

# US Patent & Trademark Office

## Patent Public Search | Text View

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United States Patent Application Publication

20250256656

Kind Code

A1

Publication Date

August 14, 2025

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## VEHICLE PORT AND RELATED MECHANISMS

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### Abstract

An apparatus can include a structural support attachment. The structural support attachment can couple with a vehicle. The structural support attachment can engage with a body. The body can include a lever to couple the body with the structural support attachment to support a tray external to the vehicle.

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**Appl. No.:** 19/052940

**Filed:** February 13, 2025

### Related U.S. Application Data

us-provisional-application US 63553377 20240214

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### Publication Classification

**Int. Cl.:** B60R9/06 (20060101); B60R11/00 (20060101)

**U.S. Cl.:**

## Background/Summary

CROSS-REFERENCE TO RELATED PATENT APPLICATIONS [0001] This application claims the benefit of and priority to U.S. Provisional Patent Application No. 63/553,377, filed on Feb. 14, 2024, the entirety of which is incorporated by reference herein.

### INTRODUCTION

[0002] Vehicles can carry or transport equipment.

### SUMMARY

[0003] This disclosure is generally related to one or more components of a vehicle. The components can include at least one apparatus. The apparatus can include at least one of a structural support attachment or an attachment mechanism. The structural support attachment can include a bumper port. The components can be included with the vehicle. The structural support attachment can be disposed, located, or placed within the vehicle. For example, the structural support attachment can be located in a bumper or bumper plate of the vehicle. As another example, the structural support attachment can be coupled or attached to a chassis of the vehicle. The attachment mechanism can include a body. The attachment mechanism can include a bumper port attachment or a bumper port attachment mechanism.

[0004] At least one aspect is directed to an apparatus. The apparatus can include a structural support attachment. The structural support attachment can couple with a vehicle. The structural support attachment can engage with a body. The body can include a lever to couple the body with the structural support attachment to support a tray external to the vehicle.

[0005] At least one aspect is directed to a vehicle. The vehicle can include a structural support attachment. The structural support attachment can couple with the vehicle. The structural support attachment can engage with a body. The body can include a lever to couple the body with the structural support attachment to support a tray external to the vehicle.

[0006] At least one aspect is directed to a method. The method can include disposing a structural support attachment withing a portion of a vehicle. The structural support attachment can couple with the vehicle. The structural support attachment can engage with a body. The body can include a lever to couple the body with the structural support attachment to support a tray external to the vehicle.

[0007] At least one aspect is directed to a vehicle. The vehicle can include a bumper port. The bumper port can receive a bumper port attachment to couple the bumper port attachment with the vehicle. The bumper port attachment can support an object external to the vehicle with the bumper port attachment coupled with the vehicle.

[0008] These and other aspects and implementations are discussed in detail below. The foregoing information and the following detailed description include illustrative examples of various aspects and implementations, and provide an overview or framework for understanding the nature and character of the claimed aspects and implementations. The drawings provide illustration and a further understanding of the various aspects and implementations, and are incorporated in and constitute a part of this specification. The foregoing information and the following detailed description and drawings include illustrative examples and should not be considered as limiting.

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## Description

## BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The accompanying drawings are not intended to be drawn to scale. Like reference numbers and designations in the various drawings indicate like elements. For purposes of clarity, not every component may be labeled in every drawing. In the drawings:

[0010] FIG. 1 depicts an electric vehicle, in accordance with an implementation.

[0011] FIG. 2 depicts a perspective view of an apparatus, in accordance with an implementation.

[0012] FIG. 3 depicts a perspective view of an attachment mechanism, in accordance with an implementation.

[0013] FIG. 4 depicts a cross-sectional view of the attachment mechanism illustrated in FIG. 3, in accordance with an implementation.

[0014] FIG. 5 depicts a cross-sectional view of the attachment mechanism illustrated in FIG. 3, in accordance with an implementation.

[0015] FIG. 6 depicts a perspective view of the apparatus illustrated in FIG. 2 and of the attachment mechanism illustrated in FIG. 3, in accordance with an implementation.

[0016] FIG. 7 depicts a perspective view of a vehicle including the apparatus illustrated in FIG. 2, in accordance with an implementation.

[0017] FIG. 8 depicts a perspective view of a vehicle including the apparatus illustrated in FIG. 2, in accordance with an implementation.

[0018] FIG. 9 depicts a perspective view of a vehicle including the apparatus illustrated in FIG. 2, in accordance with an implementation.

[0019] FIG. 10 depicts a perspective view of a vehicle including the apparatus illustrated in FIG. 2, in accordance with an implementation.

[0020] FIG. 11 depicts a perspective view of a vehicle including the apparatus illustrated in FIG. 2, in accordance with an implementation.

[0021] FIG. 12 depicts a cross-sectional view of a vehicle including the apparatus illustrated in FIG. 2, in accordance with an implementation.

[0022] FIG. 13 depicts a cross-sectional view of a vehicle including the apparatus illustrated in FIG. 2, in accordance with an implementation.

[0023] FIG. 14 depicts a cross-sectional view of a vehicle including the apparatus illustrated in FIG. 2, in accordance with an implementation.

[0024] FIG. 15 depicts a perspective view of the attachment mechanism illustrated in FIG. 3, in accordance with an implementation.

[0025] FIG. 16 depicts a perspective view of the attachment mechanism illustrated in FIG. 3, in accordance with an implementation.

[0026] FIG. 17 depicts a perspective view of the attachment mechanism illustrated in FIG. 3, in accordance with an implementation.

[0027] FIG. 18A depicts a flow diagram of a process of manufacturing an apparatus, in accordance with an implementation.

[0028] FIG. 18B depicts a flow diagram of a process of manufacturing an apparatus, in accordance with an implementation.

[0029] FIG. 19 depicts a perspective view of a vehicle, in accordance with an implementation.

[0030] FIG. 20 depicts a perspective view of a component illustrated in FIG. 19, in accordance with an implementation.

[0031] FIG. 21 depicts a perspective view of a component illustrated in FIG. 19, in accordance with an implementation.

[0032] FIG. 22 depicts a perspective view of a component illustrated in FIG. 19, in accordance with an implementation.

[0033] FIG. 23 depicts a perspective view of a vehicle, in accordance with an implementation.

[0034] FIG. 24 depicts a perspective view of a vehicle, in accordance with an implementation.

[0035] FIG. **25** depicts a perspective view of a vehicle, in accordance with an implementation.

[0036] FIG. **26** depicts a perspective view of a vehicle, in accordance with an implementation.

[0037] FIG. **27** depicts a perspective view of a vehicle, in accordance with an implementation.

[0038] FIG. **28** depicts a perspective view of a vehicle, in accordance with an implementation.

[0039] FIG. **29** depicts a perspective view of a vehicle, in accordance with an implementation.

[0040] FIG. **30** depicts a perspective view of a vehicle, in accordance with an implementation.

[0041] FIG. **31** depicts a perspective view of a vehicle, in accordance with an implementation.

[0042] FIG. **32** depicts a perspective view of a vehicle including the attachment mechanism illustrated in FIG. **3**, in accordance with an implementation.

[0043] FIG. **33** depicts a perspective view of a vehicle including the attachment mechanism illustrated in FIG. **3**, in accordance with an implementation.

[0044] FIG. **34** depicts a perspective view of a vehicle including the attachment mechanism illustrated in FIG. **3**, in accordance with an implementation.

[0045] FIG. **35** depicts a perspective view of a vehicle including the attachment mechanism illustrated in FIG. **3**, in accordance with an implementation.

[0046] FIG. **36** depicts a perspective view of a vehicle including the attachment mechanism illustrated in FIG. **3**, in accordance with an implementation.

[0047] FIG. **37** depicts a perspective view of a vehicle including the attachment mechanism illustrated in FIG. **3**, in accordance with an implementation.

[0048] FIG. **38** depicts a perspective view of a vehicle including the attachment mechanism illustrated in FIG. **3**, in accordance with an implementation.

[0049] FIG. **39** depicts a perspective view of a vehicle including the attachment mechanism illustrated in FIG. **3**, in accordance with an implementation.

[0050] FIG. **40** depicts a perspective view of a vehicle including the attachment mechanism illustrated in FIG. **3**, in accordance with an implementation.

[0051] FIG. **41** depicts a perspective view of a vehicle including the attachment mechanism illustrated in FIG. **3**, in accordance with an implementation.

[0052] FIG. **42** depicts a perspective view of a vehicle including the attachment mechanism illustrated in FIG. **3**, in accordance with an implementation.

[0053] FIG. **43** depicts a perspective view of a vehicle including the attachment mechanism illustrated in FIG. **3**, in accordance with an implementation.

[0054] FIG. **44** depicts a perspective view of a vehicle including the attachment mechanism illustrated in FIG. **3**, in accordance with an implementation.

[0055] FIG. **45** depicts a perspective of a vehicle including the attachment mechanism illustrated in FIG. **3**, in accordance with an implementation.

[0056] FIG. **46** is a block diagram illustrating an architecture for a computer system that can be employed to implement elements of the systems and methods described and illustrated herein.

#### DETAILED DESCRIPTION

[0057] Following below are more detailed descriptions of various concepts related to, and implementations of, methods, apparatuses, and systems of a bumper port and an attachment mechanism. The various concepts introduced above and discussed in greater detail below may be implemented in any of numerous ways.

[0058] The present disclosure is directed to systems and methods of one or more components for a vehicle. The components can include a structural support attachment and an attachment mechanism. The structural support attachment can include a bumper port. The bumper port can be disposed within or otherwise located within a vehicle. For example, the bumper port can be located in a bumper of the vehicle. The components can include an apparatus. The apparatus can include at least one of the structural support attachment or the attachment mechanism. The apparatus can also be provided as one or more separate components for the vehicle.

[0059] The attachment mechanism can include a body. The body can include at least one portion.

For example, the body can include a first portion and a second portion. At least one portion of the body can protrude or extend beyond a subsequent portion of the body. For example, the body can include a first portion that protrudes beyond a second portion of the body. A protruding portion of the body can be inserted into the structural support attachment. For example, the structural support attachment can include an opening and the protruding portion can be inserted into the opening.

