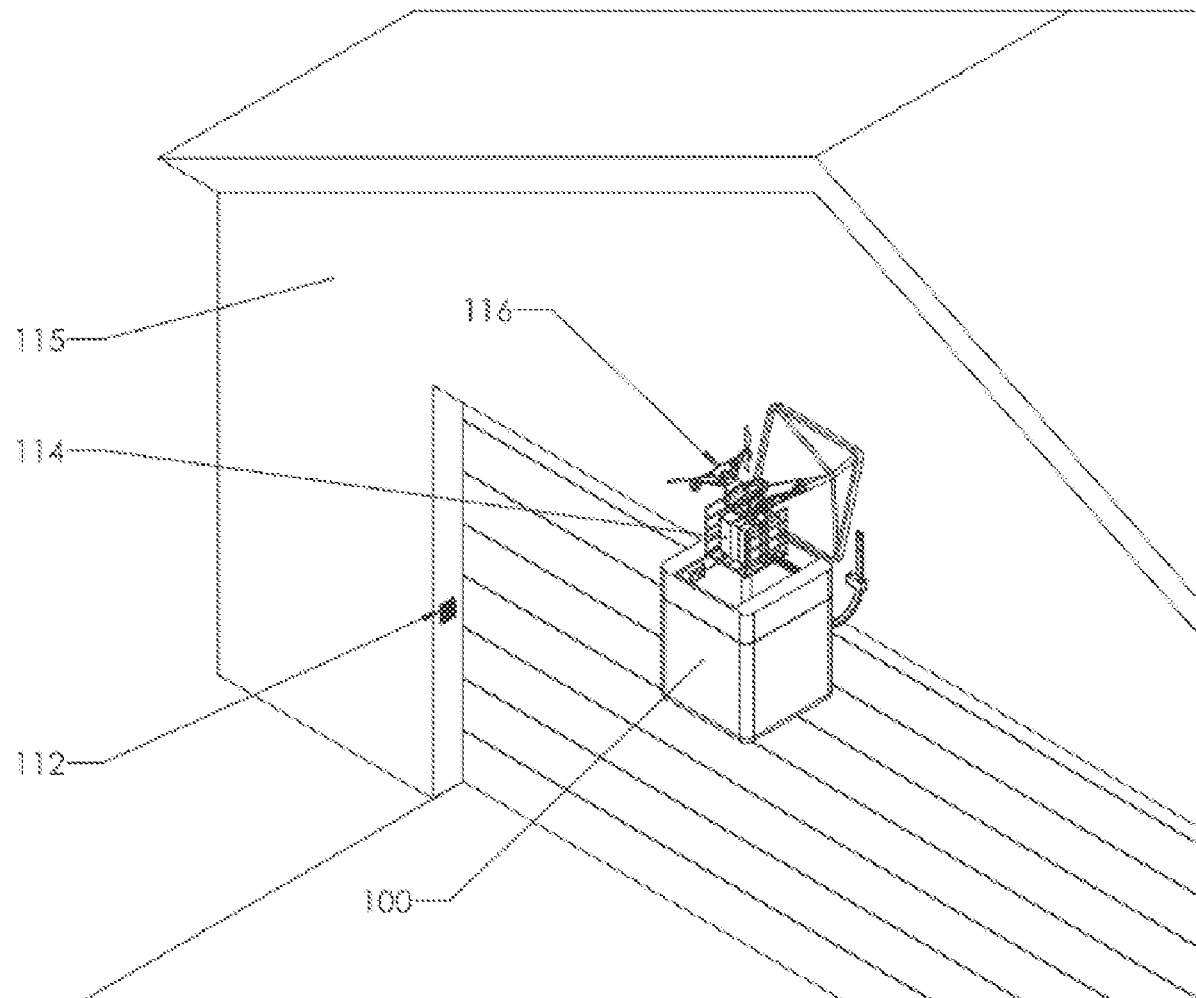




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(19) **United States**(12) **Patent Application Publication**
Haley(10) **Pub. No.: US 2022/0192406 A1**(43) **Pub. Date: Jun. 23, 2022**(54) **SUSPENDING PACKAGE STORAGE
CONTAINER**(52) **U.S. CL.**
CPC *A47G 29/141* (2013.01); *A47G 29/20*
(2013.01)(71) Applicant: **Aaron Haley**, Littleton, CO (US)(72) Inventor: **Aaron Haley**, Littleton, CO (US)(21) Appl. No.: **17/128,104**(22) Filed: **Dec. 19, 2020****Publication Classification**(51) **Int. Cl.**
A47G 29/14 (2006.01)
A47G 29/20 (2006.01)(57) **ABSTRACT**

A storage container operable to be suspended from a structure is disclosed. The storage container includes a housing having a plurality of sides configured to provide an enclosed space configured to store one or more packages. The storage container includes a first opening on a bottom portion comprising a platform configured to be lowered to receive the one or more packages. The storage container includes a top opening configured to open to receive the one or more packages, and close to secure the one or more packages. The storage container includes a transceiver configured to send and receive one or more messages or signals from a user equipment (UE). The storage container includes a locking device configured to lock each of the bottom opening and the top opening.



