(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
16 July 2009 (16.07.2009)

PCT

(10) International Publication Number
WO 2009/087412 A1

(51) International Patent Classification:
G07C 9/00 (2006.01) *G06K 19/077* (2006.01)

(21) International Application Number:
PCT/GB2009/050003

(22) International Filing Date: 5 January 2009 (05.01.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0800184.4 5 January 2008 (05.01.2008) GB

(71) Applicant *(for all designated States except US)*: **PROPELLER HOLDINGS LIMITED** [GB/GB]; 5 Winchester Drive, South West Industrial Estate, Peterlee Tyne And Wear SR8 2RJ (GB).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **ELWELL, Jon** [—/GB]; 5 Winchester Drive, South West Industrial Estate, Peterlee Tyne And Wear SR8 2RJ (GB).

(74) Agent: **MURGITROYD & COMPANY**; Scotland House, 165-168 Scotland Street, Glasgow Strathclyde G5 8PL (GB).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(54) Title: STOCK CONTROL PORTAL

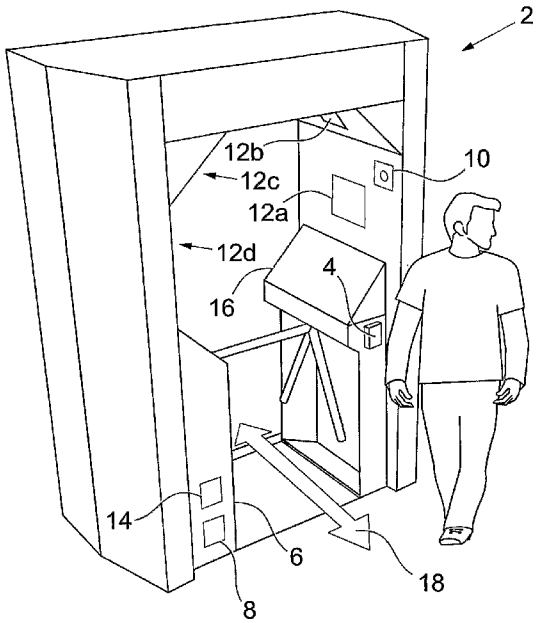


FIGURE 1

(57) Abstract: A portal (2) and method for stock control and access control to an item storage area has a user identifier reader (4) and a turnstile (16) to control user access through the portal (2) using the read user identifier. The portal also has an RFID tag reader with adjustable antennas (12a to 12d) for to reading an item identifier from a tag passing through the portal. The turnstile (16) may be activated by validation of the user identifier. The RFID tag reader may by triggered by the user identifier reader or by use of the turnstile. Alternatives to the turnstile are sliding and rotary doors that enclose the tag scanning volume.

WO 2009/087412 A1

Stock Control Portal

The present invention relates to stock control and also access control to an item storage area, such as a parts or consumables store.

RFID (Radio Frequency IDentification) portals are used for reading RFID tags attached to items passing through the portal. RFID portals can therefore be used in stock control applications to track the movement of inventory such as parts and consumables into and out of a storage area (known as a store or stores). RFID portals can also be used to track the movement of human users through the portal if they carry an RFID tag.

Access control barriers, such as ticket barriers and security gates, require a user to present some form of identification including perhaps biometric data such as a finger print scan, before they are allowed through the barrier.

One problem with the known RFID portals in stores applications is that they do not collect information about both items and users passing through the portal. This results in poor stock control, because unauthorised users can take items out of the stores unless access control is provided

separately from the RFID scanning of items, for example by staffing the stores or providing a security check external to the portal, for example at the entrance to the building in which the stores are located.

It is an object of the present invention to provide improved stock control and access control to an item storage area.

Statement of Invention

According to a first aspect of the present invention there is provided a portal for stock control and access control to an item storage area, the portal comprising:

a user identifier reader operable to read a user identifier;

an access control means for controlling user access through the portal using the read user identifier; and

an item identifier reader operable to read an item identifier from a tag passing through the portal.

Preferably the user identifier comprises a biometric reader operable to read a biometric user identifier from the user.

Alternatively, the user identifier reader comprises a carrier reader operable to read the user identifier from a user identifier carrier.

Preferably, the user identifier carrier comprises an identity card.

Preferably, the identity card comprises a bar code.

Alternatively, the user identifier carrier comprises an RFID tag.

Preferably, the portal further comprises a storage log operable to log the read user identifier.

Preferably, the portal further comprises a video capture means for capturing video of the user tagged with the read user identifier.

Preferably, the item identifier reader is triggered to read the item identifier by the user identifier reader.

Preferably, the item identifier reader is triggered to read the item identifier by the access control means.

Preferably, the access control means comprises a door arranged when closed to enclose a scanning volume of the item identifier reader.

Preferably, the door comprises a sliding door.

Alternatively, the door comprises a rotary door.

Preferably, the item identifier reader comprises an antenna mounted on the rotary door.

Alternatively, the access control means comprises a turnstile.

Preferably, the turnstile is arranged within a scanning volume of the item identifier reader.

Preferably, the item identifier reader is triggered to read the item identifier by a user going through the turnstile.

Preferably, the access control means is operable to control user access through the portal depending on validation of the read user identifier.

Preferably, the access control means is further operable to control user access through the portal out of the item storage area using the read item identifier.

Preferably, the access control means is activated responsive to validation of the read item identifier.

Preferably, the portal further comprises an item location module operable to locate an item using the read user identifier.

Preferably the item location module further comprises an item location interface for a user to locate an item and the read user identifier is used by the item location module to permit user access to the item locator interface.

Preferably, the portal further comprises an allocation module operable to allocate the read item identifier to a cost centre or work cell using the read user identifier.

Preferably, the allocation module further comprises an allocation interface for manual allocation of the item identifier by a user and the allocation module is operable to log the user onto the allocation interface.

Preferably, the allocation module is operable to automatically allocate the item identifier to a cost centre or work cell associated with the read user identifier.

Preferably, the portal provides access control to the item storage area with the entrance and exit along the same corridor.

