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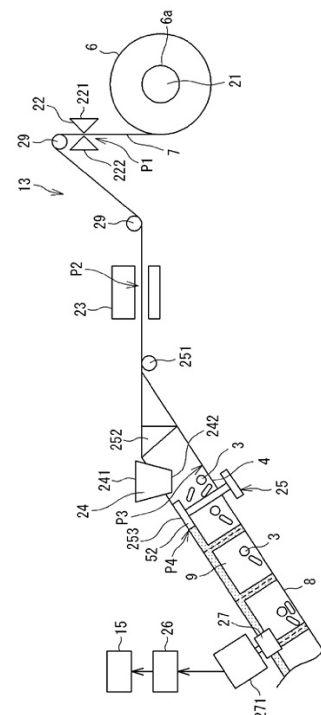
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(54) **MEDICINE PACKAGING DEVICE, MEDICINE PACKAGING METHOD, AND ROLL**

(57) In order to allow use of even a roll of a packaging sheet including a splice, provided is a medicine packaging device (10), including: a support portion (21) configured to support a roll (6) of a packaging sheet (7); a hopper (24) configured to guide a medicine to the packaging sheet (7) fed from the roll (6); a packaging portion (25) configured to package the medicine in the packaging sheet (7); and a splice sensor (22), which is provided on an upstream side of the hopper (24) in a feeding direction for the packaging sheet (7), and is configured to detect a splice (5) of the packaging sheet (7) fed from the roll (6).

FIG. 3



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Description

Technical Field

[0001] The invention of the present disclosure relates to a medicine packaging device, a medicine packaging method, and a roll of a packaging sheet to be used for the device and the method.

Background Art

[0002] There has been known a medicine packaging device that packages a medicine such as a tablet or a powdered medicine in a packaging sheet for each dose (each pack) based on a prescription to produce a medicine pack (see Patent Literature 1).

Citation List

Patent Literature

[0003] [PTL 1] JP 2008-273624 A

Summary of Invention

Technical Problem

[0004] In the medicine packaging device as described above, the packaging sheet is fed from a roll of the packaging sheet. One dose unit of a medicine is supplied to a subsequent packaging portion of the packaging sheet, which is to be one medicine pack, and the medicine is packaged in the packaging sheet (the subsequent packaging portion). This operation is repeatedly performed to produce a strip of medicine packs. Each of the medicine packs may have a patient's name, a medicine name, administration instructions on when to take the medicine (for example, morning, midday, evening, before meals, after meals, or the like), and the like, which are printed thereon.

[0005] The roll of the packaging sheet is manufactured from a roll stock in a roll manufacture factory. The roll stock may include a splice between packaging sheets. A plurality of rolls are manufactured from the roll stock including a splice. In this case, the rolls are manufactured so as not to include the splice, thus resulting in a low yield.

[0006] Meanwhile, when a roll including a splice is formed and the medicine packaging device uses the roll to produce medicine packs, the splice appears on one of the medicine packs at a certain time. The medicine pack having the splice may be unacceptable for pharmacists and patients because, for example, it is difficult (for a pharmacist) to check a medicine in the medicine pack, and the medicine pack having the splice has an unattractive appearance.

[0007] Accordingly, the present disclosure has an object to provide novel technical means that allows use of even a roll of a packaging sheet including a splice.

Solution to Problem

[0008] According to the present disclosure, there is provided a medicine packaging device roll, including: a support portion configured to support a roll of a packaging sheet; a guide configured to guide a medicine to the packaging sheet fed from the roll; a packaging portion configured to package the medicine in the packaging sheet; and a splice sensor, which is provided on an upstream side of the guide in a feeding direction for the packaging sheet, and is configured to detect a splice of the packaging sheet fed from the roll.

[0009] According to the present disclosure, there is provided a medicine packaging method, including: an introducing step of introducing a medicine to a packaging sheet fed from a roll of the packaging sheet; and a packaging step of packaging the medicine that has been introduced, in the packaging sheet. A splice of the packaging sheet fed from the roll is detected before reaching an introducing position at which the medicine is introduced to the packaging sheet. When the splice is detected, a process for medicine packaging that is different from a process performed in a case in which the packaging sheet has no splice is performed.

[0010] According to the present disclosure, there is provided a roll, which is formed by winding a packaging sheet. The packaging sheet includes: a first sheet; a second sheet connected to the first sheet with presence of a splice therebetween; and a mark on the splice.

Advantageous Effects of Invention

[0011] According to the medicine packaging device and the medicine packaging method of the present disclosure, even the roll of the packaging sheet including the splice can be used for medicine packaging.

[0012] According to the roll of the present disclosure, the detection of the splice is facilitated, and a different process can be performed depending on the presence/absence of a splice. Thus, the roll can be used for medicine packaging.

Brief Description of Drawings

[0013]

FIG. 1 is an overall view for illustrating a medicine packaging device according to one embodiment.

FIG. 2 is a perspective view of a packaging unit of the medicine packaging device.

FIG. 3 is a schematic view of the packaging unit.

FIG. 4 is an explanatory view of an example of a medicine pack strip.

FIG. 5 is an explanatory view of a packaging sheet.

FIG. 6 is an explanatory view of the packaging sheet.

FIG. 7 is an explanatory diagram of a sensor.

FIG. 8 is an explanatory view for illustrating one example of a heat sealing portion.

FIG. 9 is an explanatory view when viewed in a direction along center axes of heater shafts.

FIG. 10 is an explanatory view when viewed in the direction along the center axes of the heater shafts.

FIG. 11 is a flowchart for illustrating an operation of the medicine packaging device.

FIG. 12A is a flowchart of a post-detection process.

FIG. 12B is a flowchart of the post-detection process.

FIG. 13 is an explanatory view for illustrating an example of the medicine pack strip.

FIG. 14 is an explanatory view for illustrating a modification example of the heat sealing portion.

Description of Embodiments

<Outline of Embodiment of Invention of Present Disclosure>

[0014] An outline of an embodiment of the invention of the present disclosure is listed and described below.

(1) A medicine packaging device of the present disclosure includes: a support portion that supports a roll of a packaging sheet; a guide for guiding a medicine to the packaging sheet fed from the roll; a packaging portion that packages the medicine in the packaging sheet; and a splice sensor, which is provided on an upstream side of the guide in a feeding direction for the packaging sheet, and is used for detecting a splice of the packaging sheet fed from the roll.

[0015] According to the medicine packaging device described above, when the packaging sheet fed from the roll includes the splice, the splice sensor detects the splice. A process for medicine packaging that is different from a process performed in a case in which the packaging sheet has no splice can be performed.

[0016] For example, when the packaging sheet has no splice, the medicine is introduced through the guide to the packaging sheet for each subsequent packaging portion, which is to be one medicine pack. The packaging portion packages the medicine in the packaging sheet. Meanwhile, when the packaging sheet has the splice and the splice has been detected, the process that is different from the process performed in the case in which the packaging sheet has no splice, for example, interrupting the packaging performed by the packaging portion or performing empty packaging by the packaging portion without introducing the medicine through the guide, can be performed.

[0017] Thus, even when the packaging sheet of the roll includes the splice, the medicine packaging device can use the roll for medicine packaging.

[0018] (2) It is preferred that: the medicine packaging device further include a printing portion, which is provided on the upstream side of the guide in the feeding direction for the packaging sheet, and performs printing on the

packaging sheet fed from the roll; and the splice sensor be provided on an upstream side of the printing portion in the feeding direction for the packaging sheet.

[0019] According to the configuration described above, the splice of the packaging sheet is detected before reaching a printing position for the printing portion. When the packaging sheet fed from the roll has the splice and the splice has been detected, printing that is different from printing performed in a case in which the packaging sheet has no splice can be performed on the packaging sheet.

[0020] For example, when the packaging sheet has no splice, words or letters indicating, for example, administration instructions for the medicine are printed in a pre-determined order based on prescription information for each subsequent packaging portion, which is to be one medicine pack. Meanwhile, when the packaging sheet has the splice and the splice has been detected, a printing process that is different from a printing process performed in a case in which the packaging sheet has no splice, for example, interrupting the printing or printing information indicating the presence of the splice (for example, the word "splice"), can be performed on the subsequent packaging portion including the splice.

[0021] (3) It is preferred that the medicine packaging device according to the above-mentioned item (1) or (2) further include a measurement portion for acquiring a feed amount of the packaging sheet.

[0022] According to the configuration described above, for example, the feed amount of the packaging sheet between the detection position at which the splice is detected by the splice sensor and the introducing position at which the medicine is introduced through the guide is acquired by the measurement portion. When the splice has been detected, for example, control for stopping the introduction of the medicine to the subsequent packaging portion including the splice is precisely performed.

[0023] (4) It is preferred that: the medicine packaging device according to any one of the above-mentioned items (1) to (3) include a sheet absence sensor that detects a terminal end of the packaging sheet fed from the roll; and the sheet absence sensor also serve as the splice sensor.

[0024] The above-mentioned configuration enables the detection of the splice and the detection of the absence of the packaging sheet with a single sensor.

[0025] (5) It is preferred that: the medicine packaging device according to any one of the above-mentioned items (1) to (4) include a control portion that executes various processes; and when the splice sensor detects the splice, the control portion be allowed to execute a comparison process of comparing a remaining number representing the number of required packages for the medicine and a packageable number representing the number of packs being produceable between a detection position for the splice sensor and a packaging position for the packaging portion.

[0026] With the configuration described above, when the splice has been detected, a different process for medicine packaging can be executed for each case.

[0027] (6) It is preferred that, in the medicine packaging device according to the above-mentioned item (5), when the remaining number is less than or equal to or less than the packageable number as a result of the comparison process, the control portion execute a normal process of continuing introduction of the medicine through the guide and the packaging performed by the packaging portion, for the remaining number.

[0028] With the configuration described above, even when the splice has been detected, the introduction of the medicine and the packaging are continued for the remaining number of packages required for the medicine and the remaining number of medicine packs are continuously produced.

[0029] (7) It is preferred that, in the medicine packaging device according to the above-mentioned item (5) or (6), when the remaining number is equal to or more than or more than the packageable number as a result of the comparison process, the control portion execute an exception process on a subsequent packaging portion including the splice in the packaging sheet.

[0030] With the configuration described above, when the splice has been detected and the remaining number is equal to or more than or more than the packageable number, the exception process, which is different from normal packaging, is executed.

[0031] (8) It is preferred that, in the medicine packaging device according to any one of the above-mentioned items (1) to (7), when the splice sensor detects the splice, introduction of the medicine through the guide into a subsequent packaging portion including the splice in the packaging sheet be stopped.

[0032] The configuration described above can stop the supply of the medicine to the subsequent packaging portion in synchronization with timing at which the splice reaches the introducing position for the medicine through the guide. Thus, no medicine is contained in the subsequent packaging portion having the splice. That is, the medicine pack including the splice is an empty medicine pack (empty pack) without the medicine.

[0033] A process of stopping the introduction of the medicine as described above may be executed as the exception process of the above-mentioned item (7).

[0034] (9) It is preferred that, in the medicine packaging device according to the above-mentioned item (8), the introduction of the medicine through the guide be further stopped for the subsequent packaging portion adjacent to the subsequent packaging portion including the splice.

[0035] It is conceivable that the splice appears in a region including a boundary between two adjacent subsequent packaging portions. Even in this case, the above-mentioned configuration reliably prevents the introduction of the medicine into the subsequent packaging portions including the splice.

[0036] (10) It is preferred that, in the medicine packa-

ging device according to the above-mentioned item (8) or (9), after the introduction of the medicine is stopped, the introduction of the medicine through the guide into the subsequent packaging portion to be subsequently sent to an introducing position for the medicine be resumed.

[0037] In the configuration described above, the medicine is not contained in the subsequent packaging portion including the splice. However, the medicine is introduced into the subsequent packaging portion that is to be subsequently sent to the introducing position for the medicine. The medicine pack containing the medicine is produced after the empty medicine pack.

[0038] (11) It is preferred that, in the medicine packaging device including the printing portion, when the splice sensor detects the splice, the printing portion print an indication for presence of a splice or interrupt the printing for a subsequent packaging portion including the splice in the packaging sheet.

[0039] In the configuration described above, printing for indicating the presence of the splice or no printing is performed on the subsequent packaging portion including the splice. Thus, a worker (inspector) such as a pharmacist can easily identify the medicine pack having the splice in the medicine pack strip including a plurality of continuous medicine packs.

[0040] The process performed by the printing portion may be executed as the exception process of the above-mentioned item (7).

[0041] (12) It is preferred that, in the medicine packaging device according to the above-mentioned item (11), the printing portion further print the indication for the presence of the splice or interrupt the printing for the subsequent packaging portion adjacent to the subsequent packaging portion including the splice.

[0042] It is conceivable that the splice appears in a region including a boundary between two adjacent subsequent packaging portions. Even in this case, the above-mentioned configuration reliably enables the printing for indicating the presence of the splice or the interruption of the printing for the subsequent packaging portion including the splice.

[0043] (13) It is preferred, in the medicine packaging device including the printing portion, that: the printing portion be allowed to perform printing on the packaging sheet fed from the roll for each subsequent packaging portion, which is to be a medicine pack; the packaging portion produce a medicine pack strip including a plurality of successive medicine packs by repeating packaging; when the splice is undetected, the printing portion continuously print indications in a predetermined order in accordance with the order; and when the splice is detected, the printing portion continue printing the indications in the predetermined order in accordance with the order while skipping at least a subsequent packaging portion including the splice.

[0044] According to the configuration described above, when the splice has been detected, the following medicine pack strip that has been packaged is produced.

[0045] The medicine pack strip includes a plurality of continuous medicine packs from one side toward another side of the packaging sheet, on which the indications are printed in the predetermined order. The medicine pack strip includes a medicine pack having the splice, for which the printing of the indications in the above-mentioned order is interrupted. The medicine pack having the splice is followed by the medicine pack with the indication subsequent to the indication just before the interruption as specified by the order.

[0046] (14) It is preferred that, in the medicine packaging device according to the above-mentioned item (13), when the splice is detected, the printing portion further print an indication for presence of a splice or interrupt the printing for the subsequent packaging portion including the splice.

[0047] According to the configuration described above, the medicine pack strip including the medicine pack having the splice on which an indication for the presence of the splice is printed or the medicine pack strip including the medicine pack having the splice on which no printing is performed is produced.

[0048] (15) It is preferred that, in the medicine packaging device according to the above-mentioned item (13) or (14), when the splice is detected, the medicine be further introduced through the guide while skipping at least the subsequent packaging portion including the splice.

[0049] According to the configuration described above, when the splice has been detected, the following medicine pack strip that has been packaged is produced.

[0050] The medicine pack strip includes a plurality of continuous medicine packs from one side toward another side of the packaging sheet, on which the indications are printed in the predetermined order. The medicine pack strip includes a medicine pack having the splice without the medicine therein (empty pack), for which the printing of the indications in the above-mentioned order is interrupted. The medicine pack without the medicine is followed by the medicine pack with the indication subsequent to the indication just before the interruption as specified by the order.

