

February 26, 2016

SYSTEMS AND METHODS FOR SECURITY SENSING

InVue Security Products Inc.

Follow this and additional works at: <http://www.tdcommons.org/invue>

Recommended Citation

InVue Security Products Inc., "SYSTEMS AND METHODS FOR SECURITY SENSING", Technical Disclosure Commons, (February 26, 2016)
<http://www.tdcommons.org/invue/2>



This work is licensed under a [Creative Commons Attribution 4.0 License](https://creativecommons.org/licenses/by/4.0/).

This Article is brought to you for free and open access by the Defensive Publications Series at Technical Disclosure Commons. It has been accepted for inclusion in InVue Defensive Publications by an authorized administrator of Technical Disclosure Commons.

SYSTEMS AND METHODS FOR SECURITY SENSING

FIELD OF THE INVENTION

[0001] Embodiments of the present invention relate generally to systems and methods for security sensing, including security sensing for electronic devices from theft.

BACKGROUND OF THE INVENTION

[0002] Retailers routinely display articles of merchandise, such as portable computers (e.g. notebooks, laptops, tablets, etc.), mobile phones, e-readers, media players, and the like for customers to evaluate before making a purchase. These articles of merchandise are continually being made smaller and lighter in weight due to advances in technology and materials. As a result, such merchandise is increasingly vulnerable and susceptible to theft. At the same time, the retail price and profit margin for such merchandise continues to decline. Accordingly, these articles of merchandise need to be secured by a security device that effectively and cost efficiently protects the merchandise from theft.

[0003] It is common in the retail security industry to have electronic devices tethered to a store fixture to prevent theft yet allow a customer to interact with the device. In addition, it is desirable to provide power to the electronic device so that the device may be charged and operable for use by a potential customer, while at the same time providing security to an electronic device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] FIG. 1 is a schematic of a security system according to one embodiment of the present invention.

[0005] FIG. 2 is a perspective view of a connector according to an embodiment of the present invention.

[0006] FIG. 3 is a schematic of a circuit for voltage clamping according to one embodiment of the present invention.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0007] Embodiments of the present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which exemplary embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Rather, the exemplary embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

[0008] Reference will now be made to the accompanying drawing figures wherein identical reference numerals denote the same or similar elements throughout the various views. One or more embodiments of a security system 10 for securing an article of merchandise “M” from theft are described below. The article of merchandise M may be a display model or an operational sample of electronic merchandise, such as portable computers (e.g. notebooks, laptops, tablets, etc.), e-readers, mobile phones, smart phones, media players, and the like, for a customer to examine before making a decision to purchase the item. The article of merchandise M may be typically displayed in a manner that permits a prospective purchaser to evaluate the operation and features of the merchandise, while protecting the merchandise from a potential thief. A power cord or tether 12 may be operably engaged with the article of merchandise M at one end, and according to one embodiment, a security event (e.g., removal, cutting, or tampering of the power cord) may result in the generation of a security signal (e.g., an audible and/or visual alarm).

[0009] For example, the power cord 12 may be operably engaged with a monitoring device 25 configured to generate a security signal upon detecting a security event. In one embodiment, the power cord 12 includes a connector 14 configured to operably engage a monitoring device 25 (see, e.g., Figure 1). The power cord 12 may electrically connect the monitoring device 25 to the article of merchandise M. Thus, upon the occurrence of a security event, the monitoring device 25 may include circuitry for detecting the security event and generating an appropriate security signal. For example, the monitoring device 25 may be similar to those manufactured by InVue Security Products Inc. In one

embodiment, the monitoring device may include a display module or sensor configured to removably support the article of merchandise M, as well as provide power and security to the article of merchandise. According to some embodiments, the monitoring device may be similar to those disclosed in U.S. Patent Nos. 7,710,266, entitled Security System with Product Power Capability and issued May 4, 2010, and U.S. Patent No. 7,727,843, entitled Programmable Alarm Module and System for Protecting Merchandise and issued June 15, 2010, each of which is incorporated by reference herein in its entirety. The monitoring device could be any other suitable device, such as a sensor configured to be attached to the article of merchandise M. The sensor could be in communication with a display module, base, or stand that is configured to generate a security signal. Moreover, the monitoring device 25 could be integrated with an input power source or controller 18, such as for providing and/or receiving power and/or security signals from a connector 15 connected to the article of merchandise M and/or the article of merchandise.

[0010] Embodiments of the present invention provide for the delivery of at least power to the article of merchandise M on display through a power cord 12, cable, tether or the like. The power cord 12 may include a plurality of conductors 16. For example, a pair of conductors 16 in the power cord 12 (e.g., a positive power line and a ground line) may provide power to the article of merchandise M. An input power source or controller 18 may be in electrical communication with the power cord for transmitting power and other signals through the cord 12 and to the article of merchandise M. The power cord 12 may include additional conductors 16 if desired, such as for transmitting data, audio, video, optical and/or communication signals. Moreover, in one embodiment, the power cord 12 includes at least one conductor 16 for transmitting a security signal. For example, the power cord 12 may include a plurality of conductors 16, one of which for transmitting a signal to the connector 15, and a second conductor for returning the signal back through the power cord. Should the signal be disrupted (e.g., the cord 12 and/or connector 15 is removed or cut), a security signal may be generated. For instance, an audible and/or a visible signal may be generated. In addition, the functionality of the article of merchandise M may be interrupted and locked from further use without being overridden by an authorized user, such as by inputting a passcode or using an appropriate key.

