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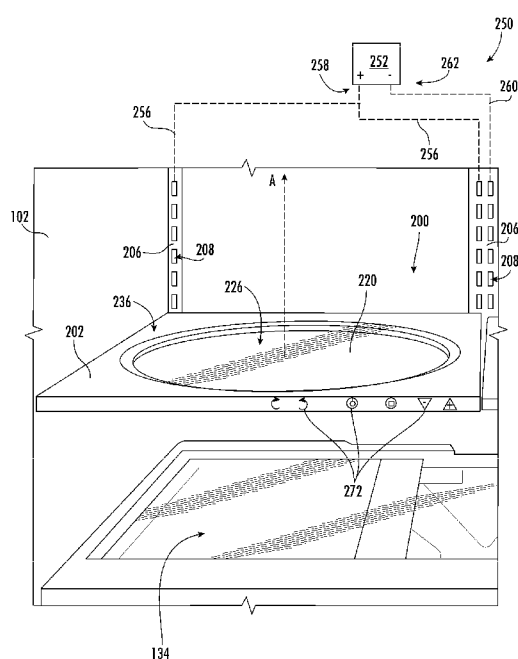


Fig. 3

(57) Abstract: A rotating shelf assembly (200) for an appliance (100) includes a shelf (202) positioned within the appliance (100) and a shelf support bracket (204) for supporting the shelf (202). A rotating disk (220) is rotatably mounted to the shelf (202) and driven by a drive mechanism (240), such as an electric motor (242) and gear assembly. The shelf support bracket (204) may be mounted to a vertical support track (206) and may include integrated electrical wiring (264) that electrically couples the electric motor (242) to a power source.

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ROTATING SHELF ASSEMBLY FOR A REFRIGERATOR APPLIANCE

FIELD OF THE INVENTION

The present subject matter relates generally to refrigerator appliances, and more particularly to shelf assemblies for refrigerator appliances.

BACKGROUND OF THE INVENTION

Refrigerator appliances generally include a cabinet that defines a chilled chamber for receipt of food articles for storage. In addition, refrigerator appliances include one or more doors rotatably hinged to the cabinet to permit selective access to food items stored in chilled chamber(s). The refrigerator appliances can also include various storage components mounted within the chilled chamber and designed to facilitate storage of food items therein. Such storage components can include racks, bins, shelves, or drawers that receive food items and assist with organizing and arranging of such food items within the chilled chamber.

However, food items placed on shelves in the chilled chamber are often difficult to view or access, particularly when placed near the back of the shelf. For example, due to the width and depth of conventional refrigerators and the fact that the shelves are typically fixed within the chilled chamber, a user must often reach deep into the chilled chamber to access items. Moreover, large items can obstruct or impede storage and access of smaller food items within the chilled chamber. Therefore, a user may need to remove items on the front of the shelf in order to reach items on the back of the shelf. These difficulties lead to consumer frustration and discomfort when placing items in or removing items from the chilled chamber.

Accordingly, a refrigerator appliance with features for improving storage of and access to food items stored within the chilled chamber of the refrigerator appliance would be useful. More particularly, a refrigerator appliance with features for manipulating the storage shelves to facilitate access to all portions of the shelf would be particularly beneficial.

BRIEF DESCRIPTION OF THE INVENTION

Aspects and advantages of the invention will be set forth in part in the following description, or may be apparent from the description, or may be learned through practice of the invention.

In a first exemplary embodiment, a refrigerator appliance is provided including a cabinet defining a chilled chamber, a door being rotatably hinged to the cabinet to provide selective access to the chilled chamber, and a rotating shelf assembly. The rotating shelf assembly includes a shelf positioned within the chilled chamber and a shelf support bracket mounted to the cabinet for supporting the shelf. A rotating disk is rotatably mounted to the shelf and a drive mechanism is mechanically coupled to the rotating disk for selectively rotating the rotating disk.

According to another exemplary embodiment, a rotating shelf assembly for an appliance

is provided. The rotating shelf assembly includes a shelf positioned within an appliance chamber and a shelf support bracket mounted to a cabinet for supporting the shelf, the shelf support bracket comprising integrated electrical wiring. A vertical support track provides a plurality of shelf mounting positions and is electrically coupled to a power source. A rotating disk rotatably is mounted to the shelf and includes a drive ring, and a motor is mechanically coupled to the drive ring of the rotating disk for selectively rotating the rotating disk, wherein the integrated electrical wiring couples the power source to the motor when the shelf support bracket is mounted at one of the plurality of shelf mounting positions.

These and other features, aspects and advantages of the present invention will become better understood with reference to the following description and appended claims. The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

A full and enabling disclosure of the present invention, including the best mode thereof, directed to one of ordinary skill in the art, is set forth in the specification, which makes reference to the appended figures.

FIG. 1 provides a perspective view of a refrigerator appliance according to an exemplary embodiment of the present subject matter.

FIG. 2 provides a perspective view of the exemplary refrigerator appliance of FIG. 1, with the doors of the fresh food chamber shown in an open position.

FIG. 3 provides a perspective view of a rotating shelf assembly that may be used in the exemplary refrigerator appliance of FIG. 1 according to another exemplary embodiment of the present subject matter.

FIG. 4 provides a bottom perspective view of the exemplary rotating shelf assembly of FIG. 3.

FIG. 5 provides an exploded perspective view of the exemplary rotating shelf assembly of FIG. 3.

FIG. 6 provides a side cross sectional perspective view of the exemplary rotating shelf assembly of FIG. 3.

FIG. 7 provides a top perspective view of another exemplary rotating shelf assembly that may be used with the exemplary refrigerator appliance of FIG. 1.

FIG. 8 provides a top perspective view of a rotating shelf assembly that may be used in the exemplary refrigerator appliance of FIG. 1 according to another exemplary embodiment of the present subject matter.

FIG. 9 provides a bottom perspective view of the exemplary rotating shelf assembly of FIG. 8.

Repeat use of reference characters in the present specification and drawings is intended to represent the same or analogous features or elements of the present invention.

DETAILED DESCRIPTION

Reference now will be made in detail to embodiments of the invention, one or more examples of which are illustrated in the drawings. Each example is provided by way of explanation of the invention, not limitation of the invention. In fact, it will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the scope or spirit of the invention. For instance, features illustrated or described as part of one embodiment can be used with another embodiment to yield a still further embodiment. Thus, it is intended that the present invention covers such modifications and variations as come within the scope of the appended claims and their equivalents.

FIG. 1 provides a perspective view of a refrigerator appliance 100 according to an exemplary embodiment of the present subject matter. Refrigerator appliance 100 includes a cabinet or housing 102 that extends between a top 104 and a bottom 106 along a vertical direction V, between a first side 108 and a second side 110 along a lateral direction L, and between a front side 112 and a rear side 114 along a transverse direction T. Each of the vertical direction V, lateral direction L, and transverse direction T are mutually perpendicular to one another.

Housing 102 defines chilled chambers for receipt of food items for storage. In particular, housing 102 defines fresh food chamber 122 positioned at or adjacent top 104 of housing 102 and a freezer chamber 124 arranged at or adjacent bottom 106 of housing 102. As such, refrigerator appliance 100 is generally referred to as a bottom mount refrigerator. It is recognized, however, that the benefits of the present disclosure apply to other types and styles of refrigerator appliances such as, e.g., a top mount refrigerator appliance, a side-by-side style refrigerator appliance, or a single door refrigerator appliance. Moreover, aspects of the present subject matter may be applied to other appliances as well, such as ovens, microwaves, etc. Consequently, the description set forth herein is for illustrative purposes only and is not intended to be limiting in any aspect to any particular appliance or configuration.

Refrigerator doors 128 are rotatably hinged to an edge of housing 102 for selectively accessing fresh food chamber 122. In addition, a freezer door 130 is arranged below refrigerator doors 128 for selectively accessing freezer chamber 124. Freezer door 130 is coupled to a freezer drawer (not shown) slidably mounted within freezer chamber 124. Refrigerator doors 128 and freezer door 130 are shown in the closed configuration in FIG. 1. One skilled in the art will appreciate that other chamber and door configurations are possible and within the scope of the present invention.

