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MERCHANDISE DISPLAY SECURITY SYSTEM

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MERCHANDISE DISPLAY SECURITY SYSTEM

BACKGROUND OF THE INVENTION

[0001] Embodiments of the present invention relate generally to security systems for protecting items of merchandise, such as consumer electronics products, from theft and/or unauthorized removal.

[0002] It is common practice for retailers to provide demonstration models of consumer electronics products, such as handheld devices, tablets, and laptop computers, so that a potential purchaser may examine the product more closely and test the operation of its features. A working demonstration model, however, increases the possibility that the demonstration model will be stolen or removed from the display area by an unauthorized person. As a result, demonstration models of consumer electronics products are typically protected by a security system that permits a potential purchaser to examine and operate the product, while reducing the likelihood that the demonstration model will be stolen or removed from the display area.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] FIG. 1 is a perspective view of a security system according to one embodiment of the present invention.

[0004] FIG. 2 is a rear perspective view of the security system shown in FIG. 1.

[0005] FIG. 3 is a perspective view of the security system shown in FIG. 1 showing the item of merchandise lifted off of the base.

[0006] FIG. 4 is a perspective view of a security system according to one embodiment of the present invention.

[0007] FIG. 5 is a rear perspective view of the security system shown in FIG. 4.

[0008] FIG. 6 is a perspective view of the security system shown in FIG. 4 showing the item of merchandise lifted off of the base.

[0009] FIG. 7 is a perspective view of a security system according to one embodiment of the present invention.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0010] Referring to the accompanying figures wherein identical reference numerals denote the same elements throughout the various views, the attached figures illustrate embodiments of security systems according to the present invention for protecting an item of merchandise against theft or unauthorized removal. The item of merchandise may be any item, including any number of consumer electronics products (e.g. hand-held device, cellular phone, smart phone, tablet, laptop computer, camera, etc.). The security systems described herein are operable for securing the item of merchandise against theft or authorized removal, while at the same time permitting a potential purchaser to closely examine and operate the item of merchandise in a display area. The security system permits a potential purchaser to examine and test the item of merchandise, while reducing the likelihood that the item of merchandise will be stolen or removed from the display area by an unauthorized person. The systems shown and described herein are suitable for securing an item of merchandise in a residential or commercial environment, as well as a retail environment, and furthermore, is not intended to be limited to use only as a security display device for protecting against theft and/or unauthorized removal.

[0011] According to one embodiment shown in FIG. 1, the security system 10 generally comprises a sensor 12 configured to be coupled to an item of merchandise 14. The security system may also include a base 18 that is configured to removably support the sensor 12 and the item of merchandise 14 thereon. In some embodiments, the security system 10 also includes a cable 20 that is secured to the sensor 12 at one end and operably engaged with a recoiler at an opposite end. As explained in further detail below, a sense circuit or loop may be defined through the cable 20. As such, the sense loop may be used to detect various security events associated with the cable 20, such as either cable being cut, shorted, and/or disconnected. The base 18 and/or sensor 12 may be configured detect security events associated with the sensor and/or the item of merchandise 14, such as the item of merchandise being removed from the sensor.

[0012] In one embodiment, the security system 10 includes a sensor 12. The sensor 12 may be secured to the item of merchandise 14 using any desired technique, such as with an adhesive, one or more fasteners, and/or mechanical brackets. As shown in FIGS. 1-3, the sensor 12 may

include one or more bracket arms 24 configured to mechanically engage the item of merchandise 14. The sensor 12 and the bracket arm 24 may be attached to one another or may be an integrally formed component. The illustrated bracket arm 24 is configured to span the width of the item of merchandise 14 and engage opposing lateral edges. The ends of the bracket arm 24 may be curved to facilitate engagement with the opposing lateral edges of the item of merchandise 14. Thus, in some cases, the bracket arm 24 may be a single integrated component. Although the term “sensor” is used herein, it is understood that the sensor 12 may simply provide a mounting member for connection to the cable 20. Thus, the sensor 12 may not include any electronics, circuitry, and/or sensing functionality in some embodiments. In other embodiments, the sensor 12 may include sensing circuitry or a plunger switch for detecting removal of the sensor from the item of merchandise 14.

