(11) Application No. AU 2010100921 A4

(19) AUSTRALIAN PATENT OFFICE

(54) Title
A return system

(51)[6] International Patent Classification(s)
G06Q 10/00 (2006.01)
G06Q 10/00 20060101AFI2010090 8BHAU

(21) Application No: 2010100921

(22) Application Date: 2010.08.24

(43) Publication Date : 2010.09.30

(43) Publication Journal Date : 2010.09.30

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ABSTRACT:

A return system including:

a radio frequency identification (RFID) reader system for reading tag data of items with RFID tags placed in a return area; and

a returns computer system, including a reader controller for controlling reading of said tag data to read the tag data of the RFID tags with security data not set and set the security data on the read RFID tags.

COMS ID No: ARCS-289836 Received by IP Australia: Time (H:m) 17:28 Date (Y-M-d) 2010-08-24

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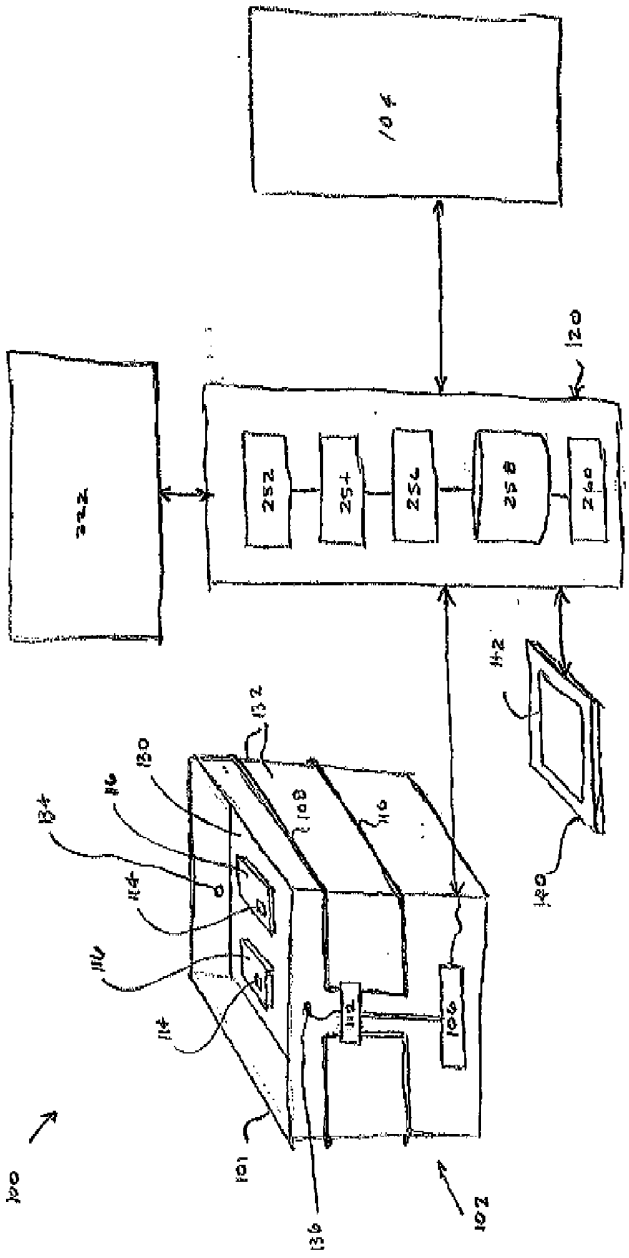

FIGURE 1

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AUSTRALIA

Patents Act 1990

COMPLETE SPECIFICATION

FOR AN INNOVATION PATENT

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Invention Title: *"A return system"*

The following statement is a full description of this invention, including the best method of performing it known to us:

A RETURN SYSTEM

FIELD

The present invention relates to a return system for processing item data associated with returned items. The items may include those held by libraries.

BACKGROUND

Libraries have introduced item or asset management systems that rely upon writing and reading data to and from radio frequency identification (RFID) adhesive tags placed on the items. The items include books, periodicals, DVDs, CDs and other items that are typically held by libraries. The item management systems include a Library Management System (LMS) and an RFID reader system that communicates with the LMS. The LMS is a computer system such as those provided by SirsiDynix (Siris Corporation), Libero (Insight Informatics Pty Ltd), and Amlib (infoXpert Pty Ltd).

The item management systems are efficient in maintaining various information on the items or assets held, but still exhibit problems associated with service delivery for users or patrons wishing to avail themselves of one or more items, after returning issued or borrowed items. LMSs typically include a circulation client that is used by a trained librarian or technical staff member to control the LMS and update the information held for an item. When items are returned, checking in the item, resetting appropriate security parameters and adjusting or updating the LMS can cause considerable delay.

Most libraries limit the number of items a patron may borrow at any given time so that a patron cannot borrow more items above the limit without returning outstanding items on loan. Accordingly, a patron may enter the library, return items in a return chute and then seek to borrow other items but be restricted because the returned items have not been checked into the LMS by the trained staff. The return of items to the shelves is also delayed as they cannot be taken to a return location until the trained staff resets security

parameters, checks the items properly into the LMS and determines a location for each item.

Accordingly it is desired to provide an improved item return system to address the above or at least provide a useful alternative.

The reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as an acknowledgment or admission or any form of suggestion that that prior publication (or information derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

SUMMARY

Embodiments of the present invention provide a return system including:

a radio frequency identification (RFID) reader system for reading tag data of items with RFID tags placed in a return area; and

a returns computer system, including a reader controller for controlling reading of said tag data to read the tag data of the RFID tags with security data not set and set the security data on the read RFID tags.

The return system may include a data store and an item management system (IMS) controller for communicating with an IMS to send the read tag data to update item data for the items stored in the IMS and access the item data for storage in the data store, and wherein the reader controller and stores the tag data in a queue of the data store for the IMS controller. The IMS controller may use the tag data in the queue to update the item data to check-in the associated item.

The return computer system may also include a sort controller for accessing item data of the items based on read tag data, determining status data for each item based on said item data, and generating display data to present on said display said status data for the

items.

The display data generated by the return system may produce a colour coded display for each of the items, representing the status data. For example, green may represent the items returned, and red may represent the items on hold or reserved for other patrons. Advantageously, the status data presented for each item may also represent a return location to which the item needs to be transferred.

The return system may also include a return bin including the RFID reader system and able to read a number of items in the bin simultaneously. For example, the reader controller may control the RFID reader system to read the number of items and set the security data on those items, and then read another number of returned items that do not have the security data set, and set their security data.

Embodiments of the present invention also provide a return system, including:

a radio frequency identification (RFID) reader system for reading tag data of items with RFID tags placed in a return area; and

a returns computer system, including:

(i) a reader controller for controlling reading said tag data and setting security data on the read RFID tags; and

(ii) a sort controller for accessing item data of the items based on read tag data, determining status data for each item based on said item data, and generating display data to present on a display said status data for the items.

Embodiments of the present invention also provide a return system including:

a radio frequency identification (RFID) reader system for reading tag data of items with RFID tags placed in a return area; and

a returns computer system, including:

(i) a reader controller for controlling reading said tag data and setting security data on the read RFID tags; and

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(ii) an item management system (IMS) controller for communicating with an IMS to send the read tag data to update item data for the items stored in the IMS and access the item data.

Embodiments of the present invention also provide a return process, executed by a return system including:

sending a request for a response from radio frequency identification (RFID) tags of items placed in a return area with security data not set; and

reading the tag data of the RFID tags providing said response and setting the security data on the read RFID tags.

