



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
29.06.2011 Bulletin 2011/26

(51) Int Cl.:
G08B 13/14 (2006.01) **G08B 13/24 (2006.01)**
A47F 7/024 (2006.01) **G06Q 30/00 (2006.01)**

(21) Application number: **09180697.6**

(22) Date of filing: **23.12.2009**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR
Designated Extension States:
AL BA RS

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(54) **A system apparatus and method for electronic article surveillance**

(57) A system for and method of managing article surveillance or other surveillance in a retail store comprises a centralised unit having a computer, a memory device connected to the computer, a power source, and a display; one or more event peripherals connected to the centralised unit operable to detect an article surveillance event or other surveillance event; one or more action peripherals connected to the centralised unit operable to take one or more actions to resolve a detected

article surveillance event or other surveillance event; the memory device of the centralised unit having configuration data which is operable to instruct the computer with what actions to take based on the occurrence of a detected event; and at least one of the actions comprising sending an instruction to one or more action peripherals, the instruction being operable to interrupt the operation of the action peripherals to provide notification of the detected event.

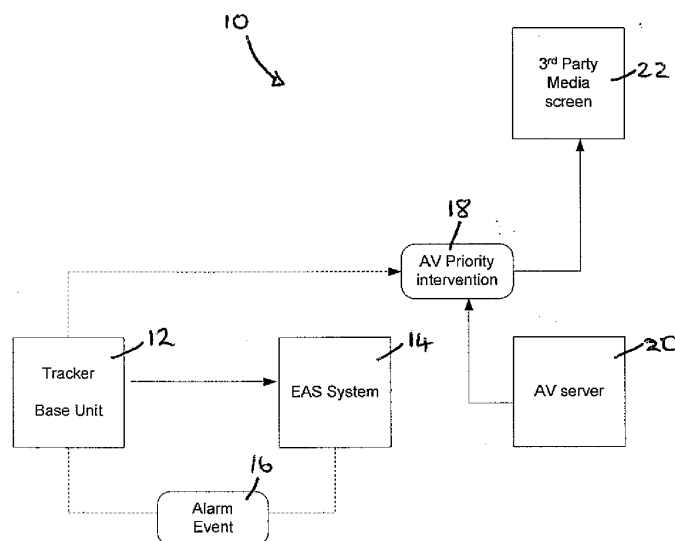


Figure 1

Description

Technical field

[0001] This invention relates to a system, apparatus and a method for managing electronic article surveillance. In particular, the invention relates to a system, apparatus and a method for electronic article surveillance and other surveillance to assist with preventing shoplifting in a retail store.

Background art

[0002] Inventory shrinkage is a continuing and unfortunately growing problem facing retailers. It has been identified that two primary sources for inventory shrinkage are shoplifting and employee theft. The resulting costs due to these problems are ultimately absorbed by the consumer in the form of price increases.

[0003] Various tactics have been developed to minimize shoplifting and employee theft. One traditional prevention system is the use of security guards positioned at the entrance(s) and exit(s) of a retail store. In the past quarter century, advances in closed circuit cameras and monitors have given rise to manned surveillance rooms. These techniques have considerable disadvantages. Both are extremely expensive requiring highly trained personnel at all times the retail store is open. Second, both are largely ineffective in preventing theft of merchandise which can be easily hidden or even worn while exiting the retail store.

[0004] Because of these disadvantages, retailers have developed automated systems to address these problems. One recent example is Electronic Article Surveillance (EAS). While current EAS systems differ in complexity, most use (a) tags affixed to each piece of merchandise and (b) tag detection devices positioned at the retail store's entrance(s) and exit(s). Each tag should be in an activated state while the merchandise is offered for sale in the retail store and capable of deactivation by a retail employee after the sale to allow the consumer to pass through the tag detection device without setting off of an alarm.

[0005] Advances in EAS technology have largely been directed to improving the tag to make it more detectable and less susceptible to degradation. Tags initially were made of strips of amorphous material, often lined with a strip of ferromagnetic material with a moderate coercive field. Detection of these tags is based upon sensing harmonics generated by non-linear magnetic response under mixture of low-frequency (10 - 1000 Hz range) magnetic fields. When the ferromagnetic material is magnetized, it no longer produces harmonics and can no longer be detected by a tag detection device. Recent advances in tag technology have included acousto-magnetic tags which include strips of magneto-restrictive metal. Other advances include use of Radio Frequency Identification (RFID) tags which use radio waves instead of varying

magnetic fields.

