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(12) **United States Patent**
Way

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(54) **FLOATING LIFT SYSTEM FOR FLOATING OR FIXED DOCKS AND METHOD OF USE**

(71) Applicant: **Robert Lindsay Way**, Brunswick, GA (US)

(72) Inventor: **Robert Lindsay Way**, Brunswick, GA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 505 days.

(21) Appl. No.: **17/963,718**

(22) Filed: **Oct. 11, 2022**

Related U.S. Application Data

(63) Continuation-in-part of application No. 17/108,899, filed on Dec. 1, 2020, now Pat. No. 11,465,717.

(51) **Int. Cl.**
B63C 1/06 (2006.01)

(52) **U.S. Cl.**
CPC ***B63C 1/06*** (2013.01)

(58) **Field of Classification Search**
CPC B63C 1/06; B63C 1/02
See application file for complete search history.

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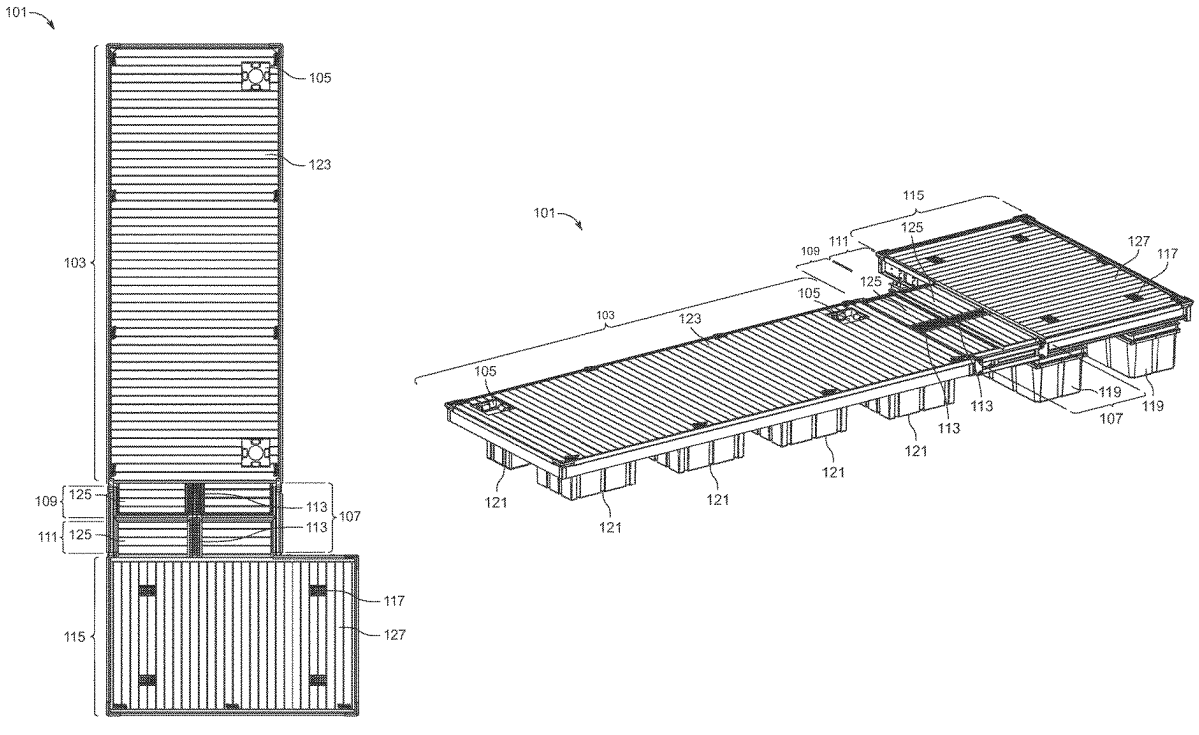
Primary Examiner — S. Joseph Morano
Assistant Examiner — Jovon E Hayes
(74) *Attorney, Agent, or Firm* — Richard Eldredge; Leavitt Eldredge Law Firm

(57) **ABSTRACT**

A floating lift system capable of fully integrating into an existing floating or fixed dock or into a floating or fixed dock currently in construction that allows users to employ a plurality of utilitarian uses, thereby providing for enhanced user experience. The floating lift system includes an elevator deck; a lift deck; and an air control system. The floating lift system allows for the raising and lowering of load into and out of water.

9 Claims, 27 Drawing Sheets



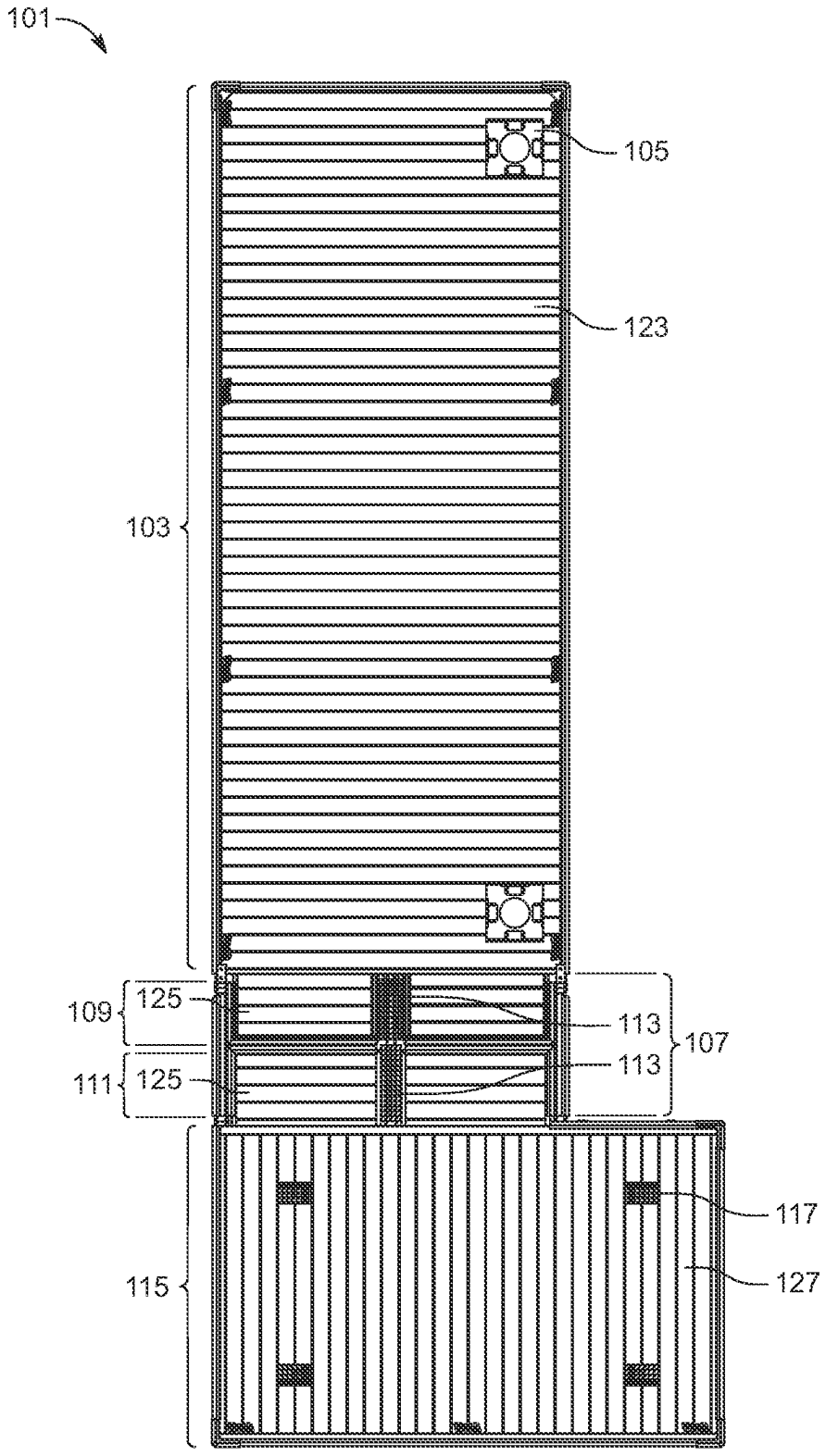


FIG. 1A

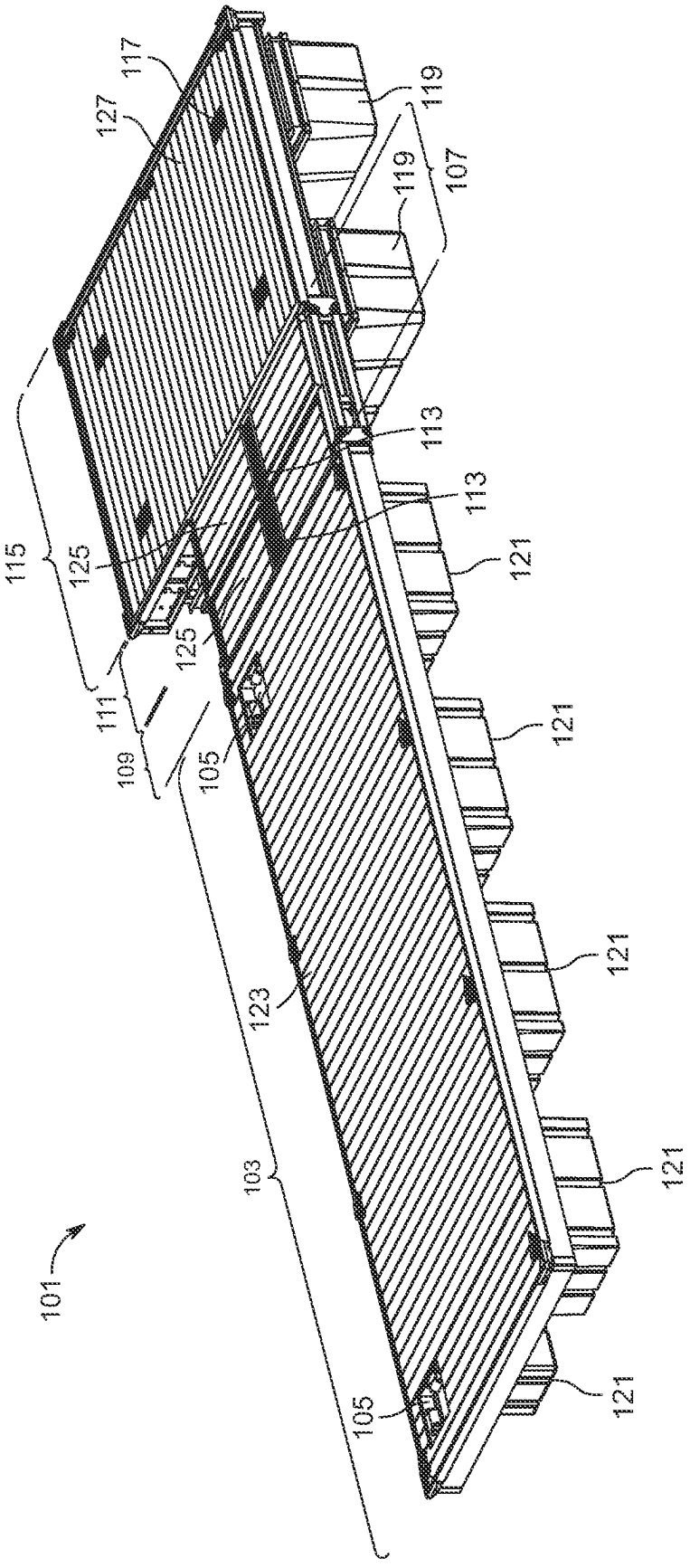

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FIG. 1B

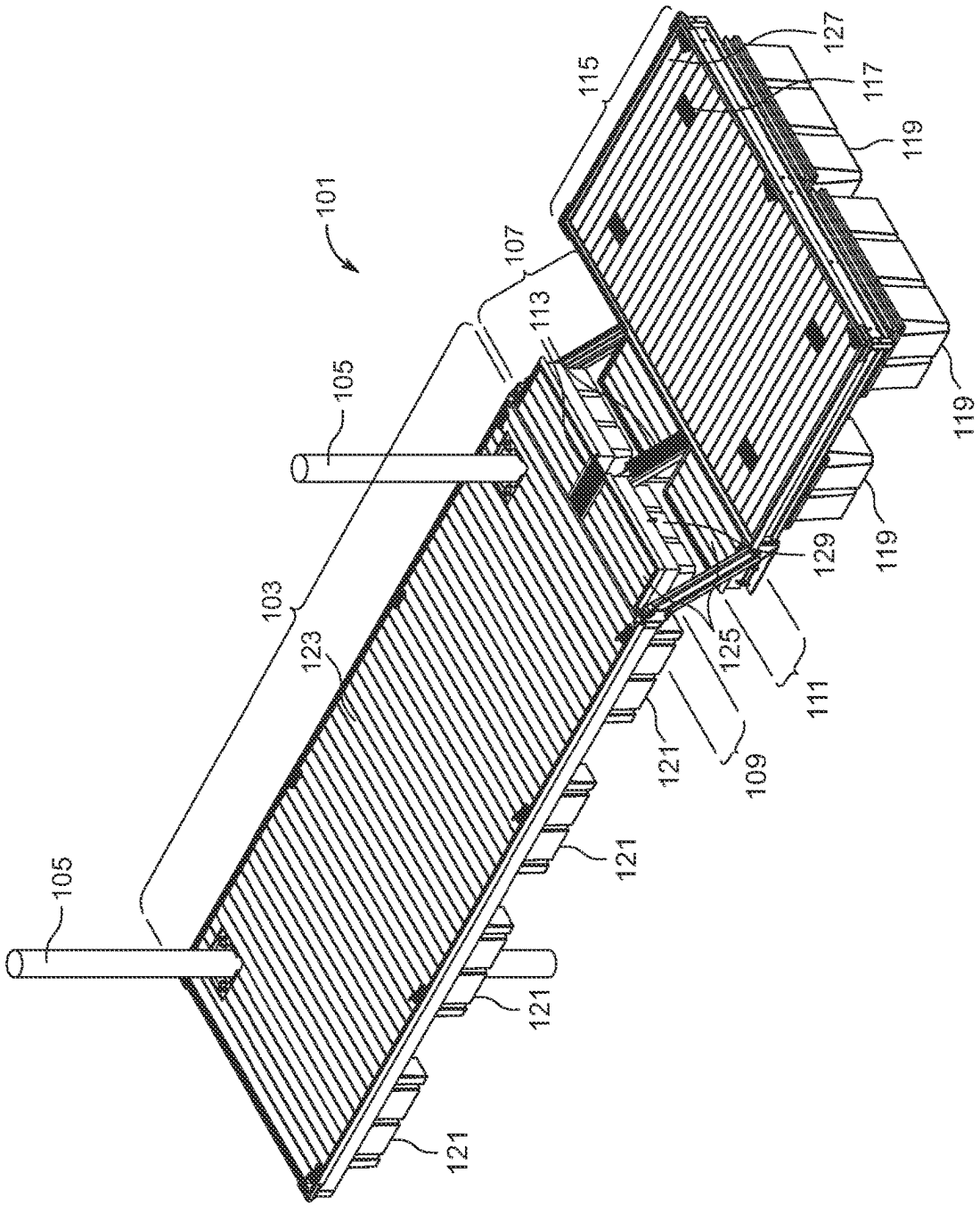
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FIG. 1C

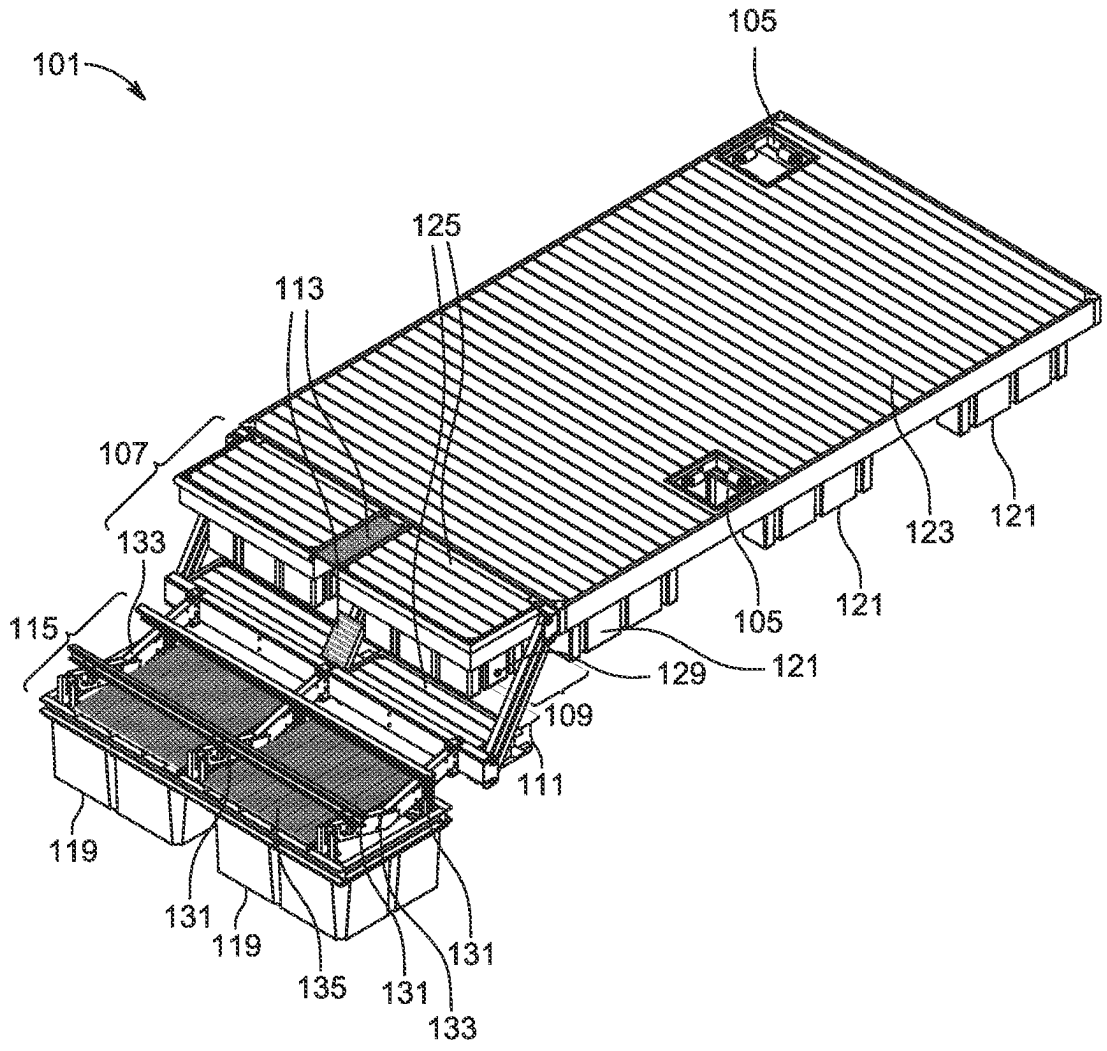
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FIG. 1D