[0060] The structural support attachment can receive the attachment mechanism. For example, the attachment mechanism can be inserted into a housing of the structural support attachment.

[0061] The apparatus can include a first structural support attachment and a second structural support attachment. The first structural support attachment can be located in a first portion of a vehicle and the second structural support attachment can be located in a second portion. The first structural support attachment can receive a first attachment mechanism and the second structural support attachment can receive a second attachment mechanism.

[0062] Vehicles can include hitch receivers that can receive accessory attachment. The other vehicles can have the hitch receiver located in a single portion. For example, the hitch receivers can be located in a middle or a center portion of the vehicle. The location of the hitch receiver in the center portion can result in challenges. For example, the weight of objects supported by the hitch receivers can result in torque being applied as the weight of the objects extend beyond the center portion of the vehicle. This can result in the objects moving or swaying relative to the hitch receiver. The hitch receivers of other vehicles can be coupled with the other vehicles in hard-to-reach areas. For example, the hitch receivers of other vehicles can be coupled with an under carriage or underbody portion of the vehicle. The coupling location of the hitch receivers can create obstacles. The hitch receivers of other vehicles can also include openings and/or apertures to receive a pin. The pin can be lost or misplaced. Without the pin, attachment accessories can be unable to couple with the hitch receivers.

[0063] The disclosed solutions have a technical advantage of providing the structural support attachments that can be disposed within a portion of a vehicle. The structural support attachments can be located within a bumper of the vehicle. The location of the structural support attachments can provide unobstructed access to the structural support attachments. For example, the structural support attachments can be accessible without an operator having to access an undercarriage of the vehicle.

[0064] Systems and methods of the present technical solution also include providing the attachment mechanism. The attachment mechanism can include a lever. For example, the attachment mechanism can include an over-center lever. The lever can drive a spring-loaded wedge block. The lever can drive the spring-loaded wedge block to apply a load. For example, the lever can drive the spring-loaded wedge block to apply a load to the structural support attachment. Stated otherwise, the spring-loaded wedge block can apply a vertical spreading load to an inside portion of the structural support attachment. The spring-loaded wedge block can provide uniform or repetitive feedback to create a consistent user experience.

[0065] Some of the present technical solutions also include the arrangement or placement of the components of the attachment mechanism. For example, the lever can have an over-center arrangement relative to the spring-loaded wedge block. The arrangement of the lever, relative to the spring-loaded wedge block, can prevent force that is applied to a clamping portion of the attachment mechanism from moving or decoupling the attachment mechanism from the structural support attachment. The attachment mechanism can also include spring-loaded pawls that can provide haptic feedback or indications that the attachment mechanism is coupled or attached with the structural support attachment. The attachment mechanism can include tabs to prevent the pawls from moving once the attachment mechanism is coupled with the structural support attachment.

[0066] FIG. 1 depicts an example cross-sectional view **100** of an electric vehicle **105** installed with at least one battery pack **110**. Electric vehicles **105** can include electric trucks, electric sport utility vehicles (SUVs), electric delivery vans, electric automobiles, electric cars, electric motorcycles,

electric scooters, electric passenger vehicles, electric passenger or commercial trucks, hybrid vehicles, or other vehicles such as sea or air transport vehicles, planes, helicopters, submarines, boats, or drones, among other possibilities. The battery pack **110** can also be used as an energy storage system to power a building, such as a residential home or commercial building. Electric vehicles **105** can be fully electric or partially electric (e.g., plug-in hybrid) and further, electric vehicles **105** can be fully autonomous, partially autonomous, or unmanned. Electric vehicles **105** can also be human operated or non-autonomous. Electric vehicles **105** such as electric trucks or automobiles can include on-board battery packs **110**, batteries **115** or battery modules **115**, or battery cells **120** to power the electric vehicles. The electric vehicle **105** can include a chassis **125** (e.g., a frame, internal frame, or support structure). The chassis **125** can support various components of the electric vehicle **105**. The chassis **125** can span a front portion **130** (e.g., a hood or bonnet portion), a body portion **135**, and a rear portion **140** (e.g., a trunk, payload, or boot portion) of the electric vehicle **105**. The battery pack **110** can be installed or placed within the electric vehicle **105**. For example, the battery pack **110** can be installed on the chassis **125** of the electric vehicle **105** within one or more of the front portion **130**, the body portion **135**, or the rear portion **140**. The battery pack **110** can include or connect with at least one busbar, e.g., a current collector element. For example, the first busbar **145** and the second busbar **150** can include electrically conductive material to connect or otherwise electrically couple the battery **115**, the battery modules **115**, or the battery cells **120** with other electrical components of the electric vehicle **105** to provide electrical power to various systems or components of the electric vehicle **105**.

[0067] FIG. 2 depicts a perspective view of an apparatus **200**. The apparatus **200** can include the apparatus described herein. For example, the apparatus **200** can provide at least one of the technical solutions described herein. The apparatus **200** can be coupled with a vehicle. For example, the apparatus **200** can be coupled with the vehicle **105**. The apparatus **200** can be coupled with the vehicle **105** by at least one of attaching, mounting, securing, and/or connecting the apparatus **200** with the vehicle **105**. For example, the apparatus **200** can be coupled with the chassis **125** of the vehicle **105**.

[0068] The apparatus **200** can include at least one structural support attachment **205**. The structural support attachment **205** can include the structural support attachment described herein. The structural support attachment **205** can interface with, engage with, or otherwise interact with at least one of the various components described herein. For example, the structural support attachment **205** can engage with the attachment mechanism described herein. The structural support attachment **205** can couple with a vehicle. For example, the structural support attachment **205** can couple with the vehicle **105**.

[0069] The structural support attachment **205** can include a bumper port **205**. The bumper port **205** can be coupled with the vehicle **105**. For example, the bumper port **205** can be attached to the vehicle **105** via one or more fasteners. The bumper port **205** can be disposed within a portion of the vehicle **105**. For example, the bumper port **205** can be placed or located within a rear bumper of the vehicle **105**. Stated otherwise, the bumper port **205** can be disposed within a portion of the vehicle **105** that is located proximate to the rear of the vehicle **105** (e.g., a rear bumper or a rear portion)

[0070] The bumper port **205** can include at least one opening **210**, at least one aperture **215**, at least one slot **220**, and at least one housing **230**. The opening **210** can define or otherwise establish a body, a housing, or an assembly of the bumper port **205**. For example, the opening **210** can define the housing **230**. The opening **210** can receive the attachment mechanism described herein. For example, the protruded portion of the attachment mechanism can be inserted into the opening **210**. The opening **210** can provide access to the housing **230**. For example, the opening **210** can provide a void or a cavity for the body of the attachment mechanism to be inserted into. The opening **210** can position at least a portion of the body within a portion of the vehicle. For example, the opening **210** can position the body of the attachment mechanism within the bumper of the vehicle **105**.

[0071] The bumper port **205** can engage with the attachment mechanism. For example, the bumper port **205** can engage with the body of the attachment mechanism responsive to the spring-load block wedge applying a load to the bumper port **205**. Stated otherwise, the body of the attachment mechanism can connect or interface with the bumper port **205**. The housing **230** can include at least one face **225**. For example, the housing **230** can include a first face **225** and a second face **225**. The faces **225** can include the apertures **215**. For example, the first face **225** can include a first aperture **215** and a second face **225** can include a second aperture **215**. The apertures **215** can be located or disposed within the faces **225**. For example, the apertures **215** can define a gap or a hole within the faces **225**.

[0072] The apertures **215** can receive at least one of the various components described herein. For example, the apertures **215** can receive the pawls (e.g., a protrusion) described herein. The apertures **215** can provide an opening, a hole, or a gap to allow the pawls to escape or otherwise exist the housing **230** of the bumper port **205**. The slots **220** can receive at least one fastener. For example, the slots **220** can receive a bolt or a screw. The slots **220** can couple the bumper port **205** with the vehicle **105** responsive to the slots receiving at least one fastener.

[0073] FIG. **3** depicts a perspective view of an attachment mechanism **305**. The attachment mechanism **305** can include the attachment mechanism described herein. The attachment mechanism **305** can include the bumper port attachment. The apparatus **200** can include the attachment mechanism **305**. The attachment mechanism **305** can include at least one body **310**, at least one lever **315**, at least one arm **325**, at least one pawl **320**, at least one portion **330**, at least one opening **335**, and at least one protrusion **340**. The body **310** can include the body described herein. For example, the bumper port **205** can engage with the body **310**. The body **310** can include the portion **330**. The body **310** or a portion thereof can be inserted into the bumper port **205**. For example, the portion **330** can be inserted into the opening **210**. The body **310** can include a first portion **330** and a second portion **330**. For example, as shown in FIG. **2** the portion **330** protrudes or extends beyond the body **310**.

[0074] The body **310** can insert within the opening **210**. For example, the portion **330** of the attachment mechanism **305** or the body **310** can be placed, located, or otherwise positioned within the opening **210**. The body **310** can couple with the bumper port **205** without a rotational force. For example, the body **310** can couple with the bumper port **205** without spinning, twisting, hinging, or otherwise rotating the body **310**. The body **310** can couple with the bumper port **205** via a single plane relative to the vehicle. For example, the body **310** can be inserted into the bumper port **205** by applying force within a single plane or direction. The opening **210** can receive at least a portion of the body **310**. For example, the body **310** can include the portion **330** and the portion **330** can be inserted into the opening **210** (e.g., the opening **210** receives at least a portion of the body **310**).

[0075] The lever **315** can couple the body **310** with the bumper port **205**. For example, the lever **315** can activate, move, or engage the protrusions **340** to have the protrusions **340** contact the bumper port **205**. Stated otherwise the lever **315** can couple the body **310** with the bumper port **205** using the protrusions **340**. The body **310** can support a tray that is external to the vehicle **105**. For example, the body **310** can support a beam (e.g., a tray) responsive to the lever **315** coupling the body **310** with the bumper port **205**. The tray can include at least one of a storage compartment, a tote, a cabinet, a chest, a shelf, a bench, a beam, a board, a cooler, a dresser, a surface top, or other possible storage devices. The lever **315** can be coupled with the arm **325**. For example, the lever **315** can be attached, secured, or otherwise mounted to the arm **325**.

