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(54) **INTELLIGENT MEDICAL MATERIAL CART**

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(57) **ABSTRACT**

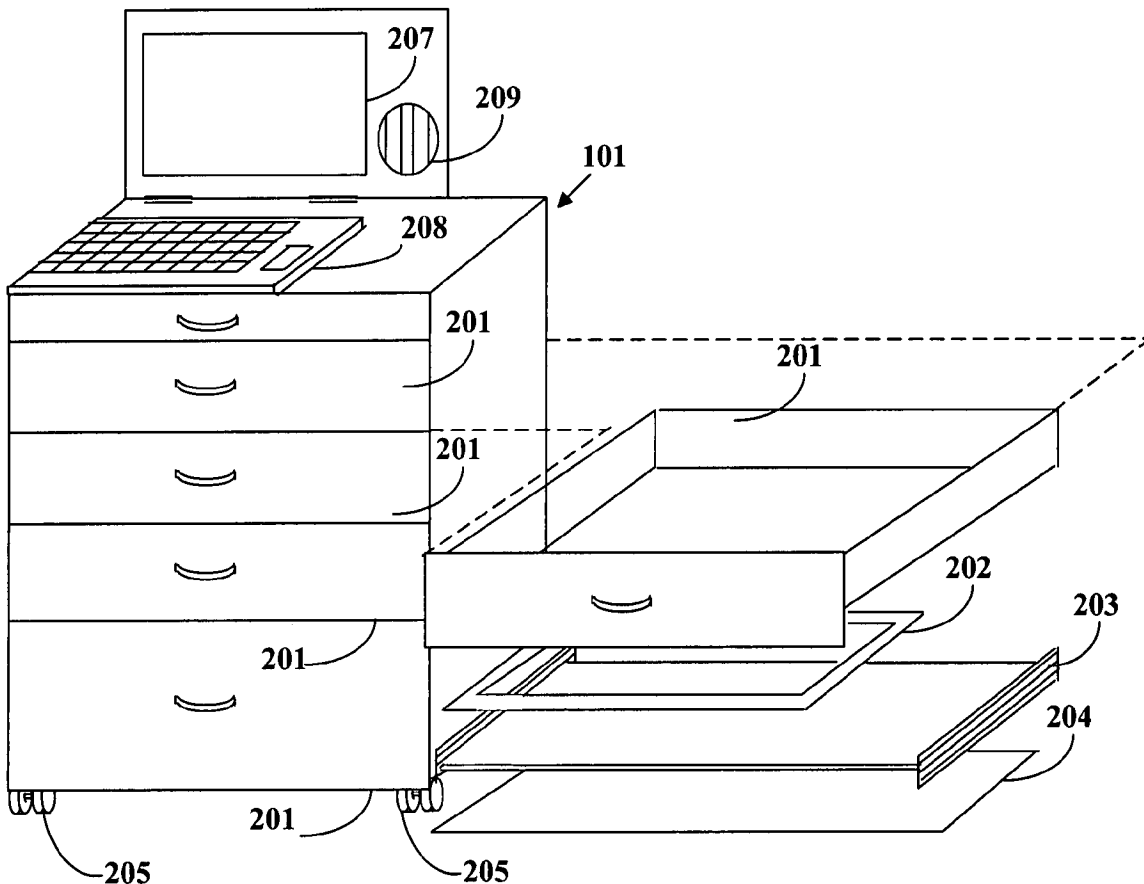
A method and system is disclosed for monitoring, control and containment of medical product in a healthcare facility. The physical coordinates of the intelligent medical material cart (IMMC) within the healthcare facility are determined. Based on the physical coordinates of the IMMC, the room and the identity of the patient being operated within the room are determined. The electronic medical records of the identified patient are accessed. The IMMC is accessed by the healthcare staff for the medical product stored within the IMMC. The IMMC determines the identity of the medical product that has been removed from the IMMC based on radio frequency identification (RFID) mechanism. The IMMC also determines the effect of interaction of the drugs on the patient, by referring to the medical profile of the patient in the electronic medical records. An alarm is set off if an adverse interaction of medical product is anticipated.

