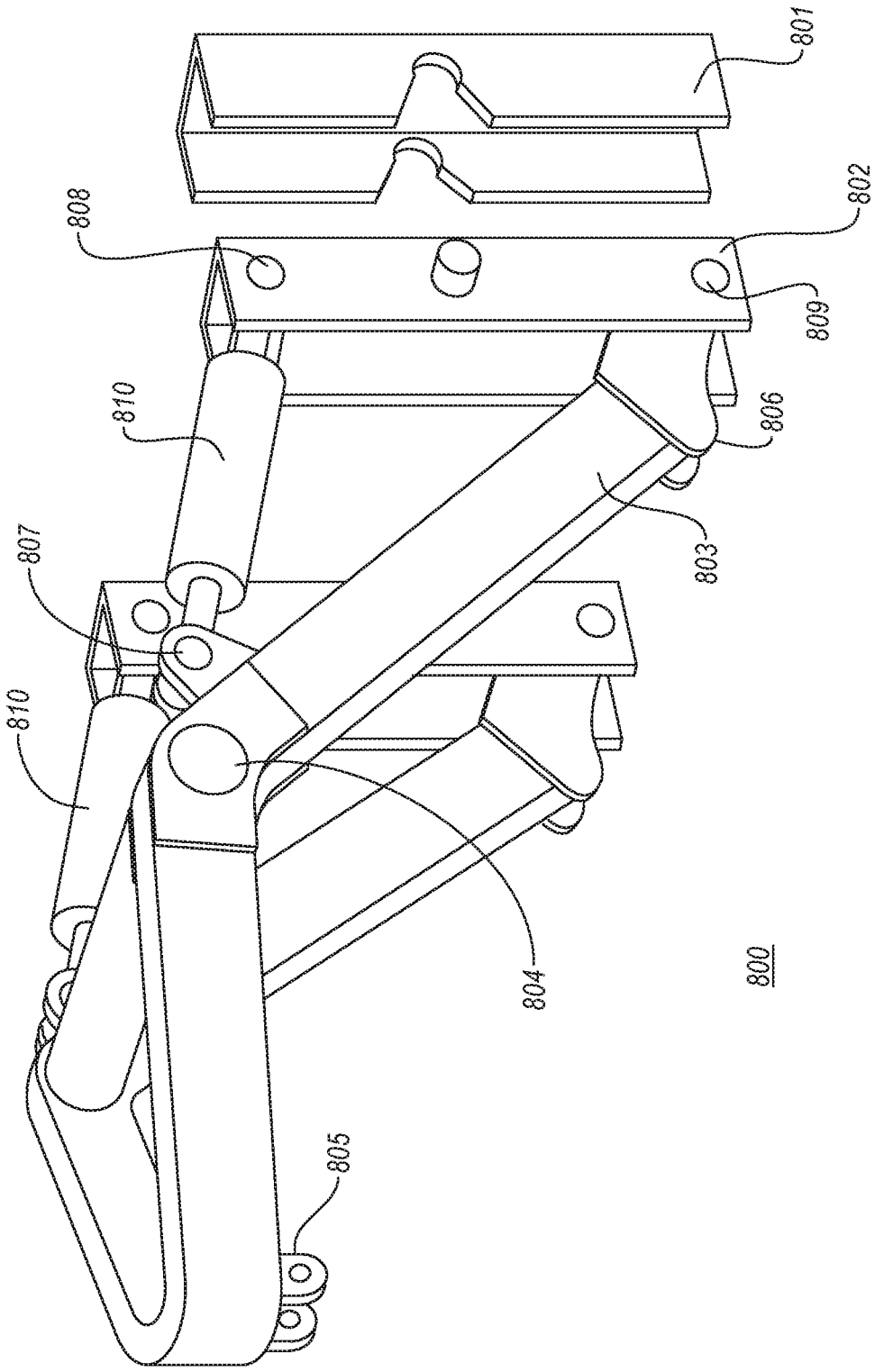

FIG. 8C

REAR ATTACHMENT ASSEMBLY FOR SKID LOADERS

[0001] The present application claims the benefits of and priority, under 35 U.S.C. § 119(e) to U.S. Provisional Patent Application No. 62/452,131 filed Jan. 30, 2017; the present application further claims the benefits of and priority, under 35 U.S.C. § 119(e), to U.S. Provisional Application Ser. No. 62/465,415 filed Mar. 1, 2017; the present application further claims the benefits of and priority, under 35 U.S.C. § 119(e), to U.S. Provisional Application Ser. No. 62/531,088 filed Jul. 11, 2017, and also claims the benefits of and priority, under 35 U.S.C. § 119(e), to U.S. Provisional Patent Application No. 62/595,569 filed Dec. 6, 2017; each of the above-identified provisional patent applications are hereby fully incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] The present invention generally relates to an attachment for skid loaders, and more particularly to a rear attachment assembly including a grappler for skid loaders.

Description of the Related Art

[0003] The skid loader, skidsteer, or "bobcat" is an engine-power vehicle including a liftable loader arm, where one or more attachments may be attached to the loader arm to perform various tasks. Common manufacturers of the skid loaders include Bobcat, Caterpillar, John Deere, Volvo, Komatsu, and others.

[0004] There are deficiencies in the related art. Attachments to the loader arm are attached in the front of the skid loader, which limits the type of tasks that can be perform by the skid loader and/or complicates and/or causes additional labor for the performance of certain tasks.

1 SUMMARY OF THE INVENTION

[0005] Accordingly, the invention is directed to an attachment for skid loaders that substantially obviate one or more of the problems due to limitations and disadvantages of the related art.

[0006] An advantage of an embodiment is to provide a reliable and robust attachment assembly for performing tasks in the rear of the skid loader, and for performing two or more tasks simultaneously from both the front and the rear of the skid loader.

[0007] Another advantage of an embodiment is to provide a quick attach system that may work with various existing tools for the rear of the skid loader.

[0008] Yet another advantage of an embodiment is to provide a foldable attachment assembly for light and compact storage with the attachment assembly is not in use.

[0009] A further advantage of an embodiment is to provide a free-standing attachment assembly for rapid attachment to the rear of a skid loader.

