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Mechanism which enables accessories to receive power when attached to a vehicle bay divider

Abstract

Systems and methods are presented herein for a vehicle bay divider comprising a plurality of powered through openings configured to interface with a locking mechanism, where the locking mechanism affixes an accessory to the vehicle bay divider enabling a powered connection between at least one of the through openings and the powered accessory. Each of the through openings comprises at least one interface configured to provide power through physical leads or wirelessly. The locking mechanism may comprise tabs or pegs configured to be received by the through openings and secure the powered accessory to the vehicle bay divider. The locking mechanism may comprise a push-push assembly and linkages that cause the tabs or pegs to translate in opposing direction into engaged and disengaged positions.

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Background/Summary

INTRODUCTION

(1) The present disclosure is directed to a locking mechanism for securing an accessory to a vehicle bay divider, and, more particularly, a locking mechanism configured to interface with a powered vehicle bay divider to secure and provide power to an accessory affixed to the vehicle bay divider using the mechanism.

SUMMARY

(2) Accessories, or tools, interfacing with a wall storage panel lack a means to receive power when engaged with a feature of the panel. Additionally, wall storage panels are configured to provide unsecured storage in that an accessory may be hung from the panel, however the accessory is not affixed to the panel. The present disclosure is directed to a vehicle bay divider, a pegboard, a panel, and/or a vehicle bay divider configured to provide power to accessories and tools which interface with features of the vehicle bay divider. Additionally, the disclosure is also directed to a locking mechanism which provides a secure connection between an accessory, or tool, and a vehicle bay divider while also providing a powered coupling between the vehicle bay divider and the accessory, or tool, such that the accessory, or tool, can function when affixed to the vehicle bay divider via the locking mechanism.

(3) In some embodiments, a vehicle bay divider of the present disclosure comprises a plurality of through openings in the vehicle bay divider and at least one interface configured to provide electric power to a respective through opening of the plurality of through openings. The through openings (e.g., slots) of the vehicle bay divider may be configured to provide power wirelessly to the accessory affixed to the vehicle bay divider via the locking mechanism. In some embodiments, the through openings or slots of the vehicle bay divider comprise leads or contacts to which the locking mechanism can be secured and are configured to provide power to accessories secured to the vehicle bay divider.

(4) In some embodiments, the plurality of through openings comprises a first subset of the plurality of through openings and a second subset of the plurality of through openings. Each of the first and second subsets of the plurality of openings are arranged at respective different spacings. Additionally, each of the plurality of through openings are structured to receive a securing feature of a mountable accessory. Each through opening of the first subset of the plurality of through openings comprises an elongated opening oriented vertically. Each through opening of the second subset of the plurality of through openings comprises an elongated opening oriented horizontally.
(5) In some embodiments, an edge of the vehicle bay divider comprises at least one mounting anchor configured to affix the vehicle bay divider to a mounting surface. The at least one mounting anchor may comprise a clamping mechanism along the at least one edge configured to interface with an extension of the mounting surface. In some embodiments, the at least one mounting anchor comprises at least one mechanical coupling configured to connect an electronic lead of the vehicle bay divider to a complementary electronic lead in the mounting surface. The vehicle bay divider may further comprise an energy storage apparatus configured to store an electric charge to provide electric power to each of the plurality of through openings.
(6) In some embodiments, the at least one interface comprises a first electrical lead arranged on a first side of each of the plurality of through openings and a second electrical lead arranged on a second side of each of the plurality of through openings. A first polarity of the first electrical lead is different from a second polarity of the second electrical lead. In some embodiments, a first opening of the plurality of through openings comprises a first electrical feature and a second opening of the plurality of through openings comprises a second electrical feature. Additionally, a first polarity of the first electrical feature is different from a second polarity of the second electrical feature. The first opening and the second opening are configured to interface with a pair of electrical leads from a same mountable apparatus to provide electrical power to the mountable apparatus.
(7) In some embodiments, the disclosure is directed to a system comprising a mountable apparatus (e.g., a tool or accessory), and a surface (e.g., a vehicle bay divider, a pegboard, and/or a panel) comprising at least one through opening configured to receive the mountable apparatus, wherein the at least one through opening comprises a pair of elongated sides configured to couple with at least one mounting peg of the mountable apparatus. The mountable apparatus comprises at least one electrical feature configured to receive electrical power from the at least one through opening, and the mountable apparatus may be configured to receive an electrical charge wirelessly when arranged in or near the at least one through opening. The at least one through opening comprises an interface between the at least one through opening and the mountable apparatus structured to withstand a weight of the mountable apparatus and vibrational motion transmitted via the mountable apparatus. In some embodiments, the system further comprises an energy storage apparatus configured to store an electric charge to provide electric power to the at least one through opening.
(8) In some embodiments, the disclosure is directed to a vehicle comprising at least one storage bay comprising a mounting surface, and a panel comprising at least one through opening, wherein the at least one through opening is configured to provide power to at least one mountable accessory.
(9) In some embodiments, the disclosure is directed to a locking mechanism comprising a push-push assembly arranged to actuate along a first axis. The locking mechanism further comprises a first linkage and a second linkage coupled to the push-push assembly. Additionally, a first sliding peg and a second sliding peg respectively coupled to the first linkage and the second linkage, wherein actuation of the push-push assembly causes the first sliding peg and the second sliding peg to translate in opposing directions, along a second axis different from the first axis, into an engaged position. In some embodiments, the locking mechanism further comprises a first spring and a second spring respectively coupled to the first sliding peg and the second sliding peg and configured to apply spring forces to the first sliding base and the second sliding base to cause the first sliding peg and the second sliding peg to translate towards each other into a disengaged

