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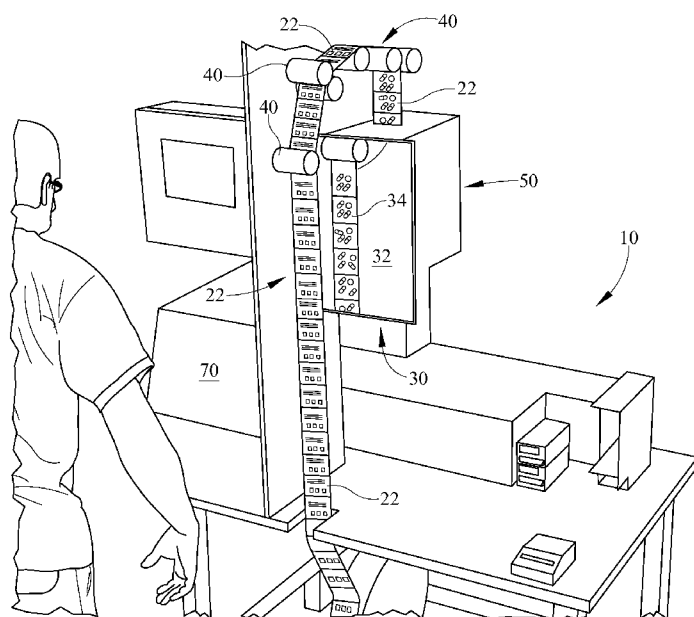


FIG. 3

(57) Abstract: The present invention covers a method and system for inspecting and packaging primary packages. The contents of the primary packages are inspected to confirm the correct contents are in each package along with the correct content information on the outside. This inspection method and system may use mirrors to inspect the package by allowing a user viewing access to both sides of the package simultaneously. This method and/or system may also use a display to show the image on the back of the package or the image associated with the data on the back of the package such as a picture of the medication that should be contained within the package. A looping inspection configuration may also be used to allow the user to compare a certain set of medications such as daily or weekly doses to confirm the contents are consistent and correct over the designated time period.

SYSTEMS AND METHODS FOR INSPECTING AND GROUPING PRIMARY PACKAGES

TECHNICAL FIELD

The present disclosure is directed to methods and systems for inspecting and packaging articles, more specifically, the methods and systems are directed to comparing the contents of a closed primary package against the content information located on the primary package exterior before loading the primary package into a secondary package.

BACKGROUND

Placing products or articles into the stream of commerce can include first protecting the product or individual article with a primary package and then placing one or more primary packages in a secondary package before shipping to a reseller or distributing to an end-user. Prior to placing certain classes of products or articles into the stream of commerce, or while products or articles are traveling in the stream of commerce, one or more parties may have an interest or need to inspect the product or articles.

Examples of products or articles that may be desirable to protect with a primary package include all manner of small, expensive, regulated, and fragile items, such as but not limited to electronic components, over-the-counter and prescription medications, consumable items including tobacco products, candy, batteries, and the like. For the purpose of teaching the present disclosure, the term “article” is used expansively to include all manner of product or thing.

A primary package(s) – a covering that holds or offers a level of protection to individual articles or groups of articles, include all manner of blister packs, pouches, bags, wraps, trays, receptacles, holders, packets, vessels, capsules, combinations thereof, and the like. For the purpose of teaching the present disclosure, the term “primary package(s)” is used expansively to include all manner of things that can hold or offer a level of protection to an article or group of articles.

In the course of shipping or distributing a primary package, it may be convenient and practical to group and place one or more primary packages within a secondary package. Examples of a secondary package(s) include all manner of cartons, boxes, sleeves, containers, receptacles, bottles, vessels, holders, canisters, cases, combinations thereof, and the like. For the purpose of teaching the present disclosure, the term “secondary package(s)” is used expansively to include all manner of things that can hold an article or group of articles.

Various reasons for inspecting the articles before or while they are in the stream of commerce may arise, such as the need to verify the quality, quantity, or condition of the articles in the primary package, or confirm the content-related information located on the primary package is consistent or compatible with the articles therein. After inspecting the articles, a party in the stream of commerce such as the manufacturer, packer, reseller, distributor, (or in the case of regulated articles) the professional licensed to dispense the articles, may desire to group and place one or more primary packages into a secondary package and label the secondary package with content-related information.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a cross-section elevation view of an exemplary inspection and grouping system.

FIG. 2 shows a primary package staging portion of an exemplary inspection and grouping system.

FIG. 3 shows a plurality of primary packages loaded in an exemplary inspection and grouping system.

FIGS. 4 and 5 show inspecting a plurality of primary package using an exemplary inspection and grouping system.

FIGS. 6 and 7 illustrate separating attached primary packages.

FIG. 8 shows a secondary package loading portion of an exemplary inspection and grouping system.

FIGS. 9 and 10 illustrate a secondary package labeling portion of an exemplary inspection and grouping system.

FIG. 11 shows an alternative embodiment of an exemplary inspection and grouping system.

FIGS. 12-15 illustrate several views of another alternative embodiment of an exemplary inspection and grouping system.

FIG. 16 shows an alternative embodiment of an inspections system.

DESCRIPTION

As required, illustrative embodiments of the present disclosure are presented herein. It must be understood that the presented embodiments are merely exemplary examples of the disclosure that may be embodied in various and alternative forms, and combinations thereof. As used herein, the word “exemplary” is used expansively to refer to embodiments that serve as an illustration, specimen, model, or pattern. The figures are not necessarily to scale and some features may be exaggerated or minimized to show details of particular components. In other instances, well-known components, systems, materials, or methods have not been described in detail in order to avoid obscuring the present disclosure. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and a basis for teaching one skilled in the art to variously employ the present disclosure.

For the purpose of teaching the present disclosure, the exemplary drawings and description are directed to pharmaceutical products held in sealed primary packages that need to be inspected to confirm the contents accurately reflect the content-related information on or associated with each primary package. After the user has confirmed the contents are at least compatible with the content-related information, the user allows the primary packages to continue in the stream of commerce. The present disclosure is not limited to pharmaceutical products.

Turning now to **FIG. 1**, there is shown a cross-section elevation view of an exemplary inspection and grouping system **10**. Generally speaking, the illustrated exemplary inspection and grouping system **10** is configured to permit various methods of inspecting and comparing the contents of a primary package against the content information located on the primary package exterior before grouping the primary package(s). In alternative embodiments a group of primary packages are then placed into a secondary package. To that end, the illustrated system **10** includes a primary package staging portion **20**, an inspection portion **30**, a primary package drive mechanism **40**, and a primary package gathering portion **50**, as explained in detail below.

As best shown in subsequent figures, alternative embodiments include a primary package severance device **60**, a secondary package blank staging portion **70**, a secondary package blank erecting sub-assembly **80**, a secondary package loading portion **90**, a secondary package labeling and/or printing portion **100**, a first image capture device **110**, a second image capture device **214**, and a display device **218**.

With reference now to **FIGS. 1** and **2** there is shown a user positioning a plurality of primary packages **22**, here illustrated as a string of attached pouches stored on a reel **24**, at the primary package staging portion **20**. In the illustrated system **10**, the primary package staging portion **20** includes a reel arm **26** that supports and positions the reel **24**. In alternative embodiments the staging portion **20** receives a plurality of primary packages **22** in other configurations, such as but not limited to blister packs wrapped around or within a spool, trays loaded within a box, bottles strung together and set directly on the floor, combinations thereof, and the like.

For the purposes of teaching and not limitation, the illustrated plurality of primary packages **22** are a series of attached pouches that are pre-filled with prescription medications and then sealed. Further, the illustrated reel **24** includes sections of primary packages **22** intended for distribution to different parties, such as multiple customers who have requested a specific pharmacy to fill their respective prescriptions. In addition, the illustrated packages **22** include

a first side on which is printed content-related information and a second side that is at least partially transparent such that a user has an unobstructed view of the contents without opening the pouch.

Content-related information may include a patient name, a regime schedule, regime reminders, prescription drug names, a description of each article(s), dosage information, lot numbers, expiration dates, instructions, warning, pouch serialized ID, package number, total package count, optical data code including 2D or 3D bar code or data matrix, physician information, pharmacy information, combinations thereof, and the like. In alternative embodiments different types of primary packages are attached and inspected using the illustrated systems. In other embodiments, attachments such as separators, spacers, blanks, leader strips, empty primary packages, combination thereof, and the like may be positioned between, before, or after the primary package(s), and those attachments may include content-related information. Further, those attachments may include the option to sever the attachment from a primary package, such as a perforated strip.

As shown in **FIGS. 1 and 3**, the illustrated plurality of primary packages **22** are positioned within the system **10** such that the packages **22** extend from the staging portion **20**, through at least a portion of the inspection portion **30**, through at least a portion of the primary package drive mechanism **40**, and are directed to the primary package gathering portion **50**. As described below with reference to the illustrated methods, an exemplary primary package **22r**, best shown in **FIG. 4**, will be directed from the staging portion **20**, past the inspection portion **30**, and into the gathering portion **50**.

The inspection portion **30** includes an image reflector **32**, illustrated here as a mirror, that presents a reflected image **34r-v** of a side of one or more primary packages **22r-v**, best shown in **FIGS. 4 and 5**. The illustrated inspection portion **30** shows a single image reflector **32**, while alternative embodiments may include a plurality of image reflectors such as two or more mirrors positioned at an angle to each other that permits the user to view the reflected image **34** from either side of the plurality of primary packages **22**.

Turning now to **FIGS. 4** and **5**, there is shown a user inspecting primary packages **22r-v**. In these exemplary illustrations the user is viewing primary packages **22r-v** as those packages pass through the inspection portion **30** of the system **10**. More specifically, the system **10** permits the user to simultaneously view both sides of each primary package **22**. To that end the user is able to directly view a first side of each package **22r-v** including content-related information, and a reflected image **34r-v** of the second side of each package including the contents. In alternative embodiments the user may directly view the contents while viewing a reflected image of the content-related information. In the course of inspecting, the user compares the relevant content-related information with the respective contents and determines whether the contents are consistent or compatible with the content-related information. Should the user identify any anomalies between the contents and the content-related information the user may take the proper recourse.

With reference to **FIGS. 1, 3** and **4**, the plurality of primary packages **22** are shown as engaged with and driven by the primary package drive mechanism **40**, here illustrated as rollers, some of which may be idle and some of which may be driven, that cooperate to move the primary packages **22** from the staging portion **20** to the gathering portion **50**. While the illustrated drive mechanism **40** comprises rollers, any drive system familiar to those skilled in the art is contemplated, including gears, belts, tooth and sprocket arrangements, pull drives, push drives, and pin drive configurations. It is further contemplated that the drive mechanism **40** will be determined by the type of primary package and how those are attached, and that the drive mechanism **40** may include alternative features, whether motorized, non-motorized, of variable speed, continuous and/or intermittent, computer programmed such that a programmed processor assists in any operation of the system **10**, and the like.

As illustrated in **FIGS. 1** and **3**, the system **10** includes a primary package gathering portion **50**, here shown as a fan fold sub-assembly, configured to receive and fold a group of inspected and approved primary packages **22**. In alternative embodiments the primary package gathering portion **50** may be

configured to roll, wrap, or otherwise gather and bundle the primary packages in alternative arrangements. It is to be understood that a fan fold arrangement of the primary packages may be dispensed from the secondary package more easily than alternate arrangements of the primary packages.

FIGS. 6 and 7 illustrate a potential location for a primary package severance device **60**, and a first group of primary packages **62** and a second group of primary packages **64**. For the purpose of the present teaching, the user of the system **10** has identified the primary package **22t** as the last pouch in a group of primary packages **22** intended for a certain patient, and primary package **22u** as the first pouch in group of primary packages **22** intended for another patient. After severing the first group of primary packages **62** from the second group **64**, the remainder of the first group pouches **62**, including primary package **22t**, are directed into the primary package gathering portion **50**. The user then ensures the second group of primary packages **64**, beginning with primary package **22u**, are re-engaged with the drive mechanism **40** and directed toward the primary package gathering portion **50**.