Preferably, the item identifier reader comprises a plurality of antennas at least some of which are adjustable.

According to a second aspect of the present invention there is provided a method of stock control and access control to an item storage area, the method comprising the steps of:

reading a user identifier;

controlling user access through a portal using the read user identifier; and

reading an item identifier from a tag passing through the portal.

Preferably, the step of reading a user identifier comprises reading a biometric user identifier from the user.

Preferably, the step of reading a user identifier comprises reading the user identifier from a user identifier carrier.

Preferably, the user identifier carrier comprises an identity card.

Preferably, the step of reading a user identifier comprises reading a bar code on the identity card.

Alternatively, the user identity carrier comprises an RFID tag.

Preferably, the step of reading a user identifier comprises logging the read user identifier.

Preferably, the step of reading the user identifier comprises capturing video of the user tagged with the read user identifier.

Preferably, the step of reading the item identifier is responsive to the step of reading the user identifier.

Preferably, the step of reading an item identifier is responsive to validation of the read user identifier.

Preferably, the step of controlling user access through the portal comprises activating a door and the method further comprises the step of closing the door to enclose a scanning volume for reading the item identifier.

Preferably, the activating comprises sliding the door.

Alternatively, the activating comprises rotating the door.

Alternatively, the step of controlling user access comprises activating a turnstile.

Preferably, the step of reading an item identifier is activated responsive to a user going through the turnstile.

Preferably, the step of controlling user access through the portal depends on validation of the read user identifier.

Preferably, the step of controlling user access through the portal out of the item storage area uses the read item identifier.

Preferably, the step of controlling user access through the portal is responsive to validation of the read item identifier.

Preferably, the method further comprises the step of locating an item using the read user identifier.

Preferably, the step of locating an item comprises permitting, using the read user identifier, a user access to an interface for the user to locate the item.

Preferably, the method further comprises the step of allocating, using the read user identifier, the read item identifier to a cost centre or work cell.

Preferably, the step of allocating comprises automatically logging a user onto an interface for the manual allocation of the item identifier by the user.

Preferably, the step of allocating comprises automatically allocating the item identifier to a work cell associated with the user identifier.

Detailed Description

The present invention will now be described by way of example only with reference to the Figures in which:

Figure 1 illustrates in schematic form a portal according to a preferred embodiment of the present invention;

Figure 2 illustrates in schematic form a portal, stores area and work cells in a factory;

Figure 3 illustrates a flow chart of the method of according to a preferred embodiment of the present invention;

Figure 4 illustrates in schematic form the antenna placement within the portal;

Figure 5 illustrates in schematic form a portal with sliding doors according to an alternative embodiment of the present invention; and

Figure 6 illustrates in schematic form a portal with rotary doors according to an alternative embodiment of the present invention.

With reference to Figure 1 the portal 2 has a proximity card reader 4 operable to read a user identifier from a user's identity card held up against the reader. Other suitable types of readers include the kind for reading different types of user identifier carriers (including swipe card readers for magnetic swipe cards and bar code readers for reading printed bar codes) and biometric readers for reading biometric user identifiers directly from the user such as finger prints and retina scans.

The control unit 6 has a processor and memory containing a storage log 8 that is used to log the read user identifiers. A video capture module includes a video camera 10 that captures video of the user and tags it with the read user identifier.

The portal 2 also has an item identifier reader which is an RFID tag reader operable to read an item identifier from an RFID tag passing through the

portal. The RFID reader has four antennas 12a to 12d connected to an RFID reader controller which is an Alien Technology alr8800 module. The antennas have a multi-static topology and circular or linear polarisation. The reader support includes EPC (Electronic Product Code) Class 1 Gen 2, EPC Class 1 Gen 1, ISO 18000-6c RFID tag protocols.

The control unit runs controller software. In this embodiment the control unit has an XScale™ processor running Linux with 64 Mb of RAM, 32 Mb of flash memory, a DSP and a Field Programmable Analogue array (FPAA) for signal processing. The RFID reader is activated to read the item identifier by the proximity card reader for example when a user swipes their identity card in front of the proximity card reader the RFID reader activates in order to read the RFID tags of items being carried by the user who has identified himself. The RFID reader may also be activated by a user going through the turnstile 16.

The turnstile 16 controls user access through the portal using the user identifier that is read by the proximity card reader. The turnstile has a top LCD (Liquid Crystal Display) indicator. It is bidirectional so can be entered from both sides. It may be fail safe (the arm will drop down when powered off), or fail secure (the arm will be locked when powered off). The turnstile arm is anti-clamping, that is the arm will be unlocked if people hold the arm when passing through. The turnstile also has an anti tail-after detector so illegal invasion can be detected.

Other access control means may be used, for example a single door with an electronic lock, however the advantage of a turnstile or similar barrier, such as double sliding doors or a rotary door, is that it only allows one person through at a time.

The turnstile, under control of the control unit, controls the user access through the portal responsive to validation of the user identifier. Validation may include for example checking the user identifier against a list of authorised users. In that case only authorised users are issued with cards with their matching user identifier. Furthermore, when the user is exiting the stores through the portal the turnstile can be used to control user access using the read RFID item identifier. For example if the user is not authorised to take certain items out of stores then activation of the turnstile can be prevented while they are carrying that item. In this way the turnstile controls user access responsive to validation of the read RFID item identifier. The validation may be performed by looking up a database which contains access rights for users with respect to parts. This may be done with a look up table or alternatively using categories for parts and a record of which categories can be accessed by which user.

The turnstile 16 is arranged within the scanning volume are of the RFID reader, which in this case is the volume defined by the arrangement of antennas 12a to 12d.

The portal provides access control to the item storage area with the entrance and exit along the same corridor 18. Alternative arrangements include a long corridor with a separate RFID reader and identity card reader and turnstile at different locations along the corridor. Furthermore there may be separate entrance and exit corridors and the access control may be provided by for example by an activatable turnstile on the entrance corridor, with the exit corridor having the RFID reader and a dumb one-way turnstile which serves only to activate the RFID reader. However such an arrangement could result in confusion of the identity of more than one user who enters the area at the same time. Therefore it is advantageous to read the user's identity when they exit the stores as well as when they

enter the stores. If however it is known that there is only one user in the stores then the computer system can indicate to the user that no reading of the user identity is required upon exit.

