Title: ANTI-THEFT DEVICE AND UNLOCKING DEVICE FOR THE ANTI-THEFT DEVICE

Abstract: The invention provides an antitheft device for preventing commodities from being stolen, an unlocking device for electronically unlocking the antitheft device and a security system comprising the antitheft device and the unlocking device. The antitheft device comprises a pin and a tag wherein the pin is frictionally locked by rotating a locking member from a first orientation to a second orientation and wherein the pin is unlocked by rotating the locking member to the first orientation.
Antitheft device and unlocking device for the antitheft device

FIELD OF THE INVENTION

The present invention relates to antitheft devices for preventing commodities from being stolen, and more specifically to antitheft devices comprising a tag for triggering an alarm and a pin for detachably attaching the tag to the commodity. The present invention further relates to unlocking devices for electronically unlocking antitheft devices.

BACKGROUND

To prevent a commodity from being stolen, store owners typically tag the commodity allowing an alarm to be triggered when the tag is detected as the commodity leaves the store. When the tag is removed, e.g. by a cashier upon payment, the commodity can leave the store without triggering the alarm.

Different types of antitheft devices using tags are known. A tag can have a counterpart in the form of a pin on a button. The pin is to be pushed through a commodity such as e.g. clothing and locked within the tag, Alternatively the tag can be part of a security container wherein a product is stored. The lid of the security container is provided with a pin that locks within the tag to close the security container. Such security container is typically used when the product to be protected does not allow a pin to be pushed through.

Removal of the tag requires special equipment. As this equipment is typically available to personnel of the store, special measures are needed to prevent the personnel from stealing commodities. Moreover, depending on the type of tag, the special equipment may be relatively easy to obtain enabling illegal removal of the tag by non-personnel.

An antitheft device is disclosed in US4722119. US4722119 relates to a fastening device which is of one piece construction of a ferromagnetic material, having in it formed a pair of jaws through which a fastening pin is inserted and
tightly engaged from reverse travel due to the inward bias and angle of the jaws, thereby preventing unauthorized removal. Removal of the pin is accomplished when the jaws are spread slightly due to a magnetic force attracting a formed upper end or loop and the resulting motion being transmitted through a riser to integral lever arms which through mechanical advantage flex the base thereby spreading the jaws apart. A disadvantage of this antitheft device is that a magnet for spreading the jaws and thereby allowing removal of the fastening pin may be obtainable and used by non-authorized persons.

An unlocking device is disclosed in US5942978. US5942978 relates to a device for removing reusable hard EAS tags from articles of merchandise. The device is controlled so as to operate in response to identification data generated by an RFID element in the hard tag. A transmitter-key device is provided to selectively condition the detaching unit to operate in the absence of the otherwise required identification data. The transmitter-key device may also be used to turn the detaching unit on and off. Data indicative of the identity of the holder of the transmitter-key device may be stored in the detaching unit or an associated point-of-sale terminal to log detaching transactions authorized by the transmitter-key device. A disadvantage of this unlocking device is that it wirelessly connects to tags, limiting the possibilities of signal and power exchange.

SUMMARY OF THE INVENTION

It is an object of the invention to provide an improved antitheft device overcoming the drawbacks of the prior art.

Moreover it is an object of the invention to provide an unlocking device for unlocking the antitheft device.

According to an aspect of the invention an antitheft device is proposed comprising a tag for triggering an alarm and an attaching member for detachably attaching the tag to a commodity. The attaching member comprises a pin. The tag comprises a housing having arranged therein a locking member for locking the pin. The locking member comprises a first pinhole.
for the pin to be substantially frictionless inserted through in a first orientation of the locking member. The locking member is rotatably provided inside the housing and arranged to rotate to a second orientation different from the first orientation. In the second orientation the pin is frictionally locked in the first pinhole.

Thus, an improved antitheft device is provided, which advantageously enables the attaching member to be securely attached to the tag, Advantageously the design of the locking member is such that an attempt to pull the pin out causes the locking member to further rotate and the friction between the pin and the locking member to increase, making it substantially impossible to remove the attaching member from the tag. Moreover, the antitheft device is immune to external magnetic force, I.e., the antitheft device cannot be opened using an external magnetic force.

The embodiment of claim 2 advantageously enables the pin to be more securely locked in the tag.

