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BASEPLATE-BASED ACCESSORY ATTACHMENT SYSTEM AND ATTACHMENT METHOD FOR VEHICLE

Abstract

An accessory attachment system includes a baseplate that provides an attachment interface on a vehicle. The baseplate is configured to engage with an accessory to secure the accessory to the vehicle. The baseplate and the accessory are configured to engage each other through an attachment system having feet that are each received within an apertures when engaged.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS [0001] This application is a divisional application of U.S. application Ser. No. 17/716,036, which was filed on Apr. 8, 2022, which claims priority to U.S. Provisional Application No. 63/254,317, which was filed on Oct. 11, 2021, and is incorporated herein by reference.

TECHNICAL FIELD

[0002] This disclosure relates generally to an attachment system and, more particularly, to an attachment system that is used to secure accessories to a vehicle.

BACKGROUND

[0003] Vehicles transport various types of cargo. A user can, for example, rely on a vehicle to transport accessories, such as containers and tools, to and from a jobsite. The accessories that need to be transported can vary based on the tasks the user performs at the jobsite.

SUMMARY

[0004] In some aspects, the techniques described herein relate to an accessory attachment system, including: a baseplate that provides an attachment interface on a vehicle, the baseplate configured to engage with an accessory to secure the accessory to the vehicle, the baseplate and the accessory configured to engage each other through an attachment system having a plurality of feet that are each received within one of a plurality of apertures when engaged.

[0005] In some aspects, the techniques described herein relate to an attachment system, wherein the plurality of apertures are within the baseplate, the plurality of feet each extending from a first side of the baseplate, through one of the plurality of apertures, and past an opposite, second side of the baseplate.

[0006] In some aspects, the techniques described herein relate to an attachment system, wherein the baseplate is attached directly to a floor of the vehicle such that the plurality of apertures are spaced a distance from the floor, the plurality of feet extending into an open area between the floor and the plurality of apertures.

[0007] In some aspects, the techniques described herein relate to an attachment system, wherein the vehicle is a pickup truck and the baseplate is attached directly a floor of a cargo bed of the pickup truck.

[0008] In some aspects, the techniques described herein relate to an attachment system, wherein the baseplate is configured to engage the accessory when the accessory is in a first position, and when the accessory is in a second position that is rotated relative to the first position.

[0009] In some aspects, the techniques described herein relate to an attachment system, wherein the baseplate is disposed along a plane, and a rotation of the accessory from the first position to the second position is a rotation about an axis that is normal to the plane.

[0010] In some aspects, the techniques described herein relate to an attachment system, wherein the plurality of apertures are in the baseplate, wherein the plurality of apertures includes at least four apertures distributed circumferentially about the axis.

[0011] In some aspects, the techniques described herein relate to an attachment system, wherein the baseplate is configured to engage with the accessory in a third position that is different than the first position and the second position, and further configured to engage the accessory in a fourth position that is different than the first position, the second position, and the third position.

[0012] In some aspects, the techniques described herein relate to an attachment system, wherein the first position, second position, third position, and fourth position are ninety degrees offset from each other.

[0013] In some aspects, the techniques described herein relate to an attachment system, wherein a profile of each aperture within the plurality of apertures is rectangular.

[0014] In some aspects, the techniques described herein relate to an attachment system, wherein the plurality of apertures are each configured to receive an E-track connector.

[0015] In some aspects, the techniques described herein relate to an accessory attachment method,

including: receiving a plurality of feet within a plurality of apertures; and sliding an accessory relative to baseplate to engage the accessory with the baseplate and secure the accessory relative to a vehicle, the baseplate secured to the vehicle.
[0016] In some aspects, the techniques described herein relate to an attachment method, wherein the accessory is configured to engage the baseplate when the accessory is in a first position and when the accessory is in a different, second position where the accessory is rotated relative to the first position.
[0017] In some aspects, the techniques described herein relate to an attachment method, wherein the rotation of the accessory from the first position to the second position is a rotation about an axis that is normal to an attachment surface of the baseplate, the accessory interfacing directly with the attachment surface when the accessory is coupled to the baseplate.
[0018] In some aspects, the techniques described herein relate to an attachment method, wherein the baseplate is configured to engage the accessory in a third position that is different than the first position and the second position, and further configured to engage the accessory in a fourth position that is different than the first position, the second position, and the third position.
[0019] In some aspects, the techniques described herein relate to an attachment method, wherein the baseplate includes the apertures and the accessory includes the feet.
[0020] In some aspects, the techniques described herein relate to an attachment method, further including capturing part of the baseplate between the plurality of feet and another portion of the accessory to engage the accessory.
[0021] In some aspects, the techniques described herein relate to an attachment method, wherein the vehicle is a pickup truck and the baseplate is attached directly a floor of a cargo bed of the pickup truck.
[0022] The embodiments, examples and alternatives of the preceding paragraphs, the claims, or the following description and drawings, including any of their various aspects or respective individual features, may be taken independently or in any combination. Features described in connection with one embodiment are applicable to all embodiments, unless such features are incompatible.