[0051] (16) It is preferred that, in the medicine packaging device including the printing portion, when the splice sensor detects the splice, the printing portion perform printing an indication for interruption of packaging on the packaging sheet or interrupt the printing on the packaging sheet, and interrupt introduction of the medicine through the guide.

[0052] The configuration described above interrupts the production of the medicine packs.

[0053] The process of interrupting the production of the medicine packs as described above may be executed as the exception process of the above-mentioned item (7).

[0054] (17) It is preferred that, in the medicine packaging device including the printing portion, when the splice sensor detects the splice, the printing portion be allowed to selectively execute: a first process of continuously

printing indications in a predetermined order in accordance with the order while skipping at least a subsequent packaging portion including the splice, and introducing the medicine through the guide while skipping at least the subsequent packaging portion including the splice; or a second process of printing an indication for interruption of packaging or interrupting the printing on the packaging sheet and interrupting the introduction of the medicine through the guide.

[0055] According to the configuration described above, when the splice has been detected, the first process of continuously producing the medicine packs or the second process of interrupting the production of the medicine packs is selectively executed.

[0056] The process selectively executed may be executed as the exception process of the the above-mentioned item (7).

[0057] (18) A medicine packaging method of the present disclosure includes: an introducing step of introducing a medicine to a packaging sheet fed from a roll of the packaging sheet; and a packaging step of packaging the medicine that has been introduced, in the packaging sheet. A splice of the packaging sheet fed from the roll is detected before reaching an introducing position at which the medicine is introduced to the packaging sheet. When the splice is detected, a process for medicine packaging that is different from a process performed in a case in which the packaging sheet has no splice is performed.

[0058] According to the medicine packaging method, when, for example, the packaging sheet has no splice, the medicine is introduced to the packaging sheet for each subsequent packaging portion, which is to be one medicine pack, and the medicine is packaged in the packaging sheet. Meanwhile, when the packaging sheet has the splice and the splice has been detected, the process for medicine packaging, which is different from the process performed in a case in which the packaging sheet has no splice, for example, interrupting the packaging or performing empty packaging without introducing the medicine, can be performed.

[0059] Thus, even when the packaging sheet of the roll includes the splice, the medicine packaging method enables use of the roll for medicine packaging.

[0060] (19) It is preferred, in the medicine packaging method according to the above-mentioned item (18), that: the medicine packaging method further include a printing step of printing on the packaging sheet fed from the roll before the introducing step; and when the splice is detected, printing that is different from printing performed in a case in which the packaging sheet has no splice be performed on the packaging sheet.

[0061] According to the method, for example, when the packaging sheet has no splice, words or letters indicating, for example, administration instructions for the medicine are (repeatedly) printed in a predetermined order based on prescription information for each subsequent packaging portion, which is to be one medicine pack.

Meanwhile, when the packaging sheet has the splice and the splice has been detected, a printing process that is different from a printing process performed in a case in which the packaging sheet has no splice, for example, interrupting the printing or printing information indicating the presence of the splice (for example, the word "splice"), can be performed on the subsequent packaging portion including the splice.

[0062] (20) A roll of the present disclosure is formed by winding a packaging sheet. The packaging sheet includes: a first sheet; a second sheet connected to the first sheet with presence of a splice therebetween; and a mark on the splice.

[0063] According to the roll, the packaging sheet has the mark on the splice. Accordingly, the detection of the splice is facilitated, and a different process can be performed depending on the presence/absence of a splice. Thus, the roll can be used for medicine packaging.

<Details of Embodiment of Invention of Present Disclosure>

[0064] Now, details of the embodiment of the invention of the present disclosure are described with reference to the drawings. At least parts of the embodiment described below may be appropriately combined.

[Overall Configuration of Medicine Packaging Device]

[0065] FIG. 1 is an overall view for illustrating a medicine packaging device according to one embodiment. A medicine packaging device 10 illustrated in FIG. 1 packages a medicine such as a tablet or a powdered medicine in a packaging sheet 7 (see FIG. 2) for each dose (each pack) based on a prescription to produce a strip of continuous medicine packs (hereinafter referred to as "medicine pack strip 8"; see FIG. 4). FIG. 2 is a perspective view of a packaging unit 13 of the medicine packaging device 10. FIG. 4 is an explanatory view of an example of the medicine pack strip 8.

[0066] The medicine pack strip 8 includes a plurality of successive medicine packs 9. A single medicine pack 9 is a pack containing a medicine 3 for one dose (one pack). The medicine pack strip 8 includes the number of medicine packs 9 specified in a prescription (prescription information). The prescription information indicates instructions such as compounding of a medicine prescribed by a doctor to a patient and how to take the medicine.

[0067] In a case of the medicine pack strip 8 illustrated in FIG. 4, each of the medicine packs 9 has an indication printed thereon. For example, at least one of a patient's name, a medicine name, or an administration instruction indicating when to take the medicine (for example, morning, midday, evening, before meals, or after meals) is printed on each of the medicine packs 9. An indication is printed by a printing portion 23 (see FIG. 2) of the medicine packaging device 10, which is described later,

based on the prescription information. In the example illustrated in FIG. 4, as the time to take the medicine, words "morning", "midday", and "evening" are printed. Three medicine packs 9 printed with "morning", "midday", and "evening", respectively, correspond to a daily dosage. For multiple daily dosages, a plurality (corresponding to the number of days) of successive sets, each including three medicine packs 9 for "morning", "midday", and "evening", form the medicine pack strip 8.

[0068] The medicine packaging device 10 produces the medicine pack strip 8 based on the prescription information. The medicine packaging device 10 can acquire the prescription information from an operation terminal (operation device) of the medicine packaging device 10 or an external computer through communication. When the operation device is used, the medicine packaging device 10 acquires the prescription information through manual input by a worker such as a pharmacist.

[0069] The medicine pack strip 8 produced by the medicine packaging device 10 contains prescribed medicines. The medicine packaging device 10 is used to prepare and dispense medicines.

[0070] The medicine packaging device 10 illustrated in FIG. 1 includes a tablet supply unit 11, a powdered-medicine supply unit 12, the packaging unit 13, a medicine delivery portion 14, a control device 15, and a casing 16.

[0071] The tablet supply unit 11 is positioned on a top of the casing 16. The tablet supply unit 11 includes: a tablet storage portion 112 including a plurality of storage cells 111 for storing tablets; and a tablet dispensing portion 113 that sequentially supplies the tablets stored in the storage cells 111 to the packaging unit 13.

[0072] A worker such as a pharmacist manually supplies a tablet for one pack (each medication time) to each of the storage cells 111. The tablet dispensing portion 113 has a shutter (not shown). When the shutter is opened, the tablet in the storage cell 111 is supplied to the packaging unit 13.

[0073] The tablet supply unit 11 is only required to have a configuration for supplying a tablet to the packaging unit 13 for one pack each time, and may be, for example, a medicine packaging device including a plurality of medicine containers, which is as disclosed in JP 2003-237714 A. The configuration thereof is not particularly limited.

[0074] The powdered-medicine supply unit 12 is positioned on the top of the casing 16. The powdered-medicine supply unit 12 has a powdered-medicine chamber 121 being open upward. A bottom portion of the powdered-medicine chamber 121 is openable and closable. The worker manually supplies a powdered medicine into the powdered-medicine chamber 121. The powdered-medicine supply unit 12 automatically divides the powdered medicine into portions, each corresponding to one pack, and sequentially supplies the portions to the packaging unit 13. The powdered-medicine supply unit 12 is only required to have a configuration for supplying the

powdered medicine in the above-mentioned manner, and the configuration thereof is not particularly limited.

[0075] The packaging unit 13 is provided inside the casing 16. Opening a front door 161 of the casing 16 allows the worker to perform an operation (for example, an operation for replacing a roll 6) for the packaging unit 13. As illustrated in FIG. 2 and FIG. 3, the packaging unit 13 includes a support portion 21, a sensor 22, the printing portion 23, a guide (hopper 24), and a packaging portion 25. FIG. 3 is a schematic view of the packaging unit 13. Configurations and functions of portions of the packaging unit 13 are described later.

[0076] The medicine delivery portion 14 (see FIG. 1) is positioned in a front of the casing 16. The medicine delivery portion 14 is a portion into which packaged medicines (medicine pack strip 8) are delivered. The medicine delivery portion 14 includes a container 141 for receiving the medicine pack strip 8 that has been delivered.

[0077] The control device 15 is provided inside the casing 16, and controls operations of units (such as the packaging unit 13) of the medicine packaging device 10. The control device 15 includes a microcomputer. Each of the units of the medicine packaging device 10 may include a control portion including a microcomputer. In such a case, the control device 15 includes a plurality of control portions described above. In this case, the plurality of control portions are mutually communicable and function in cooperation to operate the units.

[Roll 6 of Packaging Sheet 7]

[0078] The packaging sheet 7 and the roll 6 formed by winding the packaging sheet 7 are now described. FIG. 5 and FIG. 6 are explanatory views of the packaging sheet 7. FIG. 5 shows the packaging sheet 7 in a finished state, and FIG. 6 shows the packaging sheet 7 under production.

[0079] As illustrated in FIG. 5, the packaging sheet 7 has an elongated strip-like shape. The packaging sheet 7 is folded in half in advance in a longitudinal direction thereof, and has a crease 7a in the longitudinal direction of the packaging sheet 7. The packaging sheet 7 is wound to form multiple layers to thereby form the roll 6 (see FIG. 2 and FIG. 3). The roll 6 includes a core member 6a. The packaging sheet 7, which is folded in half, is wound around the core member 6a.

[0080] As illustrated in FIG. 5 and FIG. 6, the packaging sheet 7 includes: a first sheet 71; a second sheet 72 being connected to the first sheet 71 with presence of a splice 5 therebetween; and a mark (identifier) 73 on the splice 5. An end portion 711 (see FIG. 6) of the first sheet 71 and an end portion 721 of the second sheet 72 are overlapped with each other across a full width in a width direction of the packaging sheet 7. Overlapped portions 74 are fused together to thereby form a packaging sheet 7, which is continuous. In FIG. 6, the overlapped portions 74 are crosshatched.

[0081] In a case of the packaging sheet 7 of this embodiment, the overlapped portions 74 are colored, and the colored portions serve as the mark 73 (see FIG. 5). The colored portion (mark 73) is, for example, black. The mark 73 is provided to the packaging sheet 7 across the full width in the width direction of the packaging sheet 7, and is a strip-shaped colored portion.

[0082] The mark 73 may be other than a strip-shaped colored portion, and may be, for example, a barcode, a two-dimensional code, or a mark such as a star mark. The mark 73 may be provided to the overlapped portion 74 or may be provided in the vicinity of the overlapped portions 74 (in the vicinity thereof in a longitudinal direction of the packaging sheet 7).

[0083] As described later, when the mark 73 is detected by the sensor 22, the medicine packaging device 10 can easily detect the splice 5 of the packaging sheet 7.

[Packaging Unit 13]

[0084] As described above (see FIG. 2), the packaging unit 13 includes the support portion 21, the sensor 22, the printing portion 23, the guide, and the packaging portion 25. In this embodiment, the guide is the hopper 24. However, the guide may be another component. The support portion 21, the sensor 22, the printing portion 23, the hopper 24, and the packaging portion 25 are mounted to a frame 28 of the packaging unit 13.

[0085] The support portion 21 supports the roll 6 of the packaging sheet 7 in a rotatable manner. In the following description, the roll 6 has the splice 5, but may be the roll 6 without the splice 5. The packaging sheet 7 is fed from the roll 6 supported by the support portion 21.

[0086] The packaging unit 13 (see FIG. 3) includes feed rollers 27 that feed the packaging sheet 7. A pair of feed rollers 27 are rotated by a motor 271 while sandwiching part of the packaging sheet 7 therebetween.

[0087] When heater rollers (lateral rotating members 52) of a heat sealing portion 253 described later are rotated, tension is applied to the packaging sheet 7 to thereby feed the packaging sheet 7 from the roll 6. When the feed rollers 27 are rotated in synchronization with the heater rollers, the packaging sheet 7, in which the medicine is packaged, is fed downstream. When the heater rollers (and the feed rollers 27) are intermittently rotated, the packaging sheet 7 is fed intermittently.

[0088] In the present disclosure, a direction in which the packaging sheet 7 is fed from the roll 6 is defined as "feeding direction". The roll 6 corresponds to an upstream side in the feeding direction, and a side far from the roll 6 (side closer to the packaging portion 25 and the feed rollers 27) corresponds to a downstream side in the feeding direction.

[0089] The packaging unit 13 includes a plurality of guide rollers 29. The guide rollers 29 are provided in the middle of a conveyance path for the packaging sheet 7, and have functions to guide the packaging sheet 7 and change the feeding direction.

[0090] The sensor 22 has a function as a splice sensor for detecting the splice 5 of the packaging sheet 7 fed from the roll 6.

[0091] FIG. 7 is an explanatory view of the sensor 22. The sensor 22 includes, for example, a light-emitting portion 221 and a light-receiving portion 222. The packaging sheet 7 fed from the roll 6 passes between the light-emitting portion 221 and the light-receiving portion 222. A computing unit 223 of the sensor 22 acquires a light receiving level at the light-receiving portion 222 for light emitted from the light-emitting portion 221. The computing unit 223 detects the splice 5 of the packaging sheet 7 based on the light receiving level. More specifically, the computing unit 223 detects the mark 73 on the splice 5 of the packaging sheet 7 based on the light receiving level.

[0092] In this embodiment (see FIG. 5), the mark 73 on the splice 5 is a colored portion. The packaging sheet 7 (the first sheet 71 and the second sheet 72) is made of a material having light transmissivity. Thus, while part of the packaging sheet 7 other than the splice 5 is passing between the light-emitting portion 221 and the light-receiving portion 222, a light receiving level L is higher than a first threshold value $M1$ ($L > M1$).

[0093] When the colored portion of the packaging sheet 7, which corresponds to the splice 5, passes between the light-emitting portion 221 and the light-receiving portion 222, transmission of light is reduced at the colored portion, resulting in the light receiving level L lower than the first threshold value $M1$ ($L < M1$). That is, when the light receiving level L decreases below the first threshold value $M1$, the splice 5 is detected.

[0094] For example, the light receiving level L is from 60% to 80% under a state in which part of the packaging sheet 7 other than the splice 5 is passing between the light-emitting portion 221 and the light-receiving portion 222. The first threshold value $M1$ is 40%. While the colored portion of the packaging sheet 7, which corresponds to the splice 5, is passing between the light-emitting portion 221 and the light-receiving portion 222, the light receiving level L is from about 0% to about 5%, which is lower than the first threshold value $M1$ (40%).

[0095] When the splice 5 is detected, the computing unit 223 transmits a detection signal for the splice 5 to the control device 15. As described later, the control device 15 controls the medicine packaging device 10 to perform a process for medicine packaging, which is different from a process performed in a case in which the packaging sheet does not have the splice 5, based on the detection signal.