The embodiment of claim 3 advantageously enables the pin to be locked immediately upon insertion.

The embodiment of claim 4 advantageously enables electronic unlocking without an external magnetic or external kinetic force. Thus, no external magnet or external pressure can be used for removing the attaching member from the tag.

The embodiment of claim 5 provides an optimum lever of the locking member for both frictionally locking the pin and rotating the locking member to unlock the pin.

The embodiment of claim 6 advantageously enables the antitheft device to be implemented without an internal power source. Moreover, only pre-programmed unlocking devices can unlock the antitheft device preventing someone to use a random unlocking device, e.g. from another store or obtained otherwise.

The embodiment of claim 7 advantageously enables unlocking using air pressure, without an external magnetic or external kinetic force. Thus, no external magnet or external pressure other than air pressure can be used for removing the attaching member from the tag.
The embodiment of claim 8 advantageously enables the antitheft device to be implemented without an internal power source. Moreover, only pre-programmed unlocking devices can unlock the antitheft device preventing someone to use a random unlocking device, e.g. from another store or obtained otherwise.

The embodiment of claim 9 advantageously makes the locking member non-magnetic, thus increasing tamper resistance to external magnetic forces.

The embodiment of claim 10 advantageously enables logging of unlocking attempts in the unlocking device.

The embodiment of claim 11 advantageously enables the antitheft device to be used for commodities like clothing, shoes or any other article through which the pin can be pushed.

The embodiment of claim 12 advantageously enables the antitheft device to be used for products that do not allow the pin to be pushed through. These products can be placed within the security container.

According to an aspect of the invention an unlocking device is proposed for unlocking an attaching member from a sag of an antitheft device having one or more of the above mentioned features. The unlocking device comprises a connector for detachably connecting the unlocking device to the tag. The unlocking device further comprises an electronic circuit configured to generate a data signal comprising a first data pattern. The electronic circuit is further configured to modulate the data signal on a direct current. The electronic circuit is further configured to provide the direct current comprising the modulated data signal to the tag through the connector. The direct current allows the tag to be powered for unlocking the attaching member upon recognition of the first data pattern.

Thus, an unlocking device is provided that advantageously enables unlocking of the antitheft device. The power needed by the antitheft device for unlocking is advantageously provided by the unlocking device, enabling the antitheft device to be implemented without internal power source. Moreover, by providing the first data pattern the
unlocking device can identify itself enabling only pre-
programmed unlocking devices to unlock the antitheft device and
thus preventing someone to use a random unlocking device, e.g.
from another store or obtained otherwise.

5 The embodiment of claim 14 advantageously enables
logging of unlocking attempts in the unlocking device.

The embodiment of claim 15 advantageously enables the
identity of the user of the unlocking device to be verified and
logged. Hereto the external RFID tag is e.g. worn by an employee
- e.g. as part of an employee badge - and the RFID indicative of
the employee is read by the unlocking device upon activation.

According to an aspect of the invention a security
system is proposed comprising an antitheft device and an
unlocking device. The antitheft device comprises a tag for
triggering an alarm and an attaching member for detachably
attaching the tag to a commodity. The attaching member comprises
a pin. The tag comprises a housing having arranged therein a
locking member for locking the pin. The locking member comprises
a first pinhole for the pin to be substantially frictionless
inserted through in a first orientation of the locking member.
The locking member is rotatably provided inside the housing and
arranged to rotate to a second orientation different from the
first orientation. In the second orientation the pin is
frictionally locked in the first pinhole. The unlocking device
is arranged to unlock the attaching member from the tag.

Thus, a security system is provided with an improved
antitheft device and an unlocking device for unlocking the
antitheft device.

Hereinafter, embodiments of the invention will be
30 described in further detail. It should be appreciated, however,
that these embodiments may not be construed as limiting the
scope of protection for the present invention,

BRIEF DESCRIPTION OF THE DRAWINGS

Fig.1 schematically shows an antitheft device of an
exemplary embodiment of the invention;
Fig. 2 schematically shows an exemplary embodiment of a locking member and a pin in an unlocked position;  
Fig. 3 schematically shows an exemplary embodiment of a locking member and a pin in a locked position;  
Fig. 4 shows an exemplary embodiment of a pin being frictionally locked in a locking member;  
Fig. 5 shows a locking member and an attaching member of an exemplary embodiment of the invention;  
Fig. 6a shows an antitheft device of an exemplary embodiment of the invention;  
Fig. 6b shows an antitheft device of another exemplary embodiment of the invention;  
Fig. 7 schematically shows a security system comprising an antitheft device, an unlocking device and an external RFID tag of an exemplary embodiment of the invention;  
Fig. 8 schematically shows distances between elements of the antitheft device of an exemplary embodiment of the invention;  
Fig. 9 shows an electronic circuit of a tag of an exemplary embodiment of the invention;  
Fig. 10 shows an antitheft device applied to a security container of an exemplary embodiment of the invention.

