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(71) Applicant (for all designated States except US): **KONINKLIJKE PHILIPS ELECTRONICS N.V.** [NL/NL];
Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **WOOD, Karl, J.** [GB/GB]; C/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

(74) Agents: **GROENENDAAL, Antonius, W., M.** et al.;
Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

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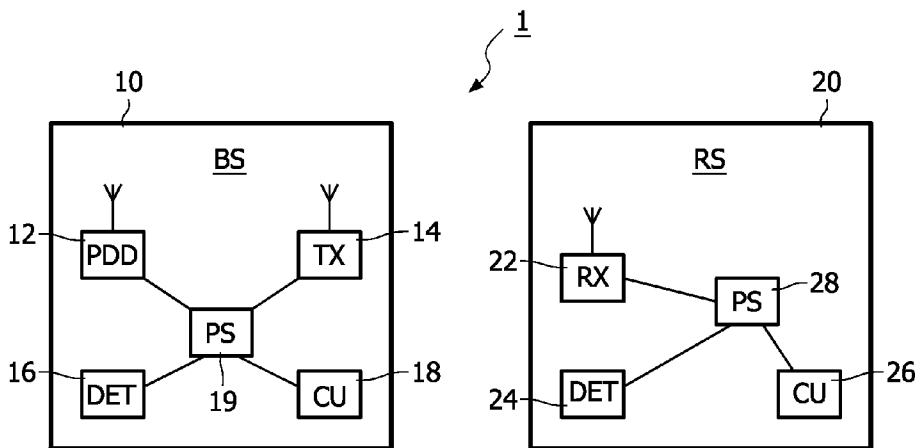
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(54) Title: THEFT PREVENTION



(57) Abstract: The present invention relates to a system for preventing theft of an object. The system comprises a base station and a remote station that is associated with the object. The base station has a position detection device for determining its position and means for transmitting information indicative of the position, and the remote station has means for receiving said information. The system has means for determining whether the base station has been displaced at least a predefined distance from a preset position and a control unit for triggering a predefined action when the determining is affirmative.

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Theft prevention

TECHNICAL FIELD

The present invention relates to a system for preventing theft of an object. The invention further relates to a base station and a remote station, respectively, for use in such a system. The invention also relates to a method for preventing theft of an object.

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BACKGROUND ART

Valuable objects have always been subject to theft. Nowadays it is common that homes and offices contain all sorts of attractive items, such as big screen TV sets, film projectors, A/V equipment, computers, safe boxes, paintings, furniture, and so on. Due to their potential risk of getting stolen, they are usually placed out of sight of people passing by or neighbors; i.e. they are often situated away from a window.

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Antitheft devices and methods for preventing these thefts become more and more sophisticated. The use of GPS for monitoring and tracking objects, especially cars, has become increasingly popular.

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US patent application US20020070874 describes a GPS tracking device, which is used for protection and tracking of valuable articles. The device may be placed within the valuable article, for example embedded in a picture frame used for holding a painting. In this way it is possible to monitor the whereabouts of the painting. The drawback of this invention is that the use of GPS does not work that well indoor, especially in high density housing areas. This is because the GPS satellites are about 20,000 km above the ground and the indoor signals are too weak to be processed by the GPS receiver.

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An object of the invention is to provide a theft preventing system that works independently of the location of the valuable object.

This object is achieved according to the present invention by a system for preventing theft of an object, the system comprising a base station and a remote station that is associated with the object, the base station having a position detection device for determining its position and means for transmitting information indicative of said position, the remote station having means for receiving said information, the system having means for determining whether the base station has been displaced at least a predefined distance from a

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preset position and a control unit for triggering a predefined action when said determining is affirmative.

The present invention is based upon the insight, not present in the prior art, of making a two part theft-preventing system. The first part, a base station, transmits
5 information indicative of its own position to the second part, a remote station, which is associated with the object. If the base station becomes displaced at least a predefined distance from a preset position, a predefined action is triggered. In this way a theft-preventing system is achieved that works independently of the location of the object. The base station may be placed anywhere in a desired place as long as it is in reach of the remote station. If the object
10 is located in a spot that has poor reception of positioning signals, the base station, comprising the position detection device, may be placed e.g. at a window or on a satellite broadcast dish where the reception normally is a lot better.