[0096] A second threshold value $M2$ is set in the computing unit 223 of the sensor 22. The second threshold value $M2$ is higher than the light receiving level indicated by the first threshold value $M1$ ($M2 > M1$). After all the packaging sheet 7 is fed from the roll 6 (core member 6a), no sheet is left on the roll 6. When no sheet is left on the roll 6 and a terminal end 7e of the packaging sheet 7 passes between the light-emitting portion 221 and the

light-receiving portion 222, the light receiving level L at the light-receiving portion 222 becomes higher than the second threshold value $M2$ ($L > M2$). That is, when the light receiving level L exceeds the second threshold value $M2$, the absence of the sheet is detected.

[0097] The second threshold value $M2$ is, for example, 90%. When the terminal end 7e of the packaging sheet 7 passes between the light-emitting portion 221 and the light-receiving portion 222, the light receiving level L at the light-receiving portion 222 is 100% and thus is higher than the second threshold value $M2$ (90%).

[0098] When the absence of the sheet is detected, the computing unit 223 transmits a detection signal indicative of the absence of the sheet to the control device 15.

[0099] As described above, in this embodiment, the medicine packaging device 10 includes the sensor 22 that functions as a splice sensor for detecting the splice 5 of the packaging sheet 7 fed from the roll 6. The sensor 22 also functions as a sheet absence sensor for detecting the terminal end 7e of the packaging sheet 7 fed from the roll 6. The sheet absence sensor also serves as a splice sensor. Thus, a single sensor 22 enables the detection of the splice and the detection of the absence of the packaging sheet.

[0100] The sheet absence sensor may be separate from the splice sensor.

[0101] Further, the sensor 22 has been described as a configuration including the light-emitting portion 221 and the light-receiving portion 222, but may be another configuration. In particular, the configuration of the sensor 22 is changed depending on the mark 73 on the splice 5.

[0102] As illustrated in FIG. 3, the sensor 22 is provided on an upstream side of an introducing position P3, at which the medicine is introduced through the hopper 24, in the feeding direction of the packaging sheet 7. In this embodiment, in particular, the sensor 22 is provided on the upstream side of a printing position P2 for the printing portion 23 in the feeding direction of the packaging sheet 7.

[0103] The printing portion 23 performs printing on the packaging sheet 7 fed from the roll 6. The printing portion 23 is, for example, a thermal transfer printer. The printing portion 23 (see FIG. 2) includes an ink cartridge 231, which is replaceable. The ink cartridge 231 has an unwinding roller and a winding roller for an ink ribbon 232 for thermal transfer. The printing portion 23 includes: an urging roller for applying tension to the ink ribbon 232; a thermal transfer head; a backup roller for bringing the packaging sheet 7 and the ink ribbon 232 into close contact with each other; and the like.

[0104] The printing portion 23 is positioned between the roll 6 (support portion 21) and the packaging portion 25 in a feeding path (see FIG. 3) for the packaging sheet 7. More specifically, the printing portion 23 is provided on the upstream side of the introducing position P3, at which the medicine is introduced through the hopper 24, in the feeding direction for the packaging sheet 7.

[0105] The printing portion 23 can print at least one

piece of information including, for example, a patient's name, a medicine name, and administration instructions.

[0106] The hopper 24 has a feed port 241 at an upper end and a nozzle portion 242 at a lower end. A medicine is loaded from the tablet supply unit 11 (see FIG. 1) or the powdered-medicine supply unit 12 to the feed port 241. The nozzle portion 242 functions as an introduction port for introducing the medicine 3 into an opening of the packaging sheet 7 folded in half.

[0107] The tablet supply unit 11 and the powdered-medicine supply unit 12 are positioned immediately above the frame 28 (see FIG. 2), in particular, immediately above the hopper 24. In the following description, the tablet supply unit 11 and the powdered-medicine supply unit 12 are also collectively referred to as "supply unit (11, 12)".

[0108] With the configuration described above, the hopper 24 guides the medicine into the packaging sheet 7 fed from the roll 6. In this embodiment, one unit dose of the medicine is intermittently supplied from the supply unit (11, 12). The hopper 24 intermittently guides one unit dose of the medicine into a subsequent packaging portion 4 of the packaging sheet 7, which is to be one medicine pack 9.

[0109] The packaging portion 25 includes a guide rod 251, an unfolding guide 252, and the heat sealing portion 253.

[0110] The guide rod 251 guides the packaging sheet 7 that has passed through the printing portion 23, and sets the feeding direction of the packaging sheet 7 so that the packaging sheet 7 is directed toward the unfolding guide 252.

[0111] The unfolding guide 252 unfolds the packaging sheet 7, which is folded in half and is fed from the roll 6, to define an opening. The unfolding guide 252 has a shape for unfolding the packaging sheet 7 folded in half and defining an opening for inserting the nozzle portion 242 of the hopper 24 thereto.

[0112] The heat sealing portion 253 seals the packaging sheet 7 so as to enclose the medicine 3 that has been introduced into part of the packaging sheet 7 through the hopper 24. The heat sealing portion 253 seals the packaging sheet 7 through thermal fusion. The medicine pack 9 is produced by sealing the packaging sheet 7.

[0113] In this embodiment, the heat sealing portion 253 seals the packaging sheet 7 while the feed rollers 27 are feeding the packaging sheet 7. The packaging unit 13 has a cutting blade (not shown). The cutting blade forms perforations that allow the medicine pack 9 to easily be separated.

[0114] FIG. 8 is an explanatory view for illustrating one example of the heat sealing portion 253. The heat sealing portion 253 includes a pair of heater shafts 51, a pair of the lateral rotating members 52, and a pair of vertical rotating members 53. The heater shaft 51 includes an electric heater, and its temperature is increased. The lateral rotating members 52 and the vertical rotating

members 53 receive heat from the heater shafts 51 and their temperatures are increased. The packaging sheet 7 is sealed by the heat of the lateral rotating members 52 and the vertical rotating members 53. FIG. 9 and FIG. 10 are explanatory views when viewed in a direction along center axes 511 of the heater shafts 51.

[0115] The pair of heater shafts 51 are arranged so as to sandwich the packaging sheet 7 to be fed.

[0116] The vertical rotating member 53 has a columnar shape. One heater shaft 51 and one vertical rotating member 53 are rotated integrally about the center axis 511 of the heater shaft 51 by a first drive mechanism 54 including a motor and a gear.

[0117] The vertical rotating member 53 has, as its outer peripheral surface: contact surfaces 531, each being an arc-like surface extending along a circular column; and non-contact surfaces 532, each being a surface positioned closer to the center axis 511 than the arc-like surfaces.

[0118] The pair of vertical rotating members 53 are rotated in synchronization in the directions opposite to each other (directions for feeding the packaging sheet 7) (see FIG. 9 and FIG. 10). The contact surfaces 531 are linearly contactable with the packaging sheet 7 in the width direction thereof. Meanwhile, the non-contact surfaces 532 are not in contact with the packaging sheet 7.

[0119] The lateral rotating member 52 is mounted over the heater shaft 51 through intermediation of a bearing, and is rotatable about the center axis 511 independently of the heater shaft 51 and the vertical rotating member 53. The lateral rotating members 52 are rotated by a second drive mechanism 55, which is different from the first drive mechanism 54. The pair of lateral rotating members 52 are rotated in synchronization in the directions opposite to each other (directions for feeding the packaging sheet 7) (see FIG. 9 and FIG. 10). Operations of the first drive mechanism 54 and the second drive mechanism 55 are controlled by the control device 15.

[0120] The lateral rotating member 52 has a disc shape. That is, the lateral rotating member 52 has an outer peripheral surface 521 with a circular shape (see FIG. 9 and FIG. 10). The outer peripheral surface 521 is contactable with the packaging sheet 7 over its entire circumference. While the lateral rotating members 52 are being rotated, the packaging sheet 7 is fed. The lateral rotating members 52 are continuously in contact with the packaging sheet 7 being fed in its longitudinal direction. As a result, the packaging sheet 7 is continuously sealed in its longitudinal direction. A lateral sealed portion 56, which is continuous in the longitudinal direction of the packaging sheet 7, is formed with the packaging sheet 7 (see FIG. 4) by the lateral rotating members 52.

[0121] When the vertical rotating members 53 are rotated, a portion of the packaging sheet 7, which is in contact with the contact surfaces 531, is fused and sealed (see FIG. 9). While the vertical rotating members 53 are rotating, the packaging sheet 7 is fed. However, a portion

of the packaging sheet 7, which is opposed to the non-contact surfaces 532, is not fused and not sealed (see FIG. 10). Vertical sealed portions 57 extending in the width direction orthogonal to the longitudinal direction are formed with the packaging sheet 7 (see FIG. 4) by the vertical rotating members 53 so as to be spaced apart from each other.

[0122] A region of the packaging sheet 7 (see FIG. 4), which is surrounded by two vertical sealed portions 57 adjacent to each other in the longitudinal direction and the lateral sealed portion 56 being successive in the longitudinal direction, is defined as a space in which the medicine 3 is to be enclosed.

[0123] The first drive mechanism 54 has a speed changing function and can change a rotation cycle of the vertical rotating members 53. When the rotation cycle of the vertical rotating members 53 is changed, a distance between the vertical sealed portions 57 of the packaging sheet 7 is changed. That is, a dimension of one medicine pack 9 is changed.

[0124] As described above, the packaging portion 25 packages the medicine in the packaging sheet 7. The packaging portion 25 packages the medicine in the subsequent packaging portion 4 of the packaging sheet 7, which is to be one medicine pack 9.

[0125] In this embodiment, the first drive mechanism 54 and the second drive mechanism 55 are provided as separate mechanisms for the lateral rotating members 52 and the vertical rotating members 53, respectively, but may be provided as a common mechanism and are not required to have the function to change the distance between the vertical sealed portions 57 of the packaging sheet 7.

[0126] The packaging unit 13 (see FIG. 3) of this embodiment includes a measurement portion 26 for acquiring a feed amount of the packaging sheet 7.

[0127] An rpm of the feed rollers 27 and an rpm of the lateral rotating members 52 are correlated with the feed amount of the packaging sheet 7. The motor 271 that rotationally drives the feed rollers 27 is a servomotor. Rotation information of the motor 271 is acquired by the measurement portion 26. The measurement portion 26 has a computing function, and acquires a signal from the motor 271 to calculate the feed amount of the packaging sheet 7.

[0128] The measurement portion 26 allows the acquisition of, for example, the feed amount of the packaging sheet 7 between a detection position P1 at which the splice 5 is detected by the sensor 22 and the introducing position P3 at which the medicine 3 is introduced through the hopper 24, and the feed amount of the packaging sheet 7 between the detection position P1 for the splice 5 and the printing position P2.

[0129] Information of the feed amount of the packaging sheet 7, which is a result of computation performed by the measurement portion 26, is transmitted to the control device 15. When the splice 5 is detected, the control device 15 performs control for stopping the introduction

of the medicine, control of printing, and the like for the subsequent packaging portion 4 including the splice 5 and the subsequent packaging portion 4 adjacent thereto by using the information of the feed amount.

[Operation of Medicine Packaging Device 10]

[0130] An operation of the medicine packaging device 10 is controlled by the control device 15. The control device 15 executes various processes for the units of the medicine packaging device 10. In particular, the control device 15 can control the supply of the medicine through the hopper 24, the packaging performed by the packaging portion 25, and the printing performed by the printing portion 23 based on the result of detection of the splice 5 by the sensor 22.

[0131] FIG. 11 is a flowchart for illustrating an operation of the medicine packaging device 10, mainly in the packaging unit 13. When the control device 15 acquires the prescription information, the control device 15 starts, based on the prescription information, an operation of packaging the medicine (prescribed medicine) in the packaging sheet 7 for each dose (single-dose packaging operation) (Step S10 and Step S11 of FIG. 11). The single-dose packaging operation is described below along the flow of FIG. 11 with reference to FIG. 1, FIG. 2, and FIG. 3.

[0132] When the feed rollers 27 and heater rollers (lateral rotating members 52) described later are rotated, the packaging sheet 7 is fed from the roll 6. The single-dose packaging operation includes a printing step S111, an introducing step S112, and a packaging step S113.

[0133] The printing step S111 is a step before the introducing step S112, in which the printing portion 23 performs printing on the packaging sheet 7 fed from the roll 6.

[0134] The introducing step S112 is a step in which the supply unit (11, 12) operates based on the prescription information to intermittently introduce one dose unit of the medicine 3 into the subsequent packaging portion 4 of the packaging sheet 7, which is to be one medicine pack 9, through the hopper 24.

[0135] The packaging step S113 is a step in which the medicine 3 that has been introduced is packaged in the packaging sheet 7 (the subsequent packaging portion 4, which is to be one medicine pack 9) by the packaging portion 25.

[0136] The printing step S111, the introducing step S112, and the packaging step S113 are repeatedly executed for the number of required packages for the medicine. The number of required packages for the medicine is determined based on the prescription information.

[0137] While the packaging sheet 7 is being fed from the roll 6, the sensor 22 performs a detecting operation for the packaging sheet 7 as a target to be detected (Step S12). When the sensor 22 no longer detects the packaging sheet 7 ("No" in Step S12), the control device 15 stops the single-dose packaging operation (Step S15).

This means that all the packaging sheet 7 has been fed from the roll 6 and no sheet is left on the roll 6. The control device 15 outputs notification information for notifying an administrator of the medicine packaging device 10 of the absence of the sheet (Step S16). The notification information is, for example, one or both of a sound from a speaker and an indication on a display.

[0138] While the packaging sheet 7 remains detected by the sensor 22 ("Yes" in Step S12), the sensor 22 performs a measurement for detecting the splice 5. In this embodiment, the light receiving level at the light-receiving portion 222 (see FIG. 7) is monitored. While the splice 5 remains undetected ("No" in Step S13), the single-dose packaging operation (Step S11) is repeatedly performed.

[0139] When the splice 5 is detected ("Yes" in Step S13), the control device 15 executes a process to be performed in a case in which the splice 5 is detected (post-detection process) (Step S14).

[0140] FIG. 12A and FIG. 12B are flowcharts of the post-detection process. In the following description, a process for which no specific subject is described is performed by the control device 15.

[0141] When the splice 5 is detected, it is determined whether or not the medicine is in a state before being loaded into the subsequent packaging portion 4 positioned at the introducing position P3 from the supply unit (11, 12) through the hopper 24 (Step S141). When the medicine is in a state before being loaded ("Yes" in Step S141), a portion having the splice 5 in the packaging sheet 7 is sent to a downstream side of a packaging position P4 by the feed rollers 27 (Step S146). A position to which the portion having the splice 5 is sent may be on the downstream side of the printing position P2. When it is determined that the medicine is in a state before being loaded ("Yes" in Step S141), printing with the printing portion 23 is not performed.

[0142] In a case in which the printing has already been started by the printing portion 23 before the splice is detected in this step (Step S14), the printing is immediately terminated and the process is stopped.

[0143] When the splice 5 is detected by the sensor 22 after the medicine is loaded ("No" in Step S141), the control device 15 executes a comparison process for comparing a remaining number of required packages for the medicine (number of remaining required packages) and a packageable number of packs that can be produced between the detection position P1 for the sensor 22 and the packaging position P4 for the packaging portion 25 (Step S142).

