

EXHIBIT

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U.S. Provisional Patent Application

62/240,171

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October 22, 2016

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APPLICATION NUMBER: 62/240,171

FILING DATE: *October 12, 2015*

RELATED PCT APPLICATION NUMBER: *PCT/US16/56239*

THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS CONVENTION, IS *US62/240,171*



Certified by

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	P1232D/PRO
		Application Number	
Title of Invention	RECOILER FOR A MERCHANDISE SECURITY SYSTEM		
<p>The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.</p> <p>This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.</p>			

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<input type="checkbox"/>	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
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Inventor 1					Remove
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Residence Information (Select One) <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service					
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<input type="checkbox"/> An Address is being provided for the correspondence Information of this application.			
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Application Information:

Title of the Invention	RECOILER FOR A MERCHANDISE SECURITY SYSTEM		
Attorney Docket Number	P1232D/PRO	Small Entity Status Claimed	<input checked="" type="checkbox"/>
Application Type	Provisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)		Suggested Figure for Publication (if any)	

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	P1232D/PRO
		Application Number	
Title of Invention	RECOILER FOR A MERCHANDISE SECURITY SYSTEM		

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Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

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This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

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Prior Application Status		Remove	
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	P1232D/PRO
		Application Number	
Title of Invention	RECOILER FOR A MERCHANDISE SECURITY SYSTEM		

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Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

<p>This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.</p> <p><input type="checkbox"/> NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.</p>
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Authorization to Permit Access:

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	P1232D/PRO
		Application Number	
Title of Invention	RECOILER FOR A MERCHANDISE SECURITY SYSTEM		

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In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

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If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.			
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<input checked="" type="radio"/> Assignee	<input type="radio"/> Legal Representative under 35 U.S.C. 117	<input type="radio"/> Joint Inventor	
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Name of the Deceased or Legally Incapacitated Inventor : <input type="text"/>			
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	P1232D/PRO
		Application Number	
Title of Invention	RECOILER FOR A MERCHANDISE SECURITY SYSTEM		
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	P1232D/PRO
		Application Number	
Title of Invention	RECOILER FOR A MERCHANDISE SECURITY SYSTEM		

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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RECOILER FOR A MERCHANDISE SECURITY SYSTEM

FIELD OF THE INVENTION

[0001] Embodiments of the present invention relate generally to recoilers, security systems, and methods for displaying articles of merchandise in a retail environment.

BACKGROUND OF THE INVENTION

[0002] Retailers routinely display articles of merchandise, such as telephones, portable computers (e.g. notebooks, laptops, tablets, etc.), 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 hence the 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.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

[0003] The detailed description of the invention provided hereafter may be better understood with reference to the accompanying drawing figures, in which embodiments of a merchandise security system for displaying an article of merchandise are disclosed, and in which like reference characters indicate the same or similar parts.

[0004] FIG. 1 is a perspective view of a merchandise security system for displaying and protecting an article of merchandise according to an embodiment of the invention.

[0005] FIG. 2 is a perspective view of a merchandise security system according to one embodiment of the present invention.

[0006] FIG. 3 is a perspective view of the base shown in FIG. 2.

[0007] FIG. 4 is a partial perspective view of the base shown in FIG. 3.

[0008] FIG. 5 is another partial perspective view of the base shown in FIG. 3.

[0009] FIG. 6 is a front view of a merchandise security system according to one embodiment

of the present invention.

[0010] FIG. 7 is a front view of a recoiler according to one embodiment of the present invention.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0011] One or more embodiments of a merchandise security system for displaying an article of merchandise are shown in the accompanying drawing figures and described below. The article of merchandise is typically a display model or an operational sample of electronic merchandise, such as portable telephones, smart phones, computers (e.g. notebooks, laptops, tablets, etc.), e-readers, media players, and the like, for a customer to examine before making a decision whether to purchase the article. The article of merchandise is typically displayed in a manner that permits a prospective purchaser to evaluate the operation and features of the merchandise, while protecting the merchandise from theft. In one embodiment, a sensor may be attached to the article of merchandise for detecting various alarming conditions, such as the article being removed from the sensor. A cable may be operably engaged with the sensor at one end, while the opposite end may be secured to a recoiler. As explained in further detail below, the sensor may also be configured to detect an alarming condition of the cable, such as a cutting, severing, removing or detaching of the cable.

[0012] According to one embodiment shown in FIG. 1, the security system 10 generally comprises a sensor 12 configured to be secured to an item of merchandise 14. The sensor 12 may be electrically connected to a connector 17 that is configured to electrically connect to an input jack of the item of merchandise 14. The security system 10 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 base 18 and the sensor 12 include one or more contacts 28, 40 for facilitating contact charging when the sensor is supported on the base. In addition, the security system 10 also includes a cable 20 that is coupled to the sensor 12 at one end and operably engaged with a recoiler 22 at an opposite end. As explained in further detail below, a sense circuit or loop defined through the cable 20 and the sensor 12 may be electrically isolated from any charging circuit used to charge the sensor 12 and/or the item of merchandise 14. As such, the sense loop may be used to detect various security events associated with the cable 20, such as the cable being cut, shorted, and/or disconnected. The charging circuit allows for charging of the

item of merchandise 14 and/or a power source 46 carried by the sensor 12 and/or the base 18. The sensor 12 may also be used to 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.

