

DRUG CONVEYING SYSTEM

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The present application claims priority to Chinese Patent Application No.
5 202011411426.8, filed on December 03, 2020 and entitled "DRUG
CONVEYING SYSTEM", which is incorporated herein by reference in its
entirety.

TECHNICAL FIELD

10 [0002] The present invention relates to the field of drug storage technologies, and
in particular to a drug conveying system.

BACKGROUND ART

[0003] A drug warehouse of a hospital is usually equipped with a plurality of drug
15 storage shelves storing drugs thereon, and meanwhile equipped with a plurality
of drug distribution windows, at each of which, there is a worker. After the worker
enters prescription information at the drug distribution window, the drug storage
shelf may discharge drugs to a drug basket, and finally the drug basket is
conveyed to the drug distribution window where the worker is located. In practice,
20 it is possible that one prescription needs to correspond to a plurality of drug
storage shelves, that is, the plurality of drug storage shelves all needs to distribute
drugs in order to complete the drug distribution according to the prescription. In
addition, in order to improve the working efficiency, the plurality of drug
distribution windows works simultaneously, and drug distribution according to
25 the plurality of prescriptions is performed at the same time in this drug warehouse.
There are many drugs being conveyed on a drug conveying system at the same
time. Therefore, it is necessary for the drug conveying system to be able to
efficiently and correctly convey drugs of the plurality prescriptions at the same
time.

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SUMMARY OF THE INVENTION

[0004] In view of this, a main object of the present invention is to provide a drug conveying system.

[0005] In order to achieve one of the above-mentioned objects of the invention,
 5 an embodiment of the invention provides A drug conveying system, comprising:
 a first conveying belt device (1), a second conveying belt device (2) and a first basket moving device (4), wherein both the first and second conveying belt devices are capable of conveying drug baskets located thereon or keep the drug baskets in a stationary state; a conveying direction of the first conveying belt
 10 device (1) is a first direction, a conveying direction of the second conveying belt device (2) is a second direction, and the first and second directions are opposite; the first basket moving device (4) is capable of moving the drug basket between the first and second conveying belt devices; and
 a number of drug outlets are disposed above the first conveying belt device
 15 (1) and are distributed along the conveying direction of the first conveying belt device (1); and when the drug basket on the first conveying belt device (1) is located under any drug outlet, the drug basket can receive a drug discharged from the drug outlet; and
 a control device configured to: acquire M drug outlets corresponding to a
 20 first prescription to be processed when receiving the first prescription to be processed, wherein the M drug outlets are a first drug outlet, a second drug outlet, ..., and an Mth drug outlet in sequence along the first conveying direction; then control the first conveying belt device (1) to make one empty first drug basket pass through an Ith drug outlet to the Mth drug outlet in sequence and receive the
 25 drug; next control the first basket moving device (4) to move the first drug basket to the second conveying belt device (2), and control the second conveying belt device (2) to convey the first drug basket along the second direction; afterwards

control the first basket moving device (4) to move the first drug basket to the first conveying belt device (1), the first drug basket being located in front of the first drug outlet in the first direction; and subsequently control the first conveying belt device (1) to make the first drug basket pass through the first drug outlet to a (I-1)th drug outlet in sequence and receive the drug, where both M and I are natural numbers, and $1 \leq I \leq M$.

[0006] As a further improvement to an embodiment of the present invention, each of the first conveying belt device (1) and the second conveying belt device (2) comprises a first end portion and a second end portion which are opposite, the first direction is from the first end portion to the second end portion, the second direction is from the second end portion to the first end portion, and a dispensing window is disposed at the second end portion of the first conveying belt device (1); and

when the control device determines that the first prescription to be processed contains a dispensed drug, after controlling the first conveying belt device (1) to make the first drug basket pass through the Mth drug outlet and receive the drug, the control device also controls the first conveying belt device (1) to convey the first drug basket to the dispensing window; next when it is detected that the first drug basket is placed at the second end portion of the second conveying belt device (2), the control device controls the second conveying belt device (2) to convey the first drug basket, and controls the first basket moving device (4) to move the first drug basket to the first conveying belt device (1), wherein the first drug basket is located in front of or in the same position as the first drug outlet along the first direction; and afterwards controls the first conveying belt device (1) to make the first drug basket pass through the first drug outlet to the (I-1)th drug outlet in sequence and receive the drug.

[0007] As a further improvement to an embodiment of the present invention, a

plurality of first basket moving devices (4) are disposed and distributed along extension directions of the first and second conveying belt devices; along the first direction, at least one first basket moving device (4) is located in front of or in the same position as the foremost drug outlet and at least one first basket moving device (4) is located behind or in the same position as the rearmost drug outlet;

said "controlling the first basket moving device (4) to move the first drug basket to the second conveying belt device (2)" specifically comprises: controlling the first conveying belt device (1) to move the first drug basket to a position of the first basket moving device, and then controlling the first basket moving device to move the first drug basket to the second conveying belt device (2), wherein in the first direction, the first basket moving device is located behind or in the same position as the Mth drug outlet; and

said "controlling the first basket moving device (4) to move the first drug basket to the first conveying belt device (1), wherein the first drug basket is located in front of the first drug outlet in the first direction" specifically comprises: controlling the second conveying belt device (2) to move the first drug basket to a position of a second basket moving device and then controlling the second basket moving device to move the first drug basket to the first conveying belt device (1), wherein in the first direction, the second conveying belt device is located in front of or in the same position as the first drug outlet.