DRAWINGS

Preferred embodiments of the present invention are hereinafter described, by way of example only, with reference to the accompanying drawings, wherein:

Figure 1 is a schematic diagram of a preferred embodiment of a return system;

Figure 2 is a block diagram of an embodiment of a return computer system of the return system;

Figure 3 is a flow diagram of a process executed by a reader controller of the return system;

Figure 4 is a block diagram of a process performed by a sort controller of the return system;

Figure 5 is a flow diagram of a process performed by a LMS controller of the return system;

Figures 6 to 10 are screen shots of displays generated by the return system.

DESCRIPTION

A return system 100 for a library or any other lending institution or organisation, as shown in Figure 1, includes a return bin 101, a return computer system 120, and an item management system 104, such as a library management system (LMS). The return bin

101 includes a radio frequency identification (RFID) reader system 102 that includes an RFID reader circuit 106 connected to parallel antenna loops 108 and 110 by a coupling circuit 112. The RFID reader 102 is able to write tag data and read tag data from RFID tags 114 placed respectively on items 116, such as books, DVDs, CDs, periodicals, etc. placed in the bin 101. The reader circuit 106 generates radio frequency signals passed to the antennas 108 and 110 to excite and communicate with the tags 114. The tag data read by the RFID reader 102 is passed to the return computer system 120. The return computer system 120 controls the RFID reader 102 and the tag data written to the tags 114 by the RFID reader 102. The tag data represents, among other information, a unique tag identification number, item asset number associated with the item, and security state, such as whether a security is set to "ON" or "OFF", representing the status of the item, e.g. whether it is considered returned or not. The tag data stored on the tags 114 complies with the draft standards of ISO 28560. An RFID reader pad 140 of the return computer system 120 includes an antenna 142 to also excite and read tags 114 of items 116 placed on the pad 140. The reader circuit 106 of the reader system 102 and the RFID pad 140 can be provided by companies that produce RFID reader hardware, such as FEIG Electronic GmbH, and Tagsys SAS and RFID system software, such as FE Technologies (Express Promotions Pty Ltd), Bibiliotheca RFID Library Systems AG, and 3M. The RFID reader circuit 106 and the return computer system 120 are connected by data communications connection, such as a serial or Ethernet connection 220. The pad 140 is connected to a USB interface 210.

The return bin 101 provides and defines a return area and includes a movable floor 130 on which items 116 are placed. The floor 130 is supported by a hydraulic ram and motor mechanism (not shown). The floor 130 is raised or lowered by the mechanism within the walls 132 of the bin 101 until a laser light source 134 is detected by a laser diode 136 connected to the detection circuitry of the mechanism. The laser diode 136 is placed near the top of the bin 101 on a wall opposite to the source 134 so as to have a direct line of sight to the source when light from the source is not encumbered by an article. As items 116 are placed in the bin, if light from the source 134 is prevented from impacting on or being detected by the diode 136, then the mechanism lowers the floor 130 until

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light from the source is again detected. This ensures that floor 130 is lowered gradually as items 116 are placed in the bin 101. The parallel antenna loops 108, 110 extend around the walls 132 so as to form loops in a plane parallel with the floor 130. The loops 108, 110 are parallel to one another but spaced vertically so as to generate together an RF (radio frequency field) with a range that covers the entire height of the bin 101 as the floor 130 descends with returned items 116. In particular the field covers the return area defined by the bin and has a shape corresponding to the shape, so as to excite multiple tags 114 in the bin 101, but not outside of the bin 101. This ensures that as the bin 101 fills with items 116 that the antennas 108, 110 are able to excite and communicate with the tags 114 of all items 116 that have just recently been returned.

The return computer system 120 communicates over a communication network 220 with the item management system (LMS) 104 using SIP2 (Standard Interchange Protocol Version 2). The LMS 104 maintains a database of item data, including at least some of the tag data, for all items held by a library or a lending institution and other enterprise resource planning (ERP) data. Library management systems are provided by a number of parties including SirsiDynix (Siris Corporation), Libero (Insight Informatics Pty Ltd), and Amlib (infoXpert Pty Ltd). The item data maintained for an item represents respective information associated with the item, including the asset number, title, author, owner location, destination location, MARC standards information, call number, etc.

The return computer system 120, as shown in Figures 1 and 2, is based on a standard computer 202, such as a 32 or 64 bit Intel architecture computer produced by Lenovo Corporation, IBM Corporation, or Apple Inc. The processes executed by the computer 202 are defined and controlled by computer program instruction code and data of software components or modules 250 stored on non-volatile (e.g. hard disk) storage 204 of the computer 202. The processes performed by the modules 250 can, alternatively, be performed by firmware stored in read only memory (ROM) or at least in part by dedicated hardware circuits of the computer 202, such as application specific integrated circuits (ASICs) and/or field programmable gate arrays (FPGAs).

The computer 202 includes random access memory (RAM) 206, at least one microprocessor 208, and external interfaces 210, 212, 214 that are all connected by a system bus 216. The external interfaces include universal serial bus (USB) interfaces 210, a network interface connector (NIC) 212, and a display adapter 214. The USB interfaces 210 are connected to input/output devices, such as a keyboard and mouse 218 and the RFID pad 140. The display adapter 214 is connected to a display device, such as an LCD display screen 222. The NIC 212 enables the computer 202 to connect to the communications network 220. The network 220 may include one or a combination of existing networks, such as a LAN, WAN, the PSTN, the Internet, mobile cellular telephone networks, etc. The computer 202 includes an operating system (OS) 224, such as Microsoft Windows, Mac OSX or Linux. The modules 250 all run on the OS 224, and include program code written using languages such as C, Ruby, C# or a framework such as Microsoft .Net. The return computer system 120 communicates with the LMS 104 using the communications network 220, and the same network can also be used to communicate with the return bin 101.

The return computer system 120 includes modules 250 that provide a reader controller 252, a sort controller 254, an LMS controller 256, a data store 258 and a returns monitor 260. The data store 258 is used to cache item data obtained from the LMS 104 by the LMS controller 256. The data store 258 may be provided by SQL database engine, such as SQLite.

The reader controller 252 polls RFID devices that are continuously operated such as the RFID reader 102 of the return bin 101. The reader controller 252 executes a process 300, as shown in Figure 3, where firstly a thread is spawned for each available RFID device being polled, and a check is first made at step 302 to determine whether a reconfiguration or stop state has been recorded for the RFID reader 102. If not, a check is made at step 304 to determine whether the RFID reader 102 is active and online. If not a reconfiguration state is recorded in the store 258 and the operation returns to step 302. If the reader 102 is online, then a determination is made at step 306 as to whether any response has been obtained from an RFID tag 114 by the reader circuit 106 with its

security data set to "OFF", i.e. whether an item 116 has been detected as being in the bin 101 that has just been returned. If no item is detected, a stop state is recorded in the store 258 and operation returns to step 302. Once at least one tag 114 has responded with its tag identification (ID) number, the reader 102 reads the tag data of all tags 114 of items 116 within the range of the antennas 108 and 110 that have their security data set to "OFF" and sets their security data "ON" so those tags 114 do not respond again.

Application Family Identify (AFI) data of International Standard ISO 15693 is used to provide the security data. AFI data is provided by one byte. Libraries will typically use one or more values from a AFI family for an ON secured state (checked in) and a single value for an OFF unsecured state (checked out), usually from a different family. For example, a AFI family may be denoted as 0x0a and will contain all values 0x1a, 0x2a, 0x3a, 0x4a, 0x5a, 0x6a, 0x7a, 0x8a, 0x9a, 0xaa, 0xba, 0xca, 0xda, 0xea, 0xfa. A library may choose to use one or more values of the family to secure their items. For example a book might be secured with a value of 0x1a and a DVD with 0x5a. A library may use a value such as 0xc2 from a different family for all unsecured items.