[0013] The sensor 12 may be secured to the item of merchandise 14 using any desired technique, such as an adhesive and/or mechanical brackets. The sensor 12 may have a variety of shapes and sizes for being secured to the item of merchandise 14. In one embodiment shown in FIG. 1, the sensor 12 may include a sensing device 15, such as a pressure or plunger switch, for detecting removal of the item of merchandise 14. In addition, the connector 17 may be configured to be removably inserted into the input jack of the item of merchandise 14. Thus, the sensor 12 and the item of merchandise 14 may be electrically connected via the connector 17. The sensor 12 may include a printed circuit board (PCB), circuitry, or the like. For example, the sensor 12 may include charging circuitry for facilitating power transfer between the base 18 and the item of merchandise 14. The connector 17 may be electrically connected to the PCB using various techniques, such as via a cable. In the illustrated embodiment, the connector 17 is mounted to and extends from the sensor 12 but could be positioned at other locations depending on the location of the input port of the item of merchandise 14.

[0014] As noted above, the sensor 12 may include one or more electrical contacts 28. In some embodiments, the sensor 12 includes a plurality of electrical contacts 28. The electrical contacts 28 may be in electrical communication with the PCB in the sensor 12 and the connector 17. Alternatively, the electrical contacts 28 may be electrically connected to only the connector 17. In some embodiments, the sensor 12 may not supply power to the item of merchandise 14 when the item is lifted from the base 18. Rather, the item of merchandise 14 may operate using its own power source when lifted from the base 18.

[0015] The base 18 may be configured to be supported by a fixed support or display surface 25, such as a counter, shelf, fixture, or the like. The base 18 may be secured to the support surface 25 using any desired technique such as an adhesive, brackets, and/or fasteners. The base 18 may include one or more magnets 34 or magnetic material, and the sensor 12 may include one or more magnets 36 or magnetic material for releasably holding the sensor on the base. The magnets 34, 36 may aid in aligning the item of merchandise 14 in a desired display orientation.

[0016] The security system 10 may include a recoiler 22 and a cable 20 as discussed above.

The base 18 may include an opening for receiving the cable 20. As such, the cable 20 may be extended through the opening when the sensor 12 and the item of merchandise 14 are lifted from the base, and the cable may be retracted through the opening when the sensor and the item of merchandise are returned to the base. The recoiler 22 may be spring biased in some embodiments such that the cable 20 is automatically retracted within the recoiler. The recoiler 22 may be mounted to an underside of the support surface 25 (see, e.g., FIG. 1), although in other embodiments, the recoiler may be housed within the base 18 and mounted on top of the support surface. Furthermore, the recoiler 22 may be in electrical communication with the cable 20. In this regard, 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 optical conductor for conducting an optical signal (e.g., a fiber optic cable).

[0017] As discussed above, the base 18 may include one or more electrical contacts 40. The contacts 28, 40 of the base 18 and the sensor 12 are configured to align with one another and contact one another when the sensor is supported on the base. Thus, the base 18 and the sensor 12 are in electrical communication with one another when the sensor is supported on the base. The base 18 may be electrically connected to a power source 38 which is configured to provide power to the base and/or the one or more electrical contacts 40 in the base. The base 18 may also include charging circuitry that is configured to facilitate power transfer from the external power source 38 and the electrical contacts 40. Thus, when the sensor 12 is supported on the base 18, power is able to be transferred between the contacts 28, 40 and to the sensor 12. The connector 17 is electrically connected to the sensor contacts 28 as power is delivered such that power is provided to the 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. In some embodiments, any voltage adaption occurs prior to being delivered to the sensor 12. Voltage adaption may be needed in order to accommodate different items of merchandise 14 that require different operating voltages. Any voltage adaption may occur prior to power being provided to the contacts 28 on the sensor 12. Thus, the sensor 12 and adapter cable 16 do not provide any voltage adaption. However, in other embodiments, the sensor 12 may include a resistor or other identifier that detects the voltage requirements of the

item of merchandise 14 which provides a signal to the base 18 for adjusting the voltage as necessary before providing power to the sensor. Although the aforementioned embodiments describe that power may be transferred via contact charging, it is understood that other techniques could be used to transfer power to sensor 12 and the item of merchandise 14. For example, inductive charging functionality could be employed for transferring power. Moreover, in some cases, the cable 20 may include one or more conductors for transferring power to the sensor 12 and/or the item of merchandise 14.

[0018] In some cases, the base 18 and the sensor 12 may include an electrical contact that detects that the sensor is lifted off of the base. For example, the sensor 12 and base 18 may each include a contact that is configured to engage one another when the sensor is supported on the base. These contacts may not transfer power. However, the contact on the base 18 may communicate with the PCB to indicate when the sensor 12 has been lifted off of the base and to cease transferring power to the electrical contacts 28, 40. This arrangement of contacts may reduce arcing and power surges when the sensor 12 is placed back on the base 18 since power will no longer be transferred to the contacts on the base after the sensor is lifted.

[0019] 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 recoiler 22, 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.