[0008] As a further improvement to an embodiment of the present invention, a plurality of empty basket storage devices (5) distributed along an extension direction of the first conveying belt device (1), wherein along the first direction, at least one empty basket storage device (5) is located in front of or in the same position as the foremost drug outlet; and

said "controlling the first conveying belt device (1) to make one empty first drug basket pass through the Ith drug outlet to the Mth drug outlet in sequence

and receive the drug" specifically comprises: taking out the empty first drug basket from the first empty basket storage device, and placing the first drug basket onto the first conveying belt device (1); and controlling the first conveying belt device (1) to make the first drug basket pass through the Ith drug outlet to the Mth drug outlet in sequence and receive the drug, wherein the first empty basket storage device is located in front of or in the same position as the Ith drug outlet.

5 [0009] As a further improvement to an embodiment of the present invention, a number of third conveying belt devices (3), wherein one end of the third conveying belt device (3) is connected to the first conveying belt device (1), and the other end thereof is connected to a drug distribution window, and the drug basket in the first conveying belt device (1) can be moved into the third conveying belt device (3);

the control device is further configured to: when receiving the first prescription to be processed, acquire a third conveying belt device (3) corresponding to the first prescription to be processed, wherein in the first direction, a connection of the corresponding third conveying belt device (3) and the first conveying belt device (1) is located behind or in the same position as the (I-1)th drug outlet; and

said "controlling the first conveying belt device (1) to make one empty first drug basket pass through the Ith drug outlet to the Mth drug outlet in sequence and receive the drug" specifically comprises: controlling the first conveying belt device (1) to make the one empty first drug basket pass through the Ith drug outlet to the Mth drug outlet in sequence and receive the drug; controlling the first drug basket to continue moving and moving the first drug basket to the third conveying belt device (3) corresponding to the first prescription to be processed; and then controlling the corresponding third conveying belt device (3) to move the first drug basket to the drug distribution window.

[0010] As a further improvement to an embodiment of the present invention, a second basket moving device disposed at the connection of the third conveying belt device (3) and the first conveying belt device (1); and

said "moving the first drug basket to the third conveying belt device (3) corresponding to the first prescription to be processed" specifically comprises: controlling the second basket moving device to move the first drug basket to the third conveying belt device (3) corresponding to the first prescription to be processed.

[0011] As a further improvement to an embodiment of the present invention, the drug outlets, the first basket moving devices (4), the second basket moving devices and the third conveying belt devices (3) are the same in quantity and in one-to-one correspondence; and

in the first direction, the first basket moving device (4), the second basket moving device and the third conveying belt device (3) which are in one-to-one correspondence are located in the same position.

[0012] As a further improvement to an embodiment of the present invention, one empty basket storage device (5) is disposed under each third conveying belt device (3).

[0013] As a further improvement to an embodiment of the present invention, the empty basket storage device (5) is a conveying belt, one end of the conveying belt being connected to the corresponding first basket moving device (4).

[0014] As a further improvement to an embodiment of the present invention, the control device is further configured to: when receiving a second prescription to be processed, determine that the second prescription to be processed only corresponds to a unique drug outlet and the unique drug outlet is in one-to-one correspondence with the third conveying belt device (3) corresponding to the second prescription to be processed; acquire the first basket moving device (4),

the second basket moving device and the empty basket storage device (5) which correspond to the unique drug outlet, control the corresponding first basket moving device (4) to acquire one empty second drug basket from the corresponding empty basket storage device (5) and place the second drug basket
5 under the unique drug outlet and receive the drug; control the second basket moving device to move the second drug basket to the corresponding third conveying belt device (3); and then control the corresponding third conveying belt device (3) to move the second drug basket to the drug distribution window.

[0015] Compared with the prior art, the present invention has the following
10 technical effects. Embodiments of the present invention disclose a drug conveying system. The drug conveying system includes two conveying belt devices which are disposed parallel and opposite to each other, drug outlets being disposed above one of the conveying belt devices. When drugs are distributed according to prescriptions, after one part of the drugs is distributed, a drug basket is transferred
15 by means of the other conveying belt device, and then the other part of the drugs is distributed. Thus, the advantage of high efficiency is achieved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] FIG. 1 is a schematic diagram of a stereoscopic structure of a drug
20 conveying system according to an embodiment of the present invention.

DETAILED DESCRIPTION

[0017] The present invention will be described in detail below with reference to embodiments shown in the accompanying drawings. However, these
25 embodiments are not intended to limit the present invention, and changes of structures, methods or functions made by those of ordinary skill in the art according to these embodiments are all included within the protection scope of the present invention.