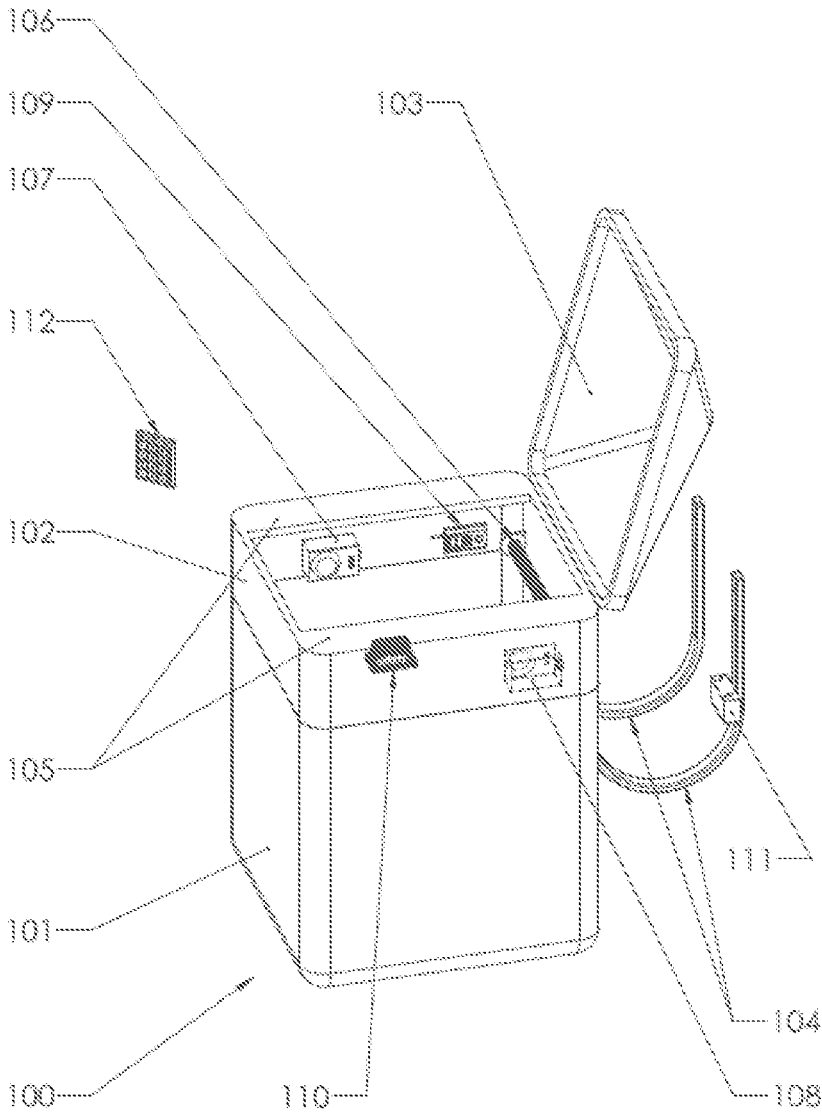


FIG. 1

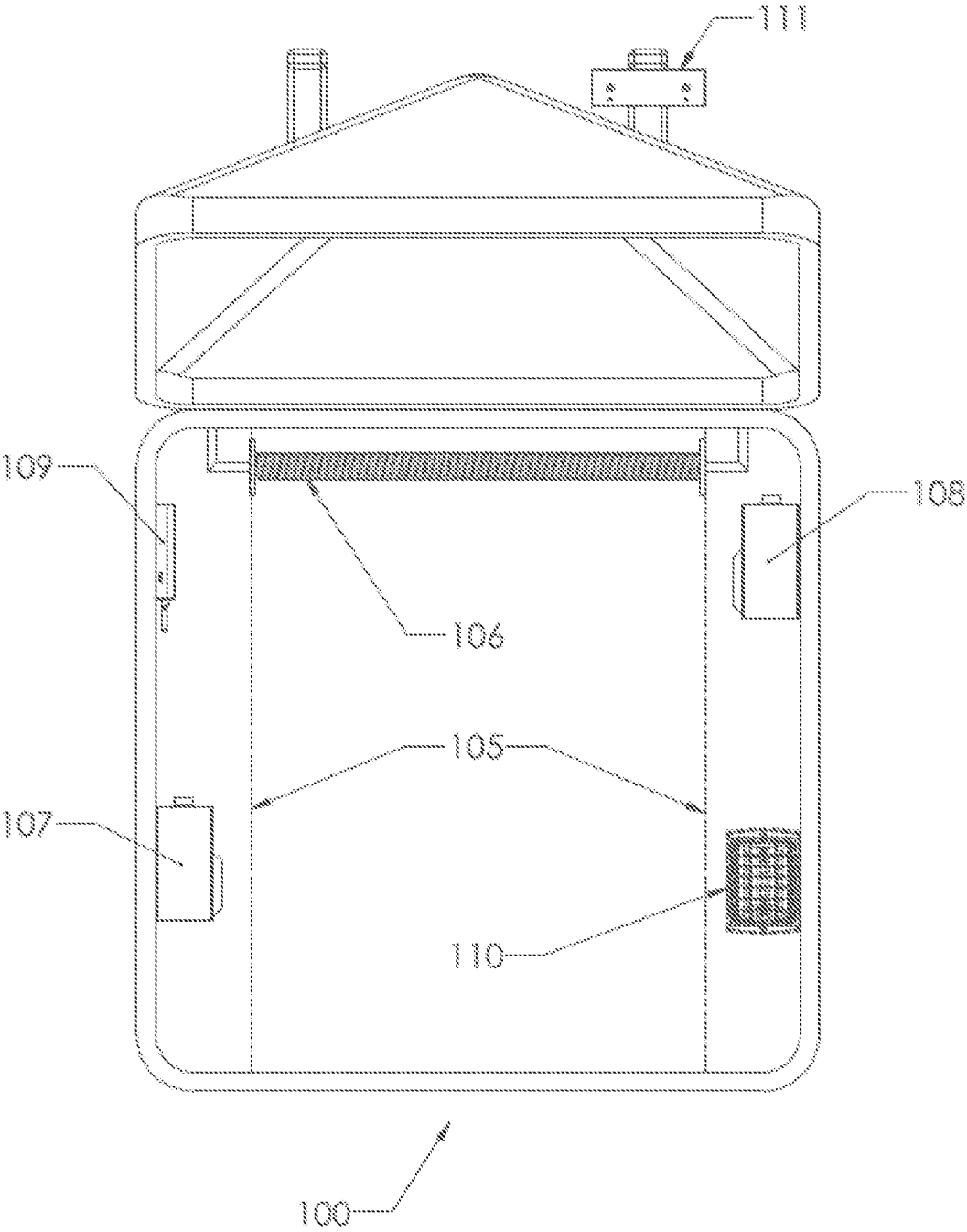


FIG. 2

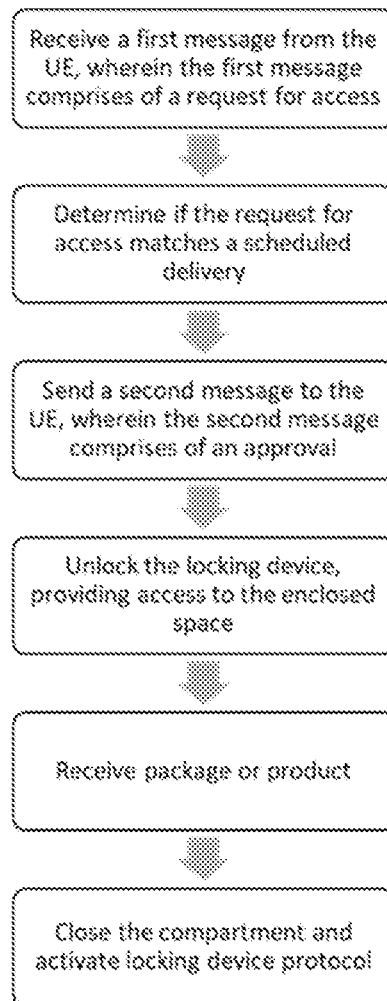


FIG. 3

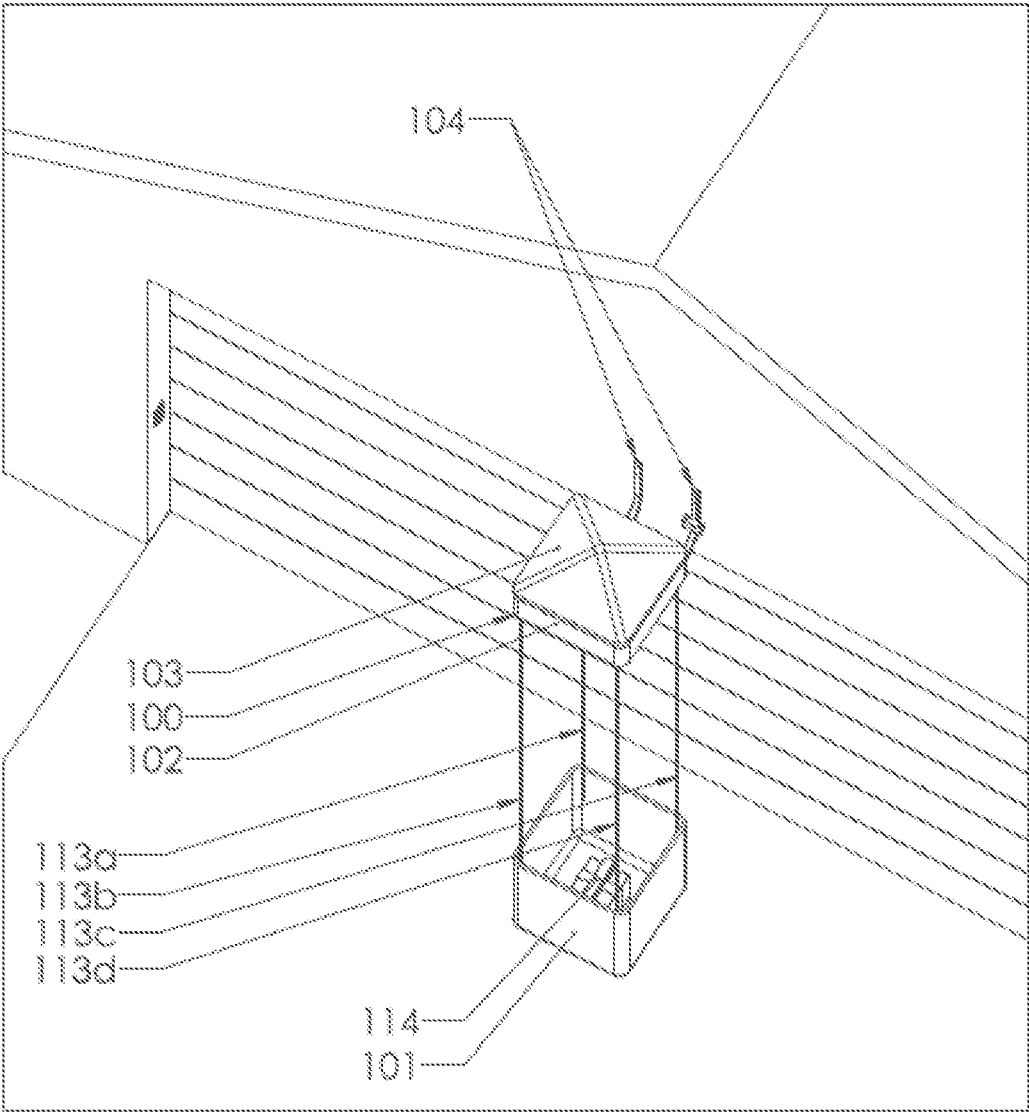


FIG. 4

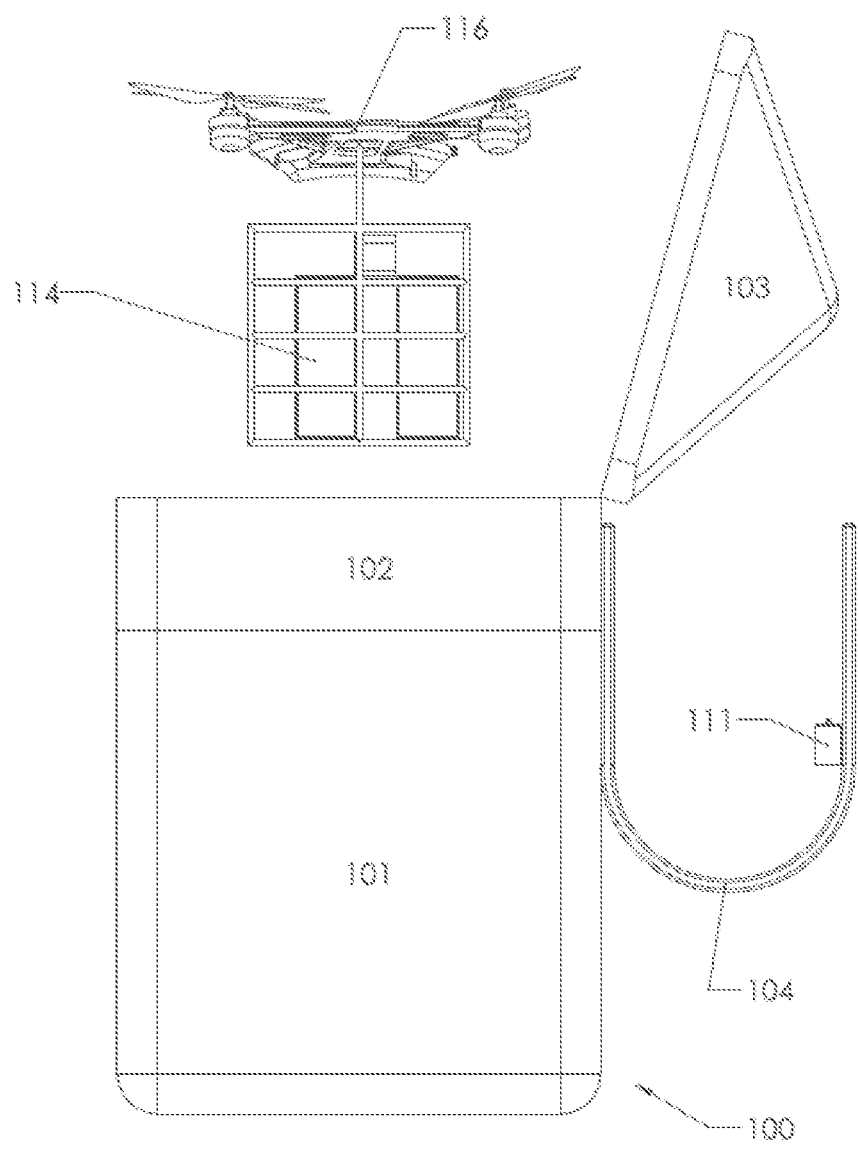


FIG. 5

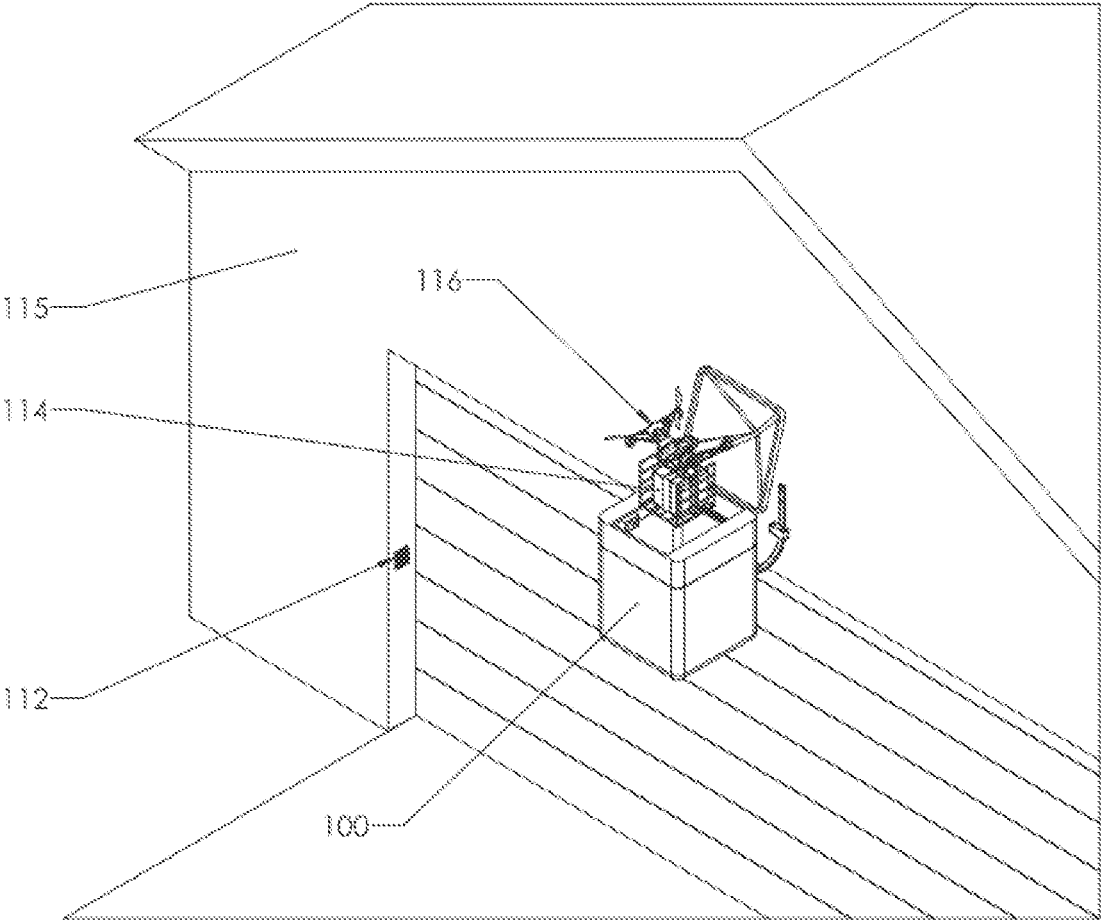


FIG. 6

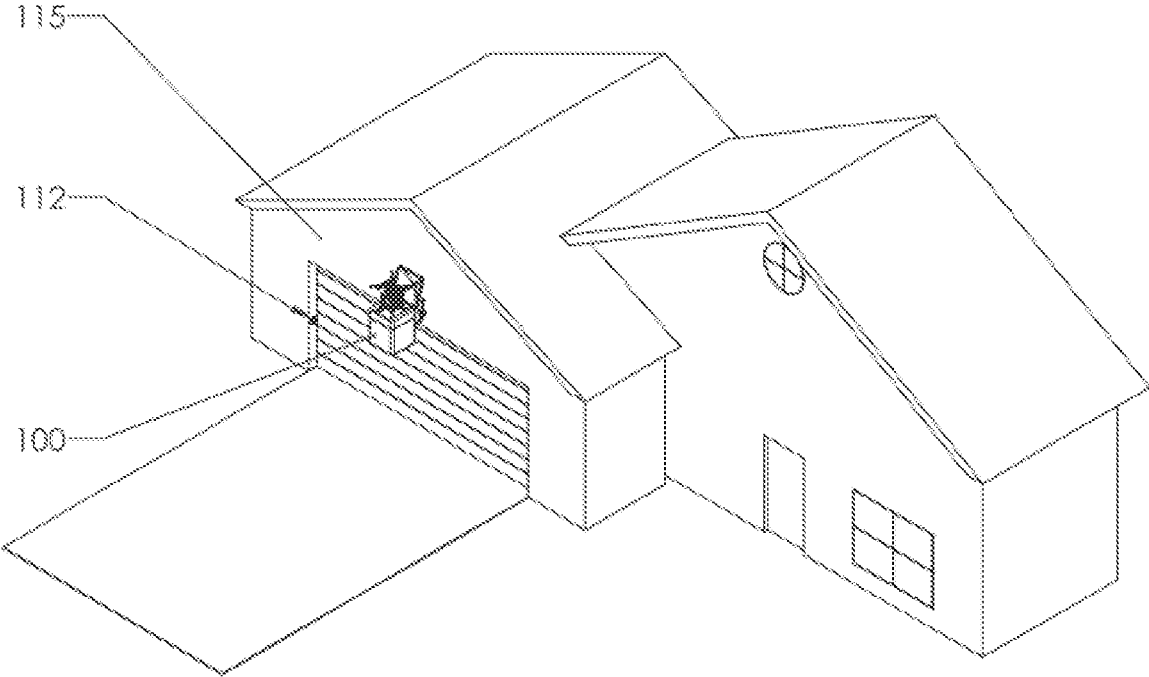


FIG. 7

SUSPENDING PACKAGE STORAGE CONTAINER

FIELD OF INVENTION

[0001] The present invention relates to a container and a system for storing one or more packages delivered to an address or a location and related methods. More particularly, the present invention relates to a container and a system for storing delivered packages in a suspending container configured to safely store multiple packages and methods for receiving and storing said packages.

BACKGROUND

[0002] Package delivery in the last few decades has evolved for a variety of parcels such as shipping containers, parcels, or high value mail as single shipments. Typically, most of the deliver of these various services are provided by postal systems, express mail, private courier companies, next day air and truck load shipping carriers. One of the fastest growing delivery markets is delivery to residential consumers. Residential consumers have developed their need for deliveries directly through to their door by avoiding malls, shopping locations, and even grocery stores by having items delivered directly to their door. Often times, consumers use same day delivery for local parcels via their local courier or a private courier.

[0003] In recent years, on-line ordering of a product and having the product delivered to a home address has become popular. This has increased the number of packages delivered to private addresses. The increase in delivered packages has caused a rise in the thefts of these packages from residences. One cause in the rise of theft of these packages is that the packages are often left in an unsecure, visible, and highly accessible area such as on a front porch of a residence when a resident is not home to receive the package. Theft problems are so prevalent with the rise in home delivered packages that the phrase “porch pirates” has been coined to explain the phenomena.

[0004] In order to combat package thefts, various security options have been utilized in order to protect packages. Parcel drop boxes have been used by consumers as an option to secure package drop offs. These devices often work much like package drop off slots you may see at your local post office. A door is opened, so that packages can be dropped within the drop slot, and when the door closes, the package drops into another compartment. Opening the drop slot door again does not expose the package stored inside the lockbox. Although these boxes may protect a package from an average grab and dash, more serious criminals won't be prevented from prying, cutting, lock picking, or lock drilling this device.

