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Convertible carrier rack and platform

Abstract

Embodiments of the present disclosure provide a convertible carrier rack and platform including a platform frame, a front rail including a pair of front rail segments, and a back rail including a pair of back rail segments, wherein the front and back rail segments are rotatable between a wall position for operation in a carrier mode and a leg position for operation in a table-type mode. Embodiments include one or more cross beams secured to a bottom side of the platform frame, wherein the cross beam can extend beyond a front face and a back face of the platform frame. Embodiments include an arrangement of rail segments that provides a secure nested arrangement in the wall position and a stable arrangement in the leg position, without over-rotation.

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Background/Summary

TECHNICAL FIELD

(1) The present disclosure relates to transportation, and more particularly to a convertible carrier rack and platform for use in travel and outdoor activities.

BACKGROUND AND SUMMARY

(2) Vehicles for transportation have inherently limited cargo carrying capacity based on vehicle size and external cargo carrying ability. External cargo transport typically involves roof-mounted or trailer-mounted devices. Unfortunately, people desiring to participate in land-based travel to outdoor activity areas for camping, hiking, tailgating or other activities, are limited in how much gear can be transported safely and effectively to the desired activity area. For instance, it is often

highly desirable to have a flat surface table-type device to use as a work area, a dining surface or other desired use. However, one cannot always bring such a desired object to the activity location due to space constraints, even with external cargo carrying ability.

(3) Present technology solutions are focused on carrying cargo or creating a freestanding table style workspace, but not both. However, there is a need for efficiently transporting cargo external to a vehicle in such a way that the cargo carrying device can be converted into a freestanding table-type platform for use after the vehicle has arrived at the desired destination. Embodiments of the present disclosure solve the above problems by providing a single convertible apparatus operable as both a carrier rack and a platform.

(4) The present disclosure relates to a device that can provide a user with both supplemental cargo carrying ability, and with a flat, stable workspace by use of the same device. This negates the need to carry multiple devices to achieve these distinctly different goals that are often both required in the same activity. The device can be employed in many applications, with a particular application as an automotive attachment to replace a roof or trailer cargo rack, where the cargo rack can be manipulated to function as a type of table.

(5) Embodiments of the present disclosure include a flat surface with rails for the purpose of carrying cargo while attached to a vehicle, carried, or somehow otherwise transported. In various embodiments, one or more rails can pivot, rotate or detach and re-attach so as to convert to legs in order to form a table by use of the same flat surface. In various embodiments, one or more rails can contact the bottom of the platform or a platform frame to provide support and stability to the device while in table configuration.

(6) Various uses of the presently described device include camping, sporting events, construction/trades and other uses where a versatile, convertible cargo carrier and table may be employed.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) FIG. 1 is a left front top perspective view of a device according to embodiments of the present disclosure, wherein the rail segments are in the table position.

(2) FIG. 2 is a partially cutaway right front perspective view of the device of FIG. 1.

(3) FIG. 3 is a perspective view of the device of FIG. 1 in the process of being folded or unfolded.

(4) FIG. 4 is a bottom perspective view of the device of FIG. 1 wherein the rail segments are in the carrier configuration.

DETAILED DESCRIPTION OF EMBODIMENTS

(5) The presently disclosed subject matter now will be described more fully hereinafter with reference to the accompanying drawings, in which some, but not all embodiments of the presently disclosed subject matter are shown. Like numbers refer to like elements throughout. The presently disclosed subject matter may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will satisfy applicable legal requirements. Indeed, many modifications and other embodiments of the presently disclosed subject matter set forth herein will come to mind to one skilled in the art to which the presently disclosed subject matter pertains having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the presently disclosed subject matter is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims.

(6) It will be appreciated that reference to “a”, “an” or other indefinite article in the present disclosure encompasses one or a plurality of the described element. Thus, for example, reference to

a rail segment may encompass one or more rail segments, reference to a connector may encompass one or more connectors and so forth.

(7) As shown in FIGS. 1 through 4, embodiments of the device **10** include a platform frame **12** having a first end **14**, a second end **16**, a front face **18** and a back face **20**. In various embodiments, the platform frame **12** can be formed as spaced apart beams **22** extending from the front face **18** to the back face **20** along with end beams **24** at the first **14** and second **16** ends, for example. In various embodiments, the platform frame **12** can include a planar top (not shown) above, mounted to, on or in place of the beams **22**, **24**. The planar top facilitates carrying of articles on, or providing a table-top type surface as a substantially flat, level surface during operation. The platform frame **12** has a perimeter formed by beams **22**, **24** labeled as edge segments J, K, L and M, as shown in FIGS. 1 and 2.