A portal 2 is shown in a fence 20 around the perimeter of a stores area 22 which is used for storing items 24. A fire exit 26 can provide an alternative exit from the stores area but in normal use the only entrance and exit is through the portal 2.

The portal further comprises a computer terminal which displays an item location interface 28. After a user has entered the stores area they use the item location interface to find an item. The user identifier that has been read by the proximity card is used to permit the user access to the item locator interface by logging them in automatically. An integrated system which has a record of the current work activities of the user may present the user with an indication immediately of where to find the part that they are currently working with or that they have been instructed by another computer screen elsewhere in the factory to go and find. In this embodiment the portal control unit has a processor which runs the software that displays the item location interface. However, this module of the portal could be distributed on a different computer system separate from the control unit.

Upon exit from the stores area the user has access to an allocation module 30 using a computer terminal which is operable to allocate the read RFID item identifier to a cost centre and/or work cell 32 using the read RFID identifier. The user may be logged on to the allocation interface automatically by the allocation module for manual allocation of the item identifier by the user. When the user does not make any entry into the terminal then the allocation module is operable to automatically allocate

the RFID item identifier to a cost centre and/or work cell associated with the user. The allocation module may be a software module running in the control unit alternatively running on a separate computer system perhaps in the terminal or in a central server.

With reference to Figure 3, a flow chart of the use of the portal and the method of stock control and access control is shown. The user walks through the portal 34 and presents their clock/proximity card against the turnstile entry reader 36. Alternatively, the user entering or wishing to gain access to the pod may have on his person a standard RFID tag encoded with his/her details (clock number, department or other personal data) that when scanned by a RFID tag proximity reader, or entry through the pod, will allow access through the turnstile on entry or exit.

At this stage the access entry is video tagged 38 and the user entry access is logged 40. If the user identity credentials are recognised 42 then the turnstile activates 44; if the credentials not recognised then the turnstile does not activate and the condition is logged 40.

The user then enters the main stores area 46 and may access the internal stores parts location interface 48. The user searches for parts locations 50. If the user fails to locate parts 52 they can leave the stores area immediately. The user may find the part directly. Alternatively, the user may allocate parts to a picking list 56 and print the picking list 58 before retrieving the parts 60. Parts removed from RFID control packaging will be added to an exceptions report and invoiced at month end 62. Parts that have been launched out of stores, e.g. thrown or passed through the exit, will be logged against the user/users present in the stores at the time of the parts' exit 64.

The user then approaches the stores exit 66. The user presents the clock/proximity card against the turnstile exit reader 68. The turnstile activates 70 and the access exit is video captured and tagged with the user identity 72. Also at this point the user exit access is logged 74.

There are various ways in which the turnstile may be activated, for example:

1. User swipes card, swipe triggers RFID reader to read the RFID tag, turnstile is activated.

2. User swipes card, swipe activates turnstile, use of turnstile triggers RFID reader to read the RFID tag.

3. RFID reader detects and reads RFID tag, then user swipes card, turnstile is activated.

4. RFID reader detects and reads RFID tag, then user ID is read from a user RFID tag/card, turnstile is activated.

5. Upon exit the turnstile is activated either using user ID alone or using user ID and item ID read from the RFID tag (i.e. the user is only allowed out with permitted items).

The user is logged automatically onto the parts allocation interface 76. The user then walks through the portal out of the stores area 78. The user approaches the stores part allocation interface 80 and confirms the parts withdrawal 82. The user selects parts and allocates to a cost centre or work area 84. The user may also allocate parts to cells or work areas 86.

Finally the user exits the area 88 and unallocated parts default to the user's own cost centre and/or work area 90.

With reference to Figure 4, the portal 2 is shown with the location of the four antennas 12a to 12d, showing the magnetic field during scanning. The lower antennas are adjustable.

In an alternative embodiment of the present invention, the portal has sliding doors for access control.

The physical dimensions and design of the portal function to contain or enclose the radio wave form generated by the RFID transmitter. The materials used, such as 1.2mm mild steel also assist this process whilst still complying with the health and safety guidelines for safe use of the RFID hardware.

This embodiment uses a sliding mechanical door mechanism as access control means. It restricts access through the portal by closing and allows access through the portal by opening. When the doors are closed during item scanning, the attenuation of the signal from the antennas by the enclosure created by the closed door and the other panels of the portal minimises signal leakage or unwanted tag reads. This provides the advantage that when other users are near the portal, for example in a queue, then the tags that they are carrying are not inadvertently read by the antennas.

This embodiment uses a two or four antenna configuration. The antennas are mounted on adjustable base plates, to give optimum coverage of the scanning volume and to allow adjustments to be made to the angle of the antenna that alters the characteristic radio wave form generated and

range of the tag recognition. The antennas may be mounted on free rotating gimbals that allow full 360 degree rotation and adjustment. In conjunction with the field strength attenuation provided by the sliding doors when closed, the portal can give full coverage to the tag reading volume.

With reference to Figures 5a to 5c, an example of the use of this sliding door embodiment is as follows:

1. The user places an access card/fob against the entry access reader.
2. The rear door 90 slides open while the front door 92 remains closed (Figure 5a).
3. The user enters the portal through the rear door frame then the door closes (Figure 5b). This defines an enclosed scanning volume bounded by closed doors 90, 92 and panels 94, 96 as well as the floor and ceiling panels.
4. Once both doors are shut the RFID scanner activates and reads the tags using the antennas 98 (Figure 5b).
5. Once tagged parts are captured the front door activates and the user exits (Figure 5c).
6. The user then allocates the parts and deposits the header card containing the RFID tag into a recycle bin.

The sliding doors utilise a lever and pulley mechanism driven by an electric motor to independently open each door in turn. In addition the mechanism is on a camber to allow the doors to retract immediately in case of a fire or when power is withdrawn from the system.

In a further embodiment of the present invention, the portal has rotating doors for access control.