[0018] The following description and accompanying drawings fully illustrate specific embodiments of the present invention, so that those skilled in the art can practice them. The parts and features of some embodiments may be included in or replaced by the parts and features of other embodiments. The scope of the
5 embodiments of the present invention includes the entire scope of the claims as well as all available equivalents of the claims. In the present invention, the terms such as "first" and "second" are merely used to distinguish one element from another element, and do not require or imply that these elements have any actual relationship or order. In fact, the first element may also be referred to as the second
10 element, and vice versa. In addition, the terms "includes," "contains," or any other variants thereof are intended to cover the nonexclusive containing, such that the structures, devices, or apparatuses including a series of elements not only include those elements, but also include other unclosely listed elements, or also include the inherent elements of such structures, devices, or apparatuses. Without more
15 limitations, the element defined by the phrase "including a/an ..." does not exclude the existence of other same elements in the structure, the device, or the apparatus that includes such an element. The various embodiments in the present invention are described in a progressive manner, each embodiment focuses on the differences from the other embodiments, and the same and similar parts among
20 the various embodiments may refer to one another.

[0019] In the present invention, orientational or positional relationships indicated by the terms "longitudinal", "transverse", "upper", "lower", "front", "rear", "left", "right", "vertical", "horizontal", "top", "bottom", "inner", "outer", etc. are orientational or positional relationships shown based on the accompanying
25 drawings, only for the purposes of facilitating describing the present invention and simplifying the description, but not indicating or implying that the specified device or element has to be specifically oriented, and structured and operated in a

specific orientation, and therefore, should not be understood as limitations to the present invention. In the description of the present invention, the terms "mounted", "connected with each other", and "connected to/with" should be understood in a broad sense unless otherwise expressly defined and limited. For example,
 5 "connection" may be a mechanical connection or an electrical connection; an internal communication of two elements; or a direct connection or an indirect connection through an intermediate medium. Those of ordinary skill in the art can understand specific meanings of the above terms according to specific circumstances.

10 **[0020]** In FIG. 1, "FE" means a first end portion and "SE" means a second end portion.

[0021] Embodiments of the present invention provide a drug conveying system. As shown in FIG. 1, the drug conveying system includes:

[0022] a first conveying belt device 1, a second conveying belt device 2 and a
 15 first basket moving device 4. Both the first and second conveying belt devices are capable of conveying drug baskets located thereon or keep the drug baskets in a stationary state. A conveying direction of the first conveying belt device 1 is a first direction, a conveying direction of the second conveying belt device 2 is a second direction, and the first and second directions are opposite. The first basket
 20 moving device 4 is capable of moving the drug basket between the first and second conveying belt devices. Here, both the first conveying belt device 1 and the second conveying belt device 2 are capable of conveying the drug baskets along their conveying directions. In order to improve the working efficiency, at the same moment, a plurality of drug baskets may be placed on each of the first
 25 conveying belt device 1 and the second conveying belt device 2, with some drug baskets being conveyed and others being in a stationary state.

[0023] As shown in FIG. 1, the first conveying belt device 1 is capable of

conveying the drug basket along the first direction (i.e., a direction indicated by a solid arrow in FIG. 1), that is, the first conveying belt device 1 is capable of conveying the drug basket from the first end portion to the second end portion. The second conveying belt device 2 is capable of conveying the drug basket along

5 the second direction (i.e., a direction indicated by a dotted arrow in FIG. 1), that is, the second conveying belt device 1 is capable of conveying the drug basket from the second end portion to the first end portion. Here, in the first direction, first positions are in front of second positions. Therefore, on the first conveying belt device 1, the drug basket may be conveyed from the first position to the

10 second position, and then the drug basket located in the second position of the first conveying belt device 1 is moved to the second position on the second conveying belt device 2 through the first basket moving device 4, and afterwards the second conveying belt device 2 may convey the drug basket to the first position. In summary, based on the first conveying belt device 1, the second

15 conveying belt device 2, and the first basket moving device 4, the drug basket can be moved bidirectionally.

[0024] Here, each of the first conveying belt device 1 and the second conveying belt device 2 may be formed by connecting a number of conveying belts in series. There may be a plurality of first basket moving devices 4, which is distributed

20 along extension directions of the first conveying belt device 1 and the second conveying belt device 2. Each first basket moving device 41 is has a fixed position. In addition, a track may be disposed and is parallel and opposite to the first and second conveying belt devices. The first basket moving device 4 may move along this track, and in this case there may be a plurality of first basket moving devices

25 4. Here, the first basket moving device 4 may be a manipulator that is capable of grabbing a drug basket from one conveying belt device and placing it onto the other conveying belt device; or a conveying belt, a lifting device, or the like (for

example, one of the first and second conveying belt devices is disposed above the other, and the lifting device may convey the drug baskets between the first and second conveying belt devices).

[0025] A number of drug outlets are disposed above the first conveying belt device 1 and are distributed along the conveying direction of the first conveying belt device 1. When the drug basket on the first conveying belt device 1 is located under any drug outlet, it can receive a drug discharged from the drug outlet. Here, a drug warehouse may be equipped with a plurality of drug storage shelves, each of which stores a plurality of drugs and is provided with one drug outlet. The drugs stored on the drug storage shelf may be discharged through the drug outlet.