[0005] Another preventative method that has been used in a smart lock. A smart lock is an electronic door lock that communicates with other Bluetooth or Wi-Fi-enabled devices, and they can be used in several ways to prevent package theft. These types of devices can be left locked, and will only open after the proper barcode for an anticipated package is scanned. However, with the average individual lacking technical know-how in the operations of these devices, any error in the functionality of these products will lead to them to go unused.

[0006] Alternatively, there consumers have the options of using non-residential drop off points. There are several

retailers or companies that offer delivery as a selling point that will allow packages to be dropped off at a secure location, other than the consumers residence, in order to provide requested protection. However, these options can often become expensive and time consuming as a consumer will have to stop by a separate physical location that they are consistently renting periodically. For some consumers, this can become quite inconvenient. As such, there is a need in the art for a device that can increase the security of packages that are delivered to residential, or commercial locations, that provides a secure yet convenient way of receiving delivered packages when a consumer is away from their home.

[0007] Additionally, there have been recent interest in various delivery companies, to deliver many packages and parcels via aerial delivery. Often, these aerial deliveries are completed by delivery drones that are Federal Aviation Administration approved. These drones are capable of transporting packages, medical supplies, food, or other goods. However, often times these drone deliveries are made difficult if the drone is required to land on a porch, or another sheltered area in order to place a delivery. It would be advantageous for these aerial delivery devices to have a location specifically designed to be convenient to a drone or aerial delivery device, and also provide for security from potential “porch pirates.”

[0008] It is therefore the intent of the present invention to solve the aforementioned problems, and issues, by providing a package storage system in order to facilitate the protection and safe delivery of a plurality of packages.