[0076] The lever **315** can include at least one position. For example, the lever **315** can include a first position and a second position. At least one position of the lever **315** can include an unlocked position. FIG. **3** depicts an example of the lever **315** in an unlocked position. At least one position of the lever **315** can include a locked position. The lever **315** can move from a first position to a second position. For example, force can be applied to pivot, swing, twist, rotate, or otherwise adjust a position of the lever **315**. The lever **315** can move between positions to reversibly couple the

body **310** with the bumper port **205**. For example, the body **310** can be coupled with the bumper port **205** with the lever **315** in a first position and the body **310** can be decoupled with the bumper port **205** with the lever **315** in a second position.

[0077] The protrusion **340** can be disposed or otherwise located proximate to the opening **335**. The protrusion **340** can be coupled with the arm **325**. For example, the protrusion **340** can be attached, secured, or mounted to the arm **325**. The protrusions **340** can move relative to the arm **325**. The protrusions **340** can also move in one or more directions. The protrusions **340** can be indirectly coupled with the arm **325**. The lever **315** can control or otherwise move the protrusions **340**. For example, the lever **315** can move the protrusions **340** from a first position to a second position. The lever **315** can move the protrusions **340** from a position within the body **310** to a position at least partially external to the body **310**. For example, the lever **315** can move the protrusions **340** to cause the protrusions **340** to escape from the body **310** via the openings **335**. The protrusions **340** can contact at least a portion of the bumper port **205**. For example, the protrusions **340** can contact an internal portion of the housing **230**. The protrusions **340** can contact the bumper port **205** with the protrusions **340** in a position that is external to the openings **335**. The bumper port **205** can engage with the body **310** responsive to the protrusions **340** making contact with the housing **230**.

[0078] The pawls **320** can escape the housing **230** via the apertures **215**. For example, the pawls **320** can align with and/or otherwise be placed proximate to the apertures **215** responsive to the body **310** or the portion **330** having been inserted into the housing **230**. The pawls **320** can secure or lock the body **310** in at least one position. For example, the pawls **320** can secure the body **310** within the housing **230**. Stated otherwise, the pawls **320** can secure the portion **330** within the housing **230**. The pawls **320** can be coupled with the lever **315**. For example, the pawls **320** can be mounted, secured, or attached to the lever **315**. The lever **315** can move the pawls **320** from a position within the body **310** to a position that is external to the housing **230** (e.g., the pawls **320** escaped via the apertures **215**).

[0079] FIG. 4 depicts a cross-sectional view of the attachment mechanism **305**. As shown in FIG. 4 a top portion, a top cover, or a top plate of the attachment mechanism **305** has been removed to expose at least one partially internal component of the attachment mechanism **305**. The attachment mechanism **305** can include at least one plate **405**. For example, the attachment mechanism **305** can include a top plate and a bottom plate **405**. The plate **405** can include at least one extrusions. FIG. 4 depicts an example of the attachment mechanism **305** including a bottom plate **405**. The bottom plate **405** can include at least one slot **435**. The slots **435** can receive at least one fastener to couple or attach the bottom plate **405** with the top plate **405**. The plate **405** can also be a bottom portion or segment of an extrusion.

[0080] The attachment mechanism **305** can include at least one carriage **410**, at least one push block **420**, and at least one pressure block **425**. At least one of the carriage **410**, the push block **420**, or the pressure block **425** can refer to or include at least one of the various components described herein. For example, the pressure block **425** can include the wedge block described herein. The carriage **410** can be coupled with the lever **315**. For example, the carriage **410** can be indirectly coupled with the lever **315** via the arm **325**. The carriage **410** can be movably coupled with the lever **315**. For example, the carriage **410** can move along with or as a result of the lever **315** moving. The arm **325** or a portion thereof can move along an opening **445** of the carriage **410**. For example, the arm **325** can be coupled with the carriage **410** responsive to a fastener coupling an opening **460** of the arm **325** with the carriage **410**.

[0081] The arm **325** can include at least one opening **460**. For example, the arm **325** can include a first opening **460** and a second opening **460**. FIG. 4 depicts an example of the arm **325** including two openings **460**. As shown in FIG. 4, a first plane **450** is showing running through the first opening **460** and a second plane **455** is shown running through the second opening **460**. As shown in FIG. 4, the first plane **450** is show above the second plane **455**. At least one of the first plane **450** or the second plane **455** can define or establish a direction of motion. For example, the first plane



**450** can establish motion in at least one of a direction **465** or a direction **470**. At least one of the direction **465** or the direction **470** can refer to or include a forward direction. At least one of the direction **465** or the direction **470** can refer to or include a reward direction. At least one of the direction **465** or the direction **470** can refer to or include a first direction. At least one of the direction **465** or the direction **470** can refer to or include a second direction.

[0082] The carriage **410** can include at least one spring assembly **415**. The spring assembly **415** can include at least one spring and at least one structural member. The spring assembly **415** can be coupled with the push block **420**. The spring assembly **415** can move from an expanded position to a compressed position or vice versa. FIG. 4 depicts an example of the spring assembly **415** in an expanded position. The spring assembly **415** can move from the expanded position to a compressed position responsive to the lever **315** moving from a first position to a second position. The spring assembly **415** moving to the compressed position can move the push block **420**.

[0083] The carriage **410** can include at least one tab **440**. The tab **440** can include a member. The tab **440** can also include a push block. The tab **440** can contact or move the pawls **320**. For example, the tabs **440** can contact the pawls **320** to move the pawls **320** from a position within the body **310** to a position external to the body **310**. As another example, the tabs **440** can prevent the pawls **320** from moving by contacting the pawls **320**. The tab **440** can extend in at least one direction beyond a point of the carriage **410**. For example, the tabs **440** can extend beyond a body of the carriage **410**. FIG. 4 depicts an example of the tabs **440** extending beyond a body of the carriage **410**. The tabs **440** can contact the pawls **320** with the spring assembly **415** in a contracted position. The tabs **440** can extend in a first direction beyond a first point of the carriage **410**. For example, the tabs **440** can extend laterally (e.g., a first direction) beyond a body or a center of the carriage **410**.

[0084] The push block **420** can contact or move the pressure block **425**. For example, the push block **420** can move the pressure block **425** responsive to the spring assembly **415** moving to the compressed position. The push block **420** contacting the pressure block **425** can cause the pressure block to rise or lift. For example, the pressure block **425** can move from a first height to a second height. The pressure block **425** can include the protrusions **340**. The push block **420** moving the pressure block **425** from a first height to a second height can cause the protrusions **340** to escape the openings **335**. The body **310** can engage the housing **230** responsive to the push block **420** moving the protrusions from within the body **310** to external the body **310** (e.g., escaped via the openings **335**).

[0085] The lever **315** can move from an unlocked position, as shown in FIG. 4, to a lock position. The lever **315** moving to a locked position can cause at least one component of the attachment mechanism to move along or in the direction **465**. For example, the lever **315** moving to the lock position can cause the carriage **410** to in the direction **465**. To continue this example, the carriage **410** moving in the direction **465** can cause the spring assembly **415** to be compressed.

[0086] The carriage **410** can move from a first position to a second position. For example, the carriage **410** can move from the position, as shown in FIG. 4, to a second position. The carriage **410** can move from the position shown in FIG. 4 responsive to the lever **315** moving from a first position to a second position.

[0087] FIG. 5 depicts a cross-sectional view of the attachment mechanism **305**. The cross-sectional view, as shown in FIG. 5, can be similar to the cross-sectional view as shown in FIG. 4. FIG. 4 depicts an example of the lever **315** having moved to the locked position or an example of the lever **315** in the locked position. As shown in FIG. 4, the opening **460**, the carriage **410**, and the push block **420** have moved in the direction **465** responsive to the lever **315** having moved to the locked position.

[0088] As shown in FIG. 5, among others, the spring assembly **415** has been compressed responsive to the carriage **410** having moved in the direction **465**. The spring assembly **415** being in the compressed position (e.g., compressed) can move the push block **420**. The push block **420**

can contact the pressure block **425** responsive to the spring assembly **415** being in the compressed position. FIG. 5 depicts an example of the lever **315** as an over-center lever. As shown in FIG. 5, the second plane **455** is shown above the first plane **450**. The position of the second plane **455** relative to the second plane **450** is an example of an over-center lever. In this arrangement, the lever **315** is prevented from moving from the locked position (as shown in FIG. 5) to an unlocked position (as shown in FIG. 4) responsive to a force being applied to lever **315** or the arm **325** along or in the direction **470**.

[0089] FIG. 6 depicts a perspective view of the bumper port **205** and the attachment mechanism **305**. The bumper port **205** can engage with the attachment mechanism **305**. For example, the portion **330** can be inserted into the opening **210**. FIG. 6 depicts an example of the bumper port **205** engaging the attachment mechanism **305** as the portion **330** is shown inserted into the opening **210**. As shown in FIG. 6, the attachment mechanism **305** includes a first plate **405** and a second plate **405**. The first plate **405** can be a top plate. The second plate **405** can be a bottom plate. FIG. 6 depicts an example of the tabs **440** having moved the pawls **320** from a position within the body **310** to a position external to the apertures **215**. As another example, the pawls **320** can be spring loaded via a spring steel leaf spring. To continue this example, the pawls **320** can be prevented from moving inward (e.g., within the attachment mechanism **305**) by the tabs **440**.

[0090] FIG. 7 depicts a perspective view of the vehicle **105**. The vehicle **105** can include at least portion **703**. The portions **703** can include at one or more various components, locations, or spots of the vehicle **105**. The portions **703** can be located proximate to the rear of the vehicle **105**. For example, the portions **703** can be located proximate to a rear bumper of the vehicle **105**. As another example, the portions **703** can include the chassis **125**. The portions **703** can include at least one opening **710**. The openings **710** can include a void or a gap for which the bumper port **205** can be accessible. For example, the openings **710** can provide access to the opening **210**.