The user of an inspection and gathering system may need to visually inspect the first few or leading primary packages of a new group of primary packages without the assistance of the system, if those leading packages were not inspected within the inspection portion **30** prior to engaging the primary packages **22** with the drive mechanism **40**. Alternatively, as mentioned above embodiments of primary packages may include attachments such as separators, blanks, or lead strips and these attachments may engage or remain engaged with the drive mechanism **40** in such a way as to facilitate or continue inspection of a new group of primary packages with the assistance of the system.

Turning momentarily to **FIGS. 2 and 3**, there is shown a secondary package blank staging portion **70**. In alternative embodiments, or as an option, a secondary package blank staging portion **70** is provided that stores secondary package blanks (not shown). Between the staging portion **70** and secondary package loading portion **90**, there is a secondary package blank erecting sub-assembly **80** (not visible). It is contemplated that the sub-assembly **80**

automatically retrieves a secondary package blank, at least partially assembles the blank into a secondary package **82**, and positions the partially assembled secondary package **82** to receive a first group of primary packages **62**, as best illustrated in **FIG. 8**. In alternative embodiments, the user removes a secondary package blank from the staging portion **70**, at least partially assembles the blank into a secondary package **82**, and places it within the secondary package loading portion **90** to receive a group of primary packages, **62, 64**. Alternatively, primary packages **62** can be loaded directly into sections of a tray for institutional distribution.

As shown in **FIGS. 9 and 10**, the system **10** includes a secondary package labeling portion **100**, which permits the user to generate and affix a secondary package label **102** to a secondary package **82a-d**. Secondary packages **82a-d** can then be grouped and stored, or grouped and further packaged for distribution. Alternatively, the information could be printed directly on the secondary package.

Referring now to **FIGS. 1 and 11**, there are shown optional elements for a computer-assisted inspection system **200**, including a first image capture device **210** configured to capture a first captured image **212**, a second image capture device **214** configured to capture a second image **216**, and a display device **218** configured to present the captured images **212, 216**. These optional image capture devices **210, 214** may comprise one or more cameras, scanners, optical character readers, bar code readers, combinations thereof, and the like, in communication with a display device **218** in the form of a graphic user interface (GUI). The display device **218** may comprise any form of display device or screen capable of presenting the captured images **212, 216** to the user of the system **200**. Exemplary image capture devices **210, 214** and exemplary display device **218** include one or electronic cameras and a flat screen, all in communication with a computer (not shown) comprising a processor, wherein the processor is configured to digitally capture an image of a primary package **22** as it passes by a camera and presents the captured image, or if the image is a data code present any related information or images from a database, on the display

device. Here, the term “computer” is used expansively to include both a device that can project images such as a film projector and a device that includes a processor with any manner of software, firmware, hardware, combinations thereof, and the like, that can display and present information.

One alternative embodiment of a computer-assisted inspection system **200** may be configured to include a single image capture device **210** that provides a first captured image **212**, possibly magnified, on the display device **218**, here the contents of the primary package **22**. Another alternative embodiment of the computer-assisted inspection system **200** may be configured to include a second image capture device **214** that provides a second captured image **216** on the display device **218**, here the content-related information **216**. Another alternative embodiment of the computer assisted system **200** can be configured to include any combination of a capture device **210**, **214**, a display device **218**, and an image reflector **32**, to permit the user to view various combinations of each primary package **22**. In still another alternative embodiment of a computer-assisted inspection system **200**, an image **212**, **216** projected on the display **218** may be related information or images retrieved from a local or remote database or memory and useful in the inspection process, such as an example of what the article(s) contained within the primary package should resemble.

Turning now to **FIGS. 12-15**, there is shown another alternative embodiment of an exemplary inspection and grouping system **10'**. Generally speaking, the illustrated exemplary inspection and grouping system **10'** is configured to permit various methods of inspecting and comparing the contents of a primary package against the content information located on the primary package exterior before grouping the primary package(s). As explained above, the system **10'** can allow a user to inspect primary packages, and to place the inspected primary packages into a secondary package. Therefore, the illustrated system **10'** also can include a primary package staging portion **20'**, which can be substantially similar to the primary package staging portion **20** discussed above, an inspection portion **30'**, which can be substantially similar to the inspection

portion **30** discussed above, an image reflector **32'**, which can be substantially similar to the image reflector **32**, and a primary package drive mechanism **40'**, which can be substantially similar to the primary package drive mechanism **40** discussed above.

Although not visible in **FIGS. 12-15**, some embodiments of the system **10'** include many of the features explained above with reference to **FIGS. 1-11**. For example, the system **10'** can include a primary package severance device similar to the primary package severance device **60** of the system **10**. Additionally, the system **10'** can include a secondary package blank staging portion similar to the secondary package blank staging portion **70**, a secondary package blank erecting sub-assembly similar to the secondary package blank erecting sub-assembly **80**, a secondary package loading portion similar to the secondary package loading portion **90**, a secondary package labeling and/or printing portion similar to the secondary package labeling and/or printing portion **100**, a first image capture device similar to the first image capture device **110**, a second image capture device similar to the second image capture device **214**, and a display device similar to the display device **218**.

Some embodiments of the system **10'** include an accumulator **220** for gathering the inspected primary packages. The accumulator **220** can include, for example, a reel onto which the inspected primary packages are rolled, a bin into which the inspected primary packages are accumulated, a box into which the inspected primary packages are placed, combinations thereof, and the like. Additionally, the system **10'** can include a tamper arm **222**, a tamper plate **224**, and a support plate **226**. These and additional features of the system **10'** will be explained below.

The system **10'** can be used to inspect a plurality **22'** of primary packages. In the illustrated embodiments, the plurality **22'** of primary packages is illustrated as a plurality of primary packages in the form of pouches. The plurality **22'** of primary packages can be transported as a reel of pouches, for example, as explained and illustrated above in **FIGS. 1-11**. As the plurality **22'** of primary packages is inspected, the inspected primary packages can be accumulated in

the accumulator **220**. The primary packages can be accumulated in the accumulator **220** in the order in which the primary packages are inspected. It will be understood that if the accumulator **220** includes a reel onto which the inspected primary packages are rolled, that the first package inspected will be the first package accumulated on the reel, and hence, also the last package taken off the reel.

As such, the system **10'** allows a user to reverse the flow of the plurality **22'** of primary packages. The plurality **22'** of primary packages can be inserted into a secondary package such that the first primary package inspected is the last primary package placed into the secondary package. As such, the first pouch out of the secondary package can be the first pouch inspected on the system **10'**.

The primary package inspection-to-accumulator path is illustrated in **FIG. 13**. The plurality **22'** of primary packages can be supplied to the system **10'**. For example, the plurality **22'** of primary packages can be stored on a supply reel that is substantially similar to the supply reel **24**, in a box, or in or on another supply mechanism, for example. The plurality **22'** of pouches can be supplied to the system **10'**, and can be inspected at the inspection portion **30'** in a manner substantially similar to that discussed above with reference to the inspection portion **30** of **FIGS. 1-11**. In other words, the plurality **22'** of primary packages can pass in front of an image reflector **32'**, e.g., a mirror or mirror assembly such that the front and rear of the plurality **22'** of primary packages can be inspected as the plurality **22'** of primary packages moves. Additionally, the system **10'** can include imaging devices, which may be similar to the imaging devices **110**, **114** of the system **10**. The imaging devices can be used for reading and/or imaging indicia on the primary packages or the package contents, which may be displayed on a display that is similar to the display **218** described above with reference to **FIGS. 1-11**. As explained above, a depiction of a properly filled and printed primary package also can be displayed on the display, and the depiction of the properly filled and printed primary package can be juxtaposed with an

image of the plurality **22'** of primary packages to help further simplify inspection of the packages.

The plurality **22'** of pouches can pass through the inspection portion **30'** and into/through a first passage **228** formed by two drive mechanism rollers **230**, **232**. The plurality **22'** of primary packages can exit the first passage **228** and can be routed over an accumulator roller **234**. The plurality **22'** of pouches can then travel to the accumulator **220**. In the illustrated embodiment, the plurality **22'** of pouches leaves the accumulator roller **234** and is supported by the support plate **226** as the plurality **22'** of pouches travels to the accumulator **220**.

The support plate **226** can be configured as a ramp, a conveyor, a chute, a side, or the like, along which the plurality **22'** of primary packages can pass toward to the accumulator **220**. The illustrated configuration of the support plate **226** is exemplary only. The support plate **226** be longer or shorter than the support plate **226** illustrated in **FIGS. 12-14**. The support plate **226** can include a rear edge **236**. The rear edge **236** can be rounded or otherwise smoothed to allow the plurality **22'** of pouches to pass through, over, and off of the support plate **226** without getting caught or snagged by any sharp edges of the support plate **226**. The plurality **22'** of pouches can be accumulated in or on the accumulator **220** while the plurality **22'** of pouches is inspected at the inspection portion **30'**.

At some time, each primary package of the plurality **22'** of primary packages has been inspected, and the plurality **22'** of primary packages can be stored, or can protrude into, the accumulator **220**. If necessary, the plurality **22'** of primary packages can be severed from an additional supply of primary packages using, for example, the primary package severance device **60'**, a perforated line of material, or other suitable means. Alternatively, the plurality **22'** of primary packages can end with a last primary package, such that severing the plurality **22'** of primary packages from an additional supply of primary packages may be unnecessary.

When the plurality **22'** of primary packages ends, or if the plurality **22'** of primary packages is severed from an additional supply of primary packages, the

plurality **22'** of primary packages may thereby display a distal end. The end of the plurality **22'** of primary packages can be similar to the last pouch **22t** described above with reference to **FIG. 7**, though the end is not visible in **FIGS. 12-14**. Returning to **FIGS. 12-14**, the end of the plurality **22'** of primary packages can be exposed near the first passage **228**, between the rollers **232** and **234**, or elsewhere along the flow path of the plurality **22'** of primary packages. In some embodiments, it may be desirable to insert the plurality **22'** of primary packages into a secondary package located at the secondary package loading area **238**. In the illustrated embodiment, the end of the inspected plurality **22'** of primary packages can be flowed into the secondary package loading area **238** along an accumulator-to-package path, for example, the accumulator-to-package path illustrated in **FIG. 14**.

As shown in **FIGS. 14** and **15**, the end of the plurality **22'** of primary packages can be placed into a second passage **240** formed by the accumulator roller **234** and another roller and/or plate. In the illustrated embodiment, the second passage **240** is formed by the accumulator roller **234** and a packaging roller **242**, though this arrangement is exemplary only. In some embodiments, the packaging roller **242** is coupled to a drive motor **244**, or another drive mechanism. In some embodiments, the accumulator roller **234** is coupled to a drive mechanism, and the packaging roller **242** simply guides the plurality **22'** of primary packages as the plurality **22'** of primary packages is moved by the accumulator roller **234**. As such, the accumulator roller **234** can move in a first direction during inspection such that the plurality **22'** of primary packages moves toward the accumulator **220**. After the plurality **22'** of primary packages is inspected, the end **238** can be placed into the second passage **240**. The accumulator roller **234** can then move in a second direction during packaging such that the plurality **22'** of primary packages moves away from the accumulator **220**.

In another embodiment, as mentioned above, the packaging roller **242** can be coupled to the drive mechanism. After the plurality **22'** of primary packages are inspected, the end of the plurality **22'** of primary packages can be placed into

the second passage **240** and the drive mechanism coupled to the packaging roller **242** can be activated such that the plurality **22'** of the primary packages moves away from the accumulator **220** and toward the secondary packaging area **238**.

In some embodiments, the secondary packaging area **238** further includes a primary package gathering portion that is similar to the primary package gathering portion **50** described above with reference to **FIGS. 1-11**. The plurality **22'** of primary packages can be fan-folded, folded, placed on a reel, or otherwise gathered, as the plurality **22'** of primary packages moves into the secondary package loading area **238**. After the plurality **22'** of primary packages are moved away from the accumulator **220**, and toward the secondary package loading area **238**, it is possible that one or more primary packages will protrude from the secondary package loading area **238**, or from a secondary package located at the secondary package loading area **238**. In other words, the plurality **22'** of primary packages may not go into the secondary package completely, and it may be desirable to apply a force to the plurality **22'** of primary packages to urge the plurality **22'** of primary packages into the secondary package.