[0026] A control device is configured to: acquire M drug outlets corresponding to a first prescription to be processed when receiving the first prescription to be processed, wherein the M drug outlets are a first drug outlet, a second drug outlet, ..., and an Mth drug outlet in sequence along the first conveying direction; then control the first conveying belt device 1 to make one empty first drug basket pass through an Ith drug outlet to the Mth drug outlet in sequence and receive the drug; next control the first basket moving device 4 to move the first drug basket to the second conveying belt device 2 and control the second conveying belt device 2 to convey the first drug basket along the second direction; afterwards control the first basket moving device 4 to move the first drug basket to the first conveying belt device 1, the first drug basket being located in front of the first drug outlet in the first direction; and subsequently control the first conveying belt device 1 to make the first drug basket pass through the first drug outlet to an (I-1)th drug outlet in sequence and receive the drug, where both M and I are natural numbers and $1 \leq I \leq M$.

[0027] Here, in the first direction, the “front” refers to a direction of the tail of the solid arrow in FIG. 1, and the “rear” refers to a direction of the head of the solid

arrow in FIG. 1; and in the second direction, the “front” refers to a direction of the tail of the dotted arrow in FIG. 1, and the “rear” refers to a direction of the head of the dotted arrow in FIG. 1.

[0028] Here, in actual use, each pharmacy is equipped with a pharmacy management system, which stores information of drugs on each drug storage shelf (at least including information such as drug types, storage quantity and storage locations of all drugs stored on each drug storage shelf). The pharmacy is usually equipped with a number of drug distribution windows at each of which a worker works. The worker will receive a prescription (for example, a patient provides a prescription receipt for the worker, or the system automatically allocates a prescription, etc.), the prescription including a number of drug types and the corresponding quantity of each drug type. Then, the worker enters information of the prescription into the pharmacy management system (for example, the worker enters a prescription number, or a card reader disposed at the drug distribution window may read the prescription number), so that the pharmacy management system can acquire information about the number of drug types and the corresponding quantity of each drug type which are included in the prescription. Next, after processing with a preset algorithm, information, such as which drug storage shelves that you need to acquire drugs from, the drug types of a number of drugs that each drug storage shelf needs to discharge, and the corresponding quantity of each drug, is acquired. Subsequently, relevant drugs need to be discharged from the corresponding drug outlets. Therefore, along the first direction, the M drug outlets may be marked as the first drug outlet, the second drug outlet, ..., and the Mth drug outlet in sequence. After the drug basket passes through these M drug outlets and receives the drugs at the respective drug outlets, the drug basket filled with the drugs may be conveyed to the drug distribution window. The worker will then take the drugs out of the basket, package them and

give them to a patient.

[0029] Here, if all the drug baskets strictly pass through the first drug outlet first, then the second drug outlet, ..., and finally the M^{th} drug outlet, it may be understood that if certain drug outlet (such as the $(I-1)^{\text{th}}$ drug outlet) is busy, the drug baskets that need to pass through this drug outlet all need to wait for a period of time, which greatly reduces the efficiency of the drug conveying system. In this case, part of drug baskets may be first conveyed to certain drug outlet located behind the $(I-1)^{\text{th}}$ drug outlet (such as the I^{th} drug outlet), and drug discharging operations at the subsequent drug outlets (from the I^{th} drug outlet to the M^{th} drug outlets) are sequentially executed. Next, the drug basket (for which the drug distribution operations from the I^{th} drug outlet to the M^{th} drug outlet have been completed) is conveyed to a position in front of the I^{th} drug outlet through the second conveying belt device 2, and subsequently the drug discharging operations from the first drug outlet to the $(I-1)^{\text{th}}$ drug outlet are completed. In summary, the efficiency of the drug conveying system can be greatly improved with high orderliness and low possibility of errors.

[0030] Optionally, when the drug basket filled with drugs is conveyed to the drug distribution window, the worker or the patient may be reminded to get the drugs, for example, by means of voice broadcasting or showing prescription-related information through a display device.

[0031] Here, a plurality of detectors is disposed on each of the first conveying belt device 1 and the second conveying belt device 2, and each drug basket is provided with a storage device therein for storing a unique identification code of this drug basket. When the drug basket passes through these detectors, the detector may read the unique identification code from the storage device, and thus can accurately identify the drug basket and acquire information such as the position of the drug basket. Meanwhile, it is also possible to establish a corresponding

relationship between the unique identification code and the prescription. For example, the detector may be a two-dimensional code scanning device, and a two-dimensional code may be sprayed on the outer surface of the drug basket and stores the unique identification code of the drug basket. The detector may be a
 5 near field communication (NFC) reading device, and an NFC communication device may be disposed in the drug basket and stores the unique identification code of the drug basket.

[0032] Here, as shown in FIG. 1, the conveying directions of the first and second conveying belt devices may not be straight.

