

Automatic Medicine Distributor

CROSS-REFERENCES TO RELATED APPLICATIONS

5 This disclosure claims the priority of the Chinese patent application filed with the Chinese Patent Office on September 5, 2019, with the application number 2019108413240 and the name is "Automatic Medicine Distributor";

and the priority of the Chinese patent application with the application number
10 2019214782750 and the name "automatic drug dispenser" filed with the Chinese Patent Office on September 5, 2019, the entire contents of which is incorporated into this disclosure by reference.

FIELD OF THE INVENTION

15 The present disclosure relates to the technical field of auxiliary medical equipment, in particular to an automatic medicine distributor.

BACKGROUND ART

20 When a patient is hospitalized, the doctor will issue a prescription according to the patient's condition, and then the hospital's pharmacy nurse will dispense and mark the medicine for the patients in the hospital according to the prescriptions issued by the doctors. After the medicines are prepared,
25 the medicine box containing the medicines will be distributed to the corresponding patient.

However, because the pharmacy nurse works a lot every day and the volume of tablets is small, when the dosage of tablets in the prescription is large,
30 the dispenser might easily count the wrong number of tablets due to being too

tired. In case of long-time work, the situation of mismatched tablets occurs from time to time.

In general, a small difference in the dosage of tablets used will not have a significant impact on the patient; but for some tablets, a small difference in the number of tablets may lead to a serious medical accident.

The inventor found in the research that the existing tablet distribution has the following shortcomings:

manual dispensing is easy to make mistakes.

SUMMARY OF THE INVENTION

The purpose of the present disclosure includes, for example, providing an automatic medicine distributor to improve the problem of medical accidents caused by errors in medicine dosage and type of medicines when using medical staff to manually dispense medicines in the prior art.

The embodiments of the present disclosure are implemented as follows:

The automatic medicine distributor provided by the present embodiment comprises a medicine board placing rack, a sliding rack, a medicine taking device, a driving mechanism, a sharp tool and a control mechanism;

the medicine board placing rack is provided with a plurality of medicine storing sections, the plurality of medicine storing sections are configured to store medicine boards, and the sharp tool is connected to the medicine board placing rack;

the sliding rack and the medicine board placing rack are arranged oppositely, the medicine taking device is connected to the driving mechanism, and the driving mechanism is configured for driving the medicine taking device to move relative to the sliding rack;

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a position information of the medicine storing section corresponding to each medicine board is pre-stored in the control mechanism, the control mechanism is connected to the driving mechanism, the control mechanism is configured to receive a medicine taking instruction and control the driving mechanism to
10 drive the medicine taking device to move to the corresponding medicine storing section relative to the sliding rack;

the control mechanism is connected to the medicine taking device, and the control mechanism can control the medicine taking device to take the medicine,
15 and control the movement of the medicine taking device relative to the sharp tool, so that the sharp tool cuts open the protective film at the corresponding medicine on the medicine board to make the medicine fall out.

Optionally, the medicine taking device comprises a medicine taking fork and
20 a driving assembly;

one end of the driving assembly is connected to the sliding rack, and the other end is connected to the medicine taking fork, the driving assembly is configured for driving the medicine taking fork to move in a direction
25 perpendicular to the medicine board placing rack;

the control mechanism is connected to the driving assembly in communication.

Optionally, the driving assembly comprises a connecting part, a base, a first
30 motor and a gear;

the connecting part is connected to the sliding rack and the base at the same time;

- 5 the first motor is arranged on the base, the first motor is communicatively connected to the control mechanism, and an output shaft of the first motor is fixedly connected to the gear;

the medicine taking fork is provided with a gear rack, the medicine taking
10 fork is slidably matched with the base, and the gear is meshed with the gear rack.

Optionally, the medicine taking fork comprises a moving plate and a fork body connected each other;

- 15 the moving plate is slidingly matched with the base, a groove is provided on one surface of the moving plate close to the base; the gear rack is arranged on a side wall of the groove, and the gear is arranged in the groove.

- 20 Optionally, two rows of fork bodies are provided, the two rows of fork bodies are arranged on the moving plate at intervals, and the two rows of fork bodies jointly define a clamping area configured to clamp the medicine board.

- Optionally, the automatic medicine distributor further comprises a top cover
25 and a medicine collecting pocket;

- the medicine collecting pocket is arranged under the base, and the medicine collecting pocket is connected to the connecting part, the base is provided with a medicine dropping hole, and the medicine collecting pocket is arranged
30 corresponding to the medicine dropping hole;

the bottom of the medicine collecting pocket is provided with an opening, and a baffle is provided at the opening, the baffle is connected with a third driving member, and the third driving member is configured to drive the baffle
5 to move relative to the medicine collecting pocket to open or close the opening;

the top cover is connected to the base, the top cover is provided with a first camera, and the first camera is connected to the control mechanism;

10 the image information of each medicine is pre-stored in the control mechanism;

the first camera is configured to acquire the image information of the medicine in the medicine board on the medicine taking fork, and transmit the image
15 information to the control mechanism, the control mechanism judges and records the quantity of medicines in the medicine board at this time, the control mechanism compares the medicine image in the medicine board on the medicine taking fork with the medicine image corresponding to the medicine taking instruction, when the medicine image in the medicine board on the medicine
20 taking fork is the same as the medicine image corresponding to the medicine taking instruction, the control mechanism controls the first motor to drive the medicine taking fork to move relative to the sharp tool, so that the sharp tool cuts open the protective film at the corresponding medicine on the medicine board;

25 the first camera is configured to acquire the quantity information of the medicine in the medicine board on the medicine taking fork after the medicine is dissected, and transmit the quantity information to the control mechanism, the control mechanism records the quantity of the medicines in the medicine
30 board at this time, and calculates the difference between the quantity of the

medicines in the medicine board before taking medicine and the quantity of medicine in the medicine board after the medicine is taken, and compares the difference with the quantity of medicine taken in the medicine taking instruction, when the difference matches the medicine taking instruction, the control mechanism controls the third driving member moves the baffle away from the opening.