In some embodiments, the system **10'** includes the tamper arm **222** and the tamper plate **224** illustrated in **FIGS. 12-14**. The tamper plate **224** can be attached to the tamper arm **222**, and the tamper plate **224** can pivot about an axis near the rear edge **236** of the support plate **226** as the tamper arm **222** is moved along a path **246**. The tamper plate **224** can be moved and can apply a force to the plurality **22'** of primary packages. The force applied by the tamper plate **224** can help urge the plurality **22'** of primary packages into the secondary package. In alternative embodiments, the tamper plate **224** can be pivoted, driven, or otherwise moved by other tamper plate driving mechanism(s), whether operated manually, electrically, mechanically, pneumatically, hydraulically, some combination thereof, and the like. It should be understood that the tamper plate **224** can be replaced with, or supplemented by, other tamper mechanisms such as, for example, pistons, cylinders, screens, or other structures.

As mentioned above, the system **10'** allows the sequential inspection of primary packages, for example, the plurality **22'** of primary packages in a first order. The inspected packages can be accumulated, for example, at an accumulator **220**. The primary package flow can be reversed, and the plurality **22'** of primary packages can be moved into a secondary package in reverse order, *i.e.*, the last primary package inspected can be the first primary package inserted or packaged in the secondary package. As such, the first primary package inspected can be the last primary package placed into the secondary package. As such, the first primary package inspected can be located at the top of the filled secondary package, allowing the secondary package to be loaded in the upright position. The ability to inspect the plurality **22'** of primary packages in a first order, and to package the plurality **22'** of primary packages such that the first inspected primary package is the first primary package taken out of the secondary package, can be beneficial in that it may be unnecessary to load the plurality **22'** of primary packages into an inverted secondary package or to inspect the plurality **22'** of primary packages in a reverse order.

In some embodiments, it is easier to inspect the plurality **22'** of primary packages when the primary packages are fed in a first order, and/or the primary packages may be designed or packaged for use in the first order. As such, it can be beneficial to package the plurality **22'** of primary packages such that the primary packages are accessible in the first order, *i.e.*, in the same order in which the primary packages are inspected. The use of the system **10'** as described above allows a user to inspect the plurality **22'** of primary packages in the first order and insert the primary packages into the secondary package in a second order. As such, the primary packages are accessible in the first order. In some embodiments, it is cheaper and easier to pack the secondary package in the second order than to flip the secondary package and load the plurality **22'** of the primary packages through the bottom of the secondary package, particularly with complex secondary packages that may require the application of glue, complex fold operations, staples, and the like, all of which may be difficult to properly apply if the secondary package is filled with the plurality **22'** of primary packages.

While the control of the system **10'** has not been described in detail, it should be understood that the system **10'** can include various controls for operating the system **10'**. For example, the system **10'** can include a control pad **248** for controlling the various components and operations of the system **10'**. The exemplary control pad **248** shown **FIGS. 12-15** is illustrated as including three control switches, though additional and/or alternative configurations are possible and contemplated. The control pad **248** can include a power switch, a product flow switch, a flow reverse switch, a light switch, control switches for one or more imaging devices and/or scanners, a tamper arm control switch, a printing device control switch, control switches for one or more drive motors **244**, combinations thereof, and the like. It should also be understood that the illustrated control pad **248** can be replaced with a touch screen, a multi-touch screen, or other touch sensitive devices, all of which may be integrated into a display such as the display **218** of **FIG. 11**.

It is to be understood that an inspection area may comprise a loop inspection configuration one such configuration is depicted in **FIG. 16**. The primary packages **22'** may be aligned in an adjustable loop configuration such that the contents of the packages are viewable by the user and may be compared for accuracy. Rollers **250**, **252**, and **254** may be used keep the primary packages **22'** aligned and in the correct orientation. It is to be understood that the number of rollers may be adjusted based on manufacturing preferences. There may be a benefit to having at least three rollers in the loop. There may be a benefit to having four rollers in the loop (bottom roller **254** to move the primary packages into the loop, first top roller **250** to create the straight viewing line **258**, second bottom roller **252** to create the second viewing line **260** for comparing to the first viewing line, second top roller set **250** to direct the inspected primary packages onto the next step). Rollers **250** may be combined into a single roller set with a top roller and a bottom roller and space between the top and bottom rollers for the primary packages **22'** to move through. It may be necessary if rollers **250** are combined to a single set of rollers to make this roller set adjustable for example by allowing one of the double rollers (top and bottom

constitutes the set) to be lifted so the primary packages **22'** may be adjustable between the rollers and line up in the loop. Roller **256** may be used to send the primary packages into the next step in the inspection machine.

In **FIG. 16** the lower roller **252** is designed to be adjustable within the machine. This feature may allow the user to adjust the number of primary packages **22'** that are viewable such that an entire days worth of a patient's medications can be compared for accuracy and consistency. Lower roller **254** may also be made adjustable so both strips of medications only display one days worth of a patient's medications. It is to be understood that the top rollers **250** may be adjustable as well both height wise and by opening the space between the roller pairs such that the strip of primary packages may be adjusted to line viewing length **258** with viewing length **260**. Manufacturing preferences will determine which rollers and how many rollers should be adjustable. The rollers **250, 254, 252, 256** may be manually rotated as the user pulls the packages along or automated such that the primary packages **22'** scroll through for the user to view without interaction from the user. It is to be understood that such an inspection configuration may reduce or eliminate the need for an inspection area using a display.

Using one of the systems disclosed herein, an exemplary method of inspecting and gathering primary packages includes: providing a primary package holding an article and content-related information located on the primary package exterior or on a related attachment; viewing a first side of the primary package and visually identifying the article therein; while viewing the first side, simultaneously viewing the content-related information located on the opposite side of the primary package or the related attachment. Thereafter, comparing the article to the content-related information and determining if the article and the content-related information are compatible. Additional steps in this method may include authorizing distribution of the primary package(s) after inspection, gathering the primary package into a secondary package, and labeling the secondary package with content-related information. In this method, the user is viewing either the article or the content-related information as a reflected image.

Using one of the systems disclosed herein, an exemplary method of inspecting and gathering primary packages includes: providing a primary package including at least one article therein and content-related information; viewing an image of the primary package and identifying the article therein; while viewing the image of the article, simultaneously viewing the content-related information; comparing the article to the content-related information; and, determining if the article and the content-related information are compatible. Thereafter, comparing the article to the content-related information and determining if the article and the content-related information are compatible. Additional steps in this method may include authorizing distribution of the primary package(s) after inspection, gathering the primary package into a secondary package, and labeling the secondary package with content-related information. In this method the user is viewing either the article or the content-related information, or both, as an image retrieved from a local or remote database or memory and presented on a display device, and then comparing the retrieved image with the primary package.

The law does not require and it is economically prohibited to illustrate and teach every possible embodiment of the present claims. Hence, the above-described embodiments are merely exemplary illustrations of implementations set forth for a clear understanding of the principles of the disclosure. Variations, modifications, and combinations are contemplated and may be made to the above-described embodiments without departing from the scope of the claims. All such variations, modifications, and combinations are included herein by the scope of this disclosure and the following claims.

CLAIMS

I claim:

1. A system for inspecting and grouping a plurality of primary packages, comprising:
at least one primary package staging portion;
at least one inspection portion including at least one image reflector;
at least one primary package gathering portion; and,
at least one primary package drive mechanism configured to direct at least one primary package past the at least one image reflector and toward the at least one primary package gathering portion.
2. The system of claim 1, further comprising at least one secondary package loading portion, wherein the primary packages are gathered into the secondary package.
3. The system of claim 1, further comprising at least one primary package severance device configured to separate the at least one primary package from an adjacent attachment.
4. The system of claim 2, further comprising at least one secondary package blank staging portion.
5. The system of claim 4, further comprising at least one secondary package blank erecting sub-assembly.
6. The system of claim 2, further comprising at least one accumulator, wherein the accumulator is located before at least one secondary package loading portion.

7. The system of claim 2, wherein the primary packages are gathered into the secondary packages using a fan fold arrangement in the secondary package loading portion.

8. The system of claim 2, further comprising a tamper mechanism for applying force to the inspected primary packages, wherein the force is applied to urge the inspected primary packages into the secondary package loading area.

9. A system for inspecting and grouping a plurality of primary packages, comprising:

at least one primary package staging portion:

at least one primary package gathering portion; and,

at least one inspection area with a loop configuration.

10. The system of claim 9, wherein the loop configuration comprises at least one adjustable rolling component.

11. The system of claim 9, further comprising at least one inspection portion including at least one image reflector; and at least one primary package drive mechanism configured to direct at least one primary package past the at least one image reflector and towards the at least one primary package gathering portion.

11. A system for inspecting and grouping a plurality of primary packages, comprising:

at least one primary package staging portion;

a first image capture device configured to capture an image of at least part of a primary package;

at least one display device configured to display the captured image or its correlated stored data base image;

at least one primary package gathering portion; and,

at least one primary package drive mechanism configured to direct at least one primary package past the first image capture device and toward the primary package gathering portion.

12. The system of claim 11, further comprising a secondary package loading portion.

13. The system of claim 12, further comprising a secondary package labeling portion.

14. The system of claim 11, further comprising a primary package severance device configured to separate a primary package from an adjacent attachment.

15. The system of claim 11, further comprising an image reflector within viewing distance of the display device.

16. The system of claim 11, further comprising a secondary package blank staging portion.

17. The system of claim 16, further comprises a secondary package blank erecting sub-assembly.

18. The system of claim 11, further comprising, a display device configured to display an image retrieved from one of a database or memory.

19. The system of claim 18, wherein the retrieved image is associated with the article.

20. The system of claim 19, wherein the retrieve image is associated with the content-related information.

21. The system of claim 11, further comprising at least one accumulator, wherein the accumulator is located before a secondary package loading portion.

22. The system of claim 2, wherein the primary packages are gathered into the secondary packages using a fan fold arrangement.

23. The system of claim 12, further comprising a tamper mechanism for applying force to the inspected primary packages, wherein the force is applied to urge the inspected primary packages into the secondary package loading portion.