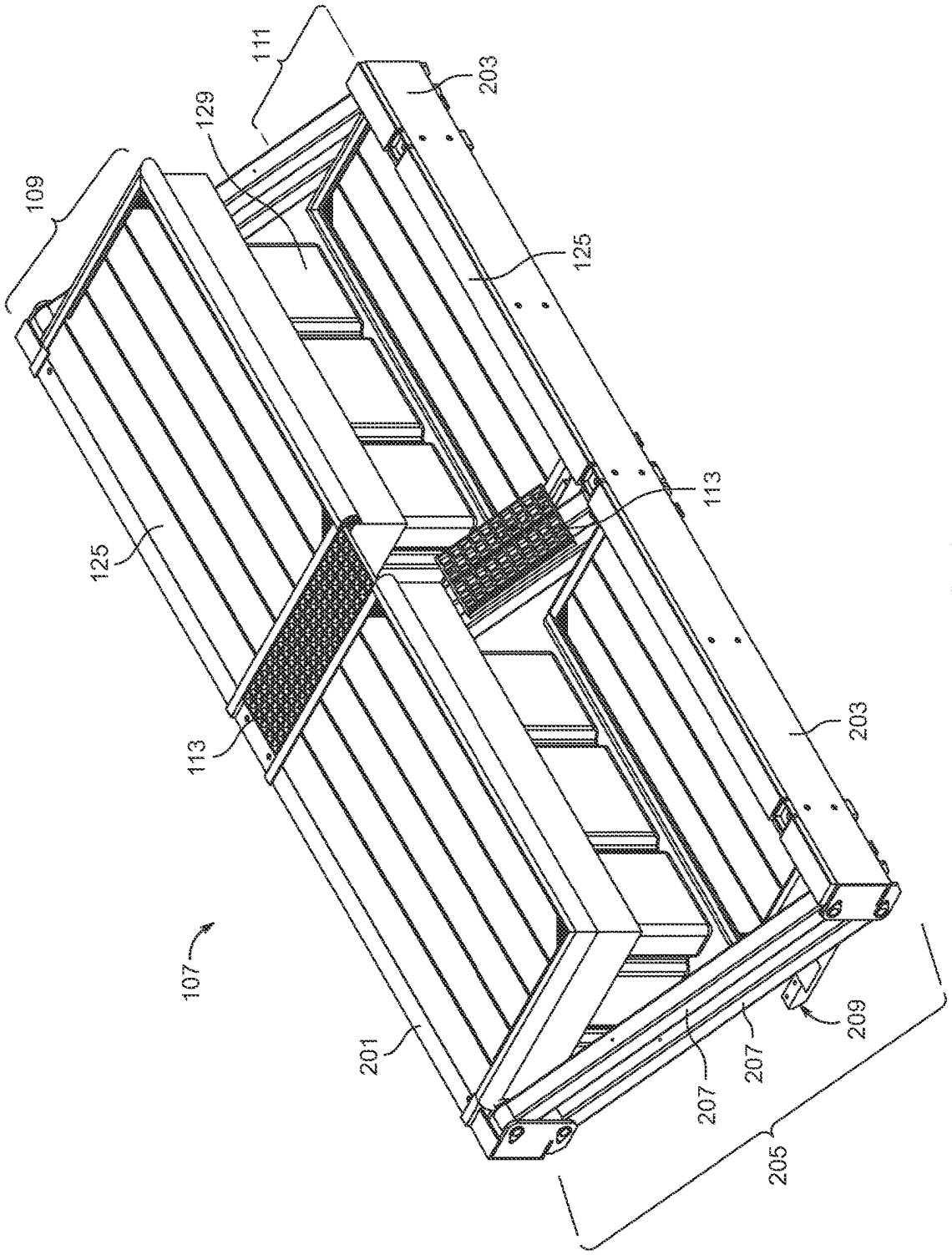

FIG. 2

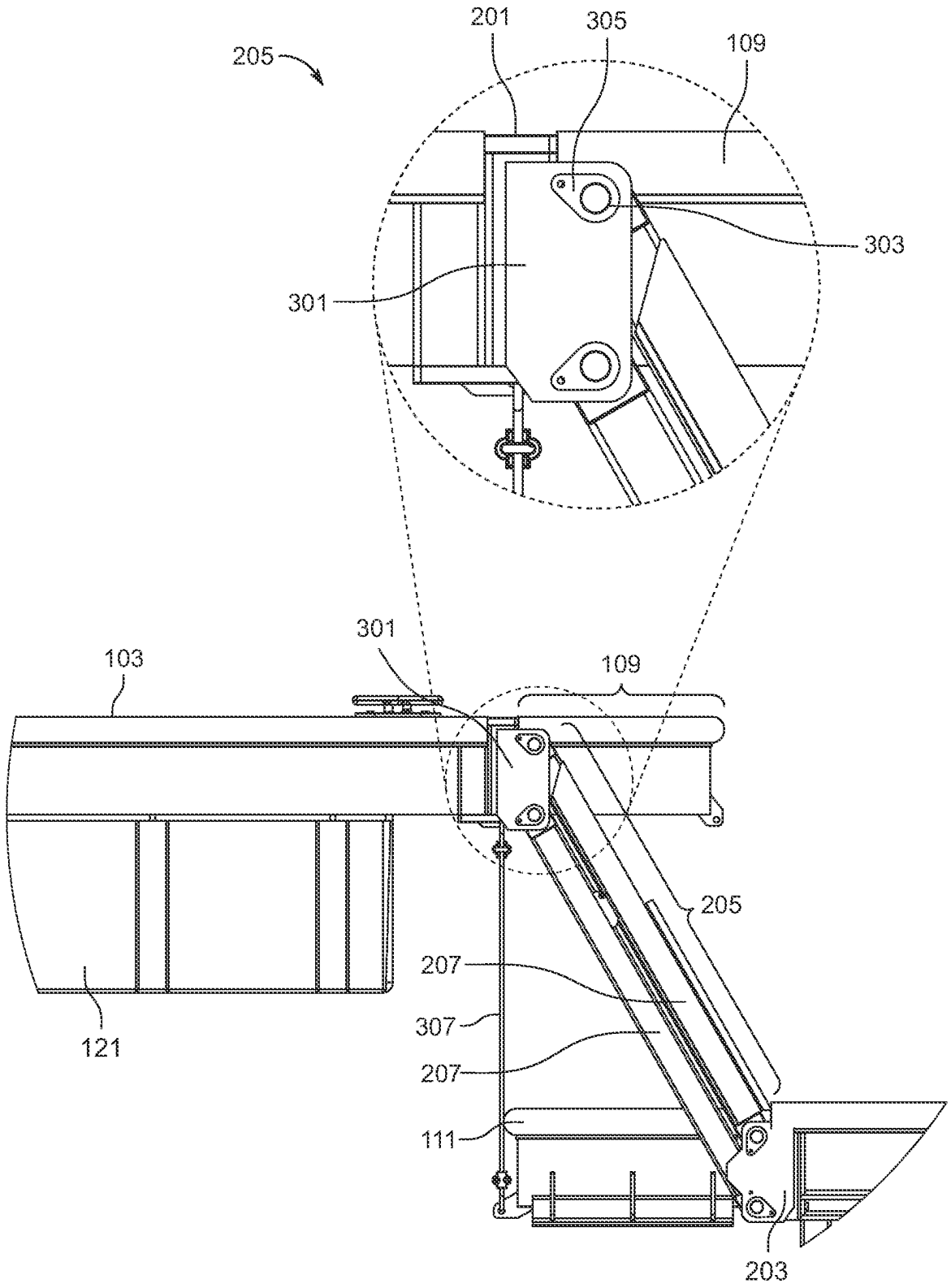

FIG. 3

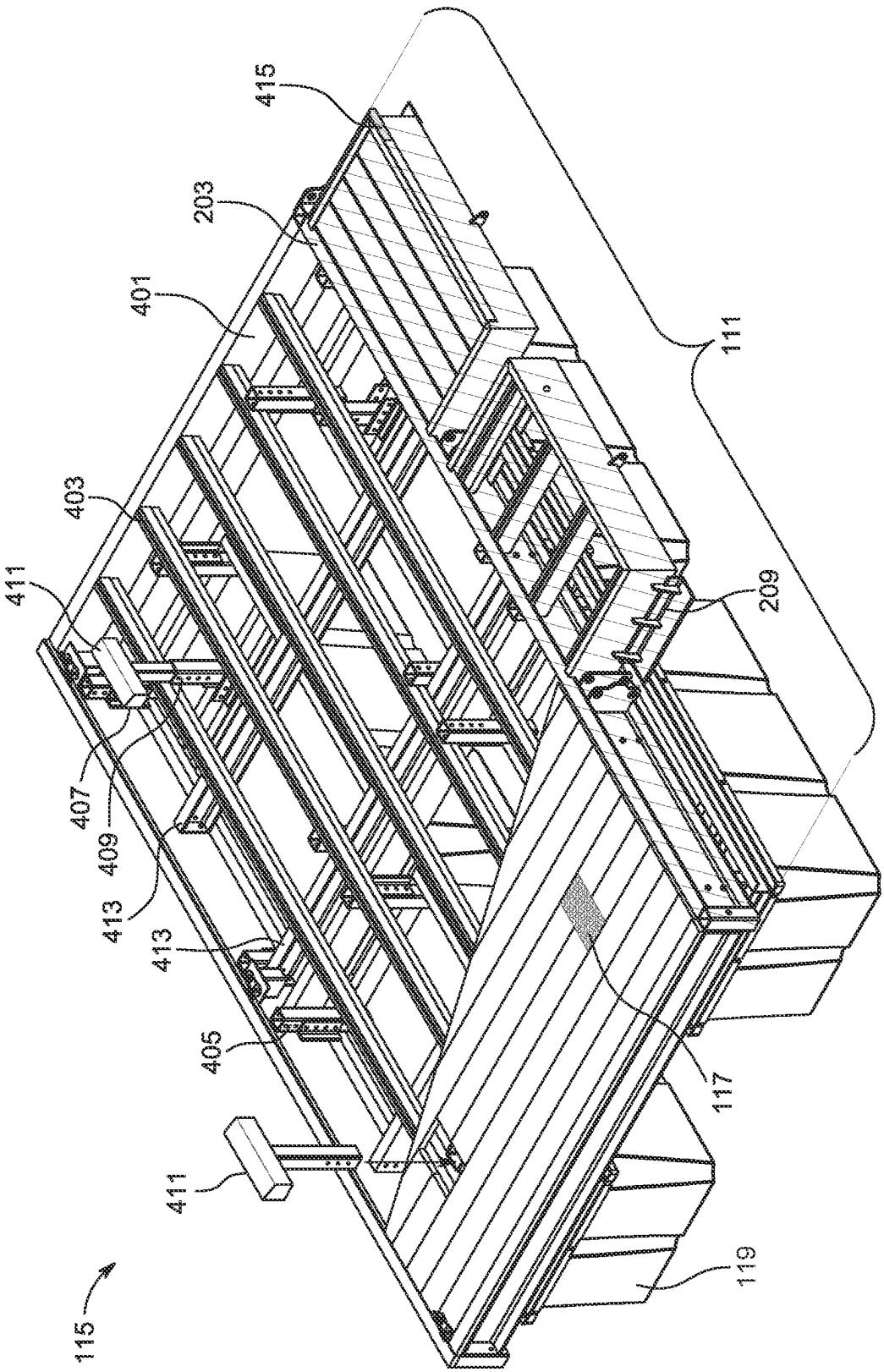

FIG. 4

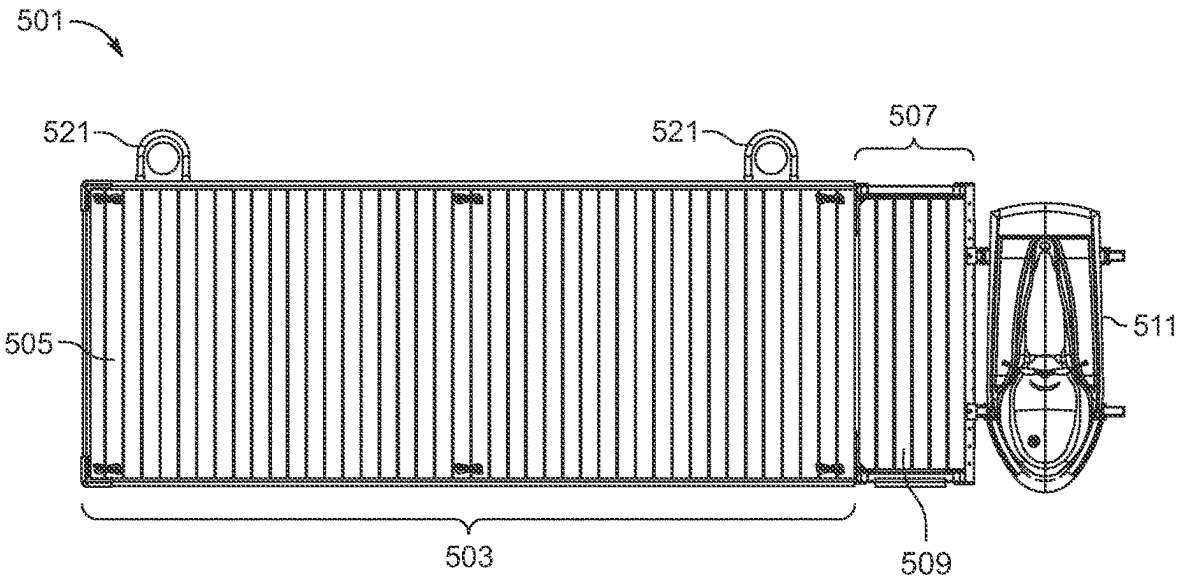

FIG. 5A

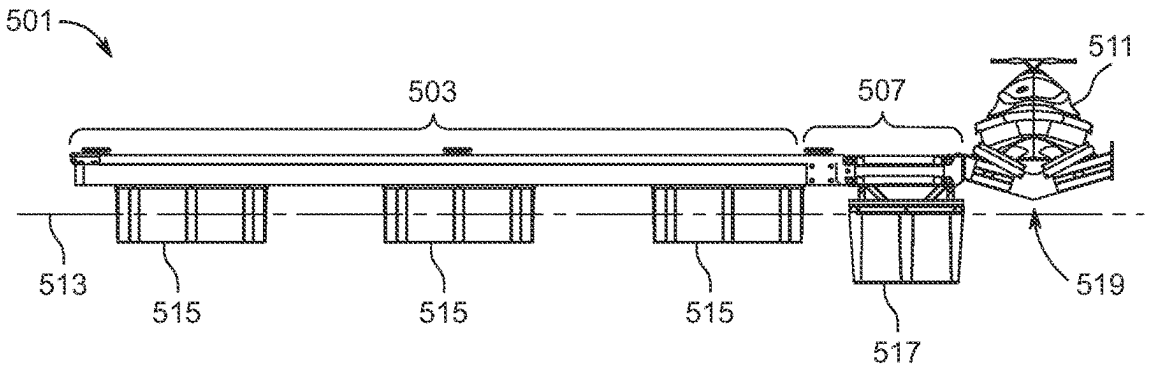

FIG. 5B

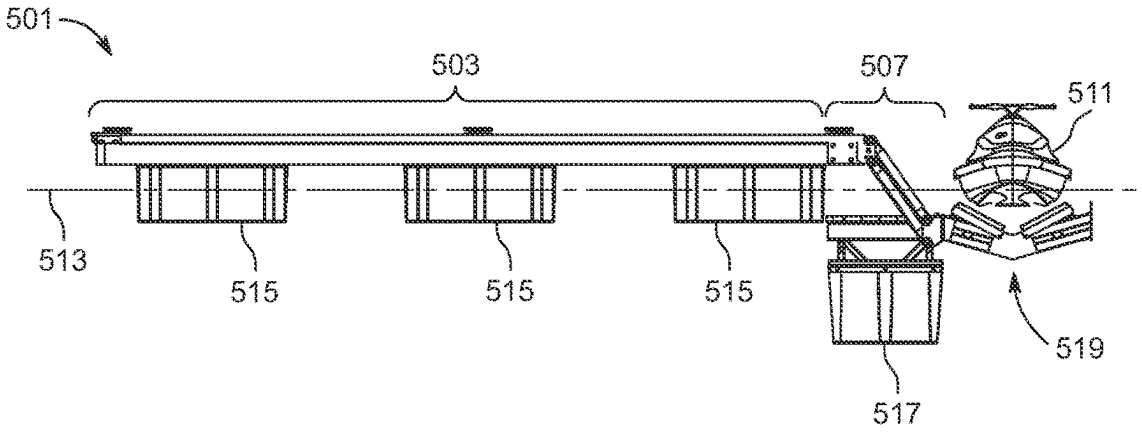

FIG. 5C