DETAILED DESCRIPTION OF THE DRAWINGS

Antitheft devices are used to protect commodities or products from being stolen. An example of an antitheft device is a hard tag that is placed on a commodity, such as e.g. a piece of clothing or any other commodity through which a pin can be pushed without damage, and that is to be removed by personnel of the store upon payment. Without removing the hard tag an alarm will go off when the tagged commodity leaves the store and the tag is detected by a detector at the exit of the store. Products that cannot be hard tagged, e.g. DVDs or any other product that cannot be hard tagged, can be protected by placing the product in a security container which is locked by using an antitheft device. The security container can be opened by personnel upon payment allowing the product to be taken out of the store.
Without removing the security container an alarm will go off when a tag in the antitheft device is detected by a detector at the exit of the store.

The antitheft device of the present invention comprises a pin that can be locked in a tag by inserting the pin through a pinhole of locking member such as a metal strip and rotating the metal strip to frictionally lock the pin in the pinhole. Pulling the pin in an attempt to remove the pin from the tag results in the tilt of the strip being increases. The resulting higher frictional grip on the pin makes it substantially impossible to remove the pin. In an exemplary embodiment, which will be described in more detail; the pin can be electronically released by generating a magnetic field between a magnet inside the tag and a coil on one end of the strip, resulting in a rotation of the metal strip such that the frictional grip on the pin decreases to a point where the pin can be removed.

In Figure 1 basic elements of an exemplary embodiment of the antitheft device 1 are shown. The antitheft device 1 comprises two separable parts; an attaching member 20 and a tag 10. The attaching member comprises a pin 201 that is to be inserted into the tag 10 where it is frictionally locked in a first pinhole 104 of a locking member 102, The pin 201 is preferably made of hardened steel to prevent it from bending, but other materials may be used. The locking member 102 is typically a rectangular rotatable metal strip, but any other-form or material may be used as long as the locking member 102 can be rotated to frictionally lock the pin 201 in the pinhole 104. Preferably the strip is made of a stainless steel, such as e.g. a type 316 austenitic chromium-nickel alloy, to make it non-magnetic. To be able to insert the pin 201 into the pinhole 104, the housing 101 of the tag 10 is provided with a second pinhole 103 in line with the pinhole 104. The second pinhole furthermore allows fixing of the pin 201 in a tangent plane to the housing 101 at the second pinhole 103 when the pin 201 is frictionally locked in the first pinhole 104. This makes it substantially impossible to move the pin 2G1 to decrease the friction between the pin 201 and the plate 102.
In Fig. 2, a side view of a locking member 102 in a first orientation and a pin 201 is shown. The pin 201 can be substantially frictionless inserted through the pinhole 104 when the locking member 102 is in the first orientation, in this example when the angle $\alpha$ between the pin 201 and the locking member 102 is substantially perpendicular, i.e. substantially 90°. In other words, the normal of the locking member 102 is parallel to the pin 201. The dashed arrow in Fig. 2 indicates the insertion direction of the pin 201. The angle $\alpha$ may deviate from 90° up to an angle where the pin gets fractionally locked in the pinhole 104.

The locking member 102 is rotatable by rotating the locking member 102 around a pivot 105. In Fig. 3, which shows a side view of the locking member 102 in a second orientation and the pin 201, the locking member 102 is rotated in the direction of the dashed arrow resulting in the angle $\alpha$ becoming acute, i.e. smaller than 90°. The tilt of the locking member 102 causes the edges of pinhole 104 to come into contact with the pin 201, In Fig. 4 this is visualized by locations $\mu$ where the pin 201 makes contact with the edge of the pinhole 104. The resulting friction between the pin 201 and the edge of pinhole 104 locks the pin in the locking member 102.