(8) As further shown in the embodiments of FIGS. 1 through 4, the device **10** includes a front rail **30** and a back rail **40**. The front rail **30** includes a first front rail segment **32** and a second front rail segment **34**. The first front rail segment **32** can be rotatably and/or removably secured to the platform frame **12** proximate the first end **14** of the platform frame **12**, and the second front rail segment **34** can be rotatably and/or removably secured to the platform frame **12** proximate the second end **16** of the platform frame **12**. The back rail **40** includes a first back rail segment **42** and a second back rail segment **44**. The first back rail segment **42** can be rotatably and/or removably secured to the platform frame **12** proximate the first end **14** of the platform frame **12**, and the second back rail segment **44** can be rotatably and/or removably secured to the platform frame **12** proximate the second end **16** of the platform frame **12**. Rotation of these elements can be provided using a connector element **90** such as a rod or pin inserted through the element into the platform frame **19**, as shown in FIGS. 1 and 2, for example. In various embodiments, the connector element **90** can extend through openings formed in two or more elements such as rail segments **32**, **34**, **42**, **44** and platform frame **12** to create a securing link.

(9) According to various embodiments, the first front rail segment **32** is formed substantially in the shape of a lower case “h” letter, with parallel support segments **50**, **51** and parallel bracing segments **52**, **53**. In embodiments, support segment **50** has a greater length than support segment **51**. Bracing segment **52** is positioned between support segments **50**, **51** at or proximate the first ends **54**, **55** of the support segments **50**, **51**, respectively. Bracing segment **53** is positioned between support segments **50**, **51** at or proximate a second end **57** of the shorter support segment **51**. The second front rail segment **34** can be formed substantially similarly to the first front rail segment **32**, with an initial support segment **50** that has a greater length than a secondary support segment **51**. According to various embodiments, the first back rail segment **42** is also formed substantially in the shape of a lower case “h” letter, with parallel support segments **60**, **61** and parallel bracing segments **62**, **63**. In embodiments, support segment **60** has a greater length than support segment **61**. Bracing segment **62** is positioned between support segments **60**, **61** at or proximate the first ends **64**, **65** of the support segments **60**, **61**, respectively. Bracing segment **63** is positioned between support segments **60**, **61** at or proximate a second end **67** of the shorter support segment **61**. The second back rail segment **44** can be formed substantially similarly to the first back rail segment **42**. Segments **50**, **51**, **52**, **53** of first front rail segment **32** and second front rail segment **34** can be formed as a single, unitary, monolithic component or may be connected as two or more separable components. Similarly, segments **60**, **61**, **62**, **63** of first back rail segment **42** and second back rail segment **44** can be formed as a single, unitary, monolithic component or may be connected as two or more separable components. It will be understood that segments **50** and **51**, and also segments **60** and **61**, can be of the same length in different embodiments of the present disclosure.

(10) It will be appreciated that the first **32** and second **34** front rail segments and the first **42** and second **44** back rail segments can be rotatable between a wall position shown generally at **25** in FIG. 4 along the front **18** and back **20** faces, respectively, of the platform frame **12** and a leg position shown generally at **27** in FIGS. 1 and 2, where the first front rail segment **32** and the first

back rail segment **42** are proximate end **14** of the platform frame **12** and where the second front rail segment **34** and the second back rail segment **44** are proximate end **16** of the platform frame **12**. The device **10** is in a table-like position when the rail segments are in the leg position **27**. As shown in FIGS. **1** and **2**, in the leg position **27**, the first front rail segment **32** and first back rail segment **42** extend downwardly from the platform frame **12** with the first ends **54**, **55** of the support segments **50**, **51**, respectively, of the first front rail segment **32** and the first ends **64**, **65** of the support segments **60**, **61**, respectively, of the first back rail segment **42** being substantially co-planar with the top surfaces of edge segments J, K, L and M of the platform frame **12**. The second front rail segment **34** and second back rail segment **44** are situated similarly to segments **32**, **42** in the leg position **27**. In various embodiments, front rail segments **32**, **34** are rotatably secured on the outside face **28** of edge segment L of the platform frame **12**, and back rail segments **42**, **44** are rotatably secured on the outside face **29** of edge segment M of the platform frame **12**. Further, the first front rail segment **32** and the first back rail segment **42** can be secured to a first end rail **70**. The second front rail segment **34** and the second back rail segment **44** can be secured to a second end rail **72**. The end rails **70**, **72** have a top surface **75** which can engage the bottom side **77** of the platform frame **12** when the rail segments **32**, **34**, **42**, **44** are in the leg position **27**. In this way, when the rail segments **32**, **34**, **42**, **44** are rotated into the leg position **27**, the end rails **70**, **72** engage the platform frame **12** so as to prevent over-rotation and maintain the device **10** in the table position (i.e., with rail segments in the leg position **27**).