[0144] This comparison process (Step S142) is a process for checking whether a sufficient length of the packaging sheet 7 is left between the detection position P1 and the packaging position P4 because the medicine packs 9 can be possibly produced with the remaining length of the packaging sheet 7. A length of the packaging sheet 7 between the detection position P1 and the packaging position P4, that is, the number of medicine packs 9

that can be produced is already known from a device layout and dimensions of the medicine pack 9.

[0145] When the remaining number (number of remaining required packages) is less than or equal to or less than the packageable number as a result of the comparison process ("Yes" in Step S143), the control device 15 executes a normal process (Step S144). The normal process is a process for continuing, for the remaining number, printing performed by the printing portion 23, introducing the medicine through the hopper 24, and packaging for each subsequent packaging portion 4, which is to be one medicine pack 9, by the packaging portion 25.

[0146] When the normal process is executed, printing, the introduction of the medicine, and packaging are continuously performed as the single-dose packaging operation for a remaining number of required packages for the medicine so that the remaining number of medicine packs 9 (packaged portions) are continuously produced.

[0147] Until single-dose packaging for the remaining number of required packages is completed, the single-dose packaging operation is continued (Step S145).

[0148] Meanwhile, when the remaining number (number of remaining required packages) is equal to or more than or is more than the packageable number as a result of the comparison process ("No" in Step S143), the control device 15 executes an exception process on the subsequent packaging portion 4 including the splice 5 in the packaging sheet 7 (Step S147 and subsequent Steps). As described later, the exception process is a process for printing, introducing the medicine, and packaging the medicine, which is executed for each different case based on setting information. As described above, when the splice 5 is detected, the exception process, which is different from normal packaging (Step S11 of FIG. 11), can be performed.

[0149] As the exception process, the control device 15 first acquires the setting information based on the prescription information (Step S147 of FIG. 12A). The setting information includes information predefining, for example, which of a plurality of exception processes is to be executed with priority. That is, a mode for one exception process to be performed with priority is preset in the setting information. The setting is performed through, for example, manual input by a worker such as a pharmacist. The control device 15 selects and starts one of a plurality of (three in this embodiment) exception processes based on the setting information (Step S148 of FIG. 12B).

[Exception Process (1)]

[0150] An exception process (1) is a process for stopping the single-dose packaging. This process is now specifically described.

[0151] When the sensor 22 detects the splice 5, the printing portion 23 prints an indication for the interruption

of packaging on the packaging sheet 7 as the exception process (1) (Step S161) and interrupts the introduction of the medicine from the supply unit (11, 12) through the hopper 24 (Step S162). Alternatively, in Step S161, the printing portion 23 may interrupt the printing on the packaging sheet 7 instead of printing an indication for the interruption of packaging.

[0152] In the exception process (1), when the splice 5 is detected, the production of the medicine packs 9 is interrupted.

[0153] In this case, the control device 15 may output notification information for notifying the administrator (inspector such as a pharmacist) of the medicine packaging device 10 of the interruption of production of the medicine packs 9. The notification information is output from an output device of the medicine packaging device 10. The notification information is, for example, one or both of a sound from a speaker and an indication on a display.

[0154] After the interruption, the single-dose packaging can be restarted from the beginning based on the prescription information.

[Exception Process (2)]

[0155] An exception process (2) is a process of continuing the single-dose packaging while skipping the subsequent packaging portion 4 having the splice 5. That is, even with the presence of the splice 5, the medicine packs 9 are continuously produced without interrupting the single-dose packaging. This process is specifically described below.

[0156] The feed rollers 27 feed the packaging sheet 7 so that the splice 5 is positioned on the upstream side of the printing position P2 (Step S151). The packaging sheet 7 is further fed, and the printing portion 23 prints an indication for the presence of the splice 5 on the subsequent packaging portion 4 including the splice 5 in the packaging sheet 7 (Step S152). That is, in place of a patient's name, a medicine name, and administration instructions indicating when to take the medicine, a word "splice" is printed on the subsequent packaging portion 4 including the splice 5 (see a medicine pack 9A illustrated in FIG. 4).

[0157] Further, in this embodiment, the printing portion 23 further prints an indication for the presence of the splice 5 on a subsequent packaging portion 4 adjacent to the subsequent packaging portion 4 including the splice 5. That is, the word "splice" is printed on the subsequent packaging portion 4 including the splice 5 and the subsequent packaging portion 4 adjacent thereto. The term "adjacent" may refer to "adjacent on both sides" corresponding to the upstream side and the downstream side in the feeding direction or "adjacent on one side" corresponding to the upstream side or the downstream side in the feeding direction.

[0158] In Step S152, instead of printing the word "splice", the printing portion 23 may interrupt the printing

for the subsequent packaging portion 4 including the splice 5 in the packaging sheet 7. Further, the printing portion 23 may further interrupt the printing for the subsequent packaging portion 4, which is adjacent to the subsequent packaging portion 4 including the splice 5. The term "adjacent" may refer to "adjacent on both sides" corresponding to the upstream side and the downstream side in the feeding direction or "adjacent on one side" corresponding to the upstream side or the downstream side in the feeding direction.

[0159] Regardless of whether the word "splice" has been printed on the subsequent packaging portion 4 including the splice 5 and the subsequent packaging portion 4 adjacent thereto or the printing has been interrupted, the printing of the administration instructions and the like is resumed for the subsequent packaging portion 4, which is to be subsequently sent to the printing position P2 (Step S153).

[0160] In the flowchart of FIG. 12B, the "number" of subsequent packaging portions 4 on which the word "splice" is to be printed or the printing is not to be performed in Step S152 is represented by "n". The subsequent packaging portion 4 having the splice 5 is included in the number "n", and hence the smallest value of "n" is "1". However, the value of "n" may be "2" (when the subsequent packaging portion adjacent on one side is included), "3" (when the subsequent packaging portions adjacent on both sides are included), or "4" or more.

[0161] In Step S153 in which the printing is resumed, the printing is resumed with an "n+1"-th subsequent packaging portion counted from the subsequent packaging portion 4 on which the word "splice" is first printed or the printing is not performed.

[0162] A printed item for indicating the presence of the splice is not limited to the word "splice", and may be, for example, other words, letters, marks, or signs such as "defective", "×", and "unusable" as long as the worker can recognize that the printed item indicates the presence of the splice.

[0163] In the case of the exception process (2), the indication for the presence of the splice 5 is printed or no printing is performed on at least the subsequent packaging portion 4 including the splice 5. Thus, an inspector such as a pharmacist can easily identify the medicine pack 9 having the splice 5 from the medicine pack strip 8 that has been produced.

[0164] It is conceivable that the splice 5 may appear in a region including a boundary between two adjacent subsequent packaging portions 4. Even in this case, as described above, the same process as that performed on the subsequent packaging portion 4 including the splice 5 is performed on the subsequent packaging portion 4 adjacent to the subsequent packaging portion 4 including the splice 5. Thus, the indication for the presence of the splice 5 can be reliably printed on or the printing can be reliably interrupted for the subsequent packaging portion 4 including the splice 5.

[0165] In the exception process (2), further, the intro-

duction of the medicine from the supply unit (11, 12) through the hopper 24 into the subsequent packaging portion 4 including the splice 5 in the packaging sheet 7 is stopped (Step S154). In this embodiment, the introduction of the medicine is further stopped for the subsequent packaging portion 4, which is adjacent to the subsequent packaging portion 4 including the splice 5.

[0166] When the "n+1"-th subsequent packaging portion 4 counted from the subsequent packaging portion 4 for which the introduction of the medicine has first been stopped is positioned at the introducing position P3 after the introduction of the medicine is temporarily stopped in Step S154, the introduction of the medicine from the supply unit (11, 12) through the hopper 24 is started (Step S155). That is, after the introduction of the medicine is temporarily stopped in Step S154, the introduction of the medicine through the hopper 24 into the subsequent packaging portion 4, which is to be subsequently sent to the introducing position P3 for the medicine, is resumed.

[0167] In the case of the exception process (2), the supply of the medicine to the subsequent packaging portion 4 is stopped in synchronization with timing at which the splice 5 reaches the introducing position P3 for the medicine through the hopper 24. Thus, no medicine is contained in the subsequent packaging portion 4 having the splice 5. That is, the medicine pack 9 including the splice 5 is an empty medicine pack (empty pack) without the medicine.

[0168] It is conceivable that the splice 5 appears in a region including a boundary between two adjacent subsequent packaging portions 4. Even in this case, as described above, the same process as that performed on the subsequent packaging portion 4 including the splice 5 is performed on the subsequent packaging portion 4 adjacent to the subsequent packaging portion 4 including the splice 5. Thus, the medicine is reliably prevented from being introduced into the subsequent packaging portion 4 including the splice 5 and the subsequent packaging portion 4 adjacent thereto. Thus, accuracy of feeding of the packaging sheet 7 is not required to be particularly high.

[0169] In the flowchart of FIG. 12B, the "number" of subsequent packaging portions 4 that are not supplied with the medicine is represented by "n" as in the case in which the printing is performed. The subsequent packaging portion 4 including the splice 5 is included in the number "n", and hence the smallest value of "n" is "1". However, the value of "n" may be "2" (when the subsequent packaging portion adjacent on one side is included)", "3" (when the subsequent packaging portions adjacent on both sides are included)", or "4" or more.

[0170] In Step S155 in which the introduction of the medicine is resumed, the introduction of the medicine is resumed with the "n+1"-th subsequent packaging portion 4 counted from the subsequent packaging portion 4 for which the introduction of the medicine has first been stopped.

[0171] When the introduction of the medicine is resumed, the medicine is not contained in the subsequent packaging portion 4 including the splice 5, but the medicine is introduced into the subsequent packaging portion 4 that is subsequently sent to the medicine introducing position P3. As a result, as illustrated in FIG. 4, the medicine pack 9 containing the medicine is produced subsequently to the empty medicine pack (empty pack) 9A as specified by the prescription information.

[0172] In the exception process (2), the control device 15 may output, for warning purposes, notification information for notifying an administrator (inspector such as a pharmacist) of the medicine packaging device 10 that the medicine pack strip 8 includes the splice 5. The notification information is output from an output device of the medicine packaging device 10. The notification information is, for example, one or both of a sound from a speaker and an indication on a display.

20 [Exception Process (3)]

[0173] An exception process (3) is a process for selectively executing a first process of continuing the single-dose packaging while skipping the subsequent packaging portion 4 having the splice 5 or a second process of interrupting the single-dose packaging (Step S171). The first process corresponds to the exception process (2), and the second process corresponds to the exception process (1).

[0174] When the first process is selected, the printing portion 23 continuously prints indications in a predetermined order while skipping at least the subsequent packaging portion 4 including the splice 5, in accordance with the order, and intermittently introduces the medicine through the hopper 24 while skipping at least the subsequent packaging portion 4 including the splice 5. Also in the exception process (3), as in the exception process (2), the indication for the presence of the splice may be printed on (or the printing may be interrupted for) the subsequent packaging portion 4 adjacent to the subsequent packaging portion 4 including the splice 5, and further, the introduction of the medicine may be skipped therefor.

[0175] When the second process is selected, the printing portion 23 prints an indication for the interruption of packaging on the packaging sheet 7 or interrupts the printing on the packaging sheet 7, and interrupts the introduction of the medicine through the hopper 24.

[0176] At a time of detection of the splice 5, the medicine packaging device 10 temporarily stops operating, and the selection between the first process and the second process is performed by, for example, an inspector such as a pharmacist. That is, when a mode for the exception process (3) is set in advance in the setting information, a selecting operation on a selection button of the control device 15 is performed by an inspector such as a pharmacist. Subsequent to the selection, the first process or the second process is selectively executed.

[0177] According to the exception process (3), when the splice 5 is detected, the first process of continuously producing the medicine packs 9 or the second process of interrupting the production of the medicine packs 9 is selectively executed.

[Medicine Pack Strip 8 Produceable by Medicine Packaging Device 10 with Configuration Described Above]

[0178] As described above (see FIG. 3), the printing portion 23 can perform printing on the packaging sheet 7 fed from the roll 6 for each subsequent packaging portion 4, which is to be the medicine pack 9. The packaging portion 25 repeats packaging to thereby produce the medicine pack strip 8 in which a plurality of medicine packs 9 (packaged portions) are connected.

[0179] When the splice 5 is not detected in the packaging sheet 7 ("No" in Step S13 of FIG. 11), the printing portion 23 continuously prints the indications in the predetermined order based on the prescription information being information such as administration instructions for the medicine in accordance with the predetermined order (Step S111). Further, the printing portion 23 repeats the printing of the indications in the above-mentioned order.

[0180] As a result, when the splice 5 is not detected, the medicine pack strip 8 illustrated in FIG. 13 is produced. That is, the order "morning, midday, evening" is determined as the predetermined order. The indications in this order are continuously printed in accordance with the order of "morning, midday, evening". Further, the indications of "morning", "midday", "evening" are repeatedly printed correspondingly to the number of prescribed days.

[0181] Meanwhile, when the splice 5 is detected ("Yes" in Step S13 of FIG. 11), the printing portion 23 continuously prints the indications in the predetermined order based on the prescription information being information indicating the administration instructions of the medicine, and the like in accordance with the above-mentioned order while skipping at least the subsequent packaging portion 4 including the splice 5, as described above regarding Step S151 to Step S153 of FIG. 12B. As described above for the exception process (2), the subsequent packaging portion 4 for which the printing is skipped may include the subsequent packaging portion 4 being adjacent to the subsequent packaging portion 4 including the splice 5.

[0182] Further, the printing portion 23 prints the indication for the presence of the splice 5 on the subsequent packaging portion 4 including the splice 5 and the subsequent packaging portion 4 adjacent thereto (Step S152) or interrupts the printing.

[0183] Further, the medicine is intermittently introduced through the hopper 24 while skipping the subsequent packaging portion 4 including the splice 5 and the subsequent packaging portion 4 adjacent thereto (Step S154, Step S155).

[0184] As a result, when the splice 5 is detected, the medicine pack strip 8 illustrated in FIG. 4, which has been packaged, is produced. That is, the medicine pack strip 8 includes a plurality of successive medicine packs 9 from one side (left side in FIG. 4) toward another side (right side in FIG. 4) in the longitudinal direction of the packaging sheet 7, and has the indications "morning", "midday", and "evening" printed thereon in the predetermined order. The medicine pack strip 8 includes the splice 5, and the indications printed in the above-mentioned order are interrupted after "midday". The medicine pack with the indication "midday" is followed by two medicine packs (empty packs) 9A without the medicine 3. The two medicine packs 9A without the medicine 3 are followed by the medicine packs 9, each containing the medicine 3. The indications on the medicine packs 9 are restarted with "evening", which is subsequent to the indication "midday" after which the printing of the indications has been interrupted, and are continuously printed according to the above-mentioned order of "morning, midday, evening". The word "splice" is printed on the two medicine packs (empty packs) 9A.