10 **[0033]** In this embodiment, each of the first conveying belt device 1 and the second conveying belt device 2 includes a first end portion and a second end portion which are opposite, the first direction is from the first end portion to the second end portion, the second direction is from the second end portion to the first end portion, and a dispensing window is disposed at the second end portion of the
 15 first conveying belt device 1.

[0034] When determining that the first prescription to be processed contains a dispensed drug, after controlling the first conveying belt device 1 to make the first drug basket pass through the Mth drug outlet and receive the drug, the control device also controls the first conveying belt device 1 to convey the first drug
 20 basket to the dispensing window; next, when it is detected that the first drug basket is placed at the second end portion of the second conveying belt device 2, the control device controls the second conveying belt device 2 to convey the first drug basket, and controls the first basket moving device 4 to move the first drug basket to the first conveying belt device 1, wherein the first drug basket is located
 25 in front of or in the same position as the first drug outlet along the first direction; and afterwards controls the first conveying belt device 1 to make the first drug basket pass through the first drug outlet to the (I-1)th drug outlet in sequence and

receive the drug.

[0035] Here, optionally, the first end portion of the first conveying belt device 1 and the first end portion of the second conveying belt device 2 are located in the same position, and the second end portion of the first conveying belt device 1 and
5 the second end portion of the second conveying belt device 2 are located in the same position.

[0036] Here, drug dispensing broadly refers to pharmaceutical technical services including prescription dispensing (dispensing based on a prescription), over-the-counter dispensing (dispensing without a prescription, for example, over-the-counter drugs are sold in social pharmacies), and drug information services
10 contained therein. It is a multi-unit operation process involving a number of pharmaceutical fields, and generally includes the steps of receiving the prescription, reviewing the prescription, formulating the prescription (including different content such as getting the drugs, sub-packaging, and preparing
15 temporary prescription medicament), packaging, checking, distributing drugs, providing an instruction in drug use, etc. The drug dispensing narrowly "refers to "a dispensing operation of a medication specifically prepared for a patient according to a doctor's prescription, with the usage and dosage indicated", and is an operation unit in drug dispensing which is understood in broad sense, i.e.,
20 preparing temporary prescription medicament (a fixed prescription medicament relative to hospital medicament) in the step of formulating the prescription. In summary, the drugs needing to be dispensed are the aforementioned dispensed drugs.

[0037] Here, the dispensed drug often needs to be manually processed by a doctor.
25 In this case, the first conveying belt device 1 may convey the first drug basket to the dispensing window, and then the doctor takes away the first drug basket, places the dispensed drug in the first drug basket, and places the first drug basket

at the second end portion of the second conveying belt device 2. Next, the second conveying belt device 2 may convey the first drug basket towards the first end portion until the first basket moving device 4 moves the first drug basket to the first conveying belt device 1, wherein the first drug basket is located in front of
 5 or at the same position as the first drug outlet along the conveying direction of the first conveying belt device 1.

[0038] Here, a sensor is disposed at the second end portion of the second conveying belt device 2 and may detect whether the first drug basket is placed at the second end portion. Similarly, a sensor is disposed at the second end portion
 10 of the first conveying belt device 1 and may detect whether the first drug basket is conveyed to the second end portion. In addition, a reminding device is disposed at the second end portion of the first conveying belt device 1. When it is detected that the first drug basket is conveyed to the second end portion, relevant information about the dispensed drug is reminded by the reminding device
 15 through voices or a display screen.

[0039] In this embodiment, a plurality of first basket moving devices 4 is disposed and distributed along extension directions of the first and second conveying belt devices; and along the first direction, at least one first basket moving device 4 is located in front of or in the same position as the foremost drug outlet and at least
 20 one first basket moving device 4 is located behind or in the same position as the rearmost drug outlet.

[0040] Said "controlling the first basket moving device 4 to move the first drug basket to the second conveying belt device 2" specifically includes: controlling the first conveying belt device 1 to move the first drug basket to a position of the
 25 first basket moving device, and then controlling the first basket moving device to move the first drug basket to the second conveying belt device 2, wherein in the first direction, the first basket moving device is located behind or in the same

position as the Mth drug outlet. Here, after the first drug basket receives the drug discharged from the Mth drug outlet, the first drug basket may be continuously conveyed backwards until it is conveyed to the position of one basket moving device; or after the first drug basket receives the drug discharged from Mth drug outlet, the first drug basket is no longer continuously conveyed backwards, and the position at this time is the position of the basket moving device.

[0041] Said "controlling the first basket moving device 4 to move the first drug basket to the first conveying belt device 1, wherein the first drug basket is located in front of the first drug outlet in the first direction" specifically includes:
 10 controlling the second conveying belt device 2 to move the first drug basket to a position of a second basket moving device and then controlling the second basket moving device to move the first drug basket to the first conveying belt device 1, wherein in the first direction, the second conveying belt device is located in front of or in the same position as the first drug outlet.