FIG. 2 provides a perspective view of refrigerator appliance 100 shown with refrigerator doors 128 in the open position. As shown in FIG. 2, various storage components are mounted within fresh food chamber 122 to facilitate storage of food items therein as will be understood by those skilled in the art. In particular, the storage components may include bins 134 and shelves 136. Each of these storage components are configured for receipt of food items (e.g., beverages and/or solid food items) and may assist with organizing such food items. As illustrated, bins 134 may be mounted on refrigerator doors 128 or may slide into a receiving space in fresh food chamber 122. It should be appreciated that the illustrated storage

components are used only for the purpose of explanation and that other storage components may be used and may have different sizes, shapes, and configurations.

Referring again to FIG. 1, a dispensing assembly 140 will be described according to exemplary embodiments of the present subject matter. Although several different exemplary
5 embodiments of dispensing assembly 140 will be illustrated and described, similar reference numerals may be used to refer to similar components and features. Dispensing assembly 140 is generally configured for dispensing liquid water and/or ice. Although an exemplary dispensing assembly 140 is illustrated and described herein, it should be appreciated that variations and modifications may be made to dispensing assembly 140 while remaining within the present
10 subject matter.

Dispensing assembly 140 and its various components may be positioned at least in part within a dispenser recess 142 defined on one of refrigerator doors 128. In this regard, dispenser recess 142 is defined on a front side 112 of refrigerator appliance 100 such that a user may operate dispensing assembly 140 without opening refrigerator door 128. In addition, dispenser
15 recess 142 is positioned at a predetermined elevation convenient for a user to access ice and enabling the user to access ice without the need to bend-over. In the exemplary embodiment, dispenser recess 142 is positioned at a level that approximates the chest level of a user.

Dispensing assembly 140 includes an ice dispenser 144 including a discharging outlet 146 for discharging ice from dispensing assembly 140. An actuating mechanism 148, shown as a
20 paddle, is mounted below discharging outlet 146 for operating ice or water dispenser 144. In alternative exemplary embodiments, any suitable actuating mechanism may be used to operate ice dispenser 144. For example, ice dispenser 144 can include a sensor (such as an ultrasonic sensor) or a button rather than the paddle. Discharging outlet 146 and actuating mechanism 148 are an external part of ice dispenser 144 and are mounted in dispenser recess 142. By contrast,
25 refrigerator door 128 may define an icebox compartment 150 (FIG. 2) housing an icemaker and an ice storage bin (not shown) that are configured to supply ice to dispenser recess 142.

A control panel 152 is provided for controlling the mode of operation. For example, control panel 152 includes one or more selector inputs 154, such as knobs, buttons, touchscreen interfaces, etc., such as a water dispensing button and an ice-dispensing button, for selecting a
30 desired mode of operation such as crushed or non-crushed ice. In addition, inputs 154 may be used to specify a fill volume or method of operating dispensing assembly 140. In this regard, inputs 154 may be in communication with a processing device or controller 156. Signals generated in controller 156 operate refrigerator appliance 100 and dispensing assembly 140 in response to selector inputs 154. Additionally, a display 158, such as an indicator light or a
35 screen, may be provided on control panel 152. Display 158 may be in communication with controller 156, and may display information in response to signals from controller 156.

As used herein, “processing device” or “controller” may refer to one or more microprocessors or semiconductor devices and is not restricted necessarily to a single element. The processing device can be programmed to operate refrigerator appliance 100, dispensing
40 assembly 140 and other components of refrigerator appliance 100. The processing device may include, or be associated with, one or more memory elements (e.g., non-transitory storage

media). In some such embodiments, the memory elements include electrically erasable, programmable read only memory (EEPROM). Generally, the memory elements can store information accessible processing device, including instructions that can be executed by processing device. Optionally, the instructions can be software or any set of instructions and/or data that when executed by the processing device, cause the processing device to perform operations.

Referring now generally to FIGS. 3 through 7, a rotating shelf assembly 200 which may be used with refrigerator appliance 100 will be described according to exemplary embodiments of the present subject matter. Specifically, rotating shelf assembly 200 may be used in place of one or more of shelves 136 of refrigerator appliance 100. In addition, rotating shelf assembly 200 may be used in place of a top wall of one or more bins 134. Alternatively, rotating shelf assembly 200 may be used in any other suitable refrigerator appliance or in any other application where a rotating shelf may be desirable. The exemplary embodiments described herein are not intended to limit the scope of the present subject matter in any manner.

As illustrated, rotating shelf assembly 200 generally includes a shelf 202 positioned within a chilled chamber of refrigerator appliance, e.g., in fresh food chamber 122. In this regard, shelf 202 may be any suitably rigid component extending substantially along a horizontal direction (e.g., as defined by the lateral direction L and the transverse direction T) for receiving one or more food items or articles for storage. In this regard, for example, shelf 202 may be constructed in whole or in part from glass, e.g. such as acrylic glass, plastic, or any other suitably rigid materials or combinations thereof.

Rotating shelf assembly 200 further includes one or more shelf support brackets 204 that are mounted to cabinet 102 and are configured for supporting shelf 202 and food items positioned thereon. For example, according to the illustrated embodiment, each shelf 202 is supported by two shelf support brackets 204 that extend along the transverse direction T from rear side 114 of cabinet 102 in a cantilevered manner. Alternatively, shelf support brackets 204 may extend from first side 108 and/or second side 110 of cabinet 102, and may not be cantilevered according to alternative embodiments. According to the illustrated embodiment, shelf support brackets 204 constructed of a rigid material, such as metal, for supporting the weight of shelves 202.

In addition, refrigerator appliance 100 may further include track support systems for removably receiving shelf support brackets 204. Specifically, as illustrated in FIG. 3, track support systems may include a plurality of vertical support tracks 206 that extend along the vertical direction V and are mounted to rear side 114 of cabinet 102. Each vertical support track 206 may define a plurality of apertures 208 which generally define a plurality of mounting positions to which shelf support brackets 204 may be mounted. In this manner, a user of refrigerator appliance 100 may remove shelf support brackets 204 and move them to any suitable vertical position before reattaching them to vertical support tracks 206.

Referring still generally to FIGS. 3 through 7, rotating shelf assembly 200 further includes a rotating disk 220 that is rotatably mounted to shelf 202. In this regard, rotating disk 220 may be a circular plate constructed from any suitably rigid material. For example rotating disk 220

may be a transparent, translucent, or semi-transparent pane of glass, acrylic, plastic, or other suitable material. Rotating disk 220 is generally configured for receiving food items for storage within the chilled chamber while facilitating improved access and visibility to such food items. Specifically, a user may reach items positioned proximate rear side 114 of cabinet 102 simply by spinning rotating disk 220 around approximately 180 degrees.

As best illustrated in FIGS. 5 and 6, shelf 202 may define a center aperture 222 that is configured for receiving rotating disk 220. In this regard, center aperture 222 may define an internal diameter that is substantially equivalent to or slightly greater than an outer diameter of rotating disk 220. In this manner, a snug fit between rotating disk 220 and shelf 202 may be achieved to prevent excessive wobble during rotation and/or to prevent food items from falling off of rotating disk 220. It should be appreciated that as used herein, terms of approximation, such as “approximately,” “substantially,” or “about,” refer to being within a ten percent margin of error.

In addition, according to exemplary embodiments, a portion of rotating disk 220 may be treated with a hydrophobic coating 224 (see FIG. 5), e.g., to contain spills. Specifically, for example, a small band of hydrophobic coating 224 may be positioned on a top surface 226 of rotating disk 220, e.g., around a perimeter 228 of rotating disk 220. In this manner, for example, liquids spilled in a center of rotating disk 220 have a tendency to be contained by hydrophobic coating 224 such that they do not fall through center aperture 222. Notably, according to alternative embodiments, rotating disk 220 may further include a ridge or raised lip that extends around a perimeter 228 of rotating disk 220 to contain spills.

