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(56) Documents Cited:  
**WO 2011/062658 A1** **US 20120218106 A1**  
**US 20070229288 A1** **US 20020000449 A1**

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(54) Title of the Invention: **Dispenser Apparatus**  
 Abstract Title: **Portable sanitiser dispenser with RFID alarm**

(57) A portable sanitizer dispenser 101 e.g. worn by hospital staff, has an active RFID reader to detect passive RFID tags 102 at locations, e.g. door entrances. The dispenser 101 can alert the user to actuate the dispenser when RFID tags are detected, e.g. using audible, visual or vibration warnings. When the dispenser 101 detects an RFID signal (RF ID detection event), e.g. the user walks into a room, an alarm is triggered. The dispenser 101 will then record whether it was actuated or not within a predetermined time. The dispenser 101 may determine that it has been too long since the dispenser was last used, register and record the event, then alert the user to dispense hand sanitizer. Upon actuation of the dispenser 101, the dispenser event is recorded. Dispensing sanitiser may be via a manual switch, or electronic switch, e.g. infrared, and is time stamped. The dispenser 101 may be mounted to a mobile or stationary entity. Data can be transmitted wirelessly to an external device 103 through a data port, or stored e.g. in flash or random access memory. The system can be used to generate reports to assist the facility in monitoring staff.