The read controller 252 is able to use the reader 102 to simultaneously read up to a predetermined number of tags 114 of items 116 that do not have their security data set to ON. The tag data of each item 116 read is stored in a read queue and other data stored on the tags 114 in the data store 258. The tag data includes the asset number of each read item 116. The controller 252 also ensures the security data is set to ON by writing security data to each of the tags 114 of the items 116 that are read. Once up to the predetermined number of items 116 are read, the process at step 308 completes, a stop state is recorded, and operation returns to 302. Operation then proceeds to step 310 to close the reader controller thread and join the main thread of the return computer system 120. On closing the reader thread the stop state is cleared. If more than the predetermined number of items have been returned in the bin 101, then up to the next predetermined number are read when the reader 102 is polled again. Polling is continuous to ensure items 116 are detected the instant they are placed in the bin 101. Their security data is set to ON and the tag data read and queued in the store 258. This

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is achieved by the reader 102 broadcasting a request for a response from all tags 114 in the return area having security data represented by AFI values that correspond to unsecured items, i.e. the security data is set to OFF. On receiving a response from the unsecured tags 114 with their tag ID, the tag data of those tags is interrogated, and the AFI value of the tag altered to a secured value so that the security data is set to ON, which prevents the tag from responding to any further requests from the reader 102.

The asset tag data stored in the queue of the data store 258 is passed directly to the LMS 104 by the LMS controller 256 to perform returns processing by the LMS 104, i.e. to check-in returned items 116, as discussed below. The LMS controller 256 returns item data for each item 116 corresponding to the asset tag data and this is cached by the return computer system 120 in the data store 258. The item data is cached for a predetermined period of time, usually a few hours. When returned items 116 are taken from the return bin 101 and placed on the RFID pad 140 of the return computer system 120, the sort controller 254 displays status data, including sort criteria, for the items on the pad 140 using tag data read from the items, the cached item data held in data store 258, data obtained from another data source or a combination of any of these. The items 116 would have already had their security data set to ON and in most cases been checked in by the LMS 104.

The sort controller 254 executes a process 400 as shown in Figure 4. The sort controller starts by invoking the reader pad 140 at step 402, and then checks whether the process is to close at step 404. If not a check is made at step 406 as to whether the reader pad 140 has detected one or more items 116. If an item 116 has been detected then for each item 116 the sort controller 254 reads the tag data of the item including the asset number, and uses the asset number to interrogate the data store 258 to obtain any item data for the item held in the cache of the data store 258. If no item data is held in the cache for the item 116 (step 408), then the LMS controller 256 is invoked to obtain the item data from the LMS 104 (step 410). Obtaining the item data takes about 2 milliseconds if it is held in the cache of the data store 258, whereas otherwise it will take about 2 seconds to use the LMS controller 256 to obtain the item data from the LMS 104. The item data

extracted for each read item 116 is then used in a display process 412. The item data for each detected item 116 includes sort properties obtained from one or more of the tag data, the cached data, the LMS 104 or another data source. Only a limit set of sort properties, such as call number and item type, may be obtained from the tag data or a static data file stored in the data store 258, whereas more extensive information can be obtained from the item data obtained form the LMS 104, such as reservation status and transfer locations. Based on the sort properties of the item data, the display process 412 determines status data associated with the item 116 which represents various sort instructions or criteria, including:

(i) To be shelved in this library
(ii) Return to another destination (with destination details)
(iii) On Hold for a patron in this library (with on hold receipt printing)
(iv) Sort by Call Number
(v) Sort by collection code
(vi) Sort by Dewey Classification
(vii) Sort by location code
(viii) Sort by media type
(ix) Sort by SIP2 screen message

The status data is used to generate display data to display the sort instructions for each item 116 on the pad 140 in a colour coded format, as shown in Figures 6 and 7. A colour band for each item 116 represents a location to which the item 116 should be transferred. For example:

(a) If the item is highlighted in green with a tick in the right-hand column, the item has been successfully checked into the LMS and it is ready to go on the shelf. Remove the item(s) and place it in the designated area to be returned to the shelf.

(b) If the item is highlighted in a colour corresponding to a transfer to different destination sort criteria, the item has been returned successfully and the LMS has instructed the system that it needs to be transferred to a different location. The name of the destination location

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is listed in the right-hand column. Remove the item(s) and place it in the designated area for transfer to that location.

(c) If the item is highlighted in a colour corresponding to an item on hold in that library, the item has been returned successfully and the LMS has instructed the system that the item is on hold for a patron in that library. The patron's name and library number will be listed in the right-hand column and an on hold receipt will be printed automatically. Select the item, print a receipt and place the receipt inside the item, and place the item in the hold section.

The display generated on the screen 222 provides automatic clear instructions to a junior staff member how to handle or transfer an item to a particular location. Audio data may also be generated based on the status data by the display process 412 to play sounds to present the sort instructions. The display data may also generate various sounds and displays, such as animations and videos, to assist untrained staff.

The LMS controller 256 executes a process 500 as shown in Figure 5. This determines at step 502 whether reconfiguration or stop data has been set for the controller 256. If not, a determination is made at step 504 to determine whether asset tag data for items has been stored in the read queue of the data store 258. If so, a check is made at step 506 to determine if the LMS 104 is online. If the determination at steps 504 and 506 is negative, then the stop data is set and reconfiguration data set, respectively. If the LMS is online, then the asset tag data in the queue is sent to the LMS for returns processing (step 508); i.e. to check-in the items and update the item data for the items in the LMS 104. Based on the asset number the LMS 104 returns to the LMS controller 256 updated item data for each item 116 represented in the queue. A check is made at step 510 to determine if the communication and item data returned is successful and if so then the item data is stored on the cache at step 512 of the data store 258. The operation then returns to step 502. If the data transfer is not successful, a determination is made at step 514 as to whether the operation should be returned to step 502 for a retry, otherwise the item data returned is recorded as a failure at step 516 and then the operation returns to

step 502. If reconfiguration or stop data is set at step 502, then all connections are closed at step 518 and the controller 256 ends.

The returns monitor 260 generates a user interface on the system 222, as shown in Figures 8, 9 and 10 based on the item data held for the returned items in the data store 258. As shown in Figure 8, it presents a live monitor tab which displays in real-time the sort criteria data that has been returned from the LMS 104. This is based on the cache data that the sort controller 254 uses to generate the sort displays of Figures 6 and 7. Figure 9 illustrates an item history tab interface that provides a display of all information that has been collected over a period of time which can be filtered using various criteria and dates. Figure 10 illustrates a statistics tab interface that provides the general statistics on the items that have been returned.

The return system enables items placed in a return area, such as in the return bin 101, to be automatically checked-in to the LMS 104 immediately. Security data is set immediately on return. The returned items can then be sorted for transfer to a particular location by simply placing them on a RFID pad 140 of the returns computer 120 so simple, clear and colour coded instructions are automatically and quickly provided. A circulation client of the LMS 104 is not required.

Many modifications will be apparent to those skilled in the art without departing from the scope of the present invention.

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CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A return system including:

a radio frequency identification (RFID) reader system for reading tag data of items with RFID tags placed in a return area; and

a returns computer system, including a reader controller for controlling reading of said tag data to read the tag data of the RFID tags with security data not set and set the security data on the read RFID tags.