The remote station is associated with the object, which means that the remote station may be located either inside or outside the object. It may be attached to or be
15 positioned somewhere nearby the object. If the object to be protected is e.g. a piece of jewelry contained in a safe box, the remote station may be placed inside or within the walls of the safe box. It may also be attached to the safe box on the outside.

The present invention further relates to a base station for use in a system according to claim 1, the base station having a position detection device for determining its
20 position and means for transmitting information indicative of said position.

The present invention further relates to a remote station for use in a system according to claim 1, the remote station having means for receiving information indicative of a position of a base station.

The present invention further relates to a method for preventing theft of an
25 object, the method comprising: determining a position of a base station; transmitting information indicative of said position; receiving said information by a remote station associated with the object; determining whether the base station has been displaced at least a predefined distance from a preset position; and triggering a predefined action when said determining is affirmative.

30 The present invention further relates to a method for preventing theft of an object, the method comprising: a remote station receiving information indicative of a position of a base station, the remote station being associated with the object; determining whether the base station has been displaced at least a predefined distance from a preset position; and triggering a predefined action when said determining is affirmative.

In a preferred embodiment of the present invention the remote station is comprised in the object. If the object to be protected is e.g. a plasma TV, a film projector or a computer, the remote station may be incorporated within the electronics of the object. The remote station may then easily receive and be assured of power supply. It also makes it worse
5 for ill-disposed persons to disengage the remote station from the object.

In another preferred embodiment of the present invention the predefined action comprises disabling of the object. If it is determined that the base station has been displaced at least a predefined distance from a preset position, then the object, e.g. a plasma TV, stops functioning. In this case the remote station is built into the electronics of the
10 plasma-TV in such a way that it will cease functioning when triggered, e.g. by disabling the power supply of the plasma-TV or by distorting or twisting the displayed picture in the plasma-TV. The objects exploiting the present invention may be labeled with some kind of security sign indicating the dysfunction feature for making it less subject to theft.

In yet another preferred embodiment of the present invention the predefined
15 action is triggered when the remote station fails to receive the information. This occurs when the object, and the remote station, is moved out of range of the base station's transmitting signals. It also happens if the base station destroyed or blocked from sending information.

In yet another preferred embodiment of the present invention the predefined action is triggered after a predefined time period. If the predefined time period is e.g. 12
20 hours, it allows time for the user to bring the object, e.g. a film projector, to work and back before the predefined action is triggered. This feature makes the invention user friendly, and it forces a thief to sell it within the same time period, again making it less subject to theft.

Further features and advantages of the present invention are recited in the attached claims, the disclosure of which is incorporated herein by reference, and to which the
25 reader is now directed.

Preferred embodiments of the present invention will now be described, by way of example only, and with reference to the accompanying drawings, in which:

30 Fig 1 shows schematically a system for preventing theft of an object according to the present invention.

Fig 1 shows a system 1 for preventing theft of an object (not shown). The system 1 comprises a base station 10 and a remote station 20. The remote station 20 is associated with the object, which means that the remote station 20 may be located either inside or outside the object. If the object is a painting, the remote station 20 may be located within the supporting frame of the painting, or attached on the backside of the frame. If the object is a film projector, the remote station 20 may be incorporated within the electronics of the film projector.

The base station 10 has a position detection device 12 for determining its position. For obtaining the positioning information, as well as associated real time data, the position detection device 12 may utilize a satellite based positioning system such as Global Positioning System (GPS), LORAN-C, Omega, TACAN, Decca, Joint Tactical Information Distribution System (JTIDS), Position Location and Reporting System (PLRS), or Global Orbiting Navigational System (GLONASS). The position detection device 12 could also make use of a telecommunication system, such as GSM, UMTS, EDGE, GPRS, or DECT for obtaining the positioning information.

The base station 10 further has means 14 for transmitting information to the remote station 20 indicative of the position obtained by the position detection device 12. The remote station 20 has means 22 for receiving the transmitted information. The base station 10 and the remote station 20 may be arranged to use a wireless communication link; they could of course also make use of a wired communication link. Wireless technologies that may be used as a local wireless protocol include Bluetooth, an 802.11 protocol, Zigbee, UWB (Ultra Wide Band), or equivalent wireless technology. They are particularly well suited for applications where wireless devices are operating in close physical proximity of each other. Embodiments of the presented invention are not limited to any specific currently existing or future wireless technologies.