[0020] An end of cable 20 may be mechanically and optically connected to the sensor 12. Thus, the cable 20 may not be electrically connected to the sensor 12 in any way, and the conductors in the cable are electrically isolated from the power transmitted to the sensor and the item of merchandise 14. In one embodiment, the sensor 12 may define an opening for receiving an end of the cable 20. In some embodiments, the end of the cable 20 includes an optical transceiver 42 for communicating with the sensor 12 and/or the item of merchandise 14. Likewise, the sensor 12 may include an optical transceiver 42 for communicating with the optical transceiver at the end of the cable 20. The optical transceivers 42 may be used to transmit optical signals in predetermined sequences or patterns, as well as receive optical signals

and convert the optical signals into electrical signals. In addition, the optical transceivers 42 may be separated by an air gap so as to not be in physical contact with one another and such that the optical transceivers are electrically isolated from one another. The cable 20 may include one or more conductors for providing power to the optical transceiver 42, as well as sending and receiving signals to and from the optical transceiver in the sensor 12. Similarly, the sensor 12 may include a power source 46 that is configured to provide power to the sensor for interpreting signals provided by the optical transceiver 42, as well as power the optical transceiver for sending and receiving optical signals. Furthermore, the end of the cable 20 may be mechanically coupled to the sensor 12 using a variety of techniques and may be configured to rotate or swivel in some embodiments. In one example, the optical transceivers 42 may be configured to rotate relative to one another. Moreover, the conductors in the cable 20 may be connected to the optical transceiver 42 and a printed circuit board (PCB) or circuitry at one end. Similarly, the connector 17 may include conductors connected to the optical transceiver 42 and a printed circuit board or circuitry in the sensor 12. The end of the cable 20 may include a releasable connector that is configured to contain the optical transceiver 42 and PCB. The releasable connector may be configured to mechanically engage a cooperating connector on the sensor 12. Moreover, FIG. 1 shows that in the case where the charging circuit and sense loop are separate and electrically isolated from another, a cable 44 may be used to electrically connect the contacts 40 and the input power source 38 along with any other data connections.

[0021] The optical transceivers 42 may be used to define a sense loop and detect various security events, such as when the cable 20 is cut or removed from the sensor 12 and/or the connector 17 is removed from item of merchandise 14 in an unauthorized manner. It is understood that various types of sensing techniques may be used for detecting when the cable 20 is attached or detached from the sensor 12 and/or item of merchandise 14, as well as when the connector 17 is removed from the item of merchandise. For example, the optical transceiver at the end of the cable 20 may communicate an optical signal to the optical transceiver in the sensor 12 where the sensor can determine that the item of merchandise 14 and the cable 20 are secure. The optical transceiver in the sensor 12 may then communicate an optical signal to the optical transceiver at the end of the cable 20 to indicate that the item of merchandise 14 is secure. The optical signals may be coded in a particular manner that is recognizable and/or expected for determining whether a security event has occurred. Should the optical signals be interrupted or

an unexpected optical signal is received, the base 18 or other alarm unit may detect the interruption and generate an alarm signal. For example, the base 18 or other alarm unit may be configured to generate an audible and/or a visible alarm. For example, FIG. 1 shows that the base 18 may include an alarm 48, such as a piezoelectric device, for generating an audible alarm. The sensor 12 may likewise include an alarm 48 for generating an audible and/or a visible alarm. The base 18 may be configured to be armed and/or disarmed via a key, such as a wireless key. For instance, FIG. 1 shows that the base 18 may include a port 45 for facilitating communication with a key. In some embodiments, the optical transceiver(s) is similar to that disclosed in U.S. Provisional Application No. 62/167,382, entitled Merchandise Security System with Optical Communication and filed on May 28, 2015, the entire contents of which are incorporated herein by reference.

[0022] FIGS. 2-7 illustrate an embodiment of a recoiler 22. The recoiler 22 generally includes a spool 52 or rotatable member that is configured to rotate within the base 18. The base 18 defines an opening 56 configured to receive the cable 20 so that the cable can be extended and retracted relative to the base as the cable is unwound from and wound onto the spool 52. The cable 20 may be wound about the spool 52 along an axis "L", which may be perpendicular or about perpendicular (e.g., 85-90 degrees) to the axis of the cable 20. As shown in FIG. 7, the outer surface of the spool 52 may include a helical recess 55 that extends along at least a portion of the length of the spool. The helical recess 55 may be sized and configured to receive a portion of the cable 20 as it is wound about the spool 52. The helical recess 55 may define a plurality of windings about the spool 52. As the spool 52 is rotated via tension being applied on the cable 20, the spool is able to rotate about a spindle 58 or other support member. A spring may be used to urge the cable 20 back into the housing 54 as tension is removed from the cable. In some examples, the helix angle of the helical recess is between 0 and about 20 degrees (+/- 1 degree), between 0 and about 10 degrees (+/- 1 degree), or between 0 and about 5 degrees (+/- 1 degree). Moreover, in some embodiments, the pitch of the helical recess 55 may be between 0 and about 5 mm (+/- 1 mm), between 0 and about 10 mm (+/- 1 mm), or between 0 and about 15 mm (+/- 1 mm). In some cases, the spool may be similar to that disclosed in U.S. Provisional Application No. 62/189,274, entitled Winch Recoiler for a Merchandise Security Device and filed on July 7, 2015, the entire contents of which are incorporated herein by reference.