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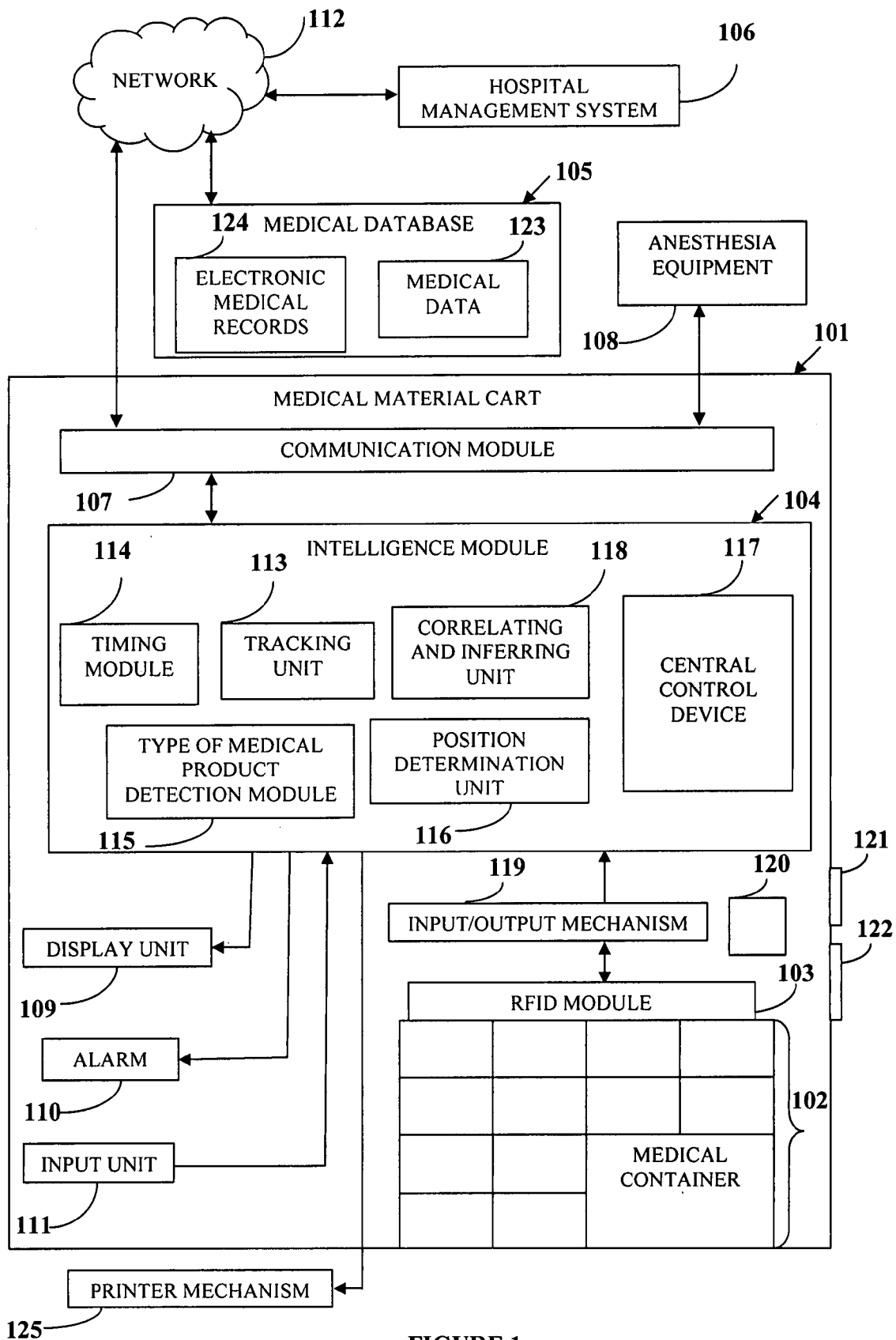