[0006] Other advances in EAS have focused on improved tag deactivation pads placed near retail store checkout counters. These deactivation pads create magnetic and/or electromagnetic fields to deactivate tags without degrading active tags affixed to merchandise near the checkout counters. More specifically, the advances have included improved bias magnets and related systems. These bias magnets must not be too strong to deactivate active tags in nearby merchandise stands to render them undetectable to the tag detection devices.

[0007] Although advances in EAS have yielded improved tags and tag deactivation pads, there is a need to advance the effectiveness of EAS systems.

[0008] One of the ways in which the effectiveness of EAS systems and other surveillance systems can be improved is by more efficient reporting or notification of compromises to store management so that appropriate actions to prevent or assist in the prevention of shoplifting and employee theft can be taken quickly. The current invention provides such a way in which the notification of a security event may be reported in an effective and efficient way so that the appropriate actions may be taken to resolve the event.

Disclosure of the invention

[0009] A first aspect of this invention provides a system for managing article surveillance or other surveillance in a retail store, the system comprising:

- a centralised unit having a computer, a memory device connected to the computer, a power source, and a display;
- one or more event peripherals connected to the centralised unit operable to detect an article surveillance event or other surveillance event;
- one or more action peripherals connected to the centralised unit operable to take one or more actions to resolve a detected article surveillance event or other surveillance event;
- the memory device of the centralised unit having configuration data which is operable to instruct the computer with what actions to take based on the occurrence of a detected event; and
- at least one of the actions comprising sending an instruction to one or more action peripherals, the instruction being operable to interrupt the operation of the action peripherals to provide notification of the detected event.

[0010] Preferably an instruction from the computer is sent to a control means for taking one or more actions through one or more action peripherals.

[0011] In one form of the invention the action peripherals comprise audio or video media playing devices. Preferably the action peripherals may interrupt media play on the audio or video media playing devices. The

interruption may comprise the playing, for a predetermined length of time, of a user determined audio, video or still image and/or instruction on the audio or video playing device to replace that which was previously being played.

[0012] Further according to the invention an event peripheral may comprise any device which provides an output signal, which includes but is not limited to a retail store alarm system, closed circuit camera system, point-of-sale (POS) system, a cash register, a customer traffic counter, a retail display cabinet door sensor, a tag, a tag detection device, any system capable of indicating a change of state output via a switch or similar device, or a tag deactivation pad.

[0013] Even further according to the invention an action peripheral may further be an electronic message alert, video capture of an event through rotating and positioning a camera, lockdown of retail display cabinets, an audible alert, or a security alert.

[0014] A second aspect of the invention provides a control means for taking one or more actions through one or more action peripherals operable with a system for managing article surveillance as described above.

[0015] In one form of the invention an action peripheral may comprise audio or video media playing devices. Preferably the control means is operable to interrupt media play on the audio or video media playing devices. The interruption may comprise the playing, for a predetermined length of time, of a user determined audio, video or still image and/or instruction on the audio or video playing device to replace that which was previously being played.

[0016] A third aspect of this invention provides a method of managing article surveillance or other surveillance in a retail store, the method comprising:

- connecting a centralised unit to one or more event peripherals, the centralised unit having a computer, a memory device connected to the computer, a power source and a display;
- communicating with one or more event peripherals to determine if an article surveillance event or other surveillance event has been detected;
- loading configuration data from the memory device onto the computer once an article surveillance event or other surveillance event has been detected to determine the appropriate action to be taken based upon each detected article surveillance event or other surveillance event;
- instructing one or more action peripherals to take one or more actions; and
- sending an instruction to one or more action peripherals, the instruction being operable to interrupt the operation of the action peripherals to provide notification of the event.

[0017] Further according to the invention the method further comprises sending an instruction from the com-

puter to a control means for taking one or more actions through one or more action peripherals.

[0018] Preferably the action peripherals comprise one or more audio or video media playing devices.

5 **[0019]** Further according to the invention the method further comprises interrupting the media play on the audio or video media playing devices.

10 **[0020]** The interruption may comprise playing, for a predetermined length of time, a user determined audio, video or still image and/or instruction on the audio or video playing device to replace that which was previously being played.

15 **[0021]** Further according to the invention an action peripheral of the method may comprise any device which provides an output signal, including but not limited to a retail store alarm system, closed circuit cameras system, point-of-sale (POS) system, a cash register, a customer traffic counter, a retail display cabinet door sensor, a tag, a tag detection device, or a tag deactivation pad.

