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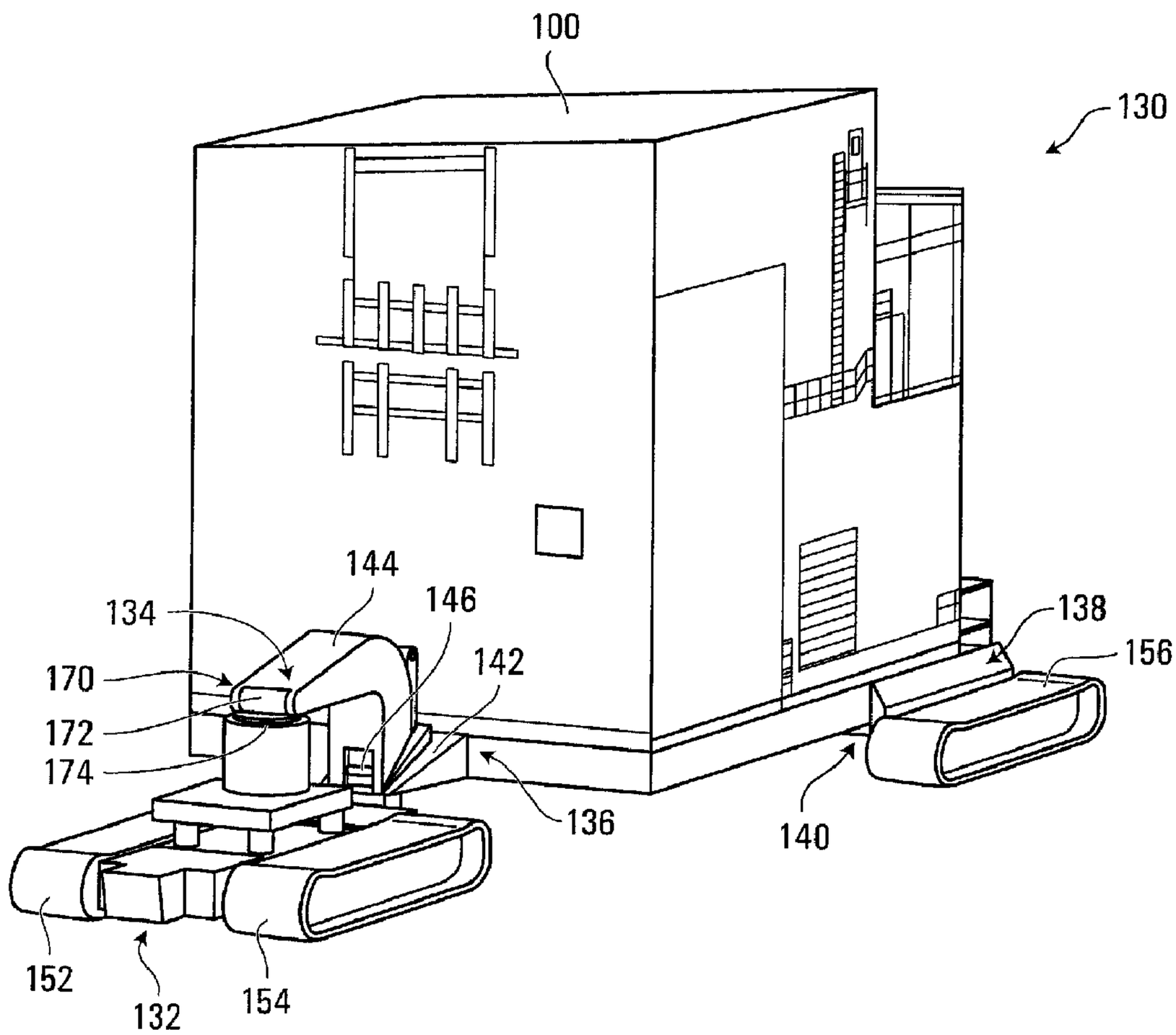
(54) **Titre : METHODE, EQUIPEMENT, ET SYSTEME DE TRANSPORT D'EQUIPEMENT DE TRAITEMENT DES BOUES**
(54) **Title: METHOD, APPARATUS, AND SYSTEM FOR TRANSPORTING A SLURRY APPARATUS**



(57) **Abrégé/Abstract:**
A system and method for transporting a slurry apparatus to a new operating location is disclosed. The system includes a first mobile support for coupling to a first lifting region of the slurry apparatus, the first mobile support being located adjacent to the

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(57) **Abrégé(suite)/Abstract(continued):**
slurry apparatus. The system also includes a second mobile support for supporting a second lifting region of the slurry apparatus, the first and second lifting regions being selected such that a center of mass of the slurry apparatus is disposed within a stability region defined between the first lifting region and the second lifting region. The first and second mobile supports are operable to take up a load of the slurry apparatus and to advance in a desired direction to cause the slurry apparatus to be moved toward the new operating location.

ABSTRACT

A system and method for transporting a slurry apparatus to a new operating location is disclosed. The system includes a first mobile support for coupling to a first lifting region of the slurry apparatus, the first mobile support being located adjacent to the slurry apparatus. The system also includes a second mobile support for supporting a second lifting region of the slurry apparatus, the first and second lifting regions being selected such that a center of mass of the slurry apparatus is disposed within a stability region defined between the first lifting region and the second lifting region. The first and second mobile supports are operable to take up a load of the slurry apparatus and to advance in a desired direction to cause the slurry apparatus to be moved toward the new operating location.

METHOD, APPARATUS, AND SYSTEM FOR TRANSPORTING A SLURRY APPARATUS

FIELD OF THE INVENTION

This invention relates generally to mining and more particularly to transporting an apparatus used for processing an ore feed to a new operating location.

BACKGROUND OF THE INVENTION

Surface mining operations are generally employed to excavate oil sand ore deposits that are found near the surface. One example of an oil sand ore deposit is the Northern Alberta tar sands, which comprise about **70** – **90**% by weight of mineral solids including sand and clay, about **1** – **10**% by weight of water, and a bitumen or oil film. The bitumen may be present in amounts ranging from a trace amount up to as much as **20**% by weight. Consequently, since oil sands ore deposits comprise a relatively small percentage by weight of bitumen, it is generally most efficient and cost effective to commence at least initial processing of the ore as close as possible to the mine face where the ore is excavated.

In general, initial processing of oil sands ore involves receiving a sized ore feed at a slurry apparatus, where water is added to the sized ore to produce a slurry. The slurry may then be hydro-transported to a secondary processing plant located some distance away from the mine face. At the secondary processing plant, hydrocarbon products may be extracted from the slurry.

The slurry apparatus may be initially located in relatively close proximity to a mine face of an ore deposit, thus facilitating processing of an ore body within a conveniently conveyable distance from the slurry apparatus. Once the mine faces have been excavated beyond the convenient conveyable distance, the slurry apparatus may be relocated to a new operating location proximate a mine face of an as yet unexcavated portion of the ore deposit. The mining

process thus involves successively excavating portions of an ore deposit surrounding the slurry apparatus, followed by a movement of the slurry apparatus to a new operating location.

There is a need in the art for improved methods, apparatus, and systems for transporting a slurry apparatus between successive operating locations.

SUMMARY OF THE INVENTION

In accordance with one aspect of the invention there is provided a system for transporting a slurry apparatus to a new operating location, the slurry apparatus having a center of mass. The system includes a first mobile support for coupling to a first lifting region of the slurry apparatus, the first mobile support being located adjacent to the slurry apparatus. The system also includes a second mobile support for supporting a second lifting region of the slurry apparatus, the first and second lifting regions being selected such that the center of mass of the slurry apparatus is disposed within a stability region defined between the first lifting region and the second lifting region. The first and second mobile supports are operable to take up a load of the slurry apparatus and to advance in a desired direction to cause the slurry apparatus to be moved toward the new operating location.

In accordance with another aspect of the invention there is provided a method for transporting a slurry apparatus to a new operating location, the slurry apparatus having a center of mass. The method involves coupling a first lifting region of the slurry apparatus to a first mobile support located adjacent to the slurry apparatus. The method also involves supporting a second lifting region of the slurry apparatus on a second mobile support, the first and second lifting regions being selected such that the center of mass of the slurry apparatus is disposed within a stability region defined between the first lifting region and the second lifting region. The method further involves taking up a load of the slurry apparatus and advancing the first and second mobile

supports in a desired direction to cause the slurry apparatus to be moved toward the new operating location.

In accordance with another aspect of the invention there is provided a system for transporting a slurry apparatus to a new operating location, the slurry apparatus having a center of mass. The system includes provisions for coupling a first lifting region of the slurry apparatus to a first mobile support located adjacent to the slurry apparatus. The system also includes provisions for supporting a second lifting region of the slurry apparatus on a second mobile support, the first and second lifting regions being selected such that the center of mass of the slurry apparatus is disposed within a stability region defined between the first lifting region and the second lifting region. The system further includes provisions for taking up a load of the slurry apparatus and provisions for advancing the first and second mobile supports in a desired direction to cause the slurry apparatus to be moved toward the new operating location.