[0009] The aspects or the problems and the associated solutions presented in this section are not necessarily approaches that have been previously conceived or pursued. Therefore, unless otherwise indicated, it should not be assumed that any of the approaches presented in this section qualify as prior art merely by virtue of their presence in this section of the application.

SUMMARY

[0010] In order to provide solutions to the previously discussed problem, various techniques for providing security for delivered packages objectives are disclosed herein. Embodiments described herein are representative examples of devices, methods, systems, services, and/or computer program products that can be used in conjunction with an extensible devices and services platform that, while being particularly applicable and advantageous for providing security objectives for delivered packages and items and in some instances in a smart home context, is generally applicable to any type of enclosure or group of enclosures (e.g., offices, factories, retail stores), vessels (e.g., automobiles, aircraft), or other resource-consuming physical systems that will be occupied by humans or with which humans will physically or logically interact. Thus, although particular examples are set forth in the context of home security for delivered packages, it is to be appreciated that the scope of applicability of the described extensible devices and services platform is not so limited.

[0011] An advance in the art is made by a smart storage system for one or more delivery packages in accordance with various embodiments of the invention. In accordance with some embodiments, the delivery package storage container of the present system comprises a storage container operable to be suspended from a structure is disclosed. The

storage container includes a housing having a plurality of sides configured to provide an enclosed space configured to store one or more packages. The storage container includes a first opening on a bottom portion comprising a platform configured to be lowered to receive the one or more packages. The storage container includes a top opening configured to open to receive the one or packages, and close to secure the one or more packages. The storage container includes a transceiver configured to send and receive one or more messages or signals from a user equipment (UE). The storage container includes a locking device configured to lock each of the bottom opening and the top opening.