position.
(10) In some embodiments, the locking mechanism comprises two pegs that are spring loaded to affix the accessory using the locking mechanism to a through opening of the vehicle bay divider. The spring loaded pegs are configured to prevent motion along X, Y, and Z axes. Additionally, the two pegs prevent rotation of the accessory. In some embodiments, the ability of the pegs to prevent relative motion of an accessory to a vehicle bay divider is particularly useful for when the vehicle bay divider is being transported or is arranged to receive accessories in a mobile work area (e.g., in a vehicle bay). A push-push assembly may be utilized to change the locking mechanism of the accessory from a disengaged or moveable configuration to an engaged or locked configuration when interfacing with a through opening of a vehicle bay divider. In some embodiments, a push-push assembly is incorporated to allow the accessory to remain in a locked or unlocked state relative to a through opening in the vehicle bay divider.
(11) In some embodiments, the locking mechanism comprises a first anchor and a second anchor, wherein the first and second sliding pegs are configured to be translated towards the first and second anchor, respectively, in response to actuation of the push-push assembly.
(12) In some embodiments, each of the first and second peg of the locking mechanism is arranged to extend through an interior surface of an accessory housing and actuate such that each of the first and second peg contact an edge of at least one through opening in a vehicle bay divider arranged to receive the first and second peg. Each of the first and second anchors comprises an extension from a material comprising the accessory housing. Additionally, the first linkage is configured to rotate about a first pivot point corresponding to the first sliding peg and the second linkage is configured to rotate about a second pivot point corresponding to the second sliding peg. The first sliding peg and the second sliding peg are spaced within an accessory housing according to a spacing of through openings in a complementary vehicle bay divider.
(13) In some embodiments, at least one guide rod is arranged within the accessory housing and configured to counteract compression achieved via the push-push assembly via at least one spring arranged concentric to a central axis of the at least one guide rod, either external to an outer diameter of a housing of the at least one guide rod or internal to an inner diameter of a housing of the at least one guide rod. A return spring interfacing with the guide rod is configured to counteract the compression.
(14) In some embodiments, the push-push assembly is coupled to a guide rod configured to return the push-push assembly to a disengaged position, wherein the disengaged position corresponds to each of the first linkage, the second linkage, the first sliding peg, and the second sliding peg being translated away from an interface on a vehicle bay divider opening and translated towards a center axis of the push-push assembly.
(15) In some embodiments, the locking mechanism comprises at least one rotary tab of a shape substantially similar to the vehicle bay divider through opening, wherein the at least one rotary tab can be rotated from a position where a main extension of the at least one rotary tab is substantially aligned to the vehicle bay divider through opening to a position wherein the main extension is perpendicular to the vehicle bay divider through opening. The at least one rotary tab is configured to prevent movement, including rotation, of the accessory relative to the vehicle bay divider when the at least one rotary tab is arranged in an engaged position relative to the vehicle bay divider through opening. Raised edges may be incorporated into a rear surface of the vehicle bay divider to guide the at least one rotary tab into the perpendicular orientation. Additionally, one or more of the rotary tabs may be incorporated into a single accessory, wherein each of the one or more rotary tabs are coupled to one or more push-push-assembly and actuated via at least one linkage assembly.
(16) In some embodiments, the disclosure is directed to a mountable accessory comprising an accessory housing and a locking mechanism. The locking mechanism comprises a push-push assembly, and at least two opposing linkages coupled to opposing sides of the push-push assembly, wherein each of the at least two opposing linkages is coupled to a first sliding peg and a second

sliding peg, respectively, each comprising respective tabs to interface with an edge of a through opening. In some embodiments, each of the tabs is configured to rotate perpendicular to an elongated edge of the through when the push-push assembly is actuated along a first axis.
(17) In some embodiments, the accessory housing is configured to receive an accessory apparatus. The accessory housing is affixed to an accessory comprising one of a securing mechanism, a camera, a light, an environment condition controller, or a tool.
(18) In some embodiments, the push-push assembly is configured to actuate along a first axis perpendicular to an axis corresponding to translation of the at least two opposing linkages. The locking mechanism further comprises at least two springs, arranged between each of the at least two opposing linkages and each of the first and second base, configured to return each of the at least two opposing linkages to an initial position after being displaced in opposing directions. At least one guide rod is configured to counteract compression of the push-push assembly. Additionally, the housing comprises mounting features configured to receive and secure an accessory apparatus.
(19) In some embodiments, the disclosure is directed to a mounting assembly comprising a vehicle bay divider and a mountable apparatus. The mountable apparatus comprises an accessory coupled to a locking mechanism. The locking mechanism comprises a push-push assembly arranged to actuate along a first axis, and at least two opposing latching tabs coupled via at least two linkages to the push-push assembly and arranged to actuate along a second axis.
(20) In some embodiments, the accessories secured to the vehicle bay divider comprise monitoring apparatuses for the environment surrounding the vehicle bay divider. For example, a camera may be secured to the vehicle bay divider. The camera may be communicably coupled to at least one of a vehicle display system or a remote mobile device such that a user can view the status of items or pets within an enclosure with the vehicle bay divider. Additional pet related accessories may include a food dispenser controllable by a remote device or a vehicle interface, a water dispenser controllable by the remote device or the vehicle interface, and an environment condition controlling apparatus such as a fan, dehumidifier, or heater. The vehicle bay divider may be arranged to separate pets and cargo in a vehicle bay, for example. Each separated area may comprise different accessories for monitoring and controlling different conditions, depending on whether the separated area is used for cargo or for a pet. Cargo related accessories may include hooks, chargers, and cameras which may be communicably coupled (e.g., for controlling the accessory or monitoring the cargo area) to at least one of a remote mobile device or a vehicle interface.