[0013] In one embodiment, the security system 10 includes a power adapter 16 with a connector 15 that is configured to electrically connect to an input jack of the item of merchandise 14. In one embodiment, the power adapter 16 may be secured to the item of merchandise 14, such as via an adhesive, and the connector 15 may be configured to be removably inserted into the input jack of the item of merchandise 14. For example, the connector 15 may be any suitable connector configured to engage a corresponding item of merchandise 14, such as a micro-USB connector or an Apple Lightning® connector. Each of the power adapter 16 and the base 18 may include one or more electrical contacts 26 for transferring power therebetween and to the item of merchandise 14. Thus, when the power adapter 16 is seated on the base 18, the electrical contacts 26 are configured to align and contact one another so that power may be transferred to the item of merchandise 14 for powering an internal battery or like power source. The base 18 may be electrically connected to a power source which is configured to provide power to the base. The power source may include a connector at a free end (e.g., a USB or like plug). The base 18 may be configured to facilitate power transfer from the external source of power to the electrical contacts 26 and to item of merchandise 14. Therefore, the item of merchandise 14 may be powered by power transferred thereto and may be used to charge a battery associated with the item of merchandise. It is understood that that other techniques may be employed to charge the item of merchandise 14, such as inductive charging. In addition, it is understood that a direct

connection between the sensor 12 and the base 18 with the cable 20 may be employed, where power and security may be provided through the cable without the use of electrical contacts.

[0014] The base 18 may be configured to be supported on a fixed support surface 44, such as a counter, shelf, fixture, or the like. Thus, the base 18 may be located entirely above the support surface 44. In other cases, the base 18 may be located below the support surface 44. In some instances, the base 18 may be configured to extend through an opening defined in the support surface 44. The base 18 may be secured to the support surface 44 using any desired technique such as an adhesive and/or fasteners. The base 18 may be operably engaged with a recoiler as discussed above. As such, the cable 20 may be extended through the base 18 when the sensor 12 and the item of merchandise 14 are lifted from the base, and the cable may be retracted through the base when the sensor and the item of merchandise are returned to the base. The recoiler may be spring biased in some embodiments such that the cable 20 is automatically retracted through the base 18. The base 18 may be supported on the support surface 44, while the recoiler may be positioned below the support surface. Furthermore, the base 18 may include a PCB, circuitry, or the like that is in electrical communication with the electrical contacts for transferring power to the item of merchandise 14 as discussed above. In some embodiments, the cable 20 may include one or more electrical conductors extending along the length of the cable. In some cases, the cable 20 may include a pair of conductors for defining a sense loop or circuit and conducting an electrical signal. In other cases, the cable 20 may include a single conductor, such as an electrical conductor, or optical conductor for conducting an optical signal (e.g., a fiber optic cable).

[0015] It is understood that the cable 20 may be any suitable cord, tether, or the like. In addition, the cable 20 may include one or more electrical conductors for transmitting electrical, security, and/or communication signals. In addition, the cable 20 may be a single strand, multi-strand, or braided. The cable 20 may be flexible to facilitate extension and retraction relative to the base 18, and in some embodiments, may be formed of a cut-resistant material. Furthermore, the cable 20 may have various cross sections, such as round or flat. In some embodiments, the security system 10 may not include a recoiler. Thus, the cable 20 could be a straight or coiled cable that is secured to the sensor 12 at one end and connected to a base 18 or other device at an

opposite end.

[0016] Various sensing techniques may be employed for determining whether the cable 20 has been cut or removed from the sensor 12 in an unauthorized manner. For example, the cable 20 may include a pair of electrical conductors that define a sense loop therethrough. Thus, should the sense loop be interrupted (e.g., by cutting or shorting the cable), the alarm mechanism 34 may detect the interruption and generate an alarm signal (e.g., an audible and/or a visible alarm).