Other aspects and features of the present invention will become apparent to those ordinarily skilled in the art upon review of the following description of specific embodiments of the invention in conjunction with the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWINGS

In drawings which illustrate embodiments of the invention,

Figure **1** is a perspective view of a slurry apparatus;

Figure **2** is a perspective view of a transport system for supporting the slurry apparatus shown in Figure **1** during transport to a new operating location;

Figure **3** is a side view of the transport system shown in Figure **2**;

Figure **4** is a top view of the transport system shown in Figure **2**;

Figure **5** is a flowchart of a process for transporting the slurry apparatus shown in Figure **1** to a new operating location;

Figure **6** is a top view of an alternative embodiment of a transport system for supporting the slurry apparatus shown in Figure **1** during transport to a new operating location;

Figure **7** is an alternative embodiment of a slurry apparatus; and

Figure **8** is a top view of an embodiment of a transport system for supporting the slurry apparatus shown in Figure **7** during transport to a new operating location.

DETAILED DESCRIPTION

Referring to Figure **1**, a slurry apparatus for processing oil sands ore feed is shown generally at **100**. The slurry apparatus **100** includes a frame **102** supported on a base **104**. The frame **102** is generally constructed of structural steel beams (such as the beams **106** and **108**), which may be joined by bolting or welding, for example. The slurry apparatus **100** further includes a cold water inlet **124** for receiving a water supply. Electrical power for operating the slurry apparatus **100** is coupled via a transformer **126**. In the embodiment shown the slurry apparatus **100** receives an ore feed at an ore input **128**. The received ore is directed into a slurry box **110**. Hot water is added to the ore in the slurry box **110** to produce a slurry flow at a slurry outlet. The slurry outlet is in fluid communication with a slurry pump **112**, which produces a slurry flow at a hydro-transport outlet **114**. In the first embodiment, the hydro-transport outlet may be connected to a transport

pipeline (not shown) for transporting the slurry to the secondary processing plant located some distance away from the slurry apparatus **100**.

In the embodiment shown in Figure **1**, the base **104** includes reinforced support regions **116** and **118** for supporting the slurry apparatus **100** in an operating location. The slurry apparatus **100** also includes further reinforced support regions on an opposite side of the base **104**. The slurry apparatus **100** is supported at the support regions **116** and **118** by ground engaging supports **120** and **122** (and further ground engaging supports on the opposite side of the base **104**). In the embodiment shown in Figure **1**, the ground engaging supports **120** and **122** comprise crane mats.

The slurry apparatus **100** contemplated in connection with the present invention is of substantial size and weight. In one embodiment the slurry apparatus **100** has, by way of example only, dimensions of about **25** meters long by about **15** meters wide by about **15** meters tall, and has a dry weight of about **1500** metric tons. The transportation of a large slurry apparatus presents a significant challenge.

In accordance with one aspect of the present invention, a transport system for transporting the slurry apparatus **100** is shown in Figure **2** and Figure **3** generally at **130**. Referring to Figure **2**, the transport system **130** includes a first mobile support **132** located adjacent to the slurry apparatus **100**. The transport system **130** also includes a coupling arm **134** (also shown in Figure **1**) coupling a first lifting region **136** of the slurry apparatus **100** to the first mobile support **132**. The transport system **130** further includes a second mobile support **138** for supporting a second lifting region **140** of the slurry apparatus **100**.

In one embodiment the second mobile support **138** may comprise a crawler apparatus, having a hydraulic lifting platform (not shown) for engaging and

elevating the second lifting region **140** of the slurry apparatus **100**. Similarly, the first mobile support **132** may comprise a crawler adapted to couple to the coupling arm **134**. Suitable crawlers are produced in various configurations by Lampson International of Kennewick WA, USA.

The coupling arm **134** and the second mobile support **138** are operable to take up a load of the slurry apparatus **100**, when the load is transferred from the stationary ground engaging supports **120** and **122** (shown in Figure **1**). The coupling arm **134** is generally sized to be able to bear the load of the first lifting region **136**, and may be welded or bolted to the base **104** of the slurry apparatus **100**.

The slurry apparatus **100** and transport system **130** are shown in top view in Figure **4**. Referring to Figure **4**, in the embodiment shown the first lifting region **136** is centrally located on a first side **178** of the slurry apparatus **100** and the second lifting region **140** is peripherally located and extends generally along a second side **180** of the slurry apparatus. Referring back to Figure **2** the coupling arm **134** is hydraulically operable and includes a first portion **142** which is securely mounted to the first lifting region **136** of the slurry apparatus **100**. The coupling arm **134** further includes an articulated second portion **144** which is pivotably connected to the first portion **142** at a pivot location **146**. Referring to Figure **3**, the first portion **142** of the coupling arm **134** further includes an upwardly extending portion **148**. The coupling arm **134** also includes a hydraulic actuator **150** coupled between the extension **148** of the first portion **142** and the articulated second portion **144**. Referring to Figure **4**, the hydraulic actuator **150** includes a cylinder **162** coupled to the extension **148** and a piston **164** connected to the articulated second portion **144**.

Referring to Figures **3** and **4**, the articulated second portion **144** of the coupling arm **134** is coupled to the first mobile support **132** using a coupling joint **170**. The coupling joint **170** includes a pivot portion **172** for permitting

up/down movement of the coupling arm **134** relative to the first mobile support **132**. The coupling joint **170** also includes a disk portion **174** for facilitating side-to-side movement in the direction of the arrow **176** to permit the first mobile support to be steered along the transport path.

In operation, the hydraulic actuator **150** is operable to produce a force for causing the articulated second portion **144** of the coupling arm **134** to be raised or lowered with respect to the first mobile support **132**. The hydraulic actuator **150** is also operable to lock the articulated second portion **144** of the coupling arm **134** in a desired transport position so that the articulated second portion **144** extends outwardly from the slurry apparatus **100** at an angle selected to cause the slurry apparatus **100** to be supported at a desired height above the ground. When the articulated second portion **144** is locked in the transport position the transport system **130** may be used to transport the slurry apparatus **100** to a new location.

Referring back to Figure **2** in the embodiment shown the first mobile support **132** includes a first crawler track **152** and a second crawler track **154**. The first mobile support **132** further includes a motive force generator (not shown). The motive force generator is coupled to the crawler tracks **152** and **154** to cause the first mobile support **132** to be advanced over the mine floor. In one embodiment the motive force generator of the first mobile support **132** is operable to provide a differential motive force to each of the first and second crawler tracks **152** and **154** for facilitating changes in direction of the first mobile support to steer the slurry facility **100** in a desired direction of transport along a path to the new operating location.

Similarly, the second mobile support **138** includes a first crawler track **156** and a second crawler track **158** (shown in Figure **4**). The second mobile support **138** also includes a motive force generator (not shown), which is coupled to the crawler tracks **156** and **158** to cause the second mobile support **132**, and

thus the slurry apparatus **100**, to be advanced over the mine floor. Coordination of a transport rate between the first and second mobile supports **132** and **138** may be provided through either manual or automated torque control. Alternatively, torque control may be provided by configuring the first mobile support **132** as a master vehicle, and the second mobile support **138** as a slave vehicle, such that the master sets the speed and torque and the slave follows by providing the same torque and speed as the master.

In the embodiment shown in Figure **4**, a load of the first lifting region **136** bears on the first mobile support **132** and a load of the second lifting region **140** bears on the second mobile support **138**, thereby defining a stability region **175** shown in broken outline. In the embodiment shown in Figure **4**, the stability region **175** has a triangular shape and extends generally between the pivot **172** and the first and second crawler tracks **156** and **158**. In general stability triangles may be defined for a load in terms of three support points on an underside of the load. As long as a center of mass of the mobile load remains within the bounds of the stability triangle, the load may be considered to be safely supported.

For the slurry apparatus **100** shown in Figure **1**, the center of mass **160** is located generally at a centroid of the base **104**, and is vertically displaced in an upward direction from the base **104** by a distance of about **7** meters. Accordingly, when the slurry apparatus **100** is moved along an inclined path, the center of mass **160** may be displaced either longitudinally or laterally with respect to the stability triangle **175**. However, when supported as shown in Figure **4**, the stability triangle **175** is relatively large, and accordingly even relatively steep slopes may be negotiated (for example an incline of about **8**%) while the center of mass **160** remains within the stability triangle. Advantageously, when supported as shown in Figure **4**, the slurry apparatus **100** is supported in a very stable condition in both longitudinal and lateral directions.

A process flowchart for transporting the slurry apparatus **100** to a new operating location is shown in Figure **5** at **200**. As shown in block **202** the process commences with the disconnection of the transformers **126** from the electrical supply, disconnection of the cold water feed from the inlet **124**, and disconnection of the hydro-transport pipeline from the hydro-transport outlet **114**. The ore feed (not shown) is also disconnected from the ore input **128**.

