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(54) **Title:** PALLET TRUCK WITH INTEGRATED HALF-SIZE PALLET SUPPORT

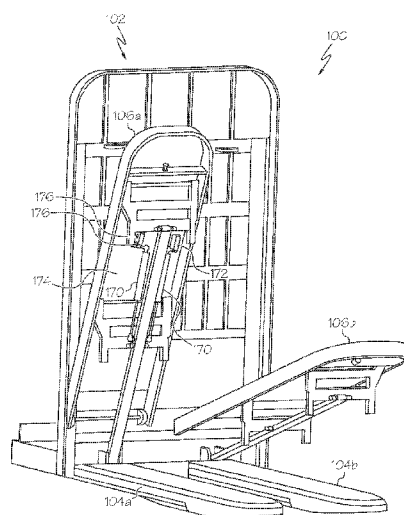


FIG. 6B

(57) **Abstract:** The present application discloses a pallet truck backrest assembly (100) for handling half-size pallets. A first half-size pallet support (106a) is pivotally coupled to a backrest (102) of the backrest assembly at a first height and a second half-size pallet support (106b) is pivotally coupled to the backrest (102) at a second height with the second height being less than the first height. The half-size pallet supports (106a, 106b) pivot between first positions against the backrest (102) and second positions extending over the forks (104a, 104b) of the pallet truck (100a) to accommodate half-size pallets.

PALLET TRUCK WITH INTEGRATED HALF-SIZE PALLET SUPPORT

TECHNICAL FIELD

5 The disclosure of the present application relates generally to pallet trucks, and more particularly, to a pallet truck with integrated half-size pallet supports.

BACKGROUND ART

10 Pallet trucks are one of the most common materials handling vehicles in use today and may include, for example, fork lift trucks, pallet jacks, and similar vehicles. Pallet trucks are utilized in a wide variety of businesses involved in product manufacturing, distribution, and retailing where large products or large packages of products need to be loaded, unloaded, and moved around a facility.

15 Pallet trucks have utilized detachable or modular adapters to customize the platform or forks to accommodate a particular type or brand of product or pallet design. These detachable or modular adapters are generally installed and removed as needed. In addition, when the adapters are not in use, they are typically removed and must be stored in the facility where the pallet truck is being used. For example, a pallet truck adapter for supporting half-size pallets is disclosed in U.S. Published
20 Patent Application No. 2013/0202400 (US'400). When fitted onto the forks of a pallet truck, the adapter of US'400 provides pallet supports having differing heights to facilitate half-size pallet handling by lifting a half-size pallet on the higher support, lifting it slightly off of the supporting surface, and then moving to and lifting another half-size pallet on the lower support. The adjacent pallets can then be moved
25 together and off loaded at different locations, unloading the pallet on the lower shoe first, and the pallet on the higher shoe thereafter.

DISCLOSURE OF INVENTION

30 In accordance with the teachings of the present application, half-size pallet supports are integrated into a pallet truck backrest assembly so that the supports can be extended over forks of the pallet truck for use or stored within a nest weldment of the backrest assembly when not in use. Advantageously when compared to existing

detachable or modular adapters, there is no need to maintain a separate storage space for the supports. Also, a pallet truck having the integrated half-size pallet supports of the present application can be quickly converted from handling full size pallets, with the supports stored on the pallet truck, to handling half-size pallets, with one or more of the supports deployed, without the need to travel to a storage location and retrieve or deposit an adapter saving operator time.

In accordance with one aspect of the invention, a backrest assembly is disclosed for enabling a pallet truck to handle half-size pallets. The backrest assembly comprises a backrest attachable to a pallet truck and extending above first fork and second forks of the pallet truck. A first half-size pallet support may be pivotally coupled to the backrest at a first height relative to a bottom surface of the backrest, and a second half-size pallet support may be pivotally coupled to the backrest at a second height relative to the bottom surface of the backrest, with the second height being less than the first height. The first half-size pallet support may pivot between a first position against the backrest and a second position extending over the first fork of the pallet truck at a first support surface height, and the second half-size pallet support may pivot between a first position against the backrest and a second position extending over the second fork of the pallet truck at a second support surface height.

In accordance with some aspects of the invention, the backrest may comprise an outer frame and grid structure secured to the outer frame such that the backrest defines a nest weldment for receiving the first and second half-size pallet supports. In accordance with a particular aspect, the pallet truck backrest assembly may further comprise a first latching assembly for securing the first half-size pallet support to the backrest when the first half-size pallet support is in the first position against the backrest and a second latching assembly for securing the second half-size pallet support to the backrest when the second half-size pallet support is in the first position against the backrest. In accordance with further aspects of the invention, the first latching assembly may comprise a first backrest latch member and an inter-mating first half-size pallet support latch member, and the second latching assembly may comprise a second backrest latch member and an inter-mating second half-size pallet support latch member. Because the presently disclosed half-size pallet supports may be stored within the nest weldment of the pallet truck backrest

assembly when not in use, there is no need to maintain a separate storage space as required by bulky detachable or modular adapters. In addition, there is no need to interrupt load handling operations to install or remove the half-size pallet supports.

5 In accordance with other aspects of the invention, the pallet truck backrest assembly may further comprise a first prop assembly movable from a collapsed position against the first half-size pallet support to a deployed position extending from the first half-size pallet support to the first fork of the pallet truck, and a second prop assembly movable from a collapsed position against the second half-size pallet support to a deployed position extending from the second half-size pallet support to the second fork of the pallet truck. In accordance with particular aspects of the invention, the collapsed position of the first prop assembly may be within the first half-size pallet support and the collapsed position of the second prop assembly may be within the second half-size pallet support.

15 In accordance with additional aspects of the invention, the first prop assembly may comprise a first prop leg pivotally connected at a first end to the first half-size pallet support and a first control rod pivotally connected to the backrest and pivotally connected to the first prop leg such that as the first half-size pallet support is pivoted from the first position to the second position, the first prop assembly is moved from the collapsed position to the deployed position. The second prop assembly may 20 comprise a first prop leg pivotally connected at a first end to the second half-size pallet support and a second control rod pivotally connected to the backrest and pivotally connected to the second prop leg such that as the second half-size pallet support is pivoted from the first position to the second position, the second prop assembly is moved from the collapsed position to the deployed position.

25 In accordance with further aspects of the invention, the first prop assembly may further comprise a second prop leg pivotally connected at a first end to the first half-size pallet support and pivotally connected to the first control rod such that as the first half-size pallet support is pivoted from the first position to the second position, the first prop assembly including the first prop leg and the second prop leg 30 is moved from the collapsed position to the deployed position. The second prop assembly may further comprise a second prop leg pivotally connected at a first end to the second half-size pallet support and pivotally connected to the second control rod such that as the second half-size pallet support is pivoted from the first position

to the second position, the second prop assembly including the first prop leg and the second prop leg is moved from the collapsed position to the deployed position.

In accordance with still further aspects of the invention, the backrest assembly may further comprise a mechanism for assisting an operator of the pallet truck in
5 moving the first and second half-size pallet supports between the first position and the second position. The assistance mechanism may comprise at least one gas spring coupled between an underside of each of the first and second half-size pallet supports and their respective first and second control rods.

In accordance with another aspect of the invention, the pallet truck backrest
10 assembly may further comprise a first door and a second door movably coupled to the backrest and each having a closed position and an open position, in which the first door encloses the first half-size pallet support when it is in the first position against the backrest and the second door encloses the second half-size pallet support when it is in the first position against the backrest. In accordance with a
15 particular aspect of the invention, the first and second doors may each comprise a handle assembly that comprises a recessed handle attached to a respective one of the first and second doors and a first tab extending from the backrest. Each recessed handle engages a respective one of the first tabs to secure the first and second doors to the backrest in the closed position.

In accordance with an additional aspect of the invention, the first and second
20 half-size pallet supports each comprise a first opening extending through a thickness and corresponding to the respective first tab such that the first tabs extend through a respective one of the first openings when the first and second half-size pallet supports are in the first position against the backrest. In accordance with a further
25 aspect of the invention, the backrest further comprises a second tab extending from the backrest, and the first and second half-size pallet supports each comprise a second opening extending through a thickness and corresponding to the respective second tab. When the first and second half-size pallets supports are in the first position against the backrest, the second tabs extend through a respective one of the
30 second openings. The first and second tabs are also configured to provide support to the first and second doors when the first and second doors are in the closed position.

In accordance with an additional aspect of the invention, the first and second doors may each be formed to conform to a shape defined by an outline of the outer frame of the backrest. In accordance with a further aspect of the invention, the backrest assembly may further comprise a central column secured to at least one of
5 the nest weldment and the outer frame and extending above the first and second forks. The central column is located along a centerline of the pallet truck and is positioned between the first and second half-size pallet supports. In accordance with still further aspects of the invention, the first and second doors may be substantially parallel to the backrest when in the closed position. In accordance with a particular
10 aspect of the invention, the first and second doors may form a substantially planar load support surface when the first and second doors are in the closed position.

BRIEF DESCRIPTION OF DRAWINGS

While the specification concludes with claims particularly pointing out and
15 distinctly claiming the present invention, it is believed that the present invention will be better understood from the following description in conjunction with the accompanying Drawing Figures, in which like reference numerals identify like elements, and wherein:

FIG. 1 is a perspective view of a backrest assembly for a pallet truck
20 illustrating a first half-size pallet support extended over a first one of the truck's forks and a second half-size pallet support secured against a backrest of the assembly so that half-size pallet supports are integrated into the truck in accordance with the teachings of the present application;

FIG. 2 is a perspective view of the backrest assembly of FIG. 1 wherein the
25 second half-size pallet support has been extended over a second one of the truck's forks so that both supports extend over the first and second forks respectively;

FIG. 3 is a front view of the backrest assembly of FIG. 1 wherein both the first and second half-size pallet supports are secured against the backrest;

FIG. 4 is a front view of the backrest assembly of FIG. 1 wherein both the first
30 and second half-size pallet supports are extended over the forks;

FIG. 5 is a perspective view showing transitional positions of the half-size pallet supports between first and second positions of the supports;

FIG. 6A is a front view similar to FIG. 3 of a backrest assembly in accordance with the teachings of the present application wherein both half-size pallet supports are secured against the backrest and each half-size pallet support further comprises a half-size pallet support lift/lower operator assistance mechanism;

5 FIG. 6B is a perspective view showing transitional positions of the half-size pallet supports of FIG. 6A between first and second positions of the supports;

FIG. 6C is a side view of one of the half-size pallet supports of FIGS. 6A and 6B in their second positions extended over the forks; and

10 FIGS. 7A-7D are perspective and side views of a backrest assembly in accordance with the teachings of the present application wherein the half-size pallet supports are secured behind doors located on the backrest.

BEST MODE FOR CARRYING OUT THE INVENTION

15 In the following detailed description, reference is made to the accompanying drawings that form a part hereof and in which is shown by way of illustration, and not by way of limitation, a specific embodiment in which the invention may be practiced. It is to be understood that other embodiments may be utilized and that changes may be made without departing from the spirit and scope of the present invention.

