MERCHANDISE SECURITY SYSTEM WITH STRAIN RELIEF FEATURES

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FIELD OF THE INVENTION

[0001] Embodiments of the present invention relate generally to displays for displaying and protecting an article of merchandise from theft.

BACKGROUND OF THE INVENTION

[0002] Retailers routinely display handheld electronic merchandise, such as mobile (e.g. cellular) telephones, iPods, game consoles, personal data assistants (PDAs), and the like, for customers to examine before making a purchase. Retailers often desire the handheld electronic merchandise to be powered as well so that a potential purchaser can test the operation and functions of the merchandise. At the same time, the retailer does not want the article of merchandise to be stolen or removed from the display area by an unauthorized person. Accordingly, the article of merchandise being displayed is attached to a merchandise display security device that monitors and protects the article of merchandise from removal or theft. Such a merchandise display security device typically includes a sensor housing to which the article of merchandise is attached that houses a sensor for monitoring whether the article of merchandise remains attached to the sensor housing. In the event that the article of merchandise is detached from the sensor housing, an audible or visible alarm is activated to alert store personnel to the situation.

[0003] Oftentimes it is desirable for a retailer to allow the article of merchandise and sensor to be removably supported on a display stand. Thus, a consumer can remove the article of merchandise from the stand with the sensor attached for inspection. Typically the display stand includes means for attachment to a display surface that can be cumbersome or consist of complicated attachment mechanisms.

DETAILED DESCRIPTION OF THE INVENTION

[0004] Embodiments of the present invention are generally directed to systems and methods for protecting articles of merchandise from theft. The article of merchandise may be any number of electronic devices, such as a mobile (e.g. cellular) telephone, game console, personal data
assistant (PDA), tablet, portable computer, speaker, and the like. The article of merchandise may be operably engaged with a display stand in a manner so as to allow customers to examine and operate the merchandise before making a decision to purchase.

[0005] Figure 1 illustrates one embodiment of a system 10 for securing an article of merchandise 12 from theft. In this regard, Figure 1 illustrates a display stand 14 that is operably engaged with a display surface 16. It is understood that the term “display stand” is not intended to be limiting and may be any stand, puck, base, or the like configured to be secured to a display surface and to support an article of merchandise. Moreover, the shape and configuration of the display stand is not intended to be limiting, as the display stand may have any desired shape and configuration that is configured to be secured to a display surface. Likewise, the term “display surface” is also not intended to be limiting and may be any surface, counter, shelf, fixture, or the like configured to be secured to a display stand.

[0006] In some embodiments, the system may include a sensor 18 that is operably engaged with the display stand and is configured to be coupled to an article of merchandise. The sensor may include a cable 20 that extends at least between the sensor and the display stand such that the sensor is tethered to the display stand. Figure 2 shows the cable 20 unattached from the display stand. The sensor and display stand may be in electrical communication with one another, such as via one or more conductors extending through the sensor cable, for defining a sense loop and transferring power and/or data. The sensor may be sized and configured to be removably supported on the display stand. Thus, a consumer may be able to lift the article of merchandise and sensor from the display stand for inspection and to place the article of merchandise on the display stand following inspection. In some embodiments, the cable 20 includes a power cable portion 22 configured to extend between the sensor and an input port of the article of merchandise. The power cable portion 22 is configured to provide power to the article of merchandise and/or define a sense loop between the display stand and the article of merchandise. For example the power cable portion 22 may include a connector 24 configured to releasably engage the input port of the article of merchandise. The connector is shown as being spaced away from the sensor.