At block **204** the coupling arm is then mounted to the first lifting region **136** of the slurry apparatus **100**. In some embodiments the coupling arm **134** may be permanently mounted on the slurry apparatus **100** by welding, for example. In other embodiments the coupling **134** may be removably secured to the slurry apparatus **100** by a plurality of fasteners, for example.

As shown in block **206** the process then continues by moving the first mobile support **132** into position adjacent to the first lifting region **136** of the slurry apparatus **100** and coupling the coupling arm **134** to the coupling joint **170**.

At block **208** the second mobile support is positioned for engagement with the first lifting region **137**. Referring back to Figure **1**, in one embodiment the slurry apparatus **100** is provided with a plurality of jacks **151**, which are hydraulically actuated to temporarily unload the slurry apparatus **100** from the ground engaging supports to permit removal thereof for facilitating positioning of the second mobile support **138**.

As shown in block **210** the load of the slurry apparatus **100** is then transferred from the ground engaging supports **120** and **122** to the first and second mobile supports **132** and **138**. In one embodiment this involves hydraulically actuating a support platform of the second mobile support **138** to be moved upwardly to engage the second lifting region **140** of the slurry apparatus **100**, thus taking up a portion of the load of the slurry apparatus **100**. At the same

time, or shortly thereafter, the hydraulic actuator **150** is actuated to cause the coupling arm **134** to take up a remaining portion of the load of the slurry apparatus **100** bearing at the lifting region **136**. At this time the slurry apparatus **100** is supported in a safe and stable condition on the first and second mobile supports **132** and **138**. Advantageously, since the center of mass **160** (shown in Figure **4**) is located well within the first and second lifting regions **136** and **140**, the slurry apparatus may negotiate a transport path having a grade of up to at least about **8%** and a cross slope of up to at least about **5%**.

As shown in block **212** the transport operation then continues by providing a motive force to the crawler tracks of the first and second mobile supports **132** and **138** to advance the slurry apparatus in a direction toward the new operating location. Advantageously the first mobile support **132** may provide a differential motive force to the first and second crawler tracks **152** and **154** to negotiate any turns that may be required along the transport path to the new operating location. Furthermore, should the transport path include inclined portions, the hydraulic actuator **150** may be actuated to raise or lower the first lifting region **136** with respect to the first mobile support **132** to maintain the slurry apparatus **100** as close as possible to a vertical orientation. Advantageously by operating the hydraulic actuator **150** in this manner, steeper incline grades may be negotiated by the slurry apparatus **100** in being transported to the new operating location.

As shown in block **214**, on reaching the new operating location, the load of the slurry apparatus **100** is transferred from the first and second mobile supports **132** and **138** to ground engaging supports, such as the ground engaging supports **120** and **122** shown in Figure **1**. Once located in the new operating location the electrical, water, and hydro-transport connections may be restored. Similarly the ore feed from the mine face may be redirected to feed the ore input **128** of the slurry apparatus **100**.

Advantageously, the system **130** facilitates transport of the slurry apparatus **100** in a safe and stable manner over a mine floor, thereby reducing the time to complete the move to the new location. In one embodiment the time to complete the move may be reduced substantially below **40** hours.

In another operational embodiment, the slurry apparatus **100** may be supported on the first and second mobile supports **132** and **138** during operation, thus further reducing the time necessary to complete the move, since the time associated with performing functions defined in the blocks **204** to **210**, and **214** of the process **200** may be eliminated from the move time.

An alternative embodiment for supporting the slurry apparatus **100** is shown in Figure **6** generally at **250**. Referring to Figure **6**, in this embodiment the first mobile support **132** is configured in the same manner as described above in connection with Figure **2** to Figure **4**. However in the support embodiment shown the second mobile support **132** shown in Figure **4** is replaced by a pair of supports **252** and **254** supporting respective lifting regions **256** and **258**. The lifting regions **256** and **258** are located at adjacent corners of the slurry apparatus **100**. The mobile support **252** includes first and second crawler tracks **260** and **262** (the crawler track **262** is partially obscured by the slurry apparatus **100** in the view shown in Figure **6**). Similarly the mobile support **254** includes first and second crawler tracks **264** and **266**.

In this embodiment, a stability triangle **270** is defined between the lifting region **256**, the lifting region **258**, and the pivot **172**. The stability triangle **270** has generally similar extent and area compared to the stability triangle **175** shown in Figure **4**. A center of mass **268** of the slurry apparatus **100** is located well within the bounds of the stability triangle **270**, and the slurry apparatus **100** is thus supported in a stable condition.

The mobile supports **252** and **254** may operate to transfer the load of the slurry apparatus **100** from ground engaging supports in a similar manner to that described above in connection with Figure **5**. Advantageously, by separately supporting the slurry apparatus **100** at the corner lifting regions, the load bearing on these lifting regions is supported by four sets of crawler tracks (i.e. the crawler tracks **260**, **262**, **264**, and **266**), thereby providing decreased ground bearing pressure area where the tracks engage the ground. In general, the decreased ground bearing pressure may facilitates travelling over less compacted mine surfaces than the embodiment shown in Figure **4**. Such surfaces may only require minimal grading and should not require further conditioning such as addition of aggregates or other surfacing materials.

Referring to Figure **7**, an alternative embodiment of a slurry apparatus is shown generally at **280**. The slurry apparatus **280** is supported on ground engaging pontoons **282** and **284**, which extend along opposite sides of a base **286** of the slurry apparatus. Referring to Figure **8**, an embodiment for supporting the slurry apparatus **280** is shown generally at **290**. The first mobile support **132** is again configured in the same manner as shown in Figure **4**, but in this embodiment a second mobile support **292** having a width *W* is provided. The width W of the second mobile support **292** permits the mobile support to be positioned between the pontoons **282** and **284** for engaging a second lifting region **298** (shown in broken outline). The second mobile support **292** includes crawler tracks **294** and **296** (shown partially obscured by the slurry apparatus **280**). In general, a height of the pontoons **282** and **284** is selected to permit the second mobile support to be positioned to take up the load of the slurry apparatus **280**.

In this embodiment, a stability triangle **300** is defined between the lifting region **298** and the pivot **172**. The stability triangle **300** has a similar longitudinal extent between the pivot and the second mobile support **292**, but

has a reduced lateral extent across the slurry apparatus **280**. Accordingly, while the support embodiment **290** should permit similar upwardly or downwardly inclined paths to be negotiated safely, a cross slope of the path would need to fall within tighter restrictions so as to avoid a center of mass **302** displacing laterally outside the bounds of the stability triangle **300**.

On reaching the new operating location, the actuator **150** of the coupling arm **134**, and the hydraulically actuated platform of the second mobile support **292** are operated to lower the slurry apparatus **100** such that the ground engaging pontoons engage the ground in the new location. Advantageously, the transport system **290** shown in Figure **8** allows the second mobile support **292** to be positioned without having to first unload the slurry apparatus **280** using hydraulic jacks as described above in connection with Figure **5**.

Advantageously, the embodiments described above permit a large apparatus such as the slurry apparatuses **100** and **280** to be relocated under safe and stable conditions, without requiring significant preparation of the ground over which the apparatus is required to move. Furthermore, the support embodiments shown facilitate moving at a greater speed once the load of the slurry apparatus is taken up by the mobile supports. For example, a speed of about **12** meters per minute may be achieved, thereby allowing a **2** kilometer move to be completed in a few hours.

Although specific embodiments of the invention have been described and illustrated, such embodiments should be considered illustrative of the invention only and not as limiting the invention as construed in accordance with the accompanying claims. Various modifications of form, arrangement of components, steps, details and order of operations of the embodiments illustrated, as well as other embodiments of the invention, will be apparent to persons skilled in the art upon reference to this description. It is therefore contemplated that the appended claims will cover such modifications and

embodiments as fall within the true scope of the invention. In the specification including the claims, numeric ranges are inclusive of the numbers defining the range. Citation of references herein shall not be construed as an admission that such references are prior art to the present invention.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A system for transporting a slurry apparatus to a new operating location, the slurry apparatus having a center of mass, the system comprising:

a first mobile support for coupling to a first lifting region of the slurry apparatus, the first mobile support being located adjacent to the slurry apparatus; and

a second mobile support for supporting a second lifting region of the slurry apparatus, the first and second lifting regions being selected such that the center of mass of the slurry apparatus is disposed within a stability region defined between the first lifting region and the second lifting region;

the first and second mobile supports being operable to take up a load of the slurry apparatus and to advance in a desired direction to cause the slurry apparatus to be moved toward the new operating location.

2. The system of claim **1** wherein the first lifting region comprises a lifting region on a first side of the slurry apparatus, the lifting region being centrally located on the first side.