20 FIGS. 1-5 show a backrest assembly 100 for a pallet truck 100a generically represented by a fork weldment 104 and first and second forks 104a, 104b generally fixed to and extending substantially perpendicularly from the fork weldment 104. The backrest assembly 100 may be mounted to the pallet truck 100a, for example, by securing a backrest 102 of the backrest assembly 100 to a battery wall 103 of the pallet truck 100a with which the backrest assembly 100 is to be used. The backrest
25 assembly 100 enables an associated pallet truck 100a to handle both industry standard full-size pallets and the newer half-size pallets, which are becoming more prevalent in the beverage industry, without a detachable adapter by using first and second half-size pallet supports 106a and 106b. The half-size pallet supports 106a, 106b are pivotally coupled to the backrest 102 of the backrest assembly 100 for
30 movement between first positions against the backrest 102 as shown in FIG. 3 and second positions extending over the first and second forks 104a, 104b, respectively, as shown in FIG. 2, with transitional positions of the half-size pallet supports 106a, 106b being shown in FIG. 5. While movement of the half-size pallet supports 106a,

106b is illustrated as being manual, powered movement is within the scope of the present invention.

The pallet truck 100a may be any suitable materials handling vehicle. For example, materials handling vehicles known as rider pallet trucks for which the present invention can be used are disclosed in U.S. Patent No. 6,595,306, which is incorporated herein by reference. Currently preferred materials handling vehicles are pallet trucks identified as Walkie Trucks for example as manufactured by Crown Equipment Corporation and identified as WP 3000 series and PW 3500 series trucks. As used herein, unless otherwise noted, the terms "vertical," "horizontal," "parallel," "perpendicular," and derivatives thereof are with reference to a centerline *CL₁₀₀* of the pallet truck 100a as shown in FIGS. 1 and 5.

The half-size pallet supports 106a, 106b are each coupled to and extend from the backrest 102, which comprises a nest weldment 108 that serves both as a load backrest and as a frame for mounting and storing the half-size pallet supports 106a, 106b. In the illustrated embodiment, the nest weldment 108 may comprise, for example, an outer frame 102a and a grid structure 102b secured to the outer frame 102a such that the backrest 102 defines a recessed area or nest for receiving the first and second half-size pallet supports 106a, 106b. Because the presently disclosed half-size pallet supports 106a, 106b are integrated into the backrest 102 of the pallet truck 100a and can be stored within the nest weldment 108 when not in use, there is no need to maintain a separate storage space as required by conventional detachable or modular adapters. In addition, there is no need to interrupt load handling operations to install or remove the half-size pallet supports 106a, 106b.

With continued reference to FIGS. 1-5, the half-size pallet supports 106a, 106b are pivotally coupled, such as coupling by hinges, to the backrest 102 such that the half-size pallet supports 106a, 106b may each be pivoted from a first position to a second position. In the first position, the half-size pallet supports 106a, 106b are generally perpendicular to the centerline *CL₁₀₀* and to the forks 104a, 104b and are resting against and retained within the nest weldment 108 of the backrest 102. In the second position, the half-size pallet supports 106a, 106b are generally parallel to centerline *CL₁₀₀* and extend horizontally over the forks 104a, 104b. In order to illustrate different aspects of the currently preferred embodiment shown in FIG. 1,

one of the half-size pallet supports 106a is shown in its second position extended over the fork 104a, and the other half-size pallet support 106b is shown in its first position secured to the backrest 102. In FIGS. 2 and 4, both half-size pallet supports 106a, 106b are shown in their second positions extending over their respective forks 104a, 104b, while both half-size pallet supports 106a, 106b are shown in their first positions in FIG. 3. FIG. 5 illustrates transitional positions of the half-size pallet supports 106a, 106b pivoting between their first and second positions.

As best seen in FIGS. 1 and 3, each of the half-size pallet supports 106a, 106b may be hingedly coupled to the backrest 102. In the illustrated embodiment, a proximal or first end 112 of each half-size pallet support 106a, 106b comprises extensions 115 secured to the backrest 102 via a lower end pivot assembly 114. The lower end pivot assembly 114 comprises two pivot tabs 116 extending from the backrest 102. An axle 120 extends between the respective pair of pivot tabs 116 and through apertures in the extensions 115 of the half-size pallet supports 106a, 106b so that the half-size pallet supports 106a, 106b can pivot between their first and second positions.

With continued reference to FIGS. 1 and 3, the backrest assembly 100 further comprises first and second prop assemblies 122 that further couple the half-size pallet supports 106a, 106b to the backrest 102 and provide longitudinal support for the half-size pallet supports 106a, 106b when they are extended in their second positions over the forks 104a, 104b, respectively. The prop assemblies 122 each comprise a lower pivot assembly 124, a control rod or rail 126, a middle pivot assembly 128 coupled to a first prop leg 130, and an upper pivot assembly 132 coupled to a second prop leg 134. The lower pivot assembly 124 comprises lower pivot tabs 136 that secure a proximal or first end of the rail 126 via axles 138 extending through the tabs 136 and apertures through the first end of the rail 126. In the embodiment depicted in FIG. 1, it can be seen that one portion of the lower pivot tabs 136 may form a substantially 90 degree angle such that one surface of each lower pivot tab 138 is secured to the backrest 102 and one surface rests against or can be secured to the forks 104a, 104b to provide additional stability and strength.

As shown in FIG. 3, the first prop leg 130 comprises a crossbar 131 to which the middle pivot assembly 128 is coupled, and the second prop leg 134 comprises a crossbar 135 to which the upper pivot assembly 132 is coupled. The middle pivot

assembly 128 comprises an axle 138 that secures a middle portion of the rail 126 to the crossbar 131 of the first prop leg 130, and the upper pivot assembly 132 comprises an axle 138 that secures a distal or second end of the rail 126 to the crossbar 135 of the second prop leg 134. First ends 160, 162 of the first and second
5 prop legs 130, 134 are each pivotally coupled to their respective half-size pallet supports 106a, 106b, such as via a hinge using axles and apertures as illustrated or other suitable hinging structure.

With reference to FIGS. 1-5, as the half-size pallet supports 106a, 106b move between their first positions against the backrest 102 and their second positions
10 extending over the forks 104a, 104b, the lower end pivot assemblies 114 and the lower, middle, and upper pivot assemblies 124, 128, 132 cooperate with the rail 126 to pivot the first and second prop legs 130, 134 about their hinged connections to the half-size pallet supports 106a, 106b between collapsed positions shown in FIG. 3 and extended or deployed positions shown in FIGS. 2 and 4. FIG. 5 shows two
15 exemplary intermediate positions of the half-size pallet supports 106a, 106b. In their collapsed positions, the prop legs 130, 134 are received within a recessed or hollow portion defined in an underside of each half-size pallet support 106a, 106b and are substantially parallel to the half-size pallet supports 106a, 106b. In their extended positions, the prop legs 130, 134 are substantially perpendicular to the half-size
20 pallet supports 106a, 106b and the forks 104a, 104b and extend therebetween to support the half-size pallet supports 106a, 106b on the forks 104a, 104b.

As seen in FIGS. 2-4, the first and second prop legs 130, 134 terminate in brackets defined by extensions 140, 142 and the crossbars 131, 135 from which the extensions 140, 142 extend for receiving the forks 104a, 104b. When the half-size
25 pallet supports 106a, 106b are in their second positions extended over their respective forks 104a, 104b, the crossbars 131, 135 of the prop legs 130, 134 engage and are supported by the upper or support surfaces of the forks 104a, 104b, with the extensions 140, 142 extending downward along the sides of the forks 104a, 104b. The extensions 140, 142 lock the half-size pallet supports 106a, 106b in place
30 to prevent side-to-side movement of the half-size pallet supports 106a, 106b.

With reference to FIGS. 1-3, the backrest assembly 100 further comprises first and second latching assemblies 150 that secure a distal or second end 156 of each half-size pallet support 106a, 106b to the nest weldment 108 of the backrest 102

when stored and not in use. In the illustrated embodiment, each of the latching assemblies 150 comprises a backrest latch member and an inter-mating support latch member. Each backrest latch member comprises, for example, a latch tab 152 extending from the nest weldment 108 of the backrest 102. Each inter-mating support latch member comprises, for example, a cross member 159 formed on a bottom surface of each of the half-size pallet supports 106a, 106b and a locking pin 158 that is supported on one surface of each cross member 159. Each latch tab 152 includes an aperture for receiving the locking pin 158. The locking pins 158 are preferably biased to extend into the apertures of the latch tabs 152, for example, by related springs (not shown). When the half-size pallet supports 106a, 106b are in the first position resting against the backrest 102 as shown in FIGS. 1 and 3, the latch tab 152 extends through a slot 154 located near the second end 156 of each half-size pallet support 106a, 106b such that the latch tab 152 is adjacent to the cross member 159 and such that the aperture in the latch tab 152 aligns with the locking pin 158 supported on the cross member 159. The locking pin 158 is then received in the aperture of each latch tab 152 to secure the half-size pallet supports 106a, 106b to the backrest 102.

As best seen in FIGS. 2-4, one of the half-size pallet supports 106a is mounted to the pallet truck 100a at a different height relative to the other half-size pallet support 106b to allow the operator to drop off/pick up one half-size pallet at a time and to pick up a specific half-size pallet among several half-size pallets stacked side-by-side. In the illustrated embodiment, the first half-size pallet support 106a is mounted to the pallet truck 100a at a higher location on the backrest 102 than the second half-size pallet support 106b such that the first half-size pallet support 106a is also referred to herein as the higher half-size pallet support 106a and the second half-size pallet support 106b is also referred to as the lower half-size pallet support 106b. As seen in FIG. 3, the lower end pivot assembly 114 of the higher half-size pallet support 106a is mounted to the backrest 102 at a location that is vertically higher than the location of a mounting point of the lower end pivot assembly 114 of the lower half-size pallet support 106b by a distance D . The respective locations and heights of the lower end pivot assemblies 114 as described herein are with reference to a vertical distance from a bottom surface 105 of the backrest 102 as shown in FIG.

3. The distance D may be approximately one inch although other distances may be used and still be in accordance with the teachings of the present application.

With reference to FIG. 4, when the half-size pallet supports 106a, 106b are in their second positions extended over the forks 104a, 104b, respectively, the higher half-size pallet support 106a has a first support surface height H_1 measured from the support surface of the fork 104a to the top surface of the half-size pallet support 104a, and the lower half-size pallet support 106b has a second support surface height H_2 measured from the support surface of the fork 104b to the top surface of the half-size pallet support 104b, with the height difference being equivalent to the distance D between the locations of the mounting points of the two lower end pivot assemblies 114 as shown in FIG. 3 (see also FIG. 2).

To accommodate for the difference in the location of the mounting points of the two lower end pivot assemblies 114, the prop legs 130, 134 of the higher half-size pallet support 106a are longer than the prop legs of the lower half-size pallet support 106b. With continued reference to FIG. 4, the first prop leg 130 of the higher half-size pallet support 106a has a length L_1 measured from the bottom surface of the higher pallet support 106a to the support surface of the fork 104a, and the first prop leg of the lower half-size pallet support 106b has a length L_2 measured from the bottom surface of the lower pallet support 106b to the support surface of the fork 104b, with the length difference being equivalent to the distance D between the location of the mounting points of the two lower end pivot assemblies 114 (see also FIG. 2). It is noted that lengths L_1 and L_2 may also be measured from the first end 160 of each of the first prop legs 134 to the support surface of the respective fork 104a, 104b. The respective second prop legs 134 of each of the higher and lower half-size pallet supports 106a, 106b have a similar relationship best seen in FIG. 3. The distance D between the locations of the mounting points of the two lower end pivot assemblies 114 may be one inch so that H_1 is one inch greater than H_2 and L_1 is one inch greater than L_2 although other distances may be used as will be apparent to those skilled in the art. By adjusting only the mounting points of the two lower end pivot assemblies 114 and the length of the respective first and second prop legs 130, 134, the higher and lower half-size pallet supports 106a, 106b may be otherwise substantially identical in configuration and size. In addition, both half-size pallet

supports 106a, 106b may use rails 126 of substantially the same dimensions. Although the first half-size pallet support 106a is currently illustrated as being mounted higher than the second half-size pallet support 106b, it is understood that the second half-size pallet support 106b could be mounted higher than the first half-size pallet support 106a.