[0017] It is understood that the configuration of the sensor 12, base 18, and cable 20 may vary according to different embodiments. For example, in another embodiment shown in FIGS. 4-6, a security system 100 generally comprises a sensor 12' configured to be coupled to an item of merchandise 14. The security system may include a base 18' that is configured to removably support the sensor and the item of merchandise thereon. In some embodiments, the security system 100 also includes a cable 20' that is secured to the sensor 12' at one end and operably engaged with a recoiler at an opposite end. The cable 20' may include an adapter cable 16' that is configured to electrically connect to the item of merchandise. As discussed above, a sense circuit or loop may be defined through the cable 20' and adapter cable 16'. As such, the sense loop may be used to detect various security events, such as either cable 20' being cut, shorted, and/or disconnected. The base 18' and/or sensor 12' may be configured detect security events associated with the sensor and/or the item of merchandise 14, such as the item of merchandise being removed from the sensor.

[0018] In one embodiment, the sensor 12' may be connected to an adapter cable 16' having a connector 15' that is configured to electrically connect to an input jack of the item of merchandise 14. In one embodiment, the adapter cable 16' may be a portion at the end of the cable 20' such that the cable is a continuous cable extending from the recoiler to the item of merchandise 14. In other embodiments, the adapter cable 16' is a separate cable electrically connected to the cable 20'. The connector 15' may be any suitable connector configured to engage a corresponding item of merchandise 14, such as a micro-USB connector or an Apple Lightning® connector. Thus, cable 20' and the item of merchandise 14 may be electrically connected via the connector 15'. An end of cable 20' may be secured to the sensor 12'.

[0019] In each of the embodiments disclosed herein, the base 18, 18' may include an alarm mechanism for generating an alarm signal in response to a security event, such as an audible and/or visible alarm signal. The cable 20 and/or recoiler may be operably engaged with the alarm mechanism such that cutting or disconnection of the cable or removal of the item of merchandise 14 from the sensor 12, 12' results in the alarm mechanism generating an alarm signal. In some cases, the alarm mechanism is a piezoelectric transducer.

[0020] In some embodiments, the base 18, 18' is operably engaged with a power module 34 (see, e.g., FIG. 7), such as via a hardwired cable or cable connectors. The power module 34 may be separate from and remotely located from the base 18, 18'. The power module 34 may include various components, such as for example, a power source (e.g., a back-up battery) and/or charging circuit rather than including such components in the base 18, 18'. Thus, the power module 34 allows various components typically housed within the base 18, 18' to be remotely located from the base, such as by a wired connection below the support surface 44. In such a case, the base 18, 18' may only include, e.g., connectors for the cable 20, an LED, and/or alarm mechanism. As a result, the size and overall footprint of the base 18, 18' may be substantially reduced.

[0021] Moreover, the power module 34 may be configured to electrically connect to a power source 54 for providing power to the power module 34. The power source 54 may be separate and remote from the power module 34. The power source 54 may be used to charge the battery within the power module 34, wherein such battery may be used for backup power to the base 18, 18' (including the alarm mechanism) in the event of a power outage so that the sense circuit is not interrupted. The power module 34 may also include a charging circuit for transferring power to the sensor 12, 12, item of merchandise 14, and/or the base 18, 18', wherein such transfer may be from the battery within the power module or directly from the power source 54.

[0022] In addition, FIG. 7 shows that the power module 34 may be configured to operably connect to one or more bases 18, 18'. In some cases where additional power is required, such as for more than one item of merchandise 14 on display, the power module 34 may be configured to electrically connect to a plurality of power sources 54.

[0023] In some cases, the power module 34 may be optional such that the power source 54

may be configured to directly connect to the base 18, 18'. Thus, the power module 34 may be modular and retrofitted to existing security systems in some embodiments, or may be an add-on feature to the security system.