The pin 201 is typically round in cross section and fits in round pinholes 103 and 104. Pins and pinholes shaped otherwise may alternatively be used, as long as the pin is frictionally lockable in the locking member 102 by rotating the locking member 102 from a first orientation to a second orientation.

The antitheft device 1 can be used to protect a variety of commodities and products from being stolen. The shape and form of the housing 101 of the tag 10 and the shape and form of the attaching member 20 comprising the pin 201 can be adapted to suit the protection of a particular commodity or product. Two examples hereof are presented in Fig. 5 and Fig. 10.

In Fig. 5 a 3D view of a locking member 102 and attaching member 20 are shown. The attaching member in Fig. 5 comprises a pin 201 that projects from a button 202. Such
attaching member 20 is typically used for attaching the antitheft device 1 to clothing or other commodities through which a pin can be pushed without damaging the commodity. The pivot 105 in Fig. 5 is realised as an axis that can be rotatably fixed to the housing 101 of the tag 1. In Fig. 5 the locking member 102 is provided with a spring 106 allowing a spring force in a direction opposite of the insertion direction of the pin 201, The direction of the spring force is indicated in Fig. 5 by the arrow. The force given to the pin 201 when pushing the pin 201 through the pinhole 104 compensates the spring force, allowing the angle a becoming approximately right and thus enabling insertion of the pin 201 through the pinhole 104. When the pin 201 is no longer pushed, the pin 201 gets frictionally locked immediately as the spring makes the locking member 102 tilt resulting in an acute angle a. When trying to remove the pin 201 by pulling the pin out of the pinhole 104, the locking member 102 gets rotated even further, i.e. the angle a becomes even more acute, increasing the frictional grip and making removal of the pin 201 impossible.

If a product is to be protected through which the pin cannot be pushed without damage, the tag 10 and the attaching member 20 can be integrated in a security container 30, as indicated in Fig. 10. A first part 301 of the security container 30 contains the tag 10, A second part of the security container 30 contains the attaching member 20. The antitheft device implemented in the security container 30 works in a similar manner as described for the antitheft device with a button and a pin as attaching member.

Fig. 6a shows a cross section of a housing 101 wherein the locking member 102 is provided. The locking member 102 is rotatably connected to the pivot 105 allowing the locking member 102 to rotate in the directions indicated by the double arrow. In Fig. 6a the spring 106 is fixed to both the housing 1 and the locking member 102, Alternative embodiments are possible wherein the spring 106 is fixed to either the locking member 102 or the housing 101, or wherein the spring is fixed to neither the locking member 102 nor the housing 101 but kept in place by a
place holder in between the housing 101 and the locking member 102. The spring 106 can be installed such that it pushes the locking member 102 in a direction making the angle $\alpha$ acute. In an alternative embodiment (not shown) a spring is installed on the other side of the locking member 102 such that it pulls the locking member 102 in a direction making the angle $\alpha$ acute.

To allow the pin 201 to be removed from the pinholes 103 and 104, the angle $\alpha$ is to be made approximately right again. As shown in Fig. 6a, hereto a coil 107 is attached to the locking member 102. The coil 107 may be attached to the locking member 102 in any suitable manner, e.g. by soldering or gluing. Opposite of the coil 107 a magnet 108, e.g. a neodymium magnet, is fixed to the housing 101 of the tag 10. By providing a current, the coil 107 can be magnetized resulting in a magnetic force between the magnet 108 and the coil 107 pulling the coil 107 towards the magnet 108. When the magnetic force exceeds the spring force, the locking member 102 rotates in the direction opposite of the insertion direction and the angle $\alpha$ becomes approximately right again. It will be understood that in an alternative tag without a spring 106, no spring force is to be overcome and less magnetic force is required for rotating the locking member 102,

In a preferred embodiment the distance $d_2$ between the pinhole 104 and the coil 107 is five times the distance $d_1$ between the pivot 105 and the pinhole 104, as indicated in Fig. 8. In this configuration the pin 201 can be frictionally locked in the pinhole 104 while a minimal magnetic force is required for unlocking the pin 201.