15 [0042] Optionally, the first basket moving device 4 may be a vertical lifting device. Each of the first and second conveying belt devices is formed by connecting a number of conveying belts in series, and steering devices are disposed at a connection of every two conveying belt devices. The first conveying belt device 1 is higher than the second conveying belt device 2, and the top end
 20 of the vertical lifting device is connected to the first conveying belt device 1 and the bottom end thereof is connected to the second conveying belt device 2. For ease of explanation, assuming that two adjacent conveying belts, i.e., first and second conveying belts, are disposed in each of the first and second conveying belt devices and that two ends of the steering device are connected to the first and
 25 second conveying belts respectively. The steering device has the following specific functions. (1) The steering device receives the drug basket conveyed by the first conveying belt, and then may convey the drug basket to the second

conveying belt. (2) The steering device receives the drug basket conveyed by the second conveying belt and then may convey the drug basket to the first conveying belt. (3) In the first conveying belt device 1, the steering device receives the drug basket conveyed by the first or second conveying belt, and then may convey the drug basket to the vertical lifting device; and then the lifting device moves downward to convey the drug basket to the steering device in the second conveying belt device 2, thereby completing the operation of moving the basket from the first conveying belt device 1 to the second conveying belt device 2. (4) In the second conveying belt device 2, the steering device receives the drug basket conveyed by the first or second conveying belt, and then may convey the drug basket to the vertical lifting device; and then the lifting device moves upward to convey the drug basket to the steering device in the first conveying belt device 1, thereby completing the operation of moving the basket from the second conveying belt device 2 to the first conveying belt device 1.

[0043] In this embodiment, the drug conveying system further includes a plurality of empty basket storage devices 5 distributed along an extension direction of the first conveying belt device 1, wherein along the first direction, at least one empty basket storage device 5 is located in front of or in the same position as the foremost drug outlet. Said "controlling the first conveying belt device 1 to make one empty first drug basket pass through the Ith drug outlet to the Mth drug outlet in sequence and receive the drug" specifically includes: taking out the empty first drug basket from the first empty basket storage device, and placing the first drug basket onto the first conveying belt device 1; and controlling the first conveying belt device 1 to make the first drug basket pass through the Ith drug outlet to the Mth drug outlet in sequence and receive the drug, wherein the first empty basket storage device is located in front of or in the same position as the Ith drug outlet. Here, at each drug distribution window, after packaging the drugs in the drug

basket and giving them to the patient, the worker will place the empty basket in the empty basket storage device 5.

[0044] In this embodiment, the drug conveying system further includes a number of third conveying belt devices 3. One end of the third conveying belt device 3 is
 5 connected to the first conveying belt device 1, and the other end thereof is connected to the drug distribution window. In addition, the drug basket in the first conveying belt device 1 can be moved into the third conveying belt device 3. The control device is further configured to: when receiving the first prescription to be processed, acquire the third conveying belt device 3 corresponding to the first
 10 prescription to be processed, wherein in the first direction, a connection of the corresponding third conveying belt device 3 and the first conveying belt device 1 is located behind or in the same position as the (I-1)th drug outlet.

[0045] Said "controlling the first conveying belt device 1 to make one empty first drug basket pass through the Ith drug outlet to the Mth drug outlet in sequence and
 15 receive the drug" specifically includes: controlling the first conveying belt device 1 to make the one empty first drug basket pass through the Ith drug outlet to the Mth drug outlet in sequence and receive the drug; controlling the first drug basket to continue moving and moving the first drug basket to the third conveying belt device 3 corresponding to the first prescription to be processed; and then
 20 controlling the corresponding third conveying belt device 3 to move the first drug basket to the drug distribution window.

[0046] Here, in practice, the worker sits next to the drug distribution window. When the drug basket filled with drugs is conveyed to the drug distribution window by the third conveying belt device 3, the worker will take away the drug
 25 basket, package the drugs therein, and distribute them to the patient. Therefore, it requires that the connection of the corresponding third conveying belt device 3 and the first conveying belt device 1 is located behind or in the same position as

the (I-1)th drug outlet.

[0047] In this embodiment, the drug conveying system further includes a second basket moving device disposed at the connection of the third conveying belt device 3 and the first conveying belt device 1. Said "moving the first drug basket to the third conveying belt device 3 corresponding to the first prescription to be processed" specifically includes: controlling the second basket moving device to move the first drug basket to the third conveying belt device 3 corresponding to the first prescription to be processed. Here, the second basket moving device may be a manipulator, etc. In addition, the first conveying belt device 1 may be formed by connecting a number of conveying belts in series. A steering device is disposed at the connection of every two conveying belt devices, and the steering device is also connected to one end portion of the third conveying belt device 3. Therefore, when the drug basket is located on the steering device, the steering device may convey the drug basket to one end portion of the third conveying belt device 3, that is, the steering device is the third conveying belt device 3.

[0048] In this embodiment, the drug outlets, the first basket moving devices 4, the second basket moving devices and the third conveying belt devices 3 are the same in quantity and in one-to-one correspondence. In the first direction, the first basket moving device 4, the second basket moving device and the third conveying belt device 3 which are in one-to-one correspondence are located in the same position.