[0010] Another advantage of an embodiment is to provide a method modification to existing skid loaders to accommodate the attachment assembly at the rear of the skid loaders.

[0011] Additional features and advantages of the invention set forth in the description which follows, and in the art, will be apparent from the description, or may be learned by practice of the invention. The objectives and other advantages of the invention will be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended figures.

[0012] In an embodiment, an attachment assembly for attaching to a skid loader for operating at a rear of the skid loader comprises boot attachments for attaching to respective sides of the rear of the skid loader; side plates each attached to one of a respective of the boot attachments; and a quick attach plate attached to the side plates, wherein the quick attach plate is configured for quick attachment to a skid loader accessory for performing a task at the rear of the skid loader. The side plates are attached to one or more pistons for moving the side plates. Pistons are attached to one or more of the side plates and the quick attach plate. The pistons are configured for moving the side plates with respect to the quick attach plate. The boot attachments each comprises a boot insert configured to insertion into a boot attached to the rear of the skid loader. A pin is inserted into openings of the boot insert and the boot when the boot insert is inserted into the boot for securing the boot and the boot insert. Pistons are attached to one or more of the side plates and the boot insert. The pistons configured for moving the side plates with respect to the boot insert.

[0013] In another embodiment, a method for operating an attachment assembly to a rear of a skid loader comprises attaching boot attachments to respective sides of the rear of the skid loader; attaching the attachment assembly to the boot attachments; attaching a skid loader accessory to a quick attach plate of the attachment assembly; and operating the attachment assembly for performing a task using the skid loader accessory at the rear of the skid loader, wherein the attachment assembly comprises side plates each for attachment to one of a respective of the boot attachments and a quick attach plate attached to the side plates. The side plates are attached to one or more pistons for moving the side plates. Pistons are attached to one or more of the side plates and the quick attach plate. The method further comprises operating the pistons to move the side plates with respect to the quick attach plate. The attachment assembly comprises boot inserts, wherein the boot attachments comprise boots, and wherein the attaching the attachment assembly to the boot attachments comprises inserting the boot inserts into the boots. The attaching the attachment assembly to the boot attachments comprises inserting a pin into each respective opening of the boot inserts and the boots when the boot inserts are inserted into the boots for securing the boots and the boot inserts. Pistons are attached to one or more of the side plates and the boot insert. The method further comprises operating the pistons to move the side plates with respect to the boot insert.

[0014] In yet another embodiment, an attachment assembly for attaching to a skid loader for operating at a rear of the skid loader comprises a frame, wherein the frame comprises a lower portion including one or more attachment points; a top portion; and a tip portion, wherein the attachment points are configured to attach to the frame to corresponding points of the skid loader for fixating the attachment assembly to the rear of the skid loader, wherein the top portion is at an angle with the lower portion, and wherein the tip portion is attached to the top portion; and one or more attachments attached to the tip portion, wherein the attachments are configured to perform tasks at the rear of the skid loader, and wherein the frame is lifted or lowered when connected to a boom of the skid loader when the boom is lifted or lowered.

The attachments comprise a grapple. The attachments further comprise a rotator attached to the grapple. The corresponding points of the skid loader comprises points on the boom. The boom includes a loader arm, and wherein the loader arm counter balances the attachment assembly when the frame is attached to the boom. The assembly includes one or more stands for independently supporting the attachment assembly. The stands are detachable. The attachment assembly further comprises one or more attachment bars, wherein the attachment bars include further attachment points for attaching to further corresponding points of the boom of the skid loader, and wherein the attachment bars are attached to the frame. The attachment assembly is configured to be attached to the boom through the further attachment points being attached to the further corresponding points of the boom. The corresponding points comprise points on a substantially counter weight portion of the boom. The corresponding points comprise points on the boom. The corresponding points comprises points on a substantially counter weight portion of the boom. The corresponding points comprise points on a body of the skid loader. An area between the lower portion and the top portion comprises reinforcement. The attachment assembly comprises steel. The attachment is operable by an operator of the skid loader. The attachment is operable by the operator through hydraulics. The top portion is foldable onto the lower portion. The attachment assembly further comprises one or more mounts configured for resting the attachments when the top portion is folded onto the lower portion.

[0015] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

[0016] The phrases "at least one," "one or more," and "and/or" are open-ended expressions that are both conjunctive and disjunctive in operation. For example, each of the expressions "at least one of A, B and C," "at least one of A, B, or C," "one or more of A, B, and C," "one or more of A, B, or C" and "A, B, and/or C" means A alone, B alone, C alone, A and B together, A and C together, B and C together, or A, B and C together.

[0017] The term "a" or "an" entity refers to one or more of that entity. As such, the terms "a" (or "an"), "one or more" and "at least one" can be used interchangeably herein. It is also to be noted that the terms "comprising," "including," and "having" can be used interchangeably.

[0018] It shall be understood that the term "means," as used herein, shall be given its broadest possible interpretation in accordance with 35 U.S.C., Section 112(f). Accordingly, a claim incorporating the term "means" shall cover all structures, materials, or acts set forth herein, and all of the equivalents thereof. Further, the structures, materials or acts and the equivalents thereof shall include all those described in the summary of the invention, brief description of the drawings, detailed description, abstract, and claims themselves.

[0019] The preceding is a simplified summary of the disclosure to provide an understanding of some aspects of the disclosure. This summary is neither an extensive nor exhaustive overview of the disclosure and its various aspects, embodiments, and/or configurations. It is intended neither to identify key or critical elements of the disclosure nor to delineate the scope of the disclosure but to present selected concepts of the disclosure in a simplified form as an introduction to the more detailed description presented below. As will be appreciated, other aspects, embodiments, and/or configurations of the disclosure are possible, utilizing, alone or in combination, one or more of the features set forth above or described in detail below.

BRIEF DESCRIPTION OF THE FIGURES

[0020] The accompanying figures, which are included to provide a further understanding of the invention are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention.

[0021] FIG. **1** illustrates a side view of an exemplary skid loader.

[0022] FIG. **2**A illustrates a perspective view of an exemplary attachment assembly according to an embodiment; FIG. **2**B illustrates a side view of the attachment assembly with corresponding boots according to an embodiment; FIG. **2**C illustrates a top view of the attachment assembly with corresponding boots according to an embodiment.