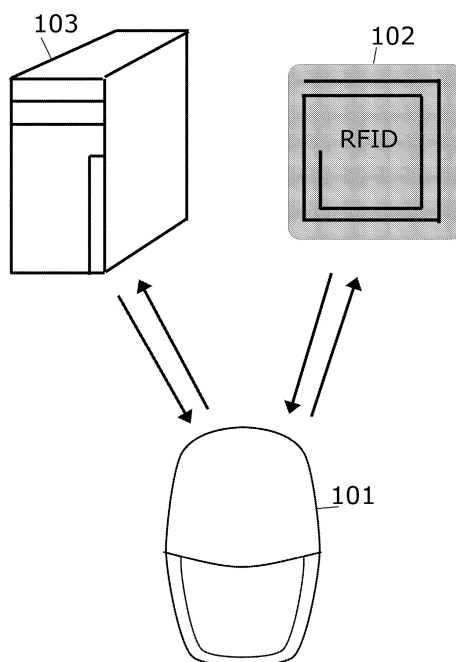


Figure 1

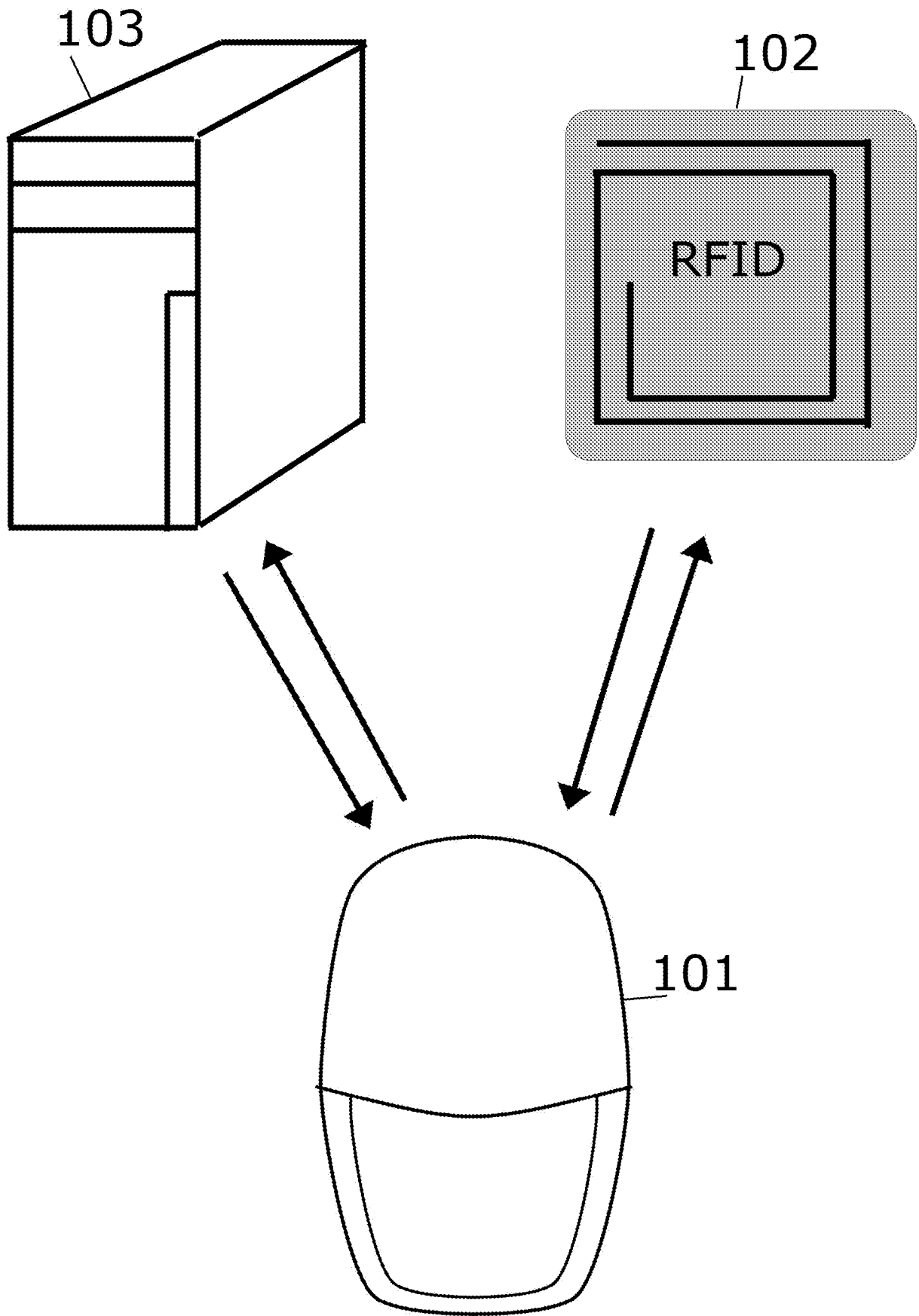


Figure 1

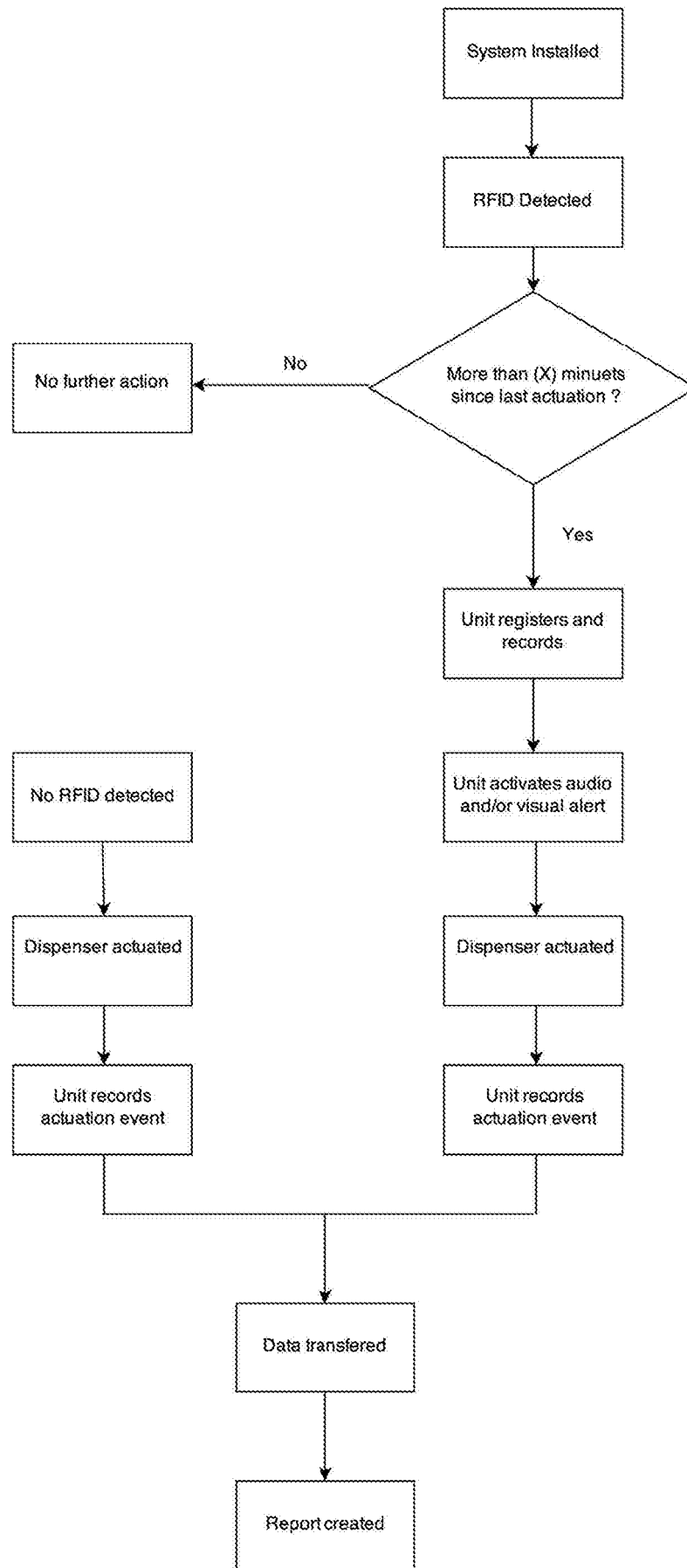


Figure 2

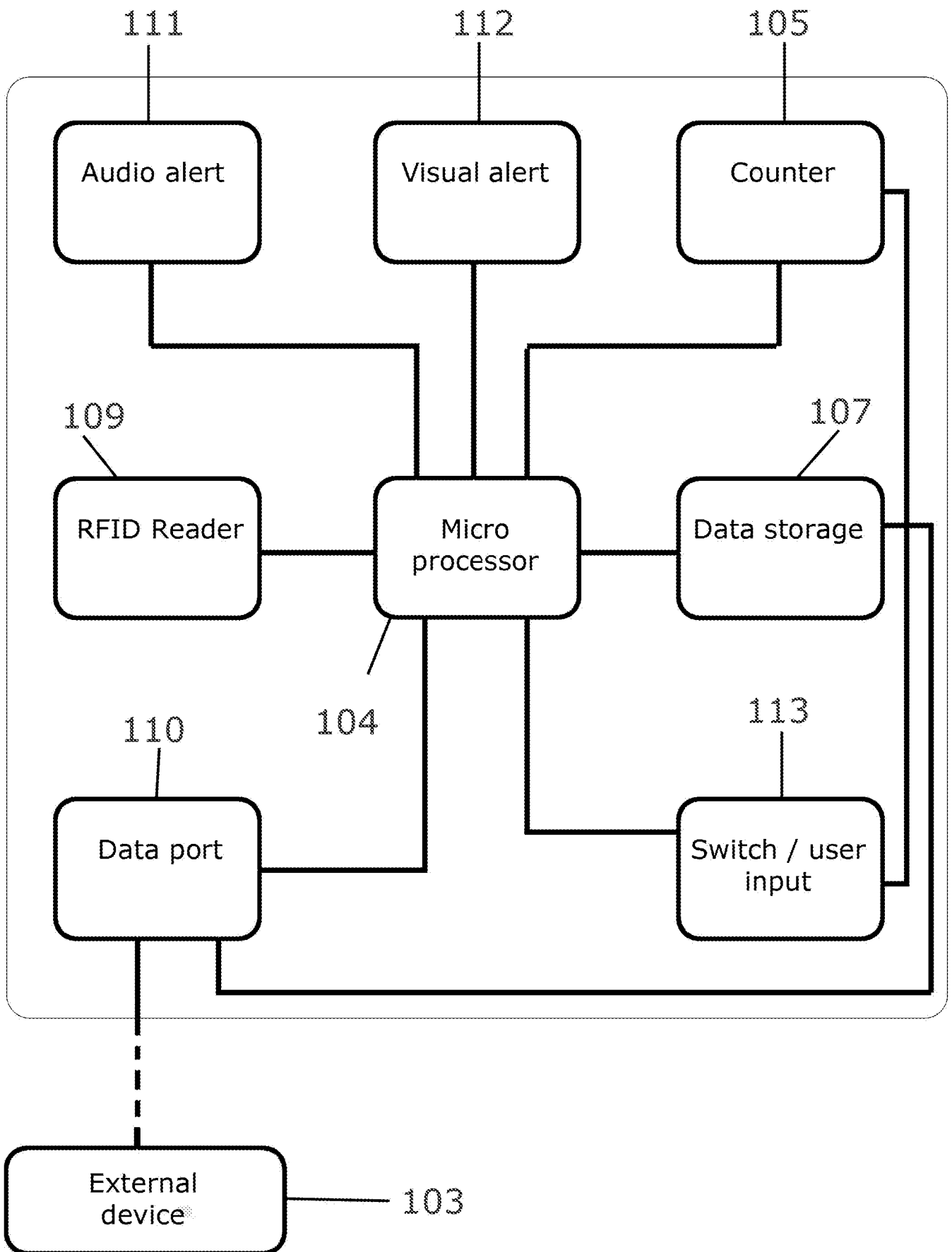


Figure 3

# DISPENSER APPARATUS

## FIELD OF THE INVENTION

5 The invention relates to a dispenser apparatus for dispensing a sanitizing composition, and in particular to a dispenser apparatus that alerts a user to dispense sanitizer at pre-determined locations and intervals.

## BACKGROUND TO THE INVENTION

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Poor hand hygiene is known to be a factor that contributes to the spread of infections, in the hospital environment it is especially important that infections are controlled. While there are procedures in place aimed at reducing and controlling the spread of infection, they are sometimes not enforced and may not result in an effective reduction of infection. It is not just patients that hygiene measures should be targeted at, if anything staff should be targeted more. It has been found that a surprisingly low number of staff were using the hygiene prevention measures that were in place. The current system provides little feedback about the use of hygiene prevention, what is needed is a system that can provide accountability and promote the use of infection reducing measures.

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## SUMMARY OF THE INVENTION

The invention proposed is a hand hygiene system, where the dispenser is a small personal unit, which may be either on the person or attached to their equipment, such as a trolley. The invention therefore provides a portable dispenser apparatus, comprising:

- a housing containing a reservoir of sanitizer; and