[0007] Thus, in one embodiment, the cable 20 is a single continuous cable extending
between the display stand 14 and the connector 24. Each of the display stand and sensor may include strain relief features for securing the cable thereto. For example, Figures 8 and 13 show that the sensor includes one or more openings 26 for receiving the power cable portion 22. In some cases, a pair of openings are defined extending along a common axis. Moreover, the sensor may define a curvilinear recess between the openings for receiving the power cable portion. The curvilinear recess may define a curvilinear, arcuate, or tortious path. The power cable portion may further include a pair of bend relief sheaths 28. The openings 26 defined in the sensor may be further configured to receive each of the bend relief sheaths for securing the sheaths therein. In some cases, one of the bend relief sheaths may be slidably disposed on the power cable portion so that the appropriate length of the cable is routed through the sensor and extends between the sensor and the input port on the article of merchandise. Thus, the appropriate length of the power cable portion may vary and depends on the dimensions of the specific article of merchandise. In some embodiments, the strain relief feature in the sensor may be similar to that disclosed in U.S. Patent Publ. No. 2013/0241741, entitled Merchandise Security Device Including Strain Relief Block filed March 13, 2013, the contents of which are incorporated by reference herein.

[0008] One skilled in the merchandise security art will readily understand and appreciate that the sensor 18 may take the place of a conventional sensor housing that typically contains a sensing element, sensor electronics and optional voltage regulating and/or power management electronics, as well as means for electrically connecting a conventional power cable to a conventional power adapter cord. The sensor may simply provide a conduit for receiving a portion of the cable. Thus, the sensor 18 may eliminate a sensing element (e.g. proximity switch, limit switch, etc.) and any electronics and not perform any sensing function.

[0009] The sensor 18 may include a lower housing 30 and an upper housing 32. The upper housing may be configured to be secured to the lower housing with a proprietary fastener. In order to secure the power cable portion within the sensor, the upper housing is secured to lower housing. The upper housing may be a metal or plastic material and is configured to be received by the display stand for supporting the article of merchandise thereon. For instance, Figure 11 shows that the upper housing may be metal or plastic and be interchangeable with the same lower housing. Furthermore, a quick-release bracket 34 may be configured to be secured to the
article of merchandise, such as with a releasable adhesive. The quick-release bracket 34 is configured to releasably engage the lower housing. For instance, the quick-release bracket may include one or more engagement members that are configured to engage corresponding engagement members on the lower housing such that rotation relative to one another secures the bracket to the lower housing. The quick-release feature allows the sensor to be readily removed for remerchandising or for daily removal such as for after hours.

The quick-release bracket may include one or more slots 36 for receiving one or more corresponding bracket arms 38. In some embodiments, the slots are defined linearly in one or more rows. Figures 7 and 12 show that a grid of slots may be defined so that the bracket arms may be inserted in different orientations (e.g., horizontal or vertical relative to the article of merchandise). The bracket arms may be configured to engage one or more lateral edges of the article of merchandise. In one embodiment, each bracket arm includes a plurality of teeth 40. The teeth may be defined along opposing lateral edges of the bracket arms. Where the bracket arms have a width greater than a thickness, the lateral edges may extend through the thickness to allow for a low profile bracket arm. The quick-release bracket includes corresponding rows of teeth defined along the slots for receiving and engaging the teeth defined on each bracket arm. Once inserted, the bracket arms cannot be slid out of the quick-release bracket when the upper and lower housings are secured thereto. Thus, the bracket arms further secure the article of merchandise to the sensor.