FIGURE 1

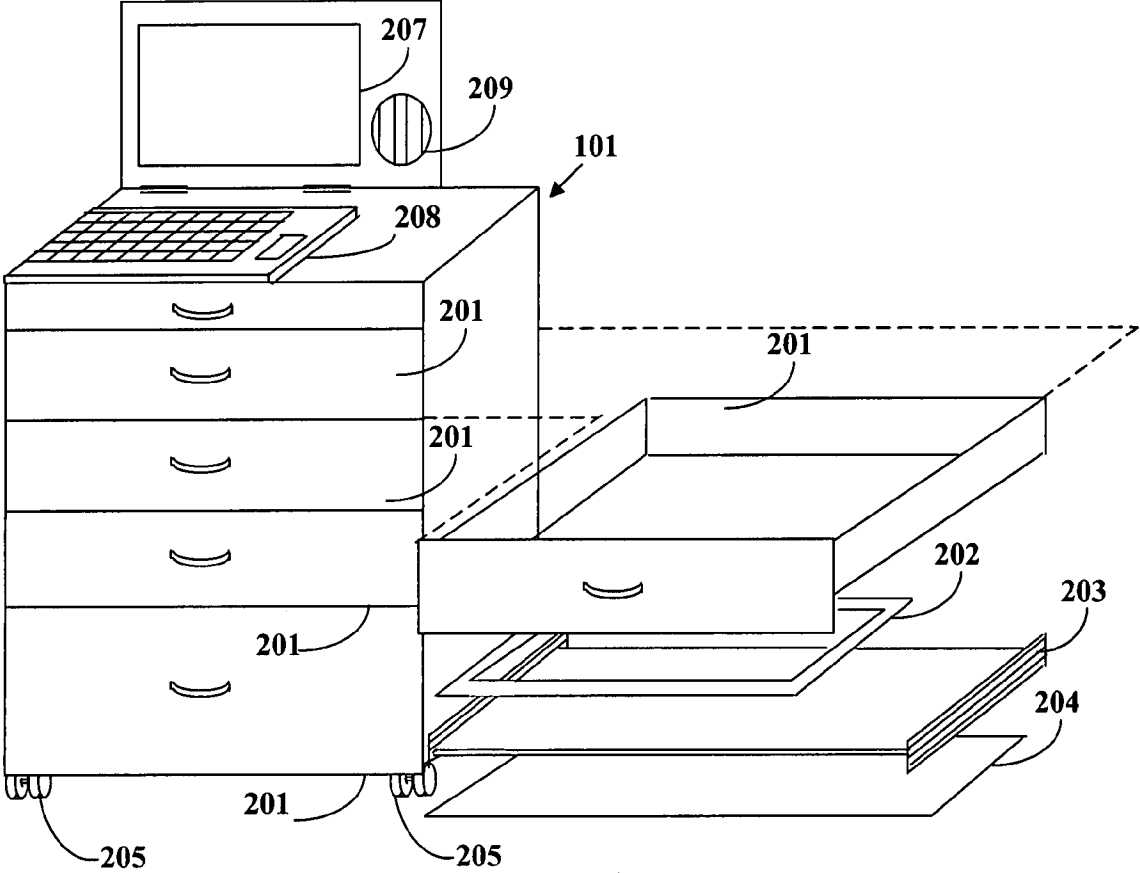


FIGURE 2

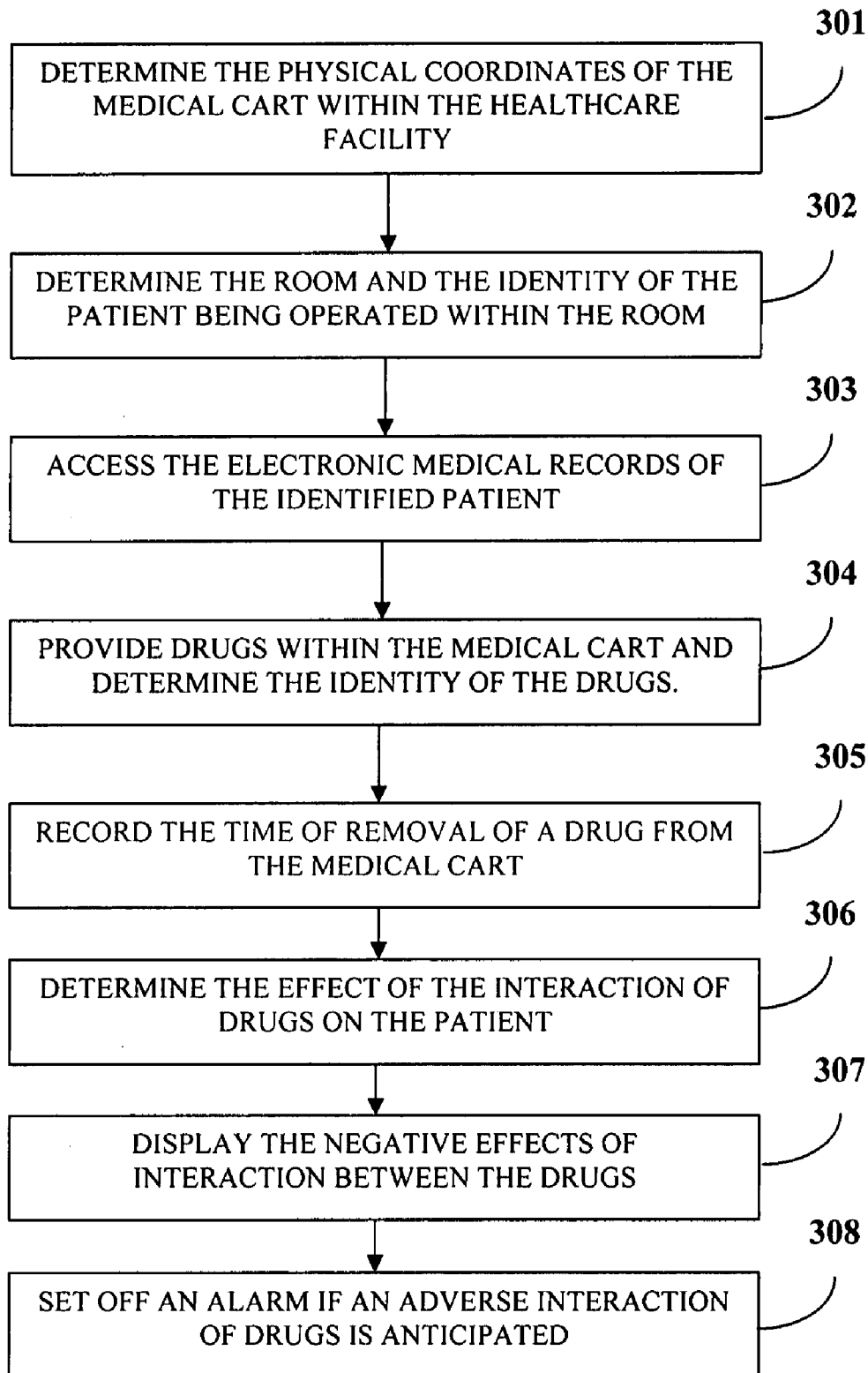


FIGURE 3

## INTELLIGENT MEDICAL MATERIAL CART

### BACKGROUND

**[0001]** This invention, in general, relates to a method and system for monitoring, control, and containment of a material, and specifically relates to a method and system for monitoring, control, and containment of a medical product comprising a drug, a non-drug, and a medical product in a hospital environment.

**[0002]** Medication errors in patient care pose significant risks to patient safety and are a common cause of death and disability. The use of a wrong drug name, incorrect dosage form, mistaken abbreviation, failure to administer a prescribed medication, error in calculation of dosage and improper combination of drugs can cause irreparable harm to patients.

**[0003]** The problems stated above are compounded in the fast-paced or emergency environment in an operation theater of a hospital. In such an environment, where decisions need to be taken in real-time, and with little time available for careful analysis, a variety of drug administration errors may occur. Emergency situations accentuate these problems as emergency procedures involve a rapid response or a quick set up, consequently affording less time for timely and accurate record keeping, drug dispensing, etc. For example, medication errors may include use of drugs the patient is allergic to, incorrect medication, wrong dosage of the correct medication, and correct dosage of the correct medication but administration of the drug at the wrong time.