- an active RFID reader configured to detect passive RFID tags at pre-determined locations;
- wherein the dispenser comprises means for alerting the user to actuate the dispenser when a passive RFID tag is detected.

When the user passes a location of importance which has an RFID embedded sign, the unit will alert the user to wash their hands and record that it has done so. It will also record if the unit

dispenses sanitizer. Preferably the dispenser stores between 50 and 150 ml of sanitizer. At predetermined time intervals the unit will report to an external device, such as a computer or smart phone, wirelessly. In this report it will transfer its usage data, this may include information such as when the unit has detected RFID, dispensed sanitizer and the ID of the RFID tags.

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Examples of the invention may provide one or more benefits or advantages over the prior art. For example, patent EP2502216 illustrates a hygiene monitoring system. There are several benefits to the present invention, for example, in comparison with EP2502216 the system uses real time tracking, whereas this system reports the data at predetermined time intervals. For example this may mean that it would send the data each morning at 10am. This is a benefit over the referenced system as people may not be comfortable being monitored constantly in real time. Some prior art featuring RFID based systems only allows the user to use a sanitizer dispenser if they have the appropriate RFID tag, this is unnecessarily restrictive. Another benefit of the present invention is that it is quick to install, with only the RFID tags needing placing at their locations.

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Preferably RFID tags would be placed at fixed locations of importance selected from doorways, corridors, entrances or exits of a building which may be a hospital or residential care home.

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Preferably the present inventions dispenser would be on the user's person, reminding them to use hand sanitizer when they pass near to the RFID tags.

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Preferably the dispenser would report data to an external device such as a computer, smart phone or central network for processing by wireless means such as Bluetooth®.

This example of the invention may include a sanitizer dispenser or a sanitizer system which would be mounted to a mobile or stationary entity.

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The dispenser in this example would be manually operated by a thumb operated pump, although it is possible that the invention could make use of an electronically operated pump. The dispenser would also include a microprocessor which would control one or more of the

electronic functions of the dispenser. One of these electronic components would include an electronic counter or clock, this would be used to timestamp each recorded RFID detection event and each time the unit is actuated so sanitizer is dispensed, also referred to as a dispensing event. A detection event or RFID detection event is when the unit receives a signal from a nearby RFID tag. Count data is the data stored by the dispenser when either of these takes place.

The dispenser also includes electronic data storage; this would be flash or random access memory, or a combination of both. The data storage would be controlled by the microprocessor and can receive and record data related to the RFID detection events and dispensing events.