[Medicine Packaging Device 10 of This Embodiment]

[0185] As described above, the medicine packaging device 10 (see FIG. 2 and FIG. 3) of this embodiment includes: the support portion 21 that supports the roll 6 of the packaging sheet 7; the hopper 24 (guide) for guiding the medicine 3 to the packaging sheet 7 fed from the roll 6; the packaging portion 25 that packages the medicine 3 in the packaging sheet 7; and the sensor (splice sensor) 22. The sensor 22 is provided on the upstream side of the hopper 24 in the feeding direction for the packaging sheet 7, and has a function to detect the splice 5 of the packaging sheet 7 fed from the roll 6.

[0186] A medicine packaging method performed by the medicine packaging device 10 of this embodiment includes the introducing step (Step S112 of FIG. 11) and the packaging step (Step S113 of FIG. 11).

[0187] In the introducing step, the medicine 3 is introduced to the packaging sheet 7 fed from the roll 6 of the packaging sheet 7.

[0188] In the packaging step, the medicine 3 that has been introduced is packaged in the packaging sheet 7.

[0189] Then, the splice 5 of the packaging sheet 7 fed from the roll 6 is detected before reaching the introducing position P3 at which the medicine 3 is introduced to the packaging sheet 7. When the splice 5 is detected, the process for medicine packaging that is different from the process performed in a case in which the packaging sheet 7 does not have the splice 5 is performed.

[0190] According to the medicine packaging device 10 of this embodiment, when the packaging sheet 7 fed from the roll 6 has the splice 5, the sensor 22 detects the splice 5. As described above regarding Step S14 of FIG. 11, the medicine packaging device 10 can execute the post-detection process, and allows the process that is different

from the process performed in a case in which the packaging sheet does not have the splice 5, to be performed as the process for medicine packaging depending on the result of detection by the sensor 22, as described below.

[0191] In this embodiment, when the packaging sheet 7 does not have the splice 5 ("No" in Step S13 of FIG. 11), the single-dose packaging operation (Step S11) is repeatedly performed. That is, the medicine 3 is introduced through the hopper 24 to the packaging sheet 7 for each subsequent packaging portion 4, which is to be one medicine pack 9 (Step S112). The packaging portion 25 packages the medicine 3 in the packaging sheet 7 (Step S113).

[0192] Meanwhile, when the packaging sheet 7 has the splice 5 ("Yes" in Step S13 of FIG. 11), the post-detection process illustrated in FIG. 12A and FIG. 12B is performed. As the post-detection process, the process that is different from the process performed in a case in which the packaging sheet does not have the splice 5, for example, interrupting the packaging performed by the packaging portion 25 (the exception process (1)) or empty packaging by the packaging portion 25 without introducing the medicine 3 through the hopper 24 (the exception process (2)), can be performed.

[0193] In this embodiment (see FIG. 3), the printing portion 23 is provided on the upstream side of the hopper 24 in the feeding direction for the packaging sheet 7, and can perform printing on the packaging sheet 7 fed from the roll 6. The sensor 22 is provided on the upstream side of the printing portion 23 in the feeding direction for the packaging sheet 7.

[0194] The medicine packaging method performed by the medicine packaging device 10 including the printing portion 23 includes the printing step (Step S111 of FIG. 11). The printing step is a step of performing printing on the packaging sheet 7 fed from the roll 6 before the introducing step (Step S112). When the splice 5 is detected, printing that is different from printing performed in a case in which the packaging sheet 7 does not have the splice 5 is performed on the packaging sheet 7.

[0195] According to the medicine packaging device 10 including the printing portion 23 as described above, the splice 5 of the packaging sheet 7 is detected before reaching the printing position P2. When the packaging sheet 7 fed from the roll 6 has the splice 5, the post-detection process illustrated in FIG. 12A and FIG. 12B is performed. As described below, as the post-detection process, printing on the packaging sheet 7, which is different from printing performed in the case in which the packaging sheet does not have the splice 5, can be performed.

[0196] In this embodiment, when the packaging sheet 7 does not include the splice 5 ("No" in Step S13), words or letters indicating the administration instructions of the medicine 3, and the like are repeatedly printed on the packaging sheet 7 in the predetermined order based on the prescription information for each subsequent packaging portion 4, which is to be one medicine pack 9 (see

FIG. 13).

[0197] Meanwhile, when the packaging sheet 7 has the splice 5 ("Yes" in Step S13), the printing process that is different from the printing process performed in the case in which the packaging sheet does not have the splice 5, for example, interrupting the printing or printing the word "splice" as information indicating the presence of the splice 5 as illustrated in FIG. 4, can be performed on the subsequent packaging portion 4 including the splice 5 in the packaging sheet 7.

[0198] As described above, even when the roll 6 of the packaging sheet 7 includes the splice 5, the medicine packaging device 10 can use the roll 6 for medicine packaging.

[0199] The medicine packaging device 10 of this embodiment is a device that packages a prescribed medicine (medicine prepared based on prescription information that is different for each patient), in the packaging sheet 7, a so-called single-dose packaging device, and is typically installed and used in a dispensing pharmacy or a pharmacy department in hospital. The medicine pack strip 8 that has been produced corresponds to packs, each containing a prescribed dose of the medicine 3 obtained through counting or weighing. One or a plurality of different medicines 3 are allowed to be contained in the medicine packs 9 adjacent to each other. That is, the medicine packaging device 10 can continuously produce the medicine packs 9, each containing a different medicine 3.

[0200] Meanwhile, a packaging device owned by a pharmaceutical company packages the same medicine in the medicine packs 9 adjacent to each other. That is, the packaging device continuously produces medicine packs containing the same medicine. In this regard, the device owned by a pharmaceutical company and the medicine packaging device 10 of this embodiment are different.

[Other Features]

[0201] In the embodiment described above (see FIG. 2 and FIG. 3), the packaging sheet 7 of the roll 6 is in a state of being folded in half. In the packaging portion 25, the packaging sheet 7 is opened by the unfolding guide 252. The medicine 3 is loaded into the packaging sheet 7 in an opened state.

[0202] The packaging sheet 7 may be in a state other than a state of being folded in half, and is not required to be folded in half when being in the form of the roll 6. In this case, the packaging unit 13 has a mechanism of folding the packaging sheet fed from the roll, in half during feeding.

[0203] In the embodiment described above (see FIG. 2 and FIG. 3), the heat sealing portion 253 is of a heater roller type including the lateral rotating members 52 and the vertical rotating members 53, which are rotatable.

[0204] The heat sealing portion 253 may have another configuration. FIG. 14 is an explanatory view for illustrat-

ing a modification example of the heat sealing portion 253. The heat sealing portion 253 illustrated in FIG. 14 includes: a pair of holding members 255, which are positioned so as to sandwich the packaging sheet 7 therebetween; and a drive mechanism portion (not shown) that brings the pair of holding members 255 closer to each other or away from each other.

[0205] In FIG. 14, illustration of the feed rollers 27 (see FIG 3) is omitted. However, the feed rollers 27 are provided on the upstream side and the downstream side of the holding members 255, respectively.

[0206] The holding members 255 are heated with a heater (not shown). When the pair of holding members 255 sandwiches the packaging sheet 7 therebetween, the packaging sheet 7 is thermally fused at the sandwiched portion.

[0207] Each of the holding members 255 has a T-like shape, but may have an L-like shape. The lateral sealed portion 56 that is continuous in the longitudinal direction of the packaging sheet 7 is formed in the packaging sheet 7 by one piece 255a of each of the holding members 255. The vertical sealed portions 57 extending in the width direction orthogonal to the longitudinal direction are formed in the packaging sheet 7 by another piece 255b of each of the holding members so as to be spaced apart from each other.

[0208] As described above, the heat sealing portion 253 may be of a pack type.

[0209] In the embodiment described above (see FIG. 4 and FIG. 13), regarding printing contents on the medicine pack strip 8, the order "morning, midday, evening" is defined as the predetermined order. The indications in this order are continuously printed in accordance with the order of "morning, midday, evening". The order and the indications are not limited to those described above. The order and the indications may be, for example, "morning, morning, midday, midday, evening, evening" or the like. Further, the printing of the administration instructions may be omitted, and only one or both of a patient's name and a medicine name may be printed. Further, printing of an indication is not essential.

[0210] The embodiment described above is illustrative in all aspects and is not limiting. The scope of the present invention is defined by the claims rather than the embodiment described above, and includes all changes within the scope equivalent to the configurations described in the claims.

Reference Signs List

[0211]

3 medicine

4 subsequent packaging portion

5 splice

6 roll

7 packaging sheet

7e terminal end

15 control device (control portion)

21 support portion

22 sensor (splice sensor)

5 23 printing portion

24 hopper (guide)

25 packaging portion

26 measurement portion

71 first sheet

10 72 second sheet

73 mark

P1 detection position

P2 printing position

P3 introducing position

15 P4 packaging position

Claims

1. A medicine packaging device, comprising:

20 a support portion configured to support a roll of a packaging sheet;
a guide configured to guide a medicine to the packaging sheet fed from the roll;
25 a packaging portion configured to package the medicine in the packaging sheet; and
a splice sensor, which is provided on an upstream side of the guide in a feeding direction for the packaging sheet, and is configured to detect a splice of the packaging sheet fed from the roll.

2. The medicine packaging device according to claim 1, further comprising a printing portion, which is provided on the upstream side of the guide in the feeding direction for the packaging sheet, and is configured to perform printing on the packaging sheet fed from the roll,
35 wherein the splice sensor is provided on an upstream side of the printing portion in the feeding direction for the packaging sheet.

3. The medicine packaging device according to claim 1, further comprising a measurement portion configured to acquire a feed amount of the packaging sheet.

4. The medicine packaging device according to claim 1, further comprising a sheet absence sensor configured to detect a terminal end of the packaging sheet fed from the roll,
50 wherein the sheet absence sensor also serves as the splice sensor.

55 5. The medicine packaging device according to claim 1, further comprising a control portion configured to execute various processes, wherein, when the splice sensor detects the splice,

the control portion is allowed to execute a comparison process of comparing a remaining number representing the number of required packages for the medicine and a packageable number representing the number of packs being produceable between a detection position for the splice sensor and a packaging position for the packaging portion.

6. The medicine packaging device according to claim 5, wherein, when the remaining number is less than or equal to or less than the packageable number as a result of the comparison process, the control portion executes a normal process of continuing introduction of the medicine through the guide and the packaging performed by the packaging portion, for the remaining number.
7. The medicine packaging device according to claim 5 or 6, wherein, when the remaining number is equal to or more than or more than the packageable number as a result of the comparison process, the control portion executes an exception process on a subsequent packaging portion including the splice in the packaging sheet.
8. The medicine packaging device according to claim 1, wherein, when the splice sensor detects the splice, introduction of the medicine through the guide into a subsequent packaging portion including the splice in the packaging sheet is stopped.
9. The medicine packaging device according to claim 8, wherein the introduction of the medicine through the guide is further stopped for the subsequent packaging portion adjacent to the subsequent packaging portion including the splice.
10. The medicine packaging device according to claim 8 or 9, wherein, after the introduction of the medicine is stopped, the introduction of the medicine through the guide into the subsequent packaging portion to be subsequently sent to an introducing position for the medicine is resumed.
11. The medicine packaging device according to claim 2, wherein, when the splice sensor detects the splice, the printing portion prints an indication for presence of a splice or interrupts the printing for a subsequent packaging portion including the splice in the packaging sheet.
12. The medicine packaging device according to claim 11, wherein the printing portion further prints the indication for the presence of the splice or interrupts the printing for the subsequent packaging portion adjacent to the subsequent packaging portion including the splice.

13. The medicine packaging device according to claim 2, wherein the printing portion is allowed to perform printing on the packaging sheet fed from the roll for each subsequent packaging portion, which is to be a medicine pack,

wherein the packaging portion produces a medicine pack strip including a plurality of successive medicine packs by repeating packaging, wherein, when the splice is undetected, the printing portion continuously prints indications in a predetermined order in accordance with the order, and when the splice is detected, the printing portion continues printing the indications in the predetermined order in accordance with the order while skipping at least a subsequent packaging portion including the splice.

14. The medicine packaging device according to claim 13, wherein, when the splice is detected, the printing portion prints an indication for presence of a splice or interrupts the printing for the subsequent packaging portion including the splice.
15. The medicine packaging device according to claim 13 or 14, wherein, when the splice is detected, the medicine is introduced through the guide while skipping at least the subsequent packaging portion including the splice.
16. The medicine packaging device according to claim 2, wherein, when the splice sensor detects the splice, the printing portion performs printing an indication for interruption of packaging on the packaging sheet or interrupts the printing on the packaging sheet, and interrupts introduction of the medicine through the guide.
17. The medicine packaging device according to claim 2, wherein, when the splice sensor detects the splice, the printing portion is allowed to selectively execute:

a first process of continuously printing indications in a predetermined order in accordance with the order while skipping at least a subsequent packaging portion including the splice, and introducing the medicine through the guide while skipping at least the subsequent packaging portion including the splice; or a second process of printing an indication for interruption of packaging or interrupting the printing on the packaging sheet and interrupting the introduction of the medicine through the guide.

18. A medicine packaging method, comprising:

an introducing step of introducing a medicine to
a packaging sheet fed from a roll of the packa-
ging sheet; and
a packaging step of packaging the medicine that
has been introduced, in the packaging sheet, 5
wherein a splice of the packaging sheet fed from
the roll is detected before reaching an introdu-
cing position at which the medicine is introduced
to the packaging sheet, and
wherein, when the splice is detected, a process 10
for medicine packaging that is different from a
process performed in a case in which the packa-
ging sheet has no splice is performed.

19. The medicine packaging method according to claim 15
18, further comprising a printing step of printing on
the packaging sheet fed from the roll before the
introducing step,
wherein, when the splice is detected, printing that is
different from printing performed in a case in which 20
the packaging sheet has no splice is performed on
the packaging sheet.