2. A return system as claimed in claim 1, including a data store and an item management system (IMS) controller for communicating with an IMS to send the read tag data to update item data for the items stored in the IMS and access the item data for storage in the data store, and wherein the reader controller and stores the tag data in a queue of the data store for the IMS controller.

3. A return system as claimed in claim 2, wherein the IMS controller uses the tag data in the queue to update the item data to check-in the associated item.

4. A return system as claimed in claim 1, 2 or 3, including a sort controller for accessing item data of the items based on read tag data, determining status data for each item based on said item data, and generating display data to present on a display said status data for the items.

5. A return system as claimed in claim 4, wherein the sort controller accesses item data stored in the data store.

6. A return system as claimed in claim 4 or 5, wherein the display data generated by the return system produces a respective display, based on colour, symbol, text, and/or sound, for each of the items, representing the status data.

7. A return system as claimed in claim 6, wherein one respective display represents

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the items to be returned to a location, and another respective display represents the items reserved for a patron.

8. A return system as claimed in claim 7, wherein, the status data presented for each item represents a location to which the item needs to be transferred.

9. A return system as claimed in any one of the preceding claims, including a return bin including the RFID reader system and for reading a number of tags of items in the bin simultaneously.

10. A return system as claimed in claim 9, wherein the reader controller controls the RFID reader system to read the number of items and set security data on the items, and subsequently read another number of returned items that do not have security data set, and set security data of said another number.

11. A return system, including:

a radio frequency identification (RFID) reader system for reading tag data of items with RFID tags placed in a return area; and

a returns computer system, including:

(i) a reader controller for controlling reading said tag data and setting security data on the read RFID tags; and

(ii) a sort controller for accessing item data of the items based on read tag data, determining status data for each item based on said item data, and generating display data to present on a display said status data for the items.

12. A return system as claimed in claim 11, wherein the reader controller controls the RFID reader system to read a number of returned items with security not set and set security data on the items, and subsequently read another number of returned items that do not have security data set, and set security data of said another number.

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13. A return system as claimed in claim 11, wherein the display data generated by the return system produces a respective display, based on colour, symbol, text, and/or sound, for each of the items, representing the status data.

14. A return system as claimed in claim 13, wherein one respective display represents the items to be returned to a location, and another respective display represents the items reserved for a patron

15. A return system as claimed in claim 14, wherein, the status data presented for each item represents a location to which the item needs to be transferred.

16. A return system including:

a radio frequency identification (RFID) reader system for reading tag data of items with RFID tags placed in a return area; and

a returns computer system, including:

(i) a reader controller for controlling reading said tag data and setting security data on the read RFID tags; and

(ii) an item management system (IMS) controller for communicating with an IMS to send the read tag data to update item data for the items stored in the IMS and access the item data.

17. A return process, executed by a return system including:

sending a request for a response from radio frequency identification (RFID) tags of items placed in a return area with security data not set; and

reading the tag data of the RFID tags providing said response and setting the security data on the read RFID tags.

18. A return process as claimed in claim 17, wherein said response is continuously broadcast in said return area.

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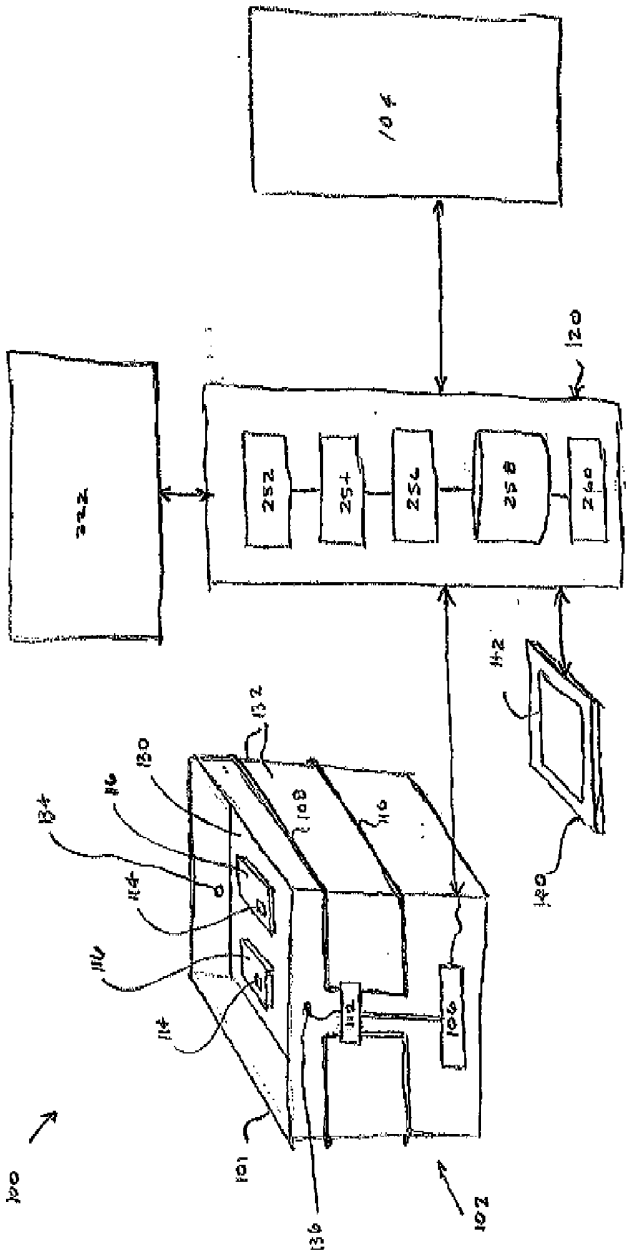

FIGURE 1

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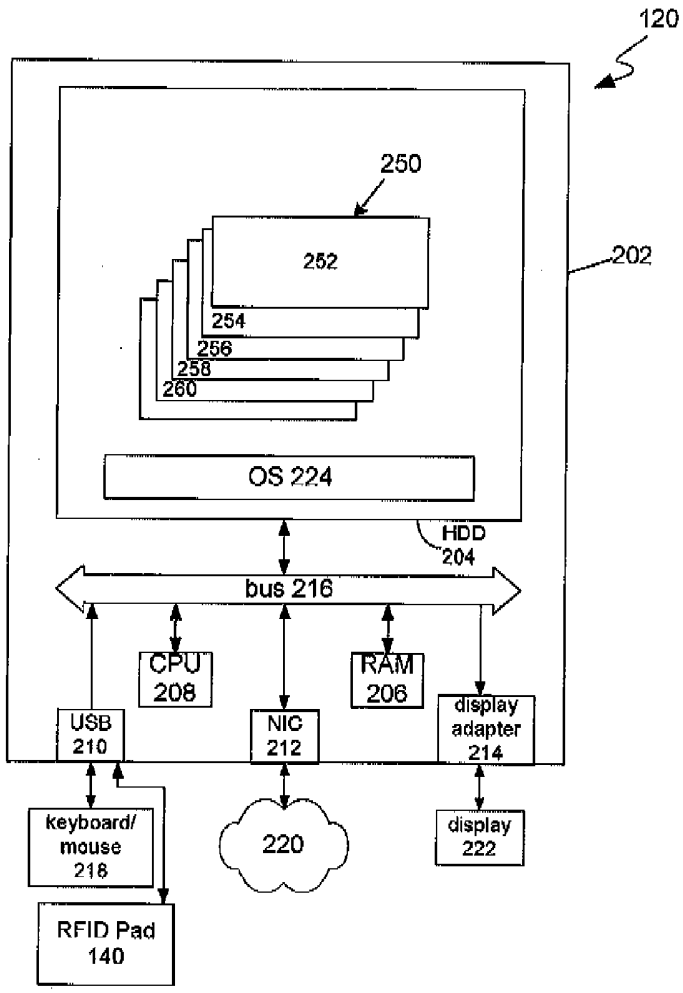