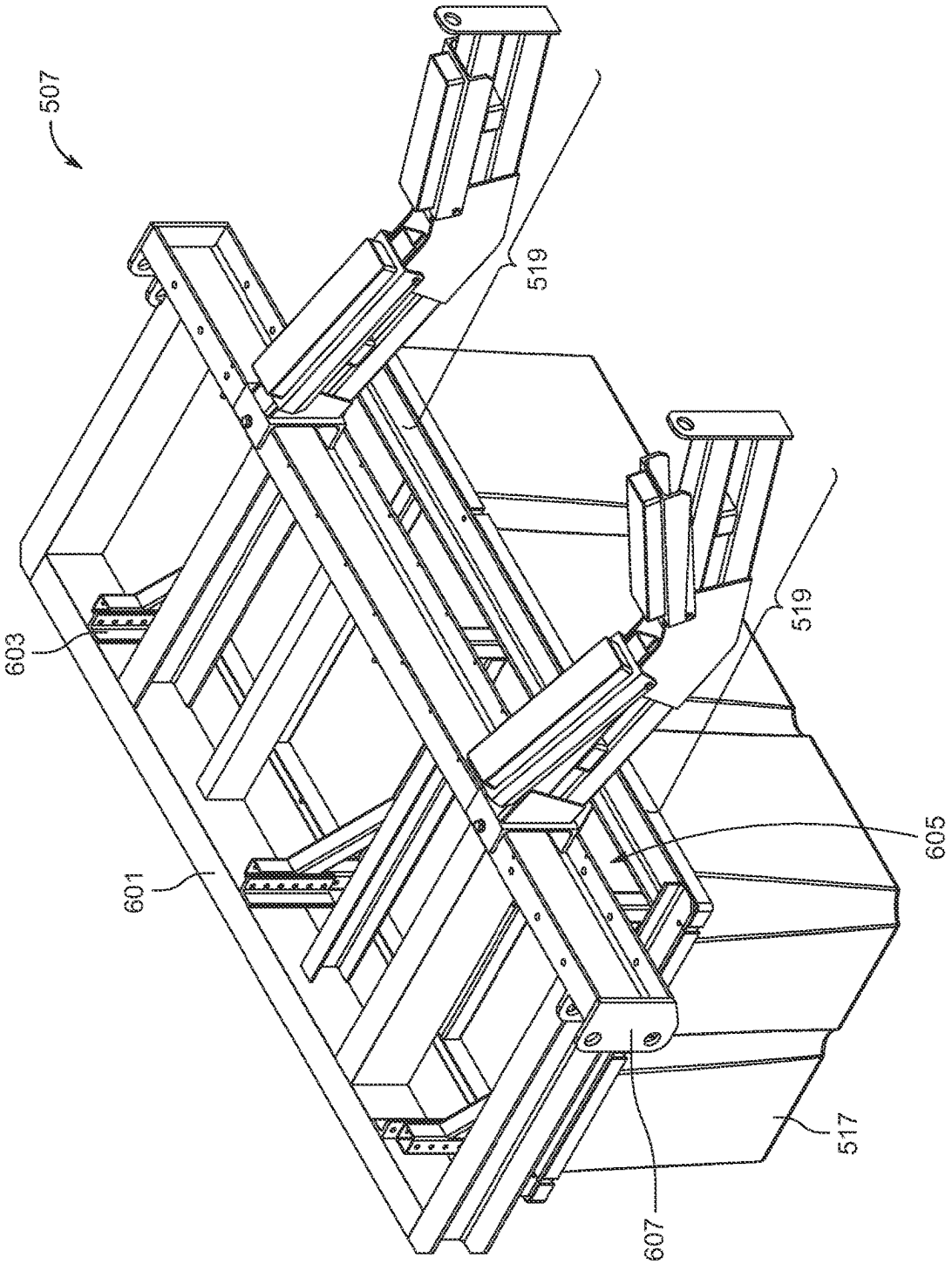

FIG. 6

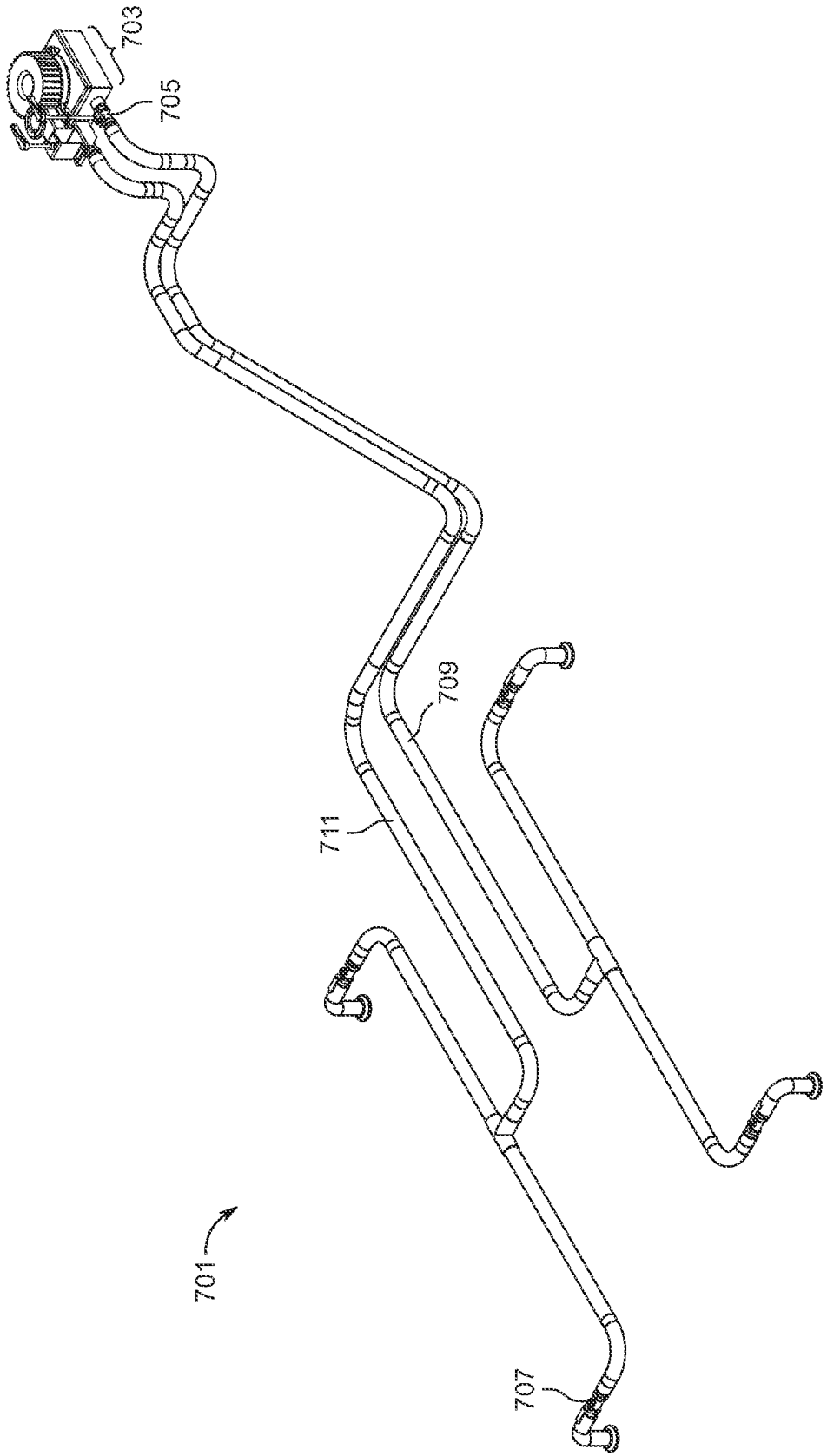

FIG. 7

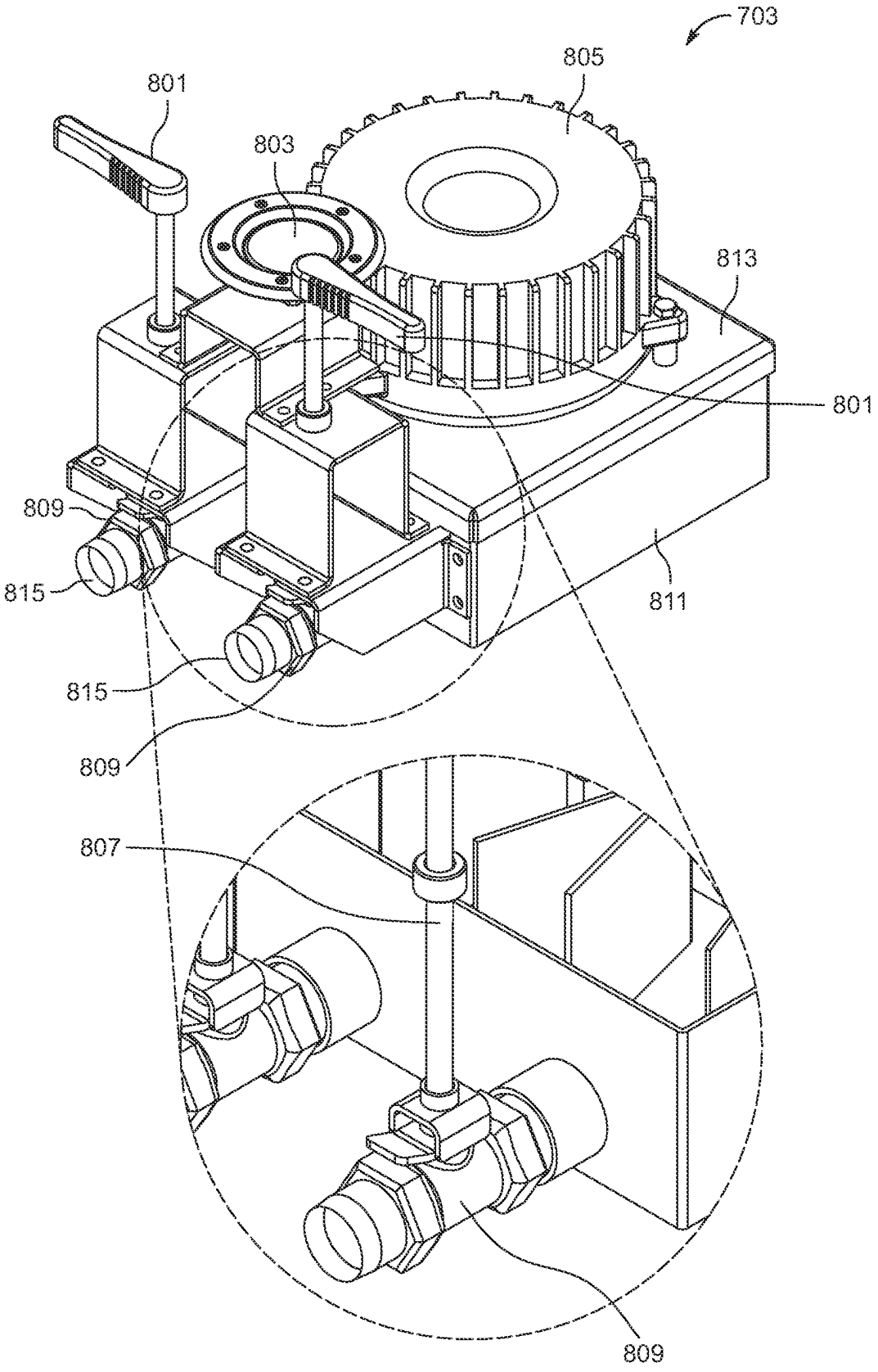

FIG. 8

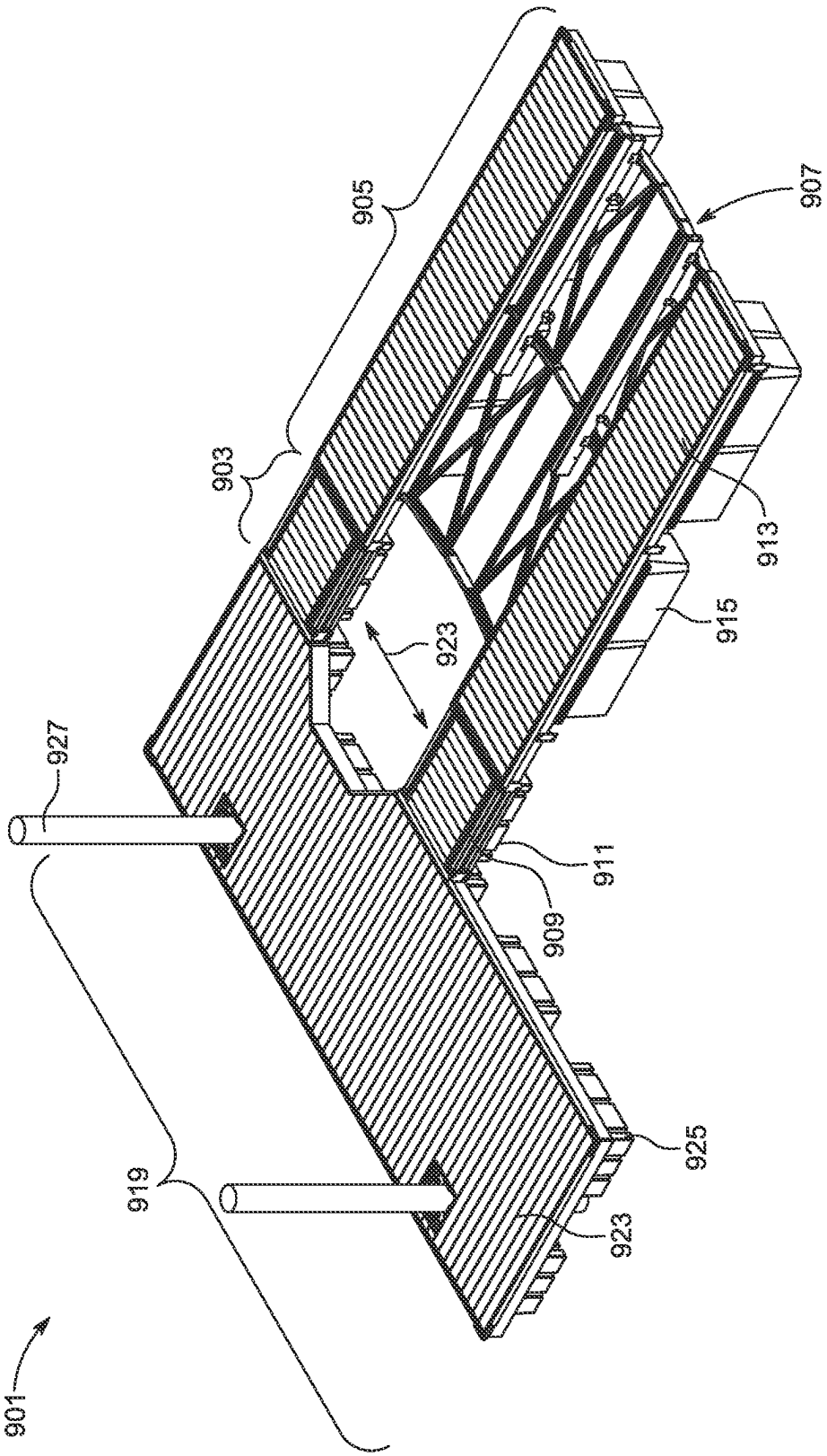

FIG. 9A

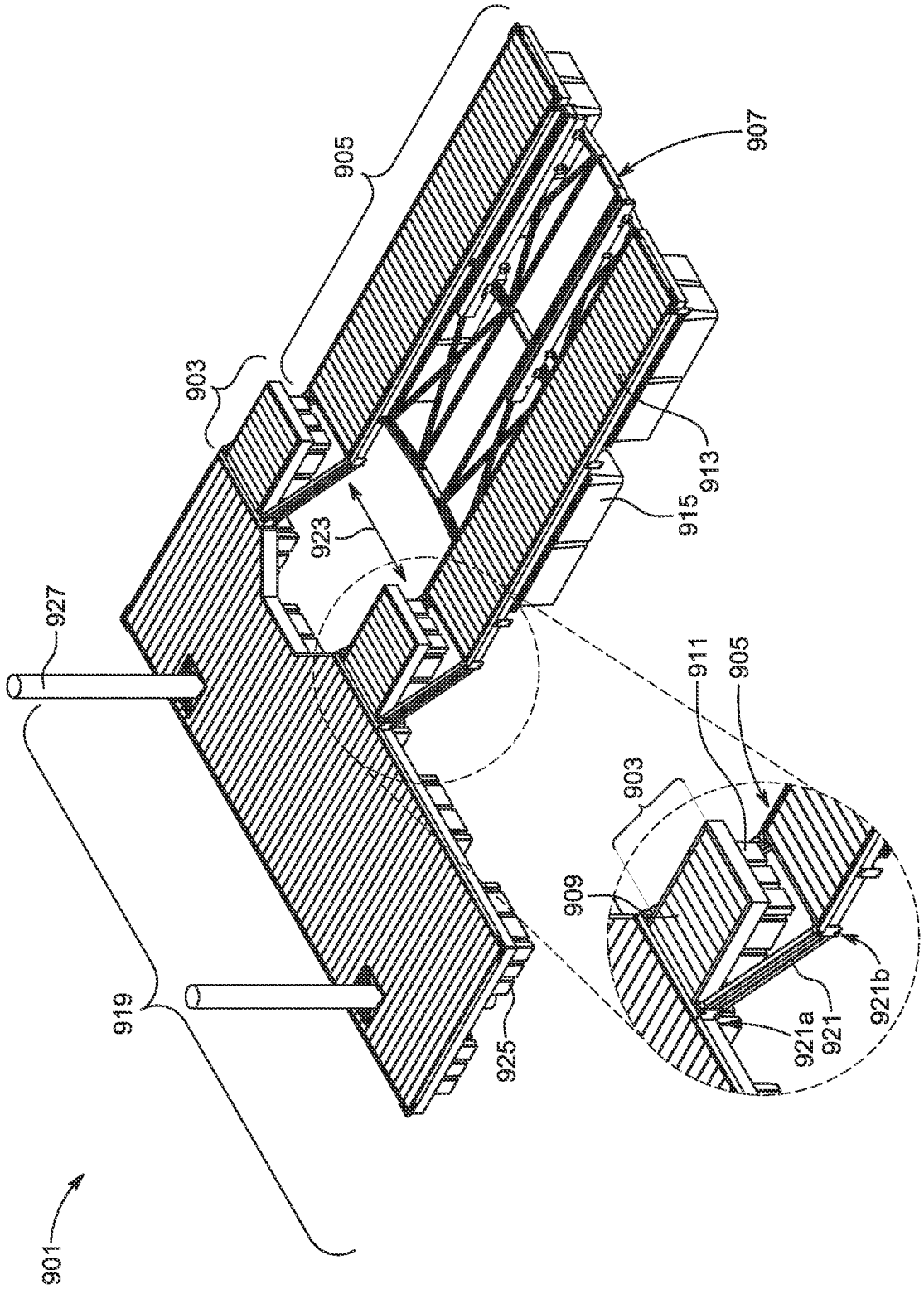
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FIG. 9B