Fig. 6b shows a cross section of another housing 101 wherein the locking member 102 is provided. The locking member 102 is rotatably connected to the pivot 105 allowing the locking member 102 to rotate in the directions indicated by the double arrow. In Fig. 6b the spring 106 is fixed to both the housing 1 and the locking member 102. Alternative embodiments are possible wherein the spring 106 is fixed to either the locking member 102 or the housing 101, or wherein the spring is fixed to neither the locking member 102 nor the housing 101 but kept in place by
a place holder in between the housing 101 and the locking member 102. The spring 106 can be installed such that it pushes the locking member 102 in a direction making the angle α acute. In an alternative embodiment (not shown) a spring is installed on the other side of the locking member 102 such that it pulls the locking member 102 in a direction making the angle α acute.

To allow the pin 201 to be removed from the pinholes 103 and 104, the angle α is to be made approximately right again. As shown in Fig. 6b, hereto a displaceable member 118 is pushed against the locking member 102 by providing air through the air inlet 117 under pressure. As the air pressure in chamber 116 builds up, the displaceable member 118 is pushed down to the locking member 102. When the force from pushing the displaceable member to the locking member 102 exceeds the spring force, the locking member 102 rotates in the direction opposite of the insertion direction and the angle α becomes approximately right again. It will be understood that in an alternative tag without a spring 106, no spring force is to be overcome and less force is required for rotating the locking member 102.

The displaceable member 118 may be locked in the chamber 116 by an electronic lock holding the displaceable member 118 at a fixed position in the chamber 116, even when air is being provided through the air inlet 117. The electronic lock may be realised in any known manner. The electronic lock is e.g. a clamp for fractionally keeping the displaceable member 116 at the fixed position until an electric current releases the clamp. Another non limiting example is a slider in between the displaceable member 118 and the locking member 102 that prevents the displaceable member 118 from reaching the locking member 102 unless the slider is moved out of the way by applying an electric current to a mechanism to pull away the slider.

To allow the tag 10 to be as small as possible, ideally no power source is present in the tag 10. In Fig. 7 a security system is shown comprising an antitheft device, an unlocking device and an optional external RFID tag 3. The power source is external to the tag 10. The antitheft device 1 shown in Fig. 7 is based on the antitheft device 1 shown in Fig. 1. Additionally, in
Fig. 7 the antitheft device 1 is provided with an electronic circuit 109 inside the tag 10 and a connector 110 in the housing 101 of the tag for connecting an unlocking device 2 to the electronic circuit 109. The electronic circuit 109 is connected to the coil 107 or to the electronic lock to conditionally allow a current through the coil 107 or unlocking the electronic lock. The unlocking device 2, which is typically a handheld device operable by personnel, has a connector 301 that fits on the connector 110. When the tag 10 and the unlocking device 2 are connected, the electronic circuit 109 of the tag becomes connected to an electronic circuit 302 of the unlocking device 2. The power source (not shown) of the unlocking device 2 can then be used as a power source for the tag 10.

An unlocking device 2 can be a simple handheld device mainly providing a power source to the tag 10. Upon connection of such simple handheld device to the tag 10, the coil or electronic lock is powered immediately resulting in the pin 201 to become removable from the locking member 102.

Preferably, the unlocking device 2 and tag 10 are more advanced allowing the pin 201 to be removed conditionally. In Fig. 7 the unlocking device 2 is equipped with an optional RFID receiver 304 for receiving an RFID (Radio Frequency Identification) from an external RFID tag 3. The RFID tag 3 is typically personalized such that the RFID is linked to a person.

To operate the unlocking device 2 the person operating the unlocking device 2 has to carry the RFID tag 3 allowing the RFID to be received in the RFID receiver 304. Any known RFID technology may be used for this purpose. The RFID receiver 304 is coupled to the electronic circuit 302 of the unlocking device 2. Identities of authorized users of the unlocking device 2 are stored in a programmable memory 303, which is e.g. implemented as an EEPROM or flash memory module on the electronic circuit 302. The received RFID is compared with the identities in the memory 303. Only if the RFID is found, the unlocking device will provide the power to the tag 10 to unlock the pin 201.