Optionally, a second camera is provided at the bottom of the medicine collecting pocket, and the second camera is communicatively connected to the control mechanism;

different prescription information and QR code information are pre-stored in the control mechanism, and each QR code information corresponds to one prescription information;

the second camera is configured to acquire the QR code image information on the medicine taking box, and transmit the QR code image information to the control mechanism, the control mechanism matches the QR code image information to the corresponding prescription information, and controls the action of the driving mechanism and the medicine taking device according to the prescription information.

Optionally, the moving plate is clamped between the top cover and the base.

Optionally, the medicine board placing rack is connected to a bracket, and the sliding rack comprises the bracket, a vertical sliding rod, a horizontal sliding rod, a first sliding block and a second sliding block;

the vertical sliding rod is arranged in a vertical direction and connected to the bracket, the horizontal sliding rod is provided in a horizontal direction

and connected to the vertical sliding rod through the first sliding block, the medicine taking device is connected to the horizontal sliding rod through the second sliding block;

5 the driving mechanism comprises a first driving member and a second driving member;

the first driving member is disposed on the vertical sliding rod and connected to the first sliding block, and the first driving member is configured to
10 drive the first sliding block to slide along the length direction of the vertical sliding rod;

the second driving member is disposed on the horizontal sliding rod and connected to the second sliding block, and the second driving member is
15 configured to drive the second sliding block to slide along the length direction of the horizontal sliding rod.

Optionally, the first driving member is an electric pushing rod, an air cylinder or a hydraulic cylinder; and/or the second driving member is an
20 electric pushing rod, an air cylinder or a hydraulic cylinder.

Optionally, the first sliding block is sleeved outside the vertical sliding rod; and/or the second sliding block is sleeved outside the horizontal sliding rod.

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Optionally, the number of the vertical sliding rods is two, the two vertical sliding rods are arranged in parallel and spaced apart, and the horizontal sliding rod is slidably matched with the two vertical sliding rods at the same time.

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Optionally, the automatic medicine distributor further comprises a medicine box fixing part;

the medicine box fixing part is arranged under the medicine taking device,
5 and the medicine box fixing part is connected to the bracket.

Optionally, the medicine storing section comprises a storage compartment and a medicine board storing part provided on the medicine board placing rack;

10 the storage compartment is connected to the medicine board placing rack;

the medicine board storing part is disposed in the storage compartment, and the medicine board storing part and the storage compartment are detachably connected;

15 the medicine board storing part is provided with a medicine taking port, and the medicine taking hole is arranged on the side of the medicine board storing part near the medicine taking device.

20 Optionally, the medicine board storing part comprises an end plate and two side plates, one end of each of the two side plates is respectively connected to the end plate, and a medicine taking port is formed between the two side plates on the side away from the end plate;

25 the inner walls of the two side plates are successively provided with slots horizontally extending from top to bottom, and the slots are configured to support the medicine board.

Optionally, the storage compartment is provided with a sliding opening, and
30 the medicine board storing part is slidably matched with the sliding opening.

Optionally, a limiting block is provided on the medicine board storing part, and the limiting block is configured to resist the storage compartment, thereby restricting the position of the medicine board storing part relative to the storage compartment when inserted into the sliding opening.

Optionally, a plurality of limiting blocks is provided, and the plurality of limiting blocks are arranged at intervals along the circumference direction of the medicine taking port.

Optionally, the medicine board storing part further comprises a handle, the handle is connected to the end plate and is located on the side of the end plate away from the medicine taking port.

Optionally, the automatic medicine distributor further comprises an alarm, which is in communication connection with the controller, and the alarm will alarm when the information or quantity of the medicine obtained by the medicine taking device is wrong.

Compared with the prior art, the beneficial effects of the embodiments of the present disclosure include, for example:

when the automatic medicine distributor provided by the present disclosure is in use, since the control mechanism pre-stored the position information of the medicine storing section corresponding to each medicine board, therefore, by inputting a medicine taking instruction in the control mechanism, including the medicine taking type and quantity to be taken, the control mechanism can control the driving mechanism to act according to the medicine taking instruction, so that the driving mechanism drives the medicine taking device to move relative to the sliding rack to the medicine storing section

corresponding to the medicine taking instruction, and controls the medicine taking device to take medicine, and then controls the medicine taking device to move relative to the sharp tool, so that the sharp tool cuts open the protective film at the corresponding medicine on the medicine board to make
5 the medicine fall out.

At the same time, because the automatic medicine distributor provided by the present disclosure dispensing medicines by receiving the medicine taking instructions, compared with manual medicine dispensing, it saves manpower and
10 avoids the problem that the dispensing staff is prone to dispensing errors due to long time dispensation.

BRIEF DESCRIPTION OF THE DRAWINGS

15 In order to more clearly explain the specific embodiments of the present disclosure or the technical solutions in the prior art, the drawings used in the specific embodiments or the description of the prior art will be briefly introduced below. Obviously, the drawings in the following description are some embodiments of the present disclosure. For those skilled in the art,
20 other drawings can be obtained based on these drawings without paying creative labor.

FIG. 1 is a front view of an automatic medicine distributor according to an embodiment of the present disclosure;

25 FIG. 2 is a rear view of the automatic medicine distributor provided by the embodiment of the present disclosure;

FIG. 3 is a side view of the automatic medicine distributor provided by the
30 embodiment of the present disclosure;

FIG. 4 is a schematic structural diagram of the automatic medicine distributor provided by the embodiment of the present disclosure;

5 FIG. 5 is a schematic structural diagram showing a sliding rack, a medicine taking device, a medicine collecting pocket, and a medicine box fixing part in the automatic medicine distributor provided by the embodiment of the present disclosure;

10 FIG. 6 is a schematic structural diagram of the medicine taking device and the medicine collecting pocket in the automatic medicine distributor provided by the embodiment of the present disclosure;

FIG. 7 is an exploded view of the medicine taking device and the medicine
15 collecting pocket in the automatic medicine distributor provided by the embodiment of the present disclosure;

FIG. 8 is a bottom view showing a medicine taking fork in the automatic
20 medicine distributor provided by the embodiment of the present disclosure;

FIG. 9 is a schematic structural diagram of a medicine board storing part of the automatic medicine distributor provided by the embodiment of the present disclosure.

