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DATA COLLECTION FOR SELL-THROUGH MERCHANDISE

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DATA COLLECTION FOR SELL-THROUGH MERCHANDISE

ABSTRACT

[0001] A merchandise security device is provided. The merchandise security device may include a security device configured to be attached to an item of merchandise for protecting the item of merchandise from theft. The security device is configured to collect data resulting from interaction between the item of merchandise and a consumer. The security system also includes an electronic key configured to communicate with the security device and to receive the data collected by the security device.

FIELD OF THE INVENTION

[0002] Embodiments of the present invention relate generally to merchandise security systems and methods for collecting data for items of merchandise, such as sell-through merchandise.

BACKGROUND OF THE INVENTION

[0003] It is common practice for retailers to store and/or display items of merchandise on or within a merchandise security device, such as a security display (e.g. alarming stand), security fixture (e.g. locking hook, shelf, cabinet, etc.) or security packaging (e.g. merchandise safer). Regardless, the security device stores and/or displays an item of merchandise so that a potential purchaser may view, and in some instances, interact with the item before making a decision whether to purchase the item. At the same time, the item is secured on or within the merchandise security device so as to prevent, or at least deter, theft of the item.

[0004] It may be desirable for retailers to collect various information regarding the shopping habits of consumers, as well as information relating to successful or

unsuccessful product purchases. Such information may be used to predict future behavior or to modify existing practices or products.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0005] Referring now to the accompanying drawing figures wherein like reference numerals denote like elements throughout the various views, one or more embodiments of a merchandise display security system are shown. In the embodiments shown and described herein, the system includes an electronic key and a merchandise security device. In some embodiments shown and described herein, the merchandise security device is employed for securing items of merchandise from theft. For example, the merchandise security device may be suitable for use with a variety of items merchandise, including packages containing items of merchandise therein. In some embodiments, the merchandise is "sell-through" merchandise. As used therein, sell-through merchandise is merchandise that requires the assistance of a sales associate prior to purchasing the item of merchandise. In some cases, the sales associate is at a check-out counter where the merchandise security device is removed from the item of merchandise. Thus, in some embodiments, a consumer is able to inspect and transport an item of merchandise and associated security device within a retail store.

[0006] The electronic key may be useable with any security device that utilizes power transferred from the key to operate a lock mechanism associated with the security device and/or utilizes data transferred from the key to authorize the operation of a lock mechanism, such as an alarm circuit. In other words, an electronic key according to embodiments of the invention is useable with any security device or lock mechanism that requires power transferred from the key to the device and/or data transferred from the key to the device. It should be noted that although the invention is described with respect to embodiments including an electronic key for transferring both data and electrical power to a

merchandise security device to operate a mechanical lock mechanism, the invention is equally applicable to an electronic key for transferring only electrical power to a merchandise security device to operate any component of the merchandise security device (e.g., a lock mechanism), whether or not the device includes an internal or external power source for operating another component of the device.

[0007] Embodiments of merchandise display systems and method according to the invention is illustrated in FIGS. 1-6, which are explained in further detail below. The embodiment of the merchandise display security system and method depicted comprises a merchandise security device that is configured to be operated by an electronic key. The system and method may further comprise an optional programming station that is operable for programming the key with a security code, which is also referred to herein as a Security Disarm Code (SDC). A programming station suitable for use with the present invention is shown and described in detail in United States Patent No. 7,737,844 entitled PROGRAMMING STATION FOR A SECURITY SYSTEM FOR PROTECTING MERCHANDISE, the disclosure of which is incorporated herein by reference in its entirety. It is understood that in other embodiments, the electronic key may be programmed without use of a programming station. For example, the key may be self-programming or could be pre-programmed with a particular security code.

[0008] In addition to programming station, the system and method may further comprise an optional charging station that is operable for initially charging and/or subsequently recharging a power source disposed within the key. The electronic key may be provisioned with a single-use (i.e. non-rechargeable) power source, such as a conventional or extended-life battery, or alternatively, the key may be provisioned with a multiple-use (i.e. rechargeable) power source, such as a conventional capacitor or rechargeable battery. In either instance, the power source may be permanent, semi-permanent (i.e. replaceable), or rechargeable, as desired. In the latter instance, charging station is provided to initially charge

and/or to subsequently recharge the power source provided within the electronic key.