20 **[0022]** Even further according to the invention an action peripheral of the method may further comprise an electronic message alert, video capture of an event through rotating and positioning a camera, lockdown of retail display cabinets, an audible alert, or a security alert.

25 **[0023]** A fourth aspect of the invention provides a method of using a control means to take one or more actions through one or more action peripherals with a system for managing article surveillance or other surveillance as described above.

30 **[0024]** In one form of the invention the action peripherals comprise audio or video media playing devices. Preferably the method of using a control means may further comprise interrupting media play on the audio or video media playing devices. The interruption may comprise playing, for a predetermined length of time, a user determined audio, video or still image and/or instruction on the audio or video playing device to replace that which was previously being played.

40 Brief description of the drawings

[0025]

45 Figure 1 shows a schematic overview of a system for managing article surveillance or other surveillance according to an embodiment of the invention; Figure 2 shows a schematic view of the system for managing article surveillance or other surveillance in a retail store according to the invention;

50 and Figure 3 shows a schematic overview of the centralised unit according to an embodiment of the invention.

55 Mode(s) for carrying out the invention

[0026] An embodiment of a system 10 for managing article surveillance or other surveillance in a retail store

to prevent or assist with preventing shoplifting or theft is shown in Figure 1.

[0027] The system 10 shown in Figure 1 comprises a centralised unit 12 which is in communication with electronic article surveillance (EAS) system 14. Both the centralised unit 12 and the EAS system 14 are also in communication with one or more event peripheral devices which are able to detect an alarm event 16, as shown in Figure 1.

[0028] It is further shown in Figure 1 that the centralised unit 12 is in communication with a control means in the form of control unit 18. This control unit 18 is connected to both an audio visual server 20 and an audio or audio visual device 22. Device 22 is preferably a third party media screen with speakers attached on which multimedia content can be played. Control unit 18 is operable to interrupt the operation of the audio or audio visual signal playing on an audio visual device 22 when it receives an instruction from the centralised unit 12 to do so, so that the required people may be notified of the event and can take the appropriate actions to resolve it. The interruption by control unit 18 preferably does not stop the audio, video or image being played on audio visual device 22, it simply sends the video, audio or image sent from centralised unit 12 directly to audio visual device 22. While the centralised unit's interruption instructions are being played on audio visual device 22, the audio visual server 20 will continue to play the video or audio it had originally been playing, but the audio video device 22 simply does not show it. When control unit 18 stops interrupting the playing of audio visual device 22 the control of the media content being played is given back to the audio visual server 20, and the audio, video or image from audio visual server 20 will then simply continue to be shown on audio visual device 22.

[0029] In a further form of the invention the interruption by control unit 18 actually does stop the audio, video or image instruction from server 20 being played on device 22. In this case when the interruption is finished, server 20 is allowed to continue with its instruction to device 22 and the audio, video or image that was originally being played on device 22 will then continue being played once more.

[0030] As illustrated in Figure 1, the EAS system 14 has the centralised unit 12 connected thereto and is used to manage the electronic article surveillance or other surveillance in a retail store. As discussed previously, article surveillance is the surveillance of any of the retail articles for sale in a retail store, and other surveillance may be, for example, the surveillance of people entering and leaving the retail store, or the surveillance of people working in the retail store.

[0031] The EAS system 14 also comprises event peripherals capable of reporting to the centralised unit 12 events such as shoplifting, employee theft, or a system malfunction. The EAS system 14 may comprises some of the action peripherals to carry out certain actions and the centralised unit 12 may also comprise some of the

action peripherals for carrying out actions. The action peripherals may be responsible for actions such as capturing an image of a store exit, IP cameras, buzzers and the like. Action peripherals may also be responsible for contacting security, alerting a store manager or emailing an alert to a store manager. Based upon the configuration of a system certain event peripherals may also act as action peripherals.

[0032] Further, the peripherals of the EAS system 14 that report the occurrence of events directly to the centralised unit 12 preferably do this by their relay output, and the centralised unit 12 is then also operable to monitor events reported from the EAS system 14.

[0033] The internal and external components of one embodiment of the centralised unit 12 of the invention are identified in Figures 2 and 3.