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Marked in the figure:

1-medicine board placing rack; 100-medicine storing section; 11-storage compartment; 12-medicine board storing part; 121-end plate; 1211-handle; 122-side plate; 1221-slot; 1222-limiting block; 123-medicine taking port; 200-
30 sliding rack; 2-bracket; 21-vertical sliding rod; 211-first driving member;

212-first sliding block; 22-horizontal sliding rod; 221-second driving member;
222-second sliding block; 3-medicine taking device; 300-driving assembly; 31-
connecting part; 32-base; 321-medicine dropping hole; 33-first motor; 34-gear;
35-medicine taking fork; 351-moving plate; 3511-groove; 3512-gear rack; 352-
5 fork body; 36-top cover; 361-first camera; 4-sharp tool; 5-medicine collecting
pocket; 51-third driving member; 52-second camera; 6-medicine box fixing part;
7-driving mechanism.

DETAILED DESCRIPTION OF THE EMBODIMENTS

10 The technical solution of the present disclosure will be described clearly
and completely in combination with the following embodiments. Obviously, the
described embodiments are a part of the present disclosure, but not all of
them. Based on the embodiments of the present disclosure, all other
15 embodiments obtained by a person skilled in the art without creative efforts
shall fall within the protection scope of the present disclosure.

FIG. 1 is a front view of an automatic medicine distributor according to an
embodiment of the present disclosure; FIG. 2 is a rear view of the automatic
20 medicine distributor provided by the embodiment of the present disclosure;
FIG. 3 is a side view of the automatic medicine distributor provided by the
embodiment of the present disclosure; FIG. 4 is a schematic structural diagram
of the automatic medicine distributor provided by the embodiment of the
present disclosure; and FIG. 5 is a schematic structural diagram showing a
25 sliding rack 200, a medicine taking device 3, a medicine collecting pocket 5,
and a medicine box fixing part 6 in the automatic medicine distributor provided
by the embodiment of the present disclosure.

As shown in FIG. 1- FIG. 5, the automatic medicine distributor provided by
30 this embodiment comprises: a medicine board placing rack 1, a sliding rack

200, a medicine taking device 3, a driving mechanism 7, a sharp tool 4 and a control mechanism; the medicine board placing rack 1 is provided with a plurality of medicine storing sections 100, and the plurality of medicine storing sections 100 is configured for storing different types of medicine boards, the sharp tool 4 is connected to the medicine board placing rack; the sliding rack 200 is arranged opposite to the medicine board placing rack, the driving mechanism 7 is arranged on the sliding rack 200, the medicine taking device 3 is connected to the driving mechanism 7, the driving mechanism 7 is configured for driving the medicine taking device 3 to move relative to the sliding rack 200; the position information of the medicine storing section 100 corresponding to each medicine board is pre stored in a control mechanism, the control mechanism is communicatively connected with the driving mechanism 7, the control mechanism is configured for receiving a medicine taking instruction and controlling the action of the driving mechanism 7, so that the driving mechanism 7 drives the medicine taking device 3 to move to the corresponding medicine storing section 100 relative to the sliding rack 200; the control mechanism is electrically connected with the medicine taking device 3; the control mechanism is electrically connected with the medicine taking device 3, the control mechanism can control the medicine taking device 3 to take medicine, and control the medicine taking device 3 to move relative to the sharp tool 4, so that the sharp tool 4 cuts open the protective film at the corresponding medicine on the medicine board to make the medicine fall out.

Before taking medicine, a label is set on the medicine storing section 100, the name of the medicine stored in the medicine storing section 100 is marked on the label, the medicine boards of the corresponding types of medicines are placed in the corresponding medicine storing sections 100, and the position information of the medicine storing section 100 corresponding to each medicine is preset in the control mechanism. At the same time, a medicine box (not

shown in the figure) is arranged under the medicine taking device 3 to receive the medicine dropped from the medicine board.

Optionally, the driving mechanism 7 includes a controller and an input terminal. The input terminal may be a computer, a mobile phone or a control panel, etc., and the input terminal is electrically connected with the controller.

It should be noted that the controller can be a PLC (Programmable Logic Controller), a single-chip microcomputer, or a microcomputer, etc. PLC is a kind of digital operation electronic system specially designed for application in industrial environment. It uses a programmable memory to store instructions for performing logic operations, sequence control, timing, counting and arithmetic operations, and control various types of mechanical equipment or production process through digital or analog input and output.

When the automatic medicine distributor provided in this embodiment is in use, since the position information of the medicine storing section 100 corresponding to each medicine board is pre-stored in the control mechanism, the medicine taking instruction is input on the driving mechanism 7, including the type of medicine taken and the quantity of medicine taken, the control mechanism can control the action of the driving mechanism 7 according to the medicine taking instruction, so that the driving mechanism 7 drives the medicine taking device 3 to move relative to the sliding rack 200 to the medicine storing section 100 according to the medicine taking instruction, and controls the medicine taking device 3 to take the type of medicine matching the medicine taking instruction, and then controls the movement of the medicine taking device 3 relative to the sharp tool 4 so that the sharp tool 4 cuts open the protective film at the corresponding medicine on the medicine board to take out a quantity of medicine that matches the medicine taking

instruction.

Therefore, according to the prescription information issued by a doctor, the medical staff can first input the quantity and type of the first medicine in the prescription information at the input terminal. After the controller receives the above medicine taking instruction, it will control the action of the driving mechanism 7 and the medicine taking device 3, take the type and quantity of the medicine corresponding to the medicine taking instruction into the medicine box. When the medicine taking is completed, the control mechanism controls the driving mechanism 7 and medicine taking device 3 to return the medicine board back to the original position of the medicine storing section 100. Then the medical staff inputs the quantity and type of the second medicine in the prescription information on the input terminal. After the controller receives the second medicine taking instruction, it will control the action of the driving mechanism 7 and the medicine taking device 3 to take the type and quantity of the medicine corresponding to the second medicine taking instruction into the medicine box. After the medicine is taken, the control mechanism controls the action of the driving mechanism 7 and the medicine taking device 3 to move the medicine board back to the original position of the medicine storing section 100; and so on, the third medicine and more medicines in the prescription information are all taken in accordance with the above-mentioned operation sequence, and the work of taking medicines based on the prescription information issued by the doctor can be completed.