[0012] In accordance with some embodiments of the invention, the first opening is configured to move between an open position allowing access to the at least one compartment and a closed position that closes the opening thereby preventing access to the at least one compartment from the location exterior of the housing.

[0013] In accordance with some embodiments of the invention, the locking device is integrated with the door or the housing, the locking mechanism.

[0014] In accordance with some embodiments of the invention, the locking device is Wi-Fi or Bluetooth enabled and configured to receive at least one of a lock signal and an unlock signal from one or more user equipment (UEs).

[0015] In accordance with some embodiments of the invention, the storage container further includes a control system comprising a microprocessor and a memory accessible by the control system, and instructions stored in the memory, wherein the instructions in the memory comprise instructions to receive a lock command and control the locking mechanism based on the lock command.

[0016] In accordance with some embodiments of the invention, the transceiver is configured to receive a first message from the UE, wherein the first message comprises of a request for access, and a predetermined verification indicator. The transceiver is further configured to determine if the predetermined verification indicator matches a scheduled delivery. The transceiver is further configured to send a second message to the UE, wherein the second message comprises of an approval, as a result of determining that the predetermined verification indicator matches the scheduled delivery. The transceiver is further configured to unlock the locking device, providing access to the enclosed space.

[0017] In accordance with some embodiments of the invention, the locking device is openable with a mechanical key, a combination code, an electronic signal, or combinations thereof.

[0018] Additionally, a storage container configured to receive aerial delivered packages, is disclosed. The storage container includes a basket configured to retain one or more packages. The storage container includes a middle section configured to retain one or more electronic devices. The storage container includes a top configured to enclose the basket. The storage container includes a mounting device configured to securely position the at least the middle section and the top to a fixed structure.

[0019] In one embodiment, the basket comprises of one or more containers or sections to organize one or more packages.

[0020] In one embodiment, the middle section further comprises and electronic cover, the electronic cover configured to securely encapsulate the electronic devices.

[0021] In one embodiment, the electronic devices comprise of one or more of a receiver, an actuator motor, a gear motor, and an illumination device.

[0022] In one embodiment, the middle section further comprises a spool comprising a retaining cord, the retaining cord configured to be strung from the spool to each corner of the basket.

[0023] In one embodiment, the basket is configured to be movable in an upward and downward direction about the retaining cord.

[0024] In one embodiment, each of the middle section and the top remains secured to the u bracket on the fixed structure.

[0025] In one embodiment, the basket is actuated in an upward direction and downward direction along the retaining cord strung in each corner of the basket by one or more of the gear motor or the actuator motor.

[0026] In one embodiment, the storage container includes a power source, configured to power each of the electronic devices.

[0027] The above aspects or examples and advantages, as well as other aspects or examples and advantages, will become apparent from the ensuing description and accompanying drawings. This summary is provided merely for purposes of summarizing some example embodiments, so as to provide a basic understanding of some aspects of the subject matter described herein.

[0028] Accordingly, it will be appreciated that the above-described features are merely examples and should not be construed to narrow the scope or spirit of the subject matter described herein in any way. Other features, aspects, and advantages of the subject matter described herein will become apparent from the following Detailed Description, Figures, and Claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] The accompanying figures are included to provide a further understanding of the invention, and are incorporated in and constitute a part of this specification. The figures illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

[0030] The foregoing and other objects, aspects, features, and advantages of the disclosure will become more apparent and better understood by referring to the following description taken in conjunction with the accompanying drawings, in which:

[0031] FIG. 1 is a perspective view of the storage container, in accordance with an example;

[0032] FIG. 2 is a top view of the storage container, in accordance with an example;

[0033] FIG. 3 is a flow diagram of a process performed by a delivery service provider server system in accordance with an embodiment of the invention, in accordance with an example;

[0034] FIG. 4 depicts the storage container suspended from a fixed structure and in the lowered position, in accordance with an example;

[0035] FIG. 5 depicts a perspective view of the storage container receiving a package from an aerial delivery, in accordance with an example;

[0036] FIG. 6 depicts a perspective view of the storage container mounted on a fixed structure, and receiving a package from an aerial delivery, in accordance with an example; and

[0037] FIG. 7 depicts a perspective view of the storage container mounted on a house above a garage door, and receiving a package from an aerial delivery, in accordance with an example.

[0038] Elements in the figures are illustrated for simplicity and clarity and have not been drawn to scale. For example, the dimensions and/or relative positioning of some of the elements in the figures may be exaggerated relative to other elements to help to improve understanding of various embodiments of the present invention. Also, common but well-understood elements that are useful or necessary in a commercially feasible embodiment are often not depicted in order to facilitate a less obstructed view of these various embodiments of the present invention. Certain actions and/or steps may be described or depicted in a particular order of occurrence while those skilled in the art will understand that such specificity with respect to sequence is not actually required. The terms and expressions used herein have the ordinary technical meaning as is accorded to such terms and expressions by persons skilled in the technical field as set forth above except where different specific meanings have otherwise been set forth herein.

DETAILED DESCRIPTION

[0039] The detailed description set forth below in connection with the appended drawings is intended as a description of the presently preferred embodiments of delivery package storage containers provided in accordance with aspects of the present devices, systems, and methods and is not intended to represent the only forms in which the present devices, systems, and methods may be constructed or utilized. The description sets forth the features and the steps for constructing and using the embodiments of the present devices, systems, and methods in connection with the illustrated embodiments. It is to be understood, however, that the same or equivalent functions and structures may be accomplished by different embodiments that are also intended to be encompassed within the spirit and scope of the present disclosure. As denoted elsewhere herein, like element numbers are intended to indicate like or similar elements or features.

[0040] Some detailed example embodiments are disclosed herein. However, specific structural and functional details disclosed herein are merely representative for purposes of describing example embodiments. Example embodiments may, however, be embodied in many alternate forms and should not be construed as limited to only the embodiments set forth herein.

[0041] The invention may be embodied in other specific forms without departing from the spirit of essential characteristics thereof. The present embodiments therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

[0042] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. As used herein, the term

“and/or” includes any and all combinations of one or more of the associated listed items. As used herein, the singular forms “a,” “an,” and “the” are intended to include the plural forms as well as the singular forms, unless the context clearly indicates otherwise. It will be further understood that the terms “comprises” and/or “comprising,” when used in this specification, specify the presence of stated features, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, steps, operations, elements, components, and/or groups thereof.

[0043] The following description is not to be taken in a limiting sense, but is made merely for the purpose of describing the general principles of exemplary embodiments. Reference throughout this specification to “one embodiment,” “an embodiment,” or similar language means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, appearances of the phrases “in one embodiment,” “in an embodiment,” and similar language throughout this specification may, but do not necessarily, all refer to the same embodiment.

[0044] Accordingly, a storage container operable to be suspended from a structure is disclosed. The storage container includes a housing having a plurality of sides configured to provide an enclosed space configured to store one or more packages. The storage container includes a first opening on a bottom portion comprising a platform configured to be lowered to receive the one or more packages. The storage container includes a top opening configured to open to receive the one or more packages, and close to secure the one or more packages. The storage container includes a transceiver configured to send and receive one or more messages or signals from a user equipment (UE). The storage container includes a locking device configured to lock each of the bottom opening and the top opening.

[0045] FIG. 1 is a perspective view of the storage container 100. The storage container can be a freestanding structure, connected to another structure, or integrated as a unit or piecemeal with or into another structure. The storage container 100, can include an internal compartment used as a basket 101 that is able to withhold one or more packages, parcels, or items. Packages can refer to any physical items including, but not limited to: items packaged in envelopes, items packaged in mailers, boxed products, unboxed products, groceries, or purchases. Accordingly, the storage container can be constructed in a variety of shapes and sizes.