FIGURE 2

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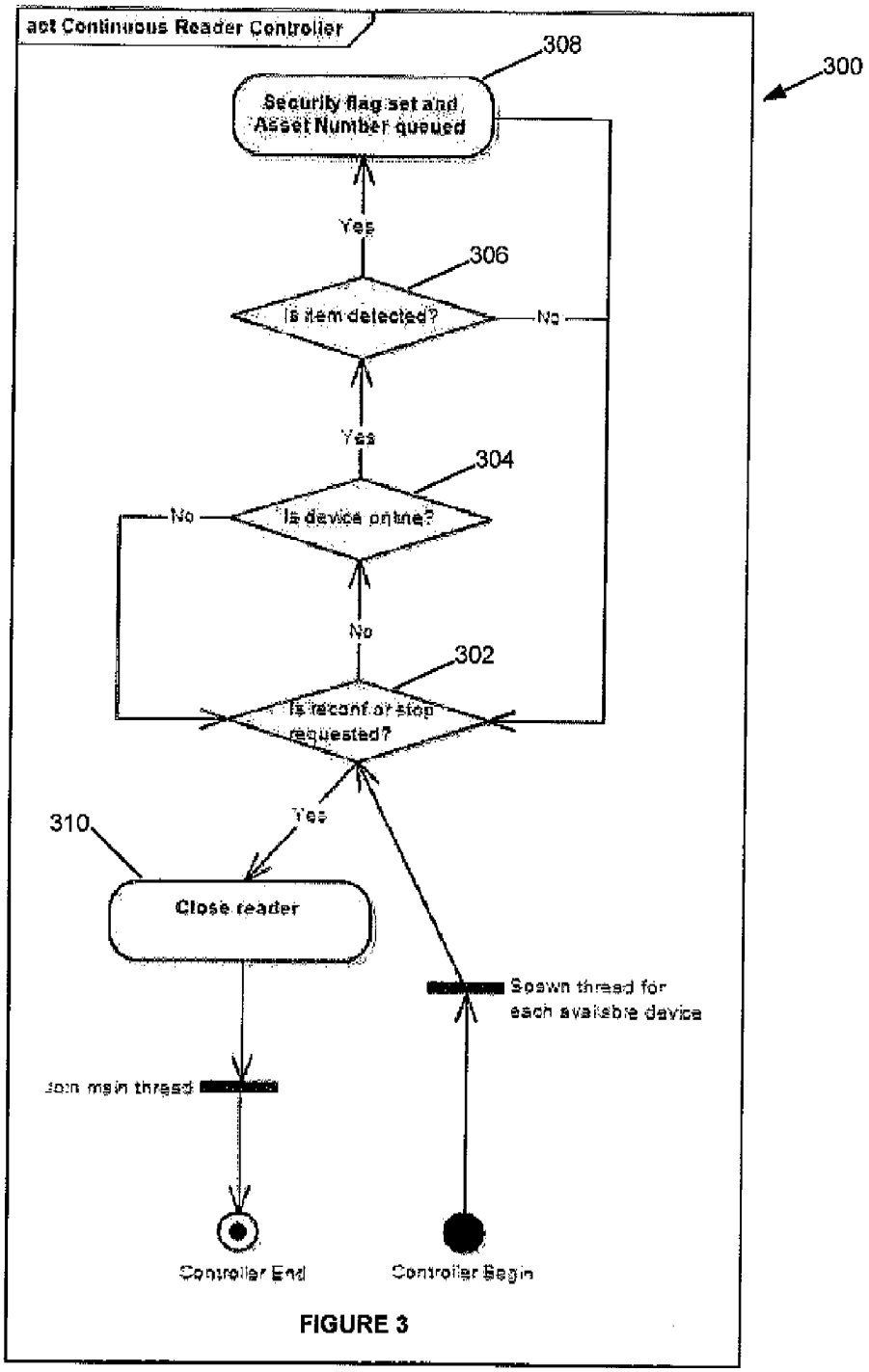

FIGURE 3

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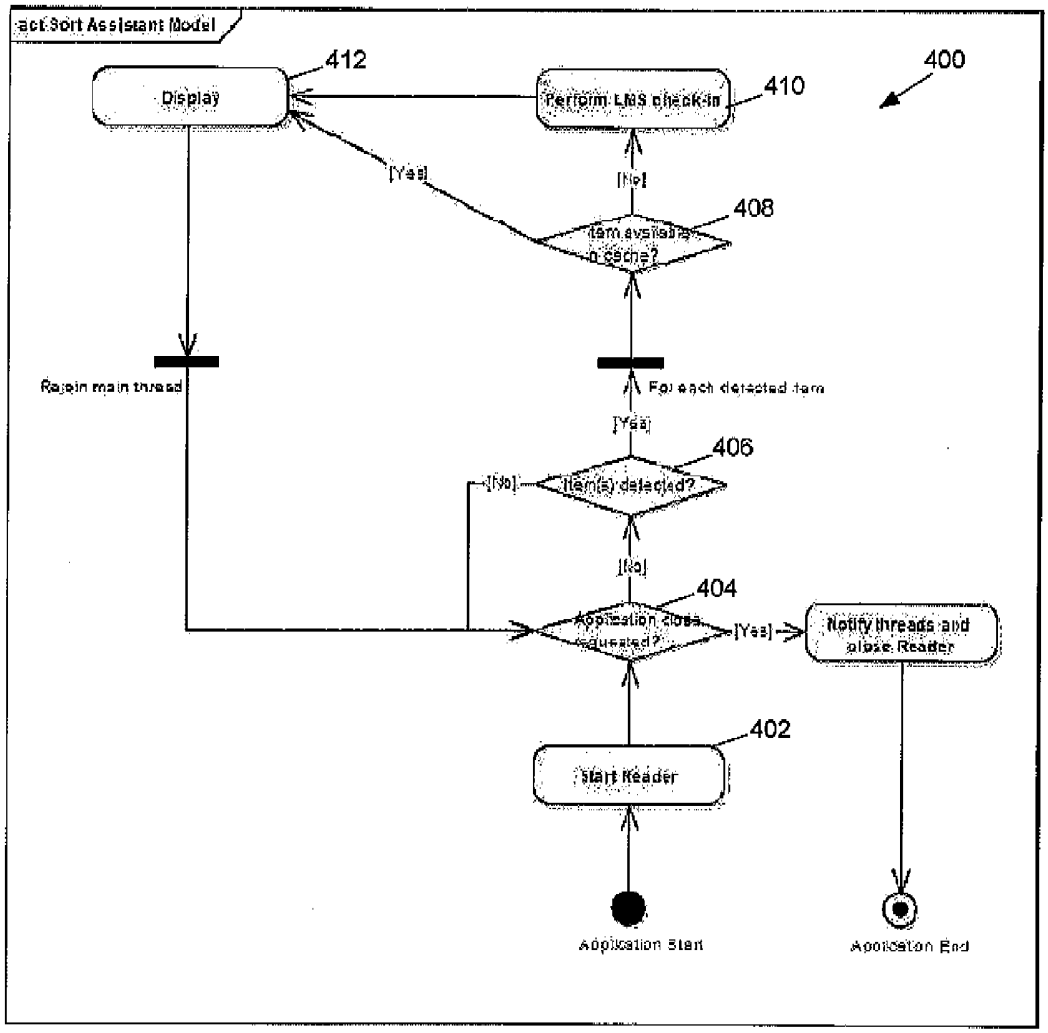