This has the same principle of operation and advantages as the sliding door embodiment, but uses a rotating cylindrical door mechanism that restricts access to the control area and minimises signal leakage or unwanted tag reads.

With reference to Figures 6a to 6c, example process of the use of this rotating door embodiment is as follows:

1. The user places an access card/fob against the entry access reader.
2. The cylindrical gateway 100 turns into the entry position (Figure 6a).
3. The user enters the Rotary pod.
4. Proximity detectors in the ceiling detect user entry past the entry threshold and rotate the cylindrical gateway so as to close both doors (Figure 6b). This defines an enclosed scanning volume bounded by closed cylindrical gateway (roating door) 100 and panels 102, 104 as well as the floor and ceiling panels.
5. When fully closed the RFID reader activates and reads the tags using the antennas 106 (Figure 6b).
6. The cylindrical gateway then rotates to allow the user to exit (Figure 6c).
7. The user then allocates the parts and deposits the header card containing the RFID tag into a recycle bin.

This rotating door embodiment can be constructed using mild steel, for example of 1.2mm thickness. It utilises an electric motor to rotate the cylindrical gateway, the rotation is forward then backward (e.g. clockwise then anticlockwise). This enables the antennas to be attached to the gateway without twisting their connecting cables. In addition the mechanism incorporates a passive sprung mechanism to allow the cylindrical gateway to spin immediately open in case of a fire or when power is withdrawn from the system. The use of two diametrically opposed

entrance/exit slots in the cylinder of the rotating door allows such a failsafe open position.

Further modifications and improvements may be added without departing from the scope of the attached claims.

Claims

1. A portal for stock control and access control to an item storage area, the portal comprising:
a user identifier reader operable to read a user identifier;
an access control means for controlling user access through the portal using the read user identifier; and
an item identifier reader operable to read an item identifier from a tag passing through the portal.

2. The portal of claim 1, wherein the user identifier comprises a biometric reader operable to read a biometric user identifier from the user.

3. The portal of claims 1 or 2, wherein the user identifier reader comprises a carrier reader operable to read the user identifier from a user identifier carrier.

4. The portal of any previous claim, further comprising video capture means for capturing video of the user tagged with the read user identifier.

5. The portal of any previous claim, wherein the item identifier reader is triggered to read the item identifier by the user identifier reader.

6. The portal of any previous claim, wherein the item identifier reader is triggered to read the item identifier by the access control means.

7. The portal of any previous claim, wherein the access control means comprises a door arranged when closed to enclose a scanning volume of the item identifier reader.

8. The portal of claim 7, wherein the door comprises a sliding door.

9. The portal of claim 7, wherein the door comprises a rotary door.

10. The portal of claim 9, wherein the item identifier reader comprises an antenna mounted on the rotary door.

11. The portal of any of claims 1 to 6, wherein the access control means comprises a turnstile.

12. The portal of claim 11, wherein the turnstile is arranged within a scanning volume of the item identifier reader.

13. The portal of claim 11, wherein the item identifier reader is triggered to read the item identifier by a user going through the turnstile.

14. The portal of any previous claim, wherein the access control means is operable to control user access through the portal depending on validation of the read user identifier.

15. The portal of any previous claim, wherein the access control means is further operable to control user access through the portal out of the item storage area using the read item identifier.

16. The portal of any previous claim, wherein the access control means is activated responsive to validation of the read item identifier.

17. The portal of any previous claim, further comprising an item location module operable to locate an item using the read user identifier.

18. The portal of claim 17, wherein the item location module further comprises an item location interface for a user to locate an item and the read user identifier is used by the item location module to permit user access to the item locator interface.

19. The portal of any previous claim, further comprising an allocation module operable to allocate the read item identifier to a cost centre or work cell using the read user identifier.

20. The portal of claim 19, wherein the allocation module further comprises an allocation interface for manual allocation of the item identifier by a user and the allocation module is operable to log the user onto the allocation interface.

21. The portal of claim 19, wherein the allocation module is operable to automatically allocate the item identifier to a cost centre or work cell associated with the read user identifier.

22. The portal of any previous claim, wherein the portal provides access control to the item storage area with the entrance and exit along the same corridor.

23. The portal of any previous claim, wherein the item identifier reader comprises a plurality of antennas at least some of which are adjustable.

24. A method of stock control and access control to an item storage area, the method comprising the steps of:
reading a user identifier;
controlling user access through a portal using the read user identifier; and
reading an item identifier from a tag passing through the portal.

25. The method of claim 24, wherein the step of reading a user identifier comprises reading a biometric user identifier from the user.

26. The method of claim 24, wherein the step of reading a user identifier comprises reading the user identifier from a user identifier carrier.

27. The method of claim 24, wherein the step of reading the user identifier comprises capturing video of the user tagged with the read user identifier.

28. The method of any of claims 24 to 27, wherein the step of reading the item identifier is responsive to the step of reading the user identifier.

29. The method of any of claims 24 to 28, wherein the step of reading an item identifier is responsive to validation of the read user identifier.

30. The method of any of claims 24 to 29, wherein the step of controlling user access through the portal comprises activating a door and the method further comprises the step of closing the door to enclose a scanning volume for reading the item identifier.

31. The method of claim 30, wherein the activating comprises sliding the door.

32. The method of claim 30, wherein the activating comprises rotating the door.

33. The method of any of claims 24 to 29, wherein the step of controlling user access through the portal comprises activating a turnstile.

34. The method of claim 33, wherein the step of reading an item identifier is activated responsive to a user going through the turnstile.

35. The method of any of claims 24 to 34, wherein the step of controlling user access through the portal depends on validation of the read user identifier.

36. The method of any of claims 24 to 35, wherein the step of controlling user access through the portal out of the item storage area uses the read item identifier.

37. The method of any of claims 24 to 36, wherein the step of controlling user access through the portal is responsive to validation of the read item identifier.