Figures 9-10 illustrate another aspect of the present invention. In this embodiment, the display stand includes a further strain relief feature for securing the end of the cable 20 opposite the power cable portion. Figure 10 shows that the display stand may define an opening 42 and a curvilinear recess 44 for receiving a portion of the cable. As before, the curvilinear recess may define a curvilinear, arcuate, or tortious path. Moreover, the display stand may include a receptacle 46 for releasably engaging a connector 48 at the end of the cable 20. In some embodiments, the cable 20 includes a reinforcing cable in addition to any conductors extending between the connectors 24 and 48. The reinforcing cable could be a metal or aircraft cable for increasing the cut resistance and tensile force in the cable. Due to the strain relief at each end of the cable 20, no special balls or attachments are required to secure the reinforcing cable to the connectors 24 and 48.
According to one embodiment, the display stand also includes a lock-down mechanism 50. In order to access the lock-down mechanism, the display stand may include a removable cover 52 (see, e.g., Figures 14 and 16). The cover may be secured to the lock-down mechanism with one or more fasteners 54. The cover may include one or more slots 56 that are configured to receive and be engaged by one or more engagement members 58 on the lock-down mechanism 50. The engagement members may have a curved edge for facilitating engagement with the cover. In some cases, a pair of engagement members are provided for clamping to the cover. The engagement members may be adjustable for engaging and disengaging the cover. For instance, Figure 9 shows that a threaded member 60 may be used to move the engagement members simultaneously towards and away from one another. In order to facilitate adjustment, a fastener 62 may be provided that is accessible when the cover is secured to the lock-down mechanism. Rotation of the fastener 62 causes corresponding rotation of the threaded member for moving the engagement members into and out of engagement with the cover.

Furthermore, Figures 17 and 18 show that the lock-down mechanism may include an upper portion 64 and a lower portion 66 pivotably attached to one another. The upper and lower portions may be releasably secured to one another with one or more fasteners. As shown, when the upper portion is pivoted away from the lower portion, the connector 48 and strain relief features are accessible. Figure 18 shows that a lower surface of the upper portion may include a raised member 68 that is configured to correspond to the profile of the curvilinear recess. Thus, when the upper portion is secured to the lower portion, the raised member engages and further secures the portion of the cable 20 placed within the curvilinear recess.

The display stand may be in electrical communication with a power source. For example, the display stand may be operably engaged with a power cable 35 that includes a connector for engaging a power source. In one embodiment, the power cable may comprise a plurality of conductors. At least some of the conductors may be electrically connected to the electronics disposed within the display stand, an external power source, an internal power source, the sensor cable, a sensor, and/or the article of merchandise. As such, the power cable may function to provide electrical power from the internal or external power source to the article of merchandise and/or sensor, and/or data communication to or from the article of merchandise and/or sensor.
In some embodiments, the display stand may include an alarm unit or alarming circuitry that is configured to generate a security signal (e.g., an audible and/or a visible alarm) in response to a security event (e.g., a cable being unplugged or cut). The alarm unit may include electronics that may be armed, disarmed, and/or silenced with a security key, which may utilize mechanical, wireless, and/or electrical communication between the alarm unit and the security key. For example, the security key may be configured to wirelessly communicate a security code to the alarm unit, such as by infrared, optical, acoustic, or inductive communication. In one particular embodiment, the security key is similar to that disclosed in U.S. Patent No. 7,737,845, entitled Programmable Key for a Security System for Protecting Merchandise, which is incorporated by reference herein.

In another embodiment, the display stand includes a port, window, or the like that is configured to receive a wireless security signal for arming and/or disarming the alarm unit, such as from a key. The port may be disposed on an upper surface of the display stand. In some embodiments, the port may be covered by the sensor when the sensor is supported on the display stand. As noted above, the wireless security signal may be any suitable signal configured to arm/disarm the alarm unit as discussed above.

As also noted above, the alarm unit may include an alarm for generating a security signal in response to a security event. For example, the alarm unit may include a piezoelectric alarm to generate an audible signal, as well as circuitry for detecting a security event. The alarm unit may be further configured to detect a connection of either cable to the article of merchandise, a sensor, and/or a power source. In some embodiments, the sensor and/or display stand include a pressure switch or other mechanism to detect unauthorized removal. The alarm unit may also be configured to generate a security signal in response to such unauthorized removal. Thus, should the connector be removed from the display stand, the sensor removed from the article, a cable cut, and/or the display stand removed from a power source or display surface, the alarm unit may be configured to generate a security signal. The display stand may further include an internal power source configured to provide power to the alarm unit in the event that power from an external power source is interrupted or lost. In one embodiment, the internal power source is a rechargeable battery that is recharged by power supplied by the cable.
In some embodiments, the display stand and the sensor include respective alignment mechanisms. For example, the display stand may include one or more recesses about its circumference that are configured to conform to and receive a portion of the sensor to facilitate alignment therewith (see, e.g., Figure 11). A pair of recesses may be defined for receiving portions of the sensor and cable.