Optionally the RFID is stored in the memory 303 for logging purposes.
The tag 10 is optionally hardcoded with a tag-identity. To enable reception of the tag-identity, the unlocking device 2 sends a polling signal to the tag 10 when being activated, e.g. after receiving a valid RFID as described above or alternatively simply upon powering on. After being activated the electronic circuit 302 of the unlocking device 2 transmits the polling signal repetitively for e.g., 5 to 10 seconds. Within this timeframe the unlocking device 2 is to be connected to the tag 10. When connected, the electronic circuit 109 of the tag 10 receives the polling signal and responds with the tag-identity. The memory 303 is typically pre-programmed with allowable tag-identities. The received tag-identity can then be compared with the stored tag-identities allowing the unlocking device 2 to conditionally provide the power to the tag 10 to enable unlocking of the pin 201. The unlocking device 2 optionally logs the tag-identity by storing the tag-identity in the memory 303.

To unlock the pin 201, the unlocking device 2 provides a direct current (DC) of e.g., 3.6 V to the tag 10 through connector 301. Typically a data pattern is modulated onto the DC to be processed by the tag. The data pattern is received by a processor in the electronic circuit 109 of the tag 10. If the data pattern is recognized, the processor enables a current to the coil 107 for unlocking the pin 201.

In Fig. 9 an example of the electronic circuit 109 of the tag 10 is shown. The electronic circuit 109 is connectable to the unlocking device 2 through connector 110. The electronic circuit 109 comprises resistors 113, a capacitor 114 and a zener diode 115, which are dimensioned such that the processor 111 can receive the polling signal from the unlocking device 2 and respond with the response signal containing the tag-identity hardcoded in the processor 111, and that the processor 111 can receive the data pattern modulated onto the 3.6 V DC. The processor 111 is programmed to recognize a particular data pattern, if the data pattern is recognized the base of transistor 112 is powered, resulting in a current to flow through the coil 107. A similar circuit may be used for powering the electronic lock for unlocking the displacable member and
allowing air provided through the air inlet to move the displaceable member.
1. An antitheft device (1) comprising a tag (10) for triggering an alarm and an attaching member (20) for detachably attaching the tag (10) to a commodity, the attaching member (20) comprising a pin (201), the tag (10) comprising a housing (101) having arranged therein a locking member (102) for locking the pin (201), wherein
the locking member (102) comprises a first pinhole (104) for the pin (201) to be substantially frictionless inserted through in a first orientation of the locking member (102), and
the locking member (102) is rotatably provided inside the housing (101) and arranged to rotate to a second orientation different from the first orientation wherein the pin (201) is frictionally locked in the first pinhole (104).

2. The antitheft device (1) according to claim 1, wherein the housing (101) comprises a second pinhole (103) for the pin to be inserted through and for substantially fixing the pin (201) in a tangent plane to the housing (101) at the second pinhole (103) when the pin (201) is frictionally locked in the first pinhole (104).

3. The antitheft device (1) according to claim 1 or claim 2, wherein the housing (101) further comprises a spring (106) applying a spring force to the locking member (102) to force the locking member (102) to the second orientation.

4. The antitheft device (1) according to claim 3, wherein a coil (107) is attached to the locking member (102), wherein the housing (101) further comprises a magnet (108), the magnet (108) preferably being a neodymium magnet, and wherein the tag (10) further comprises an electronic circuit (109) configured to conditionally provide a current to the coil (107) and thereby magnetize the coil (107) for the generation of a magnetic force between the magnet (108) and the coil (107), the
magnetic force exceeding the spring force and being directed in opposite direction of the spring force permitting the locking member (102) to be rotated to the first orientation allowing substantially frictionless removal of the pin (201).

5. The antitheft device (1) according to claim 4, wherein the housing comprises a pivot (105) allowing the rotation of the locking member (102), wherein the pivot (105) and the first pinhole (104) are arranged at a first distance (d1) at the locking member (102), wherein the first pinhole (104) and the coil (107) are arranged at a second distance (d2) at the locking member (102) in line with the first distance (d1), and wherein the ratio between the first distance (d1) and the second distance (d2) equals substantially 1:5.

6. The antitheft device (1) according to claim 4 or claim 5, wherein the tag (10) further comprises a connector (110) for detachability connecting the tag (10) to an unlocking device (2), wherein the electronic circuit (109) is configured to be powered by a direct current from the unlocking device (2) through the connector (110), wherein the electronic circuit (109) comprises a processor (111) programmed to detect a first data pattern in a data signal originating from the unlocking device (2) and modulated onto the direct current, and wherein the processor (111) is further programmed to enable the current to the coil (107) if the first data pattern is detected.