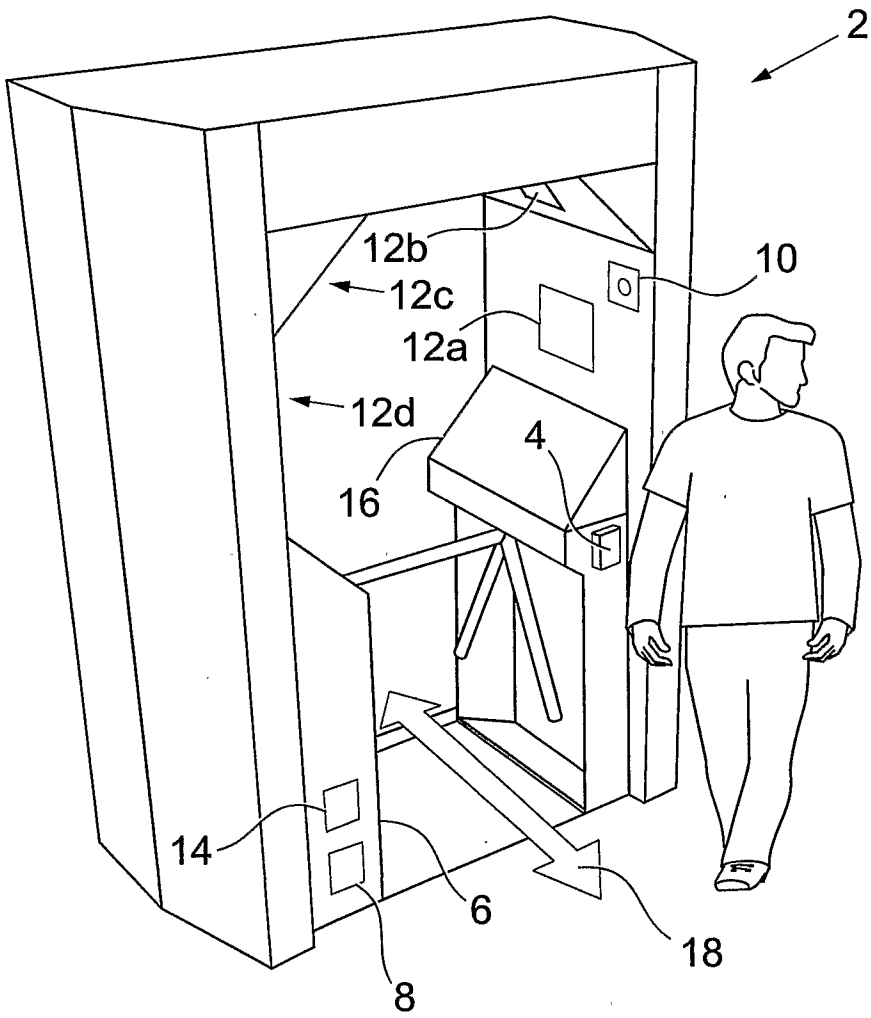
38. The method of any of claims 24 to 37, further comprising the step of locating an item using the read user identifier.

39. The method of claim 38, wherein the step of locating an item comprises permitting, using the read user identifier, a user access to an interface for the user to locate the item.

40. The method of any of claims 24 to 39, further comprising the step of allocating, using the read user identifier, the read item identifier to a cost centre or work cell.

41. The method of claim 40, wherein the step of allocating comprises automatically logging a user onto an interface for the manual allocation of the item identifier by the user.

42. The method of claim 40, wherein the step of allocating comprises automatically allocating the item identifier to a work cell associated with the user identifier.