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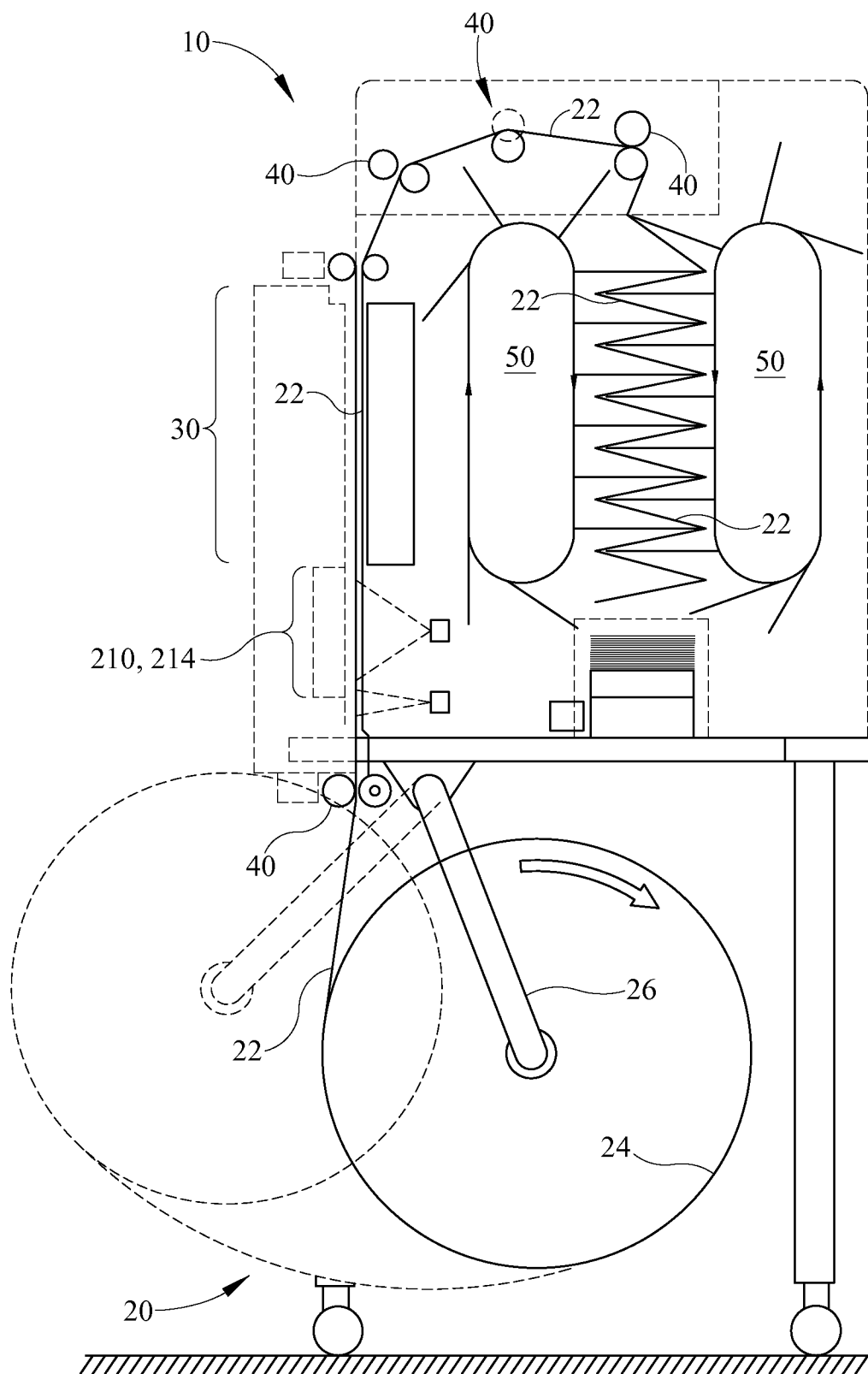


FIG. 1

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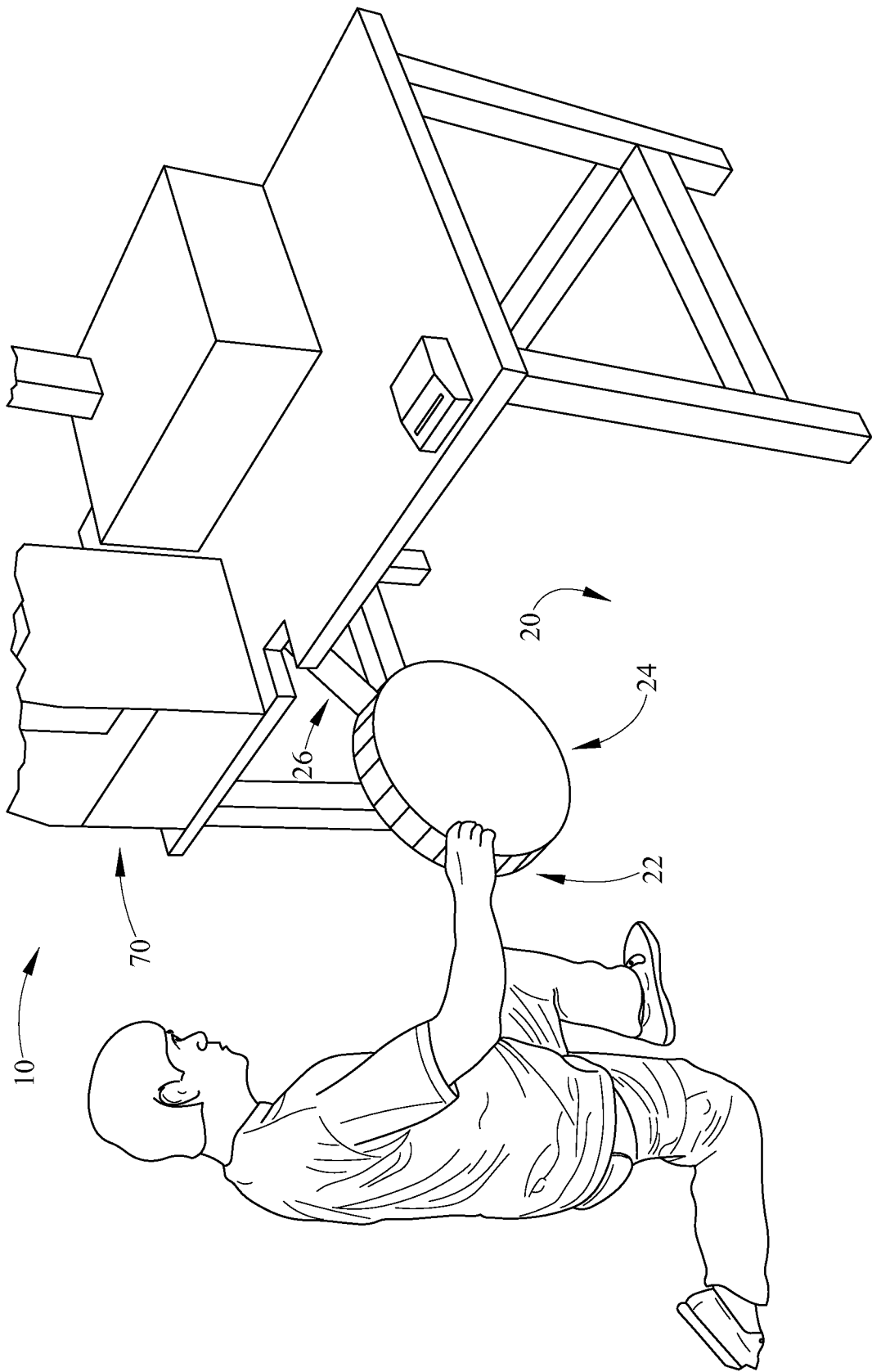