[0023] In some cases, at least one winding of cable 20 is configured to be wound about the

spool 52, and a plurality of windings may be defined about the spool as the cable is wound on the spool. In one example, the length of the spool 52 may be about the same as the outer diameter of the spool, or the length of the spool may be longer than the outer diameter of the spool. The cable 20 may be configured to wrap about the helical recess 55 from one end of the spool 52 to the other end of the spool. In one embodiment, the helical recess 55 may allow for a single row of cable to be wound about the spool 52 in a predetermined helical direction. Once the cable 20 has been wound about the helical recess 55 in one helical direction as the cable is withdrawn into the base 18, the cable is configured to wind about the spool and the first layer of cable in a second helical direction to form a second layer of cable. Thus, the helical recess 55 may facilitate a first row of cable 20 being wrapped about the spool 52 in one direction, and the cable 20 may be biased towards a direction opposite to the first helical direction such that the cable forms a second layer of cable. Due to the helical recess 55 urging the cable 20 in a first helical direction, the cable may be biased to wind in an opposite direction once the cable has been wound to the end of the helical recess. Furthermore, FIG. 6 shows that the second layer of cable may have a length that is about half of the first layer of cable. In this way, the second layer of cable may end at about the midpoint of the spool 52 thereby allowing the end of the cable to align with the opening 56 of the base 18. As such, the helical recess 55 may allow for more compact and orderly cable management within the base 18.

[0024] The recoiler 22 may also include a spring 64 in some embodiments. For example, the spring 64 may be secured to one end of the spool 52. In one embodiment, the spring 64 is a variable-force or variable-torque spring, a constant-force or constant-torque spring, or a power spring. When tension on the cable 20 is removed, the spring force of the spring 64 causes the spool 52 to rotate in an opposite direction thereby returning the cable 20 onto the spool.

[0025] As discussed above, the cable 20 may include one or more electrical conductors and the base 18 may facilitate power transfer to the sensor 12. In order to facilitate an electrical connection with the cable 18, such as for transmitting and receiving power, security, and/or data signals, the recoiler 22 may include a slip ring 72. The slip ring 72 may be electrically connected to the cable 20 and a printed circuit board 74, such as with one or more electrical wires. The slip ring 72 may be configured to rotate with the spool 52 in some cases. And FIGS. 4 and 7 show that the slip ring 72 may be mounted at an end of the spool 52 opposite the spring 64.

[0026] In another embodiment, a locking feature may be provided for locking the sensor 12 to the base 18. In this regard and with reference to FIG. 5, a lock mechanism 80 may be configured to lock the sensor 12 to the base 18 when the sensor is seated on the base thereby prevent the spool from rotating and, therefore, the cable 20 from being retracted relative to the base. Such a lock mechanism 80 may be useful for retailers who wish to secure the sensor 12 and item of merchandise 14 to the base 18, such as after hours, since the cable will be inaccessible due to the inability to lift the sensor from the base. In the illustrated embodiment, the lock mechanism 80 includes a locking member 82 that is configured to rotate between locked and unlocked positions. In this instance, the locking member 82 may be a proprietary fastener. In another embodiment, the lock mechanism 80 may be configured to engage the spool 52 to prevent rotation thereof.

[0027] Embodiments of the present invention may provide several advantages. For example, the recoiler allows greater flexibility in installing the recoiler since the recoiler may be disposed entirely within the base. In addition, the size of the base may be more flexible given that the length of the recoiler may be reduced where the cable is configured wrap about itself in an orderly manner. Moreover, the configuration of the spool and helical recess may provide for a better user experience given that the pull force on the cable may be more constant and less than conventional recoilers.

[0028] The foregoing has described one or more embodiments of recoilers, merchandise security systems, and methods for displaying and protecting 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 broad 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 displaying and protecting an article of merchandise from theft, comprising:

a sensor configured to be secured to the article of merchandise;

a base for removably supporting the sensor and the item of merchandise thereon;

a recoiler operably coupled to the sensor, the recoiler comprising a rotatable member defining a helical recess; and

a cable configured to connect to the sensor and to be unwound from and wound on the rotatable member as the cable is extended and retracted,

wherein the cable is configured to be extended from the base in response to the sensor being lifted off of the base, and wherein the cable is configured to be retracted into the base in response to the sensor being moved to a seated position on the base, and

wherein the helical recess is configured to at least partially receive the cable therein as the cable is wound on the rotatable member.

2. The merchandise security system of Claim 1, wherein an outer surface of the rotatable member defines the helical recess.

3. The merchandise security system of Claim 2, wherein the helical recess has a pitch of less than about 5 mm.

4. The merchandise security system of Claim 1, further comprising a spring fixed to one end of the rotatable member.

5. The merchandise security system of Claim 4, further comprising a slip ring at an opposite end of the variable force spring.

6. The merchandise security system of Claim 1, further comprising a slip ring coupled to the rotatable member and electrically connected to the cable.

7. The merchandise security system of Claim 6, wherein the cable comprises a plurality of electrical conductors that are electrically connected to the slip ring.

8. The merchandise security system of Claim 1, wherein the rotatable member is

configured to rotate about an axis as the cable is wound on and unwound from the rotatable member.

9. The merchandise security system of Claim 1, wherein the cable is configured to be wound about the rotatable member such that the cable overlaps itself on the rotatable member.

10. The merchandise security system of Claim 9, wherein the cable is configured to be wound about the rotatable member and within the helical recess to define a first layer of cable, and wherein the cable is configured to be wound about the first layer of cable to define a second layer of cable.

11. The merchandise security system of Claim 10, wherein the cable is configured to be wound in a first helical direction to define the first layer of cable and to be wound in a second helical direction to define the second layer of cable.