20. A roll, which is formed by winding a packaging sheet,
wherein the packaging sheet includes: 25

a first sheet;
a second sheet connected to the first sheet with
presence of a splice therebetween; and
a mark on the splice. 30

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FIG. 1

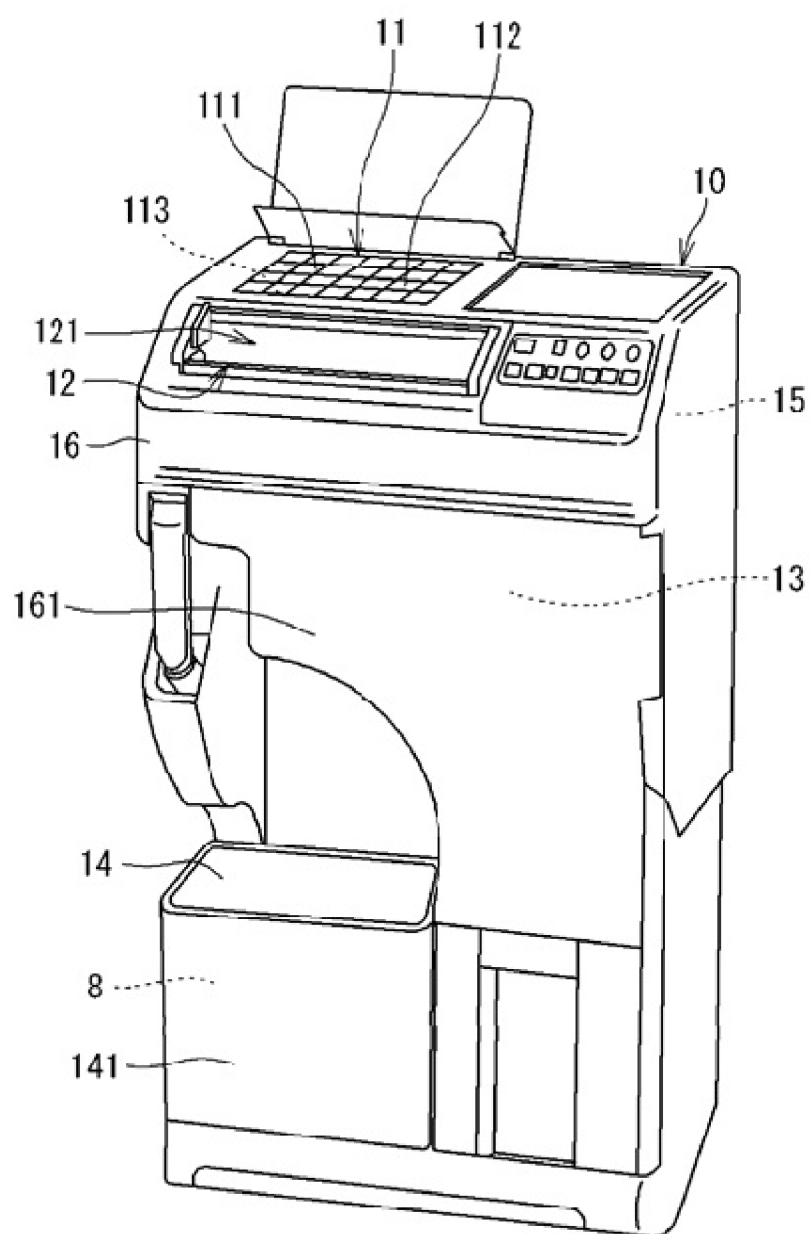


FIG. 2

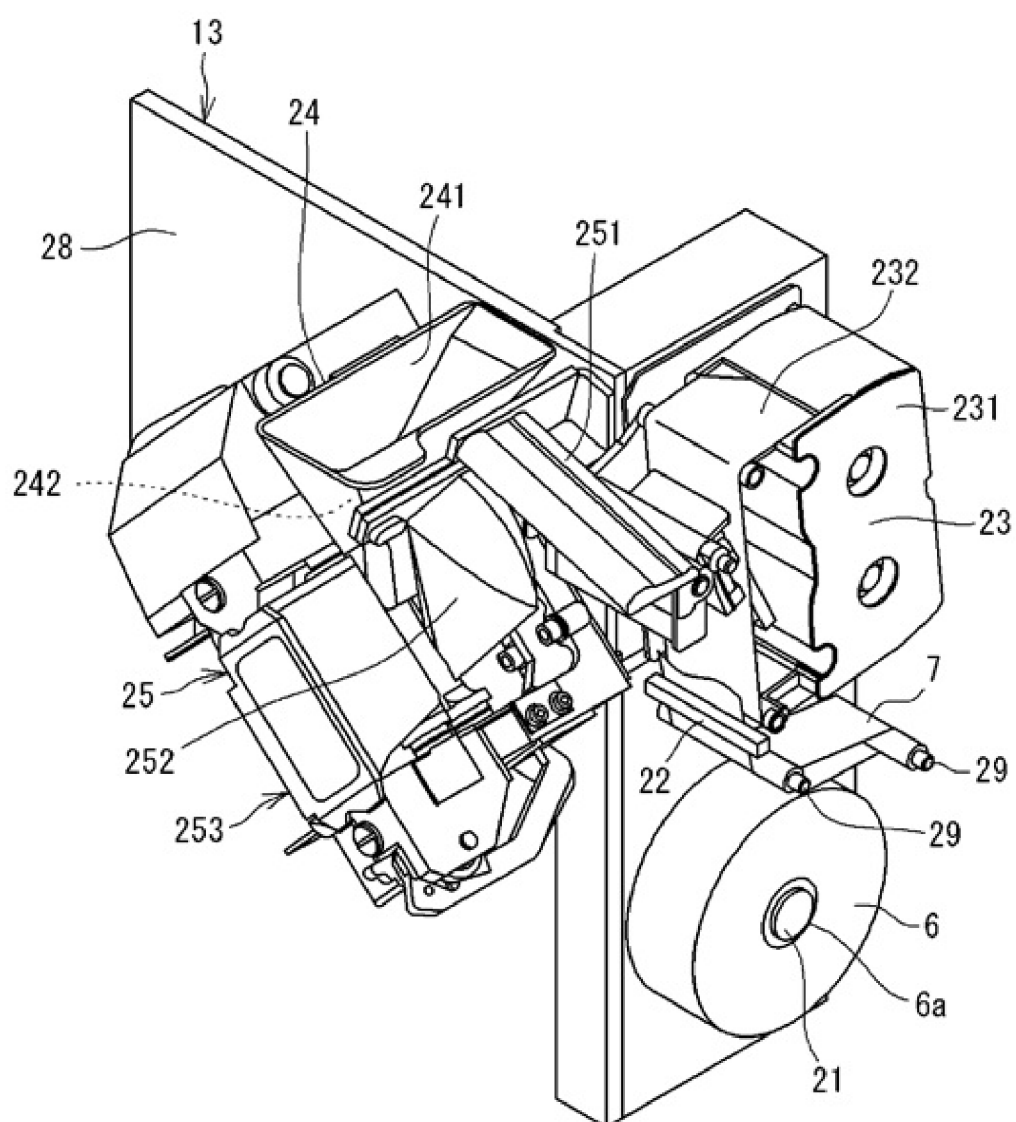


FIG. 3

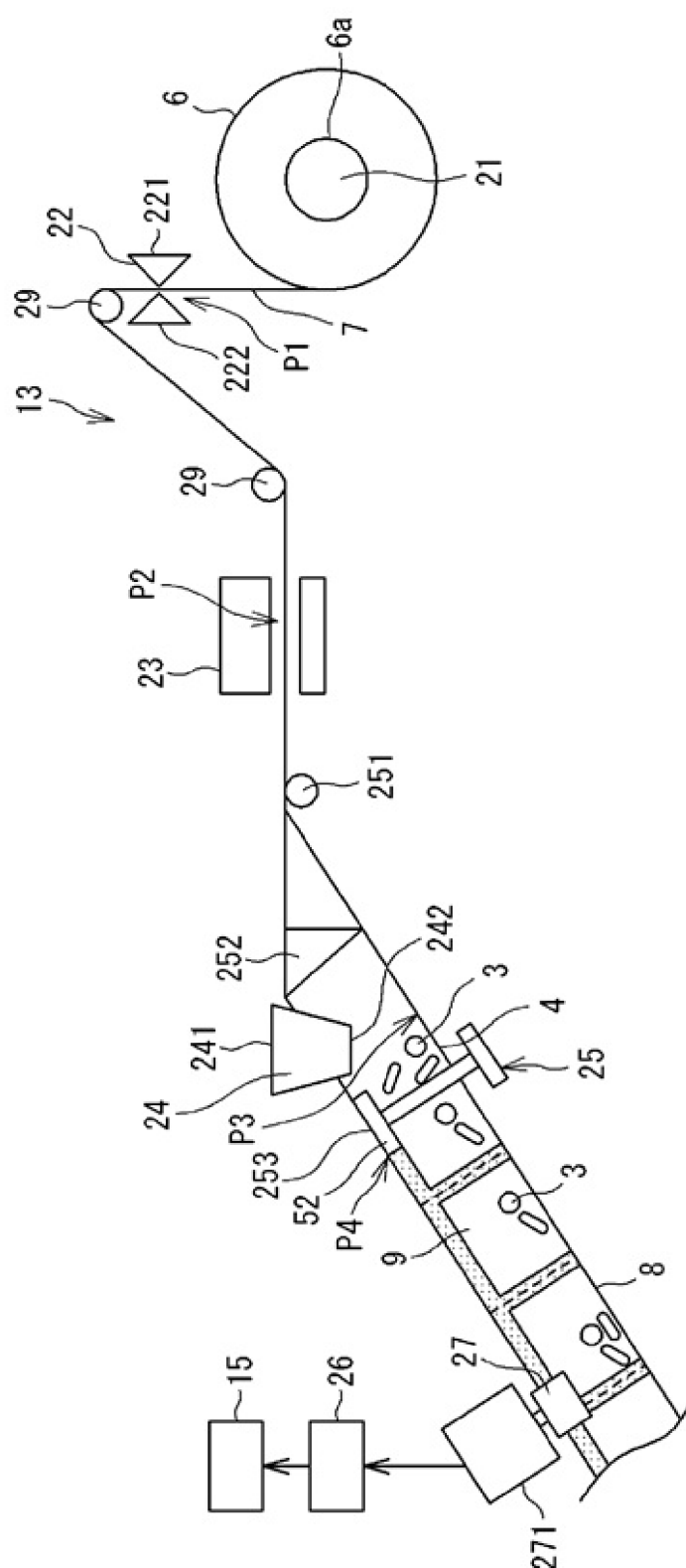


FIG. 4

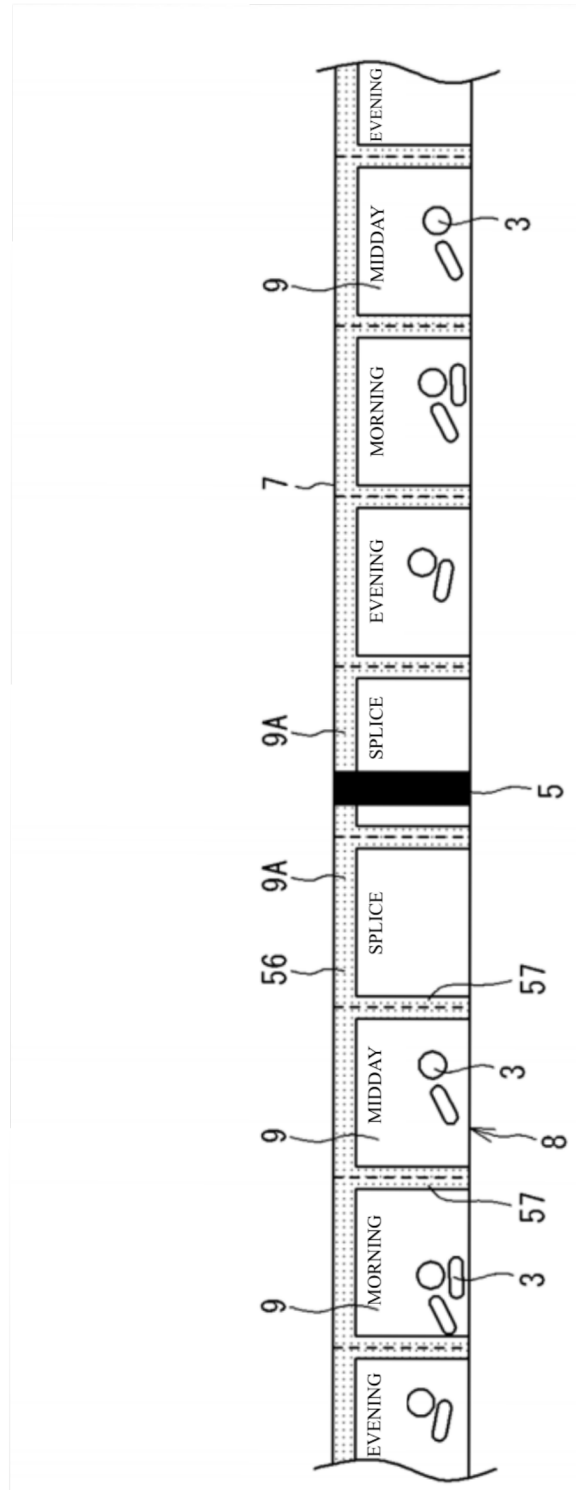


FIG. 5

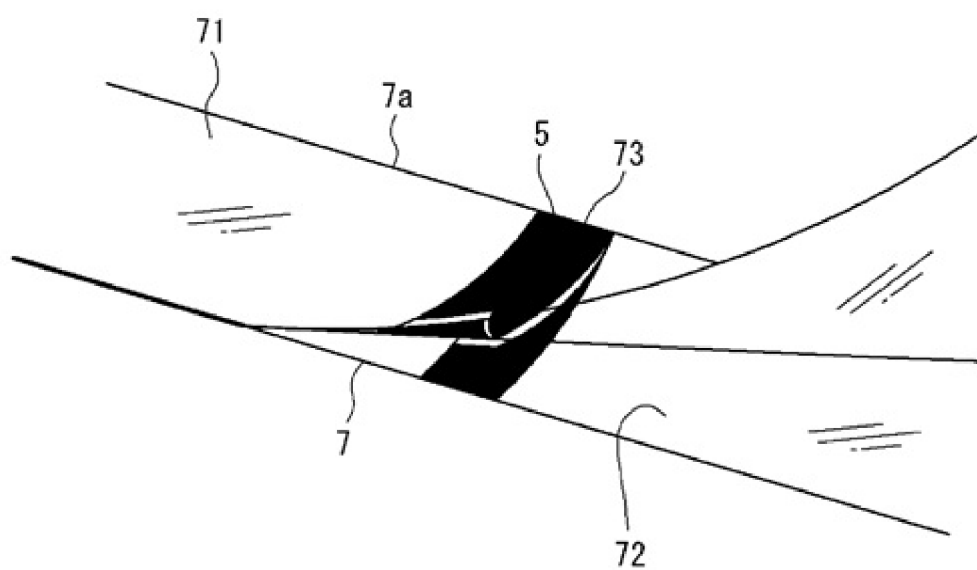


FIG. 6

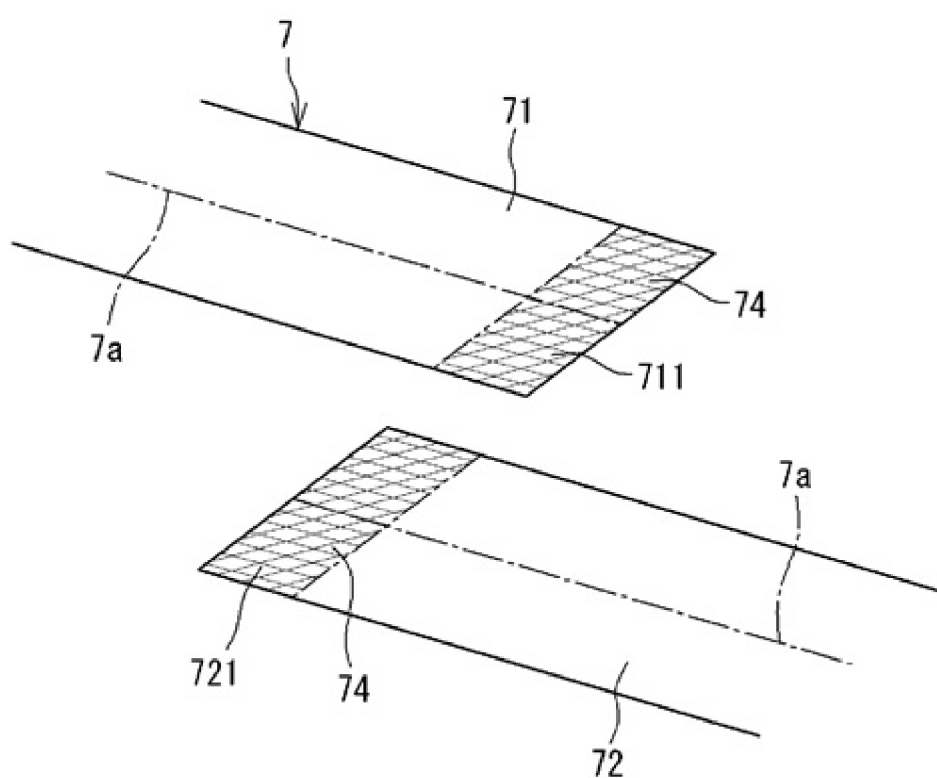


FIG. 7

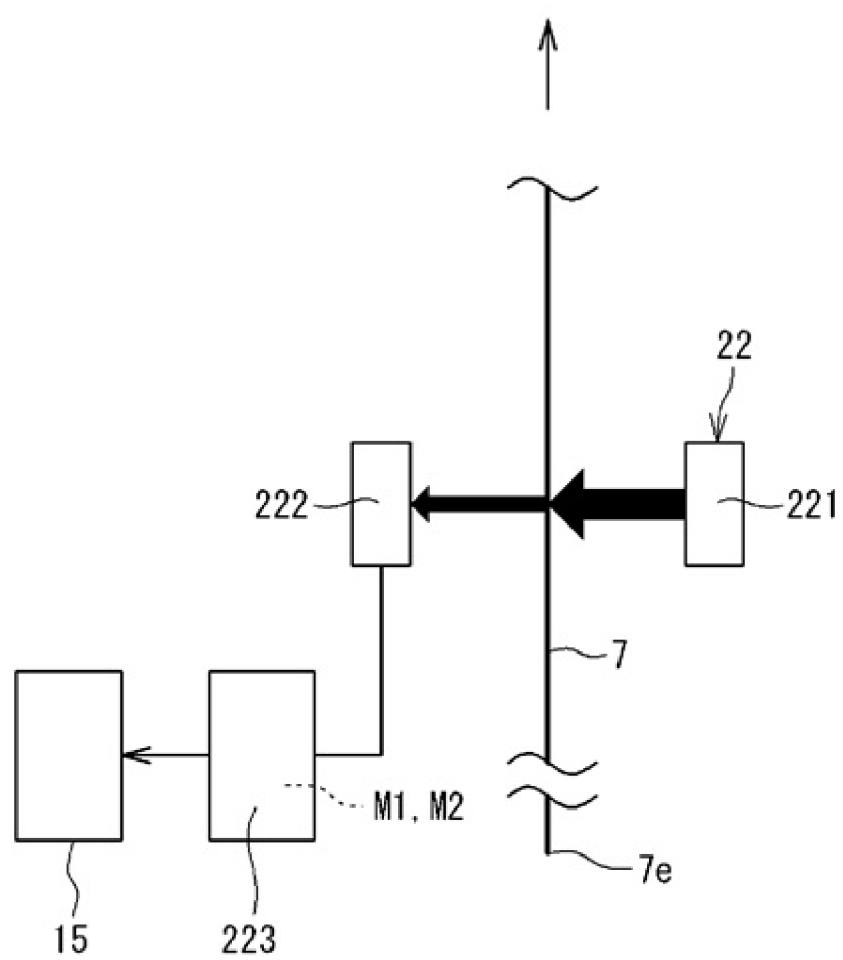


FIG. 8

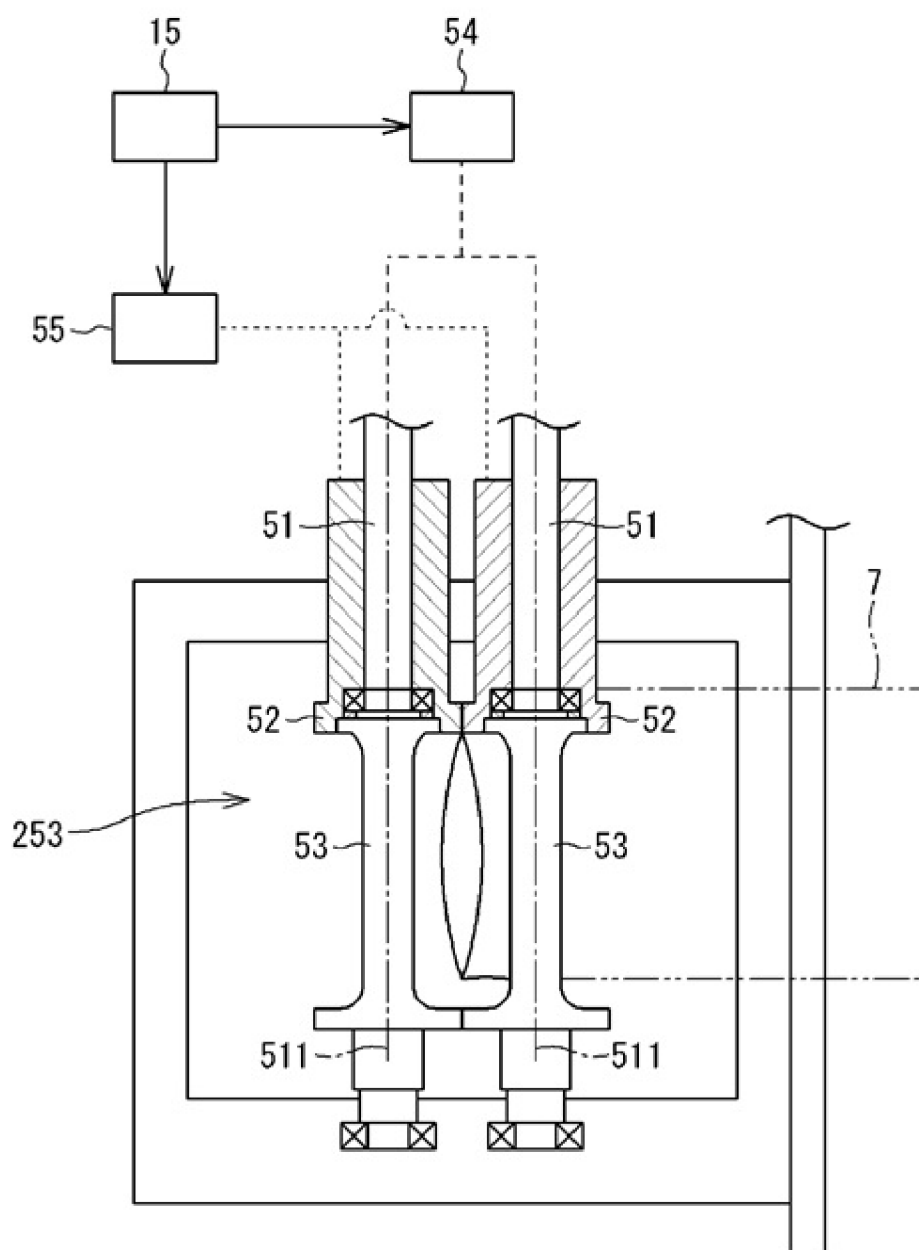


FIG. 9

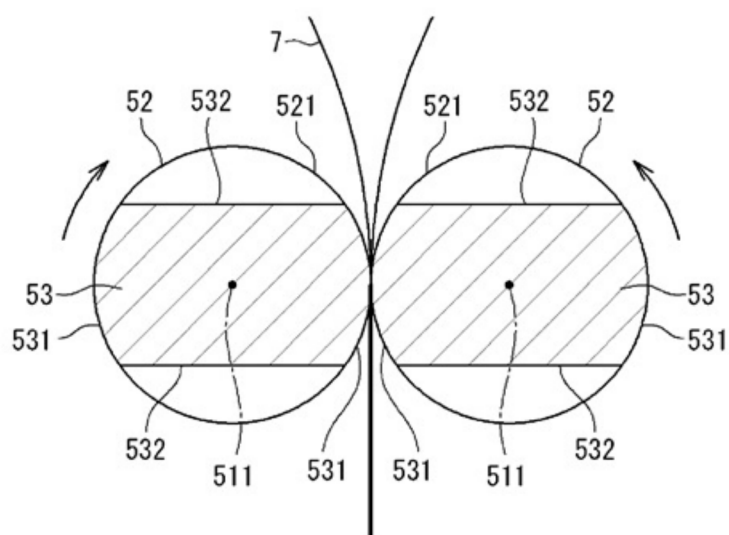


FIG. 10

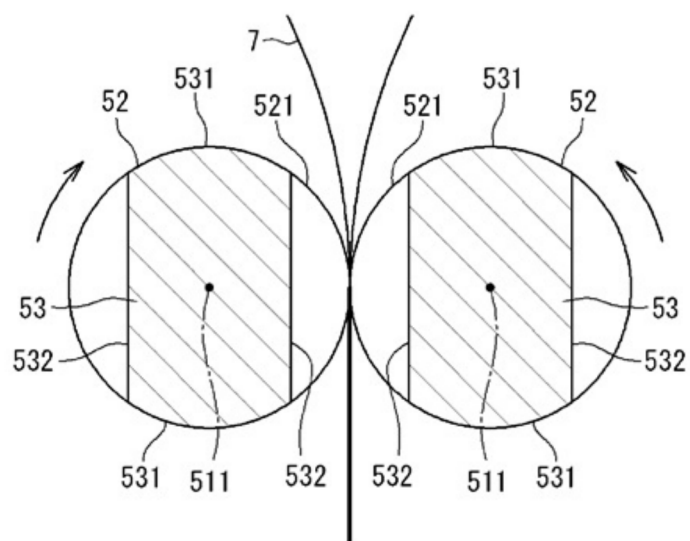


FIG. 11

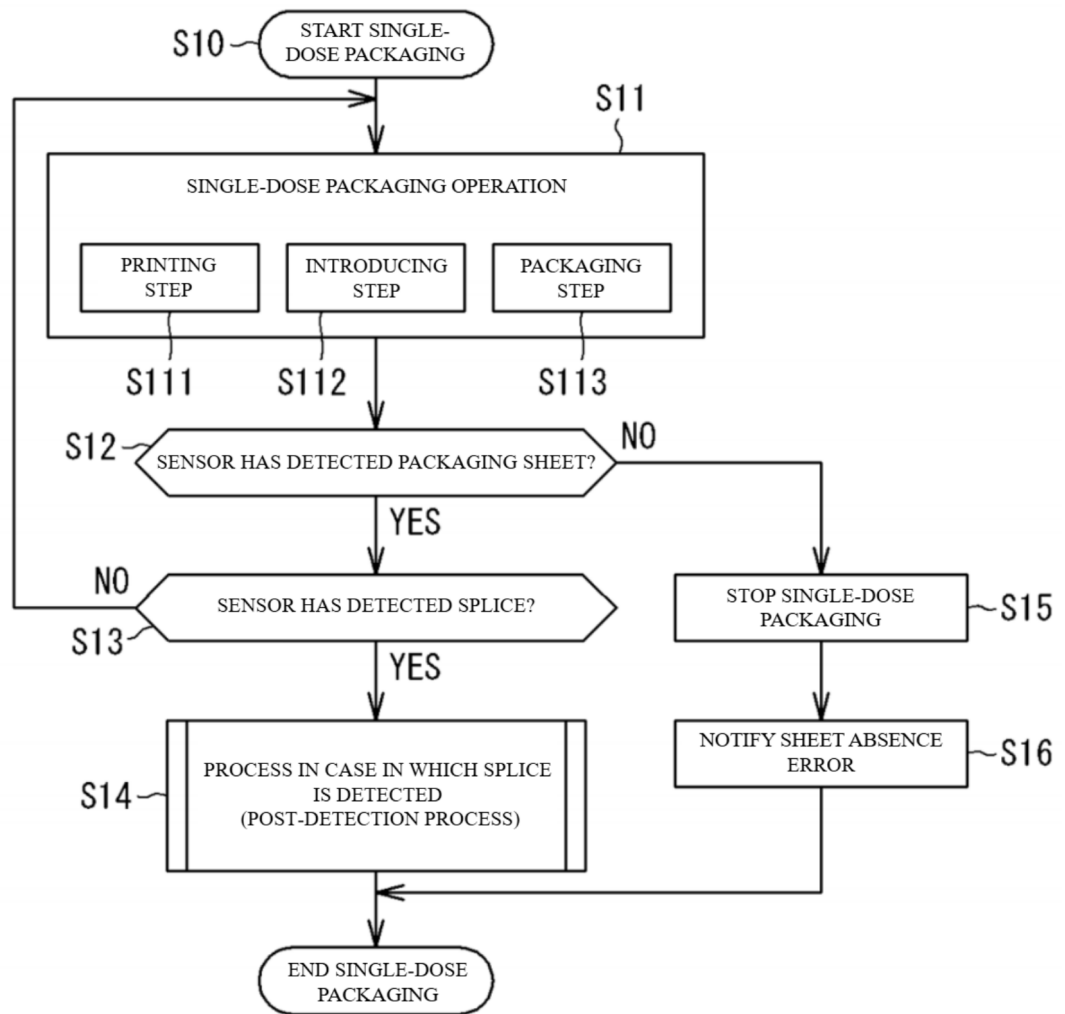


FIG. 12A

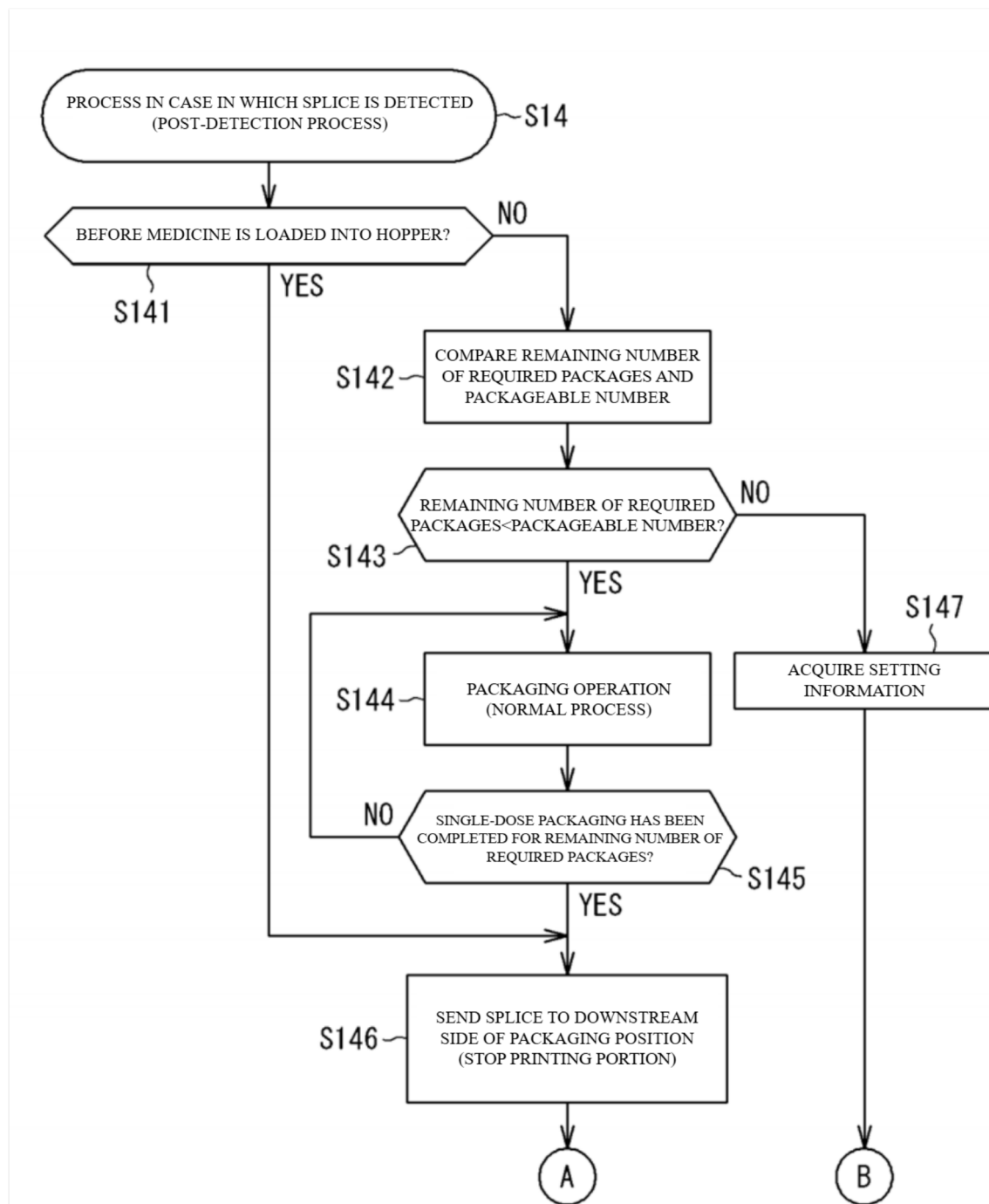


FIG. 12B

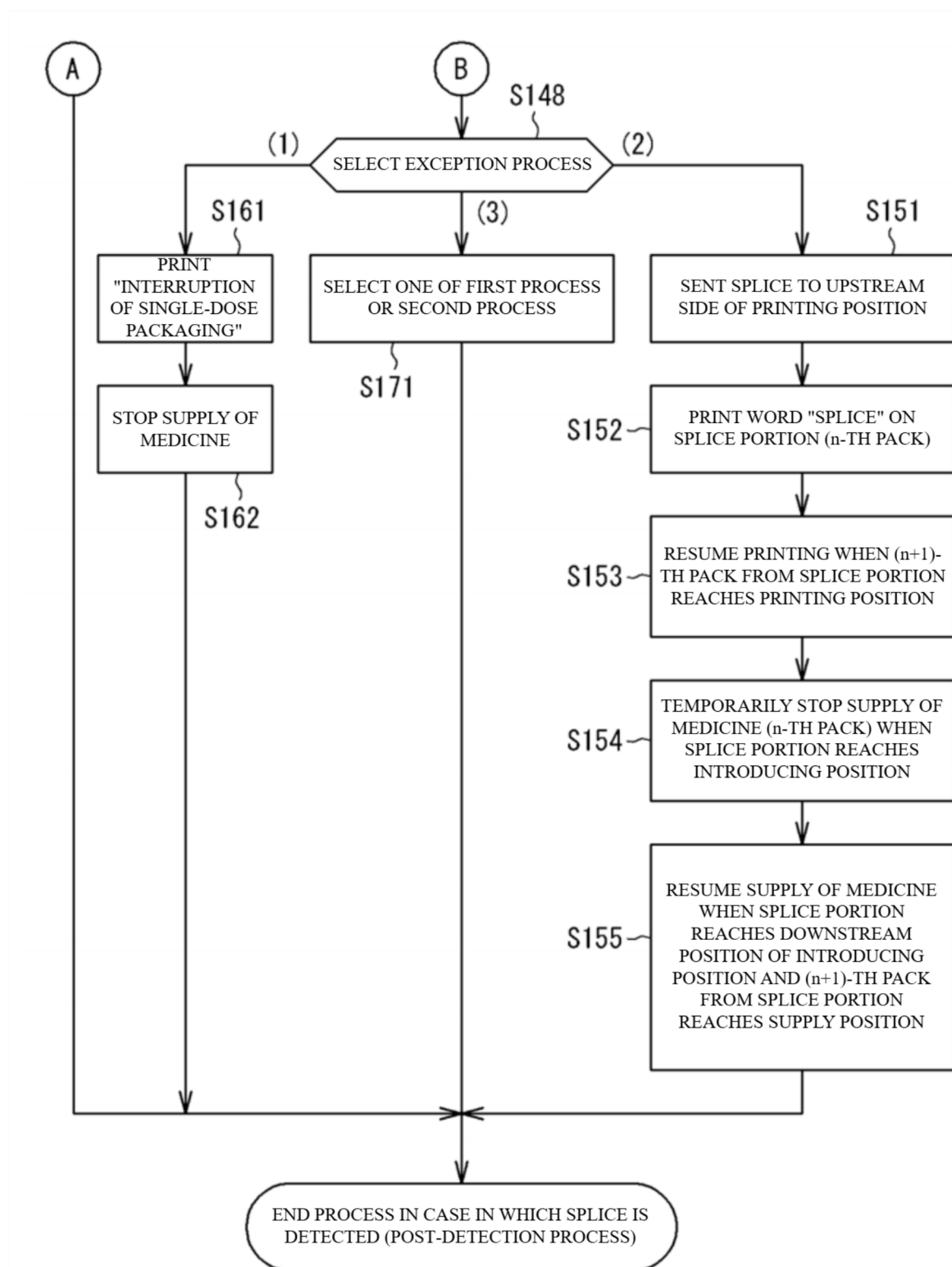


FIG. 13

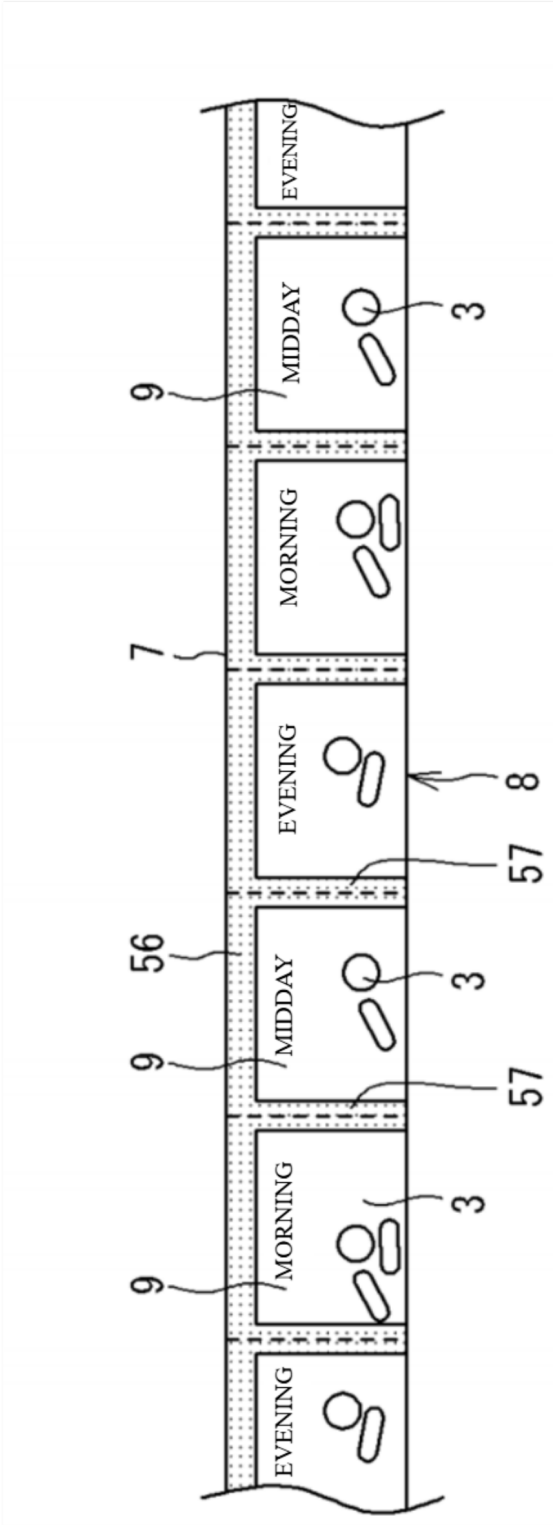
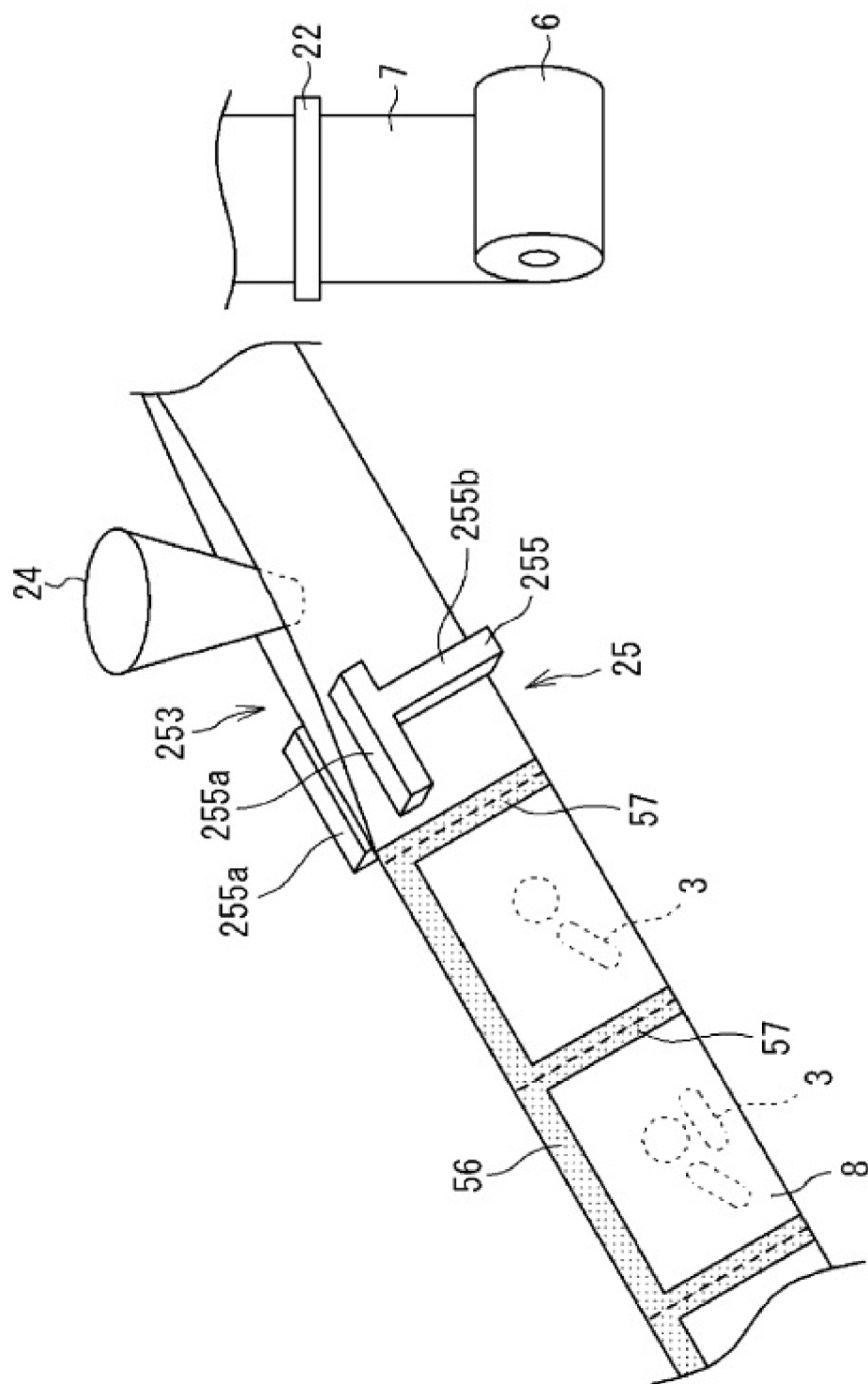


FIG. 14



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2024/033218