[0023] FIG. **3**A illustrates a perspective view of an exemplary attachment assembly with a boot insert and a boot according to an embodiment; FIGS. **3**B and **3**C illustrate views of the boot according to an embodiment; FIG. **3**D illustrates views of the boot insert according to an embodiment.

[0024] FIG. **4**A illustrates a perspective view of an exemplary attachment assembly according to an embodiment; FIG. **4**B illustrates a close-up perspective view of the attachment assembly for attachment to a skid loader according to an embodiment; FIG. **4**C illustrates a top view of the attachment assembly according to an embodiment; FIG. **4**D illustrates a side view of the attachment assembly according to an embodiment; FIG. **4**E illustrates a front view of the attachment assembly according to an embodiment.

[0025] FIG. **5** illustrates a perspective view of an exemplary attachment assembly according to an embodiment.

[0026] FIG. **6**A illustrates a top view of an exemplary attachment assembly according to an embodiment; FIG. **6**B illustrates a side view of the attachment assembly according to an embodiment; FIG. **6**C illustrates a perspective view of the attachment assembly according to an embodiment; FIG. **6**D illustrates a side of the attachment assembly in a folded position according to an embodiment.

[0027] FIG. **7** illustrates a top view of an exemplary attachment assembly according to an embodiment.

[0028] FIG. **8**A illustrates a side view of an exemplary attachment assembly attached to a skid loader according to an embodiment; FIG. **8**B illustrates a perspective view of the attachment assembly attached to a skid loader according to an embodiment; FIG. **8**C illustrates a perspective view of the attachment assembly according to an embodiment.

DETAILED DESCRIPTION

[0029] Reference will now be made in additional detail to an embodiment of the present invention, example of which is illustrated in the accompanying figures.

[0030] FIG. **1** illustrates a side view of an exemplary skid loader.

[0031] In an exemplary skid loader **100**, the skid loader **100** may be a four-wheel drive vehicle with wheels **180** (and/or tracks, treads, or other attached components for moving the skid loader **100** on land), where the wheels **180**

on each side of the skid loader **100** are locked in synchronization (e.g., where the wheels on the right-side of the skid loader can be driven independently from the wheels on the left-side of the skid loader). The skid loader **100** may have no separate steering mechanism to the wheels **180** (e.g., the wheels are held in straight alignment to the body of the skid loader). To turn the skid loader **100**, the skid loader **100** may "skid." For example, the wheels **180** on each side of the skid loader **100** may be driven separately at different speed (e.g., faster on the left side than the right side for a right turn), thereby skidding one side of the skid loader **100**. Accordingly, a feature of the skid loader **100** is that torsion forces are effectively small on the body of the skid loader **100**, which may increase the strength and durability of the skid loader **100** for heavy duty task. The skid loader **100** includes a cab compartment **190** on top of the body **110** where an operator occupies in the cab compartment **190** and operates various parts of the skid loader **100** using controls.

[0032] The skid loader **100** includes a boom **150**. The boom **150** may be configured in various shapes, configurations, and/or structures. For example, boom **150** may include a loader arm **157** that includes a front section and a back section. A bucket **151** or other attachments may be attached to the front section of the loader arm **157**. The front section of the loader arm **157** may be formed at an angle with the back section to increase the range of positions of the bucket **151** (or other attachments) when the loader arm **157** is lifted (e.g., the bucket **151** may be positioned close to the ground when the loader arm is in an unlifted position and lifted high from the ground when the loader arm is in a lifted position) or for other purposes.

[0033] The boom **150** (and the loader arm of the boom **150**) is configured to be lifted from the body **110** (through one or more pistons, hydraulics, and/or other mechanisms **153**). For example, the boom **150** may be lifted through the action of the piston **153** connected to the rear of the body **110**. The lifting motion of the boom **150** may be controlled by various control or pivot points **153**A-**155**A on the boom **150** and the corresponding control or pivot points **153**B-**155**B on the body **110** (e.g., through connected bars or other component and/or mechanism between each of the pivot points **153**A-**155**A and corresponding pivot points **153**B-**155**B). A feature of this boom **150** is that a center of gravity of the lifted boom (with the potential weight of items in the bucket **151**) may be low and centered to the skid loader **100**. The boom **150** may further include counter weight portions **156** and **158** that are positioned with respect the loader arm for facilitating with countering the movement of the loader arm **157** (e.g., in conjunction in working with pivot points **153**A-**155**A and **153**B-**155**B). The counter weight portions **156** and **158** may be formed as extensions to the loader arm **157** (e.g., as one piece with the loader arm **157**).

[0034] In the exemplary skid loader **100** as shown, the bucket **151** (at the front of the skid loader) may be attached to the arm loader of the boom **150** and can be actuated and moved by the piston, hydraulic, and/or other mechanism **152**. In other configurations the arm loader **157** may use other attachments in place of or in conjunction with the bucket **151** (e.g., backhoe, hydraulic breaker, pallet forks, angle broom, sweeper, auger, mower, snow blower, stump grinder, tree spade, trencher, dumping hopper, ripper, tillers, grapple, tilt, roller, snow blade, wheel saw, cement mixer, and wood chipper machine).

[0035] U.S. Pat. Nos. 3,732,996 and 3,672,521, which are herein incorporated by reference, discussed quick attachment devices that are carried on the front of a loader arm and are used for quickly attaching and detaching various accessories, such as different types of buckets or grapples (e.g., bucket **151**).

[0036] FIG. **2**A illustrates a perspective view of an exemplary attachment assembly according to an embodiment; FIG. **2**B illustrates a side view of the attachment assembly with corresponding boots according to an embodiment; FIG. **2**C illustrates a top view of the attachment assembly with corresponding boots according to an embodiment.