[0009] In one embodiment, the merchandise security device is a “passive” device. As used herein, the term passive is intended to mean that the security device does not have an internal power source (e.g., a battery) sufficient to lock and/or unlock a mechanical lock mechanism. Significant cost savings are obtained by a retailer when the merchandise security device is passive since the expense of an internal power source is confined to the electronic key, and one such key is able to operate multiple security devices. In addition, the security device may not require an electric motor, such as a DC stepper motor, solenoid, or the like, that is configured to lock or unlock the lock mechanism. As such, the security device may employ a simplified lock mechanism that does not require various components operated by its own source of electrical power.

[0010] In one embodiment, the electronic key does not transmit a security disarm code (“SDC”) to the security device. However, in other embodiments, the electronic key may be configured to transmit an SDC to the security device. In this example, the security device may include a corresponding SDC. Thus, the electronic key may be configured to perform a handshake communication protocol with the security device. Where the SDC of the electronic key matches the SDC of the security device, the electronic key may then be configured to transmit electrical power to the security device. As will be readily apparent to those skilled in the art, the SDC may be transmitted from the electronic key to the merchandise security device by any suitable means, including without limitation, via one or more electrical contacts, or via optical, acoustic, electromechanical, electromagnetic or magnetic conductors, as desired. Furthermore, the SDC may be transmitted by inductive transfer of data from the electronic key to the programmable merchandise security device.

[0011] In one embodiment, the logic control circuit of the key is configured to

cause the internal power source of the key to transfer electrical power to the security device to operate a lock mechanism of the security device. In one embodiment, electrical contacts disposed on the electronic key electrically couple with cooperating electrical contacts on the merchandise security device to transfer power from the internal battery of the key to the merchandise security device. Power may be transferred directly to the lock mechanism via one or more conductors. For example, a conductor may be coupled to a mechanical lock mechanism, and when electrical power is conducted through the conductor, a state change occurs thereby resulting in operation of the lock mechanism. In one example, the conductor is coupled to a shape memory material (e.g., Nitinol) such that electrical power transferred through the conductor results in a change in shape of the shape memory material. Such a change in shape may cause a mechanical actuation (e.g., linear or rotary) of the lock mechanism to thereby lock or unlock the lock mechanism. Examples of using such shape memory material for a lock mechanism may be found, for example, in U.S. Application No. 14/328,051, filed on July 10, 2014, which is hereby incorporated by reference in its entirety. In other embodiments, the lock mechanism may cooperate with a motor or solenoid for operating the lock mechanism.

[0012] The security device may include a transfer port sized and shaped to receive a transfer probe of the electronic key. For instance, FIG. 7 shows that an electronic key 10 includes a transfer probe 34, along with an actuator 20 configured to actuate the key. At least one, and sometimes, a plurality of magnets may be disposed within the transfer port for securely positioning and retaining the transfer probe of the key in electrical contact with electrical contacts of the mechanical lock mechanism. Power is transferred from the electronic key to the security device through electrical contacts disposed on the transfer probe of the key and corresponding electrical contacts disposed within the transfer port of the security device.

[0013] In another embodiment of a merchandise display security system, the

system and method comprise an electronic key with inductive transfer, and a merchandise security device that is operated by the key. However, the electronic key is useable with any security device or locking device with inductive transfer capability that requires power transferred from the key to the device by induction, or alternatively, requires data transferred between the key and the device and power transferred from the key to the device by induction.

[0014] In one embodiment, the security device comprises an internal lock mechanism. A transfer port may be formed in the security device that is sized and shaped to receive a transfer probe of the electronic key. If desired, the transfer port may comprise mechanical or magnetic means for properly positioning and securely retaining the key within the transfer port. In one embodiment, it is only necessary that the inductive transceiver of the electronic key is sufficiently aligned or proximate to the corresponding inductive transceiver of the security device or proximate to the transfer port. Therefore, magnets are not required to position, retain and/or maintain electrical contacts provided on the electronic key in electrical contact with corresponding electrical contacts provided on the security device. In the particular embodiment shown and described herein, data and/or power is transferred from the electronic key to the security device by wireless communication, such as infrared (IR) optical transmission as discussed above. Power may be transferred from the electronic key to the security device by induction across the transfer port of the security device using an inductive transceiver disposed within a transfer probe of the key that is aligned with a corresponding inductive transceiver disposed within the security device. For example, the transfer probe of the electronic key may comprise an inductive transceiver coil that is electrically connected to the logic control circuit of the key to provide electrical power from the internal battery of the key to an inductive transceiver coil disposed within the security device. The inductive transceiver coil of the security device may then transfer the electrical power from the internal battery of the key to the lock mechanism disposed within the security

device. Thus, the security device may include at least one conductor configured as a coil having a plurality of continuous windings. As previously mentioned, the power transferred from the key may be used to unlock the lock mechanism without the need for various other electrically powered mechanisms, for example, an electric motor, DC stepper motor, solenoid, or the like.