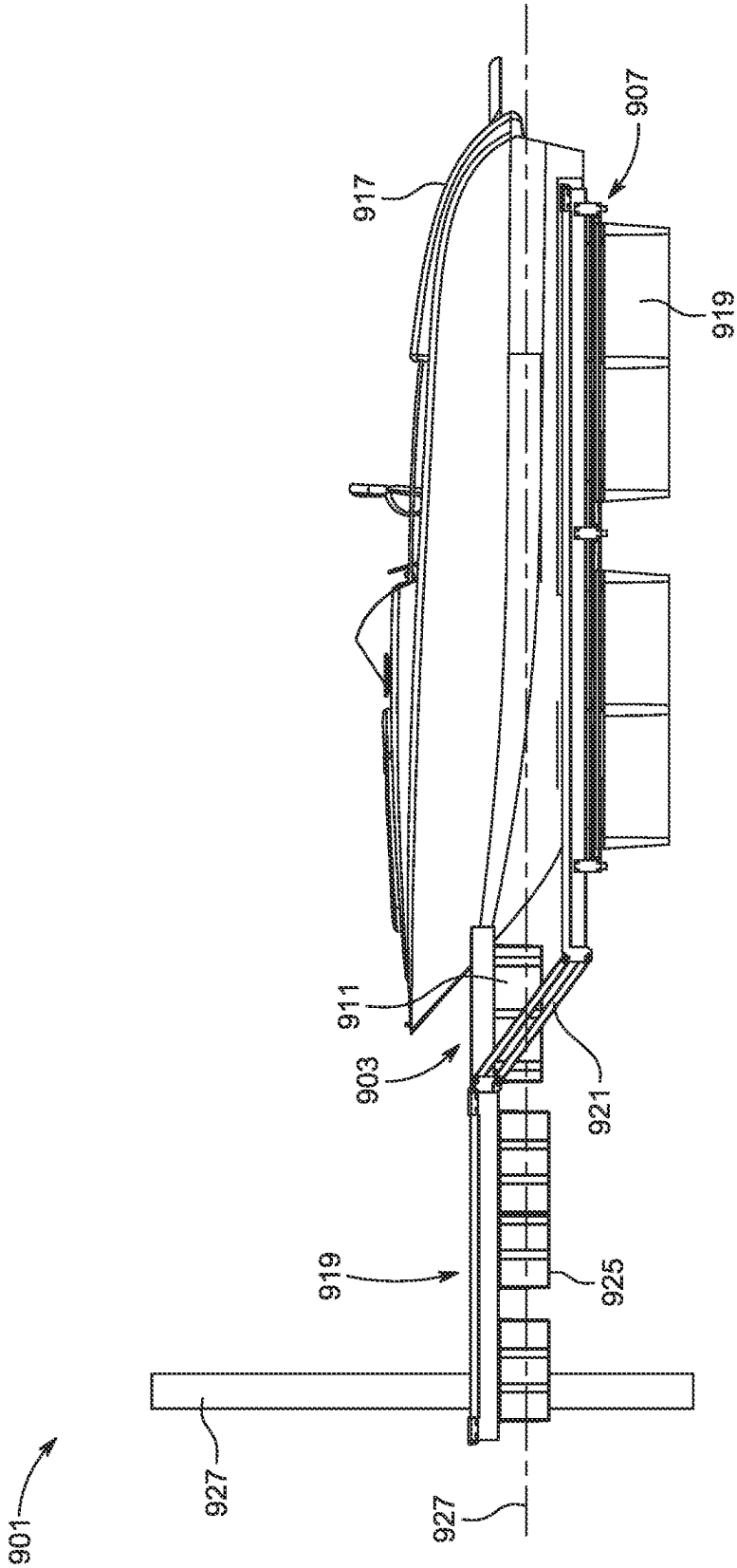

FIG. 9C

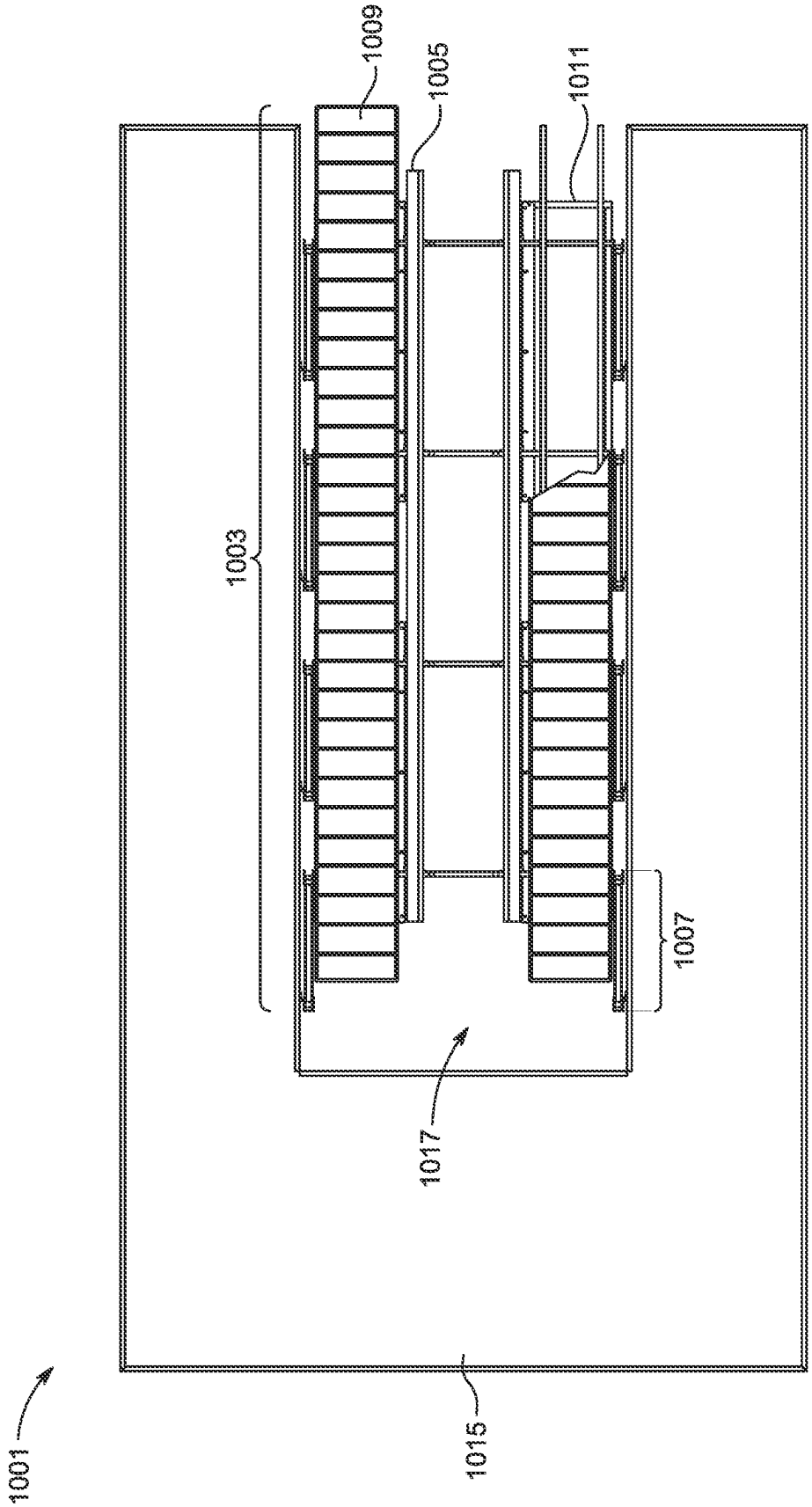

FIG. 10A

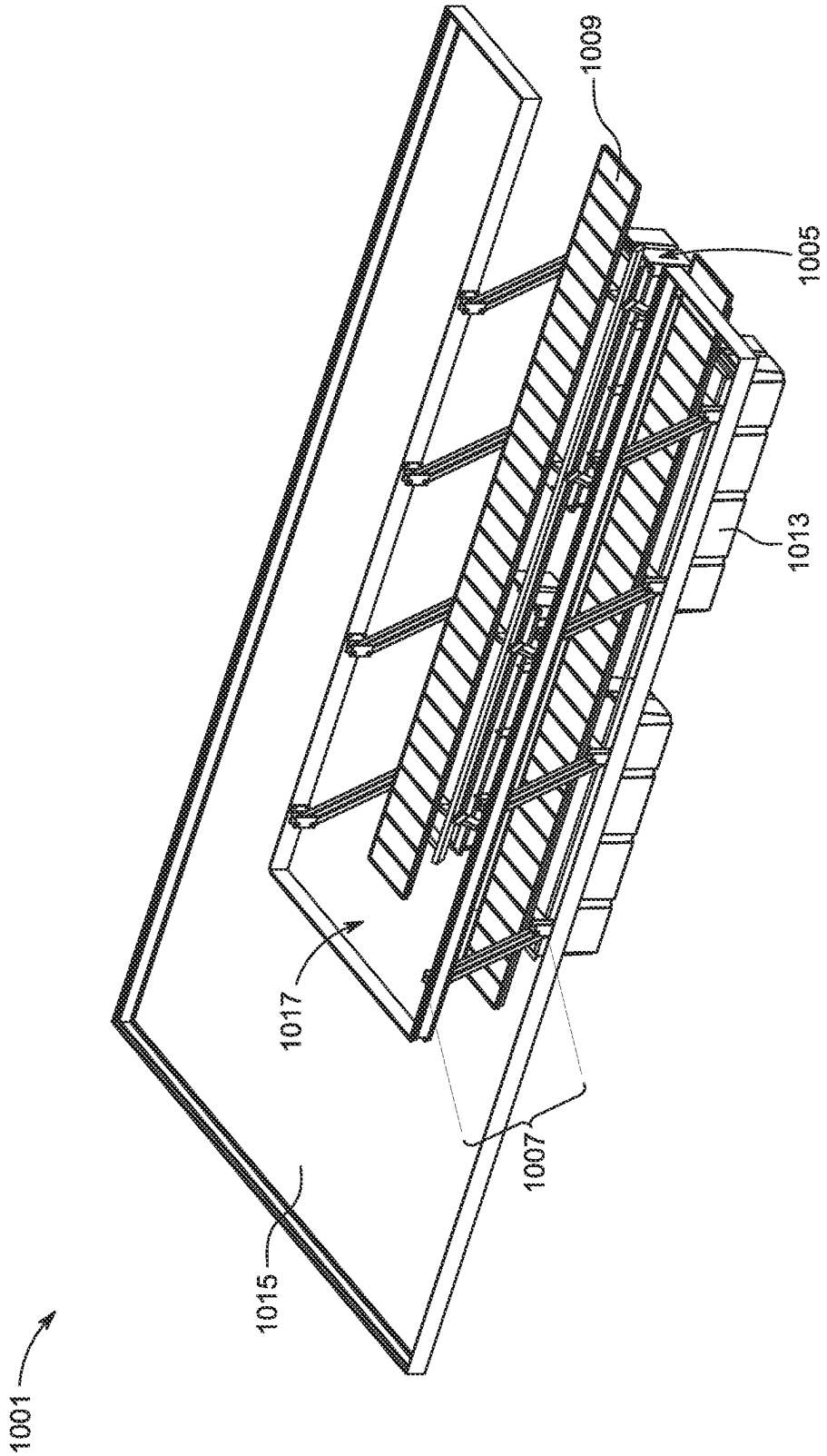

FIG. 10B

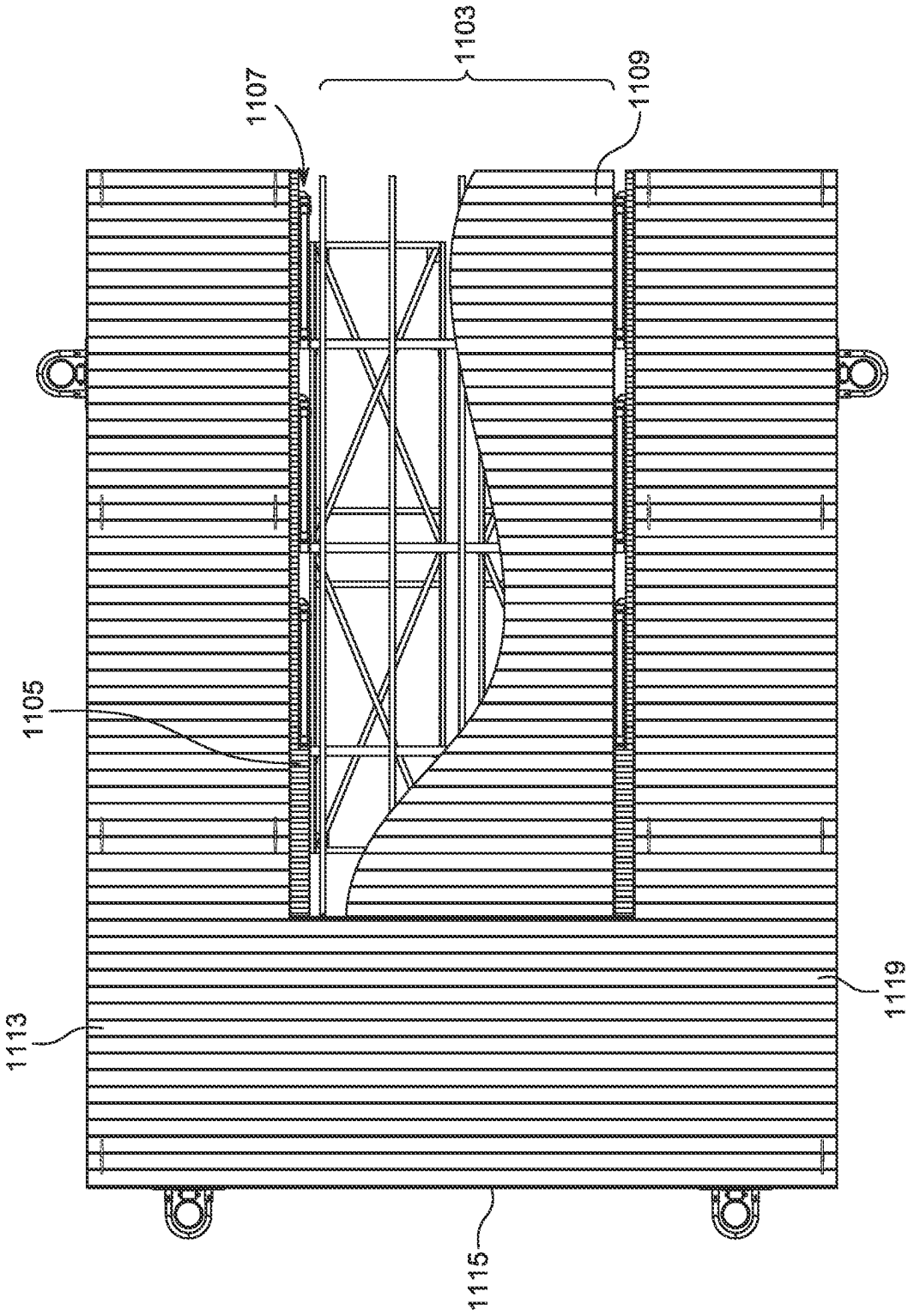

FIG. 11A

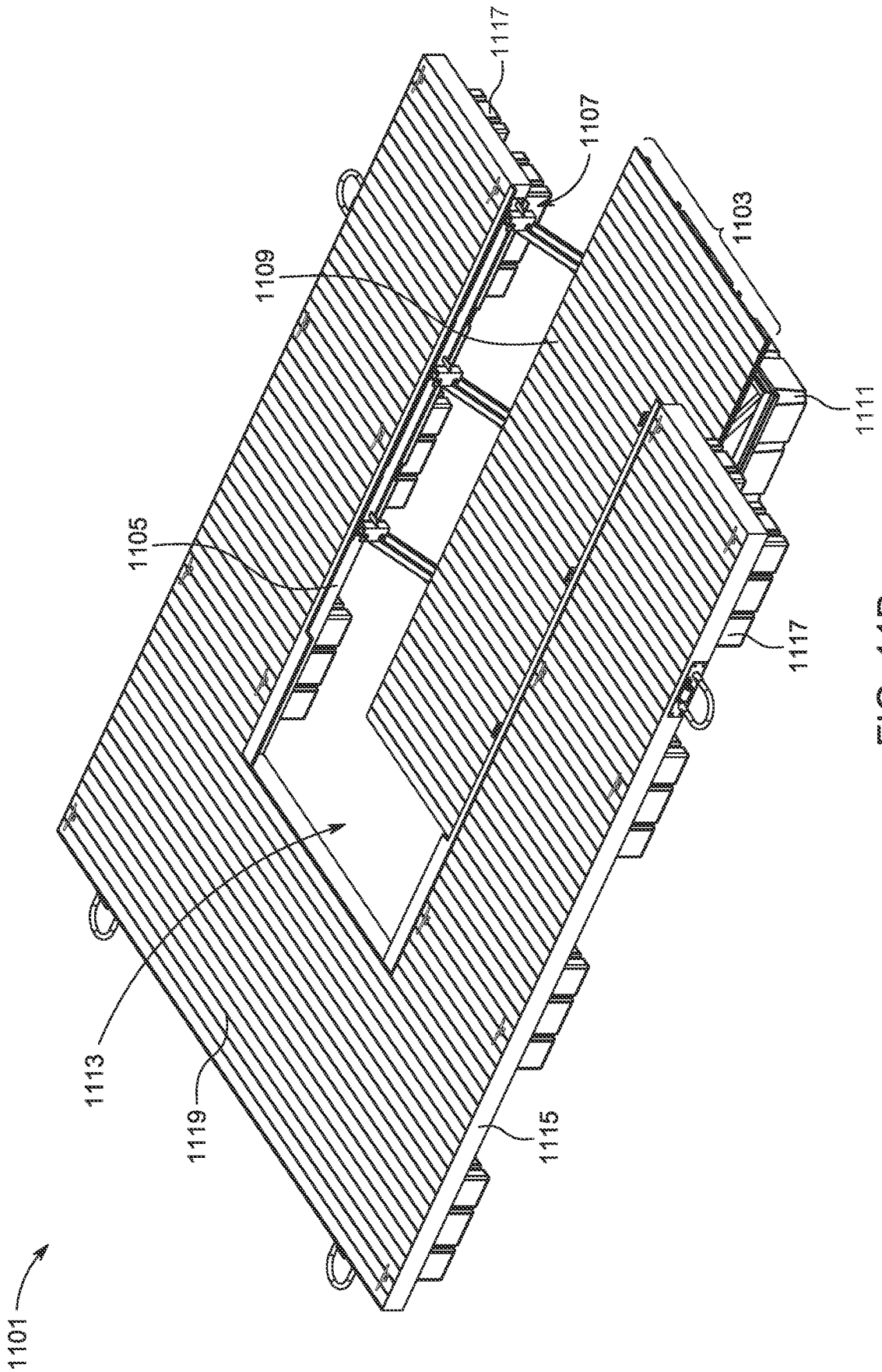

FIG. 11B

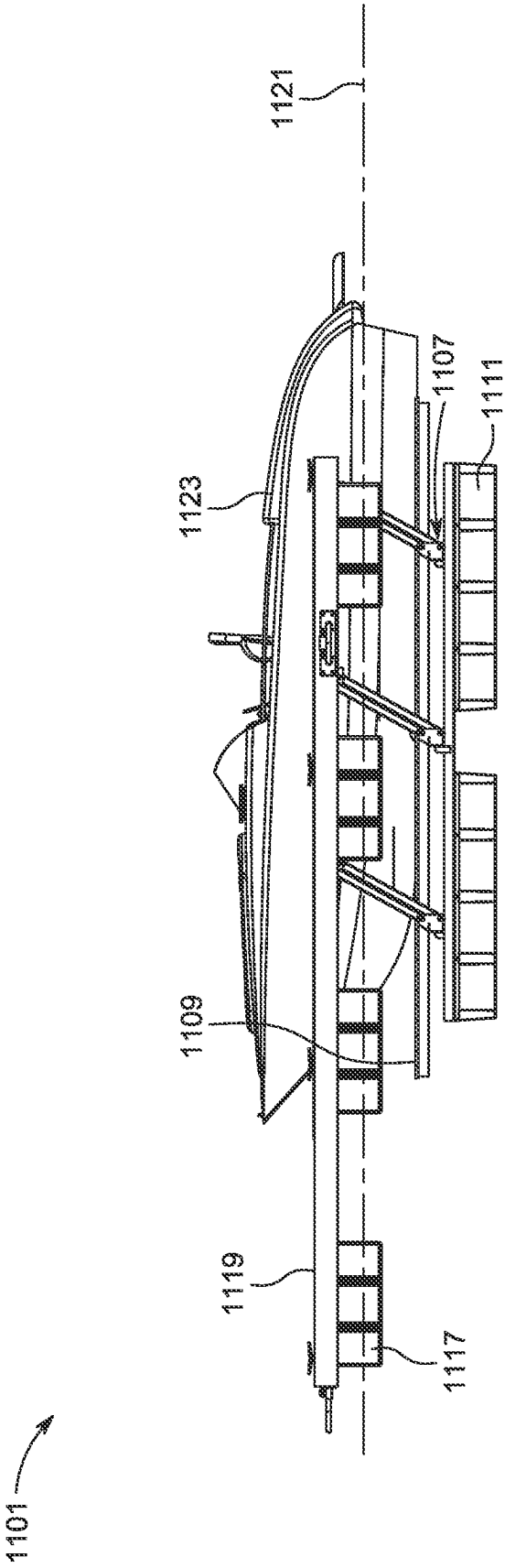

FIG. 11C

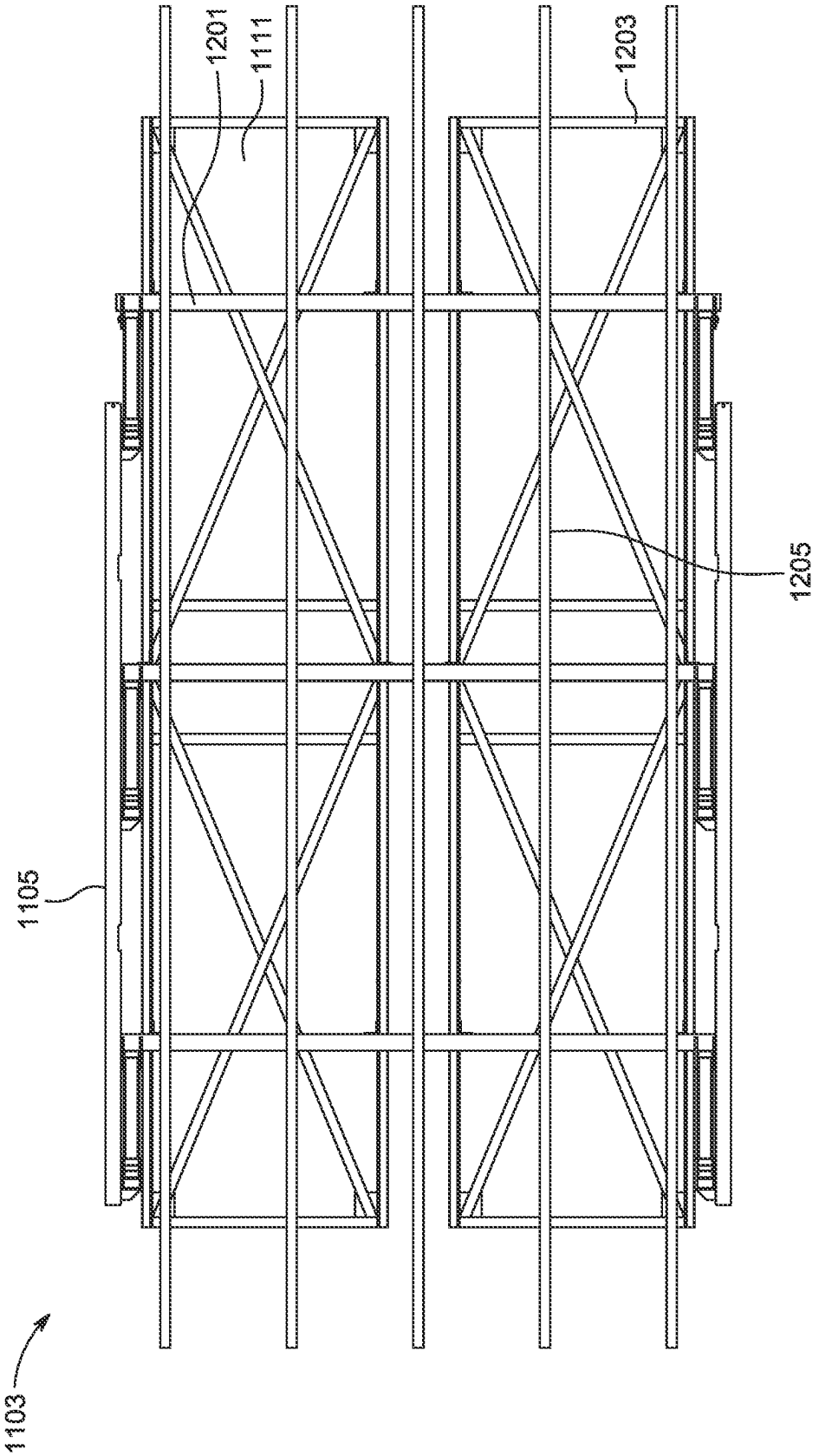

FIG. 12A