[0034] As shown in Figure 3, centralised unit 12 is comprised of an optional external housing 30 which houses a computer 31 having processing capabilities and a memory device 32 which may be a hard drive, compact flash, flash memory or the like that is capable of storing data or programs connected to computer 31. Centralised unit 12 further comprises a display connectivity 33 that is capable of connecting one or more display monitor(s) which employs LED, LCD or the like screen technology such as monitor 37. Further, centralised unit 12 may also include speakers and/or touch screen capability through connection to third party connectivity 34, and network connectivity 33 for data transfer and communication, which may be wired communication such as, for example, an ethernet port or the like, or wireless such as, for example, through Bluetooth™ WIFI™ or the like. Third party connectivity 34 ports are for example, USB, FireWire, eSATA, or serial ports which are used in data transfer and communication to computer 31. Third party connectivity 34 also includes audio in and audio out connectivity to push and receive sound from a connected device, such as monitor 37's speakers to which sound is pushed out.

[0035] Multiple monitors can be controlled by computer 31 through the use of any type of audio/video or video only multiplexer 41. It will be understood that the computer 31 and monitor 37 of centralised unit 12 may be separate units as shown in Figure 3, or they may be housed in the same unit.

[0036] The centralised unit 12's external housing 30 is preferably constructed of a rigid fire-resistant and non-corrosive material such as a metal, plastic, composite or any similar material known to one of ordinary skill in the art. Construction and design of the external housing 30 should ensure the centralised unit 12 is essentially tamper-proof and incapable of breach.

[0037] An internal or external power supply 35, which can be a battery (rechargeable or not) is used to provide power to computer 31, which in turn provides power to the computer 31 connectivity options.

[0038] Relay controller 36 allows connectivity of any relay capable devices to connect to centralised unit 12.

Relay controller 36 is controlled by computer 31 through any third party connectivity 34 or directly through internal wiring or connectivity of computer 31.

[0039] The centralised unit 12 can connect through any network 38 such as, for example, secured, unsecured, LAN, WLAN, Internet, Intranet or the like.

[0040] Apart from these three internal components 31, 35 and 36, the centralised unit 12 further includes third party connectivity to hard wire connect to both event peripherals and action peripherals. The third party connectivity interface 34 can include USB ports, serial ports, Firewire ports or the like. Communication with both types of peripherals, namely event and action peripherals, can also be wireless through Bluetooth™, WIFI™ or similar wireless configuration through network connectivity 33.

[0041] As further shown in Figures 2 and 3, the centralised unit 12 is preferably connected to a network 38 which includes a mainframe server 39. A network connectivity 33 port such as an ethernet port (or similar network port) capable of sending and receiving data is in direct connection with computer 31. This allows the centralised unit 12 access to various databases 40 on the server 39, so that it can determine what actions to take based upon specific alarm events detected by event peripherals.

[0042] Likewise, the centralised unit 12 can obtain software updates, new configurations, security warnings and other data directly from the server 39, as well as other centralised units 12 within the network 38. Thus, the EAS system 14 can employ an array of centralised units 12 in series within a single retail store to increase the effectiveness of actions taken to reduce or prevent shoplifting and employee theft.

[0043] Apart from the centralised unit 12, the EAS system 14 includes event peripherals, which are any devices within a retail store capable of reporting data to the centralised unit 12 to prevent shoplifting or employee theft. This includes the retail store alarm system (not shown), closed circuit cameras 50, a point-of-sale (POS) system 51 and cash registers 52.

[0044] These event peripherals may further include customer traffic counter 53, retail display cabinet door sensors 54, tags 55 (including acousto-magnetic tags, radio frequency tags, RFID tags, and GPS/cellular capable tags), tag detection devices 56, and tag deactivation pads 57. It will further be noted that any device capable of measuring a variance in voltage can serve as an event peripheral for detecting an alarm event in the retail store.

[0045] Event peripherals communicate detected alarm events directly to the computer 31 through third party connectivity 34 or relay controller 36, depending on how the device is connected. Computer 31 interprets these alarm events through configuration data stored in memory 32 by program 42. More specifically, configuration data stored on memory 32 through program 42 interprets a detected alarm event, determines the appropriate action, and instructs the appropriate action peripheral(s) through the third party connectivity 34 or relay controller

36 depending on where the action peripheral is connected. Configuration data on memory 32 controlled by program 42 may also prompt the display 37 to request information as to the outcome of a taken action by retail employees such as, for example, stolen merchandise recovered from shoplifter, open display cabinet has been closed, deactivate a tag after sale, and the like based upon certain events. Thus, the function of configuration data on memory 32 together with program 42 is to create retail store specific actions to effectively resolve the occurrence of an event and effectively thwart shoplifting and employee theft.

[0046] Action peripherals receive instructions from program 42 and data configuration data on memory 32 to orchestrate an effective response to an action. Examples of action peripherals used with the invention include electronic message alerts such as, for example, related email, RSS feeds, texts and tweets, to store or regional managers, video capture of an event through positioning, as well as rotation of a closed camera, lockdown of retail display cabinets, audible alarms and prompting on display 37 for an explanation from a retail employee as to what occurred and the result of the taken action to resolve the event.