A. CLASSIFICATION OF SUBJECT MATTER

B65B 57/02(2006.01)i; **A61J 3/00**(2006.01)i; **B65B 9/06**(2012.01)i; **B65B 57/00**(2006.01)i
 FI: B65B57/02; B65B9/06; A61J3/00 310E; B65B57/00 H

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B65B57/02; A61J3/00; B65B9/06; B65B57/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996
 Published unexamined utility model applications of Japan 1971-2024
 Registered utility model specifications of Japan 1996-2024
 Published registered utility model applications of Japan 1994-2024

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2005-342527 A (YUYAMA MFG. CO., LTD.) 15 December 2005 (2005-12-15) paragraphs [0019]-[0041], fig. 1-7	1-4, 8-19
A		5-7
X	JP 2007-176579 A (NISSIN FOOD PROD CO., LTD.) 12 July 2007 (2007-07-12) paragraphs [0035]-[0036], [0049]-[0091], fig. 1-6	20
Y		1-4, 8-19
Y	JP 2020-79114 A (KAWASHIMA PACKAGING MACHINERY LTD.) 28 May 2020 (2020-05-28) paragraphs [0155]-[0199], fig. 1-10	1-4, 8-19
A	JP 2022-47090 A (YUYAMA MFG. CO., LTD.) 24 March 2022 (2022-03-24)	1-20
A	WO 2017/090317 A1 (ISHIDA CO., LTD.) 01 June 2017 (2017-06-01)	1-20

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

10 October 2024

Date of mailing of the international search report

22 October 2024

Name and mailing address of the ISA/JP

Japan Patent Office (ISA/JP)
 3-4-3 Kasumigaseki, Chiyoda-ku, Tokyo 100-8915
 Japan

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2024/033218

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2005-75401 A (NIPPON SEIKI CO., LTD.) 24 March 2005 (2005-03-24)	1-20
A	CN 111409916 A (GREATVIEW BEIJING TRADING CO., LTD.) 14 July 2020 (2020-07-14)	1-20

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/JP2024/033218

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
JP	2005-342527	A	15 December 2005	(Family: none)	
JP	2007-176579	A	12 July 2007	(Family: none)	
JP	2020-79114	A	28 May 2020	(Family: none)	
JP	2022-47090	A	24 March 2022	(Family: none)	
WO	2017/090317	A1	01 June 2017	(Family: none)	
JP	2005-75401	A	24 March 2005	(Family: none)	
CN	111409916	A	14 July 2020	(Family: none)	

REFERENCES CITED IN THE DESCRIPTION

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