(11) It will be appreciated that the bracing segments **52**, **53** provide stability to the support segments **50**, **51** and bracing segments **62**, **63** provide stability to the support segments **60**, **61**. Bracing segments **52**, **53**, **62**, **63** also provide an additional barrier to cargo slippage when the rail segments **32**, **34**, **42**, **44** are in the wall position **25**. The support segments **50**, **51** can be arranged to be substantially parallel and the support segments **60**, **61** can be arranged to be substantially parallel for strength of support and ease of operation, with the gap between segment pairs **50**, **51** and **60**, **61** creating space for manual handling of the device **10**.

(12) As shown in FIGS. **1** through **4**, the longer support segments **50** and **60** of each of the rail segments **32**, **34**, **42**, **44** are positioned closer to the second end **16** of the device **10** than the shorter support segments **51**, **61** when the rail segments **32**, **34**, **42**, **44** are in the leg position **27**. Further, a connector element **90** such as a rod or pin passes through the shorter segment **51**, **61** of the first front rail segment **32** and first rear rail segment **42**, respectively, whereas connector element **90** passes through the longer segment **50**, **60** of the second front rail segment **34** and second rear rail segment **44**, respectively. In this way, when the rail segments **32**, **34**, **42**, **44** are rotated into the wall position **25** as shown in FIG. **4**, the longer segments **50**, **60** of the second front rail segment **34** and second rear rail segment **44**, respectively, are maintained adjacent platform frame **12** (i.e., adjacent surfaces **28**, **29**, respectively), and the shorter segments **51**, **61** of the first front rail segment **32** and the first rear rail segment **42** are maintained adjacent platform frame **12** (i.e., adjacent surfaces **28**, **29**, respectively). Segment **50** of rail segment **34** and segment **51** of rail segment **32** are thus linearly aligned along line X-X (see FIG. **4**), and segment **60** of rail segment **44** and segment **61** of rail segment **34** are also linearly aligned. In addition, segment **50** of rail segment **32** and segment **51** of rail segment **34** are linearly aligned along line Y-Y (see FIG. **4**) and form a top wall barrier **100** when in the wall position **25**. Similarly, segment **61** of rail segment **42** and segment **60** of rail segment **44** are linearly aligned and form another top wall barrier **102** when in the wall position **25**. In various embodiments, ends **89** of longer segments **50** connect in a friction fit with respective ends **57** of the shorter segments **51** of the first and second front rail segments **32**, **34**. Similarly, ends **99** of longer segments **60** connect in a friction fit with respective ends **67** of the shorter segments **61** of the first and second rear rail segments **42**, **44**. In various other embodiments, there is no friction fit as between these ends **89**, **57** and **99**, **67** and these ends just closely align. In such embodiments, a connector such as a clasp, rod, clip, magnet or other similar item can assist in retention.

(13) As shown in FIGS. **1**, **2** and **4**, it will be appreciated that the wall position **25** of the front **30** and back **40** rails can be substantially perpendicular to the leg position **27**, which facilitates both sturdiness of the device **10** in the leg position **27** and compactness of the device **10** in the wall position **25**.

(14) As shown in FIGS. **1** through **4**, in various embodiments, a hitch connector assembly **76** is secured to the platform frame **12**. The hitch connector assembly **76** can include one or more support beams **78** and a hitch connector **79** that is movable with respect to the one or more support beams **78**. In various embodiments, the hitch connector **79** is slidably or telescopically secured to and/or within the one or more support beams **78**. The slidable operation can be provided via a nested arrangement that permits telescopic operation of the hitch connector **79** as it moves between extended and retracted positions with respect to the support beam(s) **78**. The hitch connector **79** can also be movably secured to the platform frame **12** in the sense that it is removable and then re-securable in different positions depending upon whether it is being employed with a trailer receiver tube of a vehicle or stored within the frame of the platform for use as a table or work area, for example. In various other embodiments, the hitch connector can be pivotably secured to the one or more support beams **78**. Alternatively, the hitch connector **79** may be secured to and pivot in relation to the platform frame **12**. The hitch connector **79** can also be secured in the extended and/or retracted positions via one or more connector elements **95**. The connector element(s) **95** can be embodied in many forms, including, without limitation, a cotter pin, a spring-loaded detent, a cylindrical pin with a ring for insertion of a finger or other item, a latch and hook, magnets, clips and other similar attachment mechanisms. In embodiments where the connector element **95** is a cylindrical pin, the pin can extend through mating openings in the hitch connector **79** and support beam(s) **78**.