[0037] In certain applications, it is desirable to perform tasks with a skid loader from the rear of the skid loader. For example, in a logging application, it is desirable to carry and/or drag logs from the rear of the skid loader (where the logs may be dragged while laid longitudinally at the rear of the skid loader when the skid loader is moving forward). In current practices, logs may be held in the front of the skid loader (using grapples and/or other attachments to the boom) while laid longitudinally and dragged by moving the skid loader in reverse. There are deficiencies in this practice in at least that the operator of the skid loader must control and steer the movement of the skid loader in reverse, which may be at least inconvenient if not dangerous (e.g., the operator will have to operate and drive the skid loader in reverse). Alternatively, logs may be held in the front of the skid loader by being placed longitudinally perpendicular to the front of the skid loader. Here, the logs would need to be lifted up from the ground (as it would be difficult to drag logs when placed in this longitudinally perpendicular position to the skid loader) and would need further work of the operator and/or other workers to position the logs onto the skid loader in this longitudinally perpendicular position. Further, the lengths of logs that may be carried in the manner may be limited, as the length of the log would effectively represent a clearance width that the skid loader would need to clear on the sides (e.g., the skid loader would not be able to move effectively if the sides of the road or path are obstructed within the length of the log). Therefore, there are further deficiencies with this practice in that it may require potentially higher costs in labor and/or expenses to move logs in this manner (e.g., less logs may be moved in one trip due to the skid loader having to bear the full weight of the logs versus having the option to drag logs on the ground, additional time and/or labor needed from the operator and/or other workers, and/or a limit on the size of the log that may be moved).

[0038] In an embodiment, attachment assembly **200** may be used to attach to the rear of the skid loader and perform tasks from the rear of the skid loader (e.g., carrying items such as logs from the rear of the skid loader).

[0039] Attachment assembly **200** includes boot inserts **210**, each for attachment to corresponding a boot **299** attached to the rear of a skid loader. In an embodiment, boots **299** may be bolted or otherwise attached to corresponding locations of the skid loader (e.g., towards the bottom of the body at each side of the rear of the skid loader for support and balance or at other suitable locations). The boots **299** may be attached to the separable attachment assembly **200** through attachment with the boot inserts **210**. The boot inserts **210** may slide into the respective boots **299**, where the openings **211**A of the boot inserts **210** and the openings **211**B of the boots **299** may align, with sides **212** facing the

interior of the boots **299**, and a pin or other securing component or mechanism may be inserted into the openings to secure (e.g., lock) the boots **299** and the boot inserts **210** together.

[0040] The attachment assembly **200** includes side plates **250**. The side plates **250** may each be respectively attached to a boot insert **210** through opening **232**. In an embodiment, the side plates **250** may be attached respectively to a boot insert **210** additionally through piston **220** through openings **221** of the side plates **250** and opening **222** of the respective boot insert **210**. Openings **221**, **222**, and **232** may allow rotational movement of the side plates **250** with respect to the boot inserts **210**. Additionally, the piston **220** (or other mechanism) may facilitate and/or control the movement of the side plates **250** through the extension and contraction of the piston **220**.

[0041] The attachment assembly **200** includes quick attach plate **240**. The quick attach plate **240** may be attached to the end of the side plates **250** opposite of the boot insert **210** through openings **253**. In an embodiment, the side plates **250** may be attached to the quick attach plate **240** additionally through piston **230** through openings **231** of the side plates **250** and openings **233** of the quick attach plate **240**. Openings **231**, **233**, and **253** may allow rotational movement of the side plates **250** with respect to the quick attach plate **240**. Additionally, the piston **230** (or other mechanism) may facilitate and/or control the movement of the quick attach plate **240** through the extension and contraction of the piston **220**.

[0042] In an embodiment, the side plates **250** may be connected with supports **251** and **252** (e.g., pipe or bar) for further structural support of the side plates and/or the quick attach plate **240**.

[0043] In an embodiment, the quick attach plate **240** may be used to quickly attach and detach various accessories, such as different types of tools, buckets, grapples, and/or other accessories. These accessories may be part of a standard group of accessories for a skid loader (e.g., for the front of a skid loader). In an embodiment, the quick attach plate **240** may use similar quick attach mechanisms or devices or accessories that are carried on the front of a loader arm of a skid loader and are used for quickly attaching and detaching various accessories (e.g., quick attach devices discussed in U.S. Pat. Nos. 3,732,996 and 3,672,521, Bob-Tach mounting system, and/or other quick attach mechanisms). The quick attach plate **240** may attach to in the rear of the skid loader standard accessories that are designed for attachment to these quick attach mechanisms or devices on the front of the loader arm.

[0044] In operation according to an embodiment, the attachment assembly **200** may attach to the rear of a skid loader by aligning the boot inserts **210** to the respective boots **299** that are attached to the rear of the skid loader. For example, the attachment assembly **200** may be set at a location (e.g., supported by a stand on the ground), and a skid loader with the boots **299** installed at the rear may be operated to back into the attachment assembly **200** where the boot inserts **210** may be inserted into the boots **299**. A pin may then be inserted into the openings **211**A and **211**B when the boot inserts **210** are inserted into the boots **299** to attach the attachment assembly **200** with the skid loader.

[0045] Pistons **230** and **220** may be controllable (e.g., through hydraulics and/or other mechanical or electronics mechanism by the operator of the skid loader) to lift or lower the attachment assembly **200** when attached to the skid loader (e.g., similar to the boom and the front of the skid loader). In an embodiment, accessories with a quick attach mechanism or device may attach to the quick attach plate **240** (e.g., the skid loader may be backed into the accessory with the quick attach mechanism to attach with the quick attach plate **240**).

[0046] In an embodiment, the attachment assembly **200** (with one or more accessories attached) may be used to facilitate various tasks that can be performed by the skid loader. For example, in a logging operation, it may be desirable that an accessory such as a grapple be positioned at the rear of the skid loader so that logs that are grabbed by the grapple could be dragged from behind the skid loader when the skid loader is moving (e.g., the operator of the skid loader would not need to operate the skid loader in reverse, which may be beneficial for safety and operator convenience and comfort). In another example, it may be desirable for certain applications that the weight of the task to be better distributed to a different area or component of the skid loader (e.g., the body of the skid loader as opposed to the boom). For example, in a logging operation, a log grappled and dragged by the skid loader may be heavy, and it may be desirable that the body of the skid loader support some of the weight of the log (as opposed to the boom).