[0011] One end of the power cord 12 includes a connector 15 configured to electrically couple to the article of merchandise M. The opposite end of the power cord may be configured to be coupled to the monitoring device 25, as explained above, such as with connector 14. In other embodiments, the end of the power cord 12 may be connected to a power source 18, such as a USB-port on another electronic device or an electrical outlet. Thus, the power cord 12 may include a USB connector or the like that is electrically connected to the connector 15 at the opposite end of the cord. The connector 15 may be configured to provide at least power and security signals to the article of merchandise.

[0012] Generally, the connector 15 may include a body portion 20 and a connection portion 22 extending outwardly therefrom (see, e.g., FIG. 2). The body portion 20 and connection portion 22 may be separate members coupled to one another or integrally formed as a single component. Although the body portion 20 and the connection portion may be various sizes and configurations, the connection portion is illustrated as having a smaller cross-sectional dimension than the body portion. The power cord 12 is coupled to the body portion 20, while the connection portion 22 is configured to be inserted within an input port of the article of merchandise M so as to be electrically connected thereto. The body portion 20 may be hard wired to the power cord 12 or connected using a suitable releasable coupling. The connection portion 22 comprises a plurality of conductors 24, contacts, or pins that correspond to one or more of the conductors 16 in the power cord, as discussed above. Thus, the conductors 24 may correspond to power, data, audio, video, optical and/or communication signals. The connection portion 22 may include any number of conductors 24, such as 2, 4, 6, 8, etc. The conductors 24 may be disposed, embedded, or otherwise integrated with a conductive shield 26. Thus, the shield 26 may surround the conductors 24 and form an outer surface of the connection portion 22. The shield 26 may surround the conductors 24 and include a conductive material. In some embodiments, the connector 15 is similar to a USB connector, such as a USB-A, micro-USB, or a USB-C connector, although other types of connectors may be employed (e.g., an Apple Lightning® connector).

[0013] The input port of the article of merchandise M may include a plurality of

conductors 30, pins, contacts, or pads 44 that are configured to electrically connect to corresponding conductors 24 on the connection portion 22 and/or conductive shield 26 when the connection portion is engaged with the input port. In one embodiment, the input port includes a plurality of conductors that are configured to electrically connect to the conductors 24 and/or the conductive shield 26 of the connector.

[0014] In some instances, the article of merchandise M may be configured to provide overvoltage protection. In one embodiment, the article of merchandise may include an input voltage protection circuit 32, such as a voltage clamp circuit. If the voltage input into the article of merchandise exceeds a predetermined threshold, the voltage clamp is configured to disconnect the load to protect the article from damage. In one example, the voltage clamp may be a diode or LED which is configured to only allow current flow in one direction. In one embodiment, a sensing technique may be employed that takes advantage of the overvoltage protection provided by the article of merchandise. In this regard, a voltage may be input to intentionally clamp or otherwise trigger a voltage clamp. For example, a negative voltage may be input through the power cord 12 that triggers a voltage clamp. Inputting the voltage may occur in predetermined time periods in some embodiments. The monitoring device 25 may be in communication with the voltage clamp and configured to detect when the voltage clamp has been triggered. Where a voltage is input by the monitoring device and the voltage clamp is not triggered, the monitoring device may determine that the article of merchandise has been removed from the cord 12 and/or connector 15 or the cord has been cut. As discussed above, some conductors 24 are connected to corresponding conductors in the article of merchandise when the connector 15 is engaged with the input port, and the article of merchandise may be configured to detect this connection. Any desired conductors may be used to transmit the voltage for triggering the voltage clamp. However, in one embodiment, the input voltage may be injected on unused conductors, such as conductors that are not providing power, data, or any other signals to the article of merchandise.

[0015] In one example, a resistor 34 may be used to limit any potential deleterious effects on the voltage clamp. Repeated triggering of the voltage clamp may be harmful to the article of merchandise. In order to reduce the sudden and repeated clamping, a

resistor may be placed in series before the voltage clamp. Moreover, the monitoring device may be configured to determine the voltage at the time the voltage passes through the resistor and before reaching the voltage clamp. Once the voltage reaches the voltage clamp, the monitoring circuit may determine if the voltage clamp has been triggered and compare the voltage prior to reaching the resistor and the voltage at the clamp. For example, a voltage drop may be indicative of clamping the voltage clamp. This voltage drop could be represented by a negative voltage, wherein the magnitude of the negative voltage decreases a result of the voltage clamp being triggered.

[0016] Therefore, embodiments of the present invention may allow for the use of standard connectors for detecting various security events. In addition, embodiments of the present invention take advantage of existing functionality of articles of merchandise to detect various security events.