The presently disclosed half-size pallet supports 106a, 106b may be used in their second extended positions in combination or one at a time. The ability to quickly pivot the half-size pallet supports 106a, 106b from their extended positions to their collapsed positions enables the pallet truck 100a to carry standard, full-size pallets, as well as newer, half pallets that are increasingly used in the beverage industry. As best seen in FIGS. 1 and 3, the nest weldment 108 of the backrest 102 may comprise a recessed portion into which the half-size pallet supports 106a, 106b are retained such that the bottom surfaces of the half-size pallet supports 106a, 106b are flush with the backrest 102 when the half-size pallet supports 106a, 106b are in the first position secured against the backrest 102.

As previously described, each half-size pallet support 106a, 106b may comprise a recessed portion into which the first and second prop legs 130, 134 are retained in their collapsed position. In this way, the half-size pallet supports 106a, 106b and all associated components are stored in place and may further act as a load backrest to protect the operator and pallet truck 100a from a toppling or scattering pallet load, which is particularly important in beverage industry applications. The presently disclosed half-size pallet supports 106a, 106b may be incorporated into many existing pallet trucks, including existing load backrest designs. Furthermore, because the half-size pallet supports 106a, 106b fold up into the backrest 102, the half-size pallet supports 106a, 106b may be sized to fit existing forks 104a, 104b with no fork length loss.

A mechanism may be provided to assist an operator in lifting the half-size pallet supports 106a, 106b from their second positions extended over the forks 104a, 104b to their first positions against the backrest 102. The mechanism also assists in controlling movement of the half-size pallet supports 106a, 106b and preventing them from slamming down against the forks 104a, 104b when being lowered into their second positions extending over the forks 104a, 104b. An exemplary lift/lower operator assistance mechanism is shown in FIGS. 6A-C as comprising two gas

springs 170 mounted beneath each of the half-size pallet supports 106a, 106b to offset or support some of the weight of the half-size pallet supports 106a, 106b and to provide additional control over movement of the half-size pallet supports 106a, 106b.

5 First ends 170a of the gas springs 170 are pivotally coupled to tabs 172 extending from the underside 174 of each half-size pallet support 106a, 106b. The second end 170b of each gas spring 170 is coupled to its corresponding one of the rails 126. The tabs 172 and rails 126 include apertures 176, shown only on the pivot tabs 172, that receive rods to secure the ends 170a, 170b of the gas springs 170 to
10 the pivot tabs 172 and the rails 126 to enable the ends 170a, 170b of the gas springs 170 to pivot or rotate as the half-size pallet supports 106a, 106b are moved between their first and second positions. The tabs 172 are located between the points at which the first ends 160, 162 of each of the first and second prop legs 130, 134 are coupled to the respective half-size pallet supports 106a, 106b with the specific
15 location depending on the size of the gas springs 170 used in a given application.

In FIG. 6A, both half-size pallet supports 106a, 106b are shown in their first positions stored in the backrest 102 so that the gas springs 170 are extended. When the half-size pallet supports 106a, 106a are in the first position, the second ends of the gas springs 170 that is coupled to the rail 126 is located toward the backrest 102,
20 i.e., away from the second end 156 of the half-size pallet supports 106a, 106b, with respect to the location of the tabs 172. FIG. 6B illustrates movement of the half-size pallet supports 106a, 106b between their first positions and their second positions with the gas springs 170 being shown only on half-size pallet support 106a. The first and second ends 170a, 170b of the gas springs 170 pivot about their support rods
25 such that the second ends 170b of the gas springs 170 move with the rail 126 as the first and second prop legs 130, 134 pivot about their hinged connections to move between their collapsed positions and their extended positions.

In FIG. 6C, the half-size pallet support 106b is shown from the side in its second position extended over the fork 104b with the first and second prop legs 130, 134 in their extended positions. Portions of the gas springs 170 and the pivot tabs
30 172 are hidden in the underside of the half-size pallet support 106b and are indicated with dashed lines. The gas springs 170 have pivoted and compressed such that the second end 170b of each gas spring 170 is now located away from the backrest 102,

i.e., toward the second end 156 of the half-size pallet support 106b, with respect to the location of the pivot tabs 172.

It will be apparent to those of skill in the art that the gas springs 170 may comprise varying sizes and configurations to provide sufficient operator assistance during movement of the half-size pallet supports 106a, 106b. Varying numbers of gas springs 170 may also be used and the attachment points may be altered to achieve the desired level of support and control over the movement of the half-size pallet supports 106a, 106b. In addition, other suitable assistance mechanisms may be used, including, but not limited to mechanical springs, hydraulic cylinders or dampers, pneumatic actuators, electric motors and the like for assisting the operator in raising and/or lowering the half-size pallet supports 106a, 106b.

FIGS. 7A-7D illustrate a backrest assembly 200 for a pallet truck 200a including first and second doors 278a, 278b that may be used to enclose and secure first and second half-size pallet supports 206a, 206b. In FIG. 7A, both half-size pallet supports 206a, 206b are in a first position against a backrest 202 and the doors 278a, 278b are in a closed position. In FIG. 7B, the first door 278a has been moved to an open position to allow the first half-size pallet support 206a to be moved from its first position against the backrest 202 to a second position extended over a first fork 204a as described herein. In FIG. 7C, both half-size pallet supports 206a, 206b are in their second positions extended over the first and second forks 204a, 204b and both doors 278a, 278b are in their closed position. The pallet truck 200a, backrest assembly 200, and half-size pallet supports 206a, 206b shown in FIGS. 7A-7D may correspond to the pallet truck 100a, backrest assembly 100, and half-size pallet supports 106a, 106b described herein and although not labeled in FIGS. 7A-7D, may include one or more of the associated features described herein. As used herein, the terms "forward," "front," and derivatives thereof refer to a direction toward the forks 204a, 204b, while the terms "back," "rear," and derivatives thereof refer to a direction away from the forks 204a, 204b.

As shown in FIG. 7B, the first and second doors 278a, 278b are movably coupled to the backrest 202 such that they each have an open position and a closed position and such that the first and second doors 278a, 278b enclose the first and second half-size pallet supports 206a, 206b, respectively. Each door 278a, 278b may be, for example, coupled to a central column 280 of the backrest 202 using two

hinges (not labeled). The central column 280 may be secured to one or both of an outer frame 202a and a nest weldment 208 of the backrest 202, see FIG. 7D. The central column 280 extends vertically above the first and second forks 204a, 204b and is located along a centerline CL_{200} of the pallet truck 200a. The half-size pallet

5 supports 206a, 206b may be positioned on either side of the central column 280. When the doors 278a, 278b are in their closed positions, the doors 278a, 278b are substantially parallel to the backrest 202 as shown in FIGS. 7A, 7C, and 7D. Each of the doors 278a, 278b opens toward the centerline CL_{200} of the pallet truck 200a when the door 278a, 278b is moved from its closed to its open position. The doors
10 278a, 278b pivot about an axis that is substantially perpendicular to axes about which the first end 112 of the first and second pallet supports 106a, 106b and the first end of the rail 126 pivot, as seen in FIG. 1.

Each door 278a, 278b comprises a handle assembly 282 that secures the door 278a, 278b to the backrest 202 in the closed position. Each handle assembly
15 282 may comprise, for example, a handle 284 with a latching portion (not separately labeled) and a first tab 286a, also referred to herein as a door latch tab 286a, which extends from the backrest 202. The handle 284 may be recessed such that it does not extend beyond a forward surface of the doors 278a, 278b. The latching portion of the handle 284 engages a slot (not separately labeled) formed in the door latch tab 286a.
20 286a. The handle 284 may comprise a biasing member 285, such as a spring, that biases the handle 284 to engage the slot in the door latch tab 286a. With reference to the first half-size pallet support 206a as shown in FIGS. 7A and 7B, the half-size pallet support 206a comprises an opening 288 formed through a thickness of the half-size pallet support 206a and aligned with a location of the door latch tab 286a on
25 the backrest 202. It can be seen that when the half-size pallet support 206a is in its first position against the backrest 202 and the first door 278a is in its closed position, the door latch tab 286a extends through the opening 288, and the handle 284 engages the door latch tab 286a extending through the opening 288 in the half-size pallet support 206a to secure the door 278a and the half-size pallet support 206a to
30 the backrest.

To open the first door 278a, the operator may, for example, access the handle 284 via an opening formed in the door 278a and pull up on the handle 284 to disengage the latching portion from the door latch tab 286a and release the door

278a. The operator then swings the door 278a away from the backrest 202 and toward the centerline *CL*₂₀₀ of the pallet truck 200a as shown in FIG. 7B so that the door 278a pivots from its closed position to its open position. Once the door 278a is opened, the first half-size pallet support 206a may be moved from its first position
5 against that backrest 202 into its second position extending over the first fork 204a. The doors 278a, 278b may be used in conjunction with, for example, a latching assembly 150 as described herein to secure the half-size pallet supports 206a, 206b in the first position against the backrest 202. Because the doors 278a, 278b open toward the centerline *CL*₂₀₀, the operator is able to access each half-size pallet
10 support 206a, 206b by standing on either side of the forks 204a, 204b with no need to stand between the forks 204a, 204b or otherwise in the path of travel of the pallet truck 200a in the forks-first direction. Although not shown, it is understood that the doors 278a, 278b may also be movably coupled to a portion of the outer frame 202a so that the doors 278a, 278b open away from the centerline *CL*₂₀₀ of the pallet truck
15 200a.

To close the doors 278a, 278b, the operator swings each door 278a, 278b toward the backrest 202 so that the latching portion of each handle 284 reengages the corresponding door latch tab 286a. The operator may, for example, lift up the handle 284 while closing the doors 278a, 278b until the latching portion and
20 corresponding slot in each door latch tab 286a align, after which the operator releases the handle 284 and the latching portion engages the corresponding slot to lock the doors 278a, 278b in place. Alternatively, the operator may simply move the doors 278a, 278b toward the backrest 202 until the latching portion of the handle 284 contacts the door latch tab 286a. A forward surface of the door latch tab 286a may
25 be angled such that the latching portion of handle 284 slides along the angled surface, moving the handle 284 upward and compressing the spring 285. The operator continues to press the door 278a, 278b toward the backrest 202 until the latching portion is aligned with the slot in the corresponding door latch tab 286a, after which the spring 285 exerts a force to bias the latching portion of the handle 284 into
30 engagement with the slot. Although not shown, it is understood that the second door 278b may be opened and closed in a similar manner, and the second half-size pallet support 206b may similarly be secured against the backrest 202 and moved from a first position to a second position. As shown in FIG. 7D, the doors 278a, 278b are

positioned vertically along the backrest 202 to allow sufficient clearance to close the doors 278a, 278b when the first and second half-size pallet supports 206a, 206b are in their second positions.