Description

BRIEF DESCRIPTIONS OF THE DRAWINGS
(1) The above and other objects and advantages of the disclosure may be apparent upon consideration of the following detailed description, taken in conjunction with the accompanying drawings, in which:
(2) FIG. **1** depicts an exemplary vehicle bay divider comprising a plurality of through openings with at least one interface configured to provide electric power to each of the plurality of through openings, in accordance with some embodiments of the disclosure;
(3) FIG. **2** depicts an exemplary vehicle bay divider comprising a first and a second subset of through openings, in accordance with some embodiments of the disclosure;
(4) FIG. **3** depicts an exemplary vehicle bay divider comprising a through opening comprising features to interface with pegs of a mountable accessory and structural elements for supporting the mountable accessory, in accordance with some embodiments of the disclosure;
(5) FIG. **4** is a block diagram of an exemplary system comprising a vehicle bay divider configured to provide electrical power and a mountable accessory configured to receive the electrical power

provided via the vehicle bay divider, in accordance some embodiments of the disclosure;
(6) FIG. **5** depicts an exemplary electronic feature embedded in a peg of a mountable accessory; in accordance with some embodiments of the disclosure;
(7) FIG. **6** depicts a vehicle bay divider comprising three rows of through openings, each of the openings comprising electrical features of different polarities, in accordance with some embodiments of the disclosure;
(8) FIG. **7** depicts an exemplary vehicle comprising a front vehicle bay and a rear vehicle bay, in accordance with some embodiments of the disclosure;
(9) FIG. **8** depicts an exemplary mountable apparatus comprising an exemplary locking mechanism, in accordance with some embodiments of the disclosure;
(10) FIG. **9** depicts exemplary pegs and mountable apparatuses configured to engage with a through opening in a vehicle bay divider via the depicted exemplary rotatable pegs, in accordance with some embodiments of the disclosure; and
(11) FIG. **10** depicts an exemplary vehicle bay with an exemplary vehicle bay divider arranged within the exemplary vehicle bay, in accordance with some embodiments of the disclosure.

DETAILED DESCRIPTION

(12) Methods and systems are provided herein for a locking mechanism configured to interface with a vehicle bay divider comprising a plurality of powered through openings, wherein the locking mechanism affixes an accessory to the vehicle bay divider enabling a powered connection between at least one of the through openings and the powered accessory.
(13) The methods and/or any instructions for performing any of the embodiments discussed herein may be encoded on computer-readable media. Computer-readable media includes any media capable of storing data. The computer-readable media may be transitory, including, but not limited to, propagating electrical or electromagnetic signals, or may be non-transitory including, but not limited to, volatile and non-volatile computer memory or storage devices such as a hard disk, floppy disk, USB drive, DVD, CD, media cards, register memory, processor caches, Random Access Memory (RAM), etc.
(14) FIG. **1** depicts vehicle bay divider **102** comprising through openings **104** with at least one of electrical interface **106**A and **106**B, where each of electrical interface **106**A and **106**B are configured to provide electric power to each of through openings **104**, in accordance with some embodiments of the disclosure. Vehicle bay divider **102** may comprise fewer or additional elements or features than those depicted in FIG. **1**. Additionally, vehicle bay divider **102** may be incorporated into, may interface with, and/or may comprise any or all the elements depicted in, or described in reference to, any of FIGS. **2-10**.
(15) Vehicle bay divider **102** comprises multiple subsets of through openings **104**, each subset with different spacings and orientations along the surface of vehicle bay divider **102**. For example, a first subset of through openings **104** may comprise two parallel sides with two rounded ends arranged such that the two parallel sides align with a top and a bottom of vehicle bay divider **102**. A second subset of through opening **104** may also comprise two parallel sides with two rounded ends arranged such that the two parallel sides align with two vertical sides of vehicle bay divider **102**. A third subset of through openings **104** may comprises substantially circular openings which, as depicted in FIG. **1**, may be arranged towards either or both vertical ends of vehicle bay divider **102**. Each of the first, second, and third subsets of through openings **104** may be incorporated into vehicle bay divider **102**. In some embodiments, only one or two of these subsets are incorporated into vehicle bay divider **102**. Each of through openings **104** is formed in a surface such than material comprising the edge of each of through openings **104** comprises at least one of electrical interface **106**A and/or **106**B. Electrical interface **106**A comprises an electronic lead embedded in an edge of through openings **104**. The electronic lead is configured to provide electronic power to a complementary lead of a mountable apparatus. Electrical interface **106**B comprises a coil configured to provide electronic power to a mountable apparatus when the mountable apparatus is

arranged within one of through openings **104** or arranged to interface with an edge of one of through openings **104**. Electrical interface **106**B is configured to wireless provide power to the mountable apparatus and may be implemented where there is a risk that repeated installation and removal of the mountable apparatus creates a risk for wearing out or corroding electrical interface **106**A.