[0091] The apparatus **200** can include a first bumper port **205** and a second bumper port **205**. The first bumper port **205** can be disposed within a first opening **710**. The second bumper port **205** can be disposed within a second opening **710**. FIG. 7 depicts an example of a first bumper port **205** disposed within a first opening **710** and an example of a second bumper port **205** disposed within a second opening **710**. The first bumper port **205** can support a first portion of a tray. For example, the first bumper port **205** can support a first part of a bike rake (e.g., a tray). As another example, the second bumper port **205** can support a second part of the bike rake. The first bumper port **205** and the second bumper port **205** both supporting a part of the tray can refer to a uniform weight distribution.

[0092] The apparatus **200** can include at least one plug **705**. The plug **705** can be inserted into the opening **710**. The plug **705** can enclose or cover the bumper port **205**. For example, the plug **705** can isolate the bumper port **205** from an external environment (e.g., rain, dirt, dust, mud, snow, etc.). The plug **705** can also prevent debris from entering the housing **230**. FIG. 7 depicts an example of the plug **705** external to the opening **710** (e.g., the plug is not covering the bumper port **205**).

[0093] FIG. 8 depicts a perspective view of the vehicle **105**. As shown in FIG. 8, the plug **705** can be inserted into the opening **710**. FIG. 8 depicts an example of the plug **705** isolating the bumper port **205** from an external environment. The plug **705** can include at least one indicator or identifying element. For example, the plug **705** can include a Light Emitting Diode (LED) that can produce to identify a location of the plug **705** within the portion **703**.

[0094] FIG. 9 depicts a perspective view of the vehicle **105**. The vehicle **105** can include the bumper port **205**. The vehicle **105** can include the attachment mechanism **305**. The vehicle **105** can also receive the attachment mechanism **305**. For example, the vehicle **105** can receive the attachment mechanism **305** responsive to the portion **330** inserting into the opening **210**. The attachment mechanism **305** can include at least one aperture **905**. The aperture **905** can be included in the body **310**. The apparatus **200** can include at least one cover **910**. The cover **910** can be

inserted into the aperture **905**. The cover **910** can include at least one of a reflective material or a light fixture. The reflective material can reflect light. The light fixture can electrically couple with the vehicle **105** and the light fixture can produce light.

[0095] The attachment mechanism **305** can include at least one tray **915**. The tray **915** can include at least one the trays described herein. FIG. **9** depicts an example of the tray **915** as a beam. The tray **915** can include a surface **920**. The surface **920** can support an object. For example, the surface **920** can support an electric bicycle. The tray **915** can electrically couple the electric bike with a battery of the vehicle **105**. For example, the tray **915** can electrically couple the electric bike with the batteries **115**.

[0096] The attachment mechanism **305** or a component thereof can provide power to at least one device. For example, the attachment mechanism **305** can be electrically coupled with the battery **115** of the vehicle **105**. To continue this example, the attachment mechanism **305** can provide power, via the battery **115**, to one or more devices. The attachment mechanism **305** can electrically couple with one or more devices to provide power the devices. For example, the attachment mechanism **305** can include a Universal Serial Bus (USB) port and the attachment mechanism **305** can electrically couple with a device responsive to a device being inserted into the USB port. As another example, the attachment mechanism **305** can include a charging pad or a charging surface (e.g., induction charging).

[0097] A vehicle can include at least one bumper port **205**. For example, the vehicle **105** can include a first bumper port **205** and a second bumper port **205**. The first bumper port **205** can receive a first attachment mechanism **305** and the second bumper port **205** can receive a second attachment mechanism **305**. The bumper port **205** can be electrically coupled with a power source. For example, the bumper port **205** can be electrically coupled with the battery **115**. The bumper port **205** can include electrical contacts, electrical pins, or electrical ports. The bumper port **205** can receive the attachment mechanism **305** to electrically couple the attachment mechanism **305** with the battery **115**. For example, the portion **330** can include electrical contacts that interact with, interface with, or otherwise engage with the electrical contracts of the bumper port **205**.

[0098] The bumper port **205** can be in communication with one or more computing devices. For example, the bumper port **205** can be in communication with an infotainment system of the vehicle **105**. As another example, the bumper port **205** can be in communication with a mobile device (e.g., a mobile phone, a tablet, a laptop, a smart watch, etc.). The bumper port **205** can also be in communication with at least one component of the vehicle **105**. For example, the bumper port **205** can be in communication with one or more buttons or scroll wheels on a steering wheel. The bumper port **205** can be controllable by at least one of the components or devices that the bumper port **205** is in communication with. For example, a user of the infotainment system of the vehicle **105** can select an icon or a button displayed on a user interface to turn on or turn off power that is provided to the bumper port **205**. As another example, the user can select an icon to have power provided to a first bumper port **205** and to have power not be provided to a second bumper port **205**.

[0099] FIG. **10** depicts a perspective view of the vehicle **105**. The plug **705** can be included in or otherwise integrated into the vehicle **105**. For example, the plug **705** can be coupled with the vehicle **105**. As another example, the plug **705** can be provided with the vehicle **105**. The plug **705** can be or include a dropdown element or a flap. For example, a force can be applied to plug **705** move to plug to a dropdown position.

[0100] FIG. **11** depicts a perspective view of the vehicle **105**. As shown in FIG. **11**, the plug **705** has been moved to a dropdown position. The plug **705** can provide access, responsive to moving to the dropdown position, the bumper port **205**. The plug **705** can include a resting position. For example, the position of the plug **705**, as shown in FIG. **10**, can include a resting position. The position of the plug **705**, as shown in FIG. **11**, can include a spring-loaded position. For example, if force is applied to plug **705** with the plug **705** in the spring-loaded position, the plug **705** can return

to the position as shown in FIG. 10.

[0101] FIG. 12 depicts a cross-sectional view of the vehicle 105. The vehicle 105 can include the bumper port 205. As shown in FIG. 12, a portion of the bumper port 205 has been removed to show an internal portion of the housing 230. The body 310 and the portion 330 can have at least one ratio. For example, the body 310 and the portion 330 can have a one-to-one ratio. A one-to-one ratio can refer to or mean that a size of the body 310 is similar to a size of the portion 330. FIG. 12 depicts an example of the body 310 being larger than the portion 330.

[0102] FIG. 13 depicts a cross-sectional view of the vehicle 105. FIG. 13 depicts an example of the body 310 and the portion 330 having a ratio that is different from a one-to-one ratio. For example, the size of the portion 330 is larger than the size of the body 310. Other ratios, such as two-to-one, three-to-one, and four-to-one can be used. The portion 330 can be longer than the body 310. The portion 330 can also be longer than the body 310. The portion 330 can also extend or elongate relative to the body 310.

[0103] FIG. 14 depicts a cross-sectional view of the vehicle 105. FIG. 14 depicts an example of the portion 330 being included in or otherwise defining the body 310. For example, the body 310 and the portion 330 can be a single component. As another example, the portion 330 can define the body 310. The portion 330 and the body 310 can be a unitary portion. For example, the body 310 can include the portion 330. As another example, the portion 330 can represent the body 310. FIG. 14 also depicts an example of the portion 330 and the body 310 as a one-to-one ratio.

[0104] The attachment mechanism 305 and/or one or more components thereof can include a variety of different apparatuses. For example, the attachment mechanism 305 can include at least one of bike racks, coolers, compartments, storage bins, or various types of objects. As another example, the tray 915 can include bike racks that couple with the attachment mechanism 305. The apparatuses can couple with or connect to the bumper port 205 based on the various examples described herein.

[0105] FIG. 15 depicts a perspective view of the attachment mechanism 305. The apparatus 200 can include at least one attachment mechanism 305. For example, the apparatus 200 can include a first attachment mechanism 305 and a second attachment mechanism 305. FIG. 15 depicts an example of a first attachment mechanism 305 and a second attachment mechanism 305. The aperture 905 of the first attachment mechanism 305 can receive the portion 330 of the second attachment mechanism 305. FIG. 15 depicts an example of the first attachment mechanism 305 having, via the aperture 905, receiving the portion 330 of the second attachment mechanism 305. The first attachment mechanism 305 and the second attachment mechanism 305 can include the tray 915. FIG. 15 depicts an example of the trays 915 as pads or platforms.

[0106] FIG. 16 depicts a perspective view of the attachment mechanism 305. The attachment mechanism 305 can include the trays 915. The trays 915 can also be provided as a separate component to that of the attachment mechanism 305. For example, the trays 915 can couple with or otherwise attach with the attachment mechanism 305. FIG. 16 depicts an example of the trays 915 as bike racks. For example, the trays 915 could each receive or hold at least one tire of an electric or regular bicycle, or other apparatus. The trays 915 can include at least one hoop 1605. The hoop 1605 can receive at least one object. For example, the hoop 1605 can receive a bicycle tire or wheel. The bicycle tire can be inserted into or through an opening defined by the hoop 1605. The hoop 1605 can lock or secure the bicycle tire. For example, the hoop 1605 can compress or ratchet between positions or locations to secure the bicycle tire. As another example, the hoop 1605 can move between setpoints to secure the bicycle tire.

[0107] FIG. 17 depicts a perspective view of the attachment mechanism 305. The attachment mechanism 305 can be inserted into the bumper port 205 and an operator of the attachment mechanism 305 can step or otherwise stand on the attachment mechanism. The attachment mechanism 305 can include an opening or a loop to receive or couple with a tow hook (e.g., tow hook accessories, straps, ropes, cables, etc.). For example, the attachment mechanism 305 can refer

to or include a tool hook or recovery equipment. The attachment mechanism **305** can include at least one handle **1505**. The handle **1505** can assist in the insert or the removal of the attachment mechanism **305**. For example, an operator of the attachment mechanism **305** can grab or otherwise hold the handle **1505** to insert the attachment mechanism **305** into the bumper port **205**.

[0108] FIG. **18A** depicts a block diagram of a process **1800** for manufacturing an apparatus. The apparatus can include the apparatus **200**. The apparatus **200** can include the bumper port **205**. The manufacturing of the apparatus **200** can include providing the apparatus **200**. For example, the apparatus **200** can be provided during assembly of the vehicle **105**. The apparatus **200** can also be provided responsive to the apparatus **200** having been purchased.