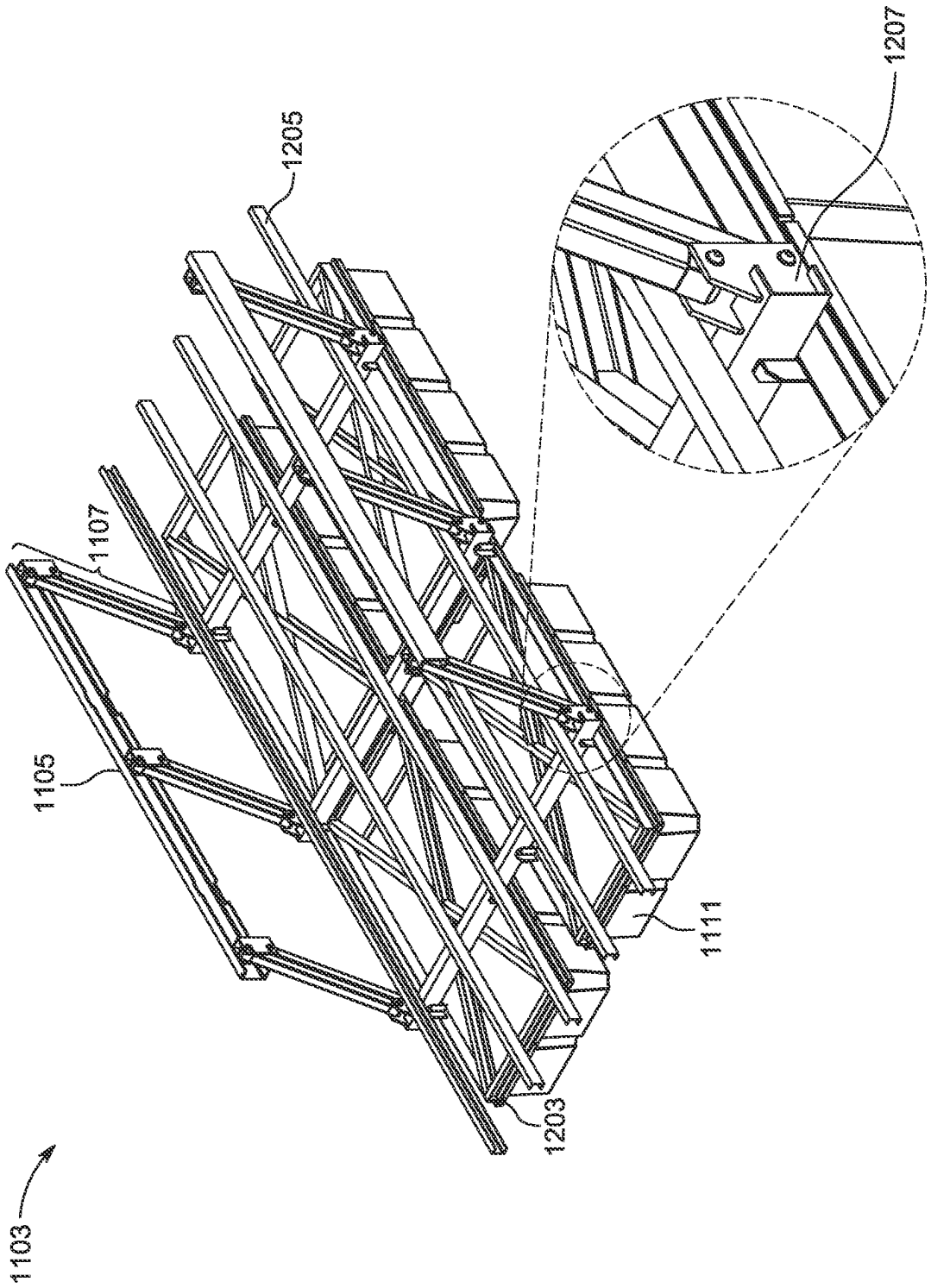

FIG. 12B

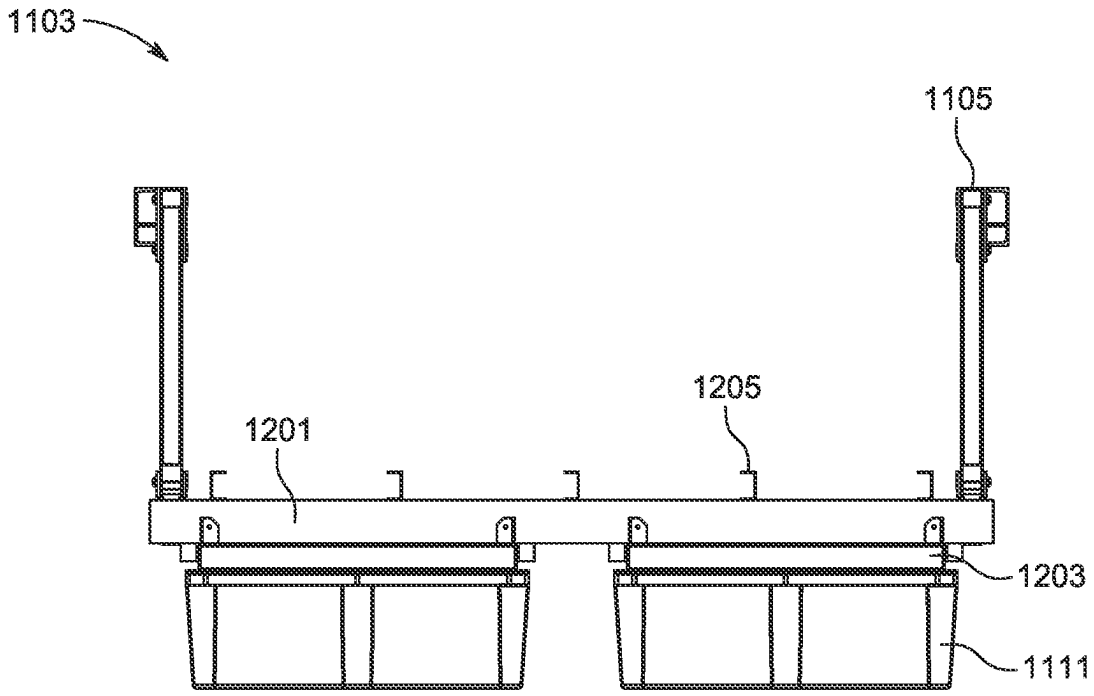

FIG. 12C

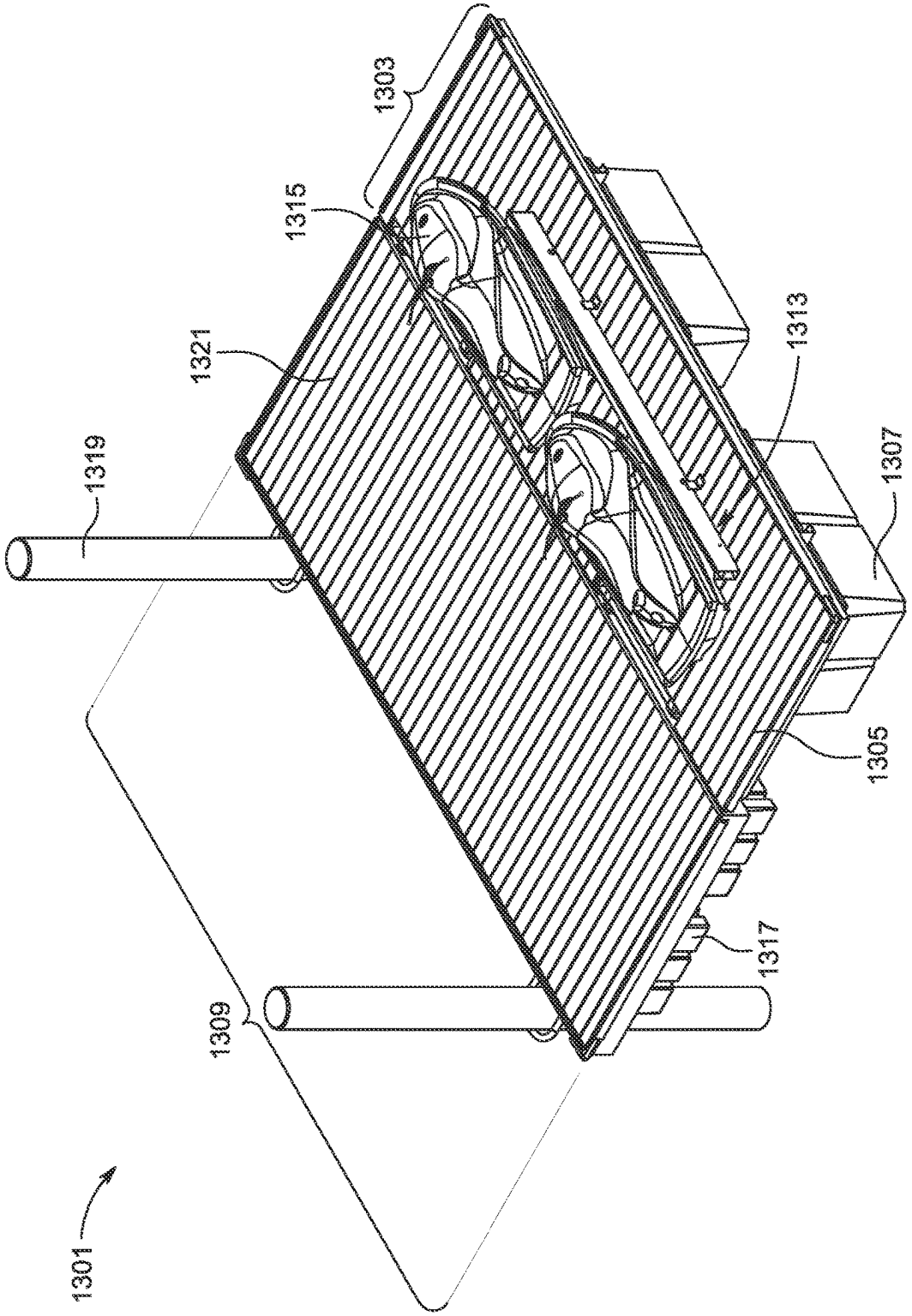

FIG. 13A

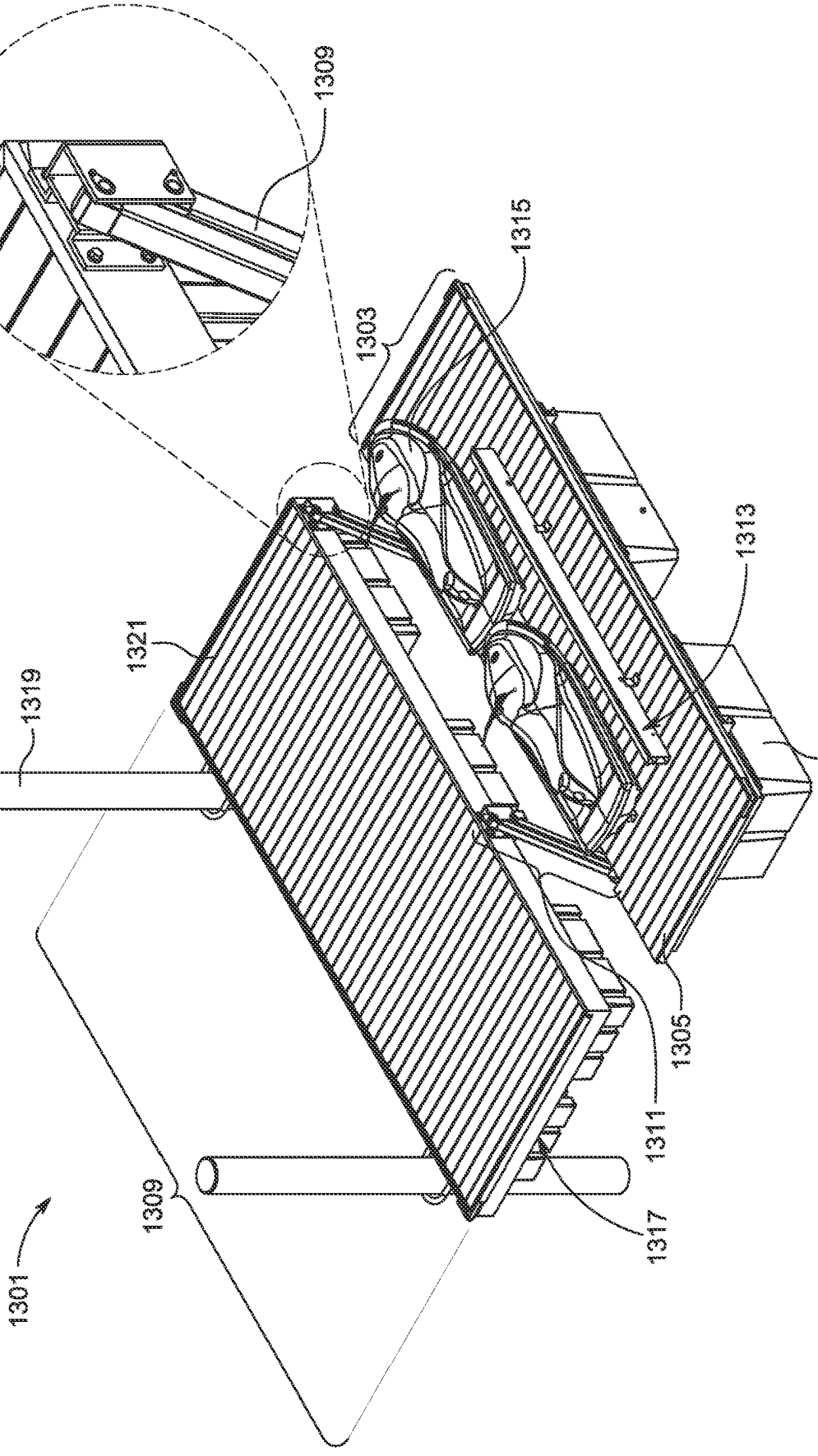

FIG. 13B

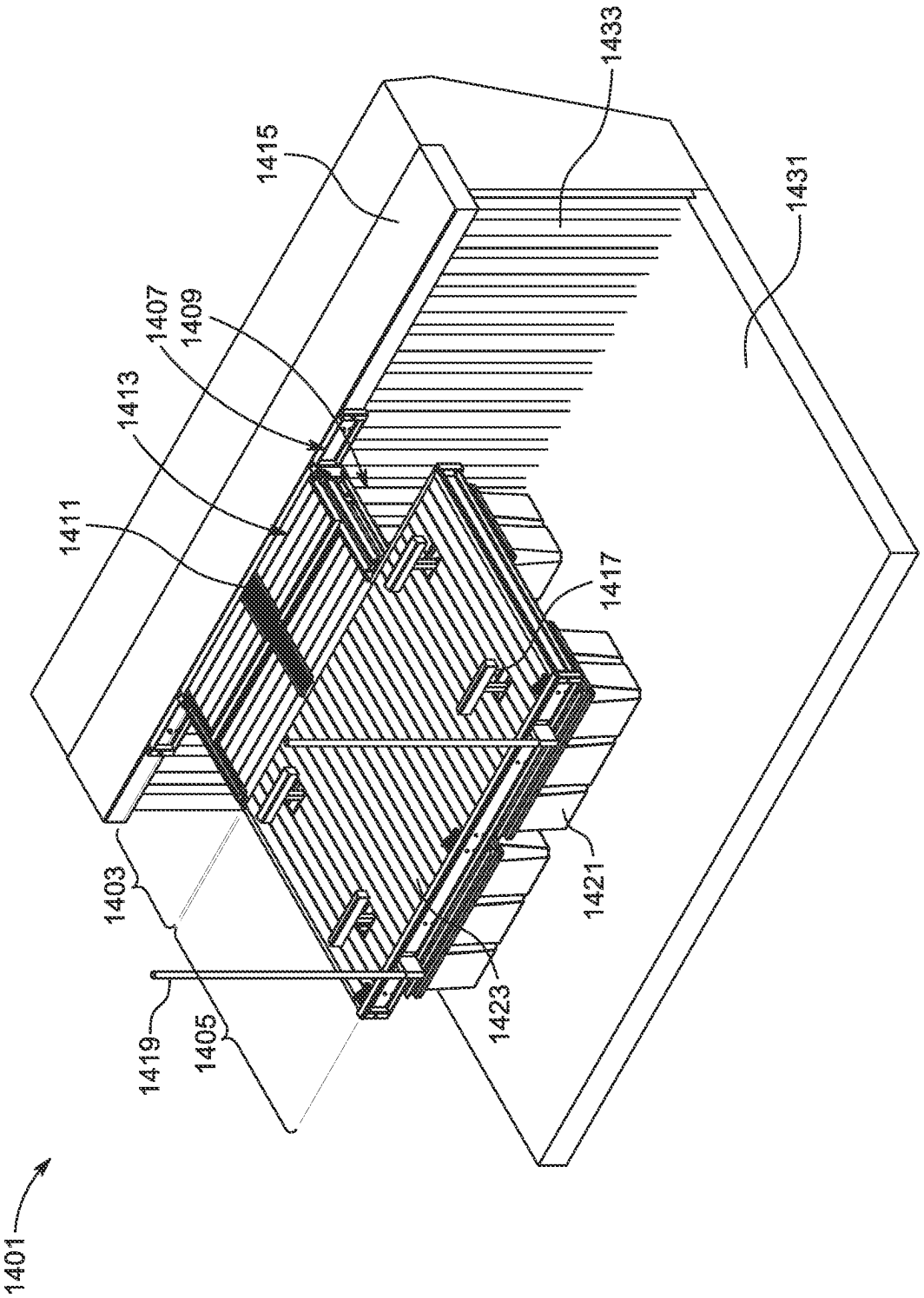
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FIG. 14A

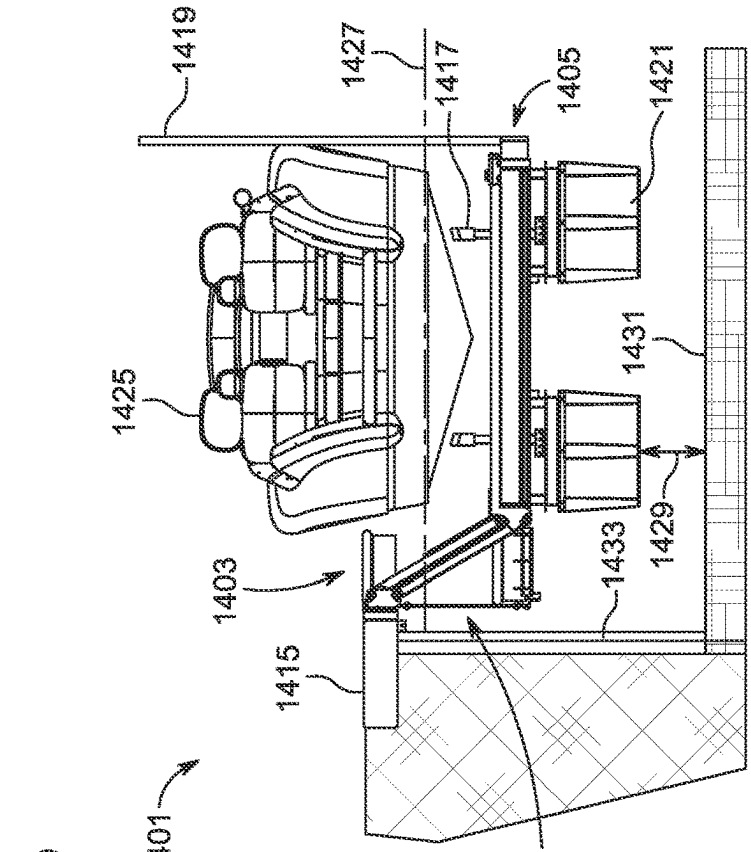

FIG. 14C

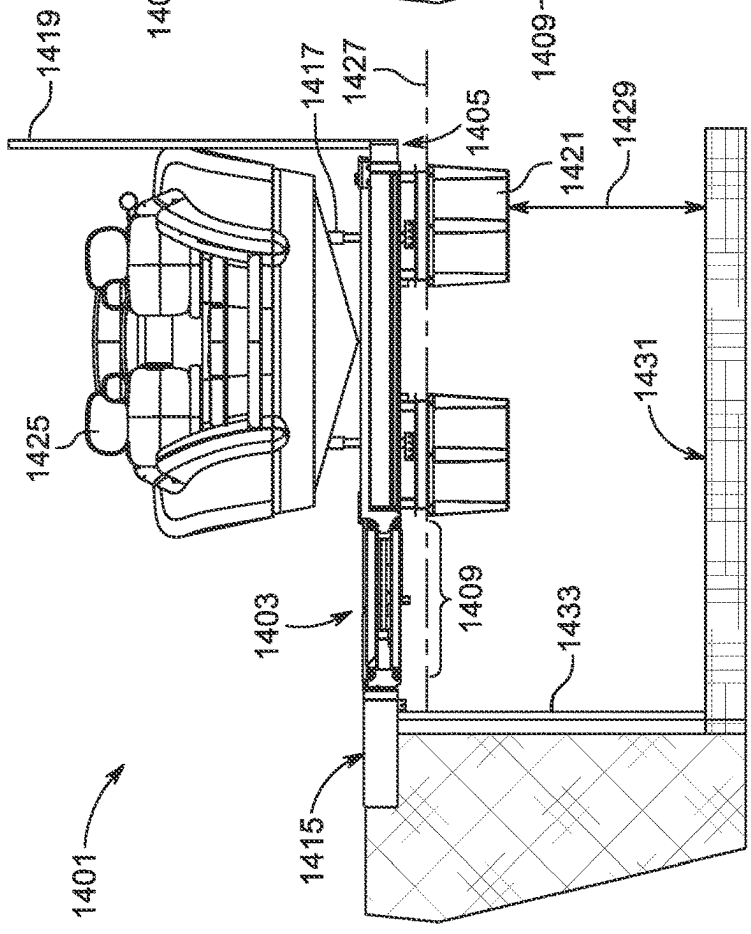