Since the automatic medicine distributor provided by the present disclosure takes medicine by receiving medicine taking instructions, compared with manual medicine dispensing, the type and quantity of medicine(s) taken are more accurate, and the problem of wrong dosage and type of medicine is less likely to occur. It not only reduces the labor intensity of dispensing medicines, but also improves the safety of dispensing medicines.

Wherein, the sharp tool 4 can be a sharpener such as a scalpel or a needle, so as to effectively cut open the protective film corresponding to the medicine on the medicine board to make the medicine fall out.

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Of course, the sharp tool 4 can also be a hammer. When the medicine board is moved to the position of the hammer under the drive of the medicine taking device 3, the hammer can press the medicine board on the side facing away from the protective film to squeeze the medicine at the corresponding position of the hammer towards the protective film, crush the protective film, and the medicine will fall out.

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Optionally, multiple prescription information issued by a doctor may be preset in the controller, and each prescription information corresponds to multiple different types and quantities of medicines. A technician can input the program to the controller so that when a medical staff inputs a certain prescription information at the input terminal, the controller will control the action of the driving mechanism 7 and the medicine taking device 3 according to the received medicine taking instruction, and sequentially take the medicines into the medicine box according to the corresponding medicine quantity in the prescription information.

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Of course, the technician can input a program to the controller, so that when the medical staff inputs the number of medicine boxes and prescription information at the input terminal, the controller can control the action of the driving mechanism 7 and the medicine taking device 3, and complete multiple medicines taking process in turn according to the prescription information, multiple medicines are taken into multiple medicine boxes, so that the medical staff can input information once, and can complete multiple taking of one prescription to meet the multi-day dosage of the same patient, thereby

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increasing the dispensing efficiency of the automatic medicine distributor.

FIG. 6 is a schematic structural diagram of cooperation of the medicine taking device 3 and the medicine collecting pocket 5 of the automatic medicine distributor provided by the embodiment of the present disclosure; FIG. 7 is an exploded view showing the medicine taking device 3 and the medicine collecting pocket 5 of the automatic medicine distributor provided by the embodiment of the present disclosure; FIG. 8 is a bottom view of the medicine taking fork 35 in the automatic medicine distributor provided by the embodiment of the present disclosure.

Optionally, in order for the controller to control the medicine taking device 3 to take medicines, the medicine taking device 3 can smoothly take out the medicine board from the corresponding medicine storing section 100, in the automatic medicine distributor provided in this embodiment, as shown in Figures 3 - 8, the medicine taking device 3 comprises a medicine taking fork 35 and a driving assembly 300; one end of the driving assembly 300 is connected to the sliding rack 200, and the other end is connected to the medicine taking fork 35. The driving assembly 300 is configured to drive the medicine taking fork 35 to move in a direction perpendicular to the medicine board placing rack 1.

The driving assembly 300 is connected to the driving mechanism 7, and the driving mechanism 7 controls the driving assembly 300 to move relative to the sliding rack 200, so as to drive the medicine taking fork 35 to move relative to the sliding rack 200.

Optionally, the driving assembly 300 may be an electric push rod, one end of the electric push rod is connected to the sliding rack 200, and the other end is connected to the medicine taking fork 35. The length direction of the

electric push rod is perpendicular to the plane of the medicine board placing rack 1.

Optionally, the driving assembly 300 is in communication connection with the
5 controller. When the driving mechanism 7 drives the electric push rod to move
to the medicine storing section 100 corresponding to the medicine type of the
medicine taking instruction, the controller controls the electric push rod to
extend so that the electric push rod pushes the medicine taking fork 35 into
the medicine storing section 100 to take the medicine board, and then the
10 controller controls the electric push rod to retract to carry the medicine
board out; then, the controller controls the driving mechanism 7 to move the
medicine taking device 3 above the sharp tool 4, and at the same time, the
controller continues to control the electric push rod to carry the medicine
taking fork 35 to move relative to the sharp tool 4, so that the sharp tool
15 4 cuts open the protective film at the corresponding medicine on the medicine
board, so that a quantity of medicine matching the medicine taking instruction
falls into the medicine box.

Optionally, the driving assembly 300 includes a connecting part 31, a base
20 32, a first motor 33 and a gear 34. One end of the connecting part 31 is
connected to the sliding rack 200, and the other end is connected to the base
32; the first motor 33 is mounted on the base 32, the first motor 33 is
electrically connected with the control mechanism, and the output shaft of
the first motor 33 is connected to the gear 34, the gear 34 rotates with the
25 rotation of the output shaft of the first motor 33; the medicine taking fork
35 and the base 32 slidably fit in a direction perpendicular to the plane of
the medicine board placing rack 1, and the medicine taking fork 35 is provided
with a gear rack 3512, the gear 34 is engaged with the gear rack 3512.

30 The action of the first motor 33 is controlled by the control mechanism, so

that the first motor 33 drives the gear 34 to rotate. Since the gear 34 cooperates with the gear rack 3512 on the medicine taking fork 35, the medicine taking device 3 can be moved relative to the base 32. Therefore, When the control mechanism controls the action of the first motor 33, the medicine taking fork 35 can be approached to or away from the medicine board placing rack 1 in a direction perpendicular to the medicine board placing rack 1, so as to complete the medicine taking work or return and place the medicine board on the medicine board placing rack 1.

10 Optionally, in order to enable the medicine taking fork 35 to be better matched with the driving assembly 300, so that the driving assembly 300 drives the medicine taking fork 35 to move smoothly in a direction perpendicular to the medicine board placing rack to complete the medicine taking work, in the provided automatic medicine distributor, as shown in FIG. 7, the medicine taking fork 35 comprises a moving plate 351 and a fork body 352; the moving plate 351 is connected to the fork body 352, and a groove 3511 is provided on one surface of the moving plate 351 close to the base 32; the groove 3511 extends along the length of the moving plate 351, that is, along the direction perpendicular to the medicine board placing rack 1, the width of the groove 3511 extends along the width direction of the moving plate 351, the gear rack 3512 is provided on a side wall of the groove 3511 in the width direction of the groove 3511, the gear 34 is arranged in the groove 3511, and the gear 34 meshes with the gear rack 3512.