[0015] FIGS. 1-3 illustrate an embodiment of a security device 100 configured to cooperate with an electronic key (see, e.g., FIG. 7) for locking and/or unlocking a lock mechanism. In some embodiments, the electronic key is also configured to arm and/or disarm an alarm circuit contained within the security device. FIG. 1 shows that the security device generally includes a housing 120 coupled to a cable 140. As shown, the cable is configured to extend at least partially about an item of merchandise. Where the item of merchandise is a six-sided item, the cable is configured to extend about the front and rear sides as well as a pair of lateral sides. The housing is configured to be positioned adjacent to one of the lateral sides of the item of merchandise, such as on the top side of the item of merchandise. Thus, the housing does not take away from the presentation of the item of merchandise, which is unlike conventional cable wraps that require the security device to be positioned on one of the major surfaces of the item of merchandise, which may hinder the visibility of relevant information, as well as hinder the ability to stack items of merchandise adjacent to one another in a compact manner.

[0016] The cable may be flexible so as to be able to extend about and conform to the shape of the item of merchandise. In some embodiments, the cable includes at least one conductor for defining a sense loop therethrough. The housing may contain an alarm circuit in communication with the sense loop that is configured to detect when the cable has been cut or removed from the housing. The alarm circuit may be configured to generate an audible and/or a visible alarm in response to interruption of the sense loop. In addition, the cable may include a cut-resistant cable or sheath. Furthermore, the cable may be a

single continuous loop. Thus, unlike conventional cable wraps, more than one cable is not required, although it is possible that more than one cable could be used if desired.

[0017] In this embodiment, the cable is configured to be manually wound and unwound from the housing for extending and retracting the cable relative to the housing. Thus, the cable may be configured to be tightened around an item of merchandise for securing the housing to the item and to be loosened for removing the housing and cable from the item. The security device further includes a lock mechanism. The lock mechanism may include a lock button that is configured to be moved between a locked position and an unlocked position. In the illustrated example, the lock button is configured to be moved outwardly to the unlocked position and inwardly within the housing to the locked position. In the locked position, the cable may be locked relative to the housing such that the cable is unable to be withdrawn out of the housing or retracted into the housing. Notably, the lock mechanism does not require complicated assemblies, such as ratchet mechanisms, for winding, unwinding, or locking the cable. When the lock mechanism is in an unlocked position, the cable can be withdrawn from the housing so that the security device may be removed from the item of merchandise.

[0018] FIGS. 4-6 illustrate another embodiment of a merchandise display security device. In this embodiment, the security device 300 is a lockable enclosure commonly referred to in the art as a "safer." The security device 300 includes a housing 320 defining a generally hollow interior compartment 321 configured to receive an item of merchandise M therein. The security device 300 also includes a lid 340 engaged with the housing 320 that is configured to move between opened and closed positions relative to the housing. A lock mechanism is operably engaged with the lid 340 and the housing 320 to lock the lid 340 onto the housing 320 in the closed position. As previously described, the security device 300 may include a shape memory material that is operably engaged with

the lock mechanism and configured to change shape in response to the lock mechanism receiving electrical power from the electronic key 40. In particular, the shape memory material is operable for unlocking the lid 340 from the housing 320 so that the item of merchandise may be removed from the housing in the opened position. The security device 300 may include a transfer port 344 on the lid 340 or the housing 320. As discussed above, the transfer port 344 is configured to receive electrical power, for example from the electronic key 40, as well as facilitate communication with the electronic key in some embodiments.

[0019] In one embodiment, the housing 320 also includes a removable hang tag 324 operably engaged with the housing. The hang tag 324 may be defined on an upper surface 322 of the housing 320 opposite the lid 340. The hang tag 324 may include an opening 326 configured to receive a rod therethrough for hanging one or more of the security devices 300 on the rod in a display orientation. The hang tag 324 may be configured to pivot between an upright position (FIG. 5) and a folded position (FIG. 4). As shown herein, the lid 340 is pivotally attached to the housing 320 (FIG. 4). Thus, the lid 340 pivots between opened and closed positions relative to the housing 320. The lid 340 may be pivotally connected to the housing 320 such that the outer surface of the lid 340 and housing 320 are substantially flush with the pivot connection 330. In this embodiment, the lid 340 of the security device 300 includes a movable latch 345. The movable latch 345 is configured to move relative to the lid 340 between a retracted (locked) configuration and an extended (unlocked) configuration.