3. The system of claim **1** wherein the slurry apparatus comprises ground engaging supports for supporting the slurry apparatus when the slurry apparatus is in a stationary operating position and wherein the second mobile support is operable to engage the second lifting region of the slurry apparatus.

4. The system of claim **3** wherein the first and second mobile supports are operably configured to transfer support of the slurry apparatus from the ground engaging supports to the first and second mobile supports prior to commencing the advancing of the first and second mobile supports.

5. The system of claim **4** further comprising a plurality of hydraulically actuated supports operably configured to bear the load of the slurry apparatus while transferring support of the slurry apparatus from the ground engaging supports to the first and second mobile supports.

6. The system of claim **4** further comprising:

a coupling arm coupled to the first lifting region and bearing on the first mobile support, the coupling arm being operably configured to take up a load of the first lifting region of the slurry apparatus; and

the second mobile support having a support surface operably configured to be elevated to take up a load of the second lifting region of the slurry apparatus.

7. The system of claim **6** wherein the coupling arm comprises at least two articulated portions having a hydraulic actuator coupled between the at least two portions, the coupling arm being operably configured to cause the load of the first lifting region to be taken up by operating the hydraulic actuator to cause the coupling arm to elevate the first lifting region of the slurry apparatus with respect to the first mobile support.

8. The system of claim **7** wherein the coupling arm is operably configured to be further elevated or lowered while advancing the first and second mobile

supports along an inclined ground surface to cause the center of mass to remain spaced inwardly with respect to the defined stability region.

9. The system of claim **4** wherein the slurry apparatus comprises at least two pontoon supports extending along opposite sides of the slurry apparatus for supporting the slurry apparatus when the slurry apparatus is in a stationary operating position.

10. The system of claim **1** wherein the second lifting region comprises a peripherally located lifting region extending generally along a second side of the slurry apparatus opposite to the first side, the first and second lifting regions defining a generally triangular shaped stability region extending between the first lifting region and lateral extents of the second lifting region along the second side.

11. The system of claim **1** wherein the second lifting region comprises a second lifting region supported on a second mobile support and a third lifting region supported on a third mobile support, the second and third lifting regions being spaced apart along a second side of the slurry apparatus opposite to the first side, the first, second, and third lifting regions defining a generally triangular shaped stability region.

12. The system of claim **11** wherein the second lifting region comprises a first corner region located on the second side of the slurry apparatus and the third lifting region comprises a second corner region located on the second side of the slurry apparatus.

13. The system of any one of claims **1 – 12** wherein the first mobile support comprises a crawler.

14. The system of any one of claims **1** – **12** wherein the second lifting region comprises a crawler.

15. The system of claim **1** further comprising a coupling arm mounted on and extending outwardly from the first lifting region of the slurry apparatus for coupling the first mobile support.

16. The system of claim **1** wherein the first and second mobile supports comprise respective crawler tracks operably configured to receive a motive force for advancing the first and second mobile supports.

17. The system of claim **16** wherein the crawler track of the first mobile support comprises first and second spaced apart crawler tracks operably configured to cause a change of direction of at least the first mobile support by providing a differential motive force to the first and second crawler tracks.

18. The system of claim **1** wherein the first mobile support comprises a coupling arm coupled to the first lifting region and bearing on the first mobile support, the coupling arm including at least two articulated portions having a hydraulic actuator coupled between the at least two portions, the hydraulic actuator being operable to cause the coupling arm to elevate the first lifting region of the slurry apparatus with respect to the first mobile support to take up a load of the first lifting region, the coupling arm being further operable to be elevated or lowered while moving along an inclined ground surface to cause the center of mass to remain spaced inwardly with respect to the defined stability region.

19. A method for transporting a slurry apparatus to a new operating location, the slurry apparatus having a center of mass, the method comprising:

coupling a first lifting region of the slurry apparatus to a first mobile support located adjacent to the slurry apparatus;

supporting a second lifting region of the slurry apparatus on a second mobile support, the first and second lifting regions being selected such that the center of mass of the slurry apparatus is disposed within a stability region defined between the first lifting region and the second lifting region; and

taking up a load of the slurry apparatus and advancing the first and second mobile supports in a desired direction to cause the slurry apparatus to be moved toward the new operating location.

20. The method of claim **19** wherein coupling the first lifting region to the first mobile support comprises coupling a lifting region on a first side of the slurry apparatus to the first mobile support, the lifting region being centrally located on the first side.

21. The method of claim **19** wherein the slurry apparatus comprises ground engaging supports for supporting the slurry apparatus when the slurry apparatus is in a stationary operating position and wherein supporting the second lifting region comprises causing the second mobile support to engage the second lifting region of the slurry apparatus.

22. The method of claim **21** further comprising transferring support of the slurry apparatus from the ground engaging supports to the first and second mobile supports prior to commencing the advancing of the first and second mobile supports.

23. The method of claim **22** wherein transferring support of the slurry apparatus from the ground engaging supports comprises causing a plurality of hydraulically actuated supports to bear the load of the slurry apparatus while transferring support of the slurry apparatus from the ground engaging supports to the first and second mobile supports.

24. The method of claim **22** wherein transferring support of the slurry apparatus from the ground engaging supports comprises:

causing a load of the first lifting region of the slurry apparatus to be taken up by a coupling arm coupled to the first lifting region and bearing on the first mobile support; and

elevating a support surface of the second mobile support to take up a load of the second lifting region of the slurry apparatus.

25. The method of claim **24** wherein the coupling arm comprises at least two articulated portions having a hydraulic actuator coupled between the at least two portions, and wherein causing the load of the first lifting region to be taken up by the coupling arm comprises operating the hydraulic actuator to cause the coupling arm to elevate the first lifting region of the slurry apparatus with respect to the first mobile support.

26. The method of claim **25** further comprising causing the coupling arm to be further elevated or lowered while advancing the first and second mobile supports along an inclined ground surface to cause the center of mass to remain spaced inwardly with respect to the defined stability region.

27. The method of claim **22** wherein transferring support of the slurry apparatus from the ground engaging supports comprises transferring

support from at least two pontoon supports extending along opposite sides of the slurry apparatus.

28. The method of claim **22** further comprising transferring support of the slurry apparatus from the first and second mobile supports to the ground engaging supports on reaching the new operating location.

29. The method of claim **19** wherein supporting the second lifting region on the second mobile support comprises supporting a peripherally located lifting region extending generally along a second side of the slurry apparatus opposite to the first side, the first and second lifting regions defining a generally triangular shaped stability region extending between the first lifting region and lateral extents of the second lifting region along the second side.

30. The method of claim **19** wherein supporting the second lifting region on the second mobile support comprises supporting a second lifting region on a second mobile support and a third lifting region on a third mobile support, the second and third lifting regions being spaced apart along a second side of the slurry apparatus opposite to the first side, the first, second, and third lifting regions defining a generally triangular shaped stability region.

31. The method of claim **30** wherein supporting the second lifting region comprises supporting a first corner region located on the second side of the slurry apparatus and wherein supporting the third lifting region comprises supporting a second corner region located on the second side of the slurry apparatus.

32. The method of any one of claims **19** – **31** wherein coupling the first mobile support comprises coupling a crawler to the first lifting region of the slurry apparatus.

33. The method of any one of claims **19** – **31** wherein supporting the second lifting region comprises using a crawler to support the second lifting region of the slurry apparatus.

34. The method of claim **19** wherein coupling the first mobile support comprises coupling the first mobile support to a coupling arm mounted on and extending outwardly from the first lifting region of the slurry apparatus.

35. The method of claim **19** wherein advancing the first and second mobile supports comprises providing a motive force to respective crawler tracks of the first and second mobile supports.

36. The method of claim **35** wherein the crawler track of the first mobile support comprises first and second spaced apart crawler tracks and further comprising causing a change of the direction of at least the first mobile support by providing a differential motive force to the first and second crawler tracks.

37. The method of claim **19** further comprising:

causing a load of the first lifting region of the slurry apparatus to be taken up by a coupling arm coupled to the first lifting region and bearing on the first mobile support, the coupling arm including at least two articulated portions having a hydraulic actuator coupled between the at least two portions and wherein causing the load of the first lifting region to be taken up by the coupling arm comprises

actuating the hydraulic actuator to cause the coupling arm to elevate the first lifting region of the slurry apparatus with respect to the first mobile support; and

causing the coupling arm to be further elevated or lowered while moving along an inclined ground surface to cause the center of mass to remain spaced inwardly with respect to the defined stability region.

38. A system for transporting a slurry apparatus to a new operating location, the slurry apparatus having a center of mass, the system comprising:

means for coupling a first lifting region of the slurry apparatus to a first mobile support located adjacent to the slurry apparatus;

means for supporting a second lifting region of the slurry apparatus on a second mobile support, the first and second lifting regions being selected such that the center of mass of the slurry apparatus is disposed within a stability region defined between the first lifting region and the second lifting region; and

means for taking up a load of the slurry apparatus and means for advancing the first and second mobile supports in a desired direction to cause the slurry apparatus to be moved toward the new operating location.