Description

BRIEF DESCRIPTION OF THE FIGURES
[0023] The various features and advantages of the disclosed examples will become apparent to those skilled in the art from the detailed description. The figures that accompany the detailed description can be briefly described as follows:
[0024] FIG. **1** illustrates a perspective view of a vehicle having a cargo bed equipped with baseplates that can be used to secure an accessory according to an exemplary aspect of the present disclosure.
[0025] FIG. **2** illustrates a top view of the cargo bed and baseplates of FIG. **1**.
[0026] FIG. **3** illustrates a perspective view of one of the baseplates of FIG. **1**.
[0027] FIG. **4** illustrates a top view of the baseplate of FIG. **3**.
[0028] FIG. **5** illustrates a section view taken at line **5-5** in FIG. **2**.
[0029] FIG. **6** illustrates a bottom view of the accessory of FIG. **1**.
[0030] FIG. **7** illustrates a close-up view of a foot of the accessory of FIG. **6**.
DETAILED DESCRIPTION
[0031] This disclosure details a baseplate-based accessory attachment system for a vehicle. The system includes a baseplate that provides an attachment interface for securing accessories to the vehicle. Various types of accessories can be secured to the vehicle through the attachment interface provided by the baseplate. The number and positions of baseplates can be adjusted for particular vehicles or particular needs. The provides a user with a substantially modular attachment system.

[0032] With reference to FIGS. **1** and **2**, a vehicle **10** includes a passenger compartment **14** and a cargo bed **18** that is aft the passenger compartment **14**. The vehicle **10** is a pickup truck. The vehicle **10** could be another type of vehicle in another example, such as a car, van, sport utility vehicle, etc.

[0033] The example vehicle **10** is an electrified vehicle and, in particular, a battery electric vehicle (BEV). In another example, the vehicle **10** could be another type of electrified vehicle, such as a hybrid electric vehicle (HEV), plug-in hybrid electric vehicle (PHEV), or a conventional vehicle.

[0034] In particular, the example vehicle **10** includes an electrified powertrain capable of applying torque from an electric machine (e.g., an electric motor) to drive a pair of wheels **22**. The vehicle **10** can include a traction battery pack, which powers the electric machine and, potentially, other electrical loads of the vehicle **10**.

[0035] In the exemplary embodiment, a plurality of baseplates **30** are secured to the cargo bed **18**. The baseplate **30**A is larger than the baseplate **30**B. Various accessories **34** can be secured to the vehicle **10** by engaging one or more of the baseplates **30**. The accessories **34** can include a lockable storage box that holds tools, a refrigerator, etc. The accessory **34** could be a lidded lockable container. Still other example accessories could include: bicycle or motorcycle racks; ladder tacks; kayak racks; lighting stands, camping equipment, wood cutting equipment (e.g., chop saw), or partitions to separate sections of the cargo bed **18**. Substantially any type of accessory having the requisite attachment interface can be secured to the vehicle **10** through the baseplates **30**. For purposes of this disclosure, an accessory can be considered any item having this attachment interface.

[0036] With reference now to FIGS. **3-7** and continued reference to FIGS. **1** and **2**, the accessories **34** can each engage one or more of the baseplates **30** via an attachment system. In the exemplary embodiment, the attachment system includes a plurality of apertures **42** and a plurality of feet **46**.

[0037] In this example, the baseplates **30** provide the apertures **42** and the accessories **34** include the feet **46**. This could be rearranged, however, such that some or all of the feet **46** extend from the baseplates **30** and the accessories **34** provide some or all of the apertures **42**.

[0038] In the exemplary embodiment, when the baseplate **30** and the accessories **34** are engaged, the feet **46** are each received within one of the apertures **42** such that the feet **46** each extend from a first side **50** of the baseplate **30**, through one of the apertures **42**, and past an opposite, second side **54** of the baseplate **30**.

[0039] The cargo bed **18** includes a floor **58**, a front wall **62**, a first side wall assembly **66**D, a second side wall assembly **66**P, and a tailgate assembly **70**. In the exemplary embodiment, the baseplates **30** are attached directly to the floor **58**.

[0040] Mechanical fasteners **72**, welds, or another attachment could be used to secure peripheral flanges **74** of the baseplates **30** to the floor **58**, which attaches the baseplates **30** to the floor.