[0020] In some embodiments, the security device includes a motion sensor. The motion sensor may be configured to detect when the security device and associated item of merchandise attached thereto is touched, picked up, or otherwise manipulated by a potential customer. In some embodiments the motion sensor is a jiggle switch or the like. The motion sensor may also be used to activate a battery or power source such that the battery is only activated when motion is detected or a security event occurs. Thus, the life of the battery may

be conserved. Moreover, the security device may include a timing mechanism. The timing mechanism may be configured to determine an amount of time that the security device has been moved as detected by the motion sensor.

[0021] As discussed above, the security device is configured to communicate with an electronic key. In some embodiments, the security device is configured to store various data and information, such as in a memory carried by the security device, in response to interaction between the item of merchandise and the consumer. For example, the data may include the number of pick-ups of a particular item of merchandise to which the security device is attached, the date and time of pick-up, an identifier or name of the item of merchandise, etc. The security device may be configured to store the data automatically in response to detecting motion. The security device may be configured to communicate with the electronic key to transfer said data to the electronic key using any of the communication techniques discussed above, as well as others such as Bluetooth, Wi-Fi, etc. The electronic key may then be configured to communicate the information to a central location or device maintained by a retailer or third party using similar communication means.

[0022] The retailer may be able to interpret the data to make various assumptions and determine various trends regarding a particular item of merchandise or a particular product line or class. For instance, if a security device detects several pick-ups that are short in duration (e.g., less than about 5 seconds), the consumer likely did not purchase the item of merchandise. Where the pick-up was longer (e.g., longer than about 30 seconds), the consumer may have considered purchasing the item of merchandise but ultimately decided against purchasing the item. Moreover, where the pick-up was substantially longer (e.g., longer than about 5 minutes), a sale of the item of merchandise likely occurred. Therefore, various trends may be interpreted using the data detected by the motion sensor and the timer. The retailer may use the data to take various actions, such as for example, to replace an item of merchandise,

change a layout of the items of merchandise on display, train sales associates that are responsible for the items of merchandise at issue, take additional security measures for high-theft items, etc.

[0023] In some embodiments, the security device and the electronic key are similar to those disclosed in U.S. Patent Publ. No. 2013/0081434, entitled Cabinet Lock for Use with Programmable Electronic Key and filed September 28, 2012, U.S. Patent Publ. No. 2012/0047972, entitled Electronic Key for Merchandise Security Device and filed August 31, 2011, and U.S. Patent Publ. No. 2011/0254661, entitled Programmable Security System and Method for Protecting Merchandise and filed June 27, 2011, U.S. Application No. 14/328,051, entitled Merchandise Display Security Devices for Use with an Electronic Key and filed on July 10, 2014, International Application No. PCT/US2014/33465, entitled Security Devices for Products and filed on April 9, 2014, and U.S. Provisional Application No. 61/936,526, entitled Wrap for an Item of Merchandise and filed on February 6, 2014, each of which is incorporated herein by reference in its entirety. In other embodiments, the security device and the electronic key are similar to those manufactured by InVue Security Products Inc., including the Plunger Locks, Smart Locks, and IR2 and IR2-S Keys.

[0024] The foregoing has described one or more embodiments of a merchandise display security device for use with an electronic key. Embodiments of a merchandise display security system have been shown and described herein for purposes of illustrating and enabling the best mode of the invention. Those of ordinary skill in the art, however, will readily understand and appreciate that numerous variations and modifications of the invention may be made without departing from the spirit and scope of the invention. Accordingly, all such variations and modifications are intended to be encompassed by the appended claims.

That which is claimed is:

1. A merchandise security system for securing an item of merchandise from theft, the security system comprising:

a security device configured to be attached to an item of merchandise for protecting the item of merchandise from theft, the security device configured to collect data resulting from interaction between the item of merchandise and a consumer; and

an electronic key configured to communicate with the security device and to receive the data collected by the security device.