(16) Vehicle bay divider **102** further comprises edge **110**. Edge **110** is configured to interface with mounting surface **112**. Mounting surface **112** corresponds to a surface of a vehicle bay, as depicted in FIG. **7** as part of vehicle **700**. In some embodiments, a pair of rails may be secured to mounting surface **112**. Mounting anchors **108** are arranged along edge **110** and are configured to interface with mounting surface **112** or a feature secured to mounting surface **112** (e.g., a pair of rails). One of mounting anchors **108** may be configured to slide along a first axis on mounting surface **112**. A second of mounting anchors **108** may comprise a clamping mechanism configured to secure vehicle bay divider **102** in a position along mounting surface **112**. For example, one or both of mounting anchors **108** may comprising a threaded nob or mechanical coupling configured to be screwed into a hole in a feature secured in mounting surface **112** or a hole directly in mounting surface **112**. In some embodiments, one or both of mounting anchors are configured to clamp onto a feature of mounting surface **112**, such as feature **114** which is depicted as a rail in FIG. **1**. When each of mounting anchors **108** are in a locked configuration, vehicle bay divider **102** is secured along edge **110** such that vehicle bay divider **102** is incapable of movement relative to mounting surface **112**. In some embodiments, at least one of mounting anchors **108** comprises an electronic lead configured to interface with a complementary electronic lead in mounting surface **112** (not shown in FIG. **1**, see FIG. **4**). Additionally, vehicle bay divider **102** may comprise an energy storage apparatus such as a battery assembly which is configured to provide electric power to each of through openings **104**.

(17) FIG. **2** depicts vehicle bay dividers **200**A and **200**B comprising respective subsets of through openings **104**, in accordance with some embodiments of the disclosure. Vehicle bay dividers **200**A and **200**B may comprise fewer or additional elements or features than those depicted in FIG. **2**. Additionally, vehicle bay dividers **200**A and **200**B may be incorporated into, may interface with, and/or may comprise any or all the elements depicted in, or described in reference to, any of FIGS. **1** and **3**-**10**.

(18) Vehicle bay divider **200**A comprises first plurality of through openings **202** and second plurality of through openings **204**. Each of the openings of first plurality of through openings **202** comprise a pair of parallel sides aligned with a vertical side of vehicle bay divider **200**A and a pair of rounded ends. In some embodiments, each of the openings of the first plurality of through openings **202** corresponds to a first subset of through openings, each comprising an elongated opening oriented vertically. Each of the openings of second plurality of through openings **204** comprise a pair of parallel sides aligned with a horizontal side of vehicle bay divider **200**A and a pair of rounded ends. In some embodiments, each of the openings of the second plurality of through openings **204** corresponds to a second subset of through openings, each comprising an elongated opening oriented horizontally. The elongated through openings are configured to receive the mountable apparatus (e.g., the securing tabs or mounting pegs of the mountable apparatus), wherein the at least one elongated through opening comprises a pair of opposing ends configured to couple with at least one mounting peg of the mountable apparatus.

(19) Mounted to vehicle bay divider **200**A are mountable accessories **206**, **208**, and **210**. Mountable accessory **206** comprises a camera which may be communicably coupled to a remote device. The remote device may comprise a mobile smart phone which enables a user to control mountable accessory **206** (e.g., power on or off, record video, and other related camera functions). Mountable accessory **208** comprises a light powered on and powered off by a push-push assembly. Mountable accessory **210** comprises a mounting apparatus which can be rotated into a secured position in one of the through openings of either of first plurality of through openings **202** or second plurality of

through openings **204**. Each of mountable accessories **206**, **208**, and **210** may be mounted to vehicle bay divider **200**A by interfacing with at least one opening from either of first plurality of through openings **202** and second plurality of through openings **204**, depending on the desired orientation of each of the mountable accessories and the size of the features extending from the mountable accessories which, when articulated, lock the mountable accessory to vehicle bay divider **200**A.

(20) Vehicle bay divider **200**B comprises first plurality of through openings **202**, second plurality of through openings **204**, and third plurality of through openings **212**. Each openings of third plurality of through openings **212** comprises a circular diameter configured to receive substantially rounded securing features from mounting apparatuses. Mounted to vehicle bay divider **200**A are mountable accessories **208**, and **210**. Each of mountable accessories **206**, **208**, and **210** may be mounted to vehicle bay divider **200**B by interfacing with at least one opening from any of first plurality of through openings **202**, second plurality of through openings **204**, and third plurality of through openings **212**, depending on whether any of the mountable accessories comprises features configured to interface with the different shaped through openings.

(21) FIG. **3** depicts vehicle bay divider **300** comprising through openings **302** and **304**, wherein through openings **304** comprise features **306**, in accordance with some embodiments of the disclosure. Vehicle bay divider **300** may comprise fewer or additional elements or features than those depicted in FIG. **3**. Additionally, vehicle bay divider **300** may be incorporated into, may interface with, and/or may comprise any or all the elements depicted in, or described in reference to, any of FIGS. **1**, **2**, and **4-10**.

(22) Through opening **302** comprises a pair of parallel sides and a pair of rounded ends configured to interface with pegs of a mountable accessory. For example, a peg of a mountable accessory may be shaped to fit into through opening **302** and then may be rotated perpendicular to the pair of parallel sides or may slide towards at least one of the rounded ends to create a secure engagement between the mountable accessory and through opening **302**. Each of through openings **304** also comprise pair of parallel sides and a pair of rounded ends configured to interface with pegs of a mountable accessory. Additionally, through openings **304** comprise features **306** which act as end stops for a rotating peg of a mountable accessory and may also be configured as structural elements for supporting the mountable accessory by increasing the stiffness of the material that forms each of openings **304**. For example, the addition of features **306** may increase the bending strength of vehicle bay divider **300** such that a mountable accessory does not plastically or elastically deform the material comprising vehicle bay divider **300** (e.g., a heavier mountable accessory may be affixed to vehicle bay divider **300** with features **306** than would be affixed to a vehicle bay divider comprising only through opening **302**). Features **306** are configured such that through openings **304** are structured to withstand a weight of the mountable apparatus and vibrational motion transmitted via the mountable apparatus (e.g., caused by vehicle motion when vehicle bay divider **300** is mounted in a vehicle bay).