39. The system of claim **38** wherein the means for coupling the first lifting region to the first mobile support comprises means for coupling a lifting region on a first side of the slurry apparatus to the first mobile support, the lifting region being centrally located on the first side.

40. The system of claim **38** wherein the slurry apparatus comprises ground engaging supports for supporting the slurry apparatus when the slurry apparatus is in a stationary operating position and wherein the means for supporting the second lifting region comprises means for causing the second mobile support to engage the second lifting region of the slurry apparatus.

41. The system of claim **40** further comprising means for transferring support of the slurry apparatus from the ground engaging supports to the first and second mobile supports prior to commencing the advancing of the first and second mobile supports.

42. The system of claim **41** wherein the means for transferring support of the slurry apparatus from the ground engaging supports comprises means for causing a plurality of hydraulically actuated supports to bear the load of the slurry apparatus while transferring support of the slurry apparatus from the ground engaging supports to the first and second mobile supports.

43. The system of claim **41** wherein the means for transferring support of the slurry apparatus from the ground engaging supports comprises:

means for causing a load of the first lifting region of the slurry apparatus to be taken up by a coupling arm coupled to the first lifting region and bearing on the first mobile support; and

means for elevating a support surface of the second mobile support to take up a load of the second lifting region of the slurry apparatus.

44. The system of claim **43** wherein the coupling arm comprises at least two articulated portions having a hydraulic actuator coupled between the at

least two portions, and wherein the means for causing the load of the first lifting region to be taken up by the coupling arm comprises means for operating the hydraulic actuator to cause the coupling arm to elevate the first lifting region of the slurry apparatus with respect to the first mobile support.

45. The system of claim **44** further comprising means for causing the coupling arm to be further elevated or lowered while advancing the first and second mobile supports along an inclined ground surface to cause the center of mass to remain spaced inwardly with respect to the defined stability region.

46. The system of claim **41** wherein the means for transferring support of the slurry apparatus from the ground engaging supports comprises means for transferring support from at least two pontoon supports extending along opposite sides of the slurry apparatus.

47. The system of claim **41** further comprising means for transferring support of the slurry apparatus from the first and second mobile supports to the ground engaging supports on reaching the new operating location.

48. The system of claim **38** wherein the means for supporting the second lifting region on the second mobile support comprises means for supporting a peripherally located lifting region extending generally along a second side of the slurry apparatus opposite to the first side, the first and second lifting regions defining a generally triangular shaped stability region extending between the first lifting region and lateral extents of the second lifting region along the second side.

49. The system of claim **38** wherein the means for supporting the second lifting region on the second mobile support comprises means for supporting a second lifting region on a second mobile support and means for supporting a third lifting region on a third mobile support, the second and third lifting regions being spaced apart along a second side of the slurry apparatus opposite to the first side, the first, second, and third lifting regions defining a generally triangular shaped stability region.

50. The system of claim **49** wherein the means for supporting the second lifting region comprises means for supporting a first corner region located on the second side of the slurry apparatus and means for supporting the third lifting region comprises means for supporting a second corner region located on the second side of the slurry apparatus.

51. The system of any one of claims **38** – **50** wherein the means for coupling the first mobile support comprises means for coupling a crawler to the first lifting region of the slurry apparatus.

52. The system of any one of claims **38** – **50** wherein the means for supporting the second lifting region comprises means for using a crawler to support the second lifting region of the slurry apparatus.

53. The system of claim **38** wherein the means for coupling the first mobile support comprises means for coupling the first mobile support to a coupling arm mounted on and extending outwardly from the first lifting region of the slurry apparatus.

54. The system of claim **38** wherein the means for advancing the first and second mobile supports comprises means for providing a motive force to respective crawler tracks of the first and second mobile supports.

55. The system of claim **54** wherein the crawler track of the first mobile support comprises first and second spaced apart crawler tracks and further comprising means for causing a change of the direction of at least the first mobile support by providing a differential motive force to the first and second crawler tracks.

56. The system of claim **38** further comprising:

means for causing a load of the first lifting region of the slurry apparatus to be taken up by a coupling arm coupled to the first lifting region and bearing on the first mobile support, the coupling arm including at least two articulated portions having a hydraulic actuator coupled between the at least two portions and wherein causing the load of the first lifting region to be taken up by the coupling arm comprises actuating the hydraulic actuator to cause the coupling arm to elevate the first lifting region of the slurry apparatus with respect to the first mobile support; and

means for causing the coupling arm to be further elevated or lowered while moving along an inclined ground surface to cause the center of mass to remain spaced inwardly with respect to the defined stability region.