[0024] The base 18, 18' and/or power module 34 may be configured to communicate with a key. For example, the base 18, 18' be configured to wirelessly communicate with a key for arming or disarming the security system 10. To further reduce the size of the base 18, 18', the power module 34 may include the communications circuitry for communicating with the key. The power module 34 may include all or a portion of the wireless communications circuitry, for example, the power module may include a radio, while an antenna in communication with the radio is routed to the base 18, 18' through a cable to facilitate wireless communication with the key. In the example shown in FIG. 7, the power module 34 may include a port 36 or other component for facilitating communication with a wireless key. In one embodiment, the key is an infrared key configured to arm or disarm the alarm mechanism (e.g., using a unique identifying code). In some embodiments, the key is similar to the IR and IR2 keys manufactured by InVue Security Products Inc.

[0025] In yet another embodiment, the power module 34 may include wireless communications circuitry. In one example, the system 10, 100 is part of a network of a plurality of security systems. According to some embodiments, the network enables communication between a plurality of security systems 10, 100'. The network may be cloud-based and include a cloud for receiving data from, and/or providing data to, the security systems. The cloud may facilitate data transfer to one or more remote locations or devices (e.g., a tablet or computer) where the data may be reviewed and analyzed. The network may be a mesh network including a plurality of nodes that are configured to communicate with one another, one or more electronic keys, and/or one or more security systems. The network may be any suitable network for facilitating wireless communication such as a mesh, star, multiple star, repeaters, IoT, etc. networks. In some cases, the nodes and the security systems may be integrated with one another such that the security systems itself operates as a node. A gateway or hub may be employed to allow for communication between the one or more nodes and the cloud. In some embodiments, all communication within the network is wireless, such as via radio-frequency signals (e.g., Sub

GHz ISM band or 2.4 GHz), although other types of wireless communication may be possible (e.g., WiFi, LoRa, etc.). In some cases, the power module 34 may be a node in the wireless network and include the wireless communications circuitry for facilitating communication with the security system. In some embodiments, the power module 34 is configured to communicate wirelessly using similar techniques disclosed in U.S. Application No. 62/909,606, filed on October 2, 2019 and entitled Merchandise Display Security Systems and Methods, the entire contents of which are incorporated by reference herein.

[0026] The foregoing has described one or more embodiments of security systems for securing an item of merchandise from theft or unauthorized removal. Although various embodiments of the present invention have been shown and described, it will be apparent to those skilled in the art that various modifications thereto can be made without departing from the spirit and scope of the invention. Accordingly, the foregoing description is provided for the purpose of illustration only, and not for the purpose of limitation.

That which is claimed is:

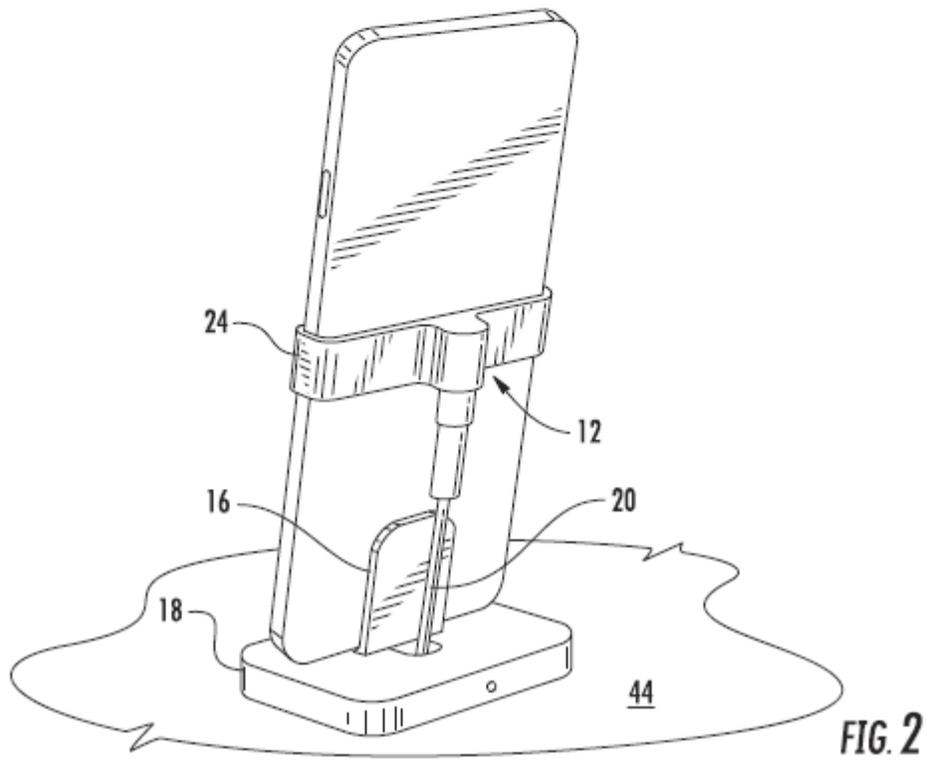
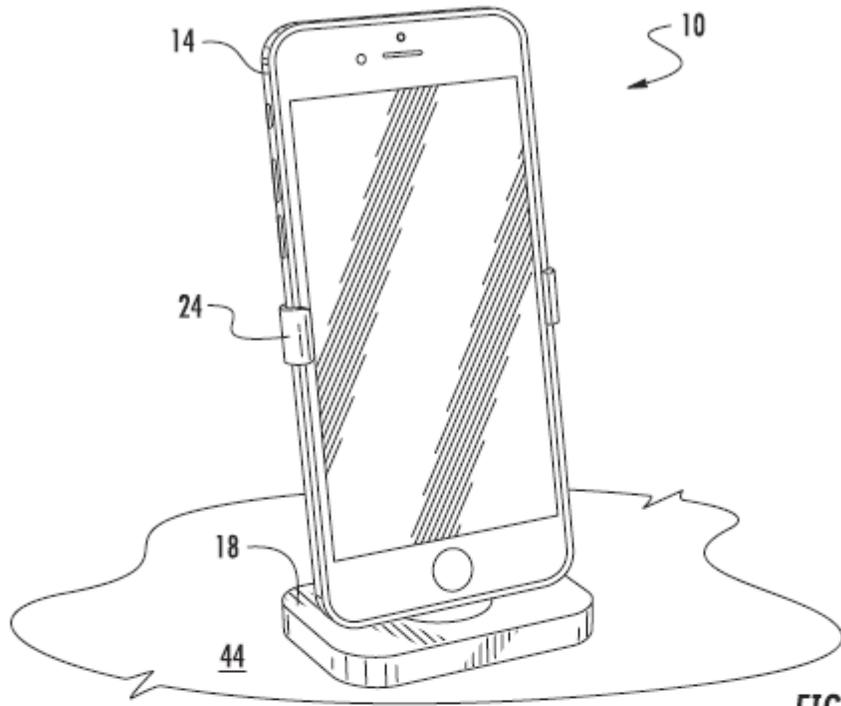
1. A security system for securing an item of merchandise from theft, comprising:
 - a sensor configured to be secured to the item of merchandise and to detect authorized removal of the item of merchandise;
 - a cable configured to be connected to the sensor;
 - a base configured to operably connect to the cable and to removably support the sensor and the item of merchandise thereon, the base housing an alarm mechanism configured to generate an alarm signal in response to a security event;
 - a power module separate and remote from the base, the power module comprising a back-up power source for providing power to the base; and
 - a power source separate and remote from the power module, the power source configured to provide power to the power module.