25 Optionally, two rows of fork bodies 352 can be arranged, and the two rows of fork bodies 352 jointly define a clamping area for clamping the medicine board. There are multiple fork bodies 352 in each row. When the first motor 33 drives the gear 34 to rotate and the gear 34 meshes with the gear rack 3512, the moving plate 351 carries the fork bodies 352 to move in a direction perpendicular to the medicine board placing rack. When taking the medicine,

the medicine board is clamped between the two rows of fork bodies 352. Therefore, when the medicine taking device 3 moves relative to the sharp tool 4, the protective film of the medicine board can be cut better by the sharp tool 4.

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Optionally, in order to ensure that the automatic medicine distributor takes medicine more accurately, to avoid an error caused by the medical staff when storing the medicine board in the medicine storing section 100, and at the same time to avoid a medicine quantity dispensing error. In the automatic medicine distributor provided in this embodiment, as shown in FIG. 7, the automatic medicine distributor further comprises a top cover 36 and a medicine collecting pocket 5; the medicine collecting pocket 5 is arranged under the base 32, the medicine collecting pocket 5 is connected to the connecting part 31, the base 32 is provided with a medicine dropping hole 321, and the medicine collecting pocket 5 is arranged corresponding to the medicine dropping hole 321. The medicine dropping hole 321 may be a square hole penetrating through the base 32; an opening is provided on the bottom of the medicine collecting pocket 5, and a baffle is provided at the opening. The baffle is connected to a third driving member 51, the third driving member 51 is configured to drive the baffle to move relative to the medicine collecting pocket 5 to open or close the opening. The top cover 36 is located above the medicine taking fork 35, and the top cover 36 is connected to the base 32. The top cover 36 and the base 32 jointly clamp the moving plate 351 of the medicine taking fork 35, so as to make the moving plate 351 more secured, so that the sliding movement is more stable.

Optionally, a first camera 361 is provided on the top cover 36, and the first camera 361 is communicatively connected to the control mechanism; the image information of each medicine is pre-stored in the control mechanism; the first camera 361 is configured to obtain the image information of the medicine in

the medicine board on the medicine taking fork 35, and transmit the image information to the control mechanism. The control mechanism judges and records the quantity of the medicine in the medicine board at this time, and compares the medicine image in the medicine board on the medicine fork 35 with the
5 medicine image corresponding to the medicine taking instruction. When the compared images are the same, the control mechanism controls the action of the first motor 33 to drive the medicine taking fork 35 to move relative to the sharp tool 4, so as to make the sharp tool 4 cutting open the protective film of the medicine board corresponding to the medicine. The first camera
10 361 is also configured to obtain the quantity of medicine in the medicine board on the medicine taking fork 35 after the medicine is dissected, and transmit the quantity information to the control mechanism. The control mechanism records the quantity of medicine in the medicine board at this time, and calculates the difference of the quantity of medicine in the medicine
15 board before taking medicine and the medicine in the medicine board after taking medicine. The difference of the quantity is compared with the quantity of medicine taken in the medicine taking instruction. When this difference matches the medicine taking instruction, the control mechanism controls the third driving member 51.

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The quantity of medicines in the medicine board on the medicine taking fork 35, after the above-mentioned medicine is dissected, refers to the quantity of remaining medicines in the medicine board on the medicine taking fork 35 after the protective film of the corresponding medicine in the medicine board
25 is cut through the sharp device 4 and the corresponding medicine falls from the medicine board.

Optionally, the third driving member 51 may be an electric push rod.

30 The medicine box is arranged corresponding to the above-mentioned opening,

and is configured to receive the medicine(s) falling from the opening of the medicine collecting pocket; it should be noted that the inner wall of the medicine collecting pocket 5 includes at least one inclined wall with an obtuse angle to the horizontal plane, and the medicine falls on the inclined wall afterwards, it has a tendency to automatically slide to the opening under the action of gravity, which is convenient for the medicine to fall into the medicine box from the opening.

Optionally, the automatic medicine distributor further comprises an alarm (not shown in the figure), and the control mechanism is electrically connected to the alarm.

When the medicine taking device 3 finishes taking medicine, the controller controls the first camera 361 to acquire the image and quantity of the medicines in the medicine board on the medicine taking fork 35, and transmits the image information and quantity information to the control mechanism, and the control mechanism records the quantity of the medicine n1 in the medicine board at this time, the control mechanism compares the medicine image in the medicine board on the medicine taking fork 35 with the medicine image corresponding to the medicine taking instruction, when the medicine images are the same, the control mechanism controls the action of the first motor 33 to drive the medicine taking fork 35 to move relative to the sharp tool 4 so that the sharp tool 4 cuts open the protective film of the medicine board corresponding to the medicine; when the medicine images are different, the control mechanism controls the alarm to alert the medical staff to check whether the medicine is wrong and avoid medical accidents caused by the wrong type of medicine. This ensures the accuracy of the type of medicine dispensed by the automatic medicine distributor.

When the control mechanism controls the medicine taking fork 35 to move

relative to the sharp tool 4, so that the sharp tool 4 cuts open the protective film of the medicine board corresponding to the medicine to expose the medicine corresponding to the medicine taking instruction, the first camera 361 continues to acquire the quantity of medicines in the medicine board on the medicine taking fork 35 at this time, and transmit the quantity information to the control mechanism. The control mechanism records the quantity of medicines n_2 in the medicine board at this time, calculates the difference between n_1 and n_2 , and compares the difference with the medicine taking quantity in the medicine taking instruction. When the difference matches the medicine taking instruction, the control mechanism controls the action of the third driving member 51 on the medicine collecting pocket 5 to move the baffle on the medicine collecting pocket 5 to open the opening, so that the medicines in the medicine collecting pocket 5 fall into the medicine box through the opening. This further ensures the accuracy of the dispensing amount of the automatic medicine distributor.