Assume a user wants to protect some of his valuable items by making use of the present invention. He observes there is a poor reception of positioning signals for the base station 10 at the location of the objects he intends to protect. The remote stations 20 are located in a plasma-TV, within the frame of a painting and outside a safe box, attached to it. He detects a good reception at a window and therefore attaches the base station 10 on the window frame. He turns on the base station 10 and receives the positioning information of the base station 10. He then initializes the theft preventing function of the system 1, e.g. by entering a password. The system 1 enters into an alarm mode. The received positioning information is now what is called the preset position, i.e. an anchored or fixed position. If the

user wants to move the base station 10 and thereby receive new positioning information, or if he for some other reason wants to turn off the alarm mode, he may do so by entering the password. When he desires to turn it on again, he must once again enter the password and initialize the theft preventing function of the system 1. This unlocking feature enables the user to freely move his valuable items wherever he wants and protect them as long as the base station 10 is brought along and is able to wirelessly communicate with the remote stations 20.

In order to prevent intruders from coercing the user to disclose the password, a third party may handle the distribution of the password. The object will thus be less subject to theft because the password is unknown to the user at the time of the intrusion. A one-time password linked to the time and date may e.g. be supplied via email or telephone. A householder may be happy to wait a couple of hours for the password to be sent, or for a time stamped password to become valid, but the intruder will not do that.

The theft preventing system 1 has further means 16, 24 for determining whether the base station 10 has been displaced at least a predefined distance from said preset position. This predefined distance is set by default but may also be set by the user, and it should not be too small to cause unintended triggering. It should also take into account the margin of error of the position detection device 12 used.

The determining means 16, 24 may be comprised either in the base station 10 or in the remote station 20. The theft preventing system 1 has also a control unit 18 for triggering a predefined action when the base station 10 has been displaced at least a predefined distance from said preset position, i.e. when the determining is affirmative. The control unit 18 may also be comprised either in the base station 10 or in the remote station 20. The quickest triggering of the predefined action when said determining is affirmative will be when both the determining means 16, and the control unit 18, are comprised in the base station 1. As soon as the base station has been displaced the predefined distance from the preset position, the control unit 18 will trigger the predefined action. In the case of the control unit 18 being comprised in the remote station 20, irrespectively of the location of the base station 10, the triggering of the predefined action will take place first when the remote station 20, and the control unit 18, receives information about said affirmative determining.

The base station 10 and the remote station 20 comprise a power supply 19, 28, respectively, for powering them. Optionally, a battery could be the primary power supply 19, 28, or it could be a backup battery capable of acting as a secondary power supply. This

enables the user to bring his valuable items with him e.g. to his summer cabin and still be able to use the present invention.

The user should be able to quite freely move about his valuable items in his home without causing unintended triggering of the predefined action. This should work properly as long as the remote stations 20 are within wireless communication range of the base station 10.

Let's return to the user who wants to protect some of his valuable items. The user has chosen for the base station 10 to transmit positioning information four times a minute to the remote stations 20. This can be chosen freely according the preference of the user. When he initializes the theft preventing function, the base station 10 transmits a signal to the remote stations 20 in order to initialize their alarm mode and to provide information required by the remote stations 20 to function properly. This information could e.g. be the time interval of the transmission of the positioning information, the preset position of the base station 10 in case the base station 10 comprises the determining means 16 and the control unit 18, or a cryptographic key that should be used by the remote station 20 in order to assure a safe communication. Preferably there is some kind of output means in the remote stations 20 indicating they have successfully entered into alarm mode and that they are continuously receiving positioning information from the base station 10.

The user of the present invention should also be able to switch, or to use another, base station 10 in case the old one is damaged, or if he wants to use a new one in his summer cabin. The base stations 10 and the remote stations 20 should thus be arranged to work freely with each other. However, when initializing the theft preventing function of the system 1, the base station 10 and the remote station(s) 20 enter into a one-to-one communication mode that is explicitly reserved between them. This is the case until providing the password shuts off the alarm mode.

Assume a person with bad intentions decides to break into the above discussed home with the valuable items. Let's discuss a few different scenarios:

1) He steals the plasma-TV and walks out of the door. As soon as the remote station 20 in the plasma-TV is out of wireless communication range of the base station 10, it detects that it is not receiving any positioning information. Predefined actions in the form of an audible alarm may be turned on, the plasma-TV may stop functioning, and an SMS and a phone call may be made to the owner of the items informing him of the incident. In this case the system 1 comprises output means for sounding the alarm and for informing the owner of the items. The intruder is lucky to get away without getting caught, but upon returning home

he discovers that the plasma-TV is not working. When the owner returns home he observes that the plasma-TV is missing, so goes out and buys a new one. He then initializes the theft preventing function of the system 1, by entering the required password.