Shelf 202 may further include a support flange 230 that extends below shelf 202 and toward rotating disk 220 in order to provide vertical support to rotating disk 220. Specifically, support flange 230 extends inward from center aperture 222 and defines a groove 232 for receiving a plurality of bearings 234. Rotating disk 220 may ride on top of bearings 234 to achieve a low friction interface between shelf 202 and rotating disk 220. In addition, support flange 230 and bearings 234 may be sized such that top surface 226 of rotating disk 220 sits flush with a top surface 236 of shelf 202 when rotating disk 220 is installed. Specifically, top surface 226 may be in the same horizontal plane as top surface 236. Although a bearing interface is described herein, it should be appreciated that any other suitable low friction interface may be used according to alternative embodiments.

Referring now specifically to FIGS. 4 through 6, rotating shelf assembly 200 may further include a drive mechanism 240 that is mechanically coupled to rotating disk 220 for selectively rotating the rotating disk 220 about an axis of rotation A. Specifically, drive mechanism 240 may include a motor 242 positioned below shelf 202 and being mechanically coupled to rotating disk 220 for driving rotating disk 220. According to the illustrated embodiment, motor 242 is a brushless DC electric motor, e.g., a pancake motor. However, according to alternative embodiments, motor 242 may be any other suitable type or configuration of motor. For example, motor 242 may be an AC motor, an induction motor, a permanent magnet synchronous motor, or any other suitable type of motor. In addition, drive mechanism 240 may include any other suitable number, types, and configurations of support bearings or

transmission mechanisms.

As best illustrated in FIG. 5, drive mechanism 240, i.e., motor 242 is operably coupled with rotating disk 220 through a gear assembly. Specifically, a drive ring 244 is mounted to a bottom surface of rotating disk 220. Specifically, drive ring 244 may be an annular ring with radially extending gear teeth (not shown). According to the illustrated embodiment, drive ring 244 is integrally formed with rotating disk 220 and extends around a perimeter 228 of rotating disk 220. However, it should be appreciated that according to alternative embodiments, drive ring 244 may be a separate component attached to rotating disk 220 or motor 242 could alternatively engage rotating disk 220 through any suitable friction interface, e.g. such as a frictional roller, as opposed to a geared arrangement.

In addition, drive mechanism 240 may include a secondary gear 246 positioned between and mechanically coupling to motor 242 to drive ring 244. In this regard, secondary gear 246 may be sized to gear down or slow a disk speed of rotating disk 220 relative to a motor speed. According to the illustrated embodiment, motor 242 is a vertically oriented such that its axis of rotation is parallel to axis of rotation A of rotating disk 220. However, it should be appreciated that according to alternative embodiments, motor 242 and the gear assembly described herein may vary while remaining within the scope of the present subject matter. For example, motor 242 may be horizontally oriented, may directly engage drive ring 244, and may be mounted to shelf 202 in any other suitable manner.

Refrigerator appliance 100 may further include a power supply system 250 for providing electrical power to motor 242. In this regard, for example, power supply system 250 may include a power source 252 that is electrically coupled to motor 242 in any suitable manner. For example, according to an exemplary embodiment, electrical wires may be run from power source 252 directly to electrical terminals 254 on motor 242. However, according to the illustrated embodiment, power supply system 250 may power motor 242 directly through vertical support tracks 206 and/or shelf support brackets 204.

Specifically, power supply system 250 may include a positive bus bar 256 that is electrically coupled to a positive terminal 258 of power source 252. Similarly, power supply system 250 may include a negative bus bar 260 is electrically coupled to a negative terminal 262 of power source 252. Positive bus bar 256 and negative bus bar 260 may be in electrical communication with vertical support tracks 206 at any suitable location for forming electrical connection with shelf support brackets 204 when installed in apertures 208. In this manner, by positioning shelf support brackets 204 on vertical support tracks 206, integrated electrical wiring 264 within shelf support brackets 204 may electrically couple motor 242 to power source 252.

Power supply system 250 as described above is one exemplary method or system for providing electrical power to motor 242 without requiring complex, visible, or exposed wiring systems. However, it should be appreciated that other methods of providing power through shelf support brackets 204 are possible and within scope of the present subject matter. For example, an exemplary system for powering shelves of refrigerator appliances may be constructed in the same or similar manner to the systems described in U.S. Application

Numbers 15/422,509 and 15/939,387 to Wantland et al., the disclosures of which are incorporated herein by reference in their entirety for all purposes.

Notably, rotating shelf assembly 200 may include a variety of features for improving the operation of rotating disk 220 and facilitating an improved customer experience related to rotating disk 220. For example, rotating disk 220 may be configured for rotating when certain events occur, such as a user approaching the refrigerator appliance, opening a door, pressing a button, etc. In addition, for example, rotating shelf assembly 200 may include user-specific functions/features. In this regard, for example, when a particular user give the rotation command, e.g., by pressing a user-specific button, rotating shelf assembly 200 may illuminate with a specific color light and rotate to a specific angle associated with that user. Exemplary systems and methods of controlling rotating disk 220 will be described below, but are not intended to limit the scope of the present subject matter in any manner.

As shown in FIG. 2, refrigerator appliance 100 may include a door sensor 270 which is generally configured for sensing whether refrigerator door 128 is in the open position or the closed position. For example, door sensor 270 may be a mechanical door switch or a light sensor positioned within fresh food chamber 122 and configured for detecting light when refrigerator door 128 is opened. A controller, e.g., such as appliance controller 156, may be operably coupled to drive mechanism 240 and door sensor 270, and may be generally configured for regulating motor 242 to rotate rotating disk 220 when refrigerator door 128 is opened. In this manner, when a user opens refrigerator door 128, rotating disk 220 may spin a predetermined amount in order to provide a quick view of all items on rotating disk 220. For example, controller 156 may be configured for spinning rotating disk 220 around one full rotation, i.e., 360 degrees. Alternatively, as mentioned above, rotating disk 220 may rotate to a user-specific position and illuminate in a user-specific light, e.g., positioned underneath rotating disk 220 or at any other suitable location within refrigerator appliance 100.

Other features of rotating shelf assembly 200 may facilitate an improved user experience and control over rotating disk 220. For example, as best illustrated in FIG. 3, rotating shelf assembly 200 may include a user input device 272, e.g. such as input buttons that permit a user to manipulate rotating disk 220. For example, user input device 272 may permit a user to start or stop the rotation of rotating disk 220, to switch the direction of rotation, to increase or decrease the speed of rotation, or to power off rotating shelf assembly 200 altogether.

In order to provide controller 156 with knowledge of the position or angular orientation of rotating disk 220, rotating shelf assembly 200 may further include a position sensor 274, e.g., for determining a zero position of rotating disk 220. For example, according to the illustrated embodiment, position sensor 274 includes a hall-effect sensor 276 mounted at a fixed position on shelf 202 and a magnet 278 positioned on rotating disk 220. As rotating disk 220 is rotated toward a predetermined position, hall-effect sensor 276 can detect the proximity of magnet 278 and controller 156 may determine that rotating disk 220 is in the zero position (or some other known position). Alternatively, any other suitable sensors or methods of detecting the position of rotating disk 220 may be used. For example, motion sensors, camera systems, optical sensors, acoustic sensors, or simple mechanical contact switches may be used according to

alternative embodiments.

Referring again generally to FIG. 1, according to an exemplary embodiment, refrigerator door 128 may define a transparent window 280 that permits a user to view fresh food chamber 122 without opening refrigerator door 128. In certain circumstances, it may be desirable to illuminate fresh food chamber 122 and perform a rotation of rotating disk 220 to permit a user to view the contents of rotating disk 220. In this regard, for example, refrigerator appliance 100 may further include a user detection feature, such as a proximity sensor 282, that is configured to detect the presence of a user in front of refrigerator appliance 100. Thus, when a user approaches refrigerator appliance 100, proximity sensor 282 may provide an indication to controller 156 which may turn on interior lights within fresh food chamber 122 and spin rotating disk 220 to showcase items within fresh food chamber 122 to the user. Other configurations control methods are possible and within the scope of the present subject matter.

In addition, rotating shelf assembly 200 may have remote activation features that permit a user to instruct rotating disk 220 to rotate, to illuminate in a particular color light, etc. In this regard, for example, rotating shelf assembly 200 may be Wi-Fi enabled such that it may communicate with a remote device, either directly or through controller 156. Thus, for example, a user may send a command from a mobile phone to spin rotating disk 220 to an angular position associated with that user. Controller 156 may determine which user sent the command (e.g., by identifying the mobile phone) and may operate rotating shelf assembly 200 to properly position and/or illuminate rotating disk 220.