(23) FIG. **4** depicts mounting system **400** comprising vehicle bay divider **402** which is configured to provide electrical power to mountable accessory **420**, in accordance some embodiments of the disclosure. Mounting system **400** may comprise fewer or additional elements or features than those depicted in FIG. **4**. Additionally, mounting system **400** may be incorporated into, may interface with, and/or may comprise any or all the elements depicted in, or described in reference to, any of FIGS. **1-3** and **5-10**.

(24) Mounting system **400** comprises vehicle bay divider **402**, which corresponds to vehicle bay divider **102** of FIG. **1**. Vehicle bay divider **402** comprises plurality of through opening **404** which interface with power transmitter **406**. Power transmitter **406** corresponds to an apparatus such as electrical interface **106**A or **106**B of FIG. **1**. For example, power transmitter **406** may be configured for a mechanical connection to mountable accessory **420** by being structured as a plug with electronic leads. In some embodiments, power transmitter **406** may be configured to wirelessly

charge mountable accessory **420** and does not need a direct connection with mountable accessory **420**. Power transmitter comprises controller **408**, communication circuitry **410** and power converter **412**. Controller **407** is configured to direct instruction received via communication circuitry **410** such that power is accessed either via vehicle bay divider electric lead **414** and/or power storage device **416**. Vehicle bay divider electric lead **414** may be a component of mounting anchor **108** of FIG. **1**. Vehicle bay divider electric lead **414** is configured to receive electric power from vehicle mounting surface electric lead **436**. Vehicle mounting surface electric lead **436** may be embedded in a mounting surface of front vehicle bay **702** and rear vehicle bay **704** of FIG. **7**, corresponding to a vehicle bay of vehicle **434**. In some embodiments, vehicle mounting surface electric lead **436** may be a component of feature **114** of FIG. **1**. Power storage device **416** corresponds to a battery apparatus which can retain an electrical charge such that vehicle bay divider **402** is a stand-alone power source or can be used to draw electric power from a vehicle battery. Each of controller **408**, power storage device **416**, and vehicle bay divider to vehicle power electric coupling **414** are communicably coupled to provide a means to regulate the source and amount of electric power **432** to be transmitted via power converter **412** to power processing circuitry **428** of mountable accessory **420**.

(25) Communication circuitry **410** is configured to transmit and receive messages from mountable accessory **420** and/or remote device **418**. For example, remote device **418** may correspond to a smart phone, a tablet, or a vehicle communication interface where a user can monitor and adjust the power supplied to mountable accessory **420**. Additionally, mountable accessory **420** comprises locking mechanism **422** which is communicably coupled to communication circuitry **424** such that both vehicle bay divider **402** and remote device **418** may receive status updates regarding the engagement status of mountable accessory **420** as well as the charging status of mountable accessory **420**. Communication circuitry **424** of locking mechanism **422** may transmit and receive information via a bilateral communication path with communication circuitry **410** as well as remote device **418**. Based at least one of a command received or a status received, communication circuitry **424** interfaces with control circuitry **426** to regulate how power processing circuitry **428** handles electric power **432** received from power converter **412**. For example, mountable accessory **420** may comprises power storage **430** which may be charged via electric power **432** or electric power **432** may be directed to a current function of mountable accessory **420**. Mountable accessory **420** may comprise a light or a camera which when mounted to vehicle bay divider **402** uses power from power converter **412**. In some embodiments, mountable accessory **420** is configured to function when not mounted to vehicle bay divider **402** and may function using power stored in power storage **430**. Remote device **418** may be configured to allow a user to select a charging mode, a power storage mode, or combination thereof to maximize the function of mountable accessory **420**. Each of the depicted elements of mounting system **400** may comprise processors and the like configured to store a non-transitory computer readable medium with computer readable instructions to enable either direct or wireless communication between the various elements depicted to execute the functions described herein.

(26) FIG. **5** depicts mountable accessory **500** comprising peg **504** with electrical feature **506**; in accordance with some embodiments of the disclosure. Mountable accessory **500** may comprise fewer or additional elements or features than those depicted in FIG. **5**. Additionally, mountable accessory **500** may be incorporated into, may interface with, and/or may comprise any or all the elements depicted in, or described in reference to, any of FIGS. **1**-**4** and **6**-**10**.

(27) Mountable accessory **500** comprises accessory housing **502**. Extending from accessory housing **502** is peg **504**. In some embodiments, peg **504** comprises material continuous with accessory housing **502**. Peg **504** may be configured to slide laterally or rotate, depending on the configuration of a locking mechanism mechanically coupled to peg **504**. Embedded in peg **504** is electrical feature **506**, which is configured to interface with electrical interface **106**A or **106**B of FIG. **1**. For example, electrical feature **506** may comprise an electrical lead configured to interface

with a complementary electrical lead embedded one of plurality of through openings **104** corresponding to at least one of electrical interface **106**A or **106**B of FIG. **1**.

(28) FIG. **6** depicts vehicle bay dividers **600**A and **600**B comprising three rows of through openings **104**, in accordance with some embodiments of the disclosure. Vehicle bay dividers **600**A and **600**B may comprise fewer or additional elements or features than those depicted in FIG. **6**. Additionally, vehicle bay dividers **600**A and **600**B may be incorporated into, may interface with, and/or may comprise any or all the elements depicted in, or described in reference to, any of FIGS. **1**-**5** and **7**-**10**.