FIGURE 4

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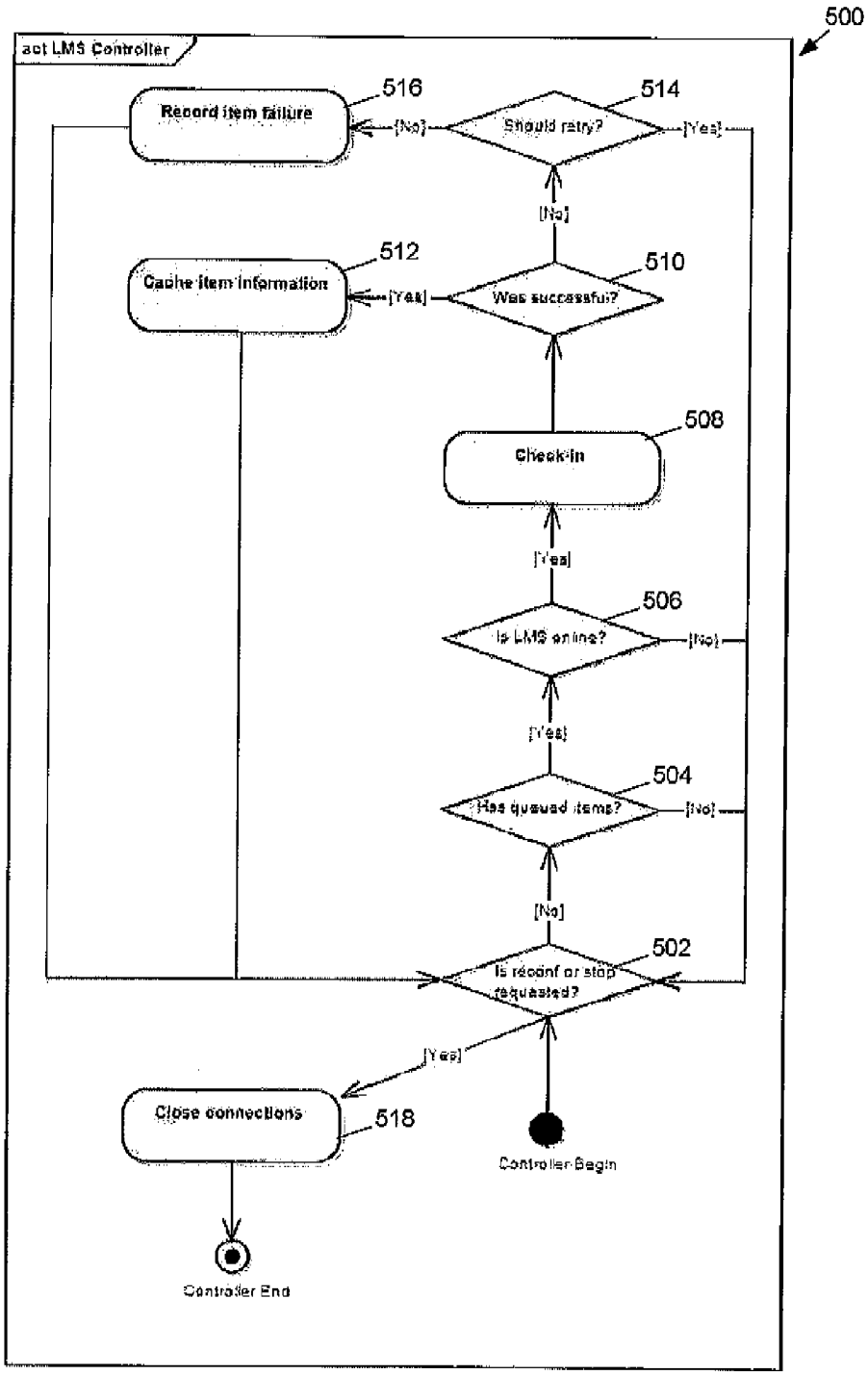

FIGURE 5

COMS ID No: ARCS-289836 Received by IP Australia: Time (H:m) 17:28 Date (Y-M-d) 2010-08-24

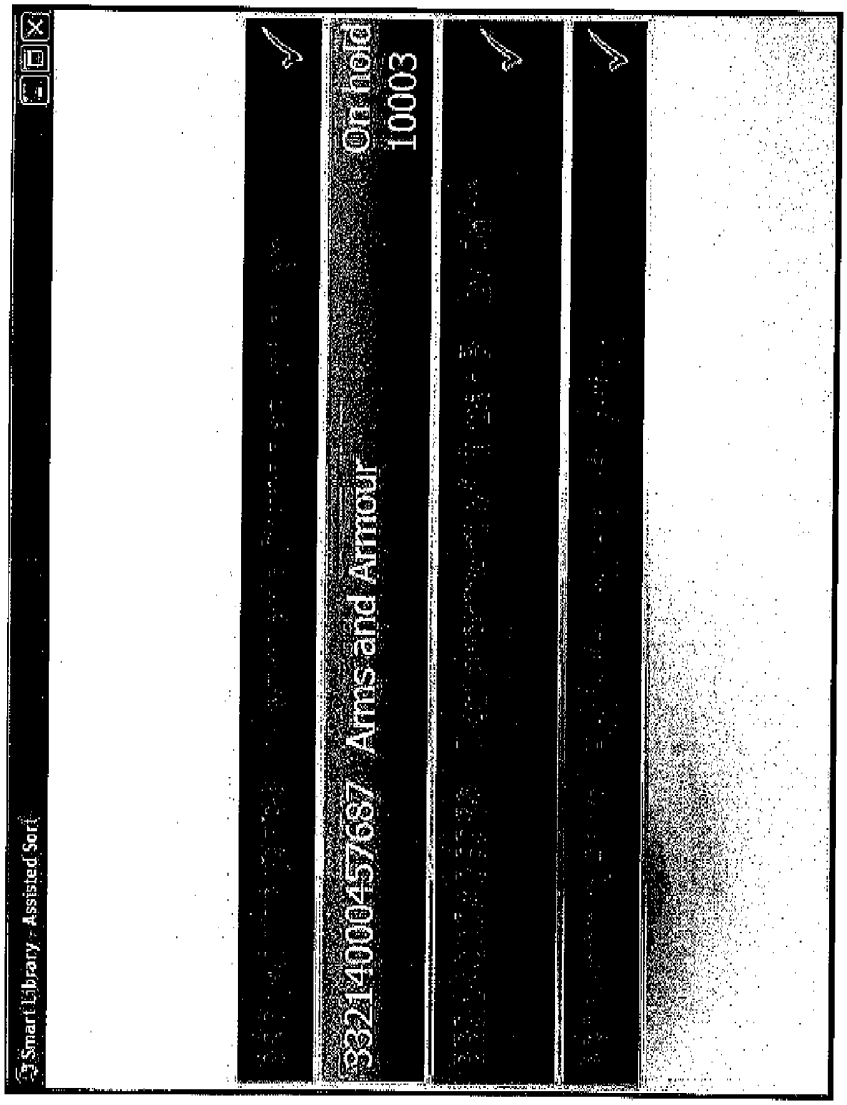
Smart Library - Assisted Sort
9214000457687 Arms and Armour
On hold
10003