Although rotating shelf assembly 200 is described herein as including a single rotating disk 220 mounted at a center of shelf 202, it should be appreciated that variations and modifications may be made to rotating shelf assembly 200 according to alternative embodiments. For example, shelf 202 may form a top of one or more of bins 134 such that drive mechanism 240 or motor 242 is positioned within storage bin 134. Alternatively, shelf 202 may include a plurality of rotating disks 220 which are operably coupled to and driven by a single motor 242 or by multiple motors at any suitable speed. Other variations and modifications are possible and within the scope of the present subject matter.

Referring now specifically to FIG. 7, an alternative drive mechanism 240 will be described according to exemplary embodiments of the present subject matter. Specifically, drive mechanism 240 may include a first belt 300 that is wrapped around a bottom of rotating disk 220 and a first pulley 302. First pulley 302 may be operably coupled with a second pulley 304, e.g., via a stacked arrangement. Second pulley 304 may be operably coupled to a slide bar 306 mounted on a front 308 of shelf 202, e.g., via a second belt 310. In this manner, when a user slides slide bar 306 along the lateral direction L, second belt 310 drives the pulley assembly to rotate first belt 300 and rotate rotating disk 220. Notably, the size of pulleys may be adjusted to manipulate the spin rate of rotating disk 220 as desired. It should be appreciated that other manual drive mechanisms are possible and within scope of the present subject matter.

Referring now specifically to FIGS. 8 and 9, according to an alternative embodiment, rotating shelf assembly 200 may include a rotating disk 320 which defines one or more

container retention features 322. Container retention features 322 are generally configured for receiving one or more containers 324 that are removably positioned within container retention features 322, e.g., such that container 324 is positioned below shelf 202. For example, according to the illustrated embodiment, container retention features 322 are apertures defined in rotating shelf 320 that are shaped to correspond with specific container profiles. Containers 224 may define an upper lip flange (not shown) that is configured for seating on top of rotating disk 320 while permitting container 324 to hang below shelf 202. Other variations and modifications on this aspect of the present subject matter are possible and within scope of the present subject matter.

As one skilled in the art will appreciate, the above described embodiments are used only for the purpose of explanation. Modifications and variations may be applied, other configurations may be used, and the resulting configurations may remain within the scope of the invention. For example, rotating shelf assembly 200 may include any suitable drive mechanism, may be positioned at any suitable location within appliance, and may include any other suitable control features or user inputs. One skilled in the art will appreciate that such modification and variations may remain within the scope of the present subject matter.

This written description uses examples to disclose the invention, including the best mode, and also to enable any person skilled in the art to practice the invention, including making and using any devices or systems and performing any incorporated methods. The patentable scope of the invention is defined by the claims, and may include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims if they include structural elements that do not differ from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal languages of the claims.

CLAIMS

What is claimed is:

- 5 1. A refrigerator appliance comprising:
a cabinet defining a chilled chamber;
a door being rotatably hinged to the cabinet to provide selective access to the chilled
chamber;
a rotating shelf assembly comprising:
10 a shelf positioned within the chilled chamber;
a shelf support bracket mounted to the cabinet for supporting the shelf;
a rotating disk rotatably mounted to the shelf; and
a drive mechanism mechanically coupled to the rotating disk for selectively
rotating the rotating disk.
- 15 2. The refrigerator appliance of claim 1, wherein the drive mechanism comprises:
a motor positioned below the shelf and being mechanically coupled to the rotating disk.
3. The refrigerator appliance of claim 2, wherein the drive mechanism comprises:
a drive ring mounted to a bottom of the rotating disk; and
a secondary gear mechanically coupling the motor to the drive ring, the secondary gear
20 configured for slowing a disk speed relative to a motor speed.
4. The refrigerator appliance of claim 3, wherein the drive ring is integrally formed with
the rotating disk and extends around a perimeter of the rotating disk.
5. The refrigerator appliance of claim 1, wherein the rotating disk is a circular piece of
acrylic glass.
- 25 6. The refrigerator appliance of claim 1, wherein the rotating shelf assembly comprises:
a plurality of bearings positioned between the shelf and the rotating disk to provide a low
friction interface.
7. The refrigerator appliance of claim 1, wherein the refrigerator appliance further
comprises:
30 a vertical support track providing a plurality of shelf mounting positions and being
electrically coupled to a power source, and wherein the shelf support bracket electrically
couples the motor to the power source when mounted at one of the plurality of shelf mounting
positions.
8. The refrigerator appliance of claim 7, wherein the vertical support track comprises:
35 a first bus bar coupled to a positive terminal of the power source; and
a second bus bar coupled to a negative terminal of the power source.
9. The refrigerator appliance of claim 1, wherein the drive mechanism comprises:
a drive belt wrapped around a bottom of the rotating disk; and
a slide bar slidably mounted on a front of the shelf, the slide bar being mechanically
40 coupled to the drive belt for rotating the rotating disk.

10. The refrigerator appliance of claim 1, comprising:
a door sensor; and
a controller operably coupled to the drive mechanism and the door sensor, the controller being configured for:

5 regulating the motor to rotate the rotating disk when the door is opened.

11. The refrigerator appliance of claim 10, wherein the door sensor is a mechanical door switch or a light sensor.

12. The refrigerator appliance of claim 1, comprising:

a shelf position sensor configured for measuring an angular position of the rotating disk.

10 13. The refrigerator appliance of claim 1, comprising:

a user input device for regulating a motor speed or rotational position of the rotating disk.

14. The refrigerator appliance of claim 1, wherein a top surface of the shelf is flush with a top surface of the rotating disk.

15. The refrigerator appliance of claim 1, wherein the shelf forms a top of a storage bin, and wherein the drive mechanism is positioned within the storage bin.

16. The refrigerator appliance of claim 1, wherein the rotating disk comprises a hydrophobic coating around a perimeter of a top surface of the rotating disk.

17. The refrigerator appliance of claim 1, wherein the rotating shelf assembly comprises:

20 a plurality rotating disks rotatably mounted to the shelf and mechanically coupled to the drive mechanism.

18. The refrigerator appliance of claim 1, wherein the rotating disk defines one or more container retention features, the rotating shelf assembly further comprising:

one or more containers that are removably positioned within the container retention features such that the containers hang below the shelf.

25 19. The refrigerator appliance of claim 1, wherein the door comprises a transparent viewing window, and wherein the rotating shelf assembly comprises:

a user detection feature, wherein the drive mechanism rotates the rotating shelf when the user detection feature detects the presence of a user.

20. A rotating shelf assembly for an appliance, the rotating shelf assembly comprising:

30 a shelf positioned within an appliance chamber;

a shelf support bracket mounted to an appliance cabinet for supporting the shelf, the shelf support bracket comprising integrated electrical wiring;

a vertical support track providing a plurality of shelf mounting positions and being electrically coupled to a power source;

35 a rotating disk rotatably mounted to the shelf and comprising a drive ring; and

a motor mechanically coupled to the drive ring of the rotating disk for selectively rotating the rotating disk, wherein the integrated electrical wiring couples the power source to the motor when the shelf support bracket is mounted at one of the plurality of shelf mounting positions.