[0047] In a further embodiment, the additional accessories attached to the attachment assembly **200** may be in addition and/or complementary to the accessory attached to the front of the skid loader. For example, construction or other projects or tasks may need to use two or more tools or accessories simultaneously or in quick succession. Consequently, a skid loader with a front quick attach system may need to remove a first accessory and then attach a second accessory for the task, which takes time for the removal and attachment process. Alternatively, the task may use two or more skid loaders with different accessories attached, which inefficiently takes up resources for a task. In an embodiment, two or more accessories may be attached to the same skid loader (e.g., one in the front and another in the rear using the attachment assembly **200**). The first accessory may be used for the task, and when the second accessory is needed, the operator of the skid loader may reverse the skid loader to continue performing the task with minimal time or resource loss. In another embodiment, one or more operators may simultaneously use the two or more accessories (e.g., in the front and rear of the skid loader) for performing one or more tasks.

[0048] In an embodiment, the attachment assembly **200** and the quick attach plate **240** may be used to attached to a grapple or other tools similar to attachment assemblies as discussed in this disclosure or other attachment assemblies as known now or may be later derived in the art.

[0049] FIG. **3**A illustrates a perspective view of an exemplary attachment assembly with a boot insert and a boot according to an embodiment; FIGS. **3**B and **3**C illustrate views of the boot according to an embodiment; FIG. **3**D illustrates views of the boot insert according to an embodiment.

[0050] The boot **320** includes at least an opening **321**, side **322**, top edge **323**, side edge **324**, bottom edge **325**, interior side **326**, and exterior side **327**. The boot insert **310** includes at least an opening **311**, side **312**, top edge **313**, side edge **314**, bottom edge **315**, interior side **316** and exterior side **317**.

[0051] In an embodiment, the boot **320** may be attached to a skid loader (e.g., two boots may be attached to two respective sides of the rear body of the skid load), with the exterior side **327** abutting the skid loader. Complementary boot inserts **310** may be attached to an attachment assembly **399** (e.g., attachment assembly **399** may be an attachment assembly as discussed in this disclosure or other attachment assemblies as known now or may be later derived in the art) to modify the attachment assembly **399** for attachment to the boot **320**. For example, portions of the attachment assembly **399** (e.g., piston and/or anchor portions that would be attached to the rear of the skid loader) may fit into the interior side **316** (e.g., through attachment with openings **318**).

[0052] The exterior side **317** of the boot insert **310** may be inserted into the interior side **326** of the boot **320** for attachment of the attachment assembly **399** to the side loader. A pin or other attachment mechanisms may be inserted into the openings **311** and **312** for securing the attachment of the boot insert **310** with the boot **320**.

[0053] In an embodiment, the boot **320** may be dimensioned with widths of 6" at the top edge **323** and 5" at the bottom edge **325**, with lengths of 14" between the top edge **323** and the side edge **324** and 8" between the bottom edge **325** and the interior side **326**, and with heights of 16" along the side edge **324** and 19" along the exterior side **327**.

[0054] In an embodiment, the boot insert **310** may be dimensioned with widths of 5½" at the top edge **313** and 4½" at the bottom edge **315**, with lengths 15½" between the top edge **313** and the side edge **314**, and with heights of 15½" along the side edge **314** and 18½" along the exterior side **317**.

[0055] FIG. **4**A illustrates a perspective view of an exemplary attachment assembly according to an embodiment; FIG. **4**B illustrates a close-up perspective view of the attachment assembly for attachment to a skid loader according to an embodiment; FIG. **4**C illustrates a top view of the attachment assembly according to an embodiment; FIG. **4**D illustrates a side view of the attachment assembly according to an embodiment; FIG. **4**E illustrates a front view of the attachment assembly according to an embodiment.

[0056] As discussed with respect to FIGS. **2**A-**2**C, in certain applications, it is desirable to perform tasks with a skid loader from the rear of the skid loader. In an embodiment, attachment assembly **400** may be used to attach to the boom of the skid loader and perform tasks from the rear of the skid loader (e.g., carrying items such as logs from the rear of the skid loader).

[0057] Attachment assembly **400** includes a frame **410** for attachment to a boom of a skid loader from the rear. In an embodiment, the frame **410** may be attached to the boom through various attachment points **420** and **430**. For example, each sides of the frame **410** may be shaped at the attachment points **420** and **430** for alignment to be attached to the respective sides of the back section of a boom (e.g., the counter weight portion **156** of boom **150**). Therefore, the frame **410** may be act as an extension of the back section of the boom (e.g., each sides of the frame **410** may act to elongate the respective arms of the back section of the boom towards the rear of the skid loader).

[0058] In an embodiment, the frame **410** may include a top portion that includes a tip **440** for holding an attachment **450**. The attachment **450** may include a grapple **453** or other types of attachments for performing tasks at the rear of the skid loader. In an embodiment, the grapple **453** (or other attachments) may be attached to the tip **440** through a rotator **451** (allowing the grapple **453** the ability to rotate with respect to the frame **410**, which may be stationary or fixed in the horizontal plane with respect to the skid loader). The rotator **451** may be attached to the tip **440** by rings **441** and a pin **442** through the rings **441**, and the rotator **451** inside the rings **441** may secure the setup.

[0059] In another embodiment, the grapple **453** (or other attachments) may be attached to the tip **440** through chains or other attachment components and/or mechanisms. For example, chains may be attached to grooves **470**. The grapple **453** (or other attachments) may be controlled through hydraulics **452** or other control mechanisms by the operator. In an embodiment, the grapple **453** (or other attachments) and/or the attachment **450** may be detachable and/or may be replaced with other components and/or attachments.

[0060] In an embodiment, the top portion of the frame **410** (including the tip **440**) may be formed or aligned at an angle with the lower portion of the frame **410** (including attachment points **420** and **430**) that is configured to attach to the boom of the skid loader as an extension of the back portion of the boom. It may be desirable for the angle that the attachment **450** is aligned with respect to the ground (horizon) at certain angle or range of angles. For example, if the grapple **453** is attached for a logging operation, it may be desirable for the base of the grapple **453** to be more parallel with the ground (as opposed to being in a more perpendicular alignment) so that the grapple **453** may apply a stronger grip to logs while dragging the logs on the ground. The angle that the top portion of the frame **410** makes with the lower portion of the frame **410** may facilitate the desired use of the attachment **450** (e.g., where the lower portion of the frame **410** may extend the boom of the skid loader, which may itself have an angle with respect to the ground, the top portion of the frame **410** aligns the attachment **450** to a more suitable and/or desirable angle or ranges of angles during operation of the attachment assembly **400**).