Similar to the backrest assembly 100 shown in FIGS. 1 and 3, the nest weldment 208 of the backrest 202 shown in FIGS. 7A-7D may comprise a recessed portion into which the half-size pallet supports 206a, 206b are retained such that the bottom surfaces of the half-size pallet supports 206a, 206b are flush with a forward surface of the backrest 202 when the half-size pallet supports 206a, 206b are in their first position secured against the backrest 202. In addition, the doors 278a, 278b may be formed to correspond to the shape and size of the backrest assembly 200 such that the doors 278a, 278b form a portion of the backrest 202 that faces toward the forks 204a, 204b. For example, as shown in FIGS. 7A, 7C, and 7D, the doors 278a, 278b are formed to align with and conform to a shape defined by an outline of the outer frame 202a of the backrest 202 and the doors 278a, 278b rest against the forward surface of the backrest 202. When the half-size pallets 206a, 206b are stowed in the first position, the doors 278a, 278b protect the components on the underside of each half-size pallet 206a, 206b from being damaged by a load 290 carried on the forks 204a, 204b. The doors 278a, 278b also protect the load 290 being carried on the forks 204a, 204b from being damaged by any components of the half-size pallet supports 206a, 206b. Furthermore, when in their closed position, the doors 278a, 278b provide a large load support surface to stabilize and support the load 290 as shown in FIGS. 7A, 7C, and 7D, regardless of whether the half-size pallets 206a, 206b are in their first or second position. The handle assemblies 282 may be formed to extend away from the forks 204a, 204b into a recessed or hollow portion defined in an underside of each half-size pallet support 206a, 206b so that the load support surface formed by the doors 278a, 278b is substantially planar.

In some embodiments, the backrest 202 may further comprise a second tab 286b that is located toward the centerline CL_{200} of the pallet truck 200a as shown in FIG. 7B. Each half-size pallet support 206a, 206b may comprise two openings 288 that are formed through a thickness of the half-size pallet support 206a, 206b and aligned with a location of each of the first and second tabs 286a, 286b on the backrest 202. With reference to FIGS. 7A and 7B, it can be seen that when the half-size pallet support 206a is in its first position against the backrest 202, the tabs 286a,

286b extend through a respective one of the two openings 288. The shape, size, and location of the tabs 286a, 286b on the backrest 202 and the placement of the openings 288 in the half-size pallet supports 206a, 206b may be such that the half-size pallet supports 206a, 206b may be interchanged from one side of the pallet truck 200a to the other side as needed. Similar to the first tab 286a, the second tab 286b may also comprise a slot for engaging the latching portion of a handle (not shown).

In addition, the tabs 286a, 286b may be configured to provide support for the doors 278a, 278b and to stabilize the load support surface formed by the closed doors 278a, 278b. For example, when the doors 278a, 278b are in their closed position, a forward surface of the tabs 286a, 286b may be adjacent to or in contact with a back surface of the doors 278a, 278b so that if an object such as a pallet impacts the doors 278a, 278b, the tabs 286a, 286b provide additional support and may help to prevent the doors 278a, 278b from bending or warping as a result of the impact. If the half-size pallet supports 206a, 206b are in their first position against the backrest 202 with the tabs 286a, 286b extending through the openings 288, the tabs 286a, 286b may also help to prevent the doors 278a, 278b from contacting and/or damaging the half-size pallet supports 206a, 206b.

While particular embodiments of the present invention have been illustrated and described, it would be obvious to those skilled in the art that various other changes and modifications can be made without departing from the spirit and scope of the invention. It is therefore intended to cover in the appended claims all such changes and modifications that are within the scope of this invention.

CLAIMS

What is claimed is:

- 5 1. A pallet truck backrest assembly for handling half-size pallets comprising:
a backrest attachable to a pallet truck and extending above a first fork and a
second fork of the pallet truck;
a first half-size pallet support pivotally coupled to the backrest at a first height
relative to a bottom surface of the backrest, the first half-size pallet support pivoting
10 between a first position against the backrest and a second position extending over
the first fork of the pallet truck at a first support surface height; and
a second half-size pallet support pivotally coupled to the backrest at a second
height relative to the bottom surface of the backrest, the second height being less
than the first height, the second half-size pallet support pivoting between a first
15 position against the backrest and a second position extending over the second fork
of the pallet truck at a second support surface height.
2. A pallet truck backrest assembly as claimed in claim 1 wherein the backrest
comprises:
20 an outer frame; and
grid structure secured to the outer frame such that the backrest defines a nest
for receiving the first and second half-size pallet supports.
3. A pallet truck backrest assembly as claimed in claim 2 further comprising:
25 a first latching assembly for securing the first half-size pallet support to the
backrest when the first half-size pallet support is in the first position against the
backrest; and
a second latching assembly for securing the second half-size pallet support to
the backrest when the second half-size pallet support is in the first position against
30 the backrest.
4. A pallet truck backrest assembly as claimed in claim 3 wherein the first latching
assembly comprises a first backrest latch member and an inter-mating first half-size

pallet support latch member and the second latching assembly comprises a second backrest latch member and an inter-mating second half-size pallet support latch member.

5 5. A pallet truck backrest assembly as claimed in claim 1 further comprising:
a first prop assembly movable from a collapsed position against the first half-size pallet support to a deployed position extending from the first half-size pallet support to the first fork of the pallet truck; and

10 a second prop assembly movable from a collapsed position against the second half-size pallet to a deployed position extending from the second half-size pallet support to the second fork of the pallet truck.

6. A pallet truck backrest assembly as claimed in claim 5 wherein the collapsed position of the first prop assembly is within the first half-size pallet support and the
15 collapsed position of the second prop assembly is within the second half-size pallet support.

7. A pallet truck backrest assembly as claimed in claim 5 wherein said first prop assembly comprises:

20 a first prop leg pivotally connected at a first end to the first half-size pallet support; and

a first control rod pivotally connected to the backrest and pivotally connected to the first prop leg so that as the first half-size pallet support is pivoted from the first position to the second position, the first prop assembly is moved from the collapsed
25 position to the deployed position; and

said second prop assembly comprises:

a first prop leg pivotally connected at a first end to the second half-size pallet support; and

30 a second control rod pivotally connected to the backrest and pivotally connected to the second prop leg so that as the second half-size pallet support is pivoted from the first position to the second position, the second prop assembly is moved from the collapsed position to the deployed position.

8. A pallet truck backrest assembly as claimed in claim 7 wherein said first prop assembly further comprises:

a second prop leg pivotally connected at a first end to the first half-size pallet support and pivotally connected to the first control rod so that as the first half-size pallet support is pivoted from the first position to the second position, the first prop assembly including the first prop leg and the second prop leg is moved from the collapsed position to the deployed position; and

the second prop assembly further comprises:

a second prop leg pivotally connected at a first end to the second half-size pallet support and pivotally connected to the second control rod so that as the second half-size pallet support is pivoted from the first position to the second position, the second prop assembly including the first prop leg and the second prop leg is moved from the collapsed position to the deployed position.

9. A pallet truck backrest assembly as claimed in claim 7 further comprising a mechanism for assisting an operator of the pallet truck in moving the first and second half-size pallet supports between the first position and the second position.

10. A pallet truck backrest assembly as claimed in claim 9 wherein the assistance mechanism comprises at least one gas spring that is coupled between an underside of each of the first and second half-size pallet supports and their respective first and second control rods.

11. A pallet truck backrest assembly as claimed in claim 2 further comprising:

a first door movably coupled to the backrest and having a closed position and an open position, wherein the first door encloses the first half-size pallet support when the first half-size pallet support is in the first position against the backrest; and

a second door movably coupled to the backrest and having a closed position and an open position, wherein the second door encloses the second half-size pallet support when the second half-size pallet support is in the first position against the backrest.

12. A pallet truck backrest assembly as claimed in claim 11 wherein the first and second doors each comprise a handle assembly, each handle assembly comprising a recessed handle attached to a respective one of the first and second doors and a first tab extending from the backrest, wherein each recessed handle engages a
5 respective one of the first tabs to secure the first and second doors to the backrest in the closed position.

13. A pallet truck backrest assembly as claimed in claim 12 wherein the first and second half-size pallet supports each comprise a first opening extending through a
10 thickness and corresponding to the respective first tab such that the first tabs extend through a respective one of the first openings when the first and second half-size pallets supports are in the first position against the backrest.

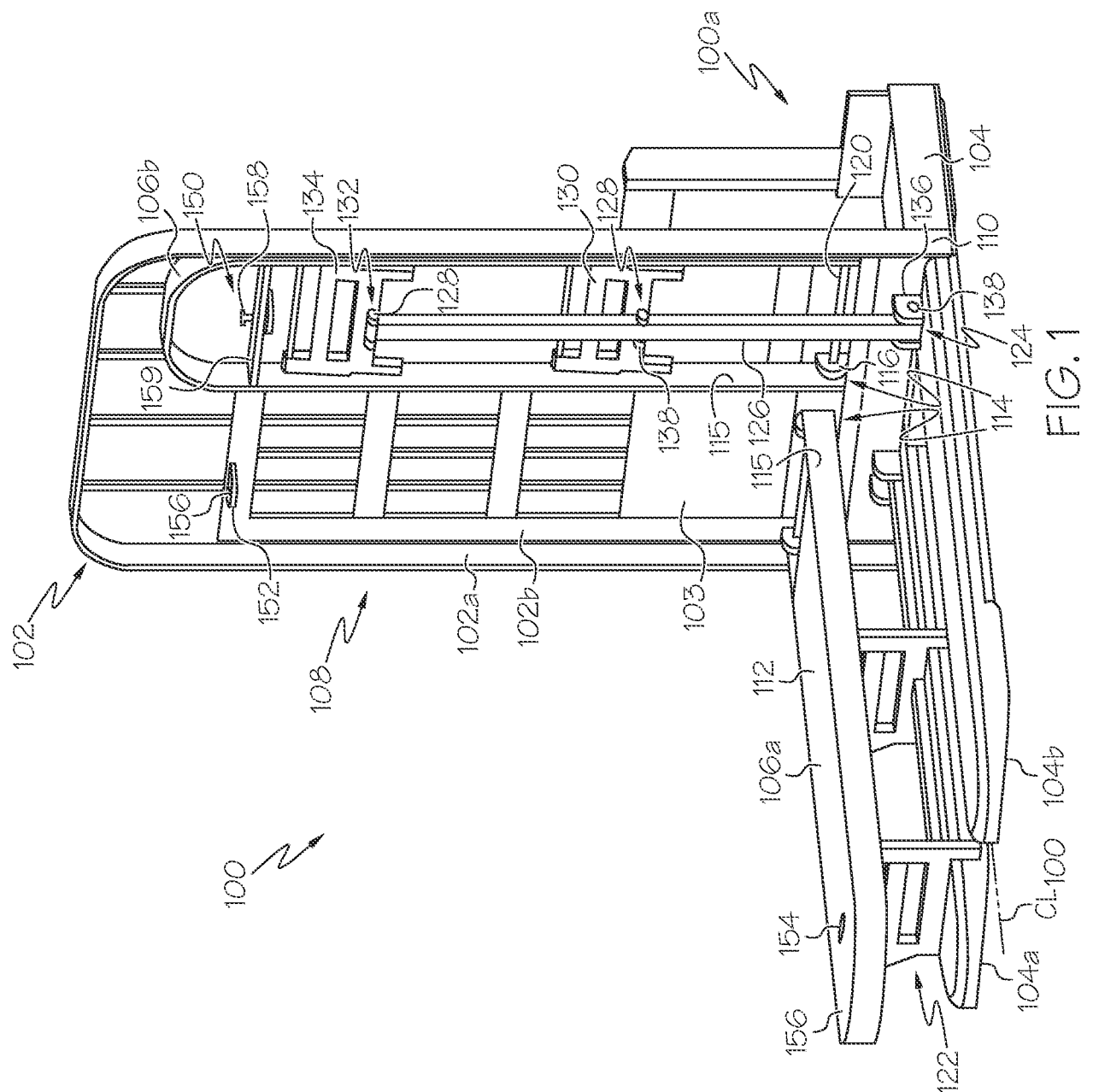
14. A pallet truck backrest assembly as claimed in claim 13 wherein:
15 the backrest further comprises a second tab extending from the backrest; and
 the first and second half-size pallet supports each comprise a second opening extending through a thickness and corresponding to the respective second tab such that the second tabs extend through a respective one of the second openings when the first and second half-size pallets supports are in the first position against the
20 backrest;
 wherein the first and second tabs are configured to provide support to the first and second doors when the first and second doors are in the closed position.