Optionally, in order to enable the driving mechanism 7 to better drive the medicine taking device 3 to slide relative to the sliding rack 200, so that the medicine taking device 3 moves to the medicine storing section 100 corresponding to the medicine type of the medicine taking instruction, in the automatic medicine distributor provided by this embodiment, as shown in Figures 1 and 3 to 5, the sliding rack 200 comprises a bracket 2, a vertical sliding rod 21, a horizontal sliding rod 22, a first sliding block 212 and a second sliding block 222.

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Optionally, the bracket 2 may be a rectangular parallelepiped frame, and the medicine board placing rack 1 is fixed on the bracket 2. The vertical sliding rod 21 is arranged in the vertical direction, and the vertical sliding rod 21 is connected to the bracket 2, the horizontal sliding rod 22 is arranged in the horizontal direction, the horizontal sliding rod 22 and the vertical

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sliding rod 21 are connected by the first sliding block 212, the medicine taking device 3 is connected to the horizontal sliding rod 22 through the second sliding block 222. The driving mechanism 7 comprises a first driving member 211 and a second driving member 221; the first driving member 211 is arranged on the vertical sliding rod 21 and connected to the first sliding block 212, and the first driving member 211 is configured to drive the first sliding block 212 to slide along the length of the vertical sliding rod 21; the second driving member 221 is arranged on the horizontal sliding rod 22 and connected to the second sliding block 222, and the second driving member 221 is configured to drive the second sliding block 222 to slide along the length direction of the horizontal sliding rod 22, so as to realize the sliding of the medicine taking device 3 relative to the medicine board placing rack 1 in the horizontal direction and the vertical direction.

It should be noted that the first driving member 211 and the second driving member 221 may be an electric push rod, a hydraulic cylinder, a pneumatic cylinder, or the like.

In addition, two vertical sliding rods 21 may be provided, and the two vertical sliding rods are arranged in parallel at intervals, and the horizontal sliding rod 22 is slidably connected with the two vertical sliding rods 21 at the same time, this improves the running stability of the horizontal sliding rod 21.

Optionally, the first sliding block 212 is sleeved outside the vertical sliding rod 21; and/or the second sliding block 222 is sleeved outside the horizontal sliding rod 22, the sliding block and the sliding rod are closely and reliably matched, and sliding more smoothly.

When the medicine storing section 100 matching the medicine taking instruction

is located above the medicine taking device 3, the control mechanism will control the first driving member 211 to drive the first sliding block 212 to slide upward along the length of the vertical sliding rod 21. When the medicine storing section 100 matching the medicine instruction is located below the medicine taking device 3, the control mechanism will control the first driving member 211 to drive the first sliding block 212 to slide down along the length of the vertical sliding rod 21. When the matched medicine storing section 100 is located on the left of the medicine taking device 3, the control mechanism will control the second driving member 221 to drive the second sliding block 222 to slide to the left along the length of the horizontal slide rod 22. When the medicine storing section 100 is located on the right side of the medicine taking device 3, the control mechanism will control the second driving member 221 to drive the second sliding block 222 to slide to the right along the length of the horizontal sliding rod 22, so that the medicine taking device 3 moves to the corresponding position of the medicine storing section 100 matching the medicine taking instruction.

In addition, it should be noted that the movement sequence of the medicine taking device 3 driven by the driving mechanism 7 in the horizontal direction or the vertical direction is not limited.

Optionally, in order to facilitate the medical staff to place the medicine board in the medicine storing section 100, and to facilitate the medicine taking device 3 to take medicine(s) from the medicine storing section 100 and return the medicine(s), the automatic medicine distributor provided in this embodiment, as shown in the Figures 2-4 and 9, the medicine storing section 100 comprises a storage compartment 11 and a medicine board storing part 12 arranged on the medicine board placing rack 1; the storage compartment 11 is connected to the medicine board placing rack 1; the medicine board storing part 12 is arranged in the storage compartment 11, and the medicine board

storing part 12 is detachably connected to the storage compartment 11. For example, the storage compartment 11 is provided with a sliding opening, and the medicine board storing part 12 is slidably matched with the sliding opening to form a drawer-like fitting structure, it is convenient for the
5 medicine board storing part 12 to be stored in or drawn out from the storage compartment 11; the medicine board storing part 12 is provided with a medicine taking port 123, and the medicine taking port 123 is arranged in the medicine board storing part 12 close to one side of the medicine taking device 3, the medicine taking device 3 is configured to take out the medicine board from
10 the medicine taking port 123 or put the medicine board into it.

With reference to Figures 2 and 9, optionally, the medicine board storing part 12 comprises an end plate 121 and two side plates 122. One end of the two side plates 122 is respectively connected to the end plate 121, and one
15 side of the two side plates 122 away from the end plate 121 jointly defines the medicine taking port 123; the inner wall of each side plate 122 is provided with a slot 1221, and the slot 1221 is configured to support the medicine board.

20 It should be noted that the number of slots 1221 on each side plate 122 is multiple, and the multiple slots 1221 are arranged at intervals in the vertical direction, and each slot 1221 extends along a direction perpendicular to the medicine board placing rack 1.

25 Optionally, a handle 1211 is provided on one side of the end plate 121 away from the medicine taking port 123.

When the medical staff needs to put medicine into the medicine board storing part 12, firstly, by pulling the handle 1211, the medicine board storing part
30 12 is moved away from the medicine taking device 3, and the medicine board

storing part 12 is pulled out from the storage compartment 11; then, the medicine board to be added is clamped into the slots 1221, so that one side of the medicine board is placed in the slot 1221 of one side plate 122, and the other side of the medicine board is placed in the slot 1221 of the other side plate 122. This not only realizes the support and placement of the medicine board by the medicine board storing part 12, but also does not fix the medicine board, that is, the medicine board can slide along the extending direction of the slots 1221. It is more convenient when taking and returning medicine by the medicine taking device 3.