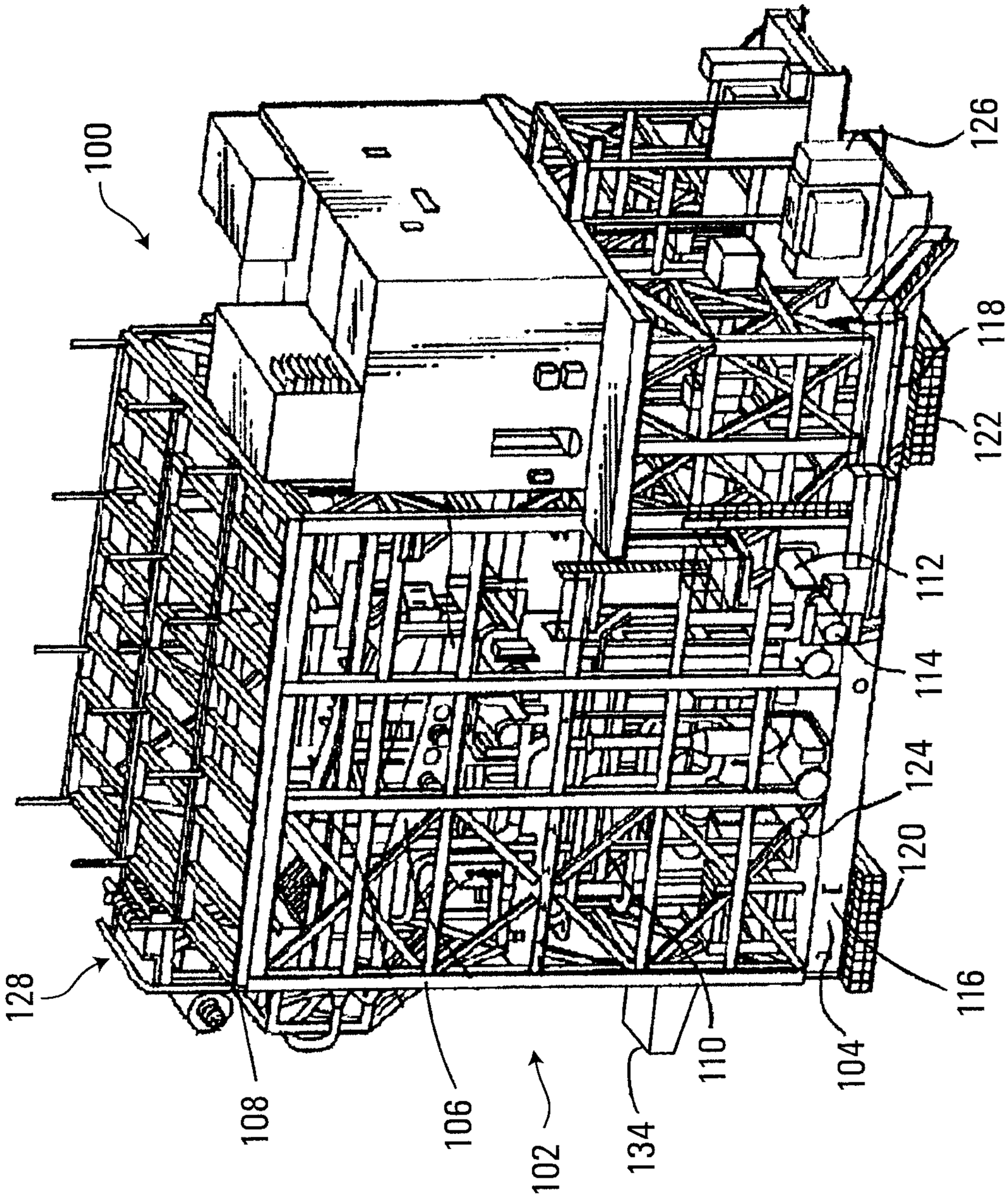

FIG. 1

FIG. 2

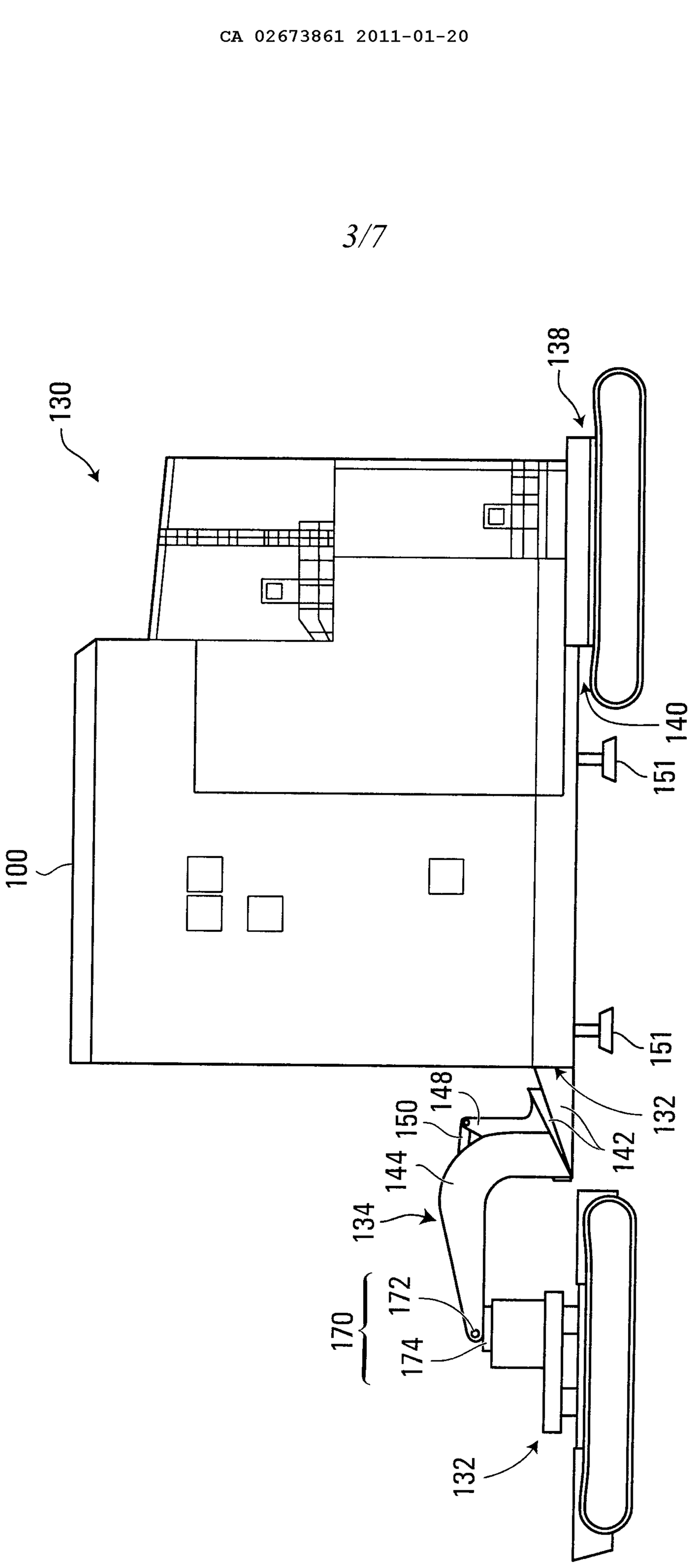

FIG. 3

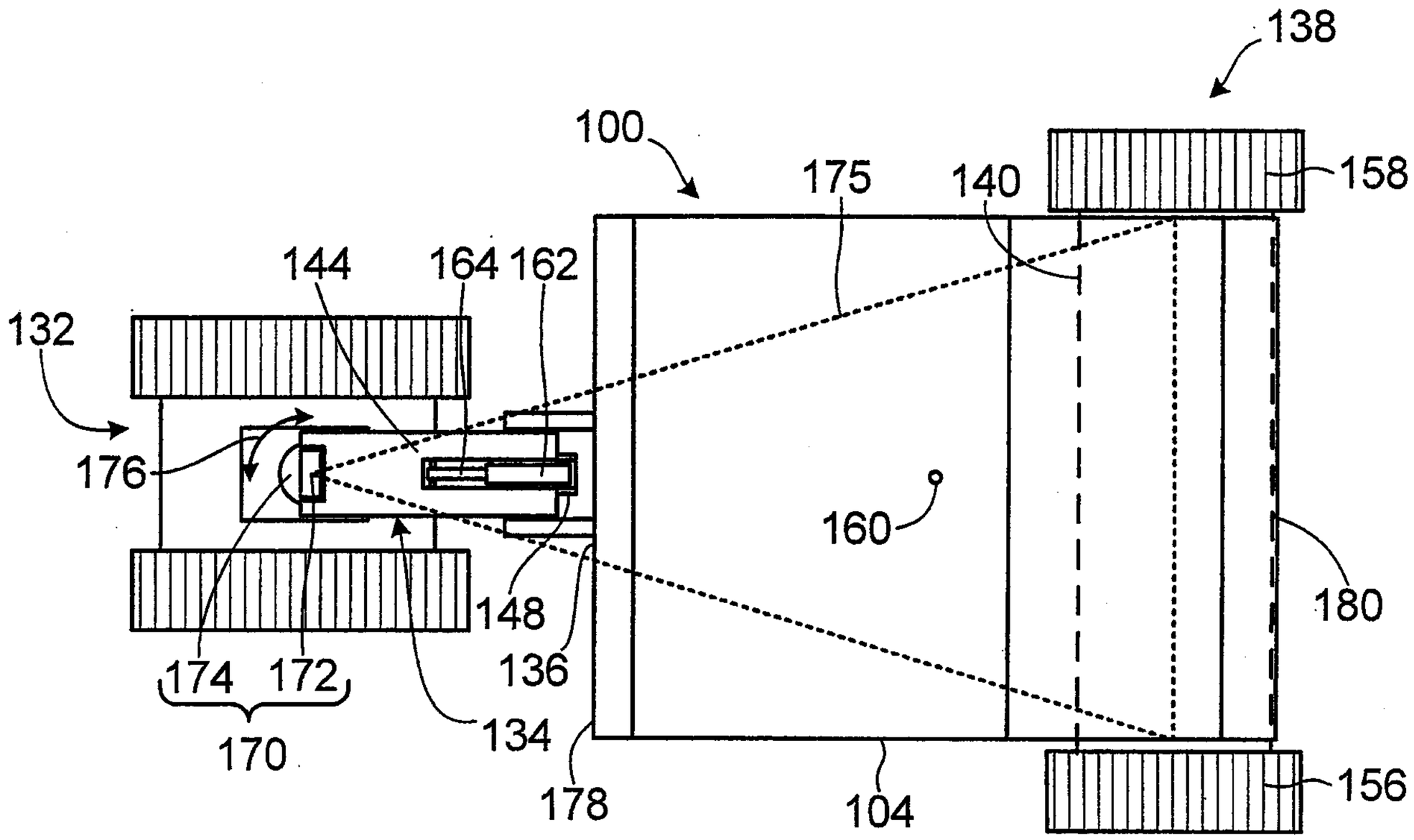
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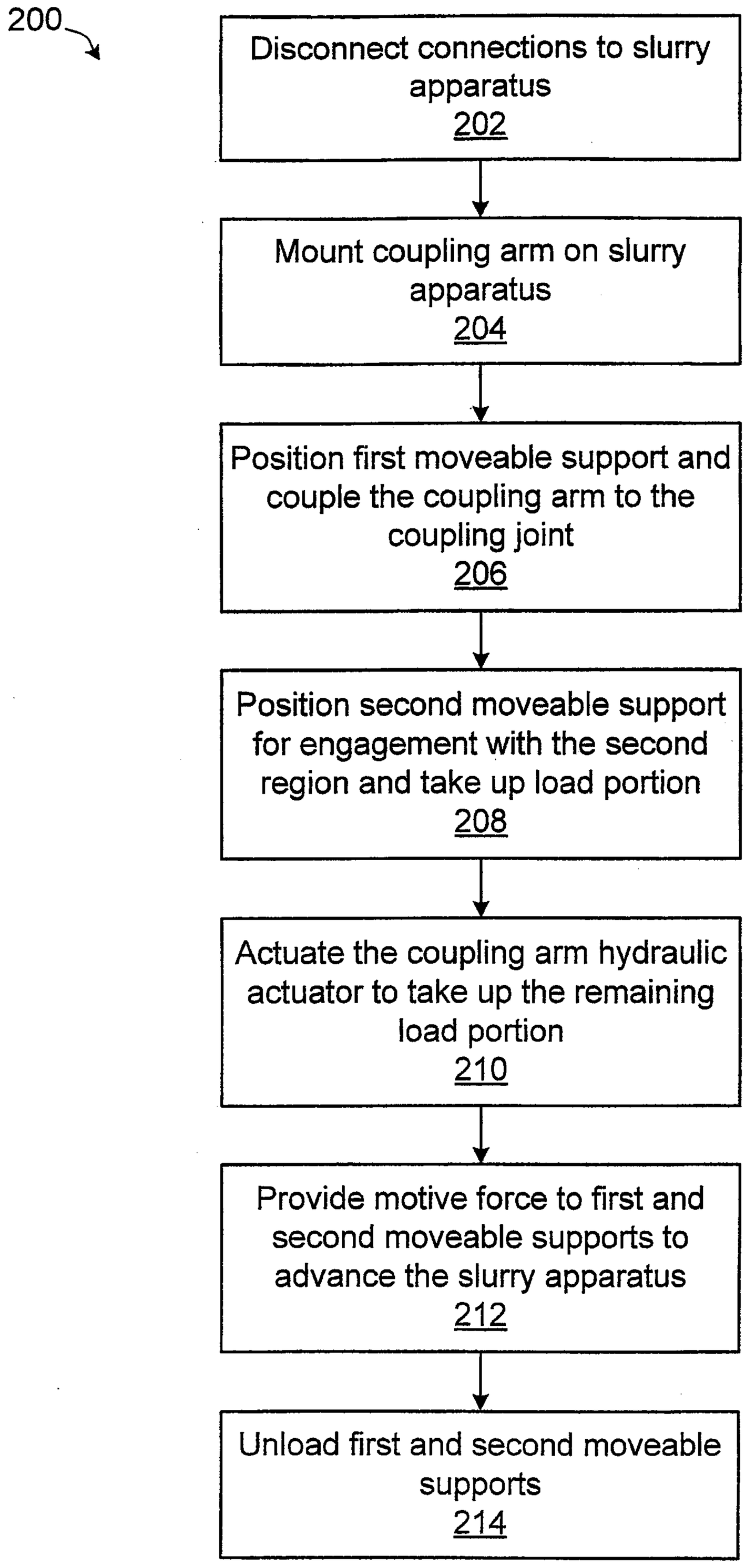
FIG. 4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Disconnect connections to slurry apparatus
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Mount coupling arm on slurry apparatus
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Position first moveable support and couple the coupling arm to the coupling joint
206
Position second moveable support for engagement with the second region and take up load portion
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Actuate the coupling arm hydraulic actuator to take up the remaining load portion
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Provide motive force to first and second moveable supports to advance the slurry apparatus
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Unload first and second moveable supports
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FIG. 5