FIG. 2

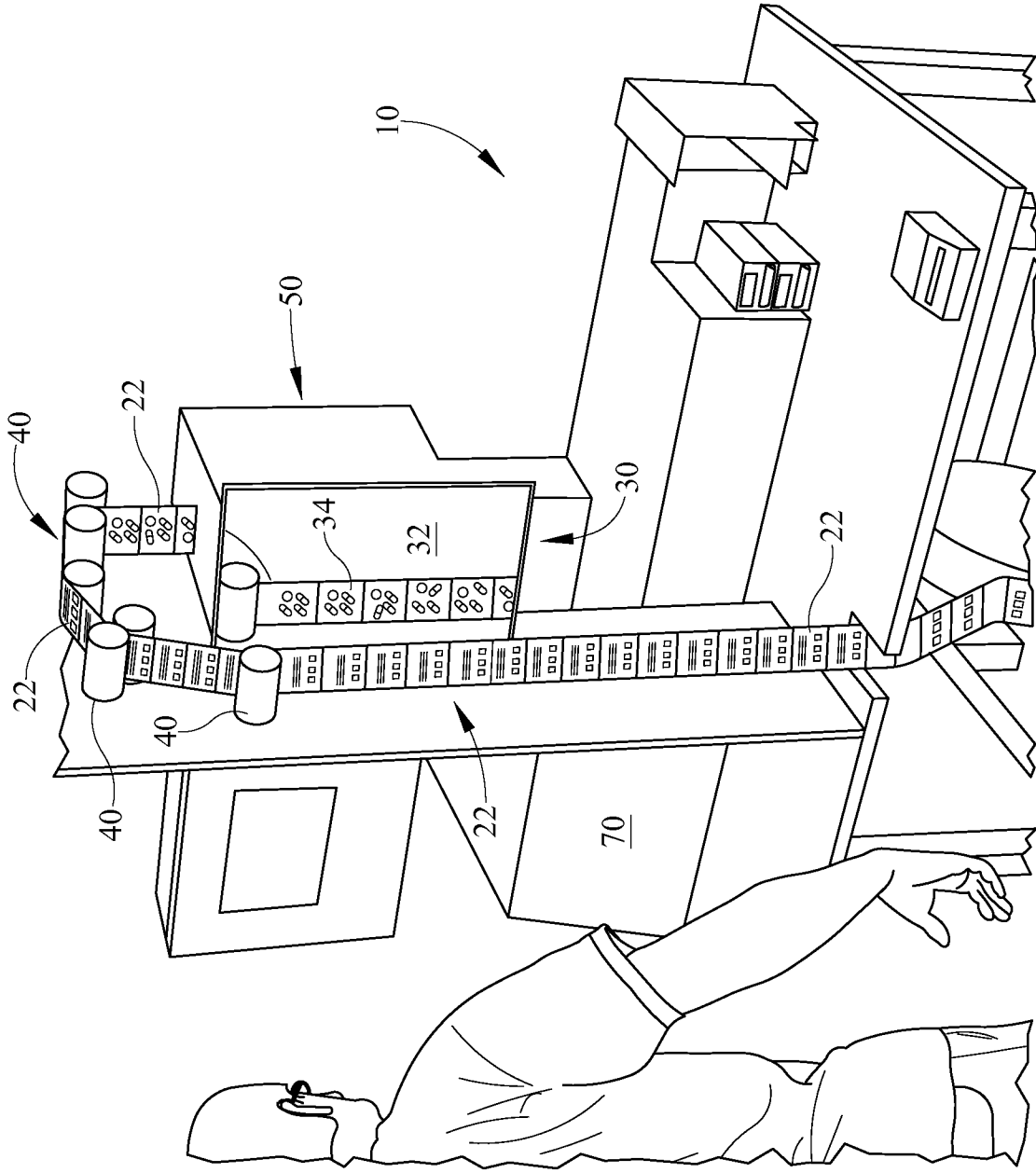


FIG. 3

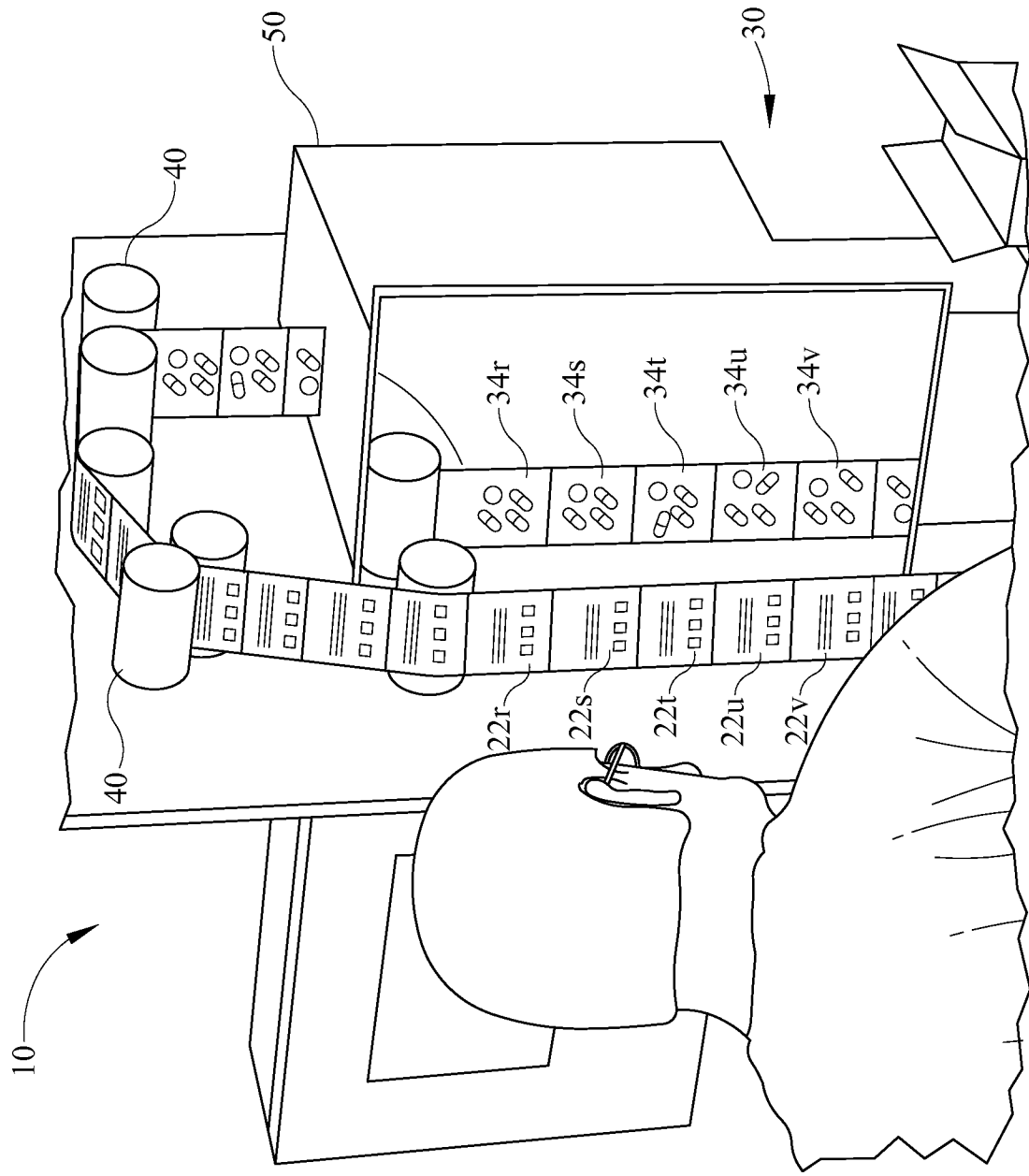


FIG. 4

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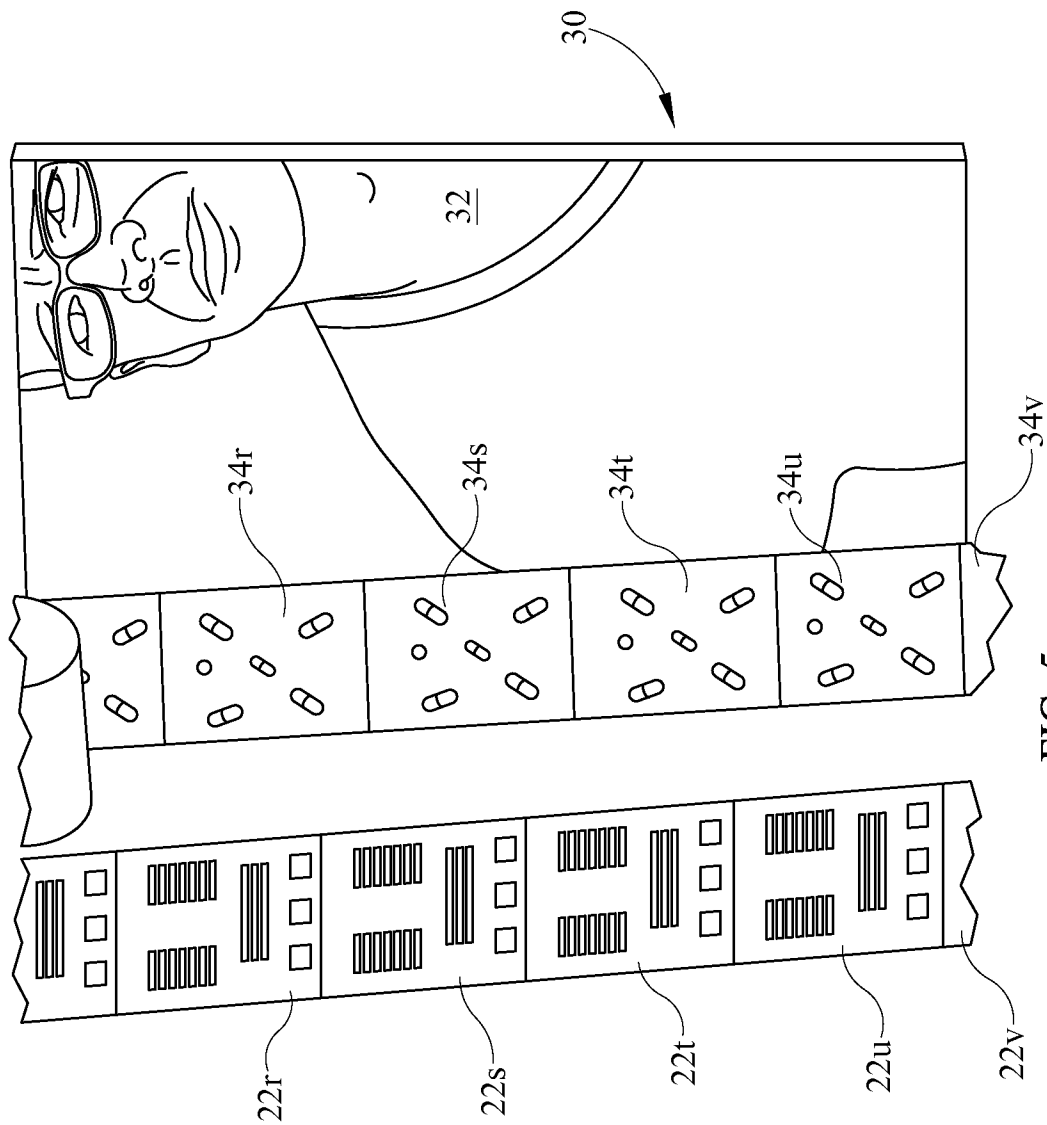


FIG. 5

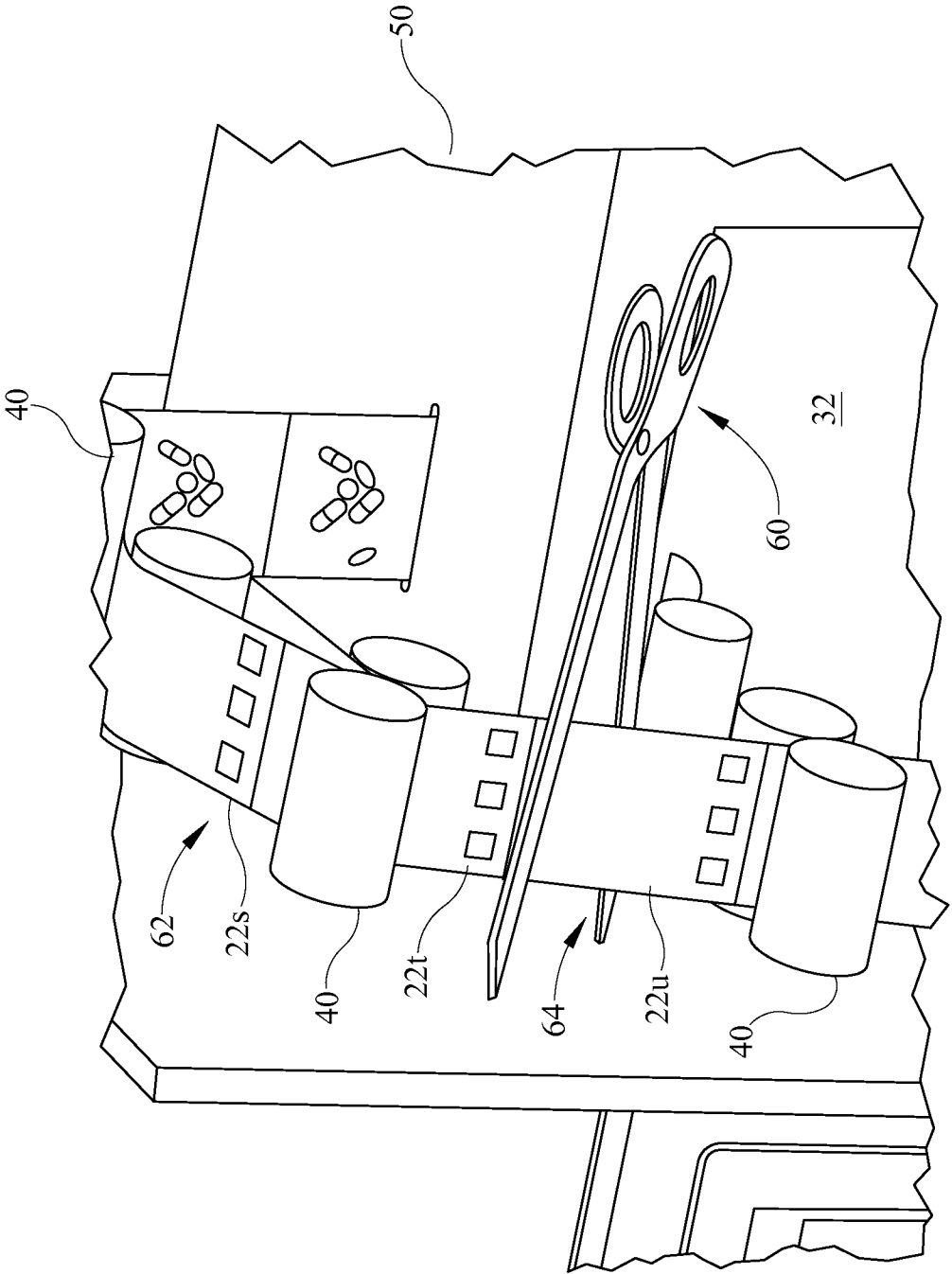


FIG. 6

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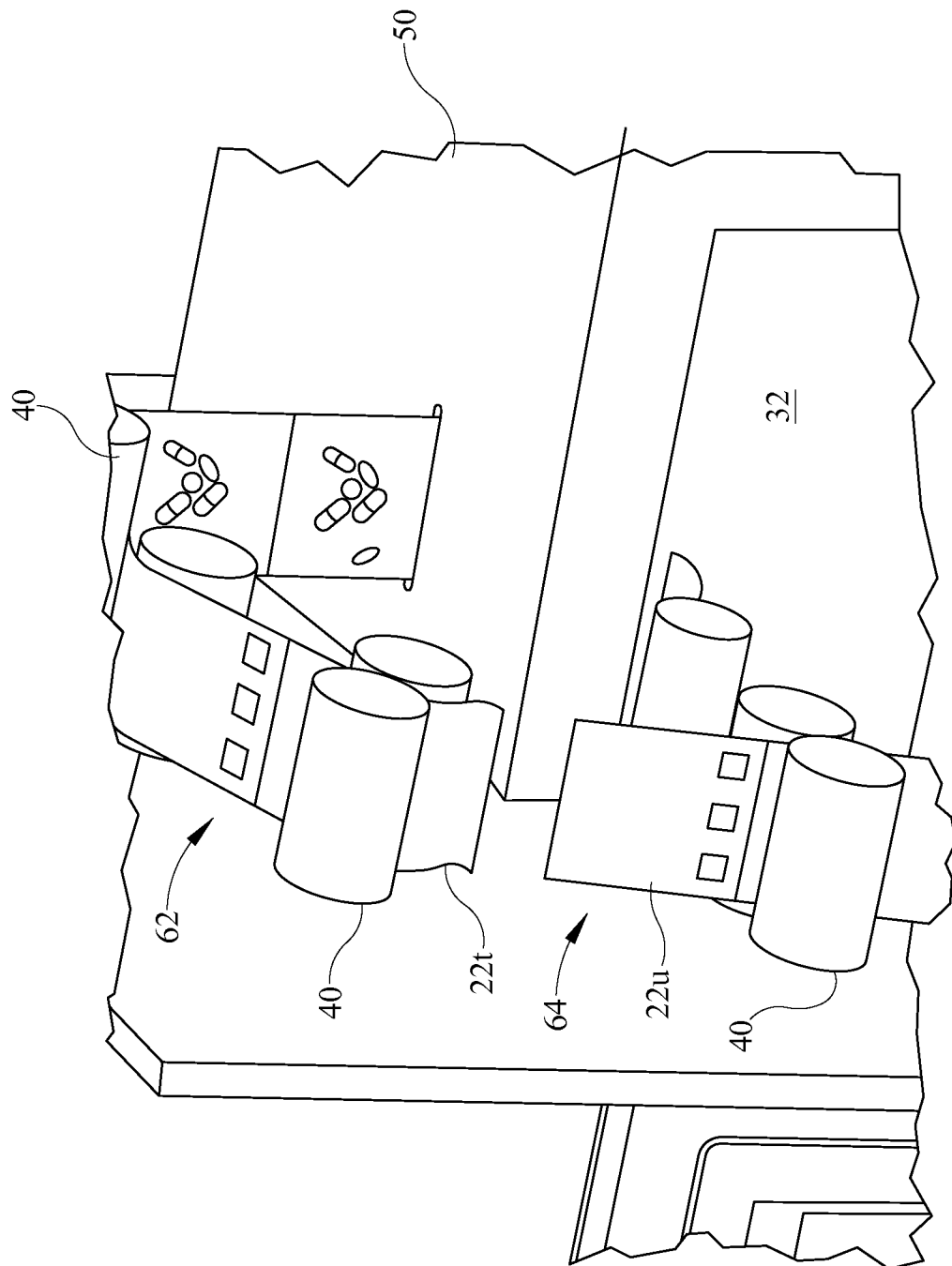