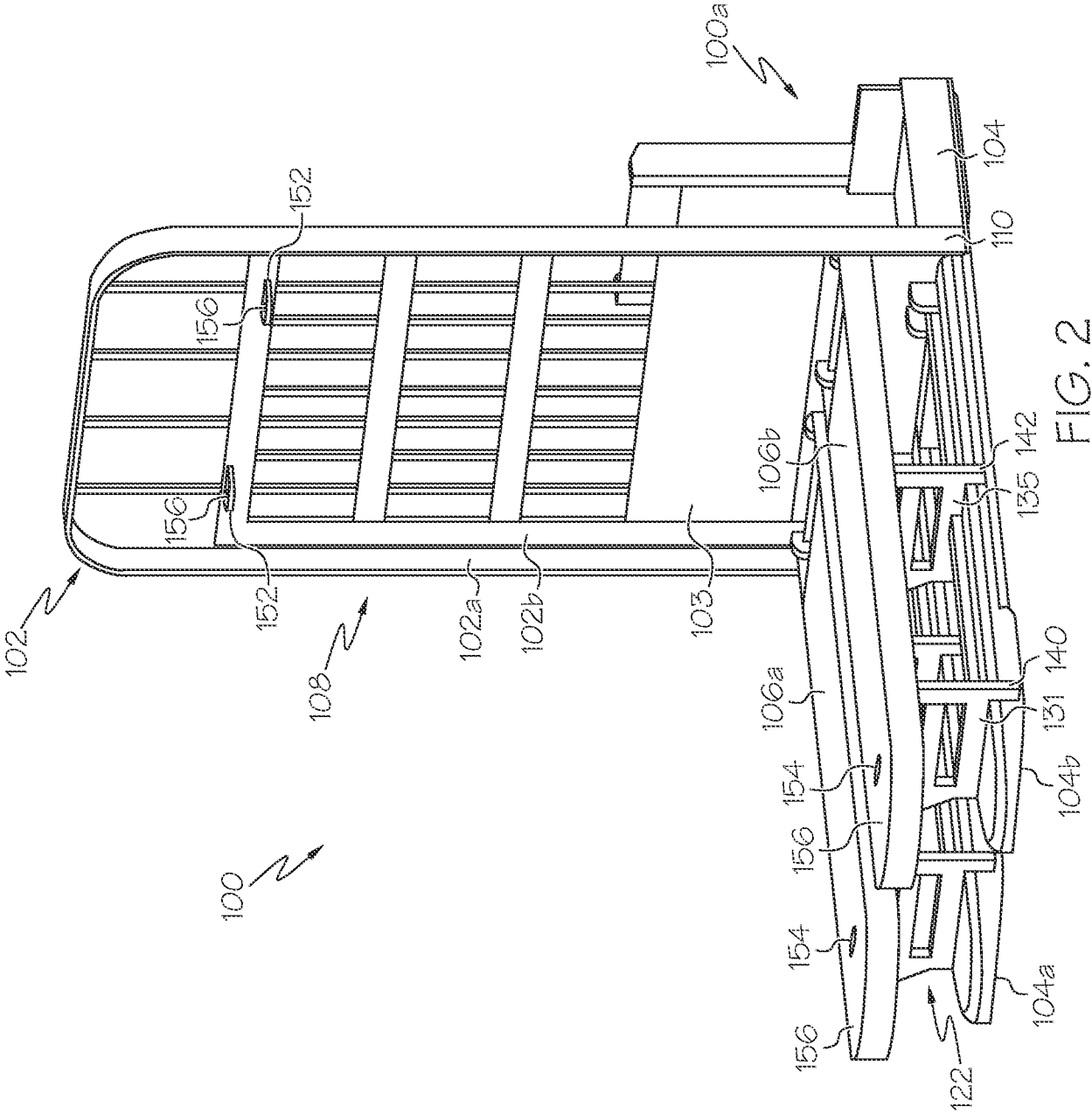
15. A pallet truck backrest assembly as claimed in claim 11 wherein the first and
25 second doors are each formed to conform to a shape defined by an outline of the outer frame of the backrest.

16. A pallet truck backrest assembly as claimed in claim 11 further comprising a central column secured to at least one of the nest weldment and the outer frame and
30 extending above the first and second forks, wherein the central column is located along a centerline of the pallet truck and is positioned between the first and second half-size pallet supports.

17. A pallet truck backrest assembly as claimed in claim 11 wherein the first and second doors are substantially parallel to the backrest when in the closed position.

18. A pallet truck backrest assembly as claimed in claim 17 wherein the first and second doors form a substantially planar load support surface when the first and second doors are in the closed position.





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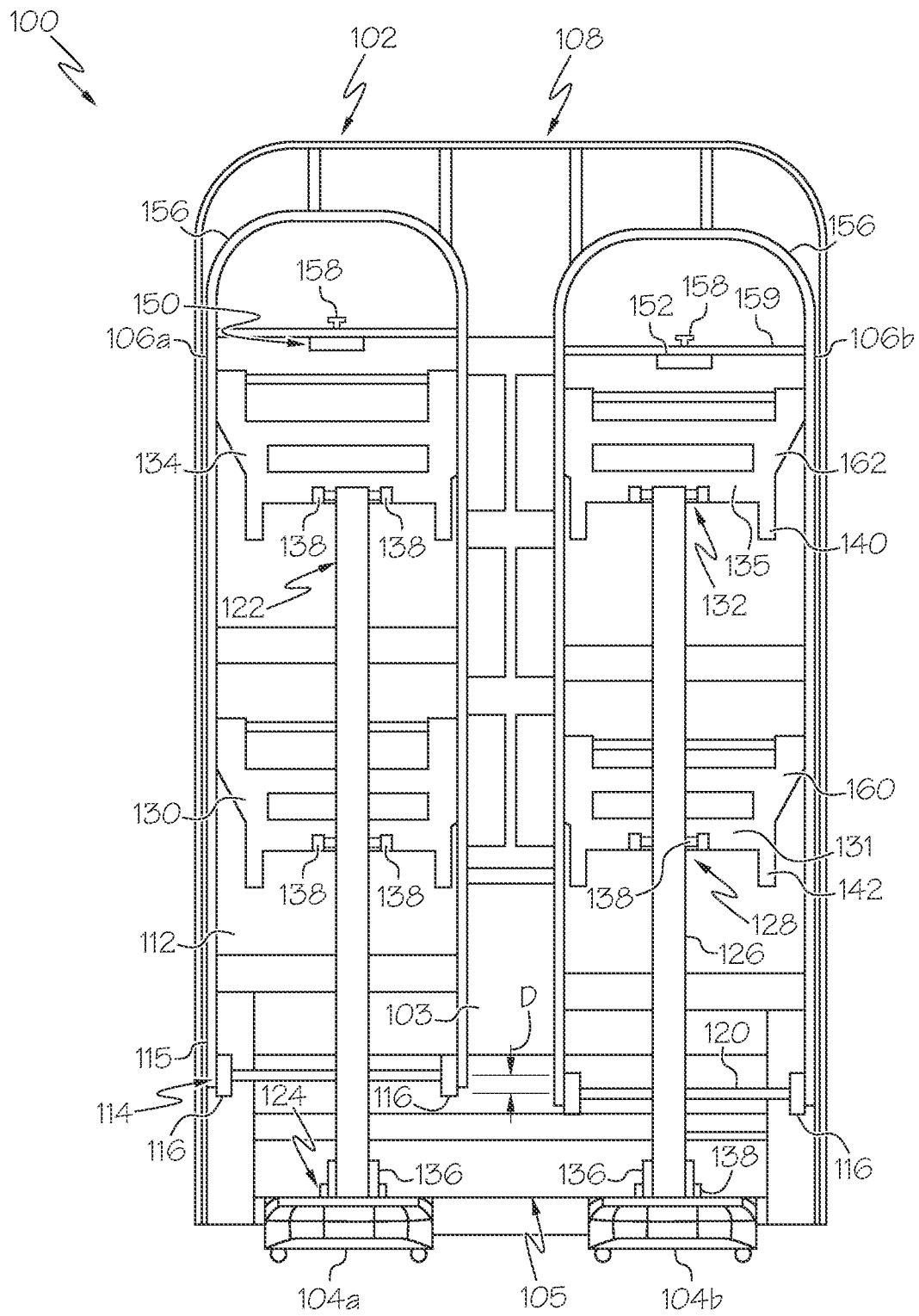