7. The antitheft device (1) according to claim 3, wherein the housing (101) further comprises a chamber (116) having an air inlet (117) and a displaceable member (118) movable in the chamber (116) in the direction of the locking member (102) by air admitted under pressure into the chamber (116) through the air inlet (117) for pushing the displaceable member (118) to the locking member (102) resulting in a force exceeding the spring force directed in opposite direction of the spring force permitting the locking member (102) to be rotated
to the first orientation allowing substantially frictionless removal of the pin (201).

8. The antitheft device (1) according to claim 7, wherein the housing further comprises an electronic locking member for locking the displaceable member in a fixed position in the chamber, wherein the tag (10) further comprises a connector (110) for detachably connecting the tag (10) to an unlocking device (2), wherein electronic locking member is configured to be powered by a direct current from the unlocking device (2) through the connector (110), wherein the electronic locking member comprises a processor (111) programmed to detect a first data pattern in a data signal originating from the unlocking device (2) and modulated onto the direct current, and wherein the processor (111) is further programmed to unlock the displaceable member if the first data pattern is detected.

9. The antitheft device (1) according to any one of the claims 4-8, wherein the locking member (102) comprises stainless steel, preferably of a type 316 austenitic chromium-nickel alloy,

10. The antitheft device (1) according to claim 6 or claim 8, wherein the processor (111) is further programmed to detect a second data pattern in a polling signal originating from the unlocking device (2) and provided through the connector (110), and wherein the processor (111) is further programmed to transmit a response signal to the unlocking device (2) upon detection of the second data pattern, the response signal comprising an identification code of the tag (10).

11. The antitheft device (1) according to any one of the claims 1-10, wherein the attaching member (20) further comprises a button (202) and wherein the pin (201) projects from the button (202).
12. The antitheft device (1) according to any one of the claims 1-10, wherein the commodity is a first part (301) of a security container (30), wherein the first part (301) of the security container (30) comprises the attaching member (20), and wherein the tag (10) is fixed to a second part (302) of the security container (30),

13. An unlocking device (2) for unlocking an attaching member (20) from a tag (10) of an antitheft device (1) according to any one of the claims 4-12, the unlocking device (2) comprising a connector (301) for detachably connecting the unlocking device (2) to the tag (10), the unlocking device (2) further comprising an electronic circuit (302) configured to generate a data signal comprising a first data pattern, to modulated the data signal on a direct current and to provide the direct current comprising the modulated data signal to the tag (10) through the connector (301), wherein the direct current allows the tag (10) to be powered for unlocking the attaching member (20) upon recognition of the first data pattern.

14. The unlocking device (2) according to claim 13, wherein the electronic circuit (302) comprises a memory (303) and wherein the electronic circuit (302) is further configured to generate a polling signal comprising a second data pattern, to provide the polling signal to the tag (10) through the connector (301), to retrieve a response signal comprising an identification code of the tag (10) from the tag (10) in response to detection of the second data pattern in tag (10), and to store the identification code in the memory (303).

15. The unlocking device (2) according to claim 14, further comprising an RFID receiver (304) for receiving an RFID from an external RFID tag (3), and wherein the electronic circuit (302) is further configured store the RFID in the memory (303), to verify the RFID, and to provide the polling signal and/or the direct current comprising the modulated data signal to the tag (10) only if the RFID is valid.
A security system comprising an antitheft device (1) and an unlocking device (2), wherein the antitheft device comprises a tag (10) for triggering an alarm and an attaching member (20) for securely attaching the tag (10) to a commodity, the attaching member (20) comprising a pin (201), the tag (101) comprising a housing (10x) having arranged therein a locking member (102) for locking the pin (201), wherein the locking member (102) comprises a first pinhole (104) for the pin (201) to be substantially fixed thereat: inputted through in a first orientation of the locking member (102), and, the locking member (102) is rotatably provided inside the housing (101) and arranged to rotate to a second orientation different from the first orientation wherein the pin (201) is fractionally looked in the first pinhole (104); and wherein the antilocking device is arranged to unlock the attaching member (20) from the tag (10).
INTERNATIONAL SEARCH REPORT

PCT/EP2011/058207

A. CLASSIFICATION OF SUBJECT MATTER

INV. E05B73/00

B. FIELDS SEARCHED

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C.

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Date of the actual completion of the international search
28 February 2012

Date of mailing of the international search report
06/03/2012

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