[0109] At act **1805**, a structural support attachment can be disposed within a vehicle. For example, the structural support attachment can be disposed within the vehicle **105**. The structural support attachment can include the bumper port **205**. The bumper port **205** can be disposed within the vehicle **105** by at least one of placing, locating, or otherwise positioning the bumper port **205** or a portion thereof within the vehicle **105**. For example, the bumper port **205** can be disposed within the portion **703** of the vehicle **105**.

[0110] The bumper port **205** can be coupled with the vehicle **105**. For example, the bumper port **205** can be coupled with the vehicle **105** responsive to a fastener having been inserted through the slots **220**. The bumper port **205** can also be coupled with the vehicle **105** responsive to the bumper port **205** having been disposed within the vehicle **105**. The bumper port **205** can engage with a body. For example, the bumper port **205** can engage with the body **310** responsive to the portion **330** having been inserted into the opening **210**. The body **310** can include a lever. For example, the body **310** can include the lever **315**. The lever **315** can couple the body **310** with the bumper port **205** to support the tray **915**. For example, the lever **315** can move from an unlocked position to a locked position and the lever **315** moving to the locked position can cause the protrusions **340** to engage with the housing **230**. The body **310** can support the tray **915** external to the vehicle. For example, the body **310** can support the tray **915** external to a body of the vehicle **105**.

[0111] FIG. **18B** depicts a block diagram of a process **1810** for manufacturing an apparatus. The apparatus can be the apparatus **200**. The process **1810** can include the process **1800**. The process **1810** can be separate from the process **1800**.

[0112] At act **1815**, a structural support attachment can be coupled. For example, the structural support attachment **205** can be coupled with the vehicle **105**. The structural support attachment **205** can be coupled with the vehicle **105** by at least one of attaching, mounting, securing, affixing, or connecting the structural support attachment **205** to the vehicle **105**.

[0113] At act **1820**, the structural support attachment can engage with a body. For example, the structural support attachment **205** can engage with the body **310**. The structural support attachment **205** can engage with the body **310** by at least one of receiving, accepting, or holding the body **310**. The structural support attachment **205** can engage with the body **310** responsive to insertion of the portion **330** into the opening **210**.

[0114] FIG. **19** depicts a perspective view of a vehicle. The vehicle can include the vehicle **105**. The vehicle **105** can include the bumper port **205**. For example, the vehicle **105** can include a first bumper port **205** and a second bumper port **205**. FIG. **19** depicts an example of the bumper port **205** having received the attachment mechanism **305** and an example of the body **310** supporting the tray **915** external to the vehicle **105**. FIG. **19** depicts an example of the tray **915** as a storage compartment. The tray **915** can include at least one handle. The tray **915** can include one or more light fixtures. For example, the tray **915** can include light fixtures that can produce light. The tray **915** can be electrically coupled with the battery **115** of the vehicle **105**. For example, the bumper port **205** can electrically couple the tray **915** with the battery **115**.

[0115] FIG. **20** depicts a perspective view of the tray **915**. The tray **915** can include at least one lid **2005** or removable surface **2005**. FIG. **20** depicts an example of the tray **915** having the lid **2005** which provides one or more features. For example, the lid **2005** is shown to include a tabletop. As

another example, the lid **2005** can also include one or more cup retainers. The lid **2005** can be removably coupled with the tray **915**. For example, a user of the tray **915** can interact with, interface with, or otherwise engage with the lid **2005** to remove the lid **2005** from a body of the tray **915**. The tray **915** or a body thereof can include a cavity **2010** or other hollow portion **2010**. The cavity **2010** can receive, store, or hold at least one item. FIG. **20** depicts an example of the cavity **2010** storing towels. The tray **915** can include at least one compartment. For example, the tray **915** can include a first compartment and a second compartment. The first compartment and the second compartment can be separated or isolated from each other. FIG. **20** depicts an example of a first compartment of the tray **915** as a cooler and a second compartment of the tray **915** as a bin or storage area.

[0116] FIG. **21** depicts a perspective view of the tray **915**. The tray **915** can include at least one support structure **2105**. For example, the tray **915** can receive an object and the support structure **2105** can support the object. FIG. **21** depicts an example of the support structure **2105** supporting an umbrella **2110**. The various objects shown in FIG. **21** can be stored or otherwise located inside of the tray **915**. For example, the tray **915** can store a chair **2107**, an umbrella **2110**, a rug **2115**, towels **2120**, speakers **2125**, or food and beverages **2130**.

[0117] FIG. **22** depicts a perspective view of the tray **915**. The tray **915** can include at least one wheel **2210**. The wheels **2210** and handle **2205** can be connected or linked. For example, the handle **2205** can move the wheels **2210** from a position within a body of the tray **915** to a position external to the tray **915**. The handle **2205** can move the wheels **2210** responsive to the handle **2205** moving from a retracted position to an extended. FIG. **22** depicts an example of the handle **2205** in an extended position and an example of the wheels **2210** in a position external to the tray. The handle **2205** can move the wheels **2210** by at least one of releasing a latch, removing an obstruction, or otherwise freeing the wheels **2210**.

[0118] FIG. **23** depicts a perspective view of the vehicle **105**. The vehicle **105** can include the bumper port **205**. For example, the vehicle **105** can include a first bumper port **205** and a second bumper port **205**. The vehicle **105** can include the attachment mechanism **305**. The attachment mechanism **305** can include a first tray **915** and a second tray **915**. FIG. **23** depicts an example of a first tray **915** as bike rack and an example of a second tray **915** as a storage compartment. The second tray **915** can include one or more components. For example, the second tray **915** can include recreation equipment, hydration material, battery banks for the electric bike, or first aid kit material. The second tray **915** and the first tray **915** can be electrically coupled with one another. For example, the second tray **915** can provide power to the first tray **915**. As another example, the first tray **915** and the second tray **915** can receive power from the battery **115**.

[0119] FIG. **24** depicts a perspective view of a vehicle. The vehicle can include the vehicle **105**. The vehicle **105** can include the bumper port **205**. For example, the vehicle **105** can include a first bumper port **205** and a second bumper port **205**. The vehicle **105** can include the attachment mechanism **305**. The attachment mechanism **305** can include the tray **915**. FIG. **24** depicts an example of the tray **915** as a rally kit. The tray **915** can include a compartment **2405** to store or hold recovery equipment. For example, the tray **915** can store a tire, tow straps, clamps, a shackle, towing equipment, flares, reflectors, flashlight, or other equipment.

[0120] The tray **915** can be movably coupled with the attachment mechanism **305**. For example, the tray **915** can hinge, pivot, swivel, rotate, detach, or move relative to the attachment mechanism **305**. The tray **915** can include at least one position. For example, the tray **915** can include a first position and a second position. The first position can include at least one of a collapsed, retracted, closed, or folded position. The second position can include at least one of an extended, dropped, or lowered position. FIG. **24** depicts an example of the tray **915** in the first position. The tray **915** can include at least one door of movable component. The door can provide access to the equipment stored within the tray **915**. For example, the door can slide from a closed position to an open position. To continue this example, the door can provide access to equipment within the tray **915**.

with the door in the open position. FIG. 24 depicts an example of the door in the open position. [0121] FIG. 25 depicts a perspective view of a vehicle. The vehicle can include the vehicle 105. The vehicle 105 can include the tray 915. FIG. 25 depicts an example of the tray 915 in a dropped position. As shown in FIG. 25, the tray 915 has been moved from the first position (shown in FIG. 24) to a second position. The tire can be accessible with the tray 915 in the second position. The tray 915 can include the compartment 2405. The compartment 2405 can include an opening or a void to house or hold the tire.

[0122] FIG. 26 depicts a perspective view of a vehicle. The vehicle can include the vehicle 105. The vehicle 105 can include the bumper port 205. For example, the vehicle 105 can include a first bumper port 205 and a second bumper port 205. The vehicle 105 can include the attachment mechanism 305. The vehicle 105 can include the tray 915. FIG. 26 depicts an example of the tray 915 as a shelf. The tray 915 can include one or more objects. For example, the tray 915 can include a cooler. The objects of the tray 915 can be provided separate from the tray 915. For example, the tray 915 can include a shelf and the shelf can support a cooler that is provided separate to the tray 915.

[0123] FIG. 27 depicts a perspective view of a vehicle. The vehicle can include the vehicle 105. The vehicle 105 can include the bumper port 205. For example, the vehicle 105 can include a first bumper port 205 and a second bumper port 205. The vehicle 105 can include the attachment mechanism 305. The vehicle 105 can include the tray 915. FIG. 27 depicts an example of the tray 915 as a shelf. The tray 915 can include one or more objects. For example, the tray 915 can include a tote. The objects of the tray 915 can be provided separate from the tray 915. For example, the tote (shown in FIG. 27) can be provided separate from the tray 915.

[0124] FIG. 28 depicts a perspective view of a vehicle. The vehicle can include the vehicle 105. The vehicle 105 can include the bumper port 205. For example, the vehicle 105 can include a first bumper port 205 and a second bumper port 205. The vehicle 105 can include the attachment mechanism 305. The vehicle 105 can include the tray 915. FIG. 28 depicts an example of the tray 915 as a shelf. The tray 915 can include at least one strap. For example, the tray 915 can include a first strap and a second strap. The straps can contact or restrict one or more objects. For example, the straps can secure objects to the shelf. FIG. 28 depicts an example, the straps securing wood to the tray 915.

[0125] FIG. 29 depicts a perspective view of a vehicle. The vehicle can include the vehicle 105. The vehicle 105 can include the bumper port 205. For example, the vehicle 105 can include a first bumper port 205 and a second bumper port 205. The vehicle 105 can include the attachment mechanism 305. The vehicle 105 can include the tray 915. The tray 915 can support one or more objects. For example, the tray 915 can support a storage compartment. The tray 915 can include one or more objects. For example, the tray 915 can include the storage compartment.

[0126] The tray 915 can support one or more objects. For example, the tray 915 can support objects that are in contact with the surface 920. The tray 915 can support objects responsive to the attachment mechanism 305 engaging with the bumper port 205. Stated otherwise, the tray 915 can support objects responsive to the attachment mechanism 305 coupling with the bumper port 205. FIG. 29 depicts an example of the tray 915 supporting a compartment 2905. The compartment 2905 can include cooking equipment. As shown in FIG. 29, the compartment 2905 can include a heating element 2910 (e.g., a stove, a range top, a griddle, a cooktop, etc.), prep area, cutting board, cooking utensils, storage areas, a cooler, a trash bin, pots and pans, a water module, equipment organizers, one or more components or equipment. The compartment 2905 can include at least one door 2915. The door 2915 can provide access to the various equipment located within the compartment. The door 2915 can also secure the equipment. The compartment 2905 or the components thereof can receive power from the vehicle 105. For example, the tray 915 can provide power from the battery 115 to the components of the compartment.