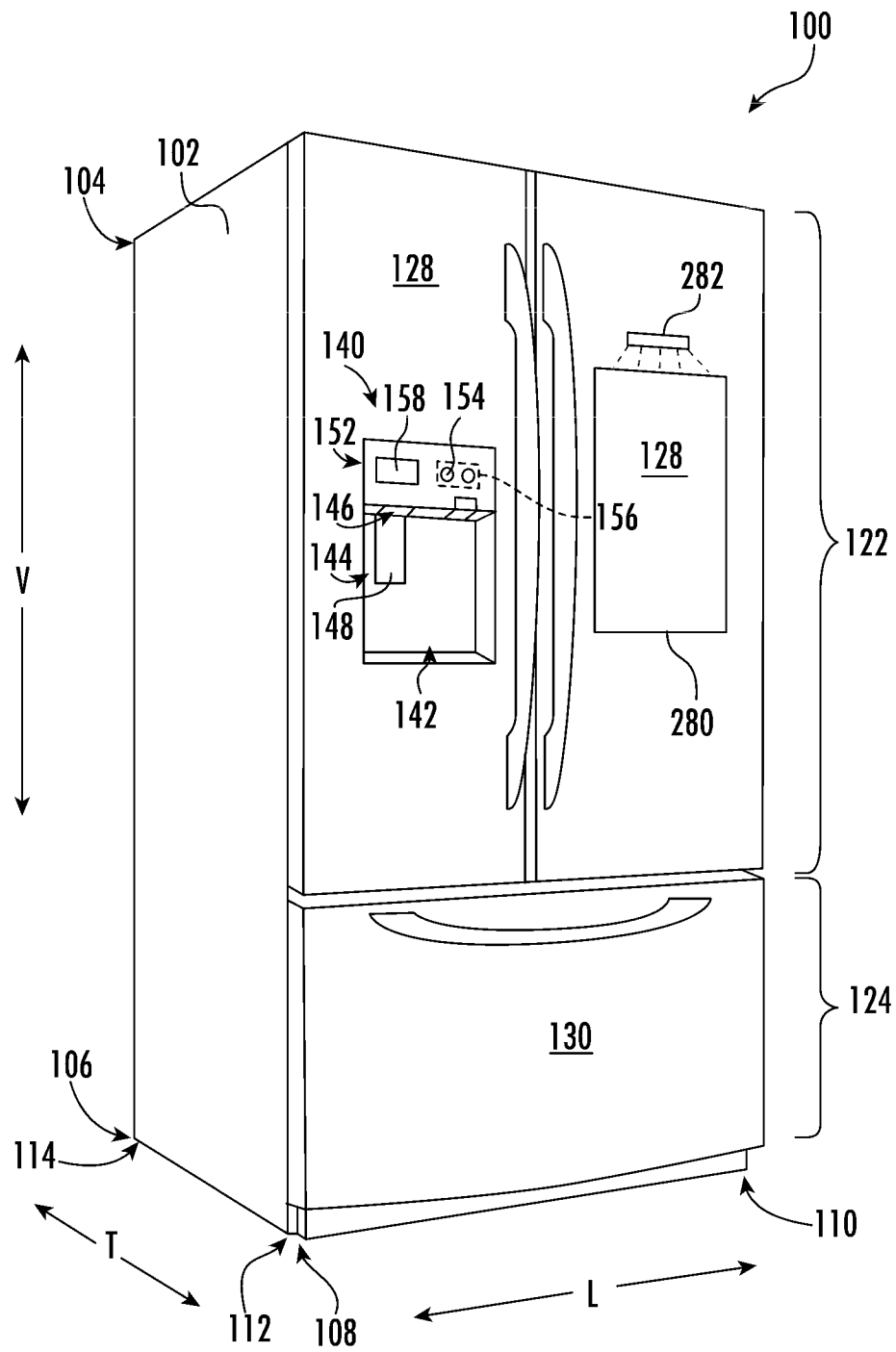


Fig. 1

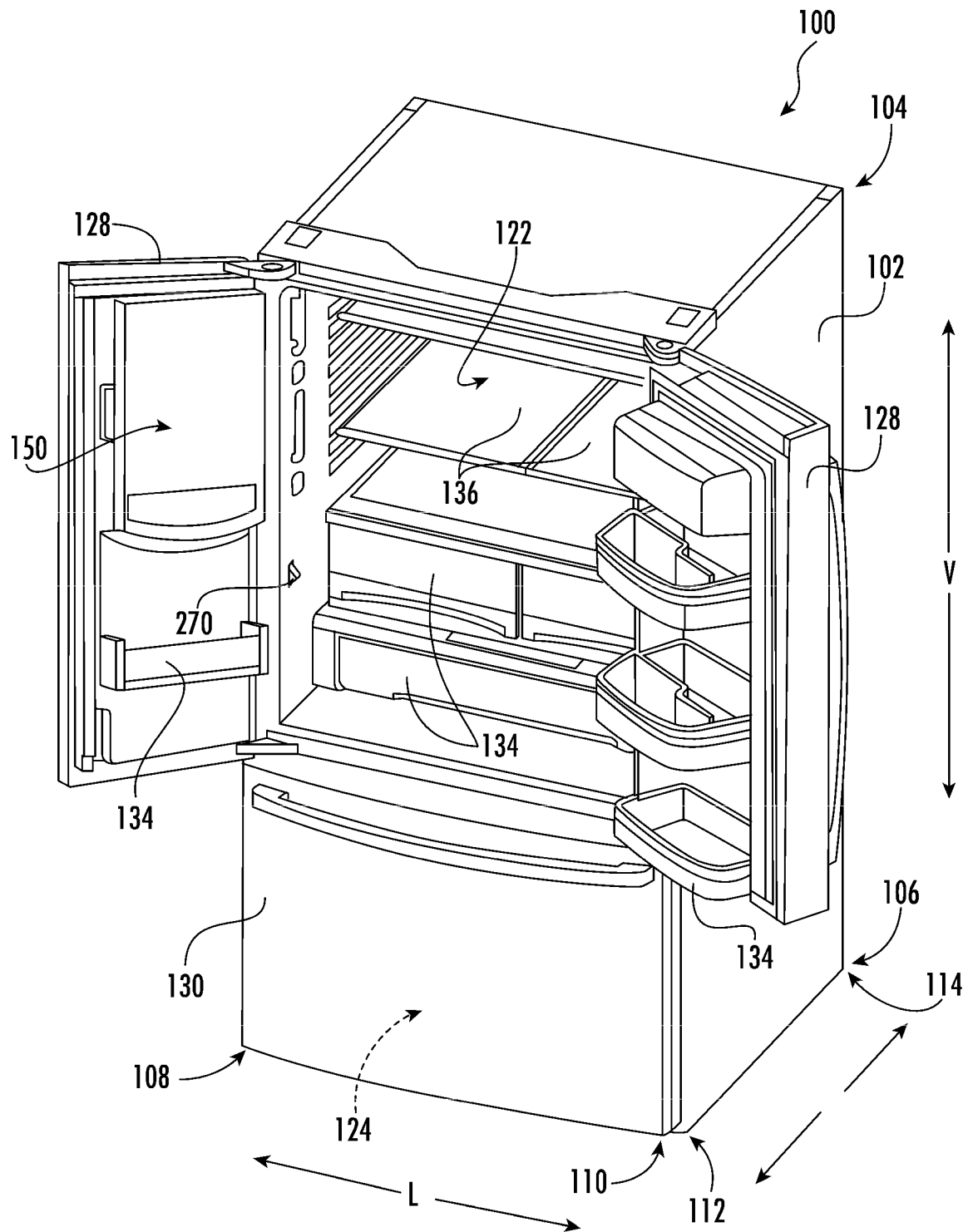


Fig. 2

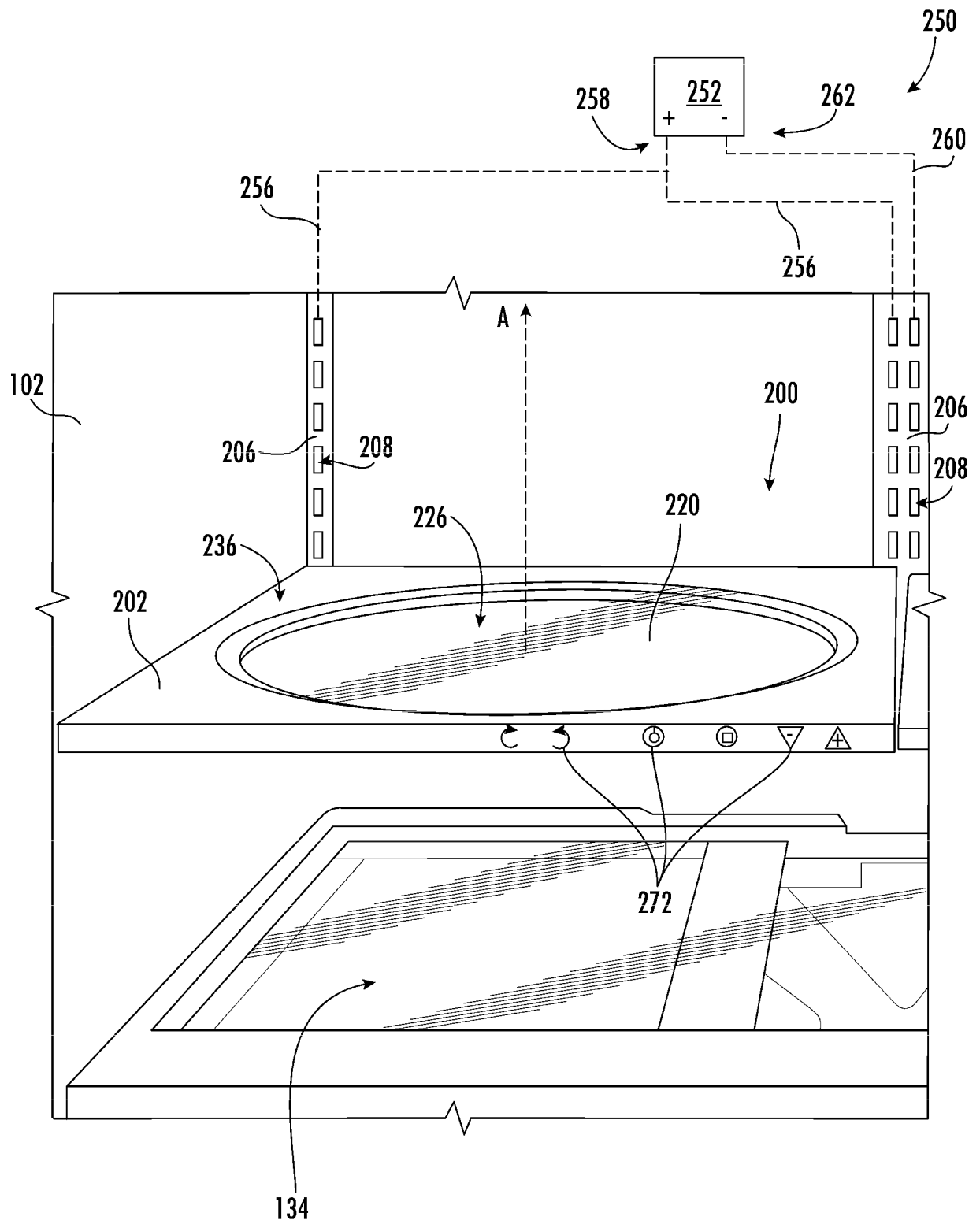


Fig. 3

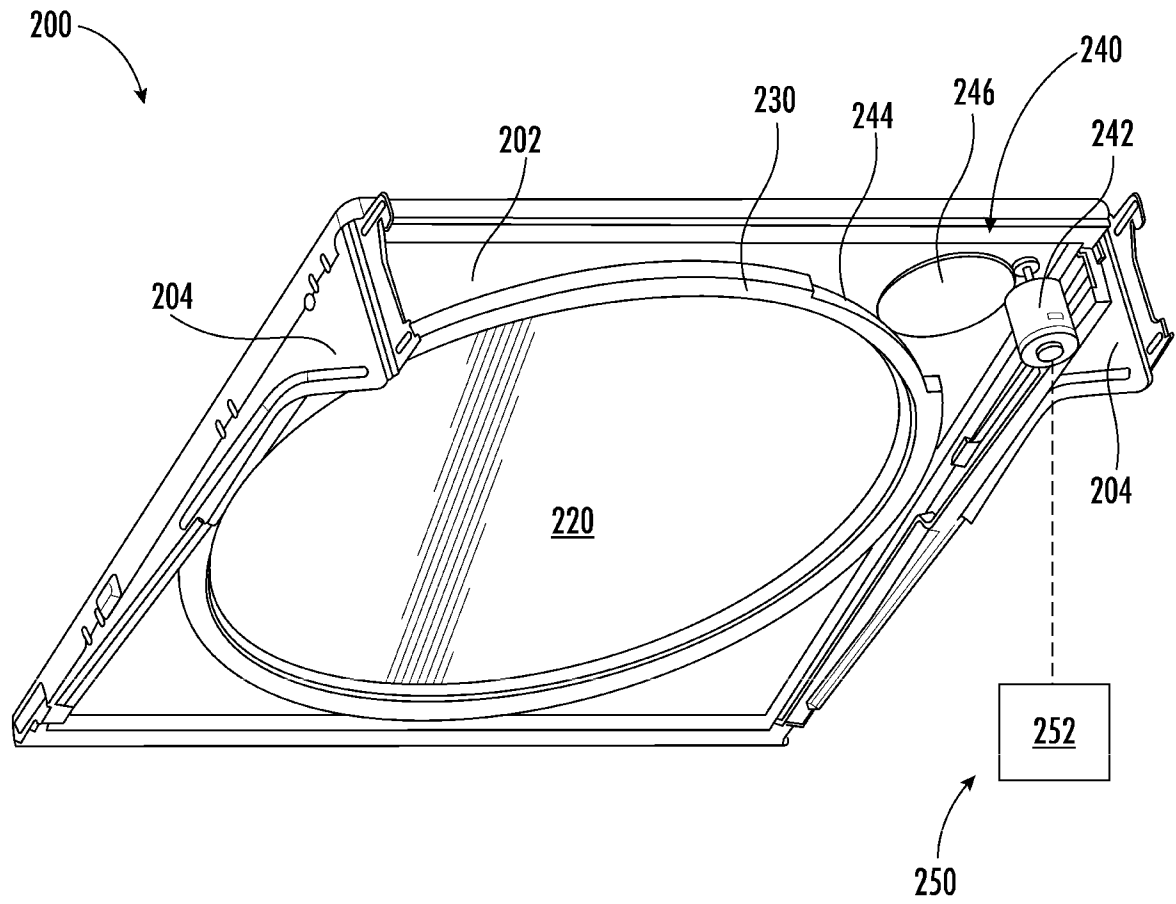


Fig. 4

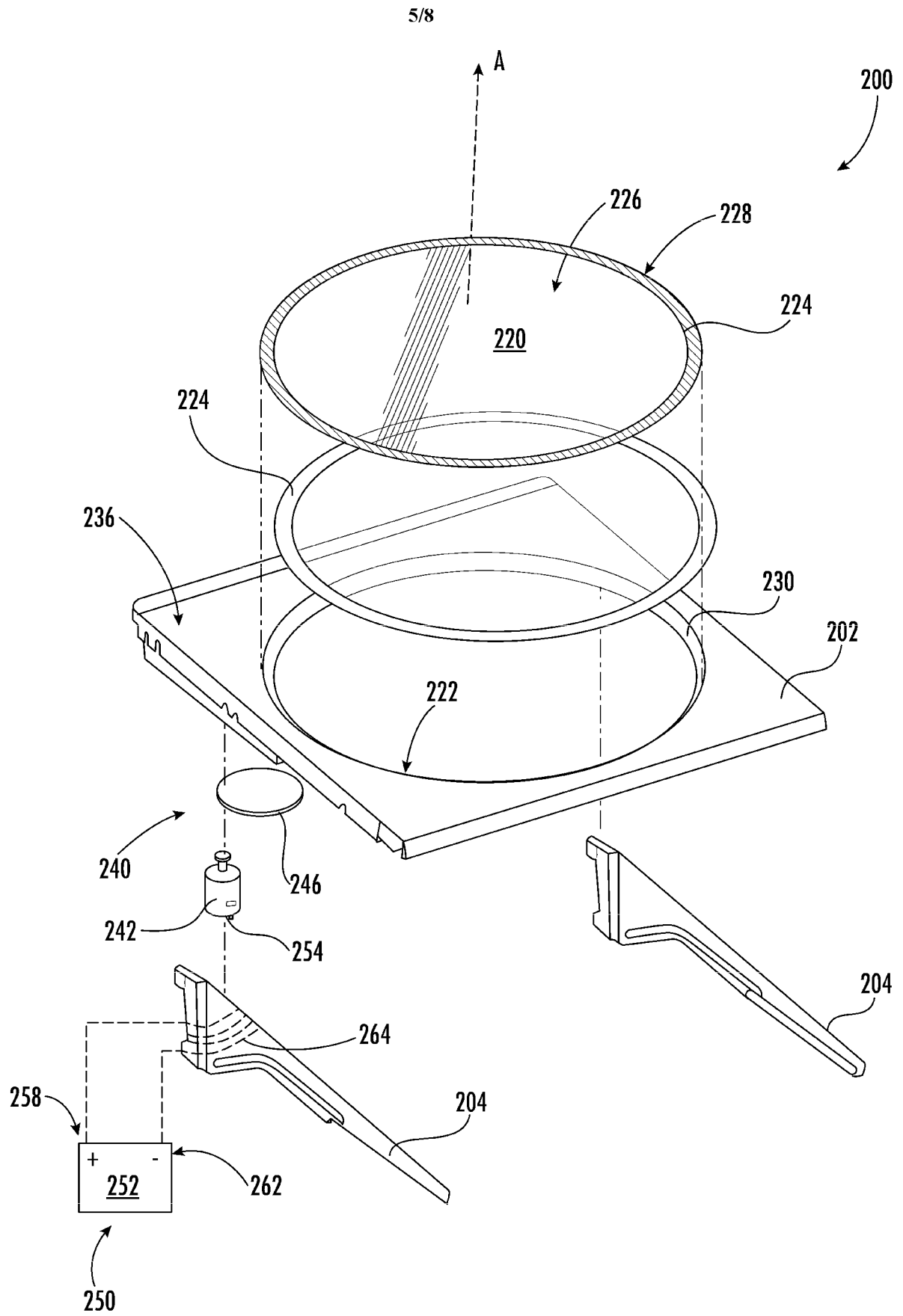


Fig. 5

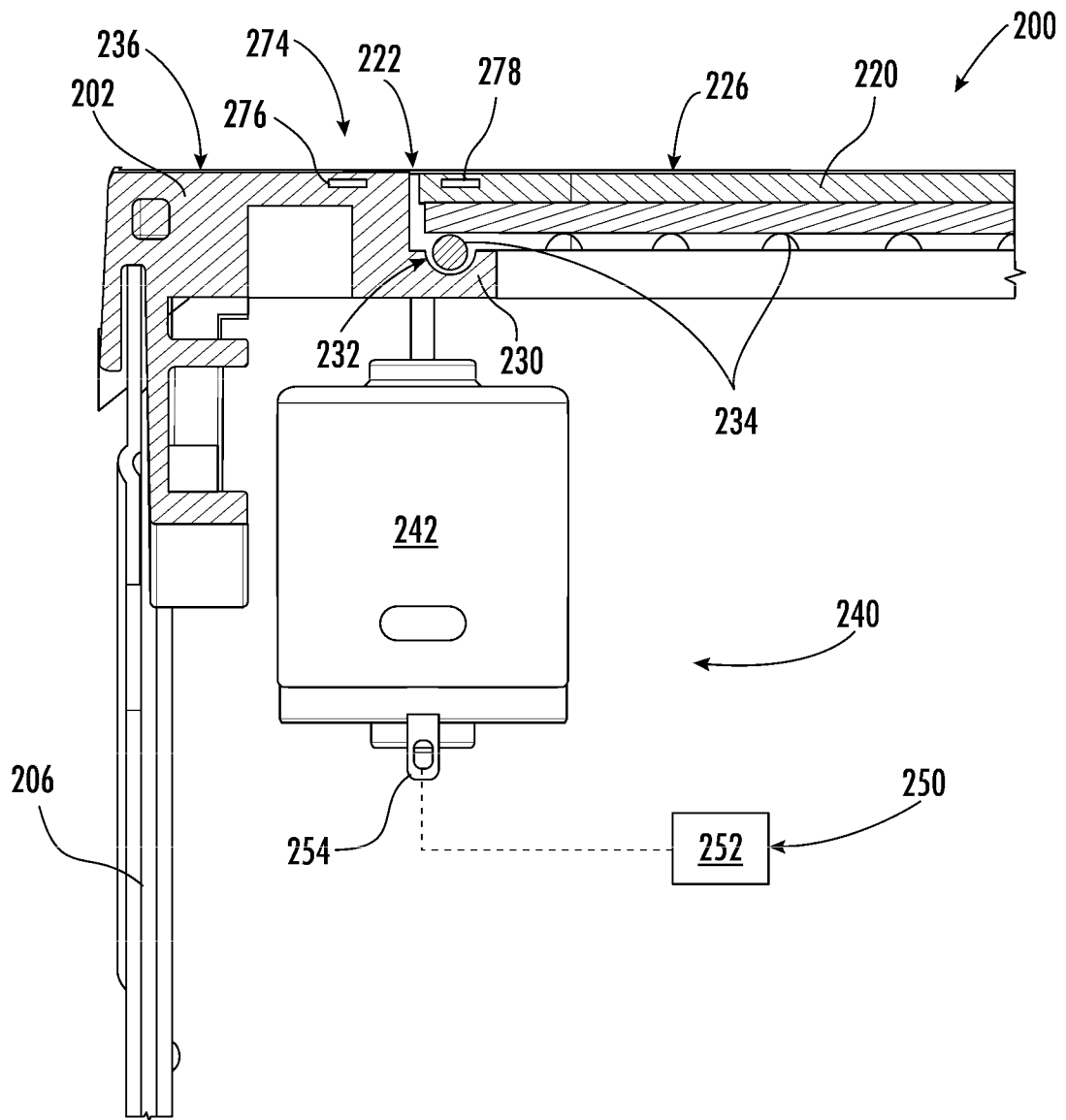


Fig. 6

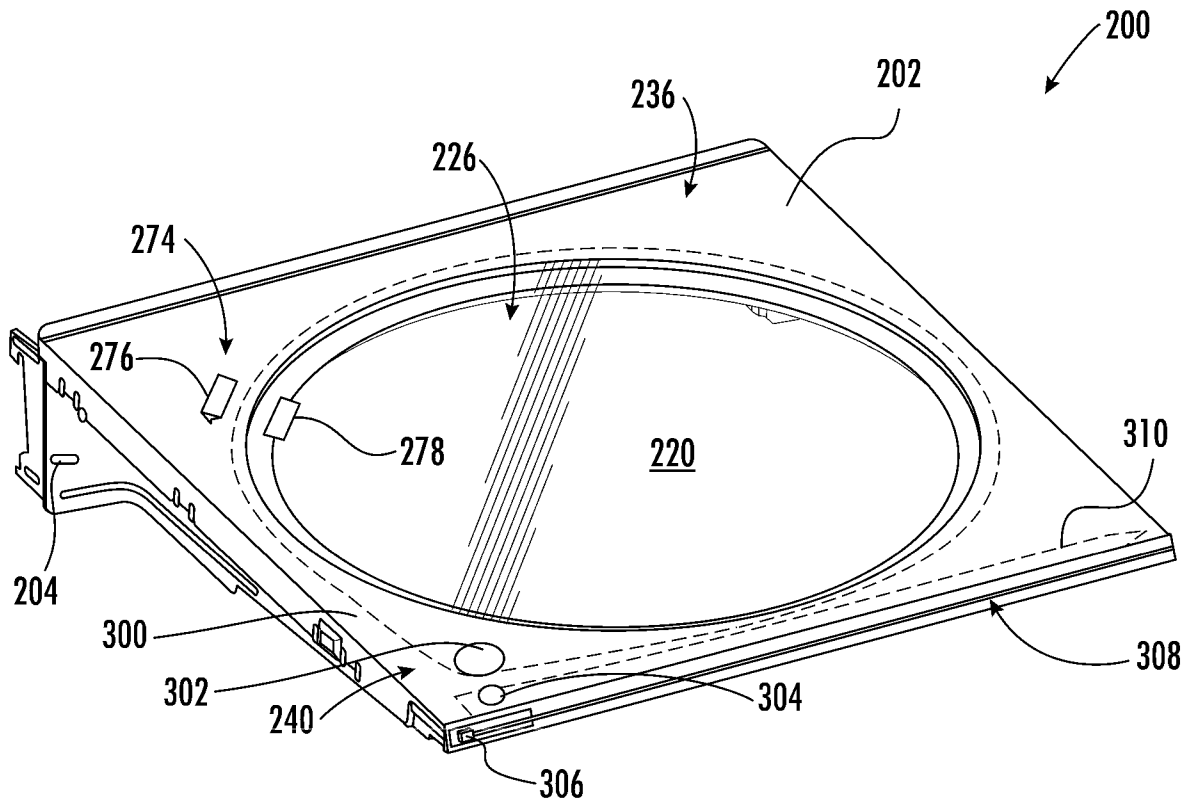


Fig. 7

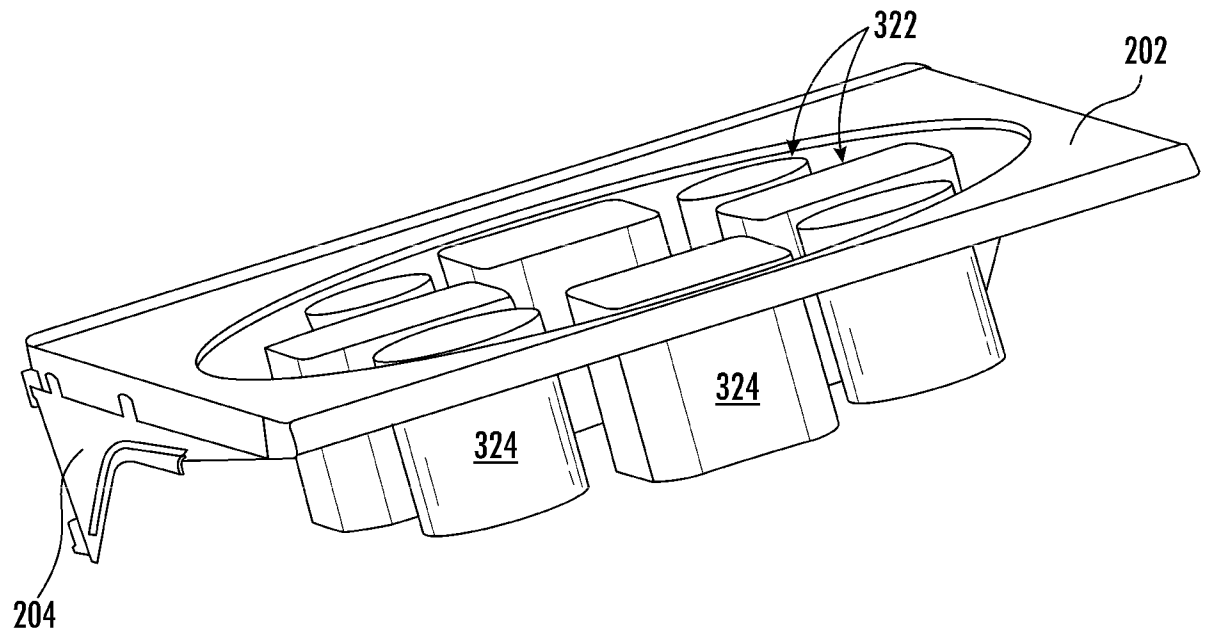


Fig. 8

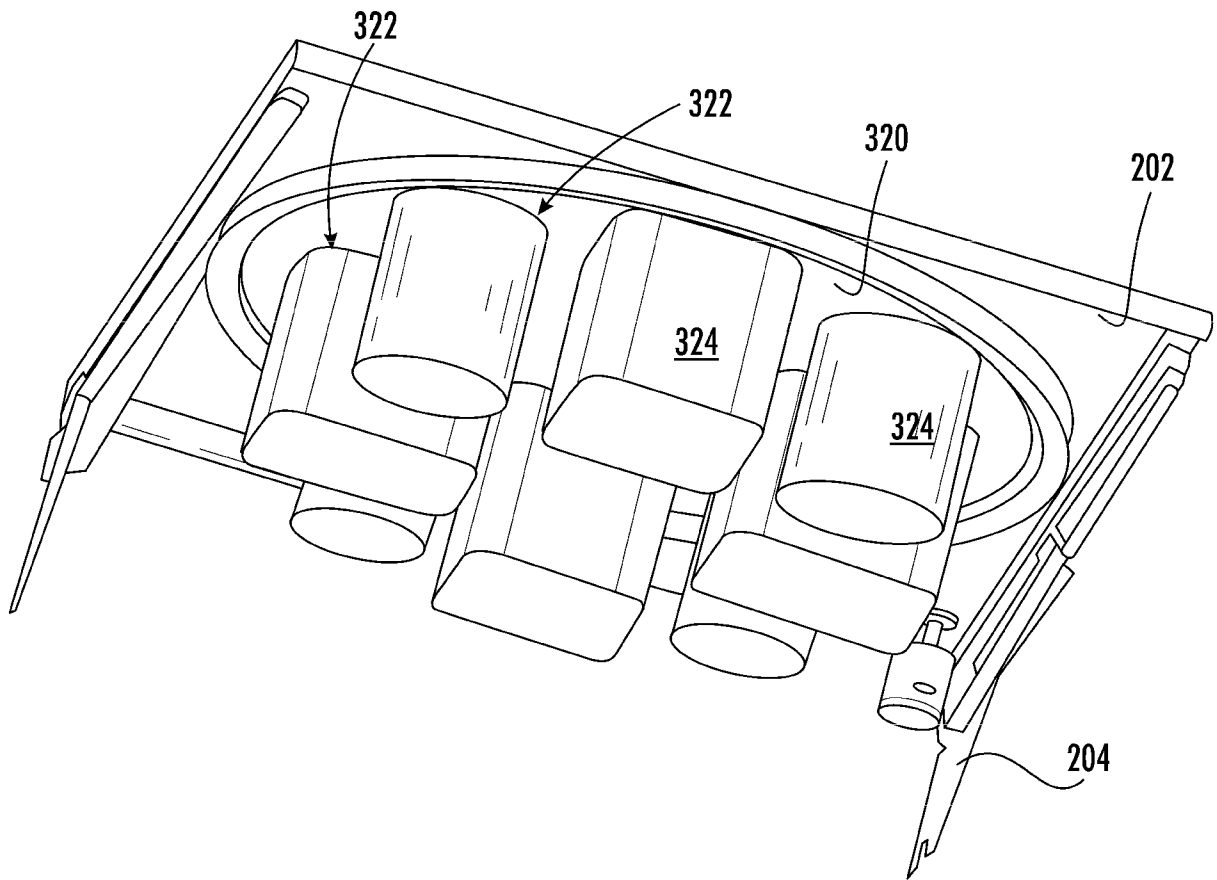


Fig. 9

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2019/097314

A. CLASSIFICATION OF SUBJECT MATTER

F25D 11/00(2006.01)i; F25D 25/02(2006.01)i