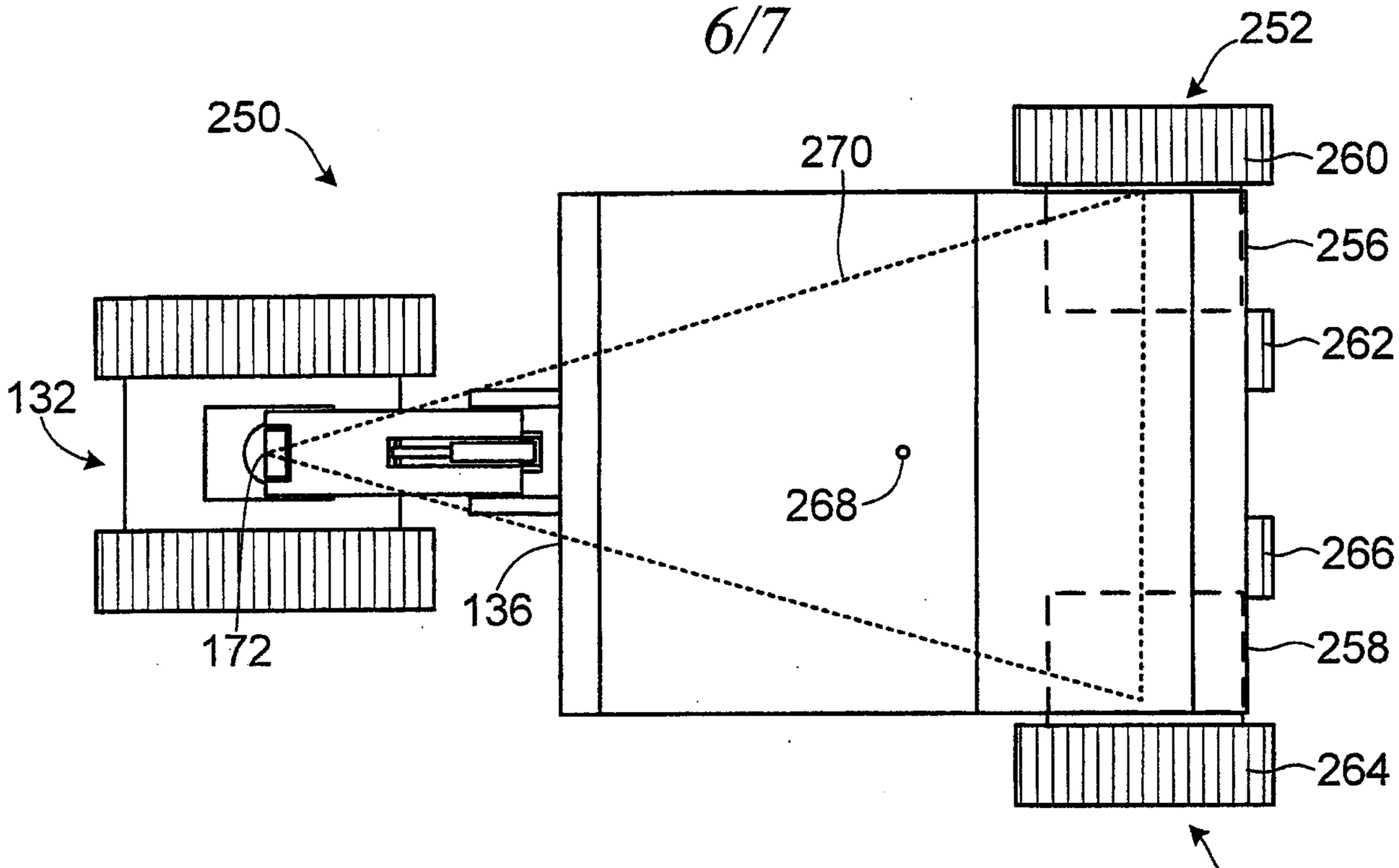
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FIG. 6

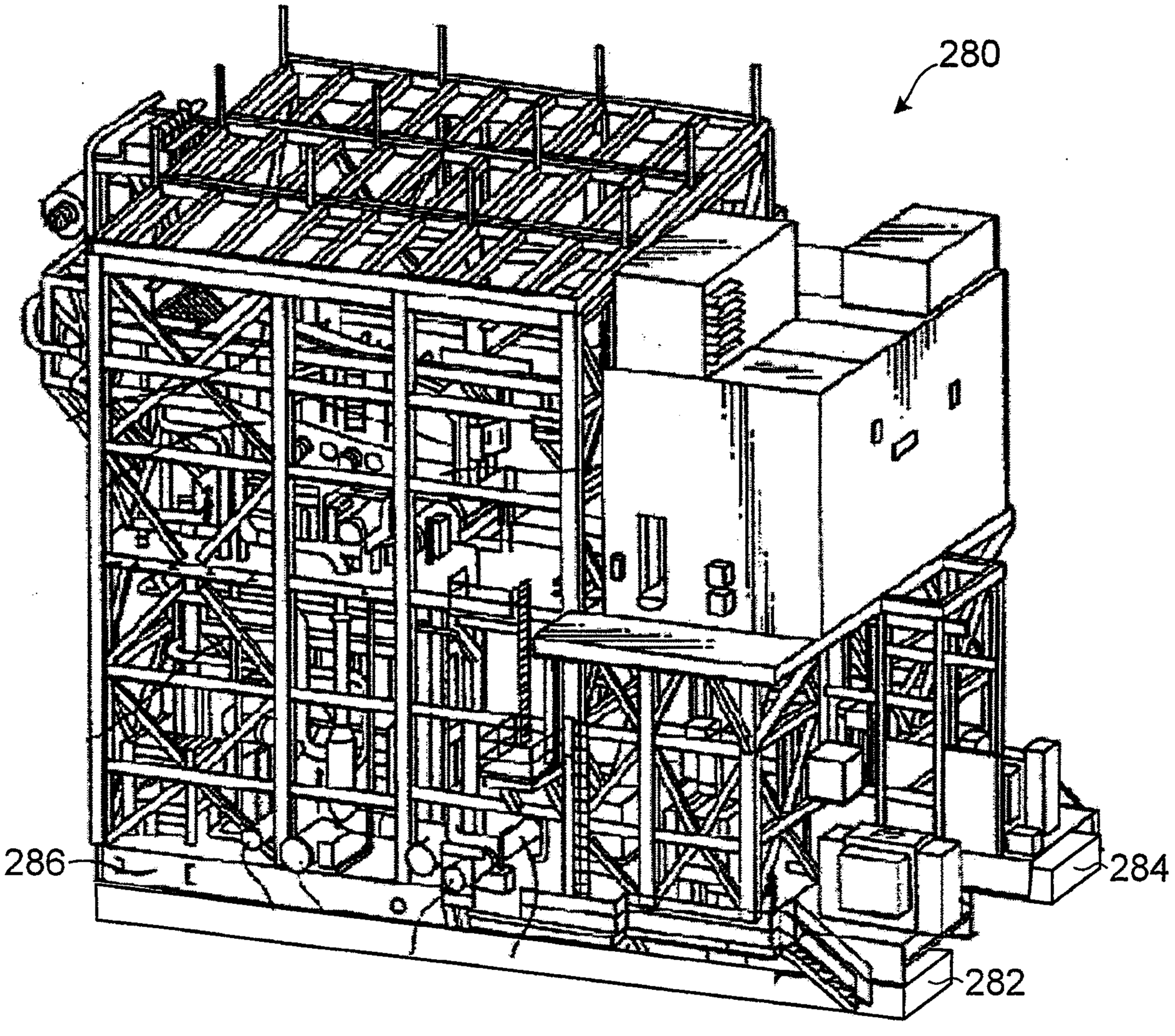
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FIG. 7