FIGURE 6

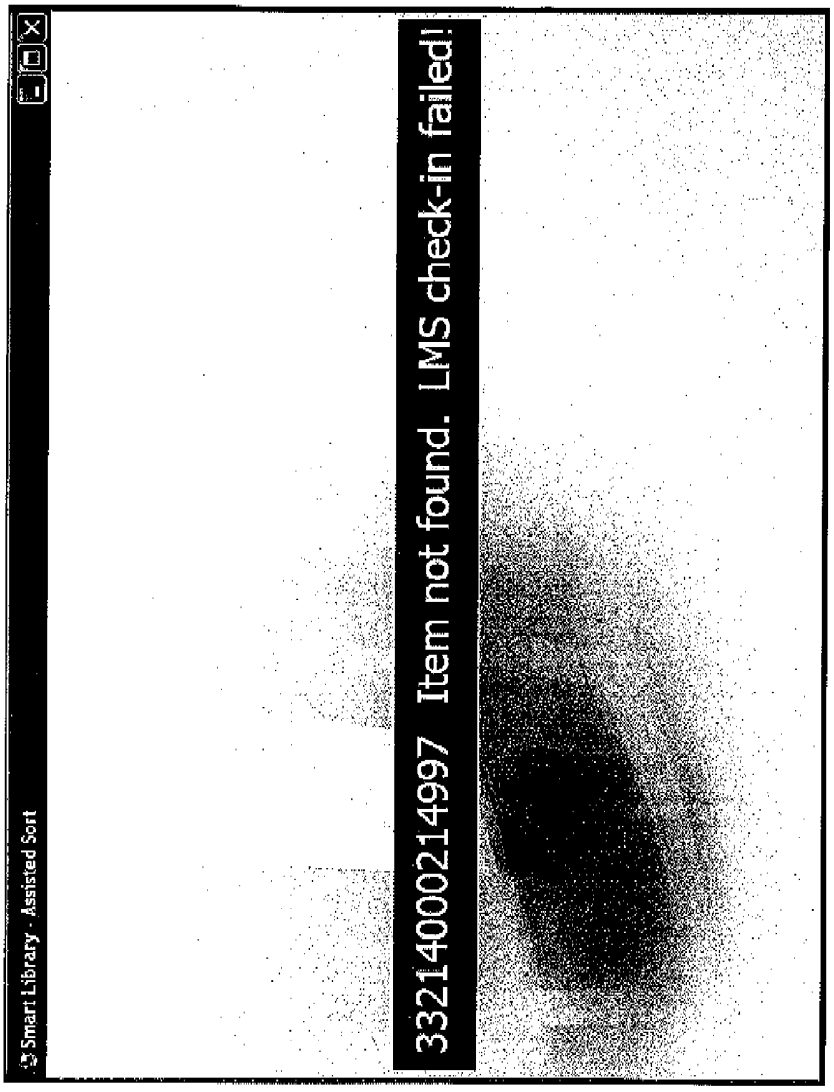
Smart Library - Assisted Sort
33214000214997 Item not found. LMS check-in failed!

FIGURE 7

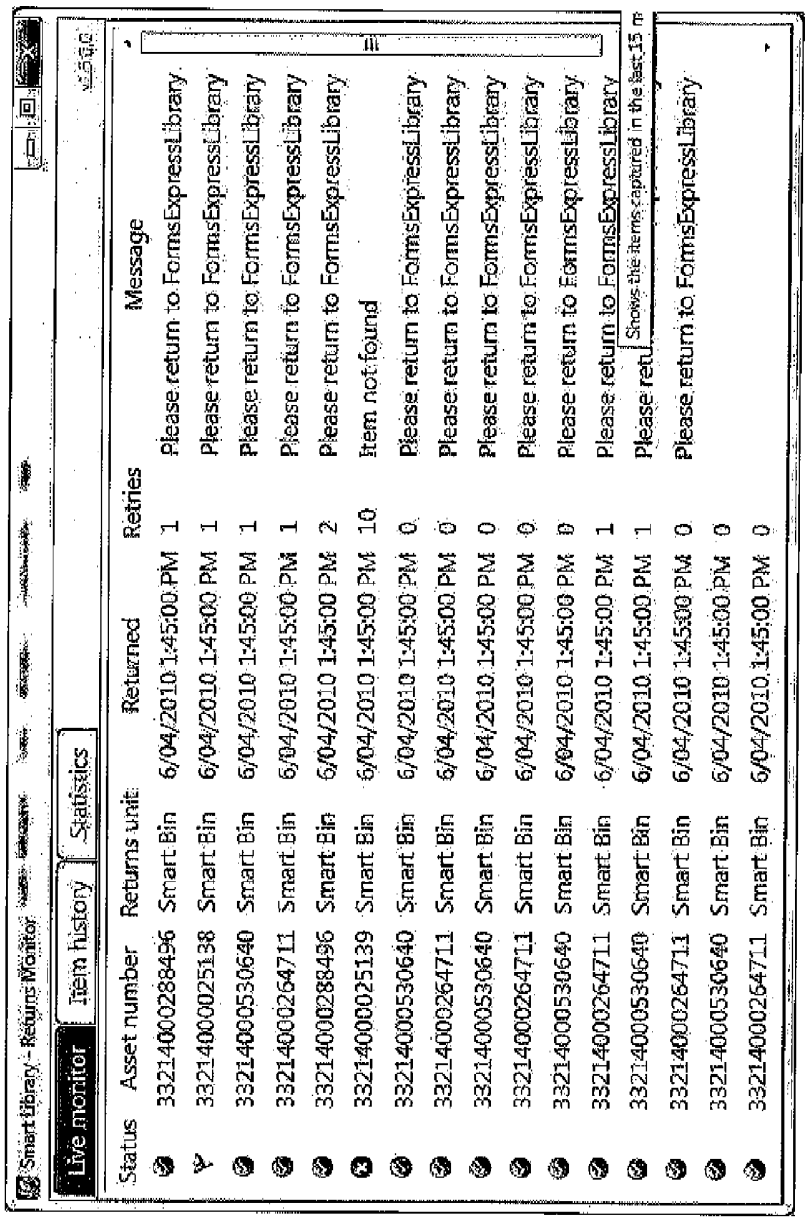
SmartLibrary - Returns Monitor
Live monitor
Item history
Statistics
Status
Asset number
Returns unit
Returned
Retries
Message
3321400028896 Smart Bin 6/04/2010 1:45:00 PM 1 Please return to FormsExpressLibrary
3321400025138 Smart Bin 6/04/2010 1:45:00 PM 1 Please return to FormsExpressLibrary
3321400530640 Smart Bin 6/04/2010 1:45:00 PM 1 Please return to FormsExpressLibrary
3321400264711 Smart Bin 6/04/2010 1:45:00 PM 1 Please return to FormsExpressLibrary
3321400288496 Smart Bin 6/04/2010 1:45:00 PM 2 Please return to FormsExpressLibrary
3321400025139 Smart Bin 6/04/2010 1:45:00 PM 10 Item not found
3321400530640 Smart Bin 6/04/2010 1:45:00 PM 0 Please return to FormsExpressLibrary
3321400264711 Smart Bin 6/04/2010 1:45:00 PM 0 Please return to FormsExpressLibrary
3321400530640 Smart Bin 6/04/2010 1:45:00 PM 0 Please return to FormsExpressLibrary
3321400264711 Smart Bin 6/04/2010 1:45:00 PM 0 Please return to FormsExpressLibrary
3321400530640 Smart Bin 6/04/2010 1:45:00 PM 0 Please return to FormsExpressLibrary
3321400264711 Smart Bin 6/04/2010 1:45:00 PM 1 Please return to FormsExpressLibrary
3321400530640 Smart Bin 6/04/2010 1:45:00 PM 1 Please retu
Shows the items captured in the last 15 m
3321400264711 Smart Bin 6/04/2010 1:45:00 PM 0 Please return to FormsExpressLibrary
3321400530640 Smart Bin 6/04/2010 1:45:00 PM 0
3321400264711 Smart Bin 6/04/2010 1:45:00 PM 0