FIG. 3

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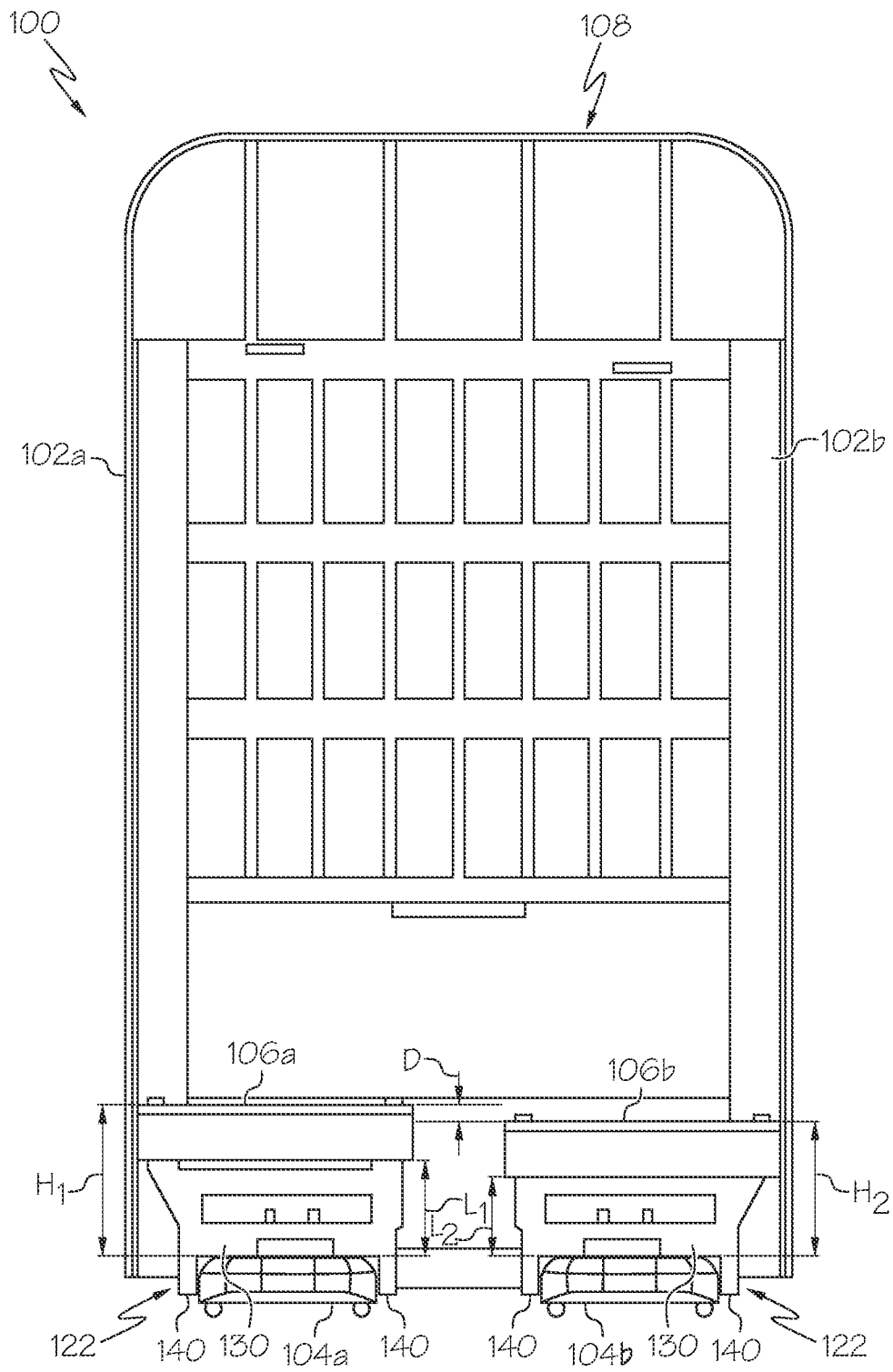


FIG. 4

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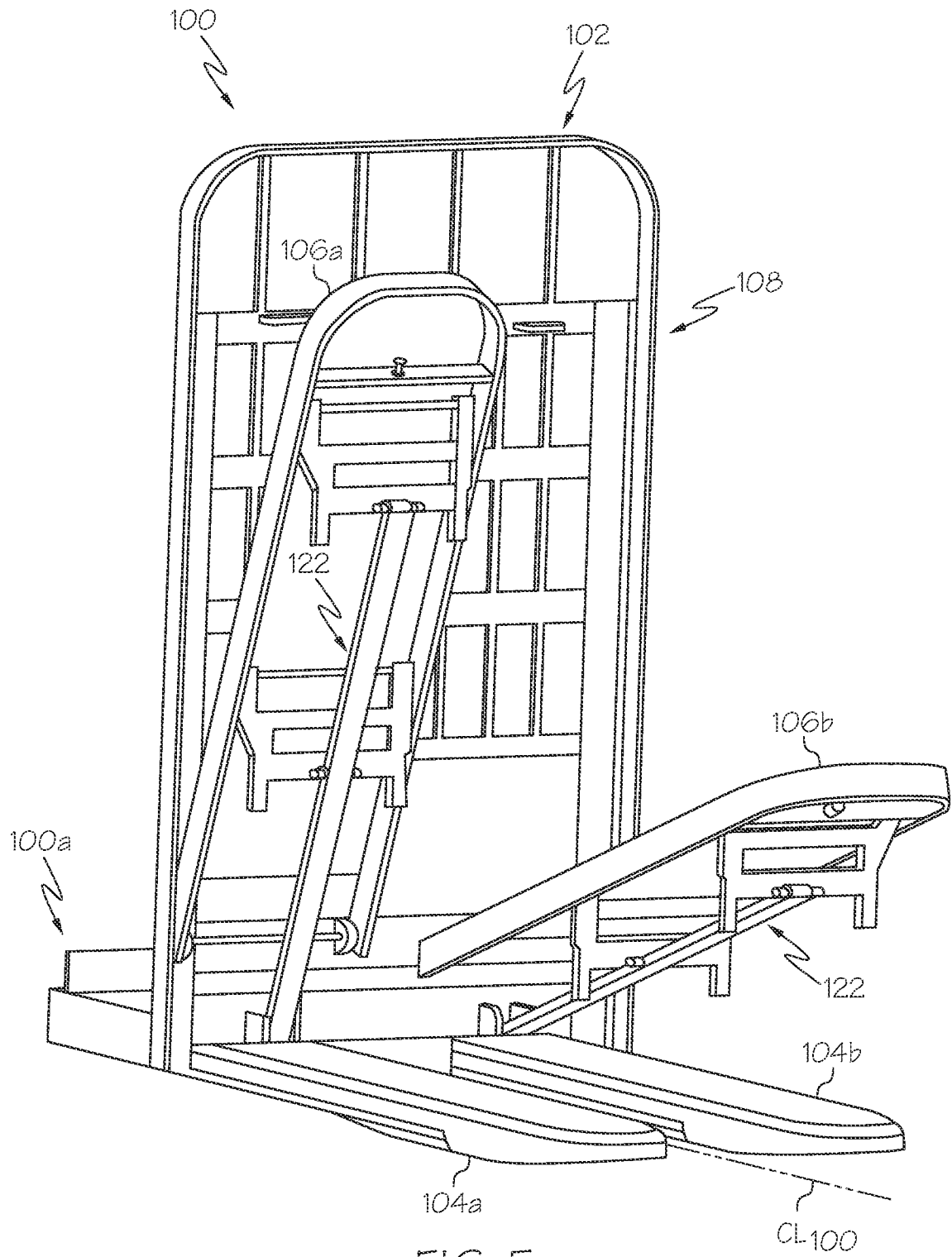


FIG. 5

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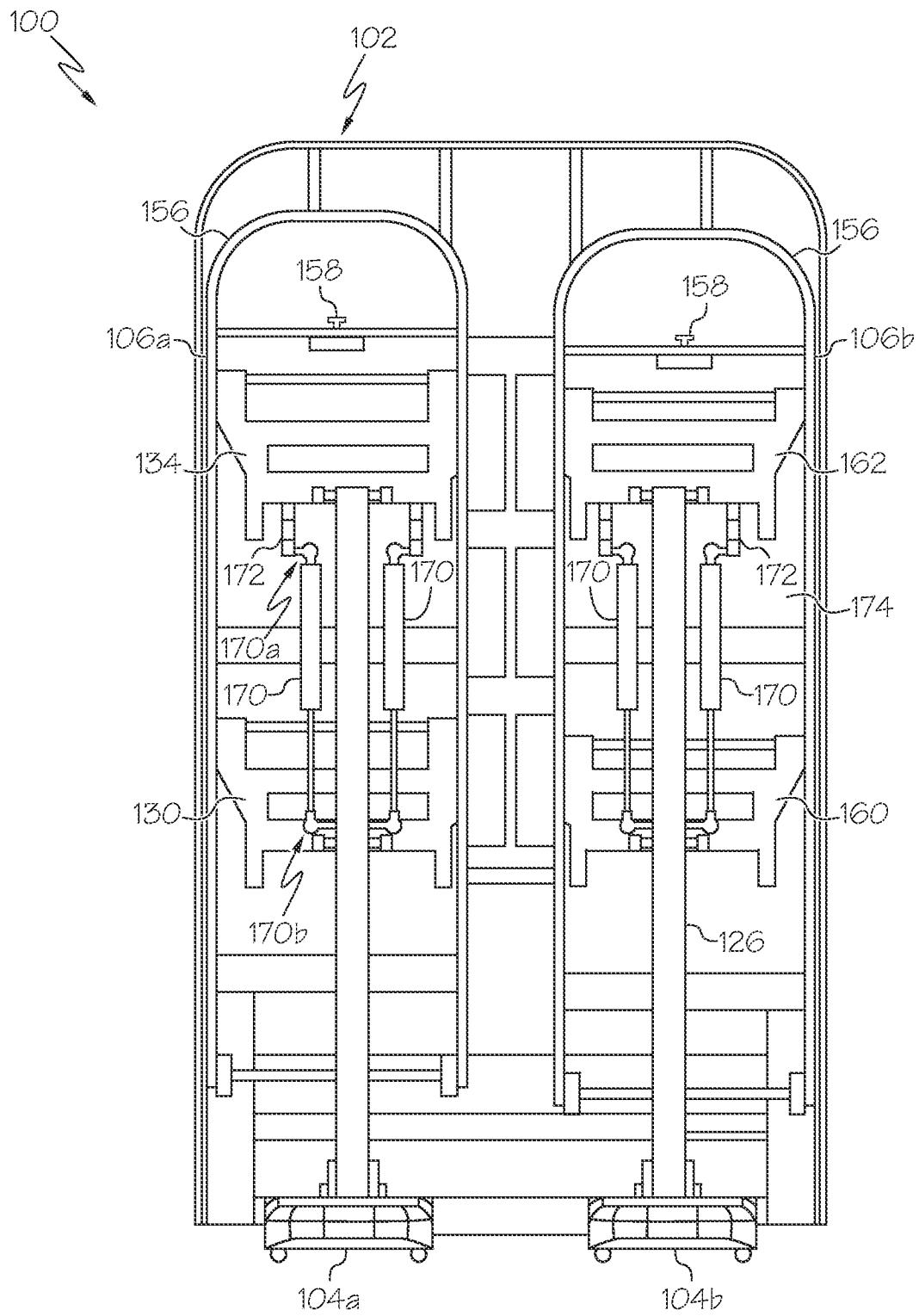