[0041] The areas of the baseplate **30** that provide the apertures **42** are raised a distance R (FIG. **5**) from the floor **58** when the baseplate **30** is attached to the floor **58**. This provides an open area **76** between the floor **58** and the apertures **42**. When the baseplate **30** and the accessories **34** are engaged, the feet **46** extend into the open area **76**. The distance R and, for that matter, the open area **76**, can be sized to facilitate cleaning between the floor **58** and the raised areas of the baseplates **30**.

[0042] Although the exemplary embodiment shows the baseplates **30** attached to the floor **58**, the baseplates **30** could instead or additionally be attached to other areas of the vehicle **10** including, but not limited to, the front wall **62**, the side wall assemblies **66**D, **66**A, and the tailgate assembly **70**.

[0043] In this example, the baseplates **30** are separate from the floor **58**. In another example, the floor **58** provides the apertures **42** and can be considered the baseplate **30**. A reas of the vehicle **10** other than the floor **58** could include apertures **42** or feet **46** and be considered the baseplate **30**. For example, the tops **78** of the side wall assemblies **66**P and **66**D could include apertures **42** and be considered a baseplate.

[0044] In this example, each baseplate **30** includes at least one group **82** of the apertures **42**. As shown in FIGS. **1** and **2**, the baseplate **30**A includes two groups **82** whereas the baseplate **30**B includes one group **82**.
[0045] A top or attachment surface **86** of each baseplate **30** is disposed along a plane. Each of the groups **82** of apertures **42** is circumferentially distributed about an axis A B that extends normal to that plane and thus normal to a top or attachment surface **86** of the baseplate **30**.
[0046] Each of the groups **82** includes four apertures **42** circumferentially distributed a respective axis A.sub.B. The four apertures **42** within each of the groups **82** are each offset ninety degrees about the axis A.sub.B from the adjacent apertures **42** within that group **82**.
[0047] With reference now to FIGS. **6** and **7**, the accessory **34** includes at least one group **88** of feet **46** that are circumferentially distributed about an axis A.sub.A that extends normal to a bottom surface **90** of the accessory **34**. The accessory **34** includes a single group **88** of the feet **46**. Other accessories could include more than one group **88** of feet **46**.
[0048] Each of the groups **88** includes four feet **46** circumferentially distributed about the axis A.sub.A. The four feet **46** with each of the groups **88** are each offset ninety degrees about the axis A A from the adjacent feet **46** within that group **88**. The feet **46** each extend from the accessory **34** to an enlarged collar **92**, which gives each foot **46** an outwardly extending hook or lip.
[0049] With reference now to FIGS. **1**-**7**, in this example, a profile of each of the example apertures **42** is rectangular. Each of the apertures **42** include four corners **98**. The apertures **42** are arranged such that one of the corners **98**F is a forward corner, one of the corners **98**R is a rear corner, one of the corners **98**D is a driver side corner, and the other corner is a passenger side corner **98**P.
[0050] When the baseplate **30** engages the accessory **34**, the feet **46** of one of the groups **88** are each received within respective apertures **42**. The baseplates **30** and apertures **42** can spaced such that the feet **46** in the group **88** of the accessory **34** can engage the four apertures **42** within group **82** on the outboard side of baseplate **30**A, the four apertures **42** within the group **82** on the inboard side of baseplate **30**A, or the four apertures **42** in the central area of baseplate **30**, which are designated as apertures **42**A in FIG. **2**. In some examples, the accessory **34** could engage two apertures **42** within the baseplate **30**A and two other apertures **42** in the baseplate **30**B.
[0051] By using different arrangements of baseplates **30** and apertures **42**, the cargo bed **18** can be configured to accommodate one or more accessories **34** in a wide variety of locations. The exemplary attachment system provided by the baseplates **30** is modular and can be adapted to particular user needs.
[0052] Due to the sizing and spacing of the apertures **42** and feet **46**, the baseplate **30** and the accessory **34** are configured to engage each other when the accessory **34** is in a first position or, alternatively, when the accessory **34** is in a second position where the accessory **34** is rotated ninety degrees clockwise about a vertical axis relative to the first position. In this example, the baseplate **30** can additionally engage the accessory **34** when the accessory **34** is in a third position that is rotated ninety degrees clockwise from the second position, and when the accessory **34** is in a fourth position where the accessory **34** is rotated ninety degrees from the third position.
[0053] The rotation and offset of the accessory **34** between the first, second, third, and fourth positions can be a rotation and offset about the axis A.sub.A or A.sub.B, which are vertical axes in this example. The axes could extend in other non-vertical directions if, for example, the baseplate **30** were used in connection with an inner side of the side wall assemblies **66**D and **66**P.
[0054] A gain, the first, second, third, and fourth positions are all ninety degrees offset from each other. This permits the baseplate **30** to engage the accessory **34** when a given side surface **94** of the accessory **34** is facing forward as shown, facing rearward, facing a driver side, or facing a passenger side. The ability to secure the accessory **34** in a variety of rotational orientations can enhance usability of the accessory **34**.
[0055] A method of attaching the accessory **34** to the baseplate can include sliding the accessory **34** over the baseplate **30** until each of the feet **46** can be received within one of the apertures **42**. The