Embodiments of the present invention may provide for various advantages. More specifically, the strain relief features are operable for relieving strain applied to the cable when a potential purchaser extends the cable beyond its usable elastic length. By relieving the strain in the cable with the strain relief features, stress induced by the strain in the cable is transferred to the strain relief features instead of to the portion of the cable that extends between the sensor and connector and the portion of the cable that extends between the display stand and the connector. The configuration of the engagement between the quick-release bracket and bracket arms may also allow for lower profile bracket arms while providing a secure connection between the sensor and the article of merchandise. The lock-down mechanism may also provide the advantage of further securing the cable to the display stand.

The foregoing has described one or more embodiments of a system and method for displaying and protecting an article of merchandise from theft. Embodiments have been shown and described herein for purposes of illustration. 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 system for securing an article of merchandise from theft comprising:
   a sensor configured to be attached to an article of merchandise;
   a display stand configured to be secured to a display surface, the display stand configured
to removably support the sensor and the article of merchandise;
   a single continuous cable configured to extend between the display stand and the article
of merchandise, the cable having a first connector at one end and a second connector at an
opposite end,
   wherein the first connector is configured to releasably engage the display stand, and the
second connector is configured to releasably engage an input port of the article of merchandise,
   wherein each of the sensor and the display stand defines a strain relief feature for
receiving a portion of the cable therein and for relieving strain on the cable.

2. The system of Claim 1, wherein each strain relief feature defines a curvilinear
recess for receiving the portion of the cable.

3. The system of Claim 1, wherein the display stand comprises a lock-down
mechanism for securing the first connector to the display stand.

4. The system of Claim 3, wherein the lock-down mechanism comprises an upper
portion and a lower portion pivotably attached to one another.

5. The system of Claim 3, wherein the display stand comprises a cover removable
from the lock-down mechanism, and wherein the lock-down mechanism comprises a pair of
engagement members configured to releasably engage the cover.

6. The system of Claim 5, wherein the lock-down mechanism comprises a threaded
member configured to move the engagement members simultaneously towards and away from
one another.
7. The system of Claim 1, wherein the cable comprises a power cable portion extending between the sensor and the second connector.

8. The system of Claim 1, wherein the sensor does not include any electronics.

9. A system for securing an article of merchandise from theft comprising:

   a quick-release bracket configured to be attached to an article of merchandise;

   a sensor configured to be releasably attached to the quick-release bracket; and

   at least one bracket arm configured to be secured between the quick-release bracket and the sensor for securing the article of merchandise to the sensor,

   wherein the bracket arm includes a width greater than a thickness, a plurality of teeth defined along opposing lateral edges of the bracket arm and through the thickness,

   wherein the quick-release bracket defines a plurality of rows of teeth configured to receive and engage a plurality of the teeth of the bracket arm.

10. The system of Claim 9, wherein the quick-release bracket is releasably engaged with the sensor.
ABSTRACT

Embodiments of the present invention are directed to systems and methods for securing an article of merchandise from theft. In one example, a system includes a sensor configured to be attached to an article of merchandise and a display stand configured to be secured to a display surface. The display stand is configured to removably support the sensor and the article of merchandise. The system also includes a single continuous cable configured to extend between the display stand and the article of merchandise. The cable has a first connector at one end and a second connector at an opposite end. The first connector is configured to releasably engage the display stand, and the second connector is configured to releasably engage an input port of the article of merchandise. Each of the sensor and the display stand defines a strain relief feature for receiving a portion of the cable therein and for relieving strain on the cable.