FIG. 6A

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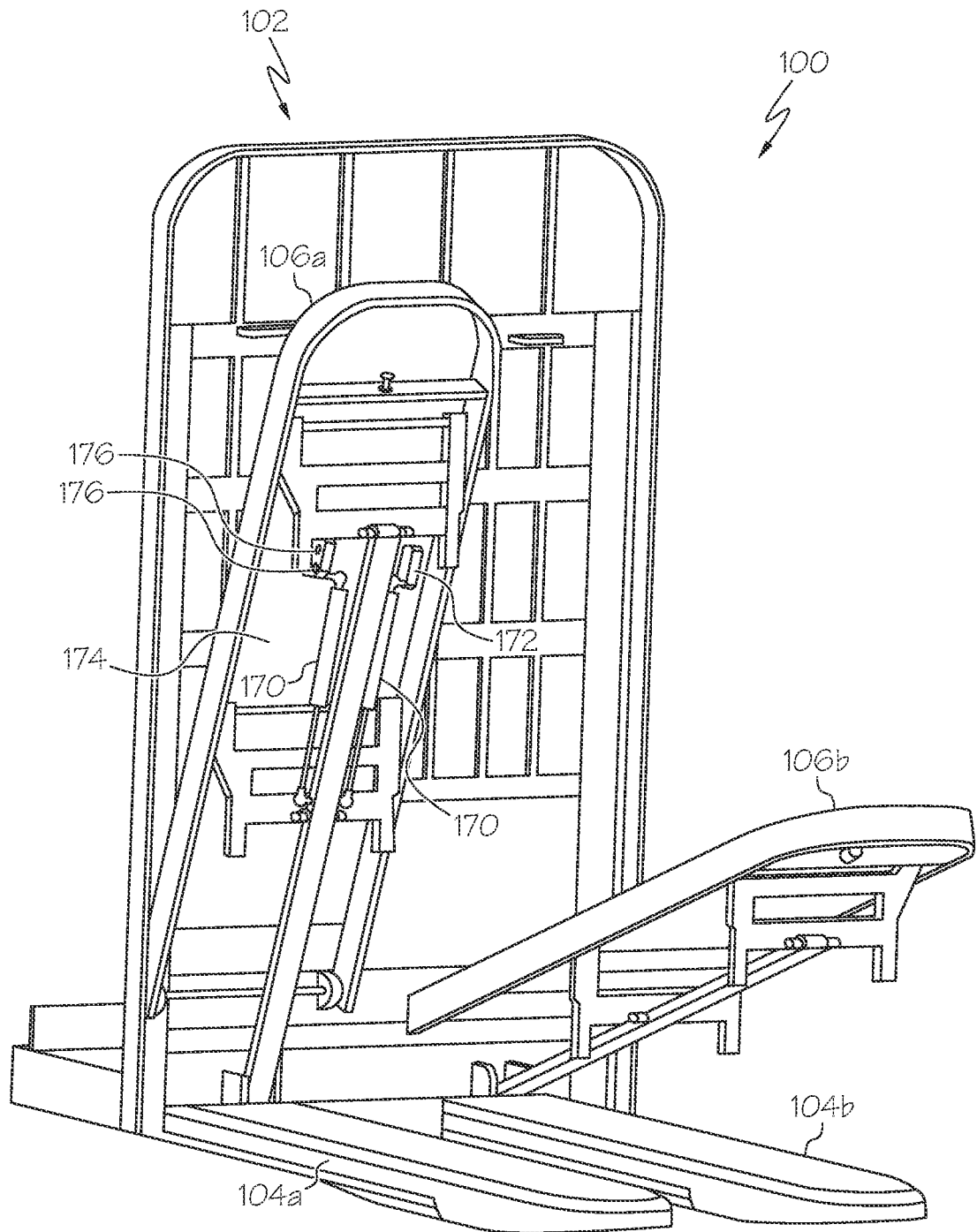


FIG. 6B

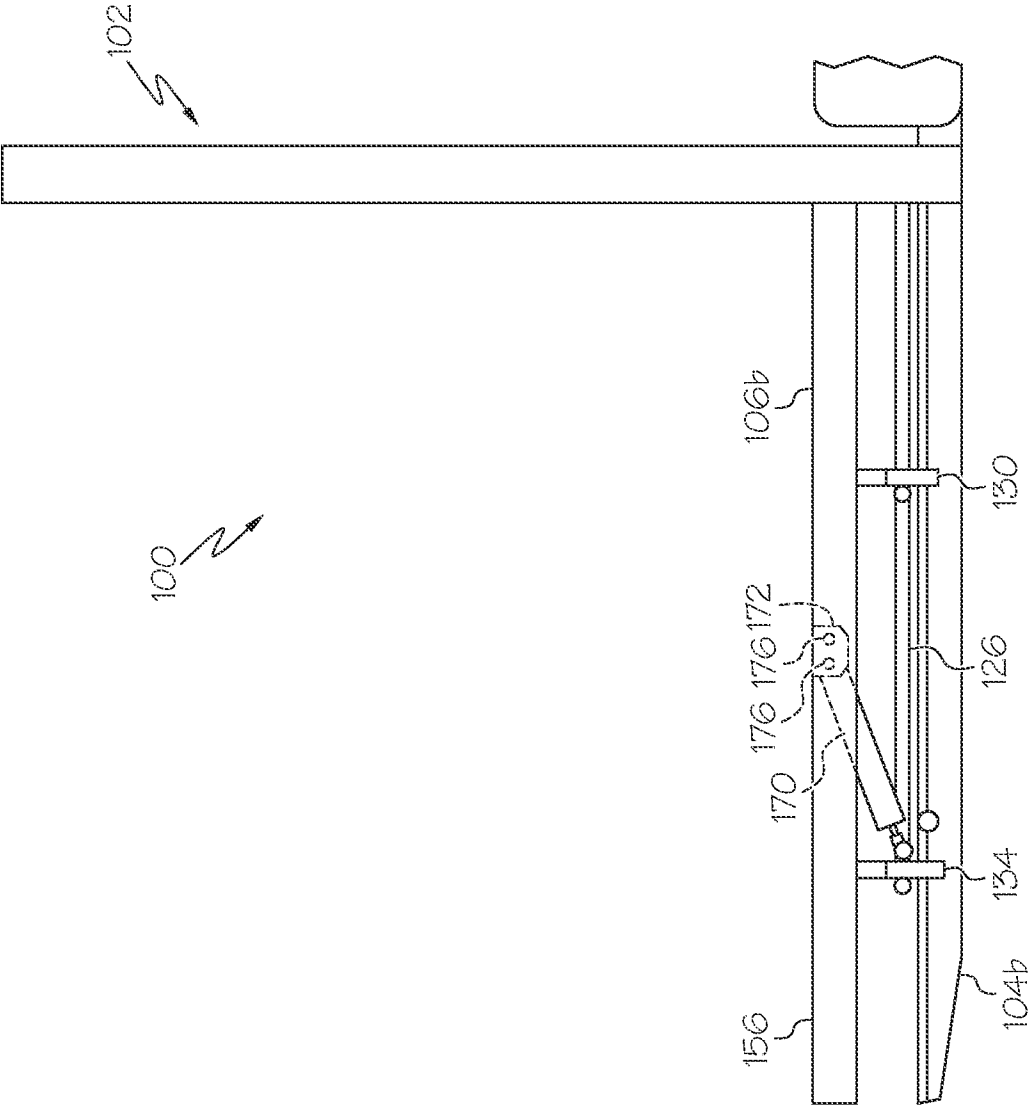


FIG. 6C

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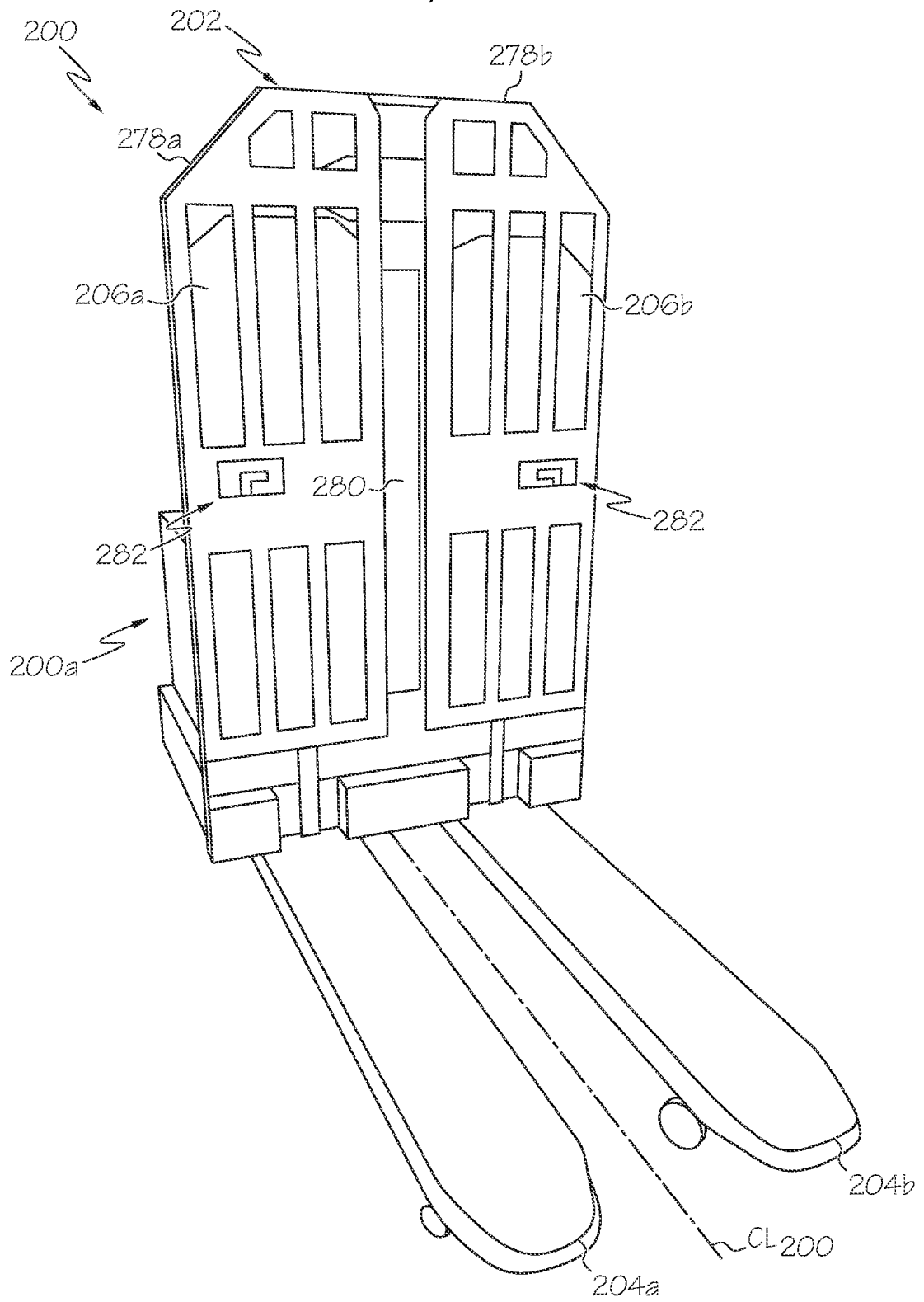