FIGURE 8

2010100921 24 Aug 2010

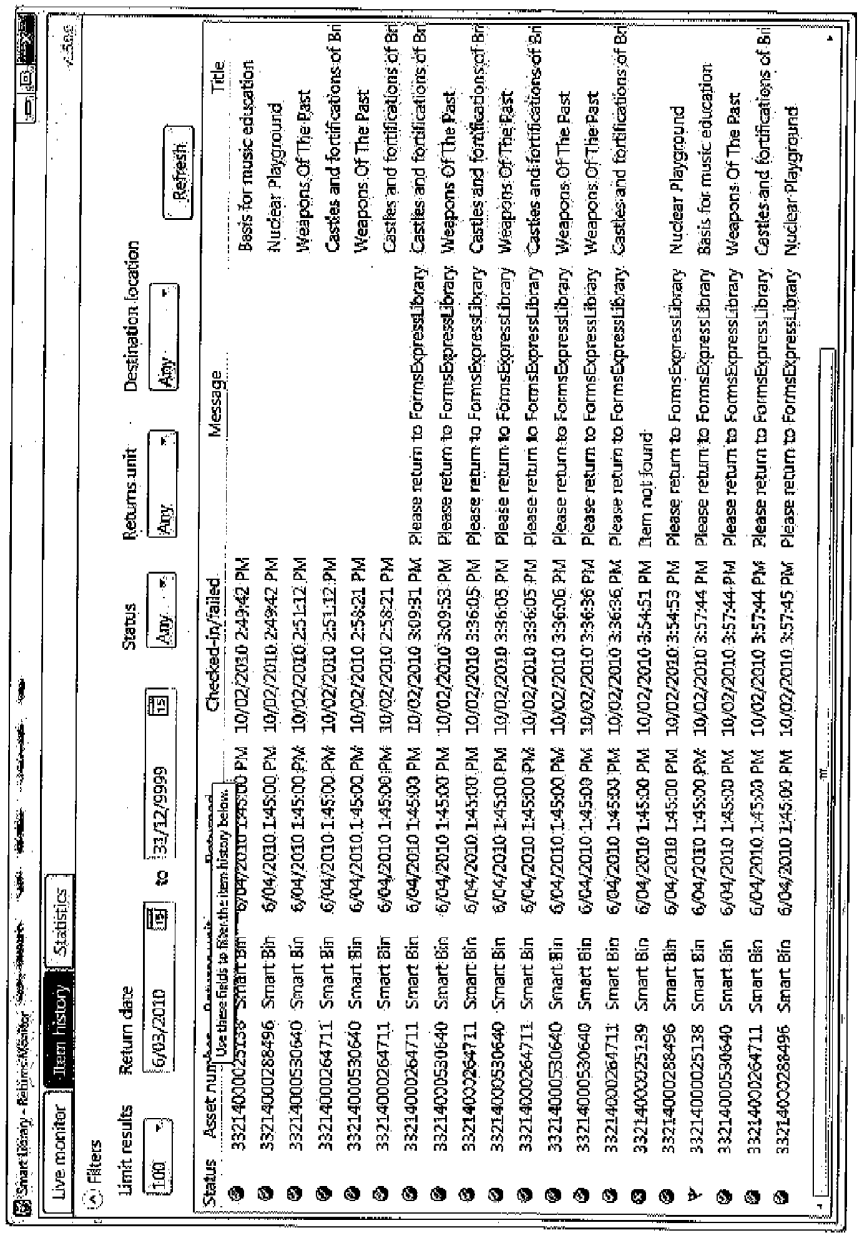

FIGURE 9

2010100921 24 Aug 2010

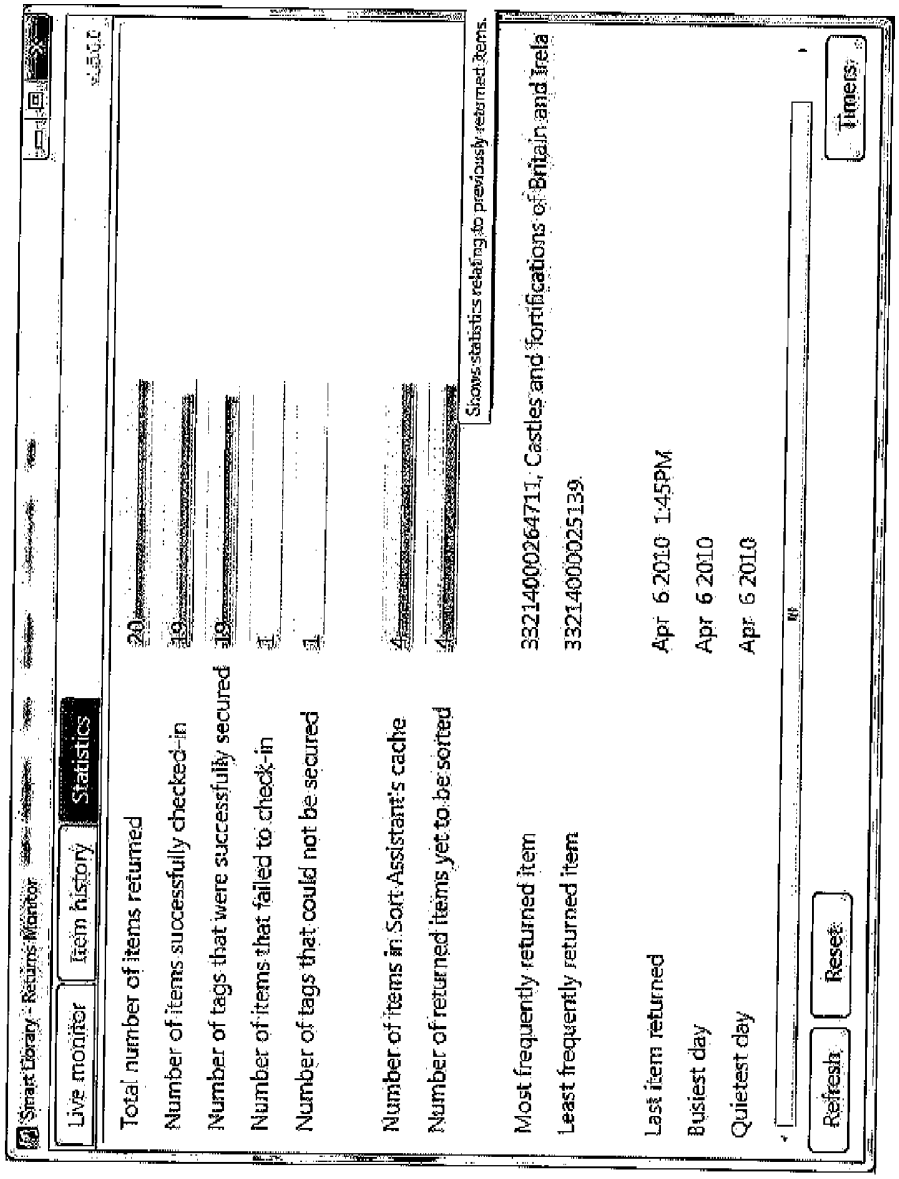

FIGURE 10