2
12b
10
12c
12a
12d
4
16
14
6
18
8

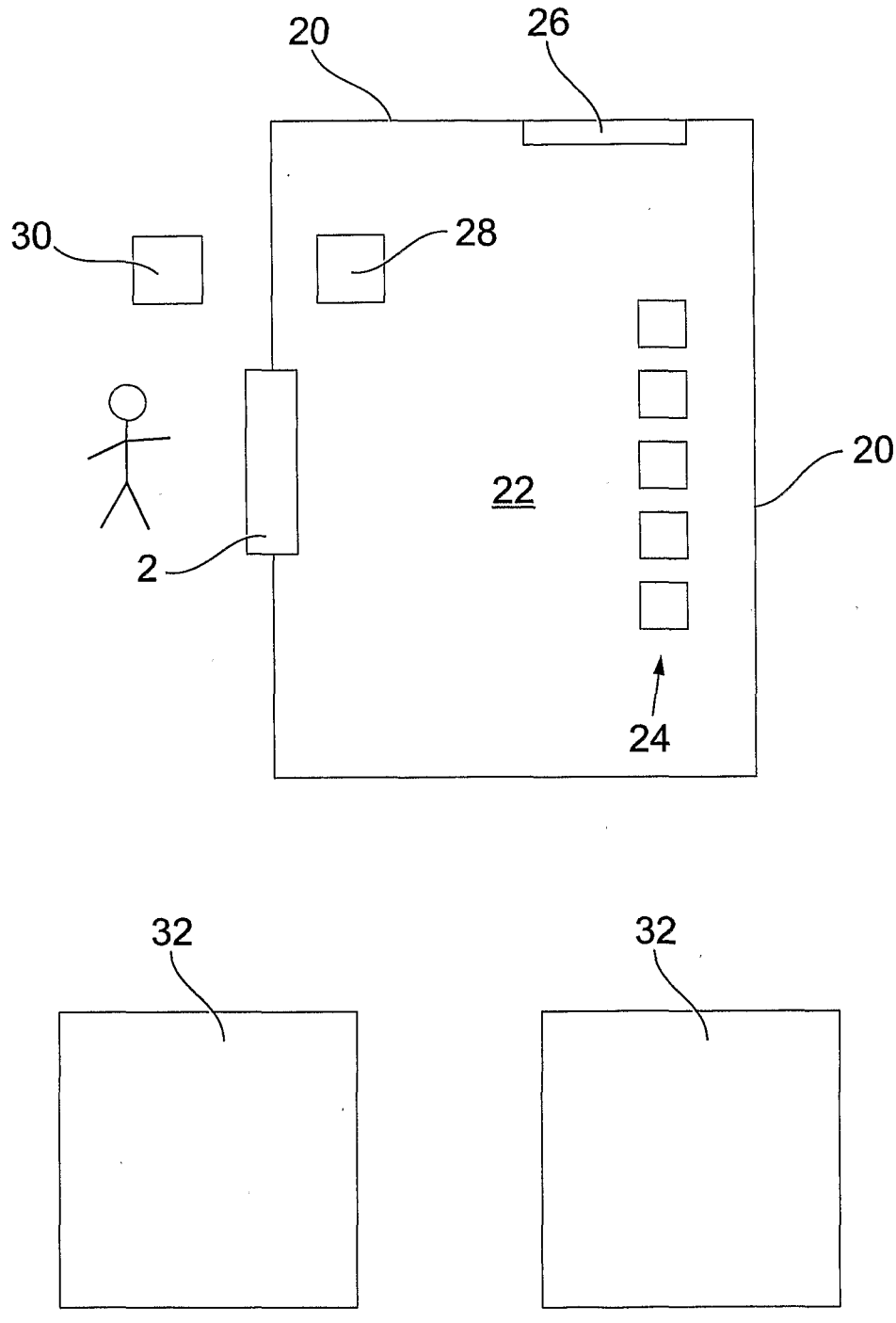
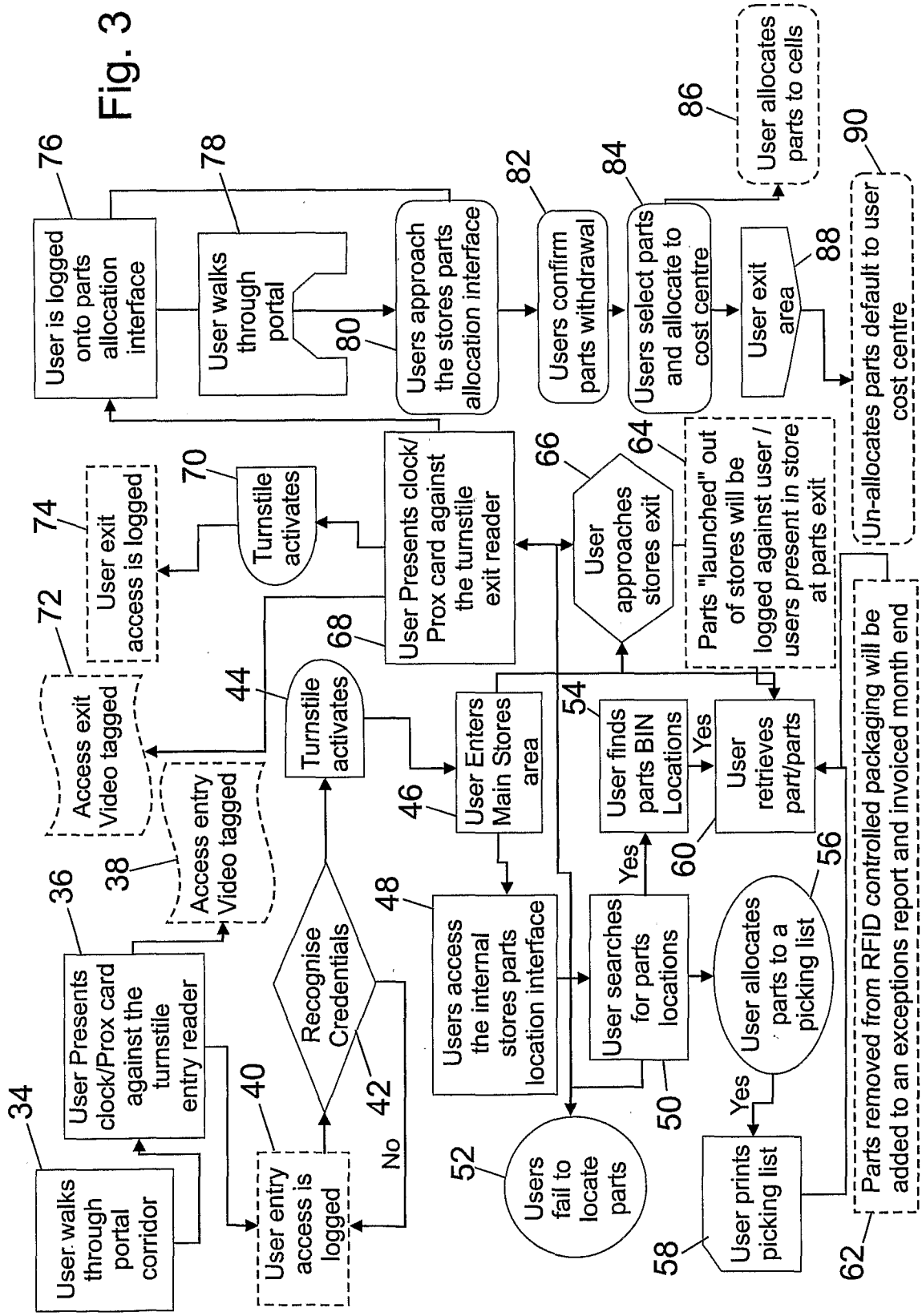


Fig. 2

Fig. 3


User walks through portal corridor
34
User Presents clock/Prox card against the turnstile entry reader
36
Access entry Video tagged
38
User entry access is logged
40
Recognise Credentials
42
No
Turnstile activates
44
Access exit Video tagged
72
User exit access is logged
74
Turnstile activates
70
User Presents clock/ Prox card against the turnstile exit reader
68
User Enters Main Stores area
46
Users access the internal stores parts location interface
48
Users fail to locate parts
52
User searches for parts locations
50
Yes
User finds parts BIN Locations
54
Yes
User retrieves part/parts
60
User allocates parts to a picking list
56
Yes
User prints picking list
58
User approaches stores exit
66
64
Parts "launched" out of stores will be logged against user / users present in store at parts exit
Parts removed from RFID controlled packaging will be added to an exceptions report and invoiced month end
62
Un-allocates parts default to user cost centre
90
User is logged onto parts allocation interface
76
User walks through portal
78
80
Users approach the stores parts allocation interface
82
Users confirm parts withdrawal
84
Users select parts and allocate to cost centre
86
User allocates parts to cells
User exit area
88