[0127] FIG. 30 depicts a perspective view of a vehicle. The vehicle can include the vehicle 105.

The vehicle **105** can include the bumper port **205**. For example, the vehicle **105** can include a first bumper port **205** and a second bumper port **205**. The vehicle **105** can include the attachment mechanism **305**. The vehicle **105** can include the tray **915**. FIG. **30** depicts an example of the compartment (shown in FIG. **29**) without the heating element and the prep area (as shown in FIG. **29**). The heating element and the prep area can be removable from the compartment. For example, the heating element can be lifted off or removed from the compartment. The compartment can include an area to store the heating element and the prep area.

[0128] FIG. **31** depicts a perspective view of a vehicle. The vehicle can include the vehicle **105**. The vehicle **105** can include the bumper port **205**. For example, the vehicle **105** can include a first bumper port **205** and a second bumper port **205**. The vehicle **105** can include the attachment mechanism **305**. The vehicle **105** can include the tray **915**. The tray **915** can support at least one object. For example, the tray **915** can support a cooking apparatus **3105** or a cooking station **3105**. The cooking apparatus **3105** can include at least one of the compartments, objects, or components described herein.

[0129] FIG. **32** depicts a perspective view of the vehicle **105**. The vehicle **105** can include one or more structural support attachments **205**. For example, the vehicle **105** can include a first structural support attachment **205** and a second structural support attachment **205**. The first structural support attachment **205** can be disposed within a rear bumper of the vehicle **105**. The second structural support attachment **205** can couple with at least a portion of the vehicle **105**. For example, the second structural support attachment **205** can couple with a portion of the vehicle **105** that is located superior (e.g., above, higher than, elevated above, etc.) to a rear window of the vehicle **105**. The second structural support attachment **205** can receive at least a portion of an object. For example, the second structural support attachment **205** can receive a wheel of a bicycle. As another example, the second structural support attachment **205** can receive a second attachment mechanism **305**.

[0130] The tray **915** can include one or more hoops **1605**. For example, the tray **915** can include a first hoop **1605** and a second hoop **1605**. The hoops **1605** can couple with an adjustment mechanism **3205**. For example, the hoops **1605** can be attached to or adjoined to the adjustment mechanism **3205**. The attachment mechanism **305** can include the adjustment mechanism **3205**. The adjustment mechanism **3205** can include at least one of a pivot, a hinge, a rotation point, or a latch. The adjustment mechanism **3205** can move the hoops **1605**. For example, the adjustment mechanism **3205** can move the hoops **1605** from a first position to a second position. The adjustment mechanism **3205** can move the hoop **1605** by at least one of rotating, pivoting, swiveling, or adjusting a position of the hoops **1605**.

[0131] FIG. **33** depicts a perspective view of the vehicle **105**. The vehicle **105** can include one or more structural support attachments **205**. For example, the vehicle **105** can include a first structural support attachment **205** and a second structural support attachment **205**. At least a portion of the structural support attachment **205** can be disposed within a rear gate of the vehicle **105**. For example, the vehicle **105** can include a liftgate and at least a portion of the structural support attachment **205** can be disposed within the liftgate. FIG. **33** depicts an example of the structural support attachment **205** having at least a portion disposed within a rear gate of the vehicle **105**.

[0132] The attachment mechanism **305** can include at least one portion **3305**. For example, the attachment mechanism **305** can include a first portion **3305** and a second portion **3305**. The portions **3305** can include one or more segments, sections, or structures. The first portion **3305** can couple with the structural support attachment **205**. For example, the first portion **3305** can be attached, mounted, secured, or affixed to the structural support attachment **205**. The first portion **3305** can couple with a first structural support attachment **205**. For example, the first structural support attachment **205** can be disposed within a rear gate of the vehicle **105**. To continue this example, the first portion **3305** can couple with the first structural support attachment **205**. The second portion **3305** can couple with a second structural support attachment **205**. For example, the



second portion **3305** can be attached, mounted, secured, or affixed to the second structural support attachment **205**. The second structural support attachment **205** can be superior to a rear window of the vehicle. For example, the second structural support attachment **205** can be located above the rear window of the vehicle **105**.

[0133] FIG. **34** depicts a perspective view of the vehicle **105**. The vehicle **105** can include attachment mechanism **305**. The attachment mechanism **305** can include the tray **915**. The tray **915** can include one or more positions. For example, the tray **915** can include a first position and a second position. The first position can include a deployed position. The second position can include a stowed position. FIG. **34** depicts an example of the tray **915** in a deployed position. The tray **915** can receive an object with the tray **915** in the first position. For example, the tray **915** can provide or serve as a ramp with the tray **915** in the first position. The tray **915** can stow the object with the tray **915** in the second position. For example, the tray **915** can secure a bicycle to the vehicle **105** with the tray **915** in the stowed position.

[0134] FIG. **35** depicts a perspective view of the vehicle **105**. The vehicle **105** can include the structural support attachment **205**. The structural support attachment **205** can include the attachment mechanism **305** and the tray **915**. For example, the attachment mechanism **305** and the tray **915** can be provided with the structural support attachment **205**. The structural support attachment **205** can be disposed within a portion of a rear gate **3510** of the vehicle **105**. For example, the structural support attachment **205** can be disposed within a body of a lower portion of a split gate **3510**. As another example, the rear gate may include a panel and the structural support attachment **205** can be disposed within the panel.

[0135] The apparatus **200** can include at least one adjustment assembly **3505**. The adjustment assembly **3505** can be coupled with the structural support attachment **205**. The adjustment assembly **3505** can couple the attachment mechanism **305** with the structural support attachment **205**. The adjustment assembly **3505** can be disposed within a portion of a rear gate of the vehicle. For example, the adjustment assembly **3505** can be disposed within a panel of a lift gate for the vehicle **105**. As another example, the adjustment assembly **3505** can be disposed within a lower portion of a split gate. The adjustment assembly **3505** can move the tray **915**. For example, the adjustment assembly **3505** can move the tray **915** from a first position to a second position. The adjustment assembly **3505** can move the tray **915** by at least one of rotating, spinning, swiveling, swinging, adjusting, or otherwise pivoting the tray **915**. The adjustment assembly **3505** can move the tray **915** from a first position within a body of the vehicle **105** to a position external to the vehicle **105**. FIG. **35** depicts an example of the adjustment assembly **3505** having moved the tray **915** from a position within the body of the vehicle **105** to a position external to the vehicle **105**.

[0136] FIG. **36** depicts a perspective view of the vehicle **105**. The adjustment assembly **3505** can be locked in one or more positions. For example, the adjustment assembly **3505** can be locked in a position within a body of the vehicle **105**. As another example, the adjustment assembly **3505** can be locked in a position external to the vehicle. The adjustment assembly **3505** can be locked in a position within the rear gate **3510** of the vehicle **105**. For example, the adjustment assembly **3505** can be locked in a deployed position within a lower portion of a split gate while the lower portion is coupled with an upper portion of the split gate. Stated otherwise, the adjustment assembly **3505** can be prevented from moving within the lower portion of the split gate coupled with the upper portion of the split gate. FIG. **36** depicts an example of the tray **915** stowed within a body of a lower portion of a split gate of the vehicle **105**.

[0137] FIG. **37** depicts a perspective view of the vehicle **105**. The vehicle **105** can include a rear portion or rear body. For example, the vehicle **105** can include a rear bumper. The rear portion or rear body can include the portion **703**. The structural support attachment **205** can be disposed within a rear body of the vehicle **105**. For example, the structural support attachment **205** can be disposed within the rear bumper of the vehicle **105**. The portion **703** can stow the tray **915**. For example, the portion **703** can include a void to receive the tray **915**. The portion **703** can stow the

tray **915** in a position within the vehicle **105**. The portion **703** can deploy the tray **915**. For example, the attachment mechanism **305** can deploy the tray **915** from a position within the vehicle **105** to a position external to the vehicle. FIG. **37** depicts an example of the tray **915** deployed in a position external to the vehicle **105**.

[0138] FIG. **38** depicts a perspective view of the vehicle **105**. The tray **915** can include at least one light source **3805** and at least one sensor **3810**. The light sources **3805** can produce light. For example, the light sources **3805** can emit light. The sensors **3810** can detect one or more objects. For example, the sensors **3810** can include proximity sensors and the sensors **3810** can detect objects proximate to the sensors **3810**. The tray **915** can communicate with the vehicle **105**. For example, the tray **915** can include a processing circuit and the processing circuit can communicate with a controller of the vehicle **105**. The tray **915** can communicate with the vehicle **105** to control the light sources **3805**. For example, the tray **915** can communicate with the vehicle **105** to receive control signals. The tray **915** can communicate with the vehicle **105** to control the sensors **3810**. For example, the tray **915** can communicate data, collected by the sensors **3810**, to the vehicle **105**.

[0139] The apparatus **200** can include one or more processors. The processors can be in communication with the tray **915**. The processors can move the tray **915**. For example, the processors can move the tray **915** from a first position to a second position. The processors can move the tray **915** by controlling one or more actuators of the vehicle **105**. For example, the actuators can be coupled with the tray **915**. To continue this example, at least a portion of the actuators can extend, based on signals from the processors, to deploy the tray **915**. The actuators can retract to stow the tray **915** in the vehicle **105**.

[0140] FIG. **39** depicts a perspective view of the vehicle **105**. The attachment mechanism **305** can include the tray **915**. The tray **915** can include one or more configurations. For example, the tray **915** can include a first configuration and a second configuration. The tray **915** can adjust from the first configuration to the second configuration. For example, the tray **915** can be folded, collapsed, extended, deployed, or stowed to change from the first configuration to the second configuration. The tray **915** can receive an object in a first configuration. For example, the tray **915** can receive a bicycle in a deployed configuration. The tray **915** can be stowed in a second configuration. For example, the tray **915** can be stowed in the vehicle **105** with the tray **915** in a folded or collapsed configuration. FIG. **39** depicts an example of the tray **915** in a deployed configuration.