The dispenser may also include a means for identifying RFID signals, for location identifying purposes, and may record RFID data in association with a dispensing event. This includes means to record the time of detection and location of an RFID tag, as well as means to record the time and actuation of the dispenser. The invention also contains a data port, which would be used to communicate the data recorded by the dispenser to an external device, for example a smart phone or computer.

In some versions of the invention a passive RFID tag may be attached to a location such as a sign or notice, and may have a unique identifier as to distinguish an individual location, such as a hospital ward. In this example of the invention, the passive RFID tag must be within a predetermined distance from the dispenser. This may be between about 0.1 and about 5 metres.

In this example of the invention there is a feature where when an RFID signal is received, the means for alerting a user includes audible, visual or vibrational means.

## DRAWINGS

FIG. 1 is a schematic diagram showing an embodiment of the invention;  
FIG. 2 is a flow diagram of the processes carried out by the invention in use; and  
FIG. 3 is a schematic diagram showing a circuit board layout.

An embodiment of the invention will now be described by referring to the accompanying drawings.

FIG. 1 shows a dispenser apparatus 101 in communication with an RFID tag 102 and a computer 103 for receiving information about use of the dispenser 101. The dispenser 101 includes a microprocessor 104, counter 105, clock 106, data storage 107 and means for communicating 108 with the RFID tag 102. When the dispenser 101 detects an RFID 102 signal within a predetermined distance of between 10cm – 5 meters, sometimes referred to as an 'RFID detection event', it will trigger an alert, which is audible and/or visual. The dispenser 101 will then record whether it was actuated or not within a predetermined time of between 5 milliseconds and 120 seconds. The dispenser 101 will then routinely transmit this data to an external device 103 or storage device.

The data transmitted is routed through the microprocessor 104 and combined with a time stamp for each dispenser event and RFID detection event before transmission. The microprocessor 104 includes a clock circuit and count data would be associated with a time stamp to indicate when the count data was produced and recorded in the data storage 107. The dispenser 101 in FIG. 1 also includes an RFID reader 109 adapted to read passive RFID tags 102, which is in communication with the microprocessor 104. RFID data is communicated to the data storage 107 and is recorded with correlating dispenser event data. Similar to the counter 105, the RFID reader 109 is adapted to route its data through the microprocessor 104 before being communicated to the data storage 107. The data storage 107 also includes time-stamped data and identifying data which correlates to the dispenser and detection events. The dispenser 101 in FIG. 1 also includes a data port 110 which is in communication with the data storage 107 and in communication with the microprocessor 104. Data from the data storage 107 would be communicated to an external device 103 through the data port 110.

The dispenser 101 is in communication with an external device 103 using the data port 110. RFID tags 102 are affixed to locations decided by the end user. These locations include the entrances to different areas within a building or at locations of special importance. When a user with the dispenser 101 walks within range of an RFID tag 102 the tag 102 is read by the RFID reader 109 in the dispenser 101 which then causes an audible and visual alert. Provided that a dispenser event is recorded within a predetermined time, the RFID signal will be correlated to the dispenser event and will be recorded along with a time stamp. The data recorded in this manner is uploaded to the external device 103 and is used to generate reports to assist a facility



in monitoring the data. If the dispenser 101 was not used within the predetermined time the two events would still be recorded, but they would not be correlated.

5 FIG. 2 illustrates a method of using the dispenser 101. A dispenser system 101 is installed and is used by a member of staff. For instance, it may be on the staff member's person. RFID tags 102 are placed at key locations throughout the premises. The staff member's dispenser 101 then detects a nearby RFID tag 102. If it has been more than a defined number of minutes (e.g. X minutes) since the last actuation of the dispenser 101, then the dispenser 101 registers and records the detected signal. The dispenser 101 will then use an audible and visual alert to notify  
10 the user that an RFID signal 102 is detected and that they should use the dispenser 101. The user should then actuate the dispenser 101, the dispenser 101 will then record the actuation – also referred to as a dispenser event.

Should no RFID tag 102 be detected but the dispenser 101 is actuated then the dispenser 101  
15 will still record the dispenser event and will not activate the alert if it detects an RFID signal 102 for the next X minutes.

The RFID data read by the dispenser 101 is time stamped. At predetermined times the dispenser 101 will then relay the recorded data to the external device 103. This data can then be  
20 used to create a report.