FIG. 7

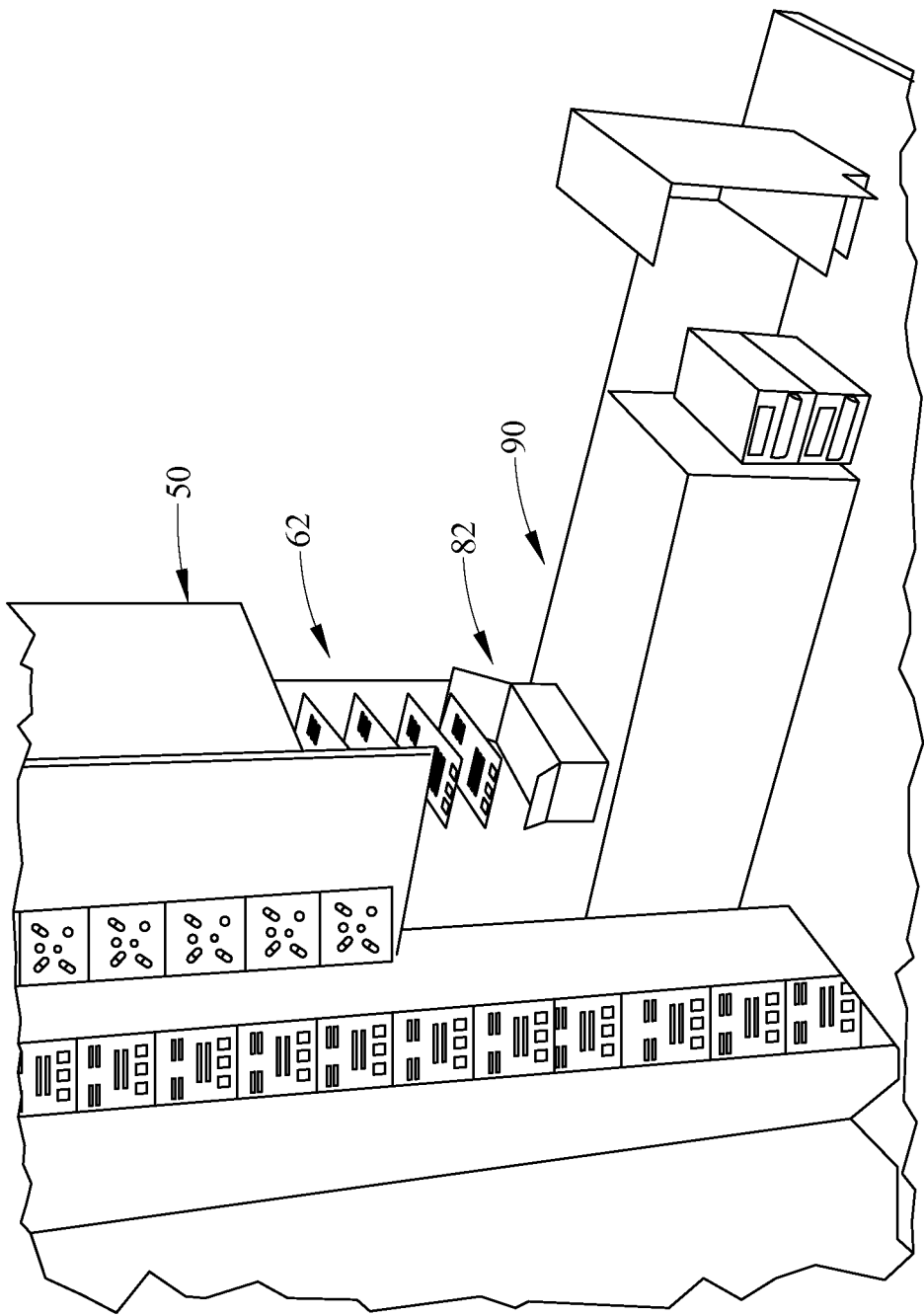


FIG. 8

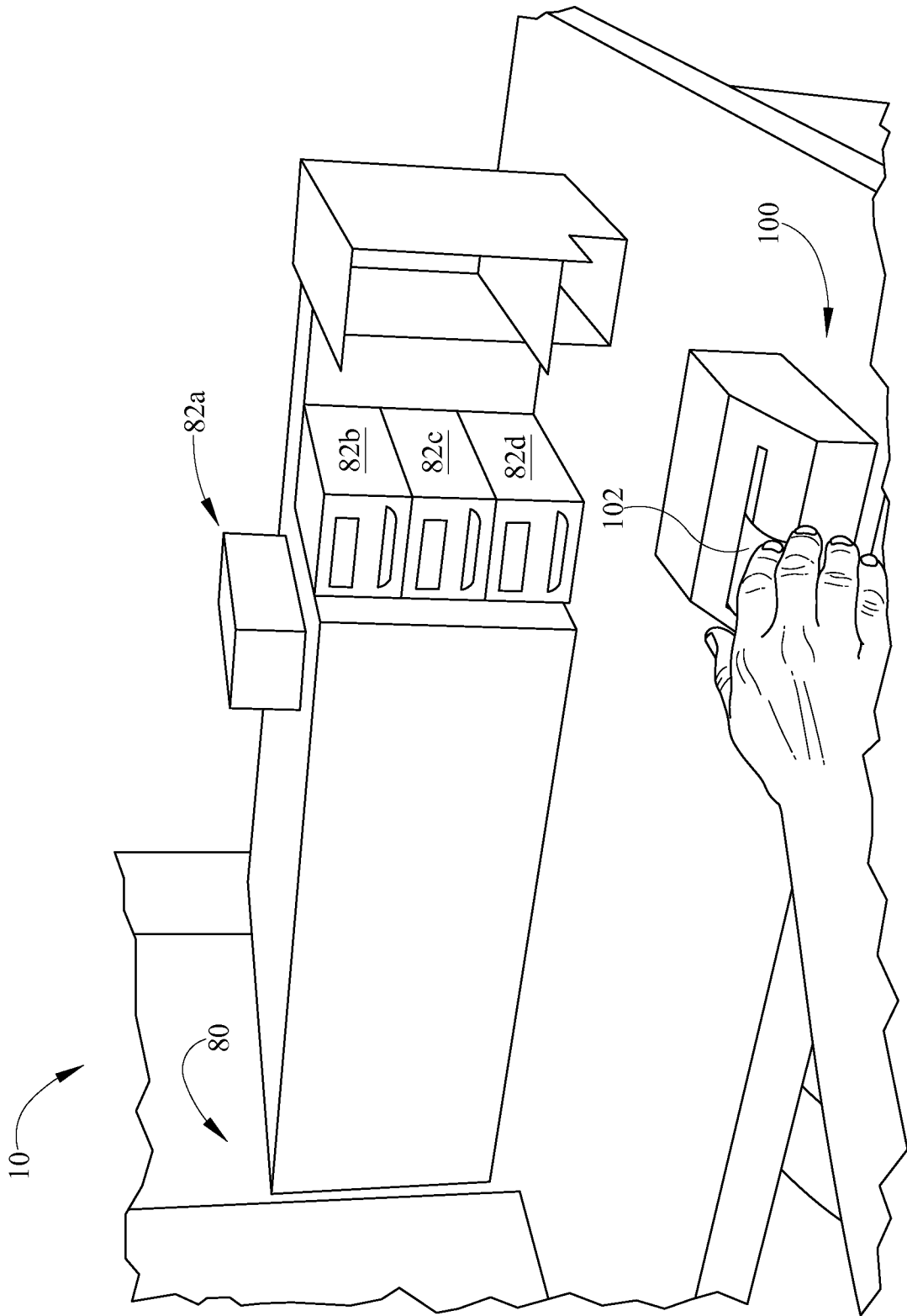


FIG. 9

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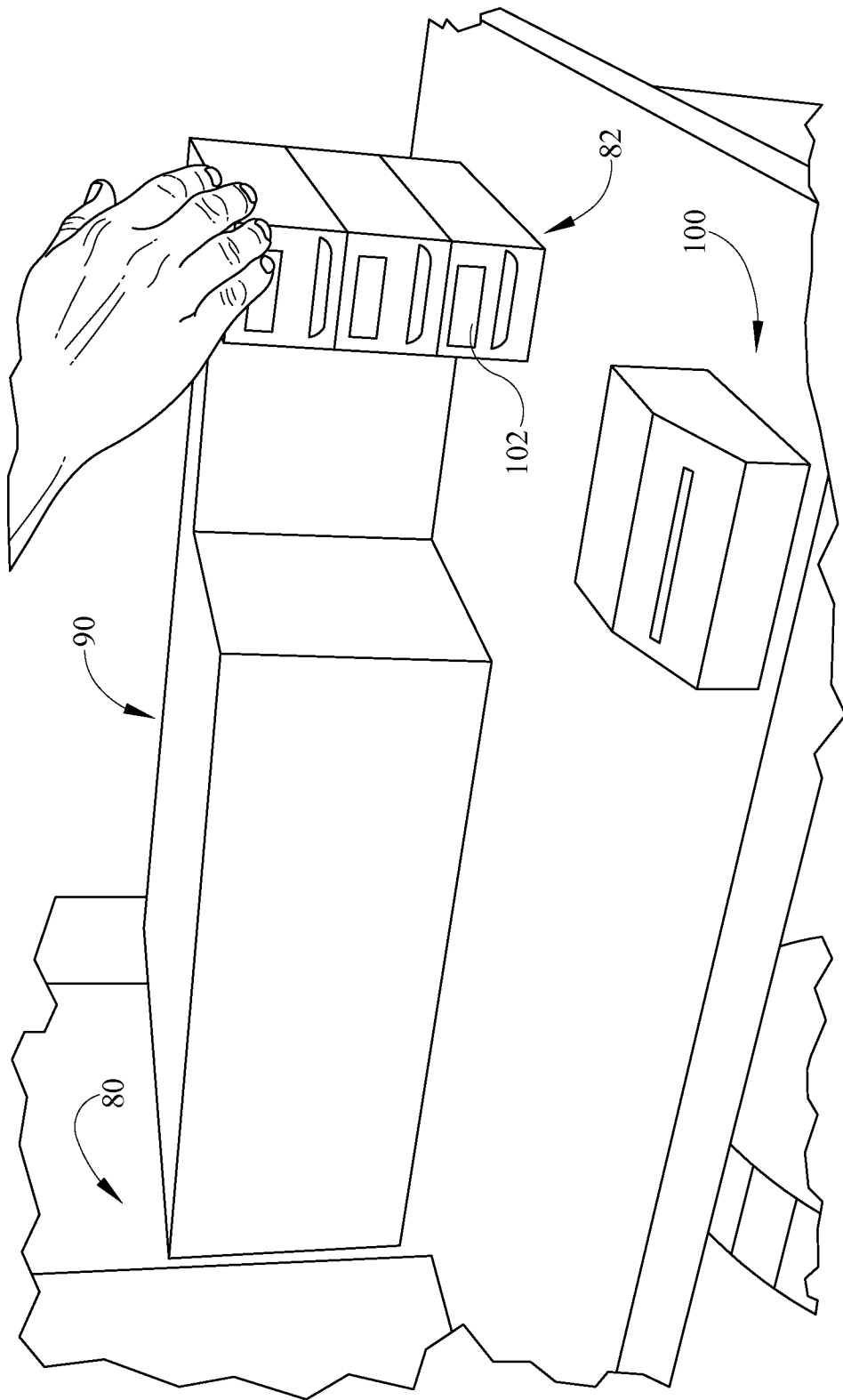