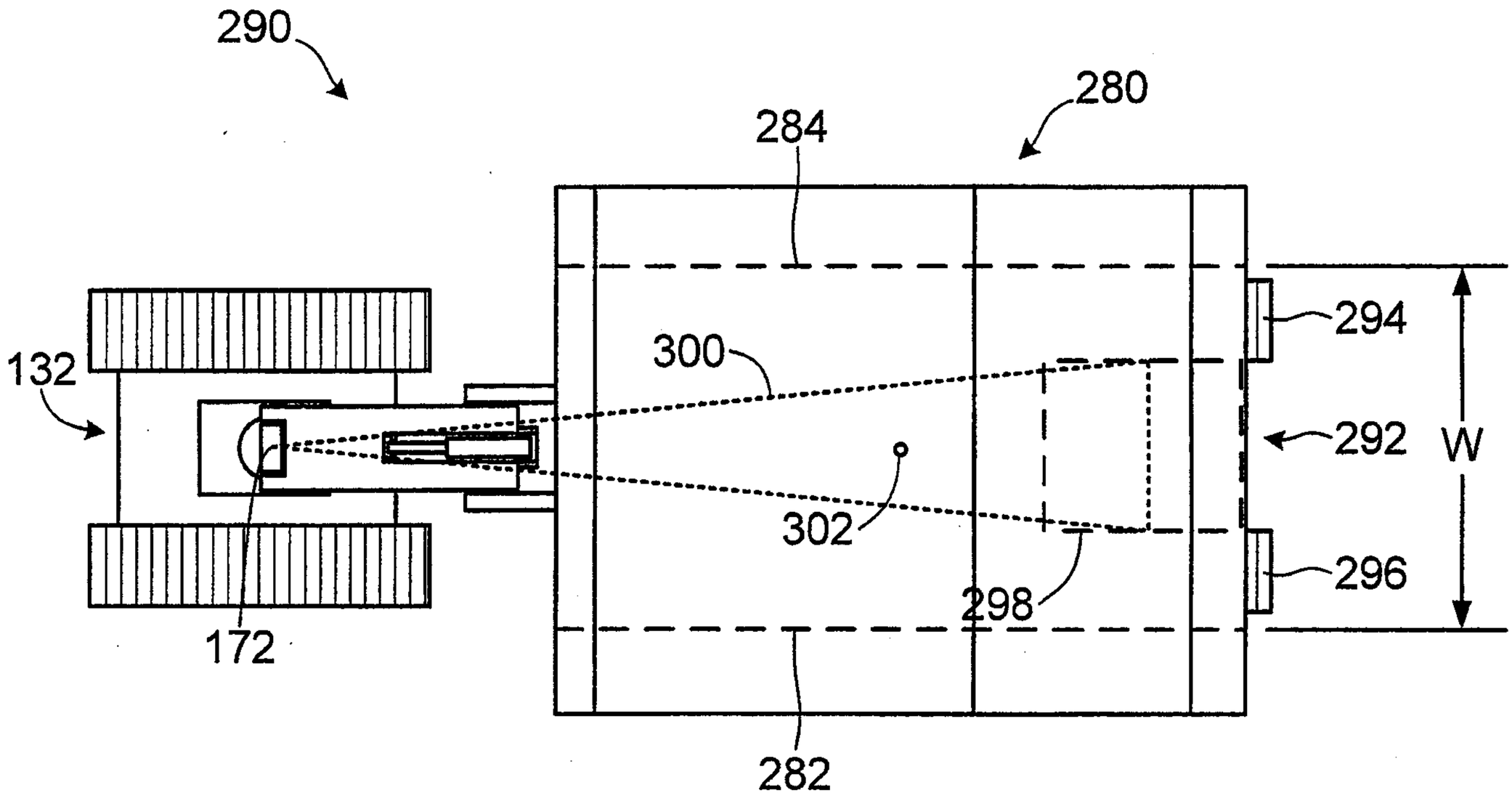
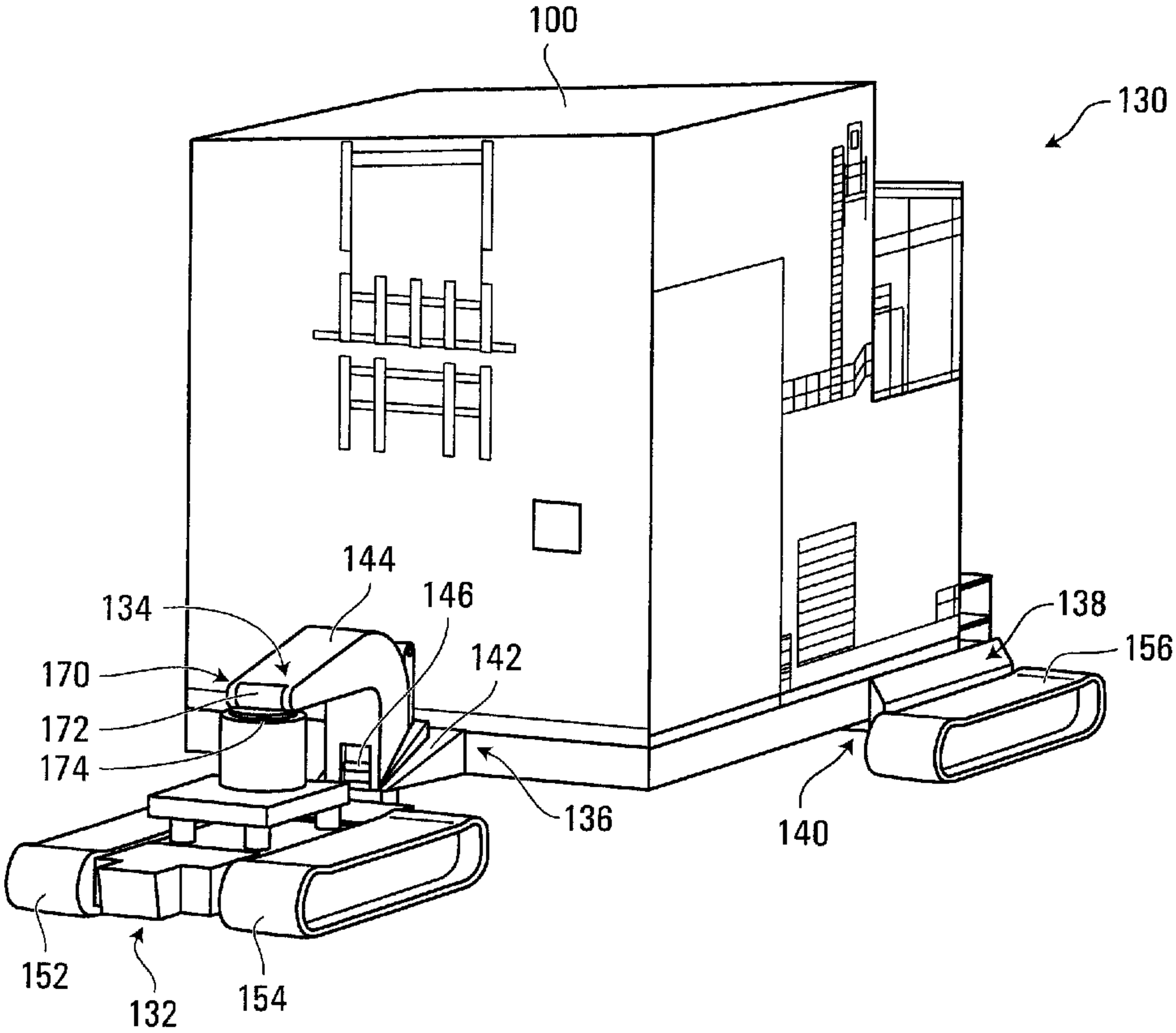


FIG. 8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