(29) Vehicle bay divider **600**A comprises first row of through openings **602**A, second row of through openings **602**B, and third row of through openings **602**C, each of the through openings corresponding to plurality of through openings **104** of FIG. **1**. First row of through openings **602**A comprises first through opening **608**A and second through opening **608**B, each with first electrical lead **604**A arranged on first side **606**A and second electrical lead **604**B arranged on second side **606**B. In some embodiments, a first polarity of first electrical lead **604**A is different from a second polarity of second electrical lead **604**B. Second row of through openings **602**B comprises first through opening **610**A and second through opening **610**B. First through opening **610** comprises first electrical feature **612**A. Second through opening **610**B comprises second electrical feature **612**B. In some embodiments, a first polarity of first electrical feature **612**A is different from a second polarity of second electrical feature **612**B (e.g., both of first electrical feature **612**A and second electrical feature **612**B are configured to interface with a pair of electrical leads from a same mountable apparatus to provide electrical power to the mountable apparatus). Third row of through openings **602**C comprises first through opening **614**A and **614**B, each comprising electrical interface **106**B of FIG. **1** such that each of through openings **614**A and **614**B are configured to wireless provide electronic power to a mountable accessory or apparatus.

(30) Vehicle bay divider **600**B comprises second row of through openings **602**B. Secured to each of through openings **608**A and **608**B is accessory housing **616**. Accessory housing **616** comprises peg **618**A and **618**B. Peg **618**A interfaces with first electrical feature **612**A. Peg **618**B interface with second electrical feature **612**B. In some embodiments, first electrical feature **612**A and second electrical feature **612**B have different polarities. Accordingly, both peg **618**A and **618**B must be engaged in their respective through openings to enable flow of electric power from vehicle bay divider **600**B to a mountable accessory comprising accessory housing **616**.

(31) FIG. **7** depicts vehicle **700** comprising front vehicle bay **702** and rear vehicle bay **704**, both configured to accommodate at least one of a vehicle bay divider or mounting assembly configured to interface with accessories in a manner similar to the vehicle bay dividers of the present disclosure, in accordance with some embodiments of the disclosure. Vehicle **700** may comprise fewer or additional elements or features than those depicted in FIG. **7**. Additionally, vehicle **700** may be incorporated into, may interface with, and/or may comprise any or all the elements depicted in, or described in reference to, any of FIGS. **1**-**6**, and **8**-**10**. Arranging a vehicle bay divider in at least one of front vehicle bay **702** or rear vehicle bay **704** corresponds to an illustrative embodiment that is not limited by the contents of this disclosure. One skilled in the art would appreciate that additional modifications may be required to either or both of front vehicle bay **702** or rear vehicle bay **704**. For example, impact criteria may be defined for a particular vehicle line which may result in corresponding structural modifications to any or all of the vehicle bay dividers of the present disclosure. The various features, assembly, and embodiments discussed herein may be omitted, modified, combined, and/or rearranged, and any additional modifications or adjustments may be performed without departing from the scope of the invention in order to accommodate various criteria for a vehicle bay and assemblies therein (e.g., responsiveness to impacts or other vehicle events). More generally, the above disclosure is meant to be exemplary and not limiting. Furthermore, it should be noted that the features and limitations described in any one embodiment may be applied to any other embodiment herein, and flowcharts or examples relating to one

embodiment may be combined with any other embodiment in a suitable manner, done in different orders, or done in parallel. It should also be noted that the embodiments of the inventions of the disclosure may be applied to, or used in accordance with, other systems and/or methods (e.g., at least those related to vehicle bay dividers and securing accessories to a vehicle bay divider).

(32) FIG. **8** depicts mountable apparatuses **800**A and **800**B, each comprising an exemplary locking mechanism, in accordance with some embodiments of the disclosure. Mountable apparatuses **800**A and **800**B may comprise fewer or additional elements or features than those depicted in FIG. **8**. Additionally, mountable apparatuses **800**A and **800**B may be incorporated into, may interface with, and/or may comprise any or all the elements depicted in, or described in reference to, any of FIGS. **1**-**7**, **9**, and **10**.

(33) Mountable apparatus **800**A comprises accessory housing **812**. Arranged within accessory housing **812** are first linkage **802**A and second linkage **802**B. Coupled to first linkage **802**A via first pivot point **806**A is first sliding peg **804**A. First spring **808**A is coupled at one end to first sliding peg **804**A and is coupled at a second end to first anchor **810**A. Coupled to second linkage **802**B via second pivot point **806**B is second sliding peg **804**B. Second spring **808**B is coupled at one end to second sliding peg **804**B and is coupled at a second end to second anchor **810**B. Arranged towards a center of accessory housing **812** is push-push assembly **816**. Push-push assembly **816** is configured to engage and disengage the locking mechanism comprising the components of FIG. **8** by pushing and pulling first linkage **802**A and second linkage **802**B about pivot points **806**C and **806**D, respectively, such that first sliding peg **804**A and second sliding peg **804**B laterally translate towards and away from each of first anchor **810**A and second anchor **810**B, respectively. Push-push assembly **816** is configured to actuate along axis **818** such that a first input presses push-push assembly **816** into an engaged position and a second input presses push-push assembly **816** into a disengaged position. Arranged on either side of push-push assembly **816** are guide rods **814**. In some embodiments, guide rods **814** comprise externally wound or internally wound springs configured to counter act compression of push-push assembly **816** in response to either the first or second input. In response to the first input, first sliding peg **804**A is configured to move towards first anchor **810**A along sliding axis **820**A. In response to the second input, first sliding peg **804**A is configured to move towards push-push assembly **816** along sliding axis **820**A in a direction opposite to the response to the first input. In response to the first input, second sliding peg **804**B is configured to move towards second anchor **810**B along sliding axis **820**B. In response to the second input, second sliding peg **804**B is configured to move towards push-push assembly **816** along sliding axis **820**B in a direction opposite to the response to the first input.