[0049] In this embodiment, one empty basket storage device 5 is disposed under each third conveying belt device 3. Here, at the drug distribution window, after the worker has distributed the drugs, the worker can directly place the empty drug basket in the empty basket storage device 5 under the third conveying belt device 3, which is very convenient to use.

[0050] In this embodiment, the empty basket storage device 5 is a conveying belt,

one end of the conveying belt being connected to the corresponding first basket moving device 4.

[0051] In this embodiment, the control device is further configured to: when receiving a second prescription to be processed, determine that the second prescription to be processed only corresponds to a unique drug outlet and the unique drug outlet is in one-to-one correspondence with the third conveying belt device 3 corresponding to the second prescription to be processed; acquire the first basket moving device 4, the second basket moving device and the empty basket storage device 5 which correspond to the unique drug outlet; control the corresponding first basket moving device 4 to acquire one empty second drug basket from the corresponding empty basket storage device 5, place the second drug basket under the unique drug outlet and receive the drug; control the second basket moving device to move the second drug basket to the corresponding third conveying belt device 3; and control the corresponding third conveying belt device 3 to move the second drug basket to the drug distribution window. Here, it may be understood that in daily use, the first and second conveying belt devices are usually quite busy. When the drugs according to one prescription only need to be gotten from one drug outlet, the first and second conveying belt devices may not be used, which can greatly improve the efficiency.

[0052] In the case shown in FIG. 1, the numbers of the drug outlets, the first basket moving devices 4, the second basket moving devices, the third conveying belt devices 3, and the empty basket storage devices 5 all may be 8, and the number of the drug distribution windows may also be 8. The first conveying belt devices 1, the second conveying belt devices 2, the drug outlets, the first basket moving devices 4, the second basket moving devices, the third conveying belt devices 3, and the empty basket storage devices 5 work independently of one another. For coordination, these components may communicate with one another,

for example, on the basis of a remote procedure call (RPC) mechanism.

[0053] It should be understood that although the description is described according to the embodiments, not every embodiment includes only one independent technical solution. This presentation manner of the description is
5 only for clarity. Those skilled in the art should consider the description as a whole, and technical solutions in all of the embodiments may also be properly combined to form other embodiments that will be understood by those skilled in the art.

[0054] The above detailed description only aims to specifically illustrate the feasible embodiments of the present invention, and is
10 not intended to limit the protection scope of the present invention. Equivalent embodiments or modifications made without departing from the spirit of the present invention shall fall within the protection scope of the present invention.

CLAIMS

What is claimed is:

1. A drug conveying system, comprising:

a first conveying belt device (1), a second conveying belt device (2) and a
 5 first basket moving device (4), wherein both the first and second conveying belt
 devices are capable of conveying drug baskets located thereon or keep the drug
 baskets in a stationary state; a conveying direction of the first conveying belt
 device (1) is a first direction, a conveying direction of the second conveying belt
 device (2) is a second direction, and the first and second directions are opposite;
 10 the first basket moving device (4) is capable of moving the drug basket between
 the first and second conveying belt devices; and

a number of drug outlets are disposed above the first conveying belt device
 (1) and are distributed along the conveying direction of the first conveying belt
 device (1); and when the drug basket on the first conveying belt device (1) is
 15 located under any drug outlet, the drug basket can receive a drug discharged from
 the drug outlet; and

a control device configured to: acquire M drug outlets corresponding to a
 first prescription to be processed when receiving the first prescription to be
 processed, wherein the M drug outlets are a first drug outlet, a second drug
 20 outlet, ..., and an Mth drug outlet in sequence along the first conveying direction;
 then control the first conveying belt device (1) to make one empty first drug basket
 pass through an Ith drug outlet to the Mth drug outlet in sequence and receive the
 drug; next control the first basket moving device (4) to move the first drug basket
 to the second conveying belt device (2), and control the second conveying belt
 25 device (2) to convey the first drug basket along the second direction; afterwards
 control the first basket moving device (4) to move the first drug basket to the first
 conveying belt device (1), the first drug basket being located in front of the first
 drug outlet in the first direction; and subsequently control the first conveying belt
 device (1) to make the first drug basket pass through the first drug outlet to a (I-

1)th drug outlet in sequence and receive the drug, where both M and I are natural numbers, and $1 \leq I \leq M$.

2. The drug conveying system according to claim 1, wherein

5 each of the first conveying belt device (1) and the second conveying belt device (2) comprises a first end portion and a second end portion which are opposite, the first direction is from the first end portion to the second end portion, the second direction is from the second end portion to the first end portion, and a dispensing window is disposed at the second end portion of the first conveying belt device (1); and

10 when the control device determines that the first prescription to be processed contains a dispensed drug, after controlling the first conveying belt device (1) to make the first drug basket pass through the Mth drug outlet and receive the drug, the control device also controls the first conveying belt device (1) to convey the first drug basket to the dispensing window; next when it is detected that the first drug basket is placed at the second end portion of the second conveying belt device (2), the control device controls the second conveying belt device (2) to convey the first drug basket, and controls the first basket moving device (4) to move the first drug basket to the first conveying belt device (1), wherein the first drug basket is located in front of or in the same position as the first drug outlet along the first direction; and afterwards controls the first conveying belt device (1) to make the first drug basket pass through the first drug outlet to the (I-1)th drug outlet in sequence and receive the drug.