[0061] In operation according to an embodiment, the attachment assembly **400** may be lifted or lowered through the operation of the boom of the skid loader. For example, when the attachment assembly **400** is attached to the boom **150** as an extension of the boom **150**, the attachment assembly **400** (along with the attachment **450**) may raise and/or lower depending on the lifting of the boom **150**. It is noted that because the attachment assembly **400** is installed at the rear of the skid loader, the lifting or the lowering of the attachment assembly **400** may be opposite to a would-be attachment at the front of the boom **150** (e.g., bucket **151**) when the boom **150** is lifted or lowered. For example, if the bucket **151** would be lifted due to a lifting of the boom **150**, the attachment assembly **400** would be correspondingly lowered. It is also noted that because the attachment assembly **400** is attached to a back portion of the boom (e.g., around counter weight portion **156**), the front portion of the boom (e.g., the loader arm portion) may act as the counter weight for the attachment assembly **400** during the lifting (e.g., the lifting and lowering movement of the attachment assembly **400** is cantilevered by the boom of the skid loader). In an embodiment, the bucket **151** or other attachment may be attached to the loader arm portion for further counter weight and/or may be removed if not needed for the tasks.

[0062] In an embodiment, the sides of the frame **410** may be attached by bars **461** and **462** of various thicknesses for reinforcement or other purposes.

[0063] In an embodiment, the frame **410** may be composed of ½" thick steel. The frame **410** may have a length of 51" at the lower portion (the portion with attachment points **420** and **430** for attachment to the boom) and a length of 60" at the top angled portion. The tip **440** may have a width of 7¼" at the narrowest point. The angle between the lower portion and the top angled portion may be 31 degrees. The total width of the lower portion of the frame **410** may be 50", the interior width may be 42", and the width of each side may be 3". The distance between the attachment points **420** and **430** may be 24". The height of the steel bars making up the frame may be 8" at the lower portion and 5½" at the top portion.

[0064] In an embodiment, the attachment point **440** may be attached to the boom using ⅞" bolts and washers, and the attachment point **430** may be attached to the boom using 1" bolts and washers.

[0065] FIG. **5** illustrates a perspective view of an exemplary attachment assembly according to an embodiment.

[0066] In an embodiment, the attachment assembly **500** includes frame **511**, which includes a tip **540** for attaching attachment **550**. The attachment **550** may include a grapple **553** (or other attachments) and/or rotator **551** (or chains or other attachment component). The grapple **553** may be controlled through hydraulics **552** (or other control mechanism).

[0067] In an embodiment, the attachment assembly **500** further includes attachment point **520** for attachment to the body of a skid loader. It is noted that it may be desirable for certain applications that the weight of the attachment assembly **500** (including the weight of the attachment **550** and items held by attachment **550**) to be better distributed to a stronger area or component of the skid loader (e.g., the body of the skid loader as opposed to the boom). For example, in a logging operation, a log grappled and dragged by the attachment assembly **500** may be heavy, and it may be desirable that the body of the skid loader support some of the weight of the log (as opposed to the boom). In an embodiment, the attachment point **520** may be configured to be attached to a low position on the body of the skid loader to allow the body of the skid loader to be loaded by some portion of the weight of the log or other items.

[0068] In an embodiment, each side of the frame **511** may be connected by bar **562**. Further, bar **562** may be connected (by cables, legs, or other connection component) to attachment bars **512**, where each attachment bar **512** corresponds to each side of the frame **511**. An attachment bar **512** includes an attachment point **530** for attachment to the boom of the skid loader. Therefore, the boom may be lifted and lowered to lift and lower the attachment bars **512**, which would lift and lower the frame **511** and the attached attachment **550**. Each side of the attachment bars **512** may be connected by bar **561**. In an embodiment, the attachment bars **512** may be supported by supports **563** and **530**, which may be attached to the frame **511**, bar **562**, or other anchors or attachment points on the attachment assembly **500**.

[0069] In an embodiment, legs or stands **571** and **572** may be attached to the corresponding points of frame **511** and attachment bars **512** to facilitate the attachment assembly **500** to be free-standing on the ground (e.g., when the attachment assembly **500** is not attached to the skid loader) and to facilitate the attachment of the attachment assembly **500** to the skid loader. The legs or stands **571** and **572** may be detachable upon attachment of the attachment assembly **500** to the skid loader. In another embodiment, legs or stands **571** and **572** may be foldable to occupy relative less space and be unobstructive when the attachment assembly **500** is being used for tasks. In an embodiment, jackscrew **575** may be operated to attach or detach the legs or stands **571** and **572** as needed.

[0070] In an embodiment, the top portion of the frame **511** (including the tip **540**) may be formed at an angle with respect to the lower portion of the frame **511** (including the attachment point **520**). The area of the formed angle may be reinforced by reinforcement **590** for further durability of the attachment assembly **500**.

[0071] FIG. **6**A illustrates a top view of an exemplary attachment assembly according to an embodiment; FIG. **6**B illustrates a side view of the attachment assembly according to an embodiment; FIG. **6**C illustrates a perspective view of the attachment assembly according to an embodiment; FIG. **6**D illustrates a side of the attachment assembly in a folded position according to an embodiment.

[0072] In an embodiment, the attachment assembly **600** includes foldable sections (e.g., for compact storage and/or weight distribution and/or for other purposes).

[0073] The attachment assembly **600** includes a lower portion (which may include mounting frame **610**, mounting plate **670**, and structural or support bar **620**) for mounting to the skid loader. The attachment assembly includes an upper portion (which may include frame **630**, structural or support bars **640** and **650**, tip **6100**, and/or attachment point **6101**), which may be attached to the lower portion by hinge **660**).

[0074] Through operation of the hinge **660** (which may be facilitated using hydraulic ram **690** (or other mechanical or other mechanism)), the upper portion of the attachment assembly **600** may be folded onto the lower portion of the attachment assembly **600**. In an embodiment, the hydraulic ram **690** may be mounted to structural or support bars **620** and **640** at the respective ends.