**[0004]** Health care delivery institutions, such as hospitals control a large amount of inventory in their system. Hundreds of items and products move in and out of supply and operating rooms everyday, and there is a need for system administrators to be sure to know exactly what items or products are being used, when they are being used, who is using them, and the frequency at which such items or products are being used. At all times, items must be accounted for, and must be fully stocked. Manual control or intervention in drug supply and administration in the item or drug supply chain increases the likelihood of causing errors.

**[0005]** When a medical product is used during an operation, the nurse or clinician usually removes it from the central or peripheral supply room and records its use on paper. Typically there is minimal accountability as to what has been taken, who took it, and how many of the items or products were taken. In many instances, a nurse must manually record every item that is being used. The information is only as accurate as to what has been recorded. During busy times, the information garnered is inaccurate or the entire process is sometimes skipped.

**[0006]** In summary, the current method of monitoring of drug administration, controlling and containment of medical products in an operation theatre or a hospital environment is prone to error and imprecise.

### SUMMARY OF THE INVENTION

**[0007]** Disclosed herein is a method and system for monitoring, control and containment of medical material in an operation theatre in a healthcare facility. The physical coordinates of the intelligent medical material cart (IMMC) within the healthcare facility are determined using a position

ing the medical item or product in a room are determined. The electronic medical records of the identified patient are accessed. The IMMC is accessed by the healthcare staff for the drugs stored within the IMMC. The IMMC determines the identity of the drug that has been removed from the IMMC based on a radio frequency identification (RFID) mechanism and records the time at which a item or drug is removed from the IMMC. The IMMC also determines the effect of interaction of the drugs on the patient, by checking with the medical profile of the patient in the electronic medical records. The effects of an adverse or other drug interaction are displayed on a display unit of the IMMC or anywhere within the healthcare facility using a network, along with other pertinent medical information. An alarm is set off on the IMMC or anywhere within the healthcare facility using a network, if an adverse drug interaction is indicated or anticipated. The IMMC is capable of accurately inventorying its entire contents, as well as any individual drug item in the medical container.

**[0008]** In another embodiment of the invention, the RFID tags may also be affixed to the medical apparatuses and the staff working in the hospital.

**[0009]** In another embodiment of the invention, the IMMC checks the patient's electronic medical records to determine whether a drug being removed from the IMMC for administration to the patient has any adverse interaction with a drug previously administered to the patient.

**[0010]** In another embodiment of the invention, the IMMC enunciates an alarm if the drug name read by the RFID tag does not match with the drug name prescribed or scheduled to be taken out of the IMMC and administered to the patient.

**[0011]** Another embodiment of the invention ensures the availability of drugs in real time in a medical operation theatre using the IMMC.

**[0012]** In another embodiment of the invention, the IMMC sends a warning notice to the physician using an alarm on the IMMC, and to the pharmacy using a network, if a drug stored in the IMMC is past its expiry date or may adversely interact with a previously administered drug to the patient.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0013]** The foregoing summary, as well as the following detailed description of the embodiments, is better understood when read in conjunction with the appended drawings. For the purpose of illustrating the invention, there is shown in the drawings exemplary constructions of the invention; however, the invention is not limited to the specific methods and instrumentalities disclosed.

**[0014]** FIG. 1 exemplarily illustrates a system architecture for the implementation of the intelligent medical material cart (IMMC).

**[0015]** FIG. 2 illustrates an exemplary representation of the intelligent medical material cart (IMMC).

**[0016]** FIG. 3 exemplarily illustrates the method of monitoring, control and containment of medical materials in an operation theatre in a healthcare facility.

### DETAILED DESCRIPTION OF THE DRAWINGS

**[0017]** FIG. 1 illustrates an exemplary system architecture for implementing the intelligent medical material cart (IMMC) 101. The IMMC 101 is a mobile cart that transports medical supplies to the operation theatres or to any other

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