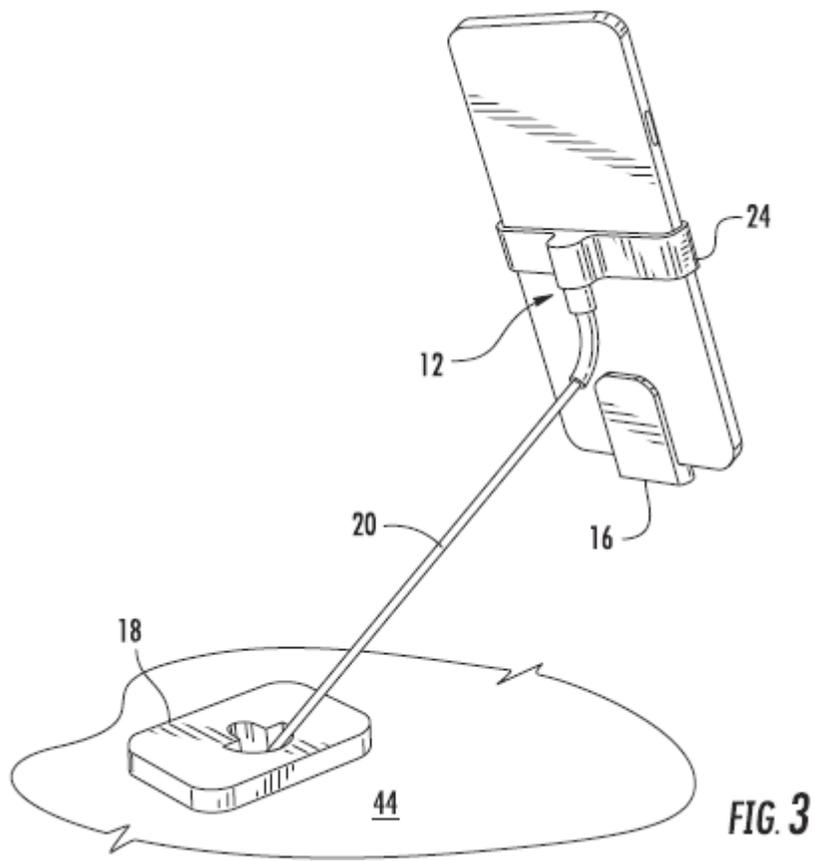
2. The security system of Claim 1, wherein the power module further comprises a charging circuit for transferring power to the base.

3. The security system of Claim 1, wherein the power module further comprises wireless communications circuitry for communicating with a key for disarming the alarm mechanism.

ABSTRACT

Embodiments of the present invention are directed to security systems for securing an item of merchandise from theft. For example, the security system may include a sensor configured to be secured to the item of merchandise and to detect authorized removal of the item of merchandise. The security system also includes a cable configured to be connected to the sensor and a base configured to operably connect to the cable and to removably support the sensor and the item of merchandise thereon, the base housing an alarm mechanism configured to generate an alarm signal in response to a security event. In addition, the security system includes a power module separate and remote from the base, the power module comprising a back-up power source for providing power to the base. The security system further includes a power source separate and remote from the power module, the power source configured to provide power to the power module.