[0075] In an embodiment, the attachment assembly **600** includes one or more stops **6110** for holding the frame **630** in a relatively fixed position in the unfolded position (e.g., stopping the frame **630** from hitting the mounting frame **610** and/or putting stress on the hydraulic ram **690**, such as when the attachment assembly is performing work (e.g., pulling logs)).

[0076] In an embodiment, a grapple **6102** (or other attachments) may be attached to the attachment point **6101**. The attachment may be further folded onto the upper portion when not in use.

[0077] In an embodiment, the attachment assembly **600** may be 99" in length by 50" in width at the lower portion. The frame **610** may be made of 3"×8"×⅜" rectangular tubing. The support bar **620** may be made of 5" schedule **40** pipe.

[0078] At the upper portion, the frame **630** may be made of 3"×6"×⅜" rectangular tubing at a length of 41". The support bar **640** may be made of 5" schedule **40** pipe, and the support bar **650** may be 2×4×11 gauge. The tip **6100** may be 6" in length as attached to the frame **630**. The hinge **660** may be 13"×6" with a hole for placing the 1¼" pin **680**. The mounting plate **670** may be 9"×10".

[0079] The hydraulic ram may be 4" bore, 16" stroke, and 2" rod and has a clearance width of 18½" with the interior side of the frame **610**.

[0080] In an embodiment, the attachment assembly **600** with the foldable mechanism (e.g., including the hydraulic ram **690** and the foldable portions of the attachment assembly **600**) may be adapted for and/or used to modify attachment assemblies as discussed in this disclosure or other attachment assemblies as known now or may be later derived in the art.

[0081] FIG. **7** illustrates a top view of an exemplary attachment assembly according to an embodiment.

[0082] In an embodiment, the attachment assembly **700** includes foldable sections (e.g., for compact storage and/or weight distribution and/or for other purposes) and may include grapple mounts for a grapple (or other attachments) when attached to the tip **711**.

[0083] The attachment assembly **700** may include an upper portion which may include a frame **709**, which is attached to a number of support bars (e.g., support bars **707** and **708**). A hydraulic ram (or other mechanical or other mechanisms) may be attached to piston mount **703** at the upper portion of the attachment assembly at one end (and the hydraulic ram may be attached to a structural or support bar at the lower portion of the attachment assembly at the other end), for facilitating the upper portion of the attachment assembly being folded onto the lower portion of the attachment assembly **700**. The mount **703** may be attached to a respective support bar **707** at each side, and the support bars may also be attached to respective supports **708**, which is attached to the frame **709**, for further support of mount **703**.

[0084] In an embodiment, grapple mounts **707** and **705** may be also attached to the frame **709** and/or the support bars **702** and **708** (for additional support). In an embodiment, the grapple mount assembly provided by the combination of the grapple mounts **707** and **705** may be used to support various components of the grapple (or other attachments). For example, the grapple may be folded onto the upper portion of the attachment assembly **700** and rest on the support assembly when the grapple is not in use.

[0085] In an embodiment, the attachment assembly **700** may include connectors **720** for connecting each of the supports **702** and **707** to the piston mount **703** (and to rotationally support the turning of piston mount **703**, with respect to the supports **702**, when the upper portion of the attachment assembly **700** is being folded onto the lower portion). The attachment assembly **700** may further include support pieces **701** for supporting the respective connectors **720**.

[0086] In an embodiment, the grapple mount **702** may be made of cut out of 2"×4"×11 gauge metal and may have a length of 9½" (a length 5" at the short side) and a height of 5". The grapple mount **708** may be made of cut out of 2"×4"×11 gauge metal and has a surface length of 10.25" for resting the grapple.

[0087] The piston mount **703** may have a length of 14" and a height of 7¼". The piston mount **703** may include a fastener for fastening the hydraulic ram and may be dimensioned 5¼"×3¼", with a 1" center hole of 1" in diameter and a corner cutout of 2"×2¼". The support **707** may be made of 5" schedule **50** pipe. The support **708** may be may of 2"×4"×11 gauge metal. The frame **709** may be made of 3×6×⅜ rectangular tubing.

[0088] The connectors **720** may have a length of 16" and a width of 6¼" at the larger end and a width of 2¾" at the smaller end. The larger end may include a hold for fitting the support **707**. The support **701** may be a cut out of 3×6×⅜ metal and shaped triangularly with a length of 9½" and a width of 3½". In an embodiment, the connectors **720** are placed at 36 degrees angles (e.g., the angle between the support **707** and the piston mount **703**).

[0089] In an embodiment, the attachment assembly **700** with the foldable mechanism and/or the grapple mounts (e.g., grapple mounts **707** and **705**) may be adapted for and/or used to modify attachment assemblies as discussed in this disclosure or other attachment assemblies as known now or may be later derived in the art.

[0090] FIG. **8**A illustrates a side view of an exemplary attachment assembly attached to a skid loader according to an embodiment; FIG. **8**B illustrates a perspective view of the attachment assembly attached to a skid loader according to an embodiment; FIG. **8**C illustrates a perspective view of the attachment assembly according to an embodiment.

[0091] In an embodiment the attachment assembly **800** may be attached to a lower portion of the back of a skid loader (e.g., to facilitate further weight counterbalance with the skid loader and/or the front portion of the skid loader including the bucket). For example, the attachment assembly may be attached to the skid loader through complementary attachment pieces **801** and **802**. The attachment piece **801** may be pre-attached to the skid loader at a location (e.g., the lower portion of the back of the skid loader) and would be complementarily attachable to attachment piece **802**, which is attached to the rest of the attachment assembly (e.g., the frame **803** including reinforcement **804** and attachment point **805**).

[0092] In an embodiment, the attachment assembly may include pistons **806** and/or other mechanism for lifting and/or moving the attachment assembly in a determined movement (e.g., lifted in an up-and-down motion). The piston may be attached with one end at an attachment point **807** of the attachment assembly, which may at a location on the frame **803**, reinforcement joint **804**, and/or other locations). The other end of the piston may be attached to a substantially secured point (which may be immovable) when the attachment assembly is attached to the skid loader (e.g., attachment point **808**, which may be fixed on the attachment piece **802**). In an embodiment, the attachment piece **802** includes an upper portion (including the attachment point **808**) for attaching the piston **810** to connect with the frame **803** at an upper portion of the frame **803**. The lower portion of attachment piece **802** may also include an attachment point **802** for attaching and/or securing a lower portion or end of the frame **803**. The lower portion of the frame **803** may be moveable when attached to attachment piece **801** through the attachment point **809** (e.g., the attachment through the attachment point **809** may be a movable joint), which facilitates the lifting and/or other movements of the frame when actuated by the piston **810** and/or other mechanism. In an embodiment, the frame **803** may be attached to the attachment piece **802** through an attachment piece **806**.