[0046] The basket 101, can include a plurality of internal compartments that are able to organize the multiple packages that are received from a delivery service. Accordingly, the packages delivered by an aerial vehicle or a ground delivery driver, can be stored and sorted within one or more defined cavities of the basket 101 by components of the storage container 100 itself. The basket 101 may be further disposed and arranged to receive user deposited packages, or outgoing packages from a user. Such outgoing packages may be moved by the storage container 100 from the pick-up opening to the defined cavities. User deposited packages may then be accessed and retrieved by a drone via the top 103.

[0047] The basket can be constructed of one or more of hard plastic, metal, steel, alloy, or another hard container like surface that is able to be durable during various seasons and weather changes. In some embodiments, only a portion of

the storage container can be made of similar material, or made in combination with one or more of metal, another rigid, non-porous material, or other suitable material, recycled metal, recycled material, or other rigid and secure material to deter tampering.

[0048] The storage container **100** can also include a middle section **102** that can be removably attached to the basket **101**. The middle section **102** is able to house multiple operable components of the storage container **100**. The middle section **102** includes a receiver antenna **109** that is configured to communicate with a transceiver that is external of the storage container. The transceiver that the receiver **109** is in communication with via various wireless technologies such as radio frequency communication, wi-fi, and small wave communications, can be operable by a remote location, a delivery driver in his truck, or an aerial delivery device. The received is configured to receive a signal that indicates that a package or delivery is requested to be made into the basket **101** of the storage container **100**. Upon receiving the signal, the transceiver can interface with a controller in order to determine if a proper security key, or access identification has been received in order to allow a delivery service to deposit the package within the internal cavity of the basket.

[0049] The storage container **100** is also configured with a cable spool **106**. The cable spool **106** is positioned towards the back of the container, and adjoins two opposite walls with two opposite ends of a rod making up the cable spool **106**. The cable spool is configured to retain a retaining cord. The retaining cord can be selected from one or more of wire, braided wire and hybrid metal, twine, rope, cable or a composite wire. The spool **106** is configured to maintain and withhold the wire as it is wrapped around the spool, and unwrapped from the spool.

[0050] The storage container **100** also includes a gear motor **108**. The gear motor **108** is configured to interface directly with the cable spool **106**. The gear motor **108** can cause the spool to rotate in a first direction, along a 360-degree axis, to retract the retaining cord, causing the retaining cord to wrap around the spool. The gear motor **108** can also rotate in a second direction in order to unravel the retaining cord from the cable spool **106**.

[0051] The storage container **100** can also include an actuator motor **107**. The actuator motor **107** is configured to interact with the gear motor **108**. The actuator motor **107** upon receiving a signal from the receiver antenna **109**, that a package is intended to be delivered, and access has been granted, can communicate with the gear motor **108** to start rotating the cable spool **106** in a first direction, to unravel the retaining cord. The actuator motor **107** can further communicate with the gear motor **108** to rotate the cable spool **106** in a second direction, to ravel the retaining cord around the cable spool **106**. The actuator motor **107** can also cause the cable spool to unravel and ravel in one or more speeds depending on the weight of the packages in the basket **101**.

[0052] Access can be granted to actuate the actuator motor and the corresponding gear motor via a wireless signal, including an access request, that is received via the receiver antenna **109**. In some instances, the receiver antenna **109** can also be a transceiver. The receiver antenna **109** is also configured to receive an access request via a code entered on a keypad **112**. The keypad can be located on a fixed structure that the storage container is attached to or in relation to. In some embodiments, the keypad can communicate an access

code via a wireless fob that can communicate a valid access identification to the transceiver or the keypad itself.

[0053] In one embodiment, the interaction and communication between the actuator motor and the gear motor can be wired, or wirelessly facilitated via controller that is in communication with one or more of the actuator motors **107**, the gear motor **108**, and the cable spool **106**.

[0054] The middle section **102** can also include a light **110** that is configured to provide illumination to the internal cavity of the basket **101**. Once a receiver of the package comes home to retrieve a parcel or package, the light **110** can illuminate upon a photo sensor determining that there is sufficient enough darkness for a light to illuminate. The light **110** can in some embodiments be configured to determine when the basket has been opened in order to retrieve one or more packages.

[0055] In order to protect the electronics and circuitry within the middle section **102**, an electronic cover **105** can be used. The electronic cover **105** can effectively cover and seal the electronic devices within the middle section from damaging elements of various weather conditions. The electronic cover **105** can essentially hide the each of the light **110**, gear motor **108**, the actuator motor **107**, and the receiver antenna **109**.

[0056] Each of the electronic components, circuitry, or electronic devices are configured to be powered via a power source. The power source can include a battery **111**. The battery **111** can be used as the main source of power, or can be connected to another power source such as a solar panel that is used to receive and store energy for the storage container's **100** electronic operation.

[0057] In some embodiments, the basket **101** itself can be permanently attached to the middle section **102**, and comprise of all of the elements therein. In essence, the basket can be configured to become a one-unit device with the middle section.

[0058] The storage container **100** can further include a top **103** that is configured to enclose over the middle section **102**, in order to enclose the parcels within the basket **101**. The top **103** is configured to open in one direction, exposing the contents within the basket **101**. The top **103** is further configured to open in a second direction in order to enclose the parcels within the basket. The top **103** is configured to utilize one or more hinges in order to open and close in either direction. The top **103** can comprise of a single door, multiple doors, or multiple panels that can be opened simultaneously or individually. Each of the doors or panels are configured to have their own hinging system that is configured to attach to the middle section **102** of the storage container **100**. The top **103** can include an opening that may also include movable cover, door, flap, or other covering that is movable to allow aerial vehicle drop-off of packages while protecting the inside portion of drop box from weather, debris, and to prevent access to the drop box other than delivery or pick-up of packages by the aerial vehicle.

[0059] The storage container **100** further comprises of a mounting device comprising of a U-bracket **104**. The U bracket **104** is configured to allow the storage container **100** to be attached to a fixed structure. The U bracket **104** allows the storage container **100** to be attached to the fixed structure while also giving enough space away from the fixed structure. Accordingly, the u-bracket can be mounted in a centrally located area with respect to an individual residence, neighborhood, main entrance, frequently used entrance, a

well-traveled route, or a convenient intersection. In some instances, the storage container **100**, may be connected to, attached to, or installed, or integrated with existing apartment buildings, condominium buildings, houses, commercial properties, hotels, parks, and airports.

[0060] The storage container **100** or apparatus may be attached, installed, or integrated into bike storage facilities, bus stops, carports, garages, partially covered areas sporting arenas, amphitheatres, gazebos, or other partially enclosed structures. Storage containers **100** adjacent to buildings or other structures may be positioned partially inside and outside of a connected building. Outdoor portions may include openings used by drones and may be located on the exterior of an existing structure, simplifying drone navigation. User pick-up openings, maintenance access, and/or storage portions may be located inside or under shelter of the connected building or structure, providing user convenience while reducing package damage. The storage container **100** or apparatus may be oriented or positioned to maximize shelter from the elements. Openings of the storage container **100** may be further positioned to provide shelter. An aperture or opening on the storage container **100** may be adjustable based on package size, drone size, or height of the user.

[0061] Accordingly, the U-brackets **104** provide an advantage to prevent obstruction of an aerial vehicle drop off. As such, the embodiments described herein are embodiments that are integrated into a building or other structure. This provides the advantage of avoiding negatively impacted package deliveries or pick-ups by aerial vehicles. Providing enough space between the fixed structure or wall, and the storage container **100**, allows a drone enough room for error to find the optimum hovering location in order to release a package into the internal cavity of the basket **101**.

[0062] FIG. 2 is a top view of the storage container **100**. As discussed in relation to FIG. 1, the storage container **100** includes a top **103** that is configured to be actuated downward in order to cover the internal cavity of the basket **101**, and the middle section **102**. The middle section **102** is most closely related in proximity to the top **103**, and is able to be accessed from the top of the storage container **100**. As shown, each of the receiver antenna **109**, the actuator motor **107**, the gear motor **108**, and the light **110** can be affixed to the insider wall of the storage container **100**. In some instances, more than one gear motor **108** and more than one actuator motor **107** can be included in order to facilitate the raveling and unraveling of retaining cord from the cable spool.