(15) In various embodiments as shown in FIGS. **1** through **4**, one or more cross beams **80** can be secured to the bottom side **77** of the platform frame **12**. Such cross beam(s) **80** provide support to the platform frame **12**, among other things. In various embodiments, the cross beam(s) **80** extend beyond the perimeter of the platform frame **12**, and specifically beyond the front face **18** and back face **20** of the platform frame. As shown in FIG. **1**, the front face **18** can be considered the outer face of edge segment L, and the back face **20** can be considered the outer face of edge segment M. The cross beam(s) **80** provide a stopping surface for the front **32**, **34** and rear **42**, **44** rail segments when these rail segments are rotated into the wall position **25**.

(16) As shown in FIG. **4**, in various embodiments, end rails **70**, **72** provide an upper wall barrier at the respective ends **14**, **16** of the platform frame **12** to restrict cargo from sliding off of the upper surface of the platform frame **12** when the rail segments are in the wall position **25**. According to various embodiments, the end rails **70**, **72** are not aligned with the perimeter edge segments J, K of the platform frame **12** but are positioned inwardly of the perimeter of the platform frame **12**, and are thus mounted on an interior edge of rail segments **32**, **34**, **42**, **44**, which can assist in positioning against the platform frame **12** during operation in the leg position **27** as described elsewhere herein. In embodiments, end rail **70** is secured to longer rail **50** of first front rail segment **32** and longer rail **60** and first back rail segment **42**, and end rail **72** is secured to shorter rail **51** of second front rail segment **34** and shorter rail **61** of second back rail segment **44**.

(17) As shown in the drawings and described herein, according to various embodiments, the first front rail segment **32** and the first back rail segment **42** are rotatable at least 270 degrees about a first pivot axis generally aligned with perimeter edge segment K and/or end **14** of the platform **12**, and the second front rail segment **34** and the second back rail segment **44** are rotatable at least 270 degrees about a second pivot axis generally aligned with perimeter edge segment J and/or end **16** of the platform **12**.

(18) In operation, the device **10** can be employed as a vehicle roof rack where the hitch connector **79** is in the retracted position and the rail segments **32**, **34**, **42**, **44** are in the wall position **25** as shown in FIG. **4**. Where no friction fit is provided as described elsewhere herein, connector

elements **95** can be employed to secure the rail segments **32, 34, 42, 44** in place in the wall position. The connector elements **95** can be positioned through one or more elements of each rail segment **32, 34, 42, 44** and the platform frame **12** as described elsewhere herein. Should it be desired to employ the device in connection with a trailer receiver tube of a vehicle, the hitch connector **79** can be moved to the extended position and secured in place using a connector element **95**, for example.

(19) When the device **10** is to be employed as a flat surface, table-type device, any connector element **95** can be disconnected, where applicable. If the hitch connector **79** is in the extended position, it can be moved to a retracted position. Otherwise, the rail segments **32, 34, 42** and **44** can be moved to the leg position **27** as shown in FIGS. **1** and **2**, whereupon the end rails **70, 72** can matingly engage the platform bottom surface **77** and/or the platform frame **12**. The rail segments **32, 34, 42, 44** can then be further secured in place using connector elements if and as desired.

(20) It will be appreciated that the components of the presently disclosed device can be fabricated from various types of materials, including aluminum, steel, carbon fiber, plastic and/or other suitable materials consistent with the transportation and recreational environments in which the device can operate.

(21) Embodiments of the present disclosure may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the claims of the application rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

Claims

1. An apparatus, comprising: a platform frame comprising a perimeter, a first end, a second end, a front face and a back face; a front rail comprising a first front rail segment and a second front rail segment, wherein the first front rail segment comprises first and second support segments, wherein the first support segment is longer than the second support segment, wherein the second front rail segment comprises initial and secondary support segments, wherein the initial support segment has a greater length than the secondary support segment, wherein the second support segment of the first front rail segment is rotatably secured to the platform frame, and wherein the initial support segment of the second front rail segment is rotatably secured to the platform frame; and a back rail comprising a first back rail segment and a second back rail segment, wherein the first back rail segment comprises first and second support segments, wherein the first support segment of the first back rail segment is longer than the second support segment of the first back rail segment, wherein the second back rail segment comprises initial and secondary support segments, wherein the initial support segment of the second back rail segment has a greater length than the secondary support segment of the second back rail segment, wherein the second support segment of the first back rail segment is rotatably secured to the platform frame, and wherein the initial support segment of the second back rail segment is rotatably secured to the platform frame.
2. The apparatus of claim 1, further comprising: a first end rail secured to the first front rail segment and the first back rail segment; and a second end rail secured to the second front rail segment and the second back rail segment.
3. The apparatus of claim 2, wherein the first end rail is secured to the first support segment of the first front rail segment and is further secured to the first support segment of the first back rail segment.
4. The apparatus of claim 3, wherein the second end rail is secured to the secondary support segment of the second front rail segment and is further secured to the secondary support segment of the second back rail segment.