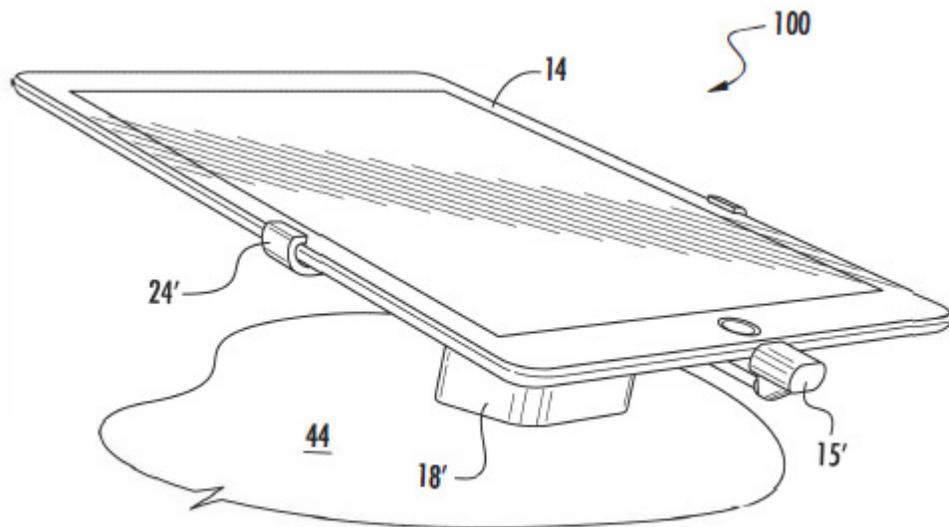


FIG. 4

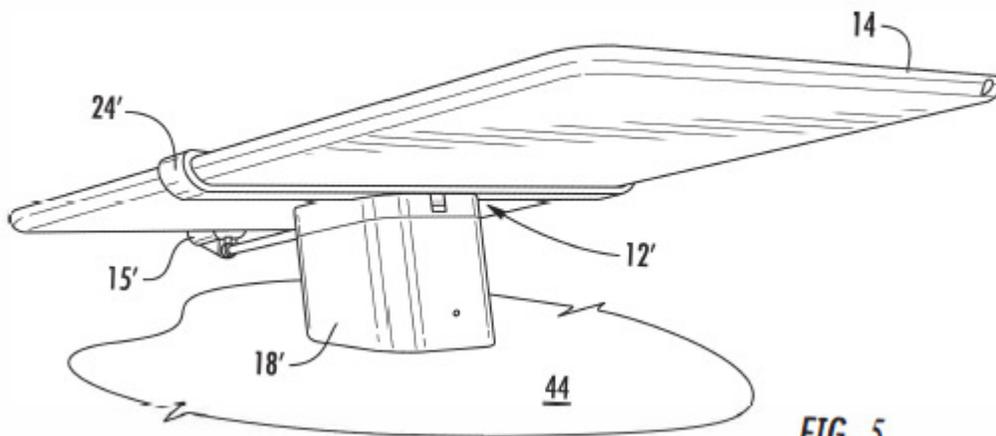


FIG. 5