[0141] FIG. **40** depicts a perspective view of the vehicle **105**. The attachment mechanism **305** can couple with the vehicle **105**. For example, the vehicle **105** can include the structural support attachment **205** and the attachment mechanism **305** can couple with the structural support attachment **205**. The structural support attachment **205** can include one or more ridges **4005** or slots **4005** and at least portion of the attachment mechanism **305** can be inserted into the ridges **4005** or slots **4005**.

[0142] FIG. **41** depicts a perspective view of the vehicle **105**. The vehicle **105** can include an undercarriage. For example, the vehicle **105** can include a component or structure that is disposed beneath the rear portion **140**. At least a portion of the structural support attachment **205** can be disposed between the undercarriage of the vehicle **105** and a ground surface. For example, the structural support attachment **205** can be positioned between the undercarriage of the vehicle **105** and a ground surface in contact with the vehicle **105**. The structural support attachment **205** can move from a first position to a second position. For example, the structural support attachment **205** can move from a position beneath the undercarriage to a position behind the undercarriage. The tray **915** can be stowed within a body of the vehicle **105** with the structural support attachment **205** disposed between the undercarriage and the ground surface. The tray **915** can be deployed to a position external of the vehicle with the structural support attachment **205** positioned behind the undercarriage. FIG. **41** depicts an example of the tray **915** positioned external to the vehicle **105** and an example of the structural support attachment **205** positioned behind the undercarriage of the vehicle **105**.

[0143] FIG. 42 depicts a perspective view of the vehicle 105. As shown in FIG. 42, the tray 915 has been stowed within a body of the vehicle 105. The tray 915 can move from a position external to the vehicle 105 to a position within the vehicle 105 by at least one of swinging, hinging, pivoting, rotating, or swiveling. The tray 915 can be stowed within the body of the vehicle 105 for transportation. For example, the tray 915 can be stowed within the body of the vehicle 105 when the vehicle 105 is in motion. As another example, the tray 915 can be stowed within the body of the vehicle 105 when the vehicle 105 is parked or idle.

[0144] FIG. 43 depicts a perspective view of the vehicle 105. The vehicle 105 can include at least one pillar 4305. The structural support attachment 205 can couple with the pillar 4305. For example, the structural support attachment 205 can be mounted, attached, secured, or affixed to the pillar 4305. The attachment mechanism 305 can couple with the structural support attachment 205 to couple with the vehicle 105. For example, the attachment mechanism 305 can be coupled with the pillar 4305 via the structural support attachment 205. The attachment mechanism 305 can move from a first position to a second position. For example, the attachment mechanism 305 can move from a position at least partially behind the vehicle 105 to a position at least partially lateral to the vehicle 105. The attachment mechanism 305 can hold the tray 915 in one or more positions. For example, the attachment mechanism 305 can hold the tray 915 with the attachment mechanism 305 at least partially behind vehicle 105. As another example, the attachment mechanism 305 can hold the tray 915 with the attachment mechanism 305 at least partially lateral to the vehicle 105.

[0145] FIG. 44 depicts a perspective view of the vehicle 105. The structural support attachment 205 can include at least one mounting assembly 4405. The attachment mechanism 305 can couple with the mounting assembly 4405. The mounting assembly 4405 can couple the attachment mechanism 305 with the vehicle 105. The attachment mechanism 305 can include at least one platform assembly 4410. The tray 915 can couple with the vehicle 105 via the platform assembly 4410. The platform assembly 4410 can rotate, spin, swivel, adjust, or move relative to a portion of the structural support attachment 205 or the pillar 4305.

[0146] FIG. 45 depicts a perspective view of the vehicle 105. The vehicle 105 can include the attachment mechanism 305. The attachment mechanism 305 can be coupled with a top portion of the vehicle 105. For example, the attachment mechanism 305 can be coupled with a roof of the vehicle 105. As another example, the attachment mechanism 305 can be coupled with a crossbar of the vehicle 105. The bumper port 205 can be disposed or located within the top portion of the vehicle 105. For example, the bumper port 205 can be located within the roof of the vehicle 105. The bumper port 205 can couple the attachment mechanism 305 with the vehicle 105. For example, the bumper port 205 can receive the attachment mechanism 305. To continue this example, the bumper port 205 can secure the attachment mechanism 305 with the vehicle 105 with the attachment mechanism 305 inserted into the bumper port 205.

[0147] FIG. 46 depicts an example block diagram of an example computer system 4600. The computer system or computing device 4600 can include or be used to implement a data processing system or its components. The computing system 4600 includes at least one bus 4605 or other communication component for communicating information and at least one processor 4610 or processing circuit coupled to the bus 4605 for processing information. The computing system 4600 can also include one or more processors 4610 or processing circuits coupled to the bus for processing information. The computing system 4600 also includes at least one main memory 4615, such as a random access memory (RAM) or other dynamic storage device, coupled to the bus 4605 for storing information, and instructions to be executed by the processor 4610. The main memory 4615 can be used for storing information during execution of instructions by the processor 4610. The computing system 4600 may further include at least one read only memory (ROM) 4620 or other static storage device coupled to the bus 4605 for storing static information and instructions for the processor 4610. A storage device 4625, such as a solid state device, magnetic disk or optical disk, can be coupled to the bus 4605 to persistently store information and instructions.

[0148] The computing system **4600** may be coupled via the bus **4605** to a display **4635**, such as a liquid crystal display, or active matrix display, for displaying information to a user such as a driver of the electric vehicle **105** or other end user. An input device **4630**, such as a keyboard or voice interface may be coupled to the bus **4605** for communicating information and commands to the processor **4610**. The input device **4630** can include a touch screen display **4635**. The input device **4630** can also include a cursor control, such as a mouse, a trackball, or cursor direction keys, for communicating direction information and command selections to the processor **4610** and for controlling cursor movement on the display **4635**.

[0149] The processes, systems and methods described herein can be implemented by the computing system **4600** in response to the processor **4610** executing an arrangement of instructions contained in main memory **4615**. Such instructions can be read into main memory **4615** from another computer-readable medium, such as the storage device **4625**. Execution of the arrangement of instructions contained in main memory **4615** causes the computing system **4600** to perform the illustrative processes described herein. One or more processors in a multi-processing arrangement may also be employed to execute the instructions contained in main memory **4615**. Hard-wired circuitry can be used in place of or in combination with software instructions together with the systems and methods described herein. Systems and methods described herein are not limited to any specific combination of hardware circuitry and software.

[0150] Although an example computing system has been described in FIG. **46**, the subject matter including the operations described in this specification can be implemented in other types of digital electronic circuitry, or in computer software, firmware, or hardware, including the structures disclosed in this specification and their structural equivalents, or in combinations of one or more of them.

[0151] Some of the description herein emphasizes the structural independence of the aspects of the system components or groupings of operations and responsibilities of these system components. Other groupings that execute similar overall operations are within the scope of the present application. Modules can be implemented in hardware or as computer instructions on a non-transient computer readable storage medium, and modules can be distributed across various hardware or computer based components.

[0152] The systems described above can provide multiple ones of any or each of those components and these components can be provided on either a standalone system or on multiple instantiation in a distributed system. In addition, the systems and methods described above can be provided as one or more computer-readable programs or executable instructions embodied on or in one or more articles of manufacture. The article of manufacture can be cloud storage, a hard disk, a CD-ROM, a flash memory card, a PROM, a RAM, a ROM, or a magnetic tape. In general, the computer-readable programs can be implemented in any programming language, such as LISP, PERL, C, C++, C#, PROLOG, or in any byte code language such as JAVA. The software programs or executable instructions can be stored on or in one or more articles of manufacture as object code.

[0153] Example and non-limiting module implementation elements include sensors providing any value determined herein, sensors providing any value that is a precursor to a value determined herein, datalink or network hardware including communication chips, oscillating crystals, communication links, cables, twisted pair wiring, coaxial wiring, shielded wiring, transmitters, receivers, or transceivers, logic circuits, hard-wired logic circuits, reconfigurable logic circuits in a particular non-transient state configured according to the module specification, any actuator including at least an electrical, hydraulic, or pneumatic actuator, a solenoid, an op-amp, analog control elements (springs, filters, integrators, adders, dividers, gain elements), or digital control elements.

[0154] The subject matter and the operations described in this specification can be implemented in digital electronic circuitry, or in computer software, firmware, or hardware, including the structures disclosed in this specification and their structural equivalents, or in combinations of one or more of

them. The subject matter described in this specification can be implemented as one or more computer programs, e.g., one or more circuits of computer program instructions, encoded on one or more computer storage media for execution by, or to control the operation of, data processing apparatuses. Alternatively or in addition, the program instructions can be encoded on an artificially generated propagated signal, e.g., a machine-generated electrical, optical, or electromagnetic signal that is generated to encode information for transmission to suitable receiver apparatus for execution by a data processing apparatus. A computer storage medium can be, or be included in, a computer-readable storage device, a computer-readable storage substrate, a random or serial access memory array or device, or a combination of one or more of them. While a computer storage medium is not a propagated signal, a computer storage medium can be a source or destination of computer program instructions encoded in an artificially generated propagated signal. The computer storage medium can also be, or be included in, one or more separate components or media (e.g., multiple CDs, disks, or other storage devices include cloud storage). The operations described in this specification can be implemented as operations performed by a data processing apparatus on data stored on one or more computer-readable storage devices or received from other sources.

[0155] The terms “computing device”, “component” or “data processing apparatus” or the like encompass various apparatuses, devices, and machines for processing data, including by way of example a programmable processor, a computer, a system on a chip, or multiple ones, or combinations of the foregoing. The apparatus can include special purpose logic circuitry, e.g., an FPGA (field programmable gate array) or an ASIC (application specific integrated circuit). The apparatus can also include, in addition to hardware, code that creates an execution environment for the computer program in question, e.g., code that constitutes processor firmware, a protocol stack, a database management system, an operating system, a cross-platform runtime environment, a virtual machine, or a combination of one or more of them. The apparatus and execution environment can realize various different computing model infrastructures, such as web services, distributed computing and grid computing infrastructures.