[0063] The battery **111**, can be positioned to be affixed to the U brackets **104** for easy accessibility. The battery **111** can be configured to be in communication with a solar panel that is attached to the top **103**. The battery **111** can also be positioned on another location of the fixed structure in order to provide additional accessibility for a user.

[0064] In one embodiment, the light **110**, can be configured to illuminate the inside of the storage container **100**, illuminate the outside of the storage container **100**, or shine downwards toward the basket **101**, when the basket is removed from the storage container **100**.

[0065] In some embodiments, the light **110**, can further include a motion detector that is configured to activate the light upon movement within close proximity of the storage container **100**. The light **110**, can also include a camera, configured to capture still pictures or video images in order to further deter, or identify potential thieves or trespassers.

[0066] In an example, as depicted in the flow diagram of FIG. 3, before the first package delivery to the container, the door can be closed over the opening but not locked. Accordingly, the door is moved to open the at least one opening of the housing to expose the at least one compartment located inside the interior of the housing. A delivery person or entity can approach the device and send a message or request via a text message, a software application interaction, or via a signal sent via Bluetooth or Wi-Fi. The signal is received by a transceiver. The message sent comprises of one or more identification information, and is subsequently matched with a scheduled delivery. The identification information can be transmitted and received by the storage container and include data associated with package content, location, recipient, estimated timing, package destination, package location information, package delivery information, drone information, drone location information, estimated time and/or location data as well as similar information associated with courier delivery services.

[0067] The scheduled delivery is determined from a pre populated list of deliveries that can be populated manually, or automatically through association with one or more delivery carriers, or company memberships. These company memberships can comprise of one or more FedEx, UPS, USPS, Amazon, Walmart, or other companies of the like. Upon verification of the identification information, a door on the bottom side of the container will open and lower a platform from one or more compartments within the container, and receive the package for delivery. Upon the detection of the package being placed on the platform, via one or more sensors selected from a touch sensor, audio sensor, ultrasonic sensor, or a video sensor, the platform is raised back into one or more of the compartments of the container for storage. A locking device, then locks the container to secure the products or packages within. A log is then updated and a message sent to an owner or user of the container, verifying that the package has been received.

[0068] FIG. 4 depicts the storage container suspended from a fixed structure and in the lowered position. In order for the storage container **100** to receive the package or parcel **114** for delivery via a delivery service or courier, the basket **101** is lowered to the ground. As shown in FIG. 4, the storage container **100** is suspended from a fixed structure **115** such as a house, building, or other structure. The top **103**, and the middle section **102** of the storage container **100**, remain affixed to the u-brackets **104** that is affixed to the fixed structure **115**, while the basket is lowered by the actuator motor and the gear motor as discussed in the above discussion. Accordingly, the basket **101** is configured to be supported by a plurality of cables **113a-d** that are positioned on each corner of the basket **101**. Each of the plurality of cables **113a-d** are raveled and unraveled from one or more cable spools **106** positioned inside of the middle section **102**. The cable spool **106** is activated and controlled by the actuator motor **107** in order to manipulate the basket **101**, downward via the gear motor **108**. The actuator **107** is configured to cause the gear motor to rotate the cable spool **106** in order to release the cable **113a-d** from the cable spool **106**, resulting in each corner of the basket **101** being lowered simultaneously. The simultaneous lowering of the basket ensures that packages **114** that are already retained within the basket **101**, will not be lost from the internal cavity of the basket **101** during lowering.

[0069] In some additional cables 113a-d can be manipulated from the cable spool in order to provide additional supports on one or more sides of the basket 101.

[0070] In some embodiments, one or more gear motors can be positioned to be in communication with, and operate each of the one or more cables 113a-d.

[0071] In one embodiment, one or more actuator motors can be positioned in combination with the one or more gear motors, to be in communication with the one or more cables 113a-d.

[0072] Similarly, as shown in FIG. 5, in another example, the internal cavity of the basket can be accessed via a top portion 103 of the suspended container via a drone 116 or other aerial delivery service. The aerial delivery service or drone can hover above the container, and send a signal or message to a transceiver or a receiver within the middle section 102 in order to gain access to the internal compartment of the storage container 100. The transceiver can receive the signal comprising of an initial request for access. The transceiver can then request the drone 116 for access identification in order to identify if a delivery is expected. The drone 116, via a transceiver, can send a message or a signal to the receiver or transceiver of the storage container 100 with an access key, encrypted key, access code, or predetermined signal. In addition to the access identification, one or more additional identification information in the message is subsequently sent that matches with a scheduled delivery. Upon verification of the identification information, the top 103 of the storage containers 100 can open from one or more compartments within the container, in order for the package 114 to be received from the drone 116. Accordingly, the package can be dropped into the compartment via the drone or aerial delivery service.

[0073] FIG. 6 depicts a perspective view of the storage container mounted on a fixed structure, and receiving a package from an aerial vehicle. As shown in FIG. 6, the drone 116 is configured to hover over the opened top 103 of the storage container 100, in order to lower or drop a package 114 in to the basket 101. The key pad 112, can be activated upon being notified via a transceiver in the middle section 102, that a package 114 has been delivered. Upon the key pad 112, being activated, the receiver of the package can type in their access identification key, and the basket 101, can be lowered to the ground for retrieval of the package 114.

[0074] FIG. 7 depicts a perspective view of the storage container 100 mounted on a house 115 above a garage door, and receiving a package from an aerial delivery. The storage container 100 can be positioned above a garage door of a house 115, or on another fixed portion of the house 116 in order to make it difficult for packages within the storage container to be accessed by anyone other than the owner of the home 115. The u-brackets are secured to the side of the home 115 in order to ensure that the storage container 100 is properly secured and unable to be removed without the proper tools.

[0075] In another example, the drone can land on the top portion of the container, and lower the product or package into an available compartment. In one example, the drone can be recharged via a wireless charging pad at the top of the top portion.

[0076] Upon the detection of the package being placed on the platform of the basket, via one or more sensors selected from a touch sensor, audio sensor, ultrasonic sensor, or a

video sensor, the door of the opening of the one or more of the compartments of the container is closed. Subsequently, a locking device, then locks the container to secure the products or packages within. A log is then updated and a message sent to an owner or user of the container, verifying that the package has been received.

[0077] In accordance with some embodiments, a locking mechanism may be associated with the door. If two or more doors, there can be two or more locking mechanisms. For example, the locking mechanism can have a throw or a latch associated with the door and a socket for receiving the throw or latch associated with the housing. In other examples, the arrangement of the throw or latch and the receiving socket can reverse. The locking system may alternate between an unlock state and to a lock state to secure the door in the closed position and may unlock to allow the door to move between the closed position to an open position to allow access through the compartment opening, or the through opening. In exemplary embodiments, the locking mechanism is a smart lock. For example, the smart lock can be Wi-Fi enabled, Bluetooth enabled, have fingerprint scanning capability, and can include a touchscreen for entering codes to lock and unlock the locking mechanism.

[0078] In accordance with some embodiments, a delivery package container may include a container control system. The container control system can comprise a computer system having a processing system and a memory accessible by the processing system. In accordance with some embodiments, the container control system may receive climate instructions, and adjust the climate control system to change the climate in the enclosure based on the climate instructions. In accordance with many embodiments, the container control system may receive a lock command and control the locking mechanism based on the lock command.

[0079] In its simplest form, the delivery package storage container of the present invention comprises a housing comprising a plurality of walls, at least one through opening, at least one door for covering the at least one through opening, and a locking mechanism for controlling access to the interior of the storage container via the at least one opening and the at least one door. The through opening allows access to the interior space, such as a compartment inside the housing, from a position exterior of the housing.