[0047] As shown in Figure 1, an audio or audio visual device 22 is one of the action peripherals used. Device 22 is preferably a media screen on which multimedia content can be played. Control unit 18 is able to interrupt the operation of the audio or an audio visual play on device 22 when it receives an instruction from the centralised unit 12 to do so. It will be understood that there may be one or more devices 22 which may be interrupted by centralised unit 12 through control unit 18. It will further be understood that centralised unit 12 may instruct device 22 directly without the use of a control unit 18.

[0048] The interruption of device 22 occurs when a security event has taken place, an alarm event message has been sent to the computer 31 from one of the event peripherals through third party connectivity 34 or relay controller 36, and computer 31 then interprets these events through configuration data on memory 32 and program 42, then and sends an instruction to control 18. Control 18 then initiates the interruption by replacing the current operational media play of audio or video on device 22, by playing a user determined audio, video or still image and/or instruction for a user predetermined length of time through program 42 on computer 31. This user determined audio or video may be selected by the user to indicate how many and what type of alarm event has occurred, as well as where in the retail store it has occurred. The user determined audio or video may be in the form of a sound file, video file, or a web based telemetry communication which is sent to device 22.

[0049] The user determined audio, video or still image and/or instruction that is played on device 22 during an interruption, provides a user, a store manager or any other person in the retail store who is in the vicinity of device 22 notification of the occurrence of a detected event. The

user, store manager or person is then able to act upon this notification and resolve the event by preventing or assisting with the prevention of any theft which potentially could result from the cause of the detected event.

[0050] It will be understood that the instruction sent to control 18 may also be able to activate an output relay, which in turn is used to trigger any connected device that is connected to control 18.

[0051] After the alarm event has occurred, centralised unit 12 will instruct control 18 to stop or override the user determined audio, video or still image and/or instruction being played on device 22, and to show the continued playing of the audio or video which was interrupted on device 22. The playing of audio or video content on device 22 will then continue normally until the next event that is detected by EAS system 14 occurs and causes centralised unit 12 to initiate another interruption so as to provide notification of the event.

Claims

1. A system for managing article surveillance or other surveillance in a retail store, the system comprising:

- a centralised unit having a computer, a memory device connected to the computer, a power source, and a display;
- one or more event peripherals connected to the centralised unit operable to detect an article surveillance event or other surveillance event;
- one or more action peripherals connected to the centralised unit operable to take one or more actions to resolve a detected article surveillance event or other surveillance event;
- the memory device of the centralised unit having configuration data which is operable to instruct the computer with what actions to take based on the occurrence of a detected event; and
- at least one of the actions comprising sending an instruction to one or more action peripherals, the instruction being operable to interrupt the operation of the action peripherals to provide notification of the detected event.

2. A system as claimed in claim 1, wherein an instruction from the computer is sent to a control means for taking one or more actions through one or more action peripherals.

3. A system as claimed in claim 1 or 2, wherein the action peripherals comprise audio or video media playing devices.

4. A system as claimed in claim 3, wherein the action peripherals interrupt media play on the audio or video media playing devices.

5. A system as claimed in claim 4, wherein the interruption comprises the playing, for a predetermined length of time, of a user determined audio, video or still image and/or instruction on the audio or video playing device to replace that which was previously being played.

6. A system as claimed in any of the preceding claims, wherein an event peripheral is any device which provides an output signal.

7. A system as claimed in claim 6, wherein an event peripheral includes a retail store alarm system, closed circuit camera system, point-of-sale (POS) system, a cash register, a customer traffic counter, a retail display cabinet door sensor, a tag, a tag detection device, any system capable of indicating a change of state output via a switch or similar device, or a tag deactivation pad.

8. A system as claimed in any of claims 1, 2, 6 or 7, wherein an action peripheral is an electronic message alert, video capture of an event through rotating and positioning a camera, lockdown of retail display cabinets, an audible alert, or a security alert.

9. A control means for taking one or more actions through one or more action peripherals operable with a system for managing article surveillance as claimed in any one of claims 1 to 8.

10. A control means as claimed in claim 9, wherein the action peripherals comprise audio or video media playing devices.

11. A control means as claimed in claim 10, which is operable to interrupt media play on the audio or video media playing devices.