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)

F25D

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

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

CNABS,SIPOABS,DWPL,JPABS,CNTXT: refrigerat+,rotat+,disk,disc,shelf,shelves

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 205957574 U (BSH BOSCH & SIEMENS HAUSGERAETE GMBH. ET AL.) 15 February 2017 (2017-02-15) description, paragraphs 1, 3 to 32, figures 1-6	1-20
A	CN 201488464 U (UNIV. ZHEJIANG) 26 May 2010 (2010-05-26) the whole document	1-20
A	CN 203396194 U (ZHONGHAN SCI. & TECHNOLOGY CO., LTD.) 15 January 2014 (2014-01-15) the whole document	1-20
A	JP 2858912 B2 (SANYO ELECTRIC CO.) 17 February 1999 (1999-02-17) the whole document	1-20
A	JP H04143588 A (SANYO ELECTRIC CO.) 18 May 1992 (1992-05-18) the whole document	1-20
A	JP H0455679 A (SANYO ELECTRIC CO.) 24 February 1992 (1992-02-24) the whole document	1-20

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

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“E” earlier application or patent but published on or after the international filing date

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“O” document referring to an oral disclosure, use, exhibition or other means

“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“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

09 October 2019

Date of mailing of the international search report

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Telephone No. 86-10-53962825

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2019/097314

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CN	205957574	U	15 February 2017	None			
CN	201488464	U	26 May 2010	None			
CN	203396194	U	15 January 2014	None			
JP	2858912	B2	17 February 1999	JP	H04131685	A	06 May 1992
JP	H04143588	A	18 May 1992	None			
JP	H0455679	A	24 February 1992	None			