FIG. 14B

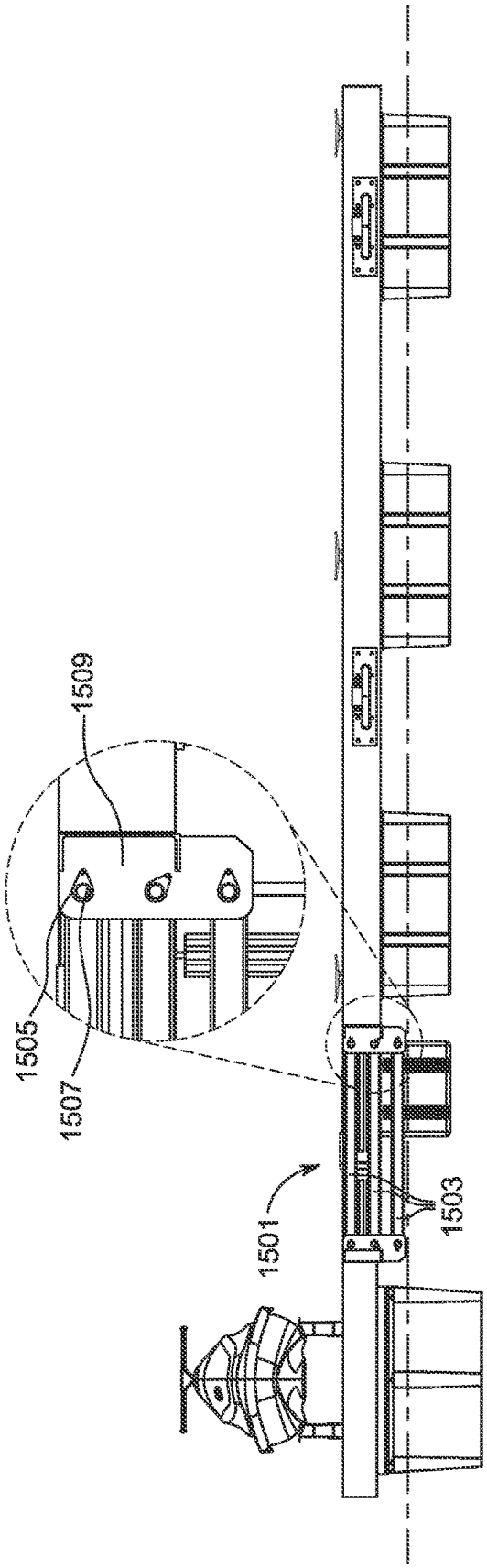

FIG. 15A

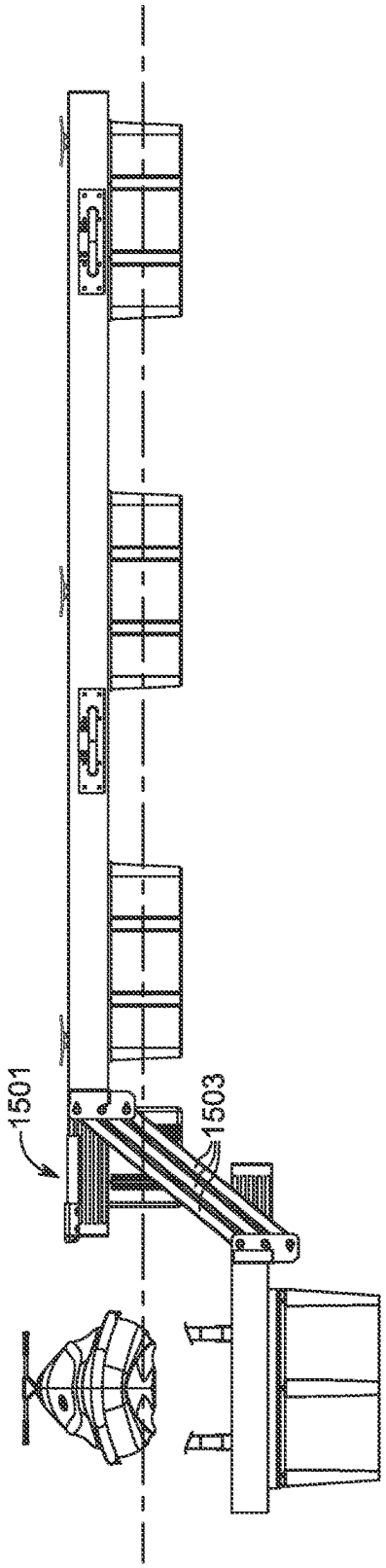

FIG. 15B

FLOATING LIFT SYSTEM FOR FLOATING OR FIXED DOCKS AND METHOD OF USE

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. application Ser. No. 17/108,899, filed on Dec. 1, 2020, of which is hereby incorporated by reference in its entirety.