12. A control means as claimed in claim 11, wherein the interruption comprises the playing, for a predetermined length of time, of a user determined audio, video or still image and/or instruction on the audio or video playing device to replace that which was previously being played.

13. A method of managing article surveillance or other surveillance in a retail store, the method comprising:

- connecting a centralised unit to one or more event peripherals, the centralised unit having a computer, a memory device connected to the computer, a power source and a display;
- communicating with one or more event peripherals to determine if an article surveillance event or other surveillance event has been detected;
- loading configuration data from the memory device onto the computer once an article sur-

- veillance event or other surveillance event has been detected to determine the appropriate action to be taken based upon each detected article surveillance event or other surveillance event;
- instructing one or more action peripherals to take one or more actions;
 - and
 - sending an instruction to one or more action peripherals, the instruction being operable to interrupt the operation of the action peripherals to provide notification of the event.
- 14.** A method as claimed in claim 13, which further comprises sending an instruction from the computer to a control means for taking one or more actions through one or more action peripherals.
- 15.** A method as claimed in claim 14, wherein the action peripherals comprise one or more audio or video media playing devices.
- 16.** A method as claimed in claim 15, which further comprises interrupting the media play on the audio or video media playing devices.
- 17.** A method as claimed in claim 16, wherein the interruption comprises playing, for a predetermined length of time, a user determined audio, video or still image and/or instruction on the audio or video playing device to replace that which was previously being played.
- 18.** A method as claimed in any one of claims 13 to 17, wherein an event peripheral is any device which provides an output signal.
- 19.** A method as claimed in claim 18, wherein an event peripheral includes a retail store alarm system, closed circuit cameras system, point-of-sale (POS) system, a cash register, a customer traffic counter, a retail display cabinet door sensor, a tag, a tag detection device, any system capable of indicating a change of state output via a switch or similar device, or a tag deactivation pad.
- 20.** A method as claimed in any one of claims 13, 14, 18 or 19, wherein an action peripheral is an electronic message alert, video capture of an event through rotating and positioning a camera, lockdown of retail display cabinets, an audible alert, or a security alert.
- 21.** A method of using a control means to take one or more actions through one or more action peripherals with a system for managing article surveillance or other surveillance as claimed in any one of claims 1 to 8.
- 22.** A method as claimed in claim 21, wherein the action peripherals comprise audio or video media playing devices.
- 23.** A method as claimed in claim 22, which further comprises interrupting media play on the audio or video media playing devices.
- 24.** A method as claimed in claim 23, wherein the interruption comprises playing, for a predetermined length of time, a user determined audio, video or still image and/or instruction on the audio or video playing device to replace that which was previously being played.