The dispenser event data and the RFID data would then be correlated to determine whether the dispenser event can be attributed to a certain RFID detection event. For instance, if the system determines that the RFID tag 102 was detected within an allowable time window between it  
25 and the dispenser event, then the two may be correlated. Suitable time windows are between about 5 milliseconds and 120 seconds.

FIG.3 shows a circuit board layout for an embodiment of the invention, in basic terms and indicates the components used and their position in relation to other components.

30 Component 111 is an audio module, which produces an audible alert when the dispenser 101 detects RFID signals. Component 109 is the RFID reader, which is in contact with the microprocessor 104 directly. Component 112 is a visual module, which produces a visual alert

when the dispenser 101 detects RFID signals. This is an LED light source. Module 105 is a counter, which records user input, RFID detection data and time.

5 Module 104 is a microprocessor, which is in electronic contact with the other components. The microprocessor 104 is in control of the devices electronic functions. Module 107 is a data storage unit, which is a flash or similar non-volatile memory. In this example, records of RFID detection, user input and count data would be stored.

10 Component 113 is a user input. This is a manually operated switch. It may alternatively be electronically operated, for example an infrared operated switch. Operation of this switch is recorded in the data storage 107 with a timestamp as a dispenser event.

15 Component 110 is a data port for wireless transmission of data, e.g. Bluetooth ®. The port 110 connects to an external device 103, such as a Personal Computer either when connected by the user or at scheduled times to transfer data from internal storage 107. This is dictated by the microprocessor 104 or counter 105. Component 103 depicts an external device. This is a smart phone, tablet computer, personal computer or data server.

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CLAIMS:

1. A portable dispenser apparatus, comprising:  
a housing containing a reservoir of sanitizer; and  
5 an active RFID reader configured to detect passive RFID tags at pre-determined locations;  
wherein the dispenser comprises means for alerting the user to actuate the dispenser when a passive RFID tag is detected.
- 10 2. Dispenser apparatus according to claim 1, wherein the amount of sanitizer stored is between 50 and 150 ml.
3. Dispenser apparatus according to claim 1 or claim 2, wherein the means for alerting a user includes audible, visual or vibrational means.
- 15 4. Dispenser apparatus according to claim 3, further comprising means to record the time of detection and location of an RFID tag.
5. Dispenser apparatus according to claim 3 or claim 4, further comprising means to  
20 record the time and actuation of the dispenser.
6. Dispenser apparatus according to claim 4 or claim 5, wherein the information recorded by the dispenser is associated with a particular user and transmitted to a computer, smart phone or central network for processing.
- 25 7. Dispenser apparatus according to claim 6, wherein the information is transmitted wirelessly.
8. Dispenser apparatus according to any preceding claim, wherein the dispenser is  
30 operated by manual or electronic means.
9. Dispenser apparatus according to any preceding claim, wherein the dispenser is adapted to be worn by a user.

10. A dispensing system comprising the dispenser apparatus according to any preceding claim, and one or more RFID tags located at fixed positions selected from doorways, corridors, entrances or exits of a building.

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11. A dispensing system according to claim 10, wherein the building is a hospital or residential care home.

12. A dispensing system according to claim 10 or claim 11, wherein the active RFID reader  
10 detects the one or more RFID tags at a distance of between 0.1 and 5m.

13. Dispenser apparatus as substantially described herein and with reference to the drawings.

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**Examiner:** John Hewet

**Claims searched:** 1-13

**Date of search:** 9 November 2015

**Patents Act 1977: Search Report under Section 17**

**Documents considered to be relevant:**

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-12	US2012/218106 A1 (ZAIMA) see especially paragraphs 64 to 127
X	1-12	US2007/229288 A1 (OGRIN) see especially paragraphs 19 to 26
X	1-8 & 10-12	US2002/000449 A1 (ARMSTRONG) see especially paragraphs 21 to 25
X	1-8	WO2011/062658 A1 (VERSUS) see especially page 10, line 3 to page 12, line 21

**Categories:**

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

**Field of Search:**

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC<sup>X</sup> :

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Worldwide search of patent documents classified in the following areas of the IPC

G01F; G07C; G08B
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The following online and other databases have been used in the preparation of this search report

Online: EPODOC & WPI
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**International Classification:**

Subclass	Subgroup	Valid From
G07C	0009/00	01/01/2006
G08B	0021/24	01/01/2006