Optionally, a limiting block 1222 is provided on one side of each of the two side plates 122 close to the end plate 121; the limiting block 1222 and the side plate 122 are integrally formed, and the limiting block 1222 is configured to limit the position of the medicine board storing part 12 relative to the storage compartment 11. When the medicines are placed, push the medicine board storing part 12 into the storage compartment 11. Because the limiting block 1222 is provided at the side of the side plate 122 near the end plate 121, when pushing the medicine board storing part 12 relative to the storage compartment 11, the problem of pushing the medicine board storing part 12 out of the storage compartment 11 due to excessive force can be avoided.

It should be understood that the limiting block 1222 can also be provided on only one side plate 122, which can also limit the position of the medicine board storing part 12 relative to the storage compartment 11, and prevent the medicine board storing part 12 from being pushed out from the storage compartment 11 along the pushing direction when it is pushed into the storage compartment 11.

Optionally, in order to facilitate the fixation of the medicine box containing the medicines, in the automatic medicine distributor provided in this

embodiment, as shown in Figures 3 - 5, the automatic medicine distributor further comprises a medicine box fixing part 6; the medicine box fixing part 6 is arranged under the medicine taking device 3 and connected to the bracket 2. A second camera 52 is provided at the bottom of the medicine collecting pocket 5, and the second camera 52 is electrically connected to the control mechanism; different prescription information and QR code information are pre-stored in the control mechanism, and each of the QR code information corresponds to one prescription Information; the second camera 52 is configured to acquire the QR code image information on the medicine box, and transmit the QR code image information to the control mechanism, the control mechanism matches the QR code image information to the corresponding prescription information, and controls the action of the driving mechanism 7 and the medicine taking device 3 according to the prescription information.

It should be noted that a variety of prescription information and QR code information issued by a doctor can be preset in the controller, each of the QR code information corresponds to one prescription information, and each prescription information corresponds to a plurality of different types and quantities of medicines. The technician can input a program to the controller, so that after the second camera 52 scans the QR code image on the medicine box, the QR code image information is transmitted to the control mechanism, and the control mechanism matches the QR code image information with the corresponding prescription information, the control mechanism controls the actions of the driving mechanism 7 and the medicine taking device 3 according to the above-mentioned prescription information instructions, and sequentially takes multiple medicines in the prescription information into the medicine box according to the corresponding medicine quantity in the prescription information.

In this way, you only need to print the corresponding QR code directly on the

medicine box according to the prescription information issued by the doctor in advance, or the medical staff can paste the corresponding QR code on the medicine box according to the prescription information issued by the doctor. No need to input information at the input terminal, which is more convenient
5 for the medical staff and greatly saves the workload of the medical staff, and improves the efficiency and accuracy of dispensing.

Finally, it should be noted that the above embodiments are only used to illustrate the technical solution of the present disclosure, but not limited
10 thereto. Although the present disclosure has been described in detail with reference to the foregoing embodiments, those skilled in the art should understand that: the technical solutions described in the foregoing embodiments can still be modified, or some or all of the technical features can be equivalently replaced; and these modifications or replacements do not
15 deviate the essence of the corresponding technical solutions from the scope of the technical solutions of the embodiments of the present disclosure.

Industrial applicability:

In summary, the present disclosure provides an automatic medicine distributor
20 with low labor intensity, high medicine dispensing efficiency and high accuracy.

CLAIMS

1. An automatic medicine distributor, characterized in that, the automatic medicine distributor comprises: a medicine board placing rack, a sliding
5 rack, a medicine taking device, a driving mechanism, a sharp tool and a control mechanism;

the medicine board placing rack is provided with a plurality of medicine storing sections, the plurality of medicine storing sections are
10 configured to store medicine boards, and the sharp tool is connected to the medicine board placing rack;

the sliding rack is arranged opposite to the medicine board placing rack, the medicine taking device is connected to the driving mechanism, and the
15 driving mechanism is configured to drive the medicine taking device to move relative to the sliding rack;

a position information of the medicine storing section corresponding to each medicine board is pre-stored in the control mechanism, the control
20 mechanism is connected to the driving mechanism, and the control mechanism is configured to receive a medicine taking instruction and control the driving mechanism to drive the medicine taking device to move to the corresponding medicine storing section relative to the sliding rack;

the control mechanism is connected to the medicine taking device, and the control mechanism controls the medicine taking device to take medicines, and controls the movement of the medicine taking device relative to the sharp tool, so that the sharp tool cuts open the protective film at the
25 corresponding medicine on the medicine board to make the medicine fall out.
30

2. The automatic medicine distributor according to claim 1, wherein the medicine taking device comprises a medicine taking fork and a driving assembly;

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one end of the driving assembly is connected to the sliding rack, and the other end is connected to the medicine taking fork, and the driving assembly is configured to drive the medicine taking fork to move in a direction perpendicular to the medicine board placing rack;

10

the control mechanism is connected to the driving assembly in communication.

3. The automatic medicine distributor according to claim 2, wherein the driving assembly comprises a connecting part, a base, a first motor and a gear;

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the connecting part is simultaneously connected with the sliding rack and the base;

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the first motor is arranged on the base, and the first motor is communicatively connected to the control mechanism, and the output shaft of the first motor is fixedly connected to the gear;

25

the medicine taking fork is provided with a gear rack, the medicine taking fork is slidably matched with the base, and the gear is meshed with the gear rack.

30

4. The automatic medicine distributor according to claim 3, wherein the medicine taking fork comprises a moving plate and a fork body connected to each other;

the moving plate is slidably matched with the base, and a groove is formed on one surface of the moving plate close to the base; the gear rack is arranged on a side wall of the groove, and the gear is arranged in the groove.

5. The automatic medicine distributor according to claim 4, wherein two rows of fork bodies are provided, the two rows of the fork bodies are arranged on the moving plate at intervals, and the two rows of the fork bodies jointly define a clamping area configured to clamp the medicine board.