25 3. The drug conveying system according to claim 2, wherein

a plurality of first basket moving devices (4) are disposed and distributed along extension directions of the first and second conveying belt devices; along the first direction, at least one first basket moving device (4) is located in front of or in the same position as the foremost drug outlet and at least one first basket moving device (4) is located behind or in the same position as the rearmost drug outlet;

said "controlling the first basket moving device (4) to move the first drug basket to the second conveying belt device (2)" specifically comprises: controlling the first conveying belt device (1) to move the first drug basket to a position of the first basket moving device, and then controlling the first basket moving device to move the first drug basket to the second conveying belt device (2), wherein in the first direction, the first basket moving device is located behind or in the same position as the Mth drug outlet; and

said "controlling the first basket moving device (4) to move the first drug basket to the first conveying belt device (1), wherein the first drug basket is located in front of the first drug outlet in the first direction" specifically comprises: controlling the second conveying belt device (2) to move the first drug basket to a position of a second basket moving device and then controlling the second basket moving device to move the first drug basket to the first conveying belt device (1), wherein in the first direction, the second conveying belt device is located in front of or in the same position as the first drug outlet.

4. The drug conveying system according to claim 1, further comprising:

a plurality of empty basket storage devices (5) distributed along an extension direction of the first conveying belt device (1), wherein along the first direction, at least one empty basket storage device (5) is located in front of or in the same position as the foremost drug outlet; and

said "controlling the first conveying belt device (1) to make one empty first drug basket pass through the Ith drug outlet to the Mth drug outlet in sequence and receive the drug" specifically comprises: taking out the empty first drug basket from the first empty basket storage device, and placing the first drug basket onto the first conveying belt device (1); and controlling the first conveying belt device (1) to make the first drug basket pass through the Ith drug outlet to the Mth drug outlet in sequence and receive the drug, wherein the first empty basket storage device is located in front of or in the same position as the Ith drug outlet.

5. The drug conveying system according to claim 4, further comprising:

a number of third conveying belt devices (3), wherein one end of the third conveying belt device (3) is connected to the first conveying belt device (1), and the other end thereof is connected to a drug distribution window, and the drug basket in the first conveying belt device (1) can be moved into the third conveying belt device (3);

the control device is further configured to: when receiving the first prescription to be processed, acquire a third conveying belt device (3) corresponding to the first prescription to be processed, wherein in the first direction, a connection of the corresponding third conveying belt device (3) and the first conveying belt device (1) is located behind or in the same position as the (I-1)th drug outlet; and

said "controlling the first conveying belt device (1) to make one empty first drug basket pass through the Ith drug outlet to the Mth drug outlet in sequence and receive the drug" specifically comprises: controlling the first conveying belt device (1) to make the one empty first drug basket pass through the Ith drug outlet to the Mth drug outlet in sequence and receive the drug; controlling the first drug basket to continue moving and moving the first drug basket to the third conveying belt device (3) corresponding to the first prescription to be processed; and then controlling the corresponding third conveying belt device (3) to move the first drug basket to the drug distribution window.

6. The drug conveying system according to claim 5, further comprising:

a second basket moving device disposed at the connection of the third conveying belt device (3) and the first conveying belt device (1); and

said "moving the first drug basket to the third conveying belt device (3) corresponding to the first prescription to be processed" specifically comprises: controlling the second basket moving device to move the first drug basket to the third conveying belt device (3) corresponding to the first prescription to be processed.

7. The drug conveying system according to claim 6, wherein

the drug outlets, the first basket moving devices (4), the second basket moving devices and the third conveying belt devices (3) are the same in quantity and in one-to-one correspondence; and

in the first direction, the first basket moving device (4), the second basket moving device and the third conveying belt device (3) which are in one-to-one correspondence are located in the same position.

8. The drug conveying system according to claim 7, wherein one empty basket storage device (5) is disposed under each third conveying belt device (3).

9. The drug conveying system according to claim 8, wherein the empty basket storage device (5) is a conveying belt, one end of the conveying belt being connected to the corresponding first basket moving device (4).

10. The system according to claim 9, wherein the control device is further configured to: when receiving a second prescription to be processed, determine that the second prescription to be processed only corresponds to a unique drug outlet and the unique drug outlet is in one-to-one correspondence with the third conveying belt device (3) corresponding to the second prescription to be processed; acquire the first basket moving device (4), the second basket moving device and the empty basket storage device (5) which correspond to the unique drug outlet, control the corresponding first basket moving device (4) to acquire one empty second drug basket from the corresponding empty basket storage device (5) and place the second drug basket under the unique drug outlet and receive the drug; control the second basket moving device to move the second drug basket to the corresponding third conveying belt device (3); and then control the corresponding third conveying belt device (3) to move the second drug basket to the drug distribution window.