2. The security system of Claim 1, wherein the security device comprises a motion sensor and a timing mechanism.

3. The security system of Claim 2, wherein the motion sensor is configured to detect movement of the security device, and wherein the timing mechanism is configured to determine the amount of time that the security device has been moved.

4. The security system of Claim 1, wherein the security device comprises a memory for storing the data.

5. The security system of Claim 1, wherein the electronic key is configured to wirelessly communicate with the security device.

6. The security system of Claim 1, wherein the security device comprises a cable wrap for extending about the item of merchandise or a lockable enclosure configured to enclose the item of merchandise therein.

7. The security system of Claim 1, wherein the security device is

configured to be attached to a sell-through item of merchandise.

8. The security system of Claim 1, wherein the data includes the duration that the consumer interacts with the item of merchandise.

9. The security system of Claim 1, wherein the electronic key is configured to communicate with the security device for removing the security device from the item of merchandise.

10. The security system of Claim 1, wherein the security device comprises an alarm circuit, and wherein the electronic key is configured to arm and/or disarm the alarm circuit.

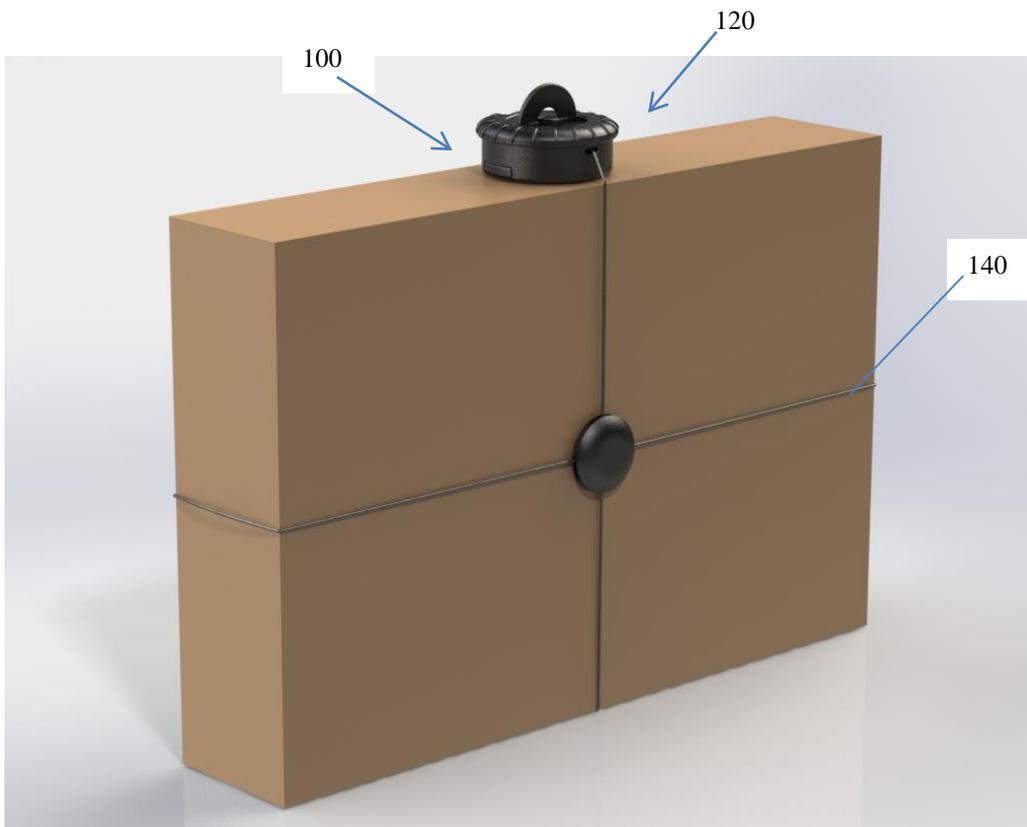


FIGURE 1

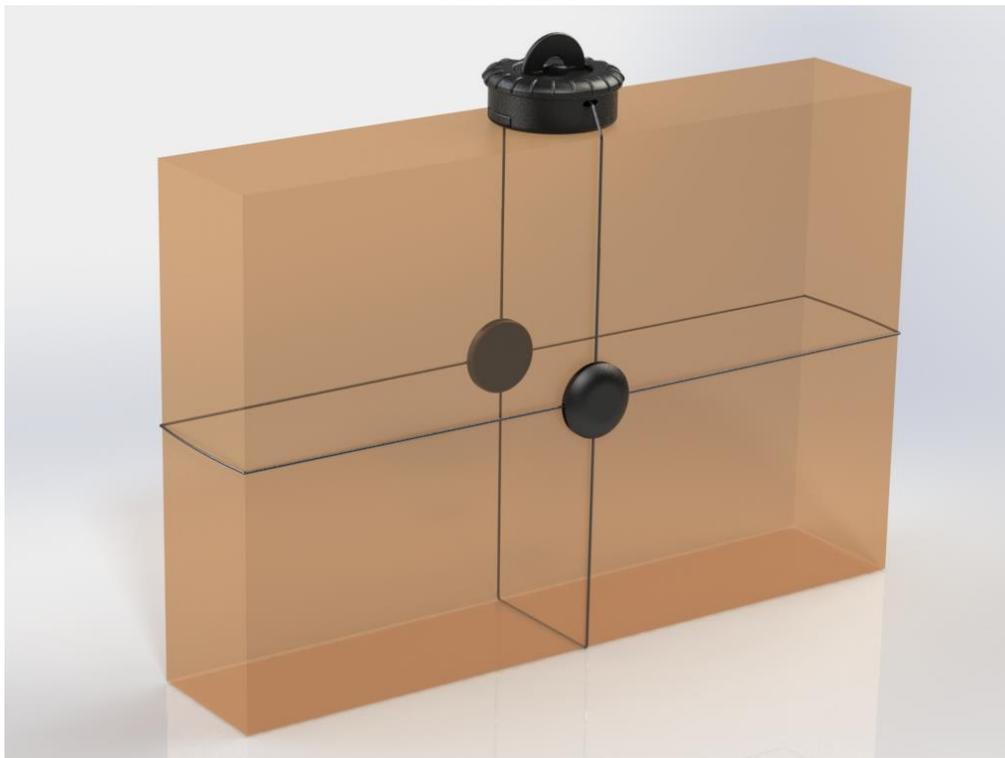


FIGURE 2

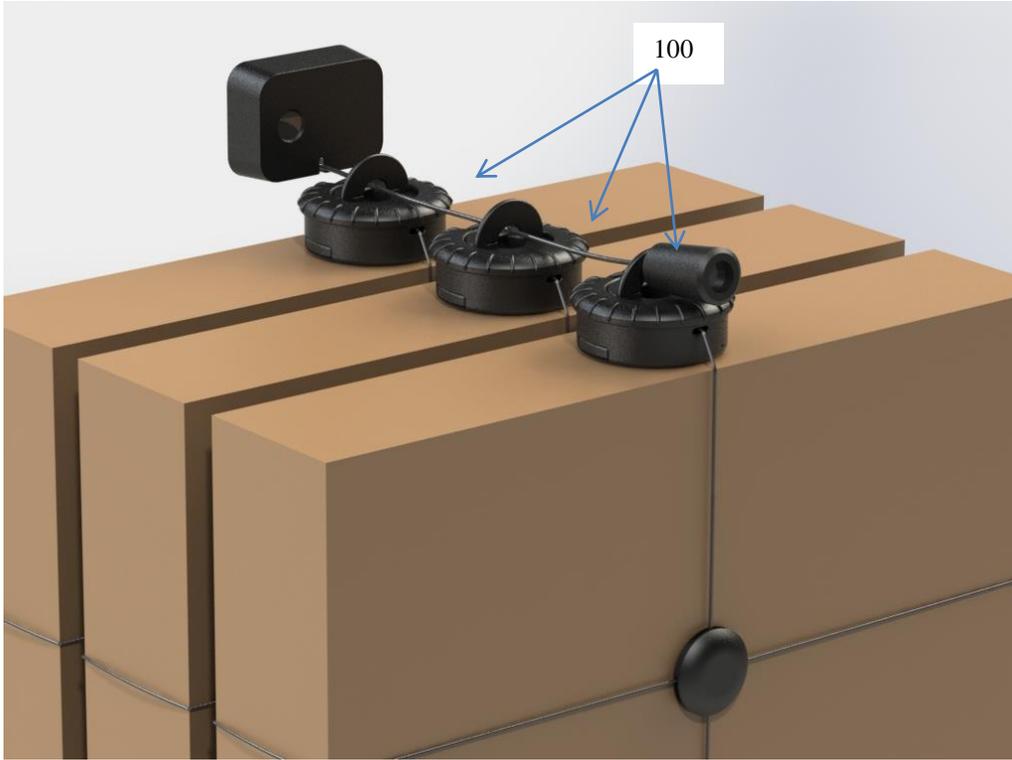


FIGURE 3

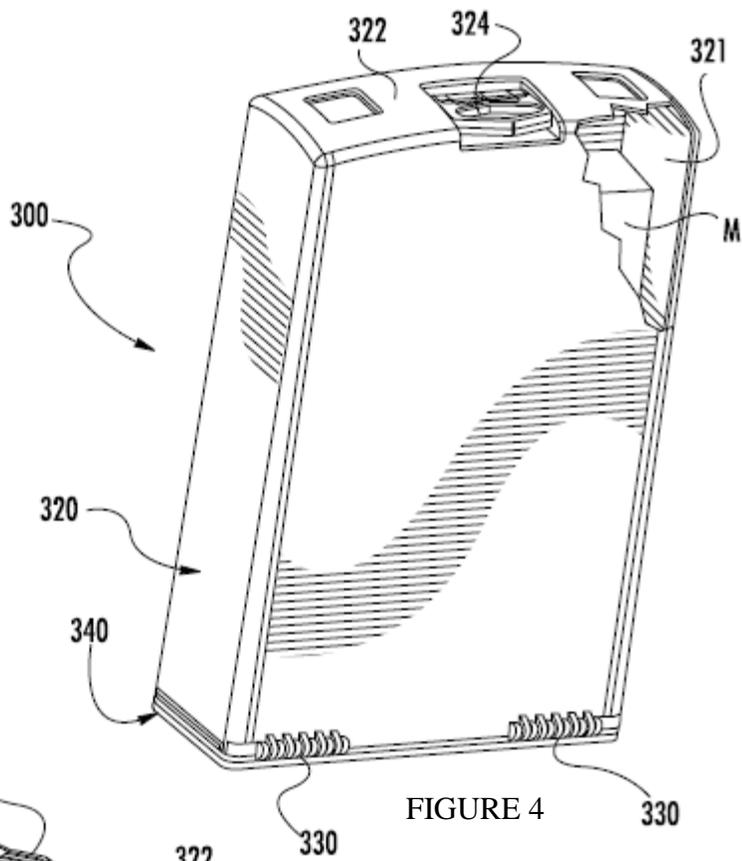


FIGURE 4

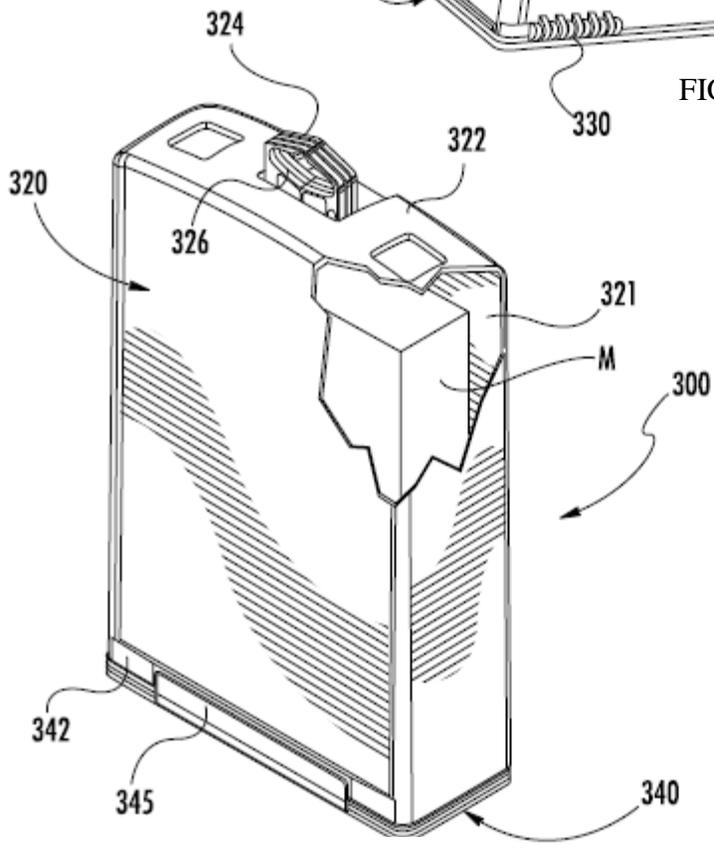


FIGURE 5