6. The automatic medicine distributor according to claim 4 or 5, wherein the automatic medicine distributor further comprises a top cover and a medicine collecting pocket;

the medicine collecting pocket is arranged under the base, and the medicine collecting pocket is connected to the connecting part, the base is provided with a medicine dropping hole, and the medicine collecting pocket is arranged corresponding to the medicine dropping hole;

the bottom of the medicine collecting pocket is provided with an opening, and a baffle is provided at the opening, and a third driving member is connected to the baffle, the third driving member is configured to drive the baffle to move relative to the medicine collecting pocket to open or close the opening;

the top cover is connected to the base, a first camera is arranged on the top cover, and the first camera is connected to the control mechanism;

the image information of each medicine is pre-stored in the control mechanism;

the first camera is configured to acquire an image information of the medicine in the medicine board on the medicine taking fork and transmit the image information to the control mechanism, the control mechanism judges and records the quantity of medicines in the medicine board at this time, and the control mechanism compares the medicine image in the medicine board on the medicine taking fork with the medicine image corresponding to the medicine taking instruction; when the medicine image in the medicine board on the medicine picking fork is the same as the medicine image corresponding to the medicine taking instruction, the control mechanism controls the first motor to drive the medicine taking fork to move relative to the sharp tool, so that the sharp tool cuts open the protective film of the medicine board corresponding to the medicine;

the first camera is configured to acquire the quantity information of the medicine in the medicine board on the medicine taking fork after the medicine is dissected, and transmit the quantity information to the control mechanism, and the control mechanism records the quantity of the medicines in the medicine board at this time, and calculates the difference between the quantity of medicines in the medicine board before taking medicine and the quantity of medicines in the medicine board after taking medicine, and compares the difference with the quantity of medicines in the medicine taking instruction, when the difference matches the medicine taking instruction, the control mechanism controls the third driving part to move the baffle away from the opening.

7. The automatic medicine distributor according to claim 6, wherein a second camera is provided at the bottom of the medicine collecting pocket, and the second camera is communicatively connected with the control mechanism;

different prescription information and QR code information are pre-stored in the control mechanism, and each of the QR code information corresponds to one prescription information;

the second camera is configured to acquire the QR code image information on the medicine box, and transmit the QR code image information to the control mechanism, and the control mechanism matches the QR code image information to the corresponding prescription information, and controls actions of the driving mechanism and the medicine taking device according to the prescription information.

8. The automatic medicine distributor according to claim 6 or 7, wherein the moving plate is clamped between the top cover and the base.

9. The automatic medicine distributor according to any one of claims 1-8, wherein the sliding rack comprises a bracket, a vertical sliding rod, a horizontal sliding rod, a first sliding block and a second sliding block;

the medicine board placing rack is connected to the bracket, the vertical sliding rod is arranged in a vertical direction, and the vertical sliding rod is connected to the bracket, the horizontal sliding rod is arranged in a horizontal direction, the horizontal sliding rod and the vertical sliding rod are connected by the first sliding block, and the medicine taking device is connected to the horizontal sliding rod by the second sliding block;

the driving mechanism comprises a first driving member and a second driving member;

5 the first driving member is arranged on the vertical sliding rod, and the first driving member is connected with the first sliding block, and the first driving member is configured to drive the first sliding block to slide along the length of the vertical sliding rod;

10 the second driving member is arranged on the horizontal sliding rod, and the second driving member is connected to the second sliding block, and the second driving member is configured to drive the second sliding block to slide along the length of the horizontal sliding rod.

15 10. The automatic medicine distributor according to claim 9, wherein the first driving member is an electric push rod, an air cylinder or a hydraulic cylinder; and/or the second driving member is an electric push rod, an air cylinder or a hydraulic cylinder.

20 11. The automatic medicine distributor according to claim 9 or 10, wherein the first sliding block is sleeved outside the vertical sliding rod; and/or the second sliding block is sleeved outside the horizontal sliding rod.

25 12. The automatic medicine distributor according to any one of claims 9-11, wherein the number of the vertical sliding rods is two, and the two vertical sliding rods are arranged at parallel intervals, and the horizontal sliding rod is slidably matched with the two vertical sliding rods at the same time.

13. The automatic medicine distributor according to any one of claims 9-12, wherein the automatic medicine distributor further comprises a medicine box fixing part;

5 the medicine box fixing part is arranged below the medicine taking device, and the medicine box fixing part is connected to the bracket.

14. The automatic medicine distributor according to any one of claims 1-13, wherein the medicine storing section comprises a storage compartment and
10 a medicine board storing part;

the storage compartment is connected to the medicine board placing rack;

the medicine board storing part is arranged in the storage compartment,
15 and the medicine board storing part is detachably connected to the storage compartment;

the medicine board storing part is provided with a medicine taking port, and the medicine taking port is arranged on one side of the medicine board
20 storing part close to the medicine taking device.

15. The automatic medicine distributor according to claim 14, wherein the medicine board storing part comprises an end plate and two side plates, one side of the two side plates is respectively connected to the end plate,
25 and the medicine taking port is formed between the two side plates on the side away from the end plate;

the inner walls of the two side plates are successively provided with slots horizontally extending from top to bottom, and the slots are
30 configured to support the medicine board.

16. The automatic medicine distributor according to claim 14 or 15, wherein the storage compartment is provided with a sliding opening, and the medicine board storing part is slidably matched with the sliding opening.

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17. The automatic medicine distributor according to claim 16, wherein a limiting block is provided on the medicine board storing part, and the limiting block is configured to resist the storage compartment, thereby restricting the position of the medicine board storing part relative to the storage compartment when the medicine board storing part is inserted into the sliding opening.

10

18. The automatic medicine distributor according to claim 17, wherein a plurality of the limiting blocks is provided, and the plurality of limiting blocks are arranged at intervals along the circumferential direction of the medicine taking port.

15

19. The automatic medicine distributor according to any one of claims 14-18, wherein the medicine board storing part further comprises a handle, and the handle is connected to the end plate and is located on the side of the end plate away from the medicine taking port.

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20. The automatic medicine distributor according to any one of claims 1-19, wherein the automatic medicine distributor further comprises an alarm, the alarm is connected with the controller in communication, and the alarm alarms when the information or quantity of the medicine obtained by the medicine taking device is wrong.

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