(34) Mountable apparatus **800**B comprises accessory housing **812** with push-push assembly **816**. Push-push assembly **816** may be coupled to an electrical lead such that as push-push assembly is first compressed, the electrical lead contacts a power source and powers an apparatus, accessory, or tool associated with mountable apparatus **800**B (e.g., a light, a camera, or a fan). When push-push assembly **816** is compressed a second time, guide rods **114** of mountable apparatus **800**A return push-push assembly **816** to a disengaged position. In some embodiments, both first sliding peg **804**A and second sliding peg **804**B move away from push-push assembly **816**. For example, when viewing push-push assembly **816** along the direction of the activation of push-push assembly **816** (e.g., into the page of FIG. **8**), both first sliding peg **804**A and second sliding peg **804**B may be offset axially along the direction of activation.

(35) FIG. **9** depicts peg assembly **900**A, and mountable apparatuses **900**B, **900**C, and **900**D, each configured to engage with a through opening in a vehicle bay divider, in accordance with some embodiments of the disclosure. Any of peg assembly **900**A, mountable apparatuses **900**B, **900**C, and **900**D may comprise fewer or additional elements or features than those depicted in FIG. **9**. Additionally, any of peg assembly **900**A, mountable apparatuses **900**B, **900**C, and **900**D may be incorporated into, may interface with, and/or may comprise any or all the elements depicted in, or described in reference to, any of FIGS. **1**-**8**, and **10**.

(36) Peg assembly **900**A comprises latching tabs **902**. Latching tabs **902** are coupled via actuation linkage **904**. Actuation linkage **904** is configured to rotate latching tabs **902** in a clockwise manner when compression force **906**A is applied to actuation protrusion **908**. Compression force **906** corresponds to a compression force caused by compressing push-push assembly **816** of FIG. **8**. Actuation linkage **904** is configured to rotate latching tabs **902** in a counterclockwise manner when return force **906**B causes actuation protrusion **908** to translate to an original position (e.g., in response to springs arranged around guide rods **814** returning push-push assembly **816** to an original position).
(37) Mountable apparatus **900**B comprises accessory housing **812** and push-push assembly **816** of FIG. **8**. Coupled to push-push assembly **816** are leads **910** which are configured to provide power to mountable accessory **912** when push-push assembly **816** is compressed while mountable apparatus **900**B is engaged with at least one of through openings **104** of FIG. **1**. Mountable accessory **816** may comprise at least one of a securing mechanism, a camera, a light, an environment condition controller, or a tool. Mountable apparatus **900**C comprises accessory housing **914** with rotatable latching tab **916**. Mountable apparatus **900**C is configured to interface with at least one of through openings **104** of FIG. **1** and is configured to be secured to vehicle bay divider **102** when rotated such that latching tab **916** is oriented perpendicular to at least one of through openings **104**.
(38) FIG. **10** depicts vehicle bay divider system **1000** with vehicle bay divider **1002** arranged within vehicle bay **1004**, in accordance with some embodiments of the disclosure. Vehicle bay divider system **1000** may comprise fewer or additional elements or features than those depicted in FIG. **10**. Additionally, vehicle bay divider system **1000** may be incorporated into, may interface with, and/or may comprise any or all the elements depicted in, or described in reference to, any of FIGS. **1-9**.
(39) Vehicle bay divider system **1000** comprises vehicle bay divider installation assembly **1002** arranged within vehicle bay **1004**. Vehicle bay **1004** corresponds to either of front vehicle bay **702** or rear vehicle bay **704** in FIG. **7**. Door **1006** is arranged to open and close vehicle bay **1004**. Vehicle bay divider installation assembly **1002** interfaces with storage surface **1008** of vehicle bay **1004**. Storage surface **1008** may correspond to a surface of a recessed storage unit or a floor of a vehicle enclosure. Vehicle bay divider installation assembly **1002** may be secured to storage surface **1008** using: an interfacing feature of vehicle bay divider installation assembly **1002** configured to be received by a recess in storage surface **1008**, a recess in vehicle bay divider installation assembly **1002** configured to receive an interfacing feature extending from storage surface **1008**, and/or a combination of fasteners and other securing features.
(40) Vehicle bay divider installation assembly **1002** comprises mounting platform **1010**. Mounting platform **1010** comprises at least one securing feature (e.g., an extension or recess) configured to interface with storage surface **1008** to maintain a stable and secure connection between mounting platform **1010** and storage surface **1008**. Mounting platform **1010** comprises guide rails **1012**. Guide rails **1012** are recessed into a top surface of mounting platform **1010** such that a top surface of guide rails **1012** do not extend beyond the top surface of mounting platform **1010**. In some embodiments, guide rails **1012** may protrude from the top surface of mounting platform **1010**. Guide rails **1012** may comprise threaded rods configured to interface with mounts **1014** of divider **1016** or may comprise slotted rails configured to guide actuation features of mounts **1014** (e.g., wheels). Mounts **1014** are structured to stabilize divider **1016** relative to mounting platform **1010** such that divider **1016** is incapable of motion independent of divider **1016**. Divider **1016** separates the top surface of mounting platform **1010** into first storage area **1018** and second storage area **1020**. First storage area **1018** is depicted as accommodating a pet. Second storage area **1020** is depicted as accommodating equipment. A plurality of through openings are on either side of divider **1016** and are configured to provide electrical power to accessories mounted to either side of divider **1016**.