[0093] In another embodiment, the frame may be substantially immovable (e.g., the piston **810** may be replaced with nonmoving connectors such as piping, chain, and/or other connectors).

[0094] The present disclosure, in various aspects, embodiments, and/or configurations, includes components, meth-

ods, processes, systems and/or apparatus substantially as depicted and described herein, including various aspects, embodiments, configurations embodiments, subcombinations, and/or subsets thereof. Those of skill in the art will understand how to make and use the disclosed aspects, embodiments, and/or configurations after understanding the present disclosure. The present disclosure, in various aspects, embodiments, and/or configurations, includes providing devices and processes in the absence of items not depicted and/or described herein or in various aspects, embodiments, and/or configurations hereof, including in the absence of such items as may have been used in previous devices or processes, e.g., for improving performance, achieving ease and/or reducing cost of implementation.

[0095] The foregoing discussion has been presented for purposes of illustration and description. The foregoing is not intended to limit the disclosure to the form or forms disclosed herein. In the foregoing description for example, various features of the disclosure are grouped together in one or more aspects, embodiments, and/or configurations for the purpose of streamlining the disclosure. The features of the aspects, embodiments, and/or configurations of the disclosure may be combined in alternate aspects, embodiments, and/or configurations other than those discussed above. This method of disclosure is not to be interpreted as reflecting an intention that the claims require more features than are expressly recited in each claim. Rather, as the following claims reflect, inventive aspects lie in less than all features of a single foregoing disclosed aspect, embodiment, and/or configuration. Thus, the following claims are hereby incorporated into this description, with each claim standing on its own as a separate preferred embodiment of the disclosure.

[0096] Moreover, though the description has included a description of one or more aspects, embodiments, and/or configurations and certain variations and modifications, other variations, combinations, and modifications are within the scope of the disclosure, e.g., as may be within the skill and knowledge of those in the art, after understanding the present disclosure. It is intended to obtain rights which include alternative aspects, embodiments, and/or configurations to the extent permitted, including alternate, interchangeable and/or equivalent structures, functions, ranges or steps to those claimed, whether or not such alternate, interchangeable and/or equivalent structures, functions, ranges or steps are disclosed herein, and without intending to publicly dedicate any patentable subject matter.

1. An attachment assembly for attaching to a skid loader for operating at a rear of the skid loader, comprising:

boot attachments for attaching to respective sides of the rear of the skid loader;

side plates each attached to one of a respective of the boot attachments; and

a quick attach plate attached to the side plates, wherein

the quick attach plate is configured for quick attachment to a skid loader accessory for performing a task at the rear of the skid loader.

2. The attachment assembly of claim **1**, wherein the side plates are attached to one or more pistons for moving the side plates.

3. The attachment assembly of claim **1**, wherein pistons are attached to one or more of the side plates and the quick attach plate.

4. The attachment assembly of claim **3**, wherein the pistons configured for moving the side plates with respect to the quick attach plate.

5. The attachment assembly of claim **1**, wherein the boot attachments each comprises a boot insert configured to insertion into a boot attached to the rear of the skid loader.

6. The attachment assembly of claim **5**, wherein a pin is inserted into openings of the boot insert and the boot when the boot insert is inserted into the boot for securing the boot and the boot insert.

7. The attachment assembly of claim **5**, wherein pistons are attached to one or more of the side plates and the boot insert.

8. The attachment assembly of claim **7**, wherein the pistons configured for moving the side plates with respect to the boot insert.

9. A method for operating an attachment assembly to a rear of a skid loader, comprising:

attaching boot attachments to respective sides of the rear of the skid loader;

attaching the attachment assembly to the boot attachments;

attaching a skid loader accessory to a quick attach plate of the attachment assembly; and

operating the attachment assembly for performing a task using the skid loader accessory at the rear of the skid loader, wherein

the attachment assembly comprises side plates each for attachment to one of a respective of the boot attachments and a quick attach plate attached to the side plates.

10. The method of claim **9**, wherein the side plates are attached to one or more pistons for moving the side plates.

11. The method of claim **9**, wherein pistons are attached to one or more of the side plates and the quick attach plate.

12. The method of claim **11**, further comprising operating the pistons to move the side plates with respect to the quick attach plate.

13. The method of claim **9**, wherein the attachment assembly comprises boot inserts, wherein the boot attachments comprise boots, and wherein the attaching the attachment assembly to the boot attachments comprises inserting the boot inserts into the boots.

14. The method of claim **13**, wherein the attaching the attachment assembly to the boot attachments comprises inserting a pin into each respective opening of the boot inserts and the boots when the boot inserts are inserted into the boots for securing the boots and the boot inserts.

15. The method of claim **13**, wherein pistons are attached to one or more of the side plates and the boot insert.

16. The method of claim **15**, further comprising operating the pistons to move the side plates with respect to the boot insert.

17. An attachment assembly for attaching to a skid loader for operating at a rear of the skid loader, comprising:

a frame, wherein the frame comprises

a lower portion including one or more attachment points;

a top portion; and

a tip portion, wherein

the attachment points are configured to attach to the frame to corresponding points of the skid loader for fixating the attachment assembly to the rear of the skid loader, wherein

the top portion is at an angle with the lower portion, and wherein

the tip portion is attached to the top portion; and

one or more attachments attached to the tip portion, wherein the attachments are configured to perform tasks at the rear of the skid loader, and wherein

the frame is lifted or lowered when connected to a boom of the skid loader when the boom is lifted or lowered.

18. The attachment assembly of claim **17**, wherein the attachments comprise a grapple.

19. The attachment assembly of claim **18**, wherein the attachments further comprise a rotator attached to the grapple.

20. The attachment assembly of claim **17**, wherein the corresponding points of the skid loader comprises points on the boom.

21-35. (canceled)

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