5 2) The thief returns to the scene of the crime some time later determined to steal some other things he saw the last time. This time he decides to try to outsmart the system. He detaches the base station 10 and physically destroys it by smashing it with a hammer. It takes a maximum of 15 seconds before the remote station 20 detects that it is not receiving any positioning information. Predefined actions in the form of an audible alarm may be turned on, the plasma-TV may stop functioning, and an SMS and a phone call may be
10 made to the owner of the items informing him of the incident. The intruder realizes his failure when hearing the alarm so he runs away. When the owner returns home he observes there is nothing missing. He enters a password on the TV in order to activate its normal functions. He then takes out a spare base station 10 and initializes the theft preventing function of the system 1.

15 3) The stubborn thief is back a third time. He recognizes the security sign on the safe-box to be the same as the plasma-TV, so he wisely avoids it. He instead decides to go for the costly painting. As soon as the remote station 20 within the frame of the painting is out of wireless communication range of the base station 10, predefined actions are taken. This time it is different because the owner has changed the settings. No audible alarm is
20 turned on; instead a phone call is made also to a security company informing them of the incident. A nearby patrol is quickly alerted and sent to the apartment building in time to welcome the surprised thief carrying out the painting.

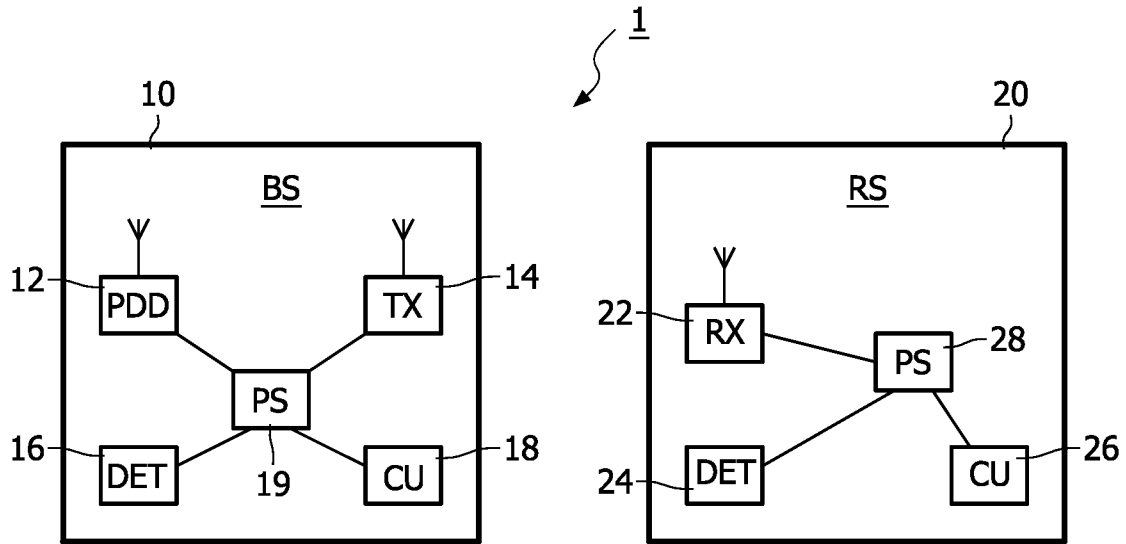
 It should be noted that the above-mentioned embodiments illustrate rather than limit the invention, and that those skilled in the art will be able to design many alternative
25 embodiments without departing from the scope of the appended claims. In the claims, any reference signs placed between parentheses shall not be construed as limiting the claim. The word "comprising" does not exclude the presence of elements or steps other than those listed in a claim. The word "a" or "an" preceding an element does not exclude the presence of a plurality of such elements.