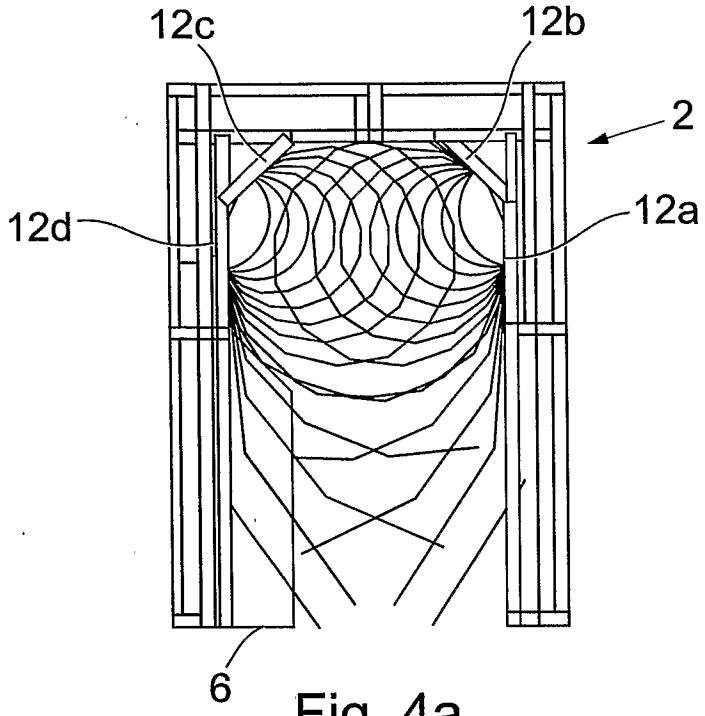


Fig. 4a

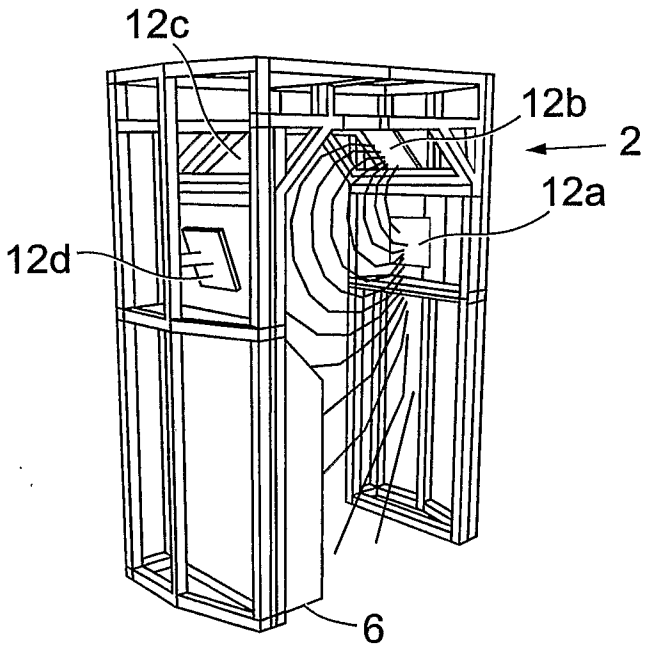


Fig. 4b

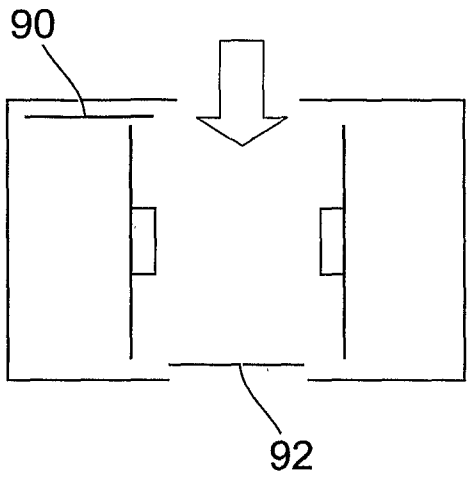


Fig. 5a

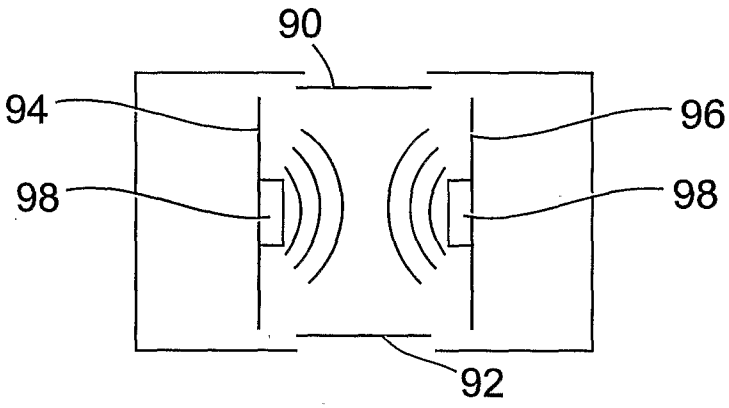


Fig. 5b

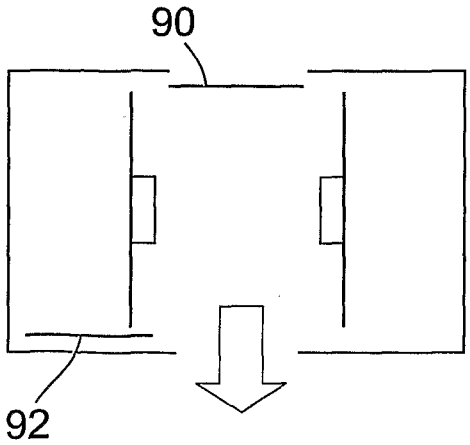


Fig. 5c

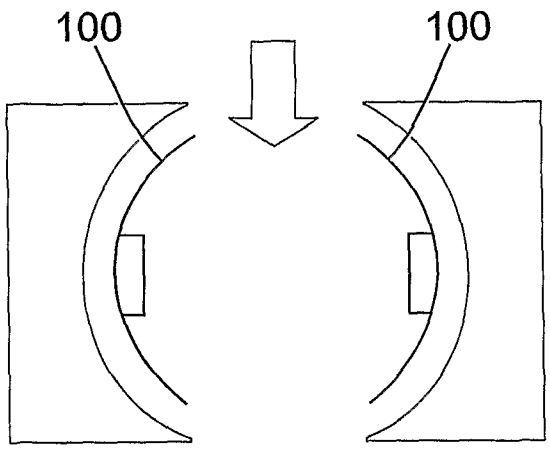


Fig. 6a

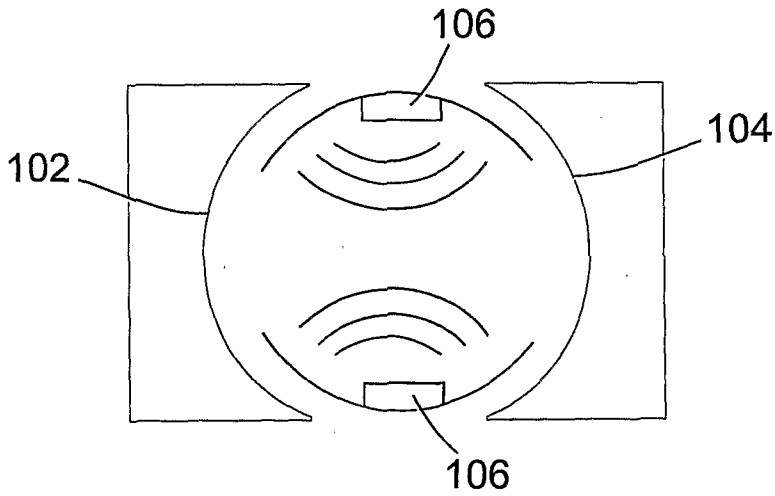


Fig. 6b

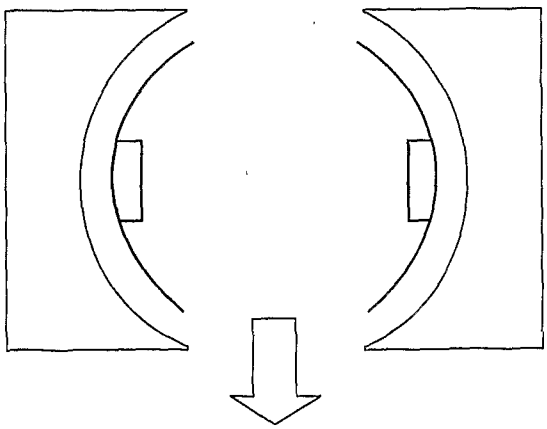


Fig. 6c

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2009/050003

A. CLASSIFICATION OF SUBJECT MATTER
INV. G07C9/00 G06K19/077

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)
G07C G06K

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	US 2005/055582 A1 (BAZAKOS MICHAEL E [US] ET AL) 10 March 2005 (2005-03-10) abstract; figures 3, 4 paragraph [0011] - paragraph [0014] paragraph [0025] - paragraph [0035]	1-42
X	WO 96/36186 A1 (SENSORMATIC ELECTRONICS CORP [US]) 14 November 1996 (1996-11-14) page 11, line 31 - page 12, line 2 page 32, line 6 - page 36, line 18	1-42
X	US 6 195 006 B1 (BOWERS JOHN H [US] ET AL) 27 February 2001 (2001-02-27) column 3, line 14 - column 4, line 37 column 6, line 47 - column 8, line 39 column 9, line 21 - column 10, line 27 column 11, line 11 - line 49; figure 5	1-42

-/--

[X] Further documents are listed in the continuation of Box C. [X] 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
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"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

Date of the actual completion of the international search	Date of mailing of the international search report
24 April 2009	06/05/2009