5. The apparatus of claim 1, wherein each of the first and second support members and each of the initial and secondary support members has an end, and wherein at least the end of the first support member of the first front rail segment engages the end of the secondary support member of the second front rail segment in a friction fit when the first and second front rail segments are rotated into a wall position.
6. The apparatus of claim 1, further comprising a cross beam secured to a bottom side of the platform frame.
7. The apparatus of claim 6, wherein the cross beam extends beyond the perimeter of the platform frame.
8. The apparatus of claim 6, wherein the cross beam extends beyond the front face and the back face of the platform frame.
9. The apparatus of claim 1, further comprising a hitch assembly and a pair of cross beams secured to a bottom side of the platform frame.
10. An apparatus, comprising: a platform frame comprising a perimeter, a first end, a second end, a front face and a back face; a front rail comprising a first front rail segment and a second front rail segment, wherein each of the first and second front rail segments is rotatable between a leg position and a wall position, wherein the first front rail segment comprises first and second support segments, wherein the first support segment is longer than the second support segment, wherein the second front rail segment comprises initial and secondary support segments, wherein the initial support segment has a greater length than the secondary support segment, wherein the first support segment of the first front rail segment is closer to the first end of the platform frame than the second support segment of the first front rail segment when in the leg position, and wherein the initial support segment of the second front rail segment is closer to the first end than the secondary support segment of the second front rail segment when in the leg position; and a back rail comprising a first back rail segment and a second back rail segment, wherein each of the first and second back rail segments is rotatable between a leg position and a wall position, wherein the first back rail segment comprises first and second support segments, wherein the first support segment of the first back rail segment is longer than the second support segment of the first back rail segment, wherein the second back rail segment comprises initial and secondary support segments, wherein the initial support segment of the second back rail segment has a greater length than the secondary support segment of the second back rail segment, wherein the first support segment of the first back rail segment is closer to the first end of the platform frame than the second support segment of the first back rail segment when in the leg position, and wherein the initial support segment of the second back rail segment is closer to the first end than the secondary support segment of the second back rail segment when in the leg position.
11. The apparatus of claim 10, further comprising: a first end rail secured to the first front rail segment and the first back rail segment; and a second end rail secured to the second front rail segment and the second back rail segment.
12. The apparatus of claim 11, wherein the first end rail is secured to the first support segment of the first front rail segment and is further secured to the first support segment of the first back rail segment.
13. The apparatus of claim 12, wherein the second end rail is secured to the secondary support segment of the second front rail segment and is further secured to the secondary support segment of the second back rail segment.
14. The apparatus of claim 10, wherein each of the first and second support members and each of the initial and secondary support members has an end, and wherein at least the end of the first support member of the first front rail segment engages the end of the secondary support member of the second front rail segment in a friction fit when the first and second front rail segments are rotated into a wall position.
15. The apparatus of claim 10, further comprising a cross beam secured to a bottom side of the

platform frame.

16. The apparatus of claim 15, wherein the cross beam extends beyond the perimeter of the platform frame.

17. The apparatus of claim 15, wherein the cross beam extends beyond the front face and the back face of the platform frame.

18. The apparatus of claim 10, further comprising a hitch assembly and a pair of cross beams secured to a bottom side of the platform frame.

19. An apparatus, comprising: a platform frame comprising a perimeter, a first end, a second end, a front face and a back face; a front rail comprising a first front rail segment and a second front rail segment, wherein each of the first and second front rail segments is rotatable between a leg position and a wall position; a back rail comprising a first back rail segment and a second back rail segment, wherein each of the first and second back rail segments is rotatable between a leg position and a wall position; at least two cross beams secured to a bottom side of the platform frame, wherein each of the at least two cross beams extends beyond the front face and the back face of the platform frame.

20. The apparatus of claim 19, wherein each of the first and second front rail segments and each of the first and second back rail segments comprises a support member having an end, wherein the end of the support member of the first front rail segment engages the end of the second front rail segment in a friction fit when the first and second front rail segments are rotated into the wall position, and wherein the end of the support member of the first back rail segment engages the end of the support member of the second back rail segment in a friction fit when the first and second back rail segments are rotated into the wall position.