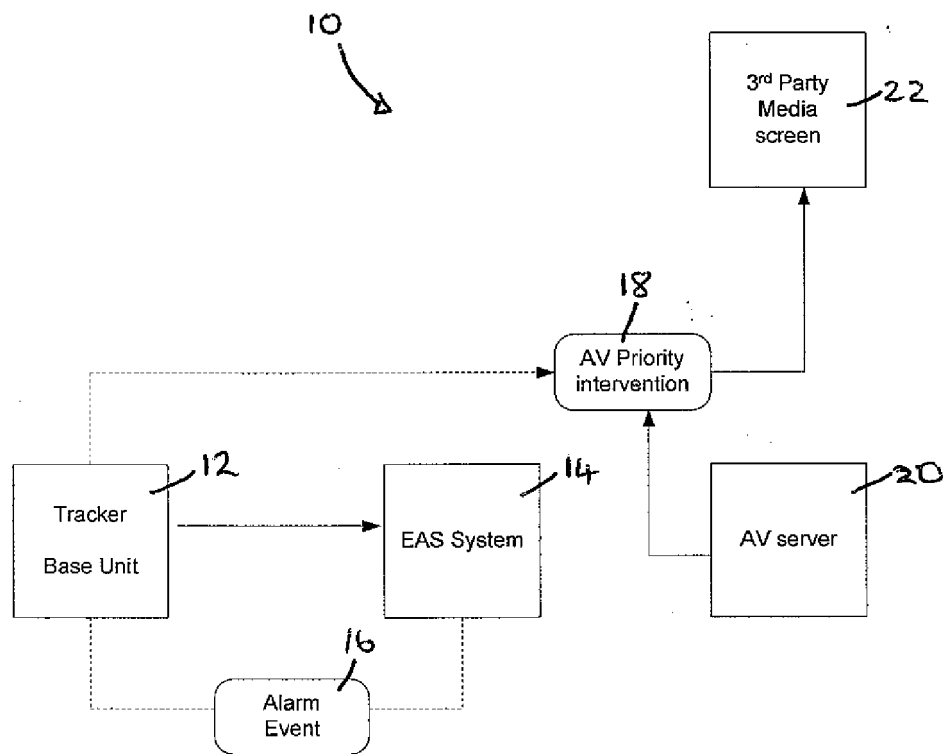


Figure 1

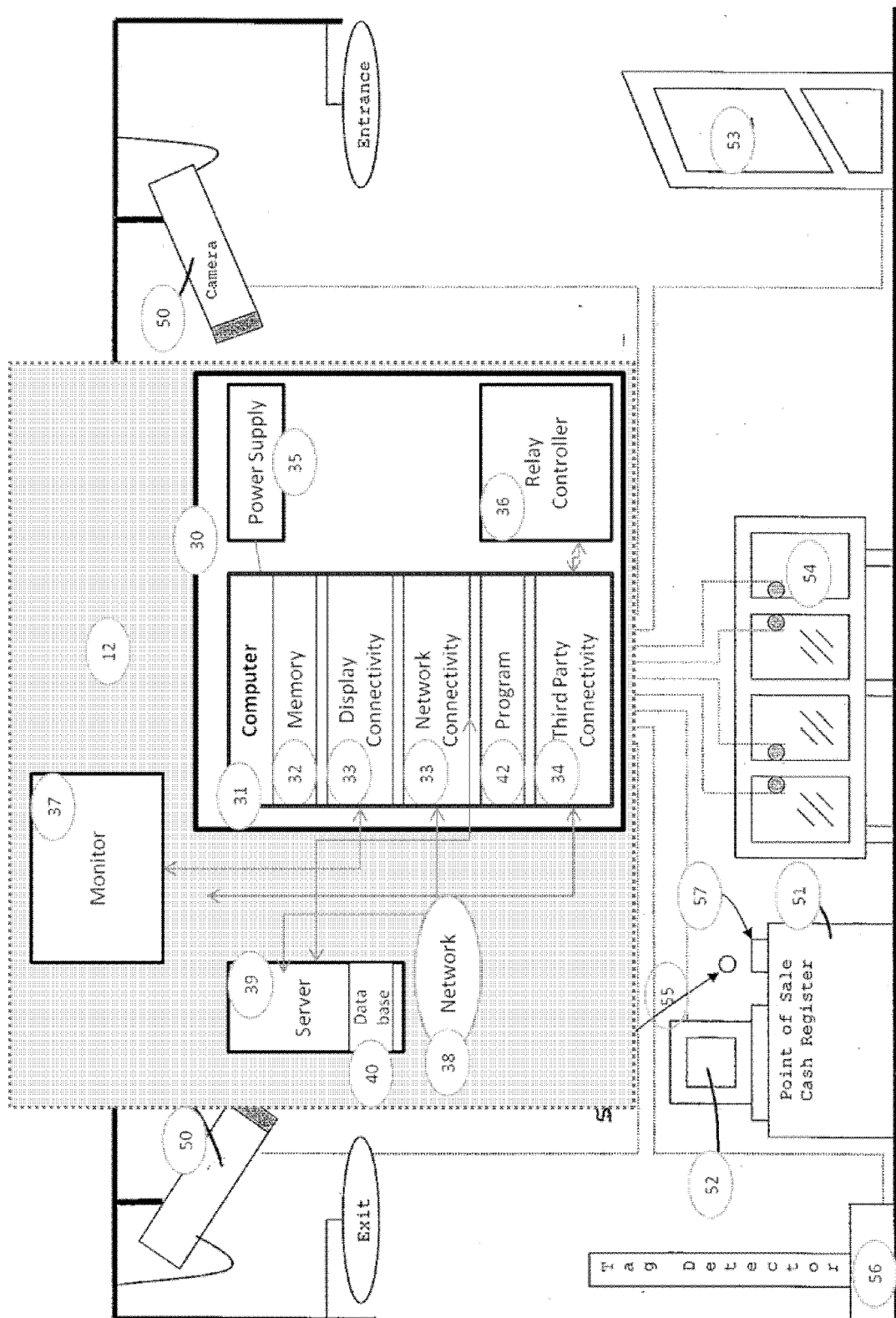


Figure 2

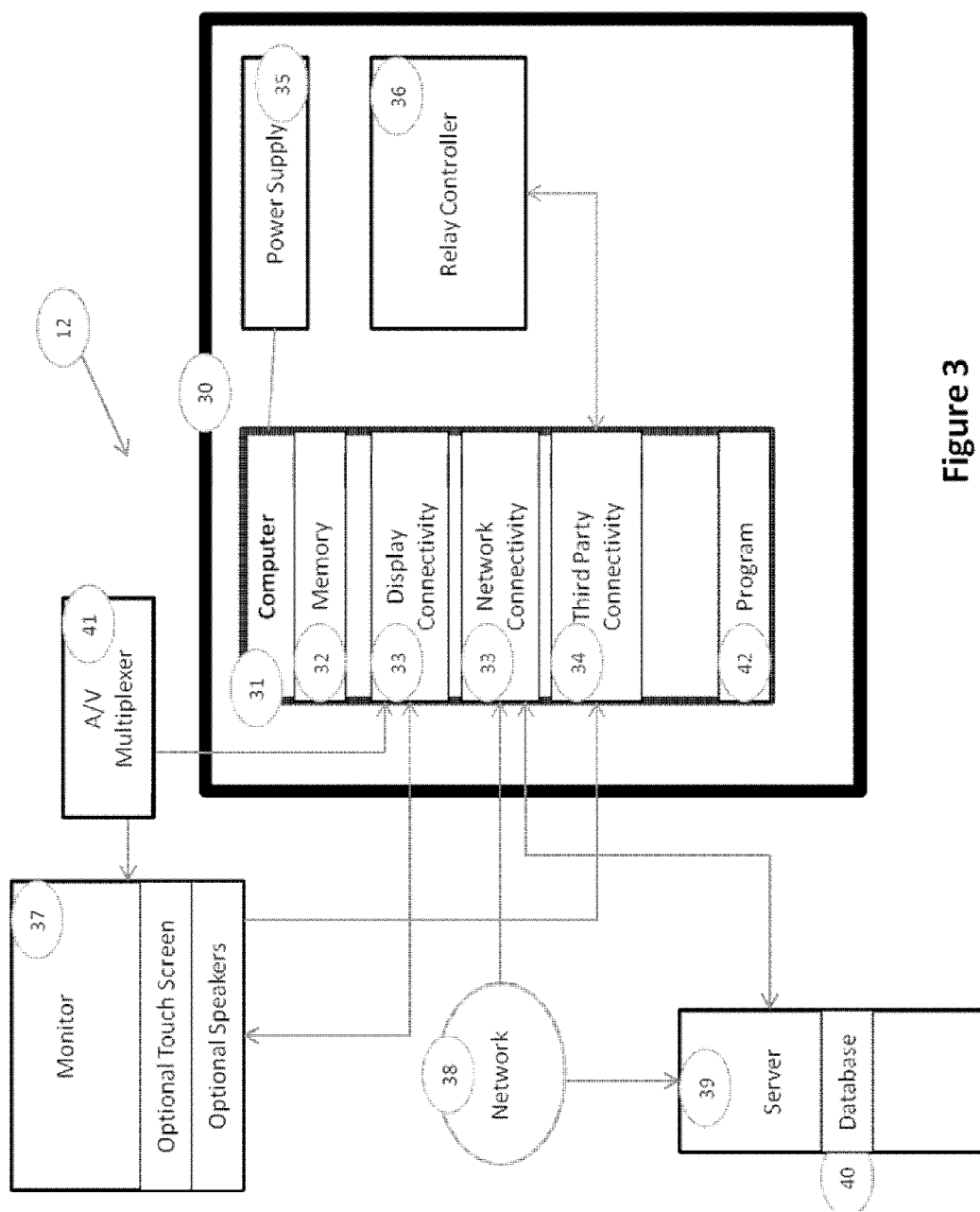


Figure 3



EUROPEAN SEARCH REPORT

Application Number
EP 09 18 0697

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2007/194918 A1 (RABINOWITZ ALAN [US] ET AL) 23 August 2007 (2007-08-23) * figures 1, 6-8 * * paragraphs [0107] - [0110] * * paragraphs [0117] - [0144] * -----	1-22	INV. G08B13/14 G08B13/24 A47F7/024 G06Q30/00
X	US 2007/229259 A1 (IRMSCHER JULIA [DE] ET AL IRMSCHER JULIA [DE] ET AL) 4 October 2007 (2007-10-04) * figures 1-4 * * paragraphs [0005] - [0009] * * paragraphs [0031] - [0039] * -----	1-24	
			TECHNICAL FIELDS SEARCHED (IPC)
			G08B A47F G06Q
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 25 May 2010	Examiner Tanguy Michotte
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 18 0697

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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25-05-2010

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