BACKGROUND

1. Field of the Invention

The present invention relates generally to floating watercraft lift systems, and more specifically to a floating lift system that utilizes an elevator deck extension for raising and lowering load into and out of water, wherein the elevator deck extension is coupled complementarily to a parent floating or fixed dock, thereby providing an aesthetically pleasing appearance for the parent floating or fixed dock.

2. Description of Related Art

Floating watercraft lift systems are well known in the art and are effective means for raising vessels out of the water for maintenance, repair, or storage. Conventional floating watercraft lift systems utilize one of two methods to raise and lower vessels by employing a series of ballast floats that delivers and discharges air therefrom. In the first method, ballast floats only partially submerge in water during vessel launching or retrieval. Ballast floats are typically tied down via rope to a cleat on a floating or fixed dock to prevent the vessel and the ballast from floating away. In the second method, ballast floats completely submerge into water during vessel launching. Unlike in the first method, the second method requires the ballast floats to be mechanically connected to a fixed mass such as a fixed or floating dock.

One of the problems associated with current floating watercraft lift systems is their overall arrangement. Current floating watercraft lift systems do not provide an avenue to fully integrate into a floating or fixed dock and thus interrupts the overall aesthetic appearance of the floating or fixed dock. Moreover, current floating watercraft lift systems are limited to raising only vessels, thereby requiring users to employ other means for raising and lowering loads into and out of water.

Hence, it would be advantageous to have a system that fully integrates into a parent floating or fixed dock, thereby providing an aesthetically pleasing appearance for the parent floating or fixed dock. In addition, it would be advantageous to have a system that raises and lowers any type of load into and out of water and offers additional usable deck surface area, thereby providing utilitarian uses.

Accordingly, although great strides have been made in the area of floating watercraft lift systems, many shortcomings remain.

DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the embodiments of the present application are set forth in the appended claims. However, the embodiments themselves, as well as a preferred mode of use, and further objectives and advantages thereof, will best be understood by reference to the following detailed description when read in conjunction with the accompanying drawings, wherein:

FIG. **1**A is a top view of a floating lift system fully raised in accordance with one or more embodiments of the present invention;

FIG. **1**B is a rear perspective view of a floating lift system fully raised in accordance with one or more embodiments of the present invention;

FIG. **1**C is a left perspective view of a floating lift system fully lowered in accordance with one or more embodiments of the present invention;

FIG. **1**D is a right perspective view of a floating lift system fully lowered in accordance with one or more embodiments of the present invention;

FIG. **2** is a perspective view of the elevator deck of FIGS. **1**A-**1**D in accordance with one or more embodiments of the present application;

FIG. **3** is a profile view of a set of link arms of the elevator deck of FIGS. **1**A-**1**D in a lowered position in accordance with one or more embodiments of the present application;

FIG. **4** is a perspective view of the lift float of FIGS. **1**A-**1**C with the walking surface area partially removed in accordance with one or more embodiments of the present application

FIG. **5**A is a top view of an alternative floating lift system fully raised with a watercraft in accordance with one or more embodiments of the present invention;

FIG. **5**B is a profile view of an alternative floating lift system fully raised with a watercraft in accordance with one or more embodiments of the present invention;

FIG. **5**C is a profile view of an alternative floating lift system fully lowered with a watercraft in accordance with one or more embodiments of the present invention;

FIG. **6** is a perspective view of the elevator deck of FIGS. **5**A-**5**C with the walking surface area removed in accordance with one or more embodiments of the present application;

FIG. **7** is a schematic of an air control system in accordance with one or more embodiments of the present invention;

FIG. **8** is a perspective view of the air box valve and blower of the air control system of FIG. **7** in accordance with one or more embodiments of the present application;

FIG. **9**A is a perspective view of a floating lift system fully raised in accordance with one or more embodiments of the present invention;

FIG. **9**B is a perspective view of a floating lift system fully lowered in accordance with one or more embodiments of the present invention;

FIG. **9**C is a profile view of a floating lift system fully lowered with a watercraft in accordance with one or more embodiments of the present invention;

FIG. **10**A is a top view of the floating lift system fully raised in accordance with one or more embodiments of the present invention;

FIG. **10**B is a perspective view of a floating lift system fully lowered in accordance with one or more embodiment of the present invention;

FIG. **11**A is a top view of a floating lift system in a raised position in accordance with one or more embodiments of the present invention;

FIG. **11**B is a perspective view of a floating lift system in a lowered position in accordance with one or more embodiments of the present invention;

FIG. **11**C is a profile view of a floating lift system in a lowered position with a watercraft in accordance with one or more embodiments of the present invention;

FIG. **12**A is a top view of the lift deck of FIGS. **11**A-**11**C in a raised position in accordance with one or more embodiments of the present application;

FIG. **12**B is a perspective view of the lift deck of FIGS. **11**A-**11**C in a lowered position in accordance with one or more embodiments of the present application;

FIG. **12**C is a front view of the lift deck of FIGS. **11**A-**11**C in a lowered position in accordance with one or more embodiments of the present application;

FIG. **13**A is a perspective view of a floating lift system fully raised with a watercraft in accordance with one or more embodiments of the present invention;

FIG. **13**B is a perspective view of a floating lift system fully lowered with a watercraft in accordance with one or more embodiments of the present invention;

FIG. **14**A is a perspective view of a floating lift system fully raised in accordance with one or more embodiments of the present invention;

FIG. **14**B is a profile view of a floating lift system fully raised with a watercraft in accordance with one or more embodiments of the present invention;

FIG. **14**C is a profile view of a floating lift system fully lowered with a watercraft in accordance with one or more embodiments of the present invention;

FIG. **15**A is a profile view of an alternative set of link arms in a raised position in accordance with one or more embodiments of the present application; and

FIG. **15**B is a profile view of an alternative set of link arms in a lowered position in accordance with one or more embodiments of the present application.

While the system and method of use of the present application is susceptible to various modifications and alternative forms, specific embodiments thereof have been shown by way of example in the drawings and are herein described in detail. It should be understood, however, that the description herein of specific embodiments is not intended to limit the invention to the particular embodiment disclosed, but on the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the present application as defined by the appended claims.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Illustrative embodiments of the system and method of use of the present application are provided below. It will of course be appreciated that in the development of any actual embodiment, numerous implementation-specific decisions will be made to achieve the developer's specific goals, such as compliance with system-related and business-related constraints, which will vary from one implementation to another. Moreover, it will be appreciated that such a development effort might be complex and time-consuming, but would nevertheless be a routine undertaking for those of ordinary skill in the art having the benefit of this disclosure.

The system and method of use in accordance with the present application overcomes one or more of the above-discussed problems commonly associated with conventional floating dock lift systems. Specifically, the present invention provides a system that can fully integrate into an existing floating or fixed dock, creating a harmonious union, thereby providing for improved aesthetic appearance. In addition, the system of the present invention allows the user to employ a plurality of utilitarian uses, thereby providing for enhanced user experience. These and other unique features of the system and method of use are discussed below and illustrated in the accompanying drawings.

The system and method of use will be understood, both as to its structure and operation, from the accompanying drawings, taken in conjunction with the accompanying description. Several embodiments of the system are presented herein. It should be understood that various components, parts, and features of the different embodiments may be combined together and/or interchanged with one another, all of which are within the scope of the present application, even though not all variations and particular embodiments are shown in the drawings. It should also be understood that the mixing and matching of features, elements, and/or functions between various embodiments is expressly contemplated herein so that one of ordinary skill in the art would appreciate from this disclosure that the features, elements, and/or functions of one embodiment may be incorporated into another embodiment as appropriate, unless described otherwise.

The preferred embodiment herein described is not intended to be exhaustive or to limit the invention to the precise form disclosed. It is chosen and described to explain the principles of the invention and its application and practical use to enable others skilled in the art to follow its teachings.

Referring now to the drawings wherein like reference characters identify corresponding or similar elements throughout the several views, FIGS. **1**A-**1**D depict various views of a floating lift system in accordance with one or more embodiments of the present application. It will be appreciated that floating lift system **101** overcomes one or more of the above-listed problems commonly associated with conventional floating watercraft lift systems. It should also be appreciated that the floating lift system **101** may vary based on aesthetical, functional, or manufacturing considerations.

In the contemplated embodiment, floating lift system **101** includes an elevator deck **107**, a lift deck **115**, and an air control system (not shown, see FIG. **7** for further discussion). The elevator deck **107** comprises of a parent dock adapter **109**, a lift deck adapter **111**, one or more grating covers **113**, and a walking surface area **125**. The parent dock adapter **109** is configured to securely attach the elevator deck **107** to a parent dock **103**. The one or more grating covers **113** are configured to conceal the link arms (not shown, see FIG. **3** for further discussion) connecting the parent dock adapter **109** and the lift deck adapter **111**. The lift deck adapter **111** is configured to securely attach the lift deck **115** to the parent dock adapter **109** via two or more link arm sets (not shown, see FIG. **3** for further discussion).

It should be appreciated that the parent dock **103** can be any existing floating or fixed dock or any floating or fixed dock currently in construction. It should also be appreciated that the parent dock **103** can include one or more pilings **105**, one or more foam-filled static floats **121**, and a walking surface area **123**.

In some embodiments, the lift deck **115** comprises of one or more vessel support bunks **411** (not shown, see FIG. **4** for further detail), one or more hollow lift floats **119**, and a walking surface area **127**, as shown in FIGS. **1**A-**1**C. The one or more hollow lift floats **119** couple directly beneath the lift deck **115**.

It should be appreciated that the one or more vessel support bunks **411** (not shown, see FIG. **4** for further detail) can be removable and the deck opening can be concealed with one or more coverings **117** to further enhance the overall aesthetic appearance. It should also be appreciated that although the elevator deck **107** is shown at the end of the parent floating dock **109**, it is contemplated that the attachment of the elevator deck **107** to the parent floating dock **103** can vary in location, size, style, and the like.

In some embodiments, the parent dock adapter **109** may include one or more parent dock adapter foam-filled static floats **129** coupled thereunder configured to offset the weight of the dead weight of the parent dock adapter **109** as the one or more hollow lift floats **119** merge into water.

In other embodiments, the lift deck **115** includes a v-hull bunking adapter **131** in lieu of a flat walk deck, as shown in FIG. **1**D. The v-hull bunking adapter **131** includes one or more support arms **133** configured to support a v-hull vessel. The lift deck **115** also includes a grate walk deck **133** configured to allow a user to walk across the v-hull bunking adapter **131** safely.

In some embodiments, a user may utilize the walking surface areas **125**, **127** as an extension of the walking surface area **123** of the parent dock **103** while the system is in the fully raised position. In one embodiment, the user may use the lift deck **115** to readily descend into and/or ascend from water during various activities including, without limitation, swimming, diving, aquatic physical therapy, and the like. In another embodiment, the user may use the lift deck **115** to readily raise and lower vessels into water including, without limitation, motorboats, canoes, kayaks, speedboats, rowboats, or the like.

It should also be appreciated that one of the unique features believed characteristic of the present application is the configuration of the elevator deck and the lift deck that allows for uniform integration to a parent dock. In addition, the installation of the air control system does not disrupt the aesthetic appearance of the parent dock, thereby providing for an overall uniform façade.

In FIG. **2**, a perspective view of the elevator deck assembly **107** is shown. The elevator deck assembly **107** includes a parent dock adapter mount **201**, a lift deck spar beam **203**, one or more sets **205** of link arms **207**, one or more parent dock adapter foam-filled static floats **129**, and one or more lift deck adapter up stops **209**. The parent dock adapter mount **201** is configured to couple the parent dock adapter **109** to any location of the parent dock **103**. The one or more lift deck adapter up stops **209** are configured to prevent the lift deck adapter **111** and the lift deck **115** from being raised to an elevation higher than the parent dock **103**.

In FIG. **3**, profile view of a set **205** of link arms **207** of the elevator deck **107** of FIGS. **1**A-**1**D in a lowered position is shown. Each end of the set **205** of link arms **207** includes one or more link arm side plates **301**, one or more pivot pins **303**, and one or more pin captive fasteners **305**. The link arm side plates **301**, pivot pins **303**, and pin captive fasteners **305** are configured to connect the first end of the set **205** of link arms **207** to the parent dock adapter mount **201** and connect the second end of the set **205** of link arms **207** to the lift deck spar beam **203**. The floating dock lift system **101** also includes one or more down limit cables **307** configured to connect the parent dock adapter **109** and the lift deck adapter **111**.

In FIG. **4**, a perspective view of the lift deck **115** of FIGS. **1**A, **1**B and **1**C with the walking surface area **127** partially removed is shown. As stated above, the lift deck **115** includes one or more vessel support bunks **411**. It should be appreciated that the one or more vessel support bunks **411** can comprise of any material suitable to prevent the hull of a vessel from being damaged including, without limitation, carpet, wood, plastic, and metal.

The lift deck **115** also includes a frame **401** with integrated lift deck spar beam **203**, one or more aluminum deck joists **403**, one or more deck frame piers **405**, one or more deck frame pier brackets **407**, and one or more bunk post receivers **409**. The one or more bunk post receivers **409** are configured to receive the one or more vessel support bunks **411**, as depicted with directional arrows. The lift deck **115** further includes one or more deck cross-members **413**, and one or more vinyl rub rails **415**.

Referring now to FIGS. **5**A, **5**B and **5**C, various views of an alternative floating lift system **501** are depicted. In this embodiment, the floating lift system **501** includes a lift deck **507** and an air control system (not shown, see FIG. **7** for further discussion). The lift deck **507** comprises of a walking surface area **509** and one or more hollow lift floats **517**. The lift deck **507** is configured to securely attach to a parent dock **503**. The one or more hollow lift floats **517** couple directly underneath the lift deck **507**.

It should be appreciated that the parent dock **503** can be any existing floating or fixed dock or any floating or fixed dock currently in construction. In addition, it should be appreciated that the parent dock **503** can include one or more foam-filled static floats **515**, one or more pilings **521**, and a walking surface area **505**. It should also be appreciated that although the lift deck **507** is shown at the end of the parent floating dock **503**, it is contemplated that the attachment of the lift deck **507** to the parent dock **503** can vary in location, size, style, and the like.

As shown, the lift deck **507** also includes one or more sets of cradle arms **519** configured to support a vessel **511** including, without limitation, a motorboat, a canoe, a kayak, a speedboat, a rowboat, or the like. In the contemplated embodiment, the lift deck **507** is configured to raise the vessel **511** above the water line **513** and to lower the vessel **511** below the water line **513**.

In FIG. **6**, a perspective view of the lift deck **507** of FIGS. **5**A, **5**B and **5**C with the walking surface area **509** removed is shown. As depicted, the cradle arms **519** are cantilevered and extend away from the lifting float and do not incorporate an elevator deck (see the elevator deck **107** in FIG. **1**D) and an elevator deck static float (see the elevator deck static float **129** in FIG. **1**C). In addition, the lift deck **507** further includes a frame **601**, one or more deck frame pier brackets **603**, one or more riser beams **605**, and one or more pivot pins **607**.

In FIG. **7**, a schematic of an air control system **701** is depicted. The air control system **701** is configured to manage the pressurized air within the one or more hollow lift floats **119**, **517**. The air control system **701** includes an air box valve and centrifugal blower **703**, one or more air box control ball valves **705**, one or more isolation ball valves **707**, a forward air hose circuit **709**, and a rear air hose circuit **711**. It should be appreciated that the installation of air control system **701** within lift systems **101**, **501** allows for an overall uniform façade of parent decks **103**, **503**.

In FIG. **8**, a perspective view of the air box valve and centrifugal blower **703** of the air control system **701** is depicted. The air box valve and centrifugal blower **703** includes one or more manual air valve operators **801**, an operator blower-foot switch **803**, an air blower **805**, a valve actuator rod-air valve **807**, one or more ball valves **809**, an air box plenum **811**, a plenum cover-blower base **813**, and one or more barbed hose fittings **815**. It should be appreciated that the one or more manual air valve operators **801** can employ electric solenoids to electrically operate the air valve operators.