12. The merchandise security system of Claim 11, wherein the first and second helical directions are opposite to one another.

13. The merchandise security system of Claim 1, wherein the rotatable member comprises a spool.

14. The merchandise security system of Claim 1, wherein the base is configured to house the recoiler therein.

15. A method for displaying and protecting an article of merchandise from theft, comprising:

securing a sensor to the article of merchandise, a recoiler operably coupled to the sensor and comprising a rotatable member defining a helical recess;

attaching a base to a support surface for removably supporting the sensor and the item of merchandise thereon; and

connecting a cable to the sensor,

wherein the cable is configured to be extended from the base in response to the sensor being lifted off of the base, wherein the cable is configured to be retracted into the base in response to the sensor being moved to a seated position on the base, and wherein the helical

recess is configured to at least partially receive the cable therein as the cable is wound on the rotatable member.

16. The method of Claim 15, further comprising lifting the sensor and the article of merchandise from the base.

17. The method of Claim 16, further comprising placing the sensor on the base such that the cable winds about the rotatable member and overlaps itself on the rotatable member.

18. The method of Claim 17, wherein placing comprising placing the sensor on the base such that the cable winds about the rotatable member and within the helical recess to define a first layer of cable and winds about the first layer of cable to define a second layer of cable.

19. The method of Claim 18, wherein placing comprising placing the sensor on the base such that the cable winds in a first helical direction to define the first layer of cable and to winds in a second helical direction to define the second layer of cable.

20. The method of Claim 19, wherein the first and second helical directions are opposite to one another.

21. The method of Claim 15, wherein connecting comprises connecting the cable to the sensor with a releasable connector.

ABSTRACT

Embodiments of the present invention are directed to recoilers, merchandise security systems, and methods for displaying and protecting an article of merchandise from theft. In one example, the merchandise security system includes a sensor configured to be secured to the article of merchandise and a base for removably supporting the sensor and the item of merchandise thereon. The system also includes a recoiler operably coupled to the sensor. The recoiler includes a rotatable member defining a helical recess. The system further includes a cable configured to connect to the sensor and to be unwound from and wound on the rotatable member as the cable is extended and retracted. The cable is configured to be extended from the recoiler in response to the sensor being lifted off of the base, and the cable is configured to be retracted into the recoiler in response to the sensor being moved to a seated position on the base. The helical recess is configured to at least partially receive the cable therein as the cable is wound on the rotatable member.