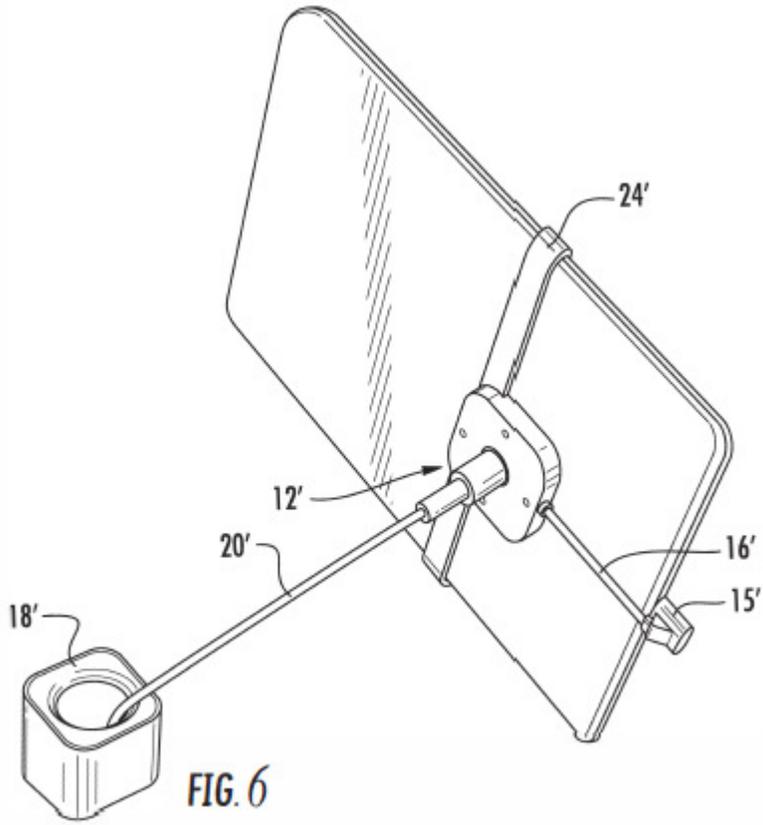


FIG. 6

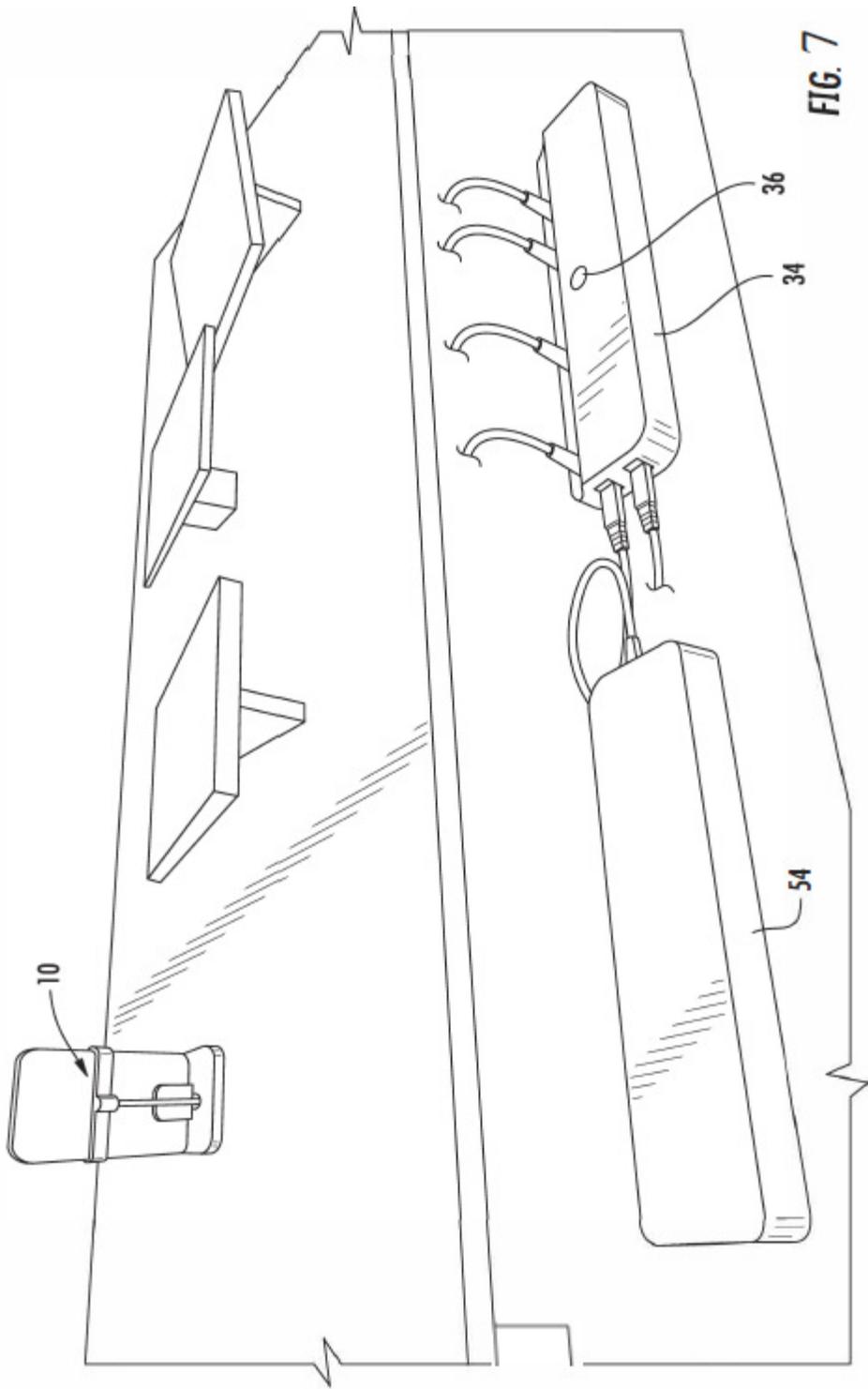


FIG. 7