[0156] A computer program (also known as a program, software, software application, app, script, or code) can be written in any form of programming language, including compiled or interpreted languages, declarative or procedural languages, and can be deployed in any form, including as a stand-alone program or as a module, component, subroutine, object, or other unit suitable for use in a computing environment. A computer program can correspond to a file in a file system. A computer program can be stored in a portion of a file that holds other programs or data (e.g., one or more scripts stored in a markup language document), in a single file dedicated to the program in question, or in multiple coordinated files (e.g., files that store one or more modules, sub programs, or portions of code). A computer program can be deployed to be executed on one computer or on multiple computers that are located at one site or distributed across multiple sites and interconnected by a communication network.

[0157] The processes and logic flows described in this specification can be performed by one or more programmable processors executing one or more computer programs to perform actions by operating on input data and generating output. The processes and logic flows can also be performed by, and apparatuses can also be implemented as, special purpose logic circuitry, e.g., an FPGA (field programmable gate array) or an ASIC (application specific integrated circuit). Devices suitable for storing computer program instructions and data can include non-volatile memory, media and memory devices, including by way of example semiconductor memory devices, e.g., EPROM, EEPROM, and flash memory devices; magnetic disks, e.g., internal hard disks or removable disks; magneto optical disks; and CD ROM and DVD-ROM disks. The processor and the memory can be supplemented by, or incorporated in, special purpose logic circuitry.

[0158] The subject matter described herein can be implemented in a computing system that includes a back end component, e.g., as a data server, or that includes a middleware component, e.g., an application server, or that includes a front end component, e.g., a client computer having a

graphical user interface or a web browser through which a user can interact with an implementation of the subject matter described in this specification, or a combination of one or more such back end, middleware, or front end components. The components of the system can be interconnected by any form or medium of digital data communication, e.g., a communication network. Examples of communication networks include a local area network (“LAN”) and a wide area network (“WAN”), an inter-network (e.g., the Internet), and peer-to-peer networks (e.g., ad hoc peer-to-peer networks). [0159] While operations are depicted in the drawings in a particular order, such operations are not required to be performed in the particular order shown or in sequential order, and all illustrated operations are not required to be performed. Actions described herein can be performed in a different order.

[0160] Having now described some illustrative implementations, it is apparent that the foregoing is illustrative and not limiting, having been presented by way of example. In particular, although many of the examples presented herein involve specific combinations of method acts or system elements, those acts and those elements may be combined in other ways to accomplish the same objectives. Acts, elements and features discussed in connection with one implementation are not intended to be excluded from a similar role in other implementations or implementations.

[0161] The phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting. The use of “including” “comprising” “having” “containing” “involving” “characterized by” “characterized in that” and variations thereof herein, is meant to encompass the items listed thereafter, equivalents thereof, and additional items, as well as alternate implementations consisting of the items listed thereafter exclusively. In one implementation, the systems and methods described herein consist of one, each combination of more than one, or all of the described elements, acts, or components.

[0162] Any references to implementations or elements or acts of the systems and methods herein referred to in the singular may also embrace implementations including a plurality of these elements, and any references in plural to any implementation or element or act herein may also embrace implementations including only a single element. References in the singular or plural form are not intended to limit the presently disclosed systems or methods, their components, acts, or elements to single or plural configurations. References to any act or element being based on any information, act or element may include implementations where the act or element is based at least in part on any information, act, or element.

[0163] Any implementation disclosed herein may be combined with any other implementation or embodiment, and references to “an implementation,” “some implementations,” “one implementation” or the like are not necessarily mutually exclusive and are intended to indicate that a particular feature, structure, or characteristic described in connection with the implementation may be included in at least one implementation or embodiment. Such terms as used herein are not necessarily all referring to the same implementation. Any implementation may be combined with any other implementation, inclusively or exclusively, in any manner consistent with the aspects and implementations disclosed herein.

[0164] References to “or” may be construed as inclusive so that any terms described using “or” may indicate any of a single, more than one, and all of the described terms. References to at least one of a conjunctive list of terms may be construed as an inclusive OR to indicate any of a single, more than one, and all of the described terms. For example, a reference to “at least one of ‘A’ and ‘B’” can include only ‘A’, only ‘B’, as well as both ‘A’ and ‘B’. Such references used in conjunction with “comprising” or other open terminology can include additional items.

[0165] Where technical features in the drawings, detailed description or any claim are followed by reference signs, the reference signs have been included to increase the intelligibility of the drawings, detailed description, and claims. Accordingly, neither the reference signs nor their absence have any limiting effect on the scope of any claim elements.

[0166] Modifications of described elements and acts such as variations in sizes, dimensions,

structures, shapes and proportions of the various elements, values of parameters, mounting arrangements, use of materials, colors, orientations can occur without materially departing from the teachings and advantages of the subject matter disclosed herein. For example, elements shown as integrally formed can be constructed of multiple parts or elements, the position of elements can be reversed or otherwise varied, and the nature or number of discrete elements or positions can be altered or varied. Other substitutions, modifications, changes and omissions can also be made in the design, operating conditions and arrangement of the disclosed elements and operations without departing from the scope of the present disclosure.

[0167] For example, descriptions of positive and negative electrical characteristics may be reversed. Elements described as negative elements can instead be configured as positive elements and elements described as positive elements can instead be configured as negative elements. For example, elements described as having first polarity can instead have a second polarity, and elements described as having a second polarity can instead have a first polarity. Further relative parallel, perpendicular, vertical or other positioning or orientation descriptions include variations within  $\pm 10\%$  or  $\pm 10$  degrees of pure vertical, parallel or perpendicular positioning. References to “approximately,” “substantially” or other terms of degree include variations of  $\pm 10\%$  from the given measurement, unit, or range unless explicitly indicated otherwise. Coupled elements can be electrically, mechanically, or physically coupled with one another directly or with intervening elements. Scope of the systems and methods described herein is thus indicated by the appended claims, rather than the foregoing description, and changes that come within the meaning and range of equivalency of the claims are embraced therein.

## Claims

1. An apparatus, comprising: a structural support attachment configured to couple with a vehicle; and the structural support attachment configured to engage with a body, the body including a lever to couple the body with the structural support attachment to support a tray external to the vehicle.
2. The apparatus of claim 1, comprising: a second structural support attachment to couple with at least a portion of the vehicle located superior to a rear window of the vehicle; and the second structural support attachment to receive at least a portion of an object.
3. The apparatus of claim 1, comprising: the tray including a hoop to receive at least a portion of an object; and the hoop to couple with an adjustment mechanism, the adjustment mechanism configured to move the hoop from a first position to a second position.
4. The apparatus of claim 1, comprising: at least a portion of the structural support attachment to dispose within a portion of a rear gate of the vehicle.
5. The apparatus of claim 1, comprising: the body including: a first portion to couple with the structural support attachment; and a second portion to couple with a second structural support attachment, the second structural support attachment disposed superior to a rear window of the vehicle.
6. The apparatus of claim 1, comprising: the tray configured to move from a first position to a second position; the first position to receive an object; and the second position to stow the object.
7. The apparatus of claim 1, comprising: the structural support attachment including the body and the tray; and the structural support attachment to dispose within a portion of a rear gate of the vehicle.
8. The apparatus of claim 1, comprising: an adjustment assembly to dispose within a portion of a rear gate of the vehicle; and the adjustment assembly configured to move the tray from a first position within a body of the vehicle to a second position external to the body of the vehicle.
9. The apparatus of claim 1, comprising: the tray configured to couple with an adjustment assembly; and the adjustment assembly configured to lock in a first position with a rear gate of the vehicle in a first position.

- 10.** The apparatus of claim 1, comprising: the structural support attachment to dispose within a rear body of the vehicle; and the rear body configured to stow the tray in a first position within the vehicle and deploy the tray to a second position external to the vehicle.
  - 11.** The apparatus of claim 1, comprising: the tray including a light source configured to produce light; and the tray configured to communicate with the vehicle to control the light source.
  - 12.** The apparatus of claim 1, comprising: the tray including one or more sensors to detect an object; and the tray configured to communicate with the vehicle to control the one or more sensors.
  - 13.** The apparatus of claim 1, comprising: at least one processor in communication with the tray; and the at least one processor configured to move the tray from a first position to a second position.
  - 14.** The apparatus of claim 1, comprising: the body including the tray; the tray configured to adjust from a first configuration to a second configuration; the first configuration to receive an object; and the second configuration to stow the tray.
  - 15.** The apparatus of claim 1, comprising: at least a portion of the structural support attachment to dispose between an undercarriage of the vehicle and a ground surface; the structural support attachment to move from a first position to a second position; the tray stowed within a body of the vehicle with the structural support attachment in the first position; and the tray deployed to a position external of the vehicle with the structural support attachment in the second position.
  - 16.** The apparatus of claim 1, comprising: the structural support attachment to couple with a rear pillar of the vehicle.
  - 17.** The apparatus of claim 16, comprising: an attachment mechanism including the body, the attachment mechanism configured to move from a first position to a second position; and the attachment mechanism configured to hold the tray while in the first position or the second position.
  - 18.** A vehicle, comprising: a structural support attachment configured to couple with the vehicle; and the structural support attachment configured to engage with a body, the body including a lever to couple the body with the structural support attachment to support a tray external to the vehicle.
  - 19.** The vehicle of claim 18, comprising: the structural support attachment disposed within a first opening of the vehicle; the structural support attachment configured to support a first portion of the tray; a second structural support attachment configured to dispose within a second opening of the vehicle; and the second structural support attachment configured to support a second portion of the tray.
  - 20.** The vehicle of claim 18, comprising: the structural support attachment disposed within a top portion of the vehicle; and an attachment mechanism including the body, the attachment mechanism configured to couple with the top portion of the vehicle via the structural support attachment.
  - 21.** A method, comprising: disposing a structural support attachment within a portion of a vehicle; the structural support attachment configured to couple with the vehicle; and the structural support attachment configured to engage with a body, the body including a lever to couple the body with the structural support attachment to support a tray external to the vehicle.
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