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Papastefanou, M

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2009/050003

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01/65478 A2 (NEDAP NV [NL]; HOGEN ESCH JOHANNES HARM LUKAS [NL]) 7 September 2001 (2001-09-07) page 2, line 8 - page 5, line 21	1-42
A	US 2006/071791 A1 (MEYERS DAVID W [US] ET AL) 6 April 2006 (2006-04-06) paragraph [0006] - paragraph [0008] paragraph [0020] - paragraph [0021] paragraph [0027] - paragraph [0028]	1-42

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/GB2009/050003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005055582 A1	10-03-2005	EP 1661063 A2	31-05-2006
		JP 2007504557 T	01-03-2007
		US 2005110610 A1	26-05-2005
		WO 2005059812 A2	30-06-2005
WO 9636186 A1	14-11-1996	AR 001885 A1	10-12-1997
		AU 705733 B2	27-05-1999
		AU 5728196 A	29-11-1996
		BR 9608314 A	26-01-1999
		CA 2216790 A1	14-11-1996
		DE 69637170 T2	22-11-2007
		EP 0826290 A1	04-03-1998
		JP 11505345 T	18-05-1999
		US 5708423 A	13-01-1998
US 6195006 B1	27-02-2001	AT 276553 T	15-10-2004
		AU 753612 B2	24-10-2002
		AU 8486598 A	16-02-1999
		CA 2296370 A1	04-02-1999
		CN 1264483 A	23-08-2000
		DE 69826284 D1	21-10-2004
		DE 69826284 T2	22-09-2005
		EP 0996941 A1	03-05-2000
		ES 2229521 T3	16-04-2005
		JP 2001511427 T	14-08-2001
		TW 393631 B	11-06-2000
		WO 9905660 A1	04-02-1999
		US 5963134 A	05-10-1999
WO 0165478 A2	07-09-2001	AU 4285401 A	12-09-2001
		EP 1259936 A2	27-11-2002
		NL 1014540 C2	04-09-2001
US 2006071791 A1	06-04-2006	WO 2006137889 A2	28-12-2006
		WO 2006039468 A1	13-04-2006