[0017] The foregoing has described one or more embodiments of a security system and method for securing an article of merchandise from theft. Those of ordinary skill in the art will 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 security system for securing an article of merchandise from theft, the security system comprising:

a connector comprising a plurality of conductors;

wherein the connector is configured to engage the article of merchandise to thereby electrically connect the conductors in the connector with the article of merchandise,

wherein the article of merchandise comprises a voltage clamp, and

wherein an absence of triggering the voltage clamp is indicative of a security event.

2. The security system according to Claim 1, wherein the connector is a USB connector.

3. The security system according to Claim 1, wherein the connector is a micro-USB connector.

4. The security system according to Claim 1, further comprising a cord comprising a plurality of conductors electrically connected to respective conductors in the connector.

5. The security system according to Claim 4, wherein at least a pair of the plurality of conductors in the cord are configured to transmit power between the connector and the article of merchandise.

6. The security system according to Claim 4, wherein the cord is configured to operably engage a monitoring device for generating a security signal in response to a security event.

7. The security system according to Claim 6, wherein the monitoring device is configured to determine when the voltage clamp has been triggered.

8. The security system according to Claim 6, wherein the monitoring device is configured to inject a negative voltage signal through at least one of the conductors in

the connector.

9. The security system according to Claim 1, further comprising a resistor in series with the voltage clamp.

10. A method for securing an article of merchandise from theft, the method comprising:

providing a voltage signal through a connector comprising a plurality of conductors, the connector configured to be engaged with the article of merchandise to thereby electrically connect the conductors in the connector with the article of merchandise; and

detecting triggering of a voltage clamp associated with the article of merchandise, wherein an absence of triggering the voltage clamp is indicative of a security event.

11. The method of Claim 10, wherein providing comprises providing a negative voltage signal.

12. The method of Claim 10, further comprising generating a security signal when the voltage clamp is not triggered.

ABSTRACT

A security system for securing an article of merchandise from theft is provided. The security system includes a connector comprising a plurality of conductors, wherein the connector is configured to engage the article of merchandise to thereby electrically connect the conductors in the connector with the article of merchandise. The article of merchandise comprises a voltage clamp, and an absence of triggering the voltage clamp is indicative of a security event.

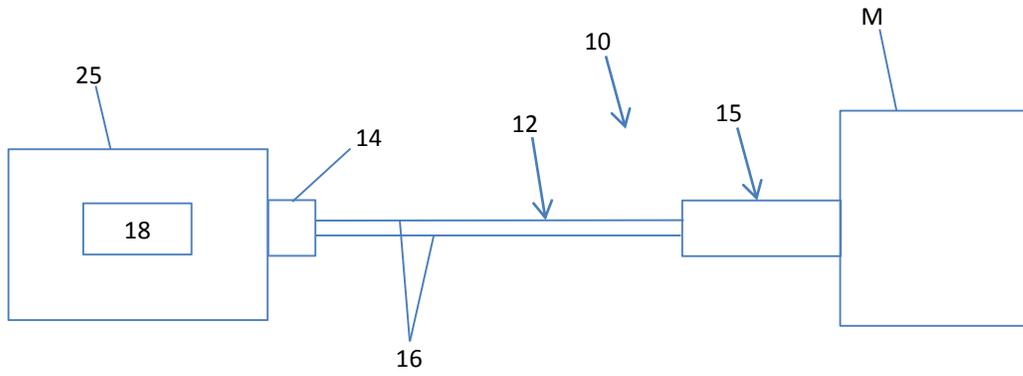


FIGURE 1

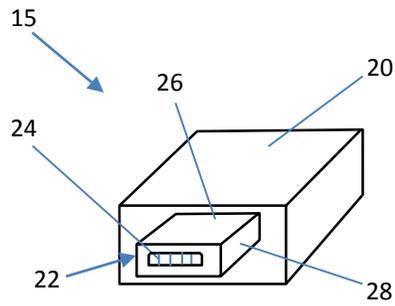


FIGURE 2

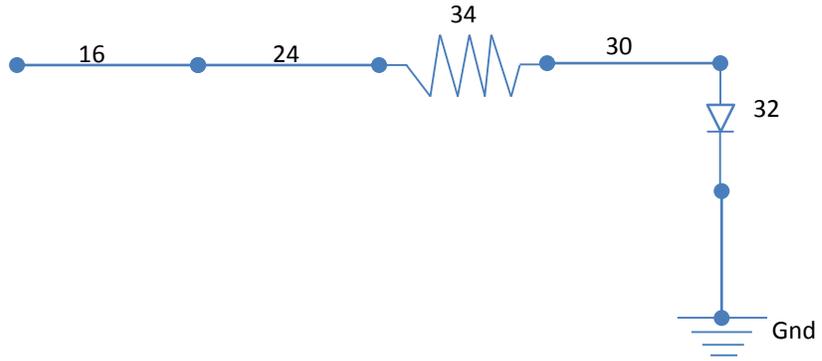


FIGURE 3