FIG. 10

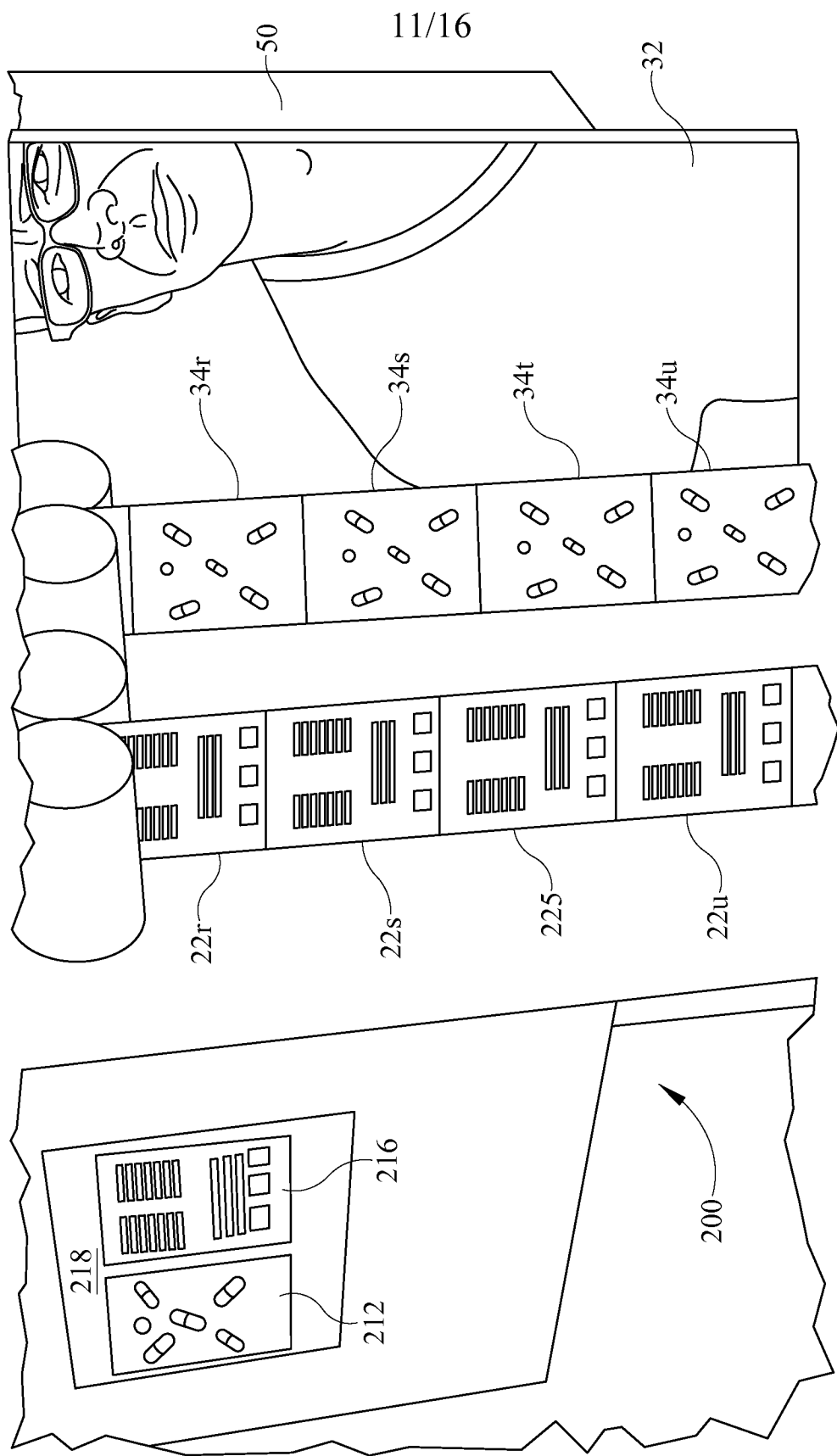


FIG. 11

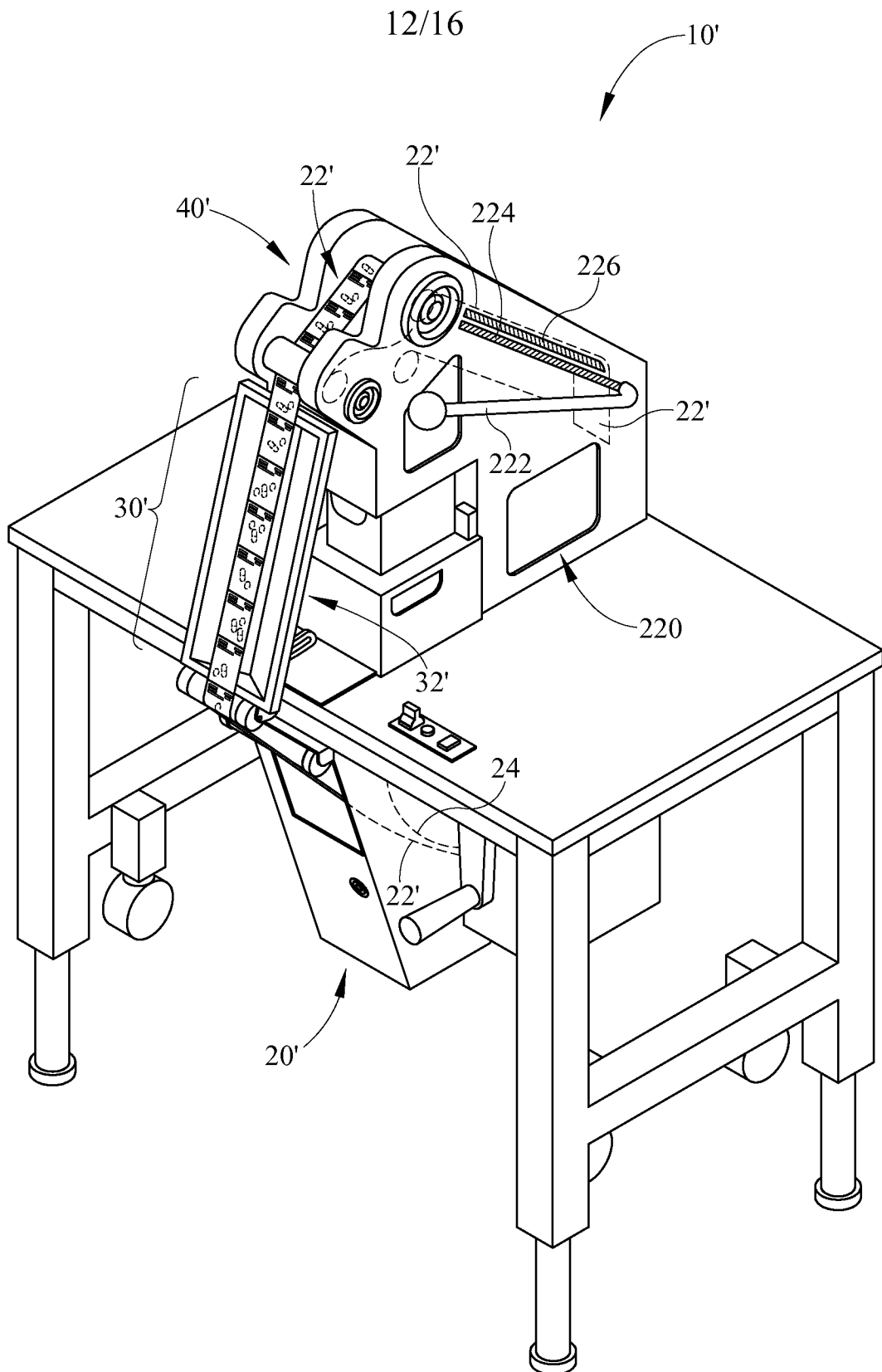


FIG. 12

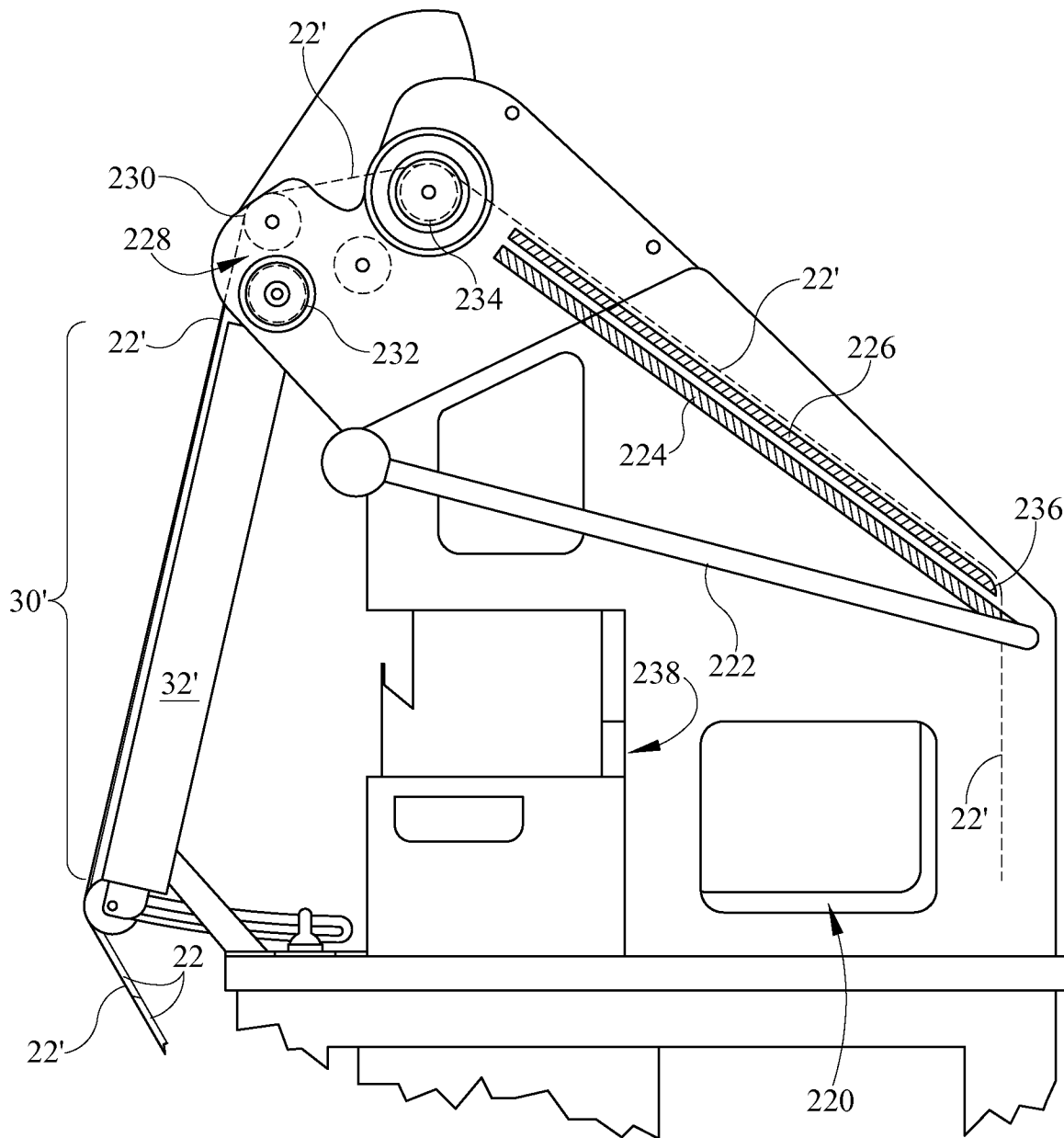


FIG. 13