method can then include sliding the accessory **34** a bit more until the enlarged collars **92** of the feet **46** extend beneath the baseplate **30** and "hook" the accessory to the baseplate **30**. Moving the feet **46** until the enlarged collars **92** at least partially extend beneath the baseplate **30** captures part of the baseplate **30** between the feet **46** and the bottom surface **90** of the accessory **34**, which engages the accessory **34** with the baseplate **30**.

[0056] The accessory **34**, the baseplate **30**, or both can include a locking system to hold the accessory **34** in this position. In this example, the locking system includes a lock member **102** that is received within one of a plurality of slots **106** of the baseplate **30**. In the exemplary embodiment, the baseplates **30** include one of the slots **106** between each of the adjacent apertures **42**. Thus, one of the slots **106** is available to receive the lock member **102** when the accessory **34** is in the first, second, third, or fourth position.

[0057] When the baseplate **30** and the accessory **34** are engaged, the lock member **102** is receivable within one of the slots **106** when the feet **46** are horizontally pressed into the corners **98** of the apertures **42**. Locking the accessory **34** to the baseplate **30** while the accessory is moved into the corners **98** can help to align the accessory **34** relative to the baseplate **30**. Locking in the accessory **34** with the feet **46** are biased or pressed into the corners **98** helps to ensure that portions of the enlarged collars **92** of the feet **46** can hook under the baseplate **30**. This can help to keep the accessory **34** and the baseplate **30** engaged.

[0058] A biasing member, such as a spring, can bias the lock member **102** into the slot **106**. To disengage the accessory **34** from the baseplate **30**, a user can lift a tab **108**. The lifting overcomes the biasing force and withdraws the lock member **102** from the respective slot **106**. The accessory **34** can then slide horizontally to a position where the enlarged collars **92** are unhooked from the baseplate **30** so that the accessory **34** can be lifted and the feet **46** withdrawn from the apertures **42**.

[0059] The accessory **34** can then be removed and replace with a different accessory. The user can, for example, hold tools for a certain type of job within the accessory **34**. When the user needs to work on a different second type of job, the user can swap the accessory **34** for another accessory having specialized tools for the second type of job.

[0060] In some examples, the accessory **34** can be electrically coupled to the vehicle **10** through the baseplate **30**. This could allow the accessories **34** to be powered. For example, the accessory **34** could be a refrigerated container that is powered by the vehicle **10** when the accessory **34** is engaged with the baseplate **30**. In another example, the accessory **34** could hold rechargeable tools, which can be recharged when held within the accessory **34** due to the accessory being powered.

[0061] The accessory **34** could also be in communication with the vehicle **10** through the baseplate **30**. The accessory **34** could, for example, couple to a communication link or bus when the accessory is engaged with the baseplate **30**. The vehicle **10** and user could rely on the communication link to identify what type of accessory **34** is coupled to the baseplate **30**, or to help locate the accessory **34** on the vehicle **10**.

[0062] In addition to the accessory **34**, the apertures **42** can be utilized to connect other types of items to the vehicle **10**. For example, the apertures **42** can be sized such that a distance D**1** from the forward corner **98**F and the rear corner **98**R is the same as a distance D**2** from the driver side corner **98**D to the passenger side corner **98**P. The apertures **42** are sized further such that the distances D**1** and D**2** are suitable for accommodating an E-track connector **110** as shown in FIG. **4**.

[0063] The E-track connector **110** can be part of an E-track system that is used to help secure cargo carried within the cargo bed **18**. The E-track connector **110** can engage the baseplate **30** to, for example, provide an anchor for a tie down strap **114**. The E-track connector can be a tie-down ring, a hook, a socket, etc.

[0064] Building on the modularity of the accessory attachment system, the apertures **42** in the baseplates **30** can be configured to work with other attachment related items. The apertures **42** could, for example, accommodate buckles, or bores for bolt down connections. The areas of the baseplate **30** around the apertures **42** can be reinforced if required.