(41) The systems and processes discussed above are intended to be illustrative and not limiting. One skilled in the art would appreciate that the actions of the processes discussed herein may be omitted, modified, combined, and/or rearranged, and any additional actions may be performed without departing from the scope of the invention. More generally, the above disclosure is meant to be exemplary and not limiting. Only the claims that follow are meant to set bounds as to what the present disclosure includes. Furthermore, it should be noted that the features and limitations described in any one embodiment may be applied to any other embodiment herein, and flowcharts or examples relating to one embodiment may be combined with any other embodiment in a suitable manner, done in different orders, or done in parallel. In addition, the systems and methods described herein may be performed in real time. It should also be noted that the systems and/or methods described above may be applied to, or used in accordance with, other systems and/or methods.
(42) While some portions of this disclosure may refer to examples, any such reference is merely to provide context to the instant disclosure and does not form any admission as to what constitutes the state of the art.

Claims

1. A system comprising: a vehicle comprising a vehicle bay with a mounting surface; and a vehicle bay divider that interfaces with the mounting surface when arranged in the vehicle bay, wherein: the vehicle bay divider comprises a plurality of through openings, an edge of the vehicle bay divider comprises at least one mounting anchor comprising a clamping mechanism along the edge that interfaces with a feature of the mounting surface, the vehicle bay divider divides the vehicle bay into separate storage areas, and at least one interface of the vehicle bay divider is configured to provide electric power to a respective through opening of the plurality of through openings.
2. The system of claim 1, wherein: the plurality of through openings comprises a first subset of the plurality of through openings and a second subset of the plurality of through openings; the first and second subsets of the plurality of through openings are arranged at respective different spacings; each through opening of the first subset of the plurality of through openings comprises an elongated opening oriented vertically; and each through opening of the second subset of the plurality of through openings comprises an elongated opening oriented horizontally.
3. The system of claim 1, wherein the at least one interface comprises an electrical lead configured to provide power to a mountable accessory, and wherein each of the plurality of through openings are structured to receive a securing feature of a mountable accessory.
4. The system of claim 1, wherein the at least one interface is configured to provide power wirelessly to an accessory interfacing with one of the plurality of through openings, and wherein each of the plurality of through openings are structured to receive a securing feature of a mountable accessory.
5. The system of claim 1, wherein the vehicle bay divider is translatable across the mounting surface to which the vehicle bay divider is secured.
6. The system of claim 1, wherein the at least one mounting anchor comprises at least one mechanical coupling configured to connect an electronic lead of the vehicle bay divider to a complementary electronic lead in the mounting surface.
7. The system of claim 1, wherein the vehicle bay divider is configured to: separate an enclosure into two spaces; and receive a mountable accessory on either side of the vehicle bay divider such that a status of either one of the two spaces can be is transmitted from the mountable accessory to a remote device.
8. The system of claim 1, further comprising a power storage device configured to store an electric charge to provide electric power to each of the plurality of through openings.
9. The system of claim 1, wherein: the vehicle bay divider is translatable across the mounting

surface via an actuation apparatus configured to couple the vehicle bay divider to the mounting surface; the actuation apparatus is configured to interface with one or more electrical features of the mounting surface; and the one or more electrical features is configured to provide electrical power to at least one of the at least one interface of the respective through opening or the actuation apparatus.

10. The system of claim 1, wherein the at least one interface comprises a first electrical lead arranged on a first side of each of the plurality of through openings and a second electrical lead arranged on a second side of each of the plurality of through openings.

11. The system of claim 10, wherein a first polarity of the first electrical lead is different from a second polarity of the second electrical lead.

12. The system of claim 1, wherein a first opening of the plurality of through openings comprises a first electrical feature and a second opening of the plurality of through openings comprises a second electrical feature.

13. The system of claim 12, wherein a first polarity of the first electrical feature is different from a second polarity of the second electrical feature.

14. A system comprising: a vehicle comprising a vehicle bay with a mounting surface; a mountable apparatus; and a vehicle bay divider that interfaces with the mounting surface when arranged in the vehicle, the vehicle bay divider comprising at least one elongated through opening configured to receive the mountable apparatus, wherein: the at least one elongated through opening comprises a pair of opposing ends configured to couple with at least one mounting peg of the mountable apparatus, the at least one elongated through opening comprises at least one interface configured to provide electric power to the mountable apparatus when the mountable apparatus is engaged with the at least one elongated through opening, the vehicle bay divider divides the vehicle bay into separate storage areas, and an edge of the vehicle bay divider comprises at least one mounting anchor comprising a clamping mechanism along the edge that interfaces with a feature of the mounting surface.

15. The system of claim 14, wherein the mountable apparatus comprises at least one electrical feature configured to receive electrical power from the at least one interface of the at least one elongated through opening.

16. The system of claim 14, wherein the mountable apparatus comprises a feature configured to receive the electric power wirelessly from the at least one interface of the at least one elongated through opening.

17. The system of claim 14, wherein the vehicle bay divider is structured to withstand a weight of the mountable apparatus and vibrational motion transmitted from the mounting surface to the mountable apparatus.

18. The system of claim 14, further comprising an energy storage apparatus configured to store an electric charge to provide the electric power to the at least one elongated through opening.

19. A vehicle comprising: at least one storage bay comprising a mounting surface; and a panel, coupled to the mounting surface, comprising at least one through opening, wherein: the at least one through opening is configured to provide power to at least one mountable accessory, the panel divides the at least one storage bay into separate storage areas, and an edge of the panel comprises at least one mounting anchor comprising a clamping mechanism along the edge that interfaces with a feature of the mounting surface.