CLAIMS:

1. A system for preventing theft of an object, the system comprising a base station and a remote station that is associated with the object, the base station having a position detection device for determining its position and means for transmitting information indicative of said position, the remote station having means for receiving said information,
5 the system having means for determining whether the base station has been displaced at least a predefined distance from a preset position and a control unit for triggering a predefined action when said determining is affirmative.
2. A system for preventing theft according to claim 1, wherein the remote station
10 is comprised in the object.
3. A system for preventing theft according to claim 1, wherein the predefined action comprises disabling of said object.
- 15 4. A system for preventing theft according to claim 1, wherein said means for determining whether the base station has been displaced is comprised in the base station.
5. A system for preventing theft according to claim 1, wherein said means for determining whether the base station has been displaced is comprised in the remote station.
20
6. A system for preventing theft according to claim 1, wherein said predefined action is triggered when the remote station fails to receive said information.
7. A system for preventing theft according to claim 1, wherein said predefined
25 action is triggered after a predefined time period.
8. A base station for use in a system according to claim 1, the base station having a position detection device for determining its position and means for transmitting information indicative of said position.

9. A base station according to claim 7, the base station further having means for determining whether the base station has been displaced at least a predefined distance from a preset position and/or a control unit for triggering a predefined action when said determining is affirmative.
- 5
10. A remote station for use in a system according to claim 1, the remote station having means for receiving information indicative of a position of a base station.
- 10 11. A remote station according to claim 9, the remote station further having means for determining whether the base station has been displaced at least a predefined distance from a preset position and/or a control unit for triggering a predefined action when said determining is affirmative.
- 15 12. A method for preventing theft of an object, the method comprising:
- determining a position of a base station;
 - transmitting information indicative of said position;
 - receiving said information by a remote station associated with the object;
 - determining whether the base station has been displaced at least a predefined
- 20 distance from a preset position; and
- triggering a predefined action when said determining is affirmative.
13. A method for preventing theft of an object, the method comprising:
- a remote station receiving information indicative of a position of a base
- 25 station, the remote station being associated with the object;
- determining whether the base station has been displaced at least a predefined distance from a preset position; and
 - triggering a predefined action when said determining is affirmative.

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INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2006/054350A. CLASSIFICATION OF SUBJECT MATTER
INV. G08B13/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G08B

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 6 961 001 B1 (CHANG E-LEE [US] ET AL) 1 November 2005 (2005-11-01) column 1, line 36 - line 52 column 2, line 10 - column 5, line 13 column 5, line 64 - column 7, line 37	1, 2, 4-6, 8-13 3, 7
X	EP 1 443 478 A (KAINZU KABUSHIKIKAISHA [JP]) 4 August 2004 (2004-08-04) paragraph [0009] - paragraph [0031]	1, 2, 5, 8-13
X	GB 2 407 937 A (EXCUSE ME INVEST LTD [VG]) 11 May 2005 (2005-05-11) page 2, line 22 - page 3, line 18 page 4, line 19 - page 5, line 8 page 6, line 12 - page 8, line 15 -/-	1, 2, 5, 6, 8-13

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents :

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

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P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

& document member of the same patent family

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Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

La Gioia, Cosimo

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2006/054350

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	GB 2 318 671 A (NOKIA MOBILE PHONES LTD [FI]) 29 April 1998 (1998-04-29)	3,7
A	page 1, line 5 - page 2, line 14 page 2, line 23 - page 3, line 6 page 4, line 25 - page 5, line 6 page 5, line 22 - page 10, line 26 page 11, line 12 - page 12, line 2	4-6
Y	EP 1 164 555 A2 (NOKIA MOBILE PHONES LTD [FI] NOKIA CORP [FI]) 19 December 2001 (2001-12-19)	3
A	paragraph [0017] - paragraph [0027] paragraph [0030] - paragraph [0046] paragraph [0049] - paragraph [0055]	4-6
A	US 2002/070874 A1 (WILLIAMS GEORGE [US] ET AL) 13 June 2002 (2002-06-13) cited in the application paragraph [0031] - paragraph [0045]	1,8,10, 12,13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2006/054350

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6961001	B1	01-11-2005	NONE
EP 1443478	A	04-08-2004	JP 3760155 B2 29-03-2006 JP 2004227384 A 12-08-2004 US 2006255933 A1 16-11-2006 US 2004155775 A1 12-08-2004
GB 2407937	A	11-05-2005	EP 1687657 A1 09-08-2006 WO 2005047924 A1 26-05-2005
GB 2318671	A	29-04-1998	NONE
EP 1164555	A2	19-12-2001	AT 312390 T 15-12-2005 DE 60115542 T2 10-08-2006 GB 2363504 A 19-12-2001 JP 2002057789 A 22-02-2002 US 2001052846 A1 20-12-2001
US 2002070874	A1	13-06-2002	NONE