During use, when the user engages the one or more manual air valve operators **801** to lower the lift deck **115**, air trapped within the one or more hollow lift floats **119**, **517** escape to the atmosphere via the open-air circuit in the top of the lift floats **119**, **517** whilst water is allowed to surge into the hollow lift floats **119**, **517** via permanent openings the

bottom of the hollow lift floats **119**, **517**, thereby causing the lift deck **515** to descend. The lift deck **115** continues to descend until either the one or more air valve operators **801** are closed, the lift deck **115** reaches the end of mechanical travel, or the slack in the one or more down limit cables **307** is taken up.

Additionally, during use, when the user engages the one or more manual air valve operators **801** to raise the lift deck **115**, the operator blower-foot switch **803** is depressed. As the operator blower-foot switch **803** is acted upon, air is pumped into the one or more hollow lift floats **119**, **517** via the air blower **805**, forcing water by displacement within the one or more hollow lift floats **119**, **517** to discharge through the permanent openings in the bottom of the hollow lift floats **119**, **517**.

Referring now to FIGS. **9**A, **9**B and **9**C, various views of a floating lift system **901** are depicted. The floating lift system **901** includes a pair of elevator decks **903**, a pair of lift decks **905**, an air control system (such as the air control system **701** discussed above in FIG. **7**), and a vessel cradle frame **907**. Each elevator deck of the pair of elevator decks **903** comprise of a walking surface area **909** and a set of one or more foam-filled static floats **911**. Each lift deck of the pair of lift decks **905** comprise of a walking surface area **913** and a set of one or more hollow lifting floats **915**. The vessel cradle frame **907** is configured to support a vessel **917** thereon such as a motorboat, a canoe, a kayak, a speedboat, a rowboat, or the like.

The elevator decks **903** are securely attached to a parent dock **919** via a first end **921***a* of one or more link arms **921**, wherein the pair the elevator decks **903** run parallel to each other with a predetermined length **923** therebetween. It should be noted that the set of one or more link arms **921** run parallel to the length of the lift decks **905**. A second end **921***b* of the one or more link arms **921** engage with a proximal end of the lift decks **905**, thereby positioning the lift decks **905** parallel to each other with the predetermined length **923** therebetween. It should be noted that the attachment of the lift decks **905** to the parent dock **919** via the elevator decks **903** create an F-shape. The vessel cradle frame **907** is positioned between the lift decks **905** and is securely attached to an interior side portion of each lift deck.

It should be appreciated that the first set of one or more static floats **911** provide static floatation to offset the weight of the one or more link arms **921** and the lift decks **905** from being borne by the parent dock **919**. In addition, it should be appreciated that the link arms **921** are constructed similarly, if not the same, as the set **205** of link arms **207** discussed above in FIG. **3**. Further, it should be appreciated that in this embodiment shown in FIGS. **9**A-**9**C, the rotation axis of link arms **921** are parallel with the width of the lift deck **913**. In contrast, in the embodiment shown in FIG. **3**, the rotation of link arms **207** are parallel with the length of the lift deck **115**.

It should also be appreciated that the parent dock **919** can be any existing floating or fixed dock or any floating or fixed dock currently in construction. In addition, it should be appreciated that the parent dock **919** can include a third set of one or more foam-filled static floats **925**, one or more pilings **927**, and a walking surface area **929**. It should also be appreciated that although the elevator decks **903** are shown at a side portion of the parent dock **919**, it is contemplated that the attachment of the elevator decks **903** to the parent dock **919** can vary in location, size, style, and the like.

In some embodiments, a user may utilize the walking surface areas **909**, **913** as an extension of the walking surface area **923** of the parent dock **919** while the system is in the fully raised position. In one embodiment, the user may use the lift decks **905** to readily descend into and/or ascend from water during various activities including, without limitation, swimming, diving, aquatic physical therapy, and the like. In another embodiment, the user may use the lift decks **905** to readily raise and lower vessels into water including, without limitation, motorboats, canoes, kayaks, speedboats, rowboats, or the like.

Referring now to FIGS. **10**A and **10**B, various views of a floating lift system **1001** are illustrated. As shown, the floating lift system **1001** includes a pair of lift decks **1003**, an air control system (such as the air control system **701** discussed above in FIG. **7**), and a vessel cradle frame **1005**. The lift decks **1003** comprise of one or more link arms **1007**, a walking surface area **1009**, a subframe support **1011**, and one or more hollow lift floats **1013**. It should be appreciated that the rotation of the one or more link arms **1007** run parallel to the width of the lift decks **1003**. The vessel cradle frame **1005** is configured to support a vessel thereon such as a motorboat, a canoe, a kayak, a speedboat, a rowboat, or the like.

In the contemplated embodiment, the floating lift system **1001** is mounted within a cavity **1017** of a horseshoe shaped parent dock **1015**. A first end of the one or more link arms **1007** couples to an interior side portion of the parent dock **1015**; and a second end of the one or more link arms **1007** couples to a side portion of each lift deck of the pair of lift decks **1003**. It should be appreciated that the parent dock **1015** can be any existing floating or fixed dock or any floating or fixed dock currently in construction. In addition, it should be appreciated that the parent dock **1015** can include one or more foam-filled static floats, one or more pilings, and a walking surface area.

In some embodiments, a user may utilize the walking surface areas **1009** as an extension of walking surface area of the parent dock **1015** while the system is in the fully raised position. In one embodiment, the user may use the lift decks **1003** to readily descend into and/or ascend from water during various activities including, without limitation, swimming, diving, aquatic physical therapy, and the like. In another embodiment, the user may use the lift decks **1003** to readily raise and lower vessels into water including, without limitation, motorboats, canoes, kayaks, speedboats, rowboats, or the like.

Referring now to FIGS. **11**A through **11**C, various views of a floating lift system **1101** are depicted. The floating lift system **1101** includes a lift deck **1103** and an air control system (such as the air control system **701** discussed above in FIG. **7**). The lift deck **1103** includes a pair of parent dock adapters **1105**, one or more link arms **1107**, a walking surface area **1109**, and one or more hollow lift floats **1111**.

In the contemplated embodiment, the floating lift system **1101** is mounted within a cavity **1113** of a horseshoe shaped parent dock **1115** via parent dock adapters **1105**. It should also be appreciated that the parent dock **1115** can be any existing floating or fixed dock or any floating or fixed dock currently in construction. In addition, it should be appreciated that the parent dock **1115** can include one or more foam-filled static floats **1117** and a walking surface area **1119**.

During use, the lift deck **1103** moves forward and up via the one or more sets of link arms **1107** when rising. In the fully raised position, the lift deck **1103** is flush with the parent dock **1113**. It should be noted that there is minimal gap between the lift deck **1103** and the parent dock **1115** while the lift deck **1103** is in the fully raised position in order to maintain aesthetics as well as to avoid opening between

walking surface areas **1109**, **1119**. When lowering, the lift deck **1103** moves back and downward via the one or more sets of link arms **1107**.

In some embodiments, a user may utilize the walking surface area **1109** as an extension of walking surface area **1119** of the parent dock **1115** while the system is in the fully raised position. In some embodiments, the user may use the lift deck **1103** to readily descend into and/or ascend from water **1121** during various activities including, without limitation, swimming, diving, aquatic physical therapy, and the like. In another embodiment, the user may use the lift deck **1103** to readily raise and lower a boat **1123** into water **1121**.

In FIGS. **12**A through **12**C, various views of the lift deck **1103** are illustrated. As shown, the lift deck **1103** includes one or more support cross-members **1201**, a pair of floatation air chamber frames **1203**, one or more decking support joists **1205**.

The one or more support cross-members **1201** perpendicularly extend between each parent dock adapter **1105**. In addition, the one or more support cross-members **1201** securely couple to a first end of the one or more link arms **1107** via a link arm plate **1207**. A second end of the one or more link arms **1107** securely couples to the pair of parent dock adapters **1105**.

The floatation air chamber frames **1203** securely couples to the one or more support cross-members **1201**. The one or more decking support joists **1205** parallelly extend the length of the lift deck and bisects the one or more support cross-members.

Referring now to FIGS. **13**A and **13**B, various views of a floating lift system **1301** are depicted. The floating lift system **1301** includes lift deck **1303** and an air control system (such as the air control system **701** discussed above in FIG. **7**). The lift deck **1303** comprises of a walking surface area **1305** and one or more hollow lift floats **1307**. The lift deck **1303** is configured to securely attach to a parent dock **1309** via one or more link arms **1311**. The one or more hollow lift floats **1307** couple directly underneath the lift deck **1303**.

The lift deck **1303** also includes one or more cradle arms **1313** configured to support a vessel **1315** including, without limitation, a motorboat, a canoe, a kayak, a speedboat, a rowboat, or the like. In the contemplated embodiment, the lift deck **1303** is configured to raise the vessel **1315** above water level (i.e., the lift deck **1303** becomes flush with the parent dock **1309**) and to lower the vessel **1315** into water level.

It should be appreciated that the parent dock **1309** can be any existing floating or fixed dock or any floating or fixed dock currently in construction. In addition, it should be appreciated that the parent dock **1309** can include one or more foam-filled static floats **1317**, one or more pilings **1319**, and a walking surface area **1321**. It should also be appreciated that the lift deck **1303** is shown mounted to the length of the parent floating dock **1309**.

Referring now to FIGS. **14**A through **14**C, various views of a floating lift system **1401** are depicted. In the contemplated embodiment, the floating lift system **1401** includes an elevator deck **1403**, a lift deck **1405**, and an air control system (not shown, see FIG. **7** for further discussion). The elevator deck **1403** comprises of a bulkhead mount adapter **1407**, a set of link arms **1409**, one or more grating covers **1411**, and a walking surface area **1413**. The bulkhead mount adapter **1407** is configured to securely attach the elevator deck **1403** to a parent concrete bulkhead **1415**. The set of link arms **1409** is configured to securely attach the lift deck **1405** to the bulkhead mount adapter **1407**. It should be appreciated that the set of link arms **1409** are constructed similarly, if not the same, as the set **205** of link arms **207** discussed above in FIG. **3**.

In some embodiments, the lift deck **1405** comprises of one or more vessel support bunks **1417**, one or more guide-in posts **1419**, one or more hollow lift floats **1421**, and a walking surface area **1423**. The one or more vessel support bunks **1417** are configured to support a vessel **1425**. The one or more hollow lift floats **1421** couple directly beneath the lift deck **1405**. It should be appreciated that the vessel support bunks **1417** and the guide-in posts **1419** can be removed to provide for a flat utility deck. In addition, it should be appreciated that the hollow lift floats **1421** are arranged in dual rows to support the dead weight on the set of link arms **1409**, thereby eliminating the need for static type floats.

During use, when the user engages the one or more manual air valve operators (not shown, see FIG. **8** for further discussion) **801** to lower the lift deck **1405**, air trapped within the one or more hollow lift floats **1421** escape to the atmosphere via the open-air circuit in the top of the lift floats **1421** whilst water is allowed to surge into the hollow lift floats **1421** via permanent openings the bottom of the hollow lift floats **1421**, thereby causing the lift deck **1405** to descend. The lift deck **1405** continues to descend until either the one or more air valve operators are closed, the lift deck **1405** reaches the end of mechanical travel, or the slack in the one or more down limit cables (not shown, see FIG. **3** for further discussion) is taken up.

It should be noted that in the fully raised position, the lift deck **1405** is flush with the elevator deck **1403** and, by extension, the parent concrete bulkhead **1415**. In addition, in the fully lowered position, there is clearance **1429** between the lift deck **1405** and the seabed **1431**.

It should be appreciated that the parent concrete bulkhead **1415** can be any existing concrete bulkhead or any concrete bulkhead currently in construction. It should also be appreciated that the parent concrete bulkhead **1415** can include sheet piling **1433** as part of its construction.

In some embodiments, a user may utilize the walking surface areas **1413**, **1423** as an extension of walking surface area of the parent concrete bulkhead **1415** while the system is in the fully raised position. In one embodiment, the user may use the lift deck **1405** to readily descend into and/or ascend from water during various activities including, without limitation, swimming, diving, aquatic physical therapy, and the like. In another embodiment, the user may use the lift deck **1405** to readily raise and lower vessels into water including, without limitation, motorboats, canoes, kayaks, speedboats, rowboats, or the like.

Referring now to FIGS. **15**A and **15**B, an alternative set of link arms **1501** in a raised position and a lowered position, respectively, are illustrated. In the contemplated embodiment, each link arm includes three elongated members **1503** wherein each opposing end of the members **1503** engage with link arm side plates **1505**. The set of link arms **1501** also includes a plurality of pivot pins **1507** and a plurality of pin captive fasteners **1509** to securely fasten the members **1503** to the link arm side plates **1505**.

It should be appreciated that the three members **1503** provide additional support for a lift deck such that the three members **1503** prevent the set of link arms **1501** to rack or twist when loads on the lift deck are unbalanced. Additionally, it should be noted that the set of link arms **1501** may be utilized in the systems disclosed herein to maintain a parallel

deck relationship between a parent dock and the lift deck through entire range of motion.

The particular embodiments disclosed above are illustrative only, as the embodiments may be modified and practiced in different but equivalent manners apparent to those skilled in the art having the benefit of the teachings herein. It is therefore evident that the particular embodiments disclosed above may be altered or modified, and all such variations are considered within the scope and spirit of the application. Accordingly, the protection sought herein is as set forth in the description. Although the present embodiments are shown above, they are not limited to just these embodiments, but are amenable to various changes and modifications without departing from the spirit thereof.

What is claimed is:

1. A floating lift system for parent docks, comprising:

a pair of elevator decks, each elevator deck having:

a walking surface area; and

a set of one or more foam-filled static floats coupled thereunder;

a pair of lift decks configured to support load being moved into and out of water along a vertical axis, each lift deck having:

a walking surface area;

a set of one or more hollow lift floats coupled thereunder;

an air control system configured to manage the displacement of pressurized air within the set of one or more hollow lift floats; and

a vessel cradle frame configured to support a vessel thereon, the vessel cradle frame positioned between each lift deck of the pair of lift decks, the vessel cradle frame securely attached to an interior side portion of each lift deck;

wherein the pair of elevator decks are securely attached to a parent dock via a first end of one or more link arms;

wherein the pair of elevator decks run parallel to each other with a predetermined length therebetween;

wherein the one more of link arms run parallel to a length of the lift decks;

wherein a second end of the one or more link arms engage with a proximal end of the lift decks, thereby positioning the lift decks parallel to each other with the predetermined length therebetween, thereby creating an F-shape with the parent dock.

2. The floating lift system of claim **1**, wherein the one or more link arms rotate at an axis parallel with a length of the pair of lift decks.

3. The floating lift system of claim **1**, wherein the set of one or more foam-filled static floats provide static float to offset weight of the one or more link arms and the pair of lift decks from being borne by the parent dock.

4. The floating lift system of claim **1**, wherein the one or more link arms further comprising:

at least two or more elongated members;

a pair of link arm side plates;

a plurality of pivot pins; and

a plurality of pin captive fasteners;

wherein an opposing end of the at least two or more members engages with one of the pair of link arm side plates;

wherein the plurality of pivot pins and the plurality of pin captive fasteners securely fasten the at least two or more elongated members to the pair of link arm side plates.

5. A floating lift system for a horseshoe-shaped parent dock, comprising:

a pair of lift decks configured to support load being moved into and out of water along a vertical axis, each lift deck having:

a walking surface area;

a subframe support; and

one or more hollow lift floats coupled thereunder;

one or more link arms configured to couple a side portion of each lift deck to an interior portion of a horseshoe-shaped parent dock, the one or more link arms including a rotation axis along a width of each lift deck;

a vessel cradle frame configured to support a vessel thereon, the vessel cradle frame positioned between each lift deck of the pair of lift decks, the vessel cradle frame securely attached to an interior side portion of a lift deck of the pair of lift decks; and

an air control system configured to manage the displacement of pressurized air within the one or more hollow lift floats.

6. The floating lift system of claim **5**, wherein the one or more link arms further comprising:

at least two or more elongated members;

a pair of link arm side plates;

a plurality of pivot pins; and

a plurality of pin captive fasteners;

wherein an opposing end of the at least two or more members engages with one of the pair of link arm side plates;

wherein the plurality of pivot pins and the plurality of pin captive fasteners securely fasten the at least two or more elongated members to the pair of link arm side plates.

7. A floating lift system for a horseshoe-shaped parent dock, comprising:

a lift deck configured to support load being moved into and out of water along a vertical axis and a horizontal axis, the lift deck having:

a pair of parent dock adapters configured to couple the lift deck within a cavity of a horseshoe-shaped parent dock;

one or more link arms configured to move the lift deck forward and up when rising, and configured to move the lift deck back and downward when lowering;

one or more hollow lift floats; and

a walking surface area;

an air control system of configured to manage the displacement of pressurized air within the one or more hollow lift floats.

8. The floating lift system of claim **7**, wherein the lift deck further comprises:

one or more support cross-members perpendicularly extending between each parent dock adapter;

a pair of floatation air chamber frames securely coupled to the one or more support cross-members; and

one or more decking support joists parallelly extending the length of the lift deck and bisects the one or more support cross-members;

wherein the one or more support cross-members securely couples to a first end of the one or more link arms via a link arm plate;

wherein a second end of the one or more link arms securely couples to a parent dock adapter of the pair of parent dock adapters.

9. The floating lift system of claim **7**, wherein the one or more link arms further comprising:

at least two or more elongated members;

a pair of link arm side plates;

a plurality of pivot pins; and

a plurality of pin captive fasteners;

wherein an opposing end of the at least two or more members engages with one of the pair of link arm side plates;

wherein the plurality of pivot pins and the plurality of pin captive fasteners securely fasten the at least two or more elongated members to the pair of link arm side plates.

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