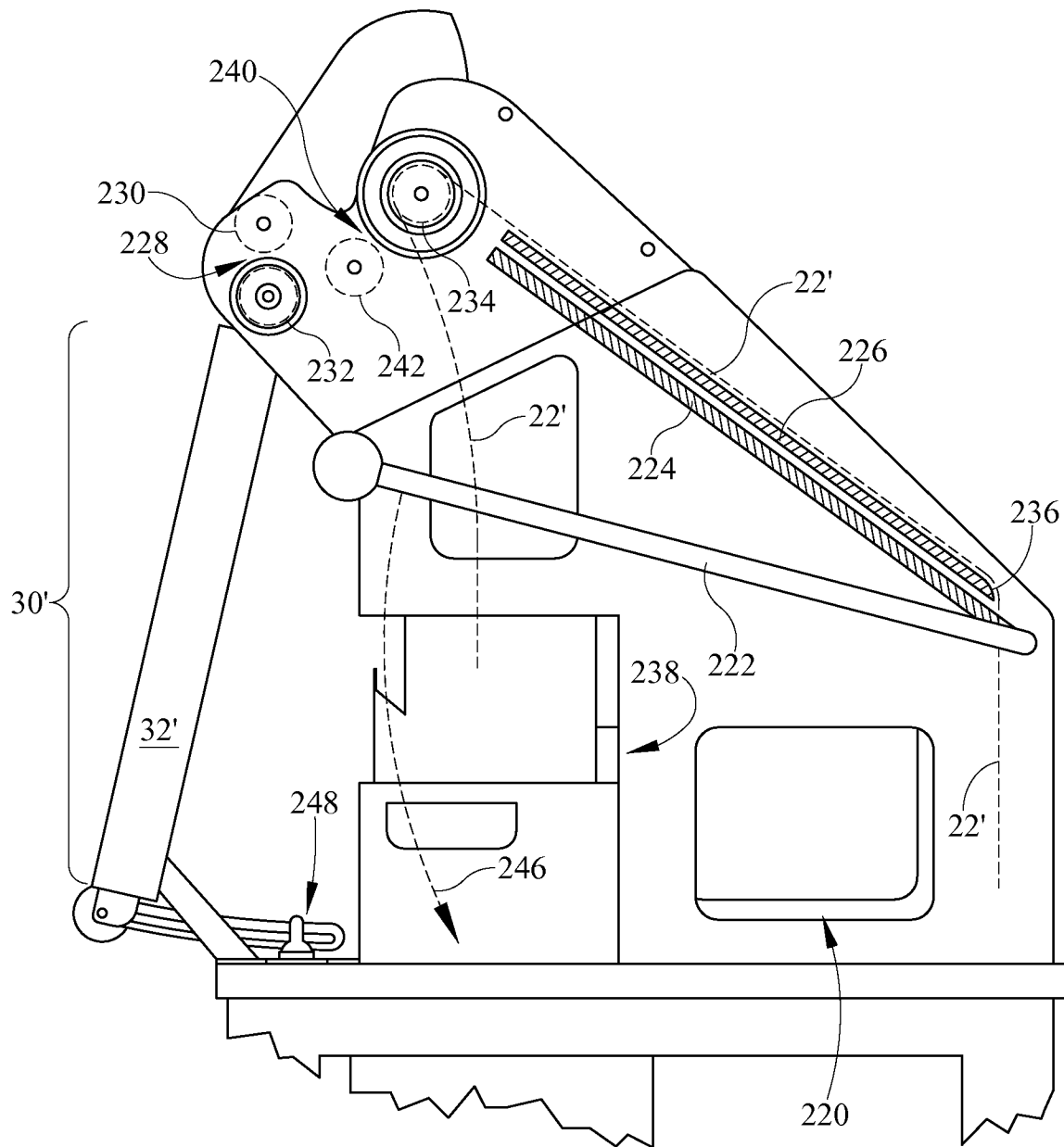


FIG. 14

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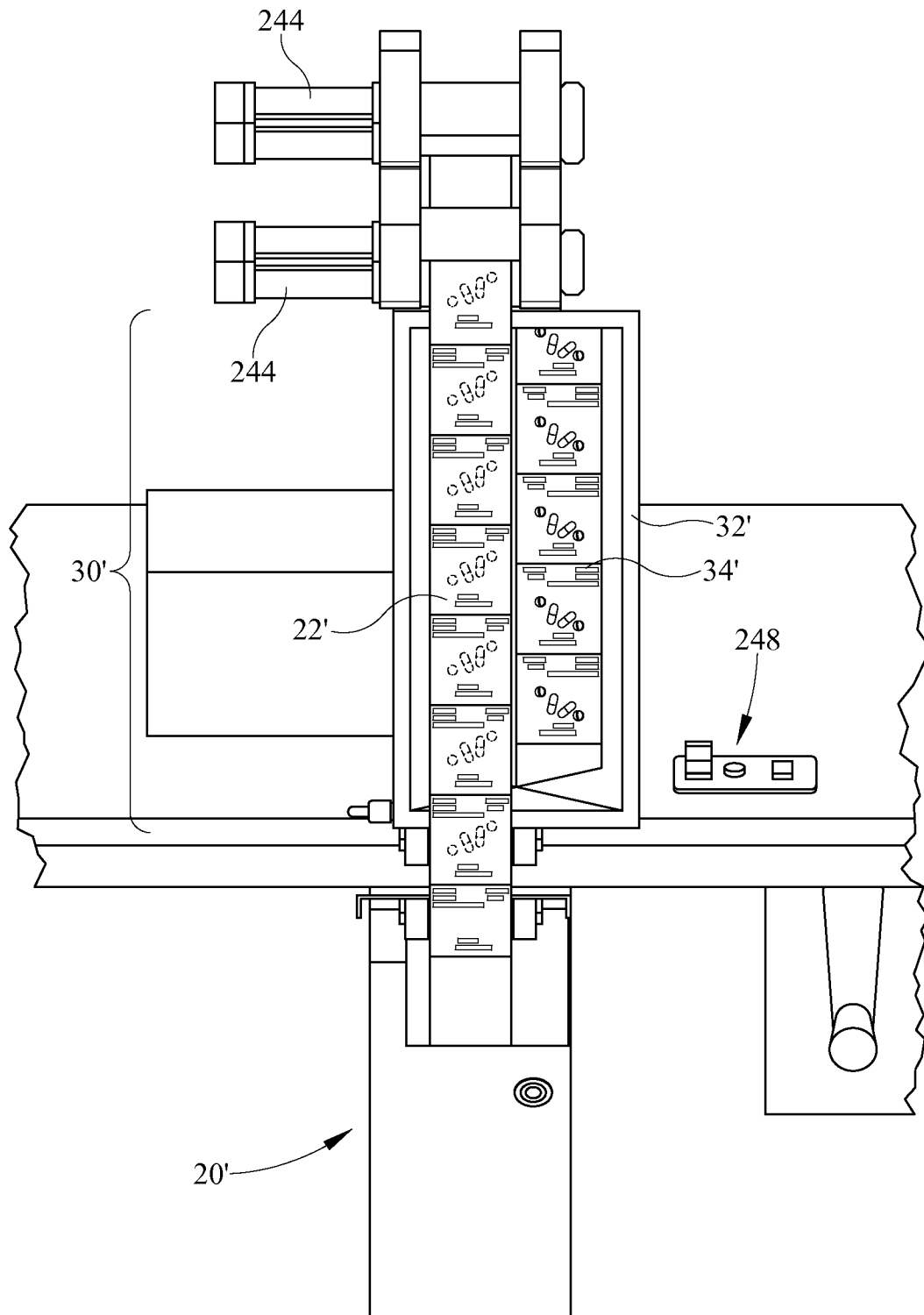


FIG. 15

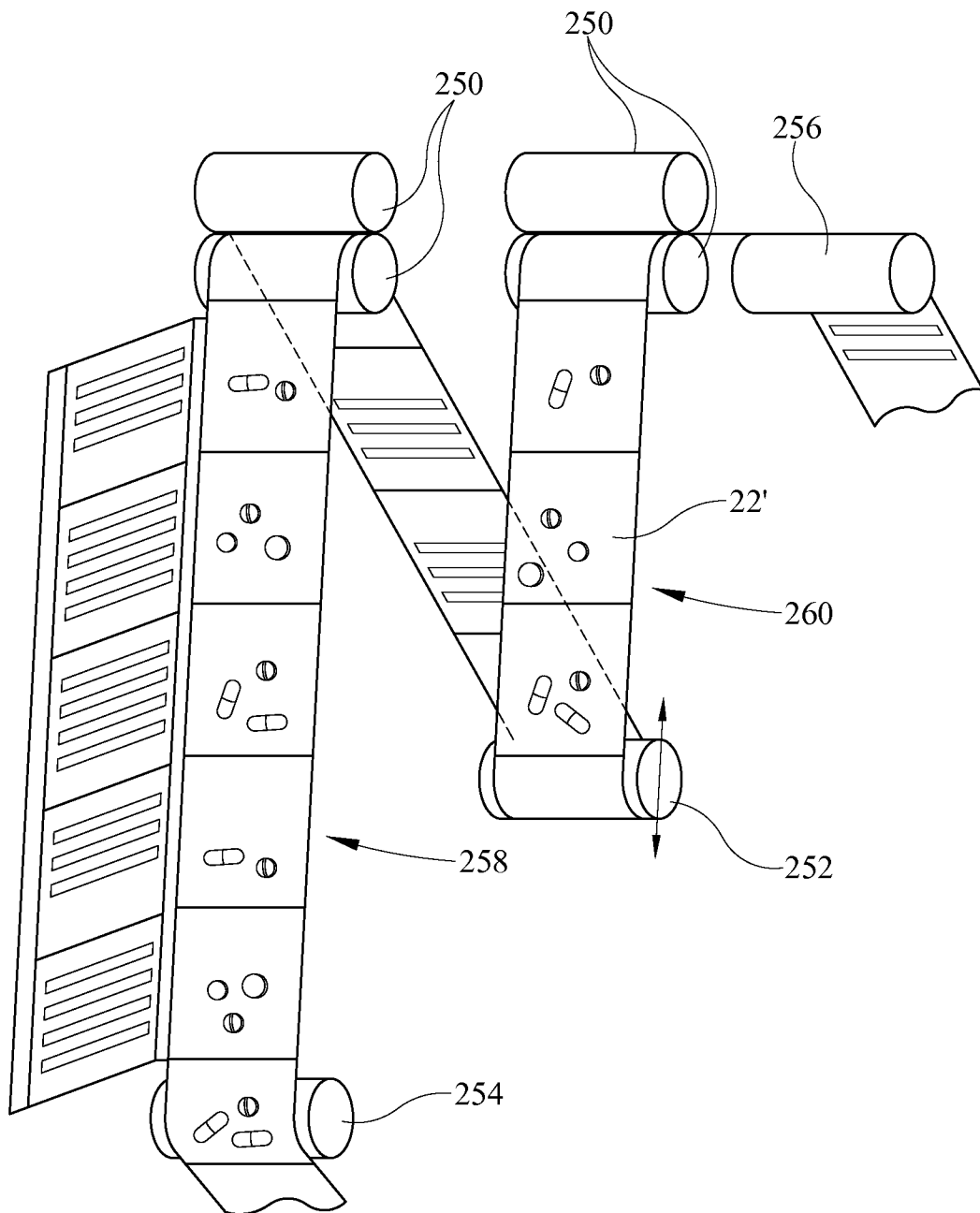


FIG. 16