[0065] The preceding description is exemplary rather than limiting in nature. Variations and modifications to the disclosed examples may become apparent to those skilled in the art that do not necessarily depart from the essence of this disclosure. Thus, the scope of protection given to this disclosure can only be determined by studying the following claims.

Claims

1. A method, comprising: providing a baseplate that is securable to a vehicle; providing an accessory that is securable to the baseplate via an attachment system, wherein the attachment system comprises one or more feet and a plurality of apertures; receiving one or more feet within the plurality of apertures; and sliding the accessory relative to the baseplate to engage and secure the accessory to the baseplate via interaction between the one or more feet and the plurality of apertures.
2. The method of claim 1, wherein the accessory is engageable with the baseplate when the accessory is in a first position and when the accessory is in a second position different than the first position where the accessory is rotated relative to the first position.
3. The method of claim 2, wherein rotation of the accessory from the first position to the second position is a rotation about an axis that is normal to an attachment surface of the baseplate, the accessory interfacing directly with the attachment surface when the accessory is coupled to the baseplate.
4. The method of claim 3, including sliding the accessory in a direction that is normal to the axis to secure the accessory to the baseplate in a securement position such that the accessory cannot be removed from the baseplate.
5. The method of claim 4, including locking the accessory to the baseplate once the accessory is in the securement position.
6. The method of claim 4, including providing the baseplate with the plurality of apertures and the accessory with the one or more feet, and inserting the one or more feet into the plurality of apertures and subsequently sliding the accessory to the securement position.
7. The method of claim 6, wherein at least a portion of the one or more feet is engageable with a lower surface of the baseplate when in the securement position.
8. The method of claim 2, wherein the baseplate is configured to engage the accessory in a third position that is different than the first position and the second position, and further configured to engage the accessory in a fourth position that is different than the first position, the second position, and the third position.
9. The method of claim 1, wherein the baseplate includes the plurality of apertures and the accessory includes the one or more feet.
10. The method of claim 9, further comprising capturing part of the baseplate between the one or more feet and another portion of the accessory to engage the accessory.
11. The method of claim 1, wherein the vehicle is a pickup truck and the baseplate is attached directly a floor of a cargo bed of the pickup truck.
12. The method of claim 1, including forming the plurality of apertures to include a first set of apertures comprising a mounting characteristic and a second set of apertures comprising a locking characteristic that is associated with the accessory.
13. The method of claim 12, including dividing the first set of apertures into a plurality of subgroups, where each subgroup includes a center aperture defining an axis and a plurality of surrounding apertures that are circumferentially distributed around the center aperture relative to the axis, and associating each pair of adjacent apertures of the plurality of surrounding apertures with at least one aperture of the second set of apertures.
14. The method of claim 12, including providing the accessory with at least one lock member, and wherein the locking characteristic comprises a selective interaction between the at least one lock

member and the baseplate such that the at least one lock member is selectively moveable between an accessory lock position and an accessory unlocked position.

15. The method of claim 14, including biasing the at least one lock member toward the accessory lock position when aligned with an aperture from the second set of apertures to lock the accessory to the baseplate.

16. The method of claim 12, wherein the mounting characteristic comprises one or more feet that are received within an aperture from the first set of apertures, and including moving the one or more feet within apertures from the first set of apertures to a securement position where the accessory cannot be removed from the baseplate.

17. The method of claim 1, including securing the baseplate to the vehicle via a first attachment interface and securing the accessory to the baseplate via a second attachment interface that is separate from the first attachment interface, and wherein the second attachment interface comprises the attachment system, and including dividing the plurality of apertures into a plurality of subgroups that are spaced apart from each other along an upper surface of the baseplate, and wherein the accessory is selectively attachable to the baseplate via each subgroup of the plurality of subgroups such that the accessory can be positioned at multiple different locations within the vehicle.

18. A system that attaches the accessory to the baseplate according to the method of claim 1, wherein the baseplate provides an attachment interface on the vehicle, and wherein the baseplate is engageable with the accessory through the attachment system having one or more feet that are each received within one of the plurality of apertures when engaged.

19. The system of claim 18, wherein the accessory is engageable with the baseplate when the accessory is in a first position and when the accessory is in a second position that is rotated relative to the first position.

20. A system comprising: a vehicle support surface; and a baseplate that provides an attachment interface on a vehicle via the vehicle support surface, the baseplate and an accessory configured to engage each other through an attachment system having one or more feet that are each received within one of a plurality of apertures, and wherein the one or more feet, when engaged within the plurality of apertures, move with the accessory relative to baseplate to attach the accessory to the baseplate in a selected one of a plurality of different positions within the vehicle.