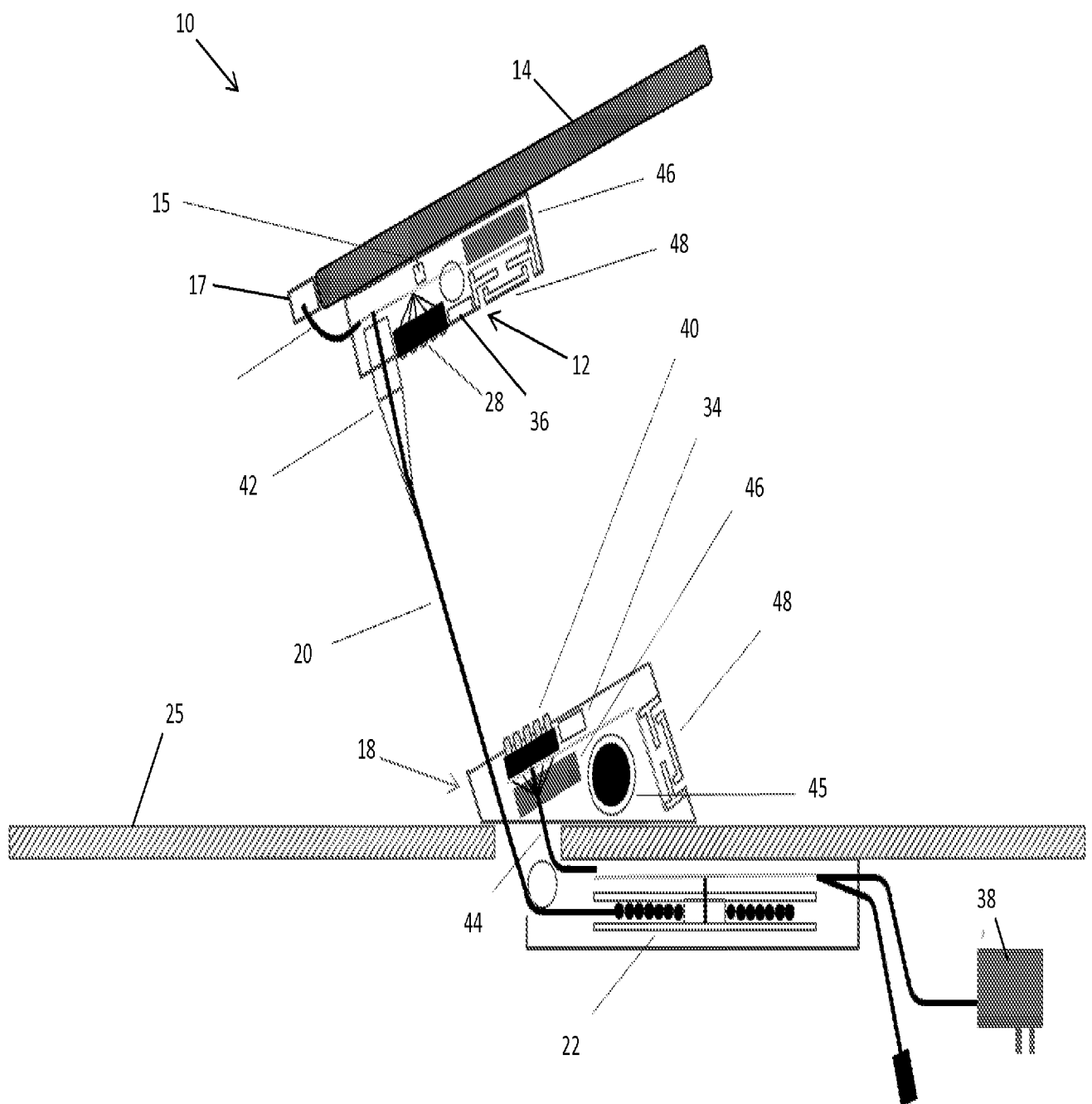


FIGURE 1

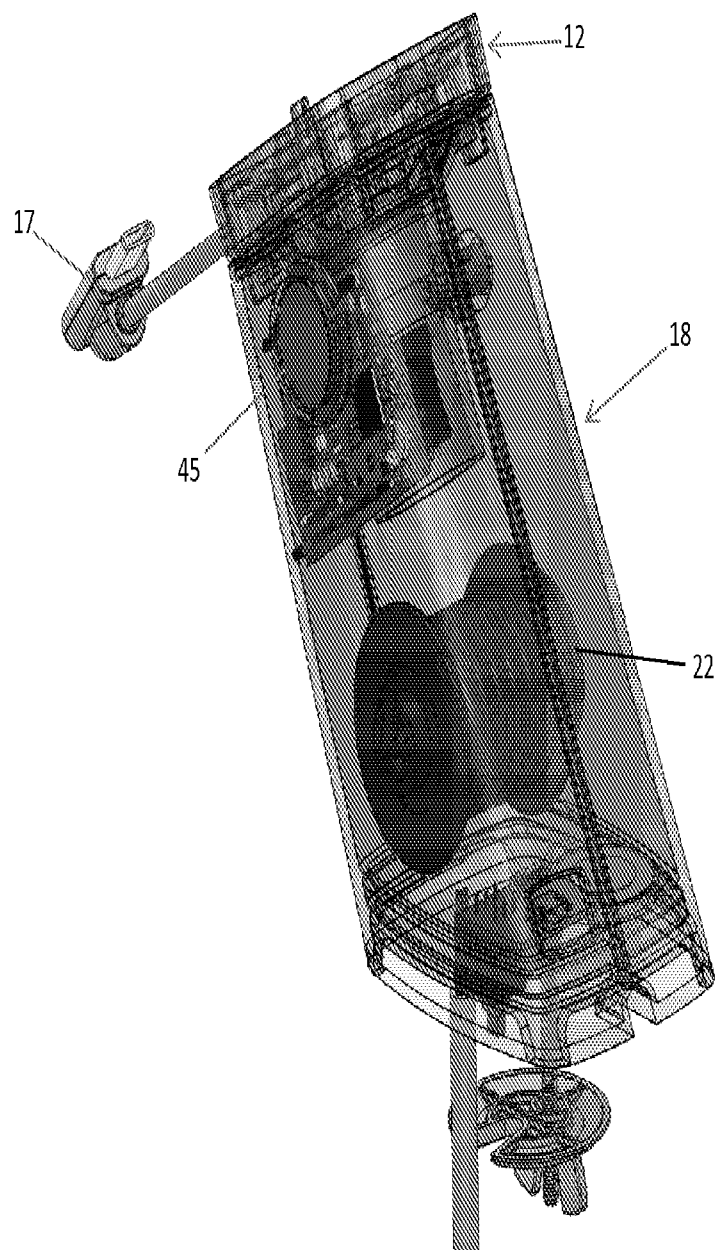


FIGURE 2

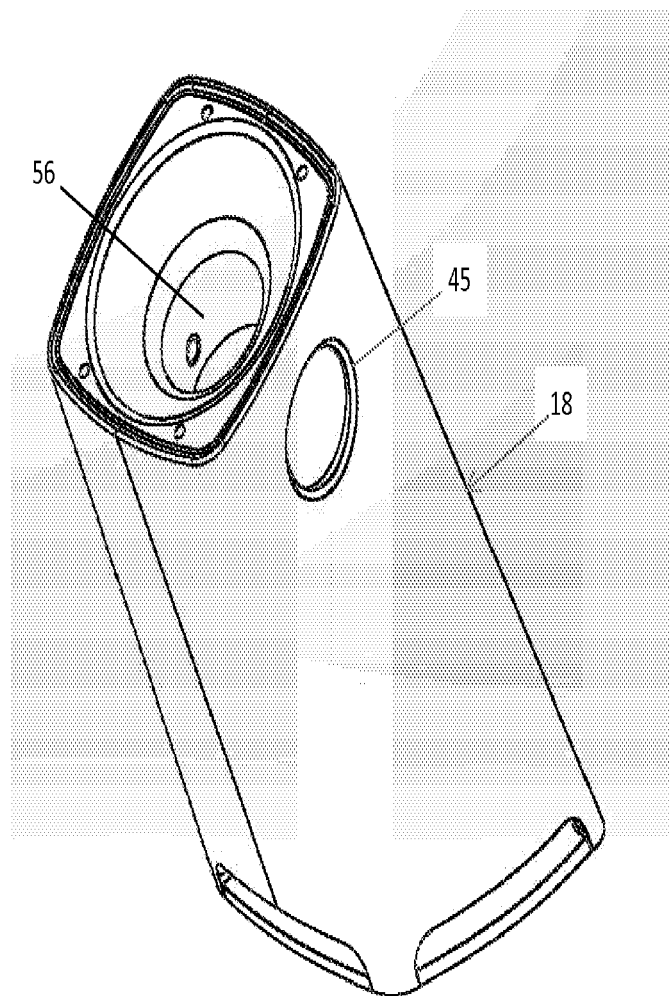


FIGURE 3

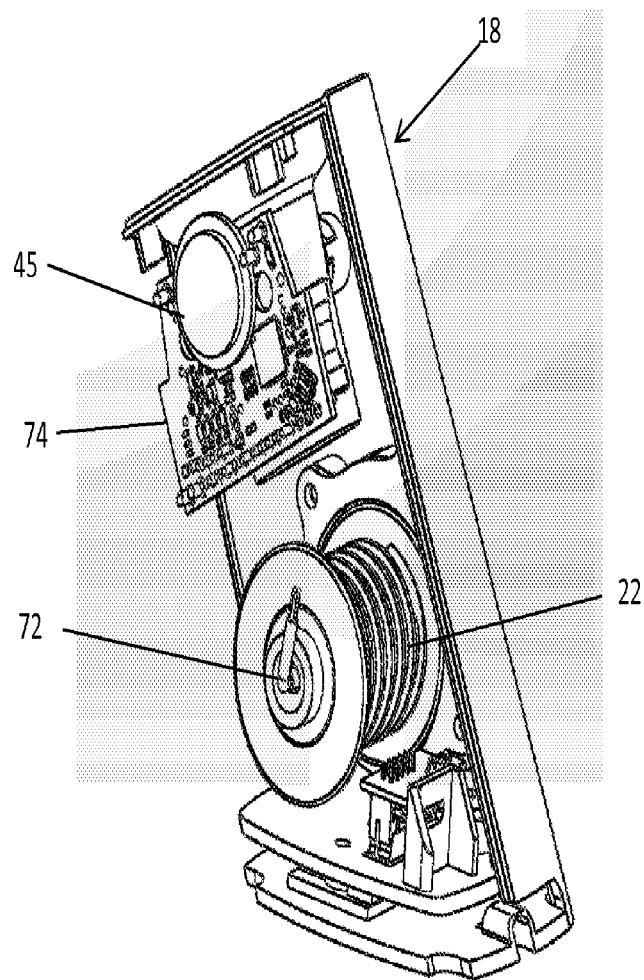


FIGURE 4

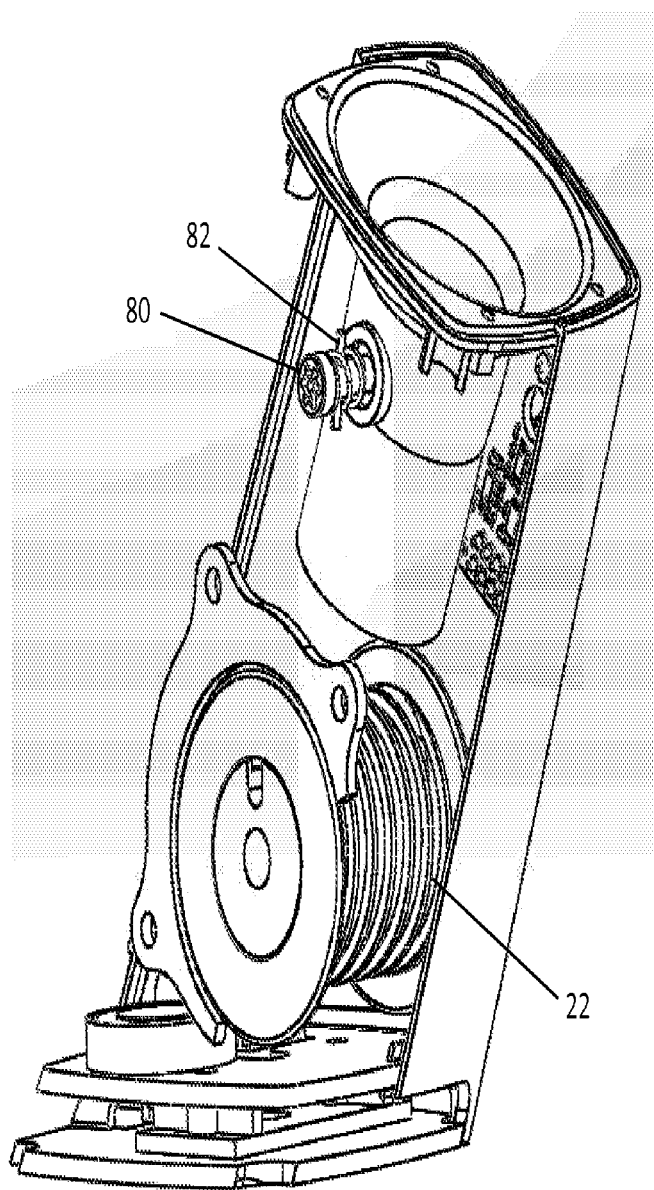


FIGURE 5

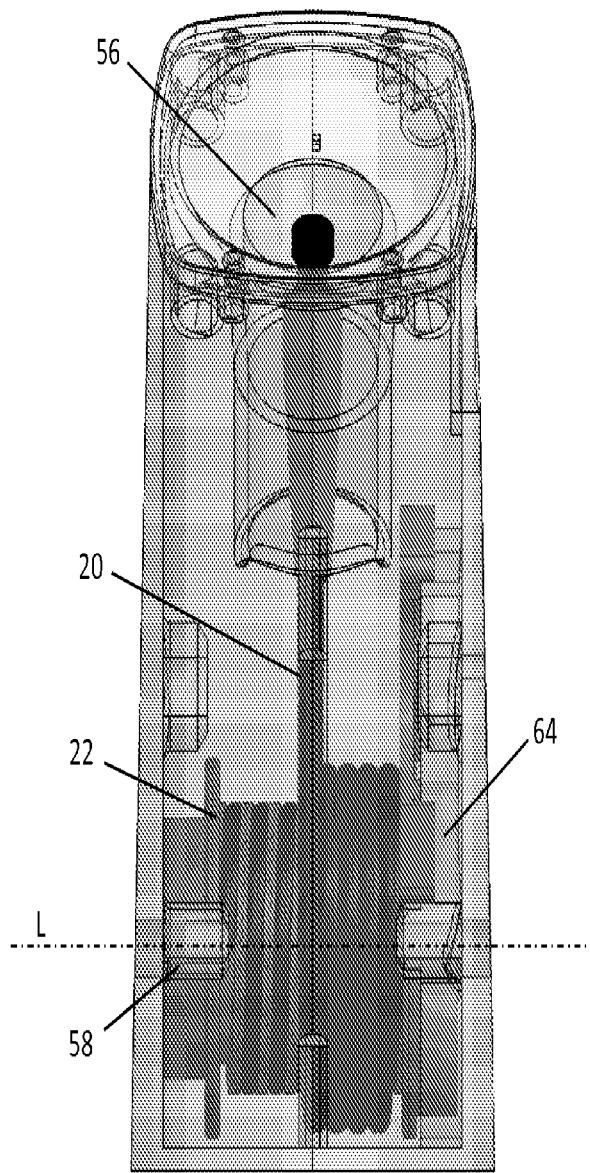


FIGURE 6

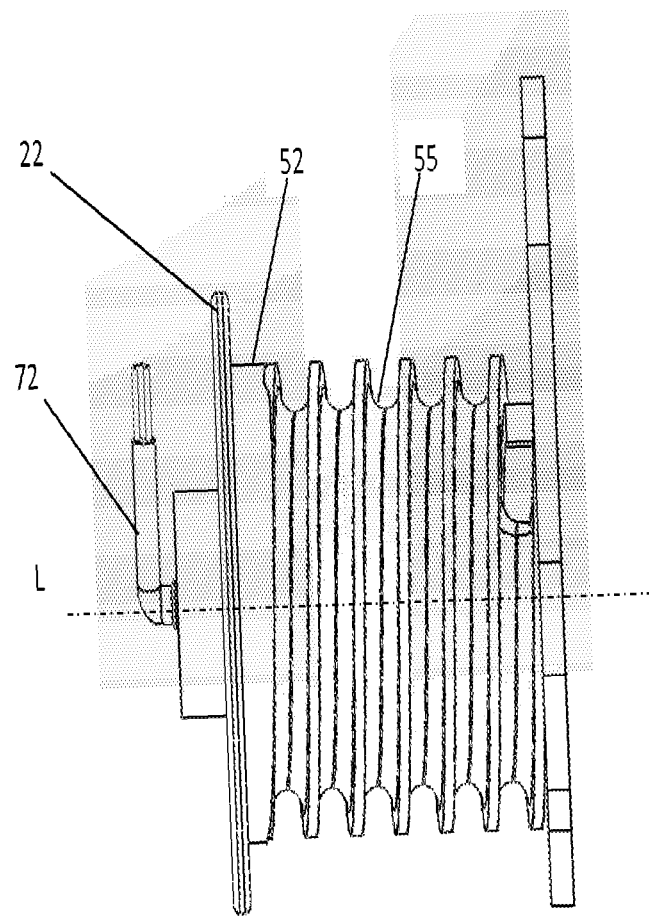


FIGURE 7

Electronic Acknowledgement Receipt

EFS ID:	23755373
Application Number:	62240171
International Application Number:	
Confirmation Number:	6459
Title of Invention:	RECOILER FOR A MERCHANDISE SECURITY SYSTEM
First Named Inventor/Applicant Name:	DAVID BERGLUND
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Application Type:	Provisional

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Payment Type	Deposit Account
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			99ae567c2ac226b9137e5820ad253c3d914fb630		
Warnings:					
Information:					
2		P1232D-PRO_app.pdf	82860	yes	13
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	Specification		1	9	
	Claims		10	12	
	Abstract		13	13	
Warnings:					
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3	Drawings-only black and white line drawings	P1223D-PRO_Figures.pdf	941160	no	7
			102ac4148bc3ad858094a3cc34ed8/068/923858		
Warnings:					
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4	Fee Worksheet (SB06)	fee-info.pdf	29718	no	2
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