FIG. 7A

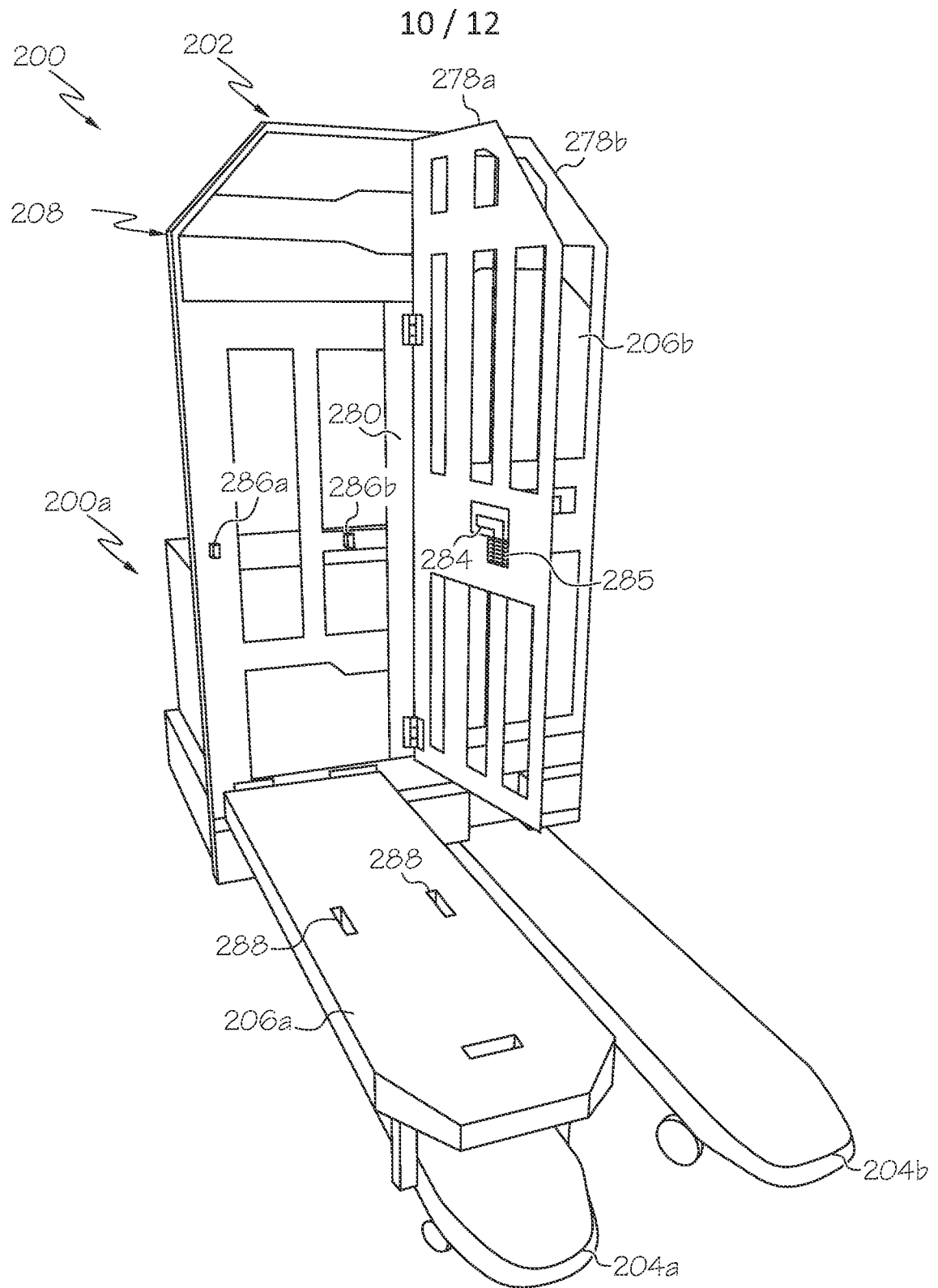


FIG. 7B

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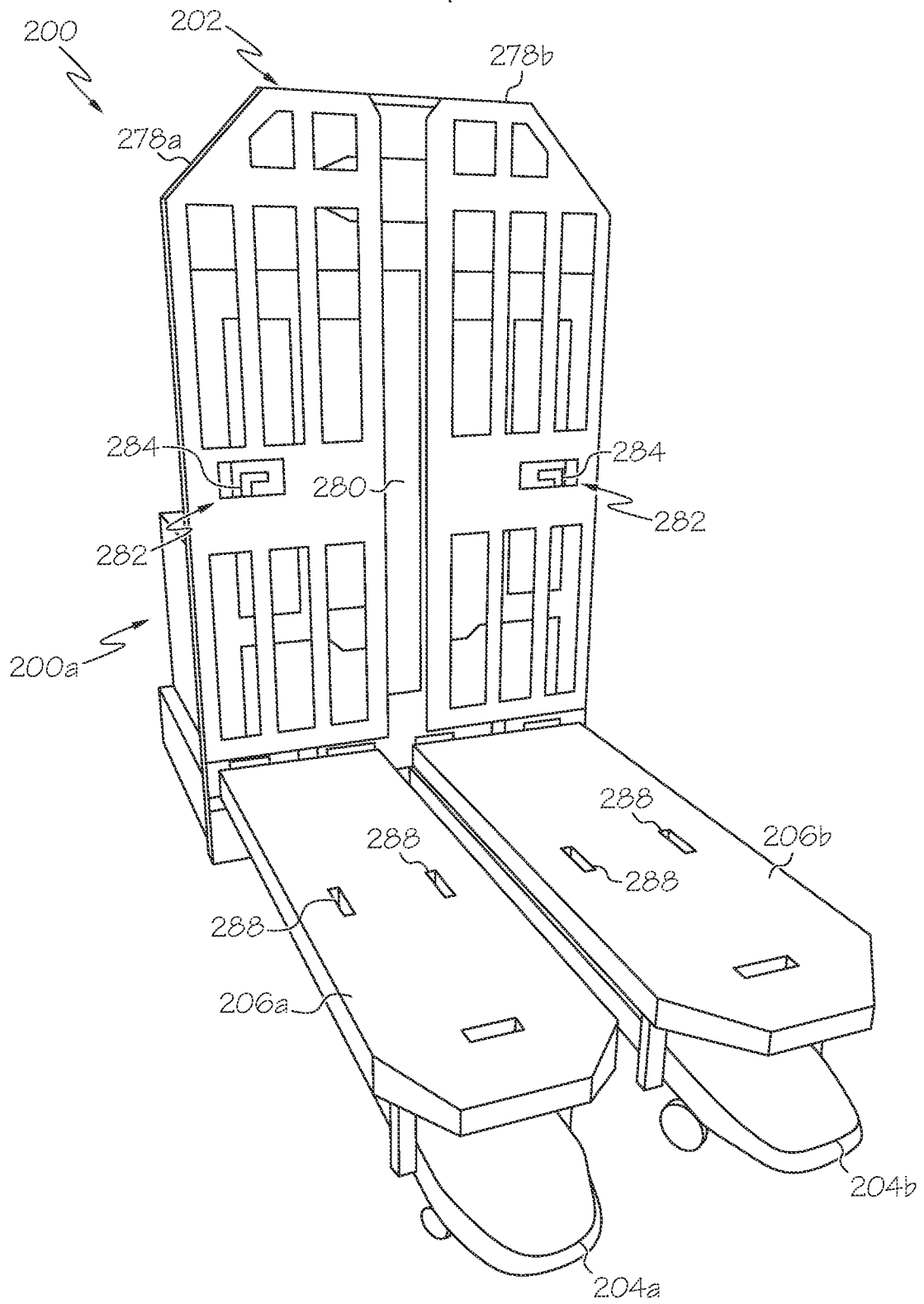
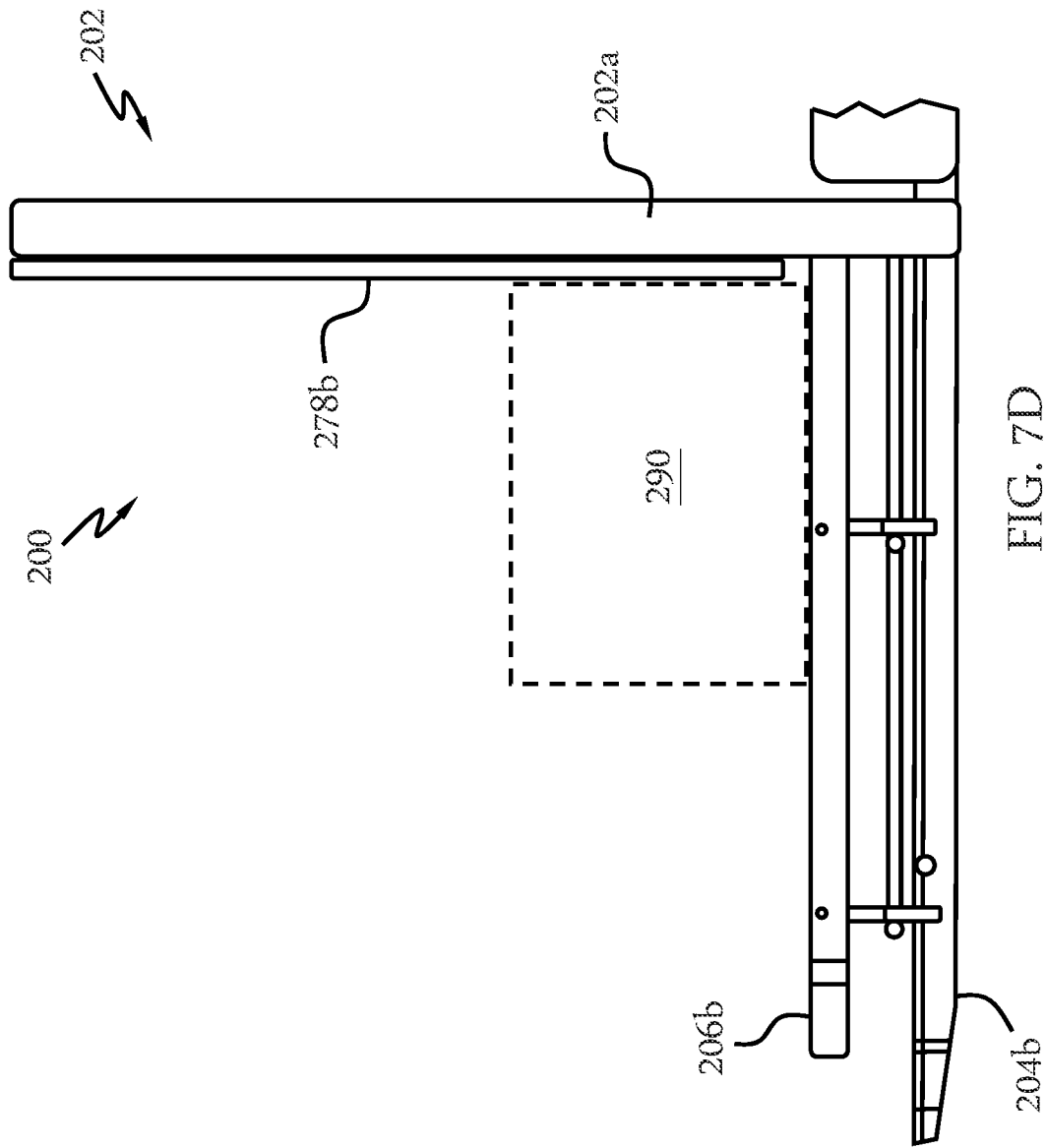


FIG. 7C



INTERNATIONAL SEARCH REPORT

International application No

PCT/US2015/058754

A. CLASSIFICATION OF SUBJECT MATTER

INV. B62B3/06 B66F9/16
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B62B B66F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2013/202400 A1 (RICHARD ANDREW P [US] ET AL) 8 August 2013 (2013-08-08) cited in the application	1-4
A	paragraph [0013] - paragraph [0028]; figures	5-18
Y	----- US 3 758 075 A (BRIGGS R) 11 September 1973 (1973-09-11)	1,3,4
A	column 2, line 4 - column 3, line 59; figures 1, 2	5-18
Y	----- US 2003/197351 A1 (BURGER JEFFREY R [US] ET AL) 23 October 2003 (2003-10-23) paragraph [0036] - paragraph [0042]; figures 9-11, 18	2
	----- -/-	



Further documents are listed in the continuation of Box C.



See patent family annex.

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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Date of the actual completion of the international search

14 January 2016

Date of mailing of the international search report

25/01/2016

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Authorized officer

Wochinz, Reinmar

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2015/058754

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2015/058754

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