[0080] In an alternative example, a docking system can also be provided with the delivery package storage container. The docking system can comprise an anchor for securely fixing the delivery package storage container to a structure, in order to suspend the container out of reach of potential thieves, and other threats to the packages within, such as to above a garage door, above a front door, on a side of a house or on top of an anchoring post. The docking system can comprise mounting flanges or fasteners for anchoring the delivery package storage container to the structure. In another example, the docking system can comprise a home docking base that is adapted to couple, receive, or engage a container docking base.

[0081] In accordance with some embodiments, the container can comprise of multiple compartments within the basket. Additionally, a first or a second door affixed to the housing can be movable between a closed position in which the door encloses the second opening and an opened position that allows access to the second compartment. For example, the delivery package storage container can have two or more compartments within the housing, each being separately

accessible by a different opening with each opening being controlled or regulated by a door. The two compartments can have the same size and/or shape or different sizes and/or shapes. By having two or more compartments, access to the different compartments can be given to different delivery personnel to further increase security.

[0082] The methods, operations, acts, and logic flows as described herein may be performed by one or more programmable processors executing one or more computer programs or may also be partially or completely implemented as special purpose logic circuitry (e.g., an FPGA or an ASIC). Processors as referred to herein include both general and special purpose microprocessors as well as any one or more processors of any kind of digital computer.

[0083] Illustrations, including figures, of the embodiments described herein are intended to provide a general understanding of the structure of various embodiments. Illustration is not intended to serve as a complete description of all the elements and features of apparatus, systems, and methods using the structures and methods described herein. Illustration is merely representational and figures may not be drawn to scale. Certain proportions within the illustrations may be exaggerated, while other proportions may be minimized. Portions of interior and exterior views of components may not be physically viewable from a single view as illustrated. Such incomplete, partial, or combinations of views and are provided for context. Thus, the disclosure and the figures are to be regarded as illustrative rather than restrictive.

[0084] Examples and embodiments should not be construed as limitations on the scope of the invention or what may be claimed, rather as descriptions of features specific to particular embodiments of the invention. Certain features that are described herein in the context of separate embodiments can also be implemented in combination in a single embodiment. Conversely, various features that are described in the context of a single embodiment can also be implemented in multiple embodiments separately or in any suitable sub-combination. Although features may be described as acting in certain combinations and even initially claims as such, one or more features from a claimed combination, can, in some cases, be excised from the combination, and the claimed combination may be directed to a sub-combination or variations of a sub-combination.

[0085] Although certain delivery storage container systems, apparatus, components, features, advantages, methods, and the like have been described herein in accordance with the teachings of the present disclosure, the scope of coverage of this patent is not limited thereto. On the contrary, this patent covers all embodiments of the teachings of the disclosure that fairly fall within the scope of permissible equivalents.

[0086] Although various embodiments of a process performed by a container control system to obtain access to the door of a compartment or interior space of a container are described, other processes for obtaining access that add, combine, modify, and/or remove steps of the processes may be performed in accordance with various other embodiments of the invention.

[0087] Methods of manufacturing and of using the delivery package storage containers described herein and components thereof are within the scope of the present disclosure.

[0088] Although limited embodiments of the delivery package storage containers and their components have been specifically described and illustrated herein, many modifications and variations will be apparent to those skilled in the art. Accordingly, it is to be understood that the delivery package containers and their components constructed according to principles of the disclosed devices, systems, and methods may be embodied other than as specifically described herein. The disclosure is also defined in the following claims.

[0089] Example embodiments having thus been described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the intended spirit and scope of example embodiments, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

[0090] Although the present invention has been described in terms of various embodiments, it is not intended that the invention be limited to these embodiments. Modification within the spirit of the invention will be apparent to those skilled in the art.

[0091] It is additionally noted and anticipated that although the device is shown in its most simple form, various components and aspects of the device may be differently shaped or modified when forming the invention herein. As such those skilled in the art will appreciate the descriptions and depictions set forth in this disclosure or merely meant to portray examples of preferred modes within the overall scope and intent of the invention and are not to be considered limiting in any manner. While all of the fundamental characteristics and features of the invention have been shown and described herein, with reference to particular embodiments thereof, a latitude of modification, various changes and substitutions are intended in the foregoing disclosure and it will be apparent that in some instances, some features of the invention may be employed without a corresponding use of other features without departing from the scope of the invention as set forth. It should also be understood that various substitutions, modifications, and variations may be made by those skilled in the art without departing from the scope of the invention.

What is claimed is:

1. A storage container operable to be suspended from a structure, comprising:

- a housing having a plurality of sides configured to provide an enclosed space configured to store one or more packages;
- a first opening on a bottom portion comprising a platform configured to be lowered to receive the one or more packages;
- a top opening configured to open to receive the one or more packages, and close to secure the one or more packages;
- a transceiver configured to send and receive one or more messages or signals from a user equipment (UE); and
- a locking device configured to lock each of the bottom opening and the top opening.

2. The storage container of claim 1, wherein the first opening is configured to move between an open position allowing access to the at least one compartment and a closed position that closes the opening thereby preventing access to the at least one compartment from the location exterior of the housing.

3. The storage container of claim 1, wherein the locking device is integrated with the door or the housing, the locking mechanism.

4. The storage container of claim 1, wherein the locking device is enabled to be digitally secured and configured to receive at least one of a lock signal and an unlock signal from one or more user equipment (UEs).

5. The storage device of claim 4, wherein the locking device is enabled to be digitally secured with one or more of wireless communication or radio frequency identification comprising short-wavelength ultra-high frequency (UHF) radio waves enabled.

6. The storage container of claim 1, further comprising: a control system comprising a microprocessor and a memory accessible by the control system; and instructions stored in the memory.

7. The storage container of claim 1, wherein the instructions stored in the memory comprises a plurality of instructions to receive a lock command and control the locking mechanism based on the lock command.

8. The storage container or claim 1, wherein the transceiver is configured to:

receive a first message from the UE, wherein the first message comprises of a request for access;

determine if the request for access matches a scheduled delivery;

send a second message to the UE, wherein the second message comprises of an approval, as a result of determining that the request for access matches the scheduled delivery; and

unlock the locking device, providing access to the enclosed space.

9. The storage container of claim 8, wherein the first message further comprises a predetermined verification indicator.

10. The storage container of claim 1, wherein the locking device is openable with a mechanical key, a combination code, an electronic signal, a key pad, a user equipment, a biometric scan via a biometric sensor or combinations thereof.

11. The storage container of claim 1, configured to be mounted on a fixed structure via a u-mount.

12. A storage container configured to receive aerial delivered packages comprising:

a basket configured to retain one or more packages;

a middle section configured to retain one or more electronic devices;

a top configured to enclose the basket; and

a mounting device configured to securely position the at least the middle section and the top to a fixed structure.

13. The storage container of claim 12, wherein the basket comprises of one or more containers or sections to organize one or more packages.

14. The storage container of claim 12, wherein the middle section further comprises and electronic cover, the electronic cover configured to securely encapsulate the electronic devices.

15. The storage container of claim 12, wherein the electronic devices comprise of one or more of a receiver, an actuator motor, a gear motor, and an illumination device.

16. The storage container of claim 12, wherein the middle section further comprises a spool comprising a retaining cord, the retaining cord configured to be strung from the spool to each corner of the basket.

17. The storage container of claim 16, wherein the basket is configured to be movable in an upward and downward direction about the retaining cord.

18. The storage container of claim 17, wherein each of the middle section and the top remains secured to the u bracket on the fixed structure.

19. The storage container of claim 17, wherein the basket is actuated in an upward direction and downward direction along the retaining cord strung in each corner of the basket by one or more of the gear motor or the actuator motor.

20. The storage container of claim 12, further comprising a power source, configured to power each of the electronic devices.

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